

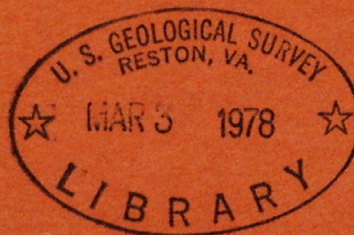
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NATIONAL WATER DATA EXCHANGE

STATUS OF THE NATIONAL WATER DATA EXCHANGE (NAWDEx)—SEPTEMBER 1977

U.S. GEOLOGICAL SURVEY
Open-File Report 78-154





STATUS OF THE NATIONAL WATER DATA EXCHANGE (NAWDEX)—SEPTEMBER 1977

By MELVIN D. EDWARDS

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UNITED STATES DEPARTMENT OF THE INTERIOR

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STATUS OF THE NATIONAL WATER DATA EXCHANGE
(NAWDEX) - SEPTEMBER 1977

By

Melvin D. Edwards

ABSTRACT

Major progress in the implementation of the National Water Data Exchange (Nawdex) took place during Fiscal Year 1977--beginning October 1, 1976 and ending September 30, 1977. This report describes the status of the program at the end of this period. Program advancement is reported in the areas of administration, membership, Local Assistance Center facilities, development of the Water Data Sources Directory and the Master Water Data Index data bases, development of systems related to these data bases, and the coordination of services available through member organizations.

INTRODUCTION

The National Water Data Exchange (Nawdex) assists users of water data to identify, locate, and acquire needed data. It is a confederation of both Federal and non-Federal organizations active in the field of water resources whose objective is to improve access to water data.

The Nawdex program was implemented nationwide in January 1976; it is managed by a Program Office located within the Water Resources Division of the U.S. Geological Survey at the Survey's National Center in Reston, Virginia. The Program Office is responsible for systems operations, liaison with members and users of the system, and the technical design and development of systems and procedures required for administration and for information and data dissemination.

This report discusses the activities of Nawdex during Fiscal Year 1977 beginning on October 1, 1976 and ending on September 30, 1977.

PROGRAM ADMINISTRATION

Procedures were developed by the Program Office during Fiscal Year 1977 to improve the administration of the Nawdex program. These included a "Program of Operation For The National Water Data Exchange (NAWDEX)," which presents guidelines for administration of the program. This document was reviewed and approved by the membership. It discusses program coordination, program management and administration, and member participation. The "Program of Operation" has been distributed to all current members and will be distributed to each new member entering the program.

The program objectives for Nawdex for Fiscal Year 1978 were presented to the membership in July 1977 and review of the objectives was completed in August 1977. These objectives inform the membership of planned activities within Nawdex during the forthcoming year, thereby, allowing the member organizations to consider them in the planning and operation of internal programs. This procedure also allows each member to comment on the viability of the objectives and recommend changes. The objectives are published annually and serve as a timetable for Nawdex members on forthcoming activities.

The second issue of the Nawdex Newsletter was released in March 1977. The Newsletter is prepared on an unscheduled basis, as frequently as necessary, to keep its readers and members informed on current activities, new members, and activities of members that submit noteworthy items for it.

The Newsletter is distributed free by the Program Office to requesters and currently has a distribution of nearly 500 individuals and organizations.

Work was completed in August 1977 on the text and design of a leaflet on the Nawdex program. The manuscript was forwarded for publication in September 1977. This leaflet discusses the Nawdex concept and its available services. It is to be used to improve public awareness of the program. Upon publication, it will be distributed to the general public and all Nawdex members for their further use and dissemination.

The Nawdex program was described by the Program Office staff at a number of technical conferences and meetings during the year. Major meetings were the Second International Conference on Transfer of Water Resources Knowledge held in Fort Collins, Colorado, on June 29 - July 2, 1977; Eleventh Meeting of the Advisory Committee on Water Data for Public Use and the Interagency Committee on Water Data held by the U.S. Geological Survey's Office of Water Data Coordination in Denver, Colorado, on November 30 - December 2, 1976; and the Eleventh Biennial Conference on Ground Water sponsored by the State of California, Department of Water Resources and the University of California, Department of Water Resources and the University of California, Water Resources Center in Fresno, California, on September 15-16, 1977. Several meetings were also held with State and local organizations to discuss their participation in the program. The Program Office staff will continue to accept invitations to participate in as many meetings as time and resources allow in order to describe the program and its concept to a greater number of organizations.

NAWDEX MEMBERSHIP

Nawdex membership increased significantly during the past year. As of September 30, 1977, 84 organizations had become participants in the program. This included 17 Federal, 25 State, 11 local-government, 4 interstate, 22 university, and 4 private organizations, and 1 foreign affiliate. A list of

these organizations is presented in Appendix A. A directory of member organizations, prepared by the Program Office, contains the name, address, telephone number, and name of the designated Nawdex representative of each member. The directory is distributed to the membership on a quarterly schedule.

