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APPLICABILITY OF
NATIONAL DATA BUOY SYSTEMS TO
REFINED NATIONAL REQUIREMENTS FOR
MARINE METEOROLOGICAL AND OCEANOGRAPHIC DATA D C

Volume II:
APPENDIXES

by

LeRoy H. Clem
Project Scientist

and

Gaylord M. Northrop

October 1968

TRC Report 7493-332b
Prepared for the U.S. Coast Guard
Under Contract No. DOT-CG-82504-A

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Views or conclusions contained in this study report should not be interpreted as official opinion or policy of the Federal Government.

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FOREWORD

Contract Number DOT-CG-82504-A between the U. S. Coast Guard and The Travelers Research Center, Inc. (TRC) consists of five parallel activities. The five final reports stemming from these activities are entitled:

- (1) Applicability of National Data Buoy Systems to Refined National Requirements for Marine Meteorological and Oceanographic Data (two volumes).
- (2) Characteristics of National Data Buoy Systems: Their Impact on Data Use and Measurement of Natural Phenomena
- (3) Cost Effectiveness Sensitivity of National Data Buoy Systems: An Essay
- (4) Computer Programs for National Data Buoy Systems Simulation and Cost Models
- (5) An Analysis of Cruise Strategies and Costs for Deployment of National Data Buoy Systems

Each of these five reports is complete in itself, but it must be recognized that in all instances the other four activities both influenced and contributed to the results presented in each individual report.

The present USCG/TRC contract is an outgrowth of a study of the feasibility of national data buoy systems performed by TRC and Albee Geophysical Associates for the USCG during 1967. Need was evident for investigation, research, and analysis in greater depth in several areas to support the concept formulation and deployment planning efforts of the newly-formed U. S. Coast Guard National Data Buoy System Designated Project Office (NDBS DPO). This report and the other four cited above satisfy some of those needs.

All five TRC reports have benefited from the close cooperation and guidance afforded by the USCG NDBS DPO. Contributions have been made by Capt. J. Hodgman (Project Manager), Cmdr. V. Rinehart, J. Wesler, E. Parker, and P. Morrill, and Lt. Cmdr. W. Merlin (Contract Monitor).

The authors wish to acknowledge the technical support and contributions provided by Paul R. MacDonald and Paul V. Luty of the TRC Technical Staff.

SUMMARY, VOLUME I

This report documents the 1968 refinement of national requirements for marine meteorological and oceanographic data -- initially compiled during the 1967 Study of the Feasibility of National Data Buoy Systems (NDBS)--and shows the applicability of certain postulated NDBS sensing characteristics to a subset of the refined data requirements. National data requirements to support operational and research activities are presented; they include physical, biological, chemical, geological, and radiological parameters which are to be measured throughout the world's oceans from the ocean bottom to 100,000 feet in the atmosphere. The data requirements are projected from the present to as far as 15 years into the future. The applicability of possible future National Data Buoy Systems (NDBS) to 1968 refined national data requirements is illustrated by the use, for reference purposes only, of the potential sensing capabilities (parameters and measurement characteristics) of a hypothetical data buoy "system".

The comprehensiveness and accuracy of the 1967 statements of data requirements were constrained by a lack of requirements collection precedence and by the usual difficulties encountered in collecting environmental data requirements from a wide variety of government agencies. The 1967 data requirements were collected without benefit of complete standardization or reference to the sensing characteristics shown to be economically and technically feasible in the 1967 TRC study. The U. S. Coast Guard was assigned development responsibility for the NDBS in November 1967. The USCG National Data Buoy Systems Designated Project Office (NDBS DPO) established a data requirements refinement effort as one activity of Contract DOT-CG-82504-A, to obtain more up-to-date, accurate, complete, and clearly-defined statements of data requirements, suitable for the initial phases of system development planning. Standardization of terms and units was sought and refinement of data requirements in the Deep Ocean (DO)* and Coastal North American (CNA)** regions were solicited from the U. S. Government agencies that had provided data requirements for the 1967 feasibility study. Throughout this work, operational data requirements have been emphasized somewhat more than research requirements because of their more stable, long-term nature and because of the potential benefits that might be realized by

*Beyond 400 n mi of North American Coast.

**Within 400 n mi of North American Coast.

implementation of an NDBS capable of satisfying operational requirements at the earliest possible time.

The 1968 data requirements refinement and the analysis of the applicability of hypothetical NDBS sensing characteristics were conducted in several phases. First, from the results of review of 1) the 1967 statements of data requirements, 2) the 1967 projected estimates of 5-year buoy state-of-the-art (SOA), and 3) the results of the 1967 feasibility study, a hypothetical data-buoy "system" was conceptualized for reference purposes (with a few important exceptions, this "strawman system" was comparable to those postulated in the 1967 feasibility study). Second, an assessment was made of how well each set of the 1967 data requirements would be met by this hypothetical "system." Third, the results of this assessment, together with questions that arose during the analysis and assessment, were forwarded to the pertinent agencies for refinement action. Fourth, responses (including answers to specific questions submitted to the agencies) were analyzed, assessed, and translated into tentative NDBS sensing characteristics needed to meet data requirements in various marine regions. Finally, the refined data requirements were interpreted in terms of tentative observation sites in hypothetical DO and CNA "system" networks in 13 geographical regions called Modular Deployment Zones (MDZ).

After receiving the TRC review and assessment of their 1967 statements of data requirements, the agencies made refinements to their data requirements in light of the potential sensing characteristics of the hypothetical technologically feasible NDBS. When the refined data requirements were returned to TRC they were again assessed and tallied in the following manner: Total operational data requirements for observations of data at sites were sorted by agency-mission-operations (AMO), by agency, by DO and CNA regions, and by 13 geographical regions called Modular Deployment Zones (MDZ). In each sort, where applicable, the distribution of requirements to collect data at observation sites was established and the redundancy or common use of observation sites, where possible, was analyzed to reduce the number of required sites. For example, various operations within an agency (or among agencies) might have requirements for data (the same or different parameters) from the same type of observational network in a given geographical area. The total number of requirements for observations would thus be larger than the number of sites required to meet them.

The required observation sites were then related to those that conformed to the network sites of the reference "system." Required observation sites were then classified as "system" or non-"system." A similar analysis of the numerical distribution of specific parameter requirements was performed for "system" and non-"system" sites within each MDZ. For each of the 13 MDZs, the total number of operational requirements for data collection at each "system" site and corresponding total requirements for specific parameters have been established, thus demonstrating the degree of utility for each "system" observation site. The complete analysis also covers non-"system" sites in the same manner and illustrates the low operational utility of these sites. A similar, but less extensive, analysis was made of research requirements that were either met or partially met by the hypothetical reference "system".

Finally, all operational requirements and selected research requirements (those research requirements for which the hypothetical "system" had considerable applicability) were combined into national data requirements and assessed for numerical distribution of requirements for observations at sites that could be assumed to be those of the hypothetical reference "system." This indicates the degree of potential utility of the hypothetical reference "system" for satisfying combined national requirements.

In total, there are 1,893 DO and 1,353 CNA requirements for data collection at sites for combined national interests that could be met by hypothetical "system" observation sites. When the potential reduction of observation sites made possible through the common use of a site is taken into account, the net number of required hypothetical "system" observation sites is 261 for the DO region and 279 for the CNA region. Thus, a 7:1 average ratio of combined requirements-for-data-collection-at-observation-sites to "system" observation sites is achieved in the Deep Ocean MDZs, and approximately a 5:1 average ratio of requirements to "system" sites is established in the Coastal North American MDZs.

Of course, these findings are based upon the assumption that the 1968 statements of refined data requirements are the best presently available and collectively represent the national interests. About mid-1968, estimates of the relative values of parameters and observing layers were solicited from four agencies with operational missions. The agency responses indicated that additional information, related to data requirements

and useful for NDBS development planning, can be obtained. This initial effort has made clear that further work of this kind should be undertaken in the future.

The ultimate sensing characteristics of various National Data Buoy Systems have not yet been finalized. The statements of data requirements presented in this report provide a base for assessment of hypothetical, technically feasible sensing characteristics,* thus adding another dimension to preliminary system development planning. Among other important features of evolving NDBS system development planning that will doubtless influence the NDBS sensing characteristics ultimately implemented are cost-effectiveness studies, trade-offs of potential development vs off-the-shelf equipment acquisition, relative values of data from contiguous geographical regions, research, economic, social, and military benefits, and national and international relative worth of the NDBS (or, the data collected by the NDBS). Within this context, the conclusions of this study are as follows.

- The continuing evolutionary nature of requirements for marine environmental data must be recognized. It is the result of numerous factors. Annual review and refinement of requirements will probably be necessary throughout the foreseeable future.
- Agency representatives have demonstrated a willingness and ability to estimate the relative importance of parameters and observing layers as part of the continued refinement of data requirements. A more intensive program to develop and exploit quantified ratings of this type should be undertaken.
- Horizontal spacings for Deep Ocean buoy networks of 600 n mi and Coastal North American network spacings of 100 to 150 n mi appear to be generally acceptable for an initial NDBS and appear to serve the stated needs of many activities. A total of 261 DO and 279 CNA data buoys would be needed to satisfy these horizontal spacing requirements in the ocean areas.
- Twenty parameters in the following table and their measurement characteristics (see Appendix IV) are suggested as representative of the basic sensing characteristics of a future DO or CNA NDBS. They are the result of the assessment of refined 1965 data requirements and appear to be generally

*Technically feasible sensing characteristics are defined as those estimated to be achievable within 5 years by conventional development effort.

acceptable to the involved U.S. Government agencies at this time. Inclusion of additional parameters of high common need or importance in specific geographic regions appears indicated. Development of new sensing capabilities for some of the additional parameters (e.g., upper air parameters) appears worthy of further consideration.

TABLE OF BASIC PARAMETERS SUGGESTED TO BE REPRESENTATIVE OF
POSSIBLE FUTURE NDBS SENSING CHARACTERISTICS

<u>Meteorological</u>	
• Air temperature	• Insolation
• Atmospheric electricity	• Precipitation rate
• Atmospheric pressure	• Wind direction
• Dew point	• Wind speed
<u>Oceanographic</u>	
• Ambient light	• Water pressure (depth)
• Ambient noise	• Water temperature
• Current direction	• Wave and swell
• Current speed	• Direction
• Salinity	• Height
• Sound speed	• Period
• Transparency	

In preparing this report, it has been the intent of the authors to document as clearly as possible the steps involved in the collection and assessment of data requirements, and the analysis leading to further delineation of the basic sensing characteristics of future National Data Buoy Systems. There is much yet to be learned about the marine environment; data requirements will likely change in the future in an evolutionary fashion. The NDBS will be but one data collection system operating ultimately within the context of a total national marine environmental data collection system. Thus, this report may be of use or guidance, not only in support of NDBS development planning, but also to agencies having requirements now or in the future for data from the marine environment and agencies having present or future responsibilities for developing and/or operating the other data collection systems that will comprise the rest of the national marine environmental data collection system.

Therefore, this report has, to the extent possible, been structured to keep this larger task in view, while at the same time concentrating on details most relevant to NDBS development.

Many of the results and conclusions discussed in this report are based on interpretations by the authors of data requirements collected from U. S. Government Agencies. Often, interpretations were made in areas that are recognized to be controversial. The cooperating agencies are encouraged to "set the record straight" on any point where these interpretations may not have hit the mark. Ultimately, it is hoped that through interactive efforts, such as described in this report, procedures that are both useful and acceptable to all concerned will evolve and the major task of developing an effective national marine environmental data collection system will be accomplished.

SUMMARY, VOLUME II

Volume II of the report, *The Applicability of National Data Buoy Systems to Refined National Requirements for Marine Meteorological and Oceanographic Data*, contains the five Appendixes for Volume I, the basic report, as listed in the Table of Contents.

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APPENDIX I
SUPPORTING DOCUMENTATION

APPENDIX I, PART A. REASONS FOR NON-INCLUSION OF PARAMETERS IN THE
TENTATIVELY PROPOSED NDBS SENSING
CHARACTERISTICS

In the 1967 compilation of 113 marine meteorological and oceanographic parameter requirements, there were 72 parameters that were considered to be measurable from unmanned buoys. After elimination of redundancy (similarity of parameters) and the computed or derived parameters, this list of 72 was collapsed to the 43 primary (observed) parameters identified in Table 2-2. Of these 43, there were 19* parameters that met the criteria for inclusion in the tentatively proposed NDBS sensing capabilities (see Table 2-5). The remaining 24 parameters are listed alphabetically on the left side of Table I-1 with an indication by (O) and (R) whether they were required for support of activities that were operational, research, or both. On the right side of the table, the reasons are given why these parameters were not included in the initial tentatively proposed NDBS sensing characteristics.

*For the purposes of this report, Sound Speed, the 20th parameter, is considered to be derived from primary (observed) parameters.

TABLE I-1
REASONS FOR NON-INCLUSION OF PARAMETERS IN TENTATIVE NDBS

<u>Parameter</u>	<u>Reason</u>
1. Albedo (R)*	There is a potential instrumentation problem, probably requiring a stabilized boom hanging out over the water surface to obtain a meaningful pyroheliometer measurement. It must continually look down on the water surface (like the Total Radiation Out instrument) and not at other sources, such as the horizon or sky.
2. Bathymetry (O*, R)	Not a rapidly changing parameter that needs several observations a day. Better done by other means (e. g. a ship) to get greater coverage along lines etc. on a not-too-frequent basis.

* (R) = Research, (O) = Operational.

TABLE I-1
REASONS FOR NON-INCLUSION OF PARAMETERS IN TENTATIVE NDBS (Continued)

<u>Parameter</u>	<u>Reason</u>
3. Biological Growth (R)	Requested only by Duke University for two points in the western Atlantic. The requirement is for a two-month duration of observation; other details are lacking.
4. Bottom Photography (0)	Requested only by N00 Code 90 ocean surveys; there is a complete lack of detail. Considered best done by a ship or deep submersible since this is a single observation made occasionally, say once a year.
5. Carbon Dioxide (R)	Requested only by Duke University for two points in the western N. Atlantic; also, there is a potential reliability problem when long unattended.
6. Gravity (0)	Requested only by N00 Code 90 Ocean Surveys, it is a one-site-at-a-time requirement for a single reading. Considered best done by a ship or submersible.
7. Ice Accumulation (R)	Requested only by the Bureau of Mines; most of the details of the requirements are unknown or not stated. Could be developed from airborne equipment and adapted for buoys.
8. Inclination (R)	Requested only by USN-Underwater Sound Lab. for less than 10 points in test ranges. This is for inclination of the mooring line at the sensor package. They have their own special equipment for this.
9. Magnetic Field (0, R) Declination D	Requested only by ESSA C + GS; it requires a highly stable platform.
10. Magnetic Field (0, R) Inclination I	Requested only by ESSA C + GS and requires a highly stable platform.
11. Magnetic Field Intensity F (0, R)	Requested by three agencies. ESSA C + GS wants both intensity and direction. This requires a highly stable platform. The USN Marine Engineering wants data from one

TABLE I-1
REASONS FOR NON-INCLUSION OF PARAMETERS IN TENTATIVE NDBS (Continued)

<u>Parameter</u>	<u>Reason</u>
11. Magnetic Field Intensity F (0, R) (Continued)	isolated area near the U.S. coast. N00 Code 90 has a one-site-at-a-time requirement for a single reading about once a year. Latter two requirements considered best met by ship or submersible.
12. Oxygen (0, R)	There is a potential instrumentation problem: that of developing sufficient reliability and stability for a year of unattended, remote operation.
13. pH (R)	Requested only by USN Marine Engineering Lab. for bottom measurement only and one point at a time along the east coast and in the Caribbean Sea. Another case of potential instrumentation problem of sufficient reliability and stability for a year of unattended operation.
14. Propagation Loss (0)	Requested only by N00 Code 90 Ocean Surveys; the details of requirements for spacing between source and receipt were not given. Better done by ocean survey ship, possibly in conjunction with a special buoy or more likely another ship some distance away.
15. Radiological Chemicals (0)	Requested only by FWPCA for estuaries and near shore. Details of requirements are vague.
16. Sediment Deposit (0, R)	Requested by three AMOs. Area wanted by USCG is polar region; outside area planned for system. N00 Code 90 requires two points only and details are lacking. The requirements by the University of Washington is for sediment load and details of measurement characteristics were unknown. This is a slowly varying parameter probably better done by other means.

TABLE I-1
REASONS FOR NON-INCLUSION OF PARAMETERS IN TENTATIVE NDBS (Continued)

<u>Parameter</u>	<u>Reason</u>
17. Tidal Fluctuation (0, R)	No instrumentation problem out to 100 feet depth. At greater depths there is a question whether the accuracy requirement (for absolute values) could be met by pressure gauge method due to both long and short term drift of instrument. This bottom observational instrument is steadily being improved. Requires continuing reevaluation.
18. Total Cloud Amount (0, R)	This parameter was judged better measured by weather satellite.
19. Total Radiation In (R)	This parameter is assumed to be the same as insolation, because of the way the requirements were stated.
20. Total Radiation Out (R)	There is a potential instrumentation problem. It may take a special boom hanging out over the water surface to obtain a meaningful measurement. This instrument must continually look down at the water surface and not at other sources such as the horizon or sky.
21. Turbidity (R)	Requested by USN Mine Defense Laboratory for small area near Panama City out to 600 feet depths. Also requested by USN Marine Engineering Laboratory for a bottom measurement only and one point at a time along the east coast and in the Caribbean Sea. Expect measurement of transparency to be equivalent.
22. Vertical Current (R)	There is a potential instrument reliability problem due to long unattended periods of operation.
23. Visibility (0) (In surface layer)	There is a potential instrumentation problem. The instrument measures integrated back-scatter from a controlled light source over a range of about 100 meters. This gives a measure of visibility sampled around the buoy with some indication of greater distances.

TABLE I-1
REASONS FOR NON-INCLUSION OF PARAMETERS IN TENTATIVE NDBS (Continued)

<u>Parameter</u>	<u>Reason</u>
23. Visibility (0) (in surface layer) (Continued)	From a conservative viewpoint, this is not exactly how visibility is generally measured.
24. Water Level (R)	Special for Great Lakes only. Involves reference of water levels to a standard marker on the land. Usually measured by fixed instrument like tide gauge.

APPENDIX I, PART B. AN EXAMPLE OF AN ASSESSMENT SHEET FOR THE 1967
DATA REQUIREMENTS

Assessment of Agency-Mission-Operation (AMO) Data Requirements

The attached two tables present in brief form an assessment of an agency-mission-operation requirement for oceanographic and marine meteorological data. The basis for the comparison and assessment is the parameter-measuring capabilities and characteristics of the tentative operational National Data Buoy "System" outlined in the course of the 1967 study of the Feasibility of National Data Buoy Systems.

In the first table, the given tentative data buoy system capabilities and characteristics are a product of common, operational requirements derived from Federal Agencies' requirements solicited in early 1967, and from estimates of the five-year state-of-the-art for buoys, sensors, and other system elements.

The development of National Data Buoy Systems by the USCG Project Management Office must be based on valid evolutionary requirements for oceanographic and marine meteorological data, both for operational and research use. The purpose of this assessment and its review by agencies is directed, first, to ensuring that all stated data requirements take cognizance of the anticipated potential of the tentative operational data buoy system and, second, to ensuring that capabilities are provided where feasible to meet all other justifiable requirements.

The first of the two attached assessment sheets presents at the top the tentative data buoy system capabilities and characteristics for the 20 parameters to be measured to satisfy common, operational data requirements. In the center of the page are the agency's data requirements comparable to the tentative "system" capabilities. At the bottom of the page is an assessment of all AMO data requirements, in terms of "requirements fully met," "Requirements partially met and why," and "requirements not met and why." The second page presents characteristics of all data requirements not met by the tentatively proposed "system." Parameters listed at the top of this page might be met - at least partially - provided certain problem areas can be resolved. Agency assistance is requested to establish where possible an acceptable approach for the development of a sensing capability for measuring these parameters. Parameters listed at the bottom of the second sheet are presently considered to be beyond the

five-year state-of-the-art for a buoy system operating unattended for at least one year. Agency concurrence, or non-concurrence and further assistance as noted above, is requested in conjunction with this assessment.

ASSESSMENT SHEET FOR 1967 DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NOBS SENSING CHARACTERISTICS

OCEANOGRAPHIC																	METEOROLOGICAL				
Parameters		OCEANOGRAPHIC												METEOROLOGICAL							
Characteristics		Cur. dir.	Salinity	Sound speed	Water temp.	W. press. (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements ^a			Air temp	Atmos. press.	Dew point	Inso- lation	Precip. rate	Wind speed			
Geographic location		Deep Ocean, American Coast out to 400 n. mi.																			
Vertical layer		5% to 5000 m depth																			
Range (5 yr RDA)		0 to 360°	0 to 42.0/50	4500 to 5000 fms	-5 to 40°C	0 to 10 ⁴ psi	0 to 2.0 11/m	-65 to -20 db	0 to 100% m	0 to 100 ft	-25 to 60°C	0 to 1000 mb	25 to 40°C	0.1 to 2.0 in/hr	0 to 100 in/hr	0 to 100 kt	0 to 100 mph				
Max error (5 yr RDA)		5°	0.03 kts	0.01 0/100	1 fms	0.01°C	0.1%	3 db	1%	0.3 ft	0.1°C	0.1 mb	0.5°C	1%	0.01 in./hr	0.5 kts or 5%	0.5 mph or 5%				
Duration of obs.		1 hr. or short period avg. (Representative)																			
Sampling Interval		X, Y 1 sec																			
Time		20 Sec. levels (IAPD)																			
Obs. synch.		X, Y, Z 10 min. (1 min)																			
Includes Measurements of Swells																					

^a Includes Measurements of Swells

2. AMO 210 REQUIREMENTS Agency Name - Support of Global Operations

Geographic location	Deep Ocean, N. American Coast out to 400 n. mi.
Vertical layer	Surface to 5000 fms
Range	0 to 4500 m
Maximum error	5'
Duration of obs.	1 hr. or short period avg. (Representative)
Sampling Interval	X, Y 1 sec
Time	20 Sec. levels (IAPD)
Obs. synch.	X, Y, Z 10 min. (1 min)

3. RESULTS OF ASSESSMENT

Requirements fully met: Wave Measurements, Air Temperature, Atmospheric Pressure, Dew Point, Precipitation Rate and Wind Velocity.

Requirements partially met and why: All other requirements listed in 2 above would be met with the exception of

- the 30 min duration of obs for current dir. and speed: Tentative "system" allows 10 min.
- the 50 m Z sampling intensity for salinity and water temp. thru thermocline: Tentative "system" has 100 m increments from 200 to 600 m.

Requirements not met and why: Tidal Fluctuation: Uncertainty about obs from buoy unattended for long periods
Total Cloud Amount: Judged better done by other means
Cloud Base and Rawinsonde: Considered beyond 5-year Buoy SOA.

"GREY AREA" PARAMETERS NOW IN QUESTION FOR THE PROPOSED DATA BUOY SYSTEM

Parameter	Total Time
Case location	DO/CNA
Vertical layer	SFC above
Range	0 to 0.20
Maximum error	30 ft 10/10
Duration of obs	1 PI 2/10
	Inst Inst
X, Y	600/100 R.M.L. R.M.L.
Z	N/A N/A
Time	12/6 12/6
Ob. sync	X, Y 10 10 10 10 Z N/A N/A

1-10

PARAMETERS CONSIDERED BEYOND THE 5-YEAR STATE OF THE ART FOR THE PROPOSED BUOY SYSTEM

Parameter		Cid Base in- (Temp, Press, RH, and Wind)
Core local tm		DO/CNA
Vertical layer		SPC TO SPC TO 50K FT 50K FT
Range		100 To 50K FT
Maximum error		20% Std
Duration of ab		1 hr 1 inst
Sampling frequency	X, Y	600/100 600 N/A N/A
	Z	N/A 100/100
	Time	12/6 12 N/A N/A
Obs. sync.	X, Y	100/100 1 hr
	Z	N/A 1 hr

APPENDIX I, PART C. GENERAL QUESTIONS FOR AGENCY REPRESENTATIVES

General Questions Related to the Refinement of Data Requirements

The attached statements and general questions pertain to problems that arose during the assessment of agencies' requirements for oceanographic and marine meteorological data. These problems need resolution to enable establishment of complete and valid data requirements for use in the development of evolutionary national data buoy systems. Following a review of the accompanying assessment of previously stated data requirements, the agencies are requested to submit coordinated answers to each of the applicable attached general questions.

(In addition to the general questions, specific questions have been prepared for each agency-mission-operation.)

General Questions

1. An assessment is being made to determine the duration of observation for each parameter that will be representative for the data use and for the particular type of buoy employed. Present indications are that the time span of representative observations will be either instantaneous (i.e., few secs. or less) or a short period average (i.e., 10 minutes or less). Will this approximation to your stated requirements suffice? If not, please detail duration of observation (time span) acceptable for each parameter and reasons for requirement.
2. The maximum allowable errors (acceptable accuracies) for certain parameters, e.g., Current Speed, Wave Height, Wave Period, and Wind Speed, should be expressed as a more stringent accuracy for low values in the range and more relaxed for the higher values of the parameter. For example, in the tentative national characteristics for Current Speed, the potential 5 yr SOA is expressed as 0.03 kts or 1% - the appropriate (or greater) value should be applied according to the magnitude of the current speed (0.03 kts accuracy applies to speeds up to 3 kts and 1% applies above 3 kts). Will you please restate your appropriate maximum allowable errors in terms comparable to the listing for the tentative National Data Buoy Parameters and Characteristics for at least Current Speed, Wave Height, Wave Period and Wind Speed?
3. As indicated in the tentative data-buoy table, there will be data available for parameters other than those requested. Would any of these additional parameters be of value in the support of this operation or activity? If additional parameters are desired, please state full details of the requirement in the appropriate spaces on the attached form.
4. The vertical sampling intensity (z) for the tentatively proposed system incorporates 20 levels from the IAPSO standards down through 5000 meters - i.e., 0, 10, 20, 30, 50, 75, 100, 150, (2, 3, 4, 5, 6, 8, 10, 15, 20, 30, 40, 50) x 100 meters. Will this approximation to your stated requirements suffice? If not, please state details of your requirement for each parameter.
5. According to some of the stated requirements, there has been some misunderstanding in what is referred to as the synchronization of observations in the horizontal (x, y) and vertical (z). These characteristics are intended to define the allowable time lapse between all observations in the horizontal area of interest of a particular parameter and the corresponding allowable time lapse between all similar observations in a given vertical sensor array. Since some requirements were stated in dimensions (e.g., ft, mi, etc.) other than time, please review the statement of this characteristic with consideration given to the tentatively proposed parameter and characteristics table and make requisite revisions.

6. There was a division made at 400 n. miles from the N. American coast between the broad synoptic-scale requirements of the deep ocean (about 500 n. mi spacing) and the finer scale requirements of the continental shelf and/or coastal waters of N. America (about 100 n. mi spacing). These spacings were not intended to be uniform throughout these areas but would be a function of the variability of the parameters of interest. However, the division between scale of the spacing between observations for the coastal water requirements and the really fine (micro-scale) requirements of the near shore and estuary observations has not been as clearly defined. I am tentatively planned to deploy the first line of buoys for the medium-scale coastal water requirements in the order of 10 to 25 n. miles out from the shore line. Please state any requirements that deviate from this.
7. Different agencies have requested tidal fluctuations, tide height, deep sea tide and tidal variations. Are these parameters the same and thus could be measured by the same instrumentation? If not, please give details of the special requirement and the recommended means for satisfying it.
8. In many cases x, y sampling intensity which should be given in nautical miles was stated in "miles." This can cause a misunderstanding of the requirement. Please give this value in nautical miles (e. g., 400 n. mi), it is not now in that form.
9. Do requirements for data "to the bottom" imply the need for a recoverable sensor package rigidly attached to some portion of the anchoring system, regardless of ocean depth? If so, give complete requirements for all parameters to be measured at this ocean bottom location.
10. If we have missed an area where some difficulty exists between a given requirement and the tentatively proposed capabilities of the data-buoy system would you please identify and state the problem that needs resolution and include a discussion or clarification.

APPENDIX I, PART D. TYPICAL SPECIFIC QUESTIONS FOR AGENCY REPRESENTATIVES

I.D.1 Specific Questions Related to the Refinement of Operational Data Requirements

The attached specific statements and questions arose during the assessment of individual agency-mission-operation (AMO) requirements for oceanographic and marine meteorological data. These questions need answers to enable the establishment of complete and valid data requirements for use in the development of evolutionary national data buoy systems. Following a review of the accompanying assessment of the applicable AMO data requirements, the agency is requested to submit coordinated answers for each of the attached questions.

(In addition to these specific questions, general questions have been prepared covering problems associated with many AMOs.)

TYPICAL SPECIFIC OPERATIONAL QUESTIONS
FOR AGENCY REPRESENTATIVES

1. Is the parameter water pressure (depth) needed only as a reference for the depth at which other oceanographic parameters are measured or as an independent observation? If the latter, please state the detailed characteristics of the requirement.
2. The stated requirement for vertical sampling intensity (Z) of 50 meters from the surface to a depth of 1000 meters for the oceanographic parameters will be met only to a depth of 200 meters since the tentative "system" is planning 100 meter increments from 200 meters to 600 meters and then 200 meter increments through 1000 meters. Will this approximation to your stated requirements suffice?
3. In view of your entries of "unknown", are the proposed ranges and accuracies for the tentative data-buoy "system" parameters as listed on the top of the assessment sheet adequate for the support of your activity? If not, please state desired values.
4. In view of the stated requirement for x, y spacing of 150 n miles for observations in the Deep Ocean, will data from the proposed 500 n mile average grid spacing be of at least limited value?
5. What is the greatest depth implied by the vertical layer requirement of surface to near bottom for the oceanographic parameters?
6. The ranges of air temperature, dew point, and sound speed are slightly different from the proposed system. Will proposed system values suffice?

7. Please clarify duration of observation (6 min.) and time sampling intensity (6 min.) requirements. Does this imply a continuous observation?
8. Is 60 minute duration of observation for wind and current an essential requirement or would a representative short period average (e. g. , 10 minutes or less) suffice?
9. Define in greater detail the current transport requirement. Is this computed from other measurements? Will the current measurement capability of the tentative system be of value?
10. Define in greater detail the bottom temperature requirement. Is this intended to be measured only within depths of 625 meters? Does the requirement for bottom temperature imply a sensing device located on the bottom? If not, how close to the bottom is measurement required? (There are practical problems associated with a measurement directly on the bottom and more information is needed. Please give complete details of this requirement.)
11. Are these data obtained primarily at other agencies' requests or for your own use? If these data are obtained for the support of other agencies, please explain in detail which agencies and for what use.
12. Please state details of required biological and chemical parameters and characteristics.
13. Is it essential that the measurement of the geomagnetic field be made at the surface or within 20 meters of surface? Would measurements from a stable platform on the ocean bottom be of value? If not of value in general, would it be of value on the continental shelf?
14. What is the required depth of the vertical layer for measuring oceanographic parameters? (Surface to what depth for each parameter?)
15. Are the 50 n mile x, y spacing and the 1 hour time sampling intensities essential? Would a spacing of approximately 100 n miles and a 3 hour observing and reporting time be of value in the support of your activities? If not, how far from the coast is the 50 n mile spacing and 1 hour time frequency required (e. g. , 50 n miles, 100 n miles)?
16. In view of your "no stated data requirements" and the potential of the tentatively proposed data buoy "system" for marine data collection as indicated at the top of the assessment sheet, are there now any marine meteorological or oceanographic data requirements needed for support of any activity in your agency?

I.D.2 Specific Questions Related to the Refinement of Research Data Requirements

The tentatively proposed national data buoy system, having the parameter-measuring capabilities and characteristics listed in the accompanying data requirements assessment sheets, is intended to meet common national data requirements. Actually, the tentative system satisfies more operational data requirements than those for research, although the tentative development plans provide for a system having the flexibility to extend some capabilities to meet a number of research data requirements. Of course, operational data requirements are generally more easily met, because, for corresponding parameters, special and temporal research data requirements are often more stringent and subject to frequent change.

The preliminary technical development plan presented in the 1967 Feasibility Study of National Data Buoy Systems includes funding for a number of special purpose buoys to meet research requirements that exceed the capabilities of the operational data buoy networks.

Agency assistance is requested for the resolution of problem areas arising from the assessment of research requirements that are only partially met or are not met by the tentative operational data buoy networks. Following a review of the accompanying assessment of previously stated research data requirements, the agency is requested to submit answers to each of the applicable attached questions.

Specific Questions for Research Data Requirements

1. Can any research data requirements be re-stated to take advantage of the potential capabilities and characteristics of the tentatively proposed operational system? Please give details of revised or augmented requirements.
2. Which of the stated requirements for measurement of parameters could be met by the tentative data buoy system capabilities by a reduction of grid spacing, a change in position and number of measurements in the vertical, and an increase of temporal reporting? What is the maximum acceptable grid spacing, minimum acceptable number and depths of vertical measurements, and the maximum acceptable reporting period? What area coverage is required (coordinates of region)? How long would the indicated intensity of data collections be required from each specified region?

3. The tentative data buoy system does not include capabilities for measuring many parameters of importance to research, such as chemical properties of ocean water, nutrients, biological variables, magnetic field characteristics, etc. Can the agency recommend instrumentation capable of measuring any of the required (specific) parameters from a data buoy unattended for long periods of time? Give details.

APPENDIX I, PART E. LIST OF INVITED AGENCY DELEGATES

Atomic Energy Commission:

Mr. Stanley S. Seiken
Reactor Development & Technology Division
Atomic Energy Commission
Washington, D. C. 20545

Environmental Science Services Administration:

Dr. Richard E. Hallgren
Director World Weather Systems
Environmental Science Services Administration
Rockville, Maryland 20852

Bureau of Sport Fisheries & Wildlife:

Dr. Lionel A. Walford
Director
Sandy Hook Marine Laboratory
P. O. Box 428
Highlands, New Jersey 07732

Bureau of Commercial Fisheries:

Dr. Julius Rockwell
Bureau of Commercial Fisheries
1801 North Moore Street
Arlington, Virginia 22209

Maritime Administration:

Mr. Raymond T. Traut
Division of Operations
Office of Ship Operations
Maritime Administration
Department of Commerce
Washington, D. C. 20235

Federal Water Pollution Control Administration:

Mr. T. A. Wastler
Office of Estuarine Studies
Federal Water Pollution Control Administration
633 Indiana Avenue, N. W.
Washington, D. C. 20242

U.S. Public Health Service:

Captain James L. Verber
Northeast Marine Health
Science Laboratory
South Perry Road
Narragansett, Rhode Island 02882

U.S. Navy:

M. E. Garrison, RALM, USN (Ret.)
Op-0935 Staff
Oceanographer of the Navy
The Madison Building
732 N. Washington Street
Alexandria, Virginia 22314

U.S. Army Corps of Engineers:

Mr. Joseph Caldwell
Chief Technical Advisor
Coastal Engineering Research Laboratory
5201 Little Falls Road, N.W.
Washington, D. C. 20016

U.S. Air Force, Air Weather Service:

Mr. William C. Huyler
Department of the Air Force
Headquarters Air Weather Service (MAC)
Scott Air Force Base, Illinois 62225

Federal Aviation Agency:

Mr. Joseph D. Blatt
Associate Administrator for Developments
Room 1016, Federal Aviation Agency
Washington, D. C. 20553

National Aeronautics & Space Administration:

Dr. J. Robert Porter (SAR)
Program Chief, Earth Resources Survey
Space Applications Programs Office
NASA
Washington, D. C.

Department of State:

Mr. Garret Soulen
Science Officer
Department of State
Washington, D. C. 20520

Bureau of Mines:

Mr. Arthur P. Nelson
Research Director
Marine Mineral Technology Center
United States Bureau of Mines
3150 Paradise Drive
Tiburon, California 94920

Smithsonian Institution:

Dr. I. E. Wallen
Office of Oceanography & Limnology
Smithsonian Institution
Washington, D. C. 20560

National Science Foundation:

Dr. Fred D. White
Head, Atmospheric Science Section
Division of Environmental Sciences
National Science Foundation
Washington, D. C. 20550

U.S. Geological Survey:

Dr. Joshus I. Tracey
Deputy Chief
Office of Marine Geology & Hydrology
U.S. Geological Survey
Department of the Interior
Washington, D. C. 20242

APPENDIX I, PART F. LIST OF OBSERVERS INVITED TO DATA REQUIREMENTS
REFINEMENT MEETING

I.F.1 List of Invited VIP Observers

Bureau of the Budget:

Mr. Richard Rettig
Budget Examiner
Bureau of the Budget
Executive Office of the President, Room 330-1/2

Commission on Marine Science Engineering and Resources:

Dr. Samuel A. Lawrence
Executive Director
Commission on Marine Science Engineering and Resources
Washington, D. C. 20500

National Council on Marine Resources and Engineering Development:

Mr. H. A. Arnold
Executive Office of the President
National Council on Marine Resources and Engineering Development
Washington, D. C. 20500

Federal Council for Science and Technology:

Dr. Charles V. Kidd
Executive Secretary
Federal Council for Science and Technology
Office of Science and Technology
Executive Office Building, Room 203
Washington, D. C. 20506

Council of Economic Advisors

Dr. Jack W. Carlson
Staff Economist
Council of Economic Advisors
Executive Office of the President
Washington, D. C. 20506

National Science Foundation - Sea Grant Programs:

Mr. Robert B. Abel
Head, Office of Sea Grant Programs
1800 G. Street, N.W.
Washington, D. C. 20550

National Security Agency:

Director
National Security Agency
Attention: R41 (Stenson)
Fort George C. Meade
Maryland 20755

Scripps Institute of Oceanography:

Mr. James M. Snodgrass
Scripps Institute of Oceanography
La Jolla, California 92037

Chevron Research Company:

Dr. F. C. Blake
Senior Research Scientist
P. O. Box 446
La Habra, California 90533

I.F.2 List of Invited Organization Observers

Committee on Marine Research, Education, and Facilities:

Dr. Edwin Shykind
Executive Secretary
Committee on Marine Research, Education, and Facilities
Building 159 B, Room 476, Washington Navy Yard
Washington, D. C. 20390

Committee on Ocean Exploration and Environmental Services:

Mr. Walter Hahn
Executive Secretary
Committee on Ocean Exploration and Environmental Services
Room 918, Building 5
6010 Executive Building
Rockville, Maryland 20852

DEMAP Study Group:

Mr. John C. Fry
Executive Office of the President
National Council on Marine Resources and Engineering Development
DEMAP Study Group
Washington, D. C. 20500

MARPEP Task Group:

CDR. R. C. Junghans, USN
Chairman, MARPEP Task Group
Page #1 Building
2001 Wisconsin Avenue, N. W.
Washington, D. C. 20235

Interdepartmental Committee for Atmospheric Sciences (ICAS):

CAPT. Sherman K. Betts, USN (Ret)
Executive Secretary
Interdepartmental Committee for Atmospheric Sciences
Room 5849, Department of Commerce
Washington, D. C. 20230

Interdepartmental Committee for Meteorological Services (ICMS):

Mr. C. E. Roache
Chairman
Interdepartmental Committee for Meteorological Services
Page #1 Building
2001 Wisconsin Avenue
Washington, D. C. 20235

Interdepartmental Committee for Applied Meteorological Research (ICAMR):

Mr. Clayton E. Jensen
Chairman
Interdepartmental Committee for Applied Meteorological Research
Room 348, Page #1 Building
2001 Wisconsin Avenue
Washington, D. C. 20235

National Academy of Sciences Committee on Oceanography (NASCO):

Dr. John C. Calhoun Jr.
National Academy of Sciences
Committee on Oceanography
2101 Constitution Avenue
Washington, D. C. 20418

National Academy of Engineering, Committee on Ocean Engineering:

Dr. Russell Keim
Executive Secretary
Committee on Ocean Engineering
National Academy of Engineering
2101 Constitution Avenue
Washington, D. C. 20418

National Security Industrial Association, OSTAC:

CDR. John H. Jorgenson USN (Ret)
Committee Executive, OSTAC
National Security Industrial Association
Suite 800
1107-19th Street, N. W.
Washington, D. C. 20036

National Oceanographic Data Center:

Dr. Thomas S. Austin
Director
National Oceanographic Data Center
Washington, D. C. 20390

National Science Foundation, Biological & Medical Sciences:

Dr. Harve J. Carlson
Division Director
Biological and Medical Sciences
National Science Foundation
1800 G Street, N. W.
Washington, D. C. 20560

Bureau of Commercial Fisheries:

Mr. Glenn A. Flittner
Bureau of Commercial Fisheries
Box 271
La Jolla, California

U. S. Air Force - Air Proving Ground Center - Eglin AFB:

COL. Brant Walker
Air Proving Ground Center (APGC)
Office of the Staff Meteorologist
Eglin Air Force Base
Florida 32542

Hurricane Research Laboratory:

Mr. Robert C. Gentry
Director Hurricane Research Laboratory
Miami, Florida

Atomic Energy Commission - Environmental Science Branch - Division of Biology & Medicine:

Mr. Arnold Joseph
Marine Scientist
Environmental Science Branch
Division of Biology & Medicine
U. S. Atomic Energy Commission
Washington, D. C. 20545

U.S. Arms Control and Disarmament Agency:

Dr. Herbert Scoville
Assistant Director
U.S. Arms Control and Disarmament Agency
Washington, D. C.

Department of Health Education and Welfare - Water Supply and Sea Resources Program:

Chief, Water Supply & Sea Resources Program
National Center for Urban and Industrial Health
U.S. Department of Health, Education and Welfare
6935 Wisconsin Avenue
Chevy Chase, Maryland 20015

APPENDIX I, PART G. ATTENDEES AT DATA REQUIREMENTS REFINEMENT
CONFERENCE 19 MARCH 1968, WASHINGTON, D. C.

1. C. J. Glass - U.S. Coast Guard, DBP
2. CDR. V. W. Rinehart, U.S. Coast Guard, DBP
3. RADM O. R. Smeder - U.S. Coast Guard, DBP
4. CAPT. J. A. Hodgman - U.S. Coast Guard, DBP
5. A. White - U.S. Coast Guard
6. ENS V. L. Whitcomb - U.S. Coast Guard Oceanographic Unit
7. J. E. Wesler - U.S. Coast Guard, DBP
8. P. S. Branson - U.S. Coast Guard, RET
9. J. W. McGary - U.S. Coast Guard Oceanographic Unit
10. Eugene J. Aubert - The Travelers Research Center, Inc.
11. G. M. Northrop - The Travelers Research Center, Inc.
12. L. H. Clem - The Travelers Research Center, Inc.
13. J. P. Pandolfo - The Travelers Research Center, Inc.
14. Peter Mellinger - U.S. Atomic Energy Commission
15. V. Palmer - Maritime Administration
16. Ben King Duffy - Committee on Marine Research, Education and Facilities
17. Clayton E. Jensen - Office of Federal Coordinator for Meteorology
18. Sidney Marcus - National Oceanographic Data Center
19. A. R. Picciolo - National Oceanographic Data Center
20. Robert H. Martin - Naval Weather Service Command
21. CDR. R. C. Hungans - Chairman, Task Group MARPEP, (Naval Weather Service Command)
22. R. P. Cook - Naval Air Systems Command - AIRS40

23. D. M. Hanson - MARPEP (ESSA)
24. Leonard Bosin - ESSA WB Systems Engineer - Member, MARPEP Task Group
25. R. E. Moses - ESSA
26. W. O. Davis - ESSA
27. R. E. Hallgren - ESSA
28. R. F. Hill - Institute of Ocean Technology, University of Rhode Island
29. R. A. Rettig - Bureau of the Budget
30. John Roche - Office of Research & Development, Maritime Administration
31. Frank V. Melewicz - Systems Research & Development Service, Federal Aviation Administration
32. Robert A. Baltzer - Water Resources Division, U.S. Geological Survey
33. Hugh McLellan - National Science Foundation
34. Fred D. White - National Science Foundation
35. Clifford J. Murino - National Science Foundation
36. E. F. Corcoran - National Science Foundation
37. M. E. Garrison - Office of the Oceanographer, U.S. Navy
38. LT N. T. Monney - Hq Naval Material Command (MAT 0327)
39. H. V. French - NAVOCEANO
40. C. H. Cline - NAVOCEANO
41. J. Osborn - DOT
42. C. Osterberg - AEC
43. Robert Wicklund - Sandy Hook Marine Lab
44. George Nonnemaker - MITRE CORP., Bedford, Mass.
45. A. Fred Feyling - Geodyne Corp., representing Instrumentation Panel, Committee on Ocean Engineering, National Academy of Engineering

46. Robert G. Walden - Woods Hole Oceanographic Institution
47. Sherman W. Betts - I. C. A. S.
48. James M. Snodgrass - Scripps Institution of Oceanography
49. R. A. Schwartzlose - Scripps Institution of Oceanography
50. I. E. Wallen - Smithsonian Institution
51. W. Aron - Smithsonian Institution
52. W. C. Huyler - U. S. Air Force, AWS
53. E. V. von Gohren - U. S. Air Force, AWS
54. B. F. Walker - U. S. Air Force, AFSC
55. F. D. Jennings - ONR
56. F. G. Blake - Chevron Research Company
57. R. W. Farwell - Ordnance Research Laboratory, Pennsylvania State University
58. J. L. Verber - DHEW/PHS
59. T. A. Wastler - USDI/FWPCA
60. John Craven - Chairman, Panel on Ocean Engineering, Committee on Marine Research, Education and Facilities
61. A. T. Pruter - Bureau of Commercial Fisheries
62. Julius Rockwell Jr. - Bureau of Commercial Fisheries
63. John Fry - Marine Science Council
64. H. A. Arnold - Marine Science Council
65. Henry Rugo - MITRE Corp. Bedford, Mass.

APPENDIX II
COMPARATIVE TABULATIONS OF 1968 REFINED DATA REQUIREMENTS

TABLE II.A. COMPARATIVE TABULATIONS OF REFINED OPERATIONAL DATA REQUIREMENTS

AMO	Geographical Location		Horizontal Spacing		Vertical Layer	Vertical Sampling Interval	Duration of Observation	Time Sampling Interval	Synch. of Obs.		Period of Observation	Remarks				
	Constant N.A. (CNA)	Deep Ocean (DO)	CNA	DO					1	2						
F1 USA AMS		6 recovery areas 480 n. mi. diam. & 2 inner recovery lines		200 n. mi.	St.	N.A.	Inst. 5 min. in oper. 8 hr. in oper.	10 min. in oper. 8 hr. in oper.	10 min.	N.A.	Cont. with strike					
F2 USA AMS	NE Gulf of Mexico 600 mi. offshore from Vandenberg AFB		500 n. mi.		St. to bottom	LA/PS levels	10 min.	10 min.	10 min.	10 min.	Cont. with strike					
F3 USA AMS				100 to 600 n. mi.	St.	N.A.	Inst.	12 hrs.	30 min.	N.A.	Cont.					
F14 MC LaJolla	West Coast 140°W	Pho. Coast to 140°E 10°S to Alaska	60 to 120 n. mi.	20 to 600 n. mi.	St. to 100 m (transp. St. to 180 m)	LA/PS levels & bottom to 500 m	10 min. Inst. when in oper.	1 hr.	30 min.	5 min.	Cont.					
F19 MC Wash. D.C.	West Coast	Pho. Coast to 140°E 10°S to Alaska	60 to 140 n. mi.	20 to 600 n. mi.	St. to 675 m	LA/PS levels & 1/2 m from bottom	10 min.	6 hrs.	30 min.	5 min.	Cont.					
F21 MC JBY	JBY 14°N 51°W	JBY 14°N 51°W and 15°N 51°W	N.A.	N.A.	St. to 5000 m	LA/PS levels & 1/2 m from bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F24 MC Mid. Sect.	Tracks in Atl. 1 tracks in Pac.	5 tracks in Atl. 6 tracks in Pac.	4 tracks in Atl. 4 tracks in Pac.	10 to 25 n. mi. 4500 n. mi. from where 25 n. mi. 100 n. mi.	St. to 5000 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F25 MC Ice Patrol	Grand Banks 39°N to 50°N and 42°W to 55°W		4 tracks in Atl. 4 tracks in Pac.	10 to 25 n. mi. 4500 n. mi. from where 25 n. mi. 100 n. mi.	St. to 5000 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F27 MC SAR	Chesapeake Bay	Chesapeake Bay	Chesapeake Bay	Chesapeake Bay	St. to 5000 m	LA/PS levels	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F28 MC Gulf of Mexico	Coast of U.S. and Canada	W. Atl. to 20°E, E. Pac. N. of 15°S	Lines at 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 n. mi. apart	10 to 40 n. mi. 200-500 n. mi.	St. to 700 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F29 MC Herring	Arctic and Antarctic			10 to 75 n. mi.	St. to 1000 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F30 MC FBA	N.A. Coast out to 100 n. mi.	Global	60 to 150 n. mi.	100 to 400 n. mi.	St. to 5000 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F31 MC FBA	Eastern & near shore lines		10 to 100 n. mi.	10 to 100 n. mi.	St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F32 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F33 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F34 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F35 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F36 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F37 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F38 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F39 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F40 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F41 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F42 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F43 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F44 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F45 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F46 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F47 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F48 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F49 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F50 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F51 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F52 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F53 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F54 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F55 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F56 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F57 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F58 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F59 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F60 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F61 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F62 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F63 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F64 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F65 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F66 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F67 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F68 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F69 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F70 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F71 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F72 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F73 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F74 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F75 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F76 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F77 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F78 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F79 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F80 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F81 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F82 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F83 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F84 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F85 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F86 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F87 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F88 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F89 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F90 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F91 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F92 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F93 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F94 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F95 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F96 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F97 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F98 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F99 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					
F100 MC FBA					St. to 100 m	LA/PS levels & near bottom	10 min.	6 hrs.	30 min.	30 min.	Cont.					

* Various with particular
 1000 n. mi. spacing - substituted by Table II.17.3. Mr. King is view of USAF (57) and 1000 n. mi. requirements
 † 2000 n. mi. spacing - substituted by Table II.17.3. Mr. King is view of USAF (57) and 1000 n. mi. requirements
 ‡ 2000 n. mi. spacing - substituted by Table II.17.3. Mr. King is view of USAF (57) and 1000 n. mi. requirements
 § 2000 n. mi. spacing - substituted by Table II.17.3. Mr. King is view of USAF (57) and 1000 n. mi. requirements

ED OPERATIONAL DATA REQUIREMENTS

ED OPERATIONAL DATA REQUIREMENTS					PARAMETER REQTS. BEST MET BY BUOYS														POTENTIAL TECHNICAL PROBLEMS				BETTER MET BY NON-BUOYS					
Duration of observation	Time Sampling Intensity	Synch. of Obs.		Period of Operation																								
		x, y	z		Wind velocity	Wind speed	Water temperature	Water pressure	Ambient light	Ambient noise	Transparency	Wave measurement	Air temp. surface	Humidity surface	Timing device	Electrical	Insulation	Precipitation rate	Wave velocity	Wave period	Wave direction	Pressure of line	Propagator time	Acoustic depth	Turbidity	Refractivity	Atmospheric pressure	Total wind speed
Inst. 5 min. 10 min.	1 to 5 hrs in oper. 6 hrs not in oper.	10 min	N/A	Cont. with breaks	x	x	x					x	x	x														
10 min	10 min	1 min	1 min	Cont. with breaks	x	x	x	x				x	x	x	x	x												
10 min	Varies w. oper.	10 min	N/A	Cont. with breaks	Gulf of Mexico Vandenberg AFB																							
Inst.	12 hrs	30 min	N/A	Cont.		x	x					x	x	x	x													
10 min. Inst. w/d. (60 min)	8 hrs	30 min	1 min	Cont.	x	x	x					x	x															
10 min	10 hrs	10 min	5 min	Cont.		x	x					x																
10 min	6 hrs	30 min	30 min	Cont.	x	x	x	x	x			x	x	x	x													
10 min	Monthly	30 min	30 min	Cont.	x	x	x	x	x			x	x	x	x													
10 min	Bi-weekly	10 min	1 min	Cont.	x	x		x	x			x	x	x	x													
10 min	Varies w. oper.	30 min	20 min	Intermittent	x	x	x	x	x			x	x	x	x													
10 min	6 hrs	10 min	1 min	Cont.	(CNA)	x	x	x	x			x	x	x	x													
Cont. for special ops	6 hrs	10 min	1 min	Cont.	(DO)	x	x	x	x			x	x	x	x													
10 min	6 hrs	30 min	30 min	Cont.	x	x	x	x	x			x	x	x	x													
Inst. or short per. avg.	CNA (DO) 6 hrs	30 min	min	Cont.	x	x	x	x	x			(CNA) (DO)	x	x	x													
Inst. 5 min. 10 min. 1 hr	3 hrs. 3 hrs	1 hr	5 min. 10 min	Cont.	Est. & hr. one Great Lakes																							
Inst. Tide cont.	1 obs. per site	N/A	N/A	Cont.																								
Inst. curr. 5 min. 10 min	5 min	1 min	5 to 5 min	Cont.	x		x	x	x																			
10 min. 30 min	6 hrs. curr. 5 hrs	N/A curr. 10 min	N/A curr. 3 min	Cont.	x	x	x	x	x			x	x	x	x													
10 min	6 hrs	1 hr	1 hr	Cont.																								
Inst. Inst. w/d. 10 min	6, 12 hrs	10 min	N/A	Cont.	x	x	x	x	x	x	x	x	x	x	x	x												
Inst. wave 30 min	1, 6 hrs	10 min	1 min	Cont. with breaks	x	x	x	x				x	x															

B

TABLE II.B. COMPARATIVE TABULATIONS OF REFINED RESEARCH DATA REQUIREMENTS

REQUIREMENT CHARACTERISTICS											
AMO	Geographical Location		Horizontal Spacing		Vertical Layer	Vertical Sampling Intensity	Duration of Observation	Time Sampling Intensity	Synch. of Obs.		Period of Operation
	Coastal N.A. (CNA)	Deep Ocean (DO)	CNA	DO					x, y	z	
*5 ACERC	Coastal N.A. Great Lakes depth > 125 m	Coastal Hawaii depth > 125 m	< 500 n. mi	< 500 n. mi	8fc	N/A	< 10 min	6 hrs	5 min	N/A	Cont.
*8 RCF-Galveston	Gulf of Mexico and Caribbean Sea	Caribbean Sea	10 n. mi near shore 50 n. mi off shore 100 n. mi deep water		8fc to near bot max 5000 m	IAP80 levels & 125, 175, 250 and 1200 m	< 10 min	6 hrs	30 min	30 min	Cont.
*9 RCF-Miami	Gulf of Mexico	Trop. Atlantic 20°N-20°S (Special areas)	500 n. mi	500 n. mi 10 to 30 n. mi	8fc to 500 m	IAP80 levels	< 10 min 3-6 hrs	12-24 hrs	10 min	1 min	Cont.
*10 RCF-Beaufort	Cont. shelf out to 200m depth Maine to Texas		100 n. mi		8fc to bot-max 200 m	IAP80 levels	1 to 5 min	3 hrs	10 min	1 min	Cont.
*11 RCF-Beaufort	Estuaries & near shore areas Cape Cod to Texas		Varies		8fc to bottom-max 200 m	Varies w. area of interest	1 to 5 min	3 hrs	10 min	1 min	Cont. 4 mo. yr
*12 RCF-Seattle	W. Coast 42°N to 60°N out to 400 n. mi from coast	W. Coast to 160°E, 40°N to Bering Sea	5 to 60 n. mi (Spec. areas) (for 15 n. mi)	60 to 100 n. mi	8fc to 5000 m	IAP80 levels	< 10 min	8fc-10 m 12 hrs 10 m-bot 24 hrs	12 hrs	1 min	Cont.
*13 RCF-Stanford	West Coast	W. Coast to 180° and N of 20°S	60 to 100 n. mi in lines - 600 n. mi apart	100 to 300 n. mi in lines - 600 n. mi apart	8fc to 800 m & bottom	Varies 7 to 25 levels	< 10 min 6 hr avg. for curr.	3/8 hrs Cont. for curr.	10 min to 30 min	1 min	Cont.
*15 RCF-Woods Hole	40°N-45°N, 64°W-74°W on shelf No deep water or Gulf Stream		(8fc) 100 to 300 n. mi (Sub-8fc) 30 to 100 n. mi		8fc to 200 m	IAP80 levels	< 10 min	3 hrs	10 min	1 min	Cont.
*16 RCF-Booth Bay Harbor	Gulf of Maine Offshore		25 to 30 n. mi or at least 3 buoys		8fc to bottom	IAP80 levels & > 5 m from bottom	< 10 min	3 hrs	10 min	1 min	Cont. 20 days at a time
*17 RCF-Booth Bay Harbor	Gulf of Maine onshore		8 to 15 n. mi		8fc to bottom	IAP80 levels & > 5 m from bottom	< 10 min	3 hrs	10 min	1 min	Cont.
*18 RCF-Washington, D.C.	Cont. shelf Cape Hatteras to Maine		10 to 20 m contours		8fc & bottom	N/A	< 10 min	3 hrs	10 min	1 min	Cont.
*20 R85-Sandy Hook	End of Georges Bank to Florida Keys out to 150 m depth		Lines out from coast 100 n. mi apart spacing in lines < 2, 5, 10, 20, 30, 50 n. mi from coast-line		8fc to bottom	Ea. 5 m to 30 m then IAP80 levels to bottom	< 10 min	1 hr in special areas 3 hrs elsewhere	5 min in special areas 10 min elsewhere	1 min	Apr. Nov. ends 11/89
*26 USCG-Ice Patrol	Grand Banks Labrador Sea	Baffin Bay Hudson Strait	30 to 100 n. mi	30 to 100 n. mi	8fc to 5000 m	IAP80 levels & more intense near surface	< 10 min & 30 min avg. spec. areas	6 hrs	10 min	1 min	Interim longest period 30 days
*31, 32, 36, 37 ES8A	Coastal N. America	Deep Ocean Global	60 to 150 n. mi (only specific areas) (at one time)	300 to 600 n. mi	8fc to 5000 m	IAP80 levels & near bottom	Near Inst.	6 min	N/R	5 min	Cont. but move loc. ea. 10 days
*40 HEW	Cont. & Est. & 2 buoys in area at 40°30'N-40°15'N and 73°40'W-73°55'W & 38°30'N-38°00'N and 74°30'W-75°00'W		25 to 50 n. mi > 50 n. mi from coast		8fc to 200 m	IAP80 levels	< 10 min	3 hrs	10 min	1 min	Cont. not yet started

* Varies with parameter.

• Denotes a change or an addition.

AMO's 21 and 22 had not submitted refinement material as of the date of this report

NTS

PARAMETER HQTS BEST MET BY BUOYS		POTENTIAL TECHNICAL PROBLEMS															BETTER MET BY SC BUOY													
	Period of operation	Current velocity	Salinity	Seabed speed	Water temperature	Water pressure	Ambient light	Ambient noise	Transparency	Wave measurement	Air temperature	Atmospheric pressure	Dew point	Precipitation	Precipitation rate	Wind velocity	Clouds	Carbon dioxide	Ozone	pH	Propagation loss	Total radiation out	Radiological chemical	Sediment deposit	Temple	Tidal fluctuation	Turbidity	Bathymetry	Bottom photography	Total cloud amount
N/A	Cont.	o		•			x	•						x																
30 min	Cont.	x	x	x			x	x	•	x	x	x	x	x	x													x		
1 min	Cont.	x	x	x				x		x		x	x	x	x															
1 min	Cont.	x	x	x	•	•	•	•						x	x															
1 min	Cont. 4 mo yr	x	x	x	•	•	•	•						x	x															
1 min	Cont.	x	x	x	x	•	•	•					x	x																
1 min	Cont.	•	x	x	x	•	x	•	•	•	x	•	x	•	x		•			•	•						•		•	
1 min	Cont.	x	x	x	x	x	x						x	x																
1 min	Cont. 20 days at a time	x	x	x	•	x	x	x	x	x	•	x	x	x	x							x						x		
1 min	Cont.	x	x	x	•	x	x	x	x	x	•	x	x	x	x							x						x		
1 min	Cont.	x		x										x																
1 min	Apr. - Nov. ends 11:58	x	x	x										x																
1 min	Interim longest period 30 days	x	x	x	x	x	•	x	x	x	•	•	•	x										x						
5 min	Cont. but move loc. ea. 30 days	x	x	x																			•							
1 min	Cont. not yet started	x	x	x	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	x	•	•	•	•	•	

B

TABLE II.B. (Continued). COMPARATIVE TABULATIONS OF REFINED RESEARCH DATA REQUIRE

REQUIREMENT CHARACTERISTICS													Current
AMR	Geographical Location		Horizontal Spacing		Vertical Layer	Vertical Sampling Intensity	Duration of observation	Time Sampling Intensity	Synch. or Corr.		Period of Operation		
	Coastal N.A. (CNA)	Deep Ocean (DO)	CNA	DO					x, y	z			
#44 NSF-Duke U	On Slow Bay N. Car. to 100 n. mi. east in Gulf Stream		A line of buoys at 10, 25, 50, 75, 100 & 200 m & 1 buoy - 30 n. mi. on either side of line		Sfc to bottom max 200 m	0, 10, 20, 35, 45 50 m then (APR) levels	1 min	12 hrs	10 min	10 min	Cont. with intermittent breaks	x x	
#47 NSF-U of Miami	Florida Straits off Bimini, Bahamas and Miami		Special points - 1 and 7 n. mi. from source		Sfc to bottom max 100 m	25, 50, 100 150, 200 & each 150 m to bottom	Inst. to 1 min. avg.	Not stated	5 min	1 min	Cont.	x	
#56 ONR-NYU	East Coast & Gulf Stream	World Oceans	20 n. mi. in strong curr. 200 to 300 n. mi. elsewhere		Sfc to bottom max 5000 m	Sfc, 500, 1000, 1500, 2000 3000, 4000 & 5000 m	20 min avg.	6 hrs	10 min	1 min	Cont. not yet started	x x	
#57 ONR-NYU	East Coast & Gulf Stream	World Oceans	20 n. mi. in strong curr. 200 to 300 n. mi. elsewhere		20 m to 1000 m	5, 10, 20 m (APR) levels to 1000 m	20 min avg.	6 hrs	10 min	1 min	Cont. not yet started	x x	
#58 NSF-Woods Hole	East Coast N. of 42° N. Port 40°N and S. of 40°N	20°N to 40°N 65°W to 75°W & Global coverings of opportunity	6 n. mi. in Gulf Stream 20 n. mi. outside of Gulf Stream		Sfc to 5000 m	(APR) levels OK in some areas should be flexible for other areas	Inst. to 10 min	1 hr	10 min	1 min	Cont.	x x	
#62 Smithsonian Institute	Not stated	Not stated	10 n. mi.	10 n. mi.	Sfc to 240 m	3, 65, 130, 190 & 240 m	Not stated	48 hrs	Not stated	Not stated	2 yrs not yet started	(1 Req)	
#76 ORL-Penn St	Gulf Stream	World Oceans	300 n. mi.	300 n. mi.	Sfc to 5000 m	(APR) levels	2 min	6 hrs	10 min	1 min	Cont.	x x	
#77 ORL-Penn St	Key West area Gulf Stream (Small selected areas of)	World Oceans	5.5 n. mi. 3 or 4 buoys in a line in each area		Sfc to 5000 m	20 levels denser near top	Inst. waves avg.	1 min	1 min	1 min	Cont.	x	
#79 USN-Mar. Eng. Lab	East Coast & Caribbean (World wide in future)	Caribbean	1 pt. at a time	1 pt. at a time	Bottom to 16 m above bottom max depth 310 m	Bottom 1.5 3, 5, 6, 9 & 16 m above bottom	1 min	30 min	N.A.	1 min	Cont. w. breaks 1 yr in area	x x	

*Varies with parameter

• Denotes a change or an addition

AMR's #s 49, 51, 59, 65, 66, and 70 had not submitted refinement material as of the date of this report.

S OF REFINED RESEARCH DATA REQUIREMENTS

LIST OF REFINED RESEARCH DATA REQUIREMENTS						PARAMETER RQTS. BEST MET BY BUOYS																POTENTIAL TECHNICAL PROBLEMS					BETTER MET BY NON-BUOY	
Real Time Sampling Interval	Duration of observation	Time Sampling Interval	Synch. of Obs.		Period of Operation	Current velocity	Salinity	Wind speed	Water temperature	Rain pressure	Atmos. high	Atmos. low	Transparency	Wave measurement	Air temperature	Atmospheric electricity	Sea color	Seismicity	Precipitation rate	Wave velocity	Ice accumulation	Ultraviolet	PH	Propagative loss	Tidal observation	Time resolution of	Time resolution of	Remote photography
			x	y																								
10-40	1 min	12 hrs	10 min	10 min	Cont with intermittent breaks	x	x	x													x							
100 & each	Inst to 1 min. avg	Not stated	5 min	1 min	Cont	x		x					x							x					x			
1000- 2000 &	20 min avg.	6 hrs	10 min	1 min	Cont not yet started	x	x	x	x				x								x							
100 m	20 min avg.	6 hrs	10 min	1 min	Cont not yet started	x	x	x					x		x	x	x	x	x	x		x						
Wave la should be for 10 min	Inst to 10 min	1 hr	10 min	1 min	Cont	x	x	x	x				x		x					x								
10 m	Not stated	48 hrs	Not stated	Not stated	2 yrs not yet started	(Required Parameters are Considered Beyond Five Year SOA)																						
2 min	6 hrs	10 min	1 min	Cont		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Inst waves avg	1 min	1 min	1 min	Cont		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
1 min	3 min	1 min	1 min	Cont w breaks 1 yr in area		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							

B

TABLE II.B. (Continued). COMPARATIVE TABULATIONS OF REFINED RESEARCH DATA REQUIREMENTS

REQUIREMENT CHARACTERISTICS													Current priority Sensitivity Sound		
AMO	Geographical Location		Horizontal Spacing		Vertical Layer	Vertical Sampling Intensity	Duration of Observation	Time Sampling Intensity	Synch. of Obs.		Period of Operation				
	Coastal N. A. (CNA)	Deep Ocean (DO)	CNA	DO					x, y	z					
#80 UNN-Mar. Eng. Lab.	Cont. Shelf & deeper water within telemetry distance of land		4 buoys in a sq. 30 n. mi apart		8/c	h	Inst	Cont.	Milli-second	N/A	Cont. not yet started				
#82 UNN- NSR & DC	Anywhere in N. Atlantic or Pacific where satellite of 4 to 6 is observed		100 to 600 n. mi	100 to 600 n. mi	8/c	N/A	30 min	4 hrs	N/A	N/A	Intermittent				
#84 ONR- Scripps Institute of Oceans	Calif. curr. 22.5°N to Columbia River	30°N to 60°N and 110°W to 130°E	100 n. mi	500 n. mi	8/c to 3000 m	IAPSO levels	Inst to Cont.	1 hr	10 min	1 min	Cont. ends 1974	x	•	x	
#85 AEC- Scripps		Pacific Ocean primarily deep curr.		Unk	8/c to 10,000 m	- 3 m off the bottom	Inst	1 hr	1 min	Unk	Cont.	x			
#86 UNN- NUWC	300 mile circle out from San Diego		1 to 4 buoys in a 10 x 10 n. mi sq.		8/c to bottom max depth 700 m	- 50 levels from 7 to 70 m part	Inst to 10 min	4 hrs	N/A	10 min	Cont. ends Feb. 71	x		x	
#89 UNN- NAVAIR- SYSCOM	Gulf of Mexico and N. A. Coast out to 150 n. mi from 15°N to 60°N	0° to 30°N & 150°W to 130°E & 35°W to NA, 30°N to 45°N & 15°W to 40°E. Antarctic 60°S to S. Pole	200 to 500 n. mi all areas 30 to 60 n. mi grid in spec. loc. for curr. & w temp. a 30 to 100 & 0.1 n. mi grid in spec. loc.		8/c to 500 m	IAPSO level	Inst wind 10 min if > 30 knots	12 hrs 30-60 n. mi 3 hrs 0.1 n. mi 2 hrs	30 min 10 min 30 sec	30 sec	Cont.	x		x	
#94 BCP- Honolulu		Pacific Ocean 0° to 35°N & 130°W to 180°		60 n. mi in curr. 500 to 800 n. mi elsewhere	8/c to 1500 m	IAPSO levels but denser in the l.	< 10 min	24 hrs	10 min	1 min	Cont.	•	•	•	
#99 BCP- Alaska	Estuaries & Cont. shelf of Alaska	50°N to Bering Sea & E of 165°E	Varies - 50 to 300 n. mi	Varies - 300 to 1000 n. mi	8/c to unk	0, 50, 100, 200 300 m then unk	Not stated	Not stated	Not stated	Not stated	Cont.	•	•	•	

*Varies with parameter.

