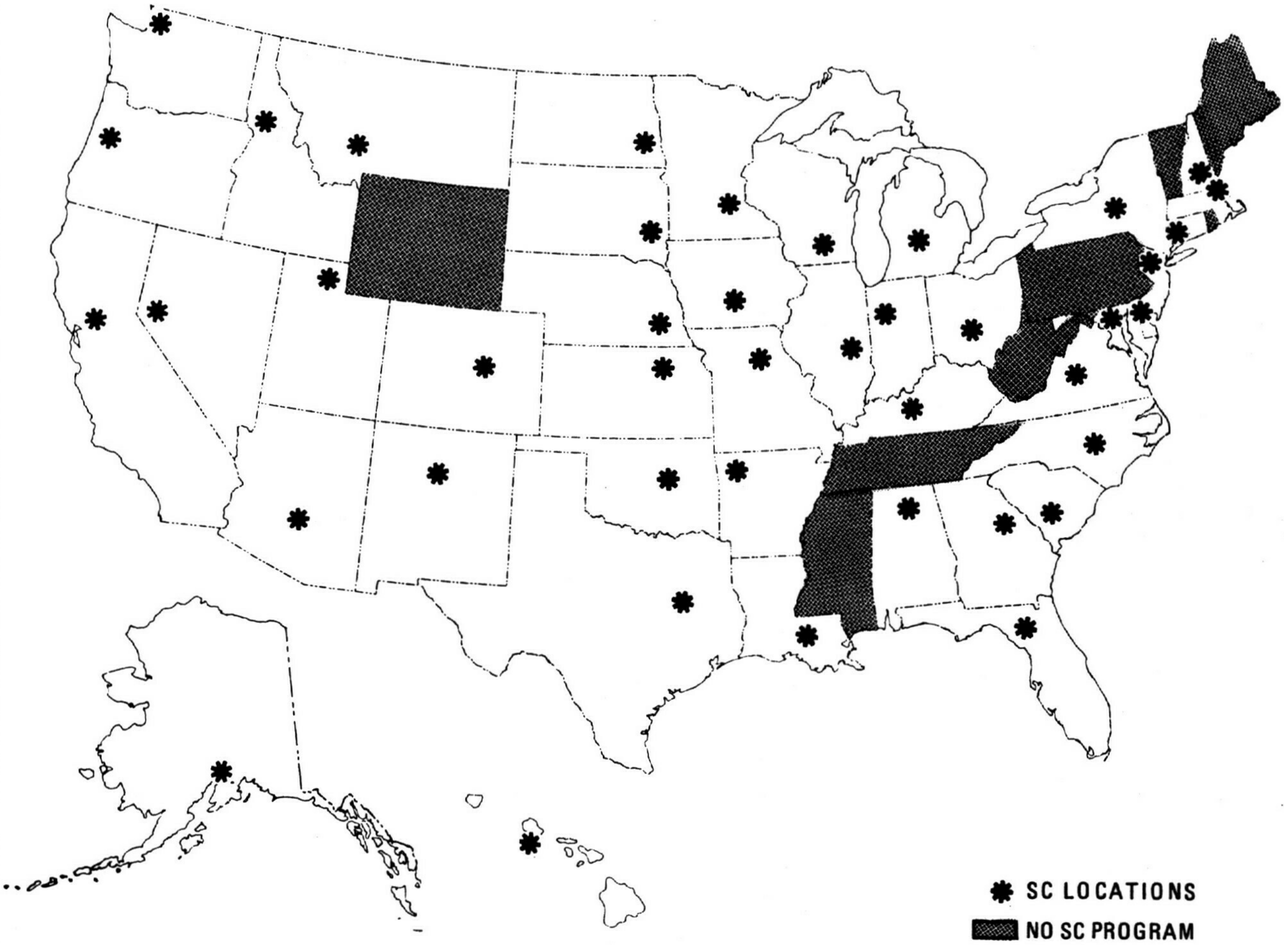
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA AND INFORMATION SERVICE
NATIONAL CLIMATIC CENTER

THE STATE CLIMATOLOGIST

IN COOPERATION WITH THE
AMERICAN ASSOCIATION OF STATE CLIMATOLOGISTS



VOLUME 5 NUMBER 4 OCTOBER 1981
PUBLISHED QUARTERLY AT THE NATIONAL CLIMATIC CENTER, ASHEVILLE N.C.

The NCC and AASC are pleased to welcome Dr. Kenneth G. Hubbard as the new State Climatologist for Nebraska. Dr. Hubbard replaces Dr. N. J. Rosenberg, who is still affiliated with the university and will assist Dr. Hubbard in the program. Dr. Hubbard's address is: Center for Agricultural Meteorology and Climatology, 239 Agricultural Engineering Bldg., East Campus, University of Nebraska, Lincoln, NE 68583-0728.

* * * * * * * *

STORM DATA, which had been slated to end with the June 1981 issue, is given a new lease on life in a revised and expanded format. Coordination among the National Climatic Center, the National Weather Service, and Dr. T. Theodore Fujita, Professor of Meteorology at Chicago University and an acknowledged tornado authority, have made this possible.

Beginning with the July 1981 issue, Dr. Fujita will review the reports provided by the National Weather Service; assign tornado F scale numbers, and add narratives and pictures on outstanding storms. NWS narratives on tropical storms will also be carried. The National Severe Storm Forecast Center will also participate in the review. Storm Data will be published by the NCC after these reviews, but likely with a slightly longer lag time.

The December issue will include an annual general summary of tornadoes and lightning, hailstorm and wind losses.

* * * * * * * *

State, Regional and National Degree Day Data. The Climatological Analysis Division of the NCC has notified users of the population-weighted heating and cooling degree day data that revised publications and data base will be available in early October. The revisions include population weights based on the 1980 census, 1951-80 normals, and updated statistics based on the 1931-80 period.

* * * * * * * *

Hurricane Tracks. Material for the revised and updated edition of Tropical Cyclones of the North Atlantic Ocean, 1871-1980 has been produced in a cooperative effort among ESIC-NHC-NHRL and NCC. NHRL has supplied $7,200 for printing 2,000 copies. The earlier version of the publication (covering 1871-1977) has been out-of-print for about two years.

* * * * * * * *

World Weather Records. Volume 6 of World Weather Records, Islands of the World, 1961-70, is being sent to GPO for printing. This volume has been prepared entirely through automated procedures.

Kenneth G. Hubbard
Nebraska State Climatologist

Dr. Kenneth G. Hubbard has been appointed as Climate Resources Specialist at the University of Nebraska, Lincoln. Among his new responsibilities will be participation and membership in the American Association of State Climatologists (AASC). Dr. Hubbard will represent Nebraska in the AASC at the request of Dr. Norman J. Rosenberg. Climate Resources Specialist is a new position at the University of Nebraska in the Center for Agricultural Meteorology and Climatology (CAMaC) of which Dr. Rosenberg is the Director.

Dr. Hubbard was drawn to Nebraska from the Utah Department of Agriculture where he had served as Assistant State Climatologist since 1977. With the guidance of E. Arlo Richardson, State Climatologist for Utah, Dr. Hubbard developed the computer products used in handling and analyzing climatic data in the Utah State Climatologist's Office. While in Utah, Dr. Hubbard also completed his Ph.D. degree in the Department of Soil Science and Biometeorology at Utah State University. The title of his dissertation study was "Characterization of Winter Wheat Grain Production as Influenced by Weather, Soil and Irrigation Factors." Dr. Hubbard obtained his M.S. degree in meteorology at the South Dakota School of Mines and Technology and his B.S. at Chadron State College.

Dr. Hubbard was previously employed by both the Utah Water Research Laboratory (Logan) and NOAA's Geophysical Fluid Dynamics Laboratory (Princeton). In addition to climatological training, he brings experience in cloud modeling, weather modification, wind energy and crop yield modeling to his new position.

