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TECHNICAL MEMORANDUM

(TM Series)

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VOLUME TWO

APPENDICES

PHASE I FINAL REPORT

NATIONAL DATA PROGRAM FOR THE MARINE ENVIRONMENT

1 DECEMBER 1967

SYSTEM
DEVELOPMENT
CORPORATION
2500 COLORADO AVE.
SANTA MONICA
CALIFORNIA
90406

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VOLUME TWO

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APPENDICES

LIST OF TABLES

This study was financed by a contract with the National Council on Marine Resources and Engineering Development, Executive Office of the President. However, the findings, recommendations, and opinion in the report are those of the contractor and not necessarily those of the Council, nor do they imply any future Council study, recommendations, or position. It is hoped that this study will contribute to the full discussion of problem areas and issues in marine science affairs.

APPENDIX A

REVIEW AND COLLATION OF DATA MANAGEMENT PLANS OF SELECTED ORGANIZATIONS

A contract requirement of Phase I is the accumulation, review and collation of the data management plans of selected organizations involved in marine science programs. In accomplishing this goal, organizational plans were obtained through personal interviews, in telephone conversations, and from existing literature. In some cases, the plans were general agency plans, not specifically oriented toward data management, whereas, others emphasized future data management plans. Table 1 lists organizations from which plans were obtained and further defines the type of plan and its format (this appendix).

The detailed process utilized in reviewing and collating the key elements of these plans is described in Section VIII. As stated there, the conclusions, recommendations and actions set forth in the plans were partitioned into 23 major subject areas as follows:

A. PHYSICAL OCEANOGRAPHY
B. BIOLOGICAL OCEANOGRAPHY
C. CHEMICAL OCEANOGRAPHY
D. METEOROLOGY
E. GEOLOGY
F. GEOPHYSICS
G. SURVEYS
H. FOOD AND FISHERIES
I. MINERALS AND DRUGS
J. WATER RESOURCES
K. RECREATION
L. POLLUTION
M. RADIOACTIVITY
N. ENGINEERING
O. DATA MANAGEMENT
P. PLATFORMS
Q. SENSORS, INSTRUMENT SYSTEMS
R. FACILITIES
S. LEGAL, MANAGEMENT
T. ORGANIZATION
U. EDUCATION, TRAINING
V. INTERNATIONAL PROGRAMS
W. MISCELLANEOUS

The results are presented in the following pages of Table 2, this appendix. In general, each page in the table covers a separate subject, although several subjects are combined on some of the later pages for brevity. The overall generalized conclusions are synthesized and drawn together in Section VIII. All of the first level of aggregation of the plan elements, however, is included in the following pages for a more detailed study.

A few more comments are in order regarding this collation process. Table 2 of this appendix, contains a complete listing of each of these topics and the categories in which they have been placed. The number of organization plans listed in Table 2 is less than that shown in Table 1, however. The Department of the Interior, for instance, has one column heading in Table 2, but has six in Table 1, since all of the marine programs for this department have been combined into one document. Industry plans were generally not discussed in sufficient detail to justify this inclusion in the chart. This was also true for other organizations so that the 20 organization plans listed in Table 2 were those finally selected for collation. The accession number refers to the SDC marine literature library number and the bibliography included in Volume I of this report.

The three columns on the right-hand side of each page of Table 2, this appendix, under the heading "Impact on Data," list relative effects on data collection, data processing or data use of each topic. This relative effect is a subjective attempt to determine whether or not a planned item will affect future data management requirements and to what extent. The assessment was made by contractor personnel. As an example of the procedure followed in making the assessment of effects, take topic 1, page 9, Table A-2. "Survey current delineation" which is planned by the USCG, the Navy and ESSA, according to entries in the chart. It is believed that large amounts of data are being and will have to be collected in order to delineate all currents in the world oceans. Therefore, a "2", indicating a major impact, has been placed in the column entitled "collection."

Because of the subjective nature of this analysis, it is doubtful that complete agreement between reviewers could be obtained. The process did, however, serve the useful purpose of filtering the nearly 300 topics in Table 2, this appendix, and reducing the number to be considered to a somewhat smaller group as is described in Section VIII of Volume I of the report.

The collation and analysis carried out to date suggests that a further analysis be developed utilizing a matrix relating the plans of various organizations to the focus of recommendations found in the literature or resulting from interviews with users of oceanographic data. This suggests another tool which should become an ongoing function because of the dynamic nature of the marine science field.

TABLE A-1

PLANS OF ORGANIZATIONS REVIEWED FOR MARINE DATA MANAGEMENT STUDY, PHASE I

FEDERAL GOVERNMENT

NAME OF ORGANIZATION	GENERAL PLAN	DATA MANAGEMENT PLAN	DOCUMENTED	VERBAL
Department of Defense				
Department of the Navy				
Naval Oceanographic Office		X		X
Fleet Numerical Weather Facility		X	X	X
NAVSHIPS				
AUTEC Management Div.		X		X
Research and Development Center		X		X
Department of the Army				
Corps of Engineers				
Coastal Engineering Research Center		X		X
Department of the Interior	X	X	X	
Geological Survey		X		X
Federal Water Pollution Control Administration		X		X
Bureau of Commercial Fisheries	X			X
Bureau of Sport Fisheries and Wildlife	X			X
Bureau of Mines	X			X
Office of Saline Water	X			X

TABLE A-1
cont'd

FEDERAL GOVERNMENT
(cont'd)

NAME OF ORGANIZATION	GENERAL PLAN	DATA MANAGEMENT PLAN	DOCUMENTED	VERBAL
Department of Commerce				
Maritime Administration	X			X
Department of Transportation				
U.S. Coast Guard Oceanographic Unit	X	X	X	X
National Aeronautics and Space Administration				
Earth Resources Program	X			X
Atomic Energy Commission				
Environmental Sciences Div.		X		X
Smithsonian Institution	X		X	X
Library of Congress				
Legislative Reference Service		X		X

TABLE A-1
cont'd

STATE GOVERNMENT AND INDUSTRY

NAME OF ORGANIZATION	GENERAL PLAN	DATA MANAGEMENT PLAN	DOCUMENTED	VERBAL
State Government				
California				
Governors Advisory Council on Ocean Resources	X		X	
State Fisheries Laboratory	X		X	
Industry				
Chemical				
Dow Chemical Company		X		X
Communications				
International Telephone and Telegraph		X		X
Transportation				
Moore-McCormack		X		X
Instrument Manufacturer				
Bissett-Berman		X		X
National Security Industrial Association		X		X

TABLE A-1
cont'd

INSTITUTIONS AND UNIVERSITIES

NAME OF ORGANIZATION	GENERAL PLAN	DATA MANAGEMENT PLAN	DOCUMENTED	VERBAL
Institutions				
Scripps Institution of Oceanography		X		X
Woods Hole Oceanographic Institution		X		X
American Geological Inst.		X		X
Universities				
University of Michigan Great Lakes Research Div.		X		X
University of Rhode Island Narragansett Marine Lab.		X		X
Columbia University Lamont Geological Observatory		X		X
Johns Hopkins University Chesapeake Bay Institute		X		X

TABLE A-1
cont'd

DATA CENTERS

NAME OF ORGANIZATION	GENERAL PLAN	DATA MANAGEMENT PLAN	DOCUMENTED	VERBAL
Data and Information Centers				
National Oceanographic Data Center	X	X	X	X
Institute of Environmental Data Services - ESSA	X	X		X
National Weather Records Center		X	X	X
Oceanographer of the Navy - Ocean Center		X	X	X
Smithsonian Oceanographic Sorting Center		X	X	X
U.S. Lake Survey - Army Corps of Engineers		X		X

TABLE A-1
cont'd

INTERNATIONAL ORGANIZATIONS

NAME OF ORGANIZATIONS	GENERAL PLAN	DATA MANAGEMENT PLAN	DOCUMENTED	VERBAL
UN Agencies				
UNESCO				
International Oceanographic Commission	X		X	
Food and Agricultural Organization - Department of Fisheries				X

TABLE A-2

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

A. PHYSICAL OCEANOGRAPHY

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry for an Integrated D	A Plan for the Marine	Proposed Plan
RECOMMENDATION OR CONCLUSION / Accession* No.	56	374	90	310	344	227
1. Survey current delineation						21
2. Study subsurface currents						
3. Survey water mass flow						
4. Prediction of temperature in the ocean						
5. Study heat flow at air-sea interface	32					
6. Identify thermal fronts						
7. Study internal waves	33					35
8. Study deep ocean surface waves	12,26					
9. Develop surface wave prediction capability		67				
10. Study waves, near shore	28,58 59					
11. Study wind-driven wave generation	12	67				
12. Study tides	34					
13. Improve tide prediction capability	27					
14. Improve tidal current prediction	27					
15. Obtain experimental verification of theoretical ocean circulation						
16. Obtain more Arctic bathymetry						
17. Obtain more Arctic ice information						21
18. Study diffusion processes near deep bottom						
19. Study diffusion processes in bays, near coasts	[illegible]					
20. Survey interchange of water between North Atlantic and adjacent areas						
21. Develop ice prediction capability		[illegible]				

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

* Accession Number - See Bibliography

** ∅ Little or No Impact
Minor Impact
Major Impact

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l Year 1967

Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 thru 1970	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	---Plan for -- Automatic Computer for use at CCOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
0	344	427	[illegible]	228	403	404	[illegible]	[illegible]	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
		21			19	13, 35 76													2	1	1
									9										2	2	1
			X		19				2										2	2	1
					21														2	2	1
					21,49 91														2	2	2
					21														2	2	1
		35			21,90														2	2	1
					26														2	2	1
					26,49 70														2	2	1
																			2	2	2
					35														2	2	2
					26														1	1	1
					26														1	1	1
																			1	1	1
					60,90														2	2	1
					77														1	1	1
		21			77														[illegible]	1	1
					92														1	1	1
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					[illegible]														2	1	1
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TABLE A-2
cont'd

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

A. PHYSICAL OCEANOGRAPHY (cont'd)

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's for an Integrated Da	A Plan for the A of Marine Ma	Proposed Plan	
RECOMMENDATION OR CONCLUSION / Accession* No.	56	374	90	310	344	227	2
22. Study ice drift							X
23. Study ice deterioration							X
24. Develop ice detection capability							X
25. Study mixed layer depth	12						
26. Study estuary dynamics					W-12		
27. Assemble tsunami historical data	34						
28. Study air-sea interaction - synoptic	12						
29. Prepare sea surface temperature synoptic maps	20						
30. Study thermocline depth short term fluctuation							
31. Prepare thermocline depth synoptic maps	20						
32. Prepare thermocline intensity synoptic maps	20						
33. Prepare temperature 10m depth synoptic maps	20						
34. Prepare temperature bottom synoptic maps	20						
35. Study benthic boundary	32						
36. Study turbulence	33						
37. Determine sampling interval selection	[illegible]						
38. Collect time series data							

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

* Accession Number - See Bibliography

** ∅ Little or No Impact
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Utilization of Industry's Capability for an Integrated Data Management System	Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
310	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lection	Pro-cessing	Use
			X		22														1	1	1
			X		23														1	1	1
			X		23				9										2	2	1
					35														2	2	2
	V-12																		1	1	1
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																			2	2	2

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TABLE A-2
cont'd

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

B. BIOLOGICAL OCEANOGRAPHY

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's C for an Integrated Data	A Plan for the Acc of Marine Natur	Proposed U Plan fo Br	
RECOMMENDATION OR CONCLUSION / Accession* No.	56	374	90	310	344	227	220
1. Investigate biological indicators							
2. Study marine boring organisms	28						
3. Study marine fouling organisms	28						
4. Investigate deep scattering caused by marine organisms							
5. Analyze biological sounds						35	
6. Study biological luminescense							
7. Study poisonous marine organisms							
8. Study predatory marine animals							
9. Investigate continental shelf ecology							
10. Obtain biological organism distribution statistics	62,65						
11. Prepare plankton volume - synoptic maps	20						
12. Prepare biological mass - synoptic maps	20						
13. Obtain taxonomy data on marine biota	63,64						
14. Study marine bacteria	63						
15. Inventory migratory birds					29		
16. Investigate migratory bird ecology					29		
17. Study migratory bird habitats					29		

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

** ∅ Little or No Impact
[illegible] Minor Impact
[illegible] Major Impact

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System -- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Rolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
0	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lection	Pro-cessing	Use
					19														1	0	1
					37														2	2	1
					37														1	0	1
					39,45														2	1	1
		35			39,99														2	1	1
					42														1	0	1
					42														1	0	1
					42														1	1	1
					98														2	2	2
					100														2	1	2
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																			1	2	1
																			1	1	1
	29																		1	1	1
	29																		1	1	1
	29																		1	1	1

TABLE A-2
cont'd

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

C. CHEMICAL OCEANOGRAPHY

RECOMMENDATION OR CONCLUSION / Accession* No. (DOCUMENT TITLE)	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's for an Integrated	A Plan for the Marine	Proposed Plan
	56	374	90	310	344	227
1. Investigate organic film at sea surface						
2. Study dissolved gas concentration	47					
3. Study mineral alteration						
4. Study hydrocarbon concentration						
5. Study material exchange at air-sea interface						
6. Study hydrogen sulfide concentration						
7. Investigate corrosion of metals						
8. Obtain chemical nutrient distribution						
9. Standardize chemical analysis techniques	12					
10. Prepare salinity, surface-synoptic map	20					
11. Prepare chemical parameters - synoptic map	20					
12. Prepare salinity, 10m depth - synoptic map	20					
13. Study chemical thermodynamics of sea water	45					

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

* [illegible]

** [illegible]

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1970	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. L. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
0	344	227	226	228	403	404	125	417	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lection	Pro-cessing	Use
					27														1	0	1
					27														1	1	1
					28														1	1	1
					28														1	1	1
					91														2	2	1
					28														1	1	1
					91														2	2	1
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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

D. METEOROLOGY

RECOMMENDATION OR CONCLUSION	DOCUMENT TITLE: Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Capa for an Integrated Data Ma	A Plan for the Accele of Marine Natural	Proposed U.S. Plan for	Brief Co
Accession* No.	56	374	90	310	344	227	226
1. Obtain Arctic weather data							
2. Determine synoptic forecast requirements		3					X
3. Study monsoons	13						
4. Prepare cloud cover - synoptic maps	20						
5. Improve and expand marine weather support to high seas shipping		5					
6. Establish a standard for weather support to all U.S. marine activities		5					
7. Improve weather support to marine activities in coastal waters, harbors		5					
8. Expand and accelerate the dissemination of observations, forecasts for small craft		10					
9. Expand and accelerate collection and acquisition of marine observations		10,45					
10. Develop service products to more clearly convey weather information		10,67					
11. Improve storm and hurricane warning systems	20	3,68					
12. Develop forecast capability at air-sea interface		10					
13. Improve dissemination of weather data		3					
14. Obtain committed broadcast time for prompt dissemination of information		10					
15. Refine techniques for observing and forecasting visibility		68					

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

** ∅ Little or No Impact
Minor Impact
Major Impact

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l Oceanographic Program al Year 1967	Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1970	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval Systems --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic [illegible]ation Laboratory	NAVSHIPS, Research & Development Center	Impact on Data		
10	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
					77														2	1	1
			X			47													2	2	2
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TABLE A-2
cont'd

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

E. GEOLOGY

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's C for an Integrated Da	A Plan for the Acc cf Marine Metur	Proposed U Plan fo Br	
Accession* No.	56	374	90	310	344	227	226
1. Study subbottom structure	57						
2. Determine sediment thickness					M-6		
3. Collect bottom sample and cores	51						
4. Investigate sediment transport					M-6		
5. Determine sediment age							
6. Survey submarine canyons, trenches	13,27						
7. Determine continental shelf - history and origin					21		
8. Develop prediction of bottom conditions in unsurveyed areas capability							
9. Determine shape of continental shelf more adequately							
10. Determine submarine mountain topography more adequately							
11. Conduct geophysical measurements to determine typical characteristics of mantle, crust							
12. Study sedimentary rock formation affected by chemical processes					15		
13. Study sedimentary rock formation affected by biological processes					15		
14. Need bottom topography charts	38						
15. Study coral atolls	13						
16. Study turbidity current	51						
17. Investigate littoral drift and determine source of littoral materials	59						
18. Study volcanics - submarine					M-9		
19. Increase bottom photography	31						
20. Develop automated index for geological data							

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

* Accession Number - See Bibliography

** ∅ Little or No Impact

1 Minor Impact

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	-- Plan for -- Automatic Computer for use at COOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
					29														2	1	1
	M-6				29														1	1	1
					29														1	1	1
	M-6				32														1	1	1
					32														0	0	1
					33														1	1	1
	21																		1	1	1
					49														1	1	1
					73	4													2	2	2
					73														2	1	1
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	15				96														2	1	1
	15				96														2	1	1
									9										1	2	1
																			1	1	1
																			1	1	1
																			1	1	1
	M-9																		1	0	1
									8										2	2	1
														X					0	2	1

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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

F. GEOPHYSICS

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Capab for an Integrated Data Mana	A Plan for the Accelera of Marine Natural R	Proposed U.S. C Plan for 19	Briefin Coa	
RECOMMENDATION OR CONCLUSION — Accession* No.	56	374	90	310	344	227	226	2
1. Investigate reversed magnetic polarization								
2. Conduct seismic refraction surveys								
3. Conduct gravity surveys								
4. Need more accurate gravity measurements								
5. Conduct magnetic surveys	35							
6. Determine heat flow at benthic boundary	33							
7. Investigate acoustic energy scattering								
8. Investigate acoustic energy transmission paths in water								
9. Investigate acoustic energy reflection								
10. Prepare acoustic data bank								
11. Study seismic reflection								
12. Study natural ocean sounds (waves, wind, rain, earthquakes, marine animals)								
13. Study industrial sounds (ships, submarines)								
14. Determine energy transfer processes near large acoustic transmitters and receivers								
15. Study and locate seismically active areas					20			

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

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l Oceanographic Program cal Year 1967	Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	---Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1969	Information Storage & Retrieval System -- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center		Impact on Data **		
10	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
					32														1	1	1
					33														2	2	1
					34														2	2	1
					76														2	2	2
					35														2	2	1
					36														1	1	0
					45														2	2	1
					44														2	1	1
					44														2	2	1
																X			1	2	1
					45														2	1	1
					48														1	1	1
					48														1	1	1
					99														1	1	1
	20																		1	1	1

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TABLE A-2
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COLLATION OF PLANS FOR THE
NATIONAL MARINE DATA PROGRAM

G. SURVEYS

LOCUMENT TITLE

RECOMMENDATION OR CONCLUSION	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Ca for an Integrated Data M	A Plan for the Accel of Marine Natur	Proposed U.S Plan for	Bric
Accession* No.	56	374	90	310	344	227	220
Oceanwide							
1. Conduct SEAMAP	12						
2. Survey dynamic ocean circulation	35						
3. Survey air-sea interaction	31						
4. Install major experimental networks in North Atlantic and North Pacific							
5. Survey sea surface temperature using infrared radiation thermometers						37	
6. Install tide gauge station net - worldwide	13						
7. Survey of world ocean using seismic refraction and reflection	13,57						
8. Survey coast lines	27						
Defined Areas							
1. Prepare reconnaissance geological maps for the entire U.S. continental shelf	23				20		
2. Prepare reconnaissance geophysical maps for the entire U.S. continental shelf					20		
3. Prepare detailed geological maps for selected areas of the continental shelf	23				20		
4. Prepare detailed geophysical maps for selected areas of the continental shelf					20		
5. Obtain subsurface stratigraphic and structural data					20		
6. Conduct Northwest Atlantic survey 1974-1975						20	
7. Continue ocean station measurements	37					26	
8. Continue standard section measurements	39					27	X
9. Conduct near coastal station measurements						30	
10. Survey of U.S. continental shelf using seismic refraction and reflection	57						
11. Study Gulf Stream							

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 thru 1975	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CCOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
310	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
																			2	2	2
																			1	1	1
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		37																	2	2	1
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																			2	2	1
	20																		2	0	1
	20																		2	0	1
	20																		2	0	1
	20																		2	2	1
	20				98														2	2	1
		20																	2	2	1
		26																	2	2	1
		27	X																2	2	1
		35																	2	2	2
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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

H. FOOD AND FISHERIES

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION / Accession* No.	Draft of a General Scientific Framework for World Ocean Study 56	Plan for a National Marine Weather Service 374	National Oceanographic Program Fiscal Year 1967 90	Utilization of Industry's Cap for an Integrated Data Ma 310	A Plan for the Accele of Marine Natural 344	Proposed U.S. Plan for 227	Brief Co 226
1. Improve procedures to estimate size, distribution, behavior of fish	13,18 75,19				F-10		X
2. Research dynamics of fish population	21,76				26		
3. Research transfer of food through food web					F-8		
4. Develop processes for making fish protein					F-12		
5. Investigate breeding organisms in captivity in the laboratory					F-8		
6. Conduct systematic biological surveys and mapping of the world ocean					F-2		
7. Increase production of phytoplankton by artificial fertilization	21						
8. Study geologic aspects of fish habitats					F-6		
9. Study effects of geology on ecology of bottom fisheries					F-6		
10. Develop processing fish for market					26		
11. Develop fish markets					27		
12. Conduct fish market research					27		
13. Implement production of anadromous fish					F-6		
14. Develop fishing gear					26		

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data →		
310	344	227	226	228	403	404	125	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
	F-10		X																1	1	2
	26																		1	1	1
	F-8																		1	1	1
	F-12																		0	0	1
	F-8																		0	0	0
	P-2																		2	2	2
																			0	0	1
	F-6																		1	1	1
	F-6																		1	1	1
	26																		0	0	0
	27																		0	0	0
	27																		0	0	0
	F-6																		0	0	0
	26																		0	0	0

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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

I. MINERALS AND DRUGS

J. WATER RESOURCES

K. RECREATION

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Cap for an Integrated Data M	A Plan for the Accele of Marine Natural	Proposed U.S. Plan for	Bri C
Accession* No.	56	374	90	310	344	227	226
I. MINERALS AND DRUGS							
1. Determine location and delineate mineral deposits	22				M-7		
2. Determine mineral deposit character					M-7		
3. Develop submarine materials handling					M-7		
4. Investigate sea floor mineral fragmentation and benefication					M-16		
5. Conduct mineral processing research					M-16		
6. Determine effect of mining operations on environment					M-16		
7. Develop techniques for recovery of minerals from seawater	21						
8. Study organism concentration of minerals	22						
J. WATER RESOURCES							
1. Determine amount of fresh water reaching marine environment					W-4		
2. Determine distribution of fresh water reaching marine environment in time and space					W-4		
3. Investigate fresh water-salt water interface					W-4		
4. Conduct desalination of saline waters research					W-4		
5. Investigate hydrologic cycle					W-4		
K. RECREATION							
1. Acquire coastal areas for public recreation	30				R-6		
2. Develop easy access to areas for outdoor recreation					R-6		
3. Determine physical carrying capacity of marine resources under different types of recreational use	29				R-9		

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

* Accession Number - See Bibliography

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1970	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	---Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. L. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
0	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
	M-7					2													2	1	2
	M-7																		2	1	2
	M-7																		0	0	0
	M-16																		0	0	0
	M-16																		0	0	0
	M-16																		1	1	1
																			1	1	1
																			1	1	1
	W-4																		2	0	1
	W-4																		2	2	1
	W-4																		2	1	1
	W-4																		0	0	1
	W-4																		2	2	1
	R-6																		0	0	1
	R-6																		0	0	1
	R-9																		1	1	1

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TABLE A-2
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COLLATION OF PLANS FOR THE
NATIONAL MARINE DATA PROGRAM

L. POLLUTION

M. RADIOACTIVITY

N. ENGINEERING

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION / Accession* No.	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's O for an Integrated Data	A Plan for the Acc of Marine Natur	Proposed U Plan fo Br
	56	374	90	310	344	227	226
L. POLLUTION							
1. Determine effects of pesticides and herbicides on nearshore and high-sea marine organisms	48						
2. Study partially treated sewage-circulation, diffusion in bays, estuaries and near shore	29						
3. Develop solid waste disposal techniques					31		
4. Develop water quality criteria					40		
5. Investigate persistent inorganic pollutants					W-9		
6. Investigate lead from auto fuels pollution	48						
7. Determine industrial waste capacity of near shore areas	29						
8. Inventory waste discharge into marine environment	24						
9. Evaluate waste discharge on biota of coastal waters	30						
M. RADIOACTIVITY							
1. Determine distribution of fallout-derived isotopes in the sea	48						
2. Determine level of radioactivity in estuaries and coastal areas						35	
N. ENGINEERING							
1. Determine mechanical properties of ocean bottom sediments					20		
2. Rehabilitate beaches					29		
3. Develop underwater tools and manipulators							
4. Develop electronic components for underwater use							
5. Fouling, corrosion, strength of materials							

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at COOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
310	344	227	226	228	403	404	123	437	436	Interview	Interview	Interview	Interview	Interview	Interview	Interview			Collection	Processing	Use
																			2	0	1
																			2	0	1
	31																		1	1	1
	40																		2	2	2
	W-9																		1	1	1
					28														1	1	1
																			1	1	1
																			2	1	2
																			2	2	1
					28														1	1	1
		35																	2	0	1
	20				33, 56 96														2	2	1
	29																		1	1	0
					56														0	0	0
					56														0	0	0
									8										2	2	1

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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

