

STATUS OF THE NATIONAL WATER DATA EXCHANGE (NAWDEX)—SEPTEMBER 1978

By MELVIN D. EDWARDS

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UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

For additional information write to:

**Chief Hydrologist
U.S. Geological Survey, WRD
421 National Center
Reston, Virginia 22092**

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ABSTRACT

This report describes the activities of the National Water Data Exchange (NAWDEX) during Fiscal Year 1978, October 1, 1977 through September 30, 1978, and the status of the program at the end of that period. Discussions are provided on program administration, NAWDEX services, the identification of sources of water data, the indexing of available water data, and the development of systems to be used with the NAWDEX data bases, the Water Data Sources Directory and Master Water Data Index.

INTRODUCTION

The National Water Data Exchange (NAWDEX) was implemented in January 1976 as a nationwide program to assist users of water data in identifying, locating, and acquiring 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.

A report on the NAWDEX program is provided at the end of each fiscal year to present accomplishments of the program during the year and to discuss any program objectives which remain outstanding at the end of the year. This report summarizes the activities of NAWDEX during Fiscal Year 1978 beginning on October 1, 1977 and ending on September 30, 1978.

PROGRAM ADMINISTRATION

The NAWDEX program continued to show significant growth during Fiscal Year 1978. Thirty-six new organizations became members of NAWDEX during the year, a 43 percent increase in membership. As of September 30, 1978, 120 organizations were member participants in the program. This included 22 Federal, 38 State, 18 local government, 4 interstate, 29 academic, 8 private organizations, and 1 foreign affiliate. Appendix A lists these organizations. An updated directory of all member organizations was published in September 1978 and is available free from the NAWDEX Program Office.

The first membership conference was held in Denver, Colorado, on May 9-11, 1978. There were 83 participants at the conference representing 47 member organizations and 15 non-member organizations. Fourteen papers describing member data systems and services or member needs were presented during the session. Data systems of NAWDEX and 10 members were exhibited throughout the conference. Four working panels were convened during the session which

provided significant input in the areas of program administration, management, and coordination; recommended methods for the handling and exchange of water data; water-data indexing and technical systems development; and request, response, and service activities.

The proceedings of the conference were completed in September 1978 and are scheduled for publication in early Fiscal Year 1979. In addition, the major recommendations resulting from the conference were included in the program objectives for Fiscal Year 1979 which were released for membership review in July 1978 and finalized in September 1978. All recommendations from the conference are under review by the Program Office and will be implemented during Fiscal Year 1979 where possible.

Issues 3 and 4 of the NAWDEX Newsletter were published in November 1977 and August 1978, respectively. The Newsletter is currently being distributed free to 566 organizations and individuals.

A brochure entitled "NAWDEX: Key to Finding Water Data" was released in May 1978 and has received wide distribution throughout the water resources community. This brochure presents an overview of the NAWDEX program and describes the services available.

The NAWDEX program was described by the Program Office staff at a number of technical conferences and meetings during the year. These included: The 50th Anniversary Conference of the Water Pollution Control Federation, Philadelphia, Pa., October 2-7, 1977; California Water Resources Conference, U.S. Geological Survey, Water Resources Division, Monterey, Calif., October 26-27, 1977; STORET User's Meeting, U.S. Environmental Protection Agency, Bethany, W. Va., October 31 - November 2, 1977; Geological Society of America, Seattle, Wash., November 6-9, 1977; Fourth Joint Conference on Sensing of Environmental Pollutants, American Chemical Society, New Orleans, La., November 6-12, 1977; Water Resources Conference, U.S. Geological Survey, Water Resources Division, Princeton, N.J., December 12-14, 1977; Water Resources Conference, U.S. Geological Survey, Water Resources Division, Casa Grande, Ariz., February 13-17, 1978; Water Resources Conference, U.S. Geological Survey, Water Resources Division, Gulf Shores, Ala., May 21-23, 1978; Thirteenth Meeting, Federal Interagency Advisory Committee on Water Data, Gatlinburg, Tenn., September 13-15, 1978.

