

By

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Introduction

At a January 16-17, 1975 interstate weather modification meeting in Denver, Colorado, the North American Interstate Weather Modification Council (NAIWMC) was formed. Representatives from twenty-three states of the United States, three provinces of Canada, and Mexico recognized that the overall objective of the Council would be to achieve and maintain state and local control of weather modification activities while endeavoring to attain a high degree of legislative uniformity and an effective information exchange mechanism.

This paper will discuss the purposes of the Council, its overall accomplishments to date, the estimated hydrometeorological measurements required in winter orographic weather modification programs, and the required legislative actions for successful co-operation and coordination in future weather modification programs.

Purposes of the Council

The purpose of the NAIWMC, as stated in the by-laws, covers six categories: operations, research and development, public involvement, legislation, regulations, and miscellaneous.

The Council shall assist governmental and private organizations in planning, design, implementation, coordination, and assessment of weather modification operations, as well as in research and development of said technology. The Council shall promote effective partnership, common activities and exchange of information in order to carry out this purpose.

The Council shall seek to provide information for and engage in discussions with public officials, interested individuals and the general public. It shall serve as spokesman for the needs and views of the members of the Council and it shall develop public education programs.

The Council shall assist in preparation, review, and alternation of legislation at all levels of government. It shall seek to obtain legislation which is responsive to local, state, interstate, national and international concerns.

The Council shall assist regulatory agencies in maintaining a high level of integrity and professional competency among weather modifiers, as well as assisting regulatory agencies in coordination of their licensing and permit functions.

All-in-all, the Council will cooperate in the development, operation, and control of weather modification activities as is consistent with the six-part purpose of the Council.

General Overall Accomplishments

Regular membership in the Council is available to all states of the United States, Mexico, and all provinces of Canada. Affiliate membership is available to political subdivisions within states or provinces, national agencies, professional organizations, and

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scientific societies. The Council is governed by the Executive Committee (Vice-Chairmen from each participating country and the Secretary-Treasurer) and ten other members of the Board of Directors.

Regular membership has grown from a total of five in 1975 to a total of eight today. Affiliate membership has grown from six in early 1976 to twelve in early 1977. Involvement in the Council's activities is also provided by some states that presently have no weather modification programs in their areas. Figure 1 shows the areas of the NAIWMC in relation to each membership and the Board of Directors.

Since the ratification of the Council, resolutions and position statements have been adopted on numerous items. The Council has supported: interest and willingness to assist in the preparation and review of existing proposed federal and state legislation; consultation of state agencies in the planning, development and implementation of emergency programs during drought situations; the control of weather modification activities by the states; use of the talent and expertise within the Weather Modification Association; establishment of a National Weather Modification Commission to investigate and recommend a national weather modification policy; development of a national climate act; the authorization of using hydrometeorological instruments and weather modification activities in and around wilderness areas; national weather modification research and development programs to include demonstration; and cooperation and coordination of the Colorado River Weather Modification Demonstration Project of the United States Bureau of Reclamation.

Other coordination and cooperation in many weather modification activities have been evident during the two years of the Council's existence. Some include:

1. Involvement in a planning session with the Council of State Governments and the National Conference of State Legislatures.
2. Support of the state model law developed by Ray Jay Davis, College of Law, University of Arizona.
3. Attendance and participation at the symposiums of the National Conference of Lawyers and Scientists.
4. Testimony before subcommittee hearings at both the State and Federal legislatures in the United States.
5. Cooperative planning sessions on the Colorado River Weather Modification Demonstration Program with the Basin states and the United States Bureau of Reclamation.
6. Coordination of state meetings associated with determining the research needs in future national programs in the United States.
7. Coordination of a northern High Plains planning session.
8. Preparation of a National Weather Modification Study proposal to perform work as mandated by PL94-490.
9. Presentation at numerous meetings in the United States and Mexico.