O. DATA MANAGEMENT

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's for an Integrated Da	A Plan for the A of Marine Ma	Proposed Plan	
Accession* No.	56	374	30	310	344	127	22
1. Develop automated shipboard data systems						47	x
2. Make collected data readily available to all users	14						
3. Use modern computers in oceanography						46	
4. Computerize wave spectra forecasting							
5. Use advanced signal processing techniques							
6. Install communication networks between data centers				6			
7. Establish data transmission to data center by satellite							
8. Determine data volume							
9. Reduce data backlog							
10. Develop numerical model							x
11. Establish center to keep information on ship tracks and types of measurements	54						
12. Record simultaneously several oceanographic parameters	59						
13. Catalog littoral drift	59						
14. Write computer programs - specialized				1			
15. Write computer programs - general purpose				1,4			
16. NWS products will require manual preparation for foreseeable future		47					
17. Archiving of expanded marine observing network observations		52					
18. Store and retrieve satellite data							
19. Retrieve information about specimens							
20. Program for on-line manipulation of data base				6			

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
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Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	---Plan for -- Automatic Computer for use s. CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
310	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
		47	X		59														2	2	1
																			1	1	2
		46			59				6										2	2	2
					72														2	2	2
					99														1	2	1
6									7		X								1	1	2
										X		X							0	0	2
				X															2	2	2
									4,8										1	2	2
			X																1	1	2
																			2	1	1
																			2	2	2
																			0	2	1
1								9,16	8										0	2	2
1,4																			0	2	2
																			0	2	1
																			0	2	1
									9										2	2	2
								3											1	2	2
6																			1	2	2

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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

P. PLATFORMS

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Ca for an Integrated Data M	A Plan for the Accel of Marine Natur	Proposed U. Plan fo	Bri
RECOMMENDATION OR CONCLUSION / Accession* No.	56	374	90	310	344	227	226
1. Plan for research vessel construction						49	X
2. Develop a deep diving vessel							
3. Develop shallow depth submarine						49	
4. Develop stable surface platforms, spar buoy (FLIP)							
5. Establish underwater habitation						49	
6. Develop towed submersible							
7. Design submersible for sea floor geological & geophysical observations					21		
8. Use drifting ice for Arctic surveys							
9. Install towers and fixed manned stations							
10. Use aircraft						49	
11. Use buoy systems	20,37					30,46	
12. Develop deep water buoy							
13. Develop monster buoys							
14. Develop NOMAD Buoy						25	
15. Construct larger vessels required for massive experimental equipment							
16. Use smaller vessels required for special tasks							
17. Develop fully automated computer commanded vessels							
18. Estimate of ship time required						37	
19. Estimate of aircraft time required						37	
20. Develop unmanned meteorological observation platform		68					
21. Collect some oceanographic data during Apollo Application B Mission							

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Numbers in matrix are document page numbers where recommendation or conclusion is discussed
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310	344	227	226	228	403	404	123	437	436	Interview	Interview	Interview	Interview	Interview	Interview	Interview			Collection	Processing	Use
		49	X		60										X				2	2	1
					81														2	0	0
		49																	2	0	0
					62														2	1	0
		49																	1	1	1
					103														2	0	0
	21				101														1	1	1
					13,78														1	1	1
					13,6[illegible]														2	2	2
		49			13														2	1	1
		30,46			13														2	1	0
					62,101														2	2	2
					61														2	2	2
		25																	2	2	1
					101														2	1	1
					101														2	1	1
					103														2	2	1
		37																	1	1	1
		37																	1	1	1
																			2	1	1
													X						2	2	1

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TABLE A-2
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COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

Q. SENSORS, INSTRUMENT SYSTEMS

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION / Accession* No.	Draft of a General Scientific Framework for World Ocean Study 56	Plan for a National Marine Weather Service 374	National Oceanographic Program Fiscal Year 1907 90	Utilization of Industry's Capab for an Integrated Data Mana 310	A Plan for the Accele of Marine Natural 344	Proposed U.S. Plan for 227	Briefi Co 226
Q. SENSORS, INSTRUMENT SYSTEMS							
1. Develop side scanning sonar					21		
2. Develop narrow focus acoustical profiling gear					21		
3. Develop ultra-sensitive magnetometers					21		
4. Develop ultra-sensitive gravimeters					21		
5. Develop remote sensing systems					21		
6. Make sound velocity measurements directly							
7. Use towed hydrophone arrays							
8. Develop sea surface slope measurement system							
9. Develop navigation systems						22	
10. Determine Arctic communications requirements							
11. Develop data acquisition package for buoys							
12. Increase bathymetric survey speed and resolution							
13. Develop long-range detection and communication acoustic systems							
14. Construct instruments for vessels of opportunity	21,60					31	
15. Install Salinity-Temperature-Depth recorders						45	
16. Install expendable BT						45	
17. Develop infrared radiation thermometer						45	
18. Develop Coast Guard sensor package						46	
19. Automate chemical analyzers	20						
20. Use passive sonar to determine plankton distribution	20						

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

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Utilization of Industry's Capability for an Integrated Data Management System

A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Collection	Processing	Use
21																		2	2	2
21																		2	2	1
21																		1	0	1
21				57														2	2	2
21				101														2	2	2
				27														1	2	1
				57														1	1	1
				57														1	1	1
	22			58														0	1	0
				77														0	0	0
				80														2	2	2
				93														2	1	1
				99														2	2	2
	31																	2	1	1
	45																	2	2	1
	45																	2	2	1
	45																	2	2	1
	46																	2	2	1
																		2	1	1
																		2	2	2

B

TABLE A-2
cont'd

COLLATION OF PLANS FOR THE
NATIONAL MARINE DATA PROGRAM

Q. SENSORS, INSTRUMENT SYSTEMS (cont'd)
R. FACILITIES

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION / Accession* No.	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Cap for an Integrated Data Ma	A Plan for the Accele of Marine Natural	Proposed U.S. Plan for	Brief C
	56	374	90	310	344	227	226
Q. SENSORS, INSTRUMENT SYSTEMS (cont'd)							
21. Standardize instruments	12						
22. Develop inexpensive, simple data collection systems for small craft	21						
23. Develop organic carbon measurement system (rapid, accurate)	61						
24. Develop unmanned weather stations		68					
25. Improve wave sensor, shipboard		68					
26. Improve wind sensor, shipboard		68					
27. Develop surf and breaker measurement device		68					
28. Improve sensors for sea surface temperature, shipboard		68					
R. FACILITIES							
1. Establish marine wilderness preserves					R-2		
2. Construct submersible laboratories					M-8		
3. Develop a nuclear power source							
4. Organize Maury center for ocean science of the Navy							
5. Install deep sea geophysical observatories (3)	35						
6. Install magnetic observatories over East Pacific Rise (8)	55						
7. Require computer for Coast Guard Oceanographic Unit							
8. Organize an environmental computer facility, jointly operated (ESSA, ETAC, NODC)				2			
9. Establish marine forecast centers (6) (ESSA)		3					

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

** 0 Little or No Impact
1 Minor Impact
2 Major Impact

...Scientific Framework
...Study

...ational Marine
...ervice

...onal Oceanographic Program
...iscal Year 1967

Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	---Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
310	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
																			2	2	1
																			2	2	1
																			2	1	1
							5												2	2	1
																			1	0	1
																			1	0	1
																			1	1	1
																			1	1	1
	R-2																		0	0	1
	M-8																		1	0	1
					53														1	0	0
					7														0	0	0
																			2	2	1
																			2	2	1
				X															1	2	1
2																			1	2	2
																			1	2	1

B

TABLE A-2
cont'd

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

S. LEGAL, MANAGEMENT
T. ORGANIZATION

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Ca for an Integrated Data M	A Plan for the Accel of Marine Natura	Proposed U.S Plan for	Brie
RECOMMENDATION OR CONCLUSION / Accession* No.	56	374	90	310	344	227	226
S. LEGAL, MANAGEMENT							
1. Enforce federal regulations					23		
2. Clarify ownership of marine mineral deposits					23		
3. Develop incentive for private development of mineral deposits					23		
4. Implement regulations to ensure compatibility of multiple use					14		
5. Arrange access to public areas blocked by private property					R-6		
6. Coordinate multi-jurisdictional management of multipli-owned coastal areas					R-13		
7. Establish continental shelf boundary					11		
8. Determine rights and duties of nations on shared continental shelf					11		
9. Determine rights and duties of nations for deep ocean use					11		
10. Publish document reviewing the Law of the Sea	21						
T. ORGANIZATION							
1. Federal Government foster partnership of several states					23		
2. Write joint research contracts with universities and institutions					23		
3. Develop multi-agency data collection and handling activities							
4. Industry to develop and participate in operation of marine data management system				5			

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

** ∅ Little or No Impact
1 Minor Impact
2 Major Impact

A

A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 thru 1976	Briefing Data for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CGOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolin, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
23																		0	0	0
23																		0	0	0
23																		0	1	1
14																		1	0	1
R-6																		0	0	0
R-13																		1	1	1
11																		2	1	1
11																		1	1	1
11																		1	1	1
																		1	0	1
23																		0	0	0
23																		1	1	1
								9										2	2	1
																		1	2	1

B

TABLE A-2
cont'd

COLLATION OF PLANS FOR THE NATIONAL MARINE DATA PROGRAM

U. EDUCATION, TRAINING

V. INTERNATIONAL PROGRAMS

W. MISCELLANEOUS

DOCUMENT TITLE	Draft of a General Scientific Framework for World Ocean Study	Plan for a National Marine Weather Service	National Oceanographic Program Fiscal Year 1967	Utilization of Industry's Capab f r an Integrated Data Manage	A Plan for the Accelerate of Marine Natural Res	Proposed U.S. Co Plan for 1966	Briefing Coast	
RECOMMENDATION OR CONCLUSION — Accession* No.	56	374	90	310	344	227	226	22
U. EDUCATION, TRAINING								
1. Strengthen marine research capabilities of universities					18			
2. Use specimens as three-dimensional library, basic to education process								
V. INTERNATIONAL PROGRAMS								
1. International Indian Ocean Expedition (IIOE)								
2. International Cooperative Investigation of the Tropical Atlantic (ICITA)								
3. Cooperative investigation of the Kuroshio							X	
4. Eastern Tropical Pacific Investigation (EASTROPAC)							X	
5. Inter-American Conference of Hydrobiology								
6. Cooperative Investigation of the Variability of the Ocean (CIVO)						15 of (attach)		
7. World Data Center for Oceanography	19							
W. MISCELLANEOUS								
1. Develop system for breathable air from water								
2. Study physiology of man-in-the-sea	68							

Numbers in matrix are document page numbers where recommendation or conclusion is discussed
* Accession Number - See Bibliography

** ∅ Little or No Impact
1 Minor Impact
[illegible] Major Impact

l Scientific Framework
l Study
National Marine
r Service
tional Oceanographic Program
Fiscal Year 1967

Utilization of Industry's Capability for an Integrated Data Management System	A Plan for the Accelerated Development of Marine Natural Resources-Interior Dept.	Proposed U.S. Coast Guard Oceanographic Plan for 1966 Thru 1970	Briefing Date for NASCO Review Panel - Coast Guard Oceanography	--Plan for -- Automatic Computer for use at CCOU	The Ocean Science Program of the U.S. Navy	Seismology Project for the Continental Shelf Program - ESSA	Federal Plan for Meteorological Services and Supporting Research, FY 1968	Information Storage & Retrieval System --- Smithsonian Institution	Briefing Statement for FY 1969 Budget - NODC	J. E. King, Div. of Bio Sciences, Bureau of Commercial Fisheries	T. A. Wastler, Federal Water Pollution Control Administration	A. C. Rayner, Coastal Engineering Research Center, U.S. Corps of Engineers	T. A. George, Earth Resources Division National Aeronautics Space Administration	T. Austin, National Oceanographic Data Center	D. Tidrick, Developmental Surveys Div. Naval Oceanographic Office	L. Bolen, Acoustic Vibration Laboratory NAVSHIPS, Research & Development Center			Impact on Data **		
310	344	227	226	228	403	404	123	437	436	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view	Inter-view			Col-lec-tion	Pro-ces-sing	Use
	18																		2	2	2
								3											1	2	1
					16														2	1	2
					16														0	0	0
			X		16	9,16													0	0	0
			X		17	16			9										2	2	2
					17														2	1	1
		15 of (attach)																	2	2	2
																			0	0	2
					27														0	0	0
					53														0	0	0

B

APPENDIX B

REVIEW AND COLLATION OF PERTINENT PRIOR STUDIES AND LITERATURE

The literature and other studies review was conducted in the same way as the prior plans review, Appendix A. As documents were reviewed by various members of the project team, important information was underlined. The underlined information was then reviewed to provide the topic headings listed under 23 subject headings in Table 1, this appendix. The same subject headings were used for this appendix as for Table 2, Appendix A. The numbers in the cells of the matrix are the page numbers in the documents where the topic is discussed.

The same subjective method of assessing the impact of each topic listed on collection, processing and use of marine data was used in assessing the literature and studies as for prior studies, Appendix A. As was done in that case, the general conclusions drawn from these studies and literature reviews are drawn together and discussed in Section VIII.

Of the many documents reviewed, 27 are included in Table 1, Appendix B. The inclusion of additional documents would make the table extremely large and, in general, it is believed that a large percentage of the recommendations and conclusions occurring in the literature which may affect a marine data management system are included. Since studies are continually being made, however, review and additions to the table should be made during Phase II and this approach should be established as an ongoing project by the organization responsible for a national marine data management program.

TABLE B-1

COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

A. PHYSICAL OCEANOGRAPHY

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - of Transition	A Study of the Fe National Dat	Oceanogra and	A
RECOMMENDATION OR CONCLUSION — Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	83	124	39
A. PHYSICAL OCEANOGRAPHY					3-110						
1. Current delineation		19,303	49,61					85		19	
2. Synoptic current data required		414			2-8 3-130						
3. Current measurements very unreliable			61								
4. Water mass location and characteristics needed		303									
5. Thermal fronts		303	49								
6. Prediction of temperature in the ocean			51								
7. Experimental verification of theoretical ocean circulation needed			49			48					
8. Upwelling location		414			3-110					26	
9. Surface waves study, deep ocean					3-22	47		89		29	
10. Surface wave prediction		353			3-110, 3-130						
11. Surface wave historical data needed					3-22						
12. Wave study, near shore		414			3-41, 3-88						
13. Tsunami historical data required					3-88						
14. Tide study					3-41	45					
15. Tide prediction					3-110, 3-130						
16. Arctic bathymetry needed		19									
17. Ice drift studies		416			3-22						
18. Ice detection		416									
19. Mixed layer depth study		304									
20. Thermocline depth, short term fluctuation		304				46					

* Accession Number - See Bibliography

** 0 Little or No Impact
1 Minor Impact
2 Major Impact

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

ic Data
eering -
ast And Geodetic
and Services -----
Use of the Sea

ernor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program. Vols. 1, 2, 3.	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations. NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report in Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. 1, Introduction and Data Collection		**Impact on Data ****		
125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			**Col-lection**	**Pro-cessing**	**Use**
85		19				3-141																2	1	1
																						2	2	1
																						0	0	1
																						2	1	1
																						2	1	1
																						2	2	1
																						2	1	1
		26																				2	0	1
89		29				1-141																1	1	1
																						1	2	1
																						0	2	1
																						1	1	1
																		14				0	1	1
																		14				1	1	1
																		14				1	2	1
																						2	1	1
																						2	1	1
																						2	1	1
																						1	2	1
																						2	1	1

B

TABLE B-1
cont'd

COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

A. PHYSICAL OCEANOGRAPHY Cont'd
B. BIOLOGICAL OCEANOGRAPHY

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Sy	Oceanography 1966, and Opportuni	Annual Re	Ocean Ar
RECOMMENDATION OR CONCLUSION / Accession* No.	381	68	66	108	Sects. 1,2,3 1	60	73	125	83	124	39	40
A. PHYSICAL OCEANOGRAPHY (Cont'd.)												
21. Heat flow at air-sea interface study		117, 289										
22. Air-Sea interaction - Synoptic Studies												
23. Land-Sea interaction												
24. Sea Surface temperature - Synoptic Maps		117, 414										
25. Sea state from displacement of clouds or cloud patterns		289										
26. Estuary dynamics study					3-41							
27. Diffusion processes in bays, near coasts study					3-81, 3-110							
B. BIOLOGICAL OCEANOGRAPHY												
1. Biological indicators research		303 416				50						
2. Marine fouling organisms study				449				78				
3. Biological luminescense - origin and use		303										
4. Biological organism distribution statistics needed		304 416	55,58			49				62		
5. Seaweed location					3-110							
6. Chlorophyll concentration		303										
7. Poisonous marine organisms						53						
8. Study of large marine animals		304										
9. Systematic, taxonomic biology of marine organisms						51						
10. Increase knowledge of environmental alteration on biota						19						

* Accession Number - See Bibliography
** 0 Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

A

...graphic Data
...ngineering -
... Coast And Geodetic
...cts and Services -----
...tive Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3.	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-?	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. 1, Introduction and Data Collection			Impact on Data **		
3	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
																							2	1	1
																			14				2	2	1
																			14				2	2	1
							1-121																2	2	1
																							1	2	1
																							1	1	1
																							1	1	1
																							1	0	1
	78																						1	0	1
																							1	0	1
			62																				2	1	2
																							2	0	1
																							2	0	1
																							1	0	1
																							1	0	0
																							1	2	1
																							1	0	1

B

TABLE B-1
cont'd

COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

C. CHEMICAL OCEANOGRAPHY

D. METEOROLOGY

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Syst	Oceanography 1966, Ach and Opportunities	Annual Report Oceanogr	Annual Oc
RECOMMENDATION OR CONCLUSION — Accession* No.	381	68	66	108	Sects. 1,2,3 1	60	73	125	83	124	39	40
C. CHEMICAL OCEANOGRAPHY												
1. Dissolved gas concentration needs investigation										32		
2. Salinity, surface-synoptic map required												
3. Salinity, 10m depth - synoptic map required												
4. Chemical nutrient distribution required					3-110					35		
5. Chemical data quality information prior to 1960 very questionable			37									
D. METEOROLOGY												
1. Establish Global Observation System - World Weather Watch								85		112		
2. Numerical Prediction Model Development										112		
3. Atmospheric Circulation										115		
4. Turbulent Boundary-Layer transport										112		
5. Improve storm and hurricane warning systems							4	86				
6. Synoptic forecast requirements					3-110							
7. Historical weather data summarized					3-21							

* Accession Number - See Bibliography

** ∅ Little or No Impact
1 Minor Impact
2 Major Impact

Numbers in matrix are document page numbers where recommendation or conclusion is discussed

A

n,
nographic Data
n Engineering -
.S. Coast And Geodetic
ducts and Services -----
ective Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/53-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program. Vols. 1, 2, 3.	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection			Impact on Data **		
73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	93	16	17	21	376	79			Collection	Processing	Use
			32				1-123																1	0	1
							1-123																0	1	1
							1-123																0	1	1
			35				1-123																2	0	1
																							0	0	0
	85		112																				2	2	2
			112																				1	2	2
			115																				2	1	1
			112																				2	1	1
4	86																						2	1	2
																							2	2	2
																							0	1	1

B

TABLE B-1
cont'd

COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

E. GEOLOGY
F. GEOPHYSICS

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Ach and Opportunities	Annual Report Oceanogr	Annua O
RECOMMENDATION OR CONCLUSION — Accession* No.	381	68	66	108	Sects. 1,2,3 1	60	73	125	83	124	39	40
E. GEOLOGY												
1. Bottom topography charts required		415			2-8 3-110		14					
2. Subbottom structure surveys					3-131			78				
3. Bottom sample collection, core drilling					2-8 3-131	45						
4. Sediment transport mechanism studies		416			3-22 3-41					51		
5. Turbidity current study										105		
6. Shore processes studies		415			3-41	48	32					
7. Beach composition		416										
8. Near shore composition		416								48		
9. Shape of continental shelf inadequately known					3-131							
10. Coral atoll studies		414										
11. Volcanism - submarine												
F. GEOPHYSICS												
1. Gravity surveys			41									
2. Magnetic surveys			41									
3. Seismic reflection surveys					3-131							
4. Acoustic energy transmission paths, reflection, and scattering in water												
5. Heat-flow at benthic boundary study												
6. Earthquakes - Submarine								78				
7. Geophysical requirements evolution									13			

* Accession Number - See Bibliography
** Ø Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

nic Data
neering -
ast And Geodetic
and Services -----
e Use of the Sea

ernor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program. Vols. 1, 2, 3.	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection		Impact on Data **		
125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Collection	Processing	Use
						1-111													287			2	2	2
78						1-109																2	1	1
						1-111																1	1	1
		51																				1	1	1
		105																				1	1	1
																						1	1	1
																						1	0	1
		48																				1	0	1
																						1	0	1
																						1	1	1
																						1	0	1
						1-109				14												2	2	1
						1-109				14												2	2	1
																			296			2	0	1
						1-125																2	1	1
						1-109																1	1	0
78										14												1	0	1
	13																					2	0	1

B

TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

G. SURVEYS

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Y of Transition	A Study of the Feas National Data	Oceanograph and Op Annu	
RECOMMENDATION OR CONCLUSION / Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	83	124	39
1. Program definition necessary to determine measurements to be made											
2. User requirements for surveys											
3. Environmental limitations on ocean survey operations											
4. National Ocean Survey Program - estimate of time, stations, cost											
5. Cost effectiveness of vessel use, National Ocean Survey Program											
6. Class III vessels (<760 tons) not usable for most surveys											
OCEANWIDE											
1. SEAMAP					3-130	41		81		10,94	
2. Time-independent properties where navigational control available								81		10,97	
3. Ocean circulation dynamics								85			
4. Air-Sea interaction surveys								85			
5. Establish navigation system with 0.1 m accuracy - worldwide										10	
6. Establish navigation system with 100 ft. or less accuracy--within 100 mi. of US										11	
7. Use contractor assistance in conducting ocean surveys										96	
DEFINED AREAS											
1. Study small scale processes								81			
2. Prepare detailed geological and geophysical maps for selected areas of the continental shelf							1				
3. South polar area and Arctic Ocean Sea Ice Study		339									
4. Inland sea, gulfs, estuaries, Sea Ice Study		339									
5. Chesapeake Bay Study & Model								73			

* Accession Number - See Bibliography
** ∅ Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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ngineering -
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cts and Services -----
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Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3,	Development of a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange for the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section 3	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. 1, Introduction and Data Collection		Impact on Data **		
125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Collection	Processing	Use
						1-74 3-2																2	2	2
						1-69, 1-94																2	2	2
						3-5																0	0	0
						3-4																0	0	0
						3-1																0	0	0
						3-62																0	0	0
81		10,94																14				2	2	2
81		10,97																				2	2	2
85																						1	1	1
85																						2	2	2
		10																				1	1	1
		11																				1	1	1
		76																				2	1	2
81																						1	1	1
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																						1	0	0
																						1	0	0
83																						1	1	1

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TABLE D-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

H. FOOD AND FISHERIES

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support -----	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of	A Study of the Feasibility of National Data	Oceanography 1966 and	Annual	Ocean
RECOMMENDATION OR CONCLUSION / Accession* No.	382	68	66	108	Sects. 1,2,3 1	60	73	125	41	124	39	40
1. Research dynamics of fish population										53		
2. Research transfer of food through food web						50				52		
3. Improve procedures to estimate size, distribution, behavior of fish		304	53		3-110					62		
4. Apply genetic techniques to study of natural organism populations										76		
5. Laboratory studies for breeding organisms in captivity										50		
6. Increase production of phytoplankton by artificial fertilization						2						
7. Develop production of anadromous fish												
8. Investigate transplanting organisms										78		
9. Study culture of seawater organisms in ponds, semi enclosed areas										79		
10. Study protection of living resources in estuarine and near coastal areas from impact of other uses					3-44					80		
11. Faunistic and ecological studies of communities in various ocean regions										81		
12. Study marine diseases and parasites										80		
13. Improve time and space prediction of oceanic properties and processes		303						55		83		
14. Conduct systematic biological surveys and mapping of the world ocean										83		
15. Study effects of waste heat on near shore environment and food chain										81		
16. Study effect of radioactivity on marine environment										82		
17. Identify algal species having high food values						14						
18. Develop processes for making fish protein						50		53		53		
19. Prepare information for commercial fishermen			51, 4									
20. Develop fishing gear												
21. Improve fishing boat location		[illegible]										

* Accession Number - See Bibliography
** ∅ Little or No Impact
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Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Systems	Oceanography 1966 Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/66-6/67	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3	Development for a Storage-Retrieval System for [illegible] Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report in Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	[illegible] DISCOVERER OBS OF	Ocean Engineering, Vol. I, Introduction and Data Collection		Impact on Data on		
125	89	124	39	40	41	107	31	273	261	371	7	94	57	393	16	17	21	376	79			Collection	Processing	Use
		53																				1	1	1
		22																				1	[illegible]	
		62																				1	1	2
		76																				1	0	0
		50																				1	0	0
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		[illegible]																				1	0	1
		10																				1	0	1
		91																				1	0	1
		30																				1	0	1
[illegible]		43							4										152			[illegible]	2	2
		[illegible]																				2	2	2
		[illegible]																				1	0	1
		[illegible]																				1	0	1
																						0	0	1
51		[illegible]																				0	0	1
																						1	1	2
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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

