

**UNOLS SHIP SCHEDULING COMMITTEE**

**Report of Meeting**

**14 September 1998**

**National Science Foundation  
4201 Wilson Boulevard, Room 1235  
Arlington, VA 22230**

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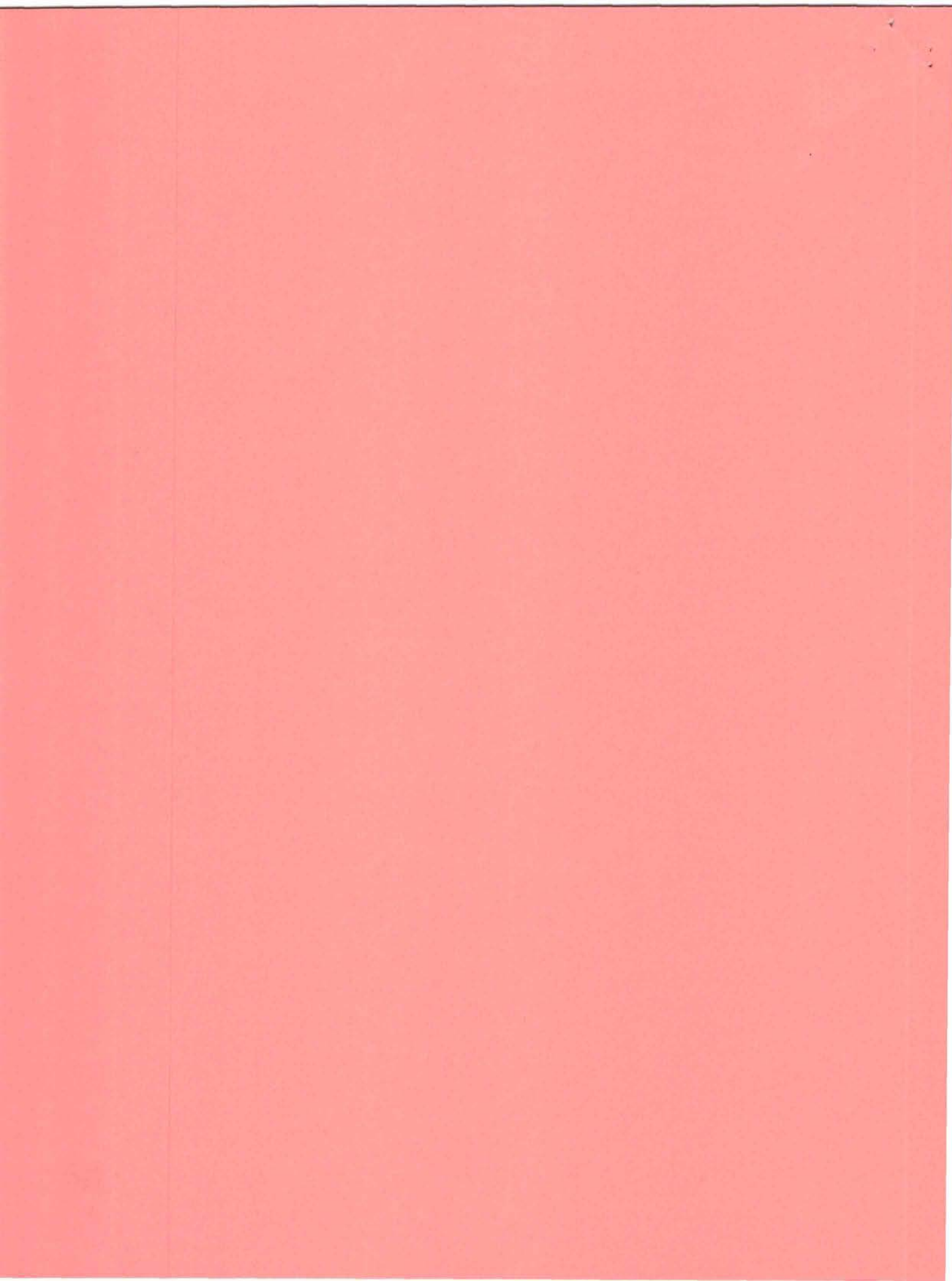
**SHIP SCHEDULING REVIEW**

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## 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

### 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 coast. 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 the \$.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 they 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.

