

UNIVERSITY - NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM

REPORT OF THE MAY 1978

ANNUAL MEETING

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SEPTEMBER 1978



EIGHTH ANNUAL MEETING

AGENDA

0900 THURSDAY MAY 18, 1978, ROOM 2008
NEW EXECUTIVE OFFICE BUILDING, 17TH STREET
NEAR PENNSYLVANIA AVE., N.W., WASHINGTON, D.C.

1. INTRODUCTION & WELCOME BY DR. WARREN S. WOOSTER, CHAIRMAN, UNOLS
2. REPORT BY MR. THOMAS R. STETSON, EXECUTIVE SECRETARY, UNOLS
3. REPORT BY DR. GEORGE H. KELLER, CHAIRMAN, UNOLS ADVISORY COUNCIL
4. CONGRESSMAN JOHN B. BREAUX (LA.), GUEST SPEAKER
"U.S. Oceanographic Research Fleet: Are We Prepared for the Future?"
5. DR. FRANK PRESS, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY, GUEST SPEAKER
"General Remarks on Science Policy"
6. MARINE RESEARCH IN FOREIGN WATERS, DR. WOOSTER

1230-1400	LUNCH BREAK	RETURN TO ROOM 2008
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7. UNOLS FLEET REFITTING & REPLACEMENT, DR. M. GRANT GROSS
8. OUTLOOK FOR FY1979 SHIP SUPPORT
Forecasts by Representatives from NSF, ONR, USGS, OTHERS
9. OTHER TOPICS
This is an opportunity for representatives of research institutions as well as individual scientists and Federal officials to raise and discuss issues concerning matters of interest to the Meeting
10. SHIP SCHEDULING SESSION, CONDUCTED BY UNOLS STAFF
 - o The ship scheduling session is an informal meeting for UNOLS members to meet, compare and discuss problems associated with 1979 ship schedules
 - o The session is open to all persons interested and especially to scientists who have ship time needs in 1979 or 1980 and wish to present their needs to ship operators
 - o Preliminary ship schedules have been developed by UNOLS members and collated sets will be distributed prior to the session and available at the time

UNOLS BUSINESS MEETING AGENDA

0830 FRIDAY MAY 19, 1978, ROOM 2010, NEW EXECUTIVE OFFICE BUILDING

1. ELECTION OF OFFICERS
The Charter requires the election or re-election of chairman and vice-chairman of UNOLS annually
2. ELECTION TO THE ADVISORY COUNCIL
Expiring terms require the election of three members
3. APPOINTMENTS TO FACILITY REVIEW COMMITTEES
Expiring terms require the appointment of two members to ALPHA HELIX Review Committee and three members to the ALVIN Review Committee
4. TO ACT ON APPLICATION FOR ASSOCIATE MEMBERSHIP FROM FLORIDA INSTITUTE OF TECHNOLOGY
5. TO ACT ON ADVISORY COUNCIL RECOMMENDATIONS REGARDING FLEET REPLACEMENT
6. TO ACT ON WORKSHOP RECOMMENDATIONS ON PROCEDURES FOR MARINE SCIENTIFIC ACTIVITIES IN FOREIGN WATERS
7. OTHER BUSINESS THAT MAY PROPERLY COME BEFORE THE MEETING

SUMMARY REPORT OF EIGHTH ANNUAL MEETING
May 18-19, 1978, New Executive Office Building
Washington, D.C.

First Day, May 18, 1978

1. GENERAL

*These notes are keyed to the numbered Agenda items, preceding page.
The actual sequence of items depended on the guest speakers' availability.*

Chairman for the two-day Annual Meeting was Dr. Warren S. Wooster, Professor of Marine Studies & Fisheries at the Institute for Marine Science, University of Washington.

After a welcome to those present and a brief review of the Agenda, the Executive Secretary was introduced.

2. SECRETARY'S REPORT

Mr. Stetson commended the Advisory Council for its work in producing the report entitled "On the Orderly Replacement of the Academic Research Fleet." If endorsed by the membership at the business meeting on the 19th, it will become the first set of approved recommendations regarding the fleet from UNOLS since 1973.

He stated he hoped RVOC would become more active; last fall's meeting saw the establishment of a steering committee and now we are looking for an outside speaker for this year's meeting. He called attention to the bibliography from which those present could procure UNOLS reports. It is appended as Appendix V. Funding and ship-use profiles are attached (Appendix VI).

After mentioning some meeting logistical details, he advertised the Second Working Conference on Oceanographic Data Systems, being sponsored by UNOLS, and to be held at Woods Hole September 26-28. Specific reports on the activities of the DSRV ALVIN and R/V ALPHA HELIX, the two National Facilities, were made by others and are mentioned below under (3).

3. ADVISORY COUNCIL CHAIRMAN'S REPORT

Dr. George H. Keller stated the Advisory Council had met four times in the past year and was occupied mainly with the production of the "Orderly Replacement" report. Three ship forecasting meetings were held: the Distant Water Operating Group, January 9 (La Jolla); East & Gulf Coasts, February 10 (Baltimore); and West Coast, March 31 (U. of Washington).

He next called upon Dr. E. Chin, Chairman, ALPHA HELIX Review Committee to review the National Facility's program. After the conclusion of the Amazon programs in June of 1977 the vessel worked between Honduran reefs and the Galápagos, and after a Jacksonville yard period, worked its way to San Diego arriving in mid-April.

Dr. Keller then called upon Dr. Geoffrey Thompson to report on the ALVIN program. Calendar 1977 saw ALVIN breaking 100 for the number of dives for

the first time. She also operated in the Pacific for the first time, on the Galápagos' vents. She provided dive services for 74 individuals from 34 institutions or organizations. LULU underwent a major overhaul early in 1978 to increase her safety and habitability.

Greater detail is a matter of record in the annual reports of both these National Facilities.

4. CONGRESSMAN JOHN B. BREAUX, GUEST SPEAKER

The verbatim outline of the Congressman's presentation is appended as Appendix I. Note: the GAO report to which Mr. Breaux refers is available from the UNOLS' Office.

5. DR. FRANK PRESS, GUEST SPEAKER

Dr. Press, Director of the Office of Science & Technology Policy, was introduced by Dr. Wooster. Dr. Press opened by asking for an open interchange between him and those present. Responding to questions such as did he foresee increased priorities for oceanography, Dr. Press replied that funding of research came off fairly well in FY 1979, with an 11% increase. However, the Defense budget was increased by a greater percentage. Since Mr. Breaux's talk had highlighted what he saw as a lack of coordination in the Nation's ocean policy, Dr. Keller asked Dr. Press how he felt government would deal with the problem. Dr. Press replied that an "uncoordinated program" would certainly be a target for Congress.

Dr. Press stressed his position was to act in an advisory capacity and that he could set up the mechanisms to address tasks and to set priorities but that his office could not take the lead role.