Member organizations form the base units of Nawdex. A large and active membership assures extensive and improved communication within the water-data community, the availability of more water data and services, a better exchange of expertise and knowledge in developing data exchange standards and procedures, and improved coordination in data exchange activities. A large membership is, therefore, important to the continuing success and future growth of the program. Membership is voluntary and all organizations active in the field of water-resources are encouraged to participate. There are no dues or fees associated with participation. New members will, however, continue to be asked to sign a Memorandum of Understanding (MOU) with the Program Office which generally defines the member's support of the program in terms of providing information on its data holdings, responding to requests for its data and participation in operational and standardization activities. The MOU also defines the Program Office's commitment to support the developmental and operational activities of the program. A copy of the Memorandum of Understanding is presented in Appendix B.

LOCAL ASSISTANCE CENTERS

As a first step in establishing user services through Nawdex, a nationwide network of Local Assistance Centers was established effective January 3, 1977. Fifty-one Centers were established in 45 states and Puerto Rico to provide local and convenient access to Nawdex services. This initial network included 50 field offices of the Geological Survey's Water Resources Division and the Texas Natural Resources Information System (TNRIS) supported by the Texas Department of Water Resources in Austin, Texas. A national news release was issued by the Geological Survey announcing these new Centers in January 1977. This release was published by many technical journals and newsletters, thereby, providing public awareness of Nawdex and its services.

Two additional Centers were added in August 1977: the Iowa Water Resources Data System managed by the Iowa Geological Survey in Iowa City, Iowa, and the Water Resources Research Center of the Virginia Polytechnic Institute and State University in Blacksburg, Virginia. Table 1 is a list of all Local Assistance Centers and their locations. A complete directory of all Centers, their mailing addresses, telephone numbers, office hours, and Local Assistance Center contacts is maintained by the Program Office and provided free upon request.

Table 1.--Locations of Nawdex Local Assistance Centers

ALABAMA, Tuscaloosa	MONTANA, Helena
ALASKA, Anchorage	NEBRASKA, Lincoln
ARIZONA, Tucson	NEVADA, Carson City
ARKANSAS, Little Rock	NEW JERSEY, Trenton
CALIFORNIA, Menlo Park	NEW MEXICO, Albuquerque
COLORADO, Lakewood (Denver)	NEW YORK, Albany and Syosset
CONNECTICUT, Hartford	NORTH CAROLINA, Raleigh
FLORIDA, Tallahassee, Miami Orlando, and Tampa	NORTH DAKOTA, Bismarck
GEORGIA, Doraville (Atlanta)	OHIO, Columbus
HAWAII, Honolulu (serves American Samoa and Guam)	OKLAHOMA, Oklahoma City
IDAHO, Boise	OREGON, Portland
ILLINOIS, Champaign	PENNSYLVANIA, Harrisburg and Philadelphia
INDIANA, Indianapolis	PUERTO RICO, Ft. Buchanan (San Juan), serves Virgin Islands
IOWA, Iowa City (USGS and the Iowa Water Resources Data System)	SOUTH CAROLINA, Columbia
KANSAS, Lawrence	SOUTH DAKOTA, Huron
KENTUCKY, Louisville	TENNESSEE, Nashville
LOUISIANA, Baton Rouge	TEXAS, Austin (Texas Natural Resources Information System)
MARYLAND, Towson (serves Delaware and District of Columbia)	UTAH, Salt Lake City
MASSACHUSETTS, Boston (serves Maine, New Hampshire, Rhode Island, and Vermont)	VIRGINIA, Richmond (USGS), Blacksburg (Va. Polytechnic Institute and State Univ.)
MICHIGAN, Okemos (Lansing)	WASHINGTON, Tacoma
MINNESOTA, St. Paul	WEST VIRGINIA, Charleston
MISSISSIPPI, Jackson	WISCONSIN, Madison
MISSOURI, Rolla	WYOMING, Cheyenne

The responsibility for the operation of each of the Local Assistance Centers is under the jurisdiction of the organization, or office, in which the Center is located. A Policy and Procedures Manual, prepared by the Program Office, provides guidelines for the operation of these Centers. Representatives of each of the initial Centers were trained in these procedures at work sessions conducted by the Program Office in Denver, Colorado, in October 1976 and in Reston, Virginia, in November 1976.