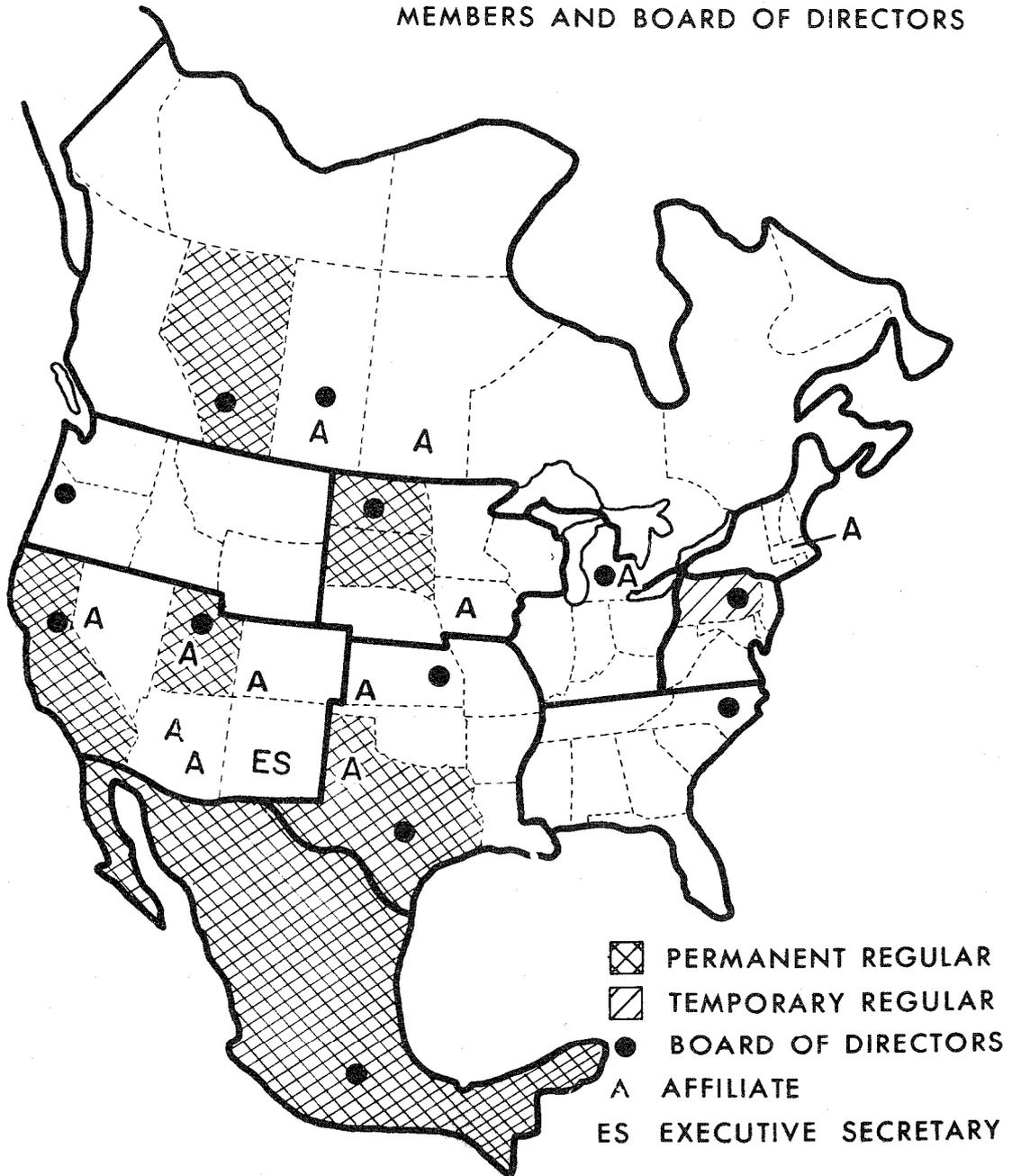
All of these activities, as well as responses from the state and provincial contacts, lead to the conclusions in the final sections of this paper.

Responses of Cooperation in Future Weather Modification Activities

During the first part of 1976, the Council's Board of Directors asked the state and provincial contacts questions concerning the requirement to develop necessary cooperation and communication between the states to solve problems associated with interstate weather modification activities. The actual questions included: Which organizations in our state have the mission of licensing, monitoring, controlling or operating weather modification activities; Does your state presently support weather modification programs; What weather modification regulation does your state have; What position does your state take

FIGURE 1.

MAP SHOWING THE LOCATION OF 1977
MEMBERS AND BOARD OF DIRECTORS



on weather modification activities; Do you believe a regional meeting should be held to solve potential problems in interstate weather modification activities; etc?

Table 1 briefly expresses the subjective opinions of state contacts that answered the questionnaire or through communication with the appropriate offices. The objective conclusions have indicated that involvement in further coordination and cooperation through the Council is related to the present involvement in weather modification activities, whether strong regulatory or research, development or operational programs. Therefore, it is assumed that the NAIWMC will become a viable organization if more states express their concern that weather modification may be a tool for water resources development and if most express the need for uniform weather modification laws and regulation thereof.

