

# SHIP SCHEDULING COMMITTEE MEETING

**National Science Foundation  
4201 Wilson Boulevard, Board Room 1235  
Arlington, VA 22230  
September 14, 1998**

**0830 HRS**

## **Appendices**

- I. [Meeting Announcement](#)
- II. [Ship Scheduling Meeting Attendance List](#)
- III. [Ship Cost Summary 1998 & 1999](#)
- IV. [1998 Proposed Cruise Tracks](#)

[Ship Schedule Review Meeting Minutes](#)

## **Introduction:**

The Ship Scheduling Committee met on 14 September 1998 in Room 1235 of the National Science Foundation (see agenda [Appendix I](#)). The list of attendees is attached as [Appendix II](#).

The meeting was called to order at 0830 by Don Moller, SSC Chair. Don welcomed the attendees. Jon Alberts was introduced as Don's replacement. Don will be retiring at the end of this year. Also new to the scheduling committee are: Matt Hawkins from University of Delaware. Matt will be Tim Pfeiffer replacement as Tim moves to an IPA position with ONR replacing Andy Silver. Norm Cherkis of NRL announced that he will be retiring at the end of this year. Also retiring will be Dr. Dick West of NSF. John Diebold of LDEO has replaced Mike Rawson as that institution's scheduler. Dan Schwartz has replaced Robert Hinton as University of Washington's Marine Superintendent and scheduler.

**UNOLS Report:** Ken Johnson, UNOLS Chair, briefly discussed the academic review process which is underway. Don Heinrichs expanded on this discussion and explained that the Fleet Review Group, chaired by Roland Schmitt, has completed two meetings to date. The first meeting was informational and provided the committee a background of UNOLS and its operations. The second meeting held in early September at Scripps gave the committee an opportunity to tour MELVILLE and ATLANTIS (with Alvin). They received briefings on alternative ship operations including NOAA, NAVO, Office of Polar Programs, Canadian Coast Guard and the British Research Program (NERC). They also received briefings on science programs, present and future. A third meeting will be held at the University of

Rhode Island in December of this year. This meeting will receive the report from consultant, Bill Humphrey, that will look at economic issues. The remainder of the meeting will be spent drafting their report. A fourth meeting will be held if necessary in January. The final report is expected shortly after the first of the year.

### **Agency Reports:**

**National Science Foundation (NSF):** Dolly Dieter provided the report for NSF. Ship operation proposals are due 1 Oct., however, extensions will be possible if advance notification is made. A copy of the new proposal guide has been mailed out. NSF is moving towards using a computerized submission of all proposals through their "FastLane" program. Operators are encouraged to use this system as soon as possible. It will become mandatory within a year or two. Sandy Shor explained that the tech proposals can also receive an extension if needed. Don Heinrichs announced that the NSF ship inspection program will be rebid and contracted through NSF. This is no reflection on Jamestown Marine Services, but a technicality in the requirement to contract this program directly through NSF and not through a grant.

**Office of Naval Research (ONR):** Andy Silver provided the ONR presentation. The ONR 6.1 budget is expected to remain the same in 1999. ONR scheduled 367 days in 1998 and is presently planning 414 ship days for 1999. ONR 6.2 projects will have field programs this year which include a coordinated LWAD program, which will be conducted on both the east and west coasts. Funds for NOPP's ship time will be coordinated through ONR.

**National Oceanographic Atmospheric Administration (NOAA):** Cdr. Beth White provided the report for NOAA. OAR is likely to receive \$2.1M less than in 1998. This shortfall will impact the Coastal Ocean Program (COP) work which includes GLOBEC and ECOHAB. Dave Johnson, the acting Deputy for COP, announced that NOAA is working internally to provide \$.7 M to support these fields programs.

**National Research Lab (NRL):** Norm Cherkis had no comment.

**NAVO:** The NAVO presentation was given by Gordon Wilkes. The budget picture for NAVO work is still not firm but looks good. NAVO has identified a requirement for 460 UNOLS ship days for 1999. They have experienced excellent results from the data collected over the last two years and have been extremely happy with the UNOLS operations. The gravity work requirements will likely be completed in 1999. NAVO is investigating requirements for 2000 and beyond.

**GENERAL:** A brief discussion was held concerning the two potential problems for scheduling in 1999. The first is the LWAD program of the Navy, complicated because multiple units will be involved and dates are not yet firm. It is anticipated that several schedules will change and extensive coordination will be necessary. The second potential problem revolves around the funding of the COP programs, GLOBEC and ECOHAB. Five ships have these programs scheduled for 1999.

Each ship's scheduler provided a proposed schedule for 1999. The cost summaries for 1999 as originally submitted are included in [Appendix III](#) along with the 1998 costs. [Appendix IV](#) includes the ship tracks submitted by the schedulers reflecting the schedules presented. Below is a ship by ship discussion of the 1999 schedules as presented by their respective schedulers.

**LAURENTIAN** - University of Michigan - No representative was available. The ship has scheduled over 200 days for 1999. A cruise for Cuehl (OCE 9732316) should be added to the schedule.

**OCEANUS** - WHOI - Don Moller presented the schedule for OCEANUS. The schedule contains 195 days which include 32 ONR days. GLOBEC work dominates the schedule and two cruises are double booked with ENDEAVOR. The GLOBEC program is meeting to determine the cruise sequences and resolving potential scheduling conflicts.

**ENDEAVOR** - University of Rhode Island - Bill Hahn provided the ENDEAVOR schedule. The GLOBEC issues discussed above are similar with ENDEAVOR. A funded Boyle cruise has been added to ENDEAVOR's schedule which includes a trip to the Azores.

**WEATHERBIRD II** - BBSR - WEATHERBIRD II schedule was presented by Lee Black. The schedule includes 136 days of funded time series work. WEATHERBIRD II is scheduling an engine overhaul in Norfolk during the month of June. The ship could be available for coastal work during this period.

**CAPE HENLOPEN** - University of Delaware - Tim Pfeiffer presented CAPE HENLOPEN's schedule of 186 days.

**CAPE HATTERAS** - Duke/UNC - The CAPE HATTERAS schedule was presented by Joe Ustach. The schedule includes 151 days of ship time. Several open periods in May, June, July and September exists for additional work. A potential for increased NAVO funding could be accommodated on HATTERAS.

**BLUE FIN** - Skidaway - No representative was available. BLUE FIN is scheduled for 136 days of funded work in 1999.

**SEWARD JOHNSON** - HBOI - Tim Askew provided the schedule for SEWARD JOHNSON. The NOAA Wilson cruise should be reduced by six days. Sanford questioned the ability of the twin screwed SEWARD JOHNSON to be able to successfully complete his work, however, after considerable discussion it was decided that this program could remain on the ship. The Thorsos work is a coordinated program with PELICAN and must be scheduled earlier to line up with the PELICAN schedule.

**EDWIN LINK** - HBOI - LINK includes GLOBEC work which still must be resolved. The ship has scheduled 160 days for 1999.

**SEA DIVER** - HBOI - SEA DIVER has 48 days scheduled in 1999.

**CALANUS** - University of Miami - Dave Powell provided the CALANUS schedule. The Deferrari work has been funded. Gruber should remain on CALANUS.

**PELICAN** - LUMCON - Steve Rabalais presented the PELICAN schedule of 227 days for 1999. Several programs can not be accommodated on this schedule. These include a one day Dortch NSF cruise, two five day Hanifen cruises and an unspecified number of privately funded days.

**LONGHORN** - University of Texas - No representative was available. The 14 day Gardner work has not yet gone to panel and is unlikely to be funded in 1999.

**GYRE** - TAMU - The GYRE schedule was presented by Ed Shaar. The schedule includes 111 days with ten of these days being funded by NSF. A 42 day NOPP's program has been added recently to the schedule.

**URRACA** - STRI - No representative was available. The Glynn cruise, OCE 9711529, is funded.

**MOANA WAVE** - University of Hawaii - Stan Winslow provided the schedule for MOANA WAVE which includes 170 days of ship time. Two Widmer cruises funded through ARPA have been added recently and need further investigation. The Catipovic ONR cruises have not been funded. MOANA WAVE is scheduled to retire at the end of 1999.