• Denotes a change or an addition.

AMOs #1, #6, #7, #2, #3, #4 and #7 had not submitted refinement material as of the date of this report.

REFINED RESEARCH DATA REQUIREMENTS

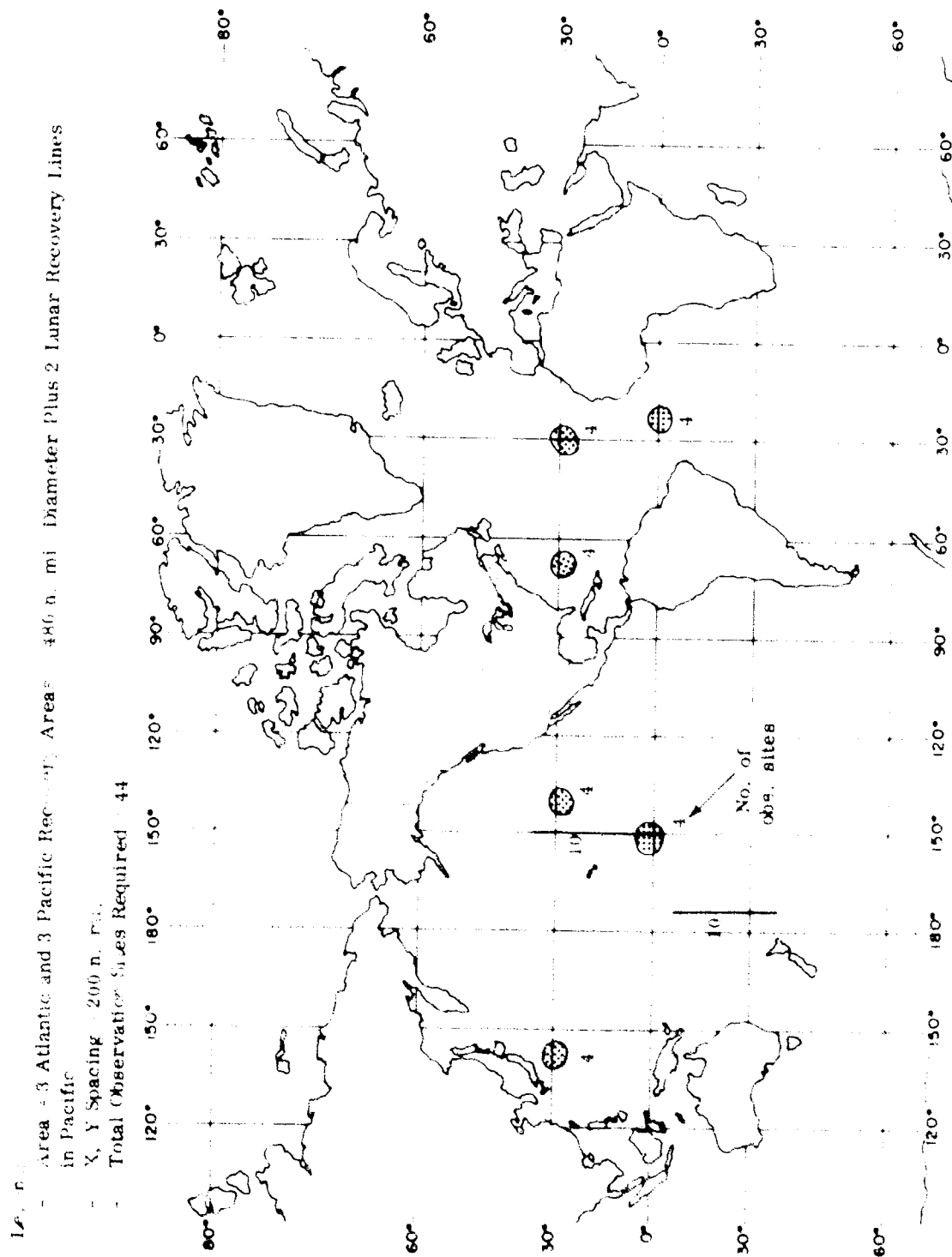
REFINED RESEARCH DATA REQUIREMENTS					PARAMETER NOTED: BEST MET BY BUOYS															POTENTIAL TECHNICAL PROBLEMS	BETTER MET BY NON-BUOY					
Duration of Observation	Time Sampling Intensity	By: of Obs.		Period of Operation	Current velocity	Salinity	Sound speed	Water temperature	Water pressure	Ambient light	Ambient color	Transparency	Wave measurement	Air temperature	Atmospheric pressure	Dew point	Insolation	Precipitation rate	Wind velocity	Carbon dioxide	Oxygen	Magnetic field intensity	Potential of fish	Tide fluctuations	Vertical current	Wave cloud amount
		x, y	x																							
Inat	Cont.	Milli-second	N A	Cont. not yet started																	x					
30 min	4 hrs	N/A	N A	Intermittent								x														
Inat to Cont.	1 hr	10 min	1 min	Cont. ends 1974	x	•		x	•	•	•	x		x	x	x	G	x	•			•	•	•	•	-
Inat	1 hr	1 min	Unk	Cont.	x																					
Inat to 10 min	4 hrs	N/A	10 min	Cont. ends Feb. 71	x			x			x							x								
Inat wind 10 min if > 20 knots	12 hrs 30-40 n. mi 3 hrs 0-1 n. mi 2 hrs	30 min 10 min 30 sec	30 sec	Cont.	x			x				x	x		x	x	x		x				x			
< 10 min	24 hrs	10 min	1 min	Cont.	•	•		•	•	•										x						
Not stated	Not stated	Not stated	Not stated	Cont.	•	•		•				•		•				•								

B

APPENDIX III

CHARTS SHOWING GEOGRAPHICAL AREAS OF INTEREST FROM
WHICH DATA ARE REQUIRED FOR INDIVIDUAL AMOs

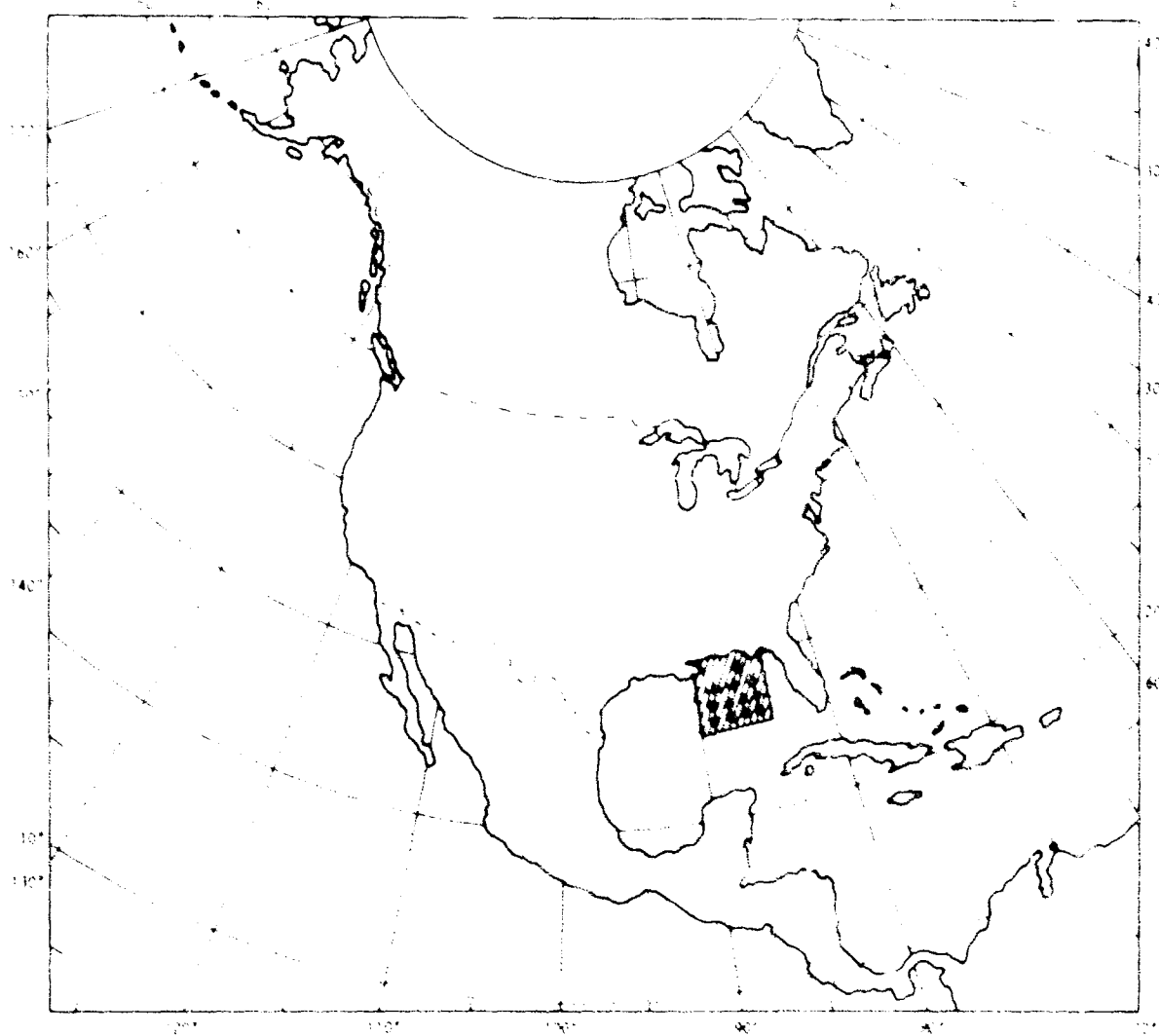
APPENDIX III, PART A. GEOGRAPHICAL AREAS AND REQUIRED NUMBER OF
OBSERVATION SITES FOR OPERATIONAL AMOs



AMO #1-LSAF (AWS)-Support for recovery of aerospace vehicles.

Legend:

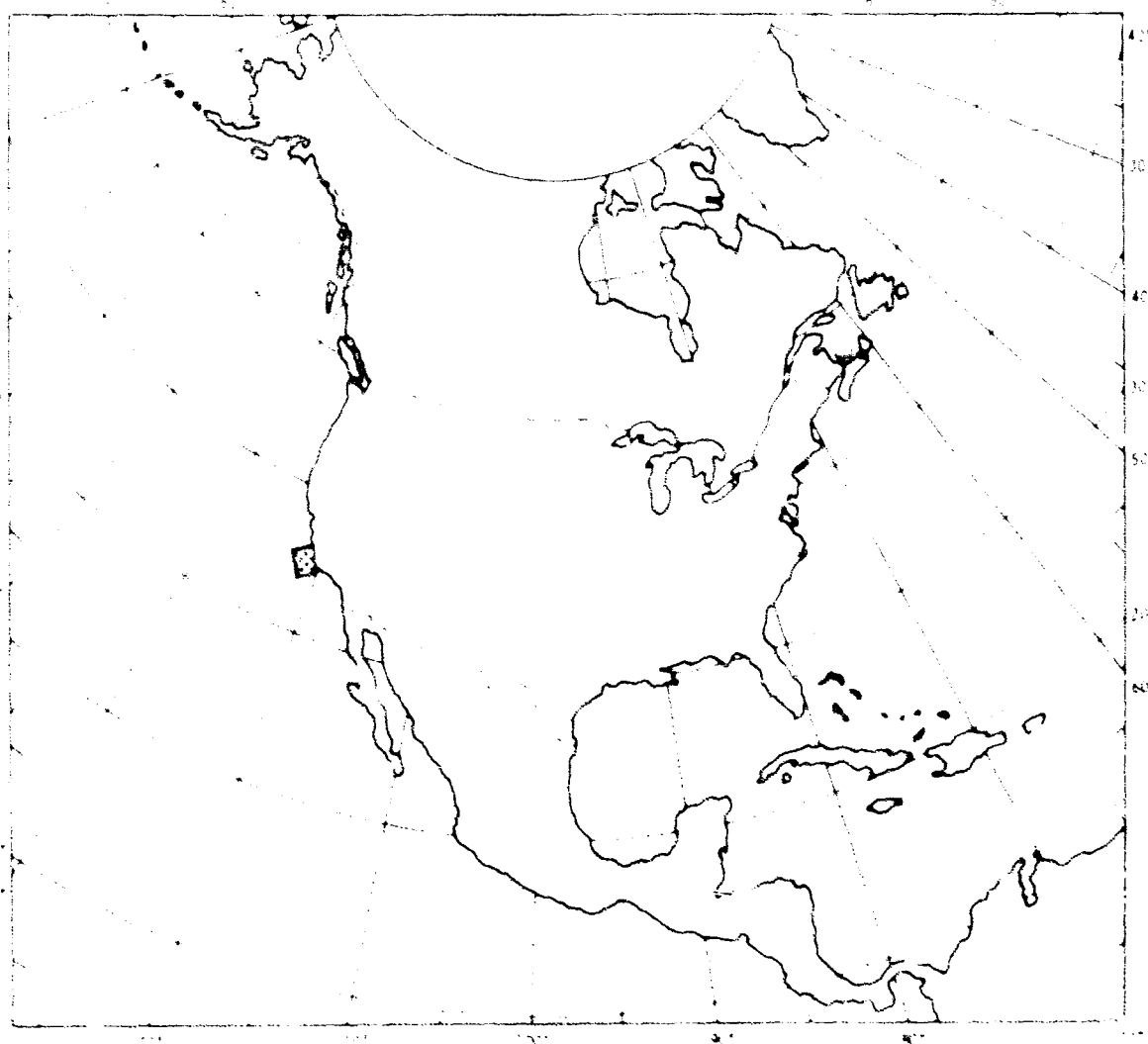
- Area - Northern Gulf of Mexico from the Coast S to 25°N and 90°W to 84°W
- X, Y Spacing - 5 Specified Points and 150 n. mi. in Rest of Area
- Total Observation Sites Required = 12



AMO #2A—USAF (AWS)—Support National Defense Weapons and Facilities
RDT & E at Eglin AFB.

Legend:

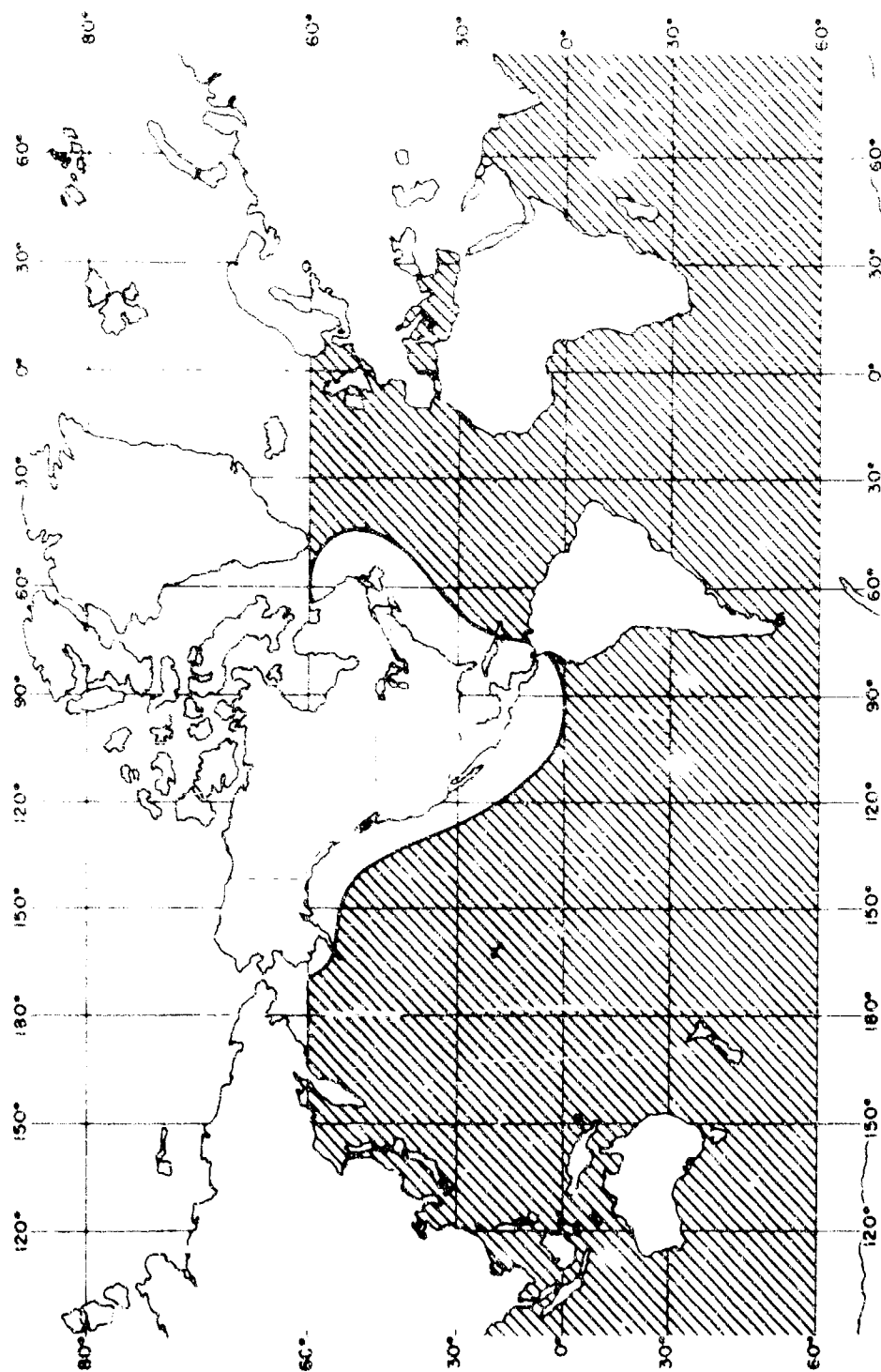
- Area - 3 Specified Sites about 1 mi. Off Shore from Vandenberg AFB
- X, Y Spacing - Sites are about 1/2 to 1 mi. Apart in a Line
- Total Observation Sites Required - 3



AMO 72B-USAf (AWS)-Support western missile test range and WINDS

Legend:

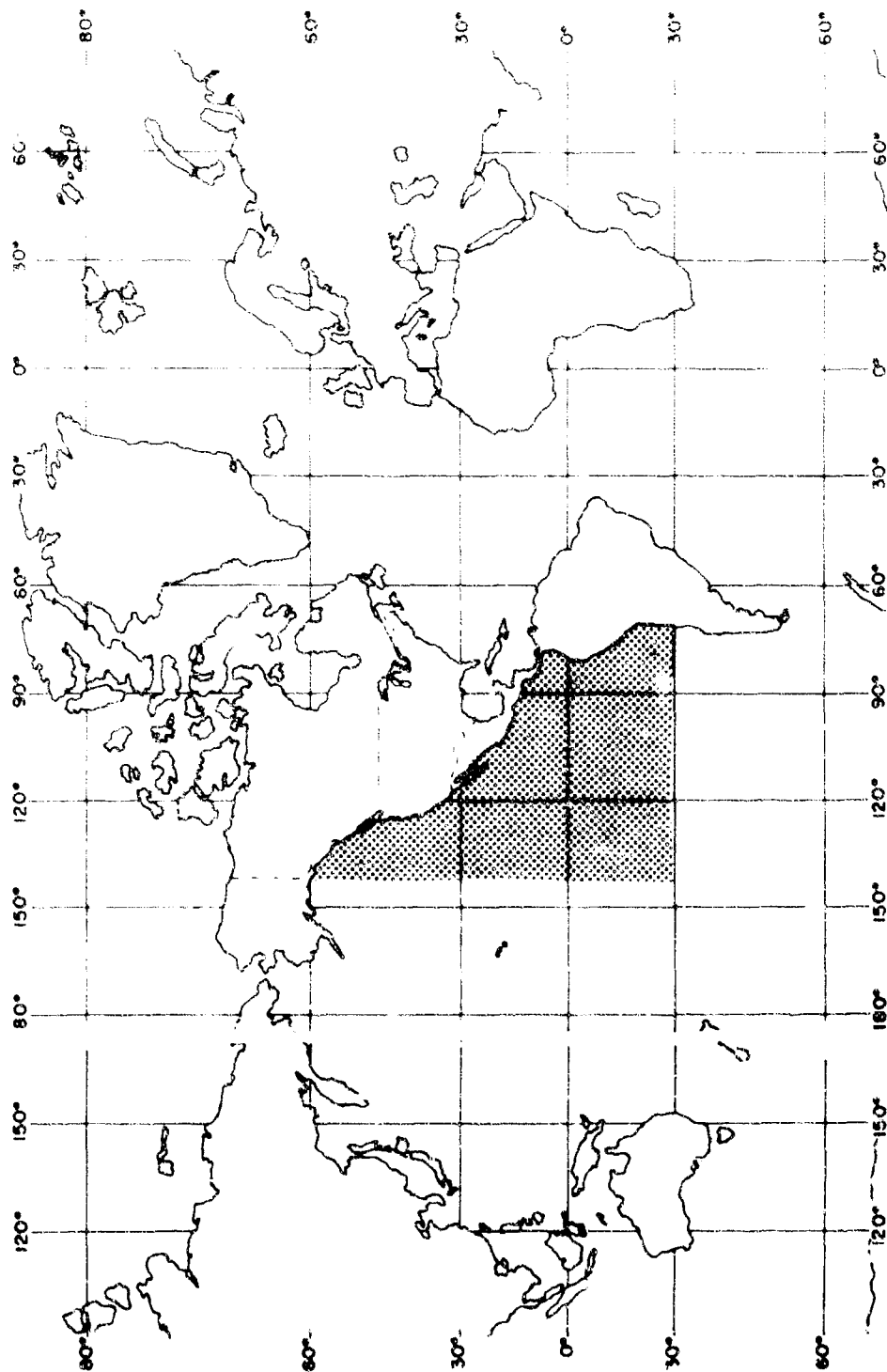
- Area = Global Deep Ocean
- X, Y Spacing = 600 n. mi.
- Total Observation Sites Required = 261



AMO #3--USAF (AWS)--Support global D.O.D. operations.

Legend:

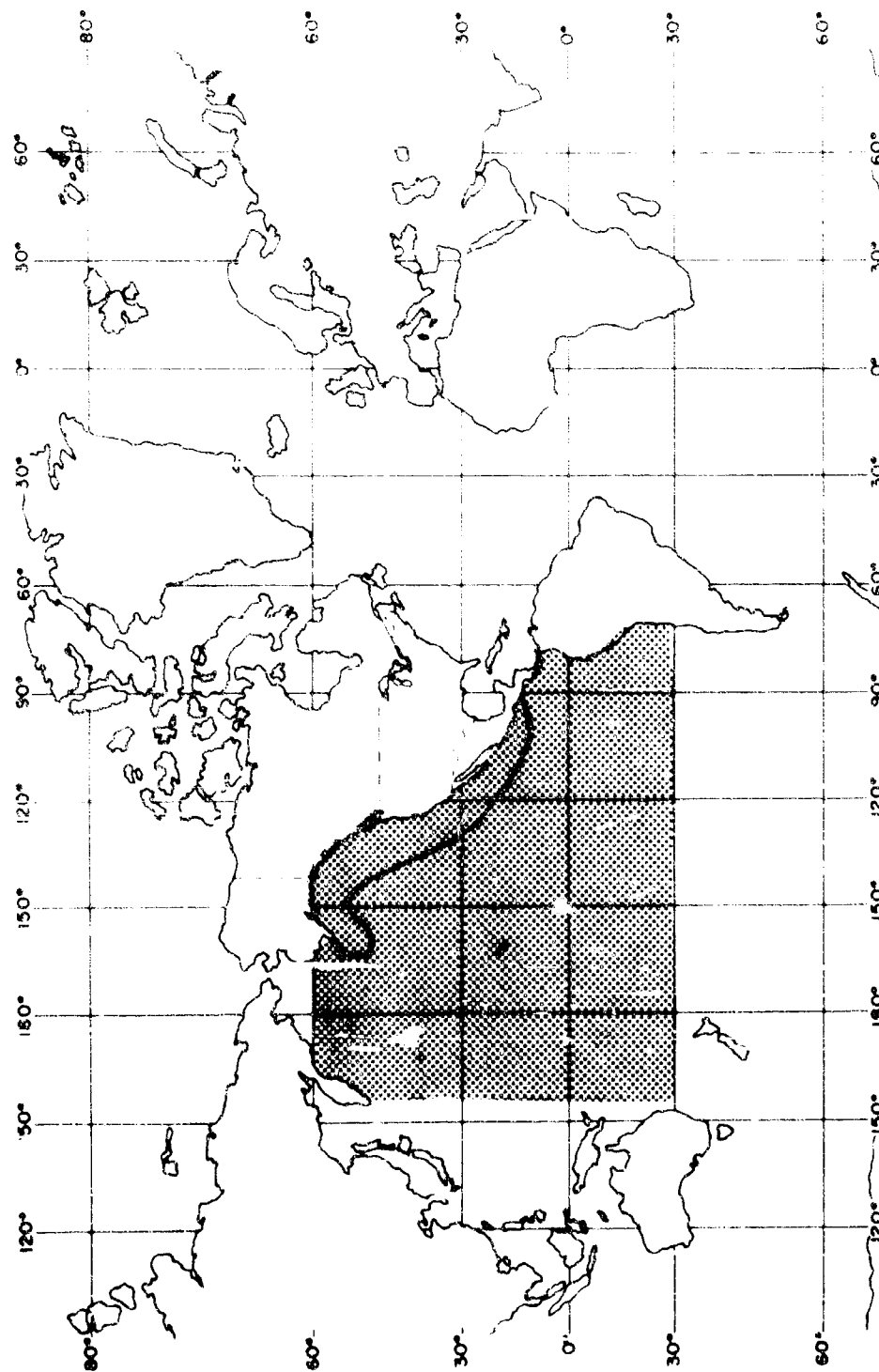
- Area = Pacific Coast, 140°W, 30°S to 60°N
- X, Y Spacings = 100 to 120 n. mi. < 400 n. mi. from N. America
- 500 to 600 n. mi. > 400 n. mi. from N. America
- Total Observations Sites Required = 186



AMO #14 - BCF, La Jolla - Distribution and environment of tuna, etc.

Legend:

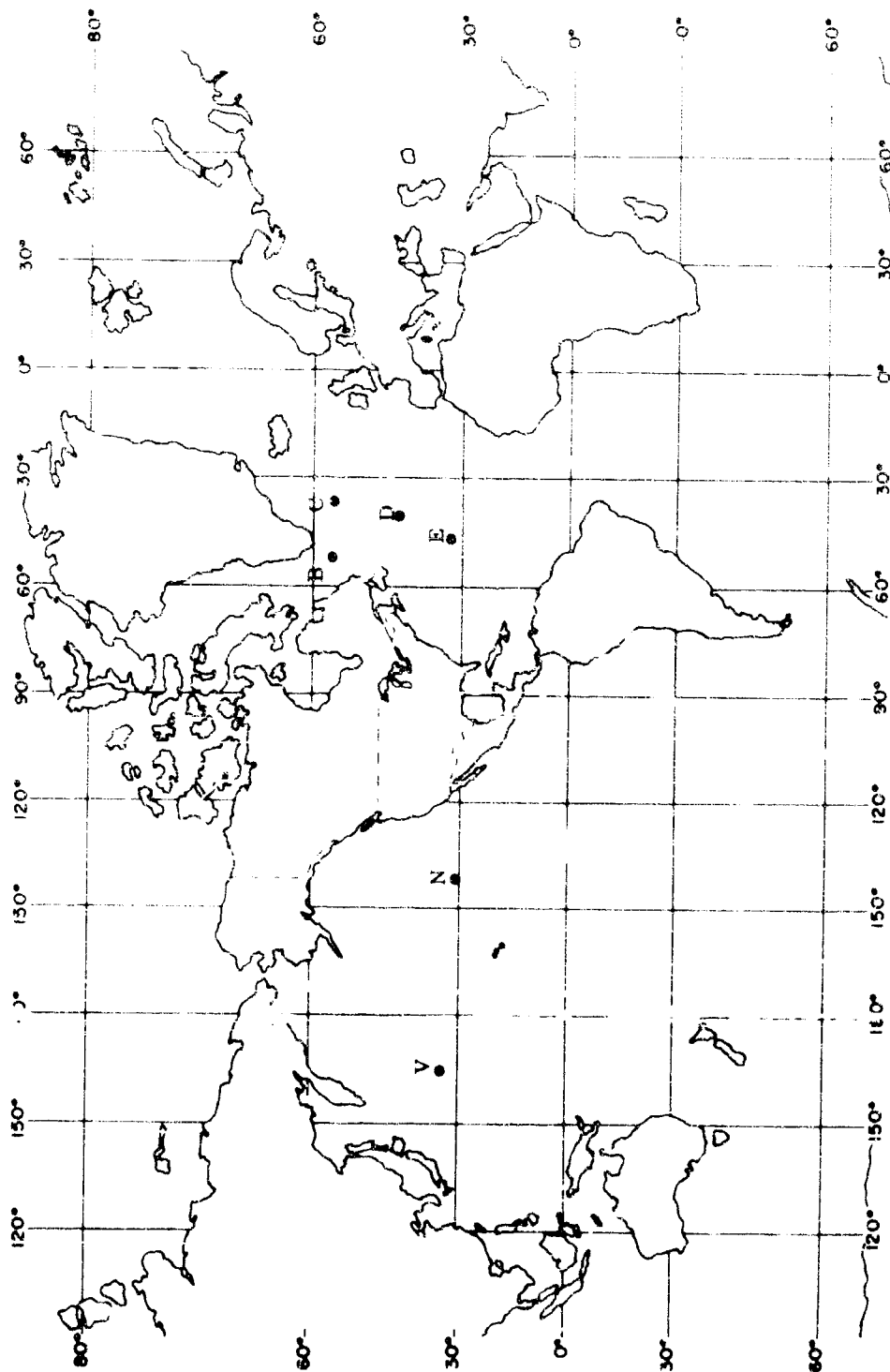
- Area = Pacific Coast to 160°E, 30°S to Alaska
- X-Y Spacings = 100 to 120 n. mi. < 400 n. mi. from N. America
500 to 600 n. mi. > 400 n. mi. from N. America
- Total Observation Sites Required = 214



AMO #19-BCF, Washington, D.C.—Synoptic climatology.

Legend:

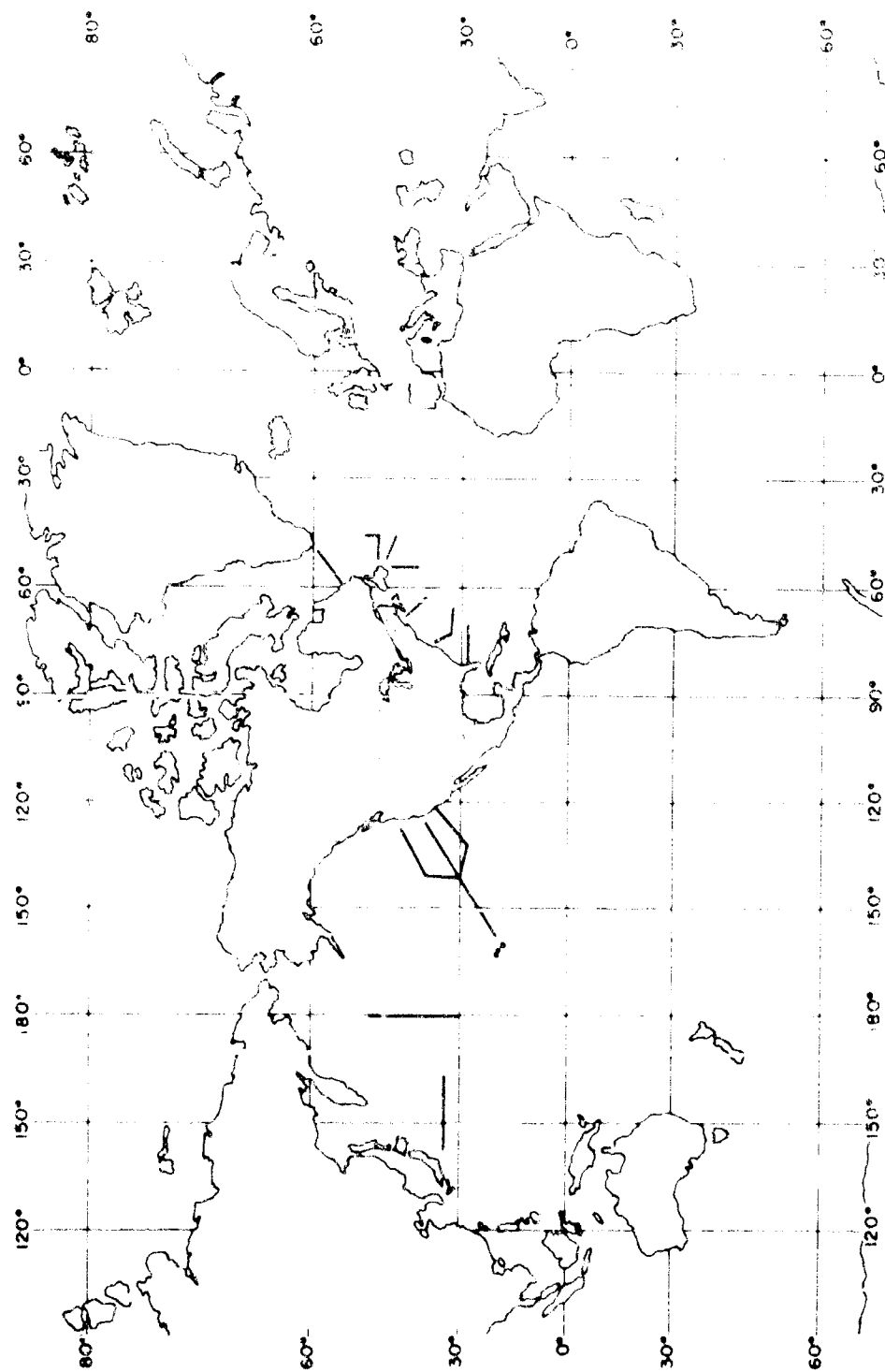
- Area = 4 OSVs in Atlantic and 2 in Pacific
- X, Y Spacing = N/A (Single Points)
- Total Observation Sites Required = 6



AMO # 23-1/SCG-Ocean station vessel/a.

Legend:

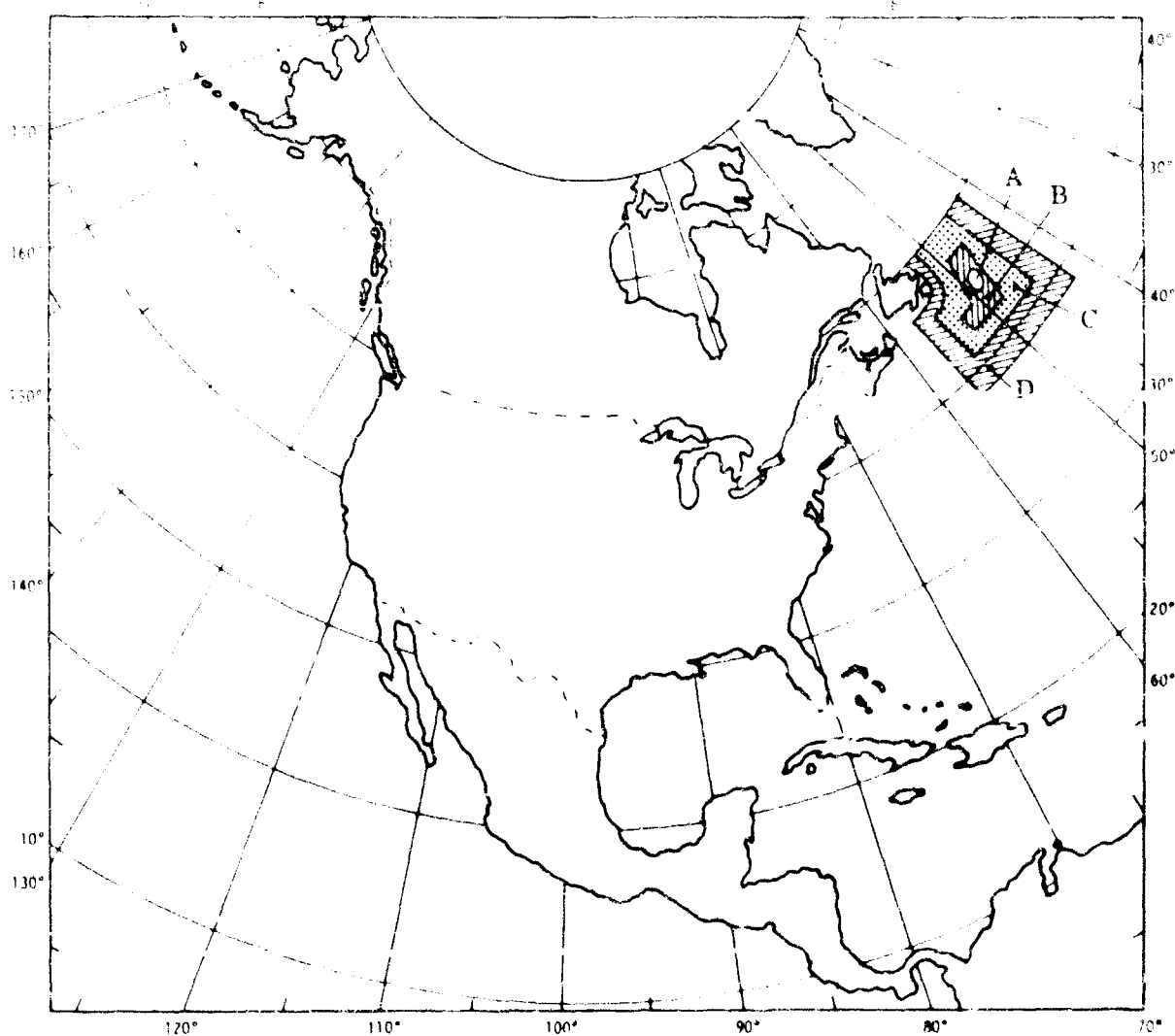
- Area = 7 Tracks in Atlantic and 6 in Pacific
- X, Y Spacing = 1 to 25 n. mi. $\leq$ 300 n. mi. from N. America
- 25 to 60 n. mi. $>$ 300 n. mi. from N. America
- Total Observation Sites Required = 227



AMO #24-USCG-Data acquisition along standard sect ons.

Legend:

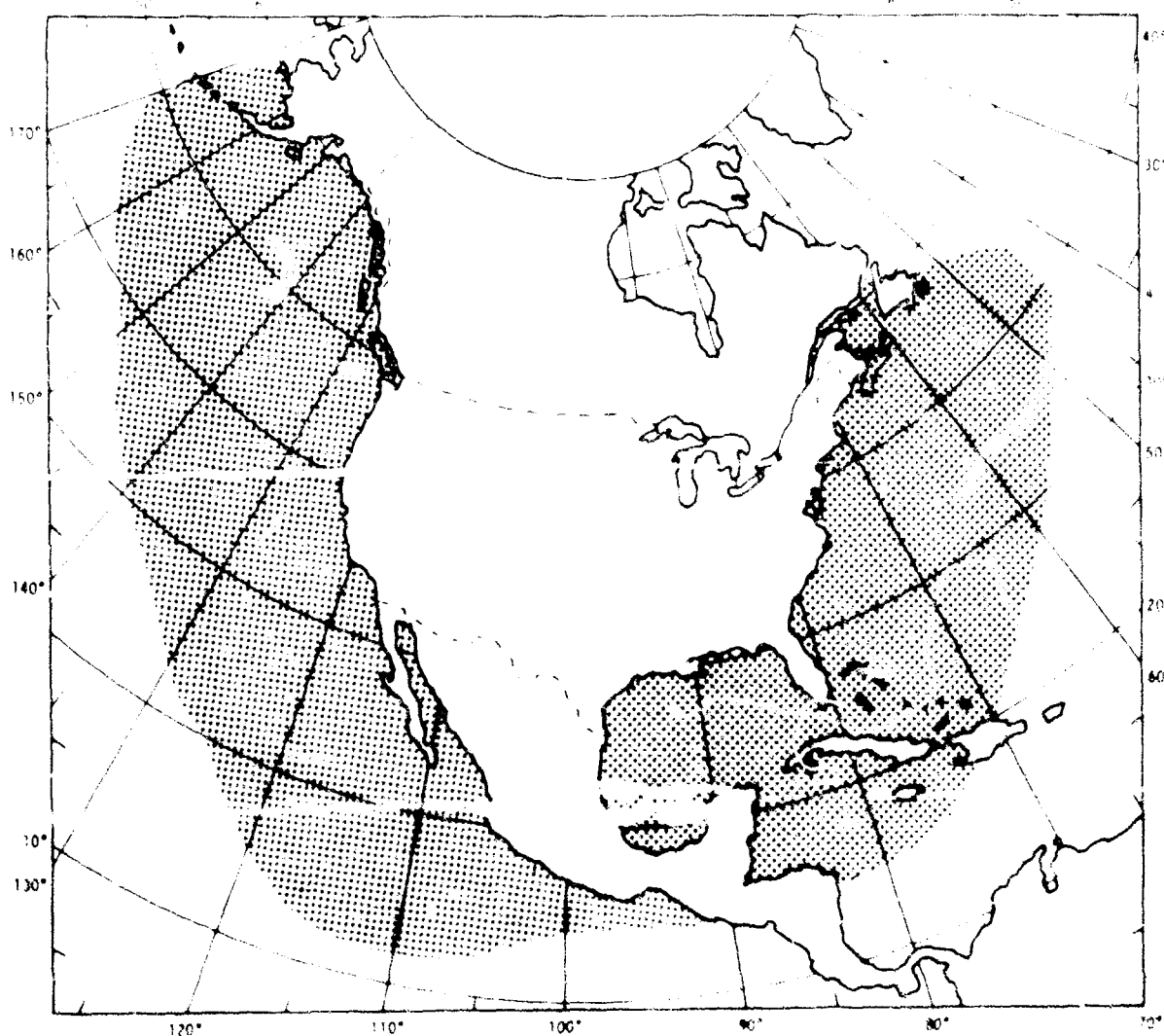
- Area Grand Banks
- X, Y Spacing
 - A. 7 Locations near 44°N, 48°W for continuous 6 hrly synoptic obs
 - B. 10 n. mi. in X 50 n. mi. in Y
 - C. 30 n. mi. in X, 50 n. mi. in Y
 - D. 100 n. mi. in X, 100 n. mi. in Y
- Total Observation Sites Required 297



AMO #25-USCG-Ice patrol monitoring.

Legend:

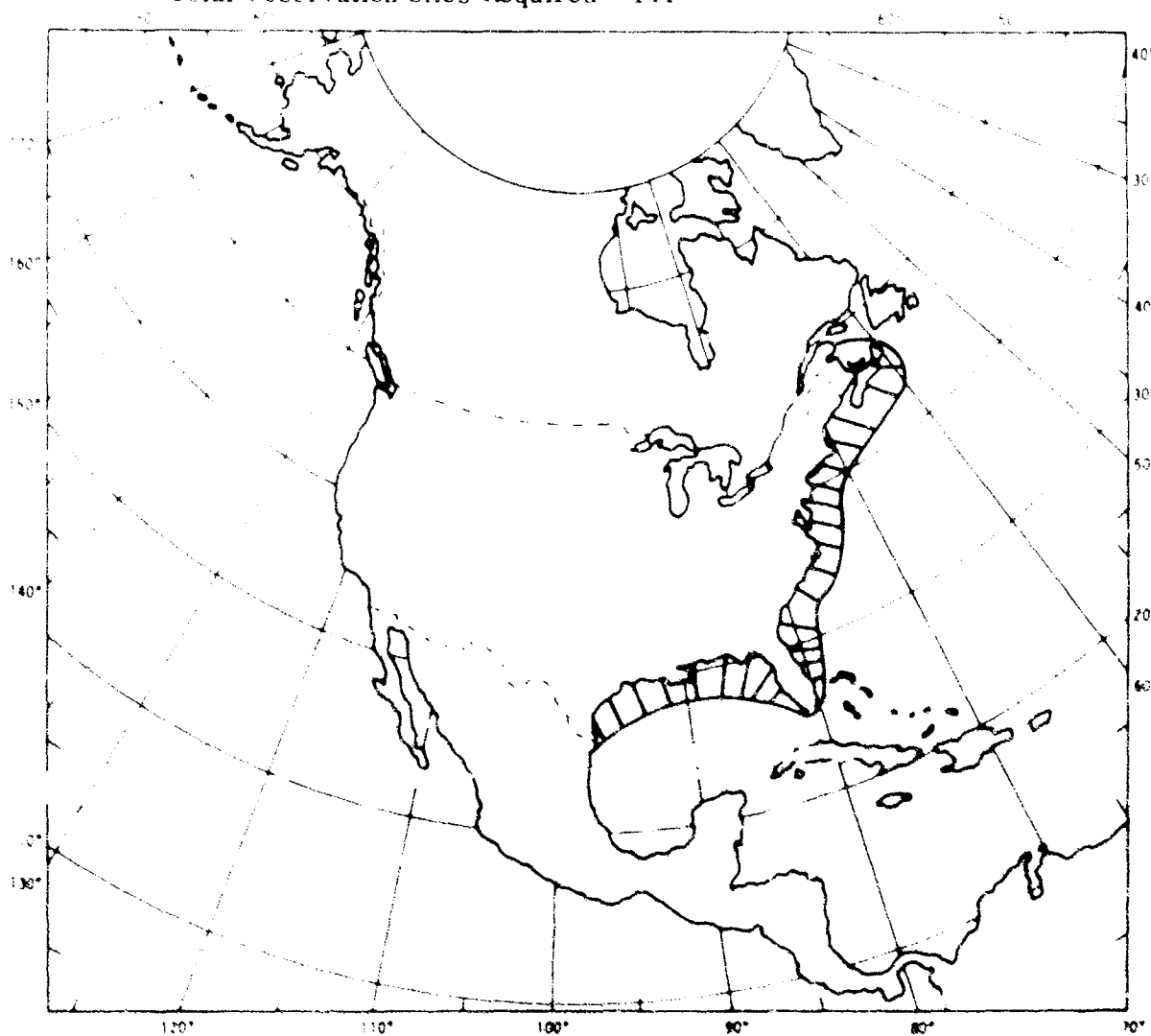
- Area Ocean Areas Contiguous to the U. S. (Area Not Clearly Defined)
- X, Y Spacing - Varies with Operation
- Total Observation Sites Required - Unknown



AMO #27—USCG—Search and rescue.

Legend:

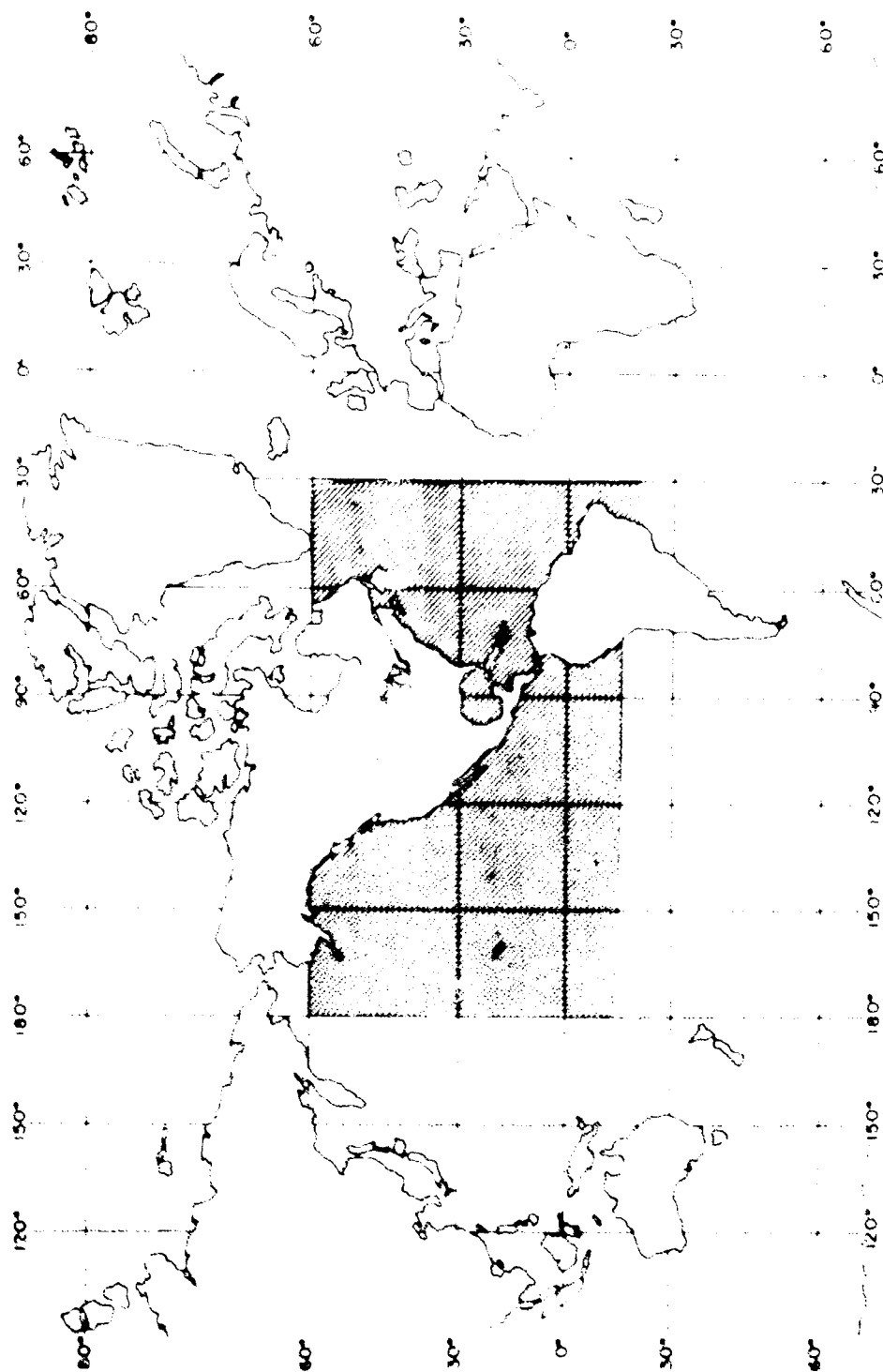
- Area - Cont. Shelf of U. S. and Canada
- X, Y Spacing - Lines with Sites at 10, 20, 30, 50, 70 + 100 Fathoms and
lines are about 100 n. mi. apart
- Total Observation Sites Required 144



AMD #28A--USCG--Coastal Oceanographic Services (weather net).

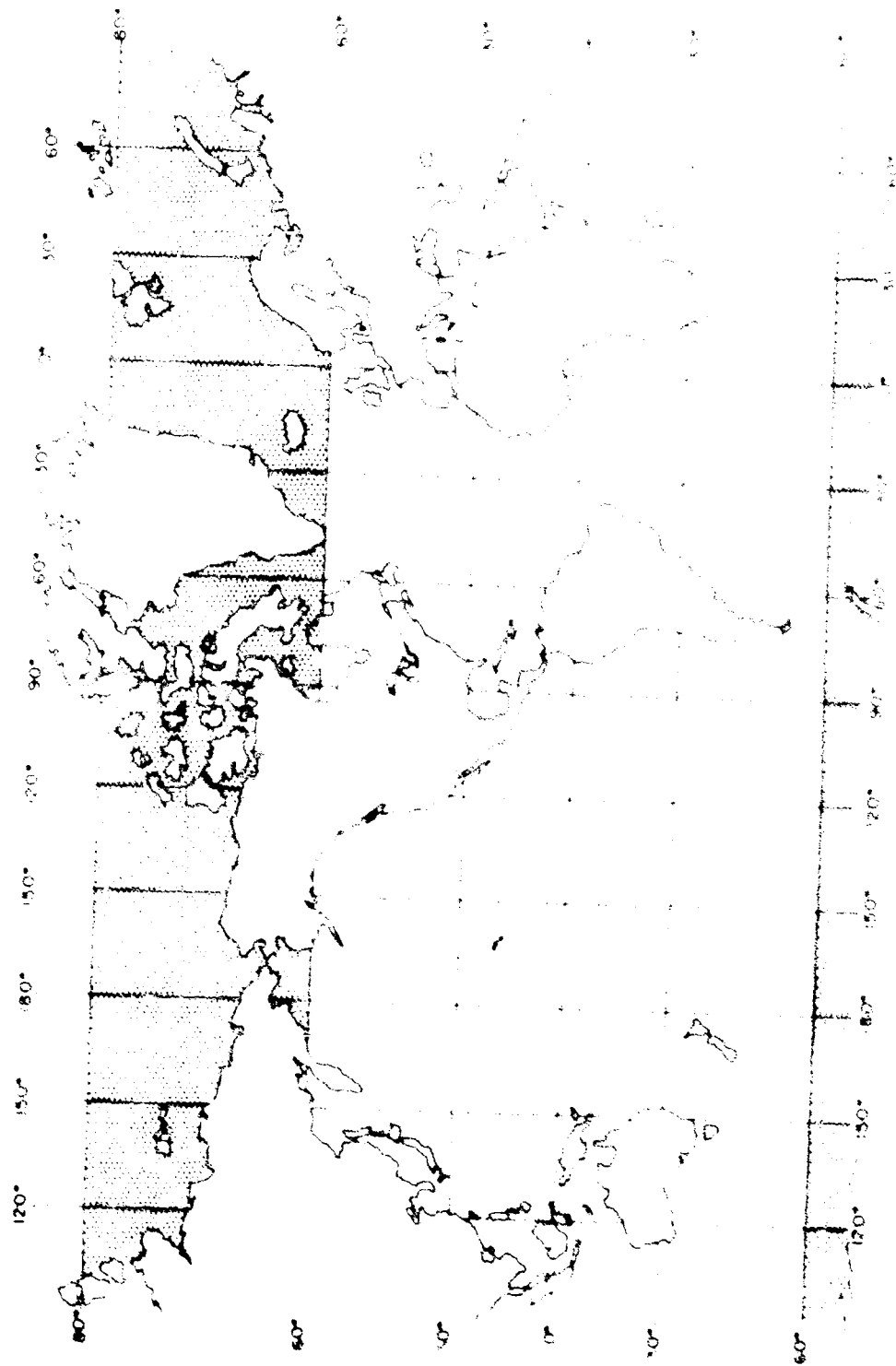
Legend:

- Area W. Atlantic N of 20° S and E Pacific N of 15° S
- X, Y Spacing - Variable Lines with Sites 10 to 40 n. mi. Apart in the Lines
- The lines are 200 to 500 n. mi. Apart
- Total Observation Sites Required - Unknown



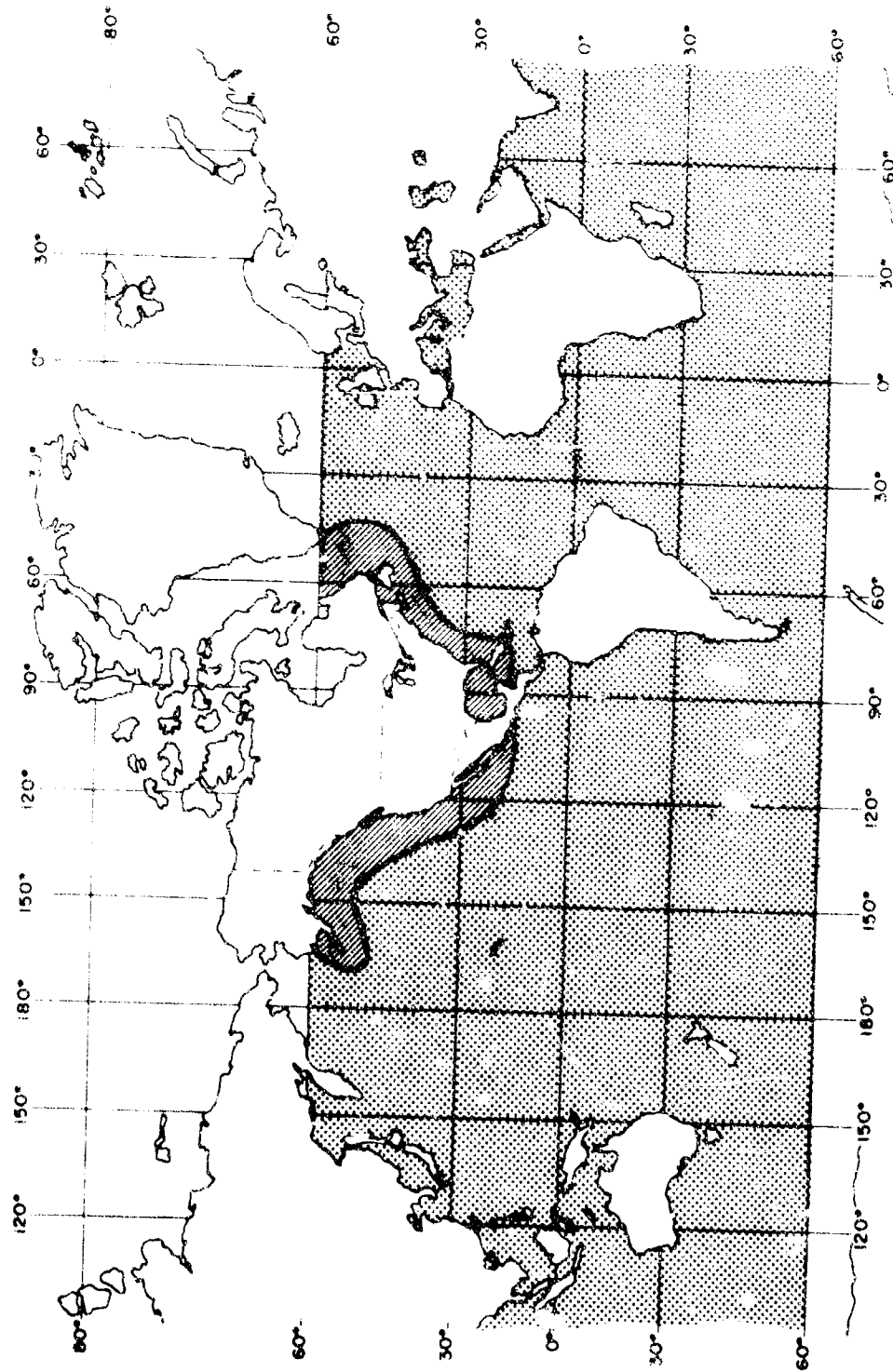
AMO # 28B - USCG - (Oceanographic Services (Ocean surveys)).

- Area Arctic and Antarctic (Above 60°N, below 60°S)
 - X, Y Spacing - Not Stated
 - Total Observation Sites Required - Unknown (C, G, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z)

[illegible]

Legend:

- Area = Global Deep Ocean and Coastal North America
- X, Y Spacing = 300 to 600 n. mi. (DO), 60 to 150 n. mi. (CNA)
- Total Observation Sites Required = 540 (261-DO, 279-CNA)

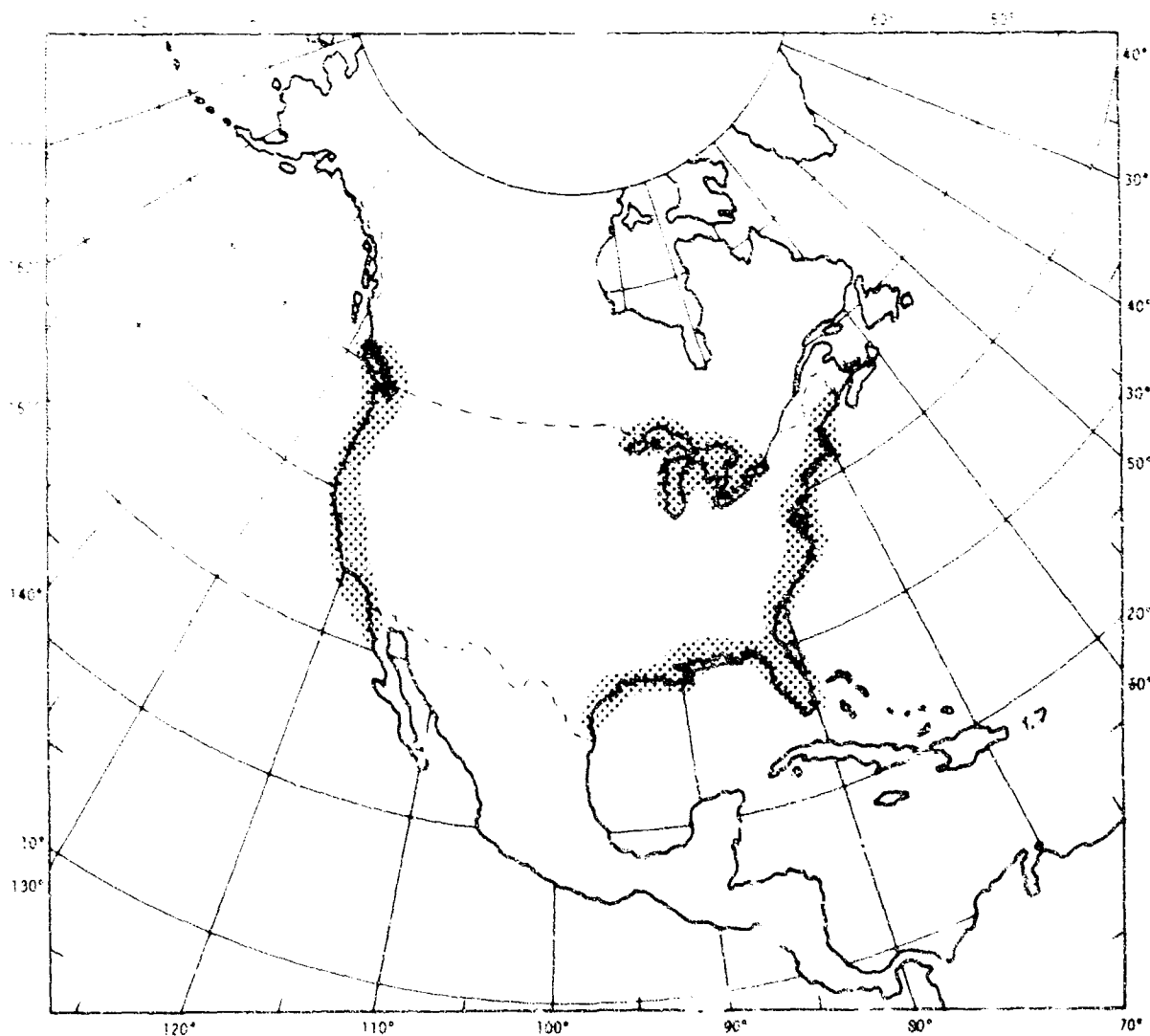


AMO #30--35-ESSA - Total agency requirements

- X, Y = 60 to 150 n. mi. = 400 n. mi. from N. A. Coast.
- X, Y = 300 to 600 n. mi. global deep ocean 60°N to 60°S.

Legend:

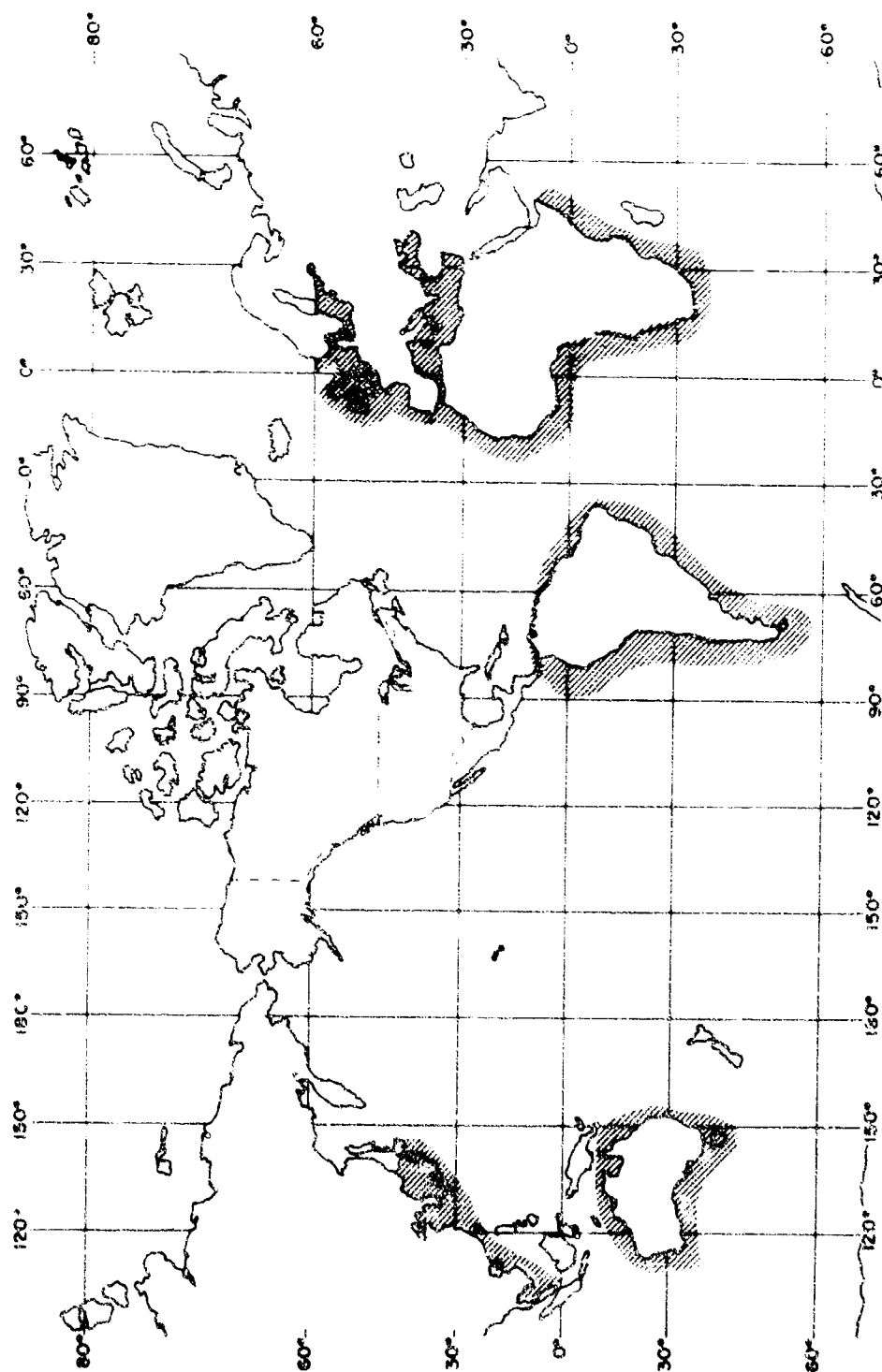
- Area - Great Lakes, Estuaries and Near Shore Areas of U. S.
- X, Y Spacing 20 n. mi. and 0.1 n. mi. in Special Areas of Great Lakes
1 to 10 n. mi. in Estuaries and Near Shore
- Total Observation Sites Required - 800 (Estimated)



AMO #39-FWPCA, U.S. Dept. of Interior-determine water quality.