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 fleet 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 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 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 was 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 of NPS work that 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. One ROV program, Cowan was 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 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 a near record high. This was partially because the commercial work by 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 are announced in June, schedules would be prepared and ready for review near the end of the month. An open plenary 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 problem.

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 ONR; CDR Beth White, NOAA; Ken Johnson, UNOLS Chair; Joe Ustach, perspective Vice Chair; Tim Pfeiffer, observer 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. Moffett 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 LWAD program may require schedule adjustments.

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

**CALANUS** - University of Miami - Gruber should remain on CALANUS. All ONR programs are 6.1 and should be noted.

**PELICAN** - LUMCON - The January NAVO work is correctly listed at ten days. Vargo's ECOHAB cruise funding is questionable. The excess work on this ship should be coordinated with other Gulf ships. The Briggs cruise should be listed as NRL not ONR.

**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 Catipovic 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 ECOHAB remains uncertain. The timing for the LWAD work must be coordinated with the THOMPSON schedule and should be scheduled for August/early September not July.

**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 LWAD program. Embley may be added to this schedule. The University of Washington Sternberg cruises are locked in time and not flexible. The LWAD cruise should be listed as ONR/6.2 not ONR/NAWC.

**MELVILLE** - Scripps - This schedule could take additional cruises. If THOMPSON can not accommodate the LWAD 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 listed as 5 days NSF/P should be 5 days ONR/P. No other issues cited.

NOTE: One additional LWAD cruise needs to be accommodated in February on a ship of 200' or larger.

# APPENDIX I

TENTATIVE AGENDA  
UNOLS SHIP SCHEDULING MEETING  
14 September 1998 - 0830 Hrs

National Science Foundation, Room 1235  
4201 Wilson Boulevard  
Arlington, VA

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 a 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. 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, Vice Chair: East Coast - Joe Ustach, Duke Univ. 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 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**

<u>NAME</u>	<u>INSTITUTION/ ORGANIZATION</u>	<u>PHONE</u>	<u>FAX</u>	<u>E-MAIL</u>
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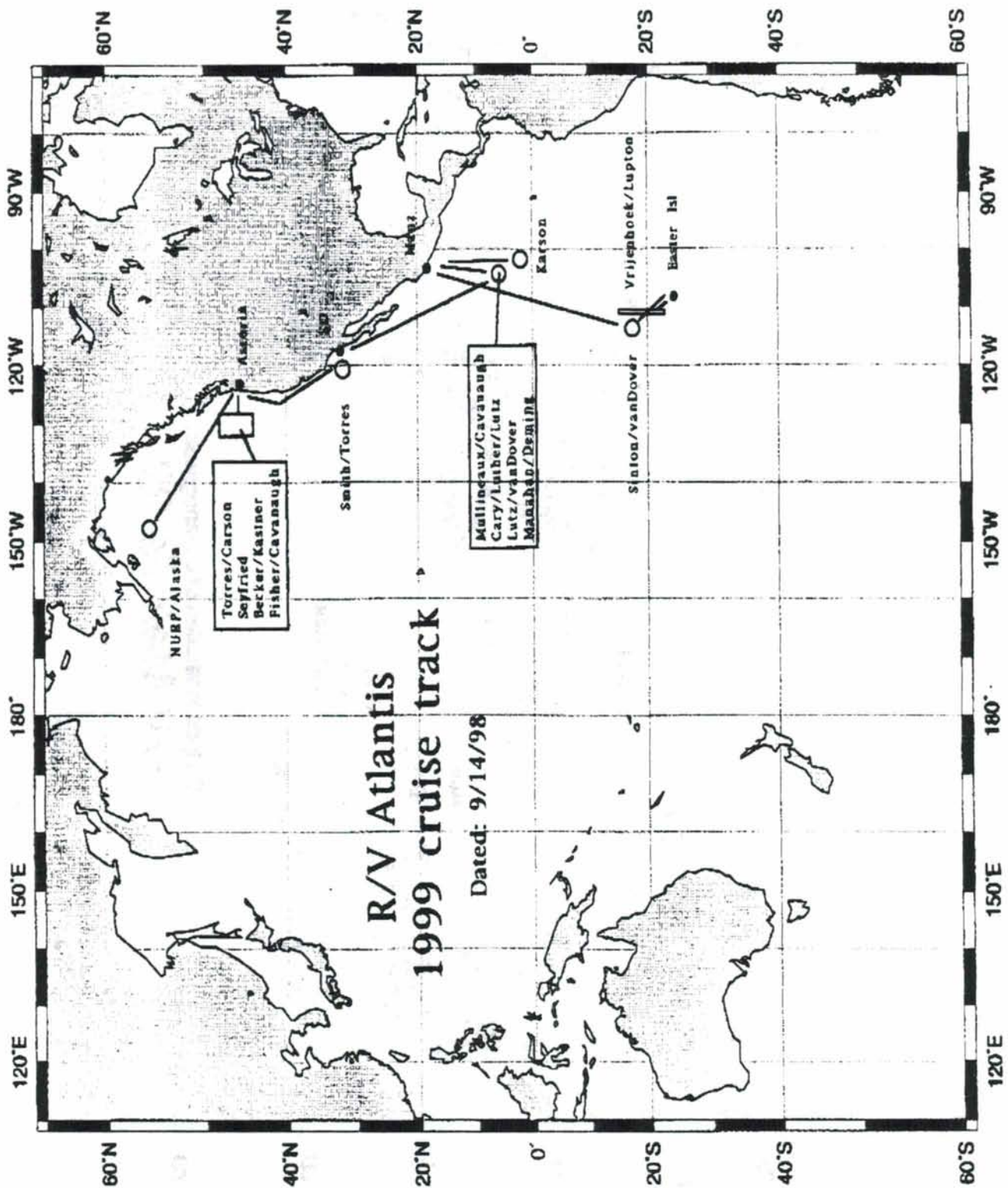
# **APPENDIX III**