I. MINERAL AND DRUGS
J. WATER RESOURCES
K. RECREATION
L. POLLUTION

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achiev and Opportunities	Annual Report of Oceanographic	Annual R Ocean
Accession* No. RECOMMENDATION OR CONCLUSION	381	68	66	108	Sects. 1,2,3 1	60	73	125	83	124	39	40
I. MINERAL AND DRUGS												
1. Develop techniques for economic extraction of minerals from sea floor								80		74		
2. Conduct studies of sea floor deposits to evaluate potential as ores							1	94		74		
3. Develop potential of sea for drugs						52						
J. WATER RESOURCES												
1. Fresh water reaching marine environment		414						77				
2. Desalination of saline waters							3	78				
K. RECREATION												
1. Acquire coastal areas for public recreation								72				
2. Easy access to areas for outdoor recreation								72				
L. POLLUTION												
1. Effects of increase and changes in nutrient level on food chain						7				90		
2. Effects of pesticides and herbicides on near-shore and high-sea marine organisms					3-110			72		90		
3. Partially treated sewage circulation, diffusion in bays, estuaries, and near shore								72		91		
4. Viability of pathogenic organisms in marine waters										91		
5. Inventory waste discharge into marine environment		417										

* Accession Number - See Bibliography
** ∅ Little or No Impact
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Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-1/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3,	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report in Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection		Impact on Data **		
73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
	80		74																				1	1	1
1	94		74																				2	1	2
																							1	0	1
	77																						2	0	1
3	78																						0	0	1
	72																						0	0	1
	72																						0	0	1
			90																				2	0	1
	72		90																				2	0	1
	72		91																				2	0	1
			91																				1	0	1
																							2	1	2

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

M. RADIOACTIVITY

N. ENGINEERING

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support -----	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1962	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Syst	Oceanography 1966, A and Opportuniti	Annual Repo	Oceanog Ann
RECOMMENDATION OR CONCLUSION / Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	83	124	39	40
M. RADIOACTIVITY												
1. Determine distribution of radioactive material at mouth of Columbia River										84		
2. Study movement and mixing of an introduced contaminant - estuaries, near shore										84		
3. Trace element input (natural), rate, route, distribution										84		
4. Distribution of fallout-derived isotopes in the sea										85		
5. Biological transport of stable trace elements										86		
6. Radiation-produced morphological damage to marine organisms										86		
7. Level of radioactivity in estuaries and coatal areas								72				
N. ENGINEERING												
1. Assemble and publish ocean engineering data										11		
2. Deep sea combers - information needed										104		
3. Earthquake overpressure information needed										105		
4. Sleet and icing effects on structures										105		
5. Fluctuations of major current streams										105		
6. Mechanical properties of ocean bottom sediments					3-36, 3-126					106		
7. Trans-Ocean-Bottom exploration										107		
8. Biological effects on materials and structures										108		
9. Properties of materials at high pressure										109		

* Accession Number - See Bibliography
** ∅ Little or No Impact
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Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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tive Use of the Sea	overnor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program. Vols. 1, 2, 3.	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection		Impact on Data **		
3	125	83	124	39	40	41	107	3[illegible]	273	261	371	7	94	57	193	16	17	21	376	79			Collection	Processing	Use
			84																				1	0	1
			84																				2	0	1
			84																				2	0	1
			85																				1	1	1
			86																				1	0	1
			86																				0	0	0
	72						1-35																2	0	1
			11																				1	1	2
			104																				0	0	0
			105																				1	0	0
			105																				0	0	0
			105																				1	0	0
			106																				1	0	1
			107																				2	1	2
			108																				1	0	1
			109																				1	0	1

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

DOCUMENT TITLE

O. DATA MANAGEMENT

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support -----	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A	of Definition	A Study of the Feas National Data	Oceanograph and Oc An
RECOMMENDATION OR CONCLUSION / Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	83	124	39
1. National Data Management System Study								33			
2. Collected data should be readily available to all users		413			3-22 3-131			65			
3. Gap in information transfer between universities and industry								57			
4. Need for cooperation between collectors, users, and storers of data			65								
5. Data requirements determination - (not desired or limited by sensor available)											
6. Data management requirements for surveys	8										
7. Data management requirements for research and development	2,10								2		
8. Data management for short-range synoptic environmental prediction	2										
9. Data management for operational efforts	2,6										
10. Prediction of data user requirements - data center problem			10								
11. Frequently required data parameters									6		
12. Geographic commonality of user data requirements									14,22		
13. Redundancy in data parameters									6		
14. Data management dictated by nature of the data			19								
15. Coordination of world wide data gathering system				444							
16. Evaluation of world wide data difficult to accomplish				445							
17. Data problem potentially great because of broad scope of oceanography	5		11								
18. Advisory panels for data management			11								
19. Descriptive data - storage, retrieval											
20. Biological data handling										147	
21. Geological data handling										149	

* Accession Number - See Bibliography
** ∅ Little or No Impact
1 Minor Impact
2 Major Impact
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Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GS DISCOVERER OSS 02	Ocean Engineering, Vol. 1, Introduction and Data Collection			Impact on Data **		
3	125	83	124	39	40	41	107	31	273	261	371	7	94	57	103	16	17	21	376	79			Collection	Processing	Use
	33																						2	2	2
	65																			334			0	1	2
	57																						0	0	2
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			149																				1	2	2

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

DOCUMENT TITLE

O. DATA MANAGEMENT Continued

RECOMMENDATION OR CONCLUSION	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	C ean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Systems	Oceanography 1966, Achievements and Opportunities	Annual Report of Oceanographic	Annual Re Oceano	An
Accession* No.	381	68	66	108	1	60	73	125	83	124	39	40	41
22. Flexibility of data center to react to users' needs is a requirement			11,65										
23. Communication between data centers and users requires standardization and flexibility of format			11,18										39
24. Data centers created to dispose of data backlog, regional data centers			9										
25. NODC develop capability for research in problems of data analysis and information retrieval	3		30			98							
26. Use of modern computers in oceanography						41		66		144			
27. Data display using automation - station data - live atlas										146			
28. Machine-produced atlases										146			41
29. Quality control of data	3		44,65										
30. Evaluation techniques for selection of significant data			6										
31. Data reliability			18										
32. Preservation of original data required			14										
33. New data requirements often retroactive on archival data			10										
34. Real time data processing investigation	6		29,35										
35. Flexible diagnostic programs required			62										
36. Flexible analysis programs required			62										
37. Automated shipboard data systems	7		27,35							144			
38. Navigation information required on data record			5										
39. Waste discharge data retrieval system							25						
40. Analog data mandatory for interpretation			6,46										
41. Simultaneous recording of several oceanographic parameters		118											
42. Buoy system data problems													

* Accession Number - See Bibliography
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1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Possibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, ...	Development of a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GS [illegible] OSS OC	Ocean Engineering, Vol. I, Introduction and Data Collection			Impact on Data **		
73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
																							0	2	2
						39											4 1			343			0	2	2
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	65		144																	344			2	2	2
			146																	379			0	2	0
			146			41																	0	2	1
																3.5				362			2	2	2
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25																							0	2	2
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

DOCUMENT TITLE

O. DATA MANAGEMENT Continued

RECOMMENDATION OR CONCLUSION	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	--ESR-ESSA--Automatic Collection, Processing & Analysis of Oceanographic Data	Oceanic Science and Ocean Engineering - 1965	A Study of the U.S. Coast and Geodetic Survey's Products and Services ----	Effective Use of the Sea	Governor's Advisory Commission Ocean Resources	Marine Science Affairs	of Commission A Study of	National Ocean
Accession* No.	381	63	66	108	1	60	73	125	83	126
43. Rapid scanning and immediate dissemination of satellite data required		413								
44. Calibration of imagery using known test site conditions		414								
45. Total information content of images or records should be evaluated		414								
46. Parameter characteristics satisfied by buoy 5-year State-of-the-Art collection									9	
47. Data summaries required			18 37,41							
48. Data storage and retrieval problems			45 41,3							
49. Data Volume problems and quantities			43,5							
50. Government should establish an oceanographic information and indexing service						121				
51. Numerical models			51					86		
52. Ocean system for BT analysis			63							
53. BT automated storage and analysis			66							
54. S-T-D processing										
55. XBT data processing										
56. Photographs - storage, retrieval, and indexing			66							
57. Synoptic data - summaries and display programs										
58. Optimum location of central data processing facilities			--	449						
59. Analog record to digital record conversion automatically	9									
60. Data transmission - rapid, reliable, accurate	1									
61. Standardization creates barriers			19							
62. Data base of deep water properties needed										14
63. Climatological statistics needed			52							

* Accession Number - See Bibliography
** 0 Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

n, ographic Data Engineering -

U.S. Coast and Geodetic ects and Services

ective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3	Development of a Storage-Retrieval System for BT Data	World Weather Watch Cost/Performance Analytic Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Handling Problem, Section VII	Conclusions, Section IV, [illegible]	Underwater Photography	USC&GS DISCOVERER (OSS 02	Ocean Engineering, Vol. 1, Instrumentation and Data Collection		Impact on Data on		
73	125	53	124	39	40	41	107	32	273	261	371	7	56	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
																							1	2	2
																							1	1	1
																							1	2	2
		9																					0	0	0
																							0	2	2
																							0	1	1
				1	34	1						11		1						342			0	0	0
																				368			0	1	2
	86					19														163			1	2	1
																							1	2	1
															2								0	2	1
											3												0	1	1
								1							1								0	1	1
													17					1					[illegible]	0	2
						19																	0	1	1
																				[illegible]			[illegible]	2	1
																							1	2	[illegible]
																	41						0	0	2
																							0	0	[illegible]
			144																				1	1	1
																							2	1	1

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TABLE B-1
cont'd

COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

P. PLATFORMS

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Ye of Transition	A Study of the Feasib National Data Bu	Oceanography and Oppor	Annu
RECOMMENDATION OR CONCLUSION — Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	83	124	39
1. Experimental vessel construction						98, 23				127	
2. Research vessel construction										127	
3. Coast Guard arctic oceanographic ship								92			
4. Deep diving vessel						36		92		131	
5. Two or three man submersible										132	
6. Shallow depth submarine					3-131	99		92		133	
7. Towed submersible						23				129	
8. Deep water buoy development								85		132	
9. Buoy systems		167			3-110 3-130	26, 46	4	85	1		
10. Stable surface platforms, spar buoy (FLIP)										139	
11. Earth satellites for data transmission		18 169						99		141	
12. Earth satellites for navigation aid								99		141	
13. Earth satellites - data collection		20 167						83			
14. Rockets		167									
15. Balloons		167									
16. Unmanned meteorological observation platform											
17. Ocean station vessels											
18. Ships of opportunity								100			
19. Aircraft											

* Accession Number - See Bibliography
** 0 Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

P

...graphic Data

...ngineering -

... Coast And Geodetic

...cts and Services -----

...ctive Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Systems	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3.	Development of a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection			Impact on Data **		
3	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Collection	Processing	Use
			127																				2	2	1
			127																				2	2	1
	92																						2	2	1
	92		131																				2	0	0
			132																				2	0	0
	92		133																				2	0	0
			129																				2	0	0
	85		132																				2	2	1
	85	1					3-78		X											339			2	2	1
			139																				2	1	0
	99		141																	341			2	2	2
	99		141																	341			1	1	1
	83																			341			2	2	2
																							1	1	1
																							1	1	1
																							2	1	1
									X														2	1	1
	100																			306			2	1	1
																				310			2	1	1

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TABLE B-1
cont'd

COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

Q. SENSORS, INSTRUMENT SYSTEMS

RECOMMENDATION OR CONCLUSION	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achi and Opportunities	Annual Report o Oceanograph	Annual R Oce	
Accession* No.	381	68	65	108	Sects. 1,2,3 1	60	73	125	83	124	39	40	4
1. Coordination between instrument designer and data processor required			65	449									
2. Field system should be simple			16										
3. Instrument standardization			66	449									
4. Deep parametric recorders (event)										137			
5. Deep optical monitors										138			
6. Instruments for vessels of opportunity													
7. Salinity - Temperature - Depth recorder installations			25										
8. Expendable BT installations			25										
9. Infrared radiation thermometer		289											
10. Chemical analyzers, automated			38										
11. Plankton distribution using active and passive sonar			56										
12. Bioluminescence using photomultiplier			56										
13. Current meter improvement			61										
14. Optical scanners to digitize historical analog records	10												
15. Microwave sensors		289, 352											
16. Near-vertical scattering cross section sensor		351											
17. Variable frequency vertical radar		352											
18. Scattering cross section sensor		352											
19. High resolution imaging radar		352											
20. Wave sensor, shipboard													
21. Wind sensor, shipboard													

* Accession Number - See Bibliography
** Ø Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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nographic Data
n Engineering -
.S. Coast And Geodetic
ducts and Services ----
fective Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report in Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USCG/SS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection			Impact on Data **		
73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Collection	Processing	Use
													17			5							2	2	1
																							2	0	0
																							2	2	1
			137																				1	0	0
			138																				1	0	0
									X														2	1	1
																							2	2	1
							2-42																2	2	1
							2-42																2	2	1
																							2	1	1
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																							2	1	1
							2-46																1	0	1
							2-46																1	0	1

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

Q. SENSORS, INSTRUMENT SYSTEMS continued...

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support -----	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of	Oceanographic Annual Re	Oceano A
RECOMMENDATION OR CONCLUSION — Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	83	124	39	40	41
22. Thermocline recorder													
23. Water clarity meter													
24. Proton precession magnetometer													
25. Station magnetometer on stable platform													
26. Radiometer - Satellite													
27. Plankton sampler - underwater pump													
28. Unattended system			14										
29. Texas A & M system			14										
30. Radio telemetry		304	15										
31. Satellite sensing system must have all weather capability		340											
32. Navigation systems					3-130								
33. Undersea cable connected instrument system			15	443, 447									
34. Power transmission to sensor on undersea cable system				448									
35. Buoy system data retrieval - Ships, shore stations, monitoring aircraft, satellite communication													
36. Instrument reliability at sea - knowledge limited													
37. Controlled Acceleration in seagoing laboratories										137			

* Accession Number - See Bibliography
** Ø Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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Oceanographic Data
cean Engineering -
he U.S. Coast And Geodetic
Products and Services - ...
Effective Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3,	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection			Impact on Data **		
73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
							2-42																1	0	1
							2-42																1	0	1
							2-44																1	0	1
							2-44																1	0	1
							2-47																2	0	1
							3-2																2	0	1
																							2	1	1
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																							2	0	1
																							1	0	0
							3-77																2	2	1
							3-2																0	0	0
			137																				0	1	0

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

R. FACILITIES

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support -----	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility National Data Buoy Sy	Oceanography 1966, and Opportunit	Annual Rep	Oceano Ann
RECOMMENDATION OR CONCLUSION — Accession* No.	381	68	66	108	Sects. 1,2,3 1	60	73	125	83	124	39	40
1. Processing Facilities - Data										145		
2. Analysis Facilities - Data										99		
3. Publication Facilities										100		
4. Laboratories for study of survival requirements of young fish and shell fish.										135		
5. Center for living marine organisms - Collection, maintenance, distribution.						99						
6. Oceanarium for fish behavior studies (1)						100				X		
7. Man-in-the-Sea Shore Facility (1)						28						
8. Submersible Laboratories						99						
9. Arctic Marine Laboratory (1)						99						
10. Tropical Marine Laboratory (1)						99						
11. Temperate Zone Marine Laboratory (1)						99						
12. Nuclear Power Source Development								X				
13. Marine Study Centers						79						
14. Navy provide support facilities for civilian research						39						
15. High-quality museum centers in the U.S.										148		
16. Establish Marine Wilderness Preserves						15						
17. Make Indian Ocean Biological Center permanent										148		

* Accession Number - See Bibliography
** ∅ Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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nd Ocean Engineering -

of the U.S. Coast And Geodetic y's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966; Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3,	Development of a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Oceanographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection		Impact on Data **		
0	73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
				145																				1	2	1
				99																				1	2	1
				100																				1	1	2
				135																				1	1	1
99																								0	1	1
100				X																				1	1	1
26																								1	1	1
99																								1	0	1
99																								1	0	1
9																								1	0	1
9																								1	0	1
		X																						1	0	0
[illegible]																								0	2	1
[illegible]																								1	2	1
				148																				1	1	1
[illegible]																								0	0	1
				148																				1	1	1

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

S. LEGAL, MANAGEMENT
T. ORGANIZATION

DOCUMENT TITLE

RECOMMENDATION OR CONCLUSION	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---ONR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy Systems	Oceanography 1966, Achievements and Opportunities	Annual Report	Oceanogra Annua
Accession* No.	381	68	66	108	Sects. 1,2,3 1	60	73	125	83	124	39	40
S. LEGAL, MANAGEMENT												
1. Enforcement of federal regulations					3-110							
2. Clarify ownership of marine mineral deposits						94		75		80		
3. Regulations to insure compatibility of multiple use					3-129	81		75		79		
4. Communications problems mostly political			17									
T. ORGANIZATION												
1. Foster partnership of several states by federal Government								30				
2. Design optimum federal organization for developing and implementing marine science policies and programs						81		17				
3. Use IOC programs as basis for national programs								35		160		
4. Formed interagency council for ocean resources - California							11					
5. Foster Corps of Engineers - California cooperative data collection efforts							27					
6. Increase support of NODC										144		
7. Continue basic research using ONR						87				172		
8. Conduct fishery research on contract, BCF										173		
9. Conduct basic research on contract, [illegible]										174		
10. Develop ocean search and recovery related to national security - Navy						40		90				
11. Conduct systematic biological research, Smithsonian Institution						90						
12. Standard surveys should be done by ESSA and the Navy								84				
13. Study shoreline degradation - federal and local initiative								71				
14. Utilize block funding of oceanographic vessels						[illegible]						
15. Organize regional fleets of oceanographic vessels						[illegible]						

* Accession Number - See Bibliography
** ∅ Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in entries are document page numbers where recommendation or conclusion is discussed

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eanographic Data
an Engineering -
U.S. Coast And Geodetic
ducts and Services ----
ffective Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/63-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program, Vols. 1, 2, 3,	Development for a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analysis/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic	Report in Oceanographic Data Exchange In the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photography	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. 1, Introduction and Data Collection			Impact on Data **		
73	125	83	124	[illegible]	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Collection	Processing	Use
																							0	0	0
	75		80																				0	0	0
	75		75																				0	0	0
																							0	0	0
	30																						0	0	0
	17																						0	0	0
	35		180																				0	0	0
11																							0	0	0
27																							1	1	1
			144																				0	1	2
			172																				2	1	2
			173																				1	0	1
			174																				2	2	[illegible]
	90																						0	0	0
																							1	0	1
	84																						1	1	1
	74																						1	0	1
																							2	2	2
																							2	2	2

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE
NATIONAL MARINE DATA PROGRAM

U. EDUCATION, TRAINING
V. INTERNATIONAL PROGRAMS

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---CMR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services	Effective Use of the	Governor's Ad y Commission on Ocean Re	Marine Affairs - A	of the Fac	National Data	Oceanography and
RECOMMENDATION OR CONCLUSION / Accession* No.	381	68	66		1	60	73	125		124	3
U. EDUCATION, TRAINING											
1. Sea Grant Program should be oriented to national purposes								58			
2. Inventory of general education programs in marine science							15				
V. INTERNATIONAL PROGRAMS											
1. International exchange and use of vessels by Department of State										176	
2. World Oceanographic Organization in U.N. to combine specialized agency activities										16	
3. IOC promote international expeditions, data exchange, radio frequency allocation Tsunami Warning System								58		181	
4. Antarctic cooperation as model for other international cooperation								58			
5. International Indian Ocean Expedition (IIOE)											
6. World Data Center for Oceanography											
7. International Data Exchange											
8. Radioactive input to the sea - record and publish by international agreement										81	
9. International use of the Great Lakes										19	

* Accession Number - See Bibliography
** ∅ Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

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...ion,
...nographic Data
...an Engineering -
...S. Coast And Geodetic
...ducts and Services
...ffective Use of the
Governor's Advisory Commission on
Ocean Resources
Marine ... Affairs - A Year
of Transition
Study of the Feasibility of
National Data Buoy System
Oceanography 1966, Achievements
and Opportunities
Annual Report of the National
Oceanographic Data Center 7/60-6/61
Annual Report of the National
Oceanographic Data Center 7/61-6/62
Annual Report of the National
Oceanographic Data Center 7/65-6/66
Operations Research Report - National
Ocean Survey Program, Vols. 1, 2, ...
Development for a Storage-Retrieval System
for ... Data
World Weather Watch Cost/Performance
Analysis Study
Application of Synoptic Oceanographic
Analyses/Forecasts to Fisheries
Processing Physical & Chemical Data from
Oceanographic Stations, NODC Publ M-2
Introduction to the National
Oceanographic Data Center, General Series
Spacecraft in Geographic Research
Report in Oceanographic Data Exchange
in the Year 1/2
A System to Digitize Bathythermograph
Temperature Curves
The Data Backlog Problem, Section III
Conclusions, Section IV, NODC
Underwater Photography
UNESCO ...
Ocean Engineering, Vol. 1,
Introduction and Data Collecting

73	125	8	124	37	40	41	107	31	273	261	371	7	94	57	193	16	17	21	375	79			Impact on Data **		
																							Collection	Processing	Use
	58																						0	0	0
15																							0	0	
			176																				1	0	1
			16																				1	0	1
	18		181																				0	0	0
	48																						0	0	0
					13																		2	1	2
														106									0	0	2
					13									1									0	0	2
			8[illegible]																				1	0	1
			79																				1	0	1

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TABLE B-1
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COLLATION OF STUDIES AND OTHER LITERATURE FOR THE NATIONAL MARINE DATA PROGRAM

W. MISCELLANEOUS

DOCUMENT TITLE	Some Problems Associated with the Provision of Historical Data Support ------	Oceanography From Space	---(WR-NSIA--Automatic Collection, Processing & Analysis of Oceanographic Data	Ocean Science and Ocean Engineering - 1965	A Study of the U.S. Coast And Geodetic Survey's Products and Services -----	Effective Use of the Sea	Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibili National Data Buoy	Oceanography 196 and Opportu	Annual Ocea	
RECOMMENDATION OR CONCLUSION / Accession* No.	381	68	66	108	Sects 1,2,3 1	60	73	125	63	124	39	4
1. Description of marine environment						50						
2. Prediction of marine environment						42		81				
3. Identify areas of marine science which need strengthening								24				
4. When synoptic data service available, user expension anticipated	117											
5. Tsunami Warning Service								86				
6. Initiate design study to determine system for long range and reliable environmental predictions								86				
7. Mission analysis of world wide data gathering system				444								
8. Statistics on state and private funding in oceanography being collected								30				
9. Economic analysis of multiple uses needed							8					
10. Automated chart preparation	9											
11. Declassification of DOD-collected data	455						19					
12. Coastal land inventory (use, future use, restrictions, etc.)							2					
13. Album of satellite data should be prepared	413											
14. Ship routing - minimum time, maximum safety					3-101			86				
15. Determine geographical coordinates with greater accuracy					2-8 3-117							
16. Submerged hazards (pipelines, cables, sunken vessels, etc.) position					3-20 3-110							
17. Photogrammetry research and development					3-36							
18. Survey of navigable water ways - quicker response required					3-48							
19. Aerial photography of shorelines					3-101							
20. Charts should include measure of reliability and be standardized					3-110 3-130							
21. Bottom photography required					3-131							

* Accession Number - See Bibliography
** ∅ Little or No Impact
1 Minor Impact
2 Major Impact
Numbers in matrix are document page numbers where recommendation or conclusion is discussed

n,
ographic Data
Engineering -
.S. Coast And Geodetic
ucts and Services ----
ective Use of the Sea

Governor's Advisory Commission on Ocean Resources	Marine Science Affairs - A Year of Transition	A Study of the Feasibility of National Data Buoy System	Oceanography 1966, Achievements and Opportunities	Annual Report of the National Oceanographic Data Center 7/53-6/64	Annual Report of the National Oceanographic Data Center 7/64-6/65	Annual Report of the National Oceanographic Data Center 7/65-6/66	Operations Research Reports - National Ocean Survey Program. Vols. 1, 2, 3.	Development of a Storage-Retrieval System for XBT Data	World Weather Watch Cost/Performance Analysis Study	Application of Synoptic Oceanographic Analyses/Forecasts to Fisheries	Processing Physical & Chemical Data from Oceanographic Stations, NODC Publ M-2	Introduction to the National Oceanographic Data Center, General Series	Spacecraft in Geographic Research	Report of Oceanographic Data Exchange in the Year 1966	A System to Digitize Bathythermograph Aperture Cards	The Data Backlog Problem, Section III	Conclusions, Section IV, NODC	Underwater Photogr	USC&GSS DISCOVERER OSS 02	Ocean Engineering, Vol. I, Introduction and Data Collection			Impact on Data **		
73	125	83	124	39	40	41	107	31	273	261	371	7	94	57	193	16	17	21	376	79			Col-lection	Pro-cessing	Use
																							2	1	2
	81																						2	2	2
	24																						1	0	1
																							0	0	2
	86																						1	1	1
	86																						2	2	2
																							0	0	0
	30																						1	0	0
8																							1	0	1
																							1	2	2
19																							0	0	1
2																							1	0	1
																							1	1	1
	86																						0	0	1
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																							1	0	1
																							1	2	1
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																							1	0	1
																							0	0	0
											51												2	0	2

B

APPENDIX C

PRIOR STUDY, PLANS AND LITERATURE ANALYSIS FORM

An analysis form was prepared at the beginning of the Phase I study for use in abstracting and compiling the information collected during the study, plans and literature review. A sample form is included as Table 1 in this appendix, which is filled in with the actual results of the review of one of the documents analyzed. The procedure followed was to underline pertinent information in the document as it was reviewed and then to copy the underlined information on to the abstract pages of the analysis (see pages 86 and 87) form. Each such entry is keyed to the document in two ways. First, the page in the document on which the information was found is listed on the right side of the left-hand column, as shown. Second, a four-digit code number is listed on the left side of the same column. The code is taken by the reviewer from the matrix on page 83. The matrix in turn codes two basic profiles of the abstracted item in terms which are pertinent to data management. For example, the reviewer issued four codes (2129, 2135, 2137 and 2143) to the abstract from page 106 listed in the next to the last paragraph on page 87. Since the discussion describes some of the functions of World Data Center A, the code 21 is used for all four entries. The variation in the last two digits of the four codes represents the functions performed, acquisition, storage, dissemination, and organization respectively.