Dr. R. Wall, NSF Oceanography Section Head, said he was continually struggling with the problem of individual competition among U.S. oceanographers versus the constant pressure to make them work together for cost-effective management. Dr. Press felt that while there was lots of criticism of U.S. programs he felt they were generally well-managed. Ending on an optimistic note Dr. Press said he felt the present Administration looked with favor upon developing new knowledge as an investment for the future.

6. MARINE RESEARCH IN FOREIGN WATERS

Dr. Wooster reviewed the findings of the joint OPC/UNOLS Workshop on Procedures for Marine Scientific Activities in a Changing Environment, January 9-10, 1978, La Jolla. Because the final report was not available at meeting time Dr. Wooster had prepared a draft version which summarized the results and is appended as Appendix II.

He pointed out the unhappy fact that whether UNCLOS results in a treaty or not, coastal states are adopting some proposed articles now and that UNOLS, in concert with the Federal fleet, had best be prepared. Particularly worrisome is the problem of monitoring post-cruise data submission and report obligations to coastal countries. Other comments came from Mr. William Erb, DOS R/V Clearance Officer and Mr. William Sullivan, DOS. The former felt the community shouldn't comply with proposed LOS articles any sooner than the situation demanded, and the latter indicated that DOS had no problem negotiating for and continuing existing bilateral agreements, such as those with Canada and Mexico.

7. UNOLS FLEET REFITTING & REPLACEMENT

This topic was introduced by Dr. Grant Gross. He mentioned long-range planning by the Advisory Council is mandated by the Charter. He reviewed the premises which were the basis for the report entitled "On the Orderly Replacement of the Academic Fleet". Dr. Gross pointed out that the report does not project any growth; this conservatism worried Dr. D. Menzel.

Action by UNOLS' members on the report's recommendations is found below under item 5, May 19th.

8. OUTLOOK FOR FY 1979 SHIP SUPPORT

NSF: Miss Mary K. Johrde projected the following figures.

	<u>Est. FY 1978</u>	<u>Projected FY 1979</u>
NSF	\$ 15.80M	\$ 16.8M
ONR	2.26	2.5
Other USN	.87	.9
ERDA	1.03	1.0
USGS	.40	1.0
Other Federal	.53	.5
Non-Federal	.70	.7
	<u>\$ 21.59M</u>	<u>\$ 23.4M</u>
Oc. Technicians	\$ 1.3M	\$ 1.3M
Oc. Equipment	1.1	1.2
ALVIN Operations	.9	1.0
Fleet Constr/Upgrading	1.7	3.0
	<u>\$ 5.0M</u>	<u>\$ 6.5M</u>
NSF totals	\$ 20.8M	\$ 23.3M

ONR: Mr. Keith Kaulum, NORDA, indicated about 25% of their oceanographic budget went for ship support with 75% for all else. About \$2.9M is earmarked for FY 1979. He noted ship support was included in specific research proposals and that the Navy no longer "block-funds".

USGS: Mr. Donald Moller, USGS vessel coordinator at Woods Hole, said they'd used about 40 days of UNOLS' vessel time in 1977, expected between 100-110 for 1978, and projected 228 for 1979. This was all concentrated on the East and Gulf Coasts. Funding limits appear to be between \$600K to \$1M for 1979.

BLM: Dr. David Allen stated BLM was undergoing a reassessment of their program, but that it appeared 25% of their budget would still be earmarked for USGS contracts related to offshore problems.

9. OTHER TOPICS

None proposed.

10. SHIP SCHEDULING SESSION

A ship scheduling session was conducted by the UNOLS staff, as provided for in Annex I of the Charter. Large world charts with projected 1979 tracks of all vessels were posted.

The following were present, representing their institutions:

U. of Hawaii - J.F. Campbell
U. of Alaska - J.R. Moore
U. of Washington - W.B. Watkins
Oregon State - G.H. Keller
U. of S. California - E.B. Veek
U. of California - R.B. Haines
Texas A&M - T.K. Treadwell
U. of Texas - A.F. Amos
U. of Miami - J. Gibbons
Duke University - O.H. Pilkey
J.H.U./C.B.I. - D.W. Menzel
U. of Delaware - W. Owen
Columbia University - E.M. Herron
Brookhaven - T.S. Hopkins
U. of Rhode Island - J.J. Griffin
W.H.O.I. - R.P. Dinsmore
NSF - M.K. Johrde
NSF - R.B. Elder

A second "cut" on 1979 ship schedules will be published by the UNOLS Office in July.

Second Day, May 19, 1978

GENERAL: A list of Member Institution delegates to the business meeting is appended as Appendix III.

1. ELECTION OF OFFICERS

Those serving on this year's Nominating Committee were Dr. M.G. Gross, Chairman; Dr. A.E. Maxwell, and Captain T.K. Treadwell. They prepared a slate from written nominations to present to the Membership. The Charter requires election or re-election of the Chairman and Vice-Chairman annually. Captain T.K. Treadwell and Dr. A.F. Richards were elected respectively to the positions.

2. ELECTION TO ADVISORY COUNCIL

Maintaining the 5:3 ratio of Members to Associate Members, Drs. G.C. Anderson (U. of Washington), W.B.F. Ryan (L-DGO), and J.M. Zeigler (VIMS) were elected.

3. APPOINTMENTS TO FACILITY REVIEW COMMITTEES

ALPHA HELIX Review Committee: To replace Drs. V. Alexander and J.F. Case, whose terms were expiring, Drs. C.P. Mangum (William & Mary) and E.H. Newcomb (U. of Wisconsin) were appointed.

ALVIN Review Committee: To replace Drs. G.D. Grice, A.F. Richards, and K.K. Turekian, whose terms were expiring, Drs. J.M. Edmond (MIT), K.C. Macdonald (Scripps), and D.C. Rhoads (Yale) were appointed.

4. APPLICANT FOR ASSOCIATE MEMBERSHIP

The application for Associate Membership from Florida Institute of Technology was approved by majority vote.

5. ADVISORY COUNCIL RECOMMENDATIONS REGARDING FLEET REPLACEMENT

A lengthy discussion developed about the report "On the Orderly Replacement of the Academic Fleet". Several criticisms were voiced. Among these were: the report does not "justify" the fleet, there is no provision for growth nor money for mid-life rehabilitations, not enough attention paid to the larger vessels, the Great Lakes were left out, etc.

A list of revisions was developed which satisfied the voiced objections to the draft report. The report was then endorsed, subject to the following corrections. Although the Secretary's notes agreed with those of Dr. Wooster, his notes are recorded here.

Minor corrections would be made in report, including change in title of Table 1 (to read "Current status and distribution of academic fleet") and the addition of a Table 4 showing the effect of a replacement schedule including \$48M for replacing four large vessels.