Other responsibilities of the Climate Resource Specialist at Nebraska will include the management of a demonstration automatic weather data collection network, systematization of weather data collection for AGNET, organization of other climate resources as well as inter-disciplinary research on problems where weather is a key issue. AGNET is a multi-user agriculture computer network with many interactive programs which allow the user to study in detail those factors related to his operation. Dr. Hubbard joins other staff members at CAMaC currently working on research studies in meteorology and climatology.

AMERICAN ASSOCIATION OF STATE CLIMATOLOGISTS

ANNUAL BUSINESS MEETING
FORT COLLINS, COLORADO

The meeting was called to order at 11:20 a.m., August 12, 1981, by President Changnon.

1. The minutes of the 1980 Annual Business Meeting, having been published in the AASC Newsletter Vol. 4, No. 3, (November, 1980) were moved for approval by Nurnberger (Michigan) and seconded by Michaels (Virginia). Motion passed.

2. Secretary/Treasurer Conner (Kentucky) provided a financial report which is appended to these minutes.

3. Chairman Schaal (Indiana) reported on activities of the Committee on Relations with EDIS and NWS. He indicated that discussions of referrals of NWS data to the State Climatologists were held but, because of the diversity of circumstances, no single recommendation could be made. He suggested that each State Climatologist contact his Meteorologist in Charge to establish these procedures.

4. Chairman Waite (Iowa) submitted a report of the Severe Storms Committee which is appended to these minutes. The committee strongly urged continuance of the Storm Data publication. The State Climatologists were urged to provide inputs to the publication.

5. Chairman Molnau (Idaho) reported on the Computer Committee's activities. The 1980 Eddy report's implementation is in abeyance pending funding. There had been contact with the National Climate Program Office advocating their sponsorship of a computer workshop for State Climatologists but no action to date. The Committee worked on computer program exchange among State Climatologists. The Chairman will provide a locator service for existing programs which are available for sharing. All State Climatologists were asked to provide programs or program descriptions to the Chairman for use in the locater service.

6. Chairman Michaels (Virginia) of the Constitution and Bylaws Committee presented for second reading the admendment which passed first reading at the 1980 meeting. Adopted without opposition.

   The Chairman offered an amendment to VII 1 to add "....or by voting members attending the annual open meeting." Moved by Bark (Kansas) and seconded by Eddy (Oklahoma) to submit the admendment to the membership. Passed without opposition.

   The Chairman offered an amendment to IV 3 to read "....nominations by ~~one~~, two or more voting members and election by a majority of voting members and payment of dues...." Moved for adoption by Lytle (South Dakota) seconded by Goodridge (California). Passed without opposition.

The Chairman offered an amendment to By-law number 9 to read "....to the membership at least thirty days prior to the next meeting ~~with the mail announcement of the meeting~~." Moved for adoption by Bark (Kansas), seconded by Eddy (Oklahoma). Passed without opposition.

7. Chairman Critchfield (Washington) of the Nominating Committee presented the Committee's nominations of Plummer (Georgia) for President-Elect and Conner (Kentucky) for Secretary/Treasurer. President Changnon announced the receipt of a petition from five members nominating Nurnberger (Michigan) for President-Elect. By secret ballot, Nurnberger was elected as President-Elect and Conner as Secretary/Treasurer.

8. President Changnon expessed his appreciation for the support of the membership during his term and passed the torch to our new President Dethier (New York).

9. President Dethier announced his committee appointments:

A. Nominating Committee

1. Chairman McKee (Colorado)
2. Miller (Connecticut)
3. Brazel (Arizona)

B. State Programs

1. Chairman Plummer (Georgia)
2. Carter (Alabama)
3. Goodridge (California)
4. Lytle (South Dakota)

C. Constitution and By-Laws

1. Chairman Michaels (Virginia)
2. Robinson (NCPO)
3. Miller (Connecticut)

D. Relations with EDIS and NWS

1. Chairman Schaal (Indiana)
2. Kuehnast (Minnesota)
3. Waite (Iowa)

E. Computer Committe

1. Chairman Molnau (Idaho)
2. Eddy (Oklahoma)
3. Brazel (Arizona)

F. Severe Storms Committee

1. Chairman Waite (Iowa)
2. Bark (Kansas)
3. Bartlett (NCC)
4. Reid (EDIS)

10. The following new Associate Members were nominated by McKee (Colorado) and unanimously elected:

John Vogel	- Illinois State Water Survey
Arnold Court	- California State University
Ellen Cooter	- Oklahoma Climatological Survey
Norm Canfield	- NOAA Climate Office
Peter Robinson	- National Climate Program Office
Ron Weaver	- World Data Center
Malcolm Reid	- EDIS
Charles Chimento	- Louisiana Assistant State Climatologist
Bob Riggio	- Texas AαM University
Richard Becker	- Alaska Climate Center
Ken Hubbard	- University of Nebraska
A. Boyd Pack	- New York

11. Invitations for the 1982 meeting were offered by the National Climatic Center to meet in Asheville, by President Dethier to meet in Ithaca, and by Past President Changnon to meet in Illinois. By a plurality, the vote was to meet in Ithica, New York during the second week in August, 1982 with the specific date to be selected by the Executive Committee.

12. President Dethier expressed the Association's gratitude for the exemplary leadership provided by Past President Changnon and to Colorado State University, Tom McKee, and his staff for their superb organization and support of the 1981 meeting.

13. Adjourned at 12:30 p.m., August 12, 1981.

Dr. Thomas D. Potter, Director, EDIS, addresses
the AASC meeting at Fort Collins, CO.

TREASURER'S REPORT

Balance as of 29 August 1980		$1378.19
Prepaid Dues		90.00
	TOTAL	$1468.19
Expenses 29 August 1980-4 August 1981		
Past President's Expenses		323.23
President's Expenses		546.23
Bank Charge		1.06
	TOTAL	$879.52
Balance as of 4 August 1981		
	TOTAL	$588.67
Registration Fees Collected 1981		$1275.00
Dues Collected		670.00
GRAND TOTAL BALANCE (Expenses of 1981 meeting not subtracted)		$2533.67

MEMBERS PAID	25
ASSOCIATE MEMBERS PAID	6

AASC CONFERENCE (11 August 1981)

Stanley A. Changnon, Jr.	Illinois State Water Survey, SC
Anthony J. Brazel	Arizona State University, SC
Robert A. Muller	Louisiana State University, SC
Bill Lytle	South Dakota State University, SC
L. Dean Bark	Kansas State University, SC
Charles L. Jordan	Florida State University, SC
Norton D. Strommen	USDA/World Agricultural Outlook Board
Joseph M. Caprio	Montana State University, SC
Howard J. Critchfield	Western Washington State, SC
William S. Cooter	Oklahoma Climatological Survey
Ellen Cooter	Oklahoma Climatological Survey
Tom Potter	EDIS
Kenneth G. Hubbard	University of Nebraska, SC
David R. Miller	University of Connecticut, SC
Richard O. Gifford	University of Nevada, SC
Myron Molnau	University of Idaho, SC
John C. Bellamy	University of Wyoming, Representative
August H. Auer, Jr.	University of Wyoming, Representative
Werner A. Baum	NAS/NRC Climate Board
Robert Chen	NAS/NRC Climate Board
Jim Goodridge	California Dept. of Water Resources, SC
Amos Eddy	Oklahoma Climatological Survey, SC
Bernie Dethier	Cornell University, New York, SC
Glen Conner	Western Kentucky University, SC