A Users Accounting System, developed by the Program Office, provides the means of tracking a request for Nawdex services from the time of receipt until final response. A sample of the basic form used to record a request is presented in figure 1. The Program Office has met all requirements for establishing this system as a new Federal system of records in compliance with the Privacy Act of 1974. Notification was received from the U.S. Department of the Interior in September 1977 that comments and

U. S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



RECORD OF DATA REQUEST

Request received by: _____ Control No. _____
Date _____

Data requested by:

NAME AND/OR TITLE: _____

ORGANIZATION NAME: _____

ADDRESS: _____
Street City State Zip Code County

TELEPHONE NO: _____ (FTS _____, Commercial _____)

TYPE OF REQUEST: Federal _____ State _____ County _____ Municipal _____ Other local _____

University _____ Private _____ Other (specify) _____

DATA REQUESTED (X) / or DATA PROVIDED (✓)

Surface water _____/_____ Water quality _____/_____ Ground water _____/_____ Published reports _____/_____

Magnetic tape _____/_____ Statistics _____/_____ Printed tables _____/_____ Punched cards _____/_____

Plots _____/_____ MWDI _____/_____ WDSI _____/_____ Other _____

Data required by: _____ (Date)

DATA REQUEST ATTACHED: _____ DATA DESCRIPTION FORM ATTACHED: _____

REQUEST RESPONSE:

Request referred to:

NAME: _____ ORGANIZATION: _____

ADDRESS: _____
Street City State Zip Code County

TELEPHONE NO: _____

Source of data: _____

Type of data provided: _____

Cost estimate provided: Yes _____ No _____ \$ _____ FEE CHARGED _____

Account Number Credited: _____

Computer processing:

Date submitted _____ Date received: _____ Class priority: _____

Date request sent to requester _____ Date record returned to NAWDEX _____

REMARKS:

Privacy Act of 1974 (PL 93-579): --Individuals furnishing information on this form are advised that certain of the data requested may be of personal nature. The information is collected under authority of 43 U.S.C. 31 (28 Stat. 398), OMB Cir. A-67, and 5 U.S.C. 301, and will be used routinely to identify requesters of water or water-related data when processing requests for such information.

Figure 1.--User accounting system encoding form.

suggested changes to the system should be submitted by November 13, 1977, after which date, this system became effective as published in the Federal Register.

During the period January 3 to September 30, 1977, the Local Assistance Centers responded to over 37,000 requests for data or information. The activities of the Centers are summarized in reports provided to all members on a quarterly schedule. The reports help to identify the user population, the types of data requested, the media in which the data are requested, and areas of high interest in water data.

Local Assistance Centers are important to the Nawdex goal of providing services to its user community in an efficient and timely manner. All member organizations having existing, or planned, data-service facilities are encouraged to participate in the program as Local Assistance Centers.

THE NAWDEX DATA BASES

Two major computerized data bases have been developed and implemented by the Nawdex Program Office which provide information on the availability of water data. They are the Water Data Sources Directory and the Master Water Data Index. These data bases utilize the System 2000 Data Base Management System. This system provides an extensive ad hoc query capability which offers flexibility in the operational use of the data bases. System 2000 also provides a Procedural Language Interface which allows for the development of peripheral software systems that interface with the data base management system. These capabilities have allowed the Program Office to develop a variety of techniques and procedures to be used for responding to requests for information on water data that require a variety of different outputs from the data base.

The two data bases were implemented in June 1976 on the U.S. Geological Survey's IBM 370 Model 155 computer facilities^{1/} located at its National Center in Reston, Virginia. There are operational in both a batch-processing mode and an interactive mode using the IBM Time Sharing Option (TSO) capabilities.

Access to the Water Data Sources Directory and Master Water Data Index was provided to all Local Assistance Centers having computer terminals in January 1977. These data bases play key roles in responding to requests for information on the availability of water data. A tutorial-style manual for use in retrieving data from these data bases was completed in October 1976 and training in the use of the data bases was provided to representatives of the Local Assistance Centers at work

^{1/} The use of brand names in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

sessions conducted by the Program Office in Denver, Colorado, in October 1976 and in Reston, Virginia, in November 1976.

Dictionaries of definitions for each of the data bases were completed in September 1977 and are being prepared for publication. The dictionaries define the structure of each data base and contain a definition and system description of each data component for each data base. They will be made available to all Nawdex members and to others, upon request, after their publication.

The Water Data Sources Directory: The Water Data Sources Directory (WDSO) identifies organizations that collect water data and locations within these organizations at which data may be obtained. Over 100 new organizations were registered in the WDSO during the past year. As of September 30, 1977, it contained information for 421 organizations. Information contained in the WDSO is incomplete for many organizations. In many cases, only the name and address exist for a registered organization. In other cases, the WDSO contains summary counts of water-data sites contributed by each organization to the Catalog of Information on Water Data maintained by the U.S. Geological Survey's Office of Water Data Coordination as the Catalog existed on April 1, 1976. Plans are to improve this information during Fiscal Year 1978 and to update the Directory to reflect all data currently indexed for each organization in the Master Water Data Index.