Legend:

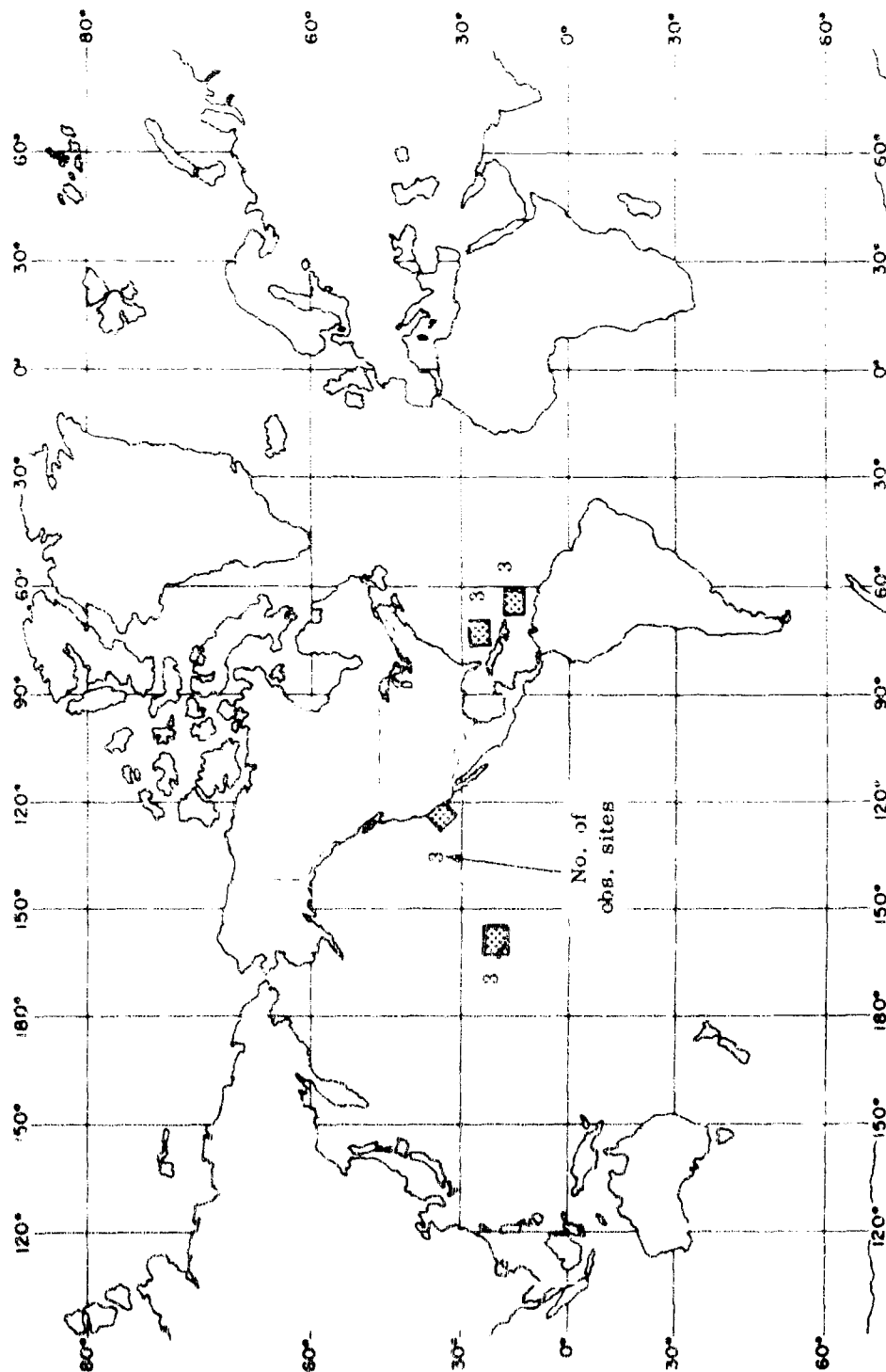
- Area = Out to 400 Fathoms Depth from SE Asia, S. America, Africa, Europe and Australia
- X, Y Spacing = N/A (Single pts)
- Total Observation Sites Required = Unknown



AMO #67—NCO—Code 80, Inshore Surveys—Measure depth of water to 400 fathoms.

Legend:

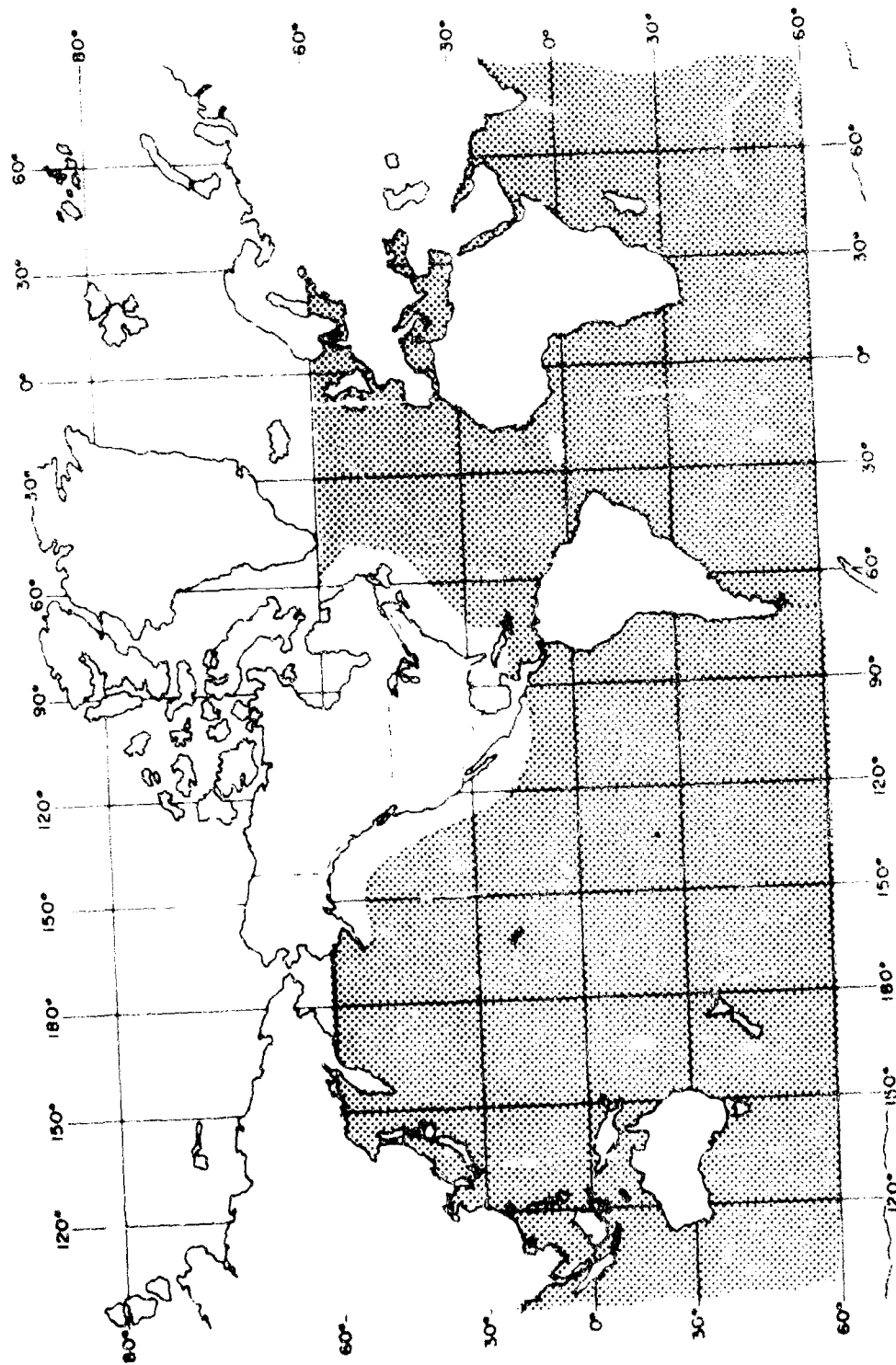
- Area = 2 Test Ranges in Atlantic and 2 in Pacific
- X, Y Spacing = 3 Sites 10 n. mi. Apart Within 20 n. mi. of Island in each Range
- Total Observation Sites Required = 12



AMO #68-XXX-Code 90—Underwater environmental monitoring for test ranges.

Legend:

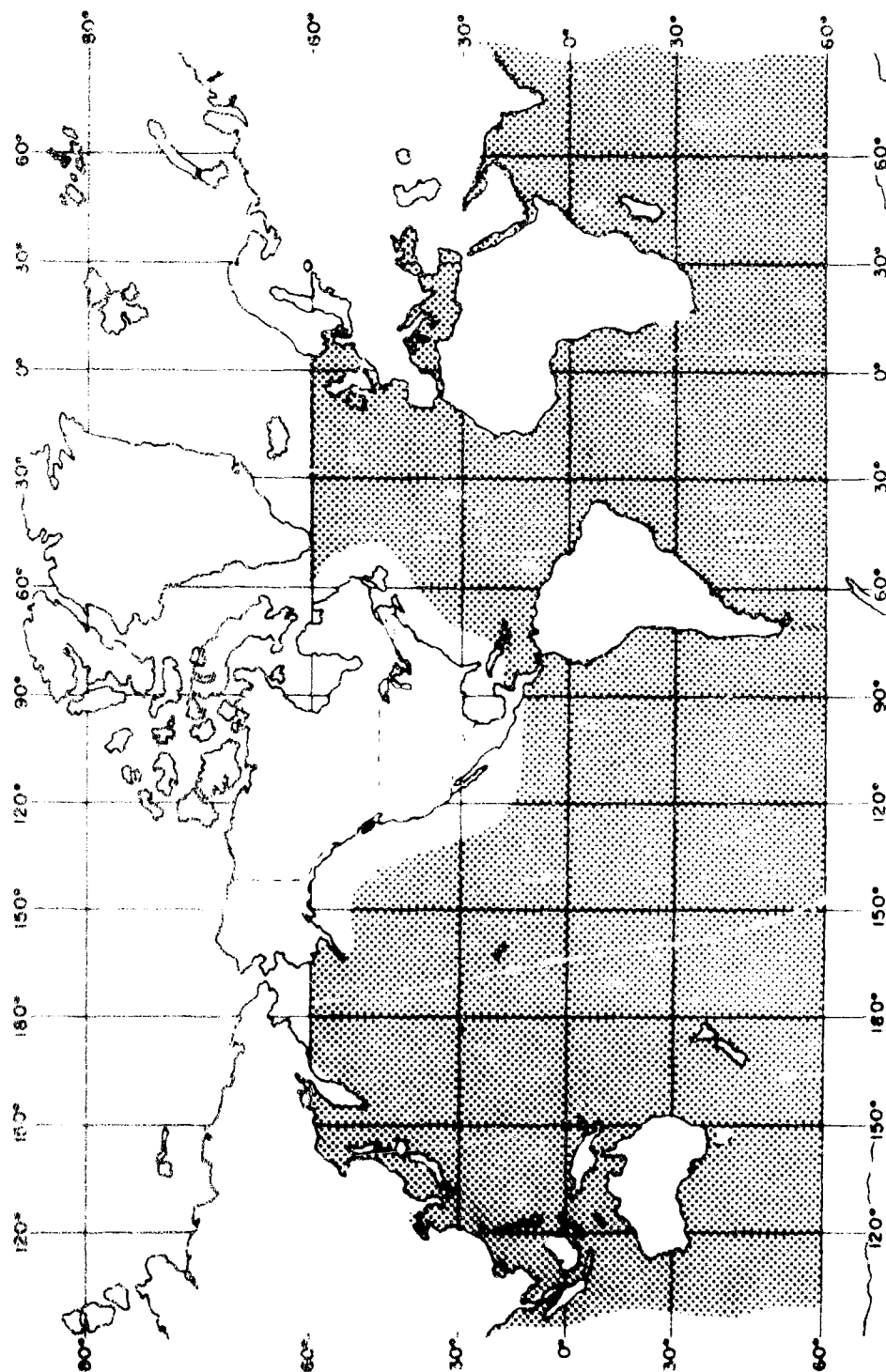
- Area = Global Deep Ocean
- 'C, Y Spacing = 1 Site at a Time or Unknown
- 'Total Observation Sites Required = Unknown



AMO #69-300-Code 90-World ocean surveys.

Legend:

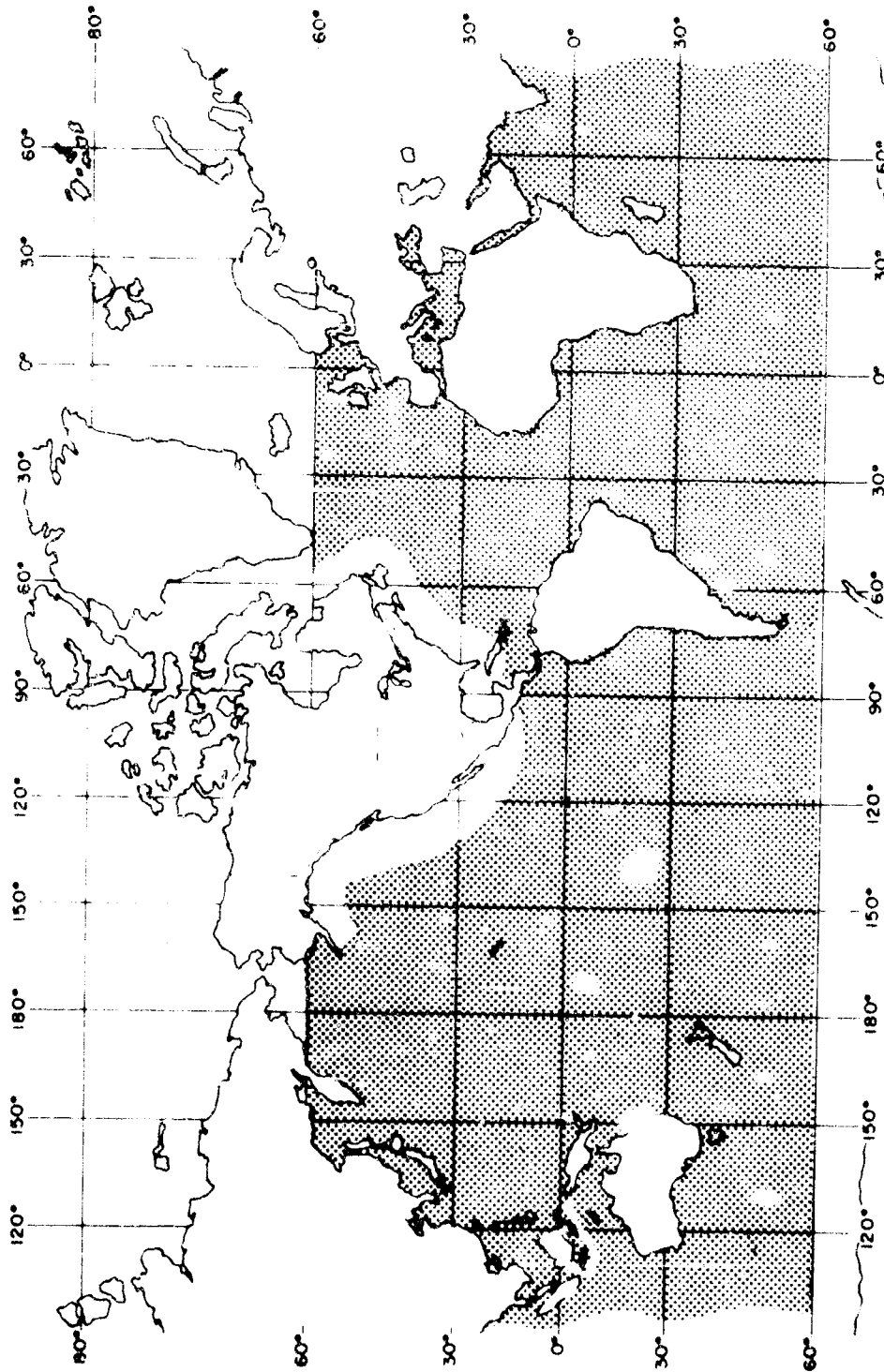
- Area = Global Deep Ocean
- X, Y Spacing = 600 n. mi.
- Total Observation Sites Required = 261



AMO #1-USN (NWS)-Support airborne operations.

Legend:

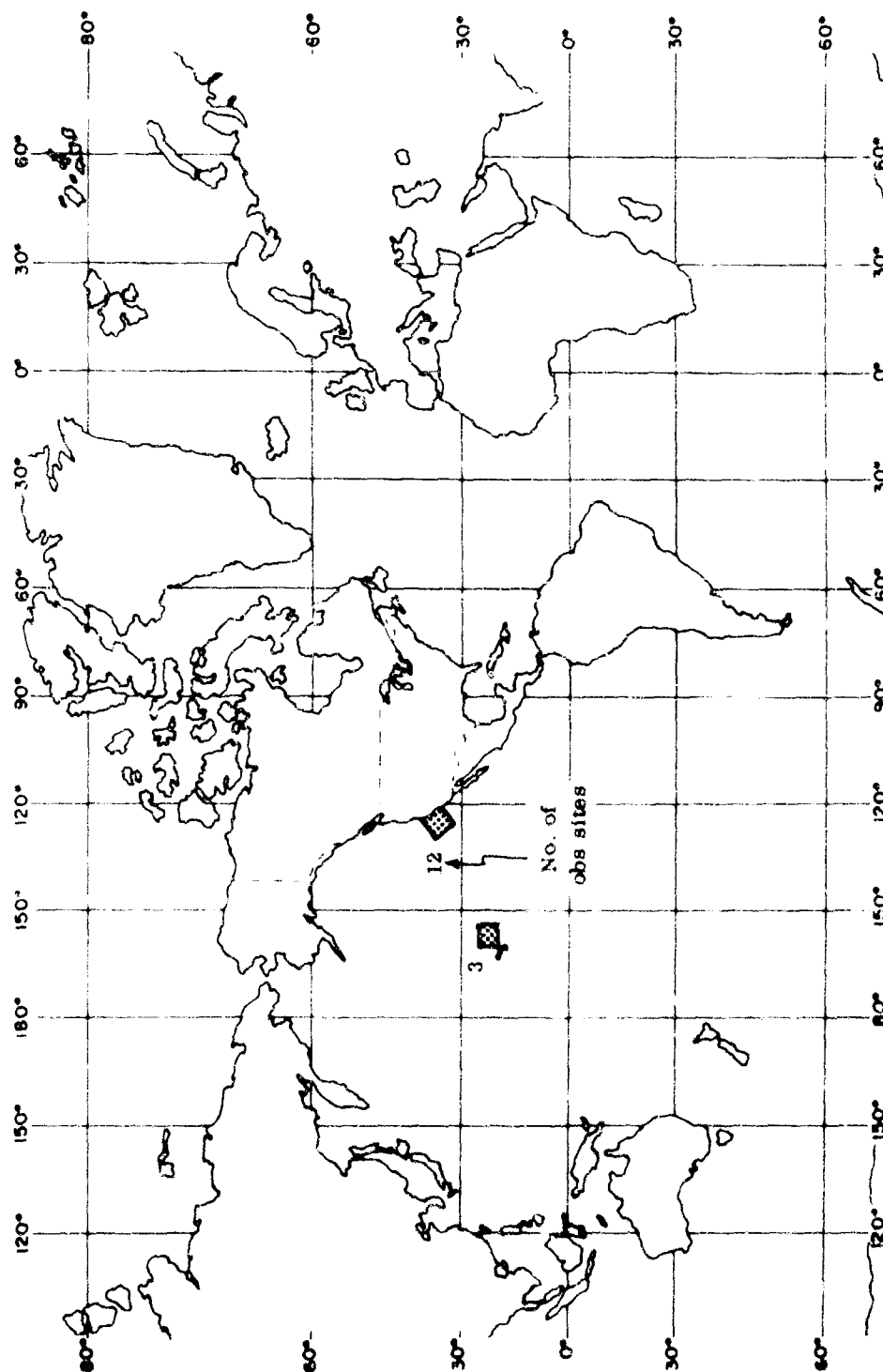
- Area = Global Deep Ocean
- X, Y Spacing = 600 n. mi.
- Total Observations Required = 261



AMO #72-US (NWS)—Support water surface and subsurface operations.

Legend:

- Area = 2 Ranges in Pacific
- X, Y Spacing = 25 to 50 n. mi.
- Total Observation Sites Required = 15

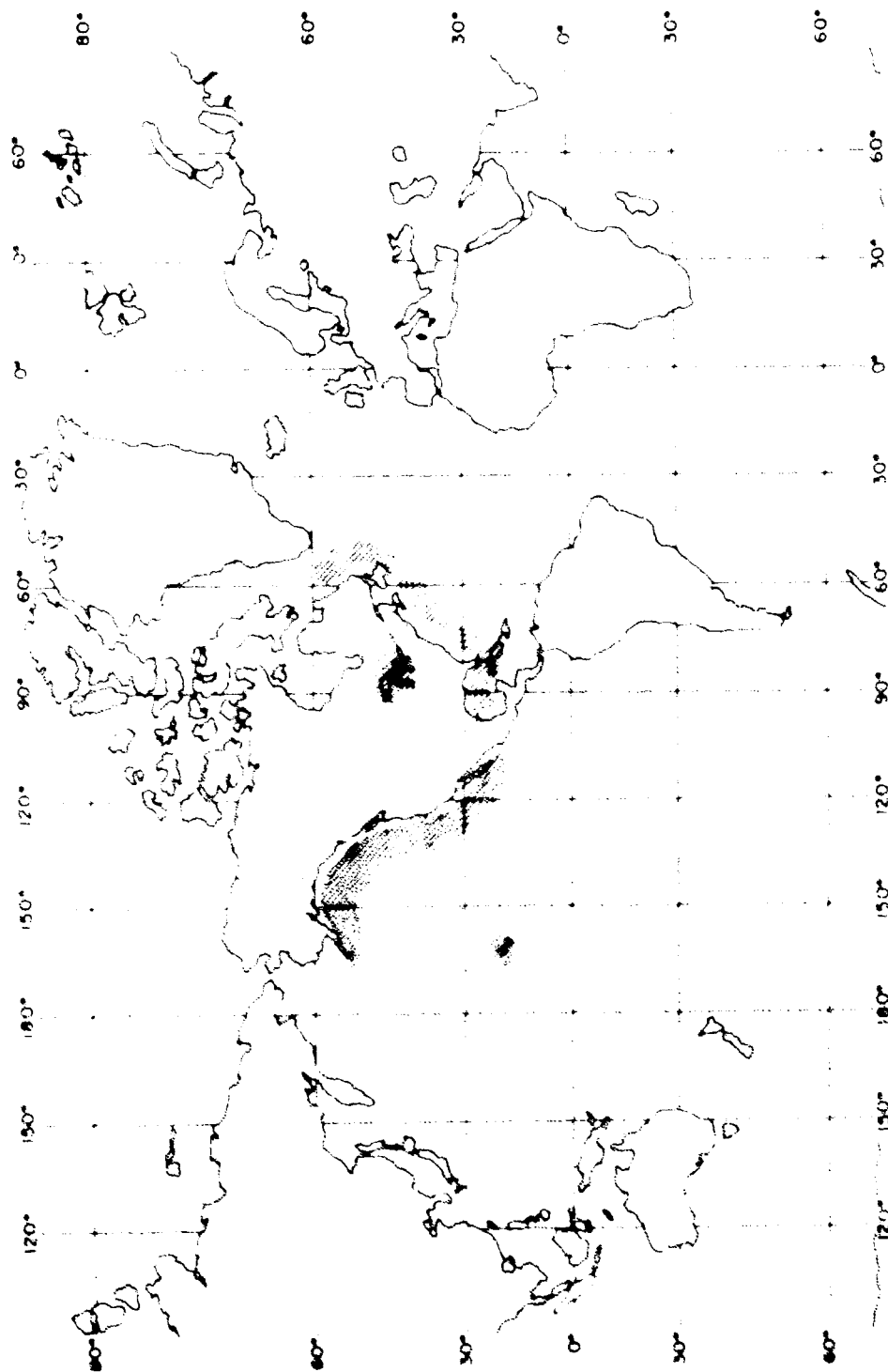


AMO #73—USN, Pacific Missile Range—Support range with environmental data.

APPENDIX III, PART B. GEOGRAPHICAL AREAS AND REQUIRED NUMBER OF
OBSERVATION SITES FOR RESEARCH AMOs

Legend:

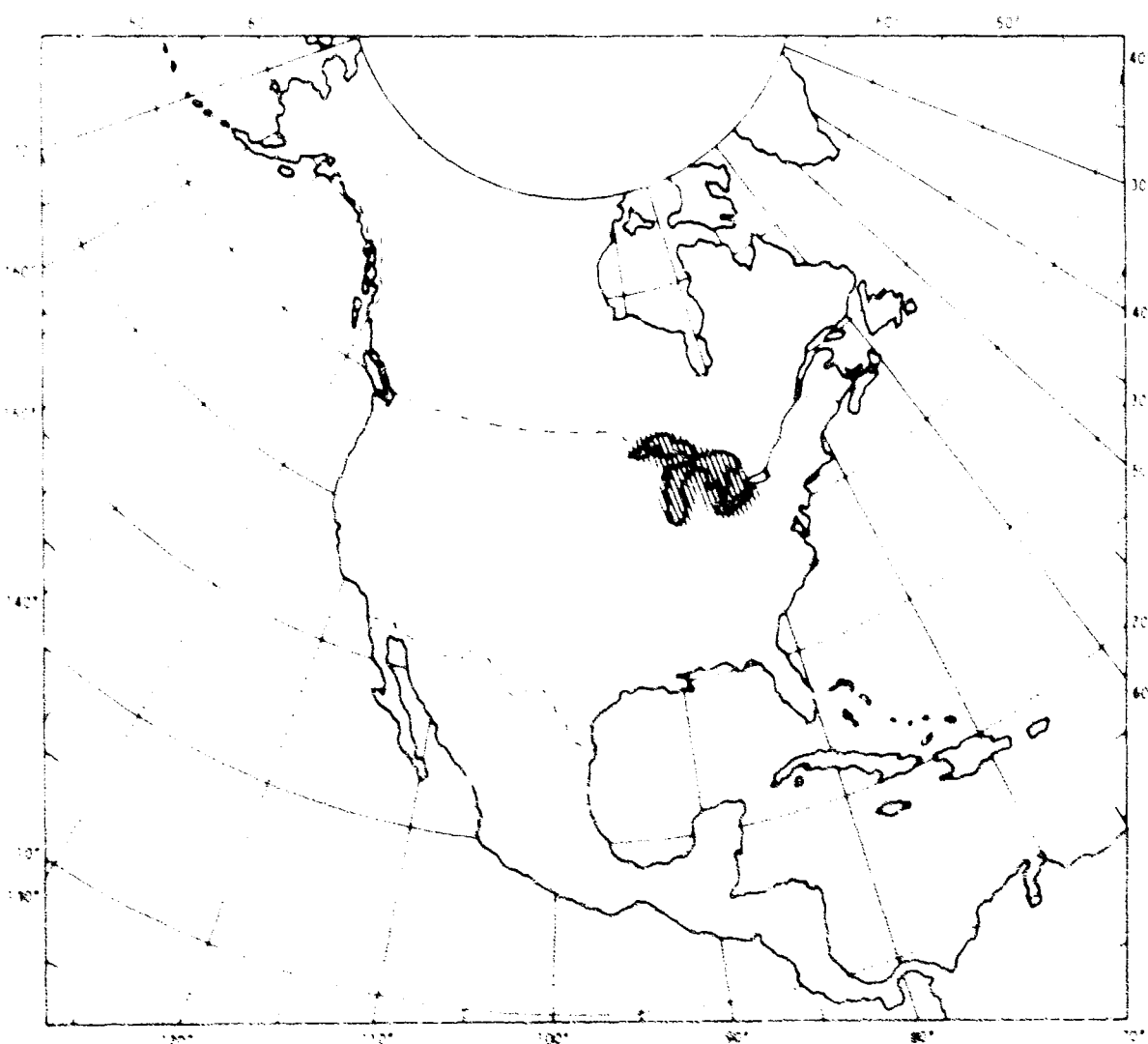
- Area - North American Coast, Hawaii and Great Lakes where Depth = 125 m
- X, Y Spacing = 500 n. mi.
- Total Observation Sites Required = 24



AMC 45-118 Army Coastal Engineering Research Center—Research in coastal engineering

Legend:

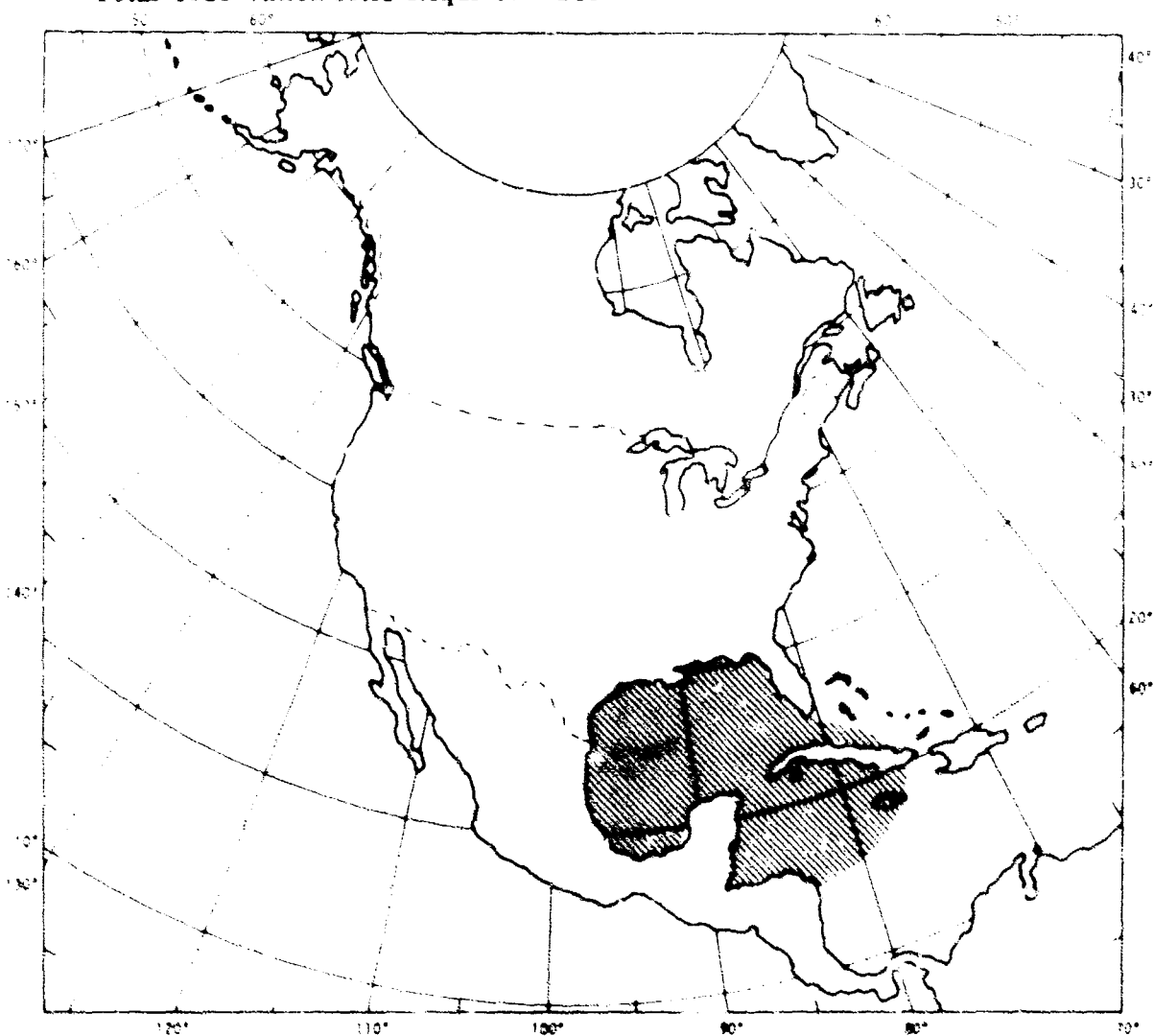
- Area = Great Lakes
- X, Y Spacing = 27.5 n. mi.
- Total Observation Sites Required = 250



AMO ★6--U.S. Army, Lake Survey--Water motion research in the Great Lakes.

Legend:

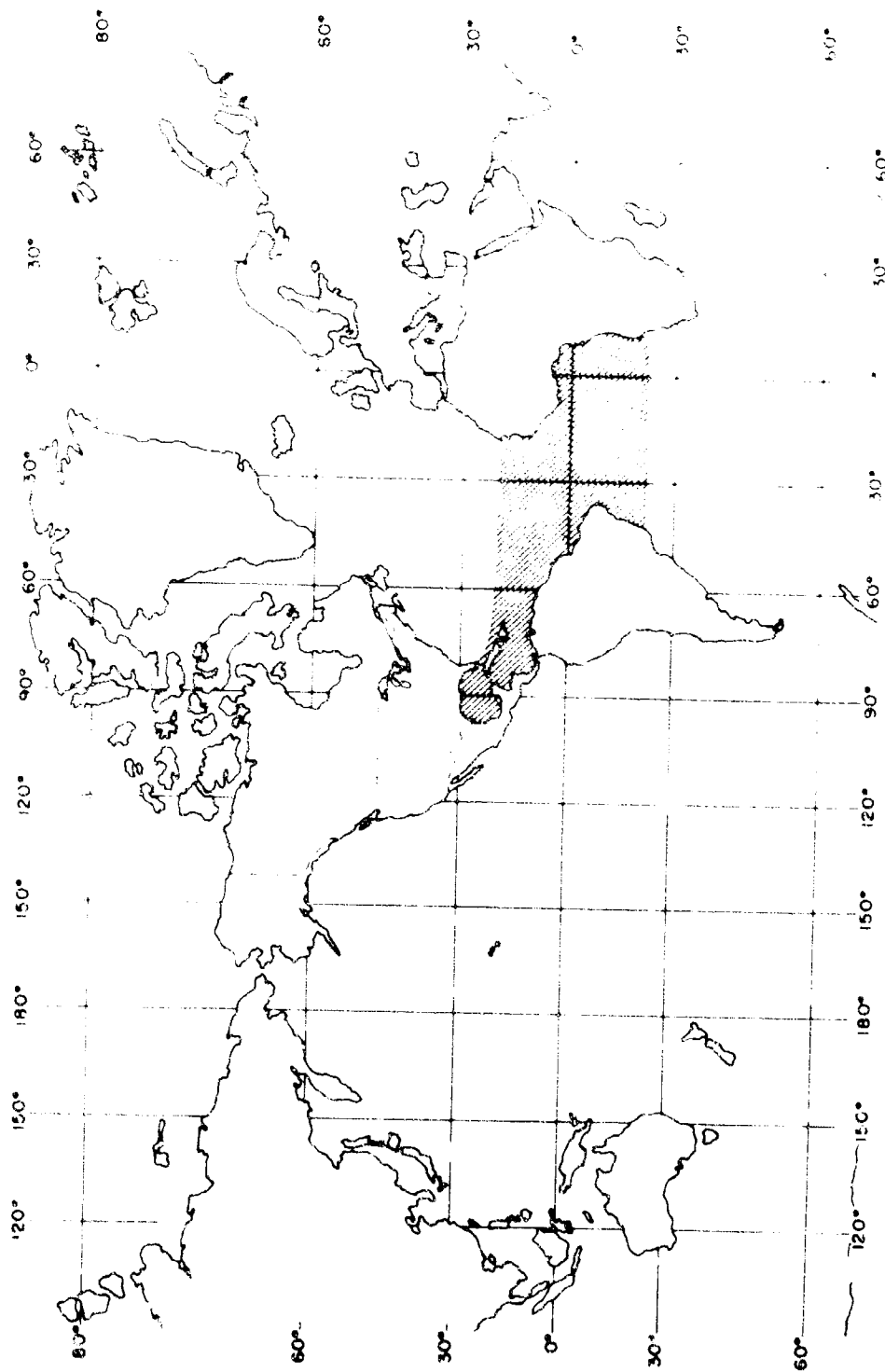
- Area = Gulf of Mexico and Caribbean
- X, Y Spacing = 10 n. mi. Near Shore, 50 n. mi. Off Shore and 100 n. mi. in Deep Water
- Total Observation Sites Required = 244



AMO 48-BCF, Galveston--Research on water masses.

Legend:

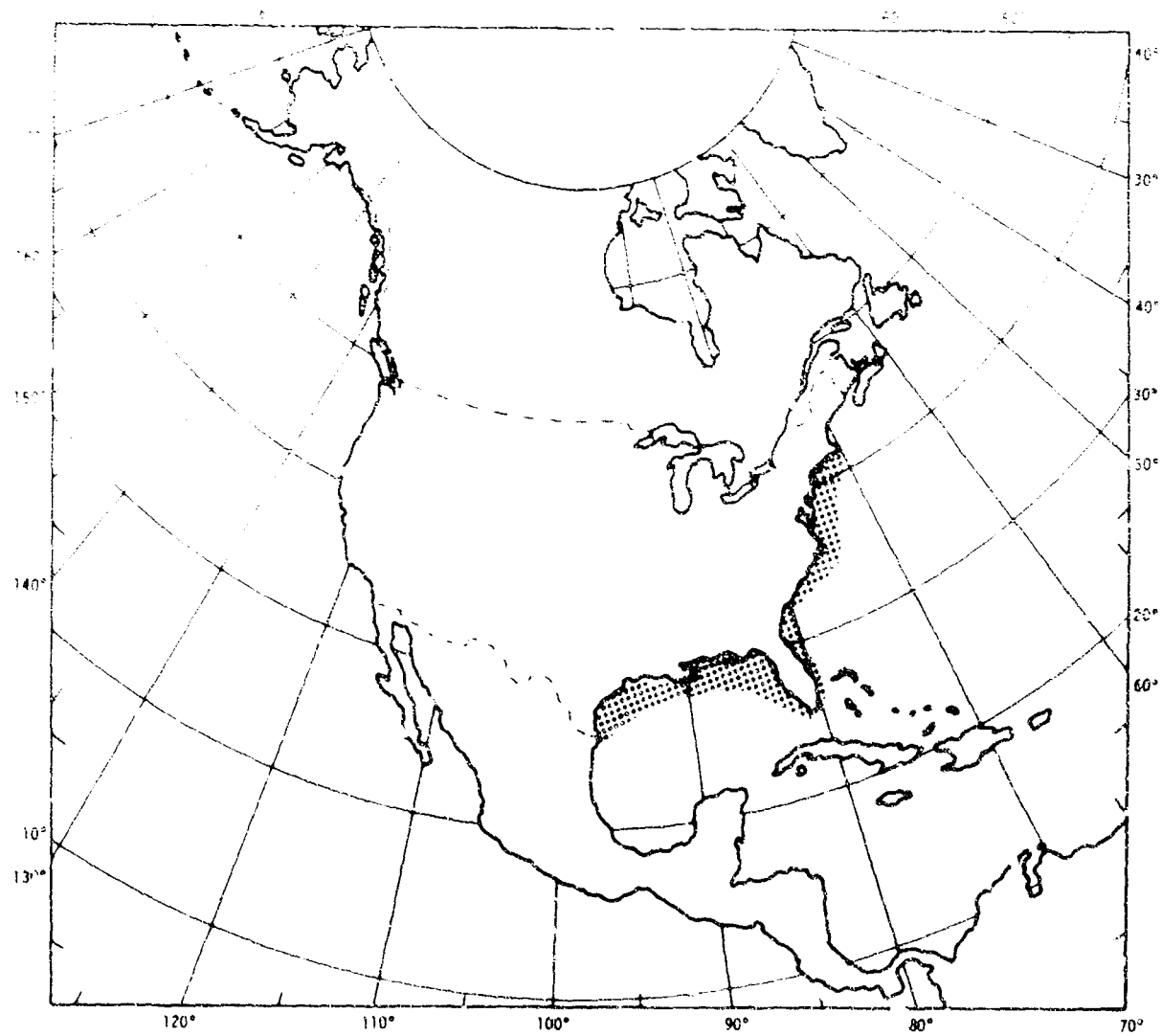
- Area = Tropical Atlantic 20° N to 20° S and Gulf of Mexico
- X, Y Spacing = A) 500 n. mi. Outside Areas of Special Interest
- 2) 6 to 30 n. mi. in Areas of Special Interest
- Total Observation Sites Required = 80



AMIO #9-BCF, Miami—Research on tuna.

Legend:

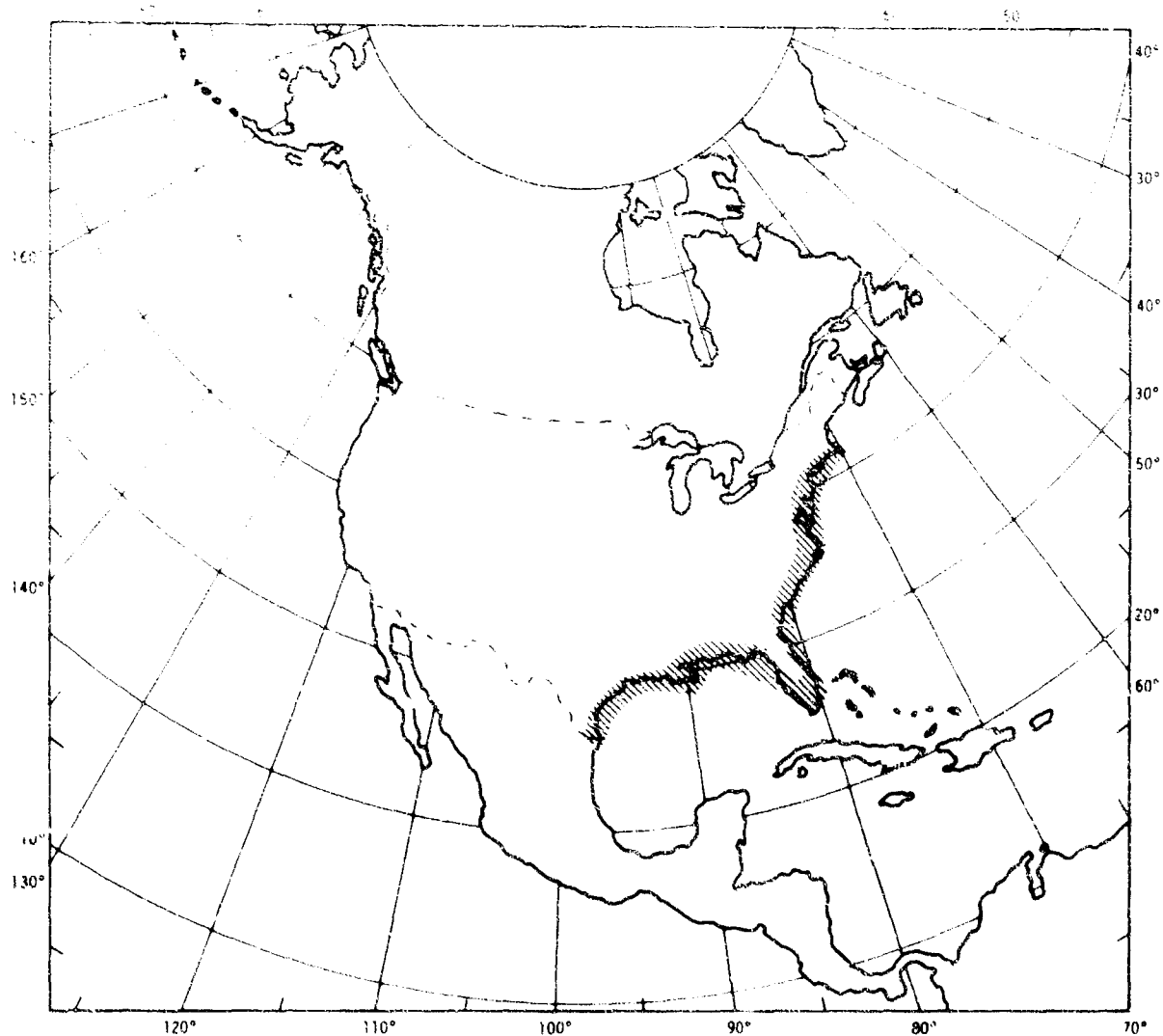
- Area = Cont. Shelf Maine to Texas out to a Maximum of 200 m.
- X, Y Spacing = 100 n. mi.
- Total Observation Sites Required = 42



AMO #10- BCF, Beaufort, N. C.—Research on menhaden and blue crab.

Legend:

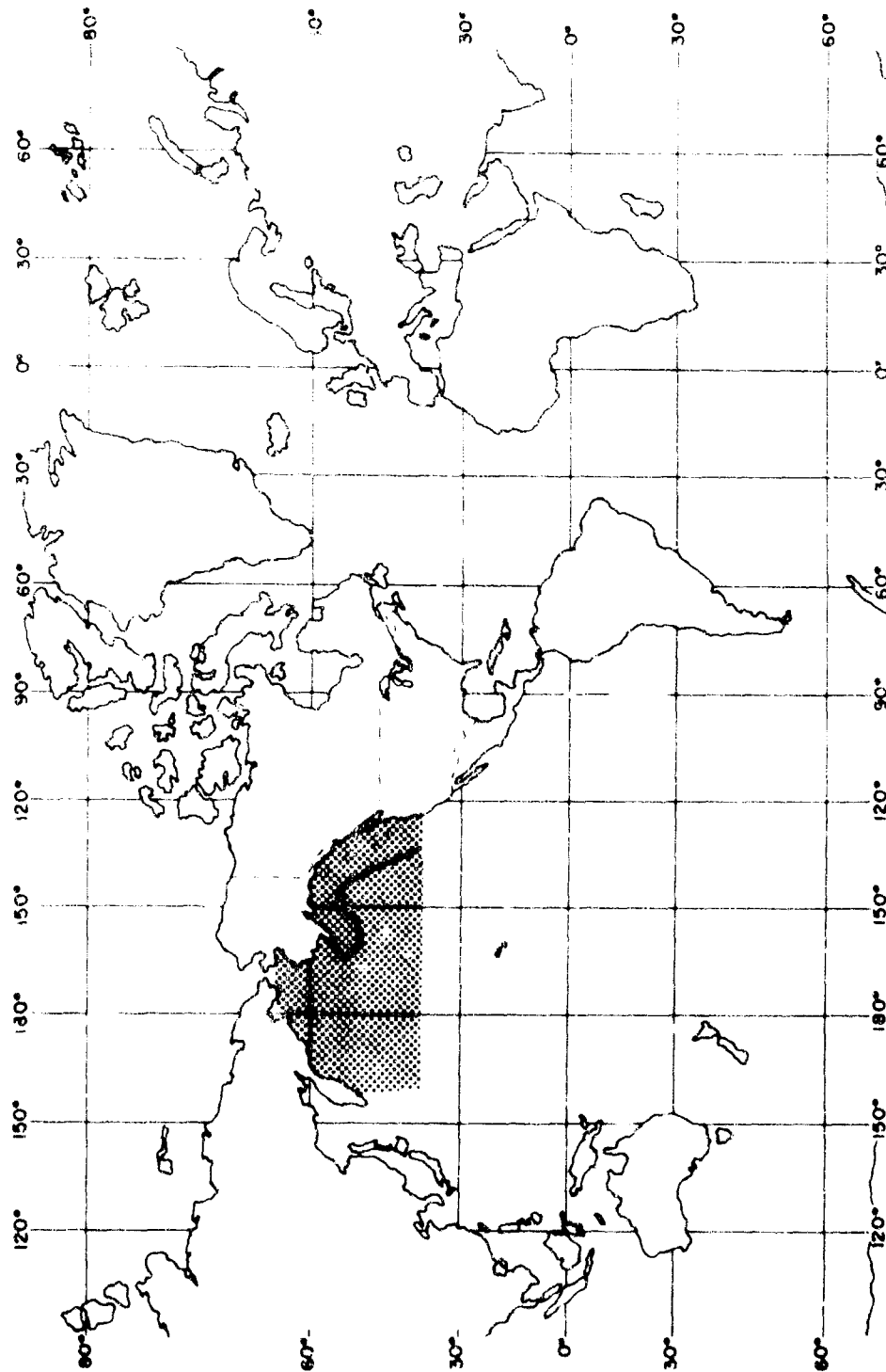
- Area = Estuaries and Near Shore Areas Cape Cod to Texas
- X, Y Spacing - Will Vary with Areas of Interest. At Present Limits Are Not Known
- Total Observation Sites Required = Unknown



AMO #11-BCF, Beaufort, N. C.—Research on menhaden and blue crab.

Legend:

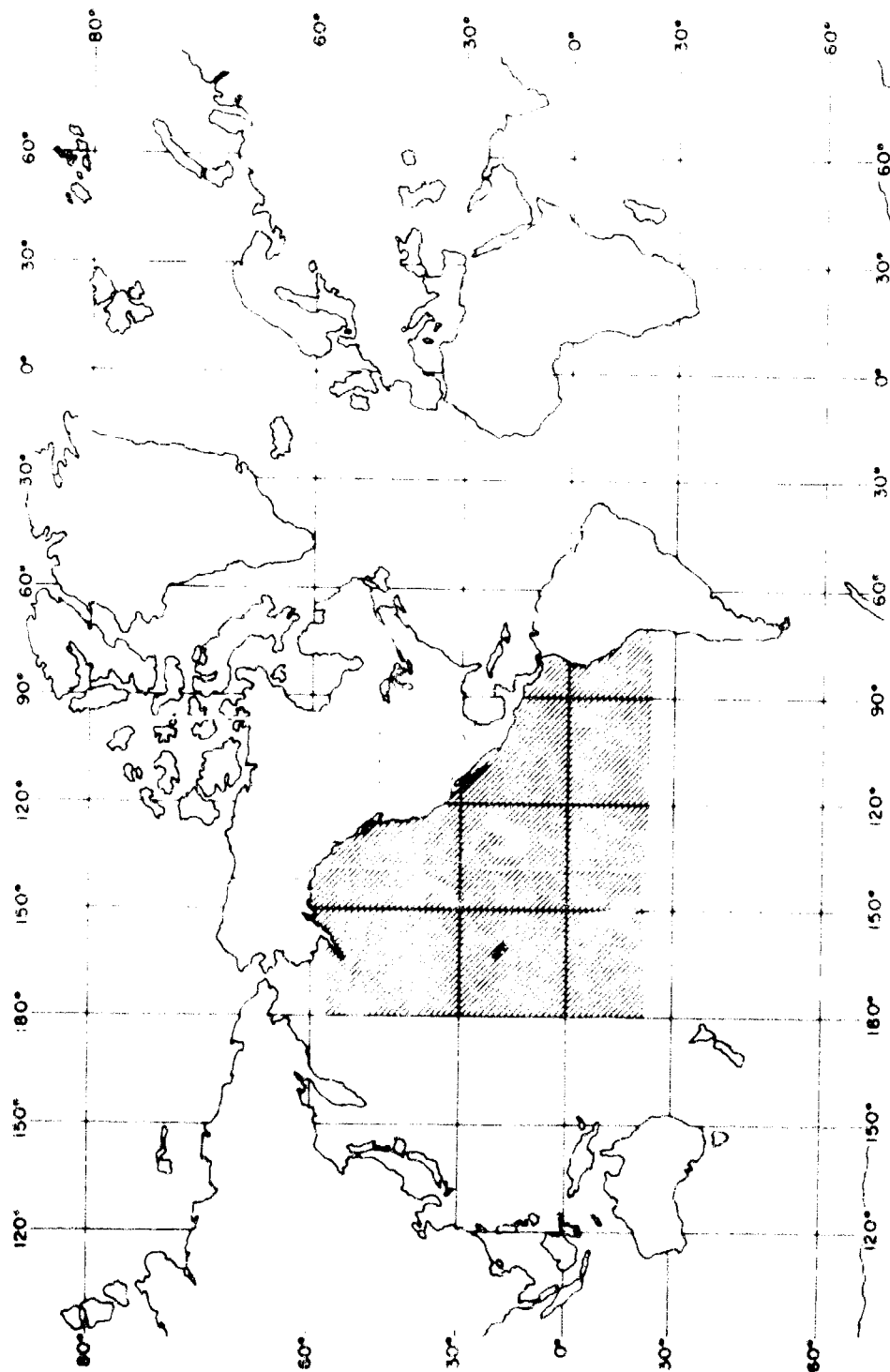
- Area = W. Coast of U.S. to 160° E, 40° N to Bering Sea
- X, Y Spacing = 60 to 100 n. mi. > 400 n. mi. from North American Coast, 5 to 60 n. mi. < 400 n. mi. from North American Coast
- Total Observation Sites Required = 400 (Estimated)



AMO #12-BCF, Seattle--Research on commercial fish.

Legend:

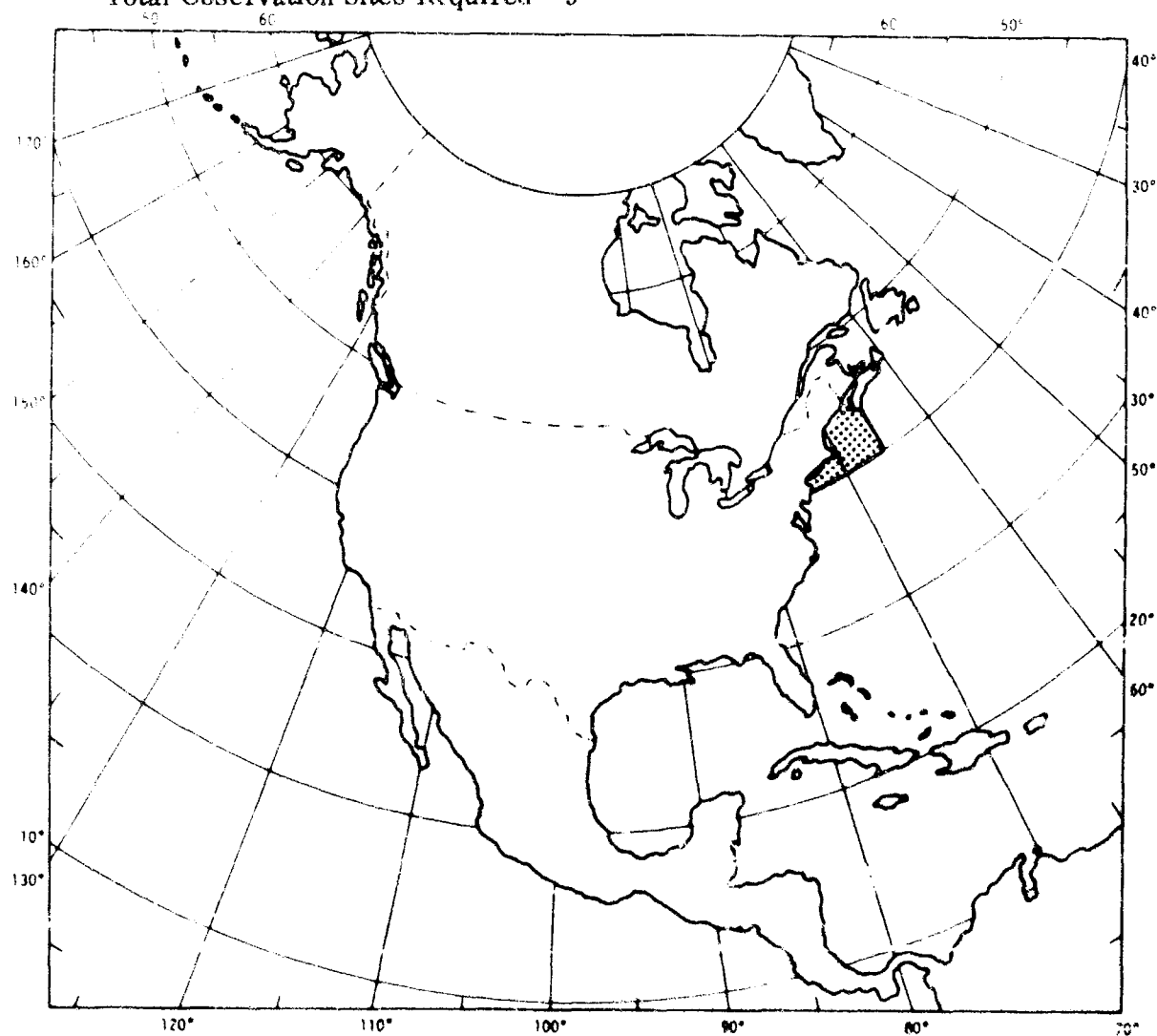
- Area = Cross-Current Lines in Pacific N of 20° S, W Coast to 180°
- X, Y Spacing = 60 to 100 n. mi. in Lines up to 600 n. mi. Apart (≤ 400 n. mi. from North America)
- 100 to 300 n. mi. in Lines up to 600 n. mi. Apart (> 400 n. mi. from North America)
- Total Observation Sites Required = 113



AMC #13—BCF, Stanford—A sea interaction research.

Legend:

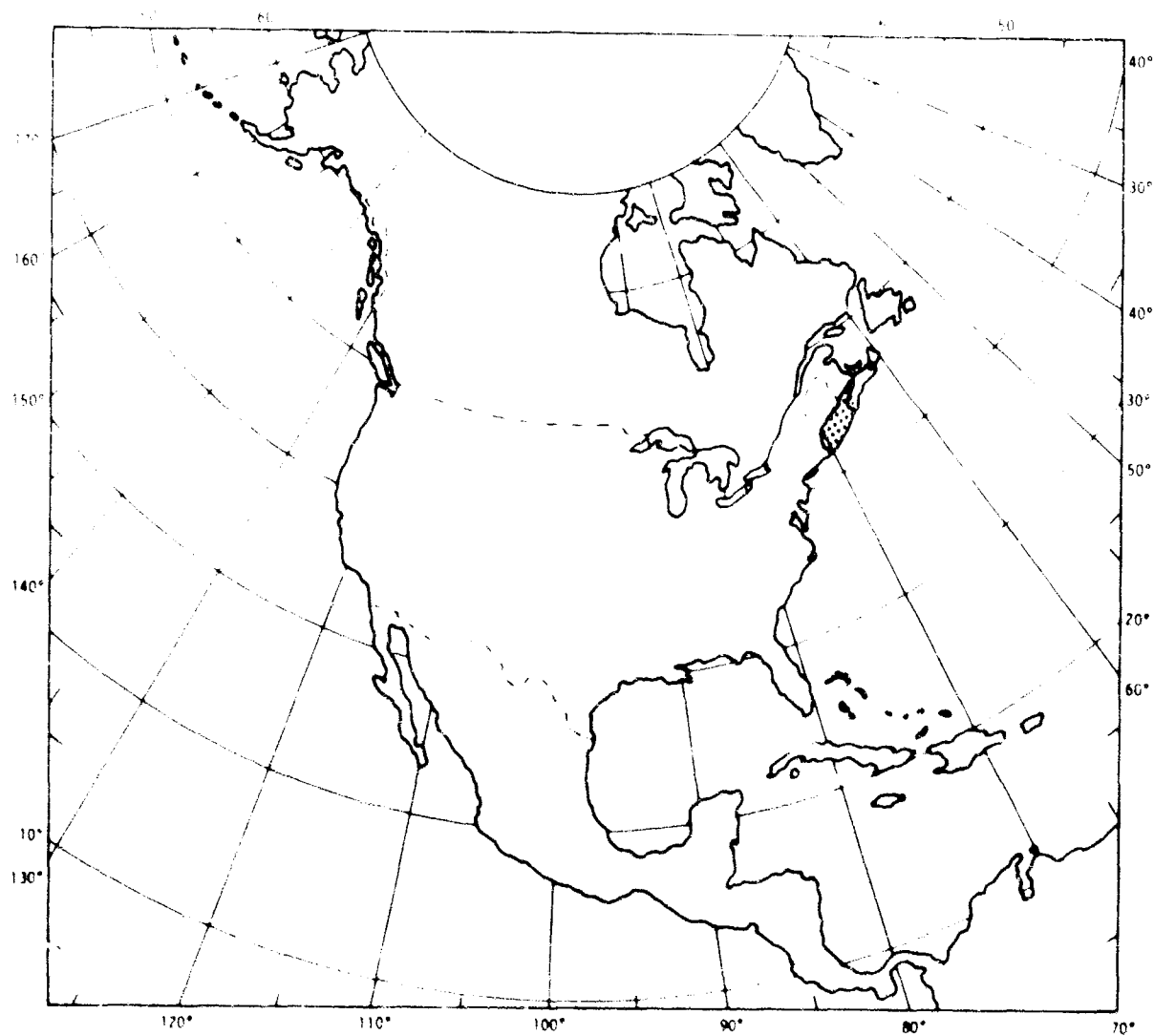
- Area = New England Cont. Shelf 40° N to 45° N and 64° W to 74° W
- X, Y Spacing = 100 to 300 n. mi. for Surface Parameters, 30 to 100 n. mi. for Oceanographic Parameters
- Total Observation Sites Required = 9



**AMO #15—BCF, Woods Hole—Research on major ground fish species off
New England Coast.**

Legend:

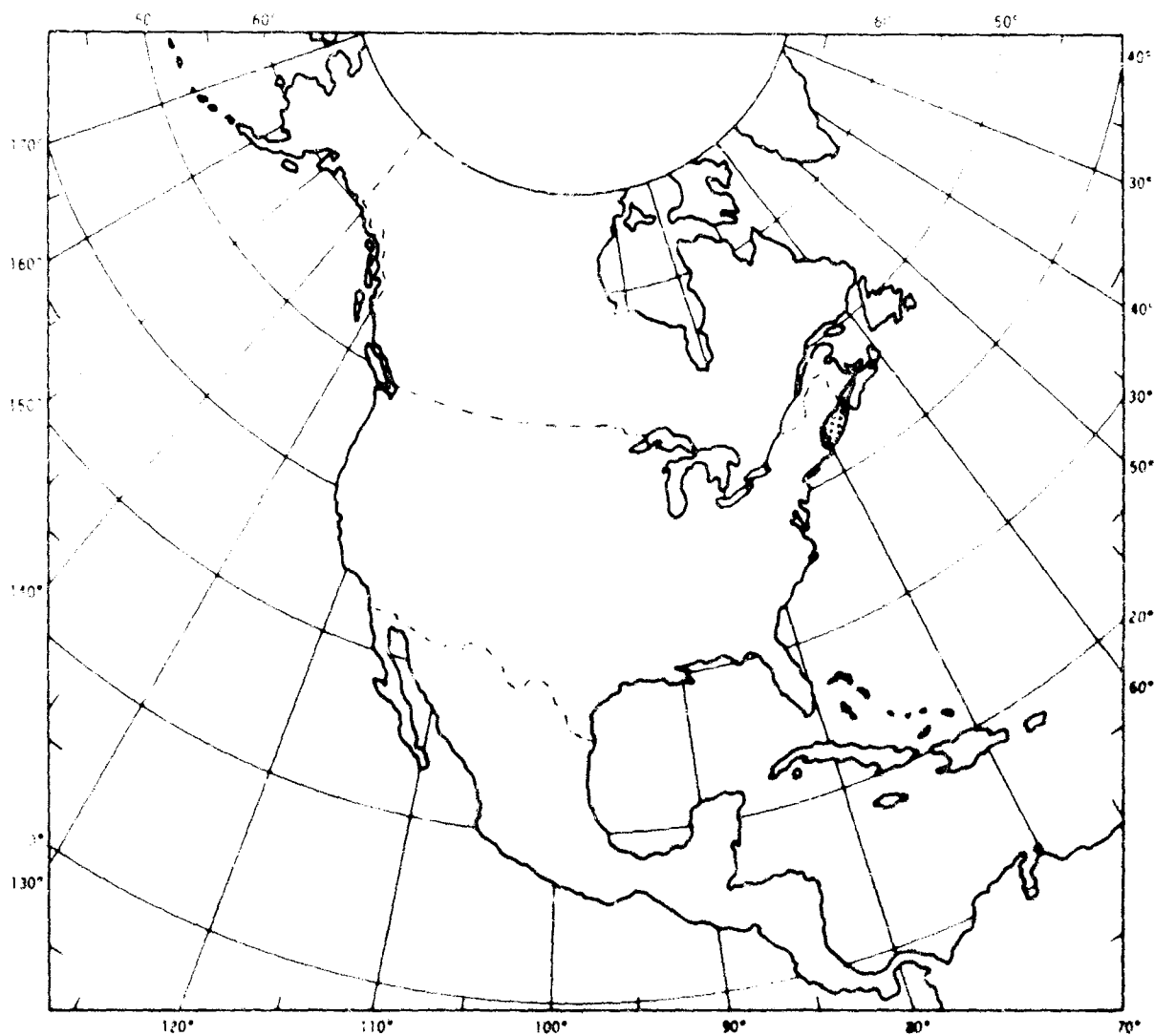
- Area = Gulf of Maine Off Shore
- X, Y S. izing = 25 to 30 n. mi. or at Least 3 Sites
- Total Observation Sites Required = 3



AMO #16—BCF, Booth Bay Harbor—Research on herring, lobster and
sardine.