Pat Michaels	University of Virginia, SC
Peter Robinson	National Climate Program Office/NOAA Representative for North Carolina, SC
Dan Mitchell	National Climatic Center, Asheville
Gayther Plummer	University of Georgia, SC
Fred V. Nurnberger	Michigan Dept. of Agriculture Weather Svc, SC
Kenneth D. Hadeen	NOAA/EDIS, Washington, DC
Wayne M. Wendland	Illinois State Water Survey
Eugene A. Carter	University of Alabama, SC
James L. Wise	University of Alaska, SC
Lawrence Schaal	Purdue University, Indiana, SC
Norman L. Canfield	NOAA/Climate Office, Washington, DC
Paul Waite	Iowa Weather Service, SC
Randy Stahlhut	Illinois State Water Survey
Robert F. Dale	USDA CSRS Purdue University, Indiana
John L. Vogel	Illinois State Water Survey
Robert C. Beebe	Tennessee Valley Authority
Nolan J. Doesken	Colorado Climate Center
Don Whitmand	National Weather Service
Brooks E. Martner	University of Wyoming, Representative
Ron Weaver	World Data Center-A: Glaciology
Bill Bartlett	National Climatic Center
Bill Tate	National Weather Service, Denver
Arnold Court	California State University of Northridge
Fred Finger	NOAA-CAC
Thomas B. McKee	Colorado Climate Center, SC

John Perry	NAS/NRC Climate Board
Martin Belsky	NOAA/Planning Office
Malcolm Reid	EDIS
John Griffiths	Texas A&M University, SC
Val Mitchell	University of Wisconsin, SC
Vaughn Havens	Rutgers University, New Jersey, SC
Earl L. Kuehnast	University of Minnesota, SC

SC - State Climatologist

AMERICAN ASSOCIATION OF STATE CLIMATOLOGISTS

Storm Data Report

The American Association of State Climatologists (AASC) Storm Data Committee (SDC) was appointed by AASC President Stanley Changnon August 29, 1980 at the AASC meeting in Milwaukee to study and report on the quality, format, timeliness and usefulness of Storm Data (SD). The SDC was further asked to provide the AASC with SD evaluations and recommendations.

The SDC formulated a SD survey which was mailed to all 42 listed State Climatologists (SC) on January 15, 1981. Twenty-eight SCs responded, 9 of which have one or more full time employees dedicated to the SC program. The remaining 19 range from half time to virtually no dedicated support to the SC program and consequently little to no state provision for providing storm information to users. Even with this limited survey, however, the value and need for SD is apparent. Seven SCs provide SD information to a total of 353 users per year or 69% of those served by the 28 respondents. One response was received from the Center for Environmental Assessment Services (CEAS) in Washington. Since a related assessment service is provided at the CEAS this response was added to the survey sample for a final count of 29. See Appendix I for the list of respondents and non-respondents. Some 67% of all SCs responded; 50% of the AASC Executive Committee returned the questionnaire.

Storm Data Survey Results - 19 to 26 of the 29 respondents provided answers to the latter 14 of the 15 items surveyed in the Storm Data Questionnaire. Some newly appointed SCs or acting SCs lacked the tenure of experience required to answer certain survey items.

The questionnaire responses:

1. 24 receive SD, 5 do not.

2. The frequency of SD usage, number per year.

No. contacts/year	No. SC	Estimated No. contacts/yr all 28 SCs
0	3	0
0-5	6	18
5-10	6	48
10-20	7	105
25-30	1	28
40-50	1	45
50	4	200
80	1	80
	29	524

3. Consumer classification - number of 21 respondents listing each consumer.

Insurance	15	Utilities	3
Government	9	Construction	3
Attorneys	9	News Media	3
Individuals	8	Universities	2
Researchers	7	Engineers	1

4. Other users - YES 19 NO 3

Research (climate and storms)	8
Climate studies	4
Data source	2
Disaster impact	5
Other	3

5. 16 said SD is timely; 3 said no.

6. Quality of data: (are there serious errors, omissions, inconsistencies?) YES 8 NO 12

Those SCs reporting low quality mentioned that not all the important storms were reported, for some the descriptions were inadequate and lightning deaths were not all entered. One reported inaccuracies in the reported data.

7. SD quality rated high by 5 SCs, medium by 17 and low by 1. No answer 6.

8. SD strengths.

It is an official climatic document of value. The best source of severe storm data. It identifies major storms. Easy to use format. Useful for impact studies. Valuable to forensic meteorologists for establishing an unbiased basis for justice.

9. SD weakness.

Decreasing quality and specificity of information in recent years. Unpublicized, not many users are aware of the publication. Incomplete. Lack of hail entries. Inadequate for economic considerations. Need better dollar values. Inconsistencies across state lines. Subjectivity of classifications. Need more on-site attention.

10. Should SD continue in present format? YES 18 NO 6

11. SC recommendations to improve SD.

Expand SD. Emphasize unusual weather features (now discontinued). Staff to do an adequate job. Emphasize accuracy and completeness. Use auxiliary data from radar, cooperative observers and news clips. Prepare regional maps, as appropriate, of damaging snowfalls, windstorms, hail, tornadoes, sleet and ice. Oklahoma reports that "at least two other federal agencies are providing storm data in printed form."

12. SCs who could assist with SD. YES 16 NO 7 MAYBE 1

13. SCs who would contract to provide SD. YES 16 NO 7 MAYBE 1

14. Realistic time schedule; 45 days-8, 30 days-7, 15 days-4.

15. Estimated cost per year to provide SD- Illinois: $5900, Iowa $8000 plus storm clips and access to SELS storm log, Oklahoma: $1800, New England: $2400, Louisiana: $5200 ($3800 salary, $1400 clippings), Maryland: 300 to 360 man hours plus clipping costs.

Survey Summary. Storm Data is an important and very useful publication despite its need for improvement in quality and detail. It is the only officially archived climatic document containing information about the majority of the most severe and damaging storms occurring within our Nation. Its need and use is demonstrated by its frequent use by certain governmental agencies, researchers, insurance, attorneys, climatologists, utilities, construction, news media and individual citizens. Decision-making information is derived from Storm Data concerning rare event disasters affecting locations and designs of public buildings, nuclear plants, bridges, etc. Also, SD provides decision-making information for insurance rates, legal action, construction, food production, transportation, education, engineering design and general public information.

Despite the demonstrated variety of uses for these data the availability of SD is so little publicized, that the NCC list of subscribers is but 1130. It appears that for its value, Storm Data is one of our Nation's best kept secrets. Since seven SCs alone now serve 353 users per year, obviously the potential is in tens of thousands of users.

The concensus of the surveyed SCs suggest that the SD should be continued in much the same format and time schedule but with greater attention to detail, accuracy and completeness. Most SCs believe (1) that the National Weather Service should continue to prepare SD, but with more funding to WSOs and WSFOs for travel to do storm investigation and (2) that the task be given a higher priority in the Nationl Weather Service. In some locations the preparer is given only an occasional day, a desk in a busy room and no time to visit storm sites. Too, the long lag involving transfer of storm data from WSOs to WSFOs and finally a report precludes timeliness to the reports.

Few SCs have done the storm data assemblage and know the data sources (e.g., radar logs, SELS reports, news clippings, NWS logs and data sheets, cooperative observer reports and agencies associated with storm events). Yet SCs and others who analyze or research storm data know the need for improved quality SD.

It was recommended that a preliminary summary (perhaps regional) of the important storms (for which data is needed quickly) be prepared and released well ahead of SD as a regional release or be published in the CEAS publication "Climatic Impact Assessment for the U.S.".

The fact that SD quality was rated satisfactory by 60% of the respondents while 40% rated SD quality as low, suggests that a variance of quality exists between states. Kansas and Iowa were among the states getting good marks. Serious discrepancies in storm data are frequently observed at state lines.