Awareness of Research Needs

"What are the states' weather modification research needs for the future?" This question was asked the Council in June 1976 by Merlin Williams, Program Manager of Weather Modification, National Oceanic and Atmospheric Administration in Boulder, Colorado. A plan was then established to determine the future research needs by setting up meetings in member states between organizations within the states, NAIWMC representatives, and the advanced Planning Group of NOAA.

Meetings were held in Salt Lake City, UT on July 19, 1976; Bismarck, ND on July 22-23, 1976; Sacramento, CA on September 21, 1976; Harrisburg, PA on September 29, 1976; Austin, TX on September 30, 1976; and in Rapid City, SD on October 6, 1976. Each of the meetings were arranged by the Executive Secretary of the Council via the NAIWMC regular member delegate or alternate.

Information derived from these meetings, as well as Questionnaire 76-2 responses provided by other states, should define the awareness of required relationships between state and federal programs dealing with research and funding of weather modification activities. Some of the questions raised at the meetings and on the questionnaire were: Has federal research in weather modification been adequate; What areas of weather modification need more federal research and development; Should the Federal government ask Congress to create federal regulation of weather modification; Do we need a Federal Weather Modification Commission?

A subjective summary of the responses are shown in Table 2. Without question, the major item recommended by the involved states was in the area of evaluation; i.e., operational programs, physical studies, transport and diffusion, etc. Moreover, the need for a national weather modification policy was required and the need for uniform regulation (licensing and project permits) was obvious.

Impact on Future Hydrometeorological Measurements

Numerous planning sessions on the Colorado River Weather Modification Demonstration Program and the Sierra Pilot Project of the United States Bureau of Reclamation have been held since the summer of 1975. Most of the water development organizations associated with these projects agree to the overall design concept of the United States Bureau of Reclamation. Both programs call for pilot or demonstration work in seven mountain ranges in the western states for the next twenty years or so.

If the Federal research and development needs of the states in weather modification are carried out, the impact for hydrometeorological measurements required by the winter programs would include:

1. Expansion of the national surface climatic network to include high elevation precipitation measuring stations upwind, within, and downwind of mountain target areas.
2. Expansion of the national upper-air measuring system to include inflow and outflow measurements for physical evaluation of the cloud seeding.
3. Expansion of the streamflow measuring network to evaluate the programs by a benefit-cost analysis.

T A B L E 1
 SUITRY OF RESPONSES TO THE NABEE
 BOARD OF DIRECTOR QUESTIONAIRE 76-1

CONTROL ORGANIZATION:	COUNTY BOARDS (1), ECOLOGY OR EIVIRONMENTAL AGENCY (2), REGULATORY, LICENSING OR PUBLIC SERVICE AGENCY (3), AGRICULTURE DERARTFETIT (6), AERONAUTICS OR WEATHER MODIFICATION BOARD OR OMISSION (7), NATURAL OR WATER RESOURCES DEPARIVENT (9).
DIRECT INVOLVEMENT IN ON-GOING PROGRAMS:	RESEARCH (ILLINOIS, KANSAS, FONTANA, NEVADA, TEXAS, WYOMING), OPERATIONS (NORTH DAKOTA, SOUTH DAKOTA, UTAH, <i>PHD</i> MANY COUNTIES THROUGHOUT THE UNITED STATES).
SUPPORT FUNDING FURTHER RESEARCH:	MOST WESTERN AND HIGH PLAINS STATES.
POSITIONS ON WEATHER MODIFICATION TECHNOLOGY:	RESEARCH ONLY (ARIZONA, MIA-TANA, NEVADA) RESEARCH AND OPERATIONS (NORTH DAKOTA, SOUTH DAKOTA), UP TO COUNTIES (KANSAS, TEXAS, UTAH), APPLICANTS HAVE BURDEN OF PROOF (NEW VEXICO).
REQUIRE FUTURE COORDINATION AND COOPERATION MEETINGS:	NONE (11), PLANNING SESSIONS (12), REQUIRES INFORMATION ONLY (27).