**ALPHA HELIX** - University of Alaska - No representative as available from Alaska. The funding for the GLOBEC work of Weingartner is yet to be resolved. Funding decisions for OPP are still outstanding.

**BARNES** - University of Washington - Dan Schwartz provided the BARNES schedule which included 110 days for 1999. The Murray OCE number is 9633571.

**WECOMA** - Oregon State University - Fred Jones presented a 174 day schedule for WECOMA. The ship is planning an engine overhaul for February. The LWAD program will require coordination with THOMPSON. Collier is funded with OCE number of 9811471.

**POINT SUR** - Moss Landing Marine Laboratory - Mike Prince provided the POINT SUR schedule. The schedule includes 184 days with 110 of these days funded to date. A discussion was held concerning the cruise of Sherrell which has been moved from POINT SUR to NEW HORIZON. Because the NPS work has limited flexibility in the schedule the Sherrel work does not fit.

**NEW HORIZON** - Scripps - Rose Dufour presented a 201 day NEW HORIZON schedule. Spiess had been shifted from REVELLE to NEW HORIZON. The schedule has open periods in August, September

and after 21 November.

**SPROUL** - Scripps - SPROUL is scheduled for an NSF inspection in January. The schedule includes 137 days of time with only three of these days yet pending. The Jaffe cruise has been funded. The OCE number for Dorman is 9712605.

**KNORR** - WHOI - Don Moller provided the Woods Hole ship schedules. KNORR will be laid up for 1999. Attempts will be made to find work for this ship.

**ATLANTIS** - WHOI - ATLANTIS schedule is dedicated to Alvin operations for the entire year. It has been oversubscribed. The schedule now contains 339 operating days. Three ROV programs, Chadwick, Cowan and Embley were moved off the ATLANTIS schedule and given to THOMPSON.

**BROWN** - NOAA - BROWN's schedule was presented by Cdr. Beth White. The ship will start the year in Charleston and will work its way to the Indian Ocean via Capetown. The ship will complete the year in the Pacific Ocean servicing the TAO project. A total of 298 operating days of all NOAA time is scheduled.

**EWING** - LDEO - John Diebold provided EWING's schedule which starts in the Atlantic early in the year and ends in Auckland. A total of 323 days is scheduled.

**THOMPSON** - University of Washington - The THOMPSON schedule was provided by Dan Schwartz. Several NOAA programs were removed, however, a navy LWAD program was added. Also added were the submersible programs of Chadwick, Cohen and Embley. A schedule of over 270 days is likely.

**MELVILLE** - Scripps - Rose Dufour provided the MELVILLE schedule which includes 252 operating days. A transit from Somoa to Honolulu is open and available for possible science. The ship is available for possible programs from THOMPSON in the Juan de Fuca area and could accommodate Fornari off Chile later in the year.

**REVELLE** - Scripps - The ship is scheduled for 277 days of work and will accomplish the Sea of Japan ONR/NRL programs. Because of the sequence of cruises a two month open period will be necessary with the ship in Pusan, Korea. The ship is expected to remain in this area through the first several months of 2000.

**Elections:** Both the Ship Scheduling Committee Chair and Vice Chair positions were up for election. Nominees of Mike Prince for Chair and Joe Ustach for Vice Chair were presented. No further nominations were offered. A vote of acclimation for these two candidates was made. The two offices must be confirmed by the UNOLS Chair at the Annual meeting September 17.

**Ship Costs:** Jack Bash provided a summary of the ship costs for 1998 and 1999 (see [Appendix IV](#)).

The total ship days and operating funds for 1998 were at record high. This was partially because the commercial work for EWING and the additional NOAA work aboard ENDEAVOR. Overall increases in both Navy and NOAA work were cited. The 1999 figures do not reflect correctly the totals for NSF and NOAA because of the unknowns associated with the GLOBEC program. Both ENDEAVOR and OCEANUS presented their GLOBEC numbers in the "Other" column causing that column to be approximately \$3M high. As these numbers become adjusted the NOAA total should approach \$6M. The Navy funding of \$13.5M should be noted and is a significant increase over the recent past. The figures for 1999 are still tentative and will likely change as the year progresses. Over the last two years there has been a significant shift in funding for the Class V vessels (ships under 100'). All of the ships in this size category have very healthy schedules signifying more efforts into coastal oceanography.

**General Discussions** - Don Moller led the committee in a general discussion of the scheduling process. In 1997 Rick Jahnke chaired a committee to look into scheduling procedures. Among his recommendations included changes in communications and information exchange and a suggested revision and a more efficient scheduling meeting process. The information exchange issues have been addressed through more advanced electronic communication and use of the UNOLS website. A revised scheduling procedure was formulated by Don and presented at this meeting. The procedure calls for an elimination of the initial publishing of schedules but that letters of intent listing potential cruises be substituted for a formal schedule. These letters of intent will be provided in May of the scheduling year and offered wide distribution. The letters would include all programs planned for a particular ship for the coming year. They should include the area of operation, funding agency, and number of ship days, however, the order of cruises and how they might fit on a schedule need not be presented. The purpose of this letter of intent is to identify double bookings and early conflicts as well as providing an inventory of potential cruises to ensure all programs have been accounted for. The traditional June scheduling Review Group meeting will not be held. As funding decisions came known in June schedules would be prepared and ready for review near the end of the month. A full scheduling meeting would be held in early July to review all schedules and address conflicts. The Scheduling Review Group would meet immediately after the scheduling meeting. Institutions would be encouraged to coordinate with ship operators where efficiencies could be realized during the remainder of July and August. Large ship operators would be required to coordinate their schedules probably through electronic or conference call methods. In September the Scheduling Review Group would meet again to finalize schedules. If contentious issues existed affected ship schedulers would be invited to this meeting to assist in the resolution of the problems.

The Scheduling Committee discussed these changes and agreed that they should go forward to the UNOLS Council for its approval and that the revised procedure be tested for a year before a charter change is made.

The meeting was adjourned at 1600.

# Ship Scheduling Review Meeting

September 14, 1998

**Introduction:** The Ship Scheduling Review Group met on 14 September 1998 in Room 1235 of the National Science Foundation following the Ship Scheduling Meeting. Those present were Don Moller, Chair; Mike Prince, Vice Chair, Dolly Dieter, NSF; Sujata Millick and Tim Pfeiffer, ONR; CDR Beth White, NOAA; Ken Johnson, UNOLS Chair; Joe Ustach, perspective Vice Chair; and Jack Bash, UNOLS Executive Secretary.

The Review Group discussed the proceedings of the Scheduling meeting held earlier in the day and provided comments on each of the ship's schedules presented in the order of the earlier session. The major unresolved issue in the scheduling process was the funding for GLOBEC and ECOHAB. Cruises on five ships are affected by these two programs which require the funding situation to be clarified between NOAA and NSF. Below will be the ship by ship comments of the Review Group.

**LAURENTIAN** - University of Michigan - Cuehl (OCE 9732316) should be added to the schedule. No other issues.

**OCEANUS** - WHOI & **ENDEAVOR** - University of Rhode Island - OCEANUS and ENDEAVOR were considered together in that their schedules revolve primarily around GLOBEC. As noted above this program will require funding resolution. The two schedules should be balanced. Moffit should be considered as possibly an OCEANUS cruise.

**WEATHERBIRD II**- BBSR - No issues were cited.

**CAPE HENLOPEN** - University of Delaware - No issues were cited.

**CAPE HATTERAS** - Duke/UNC - This is a light schedule and open for possible additional cruises. No other issues were cited.

**BLUE FIN** - Skidaway - No issues were cited.

**SEWARD JOHNSON** - HBOI - The Wilson cruise of NOAA should be 14 days at sea plus two days in port. It appears the issues surrounding Sanford's cruise have been settled and this cruise should remain on SEWARD JOHNSON. The extensive transit time for Limeburner should be investigated.