Only a few SCs indicate a willingness and capability for preparing Storm Data and indicated probable costs as varying from $1800 to $8000 per year with the most frequent cost stated near $5000 per year per state.

Storm Data, then, is important and should be continued, improved and publicized. It is part of our necessary climatic documentation and should be well done. The SD record is now becoming sufficiently long to have climatological significance.

Consultants. Meteorological and climatological consulting companies indicate that Storm Data is important to forensic meteorology. It is estimated that for those purposes alone storm data is used about 50 times per year by Iowa forensic meteorologists. All forensic meteorologists are concerned that the lack of documented storm data will hamper the course of justice and incur greater costs upon the consumer who may no longer have access to those climatic data.

Recommendations.

1. The National Oceanic and Atmospheric Administration continue Storm Data in much the same format and time schedule but with greater attention to detail, accuracy and completeness of records. Estimated storm dollar losses should be entered when available.

2. Preparation of Storm Data should be given a higher priority. One NWS person should be given adequate training, travel, time and support to provide comprehensive SD reports in each state or region (e.g., New England).

3. Publicize Storm Data. Reference its availability in Climatological Data by State; Climatological Data National Summary and selected Local Climatological Data.

4. State Climatologists should provide storm data information from the cooperative weather observers monthly records and provide those to the NWS office responsible for preparation of SD.

5. If SD should be contracted out, it should be done experimentally to only a few states until the improved procedures are established and it is proven that a contractor can provide the desired data in useful format. (Statistics are not enough, narrative is required for consumers).

AASC STORM DATA COMMITTEE

APPENDIX I

Respondents to Storm Data questionnaire:

Illinois, Kentucky, Maryland, Nebraska, Massachusetts, Virginia, South Dakota, North Dakota, Michigan, Delaware, Minnesota, Alaska, Oklahoma, California, Indiana, Washington, Kansas, Iowa, Idaho, North Carolina, Georgia, Arkansas, Connecticut, Texas, New Mexico, Florida, Alabama, Louisiana and Center for Environmental Assessment Services.

Non-Respondents to SD questionnaire:

Colorado, New York, New Hampshire, New Jersey, South Carolina, Ohio, Hawaii, Wisconsin, Missouri, Montana, Oregon, Nevada, Utah and Arizona.

States without designated SC (not surveyed):

Maine, Wyoming, Vermont, Pennsylvania, West Virginia, Rhode Island, Mississippi and Tennessee.

Historical. Storm information has always been important as evidenced by its documentation in logs, journals and historical accounts. Today, the smallest margin of errors should be sought for climatic catastrophes against our tenuous food, energy and water supplies for our ever-increasing population.

The origin of the National Weather Service is rooted in our Nation's need for adequate storm information and warnings. Our Weather Bureau was created in 1870 to provide such data. The *Report to the Chief Signal Officer* (1871-1891) documented some storm data. Special reports, such as J. P. Finley's (1882), *Character of Six Hundred Tornadoes* provided valuable storm data. The *Report to the Chief of the Weather Bureau* (1892-1949) continued to record storm data for each year beginning with 1890. Beginning June 1921, the *Monthly Weather Review* published a table of U. S. storm data titled, "Severe Local Storms" which continued through 1949. It was occasionally retitled, as for example "Severe Local Wind and Hail Storms" (April 1924-January 1927) and "Severe Storms" (1949).

In 1950 storm data titled "Severe Storms" was printed in Climatological Data National Summary. In 1954 the table was retitled "Storm Data and Unusual Phenomena". In 1959 "Storm Data" became a separate publication under that title.

The category classification of dollar losses in use since January 1956 superseded the dollar loss for crops and also for property exclusive of crops.

Prior to 1950 all losses from storms were classified under one column, "Value of Property Destroyed".

Since 1950 selected years were surveyed to determine the number of storm reports printed annually and how much data was printed as delayed. The following years and storm numbers were tallied as follows:

Year	Approximate number storm entries	Approximate number late data entries
1950	1504	32
1955	2650	58
1959	3127	30
1964	3098	90
1969	6225	90
1970	4484	148
1971	5400	148
1972	4896	390
1973	4514	360
1974	4248	990
1979	4986	1020
1980	5989	1298.

Since the closure of the National Weather Service field climatology program in 1973 the number of reports in SD has not declined but the number of late entries has increased about tenfold, even with the extension of the preparation an extra month. The greatest problem with WSFO preparation of SD is that of changing personnel, poor working conditions and low priority to SD preparation. Yet, most SCs believe the task is best left with WSFOs, but with greater attention and priority to the data gathering.

The NOAA National Climatic Center (NCC) Storm Data list of subscribers lists 45 categories of users. The greatest user number on the NCC list is U. S. Government (28%). Ranked thereafter are individuals, 20%; universities, 16%; insurance, 5%; libraries, 5%; consulting meteorologists and other scientists, 5%; and state and local governments, 5%.

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF AGRICULTURE

Lewis Cass Building, P.O. Box 30017
Lansing, Michigan 48909

DEAN PRIDGEON, Director

MICHIGAN WEATHER SERVICE

The Michigan Weather Service was established by law on June 1, 1895, under Public Act No. 246, as part of the State Board of Agriculture. It has undergone many changes since that time, the most recent being reassignment as a Division within the Department of Agriculture (MDA), by Public Act No. 314 of 1980.

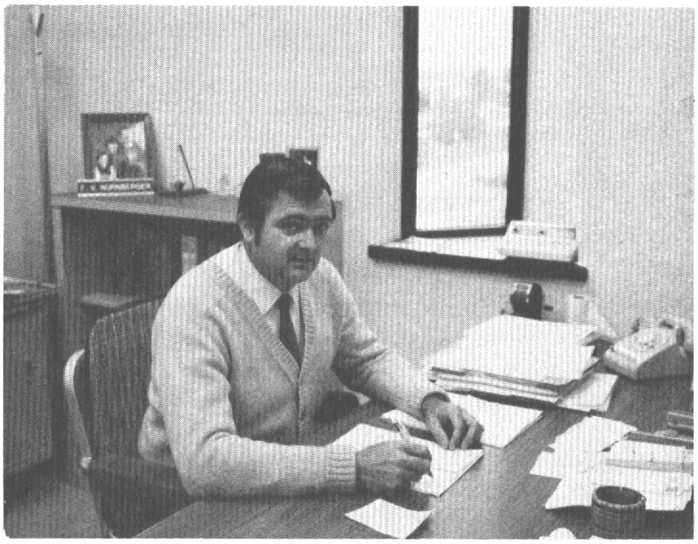
Michigan's two peninsulas exhibit unique climates for their geographic locations because of the influence of the surrounding Great Lakes. The climate is a varied semi-marine type in spite of its midcontinent location. Because of this unique climate and the wide-ranging economic activities within the State, including agriculture which produces nearly 50 commercial food crops each year, tourism, which is close to agriculture for the second and third most economically important activities in the State, and industry, various programs have been developed by the Michigan Weather Service (MWS), in cooperation with other State, regional, local, and Federal organizations, to study the climate and its local variations. Through both the special and continuing studies, better use of Michigan's agricultural land, improved design of hydrologic structures, such as bridges and drainage systems, and wiser land-use planning decisions can be made for the benefit of all the citizens and taxpayers in Michigan.

The MDA/WS is the Office of State Climatology. As such, it is the archival and service center for climatological data and information for the State of Michigan. The types of services requested and provided range from answering specific data requests over the telephone to personal consultation with the client on what data sources, summaries, reports, etc., are available and most applicable for the client's specific problem. Among those utilizing climatological data and information are: individual citizens, businesses, university researchers, attorneys, consulting engineers, insurance investigators, local and regional planning commissions, as well as state and local governmental agencies.