Software systems for providing report listings of the contents of the WDSO suitable for publication; the entry of new data, or updating of existing data, in the data base; and data-base security and recovery procedures for use in the maintenance and management of the data base were completed in March 1977. This included complete user documentation. The Program Office staff was trained in the use of these systems at that time.

Additional contractual support was obtained in September 1977 to assist the Program Office in redesigning and expanding the WDSO to include the entry of information on water-related data for each registered organization. This will allow each organization to report the availability of climatological data, water-use data, oceanographic data, and so forth, that it may have available. The existing systems for producing report listings and updating the data base will also be modified to accommodate this new information. This work is scheduled to be completed in August 1978. This new facility was recommended by several Nawdex members and is expected to greatly increase the utility of the WDSO.

In order to make the WDSO available for reporting water data holdings of individuals, a request was submitted in June 1977 to establish the WDSO as a new Federal systems of records in compliance with the Privacy Act of 1974. Notification was received from the U.S. Department of the Interior in September 1977 that this system had been announced and that

comments and suggested changes to the system should be submitted by November 13, 1977, after which date the system became effective as published in the Federal Register. The WDS was available for the registration of individuals having water data available at that time.

The Master Water Data Index: The Master Water Data Index (MWDI) identifies specific sites for which water data are available, the types of data available at each location, the period of record for which the data are available, the major water-data parameters available for each type of data, the frequency of measurement of each parameter, and the collector organization. The MWDI was created in June 1976 using information from the Catalog of Information on Water Data maintained by the U.S. Geological Survey's Office of Water Data Coordination and the Hydrologic Station File of the U.S. Geological Survey, Water Resources Division's Management Information System through April 1, 1976. The contents of the MWDI was nearly tripled during Fiscal Year 1977. The number of sites indexed increased from an original total of 61,500 to more than 181,000 in September 1977. This increase in information came from three major sources:

1. All information in the Catalog of Information on Water Data maintained by the U.S. Geological Survey's Office of Water Data Coordination during the period April 1, 1976 to April 1, 1977 was transferred to the MWDI in June 1977. At this time, the maintenance of the Catalog of Information on Water Data computerized files was discontinued and the MWDI became the primary source of this information. All future editions of the Catalog of Information on Water Data will be processed from the MWDI.

2. All information in the Hydrologic Station File of the U.S. Geological Survey, Water Resources Division's Management Information System for the period April 1, 1976 to April 1, 1977 was transferred to the MWDI in June 1977. At this time, the maintenance of the Hydrologic Station File was discontinued. The Water Resources Division now utilizes the MWDI for all of its site inventory functions for surface-water quantity and quality sites and for ground-water quality sites.

3. Work was completed on indexing the data contained in the online portion of the Water Quality File of the Storage and Retrieval (STORET) system of the U.S. Environmental Protection Agency which added over 120,000 new sites to the MWDI. This work was greatly enhanced by STORET-developed software for the computation of frequency-of-availability codes for data stored in STORET. This was a valuable contribution to the Nwdex program. Work is scheduled for completion on the indexing of the archived, offline portion of the STORET Water Quality File by the end of Fiscal Year 1978. This is expected to add approximately 150,000 additional ground-water quality sites to the MWDI. Indexing of the STORET system will be continued on an annual schedule.

Brief summaries of data for sites indexed in the MWDI for 318 organizations as of September 30, 1977, are presented in table 2 and table 3.

Table 2. -- Summary of sites identified in the Master Water Data Index

<u>TYPE OF SITE</u>	<u>NUMBER OF SITES</u>
Canal	1627
Drain	185
Estuary	3413
Well	11450
Lake	19346
Meteorological	146
Ocean	4881
Spring	275
Specific source	2729
Stream	136669
Other	<u>624</u>
	Total 181345

Table 3. -- Summary of types of data identified in the Master Water Data Index

<u>TYPE OF DATA</u>	<u>NUMBER OF SITES</u>
Streamflow	42153
Water quality	148723
Biological	63172
Physical	127455
Sediment	6727
Chemical	131711

Considerable progress was made during Fiscal Year 1977 in the development of software and systems associated with the use and expansion of the MWDI. These included:

1. Procedures for the security, backup, and recovery of the data base were completed and implemented in October 1976.
2. Procedures, instructions, and forms for the manual encoding and keypunching of data for entry into the MWDI were completed in January 1977. An instruction manual was released informally and these procedures will be implemented within the U.S. Geological Survey's Water Resources Division in October 1977. They will be tested and used in this manner until their approval by the U.S. Office of Management and Budget. At that time, they will be made available for use by all Nwdex participants.

3. Work was completed on software to be used for the editing, updating, and entry of data into the MWDI in June 1977. This software allows for the preedit of data prior to processing, the update of data already existing in the data base and the entry of new data into the data base. A user's manual for use with this software is under development.