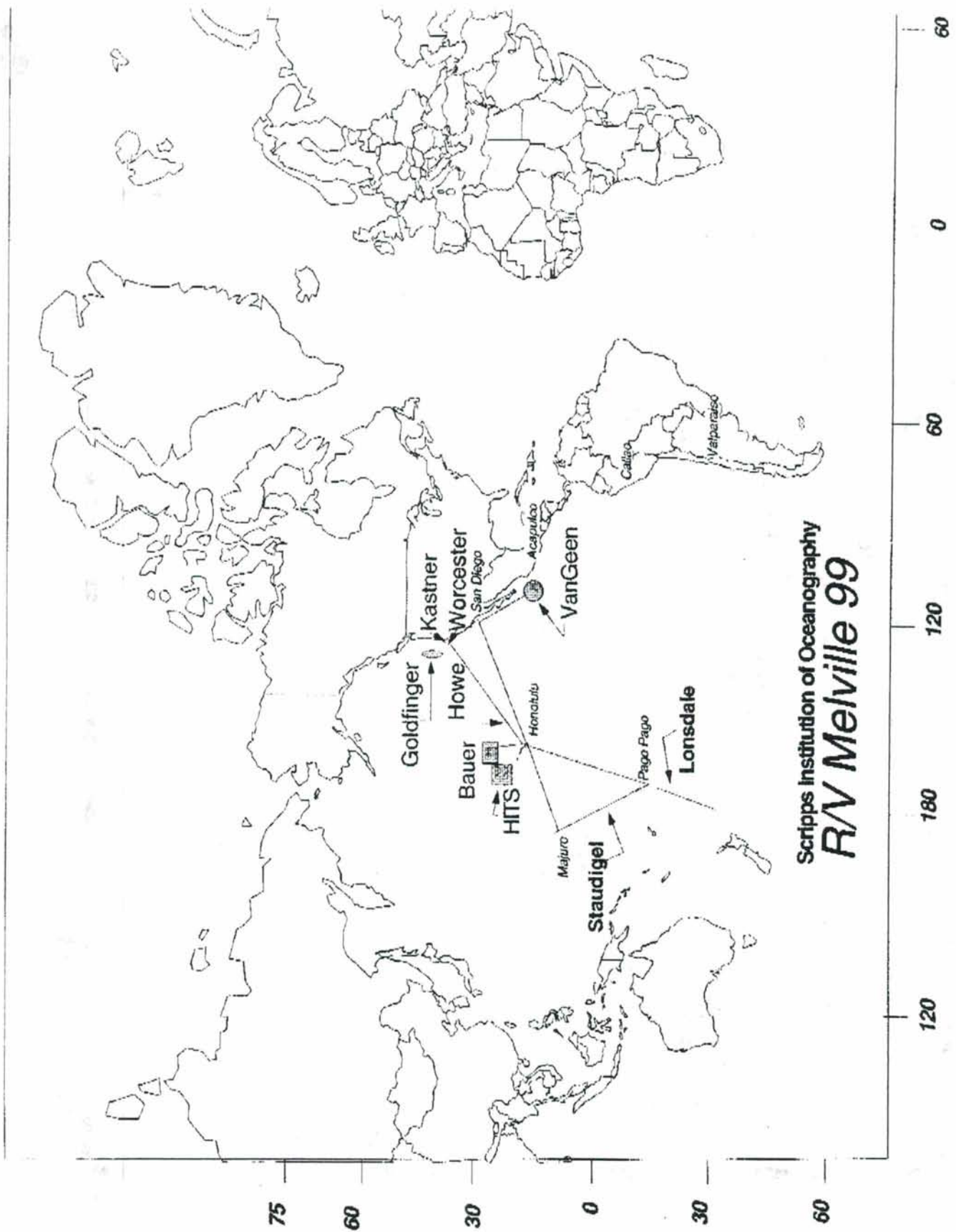
		YEAR: 1998									
SHIP/CLASS	DAY	NSF	NAVY	NOAA	DAY	OTHER	DAY	DAY	DAY	TOTAL	DAILY
As of 6/22/98		\$	\$	\$		\$				\$	RATE
R. REVELLE	128	2,163	134	2,265	0	0	54	913	316	5,341	16,902
MELVILLE	174	2,831	12	195	23	374	7	114	216	3,514	16,269
KNORR	189	3,119	72	1,188	0	0	4	68	266	4,373	16,502
ATLANTIS	205	3,188	10	156	26	406	32	488	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	948	0	0	86	1,360	277	4,380	15,812
MOANA WAVE	111	1,443	17	221	23	298	18	234	169	2,197	13,000
CLASS III	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	81	819	182	1,638	9,000
ENDEAVOR	0	0	0	0	168	1,573	0	0	168	1,573	9,966
OCEANUS	149	1,410	61	577	28	246	0	0	236	2,233	9,462
GYRE	21	151	27	181	0	0	74	533	122	875	7,172
NEW HORIZON	60	582	119	1,154	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	65	647	81	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	4,688
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	167	901	5,738
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	8	27	6	18	80	270	3,000
LAURENTIAN	140	616	0	0	0	0	10	44	160	660	4,400
BARNES	73	108	17	26	6	9	24	36	120	1,500	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	586	4,683
< 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)											