NAWDEX SERVICES

Utilization of NAWDEX services continued to increase during Fiscal Year 1978. The 53 Local Assistance Centers, the locations of which are given in Table 1, reported over 64,000 information transactions during the year. This was a 30 percent increase over the number of transactions reported during a comparable period in the previous year. Quarterly reports of the NAWDEX service activities were distributed to the membership defining the user population, the types of data requested, and the media in which the data were requested.

Training sessions for Local Assistance Center contacts were held by the NAWDEX Program Office in Denver, Colo., on November 28 to December 2, 1977, and in Reston, Va., on December 13-16, 1977. These sessions presented information on the use of NAWDEX systems and procedures in responding to requests for data.

More than 1250 requests for data were referred by the Local Assistance Centers to other organizations for response. In addition to the referral services, direct access services to the Storage and Retrieval (STORET) system of the Environmental Protection Agency were provided throughout the year by the NAWDEX Program Office in Reston, Va., and the Texas Natural Resources Information System (TNRIS) in Austin, Tex.

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 NAWDEX Program continued to provide liaison for NAWDEX members in obtaining computerized access to the data files of the Geological Survey's National Water Data Storage and Retrieval System (WATSTORE). During the

past year, Memoranda of Agreement were signed with four additional organizations, and seven additional remote computer terminals were added by organizations having prior access. The system is now accessed by 23 non-USGS organizations utilizing a total of 62 remote computer terminals. A list of outside users of WATSTORE, as of September 30, 1978, is given in Table 2. The numbers in parentheses in this table denote the number of computer terminals for organizations having multioffice access.

Table 2.--Outside Users of WATSTORE, September 1978

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 (35)
Soil Conservation Service (5)
State of Mississippi, Board of Water Commissioners
Alaska Department of Environmental Conservation
Tennessee Valley Authority
Geological Survey of Alabama
Lawrence Livermore Laboratories
Southwest Florida Water Management District
Bureau of Land Management
Science and Education Administration, Agricultural Research
North Dakota Regional Environmental Assessment Program
North Dakota State Water Commission
North Dakota Geological Survey
Conservation Division, U.S. Geological Survey
Great Lakes Basin Commission
Bureau of Reclamation
National Park Service, D.C.
U.S. Fish and Wildlife Service (2)
U.S. Nuclear Regulatory Commission

All NAWDEX member organizations which are authorized access to WATSTORE are also authorized access to the NAWDEX data bases. In addition to the above organizations, a Memorandum of Agreement has been signed with the College of Business and Public Administration of the University of Arizona for access to the NAWDEX data bases only.

NAWDEX has begun to provide support services to the Geological Survey's Office of Water Data Coordination (OWDC). This includes the processing and storage of all data contributed by participants to the Catalog of Information on Water Data. During Fiscal Year 1978, the Program Office produced the station indexes used as appendixes to the 21 regional plans developed annually by OWDC, and began production in August 1978 on the station indexes for a national-level catalog of water-data sites in coal provinces of the United States. This project is scheduled for completion in mid-1979.

IDENTIFICATION OF SOURCES OF WATER DATA

Good progress was made during Fiscal Year 1978 in the identification of additional organizations that are sources of water data. As of September 30, 1978, 616 organizations were registered in the computerized Water Data Sources Directory (WSDS). This was an addition of 196 organizations during the year, a 46 percent increase over the previous year's total.

A data dictionary entitled "Definitions of Components of the Water Data Sources Directory Maintained by the National Water Data Exchange" was published early in the fiscal year. This dictionary contains a systems description and definition of each data component in the WSDS.

Work was completed in December 1977 on a redesign of the WSDS to allow the entry of information on water-related data for each registered organization. Each organization will be able to report the availability of climatological data, water-use data, oceanographic data and other types of data pertinent to water-resource studies that it has available. Instructions for the encoding of these data have been developed and, pending approval by the Office of Management and Budget, the new system will be implemented in Fiscal Year 1979 for interagency use.

