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NEBRASKA SOIL AND WATER
CONSERVATION COMMISSION
STATE WATER PLAN
PUBLICATION NUMBER 403

*Flood Warning
and
Community Action*

AUGUST 1969

STATE OF NEBRASKA
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PROGRAMS:

SOIL & WATER CONSERVATION
WATERSHED PROTECTION
FLOOD CONTROL
RIVER BASIN INVESTIGATIONS
FLOOD PLAIN STUDIES
STATE WATER PLAN

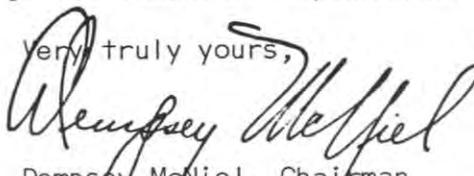
State of Nebraska
Soil and Water Conservation Commission



August 1969

Floods in Nebraska cause an average accountable loss to the economy of over \$20,000,000 each year. It is estimated that the total loss due to floods in Nebraska is nearly \$40,000,000 per year. The hardship, suffering and loss of life caused by flooding cannot be measured. In view of this terrible toll exacted by floods, the State must not fail to take vigorous action toward reducing flood damages. The cost of many steps toward reduction of flood damages is insignificant compared to the damage caused by even minor floods.

This report has been prepared for the Governor and the Legislature as one part of the State Water Plan. Specific actions are suggested which would help achieve a reduction of flood losses. Before adoption as a portion of the State Water Plan, this Special Recommendation was reviewed by a wide variety of experts in the fields of engineering, civil defense, hydrology and education. It has been endorsed by them and is wholeheartedly supported by the Commission. I urge its immediate implementation.

Very truly yours,

Dempsey McNeil, Chairman
Nebraska Soil and Water
Conservation Commission

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ABSTRACT

This Recommendation, a part of the State Water Plan requested by Legislative Resolution #5 of the regular 1967 Session, deals with the opportunity to reduce flood losses by advance planning for prompt, effective flood warnings and responsive community action. The present organization for emergency action is evaluated and improvements are proposed.

The goal of the Recommendation is to reduce the loss of life and property through improved flood emergency action by:

1. Supplementing and coordinating the existing flood forecasting system to greatly improve the quality and timeliness of flood warnings in Nebraska.
2. Increasing the state's readiness for flood disaster by preplanning actions to be taken.
3. Assisting communities to evaluate their flood hazard and make plans for effectively using flood warnings to reduce flood damages.

The actions required by the Governor and the legislature to implement such a program are specifically recommended.

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THE STATE WATER PLAN



AUTHORITY

Nebr. Rev. Stat. § 2-1507 (8) (Supp. 1965) directs the Nebraska Soil and Water Conservation Commission to

“plan, develop, and encourage the implementing of a comprehensive program of resource development, conservation, and utilization for the soil and water resources of this State in cooperation with other local, state, and federal agencies and organizations.”

Legislative Resolution #5 of the 1967 Legislature specifically directed the Nebraska Soil and Water Conservation Commission to prepare a State Water Plan, giving consideration to the full development of Nebraska’s water resources.

Responsibility for flood control, which includes reduction of damages, is assigned to the Soil and Water Conservation Commission. The broad field of emergency operations is assigned to the Adjutant General’s Department. Quite appropriately, this recommendation has been developed in close cooperation with the Adjutant General. The nature of the activities proposed by this recommendation is such

that some actions should be carried out directly by the Adjutant General’s Department, while others could most efficiently be implemented in coordination with the established flood control program and the flood plain regulations program implemented in response to the first Special Recommendation of the State Water Plan.

SPECIAL RECOMMENDATIONS

The State Water Plan includes a series of Special Recommendations to cover topics of particular importance in the management and control of the state’s water resources. **One of the most urgent problems in Nebraska is the periodic and large economic loss caused by floods.**

The Commission feels that the goal of the actions proposed in this Special Recommendation—to reduce the loss of life and property through improved flood warning and community actions—is sufficiently independent and worthwhile to warrant implementation at the present time, and that the actions recommended will be compatible with the other Special Recommendations which are being studied as a part of the State Water Plan.