4. Work was completed in August 1977 on a generalized retrieval system for use in the batch mode for the retrieval of data from the MWDI. This system provides for (1) selected data to be retrieved from the MWDI in a machine-readable form which can be used as input to application programs, (2) a report listing procedure that allows retrieved data to be printed in columnar tables. Only those data components desired may be printed in any order specified by the user. User-specified table headings may be printed and tables produced may be printed with or without column headings. The space between columns may also be specified by the user. The procedure is designed to provide greater utility to the Nawdex user in preparing information reports from the MWDI in formats that can be tailored to the user's needs, (3) a plotting procedure that can be used to produce site-location plots to be used as overlays for maps at a variety of scales. Sites must be described by latitude and longitude in the data base in order to be plotted by this procedure. This procedure serves as an interface for the input of retrieved data to Calcomp, X-Y plotting procedures available on the Geological Survey's IBM computer system. The data may be plotted on either Calcomp flat-bed or drum plotters maintained by the Geological Survey.

This generalized retrieval system is intended to be used for producing user-specified reports and to accomplish large-volume retrievals from the data base in a batch mode. It supplements the ad hoc query procedures available through the System 2000 Immediate Access Language which can be used in either an interactive or batch mode.

A user's manual for this system is under development.

5. Work began in October 1976 on the development of software to provide a computerized interface between the MWDI and the Daily Values File and Peak Flow File of the U.S. Geological Survey's National Water Data Storage and Retrieval (WATSTORE) system. The Daily Values File contains streamflow, water-quality, sediment discharge, and water-level data collected by the Geological Survey on a daily or more frequent schedule. The Peak Flow File contains annual peak observations of streamflow and river stage data. The complete indexing of these files is scheduled for completion by March 1978.

6. A study of interface requirements between the MWDI and the Ground Water Site Inventory File (GWSI) of the WATSTORE system was completed in August 1977. The GWSI contained inventory information for more than 600,000 wells and springs in September 1977. This is a System 2000

data base and, thereby, has a high degree of compatibility with the MWDI. The study showed that twenty-seven data components of the MWDI were compatible with components stored in the GWSI. While an interface between the two systems was shown to be feasible, the development of the interface was not considered to be cost effective for the near future.

The GWSI is used by the U.S. Geological Survey's Water Resources Division for the inventory of its ground-water sites. This data base is a valuable extension of the MWDI but it is not considered cost effective to redundantly index these sites in the MWDI. Since both data bases are maintained on the same computer system and are available for computer access by most Local Assistance Centers, the decision was made to make direct access use of the GWSI by Nawdex in responding to requests for these types of data. The GWSI is considered to be a physical extension of the MWDI and will continue to be used in the described manner until an interface between the two data bases is deemed cost effective.

7. Work was begun in June 1977 on the development of software to be used for the translation of information encoded and keypunched for the Catalog of Information on Water Data Files, previously maintained by the Geological Survey's Office of Water Data Coordination (OWDC), to the input formats compatible for processing and storage in the MWDI. This software will provide for (1) the processing and storage of all data encoded for input to the Catalog of Information on Water Data by organizations outside the Geological Survey since April 1, 1977, and (2) the continued use of Office of Management and Budget (OMB) approved encoding forms developed by the OWDC by these organizations and Nawdex members until such time that OMB approval can be obtained for national use of the newly developed Nawdex encoding forms. This software is scheduled for completion in November 1977 and will be implemented at that time.

NAWDEX SERVICES

The establishment of the nationwide network of Local Assistance Centers and the availability of the Water Data Sources Directory and Master Water Data Index to these Centers were significant advancements toward providing assistance to the users of water data in identifying, locating, and acquiring needed data. Systems and procedures developed and implemented during the past year have also contributed other data services available through member organizations of the Nawdex program. These include:

1. The National Water Data Storage and Retrieval System (WATSTORE). All Nawdex Local Assistance Centers, with the exception of those located in San Juan, Puerto Rico, and Blacksburg, Virginia, have computerized access to the data files of the Geological Survey's WATSTORE system. This system includes a Station Header File containing site-description information for over 53,000 surface-water sites and over 124,000

ground-water sites; a Daily Values File containing over 146 million daily observations of streamflow, water-quality, sediment discharge, and ground-water level data; a Water Quality File containing more than 1,200,000 chemical analyses of both surface and ground water; a Peak Flow File containing over 390,000 annual peak observations of streamflow and river stage data; and a Ground Water Site Inventory File containing inventory information for over 600,000 wells. The Local Assistance Centers can provide data from WATSTORE in a variety of printed table formats, computer-printed graphs, digital plots, statistical analyses, or in machine-readable form.

