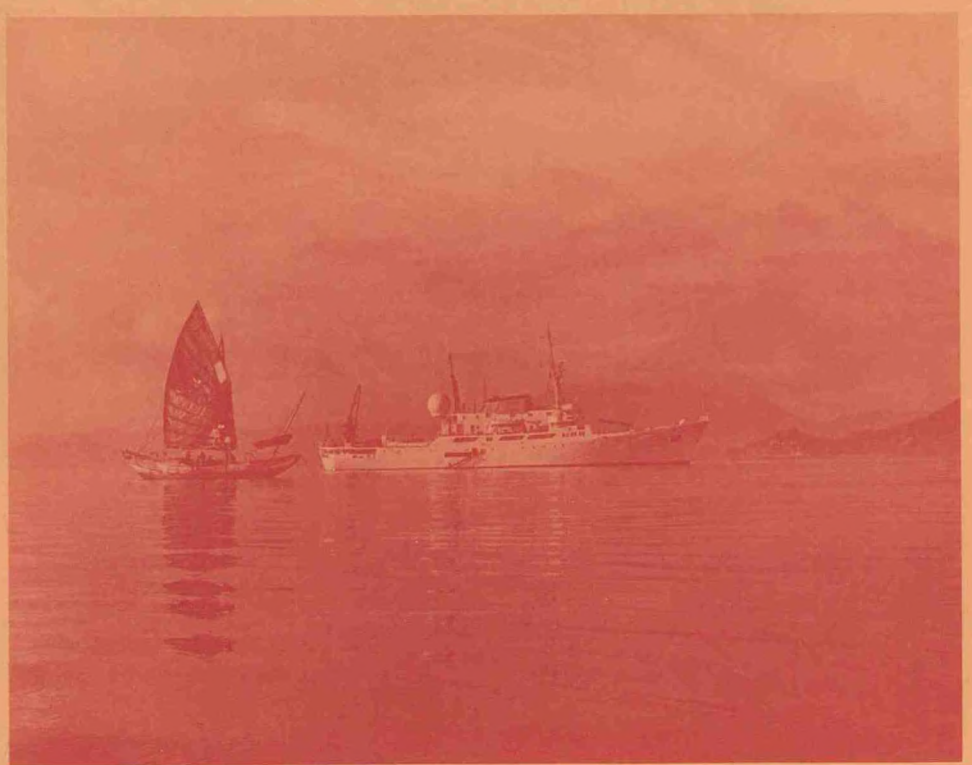
NODC/1980

National Oceanographic Data Center Annual Report



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Environmental Data and Information Service

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COVER: NOAA ship OCEANOGRAPHER at anchor in Xiamen (Amoy) harbor enroute to Shanghai during its historic research voyage to the People's Republic of China. One aspect of growing U.S./China cooperation in the marine sciences is NODC assistance in establishment of a Chinese National Oceanographic Data Center. See pages 24-25. (NOAA photo)

NODC/1980

National Oceanographic Data Center Annual Report

Washington, D. C.
August 1981

U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

National Oceanic and Atmospheric Administration
John V. Byrne, Administrator

Environmental Data and Information Service
Thomas D. Potter, Director

PREFACE

The NATIONAL OCEANOGRAPHIC DATA CENTER (NODC) is the United States national facility for the acquisition, processing, archiving, and dissemination of global oceanographic data. NODC is one of five centers* within the Environmental Data and Information Service (EDIS) of the National Oceanic and Atmospheric Administration (NOAA).

NODC builds its marine data bases with data collected by Federal, State, and local government agencies; universities and research institutions; and private industry. It also acquires data from foreign sources and operates World Data Center A for Oceanography, a part of the World Data Center System that facilitates international exchange of scientific data.

As a service organization, NODC welcomes inquiries from all potential users. Although NODC data and information products are provided at cost, general information about NODC and its data holdings is available free. To assist users in requesting information from the NODC, a Request Form has been included at the end of this report. Potential users may also write or call directly to NODC headquarters in Washington, D.C., or to the nearest EDIS/NODC Liaison Office. Addresses and phone numbers are listed on the following page.

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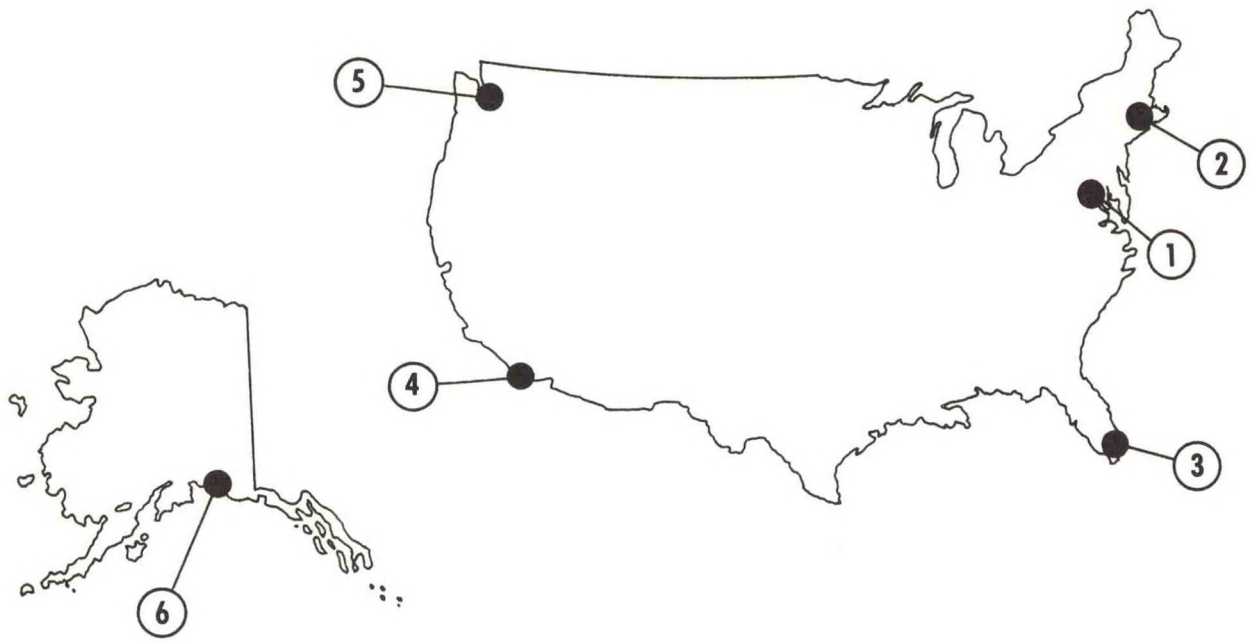
*Others are the National Climatic Center (NCC), Asheville, N.C.; the National Geophysical and Solar-Terrestrial Data Center (NGSDC), Boulder, Colo.; and the Center for Environmental Assessment Services (CEAS) and the Environmental Science Information Center (ESIC), Washington, D.C.



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Woods Hole Oceanographic Institution
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617-548-1400, Ext. 546 (Commercial)
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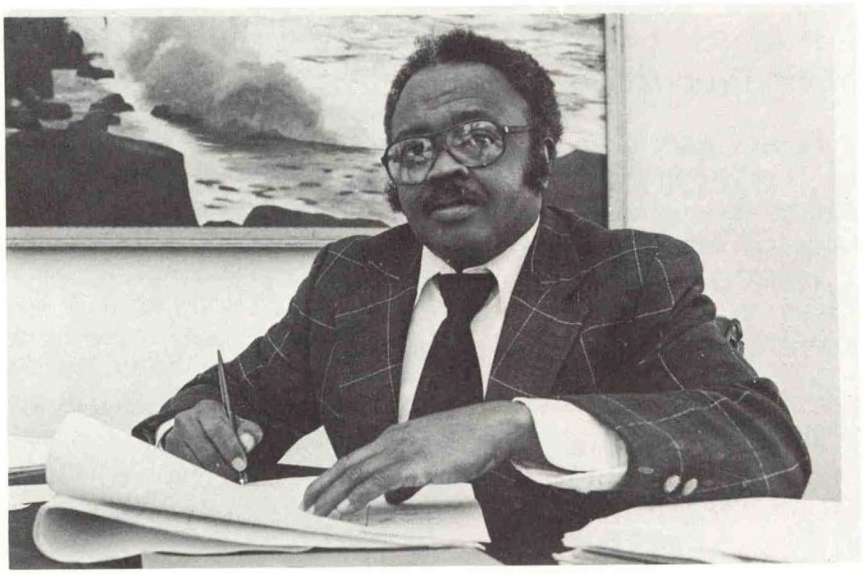
10. Survey of subscribers shows high user satisfaction with the Mariners Weather Log



FROM THE DIRECTOR

Late last year I endorsed the suggestion that the National Oceanographic Data Center revive the practice, long discontinued, of publishing an annual report of our activities. I feel strongly that NODC's mission requires us to maintain a continuing dialog with our user community. NODC must be aware of user needs and users must know what NODC is doing to meet those needs so they can provide us with their invaluable counsel and guidance.

When I joined NODC in October 1980, I assumed leadership of an organization that is going through a period of unusually rapid change and development. Increasing national needs for oceanic data and information, new marine environmental research and monitoring programs, and advances in oceanographic instrumentation and computer technology combined to present NODC and the other EDIS centers with new responsibilities--and new opportunities.

As Director of the National Oceanographic Data Center, I intend to focus our energies and resources on means of providing more timely and more useful data products and services. In a time of significant budget cuts, this means that we must somehow do more with less. A mid-range goal, which I believe we can achieve, is providing our users with direct, interactive access to NODC's data bases.

We have found that early and frequent consultation and interaction between NODC personnel and scientists charged with carrying out marine programs--that is, between data processors and archivists and data collectors--greatly facilitates our mission of data and information dissemination. As a first step in increasing this mutually beneficial interaction, we aim to enhance the capabilities of our long-established Liaison Offices located at five strategic coastal sites. These offices will serve as regional nodes of a developing marine environmental data and information network.

I solicit your comments and suggestions for structuring our services to meet your needs. Please contact me at the address on page iii.

Edward L. Ridley
Director

DATA BASES
Data Acquisition and Processing

Because oceanographic ships are becoming more and more expensive to operate, researchers, resource managers, and decision-makers charged with carrying out national programs will find it necessary to squeeze as much information as possible from existing historical data. Therefore, NODC's data archive--the largest unclassified marine environmental data bank in the world--is becoming an increasingly valuable national resource.

NODC does not just store data; it adds value to the data it acquires by:

- merging data in standard formats to create comprehensive data bases;
- periodically updating its data bases to provide complete, long-term environmental data records;
- building up global data coverage;
- providing users with easy access to these data at reasonable cost.