MEANS OF REDUCING FLOOD DAMAGES

To control floods has long been a dream of man. Only by the control of floods can those villages and cities on our flood plains be secure and our fertile valleys successfully farmed. Before the valleys were permanently settled, there were floods but few flood damages. The river periodically flooded and the nomadic valley occupants moved to higher lands. Today, however, many of these valleys are thickly populated and intensely developed with expensive roads, dwellings and other structures.

The Federal Government, referring to the "general welfare" clause of the Constitution, allocated in excess of \$7,000,000,000 between 1936 and 1962 for flood prevention. This structural program has prevented vast amounts of damages; yet, in spite of this, the annual flood losses continue to mount. One might assume from this that at the present rate of construction of flood protection works the effort would never be complete. This may be true if we fail now to invest some funds and personnel in reduction of damages through nonstructural measures.

Flood damages can be reduced through a total program including:



Effective emergency action



Soil and water conservation treatment on the uplands



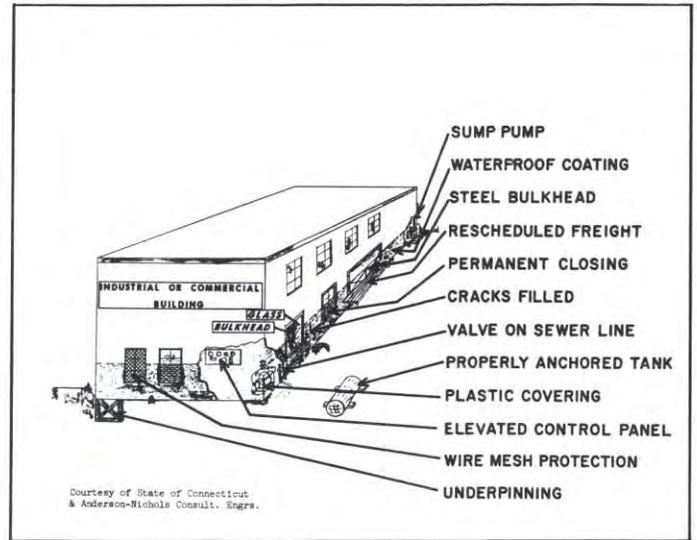
Flood water detention structures on tributary streams



Main stem structures storing large amounts of flood water



Channel improvements and local protection projects



Flood proofing



Proper use of the flood plains



Adequate design of structures affecting flood channel capacities

In a comprehensive approach to controlling flood damages, each part of the overall program complements the other. **Widespread benefits in Nebraska can be best gained at this time by increased emphasis on emergency action.**

THE NEED FOR IMPROVED FLOOD WARNING AND COMMUNITY ACTION

A flood may occur with disastrous results in almost any part of Nebraska. The flood control structures erected by man are necessarily limited by economics to the protection of only a few areas and they protect only against a limited flood. In unprotected areas, the threat to lives and the damage to property increases rapidly as flood heights increase. Effective emergency action in providing timely warnings and local response to those warnings can save lives and greatly reduce damages to both public and private property.

Assistance vitally needed during flood generated crises is normally beyond the means of an individual or small city, and occasionally even beyond the capacity of the state. However, for most situations, the state could provide supplemental manpower and equipment and leadership to give essential assistance to communities and individuals.

While floods cost millions of dollars in damages in most years in Nebraska and cause some loss of life, only meager authorities and funds have been provided to reduce these losses by effective emergency action.

Loss of life and damage due to flooding may be drastically reduced by advance preparation for flood emergencies, timely warnings, rapid provision of needed assistance and effective execution of flood fighting plans.

The actions taken before, during and immediately following a flood emergency include several distinct steps:

Pre-Flood Period

- Preparation prior to flood emergency
- Recognition of impending flood
- Evaluation and warning of flooding

Flood Period

- Liaison with endangered areas
- Provision of needed assistance

Post-Flood Period

- Recovery assistance
- Critique of performance

Each of these steps is carried out to some degree in every flood emergency. The attention given may be informal or even without express recognition of the step being considered. Detailed, conscientious effort to complete each step as fully as possible is needed for effective emergency action.