The Water Resources Division has been providing computerized access to the WATSTORE system to a limited number of governmental organizations since January 1, 1976. This access is coordinated by the Nwdex Program Office. During the past year, Memoranda of Agreement were signed with 13 additional organizations for WATSTORE access. The system is now accessed by 19 organizations representing the addition of 50 computer terminals to the system, thereby, nearly doubling the number of remote sites having access. A list of outside users of WATSTORE as of September 30, 1977 is given in table 4. The numbers shown in parenthesis in this table denote the number of computer terminals for organizations having multi-office access.

Table 4. -- Outside users of WATSTORE, September 1977

Susquehanna River Basin Commission
Iowa Geological Survey (Iowa Water Resources Data System)
West Virginia Geological and Economic Survey
Texas Natural Resources Information System (TNRIS)
Corps of Engineers (30)
Soil Conservation Service (3)
North Dakota Geological Survey
State of Mississippi Board of Water Commissioners
Alaska Department of Environmental Conservation
Tennessee Valley Authority
Southwest Florida Water Management District
Bureau of Land Management (Oregon State Office)
Agricultural Research Service
North Dakota Regional Environmental Assessment Program
North Dakota State Water Commission
Conservation Division, U.S. Geological Survey
Great Lakes Basin Commission
Bureau of Reclamation (Montana)
National Park Service, D.C.

2. The Storage and Retrieval System (STORET). An agreement was signed with the U.S. Environmental Protection Agency in July 1977 which authorizes Nwdex as a user of the Storage and Retrieval (STORET) system.

STORET contains over 40 million individual observations of water-quality properties for both surface and ground waters which have been collected and stored by several Federal organizations and over 40 state-governmental organizations. Data can be provided from the system in the form of printed tables, a variety of statistical analyses, and graphic displays, and machine-readable form. Nawdex began providing direct access services to STORET for its users in August 1977 through the Program Office in Reston, Virginia and the Local Assistance Center facilities provided by the Texas Natural Resources Information System in Austin, Texas.

3. The Environmental Data Service. The Environmental Data Service (EDS) of the National Oceanic and Atmospheric Administration became a member of Nawdex early in the program and offers an extensive level of service relating to environmental data through each of its environmental data centers. Of particular interest to Nawdex users are the EDS Oceanic and Atmospheric Information System (OASIS) which has direct access to over 40 computerized, bibliographic data files covering a wide array of water and water-related subjects and its Environmental Data Index (ENDEX) which provides references to nearly 10,000 environmental data files available in various organizations throughout the environmental community. Closer coordination has been established between Nawdex and the EDS during the past few months and this greatly strengthens the availability of data services to those involved in programs which require the interfacing of water data with other areas of the environment.

Meetings were held between Nawdex and EDS in April 1977 and August 1977 to strengthen the coordination and utilization of these two programs. As a result of these meetings, a reciprocal arrangement was decided upon, whereby, requests applicable to OASIS/ENDEX services will be accepted and referred to the EDS by Nawdex and requests for water data will be accepted and referred to Nawdex by EDS. There will be a continuing effort between Nawdex and EDS to improve utilization of the service facilities of the two programs. A list of the EDS environmental data centers are given in the membership list provided in Appendix A.

4. The Water Resources Scientific Information Center (WRSIC). The U.S. Department of Interior's Office of Water Research and Technology (OWRT) became a member of Nawdex in April 1977. An extensive bibliographic data service relating specifically to water resources activities is provided by the OWRT's Water Resources Scientific Information Center (WRSIC). This system currently contains over 100,000 computerized abstracts relating to water-resources subjects. Its Selected Water Resources Abstracts are available for subscription and it is making its computerized storage and retrieval facilities for water resources abstracts and bibliographic citations available to Nawdex members. The Nawdex Program Office is referring requests for bibliographic services to WRSIC and this service will be expanded to all Local Assistance Centers in late 1977.

WRSIC network sites provided by the Southern Water Resources Scientific Information Center of North Carolina State University at Raleigh, North Carolina, the Kurt F. Wendt Library of the University of Wisconsin in Madison, Wisconsin and the Water Resources Research Center of the Virginia Polytechnic Institute and State University in Blacksburg, Virginia have also become Nawdex members during the past year and will be working closely with Nawdex to provide WRSIC services. These services are also being provided by the Texas Natural Resources Information System (TNRIS) in Austin, Texas.

5. State-Governmental Data Systems. Water data are available through several state-governmental organizations that are members of Nawdex. These include the Texas Natural Resources Information System supported by the Texas Department of Water Resources in Austin, Texas; the Iowa Water Resources Data System managed by the Iowa Geological Survey in Iowa City, Iowa; the Pennsylvania Water Resources Data System managed by the Pennsylvania Department of Environmental Resources; the Nebraska Natural Resources Information System managed by the Nebraska Natural Resources Commission; and the REAP Resources Reference System managed by the North Dakota Regional Environmental Assessment Program. Other such systems are available, or under development, which will provide extensive data resources at the state-governmental level. The Texas Natural Resources Information System and the Iowa Water Resources Data System serve as Nawdex Local Assistance Centers. All Nawdex member data systems are available by referral through all Local Assistance Centers.