In addition, a covering note would be added reporting endorsement as a planning document by UNOLS and making the following points: (1) the report pertains only to replacement costs and assumes both adequate operating funds and funding of the necessary mid-life refits; (2) the report must be reviewed and updated periodically by the Advisory Council, because of its no-growth assumption and because of possible growth and evolution of the field; (3) note that the report pertains only to one category (B.1) of the total U.S. research fleet; (4) the report assumes that a fleet is needed, does not justify that need - refer to NACOA, PIP, etc. for necessary justification; (5) UNOLS retains its interest in growth and in special facilities, although these are not specifically covered in the report; (6) emphasize that both \$46M for intermediate and smaller vessels and \$48M for larger vessels are needed; (7) the naming of specific vessels is necessary so that the overall estimates can be made, but the details of which vessels are replaced by what remain to be worked out.

The report would be transmitted to Dr. Press, for FCCSET (as proposed by NACOA), with copies to NACOA, interested agencies, mem- and associate members.

6. WORKSHOP RECOMMENDATIONS ON ACTIVITIES IN FOREIGN WATERS

As mentioned under item 6, May 18th, a draft summary of the recommendations developed at the OPC/UNOLS Workshop is attached as Appendix II. After some discussion of the draft summary, the membership endorsed its substance in principle. The Chairman and Advisory Council were requested to ensure that the final report is consistent with the draft and to implement its provisions when appropriate.

7. OTHER BUSINESS

a. Dr. W. Gaither introduced Mr. W. Owen, Director of Marine Operations, who then reported on the various improvements to R/V CAPE HENLOPEN since her delivery in March, 1976. He stated that most of the original problems had been corrected and that as a result of extensive Navy tests the ship is now fitted with stabilizing paravanes.

Dr. Gaither invited the original SOCC Review team to visit the vessel again; Captain Treadwell pointed out that in the normal course of events she would come up for review.

b. Mr. B. Veek, USC, said their marine operation was growing, that the SEA WATCH (20m) is now equipped with winch and A-frame, that they were moving to a new warehouse facility, and that USC can offer a new STD/CTD calibration facility to UNOLS members.

c. Dr. Menzel, Skidaway, asked what tasks lay ahead for the Advisory Council. Dr. Keller and others replied that some of these were that UNOLS representatives are to be invited to testify before Congressman Breau's Committee in July, the "Orderly Replacement" report must be continually updated, replacement for ALVIN/LULU should be considered, new capability should be defined to be built into mid-life refits, consideration must be given the oceanographic equipment report now being put together by Dr. R. Mesecar's group, and implementation of the OPC/UNOLS Workshop recommendations should begin.

d. Dr. Keller gave thanks on behalf of UNOLS to Drs. Gross and Wooster for their special effort on the "Orderly Replacement" report.

e. The meeting adjourned about noon.

Thomas Stetson
Executive Secretary
UNOLS

REMARKS OF HON. JOHN BREAU
CHAIRMAN, SUBCOMMITTEE ON OCEANOGRAPHY
UNIVERSITY NATIONAL OCEANOGRAPHIC LABORATORY SYSTEM
THURSDAY, MAY 18, 1978

I. GENERAL OPENING

- O AS CHAIRMAN OF HOUSE SUBCOMMITTEE ON OCEANOGRAPHY, I
HAVE BEEN SPENDING A GREAT DEAL OF TIME INVESTIGATING
OUR NATION'S OCEAN POLICY.
- O SUBCOMMITTEE JURISDICTION AND INTEREST
 - OCEANOGRAPHIC AFFAIRS, STRUCTURES, AND PLATFORMS
 - MARINE RESEARCH AND POLLUTION
 - OCEAN MANAGEMENT
 - COASTAL ZONE MANAGEMENT
 - MARINE RESOURCES (OIL, GAS, MANGANESE NODULES)
 - LAW OF THE SEA CONFERENCE
 - SEA GRANT PROGRAM
 - OCEAN ACTIVITIES OF NATIONAL SCIENCE FOUNDATION
- O THERE IS NO COMPREHENSIVE NATIONAL OCEAN POLICY
EXAMPLES
 - O DEEPSEA MINING BILL - TREASURY, COMMERCE, STATE,
EPA, COAST GUARD, INTERIOR
 - ADMINISTRATION TASK FORCE KEEPS CHANGING POSITION
 - LACK OF GUIDANCE TO CONGRESS

- o 200 MILE POLLUTION ZONE-STATE, EPA, COAST GUARD,
COMMERCE
 - NO POSITION UNTIL HOUSE-SENATE CONFERENCE
 - WHEN ANTI-POLLUTION ZONE POSITION ADOPTED
NO ALTERNATIVE LANGUAGE PROPOSED
 - "TOO LITTLE, TOO LATE" = CONGRESS ACTED WITH-
OUT GUIDANCE FROM ADMINISTRATION
- o AQUACULTURE - ADMINISTERED BY COMMERCE, AGRICULTURE,
AND INTERIOR
 - NO COORDINATION AMONG DEPARTMENTS
 - NO PLAN TO ADDRESS NATIONAL ISSUES
 - DUPLICATION OF RESEARCH AMONG DEPARTMENTS AND
BETWEEN DEPARTMENTS AND PRIVATE SECTOR.

II. U.S. OCEANOGRAPHIC RESEARCH VESSEL FLEET

- o ANOTHER AREA WHICH NEEDS COORDINATION BETWEEN
DEPARTMENTS AND AGENCIES.
- o REQUESTED GENERAL ACCOUNTING OFFICE TO PREPARE
A REPORT ON STATUS OF CAPABILITY OF U.S. FLEET
AND NEEDS FOR THE FUTURE.
- o HEARING CONDUCTED ON MAY 5TH WHEN GAO PRESENTED
FINDINGS OF REPORT. OTHER WITNESSES APPEARING
WERE REPRESENTATIVES OF THE NATIONAL SCIENCE FOUNDATION
AND THE DEPARTMENT OF THE NAVY.

- O AS THE COORDINATION GROUP FOR THE ACADEMIC FLEET
I KNOW THAT YOU WOULD BE INTERESTED IN THE
OUTCOME OF OUR HEARING.....

A. GAO FINDINGS

- O NO SINGLE AGENCY IS RESPONSIBLE FOR THE OVERALL
MANAGEMENT OR COORDINATION OF FEDERALLY OPERATED
OR FUNDED OCEANOGRAPHIC VESSELS.
- O THERE ARE NO GOVERNMENT WIDE POLICIES OR PROCEDURES
FOR AGENCIES TO FOLLOW.
- O SOME AGENCIES ARE MOTHBALLING AND GIVING UP SHIPS
AT THE SAME TIME THAT OTHER AGENCIES ARE BUILDING OR
LEASING VESSELS TO MEET PRIORITY NEEDS.
- O THE U.S. FINDS ITSELF IN A REALTIVE DECLINE IN
OCEANOGRAPHIC VESSEL RESOURCES.
- O FOR MANY YEARS, AGENCIES HAVE BEEN CONCERNED WITH
MEETING THEIR INDIVIDUAL OCEANOGRAPHIC VESSEL NEEDS.
THIS FACTOR HAS PROVIDED LITTLE INCENTIVE FOR AGENCIES
TO COMUNICATE AND COORDINATE WITH EACH OTHER.
- O THERE IS NO FEDERAL PLAN TO ADDRESS FUTURE OCEAN
RESEARCH VESSEL NEEDS.