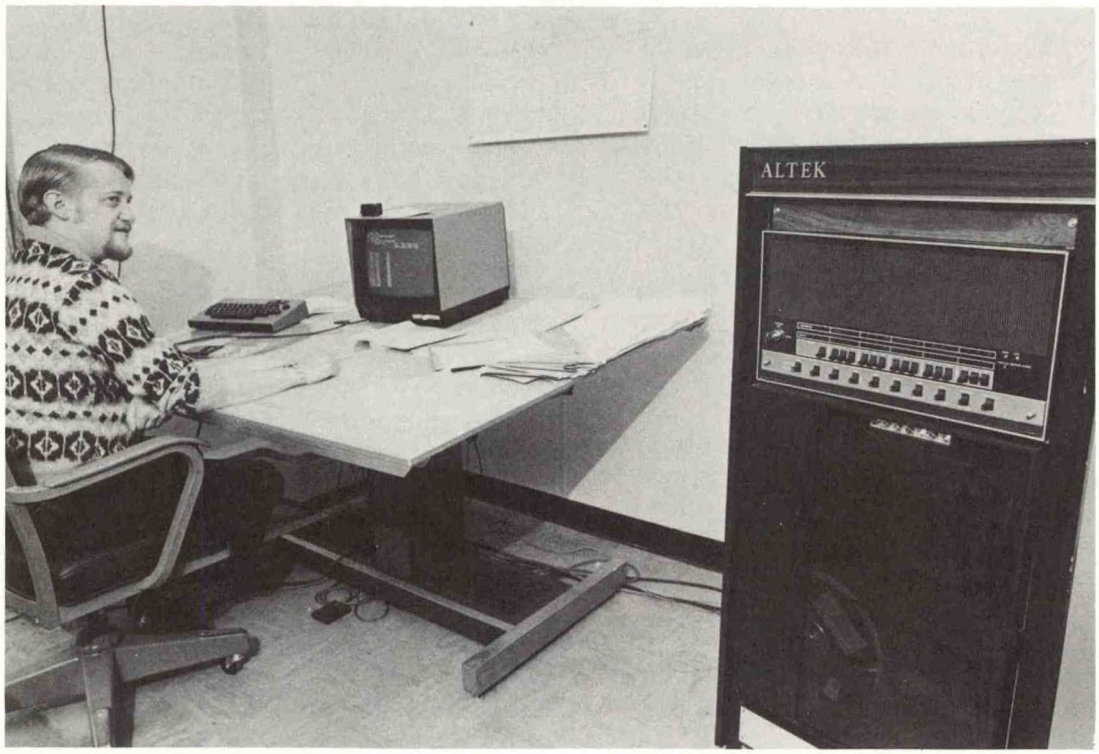
To help meet present and future needs for increased computing capacity to perform these functions, NODC began a major computer conversion in 1980. By the latter part of the year, routine data processing was temporarily halted as personnel worked to convert all software and archive data bases to operate on a new, larger NOAA computer system. During this hiatus, data acquisition continued normally, however, resulting in a data processing backlog.

The annual statistics for data acquisition reflect NODC's increasing involvement in marine pollution and biological studies. Acquisition, processing, storage, and dissemination of these various kinds of environmental assessment data augment NODC's traditional role as archiver of classical physical/chemical oceanographic data.

The system developed by NODC to process and store environmental assessment data--including biological and pollution data, and some types of physical/chemical data--is called the Multidisciplinary Data Archival and Retrieval System (MULDARS). As its name implies, MULDARS accepts a wide variety of data from many disciplines. By the end of 1980, MULDARS data were being processed and stored in 54 different digital formats. New formats can be incorporated into this system as the need arises. During the year 111 new data sets were processed in MULDARS.

Processing of classical physical/chemical oceanographic data--Nansen casts and bathythermograph observations--continues at NODC through long-established systems. On the average in recent years, about 25,000 Nansen casts and 30,000 expendable bathythermograph (XBT) observations have been final-processed annually. Usually, well more than half of all XBT digitization is performed at NODC. Under the terms of a long-standing agreement, however, NODC also receives and completes processing of a substantial number of XBT's digitized by the Fleet Numerical Oceanographic Center (formerly Fleet Numerical Weather Central) in Monterey, Calif. In 1980 NODC also provided about 10,000 prescreened XBT observations to a private contractor for digitization. These data were selected to help meet the needs of the National Climate Program for more ocean temperature data in sparsely covered areas, particularly the southern oceans.

For all practical purposes, the XBT has completely superseded the old mechanical bathythermograph (MBT). Although NODC still accepts and processes digital data derived from analog MBT temperature traces (etched on small, coated glass slides), it no longer digitizes the original traces themselves. During FY 1980 NODC final-processed about 14,000 Nansen casts and 13,000 XBT observations.



Expendable bathythermograph (XBT) temperature traces on paper strip charts are converted to digital records on magnetic tape using NODC's Altek digitizer.

NODC receives about 150 different types of data. In the following table these are grouped in three broad categories:

- o physical/chemical data, including Nansen casts, BT data, electronic C/STD data, current meter data, wave data, and miscellaneous data such as ice and marine meteorology;
- o biological data, including measurements/observations of plankton, fish, benthos, biofoulers, macrofauna, and marine mammals and birds;
- o pollutant data, including measurements of trace elements or synthetic organics in water, organisms, or sediments, and of hydrocarbons, whether dissolved, dispersed, or particulate.

NODC Data Acquisitions, 1980

(Number of stations acquired for processing)

	Data Type		
Origin	Physical/Chemical	Biological	Pollutant
United States.....	45,705	98,476*	10,813
Foreign.....	9,844	--	--
Total.....	55,549	98,476	10,813

*Includes 74,029 stations in one data accession from a fishery resource assessment program in the Gulf of Mexico.

Data Holdings

Routine updates of NODC's archive data bases were postponed during the transfer of data processing operations to the new NOAA computer. The conversion process, however, did provide NODC the opportunity to begin a review and, in some cases, a restructuring of data bases to eliminate certain inconsistencies and improve efficiency.

A major change already accomplished is the reformatting of data in the mechanical bathythermograph (MBT) and expendable bathythermograph (XBT) data bases, previously stored in different formats, into a single new format. This change will simplify servicing of requests for data selections or data products from users who want to merge all available bathythermograph data. An indicator field in the new format allows MBT and XBT observations to be distinguished from one another in a merged listing.

Because of the way they developed historically, the geographically-sorted versions of NODC's oceanographic station data base and the two bathythermograph data bases each used a different 10-degree square numbering system. Now, as the opportunity arises, NODC is converting these data bases to a single standard geographic grid system, that of the World Meteorological Organization (WMO). The WMO square system is now used for both bathythermograph data files, and during 1981 the oceanographic station geosorted file will be changed to WMO squares also.

The accompanying table gives the present sizes of NODC major data bases. Because environmental buoy data and some of the multidisciplinary data (e.g., current meter measurements) are time series, these categories are reported in units of records rather than individual stations or observations. Therefore the figures given are not strictly comparable. The following estimates of present data holdings in units of megabytes (one million bytes), however, give a measure of relative size of NODC's three largest data bases:

- oceanographic stations, 2691 megabytes;
- bathythermograph data, 818 megabytes;
- multidisciplinary data, 582 megabytes.

Major NODC Data Bases

Data Type	Volume (as of 12-31-80)
Oceanographic station (Nansen cast).....	670,149 stations
Mechanical bathythermograph (MBT).....	946,174 observations
Expendable bathythermograph (XBT).....	360,239 observations
Surface current (ship drift).....	4,175,594 observations
Environmental buoy.....	180,847 records
Multidisciplinary (environmental assessment)...	7,236,757 records

New Data Base Initiatives

In 1980 the new Director convened an NODC Goals Task Force, composed of NODC managers, to look at what NODC is doing today and to set priorities for what NODC should do in the future. After reviewing current operations and considering future needs, the Task Force listed and ranked both short-term and long-term goals. On both lists three of the top four items were the same: the need to develop systems for processing and archiving (1) conductivity/salinity-temperature-depth (C/STD) instrument data, (2) instrument-measured wave data, and (3) current meter data.

NODC users have frequently expressed the need for these data and NODC is taking preliminary steps to develop systems to handle them.

Progress during the year is summarized as follows:

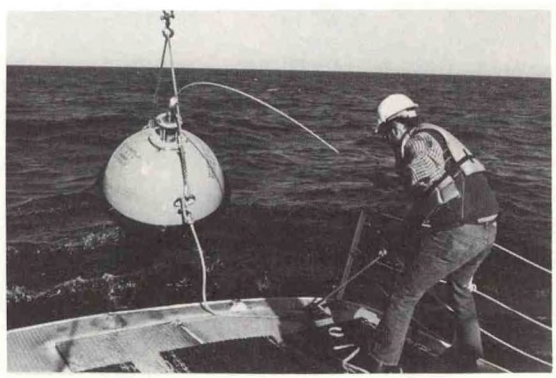
C/STD Data System

Early in the year NODC received a report from Science Applications, Inc., which had been commissioned to study requirements and conceptual system design for C/STD data. After careful review of this study and consultation with many users, NODC has concluded that user needs for these data can be met in two ways. Those researchers interested in ocean fine structure will almost always require high-resolution data. The needs of most users, however, would be satisfied by compressed data (at selected depth levels) merged into and available from NODC's Oceanographic Station (Nansen cast) Data File. Late in the year NODC began a detailed study of the feasibility and cost-effectiveness of specific alternatives to implement this basic approach.

Wave Data System

NODC estimates that a typical instrument-measured wave record contains approximately 4,800 values (20,000 characters) and that by 1983 the volume of collected data will be about 1 million records. Cost-effectiveness is obviously a prime consideration for a system to handle such a large data volume. During the year NODC consulted outside experts to begin conceptual system design and to confirm initial data volume estimates. Based on information available, NODC developed an FY 83 budget initiative for a wave data system to support NOAA's wave data program. Because NOAA's entire coastal wave program is being reevaluated, however, further system developments will depend on overall NOAA priorities.

During the year NODC continued to acquire wave spectra data from NOAA's National Data Buoy Office and began data management for a major wave data collection experiment, the Atlantic Remote Sensing Land Ocean Experiment (ARSLOE).



Wave rider being deployed in waters off Duck, N.C., during the Atlantic Remote Sensing Land Ocean Experiment (ARSLOE). (NOAA photo by Ryck Lydecker)