6. The Water Resources Document Reference Centre (WATDOC). Nawdex is pleased to be affiliated with the Water Resources Document Reference Centre (WATDOC) of the Inland Waters Directorate, Canadian Department of Fisheries and the Environment. The Program Office has a working relationship with WATDOC for the mutual exchange and processing of requests for information or data relating to water resources activities in Canada and the United States.

PROGRAM STATUS - SEPTEMBER 1977

While many activities were successfully completed during Fiscal Year 1977, several activities will be continued into Fiscal Year 1978. These include:

1. Approvals of the Water Data Sources Directory and the newly established User Accounting System as Federal Systems of records in compliance with the Privacy Act of 1974.
2. Work on the Water Data Sources Directory to assure that its contents are complete and accurate. The data base is also scheduled to be redesigned to include the registration of sources of water-related data. Publication of the Directory will take place in Fiscal Year 1978.

3. Continuation of the indexing of data contained in the STORET system of the U.S. Environmental Protection Agency and the WATSTORE system of the U.S. Geological Survey. New data encoding procedures for the Master Water Data Index are being implemented for use and testing in the Geological Survey. Procedures are also being developed to allow Nawdex members to encode data for entry into the Master Water Data Index using encoding procedures previously developed by the Office of Water Data Coordination.

4. Implementation of a new generalized retrieval system for use with the Master Water Data Index.

5. Strengthened coordination with service facilities of several Nawdex members. Availability of these services will be expanded to all Nawdex Local Assistance Centers.

SUMMARY

Significant progress was made during Fiscal Year 1977 in advancing the Nawdex program toward a full level of implementation. Improved program administration, a large increase in the program membership, the establishment of a nationwide network of service centers, completion of important software and data-gathering systems and procedures, expansion of the water-data indexing information, and improved coordination with data systems and services of member organizations have contributed much to the capability of Nawdex to provide services to the water-data community. The Program Office, with the assistance of the membership, will continue to develop Nawdex as a comprehensive and responsive system for the identification, location, and exchange of water data.

SELECTED REFERENCES

- Edwards, M.D., 1976, Directory of Local Assistance Centers of the National Water Data Exchange (NAWDEX): U.S. Geological Survey Open-File Report 76-880, 11 p.
- Edwards, M.D., 1977, The National Water Data Exchange (NAWDEX): U.S. Geological Survey Open-File Report 77-259, 5 p.
- Edwards, M.D., 1977, Program of Operation for The National Water Data Exchange (NAWDEX): U.S. Geological Survey Open-File Report 77-708, 7 p.
- Edwards, M.D., 1977, Program Objectives for The National Water Data Exchange (NAWDEX) for Fiscal Year 1978: U.S. Geological Survey Open-File Report 77-791, 8 p.

NAWDEX MEMBERS -- September 30, 1977

Federal Organizations

Agricultural Research Service

Bureau of Land Management, Oregon State Office

Bureau of Reclamation, U.S. Department of Interior

Cooperative Instream Flow Service Group, U.S. Fish & Wildlife Service

National Oceanic and Atmospheric Administration including:

 National Weather Service

 National Ocean Survey

 National Marine Fisheries Service

 National Environmental Satellite Service

 Environmental Research Laboratories

 Environmental Data Service including:

 The National Climatic Center

 The National Oceanographic Data Center

 The Environmental Science Information Center

 The National Geophysical and Solar-Terrestrial Data Center

 The Center for Experiment Design and Data Analysis

 The Center for Climatic and Environmental Assessment

Office of Water Research and Technology, U.S. Department of Interior

Soil Conservation Service

Tennessee Valley Authority

U.S. Environmental Protection Agency

U.S. Environmental Protection Agency (Region V)

U.S. Geological Survey, Water Resources Division

U.S. Water Resources Council

State Organizations

California Department of Water Resources

Colorado Division of Water Resources

Commonwealth of Pennsylvania, Dept. of Environmental Resources

Illinois Institute of Environmental Quality

Illinois State Water Survey

Iowa Geological Survey

Kansas State Board of Agriculture

North Dakota Geological Survey

North Dakota Regional Environmental Assessment Program

North Dakota State Water Commission

State of Alaska, Dept. of Environmental Conservation

State of Nebraska, Natural Resources Commission

State of Ohio Environmental Protection Agency

Texas Natural Resources Information System representing:

 Texas Department of Water Resources

 Texas General Land Office

 Texas Air Control Board

 Texas Forest Service

 Texas Industrial Commission

 Texas Department of Health

Bureau of Economic Geology, Univ. of Texas at Austin
Railroad Commission of Texas
Texas Department of Agriculture
Texas Department of Highways and Public Transportation
Texas Parks and Wildlife Department
Texas State Soil and Conservation Board
Texas Coastal and Marine Council

Local Government

Board of Water Supply, City and County of Honolulu
County of Geauga, Office of the Sanitary Engineer (Chardon, OH)
Department of Municipal Utilities, Fort Dodge, IA
Department of Public Utilities, City of Shreveport, LA
Hetch Hetchy Water and Power (San Francisco, CA)
Merced Irrigation District (Merced, CA)
Metropolitan District Water Bureau (Hartford, CT)
Pat Harrison Waterway District (Hattiesburg, MS)
Reedy Creek Improvement District (Lake Buena Vista, FL)
Santa Clara Valley Water District (San Jose, CA)
Water Department, City of Lake Mary (FL)

Interstate Organizations (River Basin Commissions)

Great Lakes Basin Commission
Ohio River Valley Water Sanitation Commission
Susquehanna River Basin Commission
Upper Mississippi River Basin Commission

Universities

Duke University, School of Engineering
Environmental Resources Center, Colorado State University
Water Resources Center, University of Delaware
Kurt F. Wendt Library, College of Engineering, Univ. of Madison, WI
University of Arizona, College of Business and Public Administration
Water Resources Research Institute, University of Idaho
Water Resources Center, University of Illinois
Water Resources Research Institute, University of Kentucky
Water Resources Research Center, University of Massachusetts
Water Resources Research Center, University of Minnesota
Water Resources Research Center, University of Missouri
Water Resources Center, Desert Research Inst., Univ. of Nevada
Water Resources Research Center, University of New Hampshire
Southern Water Resources Scientific Information Center, Univ. of N.C.
Water Resources Research Institute, University of North Dakota
Water Resources Center, Ohio State University
Water Resources Research Institute, University of Puerto Rico.
Water Resources Center, University of Rhode Island
Water Resources Institute, South Dakota State University
Water Resources Research Institute, Virginia Polytechnic Institute and
State University

Water Research Center, Washington State University
Water Resources Research Institute, University of Wyoming

Private Organizations

Carborundum Company
Electric Power Research Institute
Gidley Laboratories, Inc.
TenEch Environmental Consultants, Inc.

Foreign Affiliates

Water Resources Document Reference Centre,
Inland Waters Directorate, Canadian Department of Fisheries and
the Environment

Appendix B. Memorandum of Understanding for
Nawdex Membership

MEMORANDUM OF UNDERSTANDING
AND THE
UNITED STATES GEOLOGICAL SURVEY
PERTAINING TO THE NATIONAL WATER DATA EXCHANGE

The National Water Data Exchange (NAWDEX) is comprised of water-oriented organizations working together to provide convenient access to water data. The NAWDEX mission is to identify sources of water data, to index data holdings of water-oriented organizations, and to provide the linkage between those who acquire and those who use water data.

This memorandum recognizes _____ as a participating member of the National Water Data Exchange (NAWDEX). This membership will continue in effect until terminated by mutual agreement or by either agency providing sixty days written notice to the other agency.

The U. S. Geological Survey (USGS), through its NAWDEX Program Office, will provide the central management of NAWDEX, and will serve as a coordinating facility for all NAWDEX facilities.

The NAWDEX Program Office will be responsible for:

- - - Establishing response and referral mechanisms for handling requests for water data in the files of NAWDEX members.
- - - Establishing and maintaining a Master Water Data Index of data holdings of the NAWDEX members and making the index available to all.
- - - Establishing and maintaining a Water Data Sources Directory and making this directory available to all.
- - - Establishing a nationwide network of Local Assistance Centers that will provide data search assistance to requestors and aid them in accessing water data held by NAWDEX members.

_____ will be responsible for:

- - - Taking an active role in the formulation of NAWDEX policies, procedures, and standards and implementing them within its organization to the extent practicable.
- - - Participating in the development of standard techniques and methodologies for handling of water data and using them within its organization to the extent practicable.

- - - Providing information on internally held water data for inclusion in the Master Water Data Index and, as requested, providing current information to update the Master Water Data Index to reflect additions, changes, and corrections to the index.

- - - Providing data from its internal holdings either in response to a referral from the NAWDEX Program Office or a Local Assistance Center, or in response to a direct request for water data.

- - - Designating a representative of its organization to function as the primary contact for all NAWDEX matters.

It is mutually understood that membership in NAWDEX is voluntary and that all members will participate on an equal basis, and consent to be listed as a source of water data in the Water Data Sources Directory. There will be an open exchange of information among NAWDEX members and every effort will be made to provide water data to the user community in a timely and equitable manner.

Signature, Title

Date _____

Signature, Title

Date _____

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