- O THERE IS NO STANDARD ACCOUNTING SYSTEM AMONG VARIOUS AGENCIES TO DETERMINE AND COMPARE VESSEL OPERATIONAL AND MAINTENANCE COSTS.

B. EXAMPLES OF GAO FINDINGS

EXAMPLES OF SOME OF GAO'S FINDINGS WHICH WERE INCLUDED IN THE REPORT ARE AS FOLLOWS:

- (1) BETWEEN 1970 AND 1976, DUE TO BUDGET CONSTRAINTS SIX OCEANOGRAPHIC VESSELS WERE LEASED TO FOREIGN COUNTRIES (NEW ZEALAND, ARGENTINA, TAIWAN, PORTUGAL, BRAZIL, AND GREECE)

AT THE SAME TIME AS THESE VESSELS WERE LEASED TO FOREIGN COUNTRIES AT NO COST THE NATIONAL SCIENCE FOUNDATION WAS CONSTRUCTING SEVERAL NEW RESEARCH SHIPS.

FURTHER, IN 1974 NSF ENTERED INTO A 5 YEAR AGREEMENT WITH ARGENTINA TO CONDUCT RESEARCH ABOARD THE VESSEL WE LEASED TO THEM AT A COST OF \$1,000,000 FOR 120 DAYS OF RESEARCH TIME PER YEAR. THIS WORKS OUT TO THE SAME DAILY COST TO THE NAVY FOR THE SHIP IN 1974.

- (2) WHEN ACCOUNTING STANDARDS WERE REVIEWED BY GAO, IT WAS FOUND THAT NSF HAD NOT DEVELOPED ANY GUIDELINES FOR COST ACCOUNTING FOR VARIOUS ACADEMIC INSTITUTIONS.

ANALYSIS ALSO REVEALED THAT ONE AGENCY HAD UNDERSTATED COSTS BY AT LEAST 39% OR \$1500 PER DAY FOR TWO FISCAL YEARS. THEREFORE NO COST COMPARISONS WERE POSSIBLE BY GAO.

- (3) WHEN NOAA WAS EXAMINED, IT WAS FOUND THAT PROGRAM MANAGERS WITHIN THE AGENCY WERE LEASING VESSELS WITHOUT THE KNOWLEDGE OF NOAA'S OFFICE OF FLEET OPERATIONS.

C. RECOMMENDATIONS OF GAO

- (1) CONGRESS SHOULD DESIGNATE A SINGLE MANAGER FOR CO-ORDINATED CIVILIAN AGENCY OCEANOGRAPHIC VESSEL OPERATIONS. RESPONSIBILITIES OF THIS MANAGER:

- o ESTABLISH UNIFORM POLICIES AND PROCEDURES TO AVOID DUPLICATION AND INSURE THAT PRIORITY NATIONAL NEEDS ARE MET.
- o PROVIDE MORE EFFECTIVE MANAGEMENT AND UTILIZATION OF EXISTING VESSELS.
- o ESTABLISH UNIFORM AND STANDARDIZED VESSEL ACCOUNTING SYSTEM.

- (2) ALTERNATIVE TO SINGLE MANAGER SHOULD BE A FLEET ALLOCATION COUNCIL COMPOSED OF AGENCY MANAGERS WITH SOME AUTHORITY AND RESPONSIBILITIES OF SINGLE MANAGERS.

III. CONCLUDING REMARKS

- O AT NEXT HEARING (JULY/AUGUST) PLAN TO INVITE NOAA AND UNOLS TO TESTIFY.
- O COMMEND UNOLS FOR PREPARATION OF LATEST REPORT RECOMMENDING PLAN TO ADDRESS ACADEMIC FLEET NEEDS. THIS REPORT IS WHAT EVERY FEDERAL AGENCY NEEDS TO DO TO ESTABLISH A NATIONAL DIRECTION TO MAINTAIN U.S. FLEET CAPABILITY.
- O CAN BE ASSURED THAT I WILL DO EVERYTHING POSSIBLE TO ASSIST UNOLS IN YOUR MISSION.
- O I PERSONALLY PLAN TO FOLLOW UP OUR SUBCOMMITTEE HEARINGS WITH LEGISLATION (IF NECESSARY) TO CORRECT DEFICIENCIES AND MAKE CERTAIN THAT THIS COUNTRY HAS THE CAPABILITY TO CONDUCT THE NECESSARY OCEANOGRAPHIC RESEARCH NEEDED FOR THE FUTURE.
- O THE U.S. IS ON THE VERGE OF RENEWING US/USSR BILATERAL AGREEMENT IN OCEANOGRAPHY. A DECISION WILL BE MADE WITHIN THE MONTH.

HEARINGS HELD YESTERDAY INDICATE THAT THE U.S. EXCHANGES MUCH TECHNOLOGY AND KNOWLEDGE FOR SOVIET RESEARCH SHIP TIME. IF THIS SHIP TIME IS SUCH A PRECIOUS COMMODITY WHICH THE U.S. DOESN'T HAVE, WE SHOULD UPGRADE OUR FLEET TO PROVIDE IT.

DRAFT

MARINE SCIENTIFIC ACTIVITIES IN A CHANGING ENVIRONMENT

3 MAY 1978

A Workshop sponsored by the Ocean Policy Committee of the National Research Council and the University-National Oceanographic Laboratories System on 9-11 January 1978 at the Scripps Institution of Oceanography, La Jolla, California

Background

The Workshop, chaired by Professor T. K. Treadwell, provided an opportunity for representatives of academic institutions that operate major research vessels to review the likely nature of the future regime for the conduct of marine scientific research in distant waters and to consider procedures for communication and cooperation with the coastal states within whose jurisdiction such research would be conducted. Participants examined in detail the provisions affecting marine scientific research in the Informal Composite Negotiating Text (ICNT) of the Third United Nations Conference on the Law of the Sea. Whether or not a comprehensive treaty is adopted and ratified by the United States, it was agreed that the future regime for the conduct of such research would probably resemble closely that described in the ICNT. The following recommendations are based on that assumption.

Summary Recommendations

To the Operating Institutions:

1. That the institutions follow the attached set of recommended operating procedures and furnish the State Department and UNOLS the information requested therein.