**EDWIN LINK** - HBOI - This schedule is also tied to the GLOBEC uncertainties. The ELWAD program may require schedule adjustments.

**SEA DIVER** - HBOI - No issues were cited.

**CALANUS** - University of Miami - Gruber should remain on CALANUS.

**PELICAN** - LUMCON - The January NAVO work should be increased from ten to 15 days. Vargo's ECOHAB cruise funding is questionable. The excess work on this ship should be coordinated with other Gulf ships.

**LONGHORN** - University of Texas - No issues cited. Very light schedule.

**GYRE** - TAMU - The Herring cruise is part of NOPP.

**URRACA** - STRI - The schedule for this ship requires updating. No representative was available to discuss schedule details. The Glynn cruise has been funded.

**MOANA WAVE** - University of Hawaii - HOTS has been funded for 50 days plus ten days transit. The two ONR cruises of Catipolvic have been withdrawn.

**ALPHA HELIX** - University of Alaska - Funding for the GLOBEC program remains uncertain. Funding decisions for OPP work is not yet available.

**BARNES** - University of Washington - No issues cited.

**WECOMA** - Oregon State University - Funding for ECOHOB remains uncertain. The timing for the ELWAD work must be coordinated with the THOMPSON schedule.

**POINT SUR** - Moss Landing Marine Laboratory - The Sherrel cruise should be reconsidered for POINT SUR.

**NEW HORIZON** - Scripps - See comment above regarding the Sherrell cruise. A potential conflict with both THOMPSON and ATLANTIS schedules could exist with the Goldfinger, Collier and Spiess cruises.

**SPROUL** - Scripps - The ONR Jaffe cruise is funded. No other issues were cited.

**KNORR** - WHOI - This ship is scheduled for lay up.

**ATLANTIS** - WHOI - This ship has a very full schedule. Two Juan de Fuca programs may need revision which will cause a ripple effect for the Goldfinger, Collier and Spiess cruises on NEW HORIZON.



**BROWN** - NOAA - This ship is presently scheduled with all NOAA cruises. An additional Indian Ocean program would be welcomed.

**EWING** - LDEO - EWING is presently scheduled for 323 days and could get additions to its current programs. The transfer of at least one program to MELVILLE should be considered to provide better balance in the two schedules. The port stops for Capone and Fulthorpe need to be reexamined.

**THOMPSON** - University of Washington - The funding for the Bullock November cruise is pending. Coordination with WECOMA is necessary for the ELWAD program. Embley may be added to this schedule. The University of Washington Sternberg cruises are locked in time and not flexible.

**MELVILLE** - Scripps - This schedule could take additional cruises. If THOMPSON can not accommodate the ELWAD program it could possibly go aboard MELVILLE. Also the Fornari work late in the year could be a potential cruise.

**REVELLE** - Scripps - The Talley cruise should be listed as ONR not NSF. No other issues cited.

[Back to SSC Minutes](#)

# UNOLS SHIP SCHEDULING MEETING

**14 September 1998 - 0830 Hrs**  
**National Science Foundation, Room 1235**  
**4201 Wilson Boulevard**  
**Arlington, VA**

## MEETING AGENDA

The Scheduling meeting will be called into session by the Chair, Don Moller. This will be followed by welcoming remarks by the SSC Chair and the UNOLS Chair, Ken Johnson.

**AGENCY PRESENTATIONS** - Representatives from NSF, ONR, NOAA and NAVO will provide the ship operations funding outlook and comment on related issues for Calendar Year 1999.

**REVIEW AND UPDATE OF SCHEDULES** - Each scheduler will present and update their respective 1999 ship(s) schedule and cost information. 1998 schedules can be presented as necessary where they impact 1999 schedules. View graphs, including ship tracks, are recommended for the presentation. Scheduling conflicts and double bookings should be identified. Agency representatives will announce science funding decisions, set priorities and provide scheduling guidance where appropriate. Presentations will begin with Intermediate and Small sized vessels of the Atlantic, Gulf of Mexico and West coasts in that order. The six Large vessels will be presented as a group.

**IDENTIFY CONFLICTS AND UNRESOLVED ISSUES** - There will be discussion of outstanding issues and identification of solutions to scheduling conflicts involving scientific personnel and instrumentation, the coordination of cruises requiring specialty equipment with an eye to overall efficiency of fleet operations. (Note: We will attempt to account for all cruises on the inventory maintained by the UNOLS Office.)

**COSTS** - The UNOLS Office will provide a summary of projected costs for vessel operations in CY-'99.

**ELECTIONS** - The terms of the current SSC Chair and Vice Chair expire this fall and their replacements need be elected from the membership during this session. A telephone poll of the schedulers resulted in the nomination of two members who have agreed to stand for election. The nominees are: Chair: West Coast - Mike Prince, Moss Landing Marine Lab (POINT SUR) Vice Chair: East Coast - Joe Ustach, Duke Univ. (CAPE HATTERAS) Additional nominees can be presented from the floor.

**GENERAL DISCUSSION** - A general discussion of the scheduling process will be had with the aim of

identifying the manner in which it can be improved to remain effective in a changed scheduling environment. Utilization of the web, the implementation of electronic ship requests and posting of schedules, an increasing need to coordinate PI and instrumentation transfers between vessels, a greater mix of sponsoring agencies (NSF, ONR, NRL, NOAA and state) fleetwide, a general increase in financial pressure for fleet efficiency, and the perception of a disconnect between the scientist user and the schedulers are representative of the changes. It may be necessary to change the process/procedure for scheduling the UNOLS vessels. The following suggestions for modifying the sequence of annual scheduling events may significantly improve the process for scientists, agencies and schedulers collectively. They are offered as a starting point for discussion. 1) May/June - schedulers present a "letter of intent" to run proposed science programs and a general "flow of cruises" in lieu of a "draft" schedule; 2) 4th week June - publish preliminary schedules after NSF panel decisions have been announced; 3) 2nd week July - first scheduling meeting, plenary session. Open discussion of individual schedules with conflict resolution. Schedule Review to follow; 4) Summer - schedule refinement. Publish proposed schedules; 5) September - Schedule review committee meets. If warranted, recommendations should be developed for modifications to the scheduling process and presented to the UNOLS Chair for consideration.

## Appendix II

### Ship Scheduling Meeting Attendance List

| <b>NAME</b>      | <b>INSTIT./ORGANIZ.</b> | <b>PHONE</b>         | <b>FAX</b>     | <b>E-MAIL</b>              |
|------------------|-------------------------|----------------------|----------------|----------------------------|
| Jon Alberts      | WHOI                    | (508) 289-2277       | (508) 289-2185 | jalberts@whoi.edu          |
| Tim Askew        | HBOI                    | (561) 465-2400 x262  | (561) 465-2116 | taskew@hboi.edu            |
| Jack Bash        | UNOLS                   | (401) 874-6825       | (874) 792-6486 | unols@gso.ufi.edu          |
| C. Lee Black     | BBSRI                   | (441) 297-1880 x208  | (441) 297-1839 | lblack@bbsr.edu            |
| Norman Cherkis   | NRL                     | (202) 404-1103       | (202) 767-0167 | cherkis@qur.navy.mil       |
| Mary D'Andrea    | UNOLS                   | (401) 792-6825       | (401) 792-6486 | unols@gso.sunl.gso.uri.edu |
| John Diebold     | LDEO                    | (914) 365-8524       | (914) 365-3181 | johnd@ldeo.columbia.edu    |
| Dolly Dieter     | NSF                     | (703) 306-1577 x7233 | (703) 306-0390 | e.dieter@nsf.gov           |
| Rose Dufour      | SIO/UCSD                | (619) 534-2841       | (619) 535-1817 | shipsked@ucsd.edu          |
| David Epp        | NSF/MGG                 | (703) 306-1586       | (703) 306-0390 | depp@nsf.gov               |
| Bill Hahn        | URI                     | (401) 874-6554       | (401) 874-6574 | b_hahn@gso.uri.edu         |
| Matt Hawkins     | U of Delaware           | (302) 645-4342       | (302) 645-4006 | hawkins@udel.edu           |
| Donald Heinrichs | NSF/OCE                 | (703) 306-1576       | (703) 306-0390 | dheinric@nsf.gov           |
| David Johnson    | NOAA/NOS                | (301) 713-3338       | (301) 713-4044 | davidjohnson@noaa.gov      |
| Ken Johnson      | MLML                    | (408) 755-8657       | (408) 753-2826 | johnson@mlml.calstate.edu  |
| Fred Jones       | OSU                     | (541) 867-0224       | (541) 867-0294 | jonesf@ocs.orst.edu        |