The matrix is also employed to categorize broadly the nature of the content of the entire document being abstracted. This system was set up to provide rapid access to the source of the document data base using a computer and a general purpose retrieval program. In this way it becomes simple to search and locate the document and page number of all documents containing information pertinent to the 126 combinations of information defined by the matrix. The general purpose load and retrieval programs and computer time are currently available at SDC and they were applied during Phase I to an oceanographic data base, as described in Appendix D. Utilization of this capability should be considered during Phase II for implementation of a bibliographic retrieval capability for Marine Council use, employing a remote terminal if desired.

Table 1, described above, is a shortened and simplified version of the prior study, plans and literature analysis form included to illustrate the processes involved. Table 2 of this appendix illustrates a normal analysis for filled out in the detail which is more characteristic of the remainder of the documents reviewed.

TABLE C-1

MARINE ENVIRONMENT PRIOR STUDY, PLANS AND LITERATURE ANALYSIS FORM

1. Reviewer A. M. Rugg

Does document describe:

2. Prior Study ____
3. Organization Plans ____
4. Other Literature X

For use in the Marine Environment Data Study, is the document

5. Usable X 6. Not Usable ____

7. Accession Number 57 8. Document Location ____ (Lib. Shelf - Gaylord File - etc.)

9. Author Richmond, Benjamin S.

10. Title "Report of Oceanographic Data Exchange for the Year 1966"

11. Source (Includes Organization, Report Number, Journal, Vol., No., Date)
World Data Center A, March 1967

12. Index Terms (Key Words) Standards, Data, World Data Center, Functions

13. Mission or Goals of Organizations as Applicable

14. Contract Title ____

15. Contract No. ____ 16. Date ____ 17. Length of Contract ____

18. Contracting Agency ____

19. Contractor ____

20. Cost of Contract ____

TABLE C-1
cont'd

In the table on this page, an attempt to format the reviewed literature or plans for machine retrieval has been made. If an article describes Research and Development for Data Acquisition, an X would be placed in the box opposite data acquisition and under R&D. The definitions of column and row headings are attached. It is planned to retrieve information by any of the headings listed. The table does not eliminate the need for an abstract, which should be attached, to describe the various parameters marked in the table. It is expected that the table would be filled in after the abstract has been written. Entries in the abstract should be preceded by a four-digit number made up of the two, two-digit numbers for the cell in the table with which they are associated, the column first and row second. For instance, if an X is entered for Data Archival Requirements, the number 2235 in the abstract should precede information relating to it.

To reduce review time, it is recommended that the reviewer underline words, phrases or paragraphs which should be lifted from the text for entry into the abstract and place the same four-digit number described in the previous paragraph in the text. The typist can then go through the document and enter this information in the abstract with the corresponding number.

Mark each box of the matrix which indicates the content of the publication. Additional descriptions should be included in the abstract to indicate why the appropriate boxes were marked.

	21 Function	22 Requirements	23 Plans & Design	24 R & D	25 Operation	26 Cost	27 General
28. Data Type							
29. Data Acquisition	X						X
30. Data Recording							
31. Data Processing							
32. Data Use							
33. Data Retrieval							
34. Data Base Maintenance							
35. Data Archival	X						
36. Data Transmission	X						
37. Data Dissemination							X
38. Data Quality					X		
39. Sensors							
40. Platforms							
41. Communications							
42. Constraints							
43. Organization	X	X					
44. Personnel							
45. Other							X

TABLE C-1
cont'd

DEFINITIONS OF TERMS USED FOR THE LITERATURE SEARCH QUESTIONNAIRE

Column Heading Definitions

21. Function - Any function performed by the items identified in the row headings should be included such as the function of constraints or an agency function.

22. Requirements - Any needs for items identified in row headings such as sensor requirements or data archival requirements should be identified.

23. Plans & Design - This covers any plans or design relating to any item in the row heading such as the design of a platform or the plans for data use.

24. R & D - If the article refers to research and development for an item in the row heading, this should be identified such as development of a data transmission system.

25. Operation - If the operation of a data center is described, there would probably be discussions of data archival operations, data retrieval operations, etc. In the case of an agency, its overall operation may be described.

26. Cost - If cost information concerning individual or groups of items listed in the row headings is described in the article, this should be identified in the appropriate column.

27. General - Any areas not covered by other column headings should be included in this column and should be discussed in the abstract.

Row Heading Definitions

28. Data Type - Description of parameter(s) recorded.

29. Data Acquisition* - Description of method of data capture by sensor. Indicate collection agency.

30. Data Recording* - Description of method of recording data after capture by sensor, such as strip chart recording or analog recording on magnetic tape.

31. Data Processing - Description of manual and computer processing for format conversions or mathematical and statistical computation. Indicate processing agency.

---

* 29 and 30 combined constitute data collection

TABLE C-1
cont'd

32. Data Use - Description of uses of collected data.

33. Data Retrieval - Description of methods used to retrieve data from a data base, whether manual or automated.

34. Data Base Maintenance - Description of method used to maintain manual or automated filing system.

35. Data Archival - Description of methods used to maintain historical data.

36. Data Transmission - Description of data transmission paths used to transmit data along any of the routes from data acquisition to the ultimate user. This is a description of routes of data transmission not hardware for accomplishing transmission.

37. Data Dissemination - Description of methods used to disseminate data to ultimate users.

38. Data Quality - Description of quality, accuracy, precision and range requirements and limitations.

39. Sensors - Description of sensors, planned or existing.

40. Platforms - Description of platforms used to collect data.

41. Communications - Description of systems used to transmit data along any of the routes from data acquisition to the ultimate user.

42. Constraints - Description of effect of the following constraints on data program:

    a. Political
    b. Legal
    c. Economic
    d. Technological
    e. Physical

43. Organization - Description of organizational activities related to data management.

44. Personnel - Description of personnel involved in data management programs.

45. Other - Any items not included in 28 through 44.

TABLE C-1
cont'd

ABSTRACT

Identification Number	Abstracted Information
2745 p.1	This report summarizes the oceanographic data exchange activities of World Data Center A, Oceanography, for the year 1966.
2729, 2737 p.2	The volume of data received during 1966 increased by 93% over that received in 1965. The volume of data supplied by this Center to other activities increased by 28% over that supplied in 1965.
2745 p.2	The total number of oceanographic stations held by the Center on 31 December 1966 was 99,535, compared with 74,264 for the same data in 1965. A tabulation of these data by years and countries is given in Table 2, which lists data received, the number of oceanographic stations by the years during which the data were gathered, and the countries under which these data are catalogued.
p.3	A summary of the number of oceanographic stations received during the period 1957 through 1963, and during the individual years 1964, 1965, and 1966 are given in Table 3 on page 10.
p.13	Catalogue numbers for data received through 31 December 1966 have been added to the list of the national oceanographic programs, given in the previous report (reference 6), and listed in the various issues of INTERNATIONAL MARINE SCIENCE (IMS). The list is arranged by countries in the same numerical sequence used in the CATALOGUE OF DATA. Under each country the cruises are given in the sequence of the issues of IMS. We have continued to attempt to match data received with the cruises listed in IMS on the basis of the most reasonable agreement of: (1) Country and ship's name; (2) Beginning and ending dates of the cruise; (3) The region(s) where the data were taken.
2243 p.102	The main principles governing the responsibilities of the WDCs and the nature of data interchange are founded on the IGY "Guide" and the experience gained during the IGY.
2745 p.104	(a) World Data Centers for collection and distribution of data. For each discipline, there are two or three such centers which operate according to the principles set forth in the Guide to WDCs.

TABLE C-1
cont'd

ABSTRACT Identification Number		Abstracted Information
2745 (Continued)	p.104	(i) World Data Center A, which consists of eleven subject-matter divisions and includes all disciplines. (ii) World Data Center B, which conists of two subject-matter divisions and includes all disciplines. (iii) World Data Center C, which consists of several discipline centers in several nations. (b) Centers for certain kinds of analysis and synthesis resulting in issuance of indices, certain bulletins of summary information, etc. There are two groups of such centers and provision is made for others as needed.
2745	p. 104	(i) Permanent Services.
2745	p. 105	(ii) Special World Geophysical Centers
2243	p. 106	The objects of establishing several IGY World Data Centers for collecting IGY observational data were: (1) to insure against catastrophic destruction of a single center, (2) to meet the geographical convenience of, and provide easy communication for, workers in different parts of the world.
2129 2135 2137 2143	p. 106	Each WDC is responsible for: (1) endeavoring to collect a complete set of data in the field or discipline for which it is responsible, (2) the safekeeping of the incoming data, (3) correct copying and reproduction of data, maintaining adequate standards of clarity and durability, (4) supplying copies to other WDCs of data not received direct, (5) preparation of catalogues of all data in its charge, (6) making date in the WDCs available to the scientific community.
2538	p. 110	Quality of data. WDCs are not generally responsible for accuracy of data in their possession.

TABLE C-2

MARINE ENVIRONMENT PRIOR STUDY, PLANS AND LITERATURE SEARCH ANALYSIS FORM

1. Reviewer A. M Rugg

Does document describe:

2. Prior Study X
3. Organization Plans ____
4. Other Literature ____

For use in the Marine Environment Data Study, is the document

5. Usable X 6. Not Usable ____

7. Accession Number 1 8. Document Location Shelf
(Lib. Shelf - Gaylord File - etc.)

9. Author Frazier, N.A.

10. Title "A Study of the U. S. Coast and Geodetic Survey's Products and Services as Related to Economic Activity in the U. S. Continental Shelf Regions"

11. Source (Includes Organization, Report Number, Journal, Vol., No., Date)
Battelle Memorial Institute, 17 June 1966

12. Index Terms (Key Words)

User requirements, Charts, Maps, Geodesy, Magnetism, Seismology

13. Mission or Goals of Organizations as Applicable

14. Contract Title Same as Title

15. Contract No. ----- 16. Date ---- 17. Length of Contract ____

18. Contracting Agency U.S. Coast and Geodetic Survey

19. Contractor Battelle Memorial Institute

20. Cost of Contract ____

TABLE C-2
cont'd

In the table on this page, an attempt to format the reviewed literature or plans for machine retrieval has been made. If an article describes Research and Development for Data Acquisition, an X would be placed in the box opposite data acquisition and under R&D. The definitions of column and row headings are attached. It is planned to retrieve information by any of the headings listed. The table does not eliminate the need for an abstract, which should be attached, to describe the various parameters marked in the table. It is expected that the table would be filled in after the abstract has been written. Entries in the abstract should be preceded by a four-digit number made up of the two, two-digit numbers for the cell in the table with which they are associated, the column first and row second. For instance, if an X is entered for Data Archival Requirements, the number 2235 in the abstract should precede information relating to it.

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Mark each box of the matrix which indicates the content of the publication. Additional descriptions should be included in the abstract to indicate why the appropriate boxes were marked.

		21	22	23	24	25	26	27
		Function	Requirements	Plans & Design	R & D	Operation	Cost	General
28.	Data Type		X					
29.	Data Acquisition					X		
30.	Data Recording							
31.	Data Processing							
32.	Data Use		X					X
33.	Data Retrieval							
34.	Data Base Maintenance							
35.	Data Archival							
36.	Data Transmission							
37.	Data Dissemination							
38.	Data Quality							
39.	Sensors							
40.	Platforms							
41.	Communications							
42.	Constraints							
43.	Organization	X	X					
44.	Personnel							
45.	Other							X

TABLE C-2
cont'd

ABSTRACT "A study of the U. S. Coast and Geodetic Survey's Products and services as related to economic activity in the U. S. Continental-shelf Regions" #1

Identification Number	Abstracted Information
	The report contains numerous tables on industrial activity related to offshore marine areas. The survey covered far more than C and GS products for instance the report discusses many fishing requirements unrelated to C and GS activites.
2529 p.i	...A 16-week study was made of the gross economic activity in the U. S. continental-shelf regions, the dependency of that activity upon U. S. Coast and Geodetic Survey (C&GS) products and services, and the uses of and present needs of additional C&GS products and services relating to the U.S. continental-shelf regions. Results are based on a digest of information obtained from: (1) interviews of about 70 private firms, 40 state and local organizations, 25 Federal organizations, and 9 universities; and (2) financial reports and other literature.
2228 p.i	Priority information needs ... In no particular order these are: (1) maps of bottom topography, (2) mineral composition and properties of bottom sediments and cores, (3) simultaneous measurements of current profiles over wide regions of near-shore and estuarine waters, and (4) ability to determine and /or reoccupy more precisely the geographical coordinates of points at sea or with respect to the sea bottom.
p.III-20	Description of User Problems and Needs...Offshore oil and gas industry.
	(1) ... Extension...Triangulation of certain fixed platforms.
p.III-21	(2) ... Charts more up to date.
	(3) ... Permanent marine positioning-control points.
	(4) ... Earth-satellite systems for positioning.
	(5) ... Advanced electronic systems for positioning.
	(6) ... Place electronic positioning grids on its charts.
	(1) ... Charts...for locations not now normally frequented.
	(2) ... More detail on charts.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 (Con't)	(5) ... Locations of submerged pipelines.
p.III-21	(6) ... Charts or maps of the entire Gulf of Mexico should extend farther to the east and to the west.
	(7) ... Ocean-current data on navigational charts should be more complete.
	(1) ... Historical records of weather are needed.
p.III-22	(2) ... Studies of waves and wave action are needed.
	(3) ... Historical data on waves
	(4) ... Formation, flow, and shear pressures of ice floes.
	(1) ... Data on the first few feet of bottom material are inadequate for.
	(2) ... Data on properties of bottom material down to 100 feet below the seafloor is needed.
	(3) ... Bottom and shoreline changes resulting from major hurricanes and storms should be put on charts as quickly as possible.
	(4) ... Interactions of bottom currents and sediments.
	...Widely spaced refraction (seismic) studies are needed.
	...C&GS should make geophysical survey data accessible ... before the data are entirely complete.
p.III-24	...Metals and Minerals
p.III-36	Some of the needs expressed are as follows:
	(1) ... Three-dimensional mapping
	(2) ... More research and development in photogrammetry
	(3) ... Wide-range sonar readings
	(4) ... Offshore-positioning devices

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 (Con't)	(5) ... Data for regions farther out from shore
p.III-36	(6) ... Data-transmission centers
	(7) ... Coring
	(8) ... More publications of data
	(9) ... Bottom-soil mechanics
	(10) ... Systematic mapping and sampling
	(11) ... Survey areas of interest.
p.III-39	... Tsunami and Hurricane Protection
p.III-41	... Major user problem is a lack of design criteria for protective construction.
	... The ultimate objectives are the accumulate design criteria relative to:
	(1) ... Wave action in coastal waters
	(2) ... Shore processes
	(3) ... Tide and surge dynamics
	(4) ... Inlet and estuary dynamics
	(5) ... Sources and transport of littoral materials.
p.III-42	...Construction and Maintenance of Harbors, Channels, Intracoastal Waterways, and Beaches
p.III-44	...Deficiencies in design criteria...for sediment mechanics, estuarine and inlet dynamics, and inshore ocean processes
	...Effects of dredging on fishing grounds, oyster and clam beds, and wild life.
	...Locating offshore deposits of sand.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 p.III-45 (Con't)	... Shipbuilding
p.III-47	... Criteria to design ships that will adeuqately cope with the ocean-atmosphere-land mass processes.
p.III-48	... Ship Salvage
	... Quicker response for surveying navigable waterways.
p.III-80	... Waste Disposal
p.III-81	... Data on currents provided by C&GS are not detailed enough
p.III-88	... Tsunami problems can be grouped under five topics: (1) improved prediction for both the occurrence of a tsunami and of the maximum amplitude of the waves; (2) prevention of tsunami damage; (3) public education; (4) near-coast characteristics and effects of coastal figuration, and (5) historical data on tsunamis.
p.III-101	... Transportation
	... Minimum-time path routing through forecasting of waves, winds, and currents.
	... Bottom data for better port approaches, and new current-measurement points.
	... Aerial photography of shorelines for property boundary determination.
p.III-110	... List of Needs of Fishing Industry Noted by Industry Representatives
	... Estuarine circulation
	... Interaction of air-sea surfaces
	... Temperature and salinity measurements

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 p-III-110 (Con't)	... Bathymetric surveys in more detail
	... Better markers and leveling data (particularly West Coast)
	... More recent and accurate charts
	... Locations of bottom hazards
	... Loran lines on charts
	... Determine economic value and locations of various seaweeds
	... Development of more efficient gear and vessels
	... Increase markets for fishery products
	... Research on utilization of seafoods and by-products
	... Enforcement of fishing area restrictions and sea laws
	... Contour mapping of ocean floor (to replace soundings on charts)
	... Survey of seaweed resources along all coasts
	... Locations of upwellings and reasons for same
	... Tolerance levels of various marine species
	... Current directions and rates of movement
	... Tide movement and times in usable forms
	... Environmental preferences of various species
	... Evaluation of validity of soundings on present charts
	... Large-scale charting of critical areas
	... Show land geography on appropriate portions of coast charts
	... Detailed information on physical characteristics of the ocean in the Gulf of Mexico (particularly on continental shelf)

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 (Con't) p.III-110	... Rechart sea bottom of the Gulf continental shelf
	... Add Loran stations (and lines on charts) in Gulf area
	... Unmanned buoys to report sea conditions on the entire ocean
	... Chemical and nutrient content of waters off coasts
	... Wind and sea state (on current basis) by seasons
	... Improved tide and current information on West Coast
	... Better geographic description of leases
	... Make aerial photographs available to the public
	... Measure of reliability assigned to chart information
	... Charts based on standard grid and multiples of the same
	... Protection of bays from pollution and predators
	... Surveillance of illegal shellfishing areas
	... Make information available that appears now only on Army or Navy charts Atlas of ocean environment presenting basic data and supplements or special charts of more recent information
p.III-117	... Defense and Space
	... (1) Geodetic positioning
	(2) Environmental marine data, including up-to-date charts.
p.III-126	... Industrial Research and Development
	composition of sediments mechanics of seabottom materials

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 (Con't) p.III-127	... More precise navigation and bathemetry charts are needed.
	... Subbottom structures, location of shipwrecks, earthquake areas, and bottom current general ocean-shelf information maintained in an information center as most useful
p.III-129	... Multiple uses for the continental shelf come into conflict
p.III-130	... Problems and Needs Cited by Research and Development Investigators on the Continental-Shelf Regions
	... C&GS must concentrate on areas where they are the strongest --geodetic control, sounding, etc.
	... Positioning is a big problem and is of great importance--need a permanent grid or triangulation system in offshore similar to that on land
	... Accurate bottom-reference system -- using beacons, transponders, buoys, etc.
	... Establishment of a geodetic datum for continental shelf.
	... More accurate navigation system and reference -- extension of loran coverage. Place loran lines on C&GS charts.
	... Radar navigation system in harbors.
	... Improve navigation aid.
	... Underwater-sound navigation.
	... Systematic mapping of world oceans -- broader C&GS mission in general geophysical surveys.
	... Would like to see C&GS do in-house work on basic studies and theory, with a balance between two.
	... Surveys for areas for waste disposal.
	... Surveys to discover flat areas on the bottom which can be used for testing of sonar, to calibrate equipment, etc.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 (Con't) p.III-130	... More accurate charts are needed than currently available
	...C&GS charts are adequate for navigation but perhaps not for special purposes and surveys. Shelf needs surpass what is available from charts.
	... Standardization of charts (C&GS, Navy, Army Engineers)
	... Conversion into the metric system
	... More bathymetric maps.
	... More detailed magnetic anomaly maps especially interesting areas. When such areas are discovered, C&GS should then deviate from their schedule and survey it.
	... More accurate sounding = 1 foot (for buoy design)
	... Ice-cap soundings for future importance
	... Extension of C&GS charts perhaps to Bermuda
	... Charting of shipwrecks
	... Update charts more frequently in areas of active changes
	... Chart earthquake belts from underwater seismic data
	... Provide special-purpose maps rather than crowding information
	... Knowledge of shelf -- topographic, sediments, structure. This knowledge could be used by others to make intelligent guesses at economic resources.
	... Quick systems of collection and distribution of oceanographic records on abnormal tides.
	... More information on storms -- occurrence, practical prediction system.
	... Wave-prediction system.
	... More information on tsunami.
	... Better understanding of ocean environmental data.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2228 p.III- (Con't) 130	... Systematic, seasonal, areal and depth ocean-data collections by buoy systems and analysis for buoy design and provide atlases based on this synoptic information. ... Surface-current studies in relation to bottom topography ... Chart currents with depth to bottom (vertical profiles) ... More tide gauges in remote areas (away from population) ... More tidal and current prediction as functions of depth ... More correlation between tide prediction and precise leveling ... More systematic sampling of environmental programs ... Look into reliability of old datum ... Examine leveling network on West Coast and tie them to one datum. ... Systematic studies of shelf with research institutes as part of it. ... Active participation and cooperation of research institutes with C&GS survey programs--C&GS provide ship, they provide people ... Cooperation of C&GS with commercial fisheries to look for scattering layer. ... C&GS should be thinking of future problems 50 years from now. ... Fishing industries are suffering from lack of sufficient shelf information and from water pollution. ... Cooperation of C&GS with Bureau of Mines to chart and locate mineral deposit. ... Detailed topographic maps using sparker and near-bottom varying depth sounder.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number		Abstracted Information
2228 (Con't)	p.III-131	... Study of substructure and mapping it. ... More of bottom photography. ... Systematic bottom coring and sampling. ... More information on mechanical property, physical properties distribution of bottom sediments for anchoring design, cables, acoustic, ASE, minerals and scientific purposes. ... Deep drilling and more of it systematically. ... Marine life on bottom. ... Marine biology and its effect on sonar. ... Grid system for core sampling for systematic approach to mineral prospecting. ... Bottom surveys with small submersibles ... Use small submersible as a platform and tool to get to bottom information ... Progress on shelf has been held back because of inadequacy of shelf information. ... Government and C&GS should lead the way for exploitation of the shelf and not wait until industrial requirements are upon them. ... Present status in position control is inadequate; it should be provided by a Government agency. ... Government can take the risk of total shelf explorations. ... Original boat sheets should be furnished in full size (as they were in the past) to researchers who ask for them rather than reducing them photographically. ... Catalog or pamphlet of C&GS publications and how to obtain further information if needed.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number		Abstracted Information
2228 (Cont)	p.III-131	... Three-dimensional visual aid maps on oceanography -- for management (unfamiliar with oceanography) to grasp easily.
		... Continental-shelf data information center and C&OS as a part of it.
		... Publication of C&OS data soon after collection.
2745	p.i	... Continuation of present C&OS programs either because of the level or the absence of C&OS activity will not meet these needs on a timely basis.
	p.I-1	Project Objectives The principal objectives of this study were:
		(1)... To identify present level of gross economic activities in the continental-shelf regions
		(2)... To estimate the worth of C&OS products and services relating to the continental-shelf regions.
		(3)... To identify the technical problems and data needs bearing on future developments in continental-shelf regions.
		(4)... To consider the capability of C&OS, in terms of present C&OS programs, to meet the needs in Item (3) in the future.
		(5)... To estimate future levels of economic activity in the continental-shelf regions.
		(6)... To delineate present and future continental-shelf regions of commercial interest.
2732	p.I-3	... Users are represented by ten major groups:
		(1)... Mining and Petroleum
		(2)... Marine Engineering
		(3)... Recreation

TABLE C-2
cont'd

ABSTRACT #2

Identification Number		Abstracted Information
2732 (Cont)	p.I-3	(4)... Health and Welfare
		(5)... Transportation
		(6)... Food and Agriculture
		(7)... Defense and Space (including U. S. Coast Guard)
		(8)... Research and Development
		(9)... Other Industry (not included in above categories)
		(10)... State and Local Agencies.
2745 (Cont)	p.I-4	... Measurement of worth
	p.I-5	... User Dependency Upon C&GS Products and Services

Degree	Definition
Essential	User activity would be seriously reduced or discontinued in the absence of C&GS products and services
Fundamental	User activity is built on C&GS products and services. Lack of these, however, would not necessarily result in discontinuance of activity but would require major adjustments.
Advantageous	User activity could continue only with some difficulty or minor adjustments if C&GS products and services were not available.
Convenient	User activity makes use of C&GS products and services but would not be hampered by lack of same
Nonessential	User activity is not dependent on C&GS products and services.