To UNOLS:

2. That UNOLS establish an information service to compile and make available to its members information on planned and current distant water research programs, national and international laws and regulations pertaining to the control of marine scientific research, and details of experience in obtaining clearance and in operating off foreign coasts, including names and addresses of foreign research contacts.

3. That UNOLS assist operating institutions and the State Department in monitoring the fulfillment of obligations pertaining to the conduct of distant water research.

4. That UNOLS cooperate with the Federal Research Operators Group (FROG) to ensure that common practices and procedures are followed by all U. S. research vessels in their conduct of distant water research.

To the National Science Foundation:

5. That the Foundation, in discussions with the State Department and other appropriate Federal agencies, develop adequate funding to cover the additional costs of distant water research resulting from the changed regime.

To the State Department:

6. That the Department assist the operating institutions in carrying out the recommended operating procedures.

7. That the Department continue to serve as the official channel for communication and negotiation with other coastal states on matters relating to clearance requests, changes in research plans, and the orderly fulfillment of obligations incurred as conditions for access.

8. That a record of these communications be maintained and made available to the operating institutions and UNOLS.

9. That the Department obtain copies of all national and international laws and regulations that govern the conduct of marine scientific research in distant waters and routinely provide this information to the operating institutions and UNOLS.

10. That the Department implement procedures for facilitating the research of U.S. scientists in regions within 200 miles of the coast, over which coastal states have unilaterally claimed jurisdiction.

11. That the Department enter into regional and bilateral negotiations with appropriate organizations and countries in order to facilitate the future conduct of marine scientific research in distant waters.

Recommended Operating Procedures

1. Pre-cruise discussions: As appropriate, pre-cruise planning discussions should be held in which the chief scientist and/or other representatives of the operating institution and of the State Department meet with appropriate scientists and officials of the coastal state. Such discussions are particularly important when previous experience with the coastal state is limited, when difficulties or misunderstandings with the coastal state have occurred in the past, or when the proposed research is complex or of long duration. The purpose of the discussions is to ensure that all concerned fully understand the nature of the research and the conditions under which it is to be conducted.

2. Clearance request: Unless informal arrangements are appropriate, the operating institution should submit a clearance request to the State Department in time for it to be forwarded to the coastal state six months in advance of the proposed operation. The request should be in the standard format developed in consultations between UNOLS and the Department and should contain the information stipulated in the eventual treaty or by the coastal state concerned.
3. Clearance negotiations: When these negotiations are conducted by the State Department, a record of them should be maintained and furnished to the operating institution and to UNOLS. All conditions applying to the clearance should be clearly stated, including those relating to the conduct of the research and to post-cruise responsibilities. Academic institutions should provide UNOLS with records of informal negotiations and arrangements."
4. Changes in research plans: All significant change in research plans should be reported to the State Department by the operating institution as soon as possible. During the cruise, the Captain of the research vessel should report such changes both to a designated contact in the coastal state and to the State Department.
5. Cooperation during cruise: The Captain and the Chief Scientist should comply with the conditions under which access was granted, such as those described in Art. 250 of the ICNT, or other conditions stipulated by the coastal state, and should report the actions taken to the State Department and to UNOLS.
6. Post-cruise actions: At the conclusion of the cruise, the operating institution should inform the State Department and UNOLS about the record of cooperation with the coastal state. Arrangements for providing access to data and samples should also be reported by the operating institution;

this information should be transmitted by the State Department to the coastal state. A schedule should be established for meeting other obligations to provide information to the coastal state. The operating institution should promptly furnish the State Department, with copies to UNOLS, a summary report of the cruise for forwarding to the coastal state. Subsequently, periodic reports and relevant publications should be forwarded in the same manner.

7. Compliance with obligations: Fulfillment of obligations should be monitored by the State Department and UNOLS. At the end of two years, the operating institution should report all actions taken since the end of the cruise. The State Department should forward this information to the coastal state and indicate that all obligations have been complied with fully.

MEMBER INSTITUTION DELEGATES TO THE BUSINESS MEETING

U. of Hawaii - Mr. J.F. Campbell
U. of Alaska - Dr. J.R. Moore (by proxy)
U. of Washington - Dr. G.C. Anderson
Oregon State - Dr. G.H. Keller
U. of S. California - Mr. E.B. Veek
U. of California - Captain R.B. Haines
U. of Michigan - Dr. J.T. Katz
Texas A&M - Captain T.K. Treadwell
U. of Texas - Mr. D.F. Amos
U. of Miami - Dr. W.J. Wisby
U. of Georgia - Dr. D.W. Menzel
Duke University - Dr. O.H. Pilkey
Johns Hopkins U. - Dr. M.G. Gross
U. of Delaware - Dr. W.S. Gaither
Columbia University - Dr. E.M. Herron
U. of Rhode Island - Mr. R.K. Sexton
W.H.O.I. - Dr. G. Thompson

REGISTERED ATTENDEES
UNOLS ANNUAL MEETING
MAY 18-19, 1978

Mr. Frank R. Alexander, OFS
Dr. David Allen, BLM
Prof. E. Eugene Allmendinger, UNH
Mr. Anthony F. Amos, U of TX
Dr. George Anderson, U of WA
Dr. Thomas Austin, EDS/NOAA

Dr. Donald C. Beaumariage, NOAA
Mr. Joseph E. Bennett, NSF
Mr. Albert F. Betzel, NSF
Congressman John B. Breaux
Captain Robert P. Brown, Raytheon Co.

Mr. Frisbee J. Campbell, HIG
Dr. Edward Chin, U of Ga
Mr. H. Lawrence Clark, UNOLS
Dr. John Costlow, Duke University

Mr. Ferdinand P. Diemer, ONR
Captain Robertson P. Dinsmore, WHOI
Commander Joe Dropp, NODC
Captain Scott E. Drummond, Chief Naval Op.
Dr. Elgin A. Dunnington, U of MD

Dr. Sylvia A. Earle, Cal. Acad. of Sci.
Dr. N.T. Edgar, U.S. Geo. Survey
Mr. R.S. Edwards, WHOI
Mr. Robert Elder, NSF/OCE
Mr. William Erb, State Department

Mr. Thomas Forhan, NSF
Dr. Dirk Frankenberg, U of NC

Dr. W.S. Gaither, U of DE
Dr. Chris Garside, Biglow Lab.
Mr. James Gibbons, U of Miami
Mr. Langston J. Goree, TX A & U
Mr. James J. Griffin, URI
Dr. M. Grant Gross, Johns Hopkins

Captain R.B. Haines, SIO
Mr. Wentworth V. Harned, NORDA/NSTL
Mr. Joseph Heckleman, NACOA
Dr. Ellen M. Herron, Lamont-Doherty
Mr. Deane E. Holt, NSF
Dr. Thomas S. Hopkins, Brookhaven Nat'l Lab.

Dr. John D. Issacs

Miss Mary K. Johrde, NFS/OFS

Ms. Mary Hope Katsouros, Nat'l Acad.
of Sci.