		YEAR: 1999								
SHIP/CLASS	DAY	NSF \$	DAY	NAVY \$	NOAA \$	DAY	OTHER \$	DAY	TOTAL \$	DAILY RATE
As of: 8/1/98										
R. REVELLE *	5	83	150	2,476	380	99	1,633	277	4,571	16,502
MELVILLE *	175	2,887	73	1,205	0	4	66	262	4,158	16,500
KNORR *	0	0	0	1,000	0	0	0	0	1,000	#DIV/0!
ATLANTIS *	272	4,284	0	0	0	0	0	338	5,339	15,749
EWING *	323	4,874	0	0	0	0	0	323	4,974	15,398
T.G. THOMPSON	38	632	96	1,555	1,490	45	729	272	4,406	16,199
MOANA WAVE *	90	1,170	14	182	338	26	520	170	2,210	13,000
CLASS III	904	14,030	333	8,416	3,263	208	2,948	1,633	28,657	17,549
AVE: (7)	129	2,004	48	917	466	30	421	233	3,808	#DIV/0!
EDWIN LINK *	73	664	12	109	0	0	683	160	1,456	9,100
ENDEAVOR	71	718	15	152	?	?	1,497	234	2,367	10,115
OCEANUS *	?	?	32	320	?	?	1,630	196	1,950	10,000
GYRE *	10	78	42	328	0	0	460	111	866	7,802
NEW HORIZON *	87	836	60	516	0	0	378	201	1,729	8,602
SEWARD JOHNSON *	131	1,284	60	588	22	216	0	213	2,088	9,803
WECOMA	45	543	59	712	70	855	0	174	2,110	12,125
CLASS III	427	4,122	280	2,725	1,071	92	4,648	1,288	12,566	9,756
AVE: (7)	71	687	40	389	214	18	664	184	1,795	9,650
PELICAN	111	444	80	320	88	22	36	222	888	4,000
LONGHORN	14	56	0	0	0	0	140	49	196	4,000
POINT SUR *	50	333	83	552	0	0	339	184	1,224	6,652
CAPE HATTERAS *	50	422	90	760	0	0	93	151	1,275	8,444
ALPHA HELI *	139	1,286	0	0	194	21	46	165	1,528	9,248
R. SPROUL *	113	651	4	23	0	0	115	137	789	5,759
CAPE HENLOPEN	122	671	63	347	0	0	0	185	1,018	5,503
WEATHERBIRD II *	136	1,081	0	0	0	0	0	136	1,081	7,949
SEA DIVER *	25	120	36	173	0	0	0	61	293	4,803
CLASS IV - TOTAL	760	5,064	356	2,175	282	43	769	1,290	8,290	6,426
AVE: (9)	84	563	40	242	31	5	85	143	921	6,262
BLUE FIN *	66	161	30	73	66	27	32	136	332	2,441
LAURENTIAN	200	880	0	0	0	0	44	210	924	4,400
BARNES	78	125	0	0	11	25	40	110	176	1,600
CALANUS *	38	114	37	111	183	61	6	138	414	3,000
URRACA	15	68	0	0	0	0	491	109	569	5,128
< CLASS IV TOTAL	397	1,348	67	184	260	95	613	703	2,406	3,421
AVE: (5)	79	270	13	37	52	19	123	141	481	3,421
Fleet Total	2,488	24,564	1,036	13,500	4,876	438	8,978	4,914	51,918	10,565
AVE: (28)										