Legend:

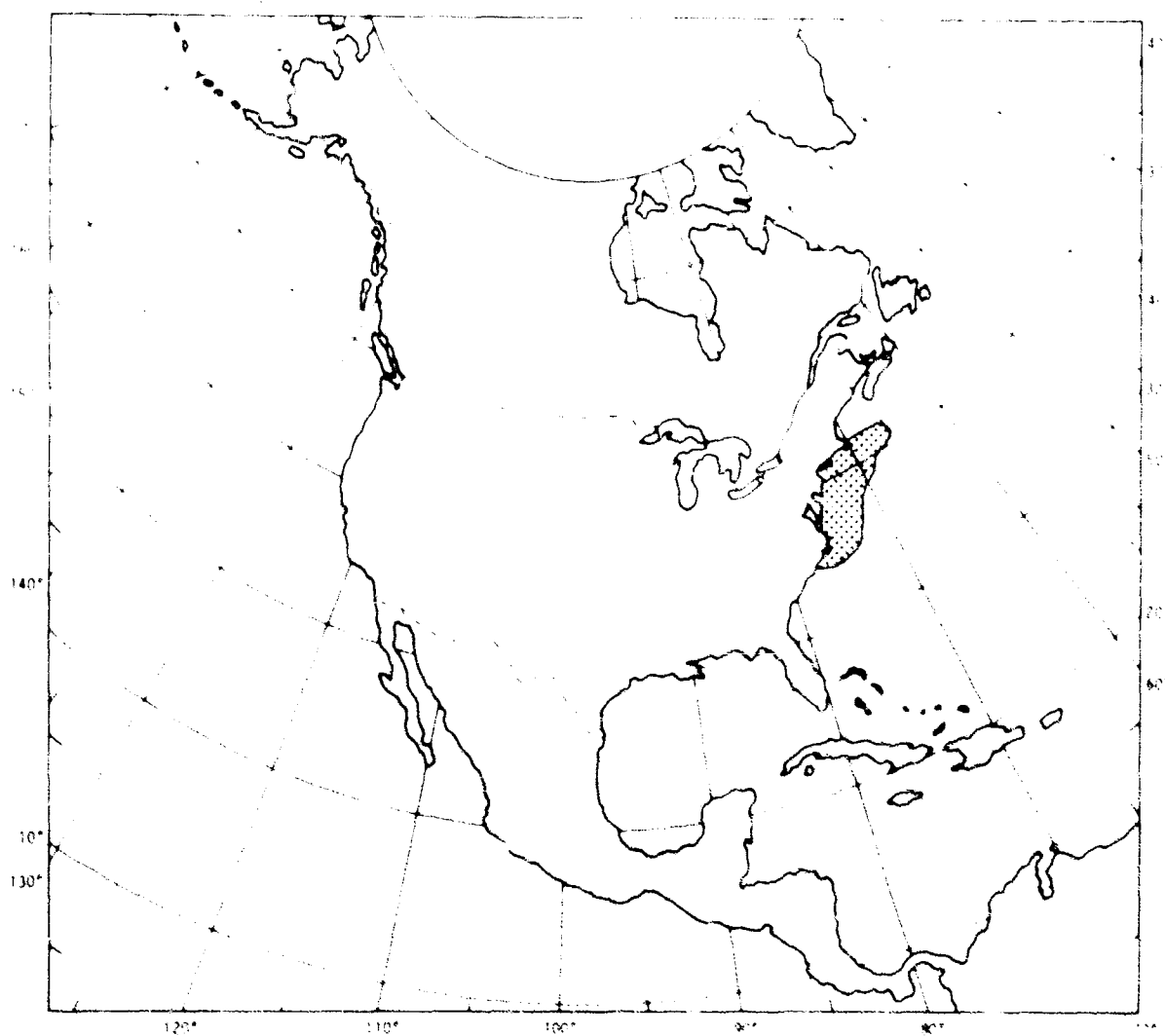
- Area = Gulf of Maine On Shore
- X, Y Spacing = 8 to 13 n. mi.
- Total Observation Sites Required = 50



AMO #17—BCF, Booth Bay Harbor—Research on herring, lobster and sardine.

Legend:

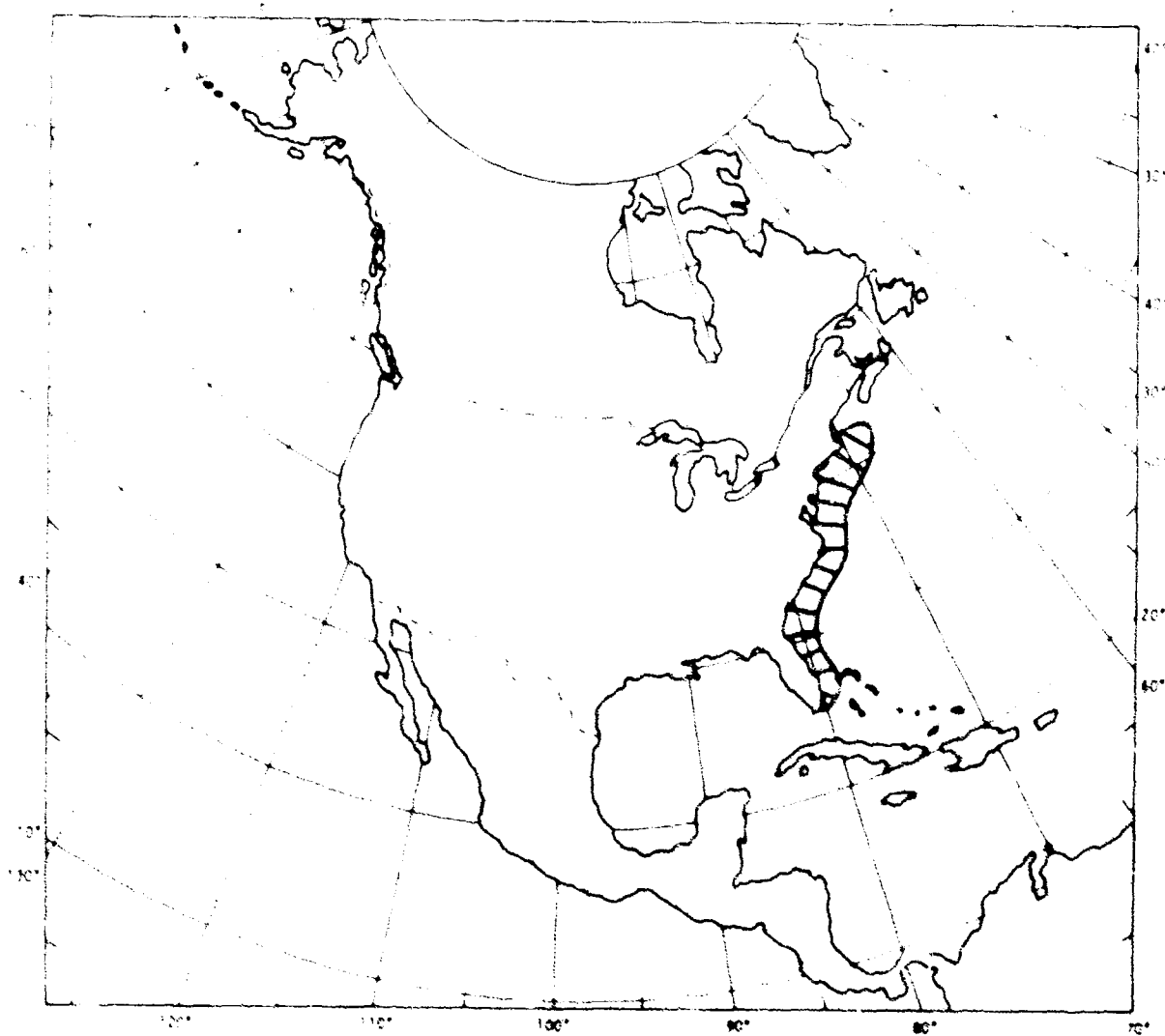
- Area - U.S. Cont. Shelf N of Cape Hatteras
- X, Y Spacing - Transect Lines Variousy Oriented with Sites at 20 m Contours on the Lines
- Total Observation Sites Required = 100 (estimated)



AMO #18-BCF, Washington, D. C.—Environmental oceanographic research.

Legend:

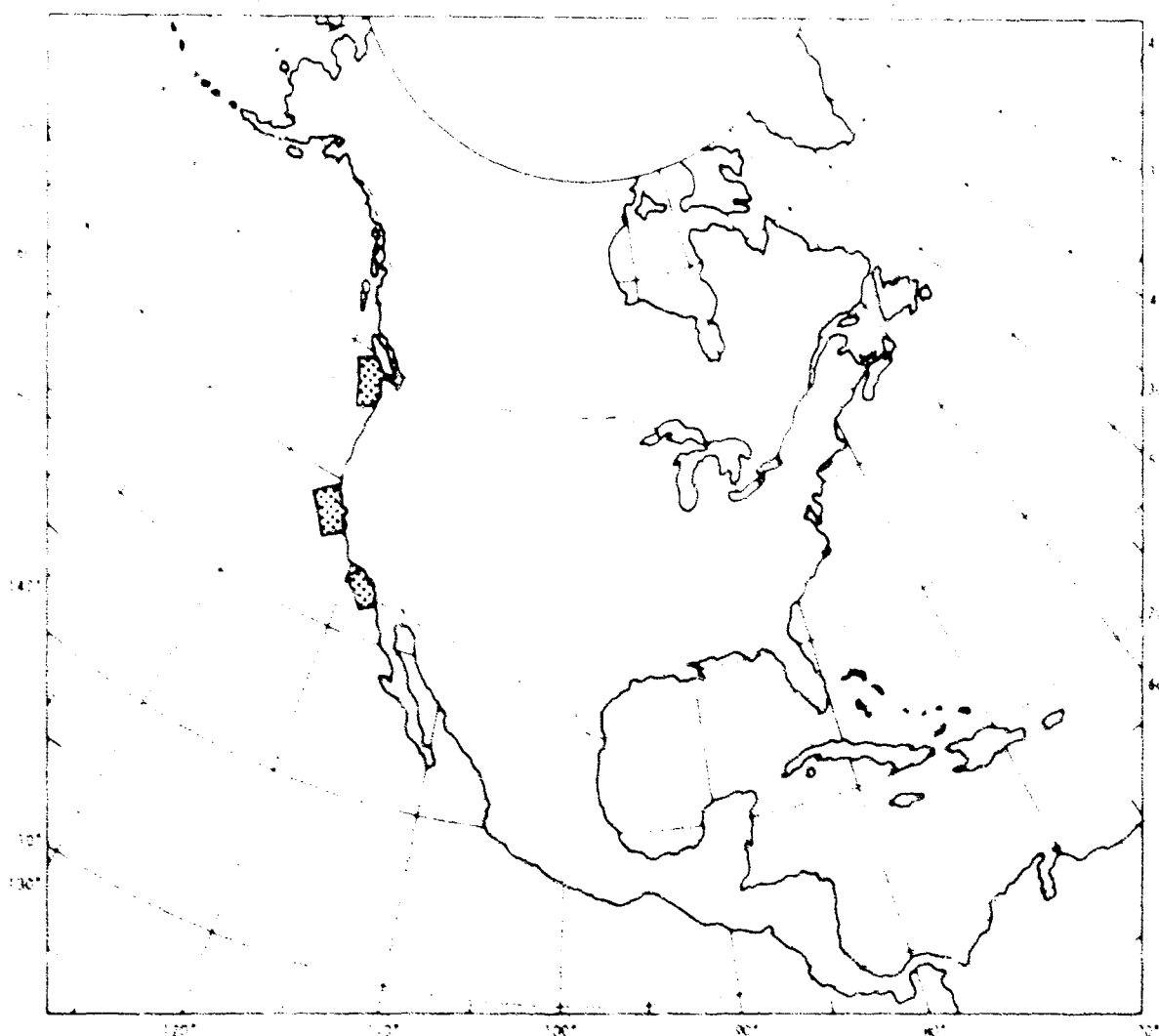
- Area - End of George's Bank to Florida Keys out to a Depth of 70 Fathoms
- X, Y Spacing - Transect Lines About 100 n. mi. Apart, Spacing in Lines = 1, 2, 3, 10, 20, 30, 40, 50 n. mi. from the Coast Line.
- Total Observation Sites Required = 100 (Estimated)



AMO #20-BSF-Sandy Hook Marine Lab.-Fish distribution along east coast of U.S.

Legend:

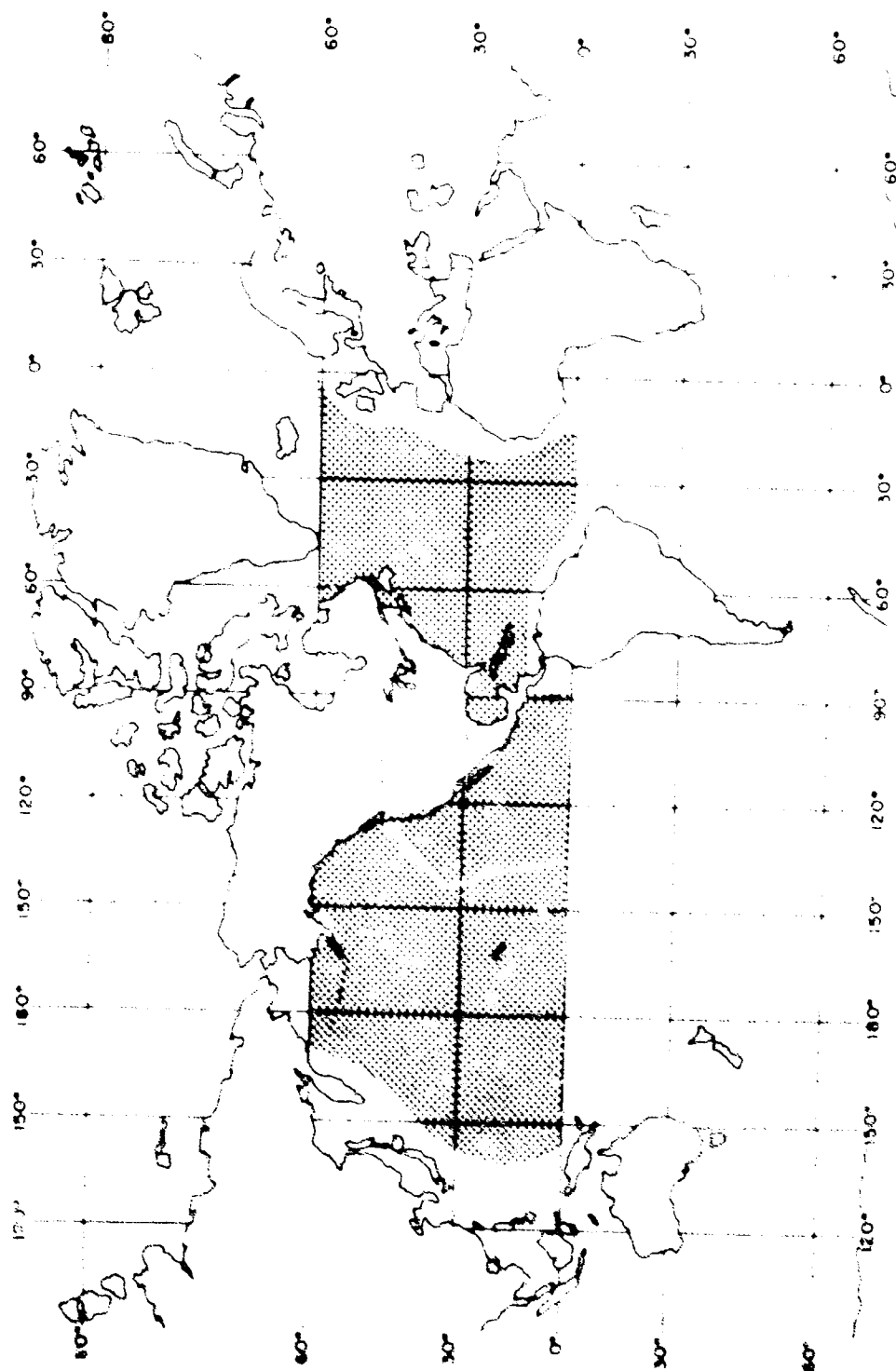
- Area = West Coast Cont. Shelf of U.S. (3 Areas)
- X, Y Spacing = Varies 10 to 45 n. mi.
- Total Observation Sites Required = 100 (Estimated)



AMO #21—BSF, Tiburon—Fish distribution along west coast of U.S.

Legend:

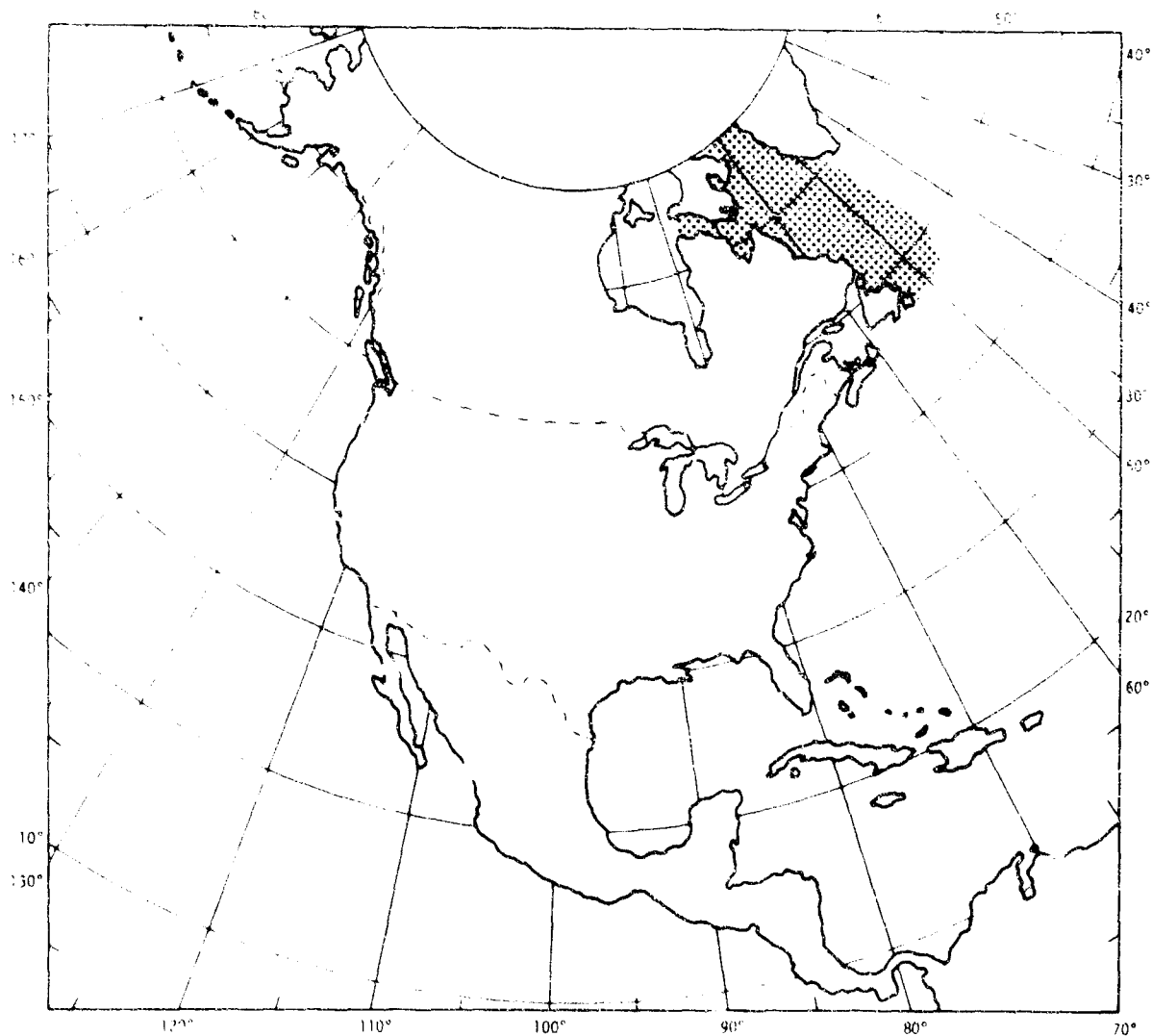
- Area = North American Coast, Deep Ocean Atlantic and Pacific
- X, Y Spacing = 50 n. mi.
- Total Observation Sites Required = Variable as Probably Only a Few Areas at a Time



AMO #22--Bureau of Mines, Dept. of Interior--Develop marine mining technology.

Legend:

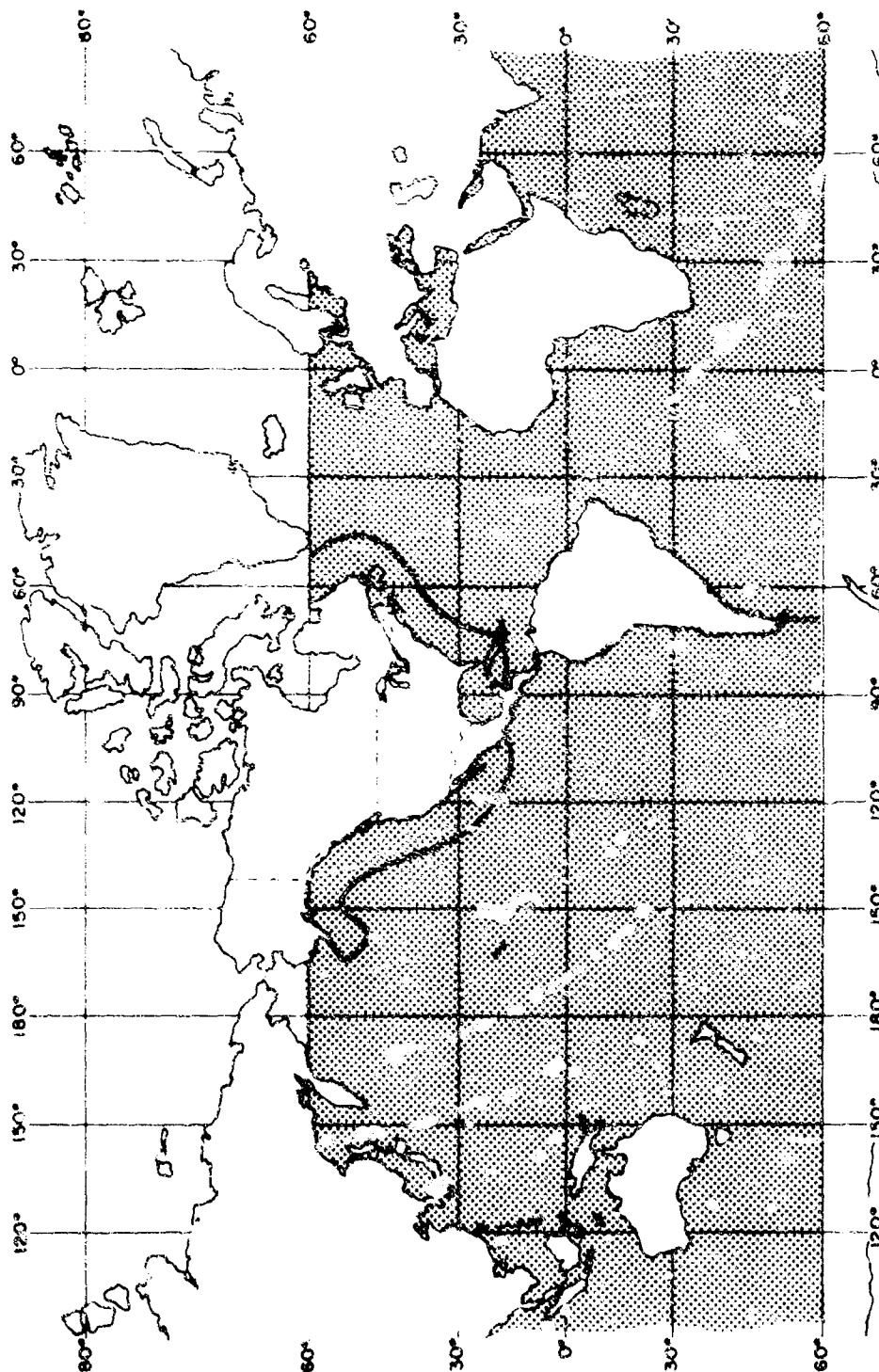
- Area = Grand Banks, Labrador Sea, Baffin Bay and Hudson Straits
- X, Y Spacing = 30 to 100 n. mi.
- Total Observation Sites Required = 111 (100 are N of 60° N)



AMO #26—USCG, Ice Patrol—Icebreaking and research on polar oceanography.

Legend:

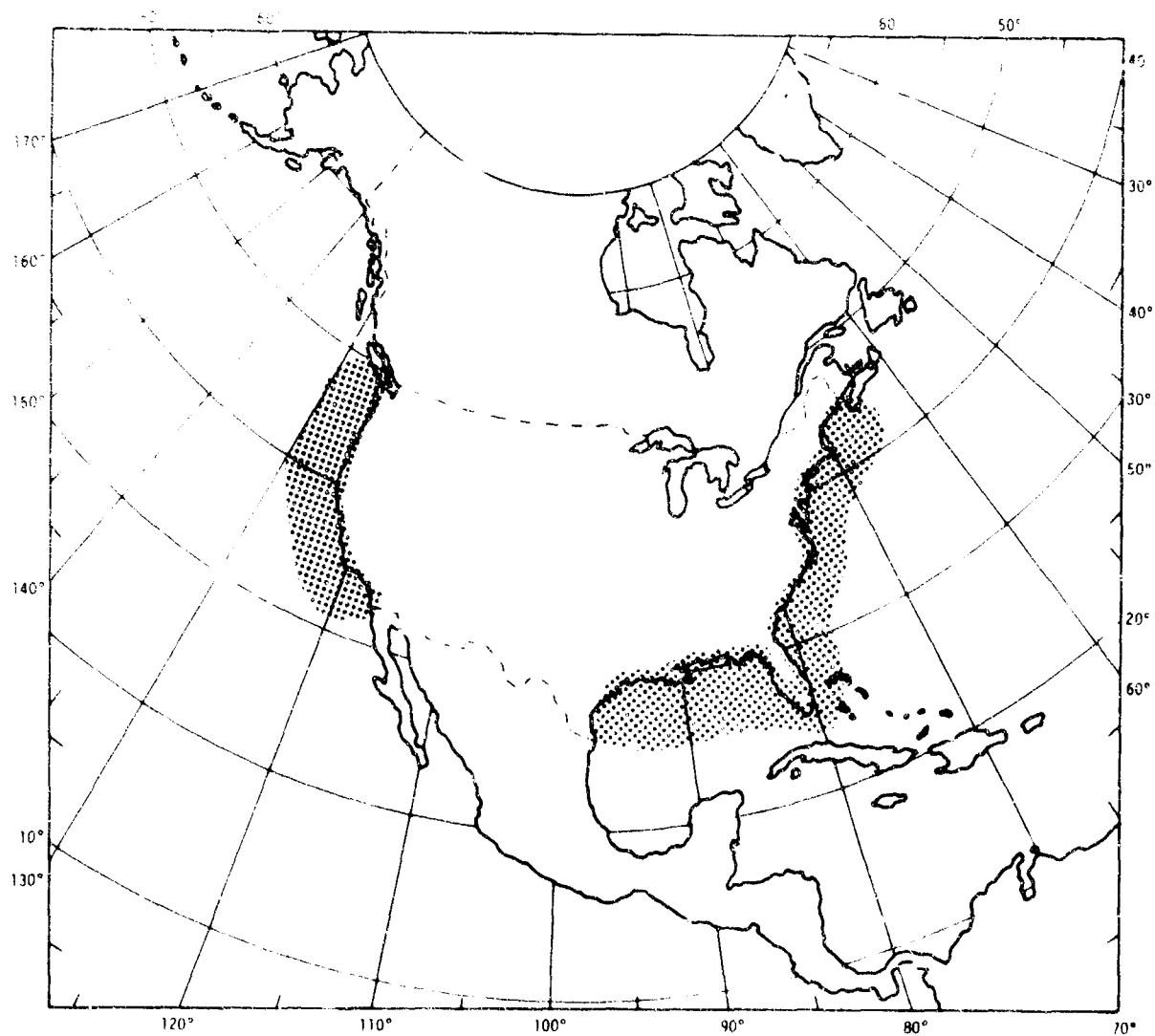
- Area = Global Deep Ocean and North American Coast (Selected Areas for 30 day Periods)
- X, Y Spacing = 300 to 600 n. mi. (DO) and 60 to 150 n. mi. (CNA)
- Total Observation Sites Required = A Few at a Time for 30 Days



AMO #31, 32, 36 and 37-ES3A-Total agency research requirements.

Legend:

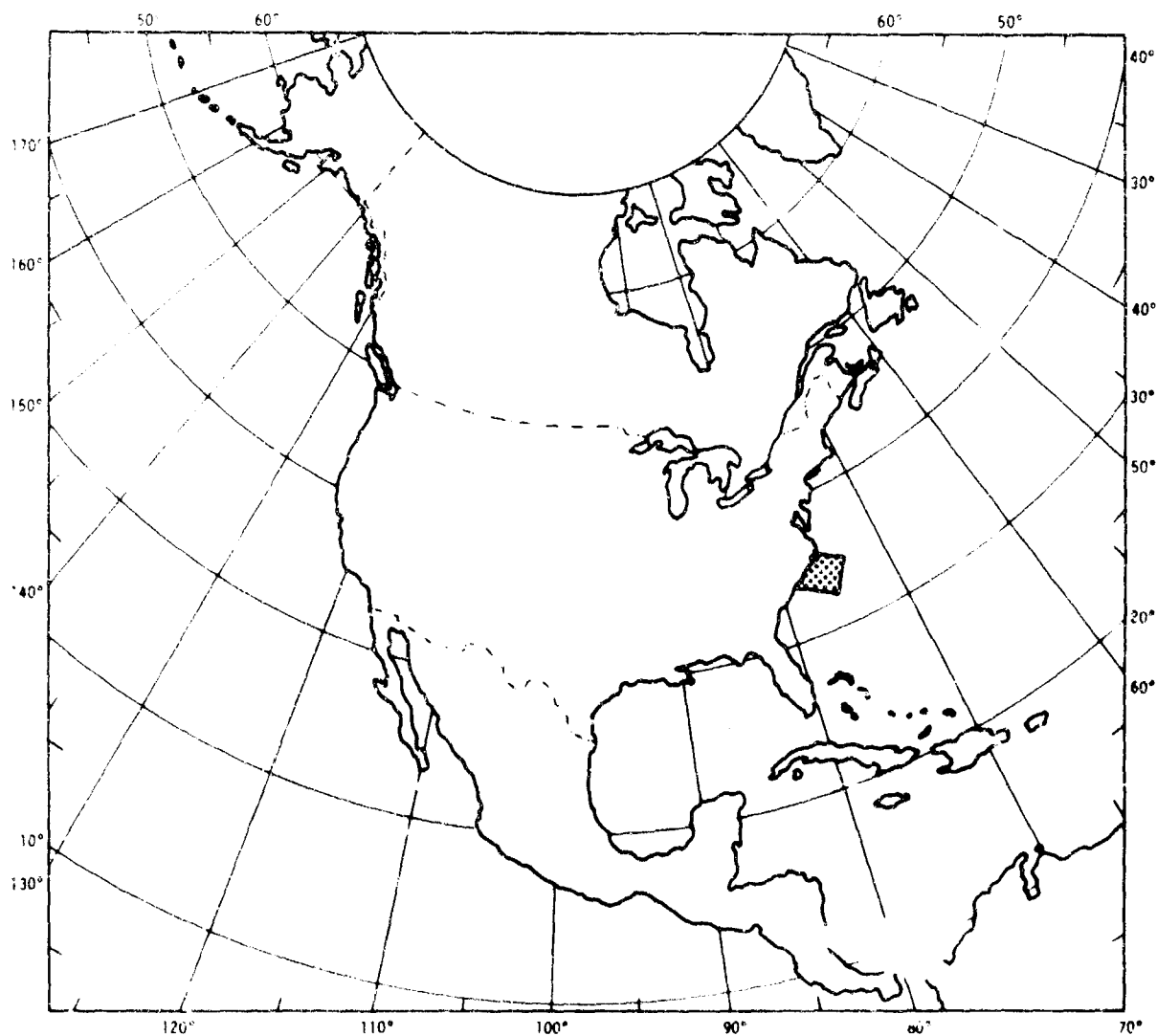
- Area = U.S. Coastal Waters
- X, Y Spacing - 25 to 50 n. mi. < 50 n. mi. from the Coast and 100 n. mi. Elsewhere Plus 4 Sites in Specified Areas
- Total Observation Sites Required = 74 Plus an Unknown Number in Estuaries



AMO #40—HEW, PHS—Research on effect of pollutants on shellfish.

Legend:

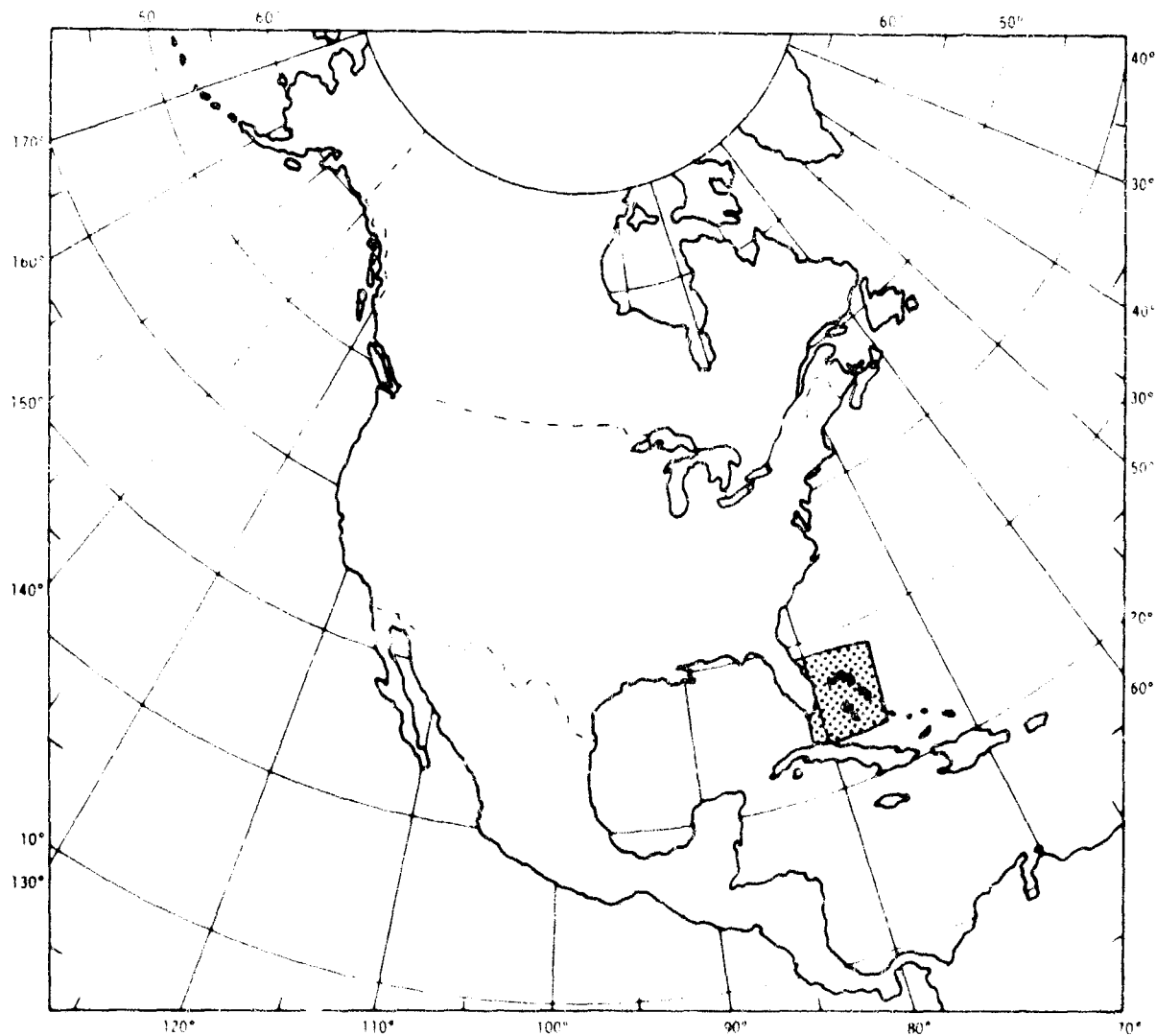
- Area = Onslow Bay, North Carolina to 100 n. mi. out in Gulf Stream
- X, Y Spacing = 1 Line with Sites Spaced at 10, 25, 50, 75, 100 and 200 n. Contours
Plus 1 Site on Either Side of Line About 30 n. mi. Distance
- Total Observation Sites Required = 8



AMO #44-NSF, Duke U.—Basic research in Gulf Stream structure and dynamics.

Legend:

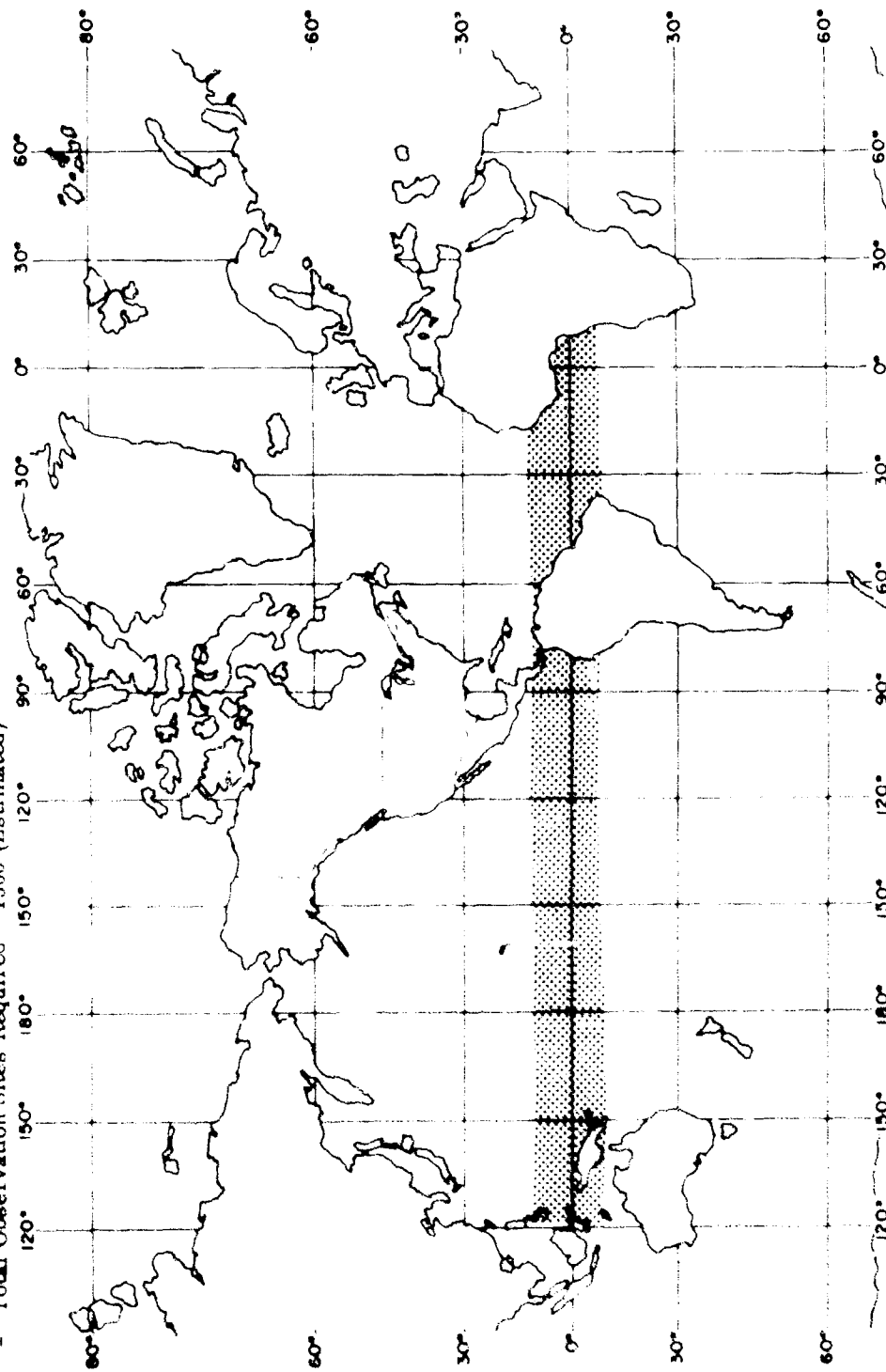
- Area - Florida Straits, off Bimini, Bahamas and Miami
- X, Y Spacing = Special Points about 3 and 7 n. mi. from a Sound Source
- Total Observation Sites Required = 20 (Estimated)



AMO #47—USF, U. of Miami—Research on oceanographic environmental parameters and underwater acoustical propagation.

Legend:

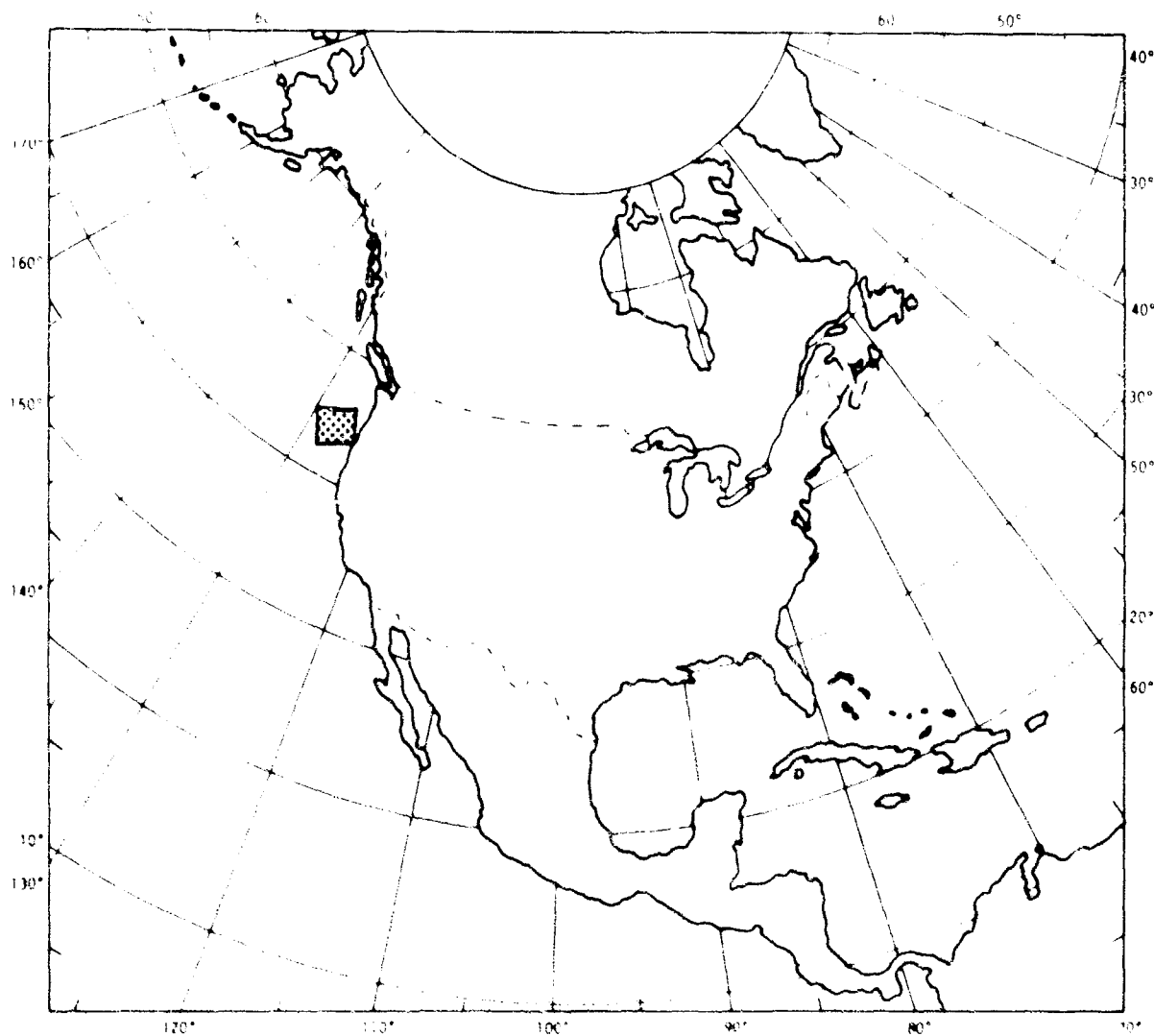
- Area = Atlantic and Pacific 12° N to 12° S
- X, Y Spacing = 15 to 30 n. mi. from 2° N to 2° S, Elsewhere 50 n. mi. in Current and 300 n. mi. Outside of Current
- Total Observation Sites Required = 1500 (Estimated)



AM J 49-NSF, U. of Miami - Research on oceanographic environmental parameters and equatorial current system.

Legend:

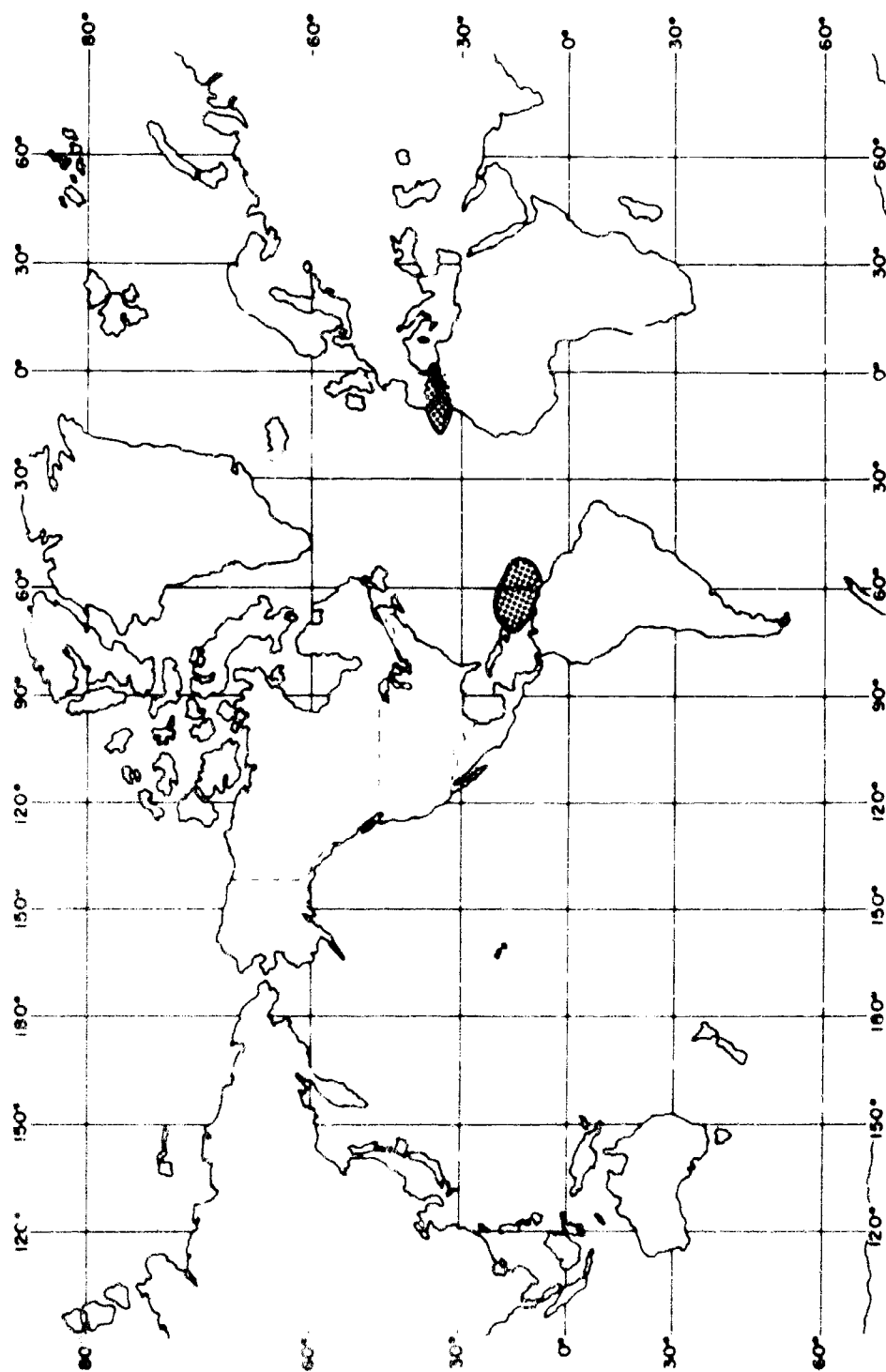
- Area = 100 mi. Square Centered at 45° N and 125° W
- X, Y Spacing = Not Certain May Be About 5 n. mi.
- Total Observation Sites Required = 35 (Estimated)



AMO #51-NSF, Oregon State U.—Research on wind stress on the ocean.

Legend:

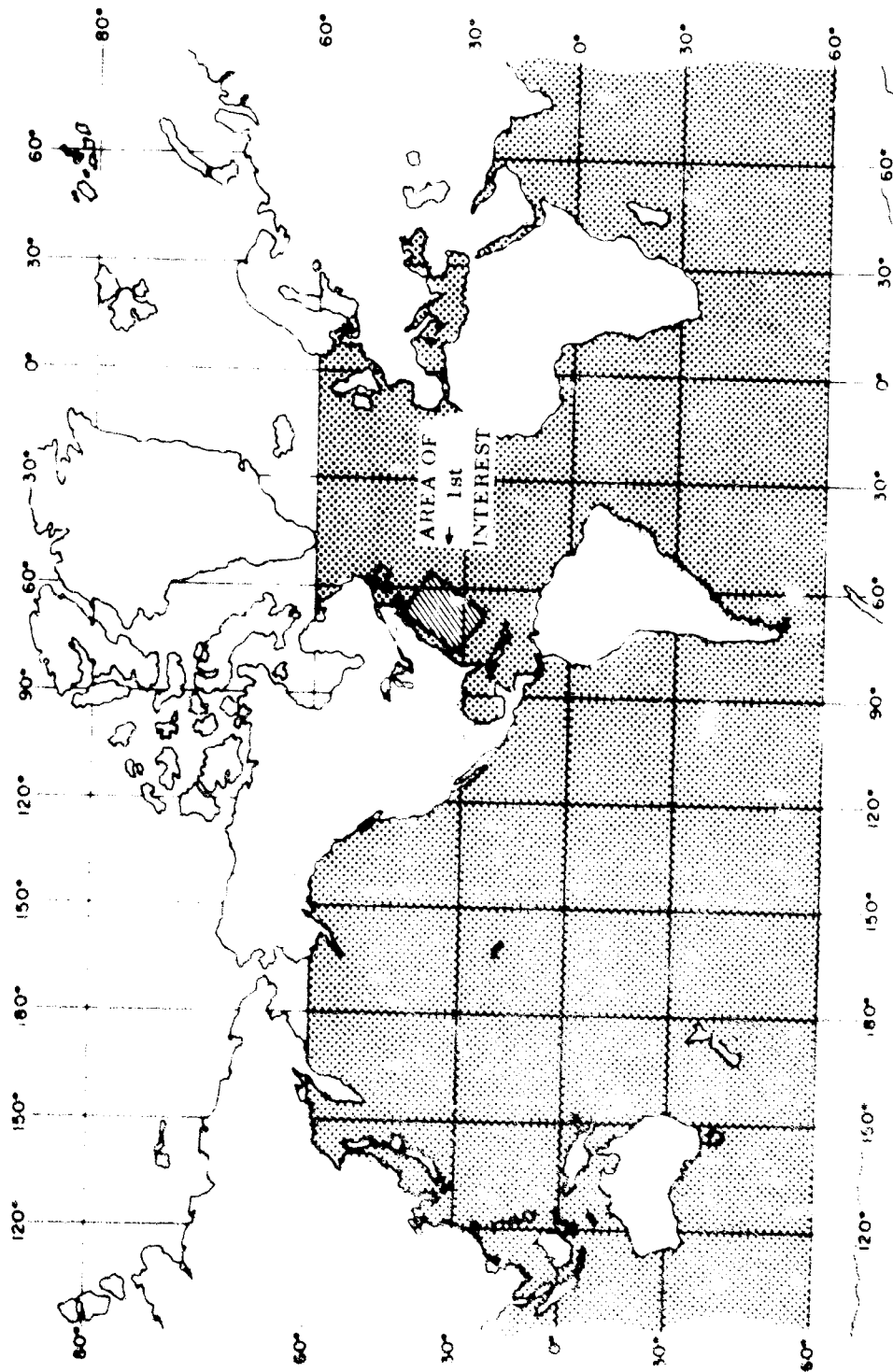
- Area = Gibraltar and Caribbean
- X, Y Spacing = 1 Per Area Except In Deep Channels Where Spacing of 2 to 5 n. mi. May Be Necessary
- Total Observation Sites Required = 8



AM. #54 - NSF, Lamont Geophysical Observatory - Current measurements along sills and renewal of water in deep basins.

Legend:

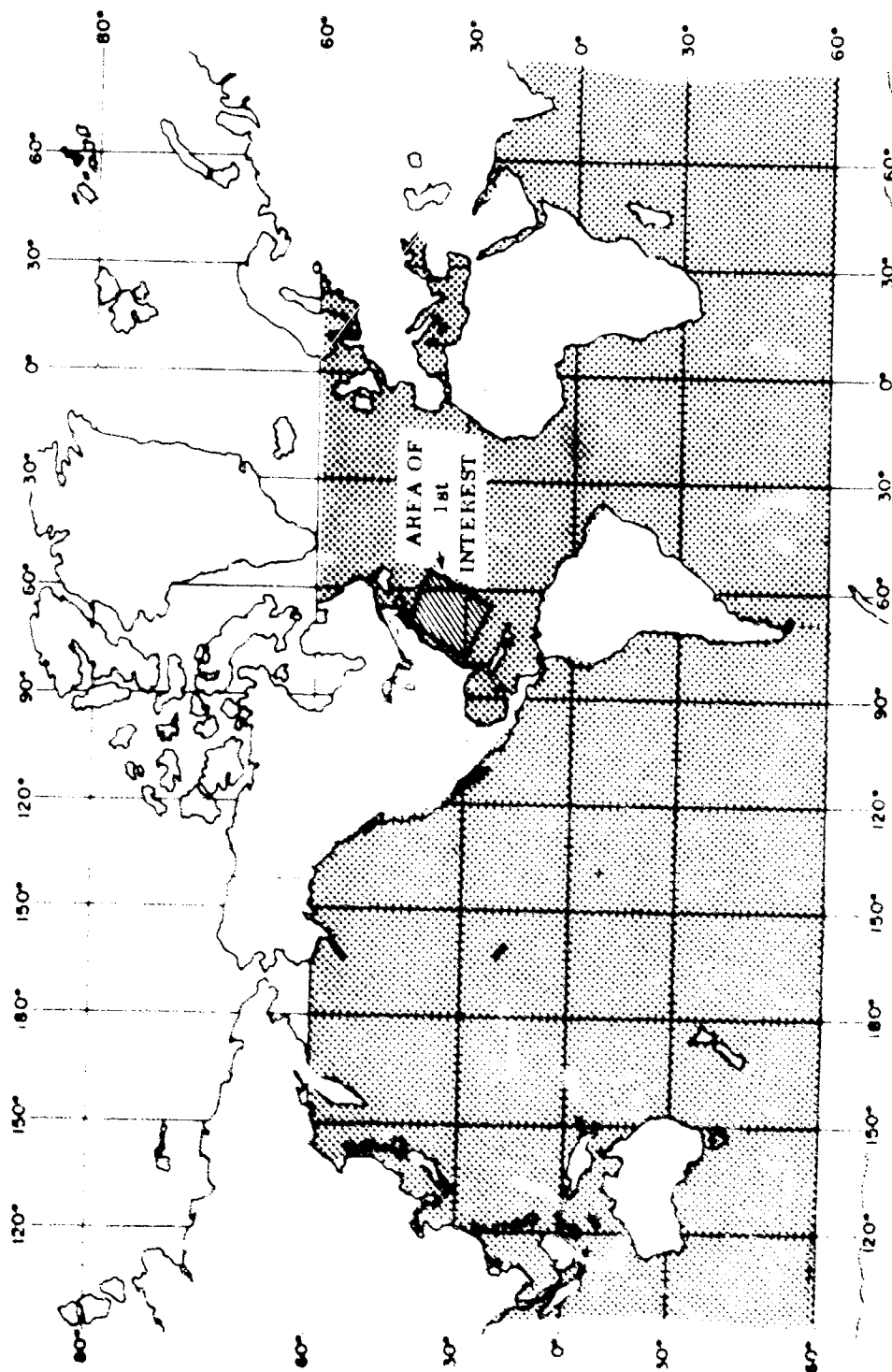
- Area = World Oceans and East Coast of U. S.
- X, Y Spacing = 200 to 300 n. mi. Except 20 n. mi. in Strong Currents
- Total Observation Sites Required = 800 (Estimated)



AMC 56-ONR, New York U.—General Circulation of the oceans.

Legend:

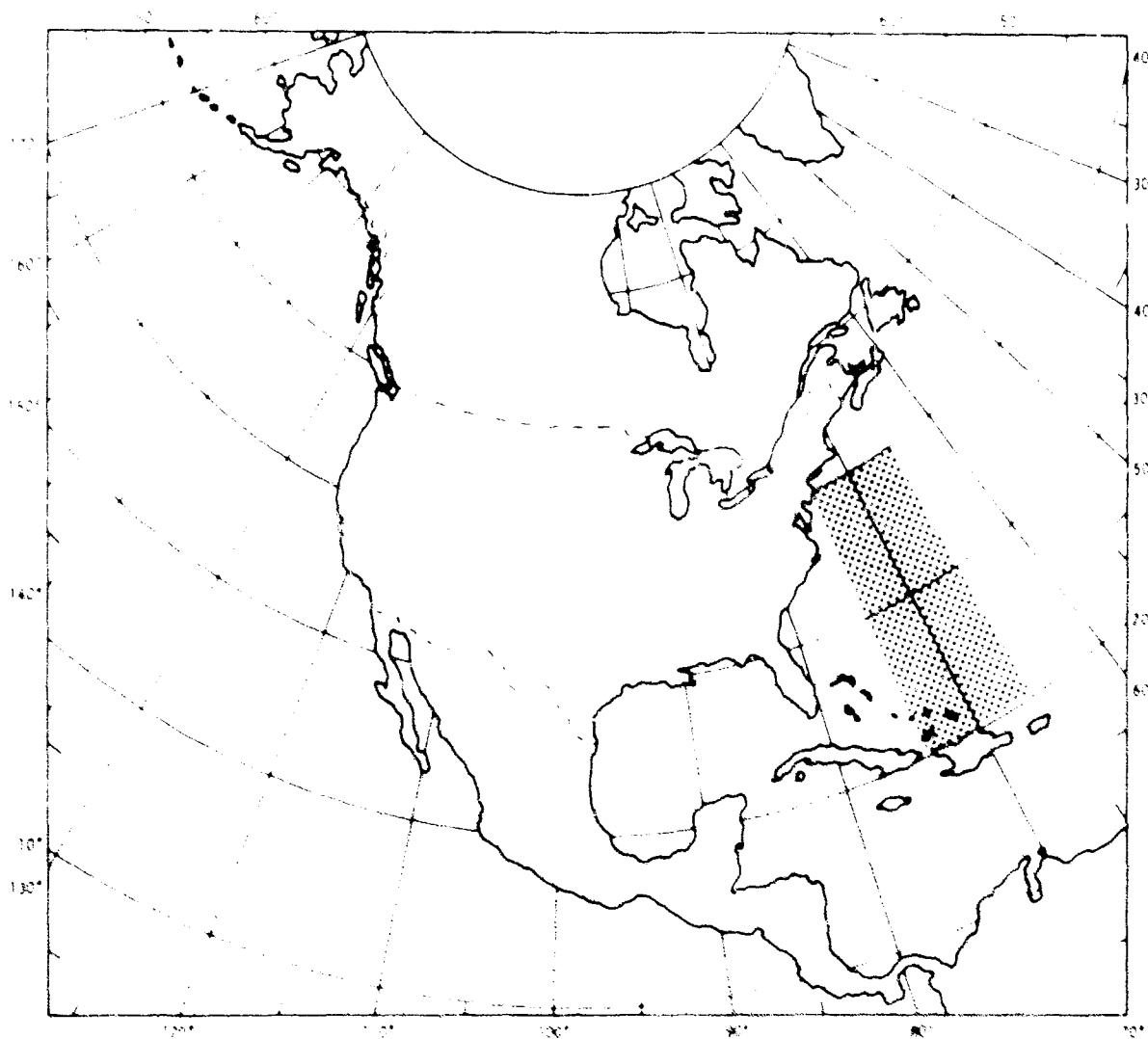
- Area - World Oceans and East Coast of U.S.
- X, Y Spacing = 200 to 300 n. mi. Except 20 n. mi. in Strong Currents
- Total Observation Sites Required = 800 (Estimated)



AMO 457-ONR, New York U. - Air/sea interaction-emphasis on wave forecasting.

Legend:

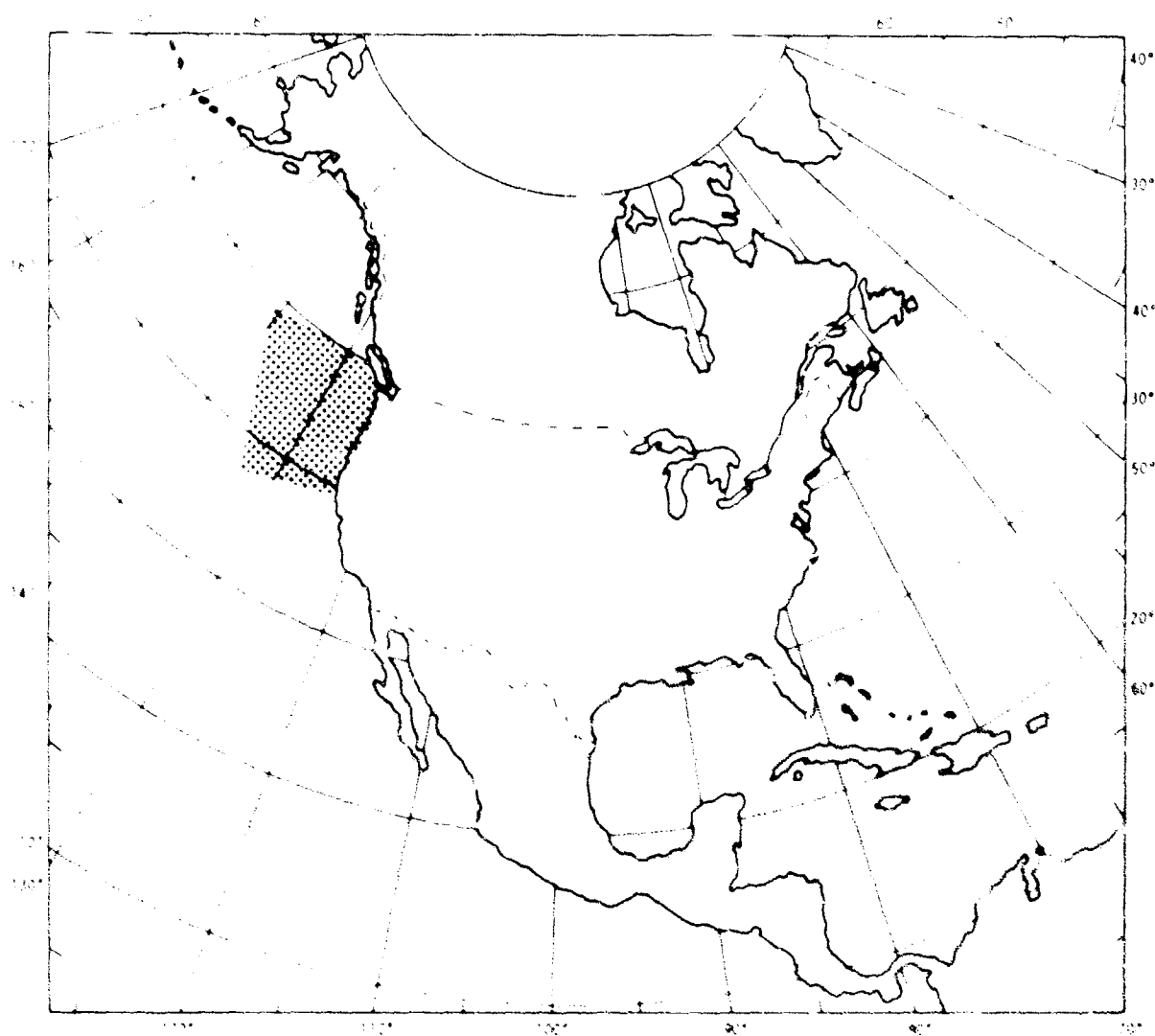
- Area = 20° N to 40° N and 65° W to 75° W
- X,Y Spacing = 6 n. mi. in Gulf Stream and 20 n. mi. Outside of Stream
- Total Observation Sites Required = 2000 (Estimated)



AMO #58-NSF, Woods Hole—Study dynamic process of the western North Atlantic.

Legend:

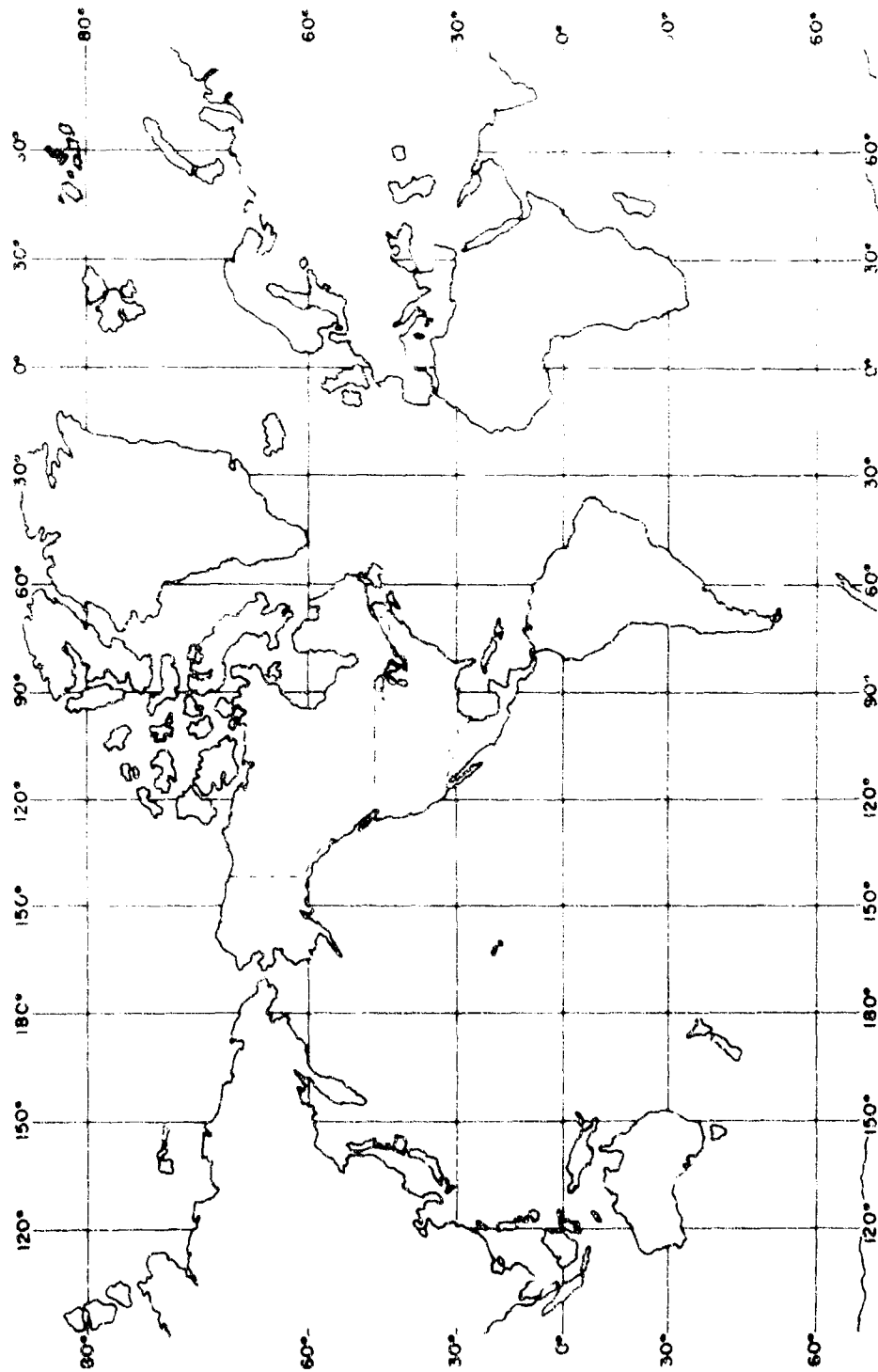
- Area = Mouth of the Columbia River to 600 n. mi. W, 300 n. mi. S and 200 n. mi. N
- X, Y Spacing = 25 n. mi.
- Total Observation Sites Required = 480



AMO #59-NSF, U. of Washington—Study effluent waters of the Columbia River.