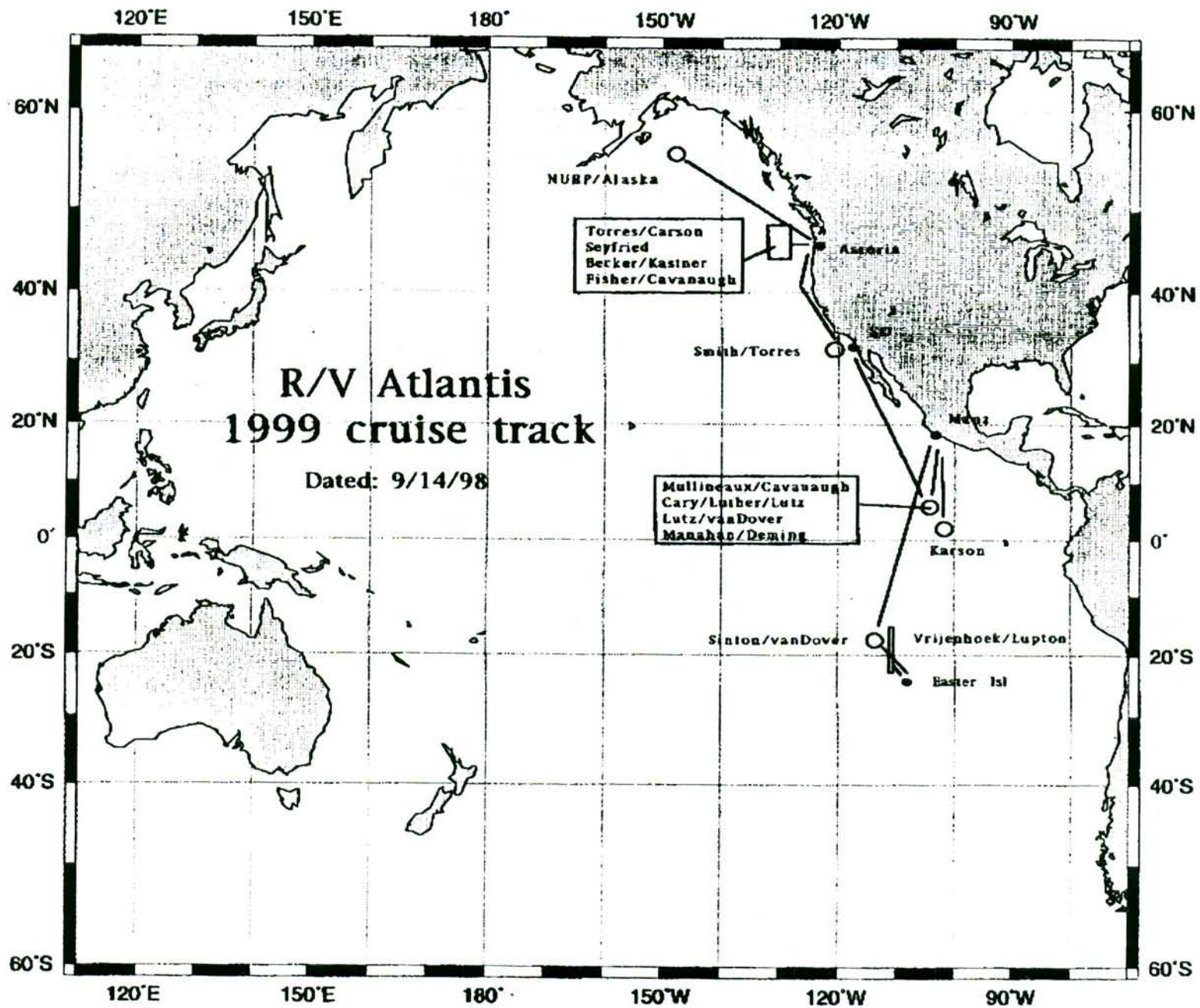
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|-----------------|-----------------|---------------------|----------------|--------------------------------|
| Robert Knox     | SIO             | (619) 534-4729      | (619) 535-1817 | rknox@ucsd.edu                 |
| Dick Lambert    | NSF             | (703) 306-1583      | (703) 306-0390 | rlambert@nsf.gov               |
| Paul Ljunggren  | LDEO            | (914) 365-8845      | (914) 359-6817 | pwl@ldeo.columbia.edu          |
| Sujata Millick  | ONR             | (703) 696-6530      | (703) 696-2007 | millics@onr.navy.mil           |
| Scott McKellar  | NOAA            | (301) 713-3435x135  | (301) 713-1541 | scottmckellar@noaa.gov         |
| Don Moller      | WHOI            | (508) 289-2277      | (508) 457-2185 | dmoller@whoi.edu               |
| Tim Pfeiffer    | U of Delaware   | (302) 645-4341      | (302) 645-4006 | pfeiffer@udel.edu              |
| Dave Powell     | U of Miami      | (305) 361-4832      | (305) 361-4174 | dpowell@rsmas.miami.edu        |
| Mike Prince     | MLML            | (408) 633-3534      | (408) 633-4580 | prince@mlml.calstate.edu       |
| Mike Purdy      | NSF             | (703)-306-1580      | (703)-306-0390 | mpurdy@nsf.gov                 |
| Steve Rabalais  | LUMCON          | (504) 851-2800      | (504) 851-2874 | srabalais@lumcon.edu           |
| Daniel Schwartz | U of Washington | (206) 543-5062      | (206) 547-6073 | schwartz@ocean.washington.edu  |
| Ed Shaar        | TAMU            | (409) 862-3290      | (409) 845-6331 | eshaar@ocean.tamu.edu          |
| Alexander Shor  | NSF/ODP         | (703) 306-1583      | (703) 306-0390 | ashor@nsf.gov                  |
| Andrew Silver   | ONR             | (703) 696-6999      | (703) 696-2007 | silvera@onr.navy.mil           |
| Joe Ustach      | Duke/UNC        | (252) 504-7579      | (252) 504-7651 | joeu@duncoc.ml.duke.edu        |
| CDR Beth White  | NOAA            | (301) 713-2465x 184 | (301) 713-0158 | elizabeth.white@noaa.gov       |
| Gordon Wilkes   | NAVOCEANO       | (228) 688-4376      | (228) 688-4078 | wilkesg@navo.navy.mil          |
| Stan Winslow    | U of Hawaii     | (808) 847-2661      | (808) 848-5451 | swinslow@poha.soest.hawaii.edu |