NOTE: ONLY THE STATES THAT ARE INVOLVED IN THE COUNCIL D(PRESSED THE DESIRE FOR AFFILIATION,

TABLE 2
 STMARY OF RESPONSES AT THE NAD371/STAIE/NOAA
 MEETINGS AND CILESTIONNAIRE 76-2

HAS FEDERAL RESEARCH IN WEATHER MODIFICATION BEEN ADEQUATE?	GENERALLY NOT -- MOST THINKCOLD FOG DISPERSAL AND WINTER OROGRAPHIC ARE READY FOR DEMONSTRATION, SEE FEEL COPE DOLLARS HAVE BED AND ARE STILL NEEDED BY THE FEDERAL PROGRAMS,
WHAT AREAS OF WEATHER MODIFICATION WED MORE RESEARCH?	EVALUATION OF OPERATIONAL PROGRAMS. TRANSPORT AID DIFFUSION STUDIES AND DELIVERY IETHODS EXTRA-AREA EFFECTS PHYSICAL STUDIES SOCIETAL STUDIES HAIL SUPPRESSION METHODS
HOW ABOUT FEDERAL REGULATION?	NEST SAY NO, HOWEVER, SOME FEEL THAT FEDERAL SUPPORT SHOULD BE GEARED TWARD TELPING WITH UNIFORM STATE REGULATION.
NEED FOR A FEDERAL WEATHER *MODIFICATION COMMISSION?	ONLY TO DEVELOP A NATIONAL POLICY.
STATES PROVIDING RESPONSES?	CALIFORNIA, INDIANA, KANSAS, MARYLAND, MICHIGAN, NORTH CAROLINA, NORTH DAKOTA, PENNSYLVANIA, SOUTH DAKOTA, TEXAS, UTAH: VERMONT, AND VIRGINIA.

4. Establishment of nuclei measuring networks, probably ground-based towers and aircraft, for transport and diffusion studies.
5. Establishment of ecological networks for environmental impact assessments.

Although most of the evaluations are costly, they are required to determine if the programs can be transformed into operational programs in the future. The questions that must be answered are: What are the changes in precipitation patterns, in runoff, in extra-area effects, in nuclei concentrations, and in the ecosystems associated with the mountain areas, including wilderness areas.

Required Legislation for Successful Cooperation and Coordination

"Legal and Scientific Uncertainties in Weather Modification" has been the title of two symposiums of the National Conference of Lawyers and Scientists during the last year. Both of the symposiums addressed the needs of state and federal legislation for adequate control of future weather modification activities.

The suggestions would definitely apply to demonstration areas as well as operational programs. There is an apparent need to assure uniform application and control of projects throughout the west, otherwise the technological problems will be settled in court. A wait and see attitude should not be taken by the concerned organizations.

Uniform state legislation and interstate agreements have been emphasized by the NAIWMC in its planning sessions on future large-scale activities in weather modification. Elements of a model state weather modification law should include:

1. Common purpose and definition of weather modification.
2. Establishment of control boards within each state to:
 - a. License weather modifiers like any other profession.
 - b. Establish rules and regulations for a permit system of weather modification projects.
 - c. Establish common standards; conduct studies, investigations, and hearings; establish advisory committees; and
 - d. Represent the state in intergovernmental cooperation.
3. Non-acceptance of liability for weather modification activities.

The important point to realize -- uniformity of state legislation on this technology may at least create scientific certainties in weather modification.

The 1976 U.S. Congressional hearings on weather modification overwhelmingly supported the development of a national policy on the technology. Public Law 94-490 mandates that studies be conducted that lead to the creation of such a policy. Much of the testimony at the 1976 hearings suggested the creation of a National Weather Modification Commission to coordinate and provide cooperation between the projects of the federal agencies and the programs of the states and provinces. It seems appropriate to realize that most Federal agencies having missions involving weather modification could not realistically coordinate regulation across governmental boundaries, i.e., counties, states, countries and continents. Therefore, Federal licensing standards may be the first objective of such a Commission.

Future NAIWMC Suggestions

The NAIWMC will continue to make recommendations on Federal, State and Local legislation to arrive at uniformity of weather modification activities and regulation. The Council is presently involved with the following items:

1. Support of S.421, H.R.783 and H.R.3399 - National Climate Program Acts of 1977. All three were introduced early in the 1st Session of the 95th Congress.
2. Support of the "Sisk Bill" in the 94th Congress.
3. Support of write-in appropriation for the Colorado River Weather Modification Demonstration Project.
4. Providing assistance in the creation of a national weather modification policy.
5. Preparation of a rough draft bill for the creation of a national effort in cooperation, coordination, development, and control of weather modification activities in the future.

The Potential of an improved weather modification technology is good, only cooperation and coordination of future activities is required to decrease the scientific and legal uncertainties of weather modification.