Those of us involved in the state climate programs are well aware that data alone do not provide the total solution to most problems. It must be properly analyzed and interpreted. A few examples of the uses of these statistical analyses in Michigan are: 1) agricultural and forestry production and research: climatological data are an essential component in any impact assessment of food, fiber, and renewable natural resource production including production planning, the question of climate change and the effectiveness of weather modification activities; 2) pest management programs: the models used to improve the effectiveness and to reduce the amount of pesticides put into the environment, all require historical climatological data for development and testing; 3) energy-use planning: the likelihood of extreme hot and cold events can be assessed and incorporated into the projection of energy demands for the various areas of the state under different climate scenarios; 4) hydrological data and statistics are essential in the design of irrigation and drainage systems, bridges, culverts, etc; and 5) land-use planning incorporates the climatological likelihood of hydrological events, e.g., droughts, extreme storms, floods, as well as expected temperatures, snowfall, winds, percent of sunshine, and other factors.

FACILITIES & STAFF:

The MWS is located in rented office space on the campus of Michigan State University (MSU) in East Lansing. The staff consists of individuals from several different agencies and cooperative programs. The State Climatologist (SC) is Dr. Fred V. Nurnberger. Both he and his Departmental Technician/Secretary/Research Assistant, Maxine Oshel, are civil servant employees of the MDA. Maxine has been with the office for approximately 14 years and Fred for nine years. Both were with the program under Dr. Norton D. Strommen when he was the Federal SC. At the time of the demise of the Federal program in 1973, the program was one of only four to continue. Ann R. Ordiway, currently at .8 of a full time employee (FTE) is a data analysis technician supported by the Southeast Michigan Council of Governments (SEMCOG) and performs the data reduction and monitoring of the 85 recording rain gages in the SEMCOG Precipitation Network in 5 counties in the Detroit area. This network originated in 1960 and is supervised by the SC.



Dr. Fred Nurnberger, Michigan SC, prepares a response to a request for climatological information.

Through a recently executed cooperative agreement between the MDA and the College of Agriculture and Natural Resources at MSU, a full-time computer programmer, Susan Perry, is now being provided to the MWS office by the Agricultural Experiment Station at MSU. Over the past 8 years, a cooperative agreement with the Agricultural Engineering Dept. at MSU has provided additional student part-time employees. This has varied from 0-3 graduate assistants to as many as 18 under-graduate students. The contribution made by these part-time employees has been as much as 5 FTE.

Susan Perry, Computer Programmer, reviews progress of her program during an interactive session with MSU CDC/CYBER 750 mainframe computer. The Terak microcomputer is shown in the foreground and will be used for data editing in the near future.

In addition to these regular office workers, two part-time field technicians are hired on a time and expenses basis under contracts by cooperating agencies. Their combined efforts are estimated to be approximately .5 FTE. Thus from a nucleus of 3.8 FTE, the program operates at various times with as many as 10 FTE.

Maxine Oshel and Mark Schwartz, a Master's Degree candidate at MSU, review data problems encountered in the computer output.

The efforts of everyone associated with the program would not be possible, however, if it was not for the excellent cooperation of the National Climatic Center (NCC) staff, the personnel of the National Weather Service (NWS) offices in Michigan and especially the NWS/Substation Network Specialist (SNS). Without the continuing reliable long-term data supply, we all would be searching for different employment.

The computer facilities used by the MWS are those at MSU. The mainframe computer is a CDC/CYBER 170 Model 750 which is accessed both interactively through a DECWRITER II and in batch mode. All historical data are archived on 7- and 9-track magnetic tapes. Through the use of in-house programs and systems routines, most data sets can be retrieved from tape and a disk file created by the submission of a batch job from the terminal. Thus, interactive access to data is usually delayed only a few minutes.

In addition to the mainframe, several other mini- and macro-computers are available through other sources and will be used by the MWS staff when they develop the expertise to utilize them. A Terak micro-computer has just recently been acquired and will be used for in-house developmental work and preliminary data editing. It will also serve as a smart terminal to the CYBER 750 for the exchange of data. Through the Pest Management Executive System (PMEX) developed and operated by the MSU/Entomology Department we will have the capability to exchange additional information and make use of the programs already developed for their Terak.

INFORMATION DISSEMINATION:

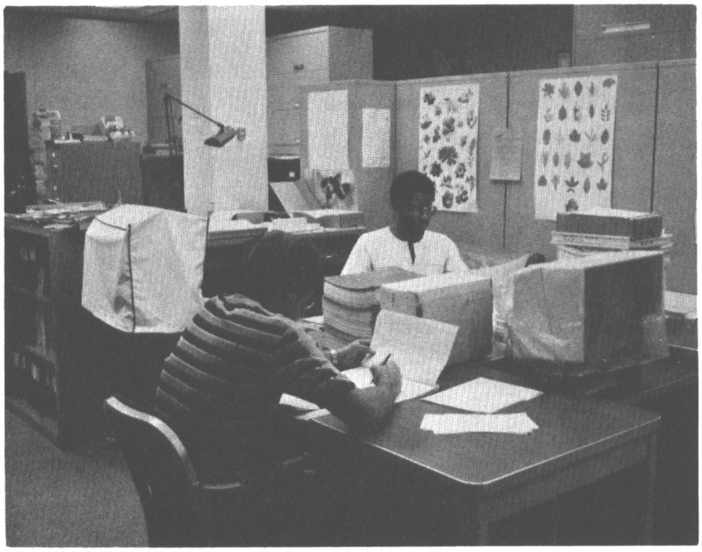
This aspect of the program takes several forms, e.g., radio tapes, local television spots, and news releases through the Communications Office of MDA. The most significant means, however, is through the development of special reports and summaries. A list of the available publications is available upon request.

In the next year or so, the office will have the capability to provide climatological information to the computer communications network (COMNET) being developed by the MSU/College of Agriculture and Natural Resources. Through COMNET each of the 83 county Cooperative Extension Service Offices, researchers on campus, and others will be able to access selected data, information, and statistics. Efforts are now under way to become familiar with the various "floppy" disk access problems so that information can be made available to clients via this mode of delivery. Currently, a remote user must be able to process data from the large magnetic tapes that can be provided.

DATA SOURCES:

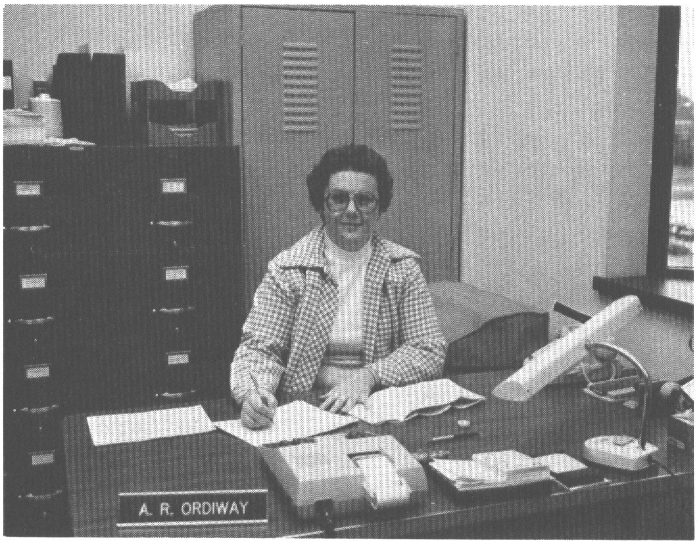
As with most State Climate programs, we rely very heavily on the data collected by the NWS programs and made available through the NCC. All the computerized data for the First-Order and cooperative observer NWS stations in Michigan have been obtained from the NCC. These data sets consititute the largest portion of the available computerized data. Enhancements to the data and expansion of the data sets are a major effort of the office.

Craig Tripp (top), Mark Moore (lower, right) and Jeff Pultorak (lower, left), all undergraduate part-time employees, are working on various phases of the quality control data.