Current Meter Data System

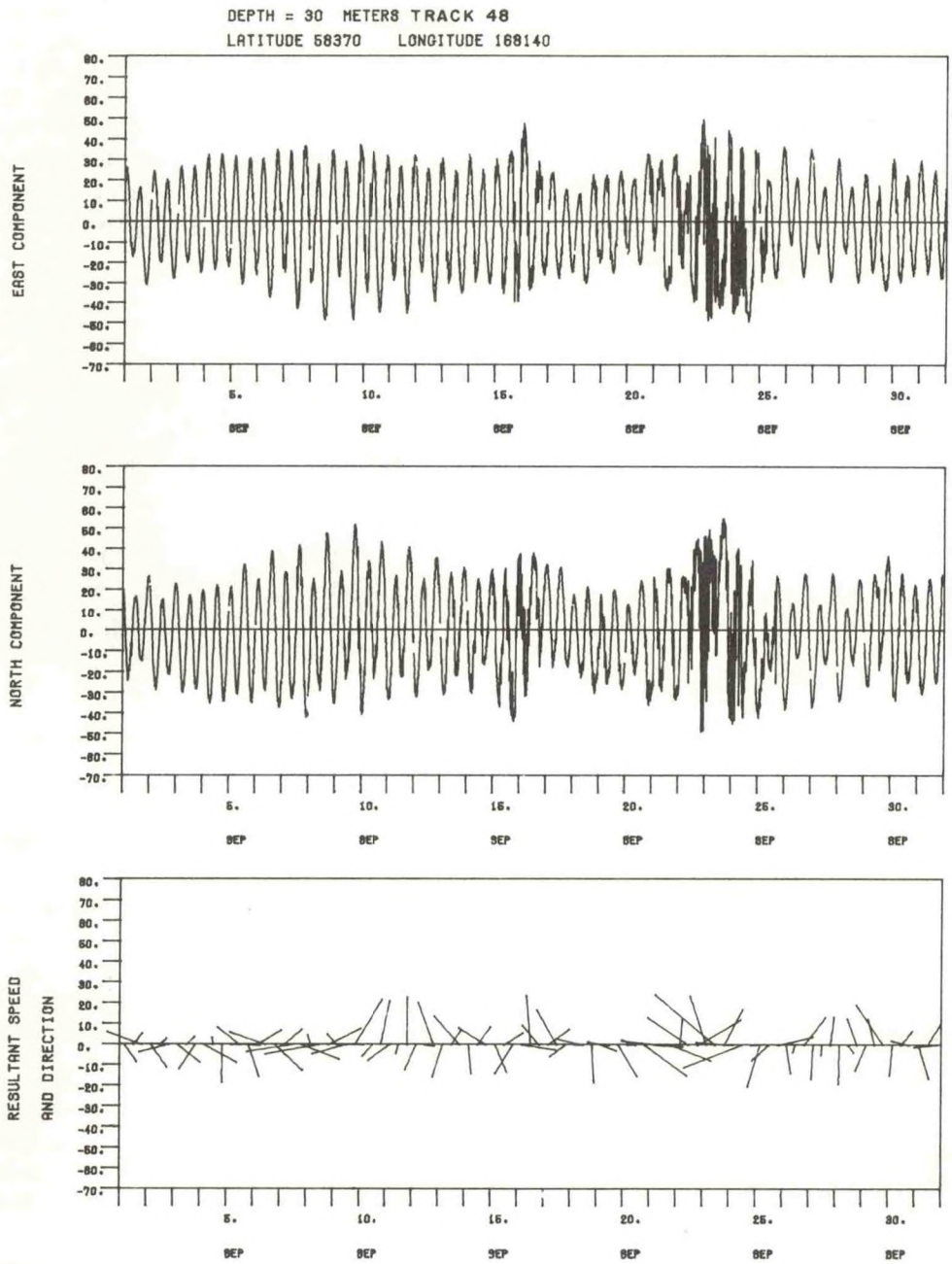
The needs of offshore industry have greatly increased the demand for measured subsurface current data. At the present time, NODC receives and archives current meter data from various projects in several different formats that meet specific project needs.

Toward the end of 1980 NODC began to review its holdings of current meter data to determine (a) if a single standard digital data format would be feasible and cost-effective, and (b) whether existing systems would provide adequate file-maintenance capabilities. Alternative courses of action will be evaluated in 1981.

PRODUCTS AND SERVICES

New Data and Information Products

Several new computer-generated data products and many enhancements to existing ones were developed during 1980. Most of these new products addressed the needs for display and summarization of multidisciplinary data from the Alaskan Outer Continental Shelf Environmental Assessment Program (OCSEAP) and supported production of the OCSEAP data products catalog.



Computer-generated plot of one month of current meter data from the Bering Sea. From top to bottom, the panels show east-west components, north-south components, and resultant direction and speed (averaged over 8-hour intervals).

Major new data products include:

Time Series Plots of Current Meter Data, that show north-south and east-west components and resultant speed and direction. Data may be plotted for a selected time period and specified meter depth or depth interval. This presentation is also applicable to wind data from fixed near-surface stations. (See p. 6.)

Symbol Maps, that show variations in relative magnitude of a parameter, for example, concentration of a chemical substance, or number or concentrations of individuals of one or more species sighted, for any specified area, time period, or survey.

Species Count by Area/Summary Plots, gridded maps that give counts by unit area of a specified species or group of species and a summary of virtually any observable characteristic. In one sample produced from OCSEAP marine mammal sighting data, the plot showed number of walruses observed by quarter-degree squares, plus the number sighted on water, on land, and on ice.

Matrix Summaries of Species versus Habitat, that show frequency of observed species versus habitat type. The matrix may consist of as many as 10 columns (habitats) and 20 rows (species). The product may summarize single or multiple data sets for any biological data, classifying statistics for any measured field based upon species and observed characteristic such as behavior, sex, or life cycle.

Although produced specifically for OCSEAP data, the programs that generate these products are part of NODC's general applications software system and can be applied to any appropriate multidisciplinary data in the NODC archive data bases.

Multidisciplinary data from environmental assessment programs and other projects are recorded and archived in fixed-field digital data formats agreed upon by principal investigators, project management, and the NODC. These formats are referred to as "File Types." During the year, four new formats were developed and approved:

- File Type 064, Invertebrate Pathology,
- File Type 127, Marine Animal Sighting and Census,
- File Type 144, Marine Toxic Substances and Pollutants, and
- File Type 181, Wave/Current Observations.

File Type 144

NODC has developed a new data format to support studies of toxic substances, including pollutants in marine and estuarine waters. The format is identified as File Type 144-Marine Toxic Substances and Pollutants. The format allows for reporting both ambient concentrations near marine discharge sites and results of monitoring surveys for broad ocean areas.

The format consists of data fields for reporting effluent information as well as survey locations, and dates of measurements for samples collected in the water column, the sediment, or biota. Two major code files are employed in the format--the NODC Taxonomic codes (a hierarchical 12-digit code) and the Chemical Abstract Service (CAS) codes of the American Chemical Society (a series of registry numbers of up to 8 characters preceded by an NODC-assigned alpha character). Other code groups are available for reporting analytical methods, gear types and other relevant parameters.

This format was designed to replace older NODC trace element and hydrocarbon formats and provide a more flexible and comprehensive form for reporting most pollution and toxicity levels in the marine environment.

To aid in the computer processing of biological data, NODC developed and maintains the NODC Taxonomic Code, a hierarchical 12-digit code for identifying marine organisms. The code, which now contains over 25,000 entries, underwent substantial revision in 1980. With advice from experts at the Smithsonian Institution, and following the currently accepted classification scheme, NODC completely revised the two sections of the Code covering vascular plants.

Publications

Highlights of the publication year at NODC include continuation of some long-term projects and the start of several new initiatives. The largest, most complex publication job of the year was the production of the fourth, and last, volume of the Catalog of OCSEAP Data. Part 4 is a compilation of samples of computer-generated data plots and summaries developed in support of the Alaskan Outer Continental Shelf Environmental Assessment Program (OCSEAP). The catalog contains data products generated by both NODC and other facilities that provide data processing and analytical support services to this program. A revised edition of Part 1 of the catalog, a summary of information about the individual OCSEAP data sets, was also released in 1980.

The second edition of the Data Catalog for the Marine Ecosystems Analysis Puget Sound Project was also published this year. MESA is another of the large, coordinated environmental assessment projects. Like the first volume of the OCSEAP catalog, this publication is a summary of individual data sets archived by NODC and includes geographic plots of data station locations.

To provide potential users with information about new data products and services and special data sets in its holdings, NODC inaugurated a new series of NODC Environmental Information Summaries. These are two-to-six-page fliers intended to announce new products and services and to assist users in ordering them. The first of these new fliers, an inventory of NODC-archived data from the Mid-Ocean Dynamics Experiment (MODE), was distributed in August.

Information dissemination is commonly agreed to be a weak link in many data-gathering programs. Because of a new legislative mandate to coordinate planning of Federal programs concerned with ocean pollution, the National Oceanic and Atmospheric Administration became aware of the need for better communication among those involved in the myriad Federal programs to study and combat ocean pollution. Therefore, four NOAA components--NODC, the National Marine Pollution Program Office, the Office of Marine Pollution Assessment and the National Marine Fisheries Service--are jointly sponsoring publication of a national, quarterly pollution newsletter called Coastal Ocean Pollution Assessment News (COPAS). COPAS is produced by the Marine Sciences Research Center (MSRC) of the State University of New York at Stony Brook; Senior Editor is MSRC Director Dr. Jerry Schubel. The inaugural issue was for fall 1980.

Getting useful marine environmental data and information to the public is the aim of a series of guides to coastal recreation areas. These compact brochures--handy for carrying in pocket or purse--are produced jointly by NODC and the Sea Grant Programs in various States. They contain weather summaries and safety information geared toward vacation boating, sailing, fishing, sunbathing, and other coastal activities, plus local lore on things to do and see and a list of other available information sources. The fifth and sixth guides were released this year and cover the eastern shore of Lake Michigan and Puerto Rico (Spanish version available in 1981).

NODC Publications, 1980

NODC Catalog of OCSEAP Data, Part 1 (Revised) - Distribution of Digital Data

Catalog of OCSEAP Data, Part 4 - Selected Examples of Graphic Products and Data Summaries Developed from OCSEAP Data Files

Data Catalog for the Marine Ecosystems Analysis Puget Sound Project: Distribution and Summarization of Digital Data

NODC Inventory of XBT Data Along Transects in U. S. Atlantic and Gulf Coast Waters from NMFS/MARAD Ship of Opportunity Program for 1979

NODC Environmental Information Summary No. 80-1: Oceanographic Data Collected in the Mid-Ocean Dynamics Experiment (MODE-1) March to July, 1973

Mariners Weather Log, Volume 24, Nos. 1-6

The Visitor's Climatic Guide to West Michigan's Shore (jointly with Michigan Sea Grant Program)

Puerto Rico's Vacation Climate (jointly with Puerto Rico Sea Grant Program)

Oceanographic Data Exchange, 1979*

Supplement No. 12 to the Catalogue of Accessioned Publications, 1979*

Change Notice Nos. 23 and 24 to the Catalogue of Data*

*World Data Center-A, Oceanography

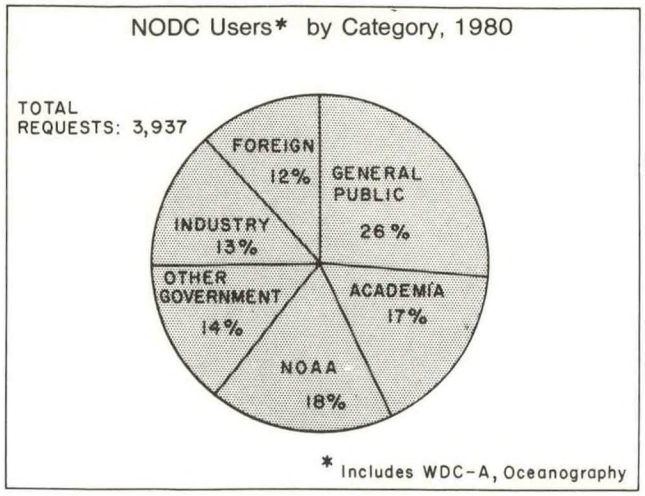
Users

There is no "typical" NODC user, but NODC users have one characteristic in common: they need to know something about the oceans. This year's roster of users--from government, industry, academia, and abroad--includes:

- o Department of Energy; Environmental Protection Agency; Coast Guard Oceanographic Unit; Naval Research Laboratory; Naval Oceanographic Office; Naval Underwater Systems Center; NASA Institute for Space Studies; and numerous offices with NOAA;
- o Exxon Production Research Co.; Shell Oil Co.; Phillips Petroleum Co.; Bechtel, Inc.; Brown and Root Development, Inc.; TRW Systems, Inc.; and Westinghouse Electric Corporation;
- o Scripps Institute of Oceanography; Woods Hole Oceanographic Institution; Massachusetts Institute of Technology; Florida State University; University of Washington, and the Gulf Universities Research Consortium;
- o Chulalongkorn University, Bangkok, Thailand; University of Gdansk, Poland; Centre Oceanologique de Bretagne, Brest, France; Continental Shelf Institute, Trondheim, Norway; and the United Nations Offshore Mineral Prospecting Program, Suva, Fiji.