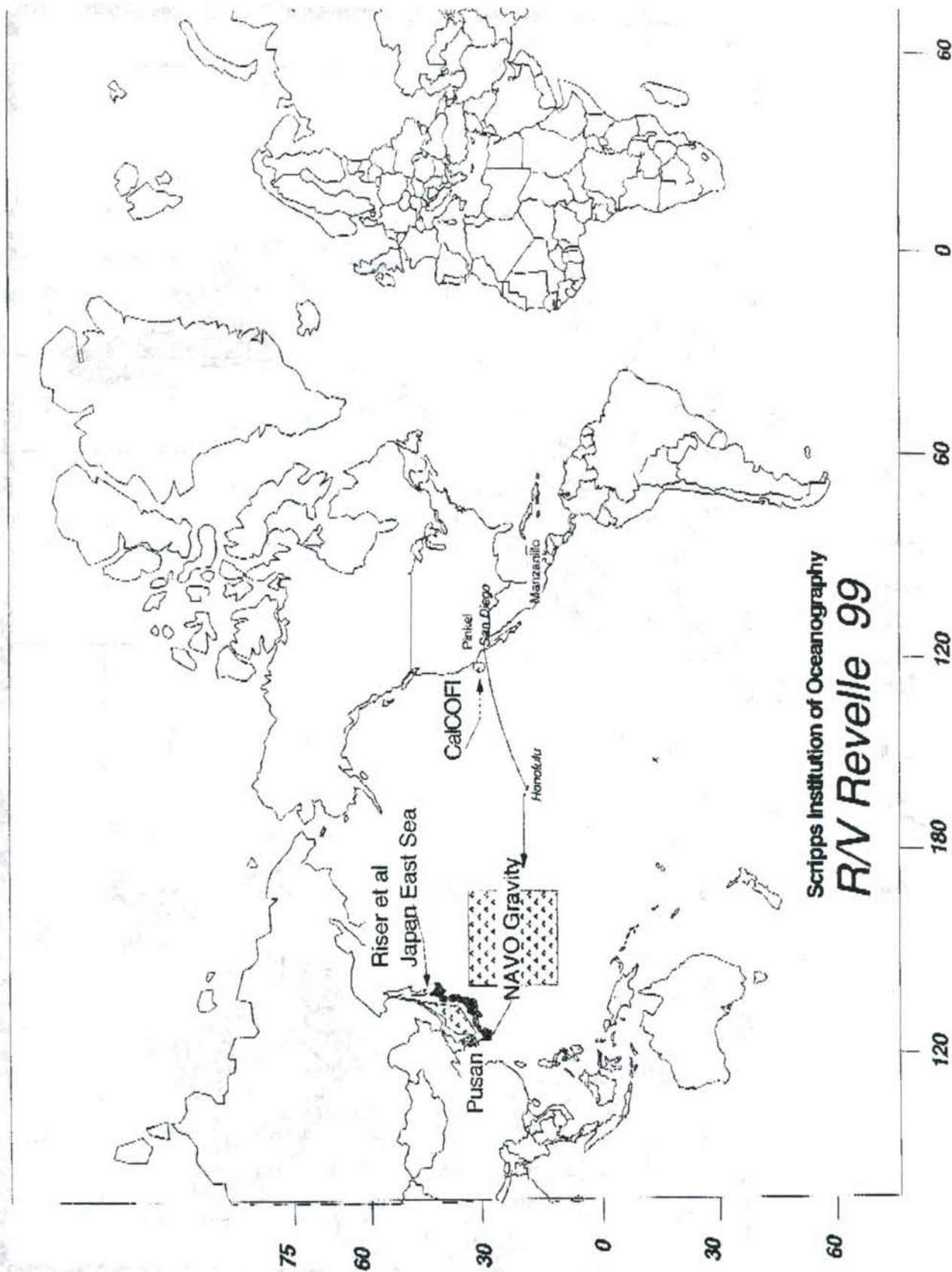
\*The daily rate has not been established as of this date.