A FLOOD EMERGENCY PROGRAM FOR NEBRASKA

STEP 1. PRE-FLOOD PREPARATION

EVALUATION

Excellent arrangements already exist regarding statewide communications and organization of the Adjutant General's staff for a flood emergency. However, relations developed with other agencies, both state and federal, which could provide assistance during an emergency are informal and insufficient. Maps, data, names, addresses and telephone numbers which may be required in an emergency are not readily available, standing assignments to personnel have not been made and the ability of various agencies to assist has not been exploited.

Early recognition of potential flood conditions is generally necessary and always beneficial in providing time for emergency plans to be effected. Persons and agencies whose participation may be required can be alerted to remain available, general information concerning the area of anticipated difficulty can be gathered and physical resources summoned to prepare for rapid action.

Current weather and stream conditions are available from the Weather Bureau Forecast Center in Kansas City. Data monitored by the Weather Bureau, Corps of Engineers, Geological Survey and Bureau of Reclamation are collected by the Forecast Center, but coverage of the system for collection of rainfall and stream flow data is insufficient for a large portion of Nebraska. Figure 1 shows those municipalities for which accurate flood projections cannot be made until provision is made for additional data collection.

At the first recognition of meteorological conditions which have a flood producing potential, only generalized weather



Preparing sand bags for flood threat

warnings are issued by the U.S. Weather Bureau. After flood-producing rains have fallen, information is available from the U.S. Weather Bureau on the expected time of arrival of flood crests and estimated crest elevations for selected points on the principal streams in Nebraska. As projections become more specific, progressively more detailed warnings can be issued to the general public and to public officials.