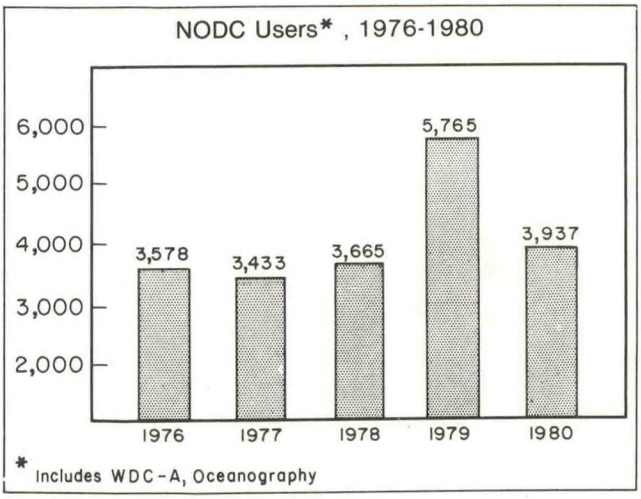
In size and complexity, requests ranged from simple student inquiries for information on oceanographic careers, through production of several hundred dollars worth of data plots for an environmental consulting firm in southern California, to fulfillment of two separate requests for copies of the entire Oceanographic Station Data File comprising 670,000 stations on 38 magnetic tapes.

During the year NODC responded to 3,937 user requests. This is a decline from the previous year's all-time high number of requests and is the first break since 1977 in the general upward trend. Rather than reflecting an



actual decrease in user demand for marine environmental data, however, this decline probably reflects certain conditions at NODC. First, NODC experienced some disruption of services during the last quarter of the year when it was converting its data systems to run on the new computer. Second, only two new coastal recreation guides--an extremely popular publication series--were produced in 1980 (versus four the year before) and this is also undoubtedly reflected in the annual statistics.

A significant trend of the past decade--the increase in data and information requests from policy makers, managers, concerned citizens, and other nontechnical users--appears to have leveled off. For the past year, however, the second largest category of users (after government users) is the general public (26 percent).



PROGRAMS AND PROJECTS

Ocean Pollution Program

In 1978 President Carter signed into law what is now designated as the National Ocean Pollution Planning Act (PL 95-273). This Act expressed the feeling of Congress that greater coordination of Federal pollution research and development and monitoring activities was required--both to avoid duplication and to fill gaps. The Act made NOAA the lead agency in development of a 5-year Federal Ocean Pollution Plan that would provide a comprehensive planning framework for all Federal activities in this field. The Act also mandates that the data and information derived from these programs be disseminated in a timely manner and in useful forms.

During 1980 NODC took the following steps to begin fulfillment of its responsibilities under the Act and to support NOAA's National Marine Pollution Program Office, which has overall responsibility for this program:

- o through its five regional Liaison Officers, NODC compiled regional summaries of non-federally funded marine pollution research, development, and monitoring activities.
- o NODC managed the development and implementation of an automated management information system, the National Marine Pollution Information System, that contains fiscal and other information about Federal pollution programs, and that will greatly facilitate the updates of the 5-year Federal plan that are required every 2 years.

The National Marine Pollution Information System

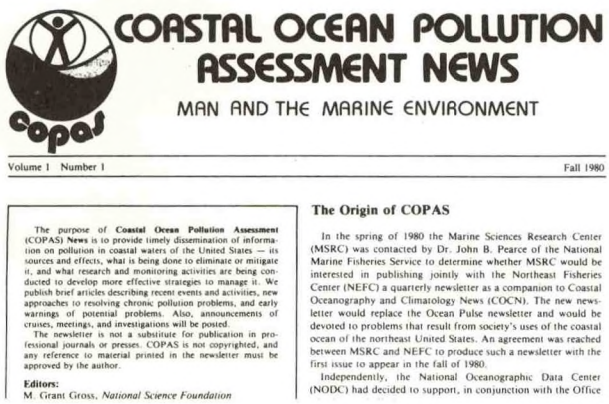
The National Marine Pollution Information System (NMPIS) is an interactive data base containing detailed information about marine pollution research, development, or monitoring projects conducted or funded by Federal agencies. At the close of 1980, it contained descriptions of over 2,500 individual projects from 96 programs in 11 Federal agencies. Each NMPIS record includes:

- o project title and description;
- o performing, funding, and managing organizations;
- o funding and personnel levels;
- o pollution cause and specific pollutants under study;
- o geographic area; and
- o project objectives.

NMPIS can be searched interactively to answer specific questions such as, "What projects are monitoring PCB's in the Great Lakes, and what are their funding levels?" In addition, associated software is available to generate standard reports summarizing the entire data base or selected subsets. Available reports include funding summaries, funding and personnel analyses by organization or project, and inter-agency funds transfer analyses. These reports have various options so they can be tailored to meet user requirements. The funding analysis, for example, can display funding for past, present, and next fiscal year and selected subcategories such as region, zone, and pollutant.

Although created specifically to support the biennial revision and updating of the 5-year Federal Ocean Pollution Plan, principal investigators, project managers, and other interested users may obtain online access to NMPIS by arrangement with NODC. NMPIS operates on a commercial network that can be accessed from most major cities in the United States and Canada, and in the greater part of Europe. NMPIS reports requested interactively are mailed to users. A NMPIS Terminal Operator's Guide is available on request from NODC.

o in cooperation with three other NOAA components, NODC is supporting publication of a national marine pollution newsletter, Coastal Ocean Pollution Assessment News.



COASTAL OCEAN POLLUTION ASSESSMENT NEWS

MAN AND THE MARINE ENVIRONMENT

Volume 1 Number 1 Fall 1980

The purpose of **Coastal Ocean Pollution Assessment (COPAS) News** is to provide timely dissemination of information on pollution in coastal waters of the United States — its sources and effects, what is being done to eliminate or mitigate it, and what research and monitoring activities are being conducted to develop more effective strategies to manage it. We publish brief articles describing recent events and activities, new approaches to resolving chronic pollution problems, and early warnings of potential problems. Also, announcements of cruises, meetings, and investigations will be posted.

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Editors:
M. Grant Gross, *National Science Foundation*

The Origin of COPAS

In the spring of 1980 the Marine Sciences Research Center (MSRC) was contacted by Dr. John B. Pearce of the National Marine Fisheries Service to determine whether MSRC would be interested in publishing jointly with the Northeast Fisheries Center (NEFC) a quarterly newsletter as a companion to Coastal Oceanography and Climatology News (COCN). The new newsletter would replace the Ocean Pulse newsletter and would be devoted to problems that result from society's uses of the coastal ocean of the northeast United States. An agreement was reached between MSRC and NEFC to produce such a newsletter with the first issue to appear in the fall of 1980.

Independently, the National Oceanographic Data Center (NODC) had decided to support, in conjunction with the Office

o NODC began preliminary planning of an Ocean Pollution Data and Information Network that would coordinate pollution-related information activities of existing Federal facilities. In January 1981 NODC held a national workshop to allow representatives of governmental agencies, private industry, universities, and public interest groups to review and comment on these plans.

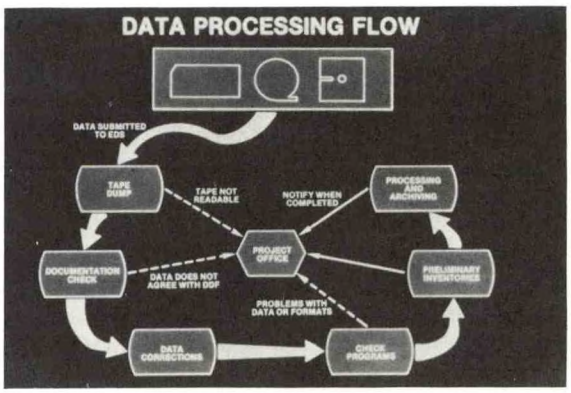
Data Management for Projects

Since the mid-1970's--a decade of rapid advances in offshore resource development and increasing environmental awareness--the NODC has become actively involved in acquiring, processing, and disseminating data from coastal waters of the United States. Although NODC's conventional deep-water oceanographic data bases continue their steady growth, data from the U. S. Outer Continental Shelf now form a major, and rapidly increasing, part of NODC's holdings.

These numerous types of physical, chemical, and biological data are collected under the auspices of large, coordinated projects, many of which are specifically designed to determine the effects on marine ecosystems of offshore oil and gas operations, ocean dumping, and other activities of man. Since these projects were initiated to address pressing resource-use problems, a major concern is that the data and information generated by them be provided to planners and decision-makers as quickly and efficiently as possible. The activities and operations by which this goal is achieved are grouped under the term "data management."

As a data manager for projects, NODC provides services that include:

o assisting project managers in developing data management plans,
o developing and maintaining automated data tracking systems,
o designing digital data formats,
o developing data applications software and providing data products and services to project participants.



During 1980 NODC continued preliminary planning for accessioning of data to be collected under Section 301(h) of the Clean Water Act, and began data management activities for a pilot, region-wide ecosystem-monitoring program, the Northeast Monitoring Program. To speed exchange of data from major projects in the Pacific Northwest and Alaska, NODC installed diskette-supported data stations at NODC headquarters in Washington, D. C. and at the EDIS/NODC Liaison Offices in Seattle, Wash., and Anchorage, Alaska. These stations permit transmission of data sets to or from any of these three locations.

NODC Data Management for Projects

OCSEAP, the Alaska Outer Continental Shelf Environmental Assessment Program, is conducted by NOAA for the Department of Interior's Bureau of Land Management (BLM). OCSEAP was initiated in 1975. By the end of 1980, NODC had acquired and archived 2,205 data sets from this project. These are described in the multi-volume Catalog of OCSEAP Data.

BLM/OCS, the Bureau of Land Management/ Outer Continental Shelf Program, comprises environmental assessment studies of potential oil and gas lease areas around the "lower 48" States. To date NODC has archived OCS data from the Gulf of Mexico, Southern California, and South Atlantic regions. These data sets date to 1975, except for some data in the eastern Gulf that goes back to 1961.

MESA, NOAA's Marine Ecosystems Analysis Program, conducts environmental assessments of the New York Bight area and Puget Sound. Through its Deep Ocean Mining Environmental Study (DOMES), it has also investigated environmental effects of manganese nodule recovery tests in the Central Pacific. NODC archives contain 1,011 data sets from the New York Bight, 949 from Puget Sound, and 27 from DOMES.

Strategic Petroleum Reserve/Brine Disposal Program of the Department of Energy involves water quality studies in the Gulf of Mexico near coastal salt domes being leached out to create underground storage caverns for oil. By year's end, NODC had archived 413 data sets collected from 1977-1980 between Galveston, Tex., and New Orleans, La. Two more years of data collection are planned.

Buccaneer Oil Field Program, conducted by NOAA for the Environmental Protection Agency, is a study of the effects on marine ecosystems of operations of an active oil field in the northwestern Gulf of Mexico. As this project neared completion at the end of 1980, NODC had archived 105 data sets.

NEMP, the Northeast Monitoring Program operated by NOAA's Northeast Fisheries Center (NEFC), was initiated in 1980 to assess and monitor the "health" of the marine environment and its living resources off the Northeastern United States. NEMP incorporates into a comprehensive plan monitoring aspects of three pre-existing programs--New York Bight Monitoring, Ocean Pulse, and Ocean Dumping. During 1980 a Data Management Task Team of NEFC and NODC personnel identified all individual NEMP units and the digital data they will collect and drafted a data management plan. NODC expects to begin receiving NEMP data in 1981.