# APPENDIX IV



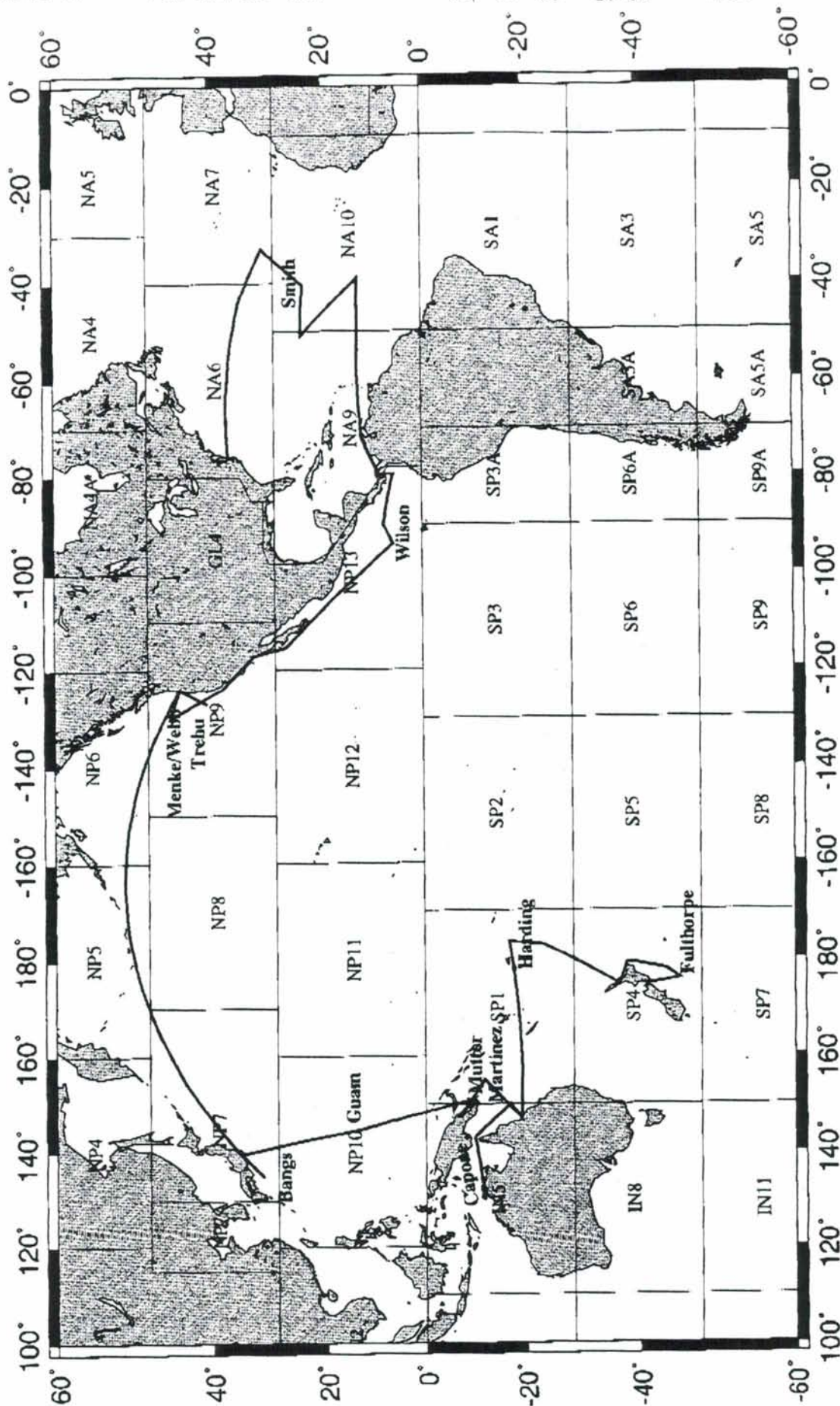


Scripps Institution of Oceanography  