Work was completed in September 1978 on modifications to the retrieval system developed for the WSDS. These modifications allow the production of a Directory of Sources of Water Data, a Directory of Sources of Water-Related Data, and ad-hoc reports to be used to respond to requests for information about individual or groups of organizations according to selected retrieval criteria. This system is being tested and will be implemented in early Fiscal Year 1979.

A scheduled review of the contents of the WSDS by all registered organizations was delayed until Fiscal Year 1979 because of necessary changes in program priorities during the fiscal year.

INDEXING OF WATER DATA

Significant advancements were made in the indexing of water data in the computerized Master Water Data Index during Fiscal Year 1978. More than 127,000 sites were added to the index during the year. This was an increase of 70 percent over the previous year's total. A summary of the sites indexed as of September 30, 1978, is given in Table 3.

Table 3.--Summary of sites indexed in the Master Water Data Index

<u>TYPE OF SITE</u>	<u>NUMBER OF SITES</u>
Stream	150,884
Well	112,120

Table 3.--Summary of sites indexed in the Master Water Data Index--Cont.

<u>TYPE OF SITE</u>	<u>NUMBER OF SITES</u>
Spring	4,297
Canal	1,596
Drain	209
Lake/Reservoir	20,832
Meteorological	343
Estuary	7,094
Ocean	4,924
Specific Source	5,434
Other	680
Total	<u>308,413</u>

The increase in the number of sites was due primarily to the completion of the first annual indexing updates of data in the Storage and Retrieval (STORET) system of the U.S. Environmental Protection Agency and the National Water Data Storage and Retrieval System (WATSTORE) of the U.S. Geological Survey. Another major source of site information is the annual update of the Catalog of Information on Water Data by the Geological Survey's Office of Water Data Coordination.

Work was completed on several software and procedural systems during the year which enhanced the efficiency and utility of the Master Water Data Index (MWDI) and the water-data indexing program. Included were:

1. Implementation of software for the translation and conversion of information encoded and keypunched for the Catalog of Information on Water Data that is provided by the Geological Survey's Office of Water Data Coordination.
2. Development and implementation of a software system for the automatic assignment of an eight-digit hydrologic unit code to sites identified by latitude and longitude. This system has been included in the edit/update procedures for the Master Water Data Index and utilizes a digitized boundary file developed by the Office of Water Data Coordination. This digitized-boundary file contains the boundaries of hydrologic unit codes assigned to the 21 hydrologic regions as defined by the U.S. Water Resources Council and subdivided into 2200 National Water Data Network cataloging units. All sites indexed in the Master Water Data Index, approximately 60 percent of the total, were assigned a code. This system provides a method of assigning a nationally consistent hydrologic identifier to all sites regardless of the source of the indexing information.
3. Modifications were made to the MWDI edit/update system which greatly simplified the maintenance of the system and reduced the overall execution time of the system by 50 percent.

4. A data dictionary entitled "Definitions of Components of the Master Water Data Index Maintained by the National Water Data Exchange" was published early in the fiscal year. This dictionary contains a systems description and definition of each data component contained in the MWDI.

5. A standard machine-readable format was designed to facilitate the development of computerized interfaces between the MWDI and data files of NAWDEX participants.

6. Instructions were completed for the pre-edit of data to be entered into the MWDI, for the submission of data to the MWDI from remote computer terminals, and for the retrieval of data from the MWDI using the generalized retrieval system developed in Fiscal Year 1977 and implemented in early Fiscal Year 1978.

7. A user's manual for the encoding and preparation of data for entry into the MWDI was published and put into use within the Geological Survey to test and validate the procedures. Full implementation of these procedures will take place in Fiscal Year 1979.

8. A set of guidelines for the use of the NAWDEX data system was developed and made available. These guidelines identified and discussed command strings developed for the retrieval of data from the MWDI and stored as a part of the data base definition.