Section 301(h) of the Clean Water Act of 1977 (PL 95-217) empowers the Environmental Protection Agency to grant modified permits to publicly owned treatment works to continue discharge into marine waters of effluent not meeting secondary treatment standards. A condition for issuance of such permits, however, is that pollution impacts be monitored. Over the past two years, NODC has been developing a system to access, process, and disseminate data collected under this program. In 1980 NODC received a file of waiver applications, began reviewing these for potential digital data sources to supplement planned monitoring data submissions in 1981-82, and implemented an automated file describing the supplementary data and status of each application.

OTEC, the Ocean Thermal Energy Conversion Program of the Department of Energy, studies the technical feasibility and commercial potential of technology to generate electricity by exploiting the thermal gradient of the oceans. NODC supports this project by developing and maintaining an oceanographic data base for the designated OTEC study areas in the Gulf of Mexico, off the east coast of Florida, and near Puerto Rico and Hawaii. At the end of the 1980 this data base, which includes data from NODC's existing archives and data collected by DOE's OTEC contractors, included: 3,991 oceanographic stations; 190 STD casts; 23,476 bathythermograph observations; and 72 current meter time series. During the year NODC serviced 54 data requests from DOE contractors.

ARSLOE, the Atlantic Remote Sensing Land Ocean Experiment sponsored jointly by NOAA and the U.S. Army Corps of Engineers, was a large-scale study of ocean waves and wave-measuring systems. Conducted during October and November 1980 off the Outer Banks of North Carolina, the primary goal of ARSLOE was to evaluate various kinds of wave measurement systems and to compare remote sensing techniques against in situ measurements. By year's end, NODC had received the first 5 of a projected 150 magnetic tapes of ARSLOE wave data.

DATA SYSTEMS DEVELOPMENTS

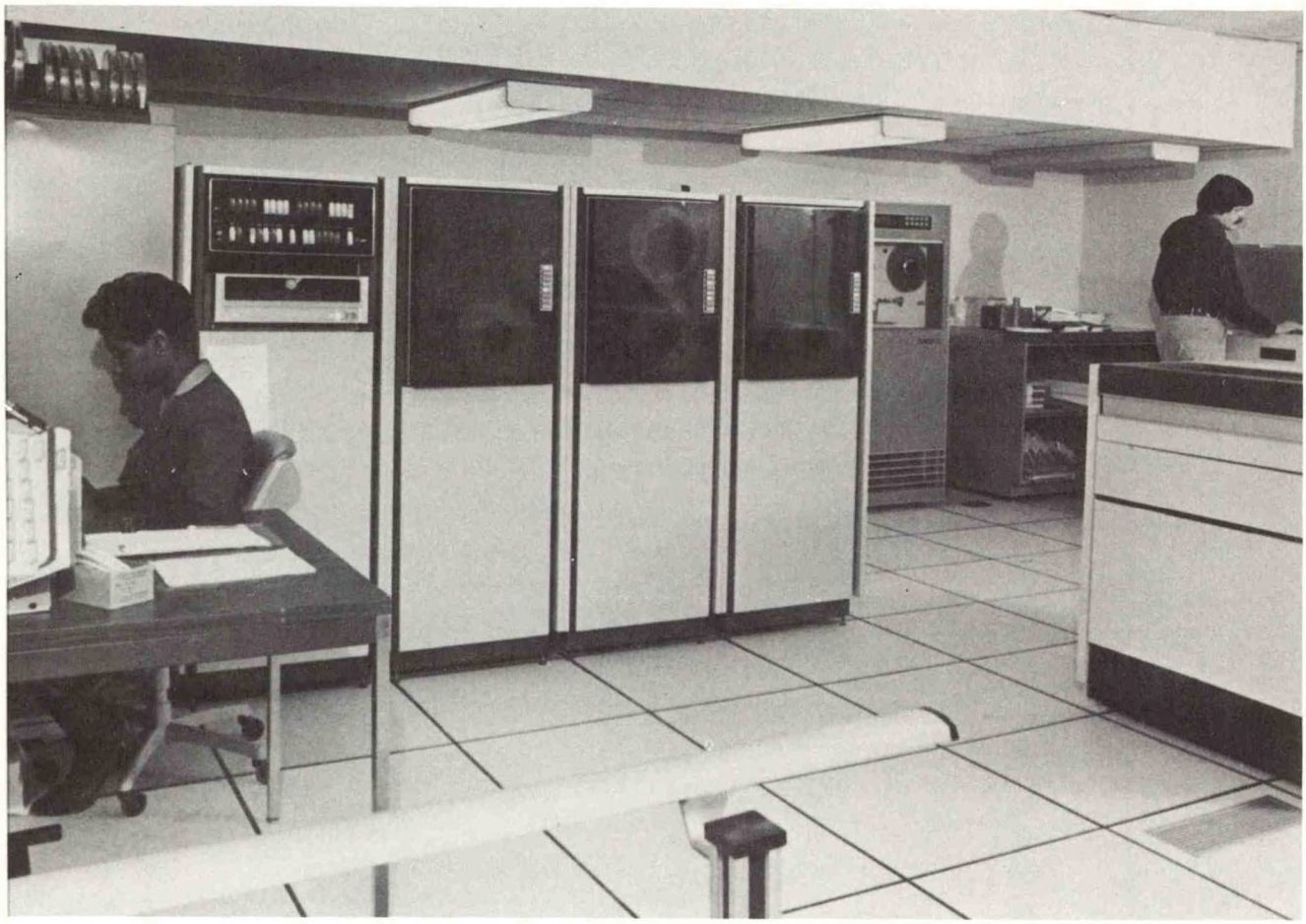
New ADP Facilities

On August 15, 1980, operation of the NOAA IBM 360/65 computer was terminated. This computer, located on the ground floor of the building that houses NODC, had served NODC and other NOAA components since 1974. After months of preliminary planning and of actual conversion work, all NODC data bases and software were transferred to the new NOAA Univac 1100/43 located in Suitland, Md., a suburb of Washington, D.C. NODC accesses this computer by means of a Univac 9300 remote job entry terminal and 43 interactive terminals scattered throughout NODC offices.

Although any organization that has undergone a major computer conversion knows that this operation is never completely painless, NODC tried to reap the maximum possible benefit from this work. While developing its conversion plans, NODC reviewed its data processing systems--which had accreted and evolved over the years--in order to streamline and coordinate where possible. This effort should pay dividends in 1981 when NODC and the other EDIS data centers consolidate their ADP operations on a single new EDIS Univac computer system.

The Univac mainframe computer supports NODC's principal data processing and data base operations. Since September 1977, however, NODC has had a MODCOMP II minicomputer that is used primarily to perform utility functions on incoming digital data. The minicomputer accelerates entry of digital data into the regular data processing cycle by enabling NODC personnel to scan, verify, copy, and generate statistics about incoming data in an interactive mode. In 1980 a number of refinements were made in the operating system of the MODCOMP to increase its efficiency and utility. In addition, all NODC mailing label operations were consolidated on this machine. By the end of the year the minicomputer was being used so much that future system upgrades were being planned to increase its capacity and range of available applications.

The NODC Systems Advisory Council provides a forum where personnel from NODC's Data Systems Group and three divisions can discuss design and implementation of automated data systems. Majority recommendations and minority viewpoints are referred to the NODC Director for final decision.



MODCOMP II minicomputer and peripheral ADP equipment at NODC.

During the year NODC also implemented a new system for remote transmission of digital data and information files. Diskette-supported work-stations installed at NODC headquarters in Washington, D.C., and NODC Liaison Offices in Seattle, Wash., and Anchorage, Alaska, are being used to exchange data sets and data management files among these three locations. This capability is currently being applied to data management and data request operations for three programs: (1) the Alaska Outer Continental Shelf Environmental Assessment Program (OCSEAP), (2) the Marine Ecosystems Analysis (MESA) Program for Puget Sound, and (3) the Environmental Protection Agency (EPA) program for issuance of permits for effluent discharge into marine waters by publicly owned treatment works under Section 301(h) of the Clean Water Act. With this system NODC can respond much more rapidly to principal investigators in the field who are serviced by these two Liaison Offices. In the future NODC also plans to use this system for data entry, data validation, and other functions.

In 1980 NODC began to automate some of its office work by acquiring a CPT 8000 word processor. This unit is installed in the Director's office where it is used to prepare documents, reports, and correspondence that are subject to extensive review and that most need this capacity for easily revising and reformatting text. It is hoped that future acquisition of remote units tied into this central facility will provide this capability to NODC's Division offices.

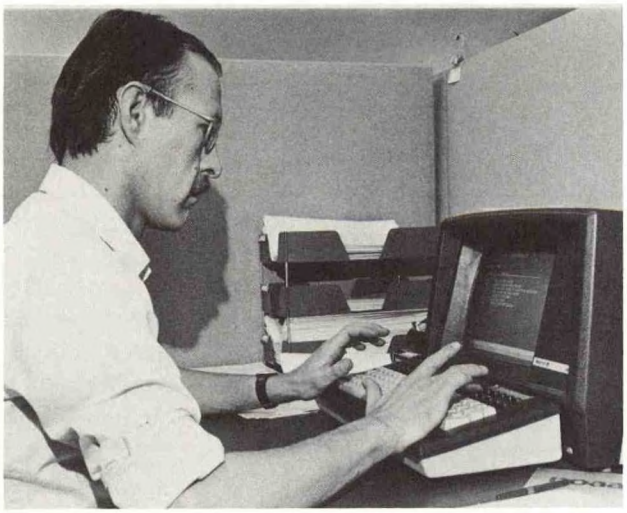
NOAA's Univac 1100/43 Computer (Hardware Features)

- 3 central processors (basic instruction time of 300 nanoseconds)
- 2 input/output units (total of 48 channels, each with maximum transfer rate of 600,000 words/second)
- 524,000 words of 280 nanosecond storage, and 262,000 words of 800 nanosecond storage (36-bit words)
- 34 Univac 8434 fixed disks (54 million words each)
- 6 Univac 8433 mountable disks (34 million words each)
- 14 U-30 9-track tape drives
- 2 U-30 7-track tape drives
- 3 Univac 0770 printers
- 2 Univac 0716 card readers
- 9 ports for Univac 9300 remote batch terminals at various user sites
- 4 ports for UTS-400 intelligent terminals at various sites
- 64 ports for 300-baud full-duplex dial-up lines
- 15 ports for 1200-baud full-duplex dial-up lines

New NODC Data Inventory Data Base

In 1980 NODC put into operation a new automated system to manage information about its data holdings. Called the NODC Data Inventory Data Base, this system uses the capabilities of the data base management system (DMS 1100) available on the new Univac computer to store, retrieve, and update inventory information. Besides providing NODC better control over its internal operations, the Data Inventory Data Base enables NODC to respond more quickly and completely to user inquiries about NODC data holdings.

The Data Inventory Data Base incorporates into a single unified system the functions of nine pre-existing NODC data inventory and control systems. These older systems had evolved and proliferated over many years to meet different, and often changing, needs and had become increasingly uncoordinated. Some of these older systems identified accessioned data; others performed data tracking functions; still others provided control information about data formats and codes. Conducting searches across system boundaries became increasingly difficult. Conversion to the new computer and availability of its powerful data base management system provided NODC the opportunity to completely redesign its inventory system. By consolidating functions and eliminating unnecessary repetition



Formatted display on a video terminal facilitates adding information about a new data accession to the NODC Data Inventory Data Base.

of data items, the new system is more efficient to operate, easier to use, and provides more complete, accurate, up-to-date information.