**R/V Melville 99**



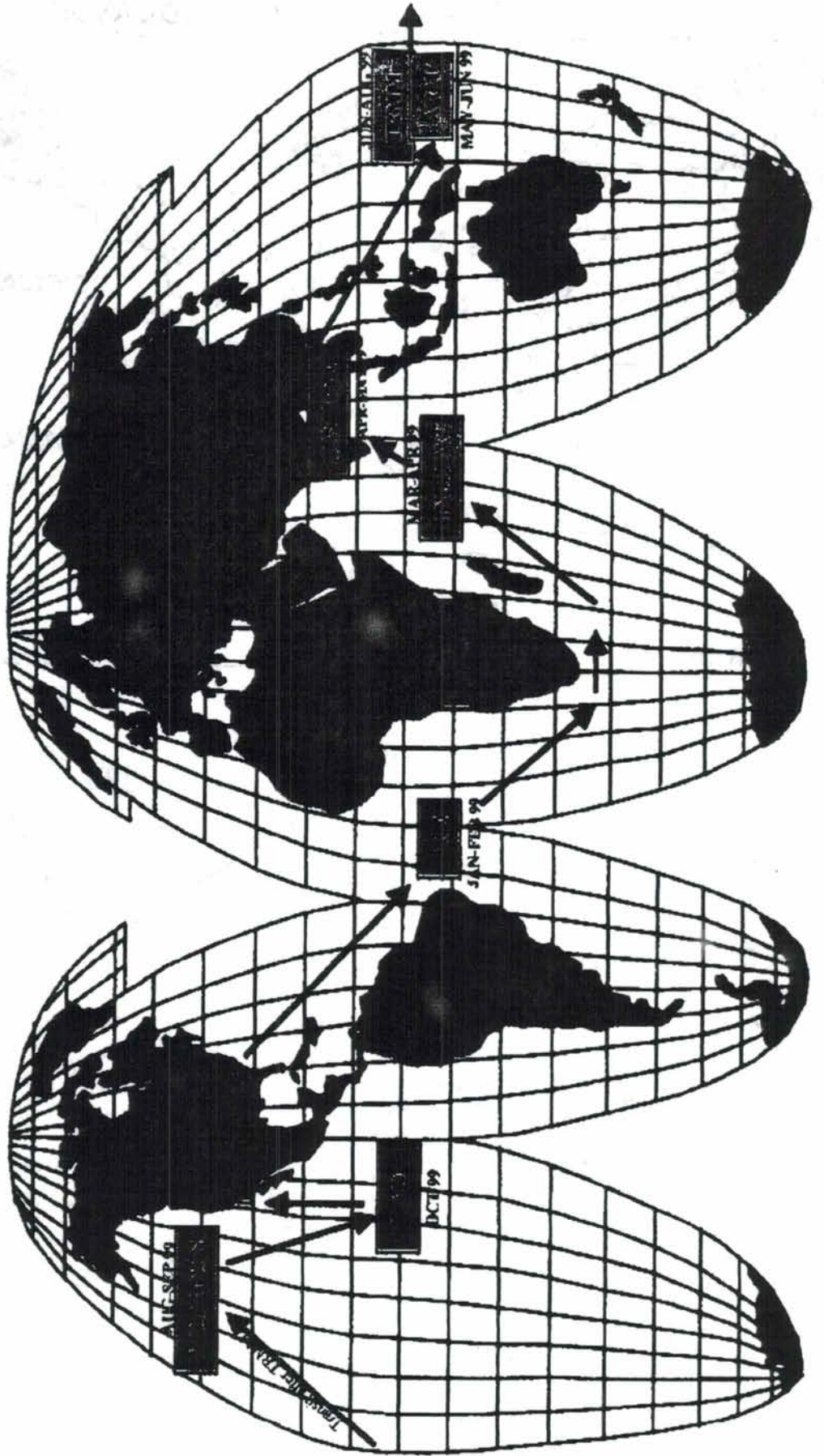
Scripps Institution of Oceanography  
**R/V Revelle 99**