SUMMARY

Good progress continued during Fiscal Year 1978 in the implementation of NAWDEX. Of special significance were the upgrading of service facilities in the Local Assistance Centers, the implementing of indexing interfaces with the Storage and Retrieval (STORET) system and National Water Data Storage and Retrieval System (WATSTORE), and the implementing of major software systems for the input and retrieval of data to the Water Data Sources Directory and Master Water Data Index data bases. Membership participation in the program continued to increase as evidenced by the excellent input to the overall program at the first membership conference. Large volumes of information were added to the data bases, thereby greatly enhancing the capabilities for NAWDEX to provide the user community with information on the availability of needed data.

All major program objectives were met during the year with the exception of a field review of the Water Data Sources Directory. This has been re-scheduled for Fiscal Year 1979. With the assistance of the membership, the Program Office will continue to expand NAWDEX capabilities for the identification, location, and exchange of water data.

SELECTED REFERENCES

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- , 1978, Status of the National Water Data Exchange (NAWDEX) -- September 1977: U.S. Geological Survey Open-File Report 78-154, 26 p.
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- Perry, R.A., and Lewis, C.J., 1978, Definitions of components of the master water data index maintained by the National Water Data Exchange: U.S. Geological Survey Open-File Report 78-183, 179 p.

APPENDIX

NAWDEX MEMBERS--September 30, 1978

Federal Organizations

Bureau of Land Management
Bureau of Reclamation, U.S. Department of Interior
Cooperative Instream Flow Service Group, U.S. Fish & Wildlife Service
Council on Environmental Quality
Federal Highway Administration, U.S. Dept. of Transportation
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 and Information 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 Environmental Assessment Services
National Stream Alteration Team, U.S. Fish and Wildlife Service
Office of Water Research and Technology, USDI
Science and Education Administration, Agricultural Research
Soil Conservation Service
Tennessee Valley Authority
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency, Office of Water and
 Hazardous Materials
U.S. Environmental Protection Agency (Region V)
U.S. Geological Survey, Water Resources Division
U.S. Nuclear Regulatory Commission
U.S. Water Resources Council

State Organizations

Alabama Geological Survey
Arkansas Department of Pollution Control and Ecology
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
Kentucky Division of Water Resources
Minnesota Pollution Control Agency
Montana Bureau of Mines and Geology
Montana Department of Natural Resources and Conservation
North Carolina Dept. of Natural Resources and Community Development

North Dakota Geological Survey
North Dakota Regional Environmental Assessment Program
North Dakota State Water Commission
Oklahoma State Department of Health
Southwest Georgia Planning & Development Commission
State of Alaska, Dept. of Environmental Conservation
State of Florida, Dept. of Environmental Regulation
State of Nebraska, Natural Resources Commission
State of New Mexico, State Engineer Office
State of Ohio Environmental Protection Agency
Tennessee Department of Public Health
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 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
City of Pendleton, Oregon
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)
King County, State of Washington, Dept. of Public Works
Los Angeles County Flood Control District
Louisville Water Company (Louisville, KY)
Marin Municipal Water District (Corte Madera, 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)
Town of Kearney, Waste Water Treatment Plant
Water Department, City of Lake Mary (FL)
Winter Haven Boat Course District (Winter Haven, 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

Academic Organizations

Alameda County Office of Education
Center for Marine Studies, San Diego State University
College of Marin, Biology Department (Kentfield, Calif.)
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
University of Iowa, Iowa Institute of Hydraulic Research
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 Guam
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
Environmental Biology Research Center, Tennessee Tech. University
Center for Water Resources Research, Utah 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

Calgon Corporation (Pittsburgh, PA)
Carborundum Company
Electric Power Research Institute
Gidley Laboratories, Inc.
Henningson, Durham & Richardson (Omaha, NE)
Seaburn and Robertson, Inc., Tampa, FL
TenEch Environmental Consultants, Inc.
Weston Environmental Consultants-Designers

Foreign Affiliates

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