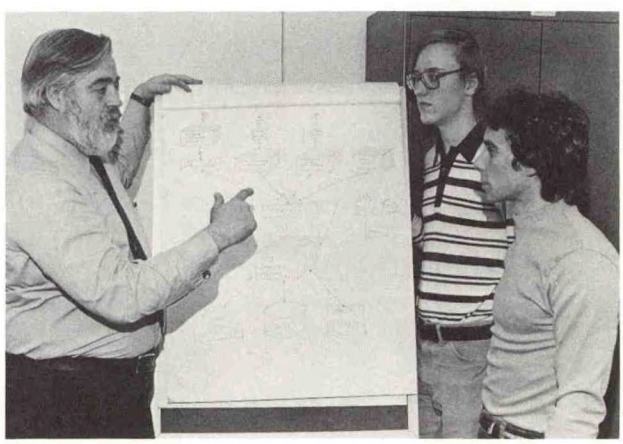
Inventory information is inserted in the Data Base in two ways: (1) by operation of computer programs that extract information directly from processed data tapes, and (2) by manually keying in information. In this manual mode, information is entered into a series of formatted screens displayed on a video terminal. Looking similar to the paper forms they replace, the formatted screens prompt the user to "fill in the blanks" with the required information. Unlike the paper forms, however, this system automatically checks for possible errors. For example, it rejects an attempt to assign to a data set an accession number already in use. Fields such as date and latitude/longitude are checked for feasible ranges of values. And all items such as country, ship, and institution that are entered by means of a numerical code are also spelled out so the user can verify that the code is correct.

The Data Inventory Data Base can be searched interactively by any field--for example, project, geographic area, cruise, date, data type--to answer user questions. Hardcopy printouts of search results can be sent directly to users to respond to their requests. The system can also generate standard reports for use by NODC as data management tools.

Distributed Access System

A system to provide direct remote access to NODC data bases is a dream long shared by NODC and many of its users. Recent advances in computer technology, in particular the availability of inexpensive microcomputers, now give promise that such a system could be feasible and economical. In fact, during 1980, NODC completed the initial phase of experimental software programming for a prototype system.

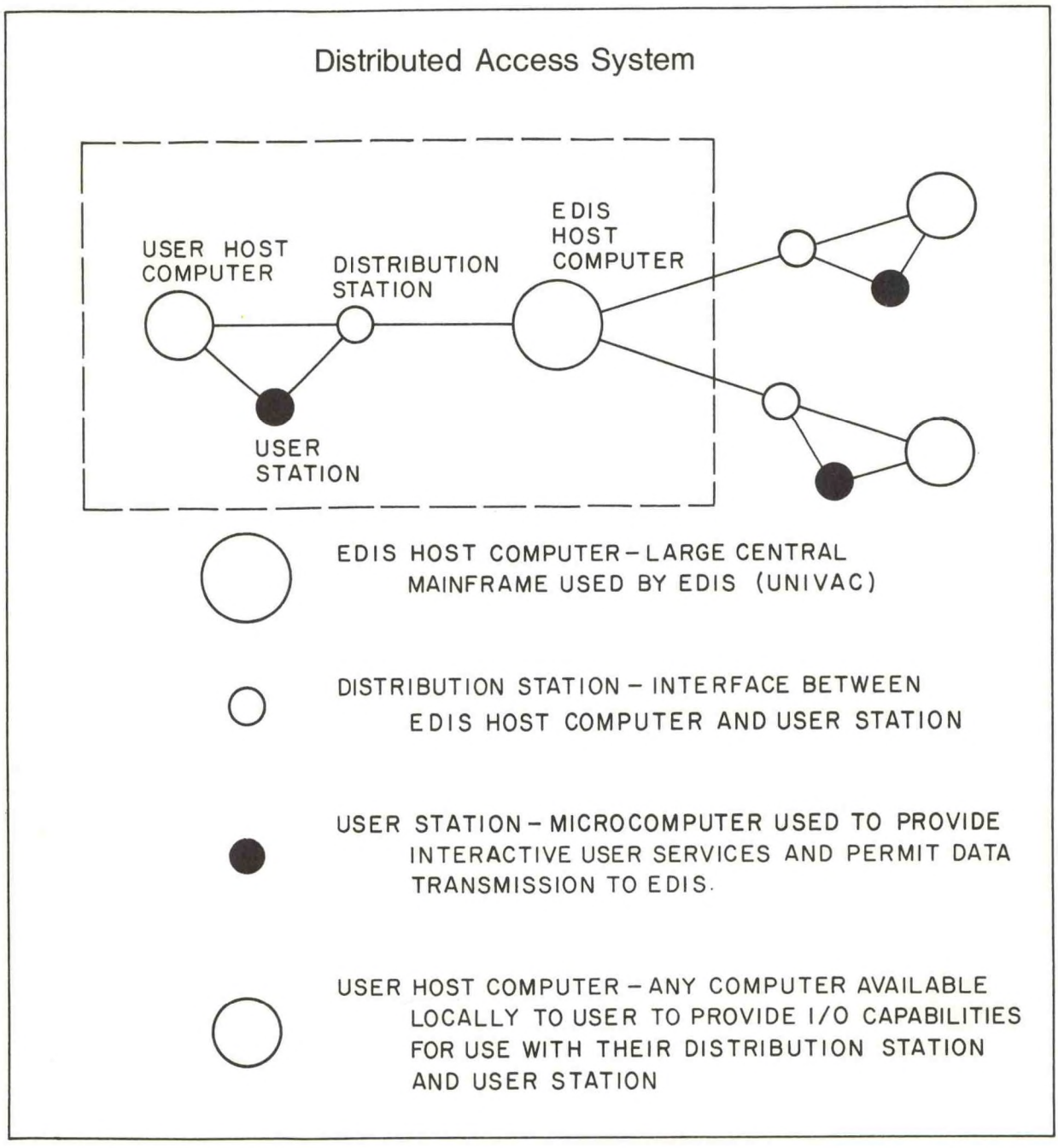
The name given this concept is the Distributed Access System (DAS); its goal is to make NODC and other EDIS data holdings more readily accessible to users and to ease the flow of data into EDIS archives. The DAS concept is based on a network comprising the EDIS central computer, user host computers, and user stations (microcomputers). As planned in a fully implemented version of this network, the user would employ his or her microcomputer and voice grade communication lines to effect transfer to the user's local mainframe computer of a



Richard Bolton (left), principal architect of the Distributed Access System (DAS), discusses further system programming with student assistants Timothy McDaniel (center) and Bruce Ollodart.

selected working set of EDIS data. The requested data would be transmitted and available within 24 hours. The user could then examine and manipulate these data at his or her location on a color video screen using a library of display programs. These programs would include statistical routines, graphic plots such as contours and profiles, and other data summaries. In addition the network would provide facilities for automated submission of computer-readable data to EDIS.

Communications and applications software completed to date is sufficient only to allow network demonstration. During the year field tests were begun at EDIS Liaison Offices in Miami and Seattle to obtain user requirements and to determine user interest in a fully implemented version of the network. Initial response has been uniformly favorable, and further field testing is scheduled in 1981 at EDIS Liaison Offices in Woods Hole, Mass., and La Jolla, Calif.



Future Developments: DAMUS and Mass Storage System

In the decade ahead, NODC and the other EDIS centers face three challenges:

- how to process and organize increasing volumes of different types of environmental data in different formats;
- how to handle an increasing number of data and information requests faster and cheaper; and
- how to make available a greater number of useful data products applicable to complex interdisciplinary problems.

As a major step in meeting these challenges, EDIS is planning to consolidate its current separate data base operations into a single, integrated Data Archive Management and User Services System (DAMUS). DAMUS will replace three independently operated computer systems--each of which has different hardware and software capabilities--with a central EDIS computer facility. This facility will be located at the National Climatic Center (NCC), Asheville, N.C. It will support not only NCC operations, but also those of the National Oceanographic Data Center, the Center for Environmental Assessment Services (Washington, D.C.), the Environmental Science Information Center (Rockville, Md.), and the National Geophysical and Solar-Terrestrial Data Center (Boulder, Colo.). With DAMUS, EDIS will have greatly increased capacity to serve the ever-increasing demands of users who wish to synthesize the complete range of available marine environmental data in order to study a specific phenomenon or geographic area.

In late December 1980, EDIS was granted authority to begin procurement of DAMUS hardware. DAMUS will be implemented in stages. The first stage, involving transfer of EDIS data base operations to the Asheville facility and inauguration of service there, is scheduled to be completed late in 1981. To meet projected system workloads, studies of future system upgrades are already being conducted.

In order to meet EDIS requirements for large data storage capacity with rapid access time, DAMUS will incorporate a state-of-the-art mass storage system. The heart of this DAMUS subsystem will be an IBM 3850 bulk storage device that is faster, more convenient, and more compact than regular magnetic tape reels. The bulk storage unit houses up to 4,700 tape cartridges of 50 megabytes each in a structure of honeycomb-like cells. Each cartridge is only 4½ x 1½ inches and contains a tape 700 inches long. On demand, a mechanical arm automatically retrieves the cartridges and places them in a read/write station.

A minicomputer serves as a mass storage processor to control data flow to and from the host computer and disk storage. This system has two important features:

- depending on how much they are used, files are automatically migrated between different levels of storage without operator intervention; and
- the system is transparent to current application software.

The mass storage subsystem is scheduled to be operational when DAMUS service is initiated.

INTERNATIONAL ACTIVITIES

International Organizations

NODC participates in planning for international data exchange primarily through collaboration with the Intergovernmental Oceanographic Commission (IOC), a semi-autonomous body within the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and with the International Council for the Exploration of the Sea (ICES), an independent intergovernmental organization. Through these two bodies, NODC has had a major influence on the direction and scope of data exchange arrangements among the sea going nations. Though a U.S. National Center, NODC is very much aware that U.S. data users have global interests. IOC, especially its Working Commission on International Oceanographic Data Exchange (IODE), which is chaired by the United States, and ICES provide convenient and efficient mechanisms for global data acquisition both through multilateral exchange and through the World Data Centers for Oceanography, part of the World Data Center (WDC) System directed by the International Council of Scientific Unions (ICSU).

During 1980 the U.S. NODC served as Responsible National Oceanographic Data Center (RNODC) for several international programs. RNODC's are data centers formally designated by IOC to provide data processing and archiving services to IOC member states in support of specific international programs. This sharing of responsibilities assists data centers with lesser capabilities, and, by assuring more rapid access to data through the WDC's for Oceanography, benefits all IOC member states.

Throughout the year NODC served as RNODC for:

- IGOSS, the International Global Ocean Station System, bathythermograph (BATHY) and temperature-salinity-current (TESAC) data;
- MAPMOPP, the Marine Pollution Monitoring Pilot Program, and its successor, MARPOLMON, the operational Marine Pollution Monitoring Program;
- IOCARIBE, the IOC Regional Program for the Caribbean and Adjacent Regions; and
- FOY, the FGGE (First GARP Global Experiment) Operational Year, an intensive air-sea data gathering program conducted from late 1978 to early 1980 (RNODC jointly with the EDIS Center for Environmental Assessment Services).

In September 1980 NODC hosted two successive IOC/IODE meetings attended by participants from the United Kingdom, Canada, India, the U.S.S.R., the Federal Republic of Germany and the United States, as well as from the IOC and World Meteorological Organization (WMO) Secretariats.