Legend:

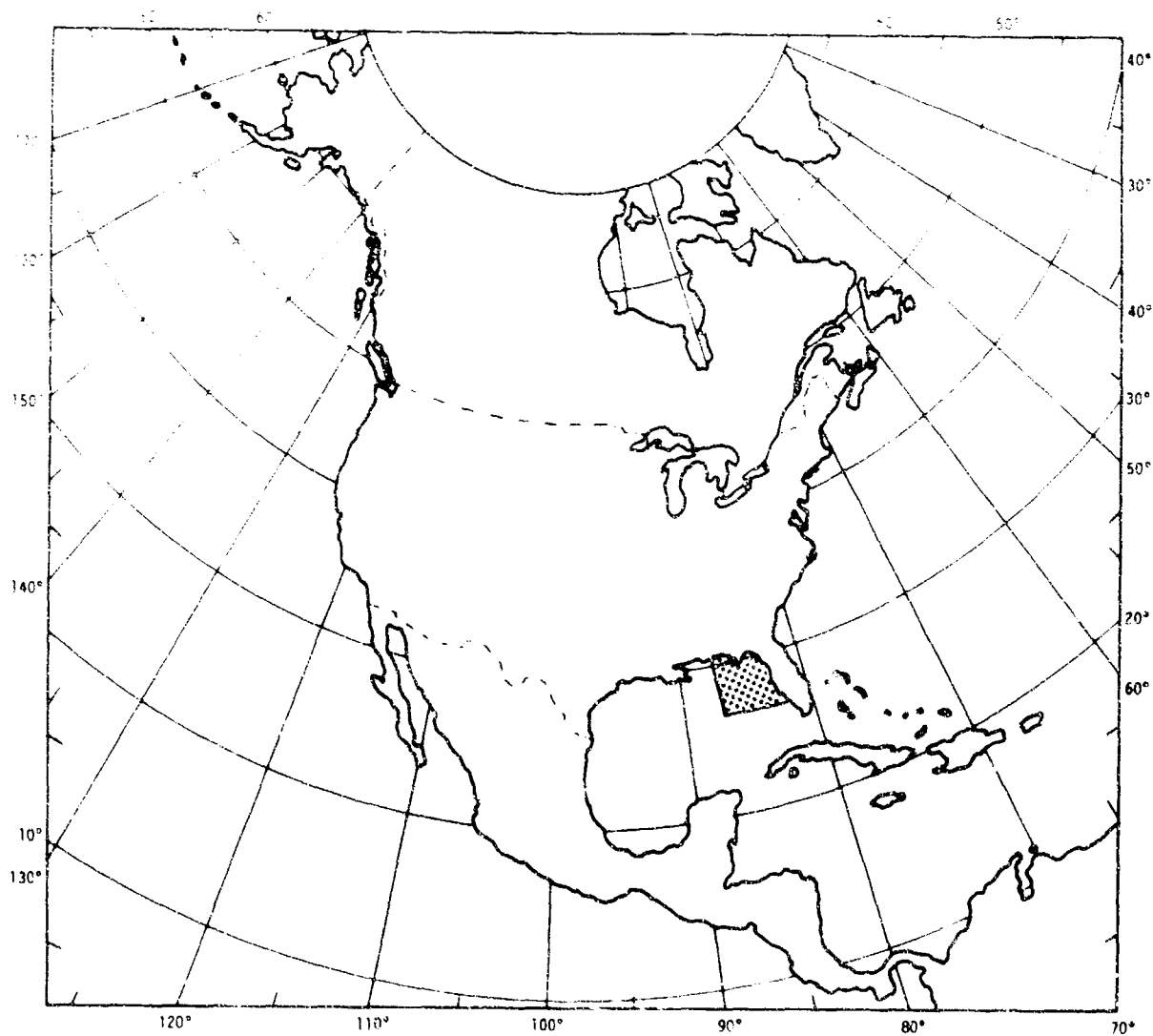
- Area = Unknown
- X, Y Spacing = 10 n. mi.
- Total Observation Sites Required = Unknown



AMO #62—Smithsonian Institution—Biological Growth studies.

Legend:

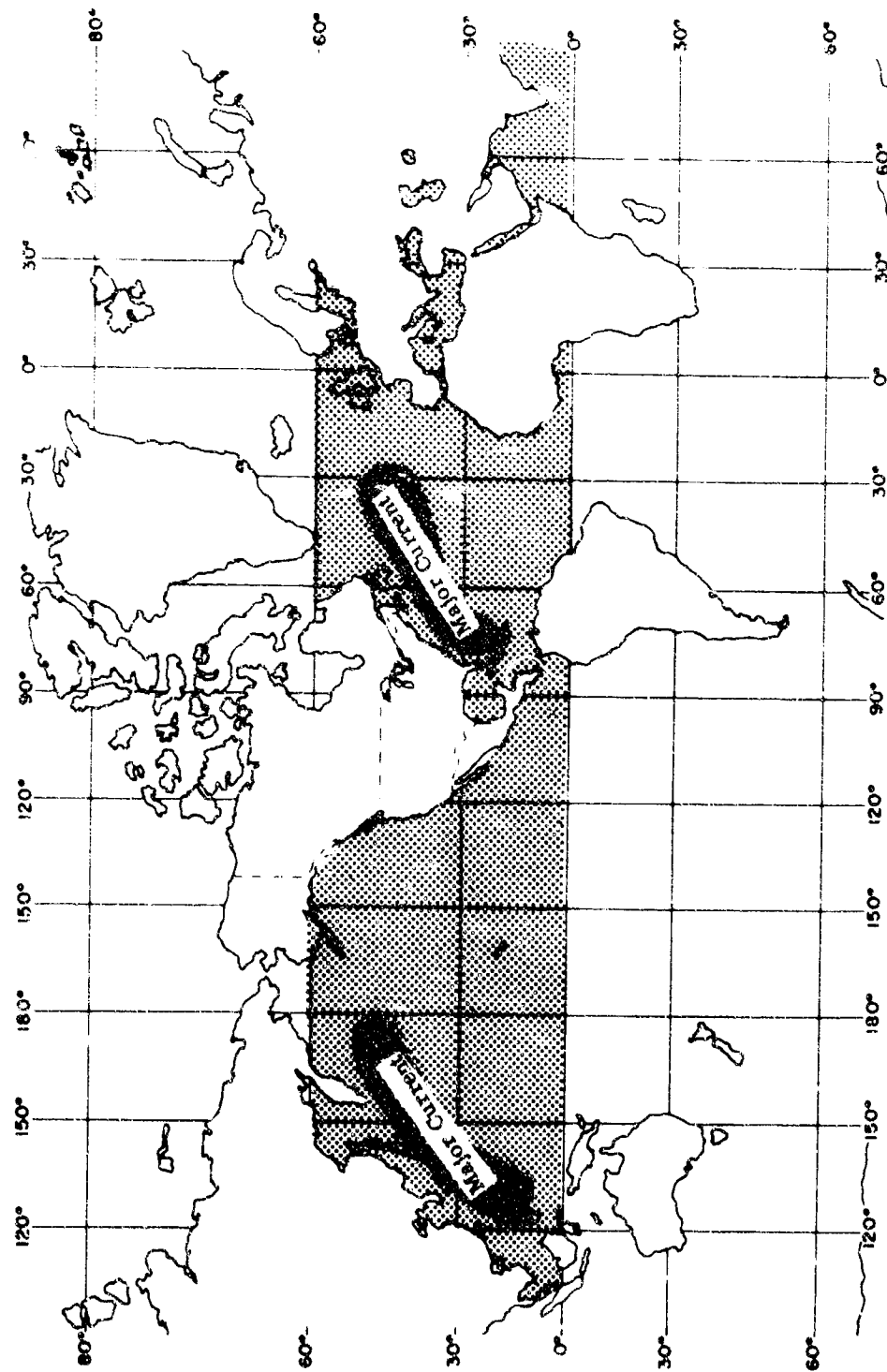
- Area = Gulf of Mexico Near Panama City Out to 200 m Depths
- X, V Spacing = 1/4 n. mi. to 10 n. mi.
- Total Observation Sites Required = 200 (Estimated)



AMO #65—USN, Mine Defense Lab.—Mine defense including inshore undersea warfare.

Legend:

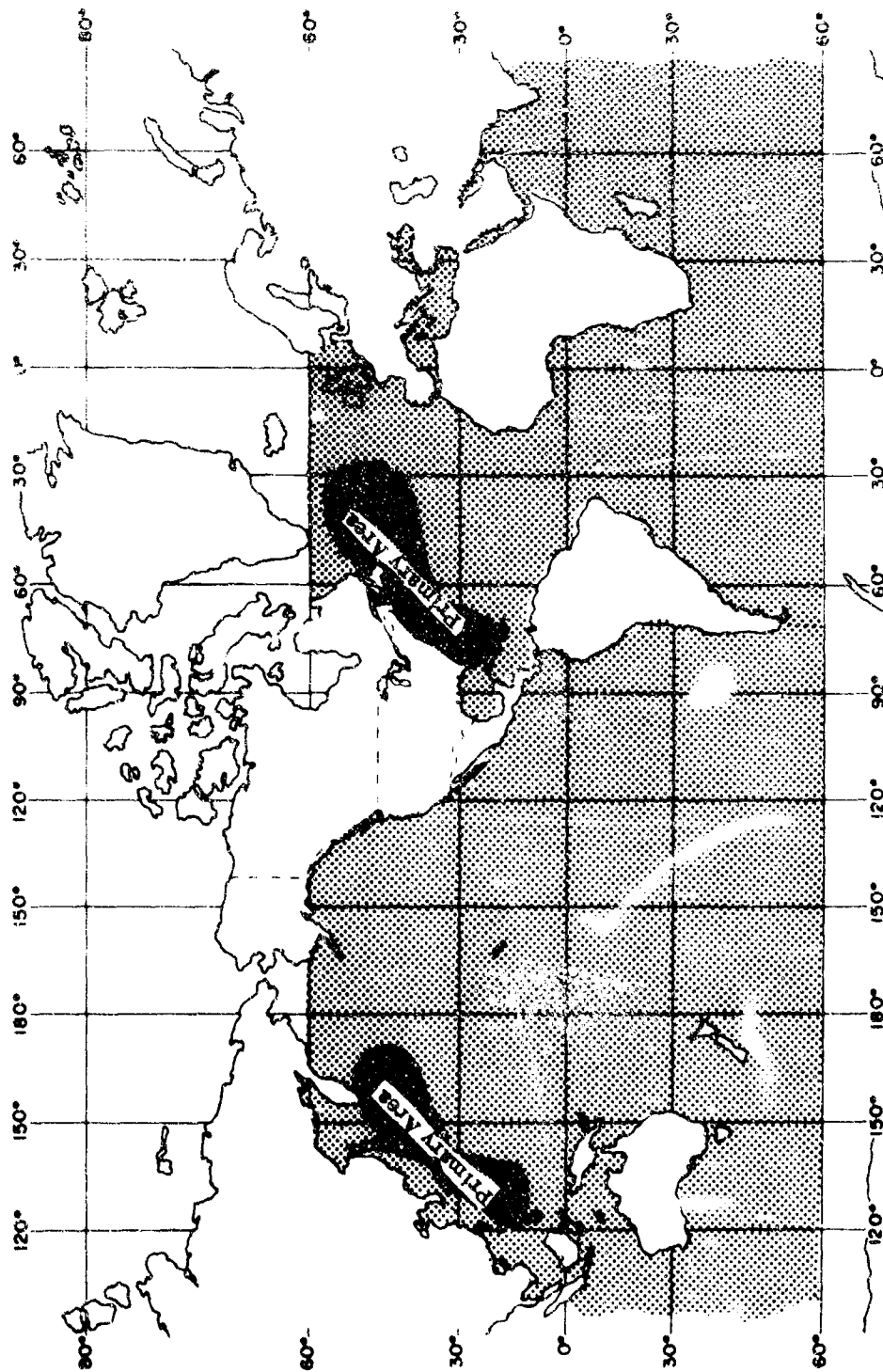
- Area = Northern Hemisphere Oceans, Primary Interest Within Major Current Areas
- X, Y Spacing = Varies 30, 50, 400 n. mi. in Current Areas, 80 and 400 n. mi. Outside Current Areas
- Total Observation Sites Required = 600 (Estimated)



AMO #66-NOO, ASWF PS—Oceanographic environmental prediction techniques, R & D test and evaluation.

Legend:

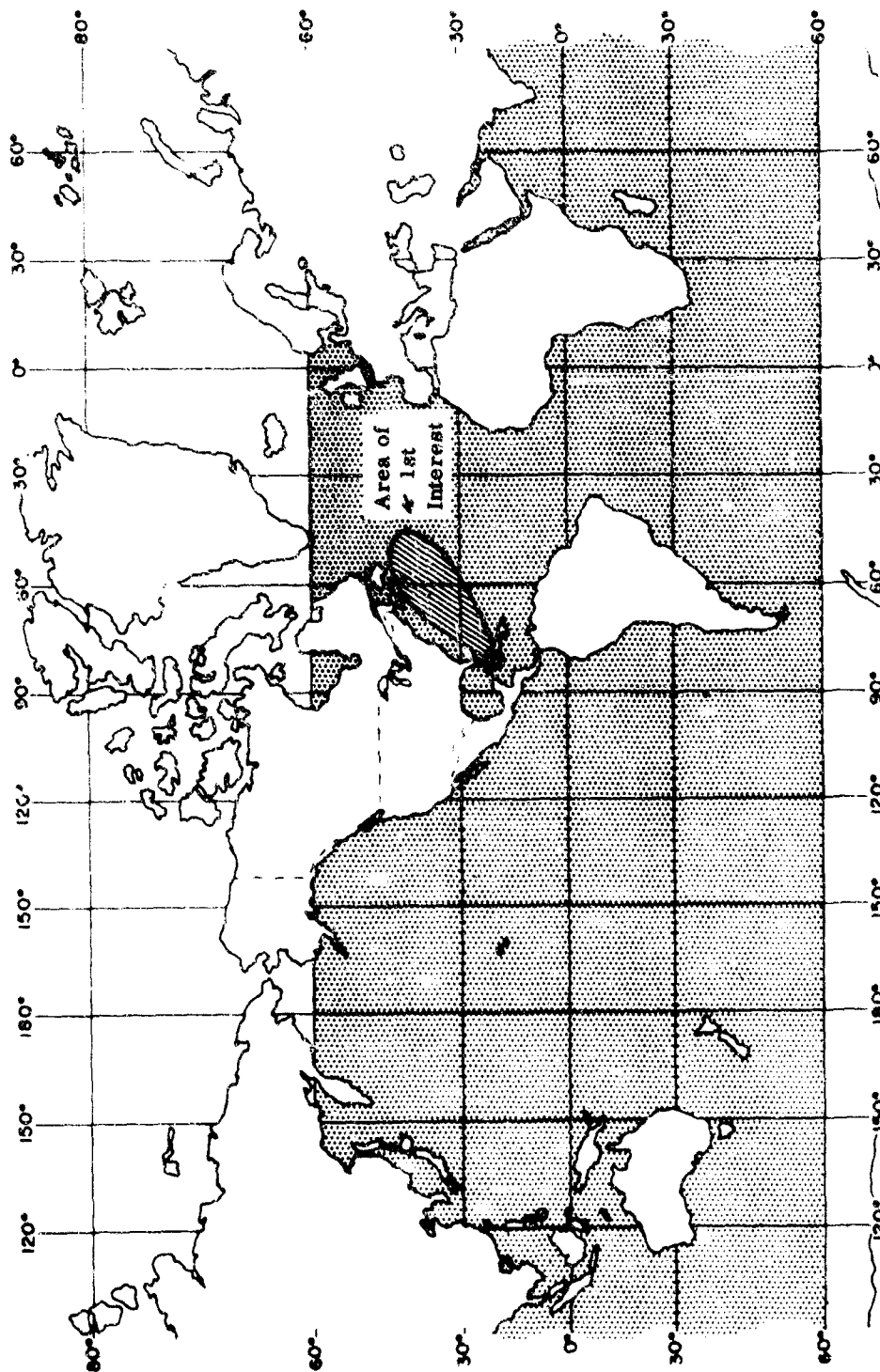
- Area = World Oceans
- X, Y Spacing = 300 n. mi.
- Total Observation Sites Required = 610



AMO #76-ORL, Penn. State—Large scale factors affecting transmission of underwater sound.

Legend:

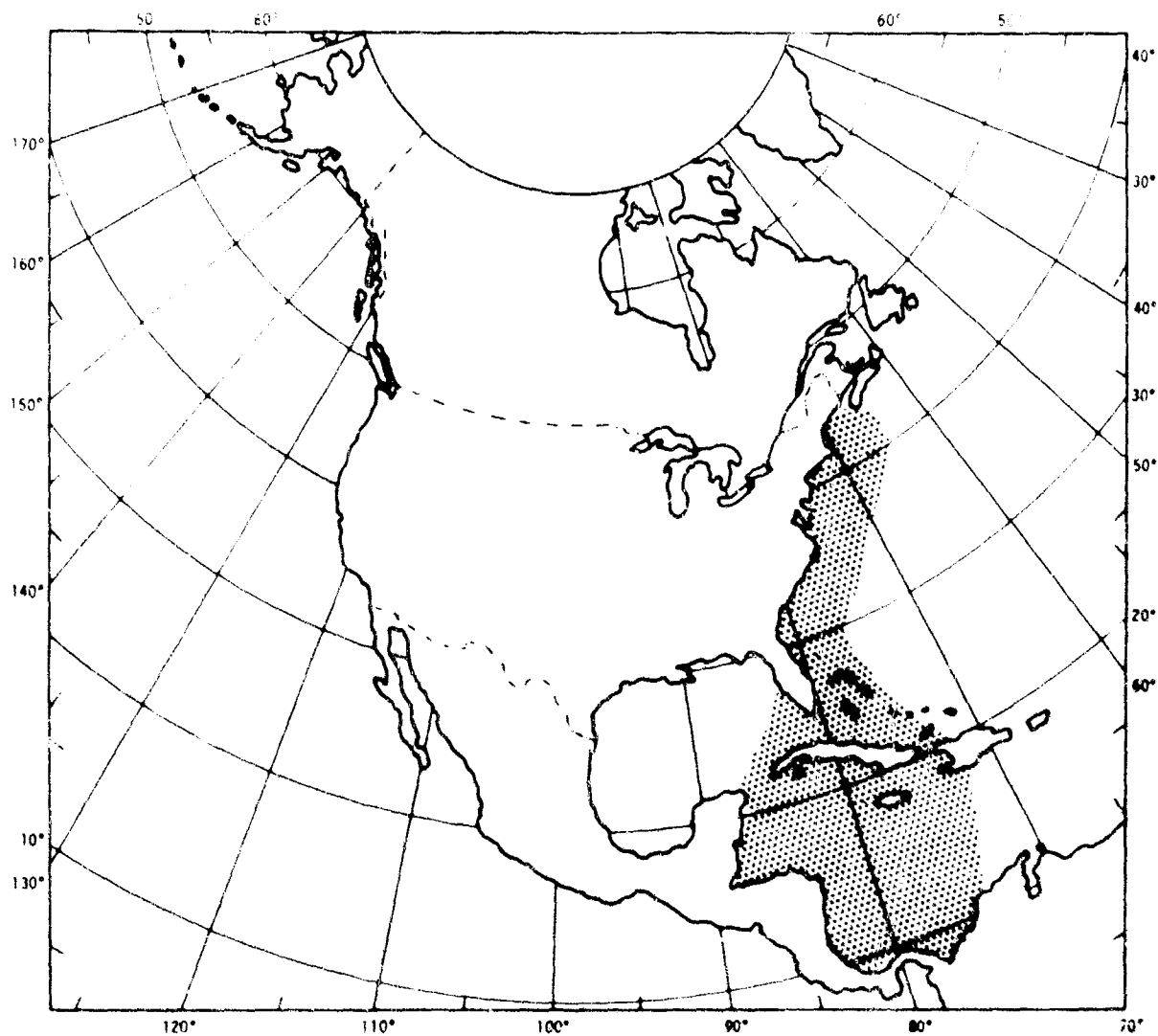
- Area = Selected Areas of World Oceans
- X, Y Spacing = 8 Buys in a 5.5 n. mi. Grid
- Total Observation Sites Required = Variable, Probably a Few at a Time



AMO #77-ORL, Penn. State—Small scale factors affecting transmission of underwater sound.

Legend:

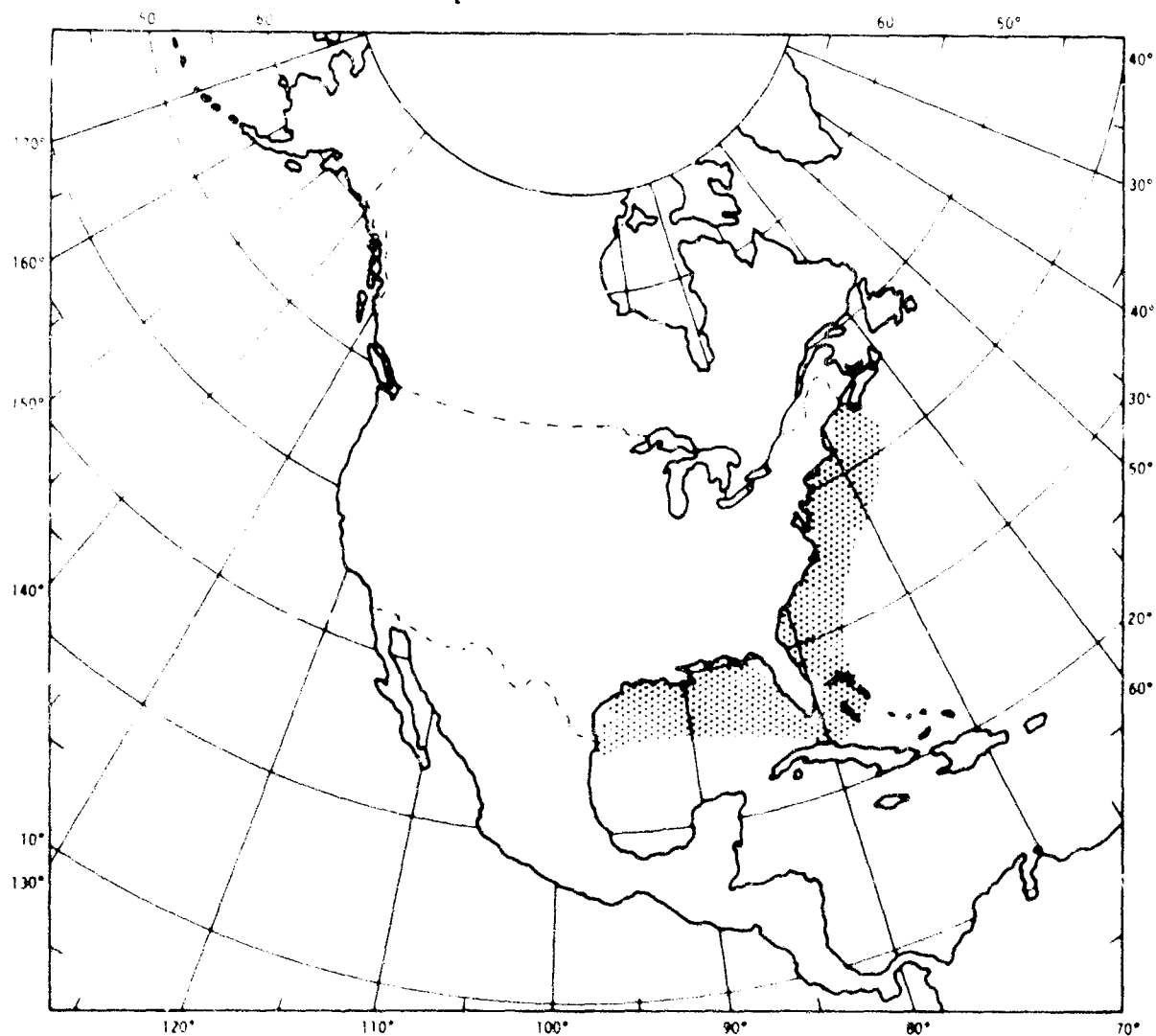
- Area = East Coast and Caribbean
- X, Y Spacing = 1 Point at a Time
- Total Observation Sites Required = 1 at a Time



AMO #79—USN, Marine Eng. Lab.—Testing of deeply submerged machinery.

Legend:

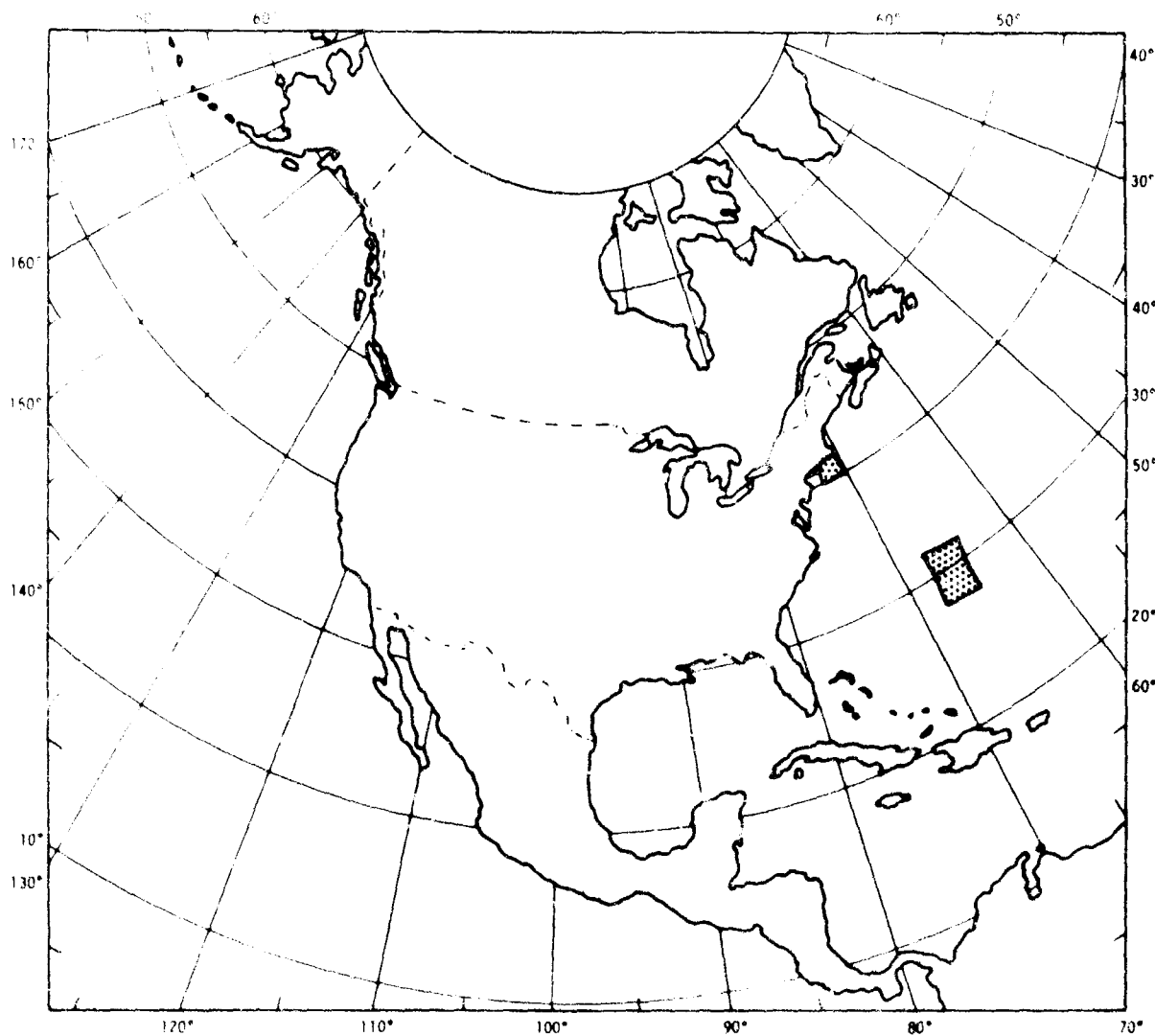
- Area = U. S. East Coast Cont. Shelf and Deeper Water Within Telemetry Distance of Land
- X, Y Spacing = 4 Sites in a Square 20 n. mi. Apart
- Total Observation Sites Required = 4 at a Time



AMO #80-USN, Marine Eng. Lab.-Geomagnetic noise study.

Legend:

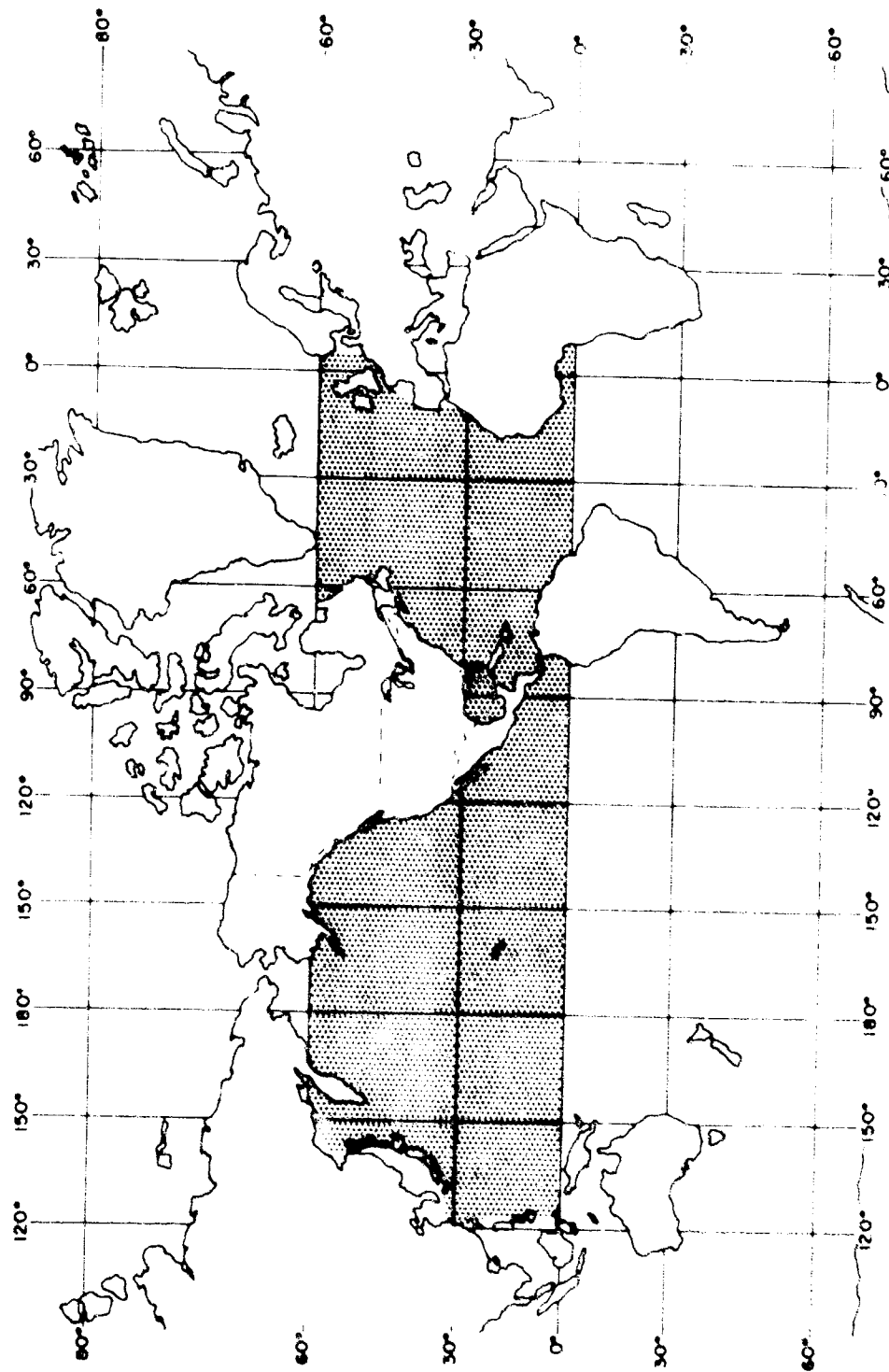
- Area = Block Island Sound and South of Bermuda Out to 150 n. mi.
- X, Y Spacing = 9 n. mi. and Variable
- Total Observation Sites Required = 20 (Estimated)



AMO #81-USN, Underwater Sound Lab.—Acoustic raypath studies.

Legend:

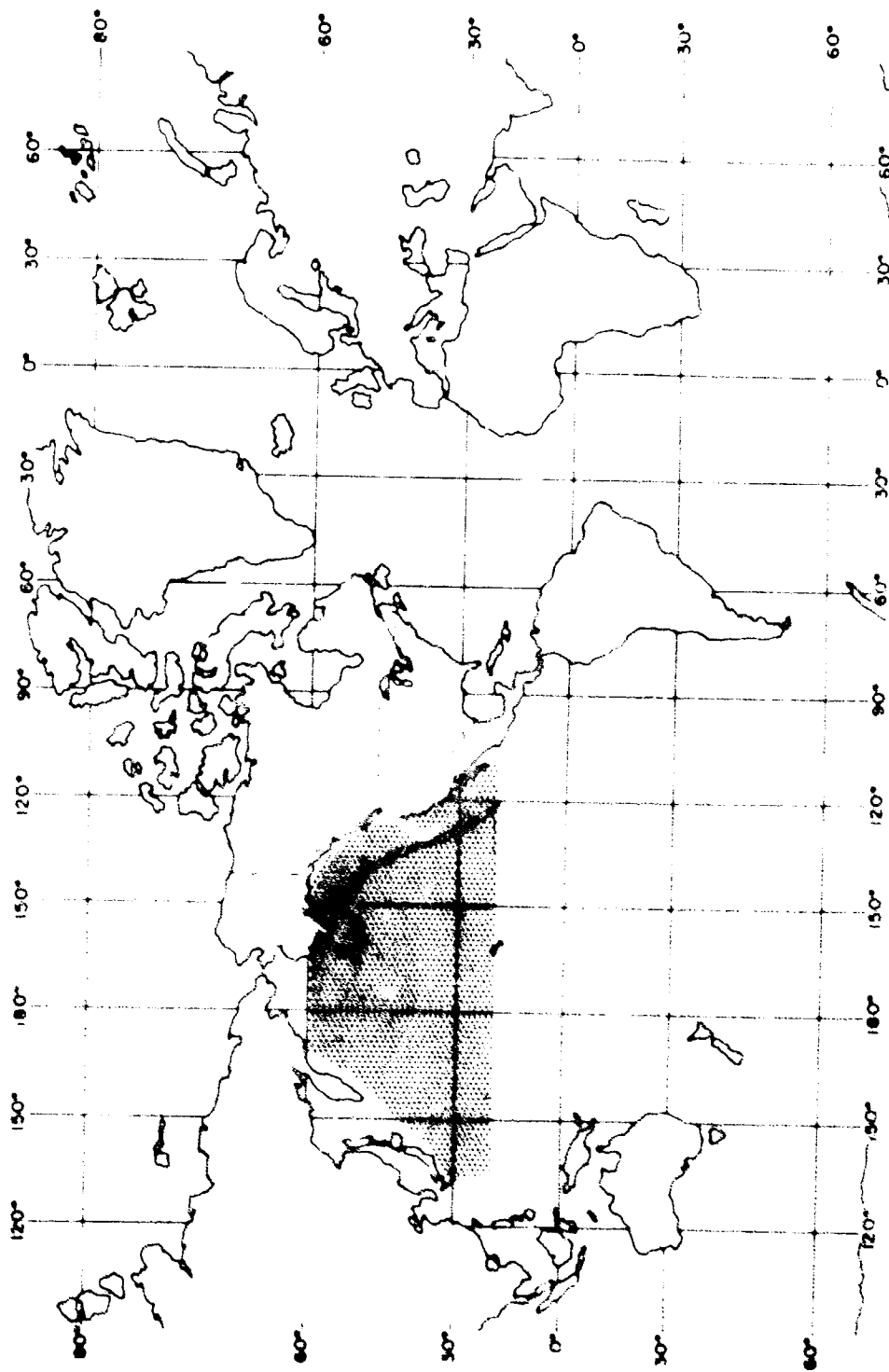
- Area = North Atlantic and North Pacific
- X, Y Spacing = 100 to 600 n. mi.
- Total Observation Sites Required = 199



AMO #82-USN, NSR & DC-Test seaworthiness of ships.

Legend:

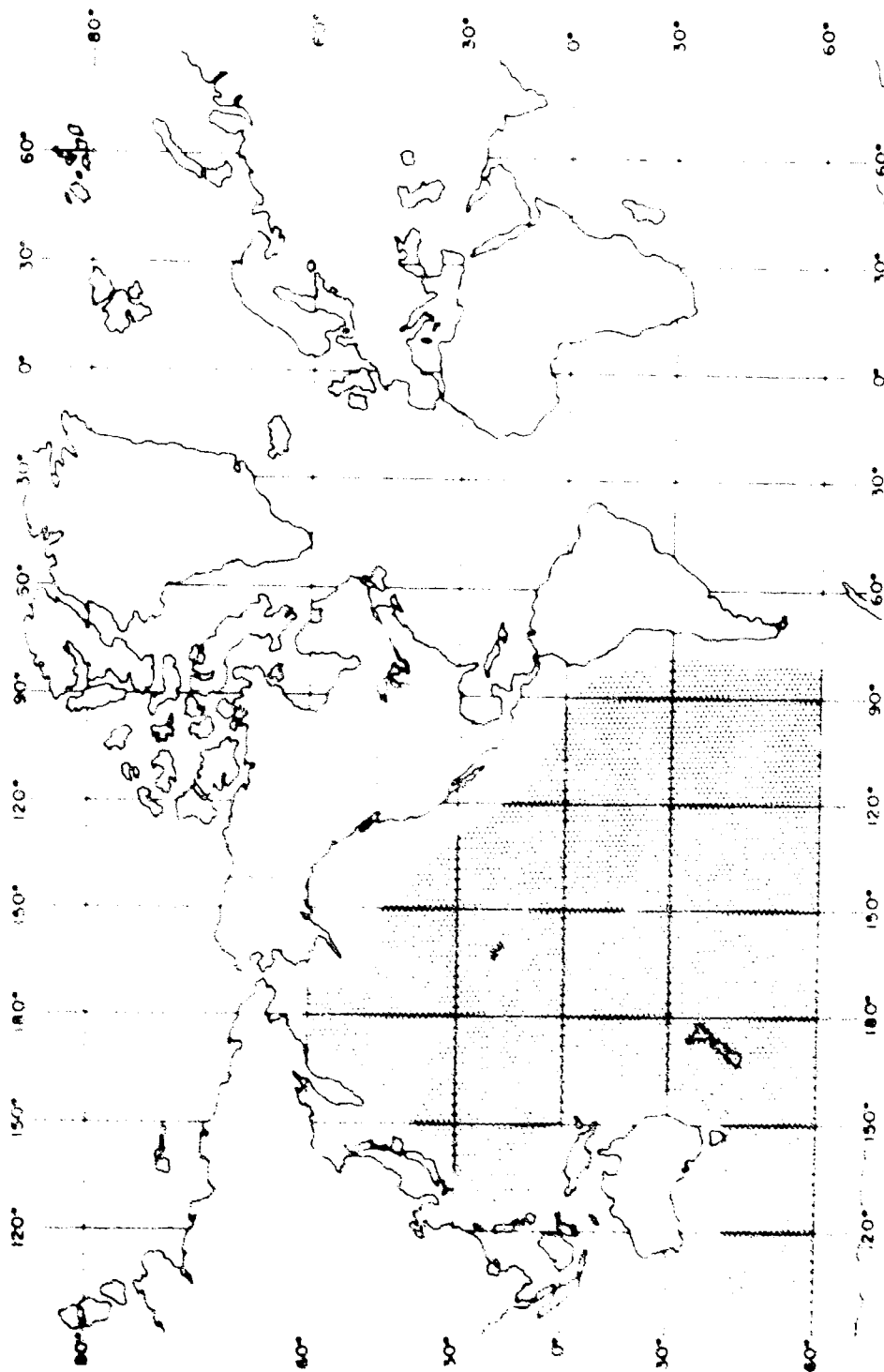
- Area = Pacific 20° N to 60° N and 110° W to 130° E
- X, Y Spacing = 500 n. mi. > 400 n. mi. from U.S. Coast
- Total Observation Sites Required = 133



AMO #54-ON Scripps Inst. of Oceanography--Basic research on N. Pacific and atmosphere.

Legend:

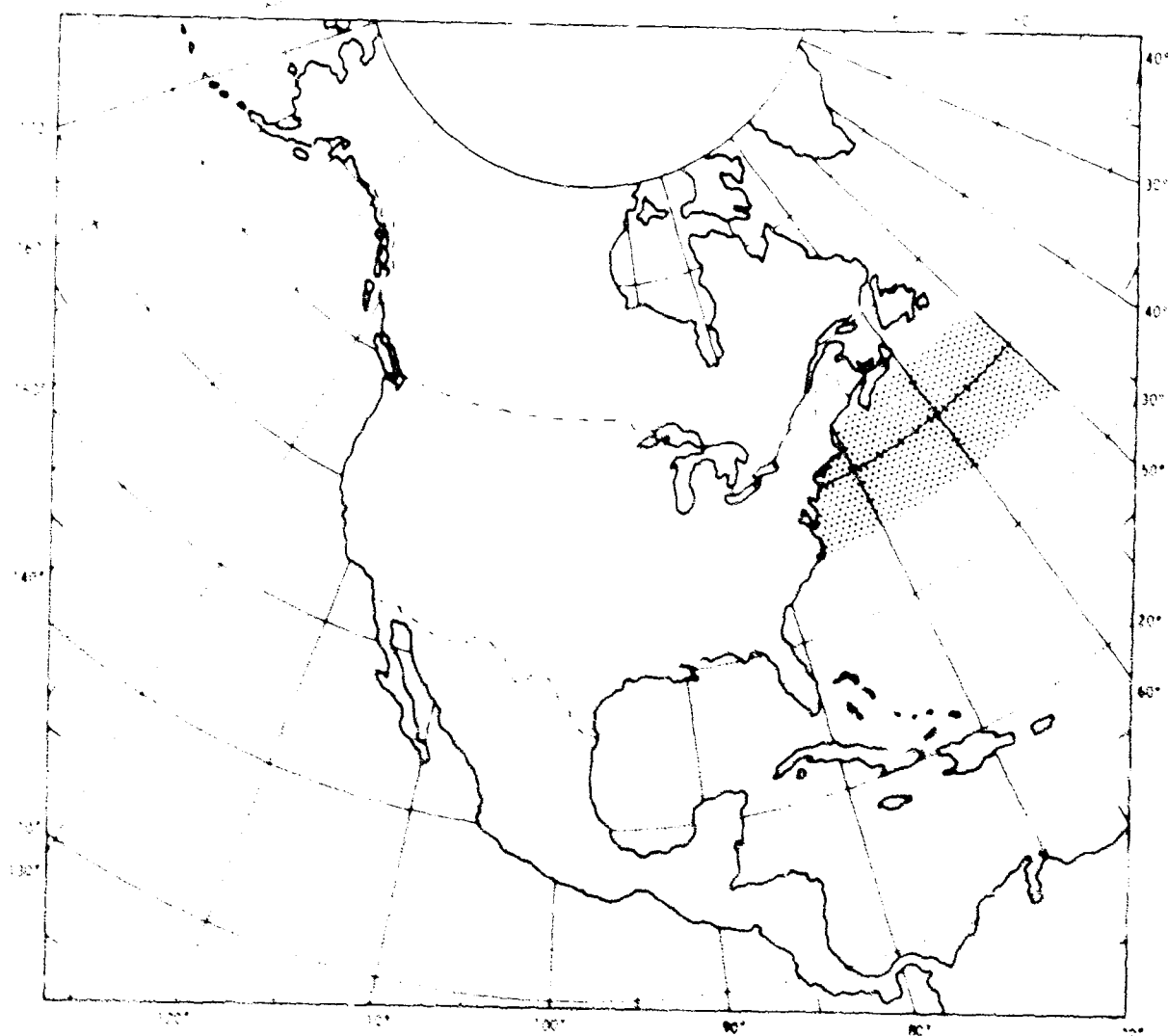
- Area - Deep Pacific, Primarily Deep Currents
- X, Y Spacing - Unknown
- Total Observation Sites Required - Unknown



AMO #85-AEC, Scripps Inst. of Oceanography - Research on near bottom currents.

Legend:

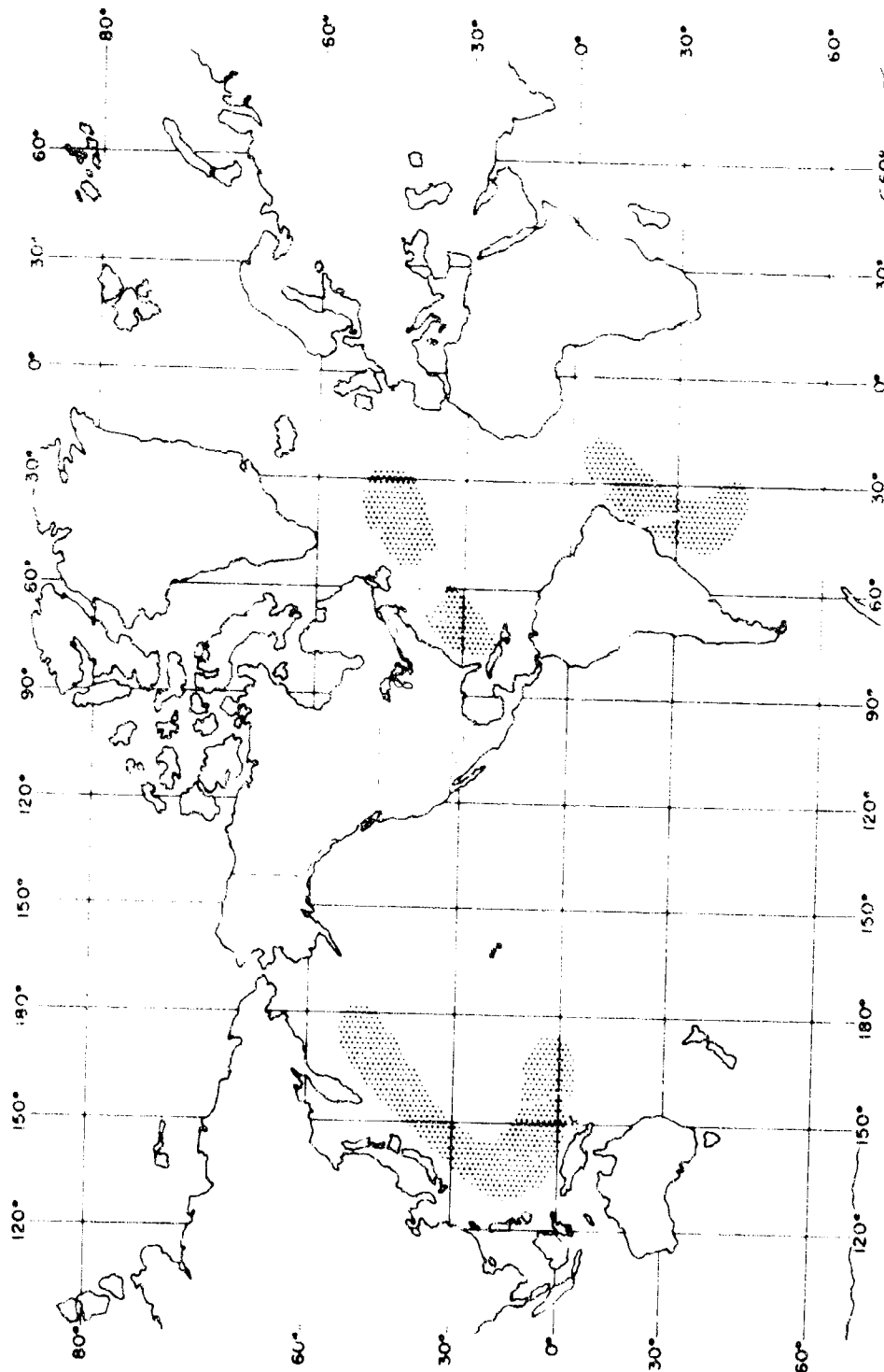
- Area = 35° N to 45° N and 50° W to 75° W
- X, Y Spacing = 10 n. mi. in Gulf Stream, 60 n. mi. Outside Gulf Stream
- Total Observation Sites Required = 750 (Estimated)



AMO 486—ONR, Woods Hole Oceanographic Institution—Research on Gulf Stream.

Legend:

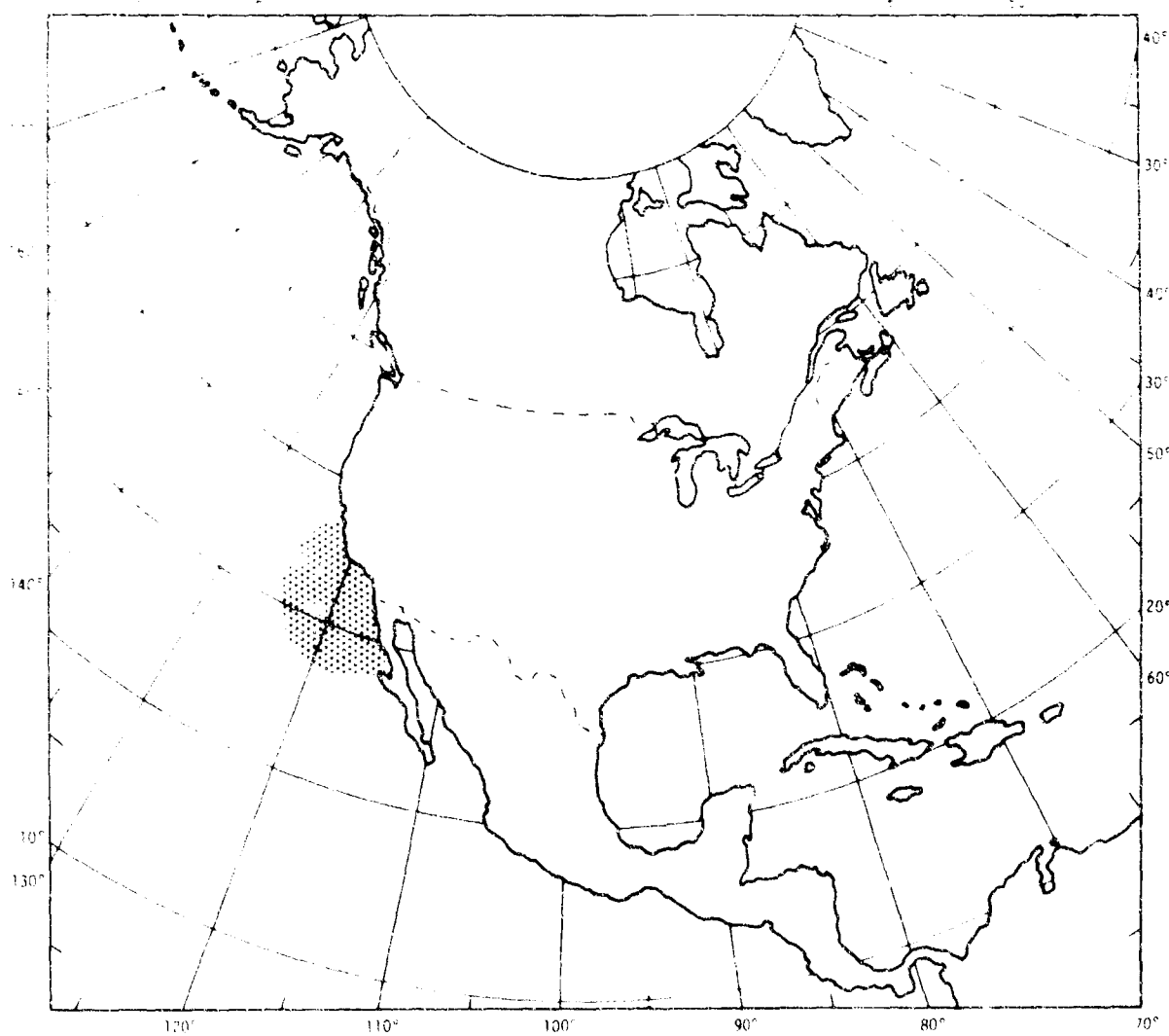
- Area = Major Currents of the World
- X, Y Spacing = 1/10 of Maximum Stream Width
- Total Observation Sites Required = 600 (Estimated)



AMO #87-ONR, Nova U. - Measure of velocity and mass fields in strong currents.

Legend:

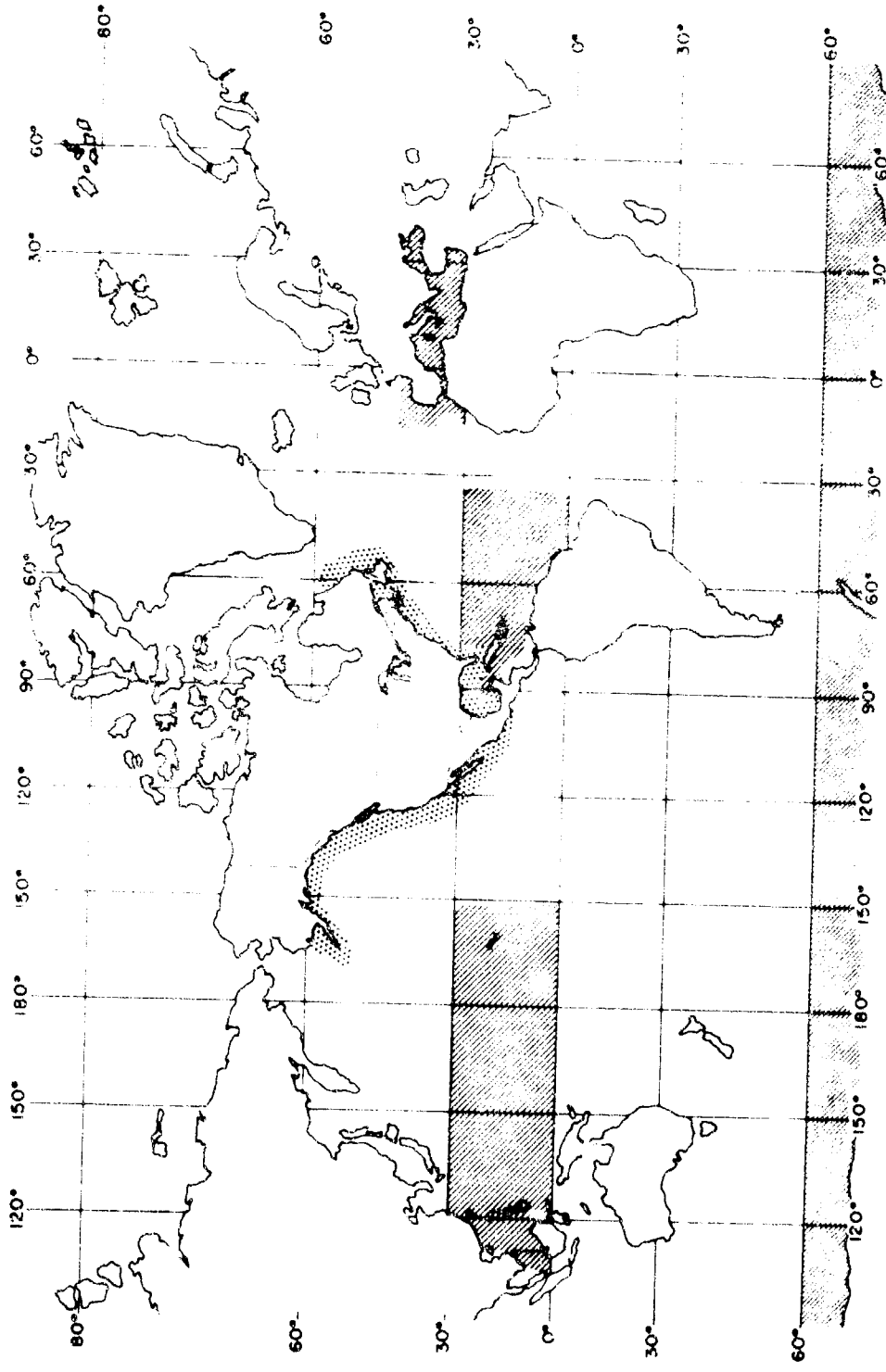
- Area = San Diego to 300 n. mi. Out in a Circle
- X, Y Spacing = 10 n. mi. or Just 1 Site
- Total Observation Sites Required = 1



AMO #88-USN, NUWC—Research on underwater sound propagation patterns.

Legend:

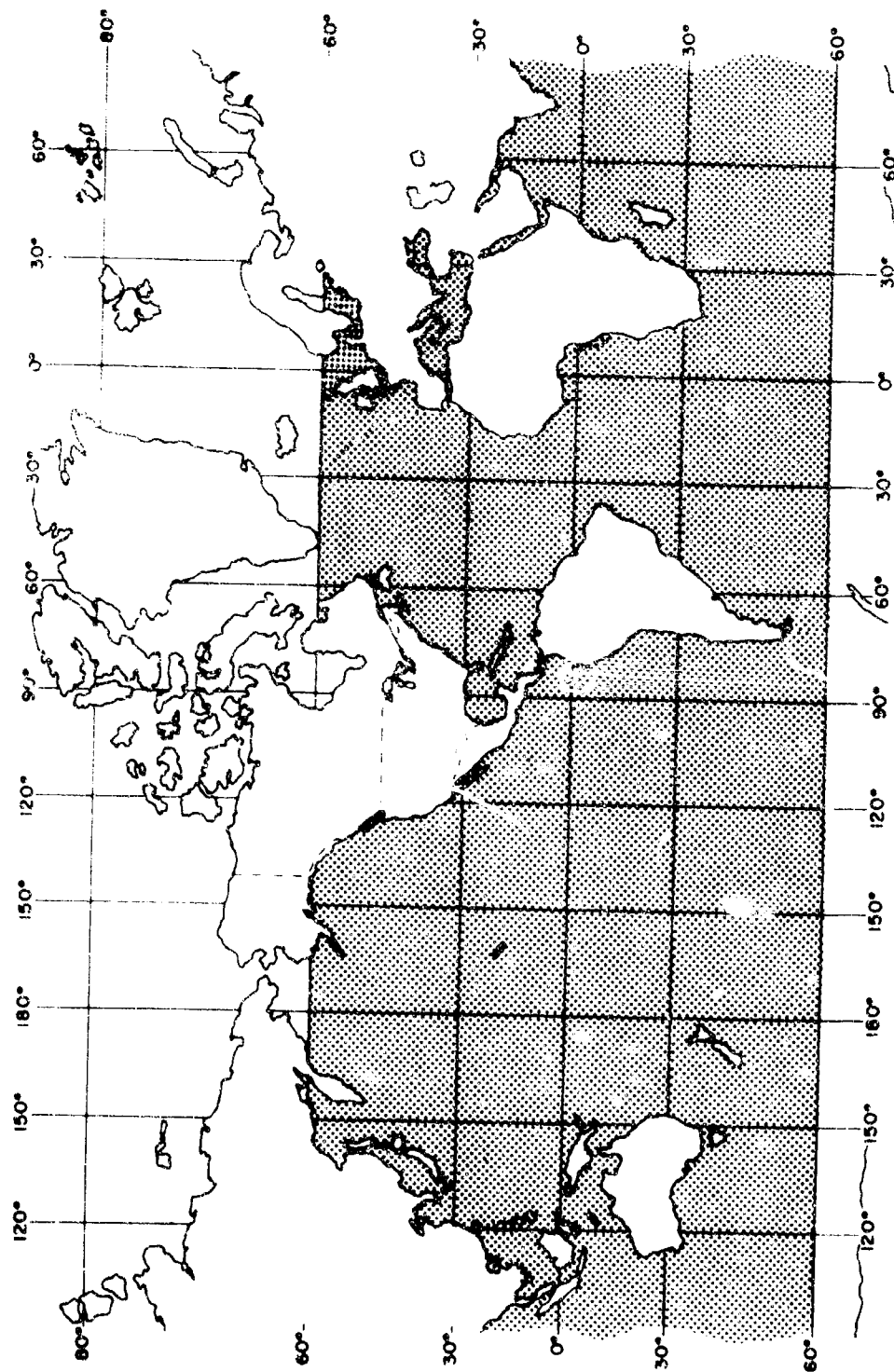
- Area = CNA Out to 150 n. mi., Gulf of Mexico, 0 to 30° N and 150° W to 120° E, 0 to 30° N and 35° W to North America, 30° N to 45° N and 15° W to 40° E, Plus Antarctic
- X, Y Spacing = 500 to 500 n. mi. in all areas, 30 to 60 n. mi., 30 to 100 n. mi., and 1 n. mi. in Special Locations
- Total Observation Sites Required = 1500 (Estimated)



AMO #89-USN, NAVAIRSYSCOM—Develop techniques to support NWS.

Legend:

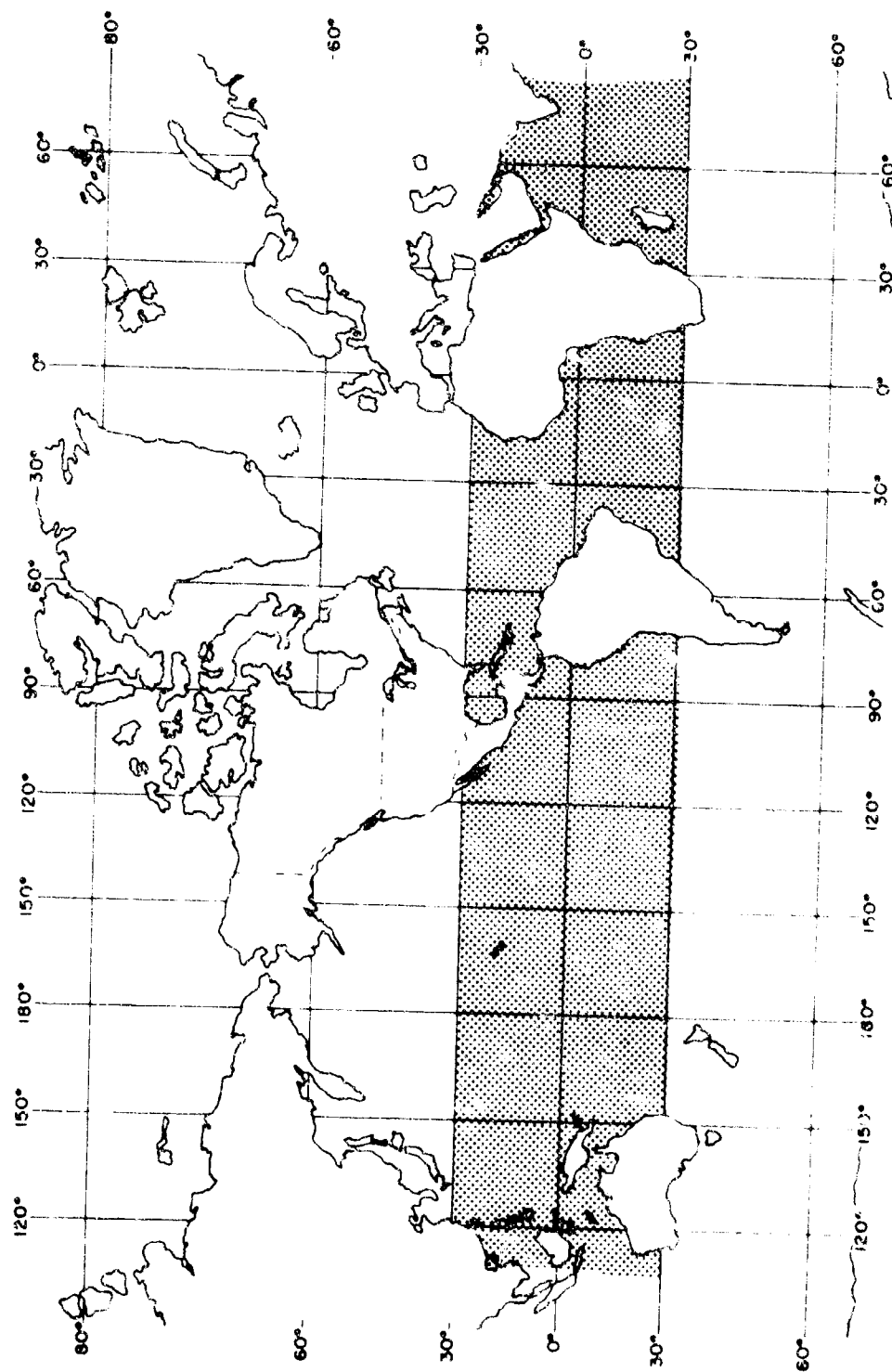
- Area = World Oceans
- X, Y Spacing = Varies - More Intense in Strong Wind and Current Gradient
- Total Observation Sites Required = 1200



AMO #92-MSF, MIT-General circulation of the atmosphere and oceans.