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2745 p.I-6 (Cont)	... Separate subsections have been devoted to each of ten major groups. Within each subsection results are presented within four major topics:
	(1)... Estimate of Present Economic Activity
	(2)... Estimate of Worth of U. S. C&GS Products and Services
	(3)... Description of User Problems and Needs
	(4)... Estimate of Future Economic Activity.
2243 p.iii	... C&GS can improve its present service by:
	(1)... Initiating a continuing customer analysis of C&GS products
	(2)... Presentation of data in forms to better meet user requirements
	(3)... Utilizing more effectively present C&GS field representatives to update information on user requirements.
p.II-10	... C&GS efforts are minimal in bottom topographic mapping and systematic sampling and analysis of bottom materials. Synoptic current profile data over wide regions of near-shore and estuarine waters is apparently nonexistent. C&GS does not have a program ... marine geodesy
2143 p.II-1	... C&GS activities
	... Hydrography Program
	... Ocean Studies Program
	... Geomagnetism Program
	... Seismology Program
	...Geodesy Program

TABLE C-2
cont'd

ABSTRACT #1

Identification Number	Abstracted Information
2232 p.II-8,	...Highest priority of information needs of users
	(1) Maps of bottom topography
	(2) Mineral composition and properties of bottom sediments and cores.
	(3) Simultaneous measurements of current profiles over wide regions.
	(4) Ability to determine and/or reoccupy more precisely the geographical coordinates of points on the sea bottom and of ships during surveying, data gathering, and other operations at sea (positioning at sea in a geodetic sense rather than in a navigational sense).
2228 p.III-136-137	The identification of earthquake belts is also necessary.
	(1) Bottom topography
	(2) Positioning control
	(3) Seasonal information on currents with depth
	(4) Bottom sediments and their type and strength
	(5) Marine life on bottom
	(6) Tides
	(7) Subbottom profiles (sparker surveys)
	(8) Various ocean environmental data
	(9) Description of slumps on the slope through bottom topography and coring
	(10) Seabottom interface studies

APPENDIX D

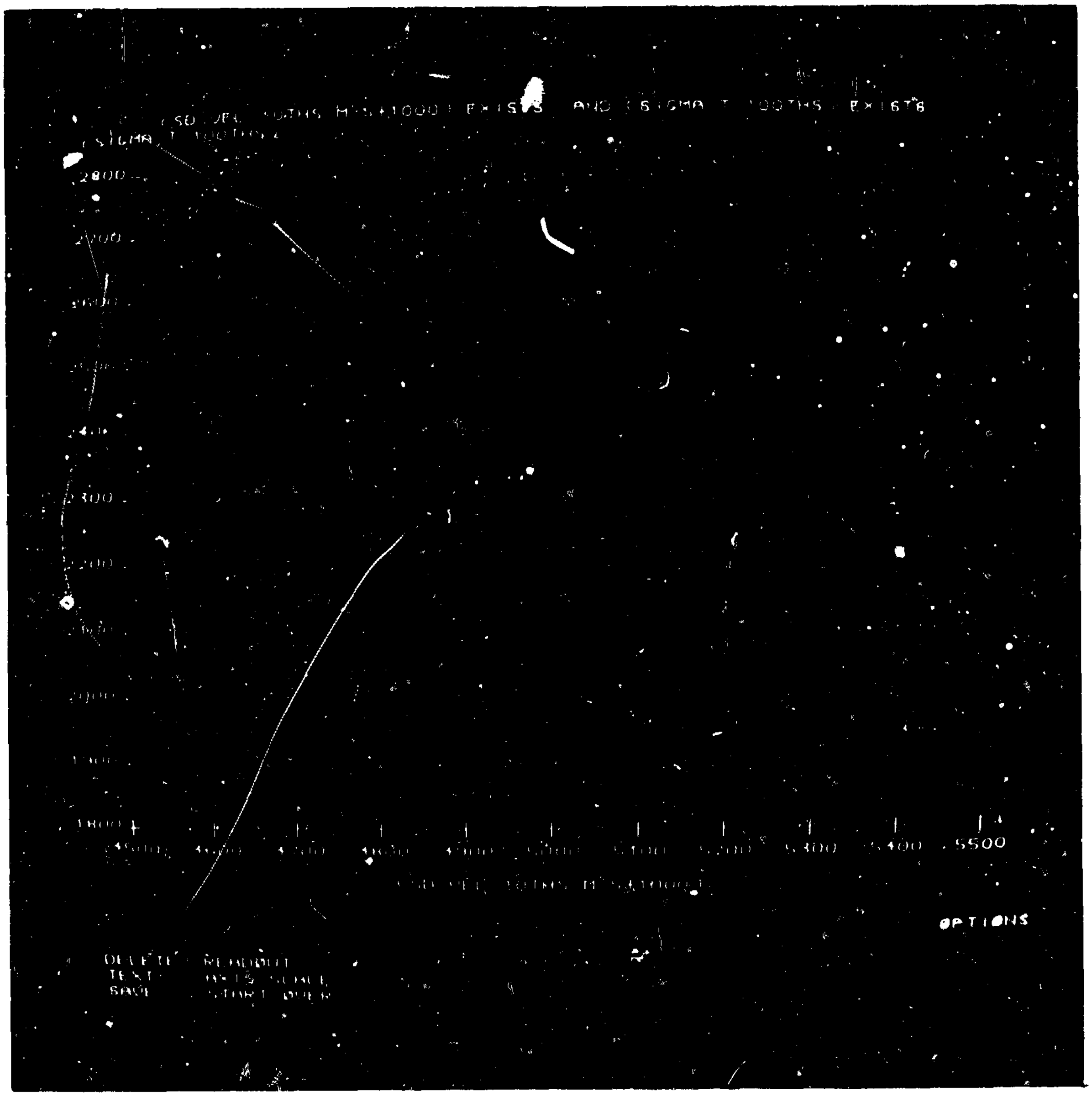
DATA MANAGEMENT TOOLS FOR MARINE RESEARCH

The growth of oceanographic data collection as a result of increased data capture activities and the merging of existing collections, offers to the researcher new opportunities for broad scope investigation, statistical analysis and hypothesis development. At the same time, and as a function of this growth, the problem of identifying and examining data subsets of potential use becomes substantial. The common problem facing the analyst at the outset of an oceanographic study is the problem of learning what data are available, how in gross terms the data are configured, and whether there are sufficient data of the proper sort to support the desired further detailed investigation. The search for appropriate material and pre-examination of its usefulness is often a frustrating and time-consuming process. It is fortunate in this situation that these problems, in the field of oceanography, are logically similar to the data retrieval problems encountered in other fields for which there have recently been developed some powerful general purpose data management tools. These tools are extremely useful for the handling of well-structured data collection such as, for instance, physical oceanographic data bases which consist of lists of phenomenological measurements, each list characterizing conditions at some point at some time.

It might be useful, for instance, for a researcher to be able to quickly check the vertical distribution of salinity or temperature at selected stations in order to decide if the data should be included in his sample. Through use of a device such as the general display system being developed at SDC, he would be able, after causing the data base of interest to be loaded into the system, to proceed by light-pen use to call for successive two-dimensional scatter plots of temperature versus depth and salinity versus depth. Visibly spurious data could be deleted. If he liked, he could (again by use of light-pen) call for an nth order curve to be fitted to the data.

To illustrate some of these capabilities a small oceanographic station data base was obtained from NODC covering one and one-half Marsden squares and containing about 800 oceanographic stations. The information was loaded into SDC's Q-32 time-sharing computer and a series of experiments were performed which are described briefly and illustrated on the following pages.

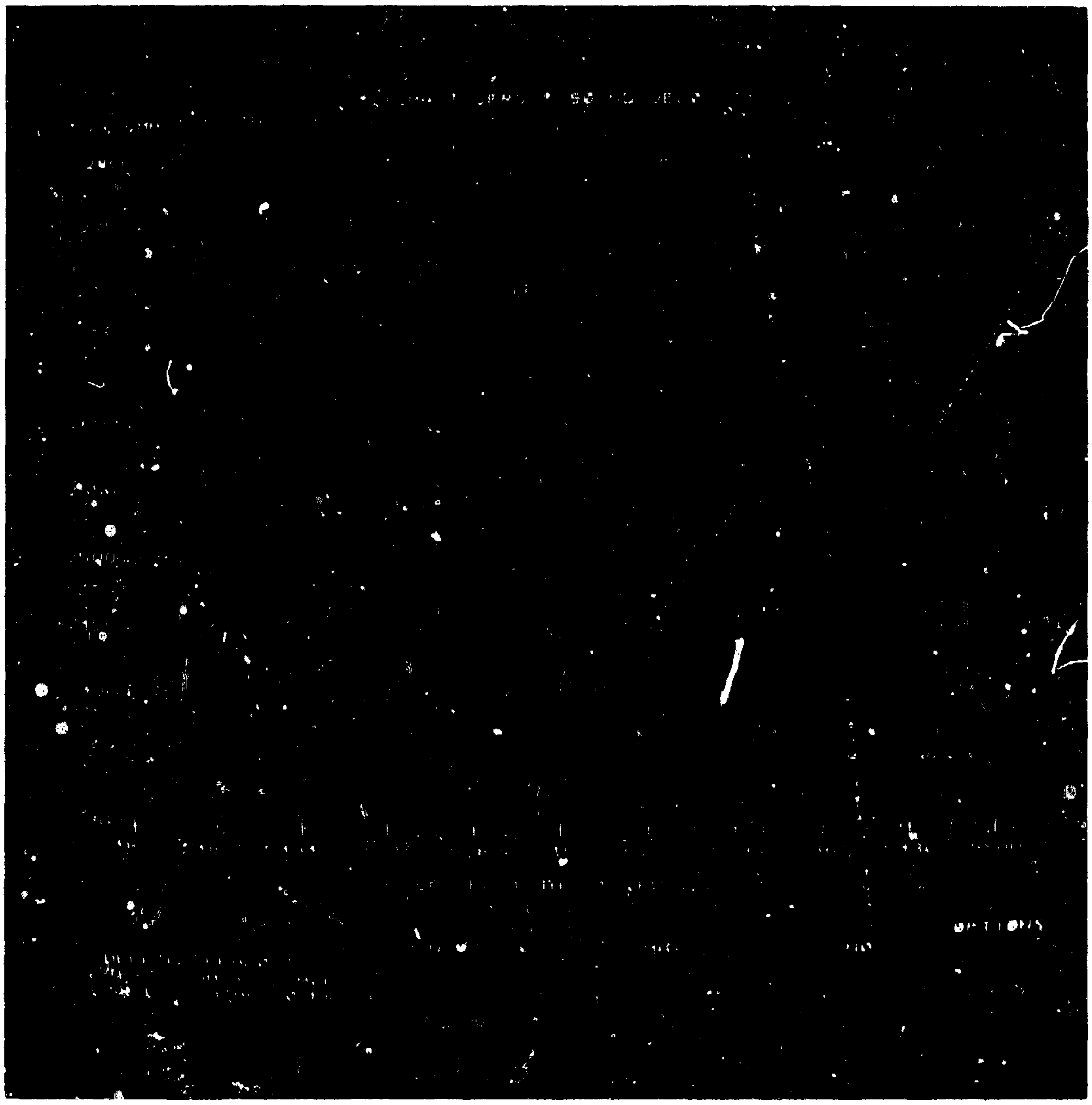
This illustration shows a scope plot, which in this case happens to be sigma-t* versus sound velocity. Five light-pen actions were required--two each to specify the X and Y variables as selected from the displayed list of data base variables, and one to give the display command. The system has chosen the scaling on the basis of the range of retrieved data.



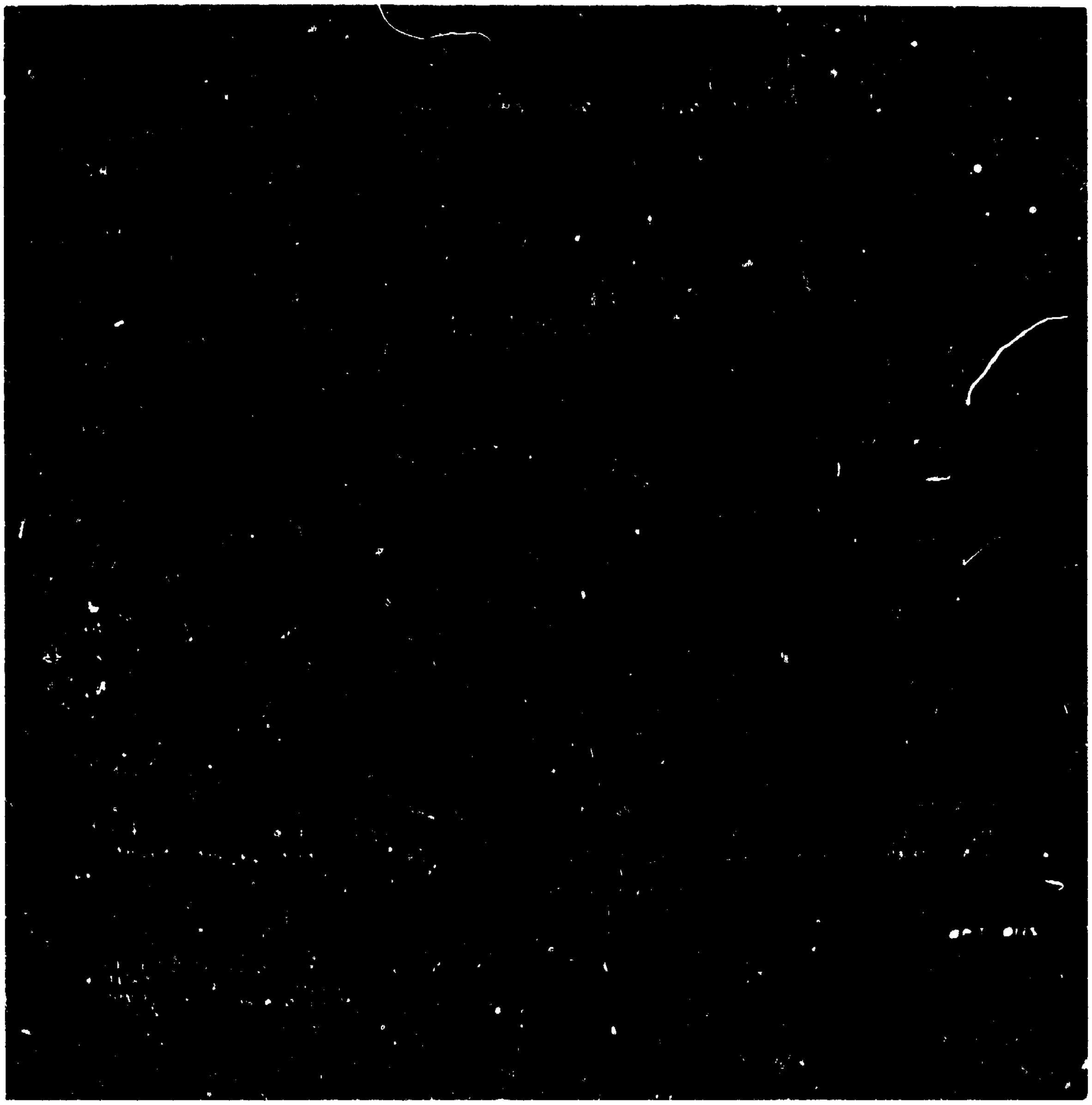
---

*Sigma-t is a shorthand expression for the parameter of density (ρ). It is described in the following manner: sigma t (σ_t) = $(\rho - 1)$ 1000. For example, for a density of 1.02531, σ_t = 25.31

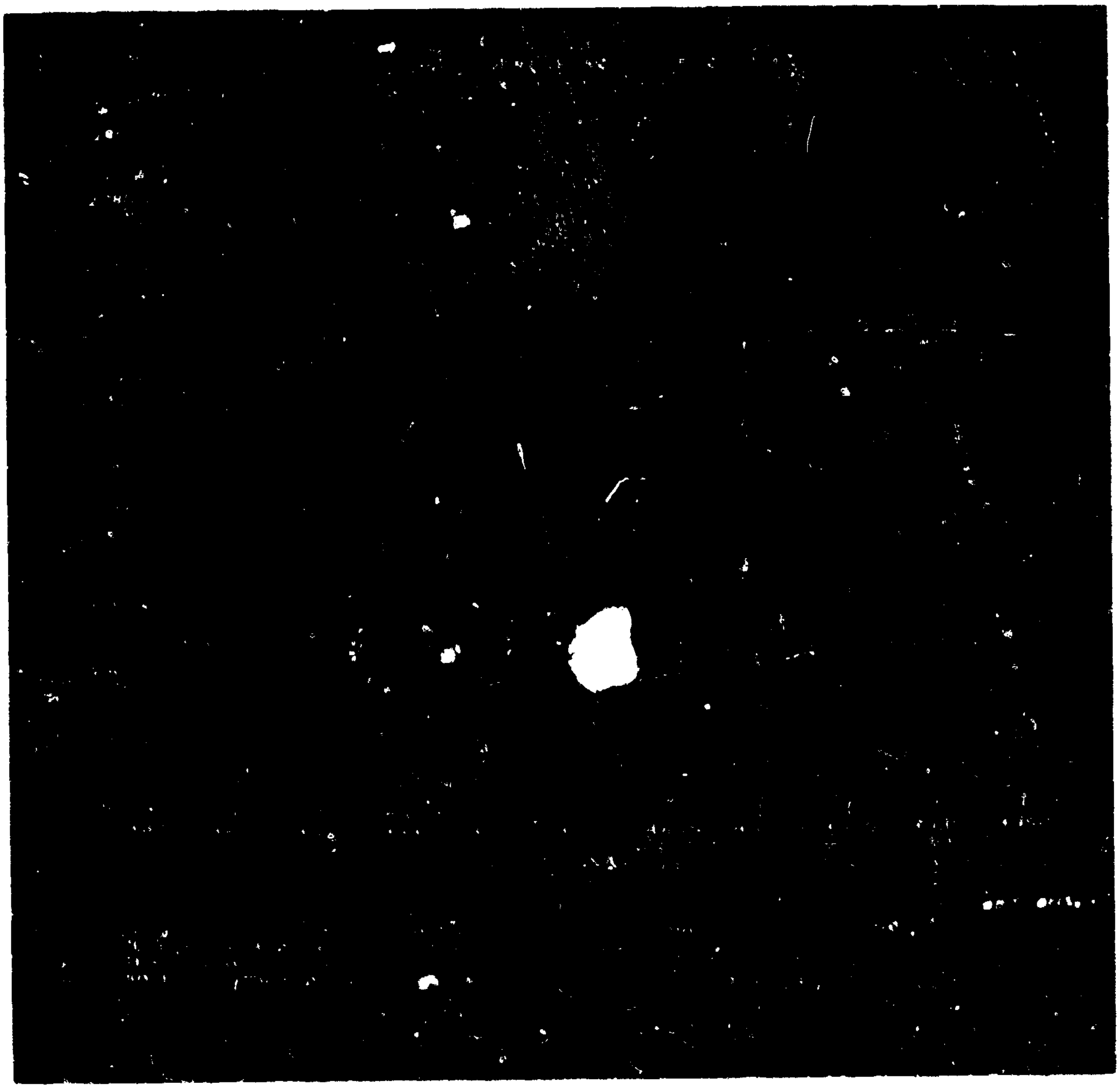
This illustration shows the curve centered and expanded on both axes as the result of light-pen adjustments to the X and Y scales. The title (at top) has been inserted via keyboard.



This illustration shows a readout of the X, Y values of a selected point (marked automatically after light-penning by a cross). The digital values are shown below the curve.



This illustration shows a blow-up of the knee of the curve achieved by again modifying the X and Y scales by light-pen.



Other options include the saving for later retrieval, and superimposition if desired, of any of the interim displays. It is possible at any time in the sequence to return to the initial display by activating "start over." The entire experimental process illustrated by the pictures consumed only about five minutes of the investigator's time.

The availability of such a device to a research would enable him to readily investigate the potential usefulness of available data, to get started earlier, and to avoid initiating studies that the availability and quality of data would not support.

The display system just demonstrated is the product of a current SDC developmental project that began with an existing data management system which employs a teletype for user interaction and added to it a display generation and interaction capability. The precursor system called LUCID provides all the tools necessary to perform the common file-processing functions of describing the entries in a data base, loading them into the machine, asking questions about them, performing calculations on them, having them presented for analysis, obtaining hard-copy reports, and maintaining the data base. The user may be asked by the system to supply parameters, control information, file names, operations to be performed, and format desired. He, in turn, may ask the system to define a term, to comment on a process he does not understand, to tell him what steps of a procedure are available, to explain error messages, or to give him other tutorial help. The system is worth examining at this point to indicate the sort of services obtainable from a general purpose interactive data management system employing a keyboard only. An oceanographic data base might have items such as the following:

SYNONYM	ELEMENT NAME --- DESCRIPTION
E1	DECK --- POSITIVE INTEGER
E2	(NODC REF) --- POSITIVE INTEGER
E3	(CONSEC NO) --- POSITIVE INTEGER
E4	YEAR --- POSITIVE INTEGER
E5	MO --- POSITIVE INTEGER
E6	DAY --- POSITIVE INTEGER
E7	HOUR --- POSITIVE INTEGER
E8	LAT --- POSITIVE INTEGER
E9	HEM-NS --- CATEGORY
E10	LONG --- POSITIVE INTEGER
E11	HEM-EW --- CATEGORY

SYNONYM	ELEMENT NAME --- DESCRIPTION
E12	(MARSDEN SQ) --- POSITIVE INTEGER
E13	(DEG SQ) --- POSITIVE INTEGER
E14	(BOTTOM DEPTH M) --- POSITIVE INTEGER
E15	SHIP --- NAME
E16	(DEPTH OBS M) --- POSITIVE INTEGER
E17	(SAL 100THS PPT) --- POSITIVE INTEGER
E18	(OXY 100THS ML/L) --- POSITIVE INTEGER
E19	(PO4 100THS MICROG-AT/L) --- POSITIVE INTEGER
E20	(NO2 100THS MICROG-AT/L) --- POSITIVE INTEGER
E21	(NO3 10THS MICROG-AT/L) --- POSITIVE INTEGER
E22	(SILICATE 100THS MICROG-AT/L) --- POSITIVE INTEGER
E23	(CURR DIR TENS DEG) --- POSITIVE INTEGER
E24	(CURR SP 10THS KTS) --- POSITIVE INTEGER
E25	(CLD AMT 9THS) --- POSITIVE INTEGER
E26	(WAVE HGT 10THS M) --- POSITIVE INTEGER
E27	(PRES HGT GEOPOTENT M) --- POSITIVE INTEGER
E28	(PRODUCTIVITY GC/M-SQ/DAY 100THS) --- POSITIVE INTEGER
E29	(VOL FILTERED M-CUB) --- POSITIVE INTEGER
E30	(ORGANISMS 2 CM ML) --- POSITIVE INTEGER
E31	(WIND SP 10THS KTS) --- POSITIVE INTEGER
E32	(WIND DIR TENS DEG) --- POSITIVE INTEGER
E33	(WAVE DIR TENS DEG) --- POSITIVE INTEGER
E34	(SD VEL 10THS M/S+1000) --- POSITIVE INTEGER
E35	(WAVE PER SEC) --- POSITIVE INTEGER
E36	(TYPE BOTTOM) --- NAME
E37	TEMP --- POSITIVE
E38	(SEA TEMP 100THS C) --- INTEGER
E39	(SIGMA T 100THS) --- INTEGER
E40	(ORGANISMS'CM ML) --- POSITIVE INTEGER
E41	(TEMP AIR 10THS C) --- INTEGER

SYNONYMS MAY BE USED INSTEAD OF ELEMENT NAMES

The data base listing, as above, is requestable after data base loading and is immediately printed in response to a DESCRIBE ELEMENTS command. Distinct values of any element are printed in response to a SHOW command.

SHOW (TYPE BOTTOM) or SHOW E36 yields:

```
V1        (GRY LOW CARBONATE MUD)
V2        (GLOBIGERINA OOZE)
V3        (ARGILLACEOUS GLOB OOZE)
V4        (YELLOW-BLACK GLOB OOZE)
V5        (LOW CARBONATE LUTITE)
V6        (MUDDY SAND)
V7        (BLUE MUD)
V8        (GRAY MUD)
V9        (SANDY MUD)
V10       (MUD)
V11       (COURSE SAND)
V12       (BLACK MUD)
V13       (DK GRAY SILTY CLAY)
V14       (GRAY SILTY CLAY)
V15       (SAND GREENISH MUD)
```

If the location of low carbonate lutite were desired, the statement could be entered PRINT LAT, LONG, WHERE (TYPE BOTTOM) EQ (LOW CARBONATE LUTITE) or shorter, PRINT E8, E10, WHERE E36 EQ V5. The result might be:

```
E8     400     E10     1700
E8     600     E10     1200
E8     408     E10     1957
E8     .....
```

If a researcher were interested in isentropic analysis which involves investigation of the distribution of various properties on a constant density surface, he might wish to examine the salinity values lying between the sigma-t surfaces of 22.70 and 23.00. In addition he would like to know the depth of occurrence of the sigma-t values. In order to do this he would order: PRINT (MARSDEN SQ), (SAL 100THS PPT), (DEPTH OBS M), (SIGMA T 100THS), WHERE (SIGMA T 100THS) GR* 2269 and (SIGMA T 100THS) LS 2301.

Resulting in an output of:

```
E12    2    E17    3498    E16    10    E39    2270
E12    2    E17    3499    E16    20    E39    2272
E12    2    E17    3505    E16    30    E39    2300
 .
 .
 .
```

If the record were desired for permanent retention, use of the option BLOCK results in a labeled columnar output:

```
(MARSDEN SQ)      (SAL 100THS PPT)      (DEPTH OBS M)      (SIGMA T 100THS PPT)
     2                 3498                  10                   2270
     2                 3499                  20                   2272
     .
     .
     .
```

This sort of system is extremely useful for obtaining quickly the answer to specific questions put to a data base. Because of the concordance-like structure employed in building the data bases and the use of direct access (disc) storage for the data base of reference all variables are equally accessible. Rapid searches of a full data base on any variable or logical combination of variables are possible. The retrieval language is simple and easily learned. The person needing the data can acquire it for himself without having to explain his requirements to an intermediary. This contributes to efficiency as well as savings in time. It is also important to note that the LUCID system contains a data base format definition and data base loading and updating mechanism that are readily controllable from the same teletype console used for retrieval interaction.