COST 1998

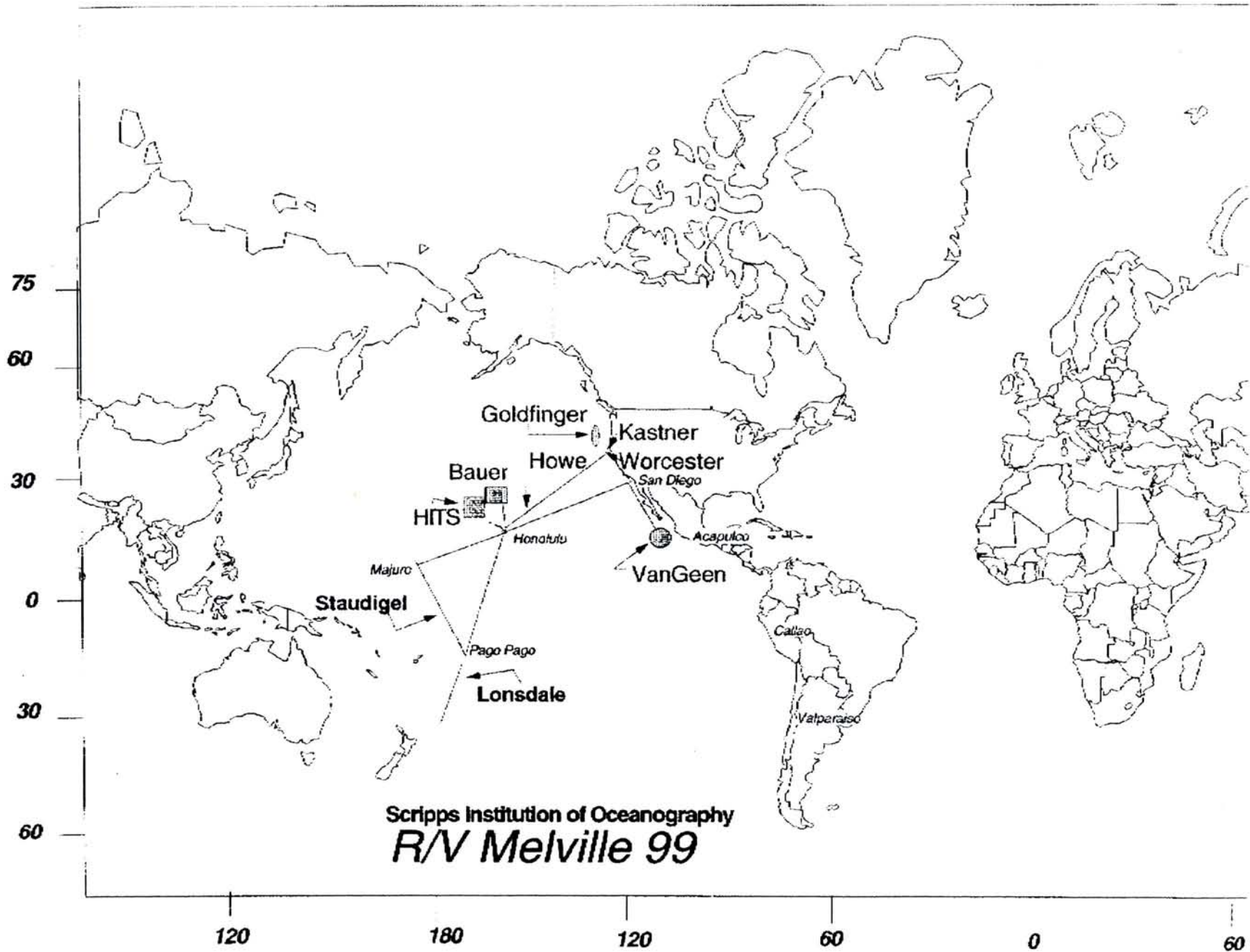
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|------------------|-------|------------|-----|---------|-----|---------|-------|----------|-------|----------|------------|--|--|--|--|
| As of:6/22/98    |       |            |     |         |     |         |       |          |       |          |            |  |  |  |  |
| SHIP/CLASS       | DAY   | NSF \$     | DAY | NAVY \$ | DAY | NOAA \$ | DAY   | OTHER \$ | DAY   | TOTAL \$ | DAILY RATE |  |  |  |  |
| R. REVELLE       | 128   | 2,163      | 134 | 2,266   | 0   | 0       | 54    | 913      | 316   | 6,341    | 16,902     |  |  |  |  |
| MELVILLE         | 174   | 2,831      | 12  | 195     | 23  | 374     | 7     | 114      | 216   | 3,614    | 16,269     |  |  |  |  |
| KNORR            | 189   | 3,119      | 72  | 1,188   | 0   | 0       | 4     | 66       | 265   | 4,373    | 16,502     |  |  |  |  |
| ATLANTIS         | 205   | 3,198      | 10  | 156     | 26  | 406     | 32    | 499      | 273   | 4,259    | 15,601     |  |  |  |  |
| EWING            | 95    | 1,330      | 0   | 0       | 0   | 0       | 150   | 2,100    | 246   | 3,430    | 14,000     |  |  |  |  |
| T.G. THOMPSON    | 131   | 2,071      | 60  | 949     | 0   | 0       | 86    | 1,360    | 277   | 4,380    | 15,812     |  |  |  |  |
| MOANA WAVE       | 111   | 1,443      | 17  | 221     | 23  | 299     | 18    | 234      | 169   | 2,197    | 13,000     |  |  |  |  |
| CLASS I/II       | 1,033 | 16,155     | 305 | 4,974   | 72  | 1,079   | 351   | 5,286    | 1,761 | 27,494   | 15,613     |  |  |  |  |
| AVE: (7)         | 148   | 2,308      | 44  | 711     | 10  | 154     | 50    | 755      | 252   | 3,928    | 15,441     |  |  |  |  |
| EDWIN LINK       | 37    | 333        | 22  | 198     | 32  | 288     | 91    | 819      | 182   | 1,638    | 9,000      |  |  |  |  |
| ENDEAVOR         | 0     | 0          | 0   | 0       | 158 | 1,573   | 0     | 0        | 158   | 1,573    | 9,956      |  |  |  |  |
| OCEANUS          | 149   | 1,410      | 61  | 677     | 26  | 246     | 0     | 0        | 236   | 2,233    | 9,462      |  |  |  |  |
| GYRE             | 21    | 151        | 27  | 191     | 0   | 0       | 74    | 533      | 122   | 875      | 7,172      |  |  |  |  |
| NEW HORIZON      | 60    | 682        | 119 | 1,164   | 0   | 0       | 62    | 602      | 241   | 2,338    | 9,701      |  |  |  |  |
| SEWARD JOHNSON   | 124   | 1,178      | 32  | 304     | 47  | 447     | 78    | 741      | 281   | 2,670    | 9,502      |  |  |  |  |
| WECOMA           | 70    | 696        | 66  | 647     | 91  | 905     | 0     | 0        | 226   | 2,248    | 9,947      |  |  |  |  |
| CLASS III        | 461   | 4,350      | 326 | 3,071   | 354 | 3,459   | 305   | 2,695    | 1,446 | 13,575   | 9,388      |  |  |  |  |
| AVE: (7)         | 66    | 621        | 47  | 439     | 51  | 494     | 44    | 385      | 207   | 1,939    | 9,249      |  |  |  |  |
| PELICAN          | 62    | 210        | 36  | 135     | 20  | 75      | 114   | 428      | 226   | 848      | 3,752      |  |  |  |  |
| LONGHORN         | 6     | 24         | 11  | 88      | 2   | 8       | 44    | 176      | 63    | 296      | 4,698      |  |  |  |  |
| POINT SUR        | 121   | 768        | 30  | 191     | 0   | 0       | 42    | 267      | 193   | 1,226    | 6,352      |  |  |  |  |
| CAPE HATTERAS    | 111   | 823        | 66  | 489     | 17  | 126     | 11    | 82       | 205   | 1,520    | 7,415      |  |  |  |  |
| ALPHA HELIX      | 139   | 1,522      | 0   | 0       | 21  | 230     | 10    | 110      | 170   | 1,862    | 10,953     |  |  |  |  |
| R. SPROUL        | 64    | 367        | 11  | 63      | 7   | 40      | 75    | 431      | 157   | 901      | 5,739      |  |  |  |  |
| CAPE HENLOPEN    | 106   | 556        | 67  | 351     | 0   | 0       | 22    | 115      | 195   | 1,022    | 5,241      |  |  |  |  |
| WEATHERBIRD II   | 131   | 1,074      | 0   | 0       | 0   | 0       | 1     | 8        | 132   | 1,082    | 8,197      |  |  |  |  |
| SEA DIVER        | 18    | 86         | 71  | 337     | 36  | 171     | 8     | 38       | 133   | 632      | 4,752      |  |  |  |  |
| CLASS IV - TOTAL | 758   | 5,430      | 292 | 1,654   | 103 | 650     | 327   | 1,655    | 1,480 | 9,389    | 6,344      |  |  |  |  |
| AVE: (9)         | 84    | 603        | 32  | 184     | 11  | 72      | 36    | 184      | 164   | 1,043    | 6,344      |  |  |  |  |
| BLUE FIN (b)     | 75    | 225        | 0   | 0       | 9   | 27      | 6     | 18       | 90    | 270      | 3,000      |  |  |  |  |
| LAURENTIAN       | 140   | 616        | 0   | 0       | 0   | 0       | 10    | 44       | 150   | 660      | 4,400      |  |  |  |  |
| BARNES           | 73    | 109        | 17  | 26      | 6   | 9       | 24    | 36       | 120   | 180      | 1,500      |  |  |  |  |
| CALANUS          | 88    | 212        | 0   | 0       | 75  | 181     | 11    | 27       | 174   | 420      | 2,414      |  |  |  |  |
| URRACA           | 15    | 70         | 0   | 0       | 0   | 0       | 112   | 526      | 127   | 596      | 4,693      |  |  |  |  |
| < CLASS IV TOTAL | 391   | 1,232      | 17  | 26      | 90  | 217     | 163   | 651      | 661   | 2,126    | 3,216      |  |  |  |  |
| AVE: (5)         | 78    | 246        | 3   | 5       | 18  | 43      | 33    | 130      | 132   | 425      | 3,201      |  |  |  |  |
| Fleet Total      | 2,643 | 27,167     | 940 | 9,725   | 619 | 5,405   | 1,146 | 10,287   | 5,348 | 52,584   | 9,832      |  |  |  |  |
| AVE: (28)        |       |            |     |         |     |         |       |          |       |          |            |  |  |  |  |