# R/V Ewing 1999





# TENTATIVE CY99 RONALD H. BROWN CRUISE TRACK



R/V ENDEAVOR

REYKJAVIK

R/V ENDEAVOR  
1999

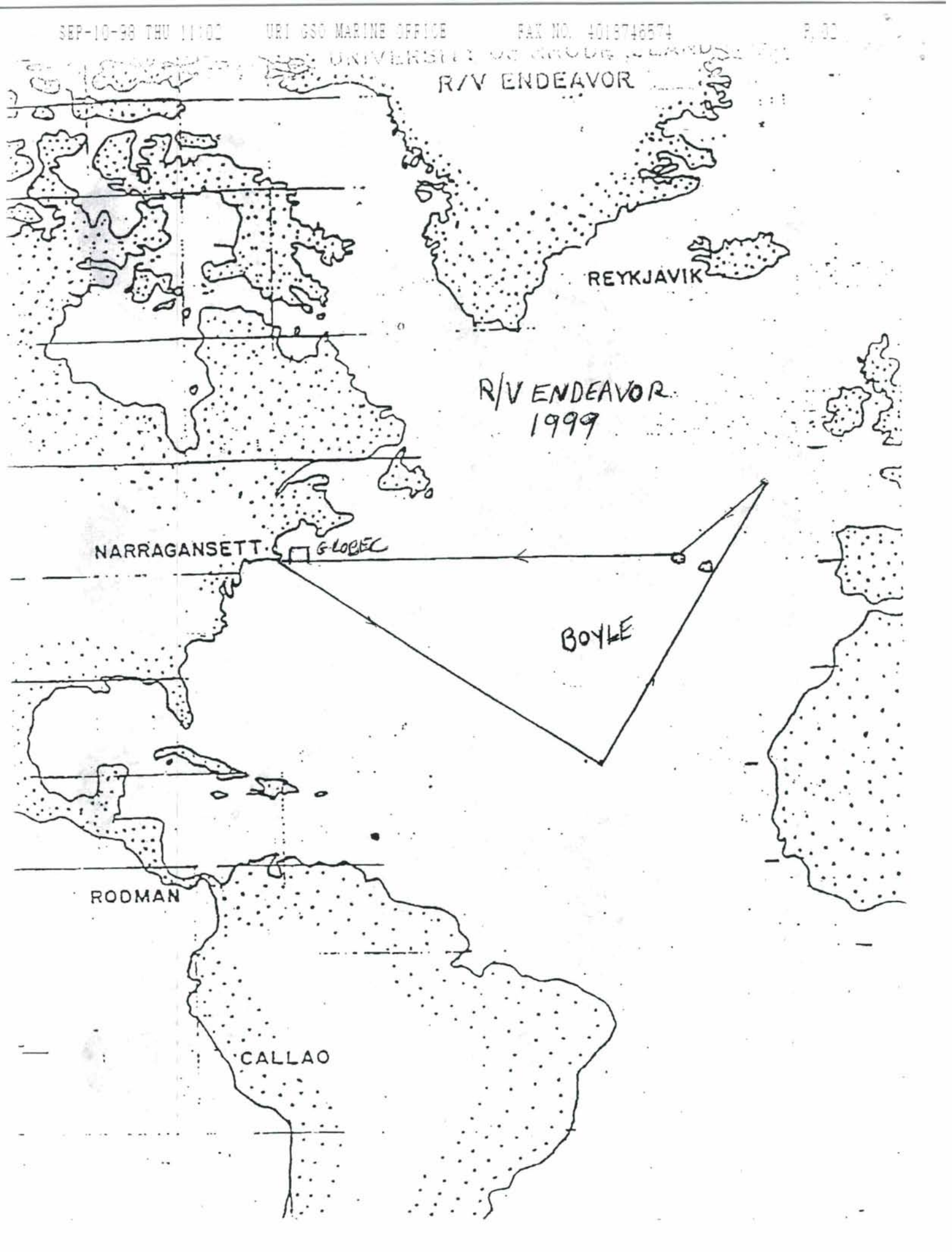
NARRAGANSETT

GLOBEC

BOYLE

RODMAN

CALLAO



**TEXAS A&M UNIVERSITY**  
**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**