The first meeting, the inaugural session of the newly established IODE Group of Experts on Format Development, was primarily devoted to work on a standard magnetic tape format for exchange of all types of oceanographic

Thomas Winterfeld (left), Advisor for International Programs, and Douglas Hamilton, Chief of the Data Processing Branch, discuss quality control of data from the FGGE (First GARP Global Experiment) Operational Year.

data. Known as GF3 (IOC General Format, Version 3), this format is gaining wide acceptance for use in data exchange among member states. Technical details about GF3, which is now ready for use, are published in the multilingual IOC Manual and Guide Series No. 9. At the meeting, participants also agreed on an approach to devise a universal standard environmental parameter code to be used with GF3.

The second meeting, an IODE Inter-sessional Coordination Meeting, enabled the Chairman and Vice-Chairman of the IODE, the IOC Secretariat, and Chairmen of subsidiary bodies to review the internal workings of IODE and to establish an agenda for the next Plenary Meeting (August 1981).

Other international meetings and consultations in which NODC participated include:

- o Third IOC/WMO Workshop on Marine Pollution Data. Participants reviewed MAPMOPP and decided to continue marine pollution programs under IOC and the United Nations Environment Program (UNEP), with the U.S. and Japan NODC's again serving as RNODC's for these data.
- o Fourth and Fifth Meetings of the Working Group on FGGE Data Management. Although oceanography is a minor component of the FGGE Program, invitation of an NODC representative demonstrated the appreciation by the Working Group and WMO of the

NODC Representation on International Organizations, 1980

T. Winterfeld	Chairman of the IOC Working Group on IODE Data Coordinator for IOCARIBE Rapporteur for IGOSS Data Archiving and Exchange Member of ICSU Panel on WDC's Member of IOC/ICSU Committee on Climatic Changes and the Ocean
E. Ridley	U.S. National Coordinator for IODE U.S. Data Coordinator for the North Atlantic Fisheries Organization (NAFO)
J. Churgin	Chairman of IOC Group of Experts on MEDI Member of POLYMODE Executive Committee and POLYMODE Atlas Editorial Board
K. Hughes	Member of IODE Group of Experts on RNODC's Rapporteur for IODE Marine Pollution Data Exchange
E. Collins	Member of ICES Working Group on Marine Data Management

contribution of oceanographic data to meteorological studies.

- o POLYMODE Data Management Meetings. In March an NODC representative visited Soviet researchers and institutions in Moscow and Leningrad to discuss processing and quality control of data from this joint U.S.-U.S.S.R. ocean dynamics study.
- o Joint IOC/WMO Meetings on the Evaluation of IGOSS Support to FGGE and on IGOSS Long-Range Plans. Among the decisions reached at these meetings was a cost-saving redefinition of the role of the RNODC's for IGOSS by transferring many of their data processing and quality control functions to IGOSS operational centers.
- o Third Session of IOCARIBE. The meeting participants expressed support for NODC's lead role in centralization and archiving of data from the Caribbean and Gulf of Mexico, and agreed to curtail publication of expensive inventory publications formerly issued by NODC as RNODC for IOCARIBE.
- o 68th Statutory Meeting of ICES. At this meeting the terms of reference of the Working Group on Marine Data Management were changed in order to increase collaboration with the Service Hydrographique and the Hydrology, Biological Oceanography, and Marine Environmental Quality Committees.

World Data Center A, Oceanography

World Data Center A, Oceanography, received data for more than 80,000 marine scientific observations during 1980, including data for over 30,000 oceanographic stations. The international marine data base of the Center now contains data for more than 1 million observations. All data held by the Center are described in semi-annual Change Notices to the Catalogue of Data.

Data inventory forms such as the Report of Observations/Samples Collected by Oceanographic Programs (ROSCOP) provide WDC-A, Oceanography, and other centers with a means for determining the availability of internationally exchangeable data in advance of the actual receipt and cataloging of the data by the data center. During 1980, more than 900 ROSCOP forms describing international cruises were received by WDC-A. The total number now on hand is 10,726.

WDC-A, Oceanography, received a total of 1,357 marine scientific publications and articles from 38 nations and 8 international organizations. These documents are listed and indexed in yearly Supplements to the Catalogue of Accessioned Publications.

The World Data Center System

The World Data Center (WDC) system was established in 1957 to collect data from the numerous and widespread observational programs of the International Geophysical Year (IGY) and to make such data readily accessible to interested scientists and scholars. The International Council of Scientific Unions (ICSU) Panel on World Data Centers is responsible for the operation of all WDC's. The guidelines which govern international exchange of oceanographic observations are found in both the ICSU's Fourth Consolidated Guide to International Data Exchange through the World Data Centres and the Intergovernmental Oceanographic Commission's (IOC's) Manual of International Oceanographic Data Exchange.

The WDC system consists of World Data Center A (WDC-A) located in the United States; WDC-B located in the U.S.S.R.; and several WDC-C's located in Western Europe, Australia, and Japan. WDC-A is established under the auspices of the U.S. National Academy of Sciences, where the Coordination Office is located. WDC-A is divided into seven discipline subcenters. These centers are located in institutions that, in the opinion of the Academy, can best serve the interests of science because of their data-handling capabilities for the appropriate scientific disciplines. WDC-A, Oceanography, is collocated with the National Oceanographic Data Center (NODC) in Washington, D.C. WDC-A, Oceanography, does not process oceanographic data; NODC performs this function on WDC-A's behalf.

The WDC-A Centers and their disciplines are:

GLACIOLOGY (Snow and Ice)
CIRES, University of Colorado
Boulder, Colo.

METEOROLOGY
EDIS,NOAA
Asheville, N.C.

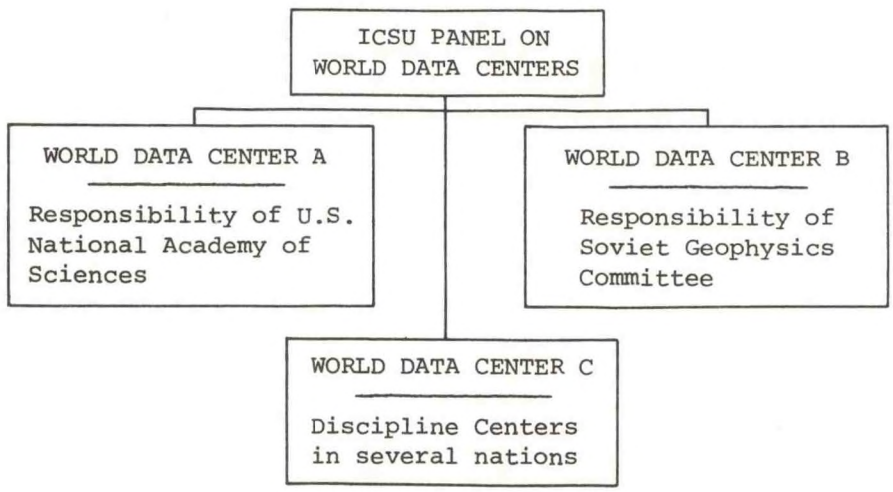
OCEANOGRAPHY
EDIS,NOAA
Washington, D.C.

ROCKETS AND SATELLITES
NASA
Greenbelt, Md.

ROTATION OF THE EARTH
U.S. Naval Observatory
Washington, D.C.

SOLAR-TERRESTRIAL PHYSICS
EDIS,NOAA
Boulder, Colo.

SOLID-EARTH GEOPHYSICS
EDIS,NOAA
Boulder, Colo.



Foreign Assistance

NODC is providing technical assistance to help establish a National Oceanographic Data Center in the People's Republic of China and to upgrade the capabilities of the National Oceanographic Data Center in Egypt.

Cooperation between NOAA and the National Bureau of Oceanography (NBO), the leading marine science institution in the People's Republic of China, dates to signing of the U.S./China Protocol in Marine and Fishery Science and Technology in May 1977. One of the terms of the Protocol deals with marine data exchange. It calls for a series of reciprocal visits by U.S. and Chinese delegations so that these marine scientists can become familiar with programs and operations in each other's countries and so that U.S. experts can provide technical advice and guidance to their Chinese colleagues in establishing a Chinese NODC.

Last year James Churgin of the U.S. NODC led a U.S. delegation on a 1-month visit to Chinese marine science institutions, and this year a delegation of Chinese scientists visited the United States. With them they brought data and publications in return for U.S. data sent earlier to China.

Following these initial exchanges, NODC began discussions with the United Nations Development Program Office in Beijing on how to further this program through assistance to the Chinese in determining their needs for computer equipment and advanced training for their personnel.

The Egyptian National Oceanographic Data Center (ENODC) in Alexandria was established by the Academy of Scientific Research and Technology in the Mediterranean Sea Branch of its Institute of Oceanography and Fisheries. In 1978 the U.S. NODC initiated a project to enhance the capabilities of ENODC. This past year, recognizing the importance of this center to marine science in Egypt and the eastern Mediterranean, the United Nations Environment Program granted funds to the Institute for the purchase of a minicomputer. And, on behalf of the ENODC, the U.S. NODC obtained additional funding for the purchase of peripheral equipment needed for the minicomputer.

In September 1980 an NODC delegation headed by Deputy Director Kent Hughes traveled to Cairo and Alexandria to provide guidance to Egyptian personnel in the organization and operation of their data center. In Cairo meetings were held with the U.S. Scientific Attache, personnel of the U.S. Agency for International Development (AID), the Director of the Egyptian Academy of Scientific Research and Technology, and the Director of the Egyptian Academy of Science. The NODC delegation was also briefed by the Head of the Institute of Oceanography and Fisheries and the Head of the ENODC.

NODC completed plans for training Egyptian personnel in the United States in 1981 with funding provided by AID. This training will consist of formal courses given by a computer vendor, plus extensive on-the-job experience at NODC.

Visitors

During October and early November, NODC hosted a visit by five marine scientists from the National Bureau of Oceanography (NBO) of the People's Republic of China. The delegation was led by Mr. Luo Chuan-wei, Deputy Director of the NBO Institute of Marine Scientific and Technological Information in Tienjin. During their nearly month-long visit, our Chinese guests visited NODC and other EDIS and NOAA offices in Washington, D.C.; the National Geophysical and Solar-Terrestrial Data Center in Boulder, Colo.; and, at the conclusion of their stay, the EDIS/NODC Liaison Office in Seattle, Wash. In spite of their busy schedule, our Chinese

Delegation of marine scientists from the People's Republic of China meets with NODC and other EDIS personnel. The Chinese delegation was led by Mr. Luo Chuan-wei (fourth from left).

guests were provided with opportunities for some sightseeing, including a tour of the White House.

Mr. Amin Karan of the Institute of Oceanography and Fisheries, Alexandria, and Ms. Nagah Elewa of the National Information and Documentation Center, Cairo, visited NODC as part of the mutual exchange of personnel in support of NODC's program of assistance to the Egyptian NODC.

Dr. Mario Ruivo, Secretary of the International Oceanographic Commission (IOC) headquartered in Paris, France, discussed international data programs with NODC personnel during his visit in March to attend IOC/IODE meetings.

Other Directors of NODC's that visited in 1980 were Dr. Marthe Melguen, Director of the French Bureau National des Donnees Oceaniques, who spent a few days with us in April; and Mr. Paul Geerders, Director of the Netherlands Centrum voor Oceanografiske Gegevens, who visited NODC enroute to a conference at Woods Hole Oceanographic Institution.