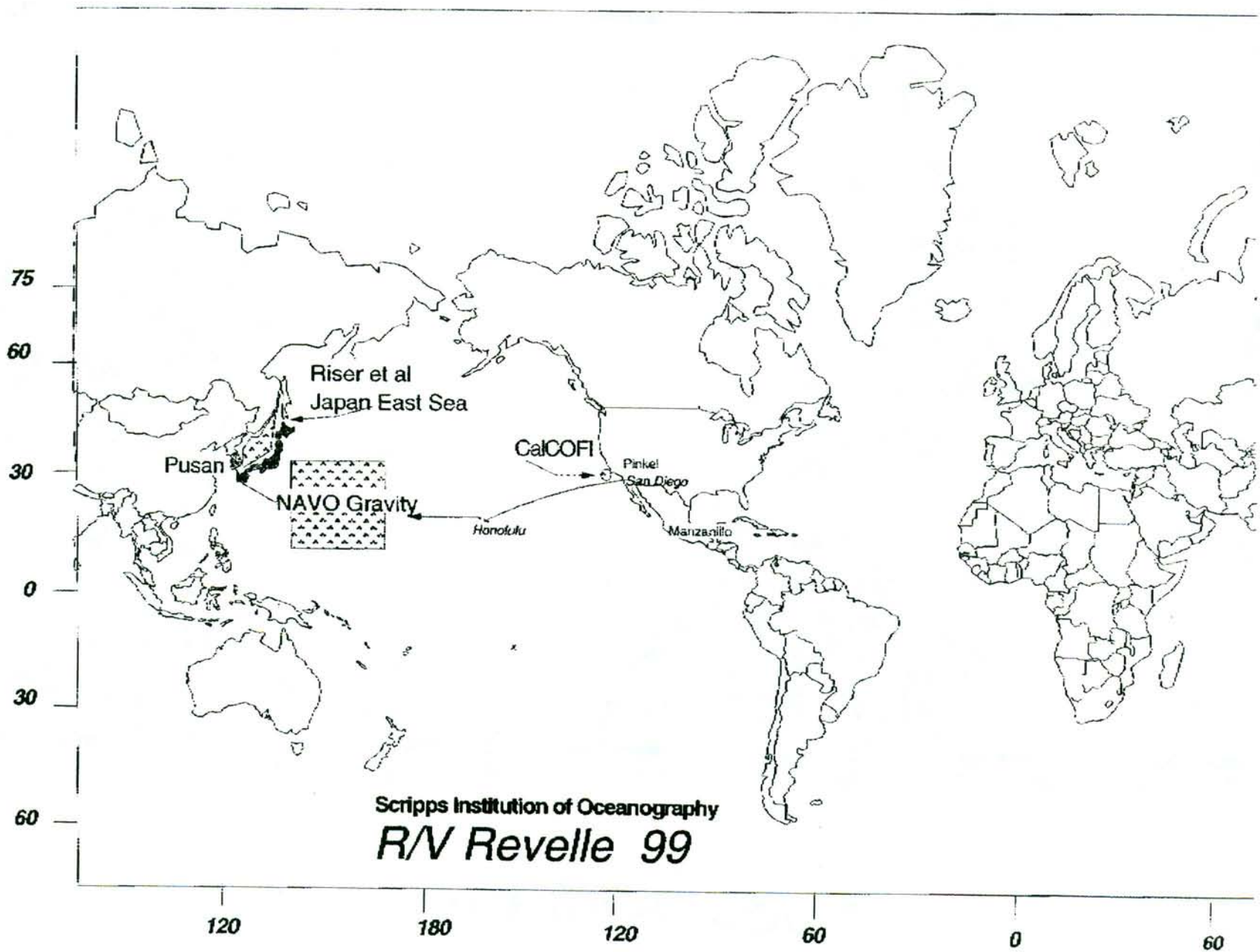
COST 1999

| YEAR: 1999  |       |        |       |         |     |         |     |          |       |          |            |  |
|---|-------|--------|-------|---------|-----|---------|-----|----------|-------|----------|------------|--|
| As of:9/11/98   |       |        |       |         |     |         |     |          |       |          |            |  |
| SHIP/CLASS  | DAY   | NSF \$ | DAY   | NAVY \$ | DAY | NOAA \$ | DAY | OTHER \$ | DAY   | TOTAL \$ | DAILY RATE |  |
| R. REVELLE *  | 5     | 83     | 150   | 2,475   | 23  | 380     | 99  | 1,633    | 277   | 4,571    | 16,502     |  |
| MELVILLE *  | 176   | 2,887  | 73    | 1,205   | 0   | 0       | 4   | 66       | 252   | 4,158    | 16,500     |  |
| KNORR *   | 0     | 0      | 0     | 1,000   | 0   | 0       | 0   | 0        | 0     | 1,000    | #DIV/0!    |  |
| ATLANTIS *  | 272   | 4,284  | 0     | 0       | 67  | 1,055   | 0   | 0        | 339   | 6,339    | 15,749     |  |
| EWING *   | 323   | 4,974  | 0     | 0       | 0   | 0       | 0   | 0        | 323   | 4,974    | 15,399     |  |
| T.G. THOMPSON   | 39    | 632    | 96    | 1,555   | 92  | 1,490   | 45  | 729      | 272   | 4,406    | 16,199     |  |
| MOANA WAVE *  | 90    | 1,170  | 14    | 182     | 26  | 338     | 40  | 520      | 170   | 2,210    | 13,000     |  |
| CLASS I/II  | 904   | 14,030 | 333   | 8,416   | 208 | 3,263   | 188 | 2,948    | 1,633 | 28,657   | 17,549     |  |
| AVE: (7)  | 129   | 2,004  | 48    | 917     | 30  | 466     | 27  | 421      | 233   | 3,808    | #DIV/0!    |  |
| EDWIN LINK *  | 73    | 664    | 12    | 109     | 0   | 0       | 75  | 683      | 160   | 1,456    | 9,100      |  |
| ENDEAVOR  | 71    | 718    | 15    | 152     | ?   | ?       | 148 | 1,497    | 234   | 2,367    | 10,115     |  |
| OCEANUS *   | ?     | ?      | 32    | 320     | ?   | ?       | 163 | 1,630    | 195   | 1,950    | 10,000     |  |
| GYRE *  | 10    | 78     | 42    | 328     | 0   | 0       | 58  | 460      | 111   | 866      | 7,802      |  |
| NEW HORIZON *   | 97    | 835    | 60    | 516     | 0   | 0       | 44  | 378      | 201   | 1,729    | 8,602      |  |
| SEWARD JOHNSON *  | 131   | 1,284  | 60    | 588     | 22  | 216     | 0   | 0        | 213   | 2,088    | 9,803      |  |
| WECOMA  | 45    | 543    | 59    | 712     | 70  | 855     | 0   | 0        | 174   | 2,110    | 12,126     |  |
| CLASS III   | 427   | 4,122  | 280   | 2,725   | 92  | 1,071   | 489 | 4,648    | 1,288 | 12,566   | 9,756      |  |
| AVE: (7)  | 71    | 687    | 40    | 389     | 18  | 214     | 70  | 664      | 184   | 1,795    | 9,650      |  |
| PELICAN   | 111   | 444    | 80    | 320     | 22  | 88      | 9   | 36       | 222   | 888      | 4,000      |  |
| LONGHORN  | 14    | 56     | 0     | 0       | 0   | 0       | 35  | 140      | 49    | 196      | 4,000      |  |
| POINT SUR *   | 50    | 333    | 83    | 552     | 0   | 0       | 51  | 339      | 184   | 1,224    | 6,652      |  |
| CAPE HATTERAS *   | 60    | 422    | 90    | 760     | 0   | 0       | 11  | 93       | 151   | 1,275    | 8,444      |  |
| ALPHA HELI *  | 139   | 1,286  | 0     | 0       | 21  | 194     | 5   | 46       | 165   | 1,526    | 9,248      |  |
| R. SPROUL *   | 113   | 651    | 4     | 23      | 0   | 0       | 20  | 115      | 137   | 789      | 5,759      |  |
| CAPE HENLOPEN   | 122   | 671    | 63    | 347     | 0   | 0       | 0   | 0        | 185   | 1,018    | 5,503      |  |
| WEATHERBIRD II *  | 136   | 1,081  | 0     | 0       | 0   | 0       | 0   | 0        | 136   | 1,081    | 7,949      |  |
| SEA DIVER *   | 25    | 120    | 36    | 173     | 0   | 0       | 0   | 0        | 61    | 293      | 4,803      |  |
| CLASS IV - TOTAL  | 760   | 5,064  | 356   | 2,175   | 43  | 282     | 131 | 769      | 1,290 | 8,290    | 6,426      |  |
| AVE: (9)  | 84    | 563    | 40    | 242     | 5   | 31      | 15  | 85       | 143   | 921      | 6,262      |  |
| BLUE FIN *  | 66    | 161    | 30    | 73      | 27  | 66      | 13  | 32       | 136   | 332      | 2,441      |  |
| LAURENTIAN  | 200   | 880    | 0     | 0       | 0   | 0       | 10  | 44       | 210   | 924      | 4,400      |  |
| BARNES  | 78    | 125    | 0     | 0       | 7   | 11      | 25  | 40       | 110   | 176      | 1,600      |  |
| CALANUS *   | 38    | 114    | 37    | 111     | 61  | 183     | 2   | 6        | 138   | 414      | 3,000      |  |
| URRACA  | 15    | 68     | 0     | 0       | 0   | 0       | 94  | 491      | 109   | 559      | 5,128      |  |
| < CLASS IV TOTAL  | 397   | 1,348  | 67    | 184     | 95  | 260     | 144 | 613      | 703   | 2,405    | 3,421      |  |
| AVE: (5)  | 79    | 270    | 13    | 37      | 19  | 52      | 29  | 123      | 141   | 481      | 3,421      |  |
| Fleet Total   | 2,488 | 24,564 | 1,036 | 13,500  | 438 | 4,876   | 952 | 8,978    | 4,914 | 51,918   | 10,565     |  |
| AVE: (28)   |       |        |       |         |     |         |     |          |       |          |            |  |
| *The daily rate has not been established as of this date. |       |        |       |         |     |         |     |          |       |          |            |  |