Most of the publications and microfilm/microfiche furnished by the NCC, with data relevant to Michigan, are contained within the data resources of the MWS Office.

Various regional and county supplemental precipitation, snowfall, and cooperative observer networks are active within the state and coordinated by the MWS Office. These include: the previously mentioned 85 recording raingages in the SEMCOG Network; 7 recording raingages in Genesee County operated by the Drain Commission; 45 seasonal snowfall stations funded by county road commissions in high snow areas of the state; 22 recording raingages on two agricultural watersheds near MSU operated in conjunction with the MSU/Agricultural Engineering Dept., the USGS, the NWS/SNS, and the Michigan Water Resources Commission; and supplemental climate staions to document on a meso-scale the climatic influence of the surrounding Great Lakes.



Anne Ordiway, Southeast Michigan Council of Governments Raingage Network Data Technician, takes a short pause in the extraction of hourly precipitation data from a strip chart.

MAJOR ACTIVITIES OF THE MWS:

The single largest activity in the office is the compilation and quality control of data. The statistical summaries being prepared require a serially complete set of data. The data obtained from the NCC is scrutinized in greater detail and missing values estimated. These "altered" data are appropriately flagged and included in the data base. Historical data prior to those available from the NCC are also being digitized and integrated into the data base, although the 1951-1980 period is receiving top priority.

As an aid the the SNS for Michigan, the carbon copies of the cooperative observer reports (E-15's) are all reviewed by trained personnel and a check sheet of significant errors sent to him for appropriate action. Both the present SNS, Donald Graves, and his predecessor, Tom Townsend, have reported this to be of great assistance in their continuing efforts to maintain and improve the quality of the observations.

In recent years, the second largest activity occupying the SC's attention has been the budgetary problems. About the time things look relatively stable, a new wrinkle develops and everything gets shaky again. AS FY 81-82 began on October 1, the state appropriated budget had underfunded the salaries and wages portion by 15%. Thus once again it is unclear as to the continued effectiveness of the program for the entire year.

Other special projects include: a Fruitbelt Climatology of Western Lower Michigan in cooperation with Dr. Jay Harman of the MSU/Geography Dept.; developmental work towards a Climatic Atlas of Michigan, also with Dr. Harman and Dr. Val Eichenlaub of the Western Michigan University/Dept. of Geography; an updated 50-year freeze statistics publication in cooperation with Mr. Ceel Van Den Brink, former Advisory Agricultural Meteorologist for Michigan with the NWS and now leader of the operational Agricultural Weather Service (AWS) at MSU, and the NCC; the establishment of an advisory group for the combined activities of the MDA/MWS and the MSU/AWS under the previously mentioned cooperative agreement; and participation in the Regional Climate Program being developed by the North Centeral Region Agricultural Experiment Stations in cooperation with the National Climate Program Office.

COMPUTER PROGRAM EXCHANGE:

Several of the SC's who attended the recent AASC annual meeting in Fort Collins, Colorado, have already taken advantage of the opportunity to exchange computer programs. A list and brief description of those in use by this office follows. For more information, please contact:

Michigan Dept. of Agriculture/Weather Service
240 Nisbet Building
1407 S. Harrison Rd.
East Lansing, MI 48823
Phone: (517) 373-8338 or 353-3270

COMPUTER PROGRAMS DEVELOPED AND USED BY THE

MICHIGAN DEPARTMENT OF AGRICULTURE/WEATHER SERVICE OFFICE

of STATE CLIMATOLOGY

For additional information contact:
Fred V. Nurnberger, Ph.D.
Meteorologist
MDA/Weather Service
240 Stephen S. Nisbet Bldg.
1407 S. Harrison Rd.
East Lansing, MI 48823
Telephone 517-373-8338

DAILY CLIMATOLOGICAL DATA

Name	Purpose
	DATA FORMAT CONVERSION AND LIBRARY DEVELOPMENT
NCHANGE	Converts NCC card image tapes blocked 10 cards/record to the MDA/NWS data format with 1860 computer words/station-year/record. A library index of the station years is generated for use by other programs. Informative listings of missing dates are provided as well as terminating information for restarting after an abortion in the middle of a station's data.
NCCEVAP	A program similar to NCHANGE but sacrifices some of the original information to include the evaporation data. The blocking structure is the same as for NCHANGE. A library index is generated.
DUMPDAT	A FORTRAN utility program that DUMPs DATa from the MDA/MWS data format with 1860 computer words/sta-yr/record onto the OUTPUT file for inspection. No conversion or analyses are performed. The data are printed days 1-15 on the left side of the page and days 16-31 on the right side of the page for each month. The program assumes an 80 line/page printer and prints 4 mo/page with suitable monthly headings and pointers.
TAPELIB	Merges two data files into one and allows for delayed data to be automatically inserted into the correct position when NCC data is received and the library is annually brought up-to-date. Requires 1, and may require 2 or 3, tape drives depending on source of input file. A new library index is generated.

Name	Purpose

DATA RETRIEVAL FROM LIBRARY

GETDATA — Retrieves desired station year(s) of data from the library and copies it to a separate file. It requires the library index as input but requests the proper magnetic tape (using an MSU utility) and verifies the existence of the requested data in the library. The option is available to write the file onto tape or disk and to save all intermediate data onto a second output disk file. An index of the primary data request is generated. Input data is the station number and inclusive years.

RESTRUCTURING DATA BLOCKING FOR EXPORTATION

BLOCK — A utility program for breaking down the 1860 words/year records to a smaller 155 words/month record for exporting data to other computing facilities.

UNBLOCK — A utility program for breaking down the 1860 words/year records into 5 words/day records for interactive editing and/or exporting of data. REBLOCK is a companion program that reverses the process.

PRELIMINARY ANALYSIS AND DATA EDITING

MCDSFTP — A program that generates a Monthly Climatological Data Summary From TaPe. As might be exptected there is a companion program for NCC format card data with the corresponding name MCDSFCD. The program may be initialized with any month and terminated at any month with any number of intervening years. If a complete year is processed, an annual report is generated. There are many internal consistency checks included, e.g., 1) Max T $\geq$ At Obs T $\geq$ Min T; 2) Max T $\geq$ Yesterdays At Obs T; 3) Min T $\leq$ Yesterdays At Obs T; 4) Precipitation if snowfall is reported; 5) Snowfall if precipitation is reported with Max T$\geq$ 32°F; 6) Change of observation time.

TUPDATE — Makes changes to an existing tape library utilizing daily card input in any of three forms: 1) Original NCC format; 2) NEW MDA/MWS format (complete for the day); and 3) Partial data, i.e., selected elements, in tne NEW format. Key words in columns 73-80 select the proper action within the program. Two tape drives are required. A new library index is generated.

FIXTIME — Rewrites the library with changes in the time of observation and division number utilizing a correction data set specifying the station number and inclusive dates for each change specified. Two tape drives are required. A new library index is generated.