Legend:

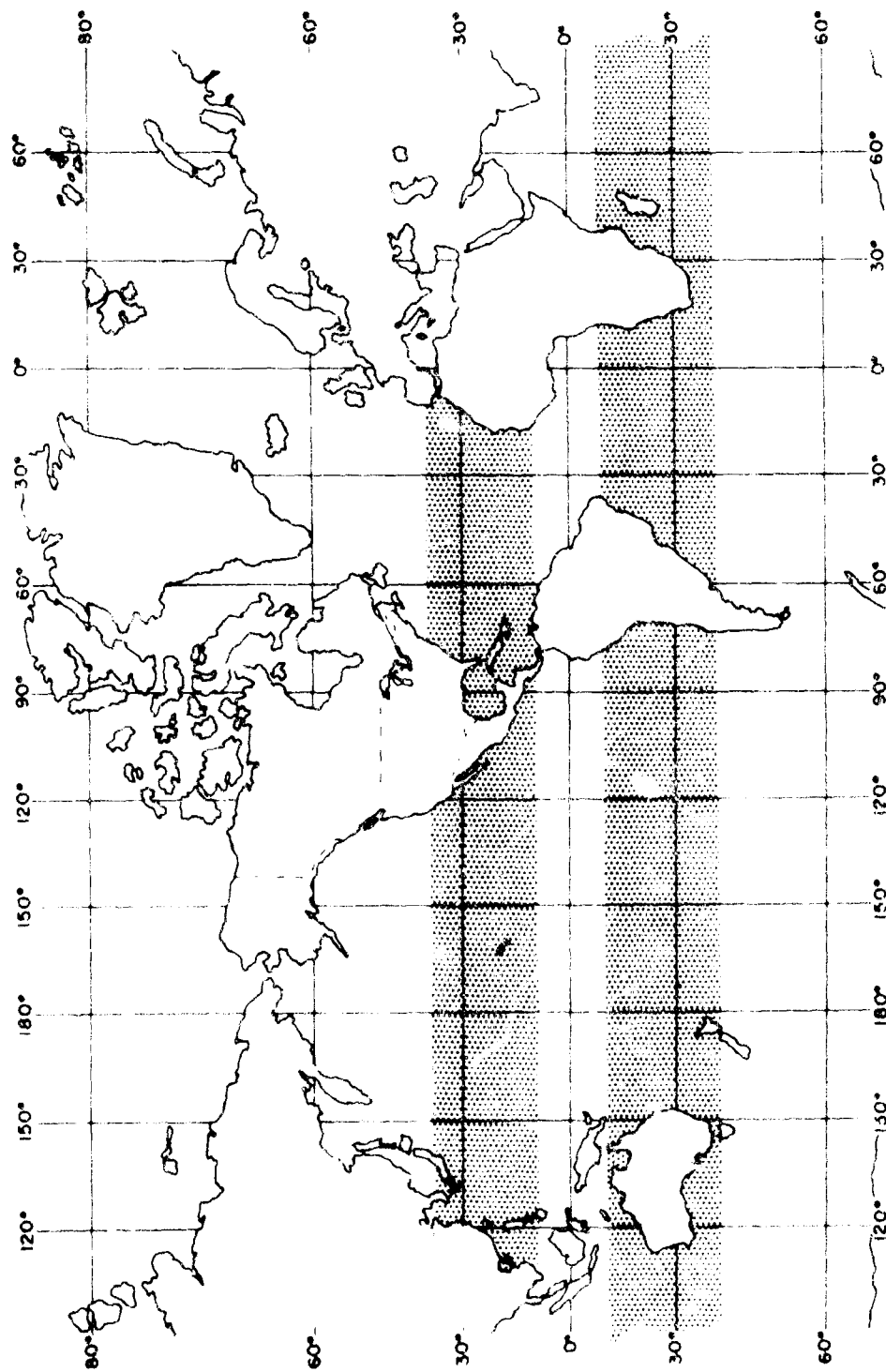
- Area = Tropical, Subtropical and Mid-Latitudes of World Oceans
- X, Y Spacing = 4 min. Squares Scattered Throughout Area of Interest
- Total Observation Sites Required = Unknown



AMO #93-NSF, MIT - Research in internal gravity waves.

Legend:

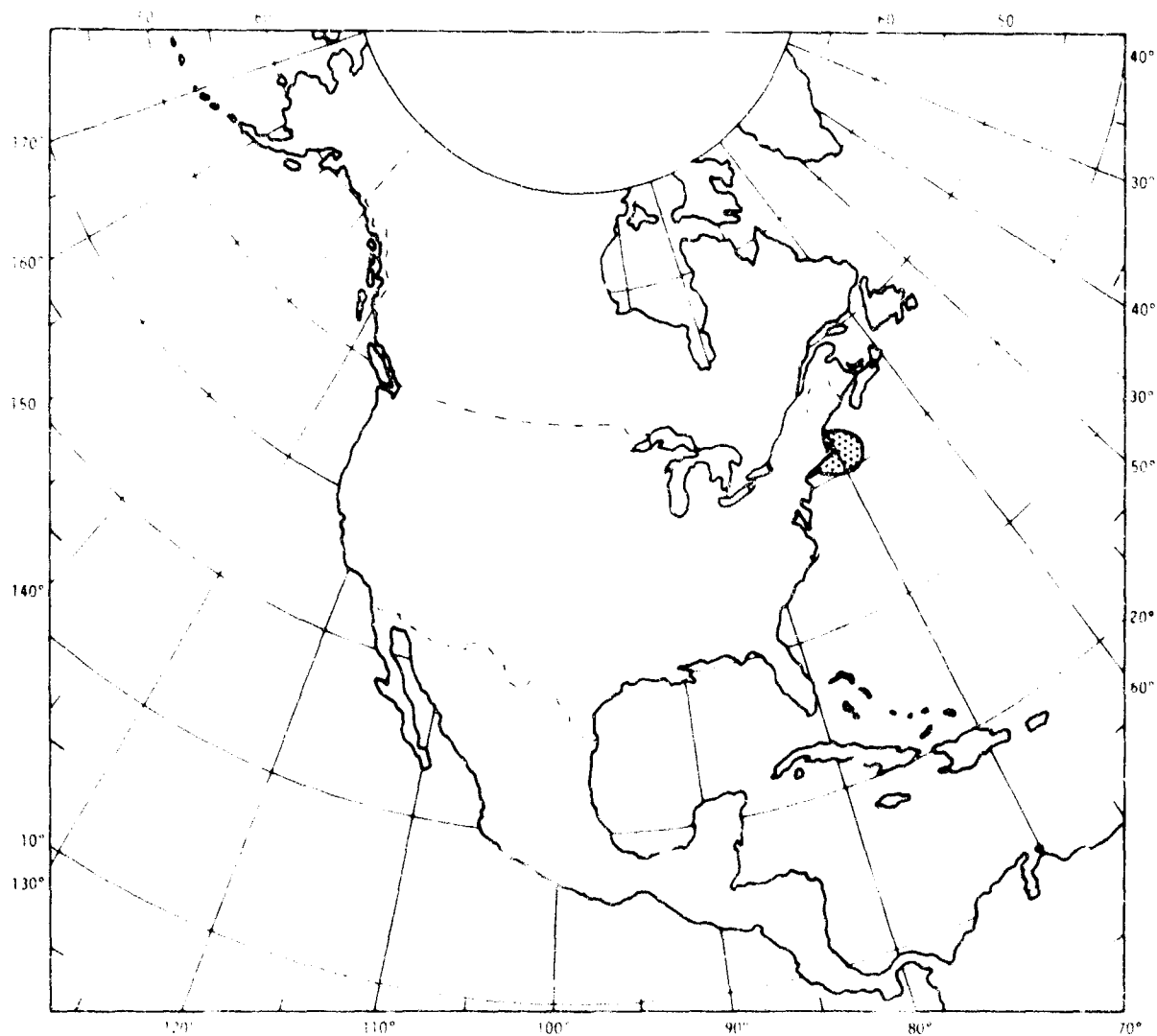
- Area = Mid-Latitude of World Oceans
- X, Y Spacing = 30 Sites in a 4° Square, 600 n. mi Between Squares
- Total Observation Sites Required = 500 (Estimated)



AMO #94-NSF, MIT-Research on Rossby waves.

Legend:

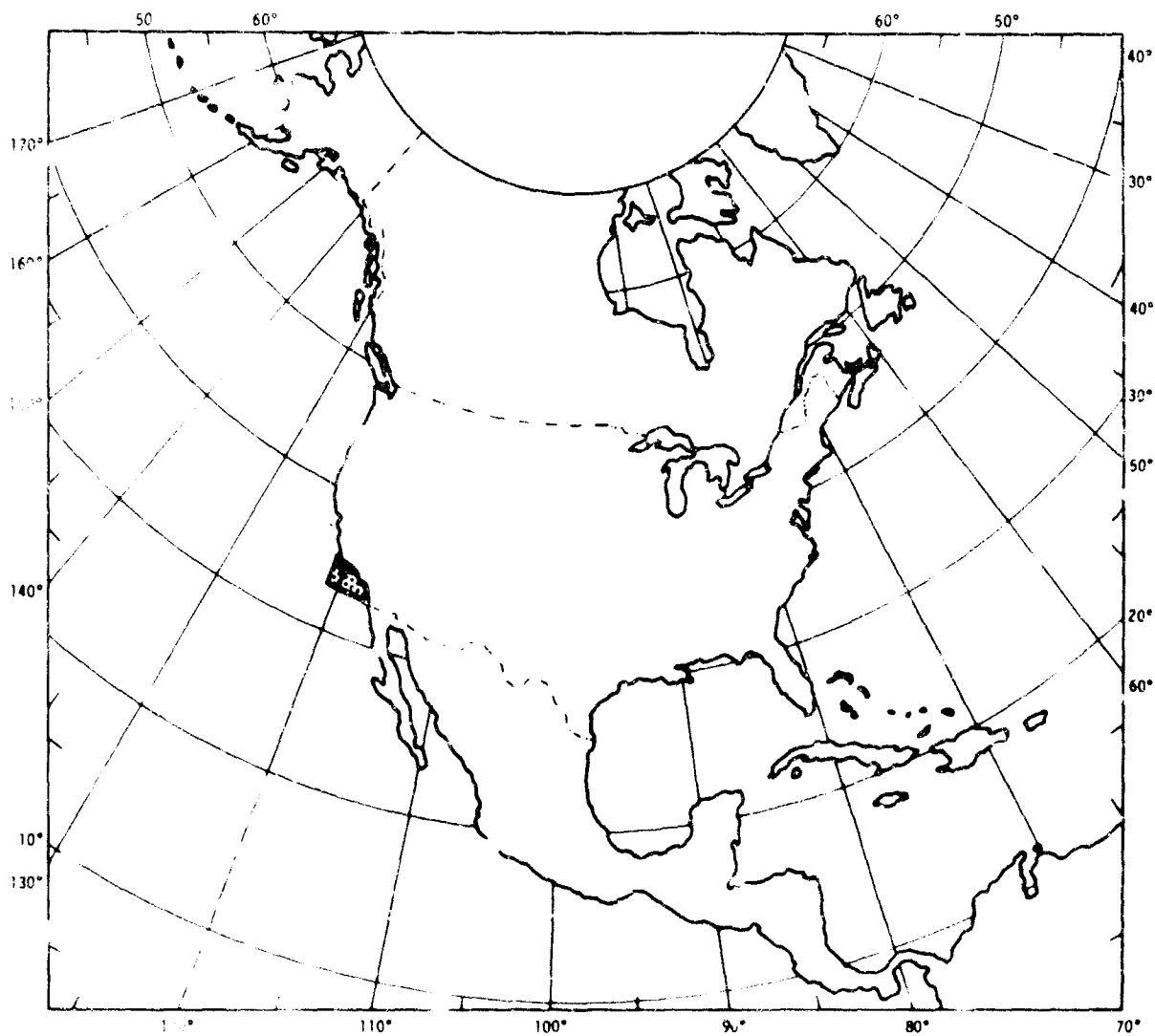
- Area = Buzzards Bay Area
- X, Y Spacing = 1 Point Only
- Total Observation Sites Required = 1



AMO #95-NSF, MIT-Research on air/sea boundary layer.

Legend:

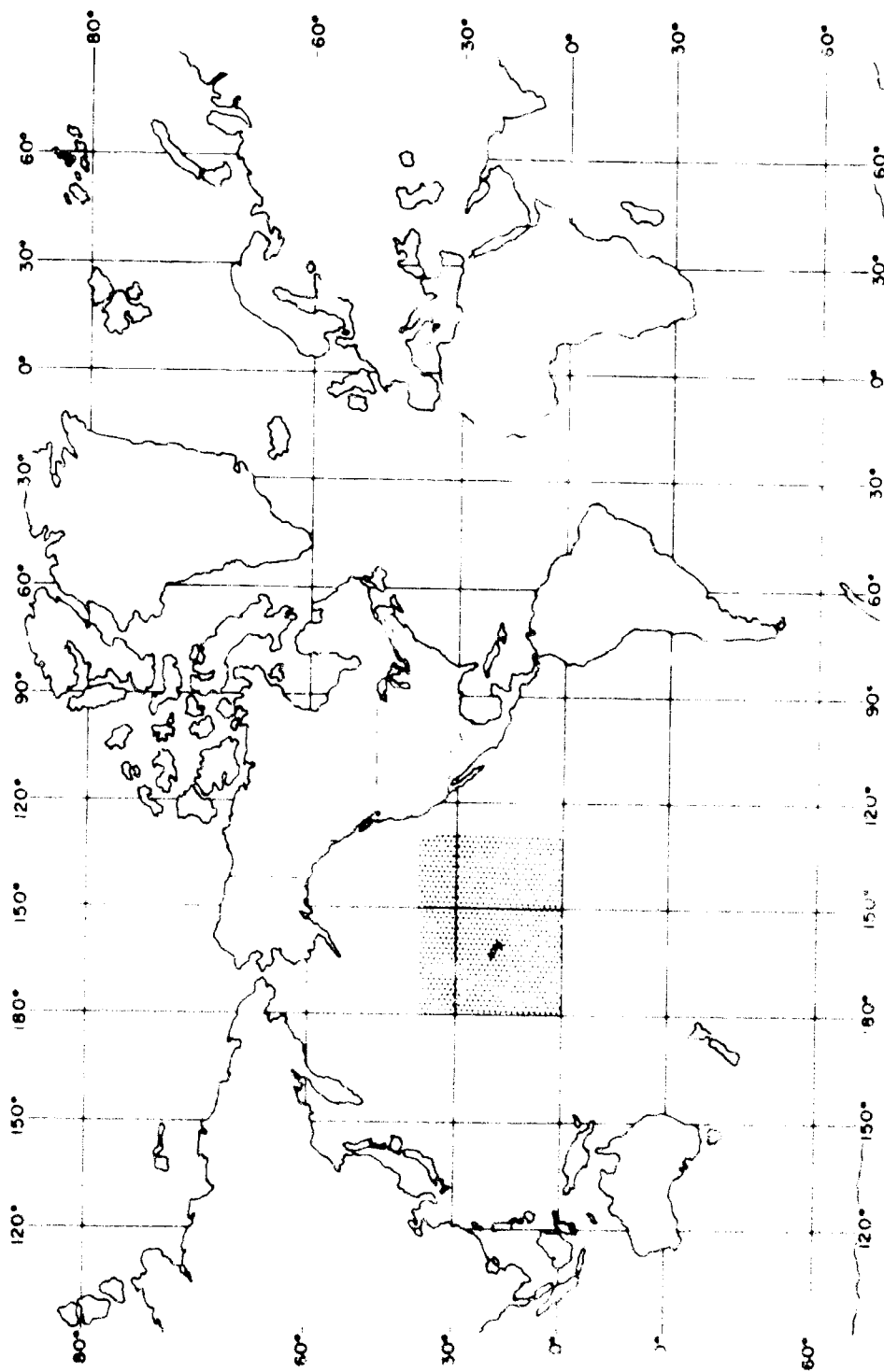
- Area = Vicinity of Santa Barbara Channel Islands, California
- X, Y Spacing = 1 Point Only
- Total Observation Sites Required - 1



AMO #97—Naval Civil Eng. Lab.—Site survey for manned underwater station.

Legend:

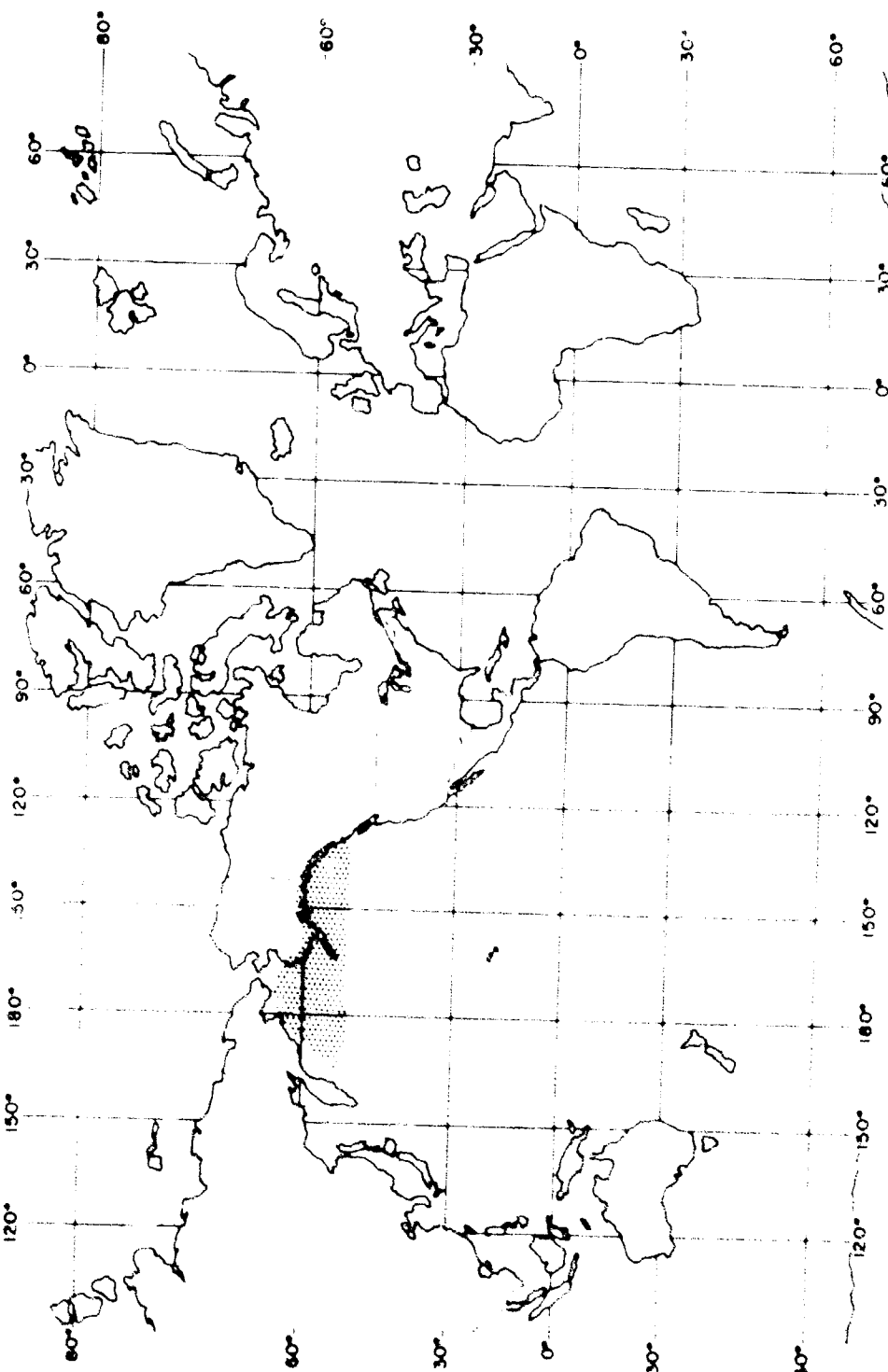
- Area = Pacific 0 to 35° N and 130° W to 180°
- X, Y Spacing = 60 n. mi in Major Currents
500 to 800 n. mi Elsewhere
- Total Observation Sites Required = 100 (Estimated)



AWO #98-BCF, Honolulu—Basic water mass studies.

Legend:

- Area = Estuaries, Cont. Shelf of Alaska, Bering Sea, and Deep Ocean N of 50° N and E of 165° E
- X, Y Spacing = A Few Miles in Estuaries
- 50' x 300 n. mi. in Coastal Waters
- 300 to 1000 n. mi. in Deeper Waters
- Total Observation Sites Required = 70



AMC-99-BCF, Alaska—Research on environment of fish in Alaskan waters.

APPENDIX IV

ASSESSMENT SHEETS FOR 1968 REFINED STATEMENTS OF DATA REQUIREMENTS

Part A Operational Activities

Part B Research Activities

THEORY OF THE EARTH AND ITS HISTORY

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

P. 4 and 20 Aug 54

1. TENTATIVELY PROPOSED NDBS SERVING CAPABILITIES

Parameters	METEOROLOGICAL									
	Cur. speed dir.	Salinity	Sound speed	Water temp	W. pres (depth)	Ambient light	Ambient noise	Transparency	Wave measurement	Wave measurement
Characteristics										
Geographic location	Deep Ocean (60°N to 60°S)	Arctic	Coast out to 400 n. mi.							
Vertical layer	Surface to 5000 m depth									
Range (5-yr SOA)	0 to 0.05 to 0.10	4500 to 5000	4500 to 5000	40°C	0 to 10 ⁴ psi	0 to 2.0 ly/m	0 to 2.0 db	0 to 100 ft	0 to 100 ft	0 to 100 ft
Max error (5-yr SOA)	5°	0.01 kts	0.01 kts	0.01°C	0.1%	1%	1 db	2%	0.2 ft	0.2 ft
Duration of obs	1 hr or 15 min									
Sampling frequency	1 hr or 15 min									
Ob. error	1 hr or 15 min									

Ob. error	1 hr or 15 min									
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2. REFINED AND 1. REQUIREMENTS U.S. Air Force (AFS) - Support for Recovery of Aerospace Vehicles

Parameters	METEOROLOGICAL									
	Cur. speed dir.	Salinity	Sound speed	Water temp	W. pres (depth)	Ambient light	Ambient noise	Transparency	Wave measurement	Wave measurement
Characteristics										
Geographic location	Deep Ocean (60°N to 60°S)	Arctic	Coast out to 400 n. mi.							
Vertical layer	Surface to 5000 m depth									
Range (5-yr SOA)	0 to 0.05 to 0.10	4500 to 5000	4500 to 5000	40°C	0 to 10 ⁴ psi	0 to 2.0 ly/m	0 to 2.0 db	0 to 100 ft	0 to 100 ft	0 to 100 ft
Max error (5-yr SOA)	5°	0.01 kts	0.01 kts	0.01°C	0.1%	1%	1 db	2%	0.2 ft	0.2 ft
Duration of obs	1 hr or 15 min									
Sampling frequency	1 hr or 15 min									
Ob. error	1 hr or 15 min									

Ob. error	1 hr or 15 min									
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3. RESULTS OF ASSESSMENT

Requirements fully met:

Requirements not met and why: All requirements listed in 2 above would be met with the exception of

• The 200 n. mi X,Y spacing. Tentative "system" has initial spacing of 600 n. mi.

• The requirements for 1 (to 3) hr observing operations. Could be met by a minor "system" operational change. "System" expected to have adequate flexibility.

Requirements not met and why: Total Cloud Amount. Judged better done by other means.

Rawinsonde Data (P, RH, T, and Wind), Refractive Index, and Visibility.

Considered beyond 5-yr busy SOA.

REFINED AMO 1

THE UNIVERSITY OF CHICAGO

Residual Var

2. METERS CONSIDERED BEYOND THE 5-1R STATE OF THE ART FOR THE TENTATIVE Y PROPOSED DATA BUOY SYSTEM

Remarks

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED ROVER SENSING CAPABILITIES

OCEANOGRAPHIC										METEOROLOGICAL											
Parameter		Curr. dir.	Curr. speed	Salinity	Sound speed	Water temp.	W. press. (depths)	Ambient light	Ambient noise	Trans- p. rancy	Wave measurement* rts.	Per	Dir	Air temp	Atmos elect	Atmos press	Dew p-	Insu- lation	Freeze rate	W. dir	W. ind. speed
Characteristics		Deep Ocean (40°N to 40°S) N. American Coast out to 400 n. mi.																			
Geographic location		Surface to 5000 m depth																			
Vertical layer		Surface																			
Range (5-yr SOA)		0 to 3000	0 to 10 kts	42.0/46	4500 ft.	-5 to 40°C	0 to 10 ⁴ psi	0 to 2 n. by 7 m	-80 to -20 db	0 to 70%/m	0 to 100 ft.	4.0 sec	360°	0 to 25 to 60°C	0 to 10 kV	0 to 1040 mb	25 to 40°F	0 to 2.0 in. m	0 to 10 hr	0 to 100 kts	
Max error (5-yr SOA)		5°	0.03 kts or 1%	0.01 g/100	1 km	0.01°C	0.1%	1%	3 db	2%	0.2 ft. or 10% of 1%	0.1 sec or 1%	5°	0.1°C	0.1 kV	0.1 mb	0.2°F	1%	10 hr	0 to 100 kts	
Duration of obs		Last or Short period avg. (Representative)																			
Sampling frequency		X, Y		Z		30 Sec LA MO levels (- seas bottom)		2 levels		Surface											
Obs. synch		X, Y, Z		10 min. (1 min.)		6 hrs/3 hrs															

2. REFINED AMO 9.2A REQUIREMENTS U.S. Air Force (AFS) Support Nat. Def. Weapons and Tactics RDT - E at Eglin AFB

Geographic location	Gulf Coast South to 25°N and from 90°W to 94°W, plus 5 Specified Locations in this Area																	
Vertical layer	Sea to 5000 m depth																	
Range	0 to 3000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Max error	5°	0.03 km	0.01 km	0.01°C	1 km	0.01°C	0.1%	1%	3 db	2%	0.2 ft	0.1 sec	0.1 sec	0.1 sec	0.1 sec	0.1 sec	0.1 sec	0.1 sec
Duration of obs	Last or Short period avg. (Representative)																	
Sampling frequency	X, Y	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Obs. synch	X, Y, Z	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)	10 min. (1 min.)

Requirements fully met: All required elements listed in 2 above.

Requirements partially met and why

Requirements not met and why: Rawinsonde Data (P, RH, T, and Wind), Propagation Loss, Effective Index, and upper-air Visibility. Considered beyond E-verbury SRA.

RE PRINTED A.M.C. # 2A

“GREY AREA” PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA HIGH SYSTEM

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUG SYSTEM

Parameter	Refractive index	Visibility	Raincode	Propagation loss
Geo location	N. Gulf of Mexico			
Vertical layer	Sfc to 7,000 ft			
Range	50 to 350 N units	26 mi	Std	0 to 20 db/n. mi
Maximum error	90 % units	1%	IMIG std	1 db
Duration of obs	10 min	10 min	Std	10 min
X, Y	150 n. mi.			
Z	500 ft	3000 ft	1000 ft	1000 ft
Time	6 hrs	6 hrs	6 hrs	6 hrs
X, Y	10 mi.	10 min	1 min	10 min
Z	1 min	1 min	1 min	1 min
(E. switch)				
Remarks:				

4: May 22 Date: 1974

THE JOURNAL OF THE

Geographic location	Where - 1 mile offshore from Vandenberg AFB

RESULTS OF ASSIGNMENTS

Requirements partially met and why

A11 requires records listed in 2 above. The 3 required locations are all in mi offshore and hence in the near shore region not included in the selective state at this time. In addition the fine X-Y spacing of the 3 pits would be far too stringent for the 100 p m CNA spacing which starts 25 ft off shore.

THE UNIVERSITY OF CHICAGO

TESTATIVELY PROPOSED MEDICAL ACADEMIST

[illegible]

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4.1 revised manuscript received 11 7 67

Request received, as usually does and only a few minutes later. The first of the two is the

Letter from the President

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED MEASURING CAPABILITIES

OCEANOGRAPHIC																		METEOROLOGICAL							
Parameters		Curr. dir.	Speed	Altitude	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements*			W. temp	Atmos. pres	Atmos. temp	W. temp	W. dir	W. speed						
Characterization											Per	Per	Per												
Geographic location		Deep Ocean (60°N to 60°S) American Coast out to 400 n. mi																							
Vertical layer		Surface to 5000 m depth																							
Range (5-yr BOA)		0 to 3000	0 to 10 kts	0 to 4500	-5 to 40°C	0 to 10 ⁴ psi	0 to 20 lb/m	0 to 20 db	0 to 20 db	0 to 20 db	0 to 100 ft	0 to 100 ft	0 to 100 ft	0 to 25 to 80°C	0 to 1000 mb	0 to 25 to 80°C	0 to 1000 mb	0 to 25 to 80°C	0 to 1000 mb						
Max error (5-yr BOA)		5°	0.03 kts or 1% or less	0.01 ft/100	1 fms	0.01°C	0.2%	3 db	3 db	2%	0.2 ft	0.1 sec	0.1 sec	0.1°C	0.1 mb	0.1°C	0.1 mb	0.1°C	0.1 mb						
Duration of obs.		1 hr. or short period avg. (Representative)																							
Sampling frequency		A, Y	≤ 600 n. mi/100-150 n. mi																						
Ob. synch.		X, Y, Z	20 Std. LA PRO levels (+ near bottom)																						
Time		6 hrs/5 kts																							
Ob. synch.		X, Y, Z	10 min. (1 min)																						
*Includes Measurements of Swells																									

Harvested 20 Aug '65

2. REFINED AND 19 REQUIREMENTS BCF, Washington, D.C. - Synoptic Climatology

Geographic location	Pacific Coast 30°S to Alaska/Pacific Coast to 160°E, 30°S to Alaska
Vertical layer	800 to 525 m
Range	0 to 5000 m
Maximum error	± 10 m
Duration of obs.	10 min or less
Sampling frequency	X, Y 500 to 600 n. mi in DO { 100 to 240 n. mi in CNA }
Ob. synch.	X, Y 30 min

Requirements fully met: All requirements listed in 2 above.

Current measurement capability of the proposed "system" will meet current transport requirements.

Requirements partially met and why:

Requirements not met and why: Constant Pressure Surface (1000 and 700 mb); Heights: Considered beyond 5-yr base 90%
 * 600 n. mi X, Y spacing for initial sensitive "system" agreed upon during telecon on 7/17/68 with Mr. King. This was in view of initial "system" requirement of 600 n. mi by ESSA, PSAT, and USN (for deep ocean).

Received 20 Aug 1988

Remarks:

References

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NDRE SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL											
		Curr. dir.	Curr. speed	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans. clarity	Wave measurement*	Ht.	Per	Dir	Air temp	Atmos. elect	Atmos. press	Dew point	Instr. lation	Precip. rate	Wind dir	Wind speed	
Characteristics		Deep Ocean (60°N to 60°S) American Coast out to 400 n. mi.																					
Geographic location		Surface to 3000 m depth																					
Vertical layer		Range (5-yr SOA)																					
		0 to 360°	0 to 10 kts	0 to 42.0/00	4500 to 5800 yds	-5 to 40°C	0 to 10 ⁴ psi	0 to 200 lx/m	0 to 200 db	0 to 100 ft	0 to 100 ft	0 to 360°	0 to 40°C	0 to 25°C	0 to 10 kv	1009 mb	40°C	0 to 200 ft	0 to 100 ft	0 to 100 hr	0 to 160 kts		
Max error (5-yr SOA)		3°	0.03 kts or 1%	0.01	0.01	0.01°C	0.1%	1%	3 db	0.2 ft or 10%	0.2 ft or 10%	5° or 1%	0.1°C	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in. hr	0.01 in. hr	0 to 160 kts or ft		
Duration of obs.		Last or short period avg. (Representative)																					
Sampling frequency		X, Y ≤ 600 n. mi / 10-150 n. mi																					
Se. depth		20 Std. 1° P50 levels (- near bottom)																					
Time		6 hrs/3 hrs																					
Obs. synch.		X, Y, Z 10 min, (1 min)																					

*Includes Measurements of Swells

2. REFINED AND 23 REQUIREMENTS U.S. Coast Guard Ocean Station Vessels (6)

N. Hemisphere 4 in Atlantic, 2 in Pacific																				
Geographic location	50° to 5000 m																			
Vertical layer	0 to 10 km																			
Range	0 to 10 km																			
Maximum error	0.1 km																			
Duration of obs.	10 min																			
Sampling frequency	X, Y	N/A																		
	Z	50 m from bottom																		
Obs. synch.	X, Y	30 min																		
	Z	30 min																		

REQUIREMENTS fully met: All requirements listed in 2 above.

Requirements partially met and why

Requirements not met and why
 Bathymetry Judged better done by other means
 Oxygen Uncertainty about obs from buoy unattended for long periods
 Rawinsonde Data (P, RH, T and Wind) and Plankton Hauls Considered beyond 5-yr SOA

*20 Sec. WPSO levels are satisfactory but will degrade adjustable interval sampling of Nansen Bottle and std work

"GREY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug 88

[illegible]

PARAMETERS CONSIDERED BEYOND THE S-VN STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Parameter code	Vertical and oblique plankton hauls to 200 m
Geo location	Ocean Station Vessels	
Vertical layer	Sfc to 100 k ft	Sfc to 200 m
Range	SOA	Not stated
Maximum error	SOA	Not stated
Duration of obs	Sed	30 min
Sampling interval	X, Y	N/A
	Z	Cert
	Time	6 hrs
Survival	X, Y	N/A
	Z	N/A
Remarks		

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

TENTATIVELY PROPOSED NOISE SENSING CAPABILITIES

OCEANOGRAPHIC										METEOROLOGICAL				
Parameters	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Characteristics	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Geographic location	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Vertical layer	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Range (5-yr SOA)	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Max error (5-yr SOA)	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Duration of obs	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Sampling frequency	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
(b) ych	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart

2. REFINED ASO # 25 REQUIREMENTS: U.S. Coast Guard - Data Acquisition Along Standard Sections

OCEANOGRAPHIC										METEOROLOGICAL				
Parameters	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Characteristics	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Geographic location	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Vertical layer	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Range	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Max error	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Duration of obs	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
Sampling frequency	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart
(b) ych	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart	Chart

REQUIREMENTS FULLY MET

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 • The line scale spacing in lines: Tentative system has initial spacing of 0.1 to 0.9 and 100-150 n. mi.

Requirements not met and why:

Barometry: Should better done by other means.
 Oxygen: Currently about 10% measured from surface and for long periods.
 Barometric: RH 1 to 100% (corresponds to 6) in x,y spacing.

REFINED ABO # 24 REQUIREMENTS (Continued)

"GREY AREA" PARAMETERS NOW IN QUOTE FOR THE TENTATIVE PROPOSED DATA BUOY SYSTEM

12/1/62 20 Aug 64

Parameter	Oxygen	Bathy	Salinity	Standard Sections
Geo location	Site to 5000 m	Bottom	5 ft	10,000 m
Vertical layer	0 to 10 ml/l	2 m		
Range	0.03 ml/l	10 min		
Maximum error	Same as list	Special locations		
Duration of ob	X Y	Z		
Sampling interval	Time			
Remarks				

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVE PROPOSED DATA BUOY SYSTEM

Parameter	Rawinsonde	(Temperature, wind, R H)
Geo location	Site to 100,000 ft	
Vertical layer	80A	
Range	80A	
Maximum error	80A	
Duration of ob	Std	
Sampling interval	Special locations	
Remarks		

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL								
	Curr dir	Curr speed	Salinity	Sound speed	Water temp	W press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements* Ht	Dir	Air temp	Atmos elect p ss	Atmos pres	De- pos- itation	Pre- cip rate	Wind dir	Wind speed	
Characteristics																			
Geographic location	Deep Ocean (60°N to 60°S) N American Coast out to 400 n mi																		
Vertical layer	Surface to 5000 m depth																		
Range (5-yr SOA)	0 to 360°	0 to 10 kts	42.0/‰	4500 to 5000 fms	5 to 40°C	0 to 10 ³ psi	0 to 20 ly m	0 to 20 db	0 to 100 m	0 to 100 ft	0 to 360°	0 to 25°C	0 to 10 kv	0 to 10 mb	0 to 1000 mb	0 to 2 in./hr	0 to 160 kts	0 to 160 kts	
Max error (5-yr SOA)	5°	0.05 kts or 1% or 1% or 1%	0.01 0/‰	1 fms	0.01°C	0.1% psi	1%	1 db	2%	0.2 ft or 19% or 1%	1°	0.1°C	0.1 kv	0.1 mb	0.2°C	0.1 in/hr	2°	0.5 kts or ft	
Duration of obs	Inst. or Short period avg. (Representative).																		
Sampling Intensity	X, Y	5, 600 n mi/100-150 n mi																	
	Z	20 Sec LA PRO levels (1- sea bottom)																	
Ob swath	Time	6 hrs/5 hrs																	
	X, Y, Z	10 min, 1 min.																	
Includes Measurements of Swells																			

2. REFINED AND #25 REQUIREMENTS U.S. Coast Guard-Ice Patrol Monitoring

Geographic location	Grand Banks - 39°N to 50°N, 42°W to 55°W (SEE MAP)																	
Vertical layer	SFC to 5000 m																	
Range	0 to 360° 0 to 10 kts 0 to 42.0/‰ 0 to 20 ly m 0 to 20 db																	
Maximum error	10° 0.05 kts 0.03 0/‰ 1 f or 1%																	

Requirements fully met All requirements listed in 2 also track X, Y speed category 3, 30-100 n mi would be met out to about 200 n mi.

- Requirements partially met and why: All other requirements listed in 2 above could be met with the exception of:
 - The time X, Y spacing in category 3 and 2 plus 100-200 n mi in snow. Tentative system has initial spacing of 100 to 150 n mi.
 - The more intensive 2 spacing over surface in many areas. Tentative system has shown LA PRO levels over surface.
 - The probable 10 min coverage over surface of moving 1000 ft diameter and N Atlantic currents. System will be in main.
- Requirements not met and why: Bathymetry. Requested better than by other means.

AREA PARAMETERS WITH AN INQUIRY FOR THE AREA

—(1) *Meaning* :—

Parameter	Field entry
Cable location	Same as [page]
Vertical layer	Bottom
Range	5 to 10,000 m
Maximum error	2 m
Duration of 20	10 or 30 ml
Sampling interval	X Y 30 m (21)
	Z 10-20 cm
	Time N 4
Other errors	X Y 30 min
	Z 30 min

PARAMETERS CONSIDERED BEYOND THE 3-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUCY SYSTEM

[illegible]

TO GET A TRAVEL VOUCHER SEE U MICROBEE STORE NOW! (A FREE GIFT)

[illegible][illegible]

1. BE FORTED A 2007 0 37

[illegible]

1. **THE STATE OF TEXAS, COUNTY OF DALLAS, ss. I, _____, Clerk of the County Court, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears from the records of the County Court of Dallas County, Texas.**

Some remarks that must be made:

- All regression models listed in 2 above were the variable X_i and T are sampling variations in the $(N_i - 1) \times (N_i - 1)$ matrix.
- by means of the bootstrap procedure.

[illegible][illegible]

Dr. J. C. Powell

[illegible]

REPORT AMB 6-20A OTIC-12 MINOR (continued)

NET AREA PARAMETER VALUES FOR THE TERMINAL AREA OF THE SYSTEM

Parameter	Value	Unit	Notes
Area	100.0	Sq. ft.	
Vertical Area	100.0	Sq. ft.	
Perimeter	100.0	ft.	
Maximum Area	100.0	Sq. ft.	
Minimum Area	100.0	Sq. ft.	
Area of 10	100.0	Sq. ft.	
Area of 20	100.0	Sq. ft.	
Area of 30	100.0	Sq. ft.	
Area of 40	100.0	Sq. ft.	
Area of 50	100.0	Sq. ft.	
Area of 60	100.0	Sq. ft.	
Area of 70	100.0	Sq. ft.	
Area of 80	100.0	Sq. ft.	
Area of 90	100.0	Sq. ft.	
Area of 100	100.0	Sq. ft.	

Area of 100 is the total area of the system.

NET AREA PARAMETER VALUES FOR THE TERMINAL AREA OF THE SYSTEM

Parameter	Value	Unit	Notes
Area	100.0	Sq. ft.	
Vertical Area	100.0	Sq. ft.	
Perimeter	100.0	ft.	
Maximum Area	100.0	Sq. ft.	
Minimum Area	100.0	Sq. ft.	
Area of 10	100.0	Sq. ft.	
Area of 20	100.0	Sq. ft.	
Area of 30	100.0	Sq. ft.	
Area of 40	100.0	Sq. ft.	
Area of 50	100.0	Sq. ft.	
Area of 60	100.0	Sq. ft.	
Area of 70	100.0	Sq. ft.	
Area of 80	100.0	Sq. ft.	
Area of 90	100.0	Sq. ft.	
Area of 100	100.0	Sq. ft.	

Area of 100 is the total area of the system.

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED REMOTE SENSING CAPABILITIES

Parameters Characteristics		OCEANOGRAPHIC										METEOROLOGICAL							
		Current dir.	Current speed	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements	Drift	Air temp	Altimeter pressure	New point	Ion- ization	Freezep rate	Wind speed	
Geographic location		Deep Ocean (40°N to 60°S) N Atlantic Coast out to 400 n. mi																	
Vertical layer		Surface to 5000 m depth																	
Range (5-yr SOA)		0 to 3000	0 to 4000	4000 to 5000	-5 to 40°C	0 to 10 ⁵ dy/m	0 to 20	-20 db	0 to 100	0 to 100	0 to 100	-25 to 60°C	10 kv	1000 mb	25 to 40°C	2.0 hr/m	0.17	0 to 160 kts	
Max error (5-yr SOA)		5%	5%	5%	0.01°C	0.1%	1%	3 db	5%	5%	5%	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	12. hr	0 to 0.5 kts or 47	
Duration of obs.		best or Short period avg. (Representative)																	
Sampling intensity		X, Y 500 n. mi/100-150 n. mi																	
Ob. synch.		Z 200 Std. LAPEO levels (+ near bottom)																	
		Time 6 hrs/1 hr																	
		X, Y, Z 10 min, (1 min)																	

* Includes Measurements of Swells

2. REFINED AND 90% REQUIREMENTS U.S. Coast Guard Oceanographic Services (Ocean Surveys)

Geographic location	Wm N Atlantic - Tropical to 30°S, 20° Trop Pacific to 15°S, Trade Wind Zone or Hawaii, Kurile-Cur														
Vertical layer	20 to 1000 m depth														
Range	0 to 3000	0 to 4000	4000 to 5000	-5 to 40°C	0 to 10 ⁵ dy/m	0 to 20	-20 db	0 to 100	0 to 100	0 to 100	0 to 25	0 to 1000	0 to 25	0 to 100	0 to 100
Maximum error	5%	5%	5%	0.01°C	0.1%	1%	3 db	5%	5%	5%	0.1°C	0.1 m	0.1°C	0.1 m	0.1 m
Duration of obs.	10 min or less														
Sampling intensity	X, Y Lines w/obs 10-40 n mi spacing														
	Z Lines w/obs 200-500 n mi apart														
	Time 6 hrs														
Ob. synch.	X, Y 10 min														
	Z 1 min														

3. RESULTS OF ASSESSMENT

Requirements fully met:

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of

* The fine (10-40 n mi) spacing in the Euse: Testative "system" has an initial spacing of 100-150 n mi in (NA and 600 n mi in DC)

Requirements not met and why: Bathymetry: Judged better done by other means

Chlorophyll, pH, and pictures of fish life: Uncertainty about obs. from buoy unattended for long period

Chlorophyll, Nutrients, Plankton, and Rawinsonde (RH, T and Wind): Considered beyond 5-yr buoy SOA

"GR-Y AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Bathymetry	Oxygen	* pH	TV or cameras + to monitor fish life					
Geo. location	Deep water			Unk					
Vertical layer	Bottom	Sfc to 6000 m	Sfc to 6000 m	Unk					
Range	to 6000 m	0 to 10 m/l	Unk	Unk					
Maximum error	2 m	0.1 ml/l	Unk	Unk					
Duration of ob.	10 min			Unk					
Sampling intensity	X, Y	Varies		Unk					
	Z	Bottom	Std LAPRO levels	Unk					
	Time	N/A	6 hrs	Unk					
Ob. synch.	X, Y	N/A	10 min	Unk					
	Z	N/A	1 min	Unk					

Remarks:

* Accuracy and ranges depend on requirements of potential users.

* Possible future requirements.

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Nutrients	Chlorophyll	* Plankton	Revolutions					
Geo. location	Deep water	Deep water	Unk	Deep water					
Vertical layer	Sfc to 6000 m	Sfc to 7000 m	Unk	Sfc to 1000 m					
Range	Unk	Unk	Unk	30A					
Maximum error	Unk	Unk	Unk	80A					
Duration of ob.	10 min	10 min	Unk	Std					
Sampling intensity	X, Y	Varies	Unk	Std					
	Z	Std LAPRO levels	Unk	Std ± signif- icant levels					
	Time	6 hrs	Unk	12 hrs					
Ob. synch.	X, Y	10 min	Unk	90A					
	Z	1 min	Unk	80A					

Remarks:

* Possible future requirements.

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NDMS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL				
	Current dir.	Current speed	Salinity	Sound speed	Water temp	W pressure (depth)	Ambient light	Ambient noise	Transparency	Wave measurements	Wave measurements	Wave measurements	Wave measurements	Wave measurements	Wave measurements
Characteristics															
Geographic location	Deep Ocean (60°N to 60°S) / Arctic Ocean (60°N to 60°S) / Antarctic Ocean (60°S to 60°N)														
Vertical layer	Surface to 5000 m depth														
Range (5-yr SOA)	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Max error (5-yr SOA)	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Sampling frequency	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz
Ob. epoch	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z

2. REFINED AND 25 REQUIREMENTS U.S. Coast Guard—Ice Breaking and Polar Oceanography

Parameters	OCEANOGRAPHIC										METEOROLOGICAL				
	Current dir.	Current speed	Salinity	Sound speed	Water temp	W pressure (depth)	Ambient light	Ambient noise	Transparency	Wave measurements	Wave measurements	Wave measurements	Wave measurements	Wave measurements	Wave measurements
Characteristics															
Geographic location	Arctic and Antarctic Areas														
Vertical layer	Surface to 5000 m														
Range	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Max error	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°	5°
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Sampling frequency	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz
Ob. epoch	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z

3. RESULTS OF ASSESSMENT

Requirements fully met:

Requirements partially met and why:

Requirements not met and why: All listed requirements for the Arctic and Antarctic Tentative data-busy "system" extends only from 60°N to 60°S

IV-28

PARAMETERS CONSIDERED BEYOND THE 5- OR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

* Other chemical and biological requirements have not been standardized.

TENTATIVELY PROPOSED KIDS SENSING CAPABILITIES

[illegible]

1. **RE FUND AMO @ 30-- 35 REQUIREMENTS ES&A -- Total Agency Requirements**

Geographic location		Global Deep Ocean/N. American Coast									
Vertical layer	Sfc to 5000 m										
Range	0 to 340°	0.05 to 6 km	20 to 40°	4500 to 5600 fms	-5 to 40°C	0 to 10 ⁴ psi					
Maximum error	5°	0.3 mls or 1%	0.01 %	0.01 %	1 fms	0.01°C	0.1%				
Duration of ob.		last or short period Ave.									
Sampling interval by	X, Y	300 to 600 fms	40 to 140 n. mi								
	Z	1A P80									
Time		mid day - at bottom									
X, Y	20 min										
Z	1 min										

Revised requirements July 7, 2007: All record requirements listed in 2 above

Require students participate more and why

Requirements not met and why	Rawsource Data (P, RH, T and Wind)	Considered beyond 5-yr buoy SOA
1. No data for 1997-2000		
2. No data for 1997-2000		
3. No data for 1997-2000		
4. No data for 1997-2000		
5. No data for 1997-2000		
6. No data for 1997-2000		
7. No data for 1997-2000		
8. No data for 1997-2000		
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96. No data for 1997-2000		
97. No data for 1997-2000		
98. No data for 1997-2000		
99. No data for 1997-2000		
100. No data for 1997-2000		

*000 a mi for initial system spacing established by telecon on 6/26/26. The data from this initial spacing of observations would, through use, help clarify what additional data are actually needed.)

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BIOT SYSTEM

Parameter	Upper-Air Soundings				Wind Dir	Wind Speed
	Air Temp.	Atmos Press	Dew Point			
Geo location	DO/CNA					
Vertical layer	800 to 1000 ft					
Range	-90 to 50°C					
Maximum error	104% to 100% kts					
	0.5°C					
Duration of job	10°					
	least					
Sampling Intensity	X Y	100 to 990 n. mi				
	7	1 ~ 40 n. mi in hurricane area				
Time	12 hrs		sequence		1 k ft	1 ~ 2 k ft
	X Y	1 hr				2 k ft
Remarks	2					

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED MEASURING CAPABILITIES

Review 30 Aug '68

Parameters

Characteristics

Geographic location

Vertical layer

Range (5 yr 80%)

Max error (5 yr 80%)

Duration of obs

Sampling frequency

Obs. synch

OCEANOGRAPHIC										METEOROLOGICAL							
Current speed	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans- perency	Wave measurements*	Air temp	Atmos elect	Atmos press	Dew point	Inso- lation	Precep- rate	Wind dir	Wind speed	
Deep Ocean (40°N to 60°S) American Coast out to 400 n. mi.																	
Surface to 5000 m depth																	
0 to 3000	0 to 4000	0 to 4500 to 5000	-5 to 40°C	0 to 10 ⁴	0 to 20	0 to 20	0 to 10	0 to 100 ft	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	
10 kts	10 kts	10 kts	0.1°C	0.1%	1 ft	1 db	1%	100 ft	100 ft	100 ft	100 ft	100 ft	100 ft	100 ft	100 ft	100 ft	
5°	0.00 kts or 1%	0.01/0.00	1 fpa	0.01°C	0.1%	3 db	2%	0.2 ft or 10%	0 °C	0.1 kv	0.1 mb	0.2 °C	1%	0.01 in. hr	0 to 360°	0 to 160 kts or 37 mph	
Last or Short period avg. (Representative)																	
X, Y	Z	Time	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels
5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min	5 min, 1 min

*See Table Measurements of Buoy

*Includes measurements of Buoy

2. REPORTED A-100 39A REQUIREMENTS U.S. Dept. Interior (FWS/PCA). Determine Water Quality

Geographic location	Near shore and Estuaries										Deep Ocean				
	Surface	1 m	10 m	100 m	1000 m	Bottom	Surface	1 m	10 m	100 m	Surface	1 m	10 m	100 m	Bottom
Vertical layer	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
Range	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
Maximum error	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Duration of obs	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Sampling frequency	X, Y	Z	Time	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels
Obs. synch	X, Y, Z	Time	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels	2 levels

REQUIREMENTS OF A-100

Deep requires partially met and why

Deep requires not met and why All listed requirements 25 n mi offshore

Further investigation of near-shore and estuarine requirements is needed. Near-shore measurement capabilities may be different from "system"

VOYAGE AREA: PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug 68

Parameter	Biological activity	Oxygen	Turbidity	Fluor Vol	pH
Core location	Nearshore and Estuarine				
Vertical layer	0 to bottom - 1 m				
Range	5 X background	0-20 mg/l	0-100 J/l	Variable	0-200 mg/l
Measure error	10%	0.5 mg/l	10%	10%	5%
Duration of obs	1 hr	100%	100%	100%	100%
X, Y	1-10 m				
Z	1 m				
Time	3 hrs				
Ob. synch	X, Y				
	Z				
Remarks					

PARAMETERS (CONSIDERED BEYOND THE STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	(1) Chemical	(2) Biological	(3) Microbiological
Core location	Nearshore and Estuarine		
Vertical layer	0 to bottom - 1 m		
Range	Variable		
Measure error	~ 10%		
Duration of obs	Variable		
X, Y	1-10 m		
Z	1 m		
Time	3 hrs		
Ob. synch	X, Y		
	Z		
Remarks			

- Chemical: Suspended solids, total nitrate, nitrite, nitrate, phosphate, silicate, boron, and lead. (Note: Organic carbon, organic nitrogen, and organic phosphorus are not included.)
- Biological: Total productivity, algae biomass, bottom organisms.
- Microbiological: Total plate counts, coliform counts, streptococci counts.

ASSESSMENT SHEET FOR REFNET DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NUMBER OF REFNET DATA REQUIREMENTS

STATION DATA										METEOROLOGICAL										REVISION	
Part number	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Characteristics	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Geographic location	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Vertical layer	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time <td>Lat</td> <td>Long</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td>	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Range (5-10 MHA)	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time <td>Lat</td> <td>Long</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td>	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Max error (5-10 MHA)	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time <td>Lat</td> <td>Long</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td>	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Direction of use	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time <td>Lat</td> <td>Long</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td>	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
Sampling frequency	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time <td>Lat</td> <td>Long</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td>	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	
(1b) system	Chart	Altitude	Sound	Water temp	Air temp	Wind speed	Wave height	Wave period	Wave direction	Time <td>Lat</td> <td>Long</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td> <td>Altitude</td>	Lat	Long	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	Altitude	

REPORT DATA / 300 MEASUREMENTS / 1.5. Instrument of the Laboratory (F.W. P.C.A.) Determine Water Quality									
Geographic location	Current values	1995-1996	1997-1998	1999-2000	2001-2002	2003-2004	2005-2006	2007-2008	2009-2010
Vertical layer	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Range	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Minimum error	15	20	25	30	35	40	45	50	55
Direction of use	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Sampling frequency	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
(1b) system	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
RESULTS OF ANALYSIS	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Report number	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min

2. REQUIREMENTS FOR REFNET DATA REQUIREMENTS

3. REQUIREMENTS FOR REFNET DATA REQUIREMENTS

THE UNIVERSITY OF CHICAGO

JERRY ARK A PARAMOUNT PICTURES PRESENTS

Parameter	Value	Unit	Notes
Core location	1000	m	
Vertical error	100	m	
Sample	100	m	
Minimum error	100	m	
Duration of obs.	100	min	
Sampling frequency	100	Hz	
Time	100	min	
Notes	100	m	

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Dr. J. H. Webb

1. *Phragmites australis* (Cav.) Trin. ex Steud. (Common reed)

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

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ASSIGNMENT SHEET FOR RESISTANCE DATA REQUIREMENTS

1. TENTATIVELY PROPOSED MEASURING CAPABILITIES

Parameters	STANDARDIZATION				METROLOGICAL				REVISION 20 Aug 64			
	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Characteristics	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Geographic location	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Vertical layer	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Range (3.77 Mm)	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Mass error	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Direction of ab	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Sampling interval	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Time	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core

2. REFINED A (M) 6.7 MEASUREMENTS (M) 6.7 Submarine Depth of Water to 400 Fathoms

STANDARDIZATION				METROLOGICAL				REVISION 20 Aug 64			
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Characteristics	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Geographic location	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Vertical layer	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Range	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Minimum error	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Direction of ab	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Sampling interval	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Time	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core

3. REFINED A (M) 6.7 MEASUREMENTS (M) 6.7 Submarine Depth of Water to 400 Fathoms

STANDARDIZATION				METROLOGICAL				REVISION 20 Aug 64			
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Characteristics	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Geographic location	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Vertical layer	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Range	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Minimum error	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Direction of ab	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Sampling interval	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Time	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core

4. REFINED A (M) 6.7 MEASUREMENTS (M) 6.7 Submarine Depth of Water to 400 Fathoms

STANDARDIZATION				METROLOGICAL				REVISION 20 Aug 64			
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Characteristics	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Geographic location	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Vertical layer	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Range	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Minimum error	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Direction of ab	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Sampling interval	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Time	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core
Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core	Core

REQUIREMENTS (Continued)

"GRAY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised: 20 Aug 98

[illegible]

part:

PARAMETERS CONSULTED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BOOT SYSTEM

[illegible]

Remarks:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

1. TENTATIVELY PROPOSED NDSS SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL							
Characteristics	Curr. dir.	Curr. speed	Salinity	Sound speed	Water temp.	A. press. (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements*		Air temp.	Atmos. elev.	Atmos. press.	Low point	Tus- o- lation	Precip. rate	Wind speed	Wind dir.
										Ht.	Per.								
Geographic location																			
Deep Ocean (60°N to 60°S)/H. American Coast out to 400 n. mi.																			
Vertical layer																			
Range (5-yr SOA)																			
0 to 360°																			
0 to 10 kts																			
4500 to 5500 fms																			
-5 to 40°C																			
0 to 10 ⁴ psi																			
0 to 2.0 W/m																			
-80 to 20 db																			
0 to 100% m																			
0 to 100 ft																			
0 to 100 mph																			
0 to 160 kts																			
5°																			
0.05 kts																			
0.01 0/100																			
1 fms																			
0.01°C																			
0.1%																			
1%																			
3 db																			
2%																			
0.1 sec																			
0.1 mph																			
0.1 kts																			
0.01																			
2°																			
In. hr																			
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2. REFINED AND 96 REQUIREMENTS Naval Oceanographic Office - Underwater Environmental Monitoring for Test Ranges

Ranking Sands, Kauai; St. Croix; and Antec Test Ranges; San Clemente only Occasional Support												
Geographic location	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom	800' to bottom
Vertical layer	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°
Range	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°
Maximum error	19°	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%	0.1 kts or 5%
Duration of obs.	Inst. or float	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg	2 min avg
Sampling frequency	X, Y	5 buoys 10 n. and apart, within 20 n. or of island in each range										
	Z	Varies (see chart)										
	Time	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min
Obs. synch.	X, Y	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min
	Z	3 min	3 min	3 min	3 min	3 min	3 min	3 min	3 min	3 min	3 min	3 min
	Time	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min

3. RESULTS OF ASSESSMENT

Requirements fully met:

Requirements partially met as follows: All requirements in 2 above would be met with the exception of:
* 5 min frequency and 1 min X, Y synch. of obs.: Tentative "system" has much less stringent values.

*All test ranges have maximum depths within the tentative "system" value of 5000 m.

Requirements not met and why: Tidal Fluctuation (DO): Uncertainty about instrumentation resulting required accuracy
Sediment Deposit: Judged better measured by other means
The San Clemente Test Range may require intense support occasionally, if a none for periods of time.

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

1. TENTATIVELY PROPOSED NON-SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL										
	Curr. speed dir.	Curr. speed	Salinity	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements* Ht.	Per.	Dir.	Air temp.	Atmos. elect.	Atmos. pres.	Dew point	Humid- itation	Precip. rate	Wind dir.	Wind speed	
Geographic location	Deep Ocean (4000 to 6000 m) American Coast (400 to 4000 m)																				
Vertical layer	Surface to 4000 m depth																				
Range (5-yr SOA)	0 to 360°	0 to 10 kts	0 to 43.75	4500 to 5800 fms	-5 to 40°C	0 to 10 ⁴ psi	0 to 2.0 ly/m	-80 to -20 db	0 to 0.75/m	0 to 100 ft	1 to 40 sec	0 to 360°	-25 to 60°C	0 to 10 kv	800 to 1099 mb	-25 to 40°C	0 to 2.0 g/m ³	0 to 12 in./hr	0 to 360°	0 to 50 kts	
Max error (5-yr SOA)	5°	0.03 kts or 1%	0.1 g/100	1 fms	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10%	0.1 sec or 1%	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	2°	0.5 kts or 5%	
Duration of obs.	hour or short period avg. (Representative)																				
Sampling intensity	X, Y	≤ 600 n. m./100-150 n. m.																			
	Z	30 Sec. LAFO levels (- near bottom)																			
Time	6 hrs/5 hrs																				
Obs. arch.	X, Y, Z	10 min, (1 min)																			

*Includes Measurements of Swells

2. REFINED AND 68 REQUIREMENTS Naval Oceanographic Office World Ocean Survey

On-graphic location		Deep Ocean (see Map)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Vertical layer	Varies																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</

3. RESULTS OF ASSESSMENT

Requirements fully met. All re- quirements listed in 2 above with the exception of 30 min duration and 3 hr frequency of obs. for current velocity—these could be met with an operational change of "system"

Requirements partially met and

Requirements not met and why Gravity, and Magnetic Field Intensity Uncertainty about measurement from general purpose buoy of type for proposed "system" Propagation Loss, Bottom Pt. Now, and Total Cloud Amount Judged better done by other means Bottom Sampling, Biological sampling, Nutrient Determination and Visibility Considered beyond 5-yr buoy SOA

GREY AREA PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug. 68

Parameter	Propagation loss	Gravity	Magnetic field intensity	Bottom photos	Total cloud amount	
Geo location	Deep Oceans					
Vertical layer	Varies	Varies	Varies	Bottom	Sfc	
Range	10 cys to 10 kc	950 k to 1 m milligal	20 k to 36 k Gamma	N/A	0 to 10/10	
Maximum error	3 db	2 milligal	1 Gamma	N/A	1/10	
Duration of ob	Varies	Inst	Inst	N/A	Inst	
Sampling intensity	X, Y	Unk	Unk	Varies	Single site	
	Z	Sea sfc	Sea sfc	N/A	N/A	
Obs error	Time	Variable			Unk	
	X, Y	N/A	1/5 yr	N/A	Unk	
	Z	N/A	N/A	N/A	N/A	
Remarks						

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Bottom sampling	Biological sampling	Visibility	Nutrient determination		
Geo location	Deep Oceans					
Vertical layer	Bottom	N/A	Sfc	Not stated		
Range	0.5 to 100 ft core in 60-90 sec	N/A	0 to >10 mi	Unk		
Maximum error	N/A	N/A	10%	Unk		
Duration of ob	N/A	1-3 hrs	1-3 hrs	Inst		
Sampling intensity	X, Y	2 site at a time				
	Z	2 selected layers		Varies		
	Time	Once / Site	Once / Site	1/sto season		
	X, Y	N/A				
Obs error	Z	N/A				
Remarks						

CONT SHEET FOR REFINED DATA REQUIREMENTS

1 TENTATIVELY PROPOSED NDBS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL							
	Current dir	Current speed	Salinity	Sound speed	Water temp	W. pres. (depth)	Ambient light	Ambient noise	Transparency	Wave measurements* Ht Per	Air temp	Atmos elect	Atmos press	Dew point	Humid- lation	Precip rate	Wind dir	Wind speed
Geographic location	Deep Ocean (60°N to 60°S) American Coast out to 400 n. mi																	
Vertical layer	Surface to 5000 m depth																	
Range (5-yr SOA)	0 to 1000	0 to 1000	0 to 4500	0 to 4500	0 to 4500	0 to 1000	0 to 20	0 to 100	0 to 100	0 to 100	0 to 25	0 to 10	0 to 1000	0 to 25	0 to 100	0 to 10	0 to 360°	0 to 160 kts
Max error (5-yr SOA)	5°	10 kts	420/100	5000 fms	40°C	100 fms	1 ft	3 db	24	0.2 ft or 10% or 12"	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	2°	9.5 kts or 5%
Duration of obs	Last or Short period avg. (Representative)																	
X, Y	± 800 n. mi/100-150 n. mi																	
Sampling frequency	2 30 Sec LA PBO levels (- near bottom)																	
Time	6 hrs/hrs																	
(X, Y) error	10 min, 10 min)																	

2 REFINED AMO # 71 REQUIREMENTS Naval Weather Service—Support Airborne Operations

Geographic location	World Wide	Integrated wind force																
		Vertical layer	Range	Max/min error	Duration of obs	X, Y	Sampling interval by	Time	X, Y	Z	Time	X, Y	Z	Time	X, Y	Z	Time	

3 REFINED AMO # 72 REQUIREMENTS

Surface requirements for Air Temp, Dew Pt, and Wind—but they are also met by USN AMO # 72.

Requirements partially met and why

Requirements not met and why Total Cloud Amount: Judged better done by other means.
All other Upper-air Obs listed on page 2 (above buoy mast to 100 K ft) Considered beyond 5-yr buoy SOA.

ONLY AREA PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA RUN SYSTEM

Revised 20 Aug. 68

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

[illegible]

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

1. TENTATIVELY PROPOSED NDMS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL				
	Curr. dir.	Curr. speed	Salinity	Sound speed	Water temp.	N. pres. depth	Subs. light	Trans. par. nomy	Wave measurement	Air temp.	Atmos. elect.	Atmos. press.	Dew point	Inso- lation	Wind speed
Geographic location	Deep Ocean 40°N to 60°N, American Coast out to 400 n. mi.														
Vertical layer	Surface to 5000 m depth														
Range (5-yr SMA)	0 to 10	0 to 4500	0 to 4500	0 to 4500	0 to 4500	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Max error (5-yr SMA)	10 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts
Duration of obs	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Sampling frequency	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min

Vertical layer	0 to 10	0 to 4500	0 to 4500	0 to 4500	0 to 4500	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Range	10 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts
Max error	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Duration of obs	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Sampling frequency	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min

2. REFINED DATA REQUIREMENTS

Naval Weather Service Support Water, Surface, and Subsurface Operations

Vertical layer	0 to 10	0 to 4500	0 to 4500	0 to 4500	0 to 4500	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Range	10 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts	4500 kts
Max error	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Duration of obs	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Sampling frequency	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min
Time	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min

3. RESULTS OF ASSESSMENT

Requirements fully met. All requirements listed in 2 above.

Requirements partially met and why: Sea State. Some measure of sea state can be approximated from wave measurements—whether the coding will be exactly what is wanted must be resolved.

Requirements not met and why: Visibility. Some measure of horizontal surface visibility can be approximated from light back-scatter measurement within close proximity of buoy—whether these will satisfy long-range visibility requirements is a technical question.

Requirements not met and why: Total Cloud Amount. Judged better than by other means.

Requirements not met and why: Cloud Base and Refractive Index. Uncertainty about instrumentation meeting required accuracy.

Requirements not met and why: Cloud Base and Refractive Index. Considered beyond 3-yr buoy SOA.