---

*GR = Greater than   LS = Less than

APPENDIX E

ESTIMATED VOLUME OF MARINE DATA COLLECTED BY SELECTED ORGANIZATIONS

As a result of interviews or literature review, the volume of some parameters of marine data collected by selected organizations was obtained and has been tabulated in Appendix E, Tables E-1 through E-6. Organizations for which this information is available include NAVOCEANO; University of Washington; Scripps Institution of Oceanography; Biological Laboratory, Honolulu, Bureau of Commercial Fisheries; California Cooperative Oceanic Fisheries Investigations; and International Expeditions. The source of the data for each table is listed on the table. During Phase II, it will be important to determine the volume of marine data files for all organizations being contacted and whether or not they duplicate other files. For the data listed in this appendix, it is not known whether any duplication exists or not. Several of the illustrations in this report are based on the data tabulated in this appendix.

YEAR	ORGANIZATION	NANSEN CAST	NANSEN CAST	S - T - D	MECHANICAL BT	MECHANICAL BT	XBT - SHIP (X 10^3)	XBT - AIRCRAFT (X 10^3)	XBT - HELICOPTER (X 10^3,	BOTTOM TEMPERATURE	BOTTOM TEMPERATURE	BOTTOM SAMPLES, CORES	BOTTOM SAMPLES, CORES	PLANKTON TOW
1949	OCEANOGRAPHIC NEAR SHORE	164										6		
	1949 TOTAL	164										6		
1950	OCEANOGRAPHIC NEAR SHORE	277										20		
	1950 TOTAL	277										20		
1951	OCEANOGRAPHIC NEAR SHORE	269			1,047							104		69
	1951 TOTAL	269			1,047							104		69
1952	OCEANOGRAPHIC NEAR SHORE	390			3,593							207		67
	1952 TOTAL	390			3,593							207		67
1953	OCEANOGRAPHIC NEAR SHORE	630			272							152		177
	1953 TOTAL	630			272							152		177
1954	OCEANOGRAPHIC NEAR SHORE	1,137			1,017							376		148
	1954 TOTAL	1,137			1,017							376		148
1955	OCEANOGRAPHIC NEAR SHORE	722	336		728	4,104						641	151	191
	1955 TOTAL	722	336		728	4,104						641	151	191

SOURCE: MR. C. H. CLINE, CHIEF, DEEP OCEAN SURVEYS DIV., OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 9/27/67 (VERBAL COMMUNICATION)

MR. R. E. MORGAN, HYDROGRAPHIC AUTOMATION BRANCH, TECHNICAL PRODUCTION DEPT., HYDROGRAPHY, NAVOCEANO 8/2/67 (VERBAL COMMUNICATION)

MR. RAYMOND J. MC GOUGH, PROJ. MGR., ASWEPS, OCEANOGRAPHIC PREDICTION DIV., MARINE SCIENCES DEPT., OCEANOGRAPHY, NAVOCEANO 7/18/67 AND 3/27/67 (VERBAL COMMUNICATION)

MR. DALE TIDRICK, DEVELOPMENTAL SURVEYS DIVISION, OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 10/10/67 (VERBAL COMMUNICATION)

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BY THE

TABLE E1

BOTTOM SAMPLES, CORES	BOTTOM SAMPLES, CORES	PLANKTON TOW	BIOLOGICAL STATIONS	FOULING MEASUREMENTS	FOULING MEASUREMENTS	WATER TRANSPARENCY	WATER COLOR	PHOTOGRAPH CAMERA STATIONS	PHOTOGRAPH CAMERA STATIONS	AMBIENT NOISE	ACOUSTIC STATIONS	ACOUSTIC RUNS	RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY,
6																				
6																				
20																				
20																				
104		69														202				
104		69														202				
207		67														27				
207		67														27				
152		177																		
152		177																		
376		148				401	18				2	22		24		1,168				
376		148				401	18				2	22		24		1,168				
641	151	194				351	62			3	8	20	283	22	11	7				
641	151	194				351	62			3	8	20	283	22	11	7				

ESTIMATED VOLUME OF MARINE DATA COLLECTED BY THE U.S. NAVAL OCEANOGRAPHIC OFFICE, 1949-1974

b

RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY, SOUND VELOCITY	SALINITY SAMPLES	PYROHELIOMETER (DAYS)	FATHOMETER SOUNDING - SHIP 1000 MILES)	FATHOMETER SOUNDING - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE CONTINUOUS - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE REPORTS - SHIP (X 10^3)	TOTAL MAGNETIC INTENSITY - SHIP (1000 MILES)	TOTAL MAGNETIC INTENSITY - AIRCRAFT (1000 MILES)	SEISMIC PROFILE - SHIP (1000 MILES)	GRAVITY PROFILE - SHIP (1300 MILES)	SEA SURFACE TEMPERATURE AIRBORNE RADIATION THERMOMETER DATA POINTS (X 10^3)
			202															
			202															
			27															
			27															
	24		1,168															
	24		1,168															
283	22	11	7															
283	22	11	7															

NOTE: SOME CLASSIFIED AND UNCLASSIFIED DATA ARE KNOWN TO BE MISSING FROM THIS CHART.

ATA COLLECTED
C OFFICE, 1949-1974

LEGEND:

CLASSIFIED DATA

e

PAGE 1 OF 4

YEAR	ORGANIZATION	NANSEN CAST	NANSEN CAST	S - T - D	MECHANICAL BT	MECHANICAL BT	XBT - SHIP (X 10^3)	XBT - AIRCRAFT (X 10^3)	XBT - HELICOPTER (X 10^3)	BOTTOM TEMPERATURE	BOTTOM TEMPERATURE	BOTTOM SAMPLES, CORES	BOTTOM SAMPLES, CORES	PLANKTON TOW	BIOLOGICAL STATIONS	FOULING MEASUREMENTS
1956	OCEANOGRAPHIC NEAR SHORE	412	249		4,481	2,483						232	79	2		
	1956 TOTAL	412	249		4,481	2,483						232	79	2		
1957	OCEANOGRAPHIC NEAR SHORE	189	163		5,207	1,346						218	61	33		
	1957 TOTAL	189	163		5,207	1,346						218	61	33		
1958	OCEANOGRAPHIC NEAR SHORE	417	304		2,910	2,417						297	204	121		17
	1958 TOTAL	417	304		2,910	2,217						297	204	121		17
1959	OCEANOGRAPHIC NEAR SHORE HYDROGRAPHIC (2)	442	237		8,623	1,977				43		352	81			
	1959 TOTAL	442	237		8,623	1,977				43		352	81			
1960	OCEANOGRAPHIC NEAR SHORE HYDROGRAPHIC (2)	579	331		5,243	1,828						152	104	21		
	1960 TOTAL	579	331		5,243	1,828						152	104	21		
1961	OCEANOGRAPHIC NEAR SHORE HYDROGRAPHIC (2)	821	93		4,783	505						363	22	84		
	1961 TOTAL	821	93		4,783	505						363	22	84		
1962	OCEANOGRAPHIC NEAR SHORE HYDROGRAPHIC (2)	1,260	114		6,447	369						684	28	4		
	1962 TOTAL	1,260	114		6,447	369						684	28	4		
1963	OCEANOGRAPHIC NEAR SHORE HYDROGRAPHIC (2)	578	182		1,641	1,368						335	137	25	42	
	1963 TOTAL	578	182		1,641	1,368						335	137	25	42	

SOURCE: MR. C. H. CLINE, CHIEF, DEEP OCEAN SURVEYS DIV., OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 9/27/67
(VERBAL COMMUNICATION)

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MR. RAYMOND J. MC GOUGH, PROJ. MGR., ASWEPS, OCEANOGRAPHIC PREDICTION DIV., MARINE SCIENCES DEPT., OCEANOGRAPHY, NAVOCEANO 7/18/67 AND 9/27/67 (VERBAL COMMUNICATION)

MR. DALE TIDRICK, DEVELOPMENTAL SURVEYS DIVISION, OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 10/10/67
(VERBAL COMMUNICATION)

ESTIMAT
BY THE U.S.

A

TABLE E1
CONTINUED

PLANKTON TOW	BIOLOGICAL STATIONS	FOULING MEASUREMENTS	FOULING MEASUREMENTS	WATER TRANSPARENCY	WATER COLOR	PHOTOGRAPH CAMERA STATIONS	PHOTOGRAPH CAMERA STATIONS	AMBIENT NOISE	ACOUSTIC STATIONS	ACOUSTIC RUNS	RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY, SOUND VELOCITY	SALINITY SAMPLES
2				113	21			22	29	2	850	16		64	28				
2				113	21			22	29	62	850	16		64	28				
33				197	87			6	16	42	333	7		61	7				
33				197	87			6	16	42	333	7		61	7				
121		17		276	6	13		10	23	77	704	24		219	43				
121		17		276	6	13		10	23	77	704	24		219	43				
				20	116			2	7	14	298	12		49	93				
				20	116			2	7	14	298	12		49	93				
21								3	9	23	307			1,191	7				
21								3	9	23	307			1,191	7				
84														3,649	15				
84														3,649	15				
4				78	119							4		286					
4				78	119							4		286					
25	42			71	60										3	17			296
25	42			71	60										3	17			296

STIMATED VOLUME OF MARINE DATA COLLECTED
THE U.S. NAVAL OCEANOGRAPHIC OFFICE, 1949 ~ 1974

B

RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY, SOUND VELOCITY	SALINITY SAMPLES	PYROHELIOMETER (DAYS)	FATHOMETER SOUNDING - SHIP 1000 MILES)	FATHOMETER SOUNDING - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE CONTINUOUS - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE REPORTS - SHIP (X 10^3)	TOTAL MAGNETIC INTENSITY - SHIP (1000 MILES)	TOTAL MAGNETIC INTENSITY - AIRCRAFT (1000 MILES)	SEISMIC PROFILE - SHIP (1000 MILES)	GRAVITY PROFILE - SHIP (1300 MILES)	SEA SURFACE TEMPERATURE AIRBORNE RADIATION THERMOMETER DATA POINTS (X 10^3)
			202															
			202															
			27															
			27															
	24		1,168															
	24		1,168															
283	22	11	7															
283	22	11	7															

NOTE: SOME CLASSIFIED AND UNCLASSIFIED DATA ARE KNOWN TO BE MISSING FROM THIS CHART.

DATA COLLECTED
C OFFICE, 1949-1974

LEGEND:

CLASSIFIED DATA

e

PAGE 1 OF 4

YEAR	ORGANIZATION	NANSEN CAST	NANSEN CAST	S - T - D	MECHANICAL BT	MECHANICAL BT	XBT - SHIP (X 10^3)	XBT - AIRCRAFT (X 10^3)	XBT - HELICOPTER (X 10^3)	BOTTOM TEMPERATURE	BOTTOM TEMPERATURE	BOTTOM SAMPLES, CORES	BOTTOM SAMPLES, CORES	PLANKTON TOW	BIOLOGICAL STATIONS	FOULING MEASUREMENTS
1964	OCEANOGRAPHIC															
	NEAR SHORE	1,094	306		2,739	556				70		491	104	166	41	
	HYDROGRAPHIC (2)															
	1964 TOTAL	1,094	306		2,739	556				70		491	104	166	41	
1965	OCEANOGRAPHIC															
	NEAR SHORE	1,079	188		6,635	206					18	190	71	48	7	
	HYDROGRAPHIC (2)															
	1965 TOTAL	1,079	188		6,635	206					18	190	71	48	7	
1966	OCEANOGRAPHIC															
	NEAR SHORE	550	299		1,209	1,040					171	313	47	95	20	
	DEEP OCEAN															
	HYDROGRAPHIC (2)															
	1966 TOTAL	550	299		1,209	1,040					171	313	47	95	20	
1967	OCEANOGRAPHIC															
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100	20	
	DEEP OCEAN	120										100				
	AGOR (4)	300		180	4,000		.3					150		41		
	HYDROGRAPHIC (2)															
	ASWEPS (3)															
	1967 TOTAL	970	300	180	5,209	1,000	.3				200	550	50	141	20	
1968	OCEANOGRAPHIC															
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100	20	
	DEEP OCEAN (1)	120										210				
	AGOR	300		180	4,000		.3					150		41		
	HYDROGRAPHIC															
	ASWEPS (3)			5,000			100	20								
	1968 TOTAL	970	300	5,180	5,200	1,000	100.3	20			200	660	50	141	20	
1969	OCEANOGRAPHIC															
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100	20	
	DEEP OCEAN	120										210				
	AGOR	300		180	4,000		.3					150		41		
	HYDROGRAPHIC															
	ASWEPS (3)			37,000			175	20								
	1969 TOTAL	970	300	37,180	5,200	1,000	175.3	20			200	660	50	141	20	

SOURCE: MR. C. H. CLINE, CHIEF, DEEP OCEAN SURVEYS DIV., OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 9/27/67 (VERBAL COMMUNICATION)

MR. R. E. MORGAN, HYDROGRAPHIC AUTOMATION BRANCH, TECHNICAL PRODUCTION DEPT., HYDROGRAPHY, NAVOCEANO 8/2/67 (VERBAL COMMUNICATION)

MR. RAYMOND J. MC GOUGH, PROJ. MGR., ASWEPS, OCEANOGRAPHIC PREDICTION DIV., MARINE SCIENCES DEPT., OCEANOGRAPHY, NAVOCEANO 7/18/67 AND 9/27/67 (VERBAL COMMUNICATION)

MR. DALE TIDRICK, DEVELOPMENTAL SURVEYS DIVISION, OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 10/10/67 (VERBAL COMMUNICATION)

ESTIMATE
BY THE U.S.

TABLE E1
CONTINUED

BOTTOM SAMPLES, CORES	PLANKTON TOW	BIOLOGICAL STATIONS	FOULING MEASUREMENTS	FOULING MEASUREMENTS	WATER TRANSPARENCY	WATER COLOR	PHOTOGRAPH CAMERA STATIONS	PHOTOGRAPH CAMERA STATIONS	AMBIENT NOISE	ACOUSTIC STATIONS	ACOUSTIC RUNS	RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY, SOUND VELOCITY	
104	166	41			205	210		39								596		3		1
104	166	41			05	210		39								596		3		1
71	48	7		2	59	71	30		2	25					22,826			5		
71	48	7		2	59	71	30		2	25					22,826			5		
47	95	20			6		1			16	47	453			27,920	29		11		
47	95	20			6		4			16	47	453			27,920	29		11		
50	100 41	20			10		5 70		25	20	50	450	9		30,000	30	650	10	10 205	
50	141	20			10		75		25	20	50	450	9		30,000	30	650	10	215	
50	100 41	20			10		5 90		25	20	50	450	9		30,000	30	600	10	550 205	
50	141	20			10		95		25	20	50	450	9		30,000	30	600	10	755	
50	100 41	20			10		5 90		25	20	50	450	9		30,000	30	600	10	550 205	
50	141	20			10		95		25	20	50	450	9		30,000	30	600	10	755	

ESTIMATED VOLUME OF MARINE DATA COLLECTED THE U.S. NAVAL OCEANOGRAPHIC OFFICE, 1949-1974

b

ACOUSTIC RUNS	RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY, SOUND VELOCITY	SALINITY SAMPLES	PYROHFLIOMETER (DAYS)	FATHOMETER SOUNDING - SHIP (1000 MILES)	FATHOMETER SOUNDING - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE CONTINUOUS - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE, REPORTS - SHIP (X 10^3)	TOTAL MAGNETIC INTENSITY - SHIP (1000 MILES)	TOTAL MAGNETIC INTENSITY - AIRCRAFT (1000 MILES)	SEISMIC PROFILE - SHIP (1000 MILES)	GRAVITY PROFILE - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE AIRBORNE RADIATION THERMOMETER DATA POINTS (X 10^3)
					596		3		1,569			225			225	200		170	
					596		3		1,569			225			225	200		170	
				22,826			5		500			225			225	200		170	
				22,826			5		500			225			225	200		170	
47	453			27,920	29		11		196		110	225	110		110 225	200	110	225	
47	453			27,920	29		11		196		110	225	110		335	200	110	225	
50	450	9		30,000	30	650	10	10 205	200	52	227 30	225	227 20	800	227 7.2 225	200	227 9.4	225	50*
50	450	9		30,000	30	650	10	215	200	52	257	225	247	800	459.2	200	236.4	225	50
50	450	9		30,000	30	600	10	550 205	200	52	300 30	225	300 20	800	300 7.2 225	200	300 9.4	225	50*
50	450	9		30,000	30	600	10	755	200	52	330	225	320	800	532.2	200	309.4	225	50
50	450	9		30,000	30	600	10	550 205	200	52	300 30	225	300 20	800	300 7.2 225	200	300 9.4	225	200*
50	450	9		30,000	30	600	10	755	200	52	330	225	320	800	532.2	200	309.4	225	200

E DATA COLLECTED
PHIC OFFICE, 1949-1974

NOTE: SOME CLASSIFIED AND UNCLASSIFIED DATA ARE KNOWN TO BE MISSING FROM THIS CHART.

LEGEND:

▨ CLASSIFIED DATA

* ESTIMATED BY SDC

PAGE 3 OF 4

C

YEAR	ORGANIZATION	NANSEN CASTS	NANSEN CASTS	S - T - D	MECHANICAL BT	MECHANICAL BT	XBT - SHIP (X 10^3)	XBT - AIRCRAFT (X 10^3)	XBT - HELICOPTER (X 10^3)	BOTTOM TEMPERATURE	BOTTOM TEMPERATURE	BOTTOM SAMPLES, CORES	BOTTOM SAMPLES, CORES	PLANKTON TOW
1970	OCEANOGRAPHIC													
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100
	DEEP OCEAN	120										210		
	AGOR	600			8,000		.6	.4				325		100
	HYDROGRAPHIC													
	ASWEPS			37,000			250	20	30					
	1970 TOTAL	1,270	300	37,000	9,200	1,000	250.6	20.4	30		200	835	50	200
1971	OCEANOGRAPHIC													
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100
	DEEP OCEAN	120										210		
	AGOR	600			8,000		.6	.4				325		100
	HYDROGRAPHIC													
	ASWEPS			37,000			325	20	35					
	1971 TOTAL	1,270	300	37,000	9,200	1,000	325.6	20.4	35		200	835	50	200
1972	OCEANOGRAPHIC													
	NEAR SHORE	550	300		1,200	1,000					200	300	30	100
	DEEP OCEAN	120										210		
	AGOR	600			8,000		.6	.4				325		100
	HYDROGRAPHIC													
	ASWEPS			37,000			400	20	40					
	1972 TOTAL	1,270	300	37,000	9,200	1,000	400.6	20.4	40		200	835	50	200
1973	OCEANOGRAPHIC													
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100
	DEEP OCEAN	120										210		
	AGOR	600			8,000		.6	.4				325		100
	HYDROGRAPHIC													
	ASWEPS			37,000			400	20	40					
	1973 TOTAL	1,270	300	37,000	9,200	1,000	400.6	20.4	40		200	835	50	200
1974	OCEANOGRAPHIC													
	NEAR SHORE	550	300		1,200	1,000					200	300	50	100
	DEEP OCEAN	120										210		
	AGOR	800		500	10,000		.8					432		120
	HYDROGRAPHIC													
	ASWEPS			37,000			400	20	40					
	1974 TOTAL	1,470	300	37,500	11,200	1,000	400.8	20	40		200	942	50	220
	GRAND TOTAL	20,470	5,202	228,040	119,375	25,899	2,054.1	141.6	185	113	1,789	11 285	1,489	2,697

SOURCE: MR. C. H. CLINE, CHIEF, DEEP OCEAN SURVEYS DIV., OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 9/27/67 (VERBAL COMMUNICATION)

MR. R. E. MORGAN, HYDROGRAPHIC AUTOMATION BRANCH, TECHNICAL PRODUCTION DEPT., HYDROGRAPHY, NAVOCEANO 8/2/67 (VERBAL COMMUNICATION)

MR. RAYMOND J. MC GOUGH, PROJ. MGR., ASWEPS, OCEANOGRAPHIC PREDICTION DIV., MARINE SCIENCES DEPT., OCEANOGRAPHY, NAVOCEANO 7/18/67 AND 9/27/67 (VERBAL COMMUNICATION)

MR. DALE TIDRICK, DEVELOPMENTAL SURVEYS DIVISION, OCEANOGRAPHIC SURVEYS DEPT., OCEANOGRAPHY, NAVOCEANO 10/10/67 (VERBAL COMMUNICATION)

ESTIM
BY THE

A

TABLE E1
CONTINUED

BOTTOM TEMPERATURE	BOTTOM SAMPLES, CORES	BOTTOM SAMPLES, CORES	PLANKTON TOW	BIOLOGICAL STATIONS	FOULING MEASUREMENTS	FOULING MEASUREMENTS	WATER TRANSPARENCY	WATER COLOR	PHOTOGRAPH CAMERA STATIONS	PHOTOGRAPH CAMERA STATIONS	AMBIENT NOISE	ACOUSTIC STATIONS	ACOUSTIC RUNS	RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS
200	300	50	100	20			10		5			20	50	450			30,000	30		
	210								90										600	
	325		100						50						19					
200	835	50	200	20			10		145			20	50	450	19		30,000	30	600	
200	300	50	100	20			10		5			20	50	450			30,000	30		
	210								90										600	
	325		100						50						19					
200	835	50	200	30			10		145			20	50	450	19		30,000	30	600	
200	300	50	100	20			10		5			20	50	450			30,000	30		
	210								90										600	
	325		100						50						19					
200	835	50	200	20			10		145			20	50	450	19		30,000	30	600	
200	300	50	100	20			10		5			20	50	450			30,000	30		
	210								90										600	
	325		100						50						19					
200	835	50	200	20			10		145			20	50	450	19		30,000	30	600	
200	300	50	100	20			10		5			30	50	450			30,000	30		
	210								90										600	
	432		120						75						26					
200	942	50	220	20			10		170			20	50	450	26		30,000	30	600	
1,789	11,285	1,489	2,097	270	17	2	1,457	770	1,062	39	123	295	707	6,828	238	11	207,600	1,061	31,867	

ESTIMATED VOLUME OF MARINE DATA COLLECTED BY THE U.S. NAVAL OCEANOGRAPHIC OFFICE, 1949-197

b

COUSTIC RUNS	RESISTANCE	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT OBSERVATIONS - DROGUES, STATIONS	CURRENT METER (HOURS)	CURRENT METER (HOURS)	VELOCIMETER STATIONS	VELOCIMETER STATIONS	TEMPERATURE, SALINITY, SOUND VELOCITY	SALINITY SAMPLES	PYROHELIOMETER (DAYS)	FATHOMETER SOUNDING - SHIP (1000 MILES)	FATHOMETER SOUNDING SHIP (1000 MILES)	SEA SURFACE TEMPERATURE CONTINUOUS - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE REPORTS - SHIP (X 10^3)	TOTAL MAGNETIC INTENSITY - SHIP (1000 MILES)	TOTAL MAGNETIC INTENSITY - AIRCRAFT (1000 MILES)	SEISMIC PROFILE - SHIP (1000 MILES)	GRAVITY PROFILE - SHIP (1000 MILES)	SEA SURFACE TEMPERATURE AIRBORNE RADIATION THERMOMETER DATA POINTS (X 10^3)
50	450			30,000	30		10		200										
						600		550			300		300		300		300		
		19						400		100	60	225	48		15		18		
															225	200		225	
														800					150*
												225							
50	450	19		30,000	30	600	10	950	200	100	360		348	800	540	200	318	225	150
50	450			30,000	30		10		200										
						600		550			300		300		300		300		
		19						400		100	60		48		15		18		
												225			225	200		225	
														800					200*
50	450	19		30,000	30	600	10	950	200	100	360	225	348	800	540	200	318	225	200
50	450			30,000	30		10		200										
						600		550			300		300		300		300		
		19						400		100	60		48		15		18		
												225			225	200		225	
														800					400*
50	450	19		30,000	30	600	10	950	200	100	360	225	348	800	540	200	318	225	400
50	450			30,000	30		10		200										
						600		550			300		300		300		300		
		19						400		100	60		48		15		18		
												225			225	200		225	
														800					400*
50	450	19		30,000	30	600	10	950	200	100	360	225	348	800	540	200	318	225	400
50	450			30,000	30		10		200										
						600		550			300		300		300		300		
		26						500		120	75		60		20		22		
												225			225	200		225	
														800					400*
50	450	26		30,000	30	600	10	1,050	200	120	375	225	360	800	545	200	322	225	400
707	6,828	238	11	297,669	1,061	31,867	99	6,575	4,161	676	2,842	3,575	2,749	6,400	6,113.6	2,600	2,559.2	3,145	1,850

NE DATA COLLECTED
PHIC OFFICE, 1949-1974

NOTE: SOME CLASSIFIED AND UNCLASSIFIED DATA ARE KNOWN TO BE MISSING FROM THIS CHART.