Name	Purpose
MCDSFCD	A FORTRAN program which performs the same operations as the program MCDSFTP but uses CarD input in the NCC format. Decoding of the overpunches, etc., is performed in the subroutine TRANSL8.
MCDARAY	A FORTRAN program which computes the MCD's the same as MCDSFCD but includes multiple stations for a given month. ARrAYs of all daily station data are generated at the conclusion of the month for the individual parameters, i.e., Maximum Temperature, Minimum Temperature and Precipitation, plus Snowfall and Snowdepths, if any are reported. Daily and monthly means and standard deviations are computed to aid in detecting obvious errors. No annual summaries are generated.
	DATA ANALYSIS
SMRY2TP	SuMmaRY to TaPe processes daily data from tape in the MDA/MWS format; provides MCDSFTP output without internal checks and flags; includes precipitation and growing degree day computations on a daily, weekly, monthly, and seasonal basis for 5 different bases, 40°, 45°, 50°, 55°, and the USWB 8650 method, for the period 3/1 to 10/31[1]; creates a file of weekly, monthly, seasonal, and annual summary data to be used in statistical analyses; and writes onto a disk file the daily data in a modified format without weather types and at observation temperatures but includes the mean temperature and computed Degree Day Data. Blocking structure is the same as the input file. A library index for the new daily data file is generated.
PSMRY30	Generates a 30-year Period Station SumMaRY utilizing the monthly and annual summary data provided by SMRY2TP. Statistical probabilities are generated utilizing specified normal, gamma[2], and beta[3] probability distribution functions where appropriate. (The use of the beta function has not been completely tested for appropriateness to date, however.)
MDDSTAT	The Monthly Degree Day STATistics FORTRAN program utilizes the monthly and annual degree-day data generated by program SMRY2TP and provides gamma[2] probability distribution statistics for each of the 13 categories. The keyword on the data cards is printed in the title of each table for ease of identification when running a series of various heating, cooling, and/or growing degree-day data at one time.

[1]Adapted from a program obtained from R. Shaw at Iowa State University.
[2]Adapted from a program originally obtained from G. McKay at NCC.
[3]International Mathematics and Statistics Library routine.

Name	Purpose
WDDSTAT	The Weekly Degree Day STATistics program utilizes the cumulative and weekly degree day and precipitation data generated by SMRY2TP and provides gamma[2] probability distribution statistics for each of the 12 categories, i.e., 5 cumulative degree days plus precipitation and 5 weekly degree days plus precipitation.
PRECSTS	The PRECipitation STatisticS FORTRAN program utilizes the monthly and annual precipitation data in the same card format as that generated by program SMRY2TP. Gamma[2] probability distribution statistics for each of the 13 categories are provided. The present version will analyze a maximum of 50 years of data/station. Any number of stations can be run consecutively.
FREEZE	This FORTRAN program* computes the statistics and probabilities using a normal distribution function for last occurrence in the Spring, first occurrence in the Fall, and length of growing season for selected temperature thresholds. Input data are from cards containing the LS and FF temperatures and dates for a given year. Two versions of the program are available: the first is for the five thresholds published by NCC in the Climatological Data Annual Summary, i.e., 32°, 28°, 24°, 20°, and 16°F thresholds; the second is for the extended and intervening four thresholds of 36°, 34°, 30°, and 26°F. The dividing date between Spring and Fall is July 31.
FREEZCK	This FORTRAN program is an editorial aid which performs consistency checks between the two different freeze data sets to be utilized by FREEZE. If the temperatures and/or dates do not mesh, an appropriate message for that station and threshold is printed describing the error.
HOURLYP	The HOURLY Precipitation program processes hourly and daily precipitation data from cards; performs summations and punching checks; generates daily precipitation tables, which include the hourly amounts, and monthly tables, which include the daily totals. All stations in a given network (county) are processed a month at a time for editorial and publication purposes.

[2]Adapted from a program originally obtained from G. McKay at NCC.

*Adapted from a program obtained from NCC.

WATER PROBLEMS: WHAT CAN THE CLIMATOLOGIST DO?

by

Charles C. Olsen USAF/AFIT

At first blush it may be tempting to say, "we can solve that water problem; just devote enough importance (i.e., dollars) and enough control agencies (the bucks and bureaucracy approach)." That bit of bravo may have worked for the space program a few years ago, where a "real and present danger" was perceived, and, in fact, it might even work for water too. But, whereas the moon just sat there, not getting farther away, water resources are being depleted and contaminated (sometimes irreversibly) each day. Although dollars alone are not likely to solve the problem, it is in many ways an economic problem. But, it is also a scientific and behavioral problem; in fact, it is precisely the type of problem that requires a coordinated, interdisciplinary approach. Climatologists alone certainly can't solve it; neither can hydrologists, economists, or policitians alone. The climatologist's role, however, in solving the increasingly serious problem of management of our water resources is as unlimited as we once thought our water to be.

To investigate the climatologist's role we will first identify several critical functions in managing the water problem. Then we will explore ways the climatologist can contribute to these functions. Finally, we will look at the climatic input to some of these management functions as applied to several water sensitive and/or intensive portions of the economy.

We can identify four functional areas that are critical in water resource management; planning, education, conservation and improved techniques of water use. These areas are <u>not</u> independent and surely not all inclusive, however, they provide <u>a</u> reasonable framework for discussion. Of all the areas, planning is the keystone.

In our case the fundamental nature of planning can be illustrated by considering two factors; time and money. Since water resources are perishable and decreasing (e.g., non-rechargeable aquifers, irreversible pollution) planning is essential to chart the correct course for management. If we embark upon an incorrect, misdirected, or, worse, no course we may find ourselves "up the creek" with our only paddle being extremely large injections of money. Whatever techniques we find for water management, there will undoubtedly be large dollar expenditures. Without far-thinking, insightful planning many dollars may be spent going in marginally or totally unproductive directions. For these reasons climatology can make a substantial contribution to planning the management of water resources.

Climatology can enter the planning process in several ways. First, it can be used in defining the problem. For example, what constitutes a drought? What is the expected long-term variation in municipal water supply from rainfall; snowmelt; groundwater? Where, when and how often are "seedable" clouds available for weather modification? Secondly, climatology can be used to establish baselines for approaching the problem, as in estimating the long-term maximum precipitation and maximum basin drainage rate for the design of reservoirs. Climatology should also be used in the evaluation stage of planning. For example, "now that we have got this new municipal water system, why isn't it supplying enough water?" Is the design bad, or is the rainfall/snowfall outside the range planned for? It is difficult to imagine planning without evaluation, but it happens all the time. A good case study of the use of climatology in planning water resource management is a weather modification or rain making project.

In defining the problem we use climatological rainfall and variability. We establish baselines -- when to seed, how often are seedable clouds present; then we evaluate the results, again using climatology to see if we produced any change. In short, the project manager needs to ensure climatology is used throughout the planning process; not just any climatology, but the "best climatology". Calling for this rather subjective "best" commodity leads us to consider education.

The climatologist's role in education is twofold. As a member of a team, a supporting specialist or however we wish to characterize his role in water resource management, it is important to remember that the analysis he provides is not an end in itself. Thus his first educational function must be to educate himself in his "customer's" needs and language. Only then can he tailor his service to those needs. The best climatology for cloud seeding is not necessarily the best climatology for an urban water works system. They have different requirements and sensitivities, so they need different input. Equipped with a sensitivity to his customer's sensitivities, the climatologist can perform his second educational function, that is to work with his customers, be they the public, public officials, committees or whatever. However, this interaction must be carefully couched in those terms or sensitivities he just learned. It takes no skill, and doesn't contribute much to the solution, to "dazzle with data"; it takes skill, imagination some cunning and maybe even some luck to show where climatological information can contribute to the problem solution.

Another function crucial in water management, and closely akin to education, is conservation. Carefully planned, and "sold", convervation programs could be a major factor in managing the water problem. The climatologist can again contribute significantly; for instance, in areas such as aquifer recharge or recycling of waste water. Conservation and improved techniques for water use are often closely related, for the aim of the latter is increasingly the former.

Improved techniques for water use, reuse or procurement encompass a myriad of disciplines, but again we focus on those in which the climatologist can contribute. These areas could be generalized as to where water and climate interact as critical factors. For instance, in considering a large scale water redistribution project, such as from eastern to western Oklahoma, the climatologist should address many facets. Can the source area support the water drain under current conditions; with population or industrial growth; with a 2-, 5-, 10-year drought? Then, how about the transport itself? Should it be open or covered; what is the trade-off between evaporation, pollution, cost? How about energy for pumping? Could alternate forms of energy such as wind power or solar be used? These questions just scratch the surface in only one project!