KEY AREA PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug 85

Parameter	Task/Cloud amount	Total fluctuation	Sea state	Horizontal variability					
Geo location	World wide								
Vertical layer	Above aft	500	500	500					
Range	0 to 10	100	0 to 9	0 to 10 mi					
Maximum error	2 ft	10%	1 category	10 ft					
Duration of obs	1 hr	1 hr	1 hr	1 hr					
Sampling intensity	X Y	600 n mi	600 n mi	600 n mi					
	Z	N/A	N/A	N/A					
Time	X Y	12 hrs	12 hrs	12 hrs					
	Z	1 hr	1 hr	1 hr					
Obs. error	X Y	1 hr	1 hr	1 hr					
	Z	N/A	N/A	N/A					

Remarks: "Original sea state measurement is a manual operation which can be approximated by a combination of system measurements"

PARAMETERS CONSIDERED BEYOND THE STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Cloud layer	Reflective index							
Geo location	World wide								
Vertical layer	500 to 1000 ft	500							
Range	0 to 100 n mi	100							
Maximum error	20%	10%							
Duration of obs	1 hr	1 hr							
Sampling intensity	X Y	600 n mi	600 n mi						
	Z	N/A	N/A						
Time	X Y	12 hrs	12 hrs						
	Z	1 hr	1 hr						
Obs. error	X Y	1 hr	1 hr						
	Z	N/A	N/A						

Remarks:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENT

TENTATIVELY PROPOSED WIDE AREA, JAPAN, TFR

Revised 20 Aug '68

Revised 20 Aug 68

OCEANOGRAPHIC										METEOROLOGICAL						
Para number	Current dir	Current speed	Salinity	Sound speed	Water temp	W. depth	Ambient light	Ambient sound	Time of day	Wave measurement	Dir	Air temp	Atmos press	Dew point	Humidity	Wind speed
1. (The underwater)																
2. (The surface)																
3. (The bottom)																
4. (The water column)																
5. (The surface layer)																
6. (The water column)																
7. (The bottom layer)																
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Underwater Measurements of Swells

1. REFERENCE: 1.1. REQUIREMENTS: Pacific Missile Range Support Range with Environmental Data

Geographic location	Lat 13-20, 14-20, 15-20, 16-20, 17-20, 18-20, 19-20, 20-20, 21-20, 22-20, 23-20, 24-20, 25-20, 26-20, 27-20, 28-20, 29-20, 30-20, 31-20, 32-20, 33-20, 34-20, 35-20, 36-20, 37-20, 38-20, 39-20, 40-20, 41-20, 42-20, 43-20, 44-20, 45-20, 46-20, 47-20, 48-20, 49-20, 50-20, 51-20, 52-20, 53-20, 54-20, 55-20, 56-20, 57-20, 58-20, 59-20, 60-20, 61-20, 62-20, 63-20, 64-20, 65-20, 66-20, 67-20, 68-20, 69-20, 70-20, 71-20, 72-20, 73-20, 74-20, 75-20, 76-20, 77-20, 78-20, 79-20, 80-20, 81-20, 82-20, 83-20, 84-20, 85-20, 86-20, 87-20, 88-20, 89-20, 90-20, 91-20, 92-20, 93-20, 94-20, 95-20, 96-20, 97-20, 98-20, 99-20, 100-20									
Vertical layer	0 to 1000 m									
Range	0 to 1000 m									
Maximum error	0 to 1000 m									
Direction of ab	0 to 1000 m									
Sampling frequency	0 to 1000 m									
Time	0 to 1000 m									
10. error	0 to 1000 m									
11. error	0 to 1000 m									
12. error	0 to 1000 m									
13. error	0 to 1000 m									
14. error	0 to 1000 m									
15. error	0 to 1000 m									
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73. error	0 to 1000 m									

VARY AREA PARAMETERS WITHIN QUANTUM FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug 67

Parameter	Units	Sampling	Frequency	Accuracy	Resolution	Range	Minimum error	Maximum error	Duration of use	Sampling interval	Time	Remarks
Location	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Vertical layer	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Range	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Minimum error	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Maximum error	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Duration of use	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Sampling interval	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Time	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Remarks	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range

PARAMETERS CONSIDERED REGARD THE STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Units	Sampling	Frequency	Accuracy	Resolution	Range	Minimum error	Maximum error	Duration of use	Sampling interval	Time	Remarks
Location	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Vertical layer	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Range	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Minimum error	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Maximum error	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Duration of use	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Sampling interval	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Time	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range
Remarks	Point	Range	Sampling	Range	Range	Range	Range	Range	Range	Range	Range	Range

APPENDIX IV, PART B. ASSESSMENT SHEETS FOR RESEARCH ACTIVITIES

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

1. TENTATIVELY PROPOSED NDSS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL							
	Characteristics	Current dir.	Current speed	Salinity	Sound speed	Water temp	W. pres (depth)	Ambient light	Ambient noise	Transparency	Wave measurements ^a	Air temp	Atmos. pres	Dew point	Inso-lation	Precip. mm	Wind dir	Wind speed
Geographic location	Deep Ocean (60°N to 60°S) N. American Coast out to 400 n. mi.																	
Vertical layer	Surface to 5000 m depth																	
Range (5-yr SOA)	0 to 0.05 to 10 kts	0 to 0.05 to 10 kts	4500 to 5000 fms	40°C	0.01°C	0.1% to 10%	0 to 10 ⁶ dy/m	0 to 20 db	0 to 20 db	0 to 100% m	0 to 100 ft	0 to 360°	0 to 1000 mb	0 to 40°C	0 to 2.0 ly/m	0 to 0.12 in./hr	0 to 160 kts	0 to 160 kts
Max error (5-yr SOA)	5°	0.03 kts or 1% or 1%	0.01 0/00	0.01°C	0.01°C	0.1%	1%	3 db	3 db	2%	0.2 ft or 10% or 10%	0.1 sec	0.1 sec	0.1°C	1%	0.01 in. hr	2°	0.5 kts or 5°
Duration of ob.	Last or Short period avg. (Representative)																	
Sampling frequency	X, Y	≤ 600 s. ml/100-150 r. ml																
	Z	20 Std. 1A 280 levels (+ near bottom)																
Time	6 hrs/5 hrs																	
Ob. synch.	X, Y, Z	10 min, (2 min)																

2. REFERENCE 5. REQUIREMENTS U.S. Army - Coastal Engineering

Geographic location	N. A. Coast, Hawaii, Great Lakes, Where Depth > 125 m																	
Vertical layer	Sfc	Sfc																
Range	0 to 360°	0 to 10 kts																
Maximum error	5°	0.03 kts or 1% or 1%																
Duration of ob.	≤ 10 min	≤ 10 min																
Sampling frequency	X, Y	≤ 500 s. ml																
	Z	N/A																
Time		6 hrs																
Ob. synch	X, Y	5 min																
	Z	N/A																

3. RESULTS OF ASSESSMENT

Requirements fully met

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of

- a. The 5-min synch. of ob. Tentative "system" allows 10 min.
- c. The X, Y spacing of 500 n. mi. Tentative "system" has initial spacing of 600 n. mi.

Requirements not met and why:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug 68

1. TENTATIVELY PROPOSED NDRC SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL						
	Cur. dir.	Cur. speed	Salinity	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Transparency	Wave measurements* Ht. Per Hr	Air temp	Atmos. elect	Atmos. press	Dew point	Inno. lation	Wind dir	Wind speed
Geographic location	Deep Ocean (40°N to 50°N, American Coast out to 400 n. mi)																
Vertical layer	Surface to 3000 m depth																
Range (5-yr SOA)	0 to 360°	0 to 10 kts	42.0/00	4500 to 5600 fms	-5 to 40°C	0 to 10 ⁵ psi	0 to 2.0 ft/m	40 to 20 db	0 to 70%/m	0 to 100 ft	0 to 30°C	0 to 10 kv	1000 mb	40°C	0 to 100 ft	0 to 100 in. hr	0 to 180 mph
Max error (5-yr SOA)	5°	0.03 kts or 1%	0.01 fms	1 fms	0.01°C	0.1 ft	3 db		2%	0.2 ft or 10% or 1%	0.1°C	0.1 kv	0.1 mb	0.2°C	1 ft		0.5 kts or 1%
Duration of obs.	Inst. or Short period avg. (Representative)																
X, Y	≤ 600 n. mi/100-150 n. mi																
Sampling intensity	Z	20 Sec. LAPRO levels (+ near bottom)															
Time	0 hr/3 hrs																
Ob. specch	X, Y, Z	10-22°m, (1 min)															

2. REFINED AND 6 REQUIREMENTS U.S. Army - Lake Survey

Geographic location		Great Lakes														
Vertical layer	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom	Site to bottom
Range	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°	0 to 360°
Maximum error	20°	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts	0.1 kts
Duration of obs.	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min
Sampling intensity	X, Y	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi	27.5 a. mi
	Z	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m	1 m
Obs. synch	X, Y	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
	Z	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min	6 min

3. RESULTS OF ASSESSMENT

Requirements fully met:

Requirements partially met and why

Requirements not met and why All requirements listed: Tentative "system" does not include the Great Lakes. Further investigation of requirements in this area is needed.

*These are 1967 data requirements, not refined.

Wm. H. W. W. W.

Discussion:

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Reasons for:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

1. TENTATIVELY PROPOSED MEASURING CAPABILITIES

Parameters Characterization	OCEANOGRAPHIC										METEOROLOGICAL											
	Curr. dir.	Curr. speed	Salinity	Sea swell	Water temp.	W. press. (depth)	Ambient light	Ambient sound	Trans- parency	Wave height	Wave period	Dir.	Per.	Dir.	Air temp.	Atmos. elect.	Atmos. pres.	Dew point	Isos- lation	Precip. rate	Wind dir.	Wind speed
Geographic location	Deep Ocean 40°N to 60°S, N. American Coast out to 400 n. mi.																					
Vertical layer	Surface																					
Range (5-yr SOA)	0 to 360°	0 to 10 km	0 to 4500 to 5000 fms	0 to 1000 fms	-5 to 40°C	0 to 10 ⁴ psi	0 to 2.0 by/m	-80 to -20 db	0 to 70%/m	0 to 100 ft	0 to 10 sec	0 to 360°	1 to 40 sec	0 to 360°	-25 to 60°C	0 to 10 kv	900 to 1009 mb	-25 to 40°C	0.01 to 2.0 by/m	0 to 12 in./hr	0 to 160 kts	0 to 360°
Max error (5-yr SOA)	5°	0.05 km or 1%	0.01 o/oo	1 fms	0.01°C	0.1%	1%	3 db	2%	0.2 ft	0.1 sec	5°	0.1 sec	0.1 sec or 1%	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	2°	0.5 kts or 5%
Duration of obs.	Last or Short period avg. (Representative)																					
Sampling Intensity	X, Y	≤ 0.05 n. mi./100-150 n. mi																				
	Z	20 Sec. LAPSO levels (+ near bottom)																				
Time	Surface																					
Ch. synth.	X, Y, Z	10 min. (1 min)																				

2. ESTIMATED AMO & REQUIREMENTS DCF, Galveston—Research on Water Masses

Geographic location		Gulf of Mexico and Caribbean																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Vertical layer	500 m 500 m	500 + 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 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m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m	500 m 500 m

3. RESULTS OF ASSESSMENT

Requirements fully met:

- Requirements partially met and why: All req. elements listed in 2 above were met with the exception of:
 - The X, Y spacing of 10 and 50 n. mi (CNA) and 100 n. mi when in DO. The tentative "system" has a spacing of 100-150 n. mi (CNA) and 600 n. mi (DO).
 - The range of 0 to 5.0 by/m for location. Tentative "system" has a realistic top value of 2.0 by/m.
 - The 4 additional depths for temperature and salinity. Tentative "system" only covers the 20 LAPSO levels plus the bottom.

Requirements not met and why:

- Total cloud amount: Judged better done by other means
- Oxygen: Dissolved about 0.5 from error sustained for long periods

REFINED AMO # 8 REQUIREMENTS (Continued)

Received 20 Aug. 64

[illegible]

Petersen & Lyden

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

[illegible]

Normative

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '58

1. TENTATIVELY PROPOSED NAME SENSING CAPABILITIES

Purs numbers	OCEANOGRAPHIC										METEOROLOGICAL										
	Current dir	Current speed	Salinity	Sound speed	Water temp	Water pressure (depth)	Ambient light	Ambient noise	Transparency	Wave measurements*	Dir	Per	Air temp	Atmos elect	Atmos press	Dew point	Insolation	Precip rate	Wind dir	Wind speed	
Characteristics	Pump Cables (100 ft to 500 ft) N American Coast out to 400 n mi																				
Geographic location	Surface to 5000 m depth																				
Vertical layer	Surface																				
Range (5-yr SOA)	0 to 360°	0 to 10 kts	42.0/50	4500 to 5800 fms	-5 to 40°C	0 to 10 ⁴ feet	0 to 20 ft/m	-80 to 20 db	0 to 70%/m	100 ft	1 to 40 sec	360°	25 to 60°C	10 kv	1025 mb	40°C	2.0 ft/m	0.1 to 0.12 in./hr	0 to 360°	0 to 160 mph	
Max error (5-yr SOA)	5°	0.03 kts or 1%	0.01 ft/100	1 fms	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10% or 100'	0.1 sec or 1%	5°	0.1°C	0.1 kv	0.1 mb	0.2°F	1%	0.01 in.	2°	0.5 kts or 10°	
Duration of obs.	Last or Short period avg. (Representative)																				
X, Y	± 600 m, 100-150 m																				
Sampling frequency	20 Std. LA PBO levels (+ near bottom)																				
Time	6 hrs/2 hrs																				
Obs. synch.	X, Y, Z 10 min. (1 min)																				

*Include Measurements of Swells

2. REFINED ABO 6 9A REQUIREMENTS BCF, Miami - Research on Tuna in Tropical Atlantic, etc.

Geographic location		Tropical Atlantic - Gulf of Mexico 20°N to 20°S (not in Major Currents or Areas of Special Interest)																			
Vertical layer		Sfc to 500 m												Sfc		Sfc		Sfc		Sfc	
Range		0 to 360°		5 to 35°C										10 to 35°C		0.015 to 2.25 ft/m		0 to 200 kts		5 to 360°	
Maximum error		10°		0.1 kts or 20%		0.1°C		0.1 %/100						1°C		1.5%		20°		5 kts or 57	
Duration of obs.		1 min avg		1 min avg										1 min avg		1 min avg		1 min avg		1 min avg	
X, Y		500 n mi		500 n mi										500 n mi		500 n mi		500 n mi		500 n mi	
Z		Sfc		Sfc										Sfc		Sfc		Sfc		Sfc	
Time		24 hrs		24 hrs		12 hrs		12 hrs						12 hrs		12 hrs		12 hrs		12 hrs	
X, Y		10 min		10 min										10 min		10 min		10 min		10 min	
Z		1 min		1 min										N/A		N/A		N/A		N/A	

3. RESULTS OF ABLE RESIDENT

Requirements fully met:

- Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 - The wind speed range to 200 kts
 - The insulation range to 2.25 ft/m
 - The X, Y spacing of 500 n mi
- Tentative "system" has a realistic value of 160 kts
- Tentative "system" has a realistic value of 2.0 ft/m
- Tentative "system" has an initial spacing of 600 n mi

Requirements not met and why:

- Oxygen: Uncertainty about obs from buoy unattended for long periods
- Upper-air Wind: Considered beyond 5-yr buoy SOA

Resumen:

PARAMETERS CONSIDERED BEYOND THE 4-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

References

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug 68

1. TENTATIVELY PROPOSED RUMS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL									
	Curr. dir.	Curr. speed	Sound speed	Water temp.	W. press. (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements*	Per.	Lar.	Air temp.	Atmos. elect.	Atmos. press.	Dew point	Inso- lation	Precip. rate	Wind dir.	Wind speed	
Characteristics	Deep Ocean (60°N to 60°S), American Coast out to 400 n. mi.																			
Geographic location	Surface to 5000 m depth																			
Vertical layer	Surface																			
Range (5-yr BOA)	0 to 10 km	0 to 4500 to 5000 fms	4500 to 5000 fms	-5 to 40°C	0 to 10 ⁴ psi	0 to 2.0 ty/m	-80 to -20 db	0 to 70%/m	0 to 100 ft	1 to 40 sec	0 to 360°	-25 to 60°C	0 to 1000 mb	1000 mb	-25 to 40°C	0.01 to 2.0 ty/m	0 to 12 in./hr	0 to 360°	0 to 160 kts	
Max error (5-yr S.M.)	± 0.00 km	0.01 0/00 or 1%	0.01 0/00	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10%	0.1 sec or 1%	5°	0.1°C	0.1 mb	0.1 mb	0.2°C	1%	0.01 in./hr	2°	0.5 kts or 7%	
Duration of obs.	Inst. or Short period avg. (Representative)																			
X, Y	± 600 n. mi/100-150 n. mi																			
Z	30 fms. LA/BO levels (+ near bottom)																			
Time	6 hrs/5 hrs																			
Ob. synch.	X, Y, Z	10 min. (1 min.)																		

*Surface measurements of Buobs

2. REFINED AND 98 REQUIREMENTS BCF, Miami - Research on Tuna in Tropical Atlantic, etc.

Geographic location	Tropical Atlantic (in Areas of Special Interest like Major Current and Lee of Islands) 20°N to 20°S																		
Vertical layer	Surf to 500 m																		
Range	0 to 20 to 360°	0.2 to 6 kts	20 to 36 0/00	5 to 36°C															
Maximum error	10°	0.1 kt or 20%	0.1 0/00	0.4°C															
Duration of obs.	1 min. avg.			1 min. avg.															
X, Y	10-30 n. mi			10-30 n. mi															
Z	10-30 fms			10-30 fms															
Time	3 hrs	2 hrs	6 hrs	6 hrs															
Ob. synch.	X, Y	10 min.		10 min.															
Z	1 min.			1 min.															

3. RESULTS OF ASSESSMENT

Requirements fully met:

- The wind speed range to 200 kts: Tentative "system" has realistic value of 160 kts.
- The X, Y spacing of 10-30 n. mi in DO: Tentative "system" has a spacing of 600 n. mi.
- The 3-hr frequency of obs: Tentative "system" is 6 hr (3 hr could be met by minor operational change).

Requirements not met and why:

- Oxygen: Uncertainty about obs. from buoy extended for long periods
- Upper-air Wind: Considered beyond 5-yr BOA.

RECOMMENDATIONS (Continued)

Revised 20 Aug 84

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Abstract

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '86

REPRESENTATIVELY PROPOSED MEASUREMENT CAPABILITIES

Parameters	METEOROLOGICAL									
	Current dir	Current speed	Wind speed	Water temp	W. press depth	Salinity depth	Trans- parency	Wave measurements*	Air temp	Altimet- er
Characteristics	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
Geographic location	Long (Lat/Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)
Vertical layer	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth
Range (5-10 m)	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft
Max error	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m
Duration of obs	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Obs error	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m

Parameters	METEOROLOGICAL									
	Current dir	Current speed	Wind speed	Water temp	W. press depth	Salinity depth	Trans- parency	Wave measurements*	Air temp	Altimet- er
Characteristics	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
Geographic location	Long (Lat/Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)	Lat (Long)
Vertical layer	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth	Surface to 1000 ft depth
Range (5-10 m)	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft	0 to 1000 ft
Max error	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m
Duration of obs	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Obs error	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m	10 m

Repetitive data only - All repeated measurements listed in 2 above

Repetitive data only - All repeated measurements listed in 2 above

Repetitive data only - All repeated measurements listed in 2 above

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REF ID: A66404

THE UNIVERSITY OF CHICAGO

فصل في بيان ما يجب من العلم

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Mar 20 1962

ANALYSIS OF THE AIR FORCE TENTATIVE DATA COLLECTION SYSTEM

Parameter	Location
Water temperature	Station 100
Water level	Station 100
Water flow	Station 100
Water quality	Station 100
Water color	Station 100
Water clarity	Station 100
Water turbidity	Station 100
Water conductivity	Station 100
Water pH	Station 100
Water oxygen	Station 100
Water nitrogen	Station 100
Water phosphorus	Station 100
Water iron	Station 100
Water manganese	Station 100
Water copper	Station 100
Water zinc	Station 100
Water cadmium	Station 100
Water lead	Station 100
Water mercury	Station 100
Water selenium	Station 100
Water tellurium	Station 100
Water vanadium	Station 100
Water chromium	Station 100
Water cobalt	Station 100
Water nickel	Station 100
Water silver	Station 100
Water platinum	Station 100
Water gold	Station 100
Water uranium	Station 100
Water thorium	Station 100
Water radium	Station 100
Water polonium	Station 100
Water astatine	Station 100
Water francium	Station 100
Water actinium	Station 100
Water protactinium	Station 100
Water neptunium	Station 100
Water plutonium	Station 100
Water americium	Station 100
Water curium	Station 100
Water berkelium	Station 100
Water californium	Station 100
Water einsteinium	Station 100
Water fermium	Station 100
Water mendelevium	Station 100
Water nobelium	Station 100
Water lawrencium	Station 100
Water rutherfordium	Station 100
Water dubnium	Station 100
Water seaborgium	Station 100
Water bohrium	Station 100
Water hassium	Station 100
Water meitnerium	Station 100
Water darmstadtium	Station 100
Water roentgenium	Station 100
Water copernicium	Station 100
Water nihonium	Station 100
Water flerovium	Station 100
Water livermorium	Station 100
Water tennessine	Station 100
Water oganesson	Station 100

News & Views

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ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug 64

TENTATIVELY PROPOSED MEASUREMENT CAPABILITIES

Parameter	OCEANOGRAPHIC										METEOROLOGICAL				
	Current speed	Salinity	Sound speed	Water temp	W. temp depth	Ambient light	Ambient noise	Trans. intensity	Wave measurement	Dir	Atmos. pressure	Atmos. elect	Atmos. temp	Humidity	Wind speed
Geographic location	Deep Ocean 30°N to 60°N, American Coast out to 400 N. mi														
Vertical layer	Surface to 4000 m depth														
Range (5 yr 10 MA)	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km
Max error (5 yr 10 MA)	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km
Duration of obs	Less than 1000 sec (Representative)														
Sampling frequency	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz
1% error	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min

2. REFINED AND 1. REQUIREMENTS (C) - Research M. C. - Research in Mammalian and Rhin Crab

Parameter	OCEANOGRAPHIC										METEOROLOGICAL				
	Current speed	Salinity	Sound speed	Water temp	W. temp depth	Ambient light	Ambient noise	Trans. intensity	Wave measurement	Dir	Atmos. pressure	Atmos. elect	Atmos. temp	Humidity	Wind speed
Geographic location	Research M. C. - Research in Mammalian and Rhin Crab														
Vertical layer	Surface to 4000 m depth														
Range (5 yr 10 MA)	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km	0 to 10 km
Max error (5 yr 10 MA)	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km	± 0.01 km
Duration of obs	Less than 1000 sec (Representative)														
Sampling frequency	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz	1 Hz
1% error	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min	10 min

REQUIREMENTS (C) - Research M. C. - Research in Mammalian and Rhin Crab

REQUIREMENTS (C) - Research M. C. - Research in Mammalian and Rhin Crab

REQUIREMENTS (C) - Research M. C. - Research in Mammalian and Rhin Crab

REQUIREMENTS (C) - Research M. C. - Research in Mammalian and Rhin Crab

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Remarks:

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Plankton	Biomass/Indiv.
Cepto location	Same as pg. 1	
Vertical layer	Sfc. to 5000 m	Sfc. to 5000 m
Range	Unk.	Unk.
Maximum error	Unk.	Unk.
Duration of obs.	Unk.	Unk.
X Y	60 to 100/5 per 10 n. mi.	
Sampling intensity	Sed LA PSO hls 6 hrs / 3 hrs	Sed LA PSO hls 8 hrs / 3 hrs
Tier 2	10 min	10 min
X, V	1 min	1 min
% synch	Z	Z

Remarks:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED REMOTE SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL			
	Characteristics	W. press (depth)	Water temp.	Sound speed	Salinity	Wind speed	Wind dir.	Wind speed	Wind dir.	Wind speed	Wind dir.	Wind speed	Wind dir.	Wind speed
Geographic location	Deep Ocean (40°N to 40°S)	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m
	Surface to 5000 m depth	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m
Vertical layer	Range (5-yr SOA)	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m
	Max error (5-yr SOA)	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m
Duration of obs.	Best or Short period avg (Representative)	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
	Time	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Sampling intensity	X, Y	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi
	Z	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)
Ob. synch.	Time	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs
	X, Y, Z	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)
*Includes Measurements of Swells														

2. REFINED AMO 6.1.2 REQUIREMENTS BCF, Stanford-Air/Sea Interaction Research

Geographic location	Pacific N. of 20°S, W. Coast to - 180°; Deep Ocean and Coastal										METEOROLOGICAL			
	Characteristics	W. press (depth)	Water temp.	Sound speed	Salinity	Wind speed	Wind dir.	Wind speed	Wind dir.	Wind speed	Wind dir.	Wind speed	Wind dir.	Wind speed
Vertical layer	Range (5-yr SOA)	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m	0 to 1000 m
	Max error (5-yr SOA)	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m	5 m
Duration of obs.	Best or Short period avg (Representative)	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
	Time	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Sampling intensity	X, Y	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi	5 600 n. mi/100 150 n. mi
	Z	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)	20 Sec. LAPSO levels (+ near bottom)
Ob. synch.	Time	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs
	X, Y, Z	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)	10 min. (1 min)
*Includes Measurements of Swells														

3. RESULTS OF ASSESSMENT

Requirements fully met:

- The finer X, Y spacing (all DO and part of CNA): Tentative "system" has 20 LAPSO levels plus bottom.
- The finer spacing of 25 levels to 500 m: Tentative "system" has 20 LAPSO levels plus bottom.
- The 6-hr average for current velocity duration of obs: Tentative "system" value is up to 10 min.

Requirements not met and why:

- Total Cloud Amount: Judged better done by other means.
- Oxygen, Tidal Fluctuation, Total Radiation in (if not insolation) Out, and Turbidity (if not transparency): Uncertainty about obs. from buoy unattended for long periods.
- Phytoplankton: Considered beyond the 5-yr buoy SOA.

GREY AREA PARAMETERS NEW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Oxygen	Tidal fluct	Turbidity	Total rad in	Total rad out	Total cloud amount
Geo location	Pacific N of 20°S E of 140°					
Vertical layer	Sfc to 999 m	Bottom	Sfc to 600 m	Sfc	Sfc	Sfc
Range	0 to 10 mi/l	0 to 50 m	0 to 40 ft	Gm-Cal CM ² min ⁻¹	Gm-Cal CM ² min ⁻¹	0 to 10/10
Maximum error	1 ml/l	01 m	2%	0 to 2.25	0.2 to 2.25	1/10
Duration of ob	10 min	24 hr avg	10 min	10 min	10 min	10 min
Sampling intensity	X, Y 600 n mi	Selected areas	Selected areas	600 n mi		
	Z 10 levels	bottom	10 levels	N/A	N/A	N/A
	Time 6 hrs	1 hr	6/3 hrs	6/3 hrs	6/3 hrs	6/3 hrs
(A synch	X, Y 10 min	10 min	10 min	32 min	30 min	10 min
	Z 1 min	N/A	1 min	N/A	N/A	N/A
Remarks						

PA LAMETTES CONSIDERED BEYOND THE N-VN STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Photo-plankton					
Geo location	Pacific N of 20°S E of 140°					
Vertical layer	Sfc to 300 m					
Range	Unk					
Maximum error	Unk					
Duration of ob	Cont.					
Sampling intensity	X, Y 500 n mi					
	Z 10 levels					
	Time Cont					
(B synch	X, Y 12 hr					
	Z 12 hr					
Remarks						

1.

Normal to

2000

Abstract

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

TENTATIVELY PROPOSED MEASURING CAPABILITIES

Parameters

Parameter	OCEANOGRAPHIC				METEOROLOGICAL							
	Current dir	Current speed	Salinity	Water temp	W. press (depth)	Amplitude	Transparency	Wave measurements	Wave direction	Wave speed	Wind speed	
Geographic location	Deep Ocean (40°N to 60°S) / NE Atlantic Coast out to 400 n. mi.											
Vertical layer	Surface											
Range (5 yr. N/A)	0 to 100	4500 to 5000	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	0 to 100	
Max error (5 yr. N/A)	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	± 0.3 kts	
Duration of obs	1 yr. Post period avg. (Representative)											
Sampling frequency	1 yr. Post period avg. (Representative)											
Time	1 yr. Post period avg. (Representative)											
Ab. error (5 yr. N/A)	1 yr. Post period avg. (Representative)											

REQUIREMENTS

1. **REQUIREMENTS** BCF, Booth Bay Harbor, Maine - Research at Har. Ing. Lobster and Sea. Offshore

2. **REQUIREMENTS** BCF, Booth Bay Harbor, Maine - Research at Har. Ing. Lobster and Sea. Offshore

3. **REQUIREMENTS** BCF, Booth Bay Harbor, Maine - Research at Har. Ing. Lobster and Sea. Offshore

Requirements fully met. Ambient Light and Irradiation

Requirements partially met and why: 1. Other requirements listed above in 2 would be met with the exception of 1. Also X, Y spec. (25-100 Hz). Temperature "system" spacing is about 100 n. mi.

If the buoy with "unit" is an alternative, one off NE Coast of Maine but not in the Bay of Fundy, one just NE of Cape Cod, and one in between then these requirements probably would be met.

- 1. **REQUIREMENTS** BCF, Booth Bay Harbor, Maine - Research at Har. Ing. Lobster and Sea. Offshore
- 2. **REQUIREMENTS** BCF, Booth Bay Harbor, Maine - Research at Har. Ing. Lobster and Sea. Offshore
- 3. **REQUIREMENTS** BCF, Booth Bay Harbor, Maine - Research at Har. Ing. Lobster and Sea. Offshore

RECEIVED AM: 4

GREY AREA PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BIOD SYSTEM

Revised by

Number	Location	Origin	Total cloud amount	Total obscuration	Resultant wind direction speed*
Vertical layer	Surface	Surface	Surface	Surface	Surface
Range	7 to 14 km	7 to 14 km	7 to 14 km	7 to 14 km	7 to 14 km
Maximum error	0.5 km	0.5 km	0.5 km	0.5 km	0.5 km
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr
Sampling intensity	X Y Z	X Y Z	X Y Z	X Y Z	X Y Z
Remarks					

Results may be compared for standard observations

PARAMETERS CONSIDERS BEYOND THE SCOR SYSTEM OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Class type
Geo. location	Gulf of Mexico Offshore
Vertical layer	90°
Range	N/A
Maximum error	N/A
Location of ...	Inst.
X, Y	20, 60, 70, 80 mi
Sampling	1° constant buoyage
Height	7
Time	86
Time	3.6m
X, Y	10, 20, 30
Time	N/A

22

EXPERIMENTAL PROCEDURES

Revised 20 Aug '68

[illegible]

REVIEWED AND 17 REQUIREMENTS BOAT, BOOTH Bay Harbor, Marine - Keenestock (a) Fish Near Shore

Geographic location										Off of Maline (Longitude: Within 10 n mi)									
V. vertical layer										S/C to bottom									
Range										S/C to bottom									
Maximum error										S/C to bottom									
Duration of obs										S/C to bottom									
Sampling frequency										S/C to bottom									
Time										S/C to bottom									
X, Y										S/C to bottom									
Z										S/C to bottom									
X, Y										S/C to bottom									
Z										S/C to bottom									
Time										S/C to bottom									
X, Y										S/C to bottom									
Z										S/C to bottom									

James A. P. J. O'Connell and Fred-erick

RECEIVED

requirements not met and why. All requirements listed Testative "system" does not include the near shore or estuarine area. Further investigation of requirements in these areas is needed.

REPORTED AM. 4-11 4000 THE MEASUREMENTS

PARAMETER AREA PARAMETER NAME IN QUANTITIES FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug 64

Parameter	Design	Altitude	Location	Direction	Speed
Current location	100 ft	100 ft	100 ft	100 ft	100 ft
Vertical layer	100 ft	100 ft	100 ft	100 ft	100 ft
Range	100 ft	100 ft	100 ft	100 ft	100 ft
Maximum error	100 ft	100 ft	100 ft	100 ft	100 ft
Duration of obs	100 ft	100 ft	100 ft	100 ft	100 ft
Sampling interval	100 ft	100 ft	100 ft	100 ft	100 ft
Time	100 ft	100 ft	100 ft	100 ft	100 ft
Remarks	100 ft	100 ft	100 ft	100 ft	100 ft

Remarks: 1. Do not enter the time, the heading would be provided by additional land-based station.
2. Maximum error in the measurements would be 100 ft.

PARAMETER NAME IN QUANTITIES FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Design	Altitude	Location	Direction	Speed
Current location	100 ft	100 ft	100 ft	100 ft	100 ft
Vertical layer	100 ft	100 ft	100 ft	100 ft	100 ft
Range	100 ft	100 ft	100 ft	100 ft	100 ft
Maximum error	100 ft	100 ft	100 ft	100 ft	100 ft
Duration of obs	100 ft	100 ft	100 ft	100 ft	100 ft
Sampling interval	100 ft	100 ft	100 ft	100 ft	100 ft
Time	100 ft	100 ft	100 ft	100 ft	100 ft
Remarks	100 ft	100 ft	100 ft	100 ft	100 ft

Received 20 Aug '62

[illegible][illegible]

As the first of the three, the *Journal of the American Medical Association* is the most widely read and influential. It is a weekly publication that covers a wide range of medical topics, including clinical medicine, public health, and medical education. The *Journal* is known for its high quality of research and its commitment to providing up-to-date information to its readers. The *Journal* is also known for its strong editorial board, which includes some of the most prominent figures in the medical profession. The *Journal* is a must-read for any medical professional who wants to stay current in their field.

4. **What is the purpose of the study?**

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

TENTATIVELY PROPOSED MDS SENSING CAPABILITIES

Parameters	4. PANORAMIC									
	Current dir	Current speed	Salinity	Sound speed	Water temp	W. press depth	Amphib depth	Amphib range	Water measurement	Water object
Geographic location	Deep Coast (80°N to 60°S) American Coast out to 400 m									
Vertical layer	Surface to 5000 m depth									
Range (5 yr SIA)	0 to 10	0 to 10	0 to 10	4500 to 4500	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
Max error	360°	360°	360°	360°	360°	360°	360°	360°	360°	360°
Max error	360°	360°	360°	360°	360°	360°	360°	360°	360°	360°
Duration of obs	Start in Short period avg. (Representative)									
Sampling intensity	X, Y = 600 m by 100-150 m									
Ch. arch	Z = 20 Sec (APSO, circle to near bottom)									
	Time 6 hrs									
	X, Y (Z) 16 min, 1 min									

*Include Measurements of Swells

2. REFINED AND 20 REQUIREMENTS HSV, Sandy Hook Marine Laboratory, Fish Distribution along F. Coast of U.S.

Geographic location	U.S. East Coast - Cape Cod to Florida, Keys out to a depth of 20 fathoms									
	Vertical layer	Range	Maximum error	Duration of obs	Sampling intensity	Ch. arch	Time	Ch. arch	Time	Ch. arch
Vertical layer	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
Range	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
Maximum error	360°	360°	360°	360°	360°	360°	360°	360°	360°	360°
Duration of obs	Start in Short period avg. (Representative)									
Sampling intensity	X, Y = 600 m by 100-150 m									
Ch. arch	Z = 20 Sec (APSO, circle to near bottom)									
	Time 6 hrs									
	X, Y (Z) 16 min, 1 min									

RESULTS OF ASSESSMENT

Requirements fully met

Requirements partially met and why: All requirements listed in 2 above with the exception of:

- The fine spacing of 10 m in transects
- The Z spacing in the first 30 m for water temperature at least between Cape Cod and Hatteras

Tentative "system" spacing is about 100 m

Requirements not met and why

All near-shore requirements within 20 m of shore

Tentative "system" locations start about 25 m off the coast

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1 TENTATIVELY PROPOSED NONDESTRUCTIVE CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	Geographic location					Deep Ocean (60°N to 60°S) / N. Amer. off coast out to 100 n. mi.					Wave measurements*					Air temp					Altimeter					Time pressure					Time location					Time rate					Time type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Characteristics	Vertical layer					Range (5-yr SCA)					Max error (5-yr SCA)					Duration of obs					Sampling intensity					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. 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error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time					Obs. error					X, Y, Z					Time				

*Includes measurements of Swells

2 REFINED AND 3 REQUIREMENTS BSF. Tiburon Mar. Laboratory - Fish Distribution Along West Coast

Continental Shelf of Western U.S. (P. 2)															
Geographic location		Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom	Sec to bottom
Vertical layer		0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300	0 to 300
Range		360°	5 kts	360°	5 kts	360°	5 kts	360°	5 kts	360°	5 kts	360°	5 kts	360°	5 kts
Maximum error		5°	0.1 kts	0.50	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C	0.25°C
Duration of obs		Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst	Inst
Sampling intensity	X, Y	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi	Varia 10 to 45 n. mi
	Z	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30	0, 10, 30
	Time	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m	50 - 100 m
Obs error	X, Y	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
	Z	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min	5 min
	Time	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min	1 min

3 RESULT OF ASSESSMENT

Requirements fully met

- Requirements partially met and why:
 - The X, Y spacing of 10 to 40 n. mi. Tentative "system" has initial spacing of 100 to 150 n. mi. in CNA.
 - The time sampling intensity of 1 hr. Tentative "system" has obs every 3 hrs.
 - The 5 min X, Y spacing of obs. Tentative "system" has obs 10 min.

Requirements not met and why:

*These are 1967 data requirements, not refined

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

TENTATIVELY PROMISED NDERS SENSING CAPABILITIES

OCEANOGRAPHY										OTHER REQUIREMENTS				REVISION
Parameters	Current speed	Salinity	Sound speed	Water temp	Ambient depth	Ambient temp	Trans. surface	Wave measurement	Atmos. press	Atmos. temp	Sea point	Wind point	Wind speed	Wind dir
Geographic location	Deep (less 150°N to 60°S) American (less 10°N to 40°N)													
Vertical layer	Surface to 4000 m depth													
Range (5 yr SGA)	0 to 1000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000
Max. error	300	100	100	100	100	100	100	100	100	100	100	100	100	100
Duration of obs	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sampling intensity	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Ob. error	10	10	10	10	10	10	10	10	10	10	10	10	10	10

OCEANOGRAPHY										OTHER REQUIREMENTS				REVISION
Parameters	Current speed	Salinity	Sound speed	Water temp	Ambient depth	Ambient temp	Trans. surface	Wave measurement	Atmos. press	Atmos. temp	Sea point	Wind point	Wind speed	Wind dir
Geographic location	Deep (less 150°N to 60°S) American (less 10°N to 40°N)													
Vertical layer	Surface to 4000 m depth													
Range (5 yr SGA)	0 to 1000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000
Max. error	300	100	100	100	100	100	100	100	100	100	100	100	100	100
Duration of obs	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sampling intensity	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Ob. error	10	10	10	10	10	10	10	10	10	10	10	10	10	10

OCEANOGRAPHY										OTHER REQUIREMENTS				REVISION
Parameters	Current speed	Salinity	Sound speed	Water temp	Ambient depth	Ambient temp	Trans. surface	Wave measurement	Atmos. press	Atmos. temp	Sea point	Wind point	Wind speed	Wind dir
Geographic location	Deep (less 150°N to 60°S) American (less 10°N to 40°N)													
Vertical layer	Surface to 4000 m depth													
Range (5 yr SGA)	0 to 1000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000	0 to 4000
Max. error	300	100	100	100	100	100	100	100	100	100	100	100	100	100
Duration of obs	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Sampling intensity	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Ob. error	10	10	10	10	10	10	10	10	10	10	10	10	10	10

REQUIREMENTS FULLY MET Some requirements listed in 1 above- except for the current in the mixing zone of the Labrador and North Atlantic and where a 100 m. current is required- could be met by operational change

REQUIREMENTS PARTIALLY MET AND WHY

Requirements not met and why: All requirements in the Hudson Strait and Haffin Bay. Tentative system does not include these areas.

Bottom Currents: Considered beyond 5-yr buoy SGA.

REQUIREMENTS FULLY MET

REQUIREMENTS PARTIALLY MET AND WHY

“GREY AREA” PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUY SYSTEM

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUY SYSTEM

Parameter	Bottom sampling Same as pg 1
Cat location	
Vertical year	
Range	N/A
Maximum etc	N/A
Duration of ob	N/A
X Y	90 to 100 n. ml
Z	N/A
Sampling intervality	
Time	N/A
X Y Z	N/A
Ab synch	N/A
Remarks	

ASSESSMENT SHEET FOR REFERENCE 1A REQUIREMENTS

Revised 20 Apr 88

1. TENTATIVELY PROPOSED MEASUREMENT CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL				
	Current dir.	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans. permeability	Wave measurements	Atmos. elect	Atmos. press	Temp	Humid	Wind speed	Wind dir
Geographic location	Deep Ocean: 60°N to 60°S / N American Coast out to 400 n mi														
Vertical layer	Surface to 1000 m depth														
Range (5 yr SCA)	0 to 1000	0 to 4500	4500 to 5800 fms	40°C	0 to 10 ⁴ dbar	10 to 20 dB	3 to 20 dB	0.01 to 0.1	0.1 to 100 ft	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb
Max error (5 yr SCA)	5°	0.1 kts	0.01 fms	0.01°C	0.1 dbar	1 dB	3 dB	2%	0.1 ft	0.1 mb	0.1 mb	0.1°C	0.1 mb	0.1 mph	0.1 mph
Duration of obs	1 hr or short period avg. (Representative)														
Sampling frequency	1 X, Y = 600 n mi / 100-150 n mi														
Ob. epoch	1 X, Y (R) 10 min, (1 sec)														

2. REQUIRED ABO #31-37 REQUIREMENTS LSA-Total Agency Requirements

Parameters	OCEANOGRAPHIC										METEOROLOGICAL				
	Current dir.	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans. permeability	Wave measurements	Atmos. elect	Atmos. press	Temp	Humid	Wind speed	Wind dir
Geographic location	Global Deep Ocean / N American Coast														
Vertical layer	0 to 5000 m														
Range	0 to 5000	0 to 4500	4500 to 5800 fms	40°C	0 to 10 ⁴ dbar	10 to 20 dB	3 to 20 dB	0.01 to 0.1	0.1 to 100 ft	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb	0.1 to 1000 mb
Max error	5°	0.1 kts	0.01 fms	0.01°C	0.1 dbar	1 dB	3 dB	2%	0.1 ft	0.1 mb	0.1 mb	0.1°C	0.1 mb	0.1 mph	0.1 mph
Duration of obs	1 hr or short period avg. (Representative)														
Sampling frequency	1 X, Y = 600 n mi / 100-150 n mi														
Ob. epoch	1 X, Y (R) 10 min, (1 sec)														

3. RESULTS OF ASSESSMENT

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 a. The 6 min frequency of obs. Tentative system values are 6.5 hrs.
 b. The required obs period is for 30 days for correlation with tide data. This 1 time requirement not met as system requires with other locations and might be fulfilled by other existing systems.
 c. The 6 min to selected buoys for 30 day periods.

Requirements not met and why:
 a. Total fluctuation. Uncertainty about obs from buoy; attended for long periods.

REFINED AS 4 31-37 REQUIREMENTS (Continued)

TABLE AREA: PARAMETERS WHEN IN QUELTER FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Unit	Location*
Geo location	Deep Ocean/North Atlantic Coast	
Vertical layer	Bottom	
Range	0 to 10 ft	
Maximum error	0.1 ft	
Duration of ob	Hour last	
Sampling intensity	X Y	100 to 600
		60 to 150 ft
	Z	N/A
Ch. error	Time	6 min
	X Y	N/A
		N/A

Remarks: *No. 1: indication of data is required. Data is 0 as shown in the buoy and retrieved during regular buoy servicing visits.

PARAMETERS TO BE INCLUDED BEFORE THE STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Unit	Location*
Geo location		
Vertical layer		
Range		
Maximum error		
Duration of ob		
Sampling intensity	X Y	
	Z	
	Time	
Ch. error	X Y	
	Z	

Remarks:

TECHNICAL PREPAREDNESS AND CAPABILITY IS

Purpose	Chart used	Scale	Area	Volume	Weight
Vertical layer					
Range 7 yr Brk.					
Mean error					
7 yr Brk.					
Duration of obs.					
A.Y.					
Inception					
Latitude					
(S. system)					
(N. system)					

Revised 20 Aug 68

There is no one doing anything.

3. REPEATED AND 0-60 REQUIREMENTS: EPA Will Research on Effect of Pollutants on the 0-60

[illegible]

Investment for research and development

of the time X is a function of Y , the time Y is a function of X . All of these would be true with the following partially ordered sets. All of these would be true with the following partially ordered sets.

The first of these is the fact that the majority of the population is now in the hands of the Government. The Government has been able to control the population for a long time, and this has been a major factor in the success of the Government.

2004-2005

- [illegible]

2

[illegible]

10

ASSESSMENT SHEET FOR REFERENCE DATA REQUIREMENTS

TEMPERATURE MEASUREMENT REQUIREMENTS CAPABILITY

Parameter	Unit	Accuracy	Resolution	Stability	Repeatability	Range	Time	Notes	Assessment	Comments
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Surface	Surface	Surface
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Subsurface	Subsurface	Subsurface
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Water	Water	Water
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Air	Air	Air
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Soil	Soil	Soil
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Ice	Ice	Ice
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Clouds	Clouds	Clouds
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Plants	Plants	Plants
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Animals	Animals	Animals
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Human	Human	Human

TEMPERATURE MEASUREMENT REQUIREMENTS

Parameter	Unit	Accuracy	Resolution	Stability	Repeatability	Range	Time	Notes	Assessment	Comments
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Surface	Surface	Surface
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Subsurface	Subsurface	Subsurface
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Water	Water	Water
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Air	Air	Air
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Soil	Soil	Soil
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Ice	Ice	Ice
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Clouds	Clouds	Clouds
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Plants	Plants	Plants
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Animals	Animals	Animals
Temperature	°C	±0.1	0.1	±0.1	±0.1	0 to 100	1 min	Human	Human	Human

TEMPERATURE MEASUREMENT REQUIREMENTS

Temperature measurement is required for the following purposes:

- To determine the temperature of the surface of the object being measured.
- To determine the temperature of the subsurface of the object being measured.
- To determine the temperature of the water in the object being measured.
- To determine the temperature of the air in the object being measured.
- To determine the temperature of the soil in the object being measured.
- To determine the temperature of the ice in the object being measured.
- To determine the temperature of the clouds in the object being measured.
- To determine the temperature of the plants in the object being measured.
- To determine the temperature of the animals in the object being measured.
- To determine the temperature of the human in the object being measured.

TEMPERATURE MEASUREMENT REQUIREMENTS

Temperature measurement is required for the following purposes:

- To determine the temperature of the surface of the object being measured.
- To determine the temperature of the subsurface of the object being measured.
- To determine the temperature of the water in the object being measured.
- To determine the temperature of the air in the object being measured.
- To determine the temperature of the soil in the object being measured.
- To determine the temperature of the ice in the object being measured.
- To determine the temperature of the clouds in the object being measured.
- To determine the temperature of the plants in the object being measured.
- To determine the temperature of the animals in the object being measured.
- To determine the temperature of the human in the object being measured.

1. *Phragmites australis* (Cav.) Trin. ex Steud.

References

Summary:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NDBS SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL									
Characteristics	a	Curr. dir.	Curr. speed	Salinity	Sound speed	Water temp.	W. press. (depth)	Ambient light	Ambient noise	Wave measurement*	W. dir.	W. per	W. per	Air temp.	Air elect.	Altitude	New point	Time	Frequency	Wind dir.	Wind speed
		Deep Ocean (60°N to 60°S)	N. American	Chart out to 400 n. mi	Surface to 5000 m depth	0 to 4510 ft	0 to 40°C	0 to 10 ⁶ psi	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m	0 to 10 ⁶ ft/m
Geographic location		Deep Ocean (60°N to 60°S) N. American Chart out to 400 n. mi																			
Vertical layer		Surface to 5000 m depth																			
Range (5-yr SOA)		0 to 4510 ft																			
Max error (5-yr SOA)		0 to 4510 ft																			
Duration of obs.		1 hr. or short period avg. (Representative)																			
Sampling frequency		20 Std. LA 70C levels (1 min. interval)																			
Obs. error		10 mds, 1 mds																			

*Include measurements of Swell

2. REQUIRED DATA 4-7 REQUIREMENTS NDB, U. of Miami Research on Oceanographic Env. Par. & Underwater Acoustical propagation

Florida straits off Simul, Bahamas and Miami:									
Vertical layer	Sfc to bottom	Sfc to bottom							
	max 400 m	bottom							
Range	0 to 360°	25 to 360°	53°C						
Maximum error	10°	0.25 kg	0.5°C						
Duration of obs	10 sec avg		Inst:						
X, Y	Special points about 5 and 7 n. mi from sound source								
Sampling intensity	Z	25, 50, 100							
		150, 200 fms. to bottom							
Time	Link	Link	Link						
X, Y	5 min	5 min	5 min						
Obs. error	1 min	1 min	1 min						

*Include measurements of Swell

RESULTS OF ASSESSMENT

Requirements fully met:

- Requirements partially met as follows: All requirements listed in 2 above would be met with the exception of:
 - The spacing of 3 and 7 n. mi. (CNA) Tentative "system" spacing is about 100 n. mi.
 - The 5 min. error of obs. Tentative "system" allows up to 10 min.
 - The unknown frequency of obs. when less than 3 hrs. Tentative "system" frequency is 3 hrs.

Requirements not met and why:

- All requirements in near-shore waters within 20 n. mi. of shore. Tentative "system" starts about 25 n. mi. out.
- Tidal fluctuation: judged better done by other means in this case since uncertainty about obs. from buoy unattended for long periods.

"GREY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA ENTRY SYSTEM

• **Stückzahl** [Stückzahl]

Parameter	Tidal fluct.
Geo location	Florida Straits
Vertical layer	Sfc to bottom max 600 m
Range	0.1 to 9 ft
Maximum error	0.2 ft
Durations or obs	Inert.
Sampling intensity	X Y Spec. points
	Z N/A
	Time Unit
Obs. synch	X Y min
	Z N/A

Reasons:

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

[illegible]

References

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NIDBS SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL									
Characteristics		Curr. dir	Curr. speed	Salinity	Sound speed	Water temp	W. pres. (depth)	Ambient light	Ambient noise	Trans. (opacity)	Wave measurements*	Ht	Dir	Air temp	Atmos. elect	Atmos. press	Dew point	Humid. itation	Precip. rate	Wind dir	Wind speed
Geographic location																					
Deep Ocean (60°N to 60°S) American Coast out to 400 n. mi																					
Vertical layer																					
Range (5-yr SOA)		0 to 360°	0 to 10 kts	0 to 4500 fms	4500 to 5800 fms	-5 to 46°C	0 to 10 ⁴ fms	0 to 2.0 hr/m	-40 to -20 db	0 to 70%/m	0 to 100 ft	0 to 1 to 40 sec	0 to 320°	0 to 25 to 60°C	0 to 10 kv	800 to 1000 mb	-25 to 40°C	0 to 2.0 in	0 to 0.12 in/hr	0 to 150 mph	0 to 15 or 17
Max error (5-yr SOA)		5°	0.03 kts or 1%	0.01 kts or 1%	0.01°C	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10%	0.1 sec or 1%	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in/hr	2°	0.5 mph or 17
Duration of obs.		Inst. or Short period avg. (Representative)																			
X, Y, Z		5 x 5 n. mi / 100 x 150 n. mi										Surface									
Sampling intensity		20 Std. LA P80 levels (+ near bottom)										2 levels									
Time		4 hrs/3 hrs																			
Obs. error		X, Y, (Z) 10 mile, (1 mile)																			

Requirements partially met and why:

• The X, Y spacing of 15 to 30 n. mi. Tentative "system" has initial spacing of 500 n. mi in 100.

• The Z sampling intensity. Tentative "system" LAPSCO levels are more gross.

• The "not stated" and "unknown" requirements. Tentative "system" may not satisfy some of these requirements if they are more stringent than "system" values.

Requirements not met and why:

• Oxygen, Tidal Fluctuation, and Vertical Current. O₂ estuary about 0.5 from buoy maintained for long periods.

• These are 1967 requirements not refined.

• 110 m from 0-30, 1-5 m from 30-120 m, 8 m from 120-150 m.

50 May 07 Passivah

Researcher's Note

PARAMETERS CONSIDERED BEYOND THE 3-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

॥ श्रीगणेशाय नमः ॥

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1 TENTATIVELY PROPOSED NDOS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC						METEOROLOGICAL								
	Cur speed	Salinity	Sound speed	Wave temp	Ambient light	Ambient noise	Transparency	Wave measurements	Air temp	Atmos elect	Atmos press	Dew point	Inso-lation	Precip rat	Wind speed
Geographic location	Deep Ocean 160°N to 50°S/N American Coast out to 400 n mi														
Vertical layer	Surface to 4000 m depth														
Range (5-yr SOA)	0 to 4500	0 to 910	4500 to 5000	40°C	0 to 10 ⁴ lux	-40 to 20 db	0 to 100	0 to 100 ft	0 to 35°C	0 to 10 kv	999 mb	40°C	0 to 1000	0 to 10 in./hr	0 to 160 kts
Max error (5-yr SOA)	360°	10 kts	420/60	5800 fms	5% m	20 db	10	100 ft	60°C	10 kv	999 mb	40°C	20 ly m	10 in./hr	160 kts
Duration of obs	5°	0.03 kts	0.01 0/00	1 fms	0.01°C	1 db	2%	0.2 ft	0.1°C	0.1 kv	0.1 mb	0.2°C	10	0.01	0.5 kts or ft
Sampling interval	1 sec or Short period avg. (Representative)														
Ob. synch	X, Y	Z													
	Time														
	X, Y, Z														

*Exclusive Measurements of Swells

2 REFINED MO 4 52 REQUIREMENTS NSF Lamont Geophysical Observatory—Bottom Current Measurements in Deep Basins of Pacific

Geographic location	Deep Ocean Pacific	
	Bottom	Bottom
Vertical layer	1500 m	1500 m
Range	0 to 360°	0 to 360°
Maximum error	5°	5°
Duration of obs	< 10 sec	< 10 sec
Sampling interval	1 point 1 point	1 point 1 point
Ob. synch	X, Y	Z
	Time	
	X, Y, Z	

*Requirements not met and why

Requirements partially met and why: All requirements listed would be met with the exception of:
 a. Vertical layer if below 5000 m. Tentative "system" only goes down to 5000 m.
 b. Z sampling interval of 25 m. Tentative "system" uses standard (APD) levels (more gross).
 c. Time sampling interval of 30 min. Tentative "system" is every 6 hrs.

Requirements not met and why:

*These are 1967 data requirements, not refined

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '85

TESTATIVELY PROPOSED HOME SENSING CAPABILITIES

Parameters (The parameters are)	OCEANOGRAPHIC										METEOROLOGIC AL							
	Current speed dir.	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements	Per	Dir	Air temp	Air press	Dew point	Inso- lation	Precip rate	Wind dir	Wind speed
Geographic location	Dive (Dress) 100°N to 40°S, American Coast out to 400 n. mi.																	
Vertical layer	Surface to 1000 m depth																	
Range (5 yr. W.A.)	0 to 10 300°	0 to 10 4200 ft	0 to 10 5000 fms	0 to 10 40°C	0 to 10 1000	0 to 10 10 m	0 to 10 20 dB	0 to 10 20%	0 to 10 100 ft	0 to 10 40 sec	0 to 10 90°	0 to 10 60°C	0 to 10 940 mb	0 to 10 40°C	0 to 10 2.0 hr	0 to 10 in.	0 to 10 360°	0 to 10 150 kts
Max error (5 yr. W.A.)	5% 5 yr W.A.	5% 0.03 kts per 15	5% 1.01, 9.90 per 15	0.02°C	0.1 ft	1 ft	1 dB	2%	0.2 ft or 10% or 15	0.1 sec or 15	5°	0.1°C	0.1 mb	0.2°C	1%	0.01 in. hr	2°	0.5 kts or 15
Direction of obs	In or short period of time																	
X, Y	1000 m, 100-150 m																	
Sampling intensity	20 and 100 levels (1 sec. system)																	
Time	4 hrs, 10 hrs																	
Ch. error	X, Y, Z 10 min, 1 min.																	

*Includes measurements of depth

2. REFINED AMBROSIA REQUIREMENTS NEF (Ambient) (Depth) (Water Temp) (Water Press) (Ambient Light) (Ambient Noise) (Transparency) (Wave Measurements) (Per) (Dir) (Air Temp) (Air Press) (Dew Point) (Inso-lation) (Precip Rate) (Wind Dir) (Wind Speed)

Geographic location																		Vertical & attitude																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Vertical layer		Near bottom																Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon		Near surface		Near bottom		Near top		Near horizon	

*Includes measurements of depth

Requirements not met and why

Measurements (Depth, Temp, Sal, Sound, W. Temp, W. Press, Ambient Light, Ambient Noise, Transparency, Wave Measurements, Per, Dir, Air Temp, Air Press, Dew Point, Inso-lation, Precip Rate, Wind Dir, Wind Speed) are all required for the purpose of the study. The depth of the water is required for the purpose of the study. The temperature of the water is required for the purpose of the study. The salinity of the water is required for the purpose of the study. The sound speed of the water is required for the purpose of the study. The water temperature is required for the purpose of the study. The water pressure is required for the purpose of the study. The ambient light is required for the purpose of the study. The ambient noise is required for the purpose of the study. The transparency is required for the purpose of the study. The wave measurements are required for the purpose of the study. The period of time is required for the purpose of the study. The direction of observation is required for the purpose of the study. The sampling frequency is required for the purpose of the study. The channel error is required for the purpose of the study.

Requirements not met and why

APPENDIX SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

REQUIREMENTS FOR REFINED DATA CAPABILITIES

Parameters	METEOROLOGICAL									
	Current speed	Surf. temp	Wave height	Wave period	Wave direction	Wave measurement	Wave measurement	Wave measurement	Wave measurement	Wave measurement
Characteristics	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Geographic location	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Vertical layer	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Range 15 yr. data	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Max error	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Direction of flow	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Sampling interval	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Ch. error	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots

REQUIREMENTS FOR REFINED DATA CAPABILITIES

Parameters	METEOROLOGICAL									
	Current speed	Surf. temp	Wave height	Wave period	Wave direction	Wave measurement	Wave measurement	Wave measurement	Wave measurement	Wave measurement
Characteristics	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Geographic location	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Vertical layer	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Range 15 yr. data	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Max error	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Direction of flow	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Sampling interval	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots
Ch. error	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots	0 to 100 knots

REQUIREMENTS FOR REFINED DATA CAPABILITIES

1. Requirements particularly are met when:
 - a. The data is of 10 yr. or more duration.
 - b. The data is of 10 yr. or more duration.
 - c. The data is of 10 yr. or more duration.

2. Requirements are met when:
 - a. The data is of 10 yr. or more duration.
 - b. The data is of 10 yr. or more duration.
 - c. The data is of 10 yr. or more duration.

REPORT OF THE
COMMISSIONER OF THE
LAND OFFICE
OF THE STATE OF NEW YORK
FOR THE YEAR 1904

RESY AREA - PALAMETTES - 147-8914

Rev. 10-1-61 10 AUG 1961

[illegible]

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FOR A COMPLETE LIST OF THE AVAILABLE INFORMATION, PLEASE CONTACT THE INFORMATION OFFICE AT THE BUREAU OF THE ARMY.

[illegible]

Washburn

"OREY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA HYDRA SYSTEM

Parameter	Geo. location	Oxygen	Total radiation out	Albedo	Lat wave spectrum	Revised 20 Aug 58
Vertical layer	Same as page 1	Sec to 100 m	Sec			
Range		0 to 6 cm ²	0 to 2 ly/m	0 to 100%	Not stated	
Maximum error		10%	Not stated			
Duration of ob.		20 min avg.				
Sampling intensity	X, Y	300/20 n. ml				
	Z	LA PSC 1/16	N/A			
	Time	6 hrs				
Ob. synch.	X, Y	10 min				
	Z	1 min				
		N/A				
Remarks						

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	Sensible heat flux	Water vapor flux	Reynolds stress	Early flux of heat
Geo. location	Same as page 1			
Vertical layer	Sec			Sec to 1000 m
Range	0 to 1 ly/m	0 to 4 ly/m	0 to 30 cm ² /cm ²	0 to 4 ly/m
Maximum error	Not stated			
Duration of ob.	20 min avg.			
Sampling intensity	X, Y	300/20 n. ml		
	Z	N/A		
	Time	6 hrs		
Ob. synch.	X, Y	10 min		
	Z	N/A		
				1 min
Remarks				

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '69

1. TENTATIVELY PROPOSED NDBS SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL					
Characteristics	Curr. dir.	Curr. speed	Salinity	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Trans parameter	Wave measurements*			Air temp	Atmos elec	Wind direction	Wind speed	
	dir.									Ht	Per	Dir					
Deep Ocean (60°N to 60°S)/N. American Coast out to 400 n. mi																	
Surface																	
Vertical layer																	
Range (5-yr LOA)	3 to 10 km	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	0 to 100°	
Max error (5-yr SOA)	5°	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	0.05 km	
Duration of obs.	Inst. or Short period avg. (Representative)																
X, Y	± 600 n. mi/100-150 n. mi																
Z	20 Sec. LAPCO levels (+ near bottom)																
Time	6 hrs/5 hrs																
Ob. synch.	X, Y, Z	10 min. (1 min)															

*Includes Measurements of Swells

2. REFINED AND 58 REQUIREMENTS NSF, Woods Hole-Study Dynamic Process of the Western North Atlantic

Geographic location	20°N to 40°N, 60°W to 75°W - Moorings of Opportunity Anywhere in World Oceans														
Vertical layer	5000 m														
Range	0 to 360°														
Maximum error	10°														
Duration of obs.	2-1/2 min														
X, Y	6 n. mi in Gulf Stream														
Z	20 n. mi outside Stream														
Time	1 hr														
Ob. synch.	X, Y, Z														

3. RESULTS OF ASSESSMENT

Requirements fully met:

- Requirements partially met and why: All listed requirements would be met with the exception of:
 - The X, Y spacing of 6 and 20 n. mi: Tentative "system" spacing is much greater 500/100 n. mi.
 - The time sampling intensity of 1 hr: Tentative "system" sampling is every 6 hrs (DO) and 3 hrs (CNA).

Requirements not met and why:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1 TENTATIVELY PROPOSED NDOS SENSING CAPABILITIES

Revised 20 Aug 68

Parameters	OCEANOGRAPHIC										METEOROLOGICAL			
	Characteristics	Current dir.	Current speed	Salinity	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Trans. paracancy	Wave measurements*	Per	Per	Type
Geographic location	Vertical layer	Deep Ocean (60°N to 60°S)/N American (ext out to 400 n. mi)												
	Range (5-yr BOA)	0 to 300 to 360*	0 to 10 kts	0 to 42.0/00	4000 to 5800 fms	40°C	0 to 10 ⁴ psi	0 to 2.0 ly/m	-80 to -20 db	0 to 70%/m	0 to 100 ft	1 to 40 sec	1 to 360*	Surface
Max error (5-yr BOA)		5*	0.03 kts or 1%	0.01 0/00	1 fms	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10%	0.1 sec or 1%	0.1°C or 1%	Surface
Duration of obs.		Last of Short period avg (Representative)												
	X, Y	± 600 n. mi/100-150 n. mi												
Sampling intensity	Z	20 Std. LAPO levels (- near bottom)												
	Time	6 hrs/3 hrs												
Obs. synch	X, Y, Z	10 min, (1 min)												
		Includes Measurements of Swells												
Atmos. elect		Tag of buoy, out to surface												
		400 to 1000 mb, 40°C, 0.1 mb, 0.1°C, 0.1 in, 0.1 ft												
Air temp		2 to 10, 50°C, 0.1°C, 0.1 in, 0.1 ft												
		0.1°C, 0.1 in, 0.1 ft												
Wind speed		0 to 10, 10 kts, 0.1 kts, 0.1 in, 0.1 ft												
		0.1 kts, 0.1 in, 0.1 ft												

2 REFINED AMO 59 REQUIREMENTS NSF, University of Washington--Study of Effluent Waters of the Columbia River

Geographic location		Mouth of the Columbia River to 600 n. mi W, 300 n. mi S and 200 n. mi N													
Vertical layer		800 to 50 m													
		0 to 360*													
Range		0 to 10 kts													
		0.03 kts or 1%													
Max error		0.01 0/00													
		0.01 0/00													
Duration of obs.		10 min													
		25 n. mi													
Sampling intensity		0, 3, 6, 9, 12, 15, 20, 25, 30, 40 - 50 m													
		2 hrs													
Obs. synch		10 min													
		1 min													

3 RESULTS OF ASSESSMENT

Requirements fully met:

- Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 - The X, Y spacing of 25 n. mi. Tentative "system" has initial spacing of 300 n. mi in D-plane 100-150 n. mi in C-A.
 - The 1 hr sampling intensity. Tentative "system" has only 5 levels in the first 50 m.
 - The 2 hr time sampling intensity. Tentative "system" is every 6 hrs (DO)/3 hrs (CNA).

Requirements not met and why:

- Oxygen. Uncertainty about obs from buoy unattended for long periods
- Nutrients, Biological Par., and Sediment Load. Considered beyond the 5-yr buoy SOA

*These are 1967 data requirements not refined

"GREY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BODY SYSTEM					
Parameter	Oxygen				
Cao location	Mouth of the Columbia River to 600 mi W, 300 mi S, and 200 mi N				
Vertical layer	Sfc to 50 m 0 to 9 m L/L				
Range					
Maximum error	0.00 m L/L				
Detection of ob.	10 min				
X Y	2.5 n mil				
Z	0, 3, 6, 9, 12, 15, 20, 25, 30, 40 - 50 m				
Time	2 hrs				
X Y	10 min				
Z	10 min				
Ob. synchrony					
Remarks					

Revised

CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DA "A BUOY SYSTEM

PARAMETER: FHS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DA "A BUOI SYSTEM"						
Parameter	Nutrients	Biological parameters	Sediment load			
Geo location	Same as above					
Vertical layer	0 to 50 m					
Range	Unk					
Maximum error	Unk					
Durisdiction of ab	10 min					
X Y	25 n mi					
Sampling intensity	Z 0, 5, 8, 12, 15, 20, 25, 30, 40 + 50 m					
Time	2 hrs					
X Y Z	10 min 1 min					
Cb, s, pch						
Remarks						

Part 3

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '66

1. TENTATIVELY PROPOSED MEASURING CAPABILITIES

Para numbers		OCEANOGRAPHIC										METEOROLOGICAL									
Characteristics		Cur. dir	Cur. speed	Salinity	Speed speed	Water temp.	W. pres (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements*	Per	Dir	Air temp	Atmos elect	Atmos press	Dew point	Instr. label	Precep rate	Wind dir	Wind speed
Geographic location		Deep Ocean (40°N to 60°S), American Coast out to 400 n. mi.																			
Vertical layer		Surface to 5000 m depth																			
Range (5-yr BOA)		0 to 360°	0 to 10 kts	42.0/00	4500 to 5800 fms	-5 to 40°C	0 to 10 ⁴ psi	0 to 2.0 ly/m	-60 to 20 db	0 to 70%/m	0 to 100 ft	1 to 40 sec	0 to 360°	25 to 60°C	0 to 10 kv	800 to 1099 mb	25 to 40°C	0 to 2 in	0 to 0.12 in. hr	0 to 360°	0 to 160 kts
Max error (5-yr BOA)		5°	0.03 kts or 1%	0.01 0/00	1 fms	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10% dir 1%	0.1 sec	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1 in	0.01 in. hr	2°	0.1 kts or 1%
Duration of obs.		Inst. or Short period avg. (Representative)																			
Sampling frequency		X, Y, Z	5 600 n mi/100-150 n. mi																		
Time		20 Std. LAPU levels (1 near bottom)																			
Ob. epoch		X, Y, Z	10 min, (1 min)																		
*Include Me. Instruments of BuOla																					

2. REFINED AMO # 62 REQUIREMENTS 8 mth mean land bud on

Geographic location																				
Vertical layer																				
Range																				
Maximum error																				
Duration of obs																				
Sampling frequency	X, Y																			
Time																				
Ob. epoch	X, Y																			

3. RESULTS OF ASSESSMENT

Requirements fully met:

Requirements partially met and why:

Requirements not met and why:

- Biological Growth: Judged better done by other means—such as the buoy tenders taking ob. from spe. al¹ suspended surfaces on buoy each time buoy is visited
- Biological Collection: Considered beyond 5-yr buoy SOA

Portmanteau

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Page 1 of 1

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug 68

1. TENTATIVELY PROPOSED MINE SENSING CAPABILITIES

Para numbers	OCEANOGRAPHIC										METEOROLOGICAL									
	Curr. speed dir.	Salinity	Sound speed	Water temp.	W. press. (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements ^a	Per	Dir	Air temp	Atmos. elect	Atmos. press.	Dew point	Inno. lat.	Precip. rate	Wind dir	Wind speed	
Characterization																				
Geographic location	Deep Ocean (40°N to 40°S) American Coast out to 400 n. mi.																			
Vertical layer	Surface to 4000 m depth																			
Range (5-yr BOA)	0 to 10 kts	0 to 42.0	4500 to 5400 fms	-5 to 40°C	0 to 10 ⁴ psi	0 to 2.0 by m	40 to 20 db	0 to 70%	0 to 100 ft	1 to 40 sec	0 to 360°	25 to 60°C	0 to 10 kv	800 to 1099 mb	25 to 40°C	0 to 2.0 by m	0 to 12 in. hr	0 to 360°	0 to 160 kts	
Max error (5-yr BOA)	5% or 0.03 kts or 1%	0.03 kts	0.01/0.00 fms	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10%	0.1 sec or 1%	5° or 10%	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in. hr	2°	0.5 kts or 7	
Duration of obs.	Last or Short period avg. (Representative)																			
X, Y	± 600 n. mi/100-150 n. mi																			
Sampling intensity	2 20 Std. LA PBO events (1. min. to 1 day)																			
Time	6 hrs/1 hrs																			
X, Y, (Z)	10 min. (1 min.)																			