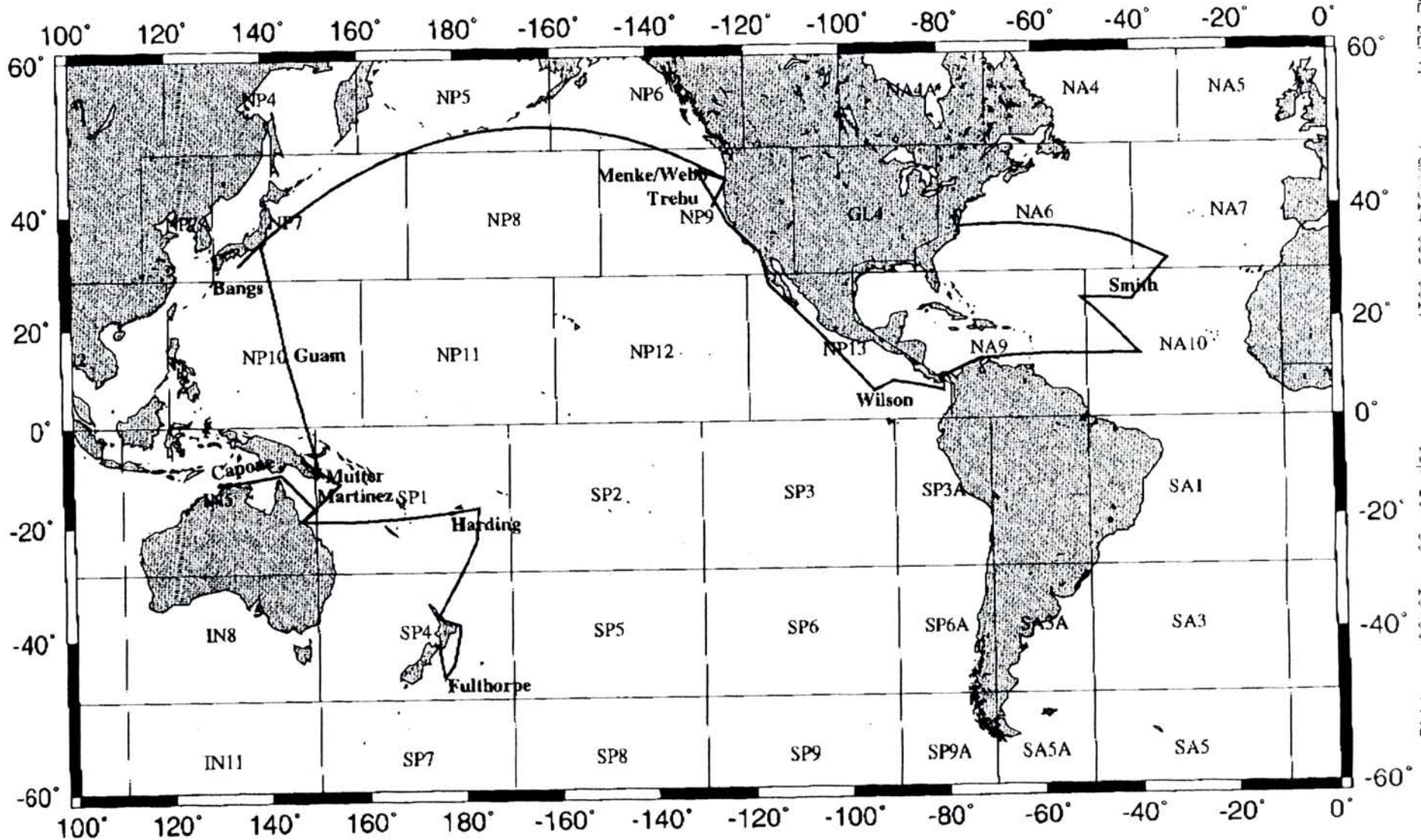




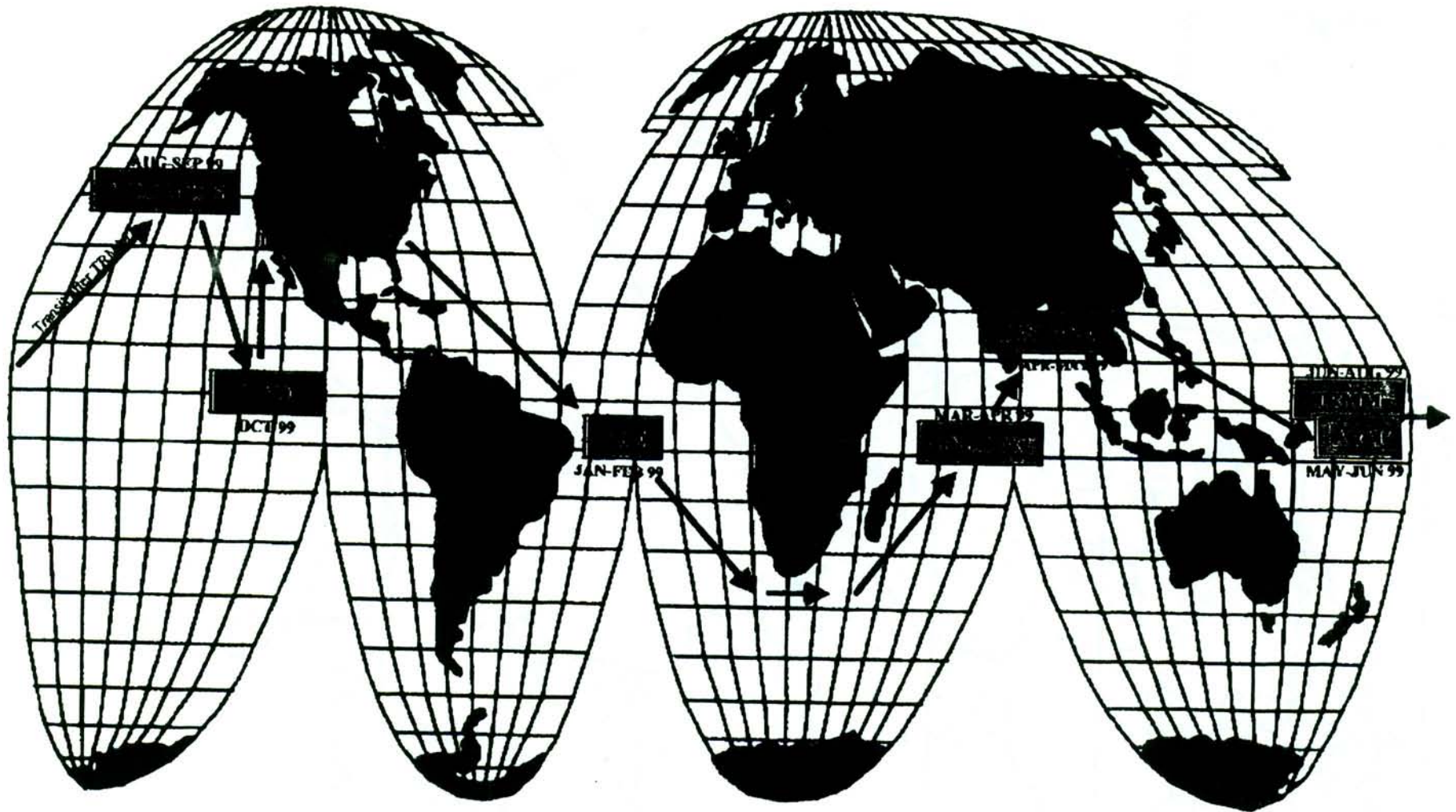




# R/V Ewing 1999



# TENTATIVE CY99 RONALD H. BROWN CRUISE TRACK



UNIVERSITY OF WISCONSIN

R/V ENDEAVOR

REYKJAVIK

R/V ENDEAVOR  
1999

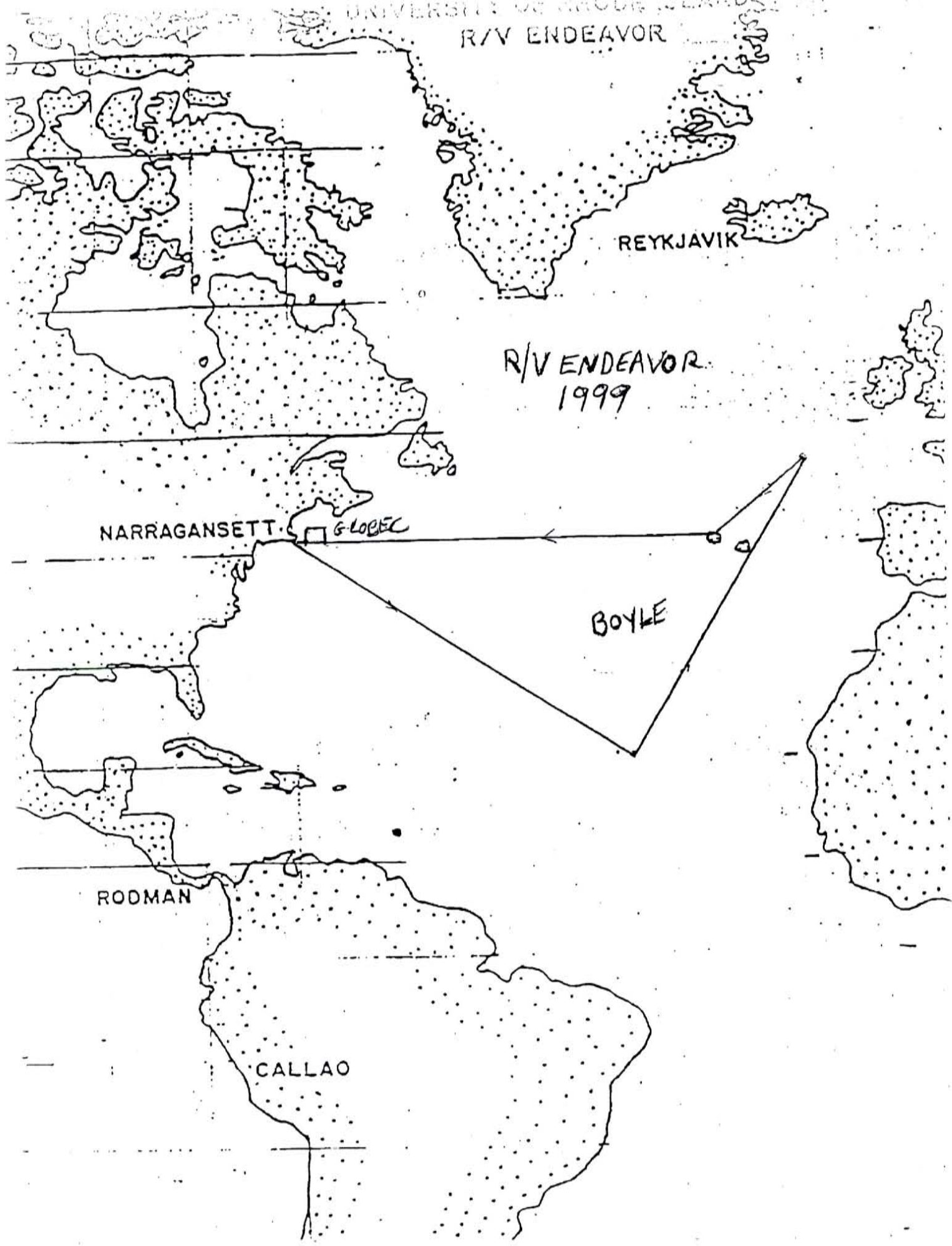
NARRAGANSETT

G-LOBEC

BOYLE

RODMAN

CALLAO



R/V GYRE  
1999 CRUISE TRACK  
UNITED STATES

ALL 99 CRUISE IN GULF OF MEXICO  
EXCEPT HERRING/KELLY/GUINASSO CRUISES IN FEBRUARY & JULY  
THESE 2 CRUISES ARE IN GULF OF MEXICO & CARIBBEAN