We've seen that the climatologist can have an important role in the management of water resources. Tailored climatological thinking and data are important input to critical management functions such as planning, education, conservation and improved techniques of use. Finally, we will look at several water sensitive or intensive areas and cite examples of how climatology can contribute to one or more of the management functions already discussed.

Agriculture is probably the most water and climate sensitive area we can find, and it certainly qualifies as a heavy user - over forty percent of daily water usage nationwide goes to agriculture ("National Geographic", Aug. 1980). And, as October grain, the entire field is ripe for harvest. In planning, for instance, studies like Thornthwaite's crop calendar at Seabrook Farms have continuing potential. Short range decision making could attempt to optimize medium range (3-5 day) forecasting with irrigation scheduling. In conservation, the effect of cultivation practices on evapotranspiration is important, especially for areas with marginal water resources. Improved techniques of water usage could result from crop sensitivity studies as related to irrigation methods (e.g., flood, sprinkler or drip type). The drought of this past year has again pointed out agricultural water problems, but as never before, it has also highlighted urban and municipal water problems.

As cities grow and as existing municipal systems age, urban planning must increasingly single out water management. The examples of some northeastern cities this winter, such as Greenwich, Connecticut demonstrate inadequacies somewhere in their water plans. From full reservoirs down to a two week supply in less than a year indicates a problem does exist. Possibly rainfall variability wasn't considered fully when designing this system, or possibly it was, and such an extreme year as last was "an acceptable risk" to the designers. As close to home as Norman, Oklahoma, water supply is an issue in the current city council election. In the urban setting, education is certainly needed in response to increasing building in flood plains or on mountainsides, as in Southern California. Here is a case of too much water in the "wrong" place, but again a water resource management problem amenable to climatological input. After all, is it really surprising what "paving" a drainage basin in the vicinity of Tulsa, or a 20- or 50-year rain in Southern California will do? It shouldn't be!

Lastly, in the areas of industrial use and energy we can find examples of climatology applied to conservation and new techniques of water use. Much industrial waste disposal uses streams and rivers. We can conceive instances where maximums and minimums of stream flow would be valuable in determining the best or worst time to discharge wastes. In energy production we have already alluded to alternate energy possibly being used to pump water across Oklahoma. This combination of a climatological feasibility study, in this case windpower, applied to the water resource problem demonstrates well the benefits of an interdisciplinary approach to management of the water resource problem.

We have seen that the climatologist has a valuable role to play in the search to manage our water resources effectively. Through examples we have illustrated a few types of possible input to four crucial water management functions; planning, education, conservation, improved techniques of use. Lastly, we looked at several applications of climatology to water sensitive or dependent areas of our economy. We conclude as we began, believing that as most problems yield to imagination and perseverance, so will most water resource management functions benefit from an imaginative an persevering climatologist.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230
OFFICE OF THE ADMINISTRATOR

UNIVERSITY AFFAIRS LETTER

Washington, D.C., August 1981

Dear Colleague,

The new NOAA Administrator . . . *Dr. John V. Byrne* . . . is on board and we welcome his leadership. A research oceanographer - marine geologist, he has been a faculty member at Oregon State University since 1960. The NOAA Deputy Administrator and Associate Administrator have not yet been selected. The selection process continues however, and it is expected that the two top positions in NOAA will be filled in the near future.

About the budget . . . there remains to be completed by late September . . . the final markup of the NOAA budget for FY '82 (which fiscal year begins October 1, 1981). Final Senate action and House-Senate Conference action will wrap it up. In the House markup, Sea Grant would be sustained and funded near the 50% level, about $20 million. However the general outlook suggests three lean budget years ahead for any additional NOAA support of University R&D.

A *small grant program* . . . is managed by ERL . . . and about $340,000 research funds are available annually. Unsolicited proposals received are evaluated on the basis of their scientific merit, competence of the principal investigation, and the likelihood of achieving results of value to the NOAA laboratory programs. Peer review uses NOAA and outside scientists. Twice yearly, fall and spring, the Grants Review Board of ERL evaluates the proposals on hand and recommends project support. Proposals may be submitted at any time and there is no prescribed form. Please send 10 copies to Mr. Nathan Stiewig, Research Grants and Contracts Coordinator, Environmental Research Laboratories, NOAA, 325 Broadway Street, Boulder, CO 80303.

The University Affairs Office . . . has underway a program aimed at bringing into NOAA each year a few of the top senior academicians through term or IPA appointments. This is a NOAA-wide effort to further strengthen the personal bonds between the university community and the NOAA community. The goal is to invite about seven energetic and creative academic leaders each year, at the full professor level, to take temporary appointments in the most attractive positions that can be arranged for them within NOAA. Through the program NOAA hopes to attract a variety of skills and expertise that otherwise would not be available.

The next deadline for applications is January 1, 1982. Send letter application with curriculum vitae to NOAA's Office of University Affairs.

The new Director of ERL . . . *NOAA's Environmental Research Laboratories, Boulder, Colorado* . . . is Dr. George H. Ludwig. George earned his Ph.D. at the University of Iowa in electrical engineering where he was co-discoverer of the Van Allen radiation belts. He is an expert in remote sensing and formerly was Director of Operations for NOAA's National Earth Satellite Services.

What are R&D Cooperative Agreement Awards? . . . The paragraphs below aim to answer the question.

In accordance with . . . *The Federal Grant and Cooperative Agreement Act of 1977* . . . NOAA may use cooperative agreement awards when the purpose is to transfer funds to an awardee to accomplish a public purpose of support or stimulation authorized by Federal Statute, and where substantial involvement is anticipated between NOAA and the awardee during the course of the project.

Cooperative Agreements . . . *are financial assistance awards*. They are like grants, which are also financial assistance awards.

The cooperative agreement format . . . *and the agreement execution* . . . will differ somewhat from grants; however, most of NOAA's grant policies remain applicable, since cooperative agreements, while based on the anticipation of substantial involvement on the part of NOAA during project performance are a form of Federal Assistance.

Some examples of substantial involvement . . . which may individually justify the use of a cooperative agreement award are: (a) participation by NOAA program in the resolution of technical, managerial, or scheduling problems; (b) NOAA program anticipation of operational involvement or participation; (c) NOAA monitoring to permit specified kinds of direction or redirection of the work because of interrelationships with other projects, institutions, or agencies; and (d) NOAA program participation in the preparation of joint progress or other substantive reports.

Special conditions . . . are the heart of cooperative agreement awards. Their purpose is to delineate the roles and responsibilities of the cooperating parties since both NOAA and the awardee are involved either directly in the project or in the management of the project. Each cooperative agreement award will have its own statement of the special terms and conditions which will identify (a) awardee responsibilities and (b) NOAA responsibilities.

It is important . . . to detail the specific responsibilities of both parties when drafting a proposal for a cooperative agreement, and in drafting the cooperative agreement awards. The latter is the task of NOAA specialists in grants and procurement who strive to keep the award document as clear and as simple as possible.

In sum . . . *the cooperative agreement* . . . is a legal instrument, similar to a grant for the award of Federal dollars. It has not received adequate study and use by either the university community faculty and research administrators or by the Federal Government program scientists and grants officers. Yet I believe it is the award instrument of the future for mission agencies like NOAA.

Sincerely yours,

Earl G. Droessler
Director of University Affairs

USCOMM-NOAA-ASHEVILLE, N.C. 10/81/450

U.S. DEPARTMENT OF COMMERCE
NATIONAL CLIMATIC CENTER
FEDERAL BUILDING
ASHEVILLE, N.C. 28801

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE
COM 210

U.S. MAIL

FIRST CLASS