Dr. Jay T. Katz, U of MI
Mr. Keith Kaulum, ONR/NSTL
Dr. George Keller, OSU

Mr. Jonathan Leiby, WHOI
Ms. Mary Lou Lindquist, OSB/NAS
Radm. Herbert R. Lippold, Jr., NOAA

Dr. John H. Martin, Moss Landing
Dr. Tracy McLellan, NSF
Dr. David W. Menzel, Skidaway
Dr. Roderick S. Mesecar, OSU
Mr. Donald B. Milligan, Ocean. of Navy
Ms. Joan Mitchell
Mr. Donald A. Moller, USGS
Mr. Dan J. Mitola, Johns Hopkins
Dr. Robert J. Moore, U of Alaska
Dr. Richard M. Morse, EDS/NOAA
Dr. Ian Morris, Bigelow Lab.
Cdm. Martin J. Moynihan, USCG
Mr. Michael W. Mulcahy, "Sea Tech Mag"
Dr. William P. Muelenhoff, NOAA/MUS&T

Mr. George A. Newton, Duke University

Cpt. Neil F. O'Connor, NOAA
Dr. George O'Hara, Fl. Inst. of Tech.
Dr. Ned Ostenso, Nat'l Sea Grant Prog.
Mr. Wadsworth Owen, U of DE

Mr. Irving Perlroth, EDS/NODC
Dr. Orrin Pilkey, Duke University
Dr. Frank Press, Dir., Off. of Sci.
and Tech. Policy
Dr. Adrian Richards, Lehigh University
Dr. Jerry Schubel, St. Univ. of NY
Mr. Robert Sexton, URI
Cdr. Fidel T. Smith, NOAA
Mr. Wayne Smith, Cong. Breaux's Asst.
Radm. Ed Snyder, Oc. of the Navy
Mr. Thomas Stetson, UNOLS
Mr. William L. Sullivan, Jr., Dept. of
State

Dr. Geoffrey Thompson, WHOI
Mr. Edward V. Tiernan, NOAA/FGGE
Mrs. Sandra D. Toye, NSF
Captain T.K. Treadwell, TX A & M Univ.

Dr. Tracy L. Vallier, U.S. Geo. Survey
Mr. Bradford E. Veek, USC
Mr. Richard C. Vetter, Nat'l Acad. of Sci.
Mr. Robert E. Vlanowicz, U of MD

Dr. Robert E. Wall, NSF
Captain John Boyce Watkins, U of WA
Dr. Ferris, Webster, WHOI
Dr. Robert H. Weisberg, NC State Univ.
Mr. H.H. Whaley, Johns Hopkins
Dr. John C. Wilkerson, NOAA/NESS
Mr. Richard Wilkins, Hobart & Wm. Smith Colleges
Captain Robert E. Williams, NOS/NOAA
Dr. Warren J. Wisby, U of Miami
Dr. Warren S. Wooster, U of WA

Dr. John M. Zeigler, VIMS
Dr. Herman B. Zimmerman, NSF

UNOLS PUBLICATION REQUEST

Appendix V

Please indicate desired publication and complete below.
Return to UNOLS Office, W.H.O.I., Woods Hole, MA 02543.

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ADDRESS: _____

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*Authorship not claimed by UNOLS personnel.

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UNOLS FUNDING & SHIP-USE PROFILES, 1977

CURRENT UNOLS FUNDING PROFILE

\$ M

	1973	1974	1975	1976	1977	EST. 1978	PROJ. 1979
NSF SHIP OPERATIONS	11.6	12.7	13.4	13.6	15.3	15.8	16.8
ONR SHIP OPS & TECHS	3.8	3.8	3.5	2.5	2.6	2.26	2.5
"OTHER" SHIP OPS**	1.5	1.5	2.9	4.1	4.3	3.53**	4.1**
TOTAL	16.9	18.0	19.8	20.2	22.2	21.59	23.4
<i>ACTUAL OR PROJECTED COSTS</i>	<i>16.9</i>	<i>18.0</i>	<i>19.1</i>	<i>21.3</i>	<i>23.0</i>	<i>24.1</i>	<i>26.0</i>
NSF TECHNICIAN FUND	0.8	1.0	1.1	1.1	1.1	1.3	1.3
NSF SHIP EQPT. FUND	1.2	1.0	1.0	1.0	1.2	1.1	1.2
NSF SHIP CONSTRUCTION	0	3.5	4.0	0.3	0	1.9*	3.0

* 1.2 for Re-engining of ATLANTIS II
.7 for Polar and Coastal Design Studies

** "Other" Ship Operations

	EST. 1978	PROJ. 1979
Other Navy (NAVALEX)	.87	.90
ERDA (DOE)	1.03	1.0
BLM	.27	.2
USGS	.4	1.0
NOAA & EPA	.26	.3
Other/private	.7±	.7±
Total	3.53	4.1

MAY 1978

SUMMARY OF UNOLS VESSELS'
OPERATIONAL AND SUPPORT STATISTICS

1977

	OVER 200 FT.	150 FT. TO 200 FT.	100 FT. TO 149 FT.	60 FT. TO 99 FT.	ALL VESSELS
NUMBER OF VESSELS	7	8	5	8	28
AVERAGE OPS DAYS	253	278	201	170	226
AVERAGE ACTUAL DAYS AT SEA	227	234	182	161	202
AVERAGE COST (EST. 1977)	\$1290K	\$900K	\$559K	\$275K	\$813K
AVERAGE DAILY RATE (EST. 1977)	\$5696	\$3244	\$2419	\$1174	\$3008
AVERAGE MAN-DAYS AT SEA	4698	3080	2012	1009	2675
PARTICIPATION BY UNOLS ASSOCIATE MEMBERS	6%	6%	21%	1%	8%
PARTICIPATION BY NON-UNOLS	12%	7%	28%	5%	13%
FOREIGN PARTICIPATION	6%	5%	2%	1%	3%
SHIP SUPPORT FUNDING					
NSF	69%	60%	78%	67%	67%
ONR	16%	31%	1%	2%	16%
ALL OTHER FEDERAL	13%	8%	12%	25%	13%
NON-FEDERAL	2%	1%	10%	6%	4%

AVERAGE DAILY RATES

1973-1978

	1973	1974	1975	1976	1977	EST. 1978
OVER 200 FT.	\$3,749	\$4,363	\$5,144	\$4,656	\$5,734	\$5,446
150 FT. - 200 FT.	2,453	2,807	2,969	3,011	3,244	3,422
100 FT. - 149 FT.	1,388	1,715	2,079	2,645	2,412	2,290
60 FT. - 99 FT.	974	1,046	1,024	1,257	1,224	1,297