2. REFINED ARO 4-55 REQUIREMENTS USN, Mine Defense Laboratory - Mine Defense including Inshore Undersea Warfare

Geographic location																					
Vertical layer																					
Range																					
Maximum error																					
Duration of obs.																					
Sampling intensity																					
Obs. synch.																					

3. RESULTS OF ASSESSMENT

Requirements fully met.

- Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 - The 30 min duration of obs. Tentative "system" is only up to 10 min.
 - The 10 m Z sampling intensity. Tentative "system" initial spacing is about 100 m (CNA).
 - The 16 m Z sampling intensity. Tentative "system" uses LAPSO levels which are more gross.
 - The time sampling intensity and X, Y synch of obs. Tentative "system" not as stringent.

Requirements not met and why:

- Turbidity and Electrical Volume Conductivity: Uncertainty about obs. from buoy unattended for long periods.

*These are 1947 data requirements not refined

Abstract

PARAMETERS (CONSIDERED BEYOND THE 5-YR STATE / V THE ART FOR THE TENTATIVELY PROPOSED DATA BULKY SYSTEM

Summary

AW ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug 64

1. TENTATIVELY PROPOSED VIDEO RECORDING CAPABILITIES

Parameters	EXPERIMENTAL									
	Current depth	Maximum depth	Water temp	Ambient light	Ambient noise	Frame rate	Assessment	Per	Per	Per
Geographic location	Deep (less than 400 ft to 400 ft)	American Coast and 400 ft								
Vertical layer	Surface to 1000 ft depth	Surface to 1000 ft depth	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10
Range (ft or m)	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Minimum error	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft
Direction of view	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)
Sampling interval	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y
Ch. output	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z

2. REQUIRED AND OLD REQUIREMENTS FOR AW Environmental Prediction (see Geographic Environmental Prediction R&D Test and Evaluation)

Parameters	EXPERIMENTAL									
	Current depth	Maximum depth	Water temp	Ambient light	Ambient noise	Frame rate	Assessment	Per	Per	Per
Geographic location	Deep (less than 400 ft to 400 ft)	American Coast and 400 ft								
Vertical layer	Surface to 1000 ft depth	Surface to 1000 ft depth	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10	5 to 10
Range (ft or m)	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Minimum error	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft	0.00 ft
Direction of view	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)	East or West (or other)
Sampling interval	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y	X, Y
Ch. output	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z	X, Y, Z

3. RESULTS OF ASSESSMENT

Requirements partially met and why: All requirements listed would be met with the exception of the X, Y spacing of 30/60 ft within 400 ft depth and 200 ft in 100 ft. Tentative assessment: No initial assessment of 400 ft depth and 200 ft in 100 ft.

Requirements not met and why: Requirements not met and why.

These are 1967 requirements not refined.

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

TENTATIVELY PROPOSED WIND MEASURING CAPABILITIES									
1. TANKERGRAPH									
Data requirements	Type of sensor	Accuracy	Response time	Weather	Waves	Air pressure	Air temperature	Air humidity	Wind speed
Geographic location	Deep Ocean (5000 to 6000 ft) American Coast and to 4000 ft								
Vertical layer	Surface to 5000 ft depth								
Range (10 yr data)	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft
Max error (10 yr data)	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft
Duration of use	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft
Measuring intensity	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft
10 yr data	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft

2. REFINED DATA REQUIREMENTS									
1. TANKERGRAPH									
Data requirements	Type of sensor	Accuracy	Response time	Weather	Waves	Air pressure	Air temperature	Air humidity	Wind speed
Geographic location	Deep Ocean (5000 to 6000 ft) American Coast and to 4000 ft								
Vertical layer	Surface to 5000 ft depth								
Range (10 yr data)	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft
Max error (10 yr data)	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft	5 to 1000 ft
Duration of use	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft
Measuring intensity	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft
10 yr data	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft	10 to 1000 ft

Supplemental partially met and why: All required measurements listed would be met with the exception of:

- The X, Y spacing of 50, 100, and 200 ft and within 1000 ft of the surface.
- The Z spacing of 10, 20, and 30 ft.

Supplemental met and why:

These are 1967 data requirements, not refined.

THEFT A TTY N I Y PLY MPO'ISE T) MCOSMS SUE WZM MO., C A D A RD L J T T B S

W9. Hwy 07. Panama

Page number	Core number	Core depth (m)	Core diameter (mm)	Core length (m)	Core weight (kg)	Core volume (m³)	Core density (g/cm³)	Core composition	Core description	Core analysis	Core interpretation
Vertical layer	Core 1 (0.00 to 0.05 m)	0.00 to 0.05	42.0	0.05	0.005	0.0005	2.5	100%	100%	100%	100%
		0.05 to 0.10	42.0	0.10	0.010	0.0010	2.5	100%	100%	100%	100%
		0.10 to 0.15	42.0	0.15	0.015	0.0015	2.5	100%	100%	100%	100%
		0.15 to 0.20	42.0	0.20	0.020	0.0020	2.5	100%	100%	100%	100%
		0.20 to 0.25	42.0	0.25	0.025	0.0025	2.5	100%	100%	100%	100%
		0.25 to 0.30	42.0	0.30	0.030	0.0030	2.5	100%	100%	100%	100%
		0.30 to 0.35	42.0	0.35	0.035	0.0035	2.5	100%	100%	100%	100%
		0.35 to 0.40	42.0	0.40	0.040	0.0040	2.5	100%	100%	100%	100%
		0.40 to 0.45	42.0	0.45	0.045	0.0045	2.5	100%	100%	100%	100%
		0.45 to 0.50	42.0	0.50	0.050	0.0050	2.5	100%	100%	100%	100%
Core 2 (0.50 to 0.55 m)	Core 2 (0.50 to 0.55 m)	0.50 to 0.55	42.0	0.05	0.005	0.0005	2.5	100%	100%	100%	100%
		0.55 to 0.60	42.0	0.10	0.010	0.0010	2.5	100%	100%	100%	100%
		0.60 to 0.65	42.0	0.15	0.015	0.0015	2.5	100%	100%	100%	100%
		0.65 to 0.70	42.0	0.20	0.020	0.0020	2.5	100%	100%	100%	100%
		0.70 to 0.75	42.0	0.25	0.025	0.0025	2.5	100%	100%	100%	100%
		0.75 to 0.80	42.0	0.30	0.030	0.0030	2.5	100%	100%	100%	100%
		0.80 to 0.85	42.0	0.35	0.035	0.0035	2.5	100%	100%	100%	100%
		0.85 to 0.90	42.0	0.40	0.040	0.0040	2.5	100%	100%	100%	100%
		0.90 to 0.95	42.0	0.45	0.045	0.0045	2.5	100%	100%	100%	100%
		0.95 to 1.00	42.0	0.50	0.050	0.0050	2.5	100%	100%	100%	100%
Core 3 (1.00 to 1.05 m)	Core 3 (1.00 to 1.05 m)	1.00 to 1.05	42.0	0.05	0.005	0.0005	2.5	100%	100%	100%	100%
		1.05 to 1.10	42.0	0.10	0.010	0.0010	2.5	100%	100%	100%	100%
		1.10 to 1.15	42.0	0.15	0.015	0.0015	2.5	100%	100%	100%	100%
		1.15 to 1.20	42.0	0.20	0.020	0.0020	2.5	100%	100%	100%	100%
		1.20 to 1.25	42.0	0.25	0.025	0.0025	2.5	100%	100%	100%	100%
		1.25 to 1.30	42.0	0.30	0.030	0.0030	2.5	100%	100%	100%	100%
		1.30 to 1.35	42.0	0.35	0.035	0.0035	2.5	100%	100%	100%	100%
		1.35 to 1.40	42.0	0.40	0.040	0.0040	2.5	100%	100%	100%	100%
		1.40 to 1.45	42.0	0.45	0.045	0.0045	2.5	100%	100%	100%	100%
		1.45 to 1.50	42.0	0.50	0.050	0.0050	2.5	100%	100%	100%	100%
Core 4 (1.50 to 1.55 m)	Core 4 (1.50 to 1.55 m)	1.50 to 1.55	42.0	0.05	0.005	0.0005	2.5	100%	100%	100%	100%
		1.55 to 1.60	42.0	0.10	0.010	0.0010	2.5	100%	100%	100%	100%
		1.60 to 1.65	42.0	0.15	0.015	0.0015	2.5	100%	100%	100%	100%
		1.65 to 1.70	42.0	0.20	0.020	0.0020	2.5	100%	100%	100%	100%
		1.70 to 1.75	42.0	0.25	0.025	0.0025	2.5	100%	100%	100%	100%
		1.75 to 1.80	42.0	0.30	0.030	0.0030	2.5	100%	100%	100%	100%
		1.80 to 1.85	42.0	0.35	0.035	0.0035	2.5	100%	100%	100%	100%
		1.85 to 1.90	42.0	0.40	0.040	0.0040	2.5	100%	100%	100%	100%
		1.90 to 1.95	42.0	0.45	0.045	0.0045	2.5	100%	100%	100%	100%
		1.95 to 2.00	42.0	0.50	0.050	0.0050	2.5	100%	100%	100%	100%

STANDARD OF EXCELLENCE IN THE FIELD OF RESEARCH, DESIGN, AND CONSTRUCTION.

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(RESEARCHER'S) RESEARCHER'S (A) RESEARCHER'S (A)

[illegible]

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

Worked by Paul J. Smith

Requirements partially met and why. All requirements listed would be met with the exception of

- * The vertical layer of soil on the bottom where deeper than 500 m. Transitive "system" deposits go to only 300 m.
- * The X₁ layer of 400 a and below in 1A. Transitive "system" has a total thickness of 600 m. (see 1 m).
- * The Z on impeding tendency of 300 m. Transitive "system" (1A zone) levels are more green.

Apa itu Sistem Informasi Pemasaran?

Subject: [REDACTED] **Date:** [REDACTED]

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

TENTATIVELY PROPOSED INSTRUMENT CAPABILITIES

Parameters	OCEANOGRAPHIC					METEOROLOGICAL				
	Current speed	Salinity	Sound speed	Water temp	Ambient depth	Ambient light	Transparency	Wave measurements	Air temp	Atmos elect
Characteristics	HT	Per	HT	Per	HT	Per	HT	Per	HT	Per
Geographic location	Deep (down to 4000 m) American Coast out to 400 n. mi.					To 4000 m				
Vertical layer	Surface to 5000 m depth					Surface				
Bar	5 yr S.O.A.	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m
Max error	5%	0.03 kts	0.01 fps	0.01°C	0.1 ft	0.1 ft	0.1 ft	0.1 ft	0.1°C	0.1 kV
Duration of obs.	1 hr or Short period avg. (representative)					1 hr or Short period avg. (representative)				
Sampling frequency	20 Sec LAPSO levels (near bottom)					2 levels				
Time	5 hrs					5 hrs				
To arch	10 min, 1 min					10 min, 1 min				

2 REFINED AND TEST REQUIREMENTS ORL, Penn St - Large scale Factors Affecting Transmission of Underwater Sound

Parameters	OCEANOGRAPHIC					METEOROLOGICAL				
	Current speed	Salinity	Sound speed	Water temp	Ambient depth	Ambient light	Transparency	Wave measurements	Air temp	Atmos elect
Characteristics	HT	Per	HT	Per	HT	Per	HT	Per	HT	Per
Geographic location	World Oceans					To 4000 m				
Vertical layer	Surface to 5000 m					Surface				
Range	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m
Maximum error	5%	0.03 kts	0.01 fps	0.01°C	0.1 ft	0.1 ft	0.1 ft	0.1 ft	0.1°C	0.1 kV
Duration of obs.	2 min					2 min				
Sampling frequency	20 Sec LAPSO levels (near bottom)					2 levels				
Time	5 hrs					5 hrs				
To arch	10 min, 1 min					10 min, 1 min				

RESULTS OF ASSESSMENT

Requirements fully met

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 • The X, Y spacing of 400 n. mi in D0. Tentative "system" spacing is about 600 n. mi

Requirements not met and why:
 • Picture of Bottom and Propagation Loss: Judged better done by other means
 • Ice Accumulation and Density: Uncertainty about ob. form NIDIS type buoy
 • Bottom Type: Considered beyond 5-yr buoy S.O.A.

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug 64

1. TENTATIVELY PROPOSED SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL						
	Current dir	Current speed	Salinity	Speed	Water temp	Ambient light	Ambient noise	Transparency	Wave measurements*	Dir	Air temp	Atmos press	Dew point	Humidity	Precip rate	Wind speed	Wind dir
Characteristics	Deep Ocean (60°N to 60°S) American Coast out to 400 n. mi.																
Geographic location	Surface to 5000 m depth																
Vertical layer	Range (5-yr SOA)																
	0 to 360°	0 to 4500 fms	0 to 42.0 ‰	4500 to 5000 fms	-5 to 40°C	0 to 10 ⁴ lux	-80 to -20 db	0 to 100% trans	0 to 100 ft	0 to 360°	-25 to 50°C	1009 mb	40°C	2.0 in/hr	0 to 360°	0 to 160 kts	
Max error (5-yr SOA)	5°	0.03 kts or 1% or 10'	0.01 ‰ or 0.01°C	1 fms	0.01°C	1 lux	3 db	2%	0.2 ft or 10% or 10'	5°	0.1°C	0.1 mb	0.2°C	1%	0.01 in/hr or 1'	0.5 kts or 1'	
Duration of obs	Last or Short period avg. (Representative)																
	X, Y: 5 600 n mi/100-150 n. mi																
Sampling Intensity	Z: 20 Sec LA PRC levels (- near bottom)																
	Time: 6 hrs/5 hr*																
Obs synch	X, Y, Z: 10 min, (1 min)																

*Includes Measurements of Swells

2. REFINED AND 77 REQUIREMENTS ORL, Penn St - Small-scale Factors Affecting Transmission of Underwater Sound

Geographic location	World Oceans - Selected Areas										RESULTS OF ASSESSMENT				
	Vertical layer	Range	Maximum error	Duration of obs	Sampling Intensity	Obs synch	Vertical layer	Range	Maximum error	Duration of obs	Sampling Intensity	Obs synch	Vertical layer	Range	Maximum error
Vertical layer	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m
Range	0 to 360°	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m	0 to 5000 m
Maximum error	5°	0.03 kts or 1% or 10'	0.01 ‰ or 0.01°C	1 fms	0.01°C	1 lux	3 db	2%	0.2 ft or 10% or 10'	5°	0.1°C	0.1 mb	0.2°C	1%	0.01 in/hr or 1'
Duration of obs	Last or Short period avg. (Representative)										RESULTS OF ASSESSMENT				
Sampling Intensity	X, Y: 5 600 n mi/100-150 n. mi Z: 20 Sec LA PRC levels (- near bottom) Time: 6 hrs/5 hr*										RESULTS OF ASSESSMENT				
Obs synch	X, Y, Z: 10 min, (1 min)										RESULTS OF ASSESSMENT				

*Includes Measurements of Swells

Requirements fully met:

Requirements partially met and why: All listed requirements would be met with the exception of:
 • The X, Y spacing of 5.5 n. mi. Tentative "system" spacing is about 600/100 n. mi. One location might coincide.
 • The 1 min frequency of obs. Tentative "system" values are 6/3 hr
 • The 1 min X, Y synch. of obs. Tentative "system" X, Y synch. is 10 min

Requirements not met and why:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '88

1. TENTATIVELY PROPOSED NDSS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC												METEOROLOGICAL									
	Current dir	Current speed	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements	Per	Dir	Air temp	Atmos. elect	Atmos. press	Low point	Baro. point	Precip. rate	Wind speed	Wind dir		
Characteristics																						
Geographic location	Deep Ocean (40°N to 40°S) N. American Coast out to 400 n. mi.																					
Vertical layer	Surface to 5000 m depth																					
Range (5-yr SOA)	0 to 360°	0 to 10 kts	0 to 42.5/100	4200 to 5400 fpm	-5 to 10°C	0 to 10 ⁴ psi	0 to 2.0 ly/m	-40 to -20 db	0 to 100%	0 to 100 ft	0 to 100%	0 to 360°	-25 to 60°C	0 to 10 kPa	1009 mb	-25 to 40°C	0.01 to 2.0 in./m	0 to 0.12 in./hr	0 to 150 kts	0 to 360°		
Max error (5-yr SOA)	5°	0.05 kts	0.01 0/100	1 tpe	0.01°C	0.1%	1%	3 db	2%	0.2 ft	0.1 sec	5°	0.1°C	0.1 kPa	0.1 mb	0.2°C	1%	0.01 in./hr	0.5 kts	2°		
Duration of obs.	best or short period avg. (Representative)																					
X, Y	≤ 600 n. mi/1 hr-150 n. mi																					
Sampling frequency	Z	20 Std. LA PRO levels (+ near bottom)																				
Time	6 hrs/5 hrs																					
Ob. synch.	X, Y, Z	10 min. (1 min)																				

2. REFINED AND 7% REQUIREMENTS USN Mar. Eng. Lab. - Testing of Deeply Submerged Machinery

Geographic location	East Coast and Caribbean (lat 5°N) World-wide Latent on																			
Vertical layer	Bottom only	Max 310 m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0 to 360°	0.01 to 2 kts	50 to 35 ‰	10°C	0.01°C	1%	1 min	1 pt only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	
Range	0 to 360°	2 kts	50 to 35 ‰	10°C	0.01°C	1%	1 min	1 pt only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	
Maximum error	10°	0.1 kts	0.1 ‰	0.01°C	0.01°C	1%	1 min	1 pt only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	Bottom only	
Duration of obs.	1 min	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	X, Y	1 pt only	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Sampling interval	Z	Bottom only	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Time	30 min	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Obs synch	X, Y	N/R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Z	N/A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

3. RESULTS OF ASSESSMENT

Requirements Met / not met:

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 • The 30-min frequency of obs. Testative "system" values are 6 hr DO/3 hr CNA.
 • The Z sampling intensity for water temperature. Testative "system" spacing is more gross (1 level).

Requirements not met and why:
 • Oxygen, pH, and Turbidity. Uncertainty about obs. from NDSS type buoy.
 • EH. Considered beyond 5-yr buoy SOA.

REF FIMED AMO 4 78

"GREY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug. 68

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVE DESIGNER'S STATE OF THE ART

[illegible]

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '66

1. TENTATIVELY PROPOSED NAME SENSING CAPABILITIES

Part number	OCEANOGRAPHIC										METEOROLOGICAL									
	Chart dir	Chart speed	Salinity	Wind speed	Water temp	W. zone (depth)	Ambient light	Ambient noise	Trans- permeability	Wave measurement*	Per	Dir	Air temp	Atmos elect	Atmos press	Dew point	Isaac- lation	Precip. rate	Wind dir	Wind speed
Geographic location	Deep Ocean (40°N to 60°N) American Coast out to 400 n. mi.																			
Vertical layer	Surface to 4000 m depth																			
Range (5-yr 80%)	0 to 360°	0 to 10 kts	42.0/100	45.00 kts	-5 to 40°C	0 to 10' per ft/m	0 to 2.0	-80 to -20 db	0 to 10%	0 to 100 ft	1 to 40 sec	0 to 360°	-25 to 60°C	0 to 10 kv	800 to 1000 mb	-25 to 40°C	0.01 to 2.0 b/m	0 to 0.12 in./hr	0 to 360°	0 to 160 kts
Max error (5-yr 80%)	5°	0.05 kts or 1...	0.01 0/100	1 kts	0.01°C	1 ft	1 ft	3 db	2%	0.2 ft or 10%	0.1 sec or 1%	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	2°	0.5 kts or 5%
Duration of obs.	Short or Short period avg. (Representative)																			
X, Y	± 400 n. mi/100-110 n. mi																			
Sampling Interval	30 sec. LA PBO levels (+ near bottom)																			
Time	0 hrs/5 hrs																			
Ob. synth	X, Y, Z	10 min, (1 min)																		

2. REFINED NAME SENSING CAPABILITIES

Geographic location	Deep Ocean (40°N to 60°N) American Coast out to 400 n. mi.																			
Vertical layer	Surface to 4000 m depth																			
Range	0 to 360°																			
Maximum error	5°																			
Duration of obs.	Short or Short period avg. (Representative)																			
X, Y	± 400 n. mi/100-110 n. mi																			
Sampling Interval	30 sec. LA PBO levels (+ near bottom)																			
Time	0 hrs/5 hrs																			
Ob. synth	X, Y, Z	10 min, (1 min)																		

3. RESULTS OF ASSESSMENT

Requirements fully met:

Re measurements partially met and why:

Re measurements not met and why:
 a. Geomagnetic Field intensity Uncertainty about ob. from an NDBS type buoy

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

[illegible]

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 29 Aug '66

1. TENTATIVELY PROPOSED MEASURING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL							
	Current speed	Salinity	Sound speed	Water temp (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements* Ht.	Per.	Dir.	Air temp	Atmos. elect	Atmos. press	Dew point	Inso- lation	Precip. rate	Wind speed dir.	
Characteristics	Dive to 4000 ft to 40-60 ft American Coast out to 400 n. mi.																	
Geographic location	Surface to 4000 m depth																	
Vertical layer	Surface																	
Range (5-yr SOA)	0 to 360°	0 to 1000	4500 to 5000 fms	-5 to 40°C	0 to 20 fty/m	80 to -20 db	0 to 100%	0 to 100 ft	1 to 40 sec	0 to 360°	-25 to 40°C	0 to 10 kv	900 to 1000 mb	-25 to 40°C	0.01 to 2.0 hr/m	0-12 in./hr	0 to 160 kts	
Max error (5-yr SOA)	5°	0.03 db	0.01 fms	0.01°C	1%	3 db	5%	0.2 ft	0.1 sec	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	2° or 5%	
Duration of obs.	1 hr or Short period avg. (Representative)																	
Sampling frequency	Surface																	
Ob. synch.	10 min, (1 min)																	

* See Index Measurements of Buoy

2. REFINED AMO : 81 REQUIREMENTS URM, Underwater Sound Laboratory-Acoustic Pathway Studies

Geographic location			Block Island Sound (1100 ft) South of Bermuda out to 150 n. miles																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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3. RESULTS OF ASSESSMENT

Requirements fully met:

- The X, Y, Z, acting of 8 n. mi (CNA) and variable (DO). Tentative "system" uses initial spacing of 600 n. mi in DO and 100-150 n. mi in CNA.
- The Z in range of 5 m. Tentative "system" standard LA PBO levels are more gross.
- The unknown (each) of ob. when less than 10 min (X, Y) and 1 min (Z). Tentative "system" allows 10 min (X, Y) and 1 min (Z).

Requirements not met and why:

- Inclination: Uncertainty about ob. from buoy unattended for long periods.

* These are 1947 data requirements not refined.

REFINED AM; 4 - 1

Revised 20 Aug 89

Personnel

4

Page 1 - 0549

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

TENTATIVELY PROPOSED NAME: SEASWAVE CAPABILITIES

Parameter	OCEANOGRAPHIC					METEOROLOGICAL												
	Current speed	Surface speed	Water temp	W. pressure (depth)	Ambient noise	Trace pressure	Wave measurement	Per	Dir	Air temp	Atmos elect	Atmos press	Dew point	Humidity	Precip rate	Wind dir	Wind speed	
Long range location	Deep (down 400 m to 600 m) American Coast near 400 m ml																	
Vertical layer	Surface to 1000 m depth																	
Range (5 yr 50 m)	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	
Mean error (5 yr 50 m)	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	
Duration of obs	Last 1000 m depth (see Remarks)																	
Sampling intensity	1000 m depth (see Remarks)																	
(% error)	1000 m depth (see Remarks)																	

Parameter	Vertical layer		Range		Mean error		Duration of obs		Sampling intensity		(% error)	
	Surface	1000 m	Surface	1000 m	Surface	1000 m	Surface	1000 m	Surface	1000 m	Surface	1000 m
Long range location	Deep (down 400 m to 600 m) American Coast near 400 m ml											
Vertical layer	Surface to 1000 m depth											
Range	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Mean error	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Duration of obs	Last 1000 m depth (see Remarks)											
Sampling intensity	1000 m depth (see Remarks)											
(% error)	1000 m depth (see Remarks)											

Requirements partially met and why: Wave Height and Direction Spectra would probably be met with the exception of the 30 m/s direction of obs. Temperature "system" value is up to 10 m/s.

The 4 hr frequency of obs. Temperature "system" value is 6 hrs in Deep Ocean.

See Note: Some measures of sea state can be approximated from wave measurements, whether the coding will be exactly what is wanted must be resolved.

Requirements not met and why:

NO COPY OF PAGE(S)

Sigrid Aune

THE TENTATIVELY PROPOSED DATA BUXT SYSTEM

Journal of Management Education

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '64

1. TENTATIVELY PROPOSED SUB-BEAMS CAPABILITIES

Parameters	PHYSICAL/PHYSICAL										METEOROLOGICAL			
	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Atmos. elect.	Atmos. press.	Dew point.	Wind speed.
Geographic location	Depth (meters) 100 to 1000	Latitude 10°N to 10°S	Longitude 100°W to 100°E	Altitude (meters) 0 to 1000	Water temp. 0 to 30°C	Wind speed 0 to 30 m/s	Wave measurement* 0 to 10 m	Trans. permeability 0 to 100%	Ambient noise 0 to 100 dB	Ambient light 0 to 100 lux	Air temp. 0 to 30°C	Air press. 0 to 1000 mb	Dew point 0 to 30°C	Wind dir. 0 to 360°
Vertical layer	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Package (1.5 m x 1.5 m)	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Max error 1.5 m x 1.5 m	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Frequency of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr

*The above measurements are for the purpose of the assessment only. The actual measurements will be made by the sub-beams.

2. REFINED DATA REQUIREMENTS (METS. BEAMS) - Pacific Coast of California (San Diego to San Francisco) - North Pacific Ocean and Air - where

Parameters	PHYSICAL/PHYSICAL										METEOROLOGICAL			
	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Atmos. elect.	Atmos. press.	Dew point.	Wind speed.
Geographic location	Depth (meters) 100 to 1000	Latitude 10°N to 10°S	Longitude 100°W to 100°E	Altitude (meters) 0 to 1000	Water temp. 0 to 30°C	Wind speed 0 to 30 m/s	Wave measurement* 0 to 10 m	Trans. permeability 0 to 100%	Ambient noise 0 to 100 dB	Ambient light 0 to 100 lux	Air temp. 0 to 30°C	Air press. 0 to 1000 mb	Dew point 0 to 30°C	Wind dir. 0 to 360°
Vertical layer	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Package (1.5 m x 1.5 m)	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Max error 1.5 m x 1.5 m	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Frequency of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr

*The above measurements are for the purpose of the assessment only. The actual measurements will be made by the sub-beams.

3. REFINED DATA REQUIREMENTS (METS. BEAMS) - Pacific Coast of California (San Diego to San Francisco) - North Pacific Ocean and Air - where

Parameters	PHYSICAL/PHYSICAL										METEOROLOGICAL			
	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Atmos. elect.	Atmos. press.	Dew point.	Wind speed.
Geographic location	Depth (meters) 100 to 1000	Latitude 10°N to 10°S	Longitude 100°W to 100°E	Altitude (meters) 0 to 1000	Water temp. 0 to 30°C	Wind speed 0 to 30 m/s	Wave measurement* 0 to 10 m	Trans. permeability 0 to 100%	Ambient noise 0 to 100 dB	Ambient light 0 to 100 lux	Air temp. 0 to 30°C	Air press. 0 to 1000 mb	Dew point 0 to 30°C	Wind dir. 0 to 360°
Vertical layer	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Package (1.5 m x 1.5 m)	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Max error 1.5 m x 1.5 m	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Frequency of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr

*The above measurements are for the purpose of the assessment only. The actual measurements will be made by the sub-beams.

4. REFINED DATA REQUIREMENTS (METS. BEAMS) - Pacific Coast of California (San Diego to San Francisco) - North Pacific Ocean and Air - where

Parameters	PHYSICAL/PHYSICAL										METEOROLOGICAL			
	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Char. dim. of obs.	Atmos. elect.	Atmos. press.	Dew point.	Wind speed.
Geographic location	Depth (meters) 100 to 1000	Latitude 10°N to 10°S	Longitude 100°W to 100°E	Altitude (meters) 0 to 1000	Water temp. 0 to 30°C	Wind speed 0 to 30 m/s	Wave measurement* 0 to 10 m	Trans. permeability 0 to 100%	Ambient noise 0 to 100 dB	Ambient light 0 to 100 lux	Air temp. 0 to 30°C	Air press. 0 to 1000 mb	Dew point 0 to 30°C	Wind dir. 0 to 360°
Vertical layer	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Package (1.5 m x 1.5 m)	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Max error 1.5 m x 1.5 m	0 to 100 m	0 to 10°N	0 to 100°W	0 to 1000 m	0 to 30°C	0 to 30 m/s	0 to 10 m	0 to 100%	0 to 100 dB	0 to 100 lux	0 to 30°C	0 to 1000 mb	0 to 30°C	0 to 360°
Duration of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Frequency of obs.	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr
Time of day	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr	1 hr

GREY AREA PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUGGY SYSTEM

Parameter	Total cloud amount	Tidal fluctuation	Mooring load	Photo mat loc	Sub-surface insolation	Radiation out	Carbon dioxide	Vertical current	Biological growth	FW
Geo location	Same as Page 1									
Vertical layer	Not stated	Bottom	S/C	S/C	S/C to 10 m	S/C	S/C	2 levels	S/C	S/C
Range	0 to 100%	Not stated	0 to 15000 lb	Not stated	0 to 2 ly/m	-10 to 60°C	150 to 200 ppm	0 to 0.5 kg	Not stated	Var of 10
Maximum error	10%	Not stated	5%	Not stated	1%	0.1°C	0.1 ppm	0.01 km	Not stated	N/A
Duration of ob.	Inst.				Cont.	Cont.	Inst.	Cont.	1 yr	Inst.
Sampling intensity	X Y	500	100 n.m.							
	Z	N/A		N/A	1 to 10 m	N/A	N/A	2 levels	N/A	N/A
Time	1 hr								1 yr	1 hr
Ob. synch.	X Y	10 min							N/A	1 min
Z	N/A				1 min	N/A	1 min	1 min	N/A	N/A
Rep. by										

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUGGY SYSTEM

Parameter	Heat Flux	Cloud type	Cloud base	Dust						
Geo location	Same as page 1									
Vertical layer	S/C	Not stated	S/C to 10,000 ft	+15 m						
Range	Not stated	Optical or radar density	0 to 10,000 ft	Filter						
Maximum error	Not stated	Probably large	10%	Not stated						
Duration of ob.	Cont.	Inst.	Inst.	1 wk						
Sampling intensity	X Y	500	100 n.m.							
	Z	N/A		N/A	N/A					
Time	1 hr									
Ob. synch.	X Y	10 min								
Z	N/A									
Remarks										

1. TENTATIVELY PROPOSED NINE LEARNING CAPABILITIES

3. In meters		OCEANOGRAPHIC										METEOROLOGICAL									
Observations	Curr. speed dir.	Curr. speed	Salinity	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave meas urement			Air temp	Atmos elect	Atmos press	New joint	Insu- lation	Pre-wip rate	Wind dir	Wind speed	
										Wt	Dir	Per									
Geographic location Deep Ocean (60°N to 80°N American Coast out to 400 n. mi)																					
Vertical	y or	Surface																			
		Range (5-r BOA)	0 to 10 km	0 to 4300 ft	-8 to 49°C	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	0 to 10°	
Max error (5-r BOA)		5°	0.03 km or 1%	0.01 g/100	1 fpe	0.01°C	0.1%	1%	3 db	2%	0.2 ft or 10%	0.2 ft or 10%	0.1 sec or 1%	0.1°C	0.1 kv	0.2 mb	0.2°C	1%	0.01 in./hr	2°	0.5 kts or ft
Inst. or short period avg. (Representative)																					
X, Y		≤ 400 n. mi/180-180 n. mi																			
Z		20 fath. LA PBO levels (+ near bottom)																			
Time		6 hrs/8 hrs																			
Ch. speed		10 min. (1 min)																			

2. REFINED AND 85 REQUIREMENTS AEC. Scripts Inst. of Oceanography - Research on Near-bottom Currents

Geographic location		Deep Pacific, Primarily Deep Currents	
Vertical layer	500 to 10,000 meters		
Range	0 to 360°	0 to 1.0 hr	
Maximum error	10°	005 kts	
Duration of obs.	Inst	Inst	
X, Y	Unk	Unk	
Sampling frequency	3 m from 3 m from bottom		
Time	1 hr	1 hr	
X, Y	1 min	1 min	
Obs. synth	Z	Unk	Unk

3. RESULTS OF ASSESSMENT

Requiem remains fully intact:

Requirer: needs partially met and why Current Velocity would be most with the exception of
 • The 3 m from bottom requirement at depths greater than 5,000 m: Testative "system" only goes to 5,000 m.
 • The maximum error of 0.908 m/s for current speed is: Testative "system" value is 0.03 km.
 • The unknown X, Y spacing is less than 400 m: Testative "system" DO spacing is about 400 m. ml

Requester wants to know what the reason is:

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

TENTATIVELY PROPOSED NORS SENSING CAPABILITIES

OCEANOGRAPHIC														METEOROLOGICAL			
Parameters	Current	Salinity	Sound speed	Water temp	Ambient depth	Ambient light	Ambient noise	Trans. accuracy	Wave measurements	Air temp	Atmos. elect	Atmos. press	Wind direction				
Characteristics																	
Geographic location	Deep stream 160°N to 60°S, 100°W to 150°E, American Coast out to 400 n. mi.																
Vertical layer	Surface to 5000 m depth																
Range (1 yr S.O.A.)	0 to 1000 ft	0 to 1000 ft	4500 to 5000 fms	5 to 30°C	0 to 10 ⁴ psi	0 to 20 m	90 to 26 db	0 to 70% /m	0 to 100 ft	0 to 100°C	0 to 1000 mb	0 to 1000 mb	0 to 100 hr				
Max error (1 yr S.O.A.)	5*	0.03 kts	0.01 fms	0.01°C	0.1 psi	1 ft	3 db	2%	0.2 ft or 10% or 17'	0.1°C	0.1 kv	0.1 mb	10 hr				
Duration of obs	Inst. or Short period (e.g. Representative)																
X, Y	600 n. mi/100-150 n. mi																
Sampling intensity	Z	20 Sec LAPRO levels (near bottom)															
(b) synch	X, Y, Z	Time 6 hrs/10 min, (1 min)															
*Includes Measurements of Swells																	

2 REFINED AND 86 REQUIREMENTS ONR, Woods Hole Oceanographic Institution - Research on Gulf Stream

Outside Gulf Stream Proper/Within Gulf Stream Proper - 35°N to 45°N and 50°W to 75°W													
Geographic location													
Vertical layer	Sfc to bottom			Sfc to bottom									Sfc
Range	0 to 360°	0 to 37.5 ‰	0 to 6 kts	0 to 35°C	0 to 10 ⁴ psi	0 to 20 m	90 to 26 db	0 to 70% /m	0 to 100 ft	0 to 100°C	0 to 1000 mb	0 to 1000 mb	0 to 100 hr
Maximum error	20*	0.03 kts	0.01 fms	0.01°C	0.1 psi	1 ft	3 db	2%	0.2 ft or 10% or 17'	0.1°C	0.1 kv	0.1 mb	10 hr
Duration of obs	Inst. or Short period (e.g. Representative)												
Sampling intensity	X, Y	600 n. mi/100-150 n. mi											
	Z	20 Sec LAPRO levels (near bottom)											
	Time	6 hrs/10 min, (1 min)											
(b) synch	X, Y	24 hrs											
	Z	15 min											
		3 sec											
RESULTS OF ASSESSMENT													

3 RESULTS OF ASSESSMENT

Requirements fully met.

Requirements partially met and why: All requirements listed in 1 above would be met with the exception of:
 • The X, Y spacing of 60/10 n. mi and 150 n. mi in DO. Tentative "system" initial spacing is 400 n. mi DO and 100-150 n. mi CNA.
 • The 3 second Z synch of 0.6. Tentative "system" allows 1 min.

Requirements not met and why:

- Oxygen: Uncertainty about 0.6 from buoy unattended for long periods.
- These are 1967 data requirements not refined.

REFINED AMO 4 86

"GRAY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BOOT SYSTEM

[illegible]

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

TENTATIVELY PROPOSED NDBS SENSING CAPABILITIES

Parameters Characteristics	OCEANOGRAPHIC						METEOROLOGICAL											
	Curr dir	Curr speed	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements* Ht Per Dir	Air temp	Atmos elect	Atmos press	Dew point	Instr. lation	precip rate	Wind dir	Wind speed
Geographic location	Deep Ocean (60°N to 60°S) American Coast out to 100 n mi																	
Vertical layer	Surface to 5000 m depth																	
Range (5-yr SOA)	0 to 360°	0 to 10 kts	42.0 to 46.0	4500 to 5500 fms	5 to 40°C	0 to 10 ⁴ dbar	0 to 10 ⁴ lux	80 to 20 db	0 to 70 ft	0 to 100 ft	0 to 60°C	0 to 10 kV	980 to 1030 mb	25 to 30°C	0 to 10 in	0 to 100 in/hr	0 to 160 kts	0 to 100 mph
Max error (1-yr SOA)	5°	0.03 kts or 1% or 1% or 1%	0.01 dbar	1 fms	0.01°C	0.1 ft	1%	3 db	2%	0.2 ft or 10%	0.1 sec	0.1 kV	0.1 mb	0.2°C	1%	0.1 in/hr	0.1	0.1 mph
Duration of obs	Last or Short period avg. (Representative)																	
Sampling intensity	X, Y	600 n mi/100-150 n mi																
(b) since	X, Y, Z	20 Std LAPO levels (near bottom)																
	Time	6 hrs/3 hrs																
	X, Y, Z	10 min, 11 min																

*Includes Measurements of Swells

REFINED AND ST. REQUIREMENTS (NRL, Navy University - Measure of Velocity and Mass Fields in Strong Currents)

Geographic location		Major Currents of the World															
Vertical layer	Any depth																
Range	0 to 360°																
Maximum error	10°																
Duration of obs	1 month																
Sampling intensity	X, Y																
(b) since	X, Y, Z																

REQUIREMENTS OF ASSESSMENT

Requirements fully met

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of

- The duration of obs if longer than 10 min. Tentative "system" is 10 min or less.
- The fine scale X, Y spacing. Tentative "system" initial spacing of 500 ft (100-150 n mi) will be greater especially in DO.
- The Z in Z sampling intensity. Tentative "system" uses 20 LAPO levels to 5000 m which will be too gross in depths greater than 500 m.

Requirements not met and why:

- Electrical Volume Conductivity. Uncertainty about 1% from bulk unattended for long periods.

*These are 1967 data requirements not refined.

REFINED AMO # 57

GREY AREA: PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUYS. *EM

Normas

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Exhibits:

TECHNICAL PROPOSED IDEAS SENSING CAPABILITIES

Revised 20 Aug '84

Part numbers		OCZANGBA, MIC										METEOROLOGICAL						
Characteristic		Cur speed	Salinity	Sound speed	Water temp	W press (depth)	Ambient light	Trans- parency	Wave measurements*	Air temp	Atmos elect	Atmos press	Dew point	Inso- lation	Precip rate	Wind dir	Wind speed	
		dir							Ht.	Per	Dir							
Conc-ographic location		Deep Ocean 40°N to 40°S American Coast out to 400 n. mi																
Vertical layer		Surface																
Range (5-yr SOA)		0 to 3000	0 to 10	4500 to 5000	-5 to 40°C	0 to 10 ⁴	0 to 2.0	0 to 10	0 to 100 ft	1 to 40 sec	0 to 360°	0 to 1000 mb	25 to 40°C	0.01 to 2.0 hr/m	0.12 in. hr	0 to 360°	0 to 150 kts	
Max error (5-yr SOA)		5'	0.02 kts	0.01/0.00 or 1%	0.01°C	0.1%	12	3 db	2%	0.2 ft or 10%	5° or 1%	0.1 mb	0.2°C	1%	0.01 in. hr	2° or 10	0 to 150 kts	
Duration of obs		Last or Short period avg. (Representative)																
X, Y		5, 600 n. mi/100-15. n. mi																
Sampling intensity		20 Std LAT/LO levels (+ near bottom)																
Time		8 hrs/3 hrs																
Obs. synch		X, Y (2) 10 min, (1 min)																

Includes Macintosh and SuperMac

REFINED AMO # 88 REQUIREMENTS Naval Undersea Warfare Center--Research on Underwater Sound Propagation Patterns

San Diego to 300 Miles out in a Circle						
Geographic location	Sfc - bottom max 72 m	Sfc to bottom max 100 ft	Bottom 766 m	S/c	S/c to 20 ft	S/c to 80 ft
Vertical layer	0 to 0 to	0 to 25 °C	Needs elaboration	0 to 10 ft	0 to 30 ft	0 to 50 ft
Range	3 hrs	25 °C	A/R	10 ft	2*	2*
Maximum error	0.2 kts s/c; 1 kts bottom	0.2 °C	1 min avg.	1 min avg.	1 min	1 min
Duration of ab	last	last				
X, Y	10 n. mi or just site					
Sampling frequency	S/c - bottom	Varies 7 to 10 min (c. 30 X/hr)	Bottom only	N/A	Not used	Not used
Time	4 hrs	4 hrs	4 hrs	4 hrs	4 hrs	4 hrs
X, Y	N/A	N/A	N/A	N/A	N/A	N/A
Cb. area	Z	10 min	N/A	N/A	N/A	N/A

Requiere un momento totalmente libre.

• The Z spacing of 7 to 70 m (about 50 levels to 700 m). Testative "systems" has only 12 levels to 700 m.

Acquirements and cost and why

None of the above measurements will be of value unless made in conjunction with rather involved acoustic measurements at the same station using bottom-mounted hydrophone arrays and elaborate signal-processing equipment. It is doubtful that any sensible arrangement could be made to satisfy their requirements with a general purpose buoy

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NAME SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL									
		Curr. dir	Curr. speed	Salinity	Sound speed	Water temp	W. press (depth)	Ambient light	Ambient noise	Trans- parency	Wave measurements* Ht.	Per	Dir	Air temp	Atmos. elect	Atmos. pres	Dew point	Inso- lation	Precip. rate	Wind speed	Wind dir
Characteristics																					
Geographic location		Deep Ocean 40°N to 40°S, 150°W to 150°E, American Coast out to 400 n. mi.																			
Vertical layer		Surface to 5000 m depth																			
Range (5-yr SOA)		0 to 360°	0 to 360°	0 to 360°	4500 to 5500 fms	-5 to 40°C	0 to 10 ⁴ psi	9 to 20 f/yr	-80 to -20 db	0 to 100%	0 to 100 ft	1 to 40 sec	0 to 360°	-25 to 60°C	0 to 10 kv	800 to 1095 mb	-25 to 40°C	0.01 to 2.0 ly/m	0 to 10 in./hr	0 to 160 kts	0 to 360°
Max. error (5-yr SOA)		5°	5°	5°	0.01 kts	0.01°C	0.1%	1%	3 db	5%	0.2 ft	0.1 sec	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	0.5 kts	2° or 3%
Duration of obs.		Last of short period avg. (Representative)																			
Sampling interval		X, Y ± 600 n. mi./100-150 n. mi.																			
Ob. arch.		20 Std. LA PNO levels (+ near bottom)																			
		6 hrs/3 hrs																			
		Surface																			
		</																			

2. REFINED AMO & SSA REQUIREMENTS USN NAVAIRSYSCOM (AIR-5601)-Develop Analy. s/Prediction Techniques to Support NWS (Synoptic)

Geographic location		CNA out to 150 n. mi., Gulf of Mexico, 0 to 30°N - 150°W to 120°E, 0 to 30°N - 35°W to NA, 30°N to 45°N - 150°W to 40°E (+ Antarctic)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Vertical layer	Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc 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to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 500 m		Sfc to 50	

3. RESULTS OF ASSESSMENT

Requirements fully met:

- Requirements partially met why: All requirements listed in 2 above would be met with the exception of:
 - The maximum allowable error of 0.5% for current speed: Tentative "system" value is the larger of 0.03 kts or 1%.
 - The 30 sec Z arch. of obs: Tentative "system" allows up to 1 min.
 - The X, Y spacing of 200-500 n. mi in the DO: Tentative "system" spacing is about 600 n. mi.

Requirements not met and why:

- All requirements in Antarctica 60°S to South Pole: Tentative "system" does not include this area.
- Total Radiation is not met: Uncertainty about obs. from NDBS type buoy.

Figure 1. A. Schematic of the experimental design. B. Example of a single trial. C. Example of a single trial with a correct response. D. Example of a single trial with an incorrect response. E. Example of a single trial with a correct response. F. Example of a single trial with an incorrect response.

[illegible]

1000

Revised 20 Aug '74

TESTATIVE, PRC (PRZ) MINDS OF MINDS, CAPABILITIES

[illegible]

includes membership of the

[illegible]

1998-1999

1. **Introduction**

- The X₁ Y operator of 24.11 and in the last predicate "exists" meaning is almost always in the predicate "exists" value in the
- The first one I saw of the predicate "exists" value is 1 with

[illegible]

TRANSACTIVELY PREGNANT WITHIN SEVERAL HOURS (AFTER 1772)

[illegible]

RECEIVED AM 10 09 1966

RECEIVED AMERICAN OVERSIGHT

[illegible][illegible]

Always remember a lady's name

• The intra-state tax is sensitive to the state's economic conditions. All states would be treated with the exception of Alaska and Hawaii.

- [illegible]

FOR THE RECORD

- All representative in Australia 40% to 80% under "relative" system
- some predictions in and out uncertainties about 10% from 45% to 55%

Approved: AUG 13

GREY AREA PARAMETERS: A QUESTION FOR THE TEST TAKER: PROPOSED DATA LOSS SYSTEM

Parameter	total radiation, m	total radiation, m
Geo. location	Same as fig. 1	
Vertical laser	Near site	Near site
Range	0.015 to 2.25 ly. m	0.015 to 2.25 ly. m
Maximum error	1.5%	1.5%
Duration of obs.	Inst.	Inst.
	30 to 60 n. mi.	30 to 60 n. mi.
Sampling intensity	Z	N. A.
Time	3 hrs.	3 hrs.
Obs. synth.	X, Y Z	30 sec N. A.

References

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BULKY SYSTEM

[illegible]

References

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1 TENTATIVELY PRO SED ND88 SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL					
	Characteristics	Curr. speed dir.	Salinity	Sound speed	Water temp.	W. press (depth)	Ambient light	Ambient noise	Transparency	Wave measurements	Dir	Air temp	Clouds	Atmos. press	Humidity	Wind speed
Geographic location																
Deep Ocean (60°N to 80°S) American Coast out to 400 n mi																
Vertical layer																
Surface to 5000 m depth																
Range (5-yr SOA)																
360°																
0 to 10 kts																
42.0/100																
5000 fms																
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2 REFINED AND 92 REQUIREMENTS NSF, MIT - General Circulation of the Atmosphere and Oceans

Geographic location: World Oceans																
Vertical layer: 800 to 400 m																
Range	0 to 360°	0 to 360°	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms	0 to 4500 to 5000 fms
Maximum error	5°	0.03 kts	0.01 0/00	1 fms	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C	0.02°C
Duration of obs. 24 hrs																
X, Y: Varies - 1200 n mi																
Z: To be determined																
Time: 2 days																
Obs. synch: X, Y: 2 hrs																
Z: 2 hrs																

RESULTS OF ASSESSMENT

Requirements fully met.

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of

- The 24 hr duration of obs. Tentative "system" has duration of 16 min or less.
- The to be determined requirements. Tentative "system" may not satisfy some of these requirements when they are determined.

Requirements not met and why:

- Rawinsonde Data, Flux-mass, Heat and Momentum: Considered beyond 5-yr buoy SOA.

*These are 1987 data requirements not refined.

"KEY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BODY SYSTEM

[illegible]

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Parameter	(Rawinsonde Data)		R. H.	At. Press.	Wind Dir.	Wind Speed	Flux - Mica	Flux - Heat	Flux - Momentum
	Air Temp.	Humidity							
Geo. location	World Oceans								
Vertical layer	Sfc to 10 mb								
Range	-100 to 60 °C	0 to 100%		10 to 1050 mb	0 to 360°	0 to 300 kts	Sfc to 400 m To be determined		
Maximum error	UGWB Standard						To be determined		
Duration of obs	15 min					24 hrs			
Sampling intensity	X, Y	300 n. mi					Varies ~ 1200 obs aligned over 053000Z		
	Z	Mandatory levels					To be determined		
Ck. synch	Time	12 hrs							
	X, Y	1 hr					24 hrs		
	Z	1 hr					2 hrs 2 hrs		

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

1. TENTATIVELY PROPOSED NOISE SENSING CAPABILITIES										2. REFINED AMC # 93 REQUIREMENTS NSF, MIT - Research on Internal Gravity Waves									
OCEANOGRAPHIC										METEOROLOGICAL									
Parameters		Geographic location	Depth	Water temp.	Salinity	Speed	W. Press	Trans- parency	Wave measurement	Altimeter	Altimeter	Altimeter	Altimeter	Altimeter	Altimeter	Altimeter	Altimeter	Altimeter	Altimeter
		Deep Ocean (60°N to 60°S)	Surface to 5000 m depth	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Vertical layer		0 to 1000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000
Range (5-7 SCA)		0 to 1000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000
Max error (5-7 SCA)		0 to 1000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000
Duration of obs		0 to 1000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000
Sampling intensity		0 to 1000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000
Ob. synch. X, Y, Z		0 to 1000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000	0 to 5000

3. RESULTS OF ASSESSMENT									
Requirements fully met:									
Requirements partially met and why: All requirements listed would be met with the exception of: - The 20 min average duration of obs. for W. Press: Tentative "system" has more realistic operational values of 0.019, 0.019, and 0.019. - The 5 min X, Y, and 10 sec Z synch. of obs: Tentative "system" allows 10 min (X, Y) and 1 min (Z). - The Fine scale X, Y, Z spacing: Tentative "system" allows 10 min (X, Y) and 1 min (Z). - The vertical layer if bottom is below 5000 m: Tentative "system" only goes to 5000 m. Requirements not met and why:									

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

1 TENTATIVELY PROPOSED NDBS SENSING CAPABILITIES

Parameters	OCEANOGRAPHIC										METEOROLOGICAL									
	Curr. dir	Curr. speed	Salinity	Sound speed	Water temp.	W. press. (depth)	Ambient light	Ambient noise	Trans. permeability	Wave measure. Ht.	Wave measure. Per	Wave measure. Dir.	Air temp.	Atmos. elect. pres.	Atmos. Dew point	Inno. lation	Precip. rate	Wind speed	Wind dir.	
Characteristics																				
Geographic location	Deep Ocean (60°N to 60°S) American Coast out to 400 n. mi.																			
Vertical layer	Surface to 5000 m depth																			
Range (5-yr SOA)	0 to 360°	0 to 4500 m	42.0 to 45.0 ‰	1400 to 1500 mps	0 to 40°C	0 to 10 ⁴ psi	0 to 2 lx	-80 to 20 db	0 to 100%	0 to 100 ft	0 to 10 sec	0 to 360°	25 to 60°C	1009 to 1015 mb	25 to 40°C	0.01 to 0.03 in./hr	0 to 160 kts	0 to 360°		
Max error (5-yr SOA)	5°	0.03 kts	0.01 ‰	1 fpe	0.01°C	0.1%	1 lx	3 db	2%	0.2 ft	0.1 sec	5°	0.1°C	0.1 mb	0.2°C	0.01 in./hr	0.5 kts	2°		
Duration of obs.	Last 2 Short period avg. (Representative)																			
X, Y	5 800 n. mi/100-150 n. mi																			
Sampling Intensity	2 20 Sec. LA POC levels (near bottom)																			
Time	6 hrs/5 hrs																			
Obs. synth.	X, Y (Z) 10 min, (1 min)																			

2 REFINED AMO 94 REQUIREMENTS NET. MIT - Research on Roseby Waves

Geographic location		Mid-Atlantic of World Ocean	
Vertical layer	8 ft to Bottom	8 ft to Bottom	Bottom
Range	0 to 360°	0 to 360°	0 to 360°
Maximum error	10°	0.02 kts	0.02°C
Duration of obs.	5 min	5 min	5 min
Sampling intensity	2 20 gpc intervals	2 20 gpc intervals	2 20 gpc intervals
Ob. synth.	2 10 sec	2 10 sec	2 10 sec
X, Y (Z)	10 min, (1 min)	10 min, (1 min)	10 min, (1 min)

3 RESULTS OF ASSESSMENT

Requirements fully met:

- Requirements partially met and why: All requirements listed would be met with the exception of:
 - The minimum error for Salinity and W. Press. Tentative "system" has more realistic operational values of 0.01‰ and 0.1%.
 - The 5 min (D, Y) and 10 sec (Z) synth. of obs. Tentative "system" allows 10 min (D, Y) and 1 min (Z).
 - The X, Y sampling intensity. Tentative "system" has one way each 600 n. mi.
 - The vertical layer if bottom is below 5000 m. Tentative "system" only goes to 5000 m.

*These are 1967 data requirements, not refined.

ASSESSMENT SHEET FOR REFINED DATA REQUIREMENTS

Revised 20 Aug '68

TENTATIVELY PROPOSED NDARS SENSING CAPABILITIES

Parameters		OCEANOGRAPHIC										METEOROLOGICAL								
Characteristics		Current dir	Salinity	Speed speed	Water temp.	W pres (depth)	Ambient l jht	Ambient noise	Trans- parency	Wave measurements* Ht.	Per	Dir	Air temp	Altimet elect.	Altimet press	Dew point	Inno- lation	Precip rate	Wind dir	Wind speed
Geographic location		Deep Ocean 180°N to 40°S/American Coast out to 400 n. mi																		
Vertical layer		Surface to 3000 m depth																		
Range (5-yr SCA)		0 to 30.0°	0.05 to 10 kts	45.00 to 50.00 fms	-5 to 40°C	0 to 2.0 fms	0 to 2.0 fms	-80 to -20 db	0 to 100%	0 to 100 ft	1 to 40 sec	0 to 360°	-25 to 60°C	0 to 10 kv	800 to 1000 mb	-25 to 40°C	0.01 to 2.0 ly/m	0.12 to 1.0 in./hr	0 to 180 kts	0 to 180 kts
Max error (5-yr SCA)		5°	0.05 kts or 1%	0.01 fms or 1%	0.1°C	0.1 fms	1 fms	3 db	5%	0.2 ft or 10%	0.1 sec or 1%	5°	0.1°C	0.1 kv	0.1 mb	0.2°C	1%	0.01 in./hr	2°	0.5 kts or 5%
Duration of obs		Last 100 short period avg. (Representative)																		
X, Y		500 n. mi/100-150 n. mi																		
Sampling Intensity		20 Std. LAHCO levels (near 100m)																		
Time		6 hrs/3 hrs																		
Obs. sync		X, Y, Z		1 min. (1 min)																

2. REPORT DAWO 97 REQUIREMENTS Naval Civil Engineering Laboratory-Bike Survey for Manned Underwater Station

Geographic location		Vicinity of Santa Barbara Channel Islands, California																
Vertical layer		800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom	800 to bottom
Range		0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°	0 to 30.0°
Maximum error		0.1 hrs	0.010 / 100	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C	0.2°C
Duration of obs		≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min	≤ 10 min
X, Y		Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated
Z		10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels	10 levels
Time		6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs	6 hrs
X, Y		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Z		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Requirements partially met and why: All requirements listed in 2 above would be met with the exception of:
 a. The "not stated" X, Y spacing. Tentative "system" may be using ground.
 b. The 10 levels for Z sampling intensity. Tentative "system" would have 1 as than 10 levels in most of the area of interest.
 c. Sea state. Some measure of sea state can be approximated from wave measurements whether the coding will be exactly what is wanted must be resolved.

Requirements not met and why:

*These are 1967 data requirements not refined.

"GREY AREA" PARAMETERS NOW IN QUESTION FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

Revised 20 Aug. 64

[illegible]

Remarks: (Original Sea State measurement is a manual operation which can be approximated by a combination of "system" measurements)

PARAMETERS CONSIDERED BEYOND THE 5-YR STATE OF THE ART FOR THE TENTATIVELY PROPOSED DATA BUOY SYSTEM

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Figure 1

ASSESSMENT OF DATA REQUIREMENTS

TENTATIVELY PROPOSED MONITORING CAPABILITIES

TENTATIVELY PROPOSED NOMENCLATING CAPABILITIES																		
Revised 20 Aug '68																		
Parameters		OCEANOGRAPHIC							METEOROLOGICAL									
		Current dir	Current speed	Salinity	Water temp	Water depth	Ambient light	Ambient noise	Transparency	Wave measurements	Air temp	Atmos elect	Atmos press	Dew point	Inso lat/lon	precip rate	Wind dir	Wind speed
Geographic location		Drop Ocean 60°N to 60°S, 10°E to 10°W, 1000 m to 4000 m																
Vertical layer		Surface to 4000 m depth																
Range (5 yr MA)		0 to 360°	0 to 1000	0 to 40	0 to 4000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Max error (1 yr MA)		5°	0.01 m/s	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Duration of obs		Last or short period avg (Representative)																
Sampling frequency		10 min, 1 min, 1 sec																
On system		2 levels																
Ch system		10 min, 1 min, 1 sec																

*Include measurement of Swell

2. REFINED AND 99 REQUIREMENTS BCF, Alaska - Research in Environment of Fish in Alaskan Waters

Part 1 - Continental Shelf in Gulf of Alaska - Bering Sea and 60° N of 50° N and E of 185° W																
Geographic location	Vertical layer	Range	Maximum error	Duration of obs	X Y	See to unit	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated	Not stated
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Requirements not met and why: All requirements listed in 2 above would be met with the exception of the "Not stated" requirements. The "Not stated" requirements may not satisfy some of these requirements if they are more stringent than "system".

Requirements not met and why:

All requirements in section 2 above would be met with the exception of the "Not stated" requirements. The "Not stated" requirements may not satisfy some of these requirements if they are more stringent than "system".

APPENDIX V
TENTATIVE APPROACH FOR THE ESTIMATION OF RELATIVE VALUES
OF OPERATIONAL PARAMETERS AND LAYERS

APPENDIX V. TENTATIVE APPROACH FOR THE ESTIMATION OF RELATIVE VALUES OF OPERATIONAL PARAMETERS AND LAYERS

Up to now a baseline set of environmental parameters has been established for the National Data Buoy Systems by a process of interviewing user agencies, collating the results and determining the degree of commonality and feasibility for collection by data buoys. These agency data requirements, although further refined, have been determined only on a "YES-NO" basis and no attempt has been made to rank parameters by their relative value to the agency in the performance of its various missions. In order that the National Data Buoy Systems development planning can be based on as logical a foundation as possible and to insure that the resulting buoy systems are responsive to the nation's important data requirements in a cost-effective way, it is now necessary to obtain users' estimates of relative values of the various requested parameters.

Some parameters have greater "worth" than others, either because more agencies need them, or they are more essential to satisfying mission requirements. A properly responsive data collecting system should satisfy these requirements to a high degree. Whether other less important parameters should be collected can then be decided on the basis of their incremental worth and the incremental cost of collecting them. Unfortunately, no convenient analytical means exists for determining the worth on a purely objective basis, at least within the time frame involved. The approach to be used, then, will be to take advantage of expert judgment expressed in the form of subjective evaluations.

By estimating the relative values of marine environmental parameters, the users will help establish those parameters which make up the essential minimum set that must be gathered by some means and must be considered in the hardware development plans for the initial buoy systems. This procedure will also help describe a logical path for development plans beyond the initial systems to meet the longer range, less critical requirements.

In order to make this initial attempt at ranking parameters meaningful, it must be kept comparatively simple and it must be consistent from agency to agency.

Accordingly, the following assumptions and ground rules should be followed by the estimators:

1. Each agency will make two ratings of the parameters. The first rating will be for all categories of oceanic missions, while the second rating will be for atmospheric missions. All parameters will be rated for each of the appropriate layers by each of the categories of missions.
2. The parameter characteristic requirements (accuracy, spatial distribution, etc.) are assumed to be met by the proposed system.
3. Parameters should be rated without regard to the platform to be used to collect the data.

For the evaluation, a list of marine environmental parameters has been developed from a refinement of agency requirements and attached to this cover sheet for assignment of relative values. A system has been devised by which quantitative values can be assigned to four subjective criteria in which a parameter can be placed based on its relative importance in fulfilling an operational need. Although many parameters may be absolutely necessary to satisfy a mission or important to satisfy a mission, they may not have the same value relative to each other. Therefore, each of the two most important categories have been broken down into two relative values each. It is necessary that the parameters be carefully weighed in order to make an evaluation of their value meaningful. The four criteria, with their respective values are:

<u>Value(s)</u>	<u>Criteria</u>
5,4	- Must have to satisfy missions
3,2	- Important to satisfy missions
1	- Useful to satisfy missions
0	- Of no value to satisfy missions

Blank spaces are provided at the bottom of each list for including any parameters that are necessary to meet oceanic or atmospheric missions that were omitted in this

listing. Realizing that the relative value of a parameter may change at different levels, the attached list has been broken down into seven vertical layers with approximate limits as follows:

- Upper air: - 1. 100,000 to 30,000 feet
- 2. 30,000 to 45 feet
- Surface: air water - 3. 45 feet to 0
- 4. 0 to 10 m
- Sub surface: - 5. 10 m to 500 m
- 6. 500 m to 5000 m
- 7. At or near bottom, regardless of depth.

Each agency is requested to make separate oceanic and atmospheric mission value ratings of the seven listed layers in a manner similar to that for the parameters. This rating will be done on the separate table at the bottom of the rating sheet.

Any questions that arise concerning the response to this form should be made by phone to Commander MORRILL of the Coast Guard Project Management Office.

This represents the first attempt at estimating the relative values of operational parameters within vertical layers. Future refinements may still be required to establish the total set of parameters within layers to be measured by the initial buoy systems. Various negotiations with agency representatives may still be required once the completed forms have been analyzed. It is recognized that there are limitations to this approach but the results should provide a guide for initial data buoy system development efforts while the federal government continues to refine specifics on data use and user benefits.

It is requested that the two completed forms be returned by 16 August 1968.

Please send the completed responses to:

CDR P.A. MORRILL
Chief, Requirements Division
National Data Buoy Systems Project
Management Office, Suite 400
733 15th Street N.W.
Washington, D. C. 20005
Tel. No. 964-2909

Layer				Layer			
100,000 to 30,000 feet				0 to 10 meters			
30,000 to 45 feet				10 to 500 meters			
45 to 0 feet				500 to 5000 meters			
0 to 10 meters				At or near the bottom			
Parameter				Parameter			
Ozone Content				Ambient Light			
Cosmic Radiation				Ambient Noise			
Cloud Tops				Current Direction			
Cloud Bases				Current Speed			
Cloud Amount				Salinity			
Wind Speed				Sound Speed			
Wind Direction				Transparency			
Air Temperature				Water Temperature			
Height				Propagation Loss			
Atmos. Pressure				Depth			
Dew Point, Humidity				Water Pressure			
Atmos. Electricity				Oxygen			
Insolation				Carbon Dioxide			
Precipitation				Phosphates			
Visibility				Nitrates			
Magnetic Field				pH			
Declination				Nutrients			
Magnetic Field				Plankton			
Inclination				Chlorophyll			
Magnetic Field				Biological Growth			
Intensity				Phases of Fish			
Gravity				Vertical Current			
Wave Period				Bottom Composition			
Wave Direction				Photos of Bottom			
Wave Height				Bathymetry			
Tidal Fluctuation				Sediment Deposit			

Layer	Value
100,000 to 30,000 feet	
30,000 to 45 feet	
45 to 0 feet	
0 to 10 meters	
10 to 500 meters	
500 to 5000 meters	
At or near the bottom	

Criteria for		Value	Criteria
Estimating	Relative	5,4	Must have to satisfy missions
		3,2	Important to satisfy missions
Values		1	Useful to satisfy missions
		0	Of no value to satisfy missions

DOCUMENT CONTROL DATA

UNITED STATES COAST GUARD

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MARINE METEOROLOGICAL AND OCEANOGRAPHIC DATA

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UNITED STATES COAST GUARD

13. ABSTRACT

Volume I - This report documents the 1968 refinement of requirements for marine meteorological and oceanographic data--initially compiled during the 1967 Study of the Feasibility of National Data Buoy Systems--and shows the applicability of certain postulated National Data Buoy Systems sensing characteristics to a subset of the refined data requirements. Included in the refined requirements to support national operational and research activities are physical, biological, chemical, geological and radiological parameters which are to be measured throughout the world's oceans from the ocean bottom to 100,000 feet in the atmosphere. The data requirements are projected from the present to as far as 15 years into the future.

The study presents a subset of 20 parameters suggested as being representative of the basic sensing characteristics of a future deep ocean or coastal North American National Data Buoy Systems. Estimates of relative values of parameters and observing layers are also included in this study as part of the documentation of the ongoing effort to provide a base for the assessment of hypothetical technically feasible sensing characteristics within the 5 year state-of-the-art. ()

Volume II - This report contains five supporting Appendixes for Volume I.