Ms. Siv Borgin, Director of the Republic of South Africa National Oceanographic Data Center, spent three weeks at the NODC in March consulting with NODC personnel, observing our operations, and collecting documentation and sample outputs from NODC systems that could be applied or adapted for use at her home institution.

Ing. Hugo David del Peral and Biol. Jose-Antonio Sosa Barajas of Mexico's Direccion General de Geographia del Territorio Nacional spent two weeks at NODC receiving training in data processing operations.

Other countries represented by visitors to NODC during 1980 included Canada, Chile, Japan, New Zealand, Sweden, the U.S.S.R., and Venezuela.

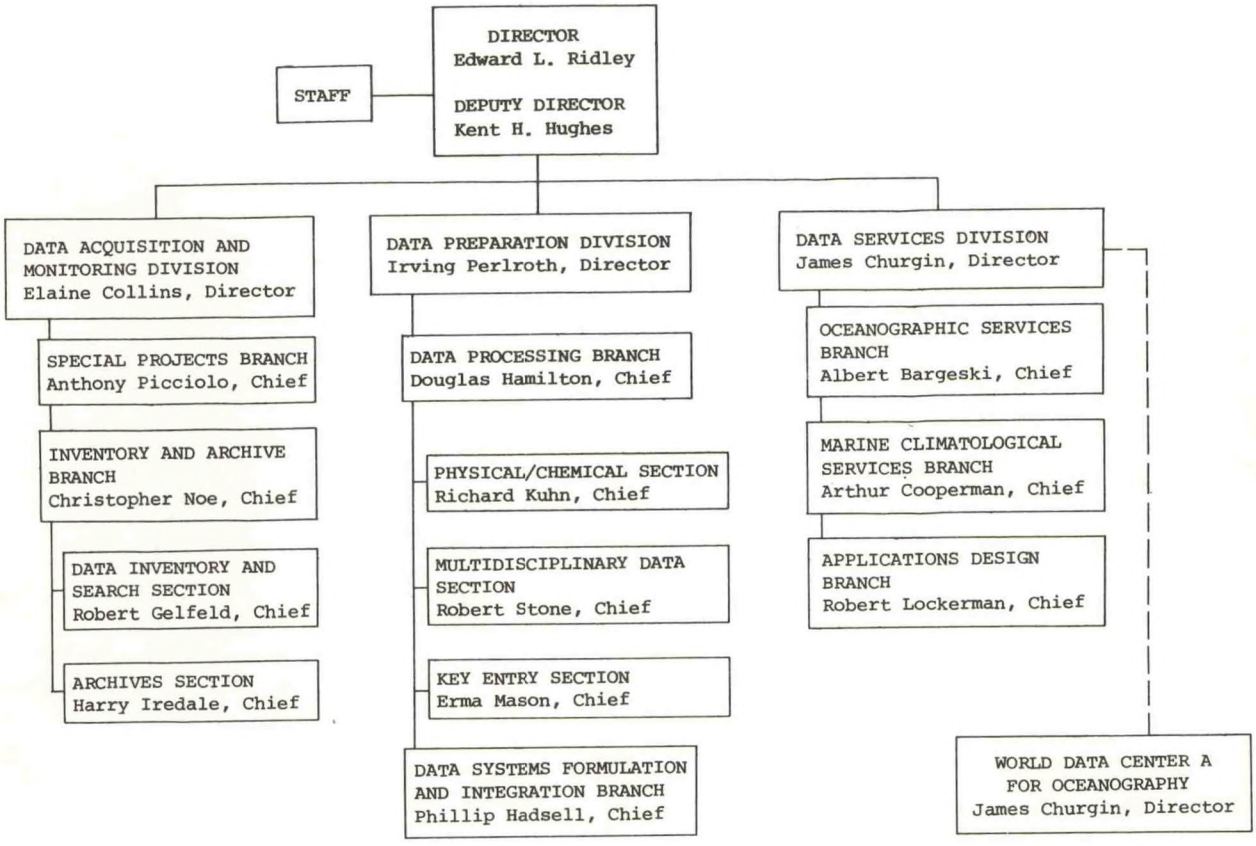
ORGANIZATIONAL AFFAIRS
NODC Reorganization

NODC underwent a major reorganization late in 1979. To bring our users up-to-date, that reorganization is reported here.

This change in the internal structure of NODC largely reflects a trend already mentioned in this publication--NODC's increasing role as a data manager for environmental assessment projects on the U.S. Outer Continental Shelf and the accession of large amounts of multidisciplinary data from these projects. Besides rapidly increasing the volume of data held by the NODC, these projects also increased the variety of data the NODC handles. NODC's relatively simple, straight-forward world of Nansen casts and bathythermograph observations was suddenly complicated by an influx of pollutant concentration measurements, marine mammal sightings, fish pathology observations, and other types of environmental assessment data.

The reorganization basically strengthened NODC capabilities to deal with its new responsibilities. The old Special Projects Division was restructured as the Data Acquisition and Monitoring Division. All preprocessing of data--accessioning, listing, and copying--is consolidated in a new Data Inventory and Search Section. Finally, the Technical Records Branch was transformed into a new Archives Section, responsible now for physically archiving all data, data documentation, and software.

NATIONAL OCEANOGRAPHIC DATA CENTER



NODC People

In October Edward L. Ridley became NODC Director. Mr. Ridley succeeds Robert V. Ochinero, who retired at the beginning of the year after serving as Director since 1970.

Immediately before coming to the NODC, Mr. Ridley was Director of the Marine Assessment Division of the EDIS Center for Environmental Assessment Services (CEAS). He began his career as an oceanographer in 1954 with the U.S. Naval Hydrographic (now Oceanographic) Office. When he left that agency in 1978 to transfer to EDIS, he was Director of the Ocean Sciences Department.

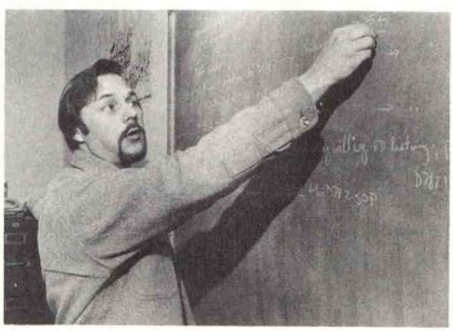
Dr. Elaine Collins, formerly Chief of NODC's Data Processing Branch, was appointed Director of the new Data Acquisition and Monitoring Division created during the recent reorganization. Douglas Hamilton, an oceanographer in the Applications Design Branch, is Dr. Collins' successor as head of the Data Processing Branch.

Kent Hughes, Deputy Director.

James Churgin, Director, Data Services Division and Director, World Data Center A for Oceanography.

Elaine Collins, Director, Data Acquisition and Monitoring Division.

Charles Cotten, Financial Manager (with clerk-typist Evette Parker)



George Saxton, Chief of the Data Systems Group.

Irving Perlroth, Director, Data Preparation Division.

Claudia Colleli, Administrative Officer.

Through the years NODC employees have conveyed information about oceanography to countless elementary, high school, and college students by participating in science fairs, career days, and other school programs. During 1980 NODC renewed its commitment to community outreach by scheduling a series of career orientation visits to colleges and universities in the Washington, D.C., area and to conferences of organizations dedicated to equal employment opportunity. This series of presentations, which is being conducted in support of the Federal Equal Opportunity Recruitment Program (FEORP), was inaugurated in November by the attendance of NODC's Administrative Officer, Claudia Colleli, at the 1980 National Conference of the Society for Advancement of Chicanos and Native Americans in Science (SACNAS).

Retirees, 1980

Carmen Johnson	Physical Scientist
Edgar Law	Director, Data Acquisition and Monitoring Division
Robert Ochinero	NODC Director
Catherine Powell	Physical Science Technician
Cora Slade	Oceanographer
Ellease Timmons	Physical Science Technician
Wellington Waters	Oceanographer
Thomas Winterfeld	Advisor for International Programs

PREVIEW, 1981

Ocean pollution activities will be increasingly important at NODC in 1981 and beyond. NODC will further carry out its responsibilities for ocean pollution data and information dissemination under Section 8 of the National Ocean Pollution Planning Act of 1978. As far as practicable, NODC will implement the recommendations of the Workshop on Marine Pollution Information Management that was convened in January 1981 at Frederick, Md.

The Workshop recommended strong emphasis on regional access and dissemination of marine pollution data and information, including data synthesis products. Therefore, to fulfill the mandate of Section 8 of the Statute, NODC envisages a system of Regional Coordination and Referral Offices (RCROs) directed by a Central Coordination and Referral Office (CCRO) established within the NODC in Washington, D.C. To the greatest extent possible, these offices will use existing resources and facilities. Collectively, they will form an Ocean Pollution Data and Information Network (OPDIN) charged with ensuring that timely and useful pollution products and services are available to government agencies and other users.

Data management for a major new project, the Section 301(h) program of the Clean Water Act of 1977, will become fully operational if Environmental Protection Agency (EPA) funding continues in support of this effort. Working closely with the project manager, EPA's Office of Marine Discharge Evaluation, NODC has developed a systemto receive, process, and disseminate pollution-monitoring data collected in relation to ocean discharge permits granted to publicly owned treatment works. NODC views this program as potentially one of the largest single contributors of ocean data to the National data archives. Data are expected in late 1981 or within the year following EPA's granting of the first modified permits.

NOAA has been delegated important new authority to license and regulate ocean mining and energy facilities. NODC will work closely with NOAA's new Office of Ocean Minerals and Energy (OOME) and provide data management support for OOME programs. Data support will also be provided to the Gulf of Mexico Strategic Assessment Project recently initiated by the Office of Coastal Zone Management's Office of Ocean Resource Coordination and Assessment (ORCA). NODC personnel will cooperate with ORCA staff and other project participants to carry out this comprehensive study of pollutant loading and transport in the Gulf.

NODC employees and users alike eagerly look forward to the return in 1981 of a stable data processing environment, first on the new NOAA Univac 1100/43, and later in the year on the Asheville,N.C., Univac computer that will support the developing Data Archive Management and User Services (DAMUS) System. Although NODC will be changing computers for the second year in a row, this shift between Univac machines will be much simpler than the original IBM-to-Univac conversion.

NODC's Distributed Access System (DAS) will undergo further field demonstrations in 1981. This pilot project will continue to research and test techniques for applying major new advances in micro-processors to oceanographic data accession and dissemination. At present, DAS is capable of handling only oceanographic station data. In 1981 NODC will begin the developmental effort to extend DAS capabilities to handle certain kinds of multidisciplinary data.

NODC INFORMATION REQUEST FORM

FROM: (Name) _____

(Organization) _____

(Address) _____

(City) _____ (State) _____ (Zip) _____

Please send NODC User's Guide and other general information about NODC data products and services.

Please send specific information about following product or service:

_____

Please send copy (if free) or price information on the following NODC publication(s):

_____

_____

Please send data inventory for:

Data type and/or parameter (e.g., BT, Nansen cast, salinity):

_____

Project, if applicable (e.g., OCSEAP, MESA, OTEC):

_____

Geographic area (by latitude/longitude):

_____

Time period (specify all available data, or ranges of months/years):

_____

Depth criteria, if any (e.g., observations deeper than],000 m):

_____

(Note: User telephone number required for data inventory requests)

Other: _____

_____

Mail this form to: National Oceanographic Data Center
Oceanographic Services Branch
NOAA/EDIS D761
Washington, DC 20235

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