1978

PROFILE OF UNOLS FLEET

BY AGE & SIZE

	10 YRS. & UNDER	11-20	21-30	30 YEARS	TOTAL
OVER 200 FT.	KNORR MELVILLE	ATLANTIS II CONRAD GILLISS THOMPSON WASHINGTON	0	0	7
150 - 200 FT.	ENDEAVOR OCEANUS NEW HORIZON* MOANA WAVE WECOMA GYRE ISELIN	KANA KEOKI	0	VEMA	9
100 - 149 FT.	CAPE HENLOPEN	WARFIELD ALPHA HELIX EASTWARD	0	VELERO IV	5
65 - 99 FT.	CALANUS BLUE FIN CAYUSE LONGHORN	ACONA E.B. SCRIPPS	ONAR	HOH	8
ALL SHIPS	14	11	1	3	29

*Under Construction

AVERAGE ANNUAL SHIP OPS, COST - \$ K

	1973	1974	1975	1976	1977	EST. 1978	AVG. ANNUAL INCREASE
OVER 200 FT.	1,026	1,193	1,249	1,281	1,474	1,663	9.0%
150 FT. - 200 FT.	632	696	723	775	900	983	8.4%
100 FT. - 149 FT.	370	367	473	575	472	679	9.2%
60 FT. - 99 FT.	149	154	155	191	253	253	7.4%
TOTAL FLEET COSTS	15,442	17,960	19,058	21,300	22,146	24,500	9.0%

NUMBER OF UNOLS SHIPS/
AVERAGE OPERATING DAYS

	1972	1973	1974	1975	1976	1977
OVER 200 FT.	8/264	8/280	8/277	8/243	7/266	7/253
150 FT. - 200 FT.	7/253	7/259	8/252	8/243	8/233	8/278
100 FT. - 149 FT.	6/193	6/219	4/211	4/227	4/230	5/201
60 FT. - 99 FT.	13/180	11/187	10/174	9/152	9/149	8/170
TOTAL NUMBER OF SHIPS	34	32	30	29	28	28

UNOLS RESEARCH VESSELS FLEET OPERATION - 1977

CRUISE DAYS PROFILE

RESEARCH VESSEL	PHYS OCEAN	ACCUJ STICS	CHEM OCEAN	BIOL OCEAN	ENVIR & CLCL	FISH. INVS	CLIM/ METE	GEOG GEOG	MAP & CHRTG	OCEAN ENG'G	TRAIN ING	TRANS NONSI	TOTAL -----
MELVILLE	53	0	28	0	83	0	0	93	0	13	0	15	290
KNORR	93	0	34	26	40	0	0	89	0	0	0	0	281
ATLANTIS II	41	0	45	13	0	0	0	208	0	0	0	0	307
CONRAD	0	0	0	3	0	0	0	241	18	0	0	0	259
J. GILISS	54	0	10	32	49	0	0	5	0	0	0	0	150
T.G. THOMPSON	36	0	7	14	72	0	0	63	0	0	0	12	204
T. WASHINGTON	6	0	0	48	41	0	0	157	0	1	0	0	253
VERA	0	0	0	0	0	0	18	347	0	0	0	0	365
ENDEAVOR	101	0	0	53	65	0	0	6	0	0	0	0	225
OCEANUS	84	0	0	58	21	0	0	68	0	0	0	10	241
WECOMA	31	15	0	5	74	3	0	115	0	0	0	13	256
GYRE	0	0	55	0	146	0	0	63	0	0	10	0	274
MOANNA WAVE	0	0	0	0	0	0	0	365	0	0	0	0	365
C. ISEI IN	20	0	20	20	180	0	0	11	0	0	0	0	251
KANA KEOKI	42	0	0	20	22	0	0	163	0	0	0	1	248
ALPHA HELIX	0	0	20	185	70	0	0	25	0	0	0	10	310
CAPE MENLOPEN	0	0	6	0	41	0	0	27	0	0	32	7	113
EASTWARD	0	0	6	21	59	0	0	125	0	0	0	10	221
VELERO IV	0	2	16	25	85	0	0	73	0	6	6	0	213
R. WARFIELD	5	0	0	57	68	0	0	19	0	0	1	0	150
E.B. SCRIPPS	0	10	5	41	30	0	0	44	0	19	2	1	152
ACORN	15	0	31	5	94	41	0	0	0	0	0	0	186
CAYUSE	6	5	47	2	95	3	3	3	0	0	0	49	214
LONGHORN	3	0	10	32	120	0	0	5	0	0	6	2	178
BLUEFIN	12	0	4	47	63	0	0	17	0	0	1	0	144
HCH	2	0	0	37	29	55	0	4	0	8	6	0	141
ONAP	41	0	32	13	59	1	0	23	0	6	8	0	183
CALANUS	0	0	0	73	48	0	0	37	0	0	3	0	161
TOTALS	645	32	376	827	1660	103	21	2395	18	53	75	130	6335
PERCENT.	10.2	.5	5.9	13.1	26.2	1.6	.3	37.8	.3	.8	1.2	2.1	

UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1977

CRUISE DAYS PROFILE

NUMBER OF OPERATIONAL DAYS BY DISCIPLINE

	PHYS OCEAN	ACCOJ STICS	CHEM OCEAN	BIOL OCEAN	ENVIR GEOG	FISH INVT	CLIM/ METEO	GEOG GEOG	MAP & CHRTG	OCEAN ENGRG	TRAIN ING	TRANS NOSCI	TOTAL -----
NAT'L SCIENCE FNDTN	516	8	270	696	1062	97	18	1414	0	41	5	107	4234
OFF. NAVAL RESEARCH	93	24	19	26	34	0	3	799	0	4	0	2	1004
US GEOL. SURVEY	0	0	0	0	0	0	0	43	0	0	0	0	43
BUR. LAND MNGMT.	3	0	10	32	317	0	0	53	0	0	0	12	427
NAT'L OCEAN/ATMOSP	15	0	31	5	28	3	0	4	0	1	0	0	87
ENERGY R&D ADMIN.	12	0	41	43	90	0	0	12	0	0	0	0	198
OTHER FEDERAL	4	0	0	4	72	3	0	4	0	0	0	0	87
STATE/MUNICIPAL	2	0	0	21	1	0	0	41	0	1	70	9	145
OTHER / PRIVATE	0	0	5	0	56	0	0	25	18	6	0	0	110
TOTALS	645	32	376	827	1660	103	21	2395	18	53	75	130	6335
PERCENT	10.2	.5	5.9	13.1	26.2	1.6	.3	37.8	.3	.8	1.2	2.1	

UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1977

OPERATIONAL DAYS CHARGED BY SPONSOR

	NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOL. SURV.	BUR. LAND MNGMT	NATL OCEAN ATMOS	ENER. R & D ADMIN	OTHER FEDER FUNDS	STATE OR MUNIC	PRIV/ FORGN FUNDS	TOTALS -----
MELVILLE	290	0	0	0	0	0	0	0	0	290
KNORR	161	52	0	13	0	28	27	0	0	281
ATLANTIS II	241	61	0	0	0	0	0	0	5	307
CONRAD	122	119	0	0	0	0	0	0	18	259
J. GILLISS	107	0	0	43	0	0	0	0	0	150
T.C. THOMPSON	70	23	0	98	0	12	0	0	1	204
T. WASHINGTON	215	31	0	0	0	0	0	7	0	253
VEMA	200	165	0	0	0	0	0	0	0	365
ENDEAVOR	183	28	0	0	14	0	0	0	0	225
OCEANUS	194	32	15	0	0	0	0	0	0	241
WECOMA	198	51	0	0	0	0	7	0	0	256
GYRE	112	11	0	105	0	0	20	26	0	274
MOANNA WAVE	0	365	0	0	0	0	0	0	0	365
C. ISELIN	240	0	0	5	0	6	0	0	0	251
KANA KENKI	206	34	0	0	0	0	0	8	0	248
ALPHA HELIX	310	0	0	0	0	0	0	0	0	310
CAPE HENLOPEN	9	2	0	13	9	0	0	34	46	113
EASTWARD	211	0	0	0	0	10	0	0	0	221
VELERO IV	157	2	0	22	0	0	12	12	8	213
R. WARFIELD	96	0	15	0	0	26	9	1	3	150
E.B. SCRIPPS	70	19	13	0	0	23	0	27	0	152
ACOMA	97	0	0	0	60	0	0	0	29	186
CAYUSE	193	9	0	0	3	9	0	0	0	214
LONGHORN	37	0	0	123	0	0	0	13	0	178
BLUEFIN	53	0	0	0	0	82	8	1	0	144
HON	136	0	0	0	0	0	0	5	0	141
ONAR	172	0	0	0	1	2	0	8	0	183
CALANUS	154	0	0	0	0	0	4	3	0	161
TOTALS	4234	1004	43	427	87	198	87	145	110	6335
PERCENT	66.8	15.8	.7	6.7	1.4	3.1	1.4	2.3	1.7	

UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1977 -

OPERATIONAL DAYS CHARGED BY SPONSOR

	NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOL. SURV.	BUR. LAND MNGMT	NATL OCEAN ATMOS	ENER. R & D ADMIN	OTHER FEDER FUNDS	STATE OR MUNIC	PRIV/ FORGN FUNDS	TOTALS -----
UNIV. HAWAII	206	399	0	0	0	0	0	8	0	613
UNIV. ALASKA	97	0	0	0	60	0	0	0	29	186
UNIV. WASHINGTON	378	23	0	98	1	14	0	13	1	528
OREGON STATE UNIV.	391	60	0	0	3	9	7	0	0	470
SCRIPPS INST. OCEAN	885	50	13	0	0	23	0	34	0	1005
UNIV. SO. CALIF.	157	2	0	22	0	0	12	12	8	213
TEXAS A&M UNIV.	112	11	0	105	0	0	20	26	0	274
UNIV. TEXAS	37	0	0	128	0	0	0	13	0	178
UNIV. MIAMI, RSMAS	501	0	0	48	0	6	4	3	0	562
UNIV GA., SKIDAWAY	53	0	0	0	0	82	8	1	0	144
DUKE UNIV.	211	0	0	0	0	10	0	0	0	221
JOHNS HOPKINS UNIV.	96	0	15	0	0	26	9	1	3	150
UNIV. DELAWARE	9	2	0	13	9	0	0	34	46	113
LAMONT-DOHERTY GEOL	322	234	0	0	0	0	0	0	18	624
UNIV. RHODE ISLAND	183	28	0	0	14	0	0	0	0	225
WOODS HOLE OCEAN. I	596	145	15	13	0	28	27	0	5	829
UNOLS ASSOC. MEM.	0	0	0	0	0	0	0	0	0	0
TOTALS	4234	1004	43	427	87	193	87	145	110	6335
PERCENT	66.8	15.8	.7	6.7	1.4	3.1	1.4	2.3	1.7	

UNOLS RESEARCH VESSELS FLEET OPERATIONS - 1977 -

PROJECT MAN-DAYS AT SEA BY SPONSOR

	TOTAL DAYS CHRGD	NATL SCI. FNDTN	OFF. NAVAL RES.	U.S. GEOL. SURV.	BUR. LAND MNGMT	NATL OCEAN ATMOS	ENER. R & D ADMIN	OTHER FEDER FUNDS	STATE OR MUNIC	PRIV/ FORGN FUNDS	TOTALS -----
MELVILLE	290	5567	69	0	0	0	16	0	0	143	5795
KNORR	281	3599	1958	0	312	0	425	608	0	0	6992
ATLANTIS II	307	5737	887	0	0	0	24	0	0	112	6760
CGWRAD	259	1039	1009	0	0	0	0	0	0	116	2164
J. GILLISS	150	507	0	0	180	0	0	0	0	0	687
T.G. THOMPSON	204	772	210	0	1372	0	252	0	0	7	2613
T. WASHINGTON	253	2789	629	0	0	0	366	24	57	0	3865
VENA	365	2193	1784	0	0	0	0	0	0	0	3982
ENDEAVOR	225	1914	425	0	0	182	36	4	34	48	2643
OCEANUS	241	1877	369	166	0	6	55	0	0	26	2499
WECOMA	256	2281	889	0	0	0	0	117	0	0	3287
GYRE	274	1631	276	0	1632	0	0	342	180	0	4061
MOANA WAVE	365	390	1452	0	0	0	0	0	0	0	1842
C. ISELIN	251	1395	0	0	0	0	0	0	0	0	1396
KANA KECKI	249	2753	480	0	0	0	0	0	13	0	3246
ALPHA HELIX	310	2544	0	54	0	0	0	27	0	150	2775
CAPE HEALUPEN	113	78	7	5	253	99	0	0	278	330	1050
EASTWARD	221	2617	0	0	0	72	286	44	0	0	3021
VELERO IV	213	1406	43	0	272	0	2	165	260	36	2184
R. WARFIELD	150	665	0	195	0	0	112	51	0	9	1032
E.B. SCRIPPS	152	317	112	104	8	14	170	20	191	5	941
ACCOMA	186	605	0	0	0	377	0	0	0	236	1218
CAYUSE	214	943	102	0	0	24	45	0	0	0	1114
LONGHORN	178	234	0	0	1017	0	0	0	241	0	1492
BLUEFIN	144	126	0	0	0	0	335	20	22	0	503
HOM	141	633	0	0	0	0	0	0	84	0	717
ONAR	183	950	0	0	0	4	7	0	119	0	1080
CALANUS	161	283	0	0	0	0	0	0	33	0	316
TOTALS	6335	45941	10701	524	5046	778	2133	1422	1512	1218	69275
PERCENT		.0	.0	.0	.0	.0	.0	.0	.0	.0	