LEGEND:

CLASSIFIED DATA

*ESTIMATED BY SDC

C

TABLE E-2

U. S. BUREAU OF COMMERCIAL FISHERIES
BIOLOGICAL LABORATORY, HONOLULU (BLH)

PARTIAL SUMMARY OF CRUISE INFORMATION

YEAR	CRUISE	DAYS AT SEA	NUMBER OF SHIPS	TOTAL NUMBER OF OCEANOGRAPHIC CASTS	AVERAGE NUMBER OF NANSEN BOTTLES/STATION	TOTAL NUMBER OF BATHYTHERMOGRAPH CASTS	TOTAL NUMBER OF PLANKTON TOWS	TOTAL NUMBER OF STATIONS MEASURING PHOSPHATE (PO_4-P)	TOTAL NUMBER OF STATIONS MEASURING OXYGEN (O_2)	SEA SURFACE TEMPERATURE UNDERWAY
1950	HMS-2 HMS-5	101	1	93	13	1055	1000	93	93	CONTINUOUS THERMOGRAPH
1951	HMS-8 HMS-10 HMS-11 HMS-12	87	1	191	13	1262	200	55	191	1/BT OBSERVATION
1952	HMS-14 HMS-15 HMS-16 HMS-17	107	1	168	13	1355	231	125	0	THERMOGRAPH
1953	HMS-20 HMS-21	45	1	136	13	449	135	67	0	THERMOGRAPH
1954	HMS-25 HMS-26 CHG-17	122	2	150	13	676	143	110	144	THERMOGRAPH
1955	HMS-27 HMS-31	72	1	84	13	944	535	84	84	THERMOGRAPH
1956	HMS-33 HMS-34 HMS-36	78	1	66	13	441	195	40	40	THERMOGRAPH
1957	HMS-38 HMS-40 [illegible]	[illegible]	2	[illegible]		747	250	103	130	THERMOGRAPH

	HMS-17									
1953	HMS-20 HMS-21	45	1	136	13	449	135	67	0	THERMOGRAPH
1954	HMS-25 HMS-26 CHG-17	122	2	150	13	676	143	110	144	THERMOGRAPH
1955	HMS-27 HMS-31	72	1	84	13	944	535	34	84	THERMOGRAPH
1956	HMS-33 HMS-34 HMS-36	78	1	66	13	441	195	40	40	THERMOGRAPH
1957	HMS-38 HMS-40 CHG-34 HMS-41 HMS-42 CHG-36	132	2	140	13	747	250	103	130	THERMOGRAPH
1958	HMS-45 HMS-46 CHG-37 HMS-43 HMS-44 MAKUA	169	3	124	13	694	67	112	113	THERMOGRAPH
TOTAL: 9 Years	36 cruises	1194	3	1152		7623	2761	789	795	
Average/ Year	4 cruises	133	1	128		847	307	88	88	
Average/ Cruise		33	1	32	13	212	77	22	22	

SOURCE: Oceanic Observations of the Pacific (1950-1958 Data Volumes, University of California Press)

*FORMERLY PACIFIC OCEANIC FISHERIES INVESTIGATION (POFI)

B

TABLE E-3

UNIVERSITY OF WASHINGTON
OCEANOGRAPHY DEPARTMENT

PARTIAL SUMMARY OF CRUISE INFORMATION

YEAR	CRUISE	DAYS AT SEA	NUMBER OF SHIPS	TOTAL NUMBER OF OCEANOGRAPHIC CASTS	AVERAGE NUMBER OF NANSEN BOTTLES/STATION	TOTAL NUMBER OF BATHYTHERMOGRAPH CASTS	TOTAL NUMBER OF PLANKTON TOWS	TOTAL NUMBER OF STATIONS MEASURING PHOSPHATE (PO_4-P)	TOTAL NUMBER OF STATIONS MEASURING OXYGEN (O_2)	SEA SURFACE TEMPERATURE UNDERWAY
1952	BB-1 BB-4 BB-7 BB-9	62	1	73	12	454	0	9	64	BUCKET
1953	BB-26 BB-29 BB-31 BB-33	44	1	129	12	723	49	29	129	BUCKET
1954	BB-56 BB-62 BB-64 BB-67	35	1	97	14	526	69	64	92	BUCKET
1955	BB-80 BB-103 JNC 23 PAR MIT	130	4	121	9	428	136	89	90	BUCKET
1956	BB-139 BB-142 MIT TOR BB-143 PAR CEL JNC BB-144 BB-151	477	6	349	11	1574	628	125	131	BUCKET
1957	BB-158 BB-163 BB-168 BB-175 BB-176	48	1	149	15	668	131	83	120	BUCKET
1958	BB-188 BB-193									

1956	BB-139 BB-142 MIT TOR BB-143 PAR CEL JHC BB-144 BB-151	477	6	349	11	1574	628	125	131	BUCKET
1957	BB-158 BB-163 BB-168 BB-175 BB-176	48	1	149	15	668	131	83	120	BUCKET
1958	BB-188 BB-193 BB-199 BB-202	70	1	87	15	650	203	82	86	BUCKET
1959	BB-234 BB-235	26	1	74	13	291	119	36	74	BUCKET
TOTAL: 8 Years	38 cruises	892	1*	1079		5314	1402	517	986	
Average/Year	5 cruises	112	1*	135		664	175	65	123	
Average/Cruise		24	1*	28	13	140	37	14	26	

*79% of cruises were completed by the R/V Brown Bear (BB)

SOURCE: Oceanic Observations of the Pacific (1952-1959 Data Volumes, University of California Press)

B

TABLE E-4

SCRIPPS INSTITUTION OF OCEANOGRAPHY (SIO)

PARTIAL SUMMARY OF CRUISE INFORMATION

YEAR	CRUISE	DAYS AT SEA	NUMBER OF SHIPS	TOTAL NUMBER OF OCEANOGRAPHIC CASTS	AVERAGE NUMBER OF HANSEN BOTTLES/STATION	TOTAL NUMBER OF BATHYTHERMOGRAPH CASTS	TOTAL NUMBER OF PLANKTON TOWS	TOTAL NUMBER OF STATIONS MEASURING PHOSPHATE (PO_4-P)	TOTAL NUMBER OF STATIONS MEASURING OXYGEN (O_2)	SEA SURFACE TEMPERATURE UNDERWAY
1951	NORTHERN HOLIDAY	53	1	65	15	118	198	60	61	THERMITOW
1952	SHELLBACK CAPRICORN	269	3	240	15	1971	494	107	228	THERMOGRAPH
1953	MAGDALENA BAY TRANSPAC	117	2	154	16	554	410	58	132	THERMOGRAPH
1954	CUSP APALLICO TRENCH	43	2	28	16	509	0	0	9	THERMOGRAPH
1955	EASTROPIC	143	2	137	19	1321	166	153	175	THERMOGRAPH
1956	SCOPE CHINOOK	34	2	41	16	351	26	35	40	THERMOGRAPH
1957	MUKLUK DOWNWIND ISLAND CURRENT SURVEY	184	2	139	17	1516	143	109	118	THERMOGRAPH
1958	DOLPHIN DOLDRUMS TO-58-1 TO-58-2	123	3	130	17	1367	352	92	127	THERMOGRAPH
1959	TO-59-1 TO-59-2 VERMILION SEA DORADO COSTA RICA DOME	149	4	174	18	1063	276	104	154	THERMOGRAPH
196	[illegible]									

/00

	DOLDRUMS TO-58-1 TO-58-2	123	3	130	17	1367	352	92	127	THERMOGRAPH
1959	TO-59-1 TO-59-2 VERMILION SEA DORADO COSTA RICA DOME	149	4	174	18	1063	276	104	154	THERMOGRAPH
1960	MONSOON TETHYS	295	2	70	20	1106	138	30	63	THERMOGRAPH
1961	SWANSONG RISEPAC GULFCAL ZIGPAC II LEAP FROG BAJA BANK	314	3	164	20	227	219	58	164	THERMOGRAPH
1962	PROA TEMPO ZEPHYRUS LUSIAD	764	3	324	20	975	327	232	313	THERMOGRAPH
1963- 1964	CARROUSEL DODO VI	48	2	100 (425TD)	20	1124	562	0	100	THERMOGRAPH
1965	LA PARED MUD LAUBER URSA MAJOR EXPEDI- TION X	170	2	124 (344STD)	20	150	276	77	124	THERMOGRAPH
1966	ZETES I EQUIBIA SPHERES MAITAI BOREAS	136	3	13 (696STD)	20	281 (1070BT)	78	69	101	THERMOGRAPH
TOTAL: 16 Years	45 cruises	2842	7	2077		11,509	3027	1184	1909	
Average/Year	3 cruises	178	2	130		719	189	74	119	
Average/Cruise		63		46	18	256	67	26	42	

SOURCE: Oceanic Observations of the Pacific (1951-1959 Data Volumes, University of California Press

Scripps Institution of Oceanography (Data Processing Section)

B

TABLE E-5

CALIFORNIA COOPERATIVE OCEANIC FISHERIES INVESTIGATION (CCOFI)

PARTIAL SUMMARY OF CRUISE INFORMATION

YEAR	CRUISE	DAYS AT SEA	NUMBER OF SHIPS	TOTAL NUMBER OF OCEANOGRAPHIC CASTS	AVERAGE NUMBER OF NANSEN BOTTLES/STATION	TOTAL NUMBER OF BATHYTHERMOGRAPH CASTS	TOTAL NUMBER OF PLANKTON TOWS	TOTAL NUMBER OF STATIONS MEASURING PHOSPHATE (PO_4-P)	TOTAL NUMBER OF STATIONS MEASURING OXYGEN (O_2)	SEA SURFACE TEMPERATURE UNDERWAY
1950	5001-5011	366	5	1300	-	4082	939	675	1233	IRREG.
1951	5101-5112	433	6	1399	13	4536	1468	729	1096	CONTINUOUS THERMITOW
1952	5201-5211	390	5	1484	14	5186	1647	0	1259	IRREG.
1953	5301-5312	317	5	1383	15	5627	1427	0	754	THERMOGRAPH
1954	5401-5412	382	5	718	16	6089	1534	0	57	THERMOGRAPH
1955	5501-5512	300	6	659	9	4509	1520	0	520	THERMOGRAPH
1956	5601-5612	317	6	533	16	5666	1744	0	458	THERMOGRAPH
1957	5701-5712	355	6	758	17	5923	1843	0	735	THERMOGRAPH
1958	5801-5812	409	6	959	17	2974	1992	0	496	THERMOGRAPH
1959	5901-5912	351	7	947	18	2767	1893	48	878	THERMOGRAPH
1960	6001-6010	337	6	930	18	1936	1936	0	337	THERMOGRAPH
1961	6101-2 6103-4 6104-5 6107-8 6110-1	219	4	472	18	1301	892	0	470	THERMOGRAPH
1962	6201-2 6203-4 6207-8 6210-11	197	4	534	18	1104	653	0	418	THERMOGRAPH
1963	6301-2 [illegible] [illegible] 6307-8 6311-12	197	4	228	18	737	694	278	401	THERMOGRAPH

3705/004/00

1960	6001-6010	337	6	930	18	1936	1936	0	337	THERMOGRAPH
1961	6101-2 6103-4 [illegible] [illegible] [illegible]	219	4	472	18	1301	892	0	470	THERMOGRAPH
1962	6201-2 6203-4 6207-8 6210-11	197	4	534	18	1104	653	0	418	THERMOGRAPH
1963	6301-2 6302-3H 6305-6H 6307-8 6311-12	187	4	228	18	757	694	278	401	THERMOGRAPH
1964	70-64-1 6401 6404 6407 6409 6410	190	4	518	18	1634	880	0	426	THERMOGRAPH
1965	6501 6504 6505 6507 6509	162	2	227	18	1139	1139	200	209	THERMOGRAPH
1966	6601 6602 6604 6605 6609 6610 6611 6612	190	3	208	18	1334	1334	0	208	THERMOGRAPH
TOTAL: 17 Years	151 cruises	5122	7	13,347		56,174	23,595	1930	9965	
Average/ Year	9 cruises	301	5	785		3304	1388	114	586	
Average/ Cruise		40		88	17	372	156	13	66	

SOURCE: Oceanic Observations of the Pacific (1950-1959 Data Volumes, University of California Press)

Scripps Institution of Oceanography (Data Processing Section)

B

TABLE E-6

INTERNATIONAL EXPEDITIONS

PARTIAL SUMMARY OF CRUISE INFORMATION

INTERNATIONAL COOPERATIVE INVESTIGATION OF THE TROPICAL ATLANTIC (ICITA)											
YEAR	CRUISE	DAYS AT SEA	NUMBER OF SHIPS	TOTAL NUMBER OF OCEANOGRAPHIC CASTS	AVERAGE NUMBER OF NANSEN BOTTLES/STATION	TOTAL NUMBER OF BATHYTHERMOGRAPH CASTS	TOTAL NUMBER OF PLANKTON TOWS	TOTAL NUMBER OF STATIONS MEASURING PHOSPHATE (PO_4-P)	TOTAL NUMBER OF STATIONS MEASURING OXYGEN (O_2)	SEA SURFACE TEMPERATURE UNDERWAY	COUNTRIES
1963-1964	EQUALANT I	465	13	782	--	3137	503	654	717		ARGENTINA BRAZIL GERMANY NIGERIA REPUBLIC OF CONGO REPUBLIC OF IVORY COAST SPAIN UNITED KINGDOM USA USSR
	EQUALANT II	211	11	532	--	2143	881	486	532		
	EQUALANT III	128	7	281	--	1671	376	56	338		
	TOTAL:	804	21	1594		6951	1760	1196	1587		
NORTH PACIFIC EXPEDITION (NORPAC)											
1955	NORPAC	735	21	1002	2-16	3224	1641	567	1002	VARIABLE THERMOGRAPH BUCKET BT	CANADA JAPAN USA

SOURCE: National Oceanographic Data Center (EQUALANT I-III Data Reports)

Oceanographic Observations of the Pacific (NORPAC Data Volume, University of California Press)

APPENDIX F

LIST OF ORGANIZATIONS AND INDIVIDUALS CONTACTED DURING THE MARINE DATA MANAGEMENT STUDY - PHASE I

This appendix lists all organizations and individuals contacted during Phase I. They are grouped in categories of: Federal, Universities and Institutions, States and Industry. In some cases, several contacts were made with one individual or organization but they are only listed once in the table. A formal interview was held with some, including completion of the questionnaire. Interaction with others included exchanges of letters and telephone conversations. Virtually all of these organizations must be reviewed in greater depth during Phase II and others, not listed, must also be included.

DIVISION OR BRANCH	PERSON INTERVIEWED	TITLE	DATE
	FEDERAL GOVERNMENT		
DEPARTMENT OF DEFENSE - NAVY			
Oceanographer of the Navy Ocean Center	Mr. Fred Small	Director	7/18/67
NAVOCEANO			
Research and Development Department	Mr. J. J. Schule, Jr.	Deputy Director	7/7/67
Marine Sciences Department Oceanographic Prediction Division, ASWEPS	Mr. R. J. McGough	Acting Director	7/18/67
Office of Hydrography, Technical Production Department Hydrographic Automation Staff	Mr. N. Johnson Mr. M. E. Morgan Mr. J. Lahr	Chief	7/19/67 8/2/67 8/2/67
Office of Oceanography			
Oceanographic Surveys Department	Mr. R. M. Randall	Director	8/1/67
Division of Nearshores Surveys	Mr. Lloyd B. Bertholf	Director	8/1/67
Deep Ocean Surveys Division	Mr. C. H. Cline	Director	10/10/67
Developmental Surveys Division	Mr. Dale Tidrick		10/10/67
Research and Development Department Spacecraft Oceanography Project Office	Mr. Arthur Alexiou	Chief	8/4/67
NAVSHIPS			
Autec Management Division	Mr. Leon Slavin	Assistant Director	10/11/67
Research and Development Center Acoustic Vibration Laboratory Development Section	Mr. Lee Balen	Head	10/11/67
Committee on Data Storage and Retrieval for Acoustic Data	Mr. E. G. Sevasten	Chairman	10/11/67
Navy Ocean Science Program (NOSP)			
NAVOCEANO			
Office of the Oceanographer National and International Programs and NIA Liaison	Mr. W. H. Hynes	Special Assistant	7/18/67
Plans and Policy	Mr. M. E. Garrison		7/18/67
Office, Chief of Naval Material	LCDR C. W. Martin		7/18/67
NAVAIR Systems Command	Mr. Murray H. Schefer		7/18/67
Naval Ordnance Systems Command	Mr. John F. Rapek	Acting Deputy	7/18/67
Naval Ship Systems Command, Oceanography	Mr. Alfred F. Franceschetti	Program Manager	7/18/67
Naval Facilities Engineering Command Research and Development	Mr. K. M. Halajian	Assistant Commander	7/18/67
Naval Weather Service Command Operations	CDR Robert C. Junghans	Deputy Commander	7/18/67

DIVISION OR BRANCH	PERSON INTERVIEWED	TITLE	DATE
	FEDERAL GOVERNMENT		
DEPARTMENT OF DEFENSE - NAVY			
Navy Ocean Science Program (NOSP) Cont'd			
Naval Weather Service Command	Mr. Harry O. Davis	Meteorologist	7/18/67
Ocean Science & Technology Group, ONR	Mr. D. P. Martineau		7/18/67
Ocean Sciences & Engineering Division, NRL	Mr. R. Nekritz		7/18/67
Marine Sciences Department	Mr. A. R. Gordon, Jr.	Acting Director	7/18/67
Hydrographic Surveys Department	Mr. M. R. Ullom	Director	7/18/67
Oceanographic Survey Department	Mr. R. H. Randal	Director	7/18/67
Hydrographic Plans Office, Target Programs	Mr. Fred Anderson, Jr.		7/18/67
NODC	Dr. Thomas Austin	Director	7/6/67
	Mr. Harold Dubach	Deputy Director	7/6/67
Acquisition Branch	Mr. Albert M. Bargeski	Head	7/6/67
Services Branch	Mr. James Churgin	Head	7/6/67
	Mr. Thomas Stout		7/6/67
Advanced Developments Staff	Mr. Thomas Winterfeld		7/6/67
	Mr. Henry Odum		7/6/67
DEPARTMENT OF DEFENSE - ARMY			
Corps of Engineers	Lt. Col. James E. Bunch	District Engineer	8/3/67
U. S. Lake Survey	Mr. R. J. Walton	Supervisor	8/3/67
Coastal Engineering Research Center	Mr. A. C. Rayner	Special Assistant	3/22/67
DEPARTMENT OF COMMERCE			
ESSA			
Environmental Data Service	Dr. W. C. Jacobs	Director	7/6/67 8/3/67 8/5/67 8/7/67
Marine Climatology Branch	Mr. Richard M. DeAngelis		8/7/67
Data Information	Mr. Robert W. Schloemer	Acting Director	8/7/67
	Mr. Arthur I. Cooperman		8/3/67
National Weather Records Center, Asheville, North Carolina	Mr. William H. Haggard	Director	8/23/67
Climatic Operations Branch	Mr. Gilbert E. Stegall	Chief	8/23/67
Data Verification Section	Mr. Herman C. Steffan	Chief	8/23/67
Data Reduction Section	Mr. Grady F. McKay	Chief	8/23/67
National Environmental Satellite Center	Mr. John Huson		8/4/67
Maritime Administration			
Office of Research and Development			
Shipbuilding	Mr. Richard Black	Program Manager	8/22/67
	Mr. R. Falls		8/22/67

DIVISION OR BRANCH	PERSON INTERVIEWED	TITLE	DATE
	FEDERAL GOVERNMENT		
DEPARTMENT OF THE INTERIOR			
Marine Resources Development Program	Mr. Howard Eckles and Department Representatives	Program Manager	7/17/67
U. S. Geological Survey			
Office of Marine Geology and Hydrology	Mr. Josh Tracey	Deputy Chief	7/20/67
Bureau of Commercial Fisheries			
Division of Biological Sciences			
Branch of Marine Fisheries	Mr. Joseph King	Chief	7/17/67
Biological Research	Mr. Jim Johnson	Assistant Director	7/17/67
Environmental Oceanographic Research	Dr. J. Lockwood Chamberlin	Chief	7/17/67
Bureau of Commercial Fisheries - La Jolla			
Fishery Oceanography Center	Dr. E. H. Ahlstrom	Sr. Scientist	7/13/67
Tuna Forecast	Dr. Glenn Flittner	Fisheries Biologist	7/13/67
Fisheries Research	Mr. David Kramer	Research Biologist	7/13/67
Bureau of Sport Fisheries and Wildlife			
Branch Fish ECO System Research	Mr. Bruce Kimsey	Chief	7/21/67
Division of Fisheries Research			
Office of Saline Water	Dr. John Hunter	Director	7/21/67
Program Analysis	Dr. Milton Sachs	Chief	7/21/67
Research	Dr. F. H. Coley	Chief	7/21/67
Distillation Division	Mr. Paul B. Pruett	Chief	7/21/67
U. S. Bureau of Mines			
Mining Research	Mr. Jim Hill	Assistant Director	7/20/67
Federal Water Pollution Control Administration			
Estuariar Research	Mr. T. A. Wastler		8/21/67
Streams and Rivers	Mr. P. Taylor		8/21/67
Division of Pollution Surveillance	Mr. J. McDermott		8/21/67
DEPARTMENT OF TRANSPORTATION			
U. S. Coast Guard			
Coast Guard Oceanographic Unit	CMDR R. P. Dinsmore	Commanding Officer	7/19/67
EXECUTIVE OFFICE OF THE PRESIDENT			
Smithsonian Institution			
Office of Oceanography and Limnology	Dr. I. E. Wallen	Director	8/1/67
Museum of Natural History	Dr. Donald Squires	Deputy Director	8/9/67
Oceanographic Sorting Center (SOSC) Records Department	Betty J. Landrum	Supervisor	8/2/67
Information Systems Division	Mr. Nicholas Suszynski	Director	10/12/67
Museum of Natural History	Mr. Kenneth Ebbs		10/12/67

DIVISION OR BRANCH	PERSON INTERVIEWED	TITLE	DATE
	FEDERAL GOVERNMENT		
EXECUTIVE OFFICE OF THE PRESIDENT, Cont'd			
National Aeronautics Space Administration Earth Resources Programs	Mr. Theodore A. George	Manager	8/3/67
Atomic Energy Commission Environmental Sciences Division of Biology and Medicine	Dr. C. L. Osterberg	Marine Biologist	9/27/67
	Mr. Arnold Joseph		9/27/67
LEGISLATIVE BRANCH			
Library of Congress Library Reference Service	Mr. George Doumani		7/20/67
	UNIVERSITIES AND INSTITUTIONS		
Scripps Institution of Oceanography	Dr. Wm. A. Nierenberg	Director	7/13/67
	Dr. F. N. Spiess	Associate Director	7/13/67
Marine Food Chain Research Group			
Institute of Marine Resources	Dr. J. D. H. Strickland	Head	7/13/67
Physical and Chemical Oceanography	Dr. Warren Wooster		7/13/67
Oceanography	Dr. Douglas L. Inman	Professor	7/13/67
	Mr. John Wylie	Sr. Marine Technician	7/13/67
	Mrs. Frances Wilkes		7/13/67
	Mr. J. L. Reid	Research Oceanographer	7/13/67
Woods Hole Oceanographic Institution	Dr. Paul M. Fye	Director	8/23/67
	Dr. Arthur E. Maxwell	Associate Director	8/23/67
	Mr. J. H. Stanbrough	Technical Assistant to the Director	8/23/67
Department of Geophysics	Elizabeth T. Bunce	Assoc. Scientist	8/23/67
Department of Biology	Dr. Mary Sears	Sr. Scientist	8/23/67
Physical Oceanography	Dr. Arthur R. Miller	Assoc. Scientist	8/23/67
Data Center	Mr. W. M. Dunkle	Head	8/23/67
University of Rhode Island Narragansett Marine Laboratory	Dr. Saul B. Saila		8/23/67
Columbia University Lamont Geological Observatory	Mr. J. L. Worzel	Assoc. Director	8/24/67
Hudson Laboratory	Dr. James R. Hertzler	Director	8/24/67

DIVISION OR BRANCH	PERSON INTERVIEWED	TITLE	DATE
UNIVERSITIES AND INSTITUTIONS			
Johns Hopkins University Department of Oceanography and Chesapeake Bay Institute	Dr. Donald W. Pritchard	Director	8/24/67
University of Michigan Great Lakes Research Division	Dr. D. C. Chandler	Director	9/25/67
American Geological Institute Science and Information	Mr. Foster D. Smith, Jr.	Director	8/23/67
STATE			
State of California	Col. T. R. Gillenwaters	Marine Science Advisor to Governor	8/9/67
California State Fisheries Laboratory	Mr. Harold B. Clemens	Assistant Director	9/14/67
INDUSTRY			
National Security Industrial Association ASW and OST Committee	CMDR J. H. Jorgenson	Executive Secretary	7/21/67
International Telephone and Telegraph Avionics Division Engineering	Mr. C. H. Elbert	Manager	8/24/67
Dow Chemical Company Government Affairs Department	Mr. D. E. Yanka Mr. Bill Coffey	Manager	9/25/67
Moore-McCormack Inc.	Captain Fennick		8/24/67
	Captain Ryan		8/24/67
	Captain Savastio	Marine Superintendent	8/24/67

APPENDIX G

QUESTIONNAIRE

A questionnaire was prepared at the beginning of Phase I for the purpose of gathering pertinent information concerning current and future data requirements and plans of marine organizations. Based on preliminary interview results it underwent three revisions during Phase I to improve the information collection processes. The final revision is included in this appendix.

The resulting questionnaire can be used by any organization, since it has been designed to determine data requirements, location, flow and volume, whether the organization is a data collector, processor, disseminator or user. The first section of the questionnaire is designed to obtain general information concerning the organization. The remaining sections deal specifically with the data collection, storage, processing and dissemination functions.

MARINE DATA QUESTIONNAIRE

Check if an Interview ________

Interviewer ________________

Time Begun ________________

Time End ________________

A. GENERAL INFORMATION

1. Date ______________________
   Year Month Day

   Person Completing Form or Interviewee

2. Name ______________________
3. Title ______________________
4. Phone Number ______________________

   Organization

5. Name ______________________
6. Mailing Address ______________________
   ____

7. Street Address ________
   ____

8. Organization Mission and Goals

9. Organization Functions

Which of the following categories describes the organization's activities? Please place an X by each program area in which the organization is involved.

10. ______ Resource Development
11. ______ Mineral
12. ______ Petroleum
13. ______ Chemical
14. ______ Food
15. ______ Drug
16. ______ Other (specify) ______
17. ______ Engineering
18. ______ Marine
19. ______ General Ocean
20. ______ Coastal
21. ______ Conservation
22. ______ Recreation
23. ______ Health and Welfare
24. ______ Transportation
25. ______ Synoptic Oceanography
26. ______ Oceanographic Prediction
27. ______ Map and Chart Preparation
28. ______ Applied Research
29. ______ Basic Research
30. ______ Physical Oceanography
31. ______ Chemical Oceanography
32. ______ Biological Oceanography
33. ______ Geology & Geophysics
34. ______ Air-Sea Interaction
35. ______ Other (specify) ______
36. ______ Legal
37. ______ Defense and Space
38. ______ Data Center
39. ______ Instrument Development
40. ______ Equipment Development
41. ______ Other (specify) ______

Copy of Organization Chart

42. Names of Departments
43. Names of Department Heads
44. The relationship each department has in the organization's marine operations.

45. Additional description of organization

Rank from 1 to 4 the relative importance of the following activities for the organization.

46. __________ Collector of marine data

47. __________ User of marine data

48. __________ Processor/disseminator of marine data (data center)

49. __________ Disseminator of marine data

Are there limitations on the collection of data? If so, please rank the following parameters from 1 to 6 according to relative importance.

50. __________ Political

51. __________ Legal

52. __________ Economic

53. __________ Technological

54. __________ Physical

55. __________ Other (specify) __________

56. If the answer is yes to any of the above, please explain.

57. Have prior studies concerning data management been made by your organization? __________ If so, are they published? __________ Are they available to SDC? __________

58. What are the current plans of your organization concerning data management? If available in printed form, is a copy available to SDC? __________ If not printed, please describe them.

59. Do you know of new sampling programs, instruments or systems now under development which will provide additional data in large volume in the future? If so, please describe and estimate the increased volume and the time when increased volume will occur.

60. Are data exchanged with other countries? If so, please complete.

Data Type (See Attachment A)	Country with which data are exchanged

61. What is the time response requirement for data received from other sources?

62. Is there a system in your organization for document indexing, storage and retrieval in use now? If so, please describe. Is the indexing system documented? If so, are copies available to SDC for loan or retention?

COST OF DATA HANDLING

63. ITEM*	64. INITIAL (dollars)	65. ANNUAL MAINTENANCE (dollars)	66. ANNUAL OPERATION (dollars)	67. COMMENTS

*Please list items used for data collection, storage, processing, etc., including type, manufacturer or description of instruments, equipment, platforms (ships, buoys), computer hardware, computer software, remote terminals, etc.

B. **DATA COLLECTION**

If your organization is involved in marine data collection please complete the attached Data Collection form. Attachments A and B have been included to serve as guidelines in filling out rows 13 and 18. If the list is inadequate for your purposes it would be appreciated if you would make additions as necessary.

In addition to completing the summary sheet it would be helpful if the answers to the following questions could be supplied.

What are the types, duration, and frequency of your surveys or cruises?

1. Type	2. Duration	3. Frequency

4. Does your organization participate in cooperative cruises and surveys, either on a local, state, national or international basis? ______
If so, what type of surveys and cruises and how frequently?

Arrays and networks of sensors are often used to collect data. It would be helpful if you would include information regarding the data that is obtained in this manner on the attached Data Collection Summary form. Additionally, if several sensors are used simultaneously, are:

5. ______ Sensor outputs combined into a single output?

6. ______ Sensor outputs recorded individually?

7. ______ Other combinations of recording or summation used (specify)?

8. Please add any description of arrays which will add to an understanding of the data types and volumes involved.

If you collect classified or proprietary data, please indicate by a check mark in the appropriate rows on the attached Data Collection table.

9. Are examples of marine data types collected by your organization available?

10. ______ For permanent retention by SDC?

11. ______ Can they be borrowed?

12. ______ In the literature? If so, where ______________________________

DATA COLLECTION

13. Data Type (See Attachment A)					
14. Method of Collection (Sensor or System Name i.e., Nansen Cast, BT)					
15. Manufacturer and Model Number					
16. Platform Used for Data Collection (Ship, Buoy, etc.)					
17. Frequency of Data Collection (i.e., 10 BT's/Day)					
18. Data Collection Format (See Attachment B)					
19. Data Transmission Mode (Mail, Teletype, etc.)					
Current Volume/Year					
20. 1968					
21. 1969					
22. 1970					
23. 1975					
24. 1980					
25. Are Data Preprocessed Prior to Recording and Storage? If so, how? (i.e., sensor instruments, preprocessing, computer, manual, etc.)					
26. Use of Data (research, forecasting, planning, etc.)					
27. Classified					
28. Proprietary					

C. DATA USE

If your organization utilizes marine data provided by other sources, please complete the attached Data Use form. Attachments A and B have been included to serve as guidclines in filling out rows 1 and 3. If the list is inadequate for your purposes it would be appreciated if you would make additions as necessary.

If you receive classified or proprietary data, please indicate by a check mark in the appropriate rows.

DATA USE

1. Data Type (See Attachment A)					
2. From Whom are Data Received					
3. Data Format (See Attachment B)					
4. Data Transmission Mode (Mail, Teletype, etc.)					
5. Frequency of Receipt (No/Week, No/Month, etc.)					
Input Volume/Year					
6. 1968					
7. 1969					
8. 1970					
9. 1975					
10. 1980					
11. Are Data Preprocessed Prior to Receipt? How? (i.e., sensor instruments, preprocessing, computer, manual, etc.)					
12. Use of Data (research, forecasting, planning, etc.)					
13. Classified					
14. Proprietary					

D. DATA PROCESSING AND STORAGE

If your organization is involved in the data processing and storage aspects of marine data management, please complete the attached summary sheet. Attachments A and B have been included as guidelines in filling out rows 6 and 8. If the list is inadequate for your purposes, it would be appreciated if you would make additions to it as necessary.

In addition to completing the summary sheet, it would be helpful if the answers to the following questions could be supplied.

Do your data files duplicate those maintained by other organizations? If so, please list the data files and the organization where duplicates are available.

1. Data Type (From Attachment A)	2. Data Volume	3. Organization, Location

If any of your marine data files and outputs are classified or are of a proprietary nature, please indicate by a check mark in the appropriate rows on the attached summary sheet.

If there is a system for ultimate declassification, or release of classified data, please describe for each data type.

4. Data Type	5. System for Declassification

DATA PROCESSING AND STORAGE

6. Data Type (See Attachment A)					
7. Source of Data					
8. Storage Media (See Attachment B)					
9. Where are Data Stored?					
Storage Volume/Year					
10. 1968					
11. 1969					
12. 1970					
13. 1975					
14. 1980					
Purged Data Volume from Files/Year					
15. 1968					
16. 1969					
17. 1970					
18. 1975					
19. 1980					
20. What is Done with Purged Data?					
21. What is Estimated Maximum Data Storage Volume?					
22. Data Processing Functions					
23. Frequency of Data Processing					
24. What is the Time Lag Between Data Collection and Receipt at the Data Center?					
25. Are copies of Data Sent to NODC?					
26. Classified					
27. Proprietary					

E. DATA DISSEMINATION

If your organization is involved in disseminating marine data, please complete the attached summary sheet. Attachments A and B have been included to serve as guidelines in filling out rows 6 and 7.

If the list proves to be inadequate for your purposes, it would be appreciated if you would make additions to it as necessary.

In addition to completing the summary sheet, it would be helpful if the answers to the following questions could be supplied:

1. Is a special form used to request your data? If so, are copies available for retention by SDC? ________

Are examples of your data outputs available?

2. ______ For permanent retention by SDC?

3. ______ Can they be borrowed?

4. ______ In the literature? If so, where? ____________________

If you disseminate classified or proprietary data, please indicate by a check mark in the appropriate row on the attached summary sheet.

DATA DISSEMINATION

5. Data Type (See Attachment A)					
6. Dissemination Media (See Attachment B)					
Dissemination Volume/Year					
7. 1968					
8. 1969					
9. 1970					
10. 1975					
11. 1980					
12. Data Transmission Mode (i.e., Mail, Teletype, etc.)					
13. Frequency of Dissemination					
14. Are Data Outputs Scheduled or Requested?					
15. Recipient of Data					
16. Time Delay Between Request for and Dissemination of Data					
17. Classified					
18. Proprietary					

F. COMPUTER HARDWARE AND SOFTWARE

Are computers used for:

1. ______ Computation?

2. ______ Data Storage and Retrieval?

Hardware

If computers are used, please complete the following:

CURRENT

3. Type	4. Function of Computer (i.e., computation)	5. Location	6. Approx. Time Used/Month	7. Rental per Month or Purchase Price
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______

FIVE-YEAR FUTURE REQUIREMENTS

8. Type	9. Function of Computer (i.e., computation)	10. Location	11. Approx. Time Used/Month	12. Rental per Month or Purchase Price
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______
______	______	______	______	______

Software

CURRENT

13. Name of Program	14. Function	15. Number of Instructions	16. Language	17. Date Put Into Use	18. Freq of Use	19. Type of Computer

FIVE-YEAR FUTURE REQUIREMENTS

20. Name of Program	21. Function	22. Number of Instructions	23. Language	24. Date Put Into Use	25. Freq. of Use	26. Type of Computer

G. DATA FLOW CHART

If your organization collects and transmits data to other user agencies, it would be appreciated if you would fill out the attached Data Flow Chart Summary as completely as possible. In addition, it would be helpful if you could provide SDC with a schematic drawing of the data flow from your organization to other organizations on the attached table.

An example of a completed Data Flow Chart Summary and Schematic Data Flow Diagram is shown below.

Please use a separate summary sheet to describe future data flow patterns which do not currently exist.

DATA FLOW CHART SUMMARY

Organization Producing Data U. S. Coast Guard Date 7/19/67

Reviewed with C.G. 10/06/67

Person Interviewed Cmdr. R. Dinsmore

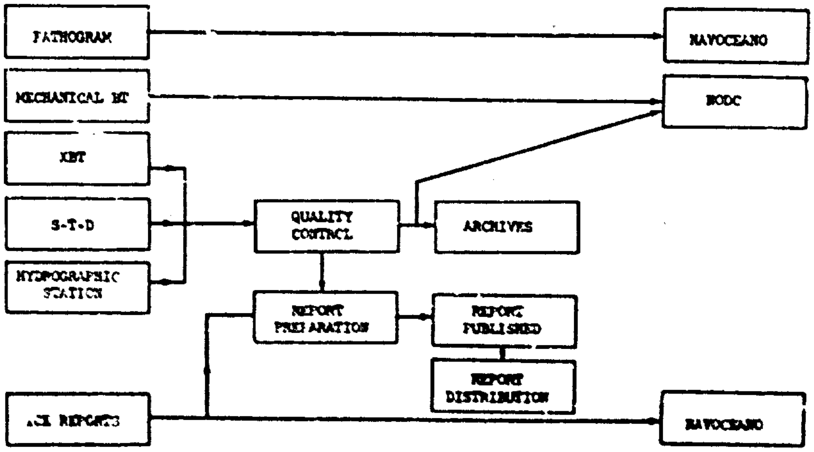
Title Commanding Officer, Coast Guard Oceanographic Unit, Building 159-E

Address Navy Yard Annex, Washington, D. C. 20390

Data sent to the following from Coast Guard Ships:

Organization	How Sent	Data Type	Data Format	Volume	Frequency
NODC	Mail	Mech. B. T.	Glass Slide	92/day*	Taken every 6 hours
NAVOCEANO	Mail	Fathogram	Analog Strip Chart	360,000 miles/year	
Bu. Commercial Fisheries & National Sorting Center (Smithsonian)		Plankton Tow	Specimen	4/day	

SCHEMATIC FLOW CHART
COAST GUARD OCEANOGRAPHIC DATA



DATA FLOW CHART SUMMARY

Current ________ Future ______

Organization Producing Data ________________________ Date __________

Information Supplied by: ______________________________

Title ______________________________

Address ______________________________

Data sent to the following:

Organization	How Sent	Data Type	Data Format	Volume	Frequency

ATTACHMENT A

PARTIAL LIST OF DATA TYPES

Data Normally Recorded Regardless of Measurements Made

- Ship Name
- Cruise
- Project Manager
- Ship Heading and Speed
- Time
- Geographical Location
- Depth
- Sea State
- Weather Conditions
- Others

Physical

- Pressure
- Temperature
- Water Density
- Horizontal Current Direction
- Horizontal Current Velocity
- Vertical Current Velocity
- Tidal Period
- Tidal Height
- Internal Tide
- Wave Length
- Wave Period
- Wave Height
- Wave Direction
- Swell, Period Height and Direction
- Surf Conditions
- Wave Surge
- Explosive Waves
- Tsunami Wave Record
- Drift Bottle Position
- Long-Period Oscillations
- Mechanical BT
- Expendable BT
- S-T-D
- Fresh Water Inflow
- Dye Tracer Concentration
- Sediment Settling Rate
- Water Eh
- Seabed Drifter Position
- Internal Wave Parameters
- Others

Chemical

- Salinity
- Nutrients
  - Nitrates
  - Nitrites
  - Phosphate
  - Silicate
- Carbonate
- Sulphate
- Chloride
- Dissolved Gas
  - Oxygen
  - Carbon Dioxide
  - Helium
  - Ammonia
  - Hydrogen Sulfide
- Radioactivity
  - Oxygen -18
  - Carbon -14
  - Strontium -90
- Metals - list under 'others'
- Non-Metals - list under 'others'
- Rare Elements (Rubidium, Uranium)
- pH
- Alkalinity
- Acidity
- Particulate Matter
- Vitamins
- Dissolved Organics
- Others

ATTACHMENT A
cont'd

Biological

- Kingdom - Animalia, Plantae, Protista
  - Subkingdom
    - Phylum
      - Class
        - Order
          - Genus
            - Species
- Phytoplankton
- Zooplankton
- Bacteria
- Protozoa
- Algae
- Diatoms
- Rotifers
- Insects
- Crustacea
- Mollusca
- Coral
- Other Invertebrates
- Fish
- Marine Mammals
- Photographs
- Specimens
- Fouling Organisms
- Bioluminescence
- Water Color
- Biochemical Analysis
- Pigment Content
- Dissolved and Particulate Organic Carbon
- Sonar Graphs
- Commercial Fishing Reports
- Sport Fishing Catch Reports
- Fish Tagging
- Fish School Sightings
- Bird Flock Sightings
- Biological Sound Frequency
- Biological Sound Intensity
- Chlorophyll
- Bio-Assays
- Plankton Tow or Trawl
  - Type of Sampler
  - Direction of Tow
  - Depth of Tow
  - Volume of Water Strained
  - Net Condition
  - Winch Hauling Rate
  - Collector
- Occurrence of Fish Eggs & Larvae
- Others

Geological and Geophysical

- Bottom Samples
  - Type of Dredge
- Sediment Description
- Bottom Heat Flux
- Bottom Photographs
- Sediment Transport
- Sediment Distribution
- Geochemistry
- Sedimentation
- Bathymetry
- Texture
- Composition
- Color
- Carbon Content
- Carbonate Content
- Biostratigraphic Age
- Subbottom Seismic Profiles
- Magnetic Field
- Gravitational Field
- Seismograms
- Seismic Velocities
- Seismicity
- Permeability
- Porosity
- Gamma Log
- S P Log
- Resistivity Log
- Bottom Oxygen Uptake
- Sediment pH
- Sediment Eh
- Seafloor Volcano
  - Location
  - Size
- Seafloor Guyot
  - Location
  - Depth
  - Size
- Glaciologic Effects
- Drill Cores
  - Type of Corer
- Others

ATTACHMENT A
cont'd

Meteorology

Air Temperature
Air Pressure
Wind Velocity
Wind Force
Wind Direction
Humidity
Photographs - Cloud Cover
Solar Radiation
Air Samples
Precipitation
Weather (Clouds: Type, Amount, Fog, etc.)
Ozone Content
Radiosonde Observation (wind profile)
Condensation
Sunlight Intensity
Storm Frequency
Storm Severity
Cloud Type
Cloud Cover
Visibility
Insolation
Others

Pollution

Pesticides
Tetra Ethyl Lead
Industrial Chemicals
Waste Heat
Radioactive Waste
Detergents
Organic Waste
Biological Oxygen Demand
Coliform Bacteria
Oil - Grease
Phenols
Solids - Settleable
Solids - Suspended
Fecal Coliform Bacteria
Fecal Streptoccoci Bacteria
Pathogens
Viruses
Organic Nitrogen
Others

Acoustic Properties

Sound Velocity
Absorption
Intensity
Frequency
Others

Electrical Properties

Conductivity
Dielectric Constant
Attenuation
Others

ATTACHMENT A
cont'd

Optical Properties

- Color
- Absorption
- Scattering
- Reflection
- Refraction
- Radiance
- Irradiance
- Polarization
- Transmission
- Attenuation
- Transparency
- Others

Sea Ice

- Ice Drift Direction
- Ice Drift Speed
- Ice Deterioration
- Ice Detection
- Ice Concentration
- Iceberg Shape
- Others

Engineering

- Engineering Properties of Bottom
  - Wet Unit Weight
  - Specific Gravity of Solids
  - Water Content
  - Void Ratio
  - Saturated Void Ratio
  - Porosity
  - Liquid Limit
  - Plastic Limit
  - Plasticity Index
  - Liquidity Index
  - Compression Index
  - Compressive Strength
  - Cohesion
  - Sensitivity
  - Angle of Internal Friction
  - Activity
  - Modulus of Elasticity
  - Slump
  - Stability
- Corrosion
- Coastal Erosion
- Wave Forces
- Wave Run-up
- Wave Refraction, Reflection, Diffraction
- Mass Flows
  - Velocity
  - Force
  - Density
  - Frequency
  - Region of Occurrences
- Others

ATTACHMENT A
cont'd

Socioeconomic

- Ownership
- International Treaties
- International, National, Interstate Negotiations and Agreements
- Requirements for National Defense
- Federal Laws
- State Laws
- Local Laws
- Law Enforcement
- Population
- Industrial Output
- Water Withdrawl
  - Municipal
  - Industrial
- Marinas
- Recreation Demand
- Port Charges
- Labor Availability
- Transport Availability
- Import Tariffs
- Obstruction Position
  - Cables
  - Pipelines
  - Sunken Wrecks
- Recreation Areas
- Shipping Lanes
- Restricted Area Boundaries
- Others

Miscellaneous

- Photographs
- Microwave Images
- Infrared Images
- Television Images
- Others

ATTACHMENT B

DATA FORMATS

Handwritten or printed forms

Scientific Publications

Technical Reports

Magnetic Tape, Digital

Magnetic Tape, Analog

Paper Tape

Punch Cards

Listing of Descriptive Data

Digital Printout

Visual Analog Records

Charts or Maps

Specimens (Biological, Geological, etc.)

Photographs

Infrared Image

Microwave Image

Microfilm

Microfiche

Other (specify)

APPENDIX H

PRELIMINARY RECOMMENDATIONS FOR INSTRUMENTATION DEVELOPMENT AND USE

From a very cursory review of current marine data collection and handling practices a few recommendations for immediate consideration emerged from Phase I as follows:

1. In the area of sensing instruments:

   Encourage a systems approach to sensing instrument development programs.

   Today, most sensing instruments are developed to meet relatively narrowly defined objectives. Many do not produce electrical output signals. To make progress toward system goals each new sensing instrument development should incorporate the following thinking as applicable:

   - Encourage electrical output signals, preferably of standard amplitude ranges, as is done in most telemeter instrument developments.

   - Encourage built-in calibrators, operable on remote command.

   - Encourage the provision of standard signal conditioning packages including buffer amplifiers to raise low level analog signals to standardized recording levels.

   - Encourage consideration of system cost/benefit effects of designing the instrument to provide direct digital output.

2. In the area of cruise ship instrumentation:

   a. Encourage the further development of standard recording systems for all marine data in electrical signal form. Such systems should:

      - Contain a master date-time generator and displays for recording on all data recording mechanisms throughout the ship (central recorders, special-purpose recorders like the fathometer, even on hand-logged data forms). This generator should also put out cruise identification frequently.

- Provide multiple channel input capacity, selectable in modular sets to fit the cruise mission. Use one or more standard tape recorders as needed.

- Incorporate time multiplexing to efficiently handle very low bandwidth and sampled signals.

- Incorporate provisions for recording ship track information, verbally or automatically.

- Provide analog strip-chart play-outs of recorded variables to enable quality assurance, correlation of events and scientific calculations.

- Incorporate one or more voice channels for recording field operating conditions, key changes in techniques being tried, etc., in order to enable ease of playback intrepretation and editing and to assure against loss of this vital information.

Consider lending simplified versions of this equipment to investigators operating on even the smallest ships. The advantages of a truly simple-to-operate, field-worthy, modular unit to the investigator in most cases provide sufficient incentive for him to foster its use. The advantages to the National Marine Data Program are manifold, but hinge around increasing the accuracy and correlatability of marine observations and thus the building of knowledge of the marine environment for achievement of national goals.

b. Develop an inexpensive shipboard unit for semi-automatic navigation satellite tracking in order to provide accurate ship track information.

Consider lending these units to investigators using even the smallest ships. The advantage to the investigators of having accurate track information should in most cases provide sufficient incentive for them to take care of and operate the units. The advantage to the National Marine Data Program is of course, another increment in the upgrading of overall marine data accuracy and the correspondingly increased capability to correlate the cruise information with other data gathered from that region.

c. Develop sealed "Black Box" oceanographic recording units for emplacement on Ships of Opportunity. These units, recording such variables as sea surface temperature, should provide useful information, but they pose many problems as well. Among them are: time synchronization at beginning of cruise, loss of time clock synchronization during and after ship's power outages; mishandling of probes unless they are beyond reach of the crew; difficulty of correlating recorded data with ship track information. But above all the problem is lack of direct benefit to the vessel operator. He therefore has no incentive to care for the device or submit the recordings promptly.

It is this fundamental benefit problem which will undoubtedly limit the utility of Ships of Opportunity as marine data observation platforms. One hope lies in the sealed black box approach similar to that used successfully by the Air Force in their crash recorder program and the newly adopted airline recorder designed to monitor flight variables. In both cases, the recorder operation is beyond the control of the pilot. It simply comes on when the master switch is thrown.

Outwardly, these precedents may sound similar to the ship problem and thereby give promise. In reality, however, a fundamental difference still exists. The operators of the aircraft, i.e., the Air Force and the airlines want the information provided by the black box. They therefore see that installation of sensors, cables, etc., is proper and that frequent inspections are performed. Only the pilots are inclined to drag their feet. In the case of ships, however, neither the ship operator nor the ship captain has such an incentive. Hence, the assurance of useable results is a far more difficult problem for Ships of Opportunity than for the case of aircraft recorders.

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13. ABSTRACT

This report documents the Phase I Study of the National Data Program for the Marine Environment. This study was sponsored by the National Council on Marine Resources and Engineering Development. The end product of Phase I is a Study Approach for Phase II. In support of this approach, findings were derived from:

1. A review and analysis of the findings and recommendations of pertinent prior studies. Twenty-seven documents were reviewed.
2. A survey of the relevant literature on the informational structure, storage and retrieval, and reduction to sueful forms of marine information. Four hundred and thirty-nine documents were surveyed.
3. A collation of the plans of selected agencies for the development of improved marine data handling capability. Seventeen plans were reviewed.

Additional Phase I activities were as follows:

1. A questionnaire was developed to assess the size and characteristics of the marine data problem. (See continuation sheet)

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CONTINUATION OF ABSTRACT DD FORM 1473

2. Interviews were conducted with:

   75 persons in 28 Federal Agencies.

   20 persons in six Scientific Institutions.

   10 persons in seven Regional Authorities and in Industry.

   These interviews included organizations whose activities spanned the entire spectrum of marine data functions; collection, processing, storage and retrieval, dissemination and use.

3. A detailed methodology was developed for structuring the Phase II design efforts. This methodology was applied during Phase I for the preliminary analysis of:

   - National Marine Science Program Objectives
   - Functional Requirements
   - Data Program Requirements
   - Constraints
   - Effectiveness Analysis of Data Programs
   - Cost/Benefit/Effectiveness Analysis of Data Programs
   - Data System Requirements

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Data						
Marine sciences						
Marine science affairs						
Marine environment						
Marine resources						
Marine data						
Date management--Data management program						
Data programs						
Data requirements						
Data system						
Ocean exploration						
World Weather Watch						
National marine science programs						
National marine data program						
Functional data requirements						