ADDITIONAL DATA COLLECTION NEEDED

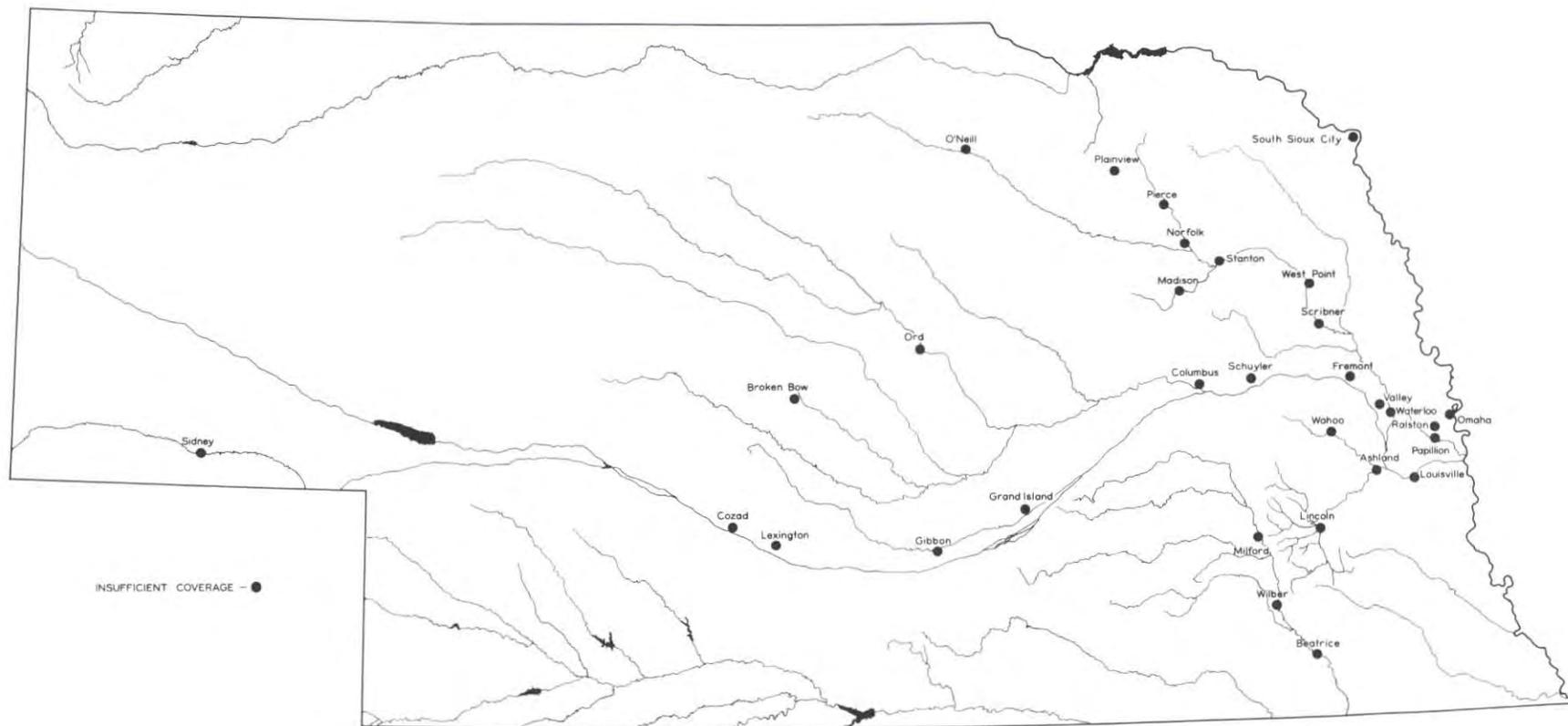


FIGURE 1

Local plans for flood emergencies are, in general, inadequate or nonexistent. Of the 31 Nebraska municipalities of over 1,000 population which are most susceptible to flood damage, only two have specific written plans on which to base emergency action.

PROPOSED IMPROVEMENTS

The state plan of action to be followed during an emergency should be carefully thought out in advance and modifications should be introduced as a result of experience in progressive responses to emergencies. Whether or not major emergencies take place over an extended period of time, principal participants should meet periodically to review the current plan of action, evaluate the need for changes and retain a close working relationship. The plan should include:

1. Official arrangements with necessary state and federal agencies for the use of specialists during emergencies.
2. Concise and current listings of state and federal agencies including names, addresses, home and office telephone numbers of key staff members and types of assistance which each agency is authorized to provide.
3. Listings of contractors and other sources of heavy equipment and trained manpower.
4. Assignment of responsibilities to primary participants.
5. Provision of adequate maps, data, equipment and office supplies to support the emergency operation.
6. Provision for a continuing public information-education program.

Drafting of the formal plan should follow a meeting of those federal and state agencies, which might be able to significantly contribute to development of the emergency action plan. Agencies invited to such a meeting should include:

STATE

Adjutant General's Department
Department of Aeronautics
Department of Health
Department of Water Resources
Game and Parks Commission

Highway Department
Soil and Water Conservation Commission
University of Nebraska
Civil Defense
Department of Economic Development
Red Cross
Department of Education
Telecommunications Division
Safety Patrol

FEDERAL

Army Corps of Engineers
Bureau of Reclamation
Public Health Service
Federal Water Pollution Control Administration
Geological Survey
Office of Emergency Planning
Soil Conservation Service
Weather Bureau
Bureau of Public Roads
Housing & Urban Development
General Services Administration
Office of Education
Small Business Administration
National Red Cross
Regional Office of Civil Defense
Agricultural Stabilization and Conservation Service

Subsequent meetings might be required to fully develop the general plan of emergency action. After development of the plan, only periodic meetings between participating agencies would be required.

The above steps should be carried out by the Adjutant General's Department with technical assistance from the Nebraska Soil and Water Conservation Commission.

State participation necessary to provide minimum satisfactory flood warning to communities includes the collection of additional data. It is essential that such data be collected at specific points upstream of the communities to be protected. Specific needed improvements and their location are:

1. Additional stream level gauging stations shown in figure 2 as red triangles. (Existing stream level gauging stations are shown as black triangles.)
2. Additional precipitation measurement stations shown in Figure 3 as green circles. (Existing precipitation measurement stations are shown as black circles.)

STREAM LEVEL GAGING STATIONS

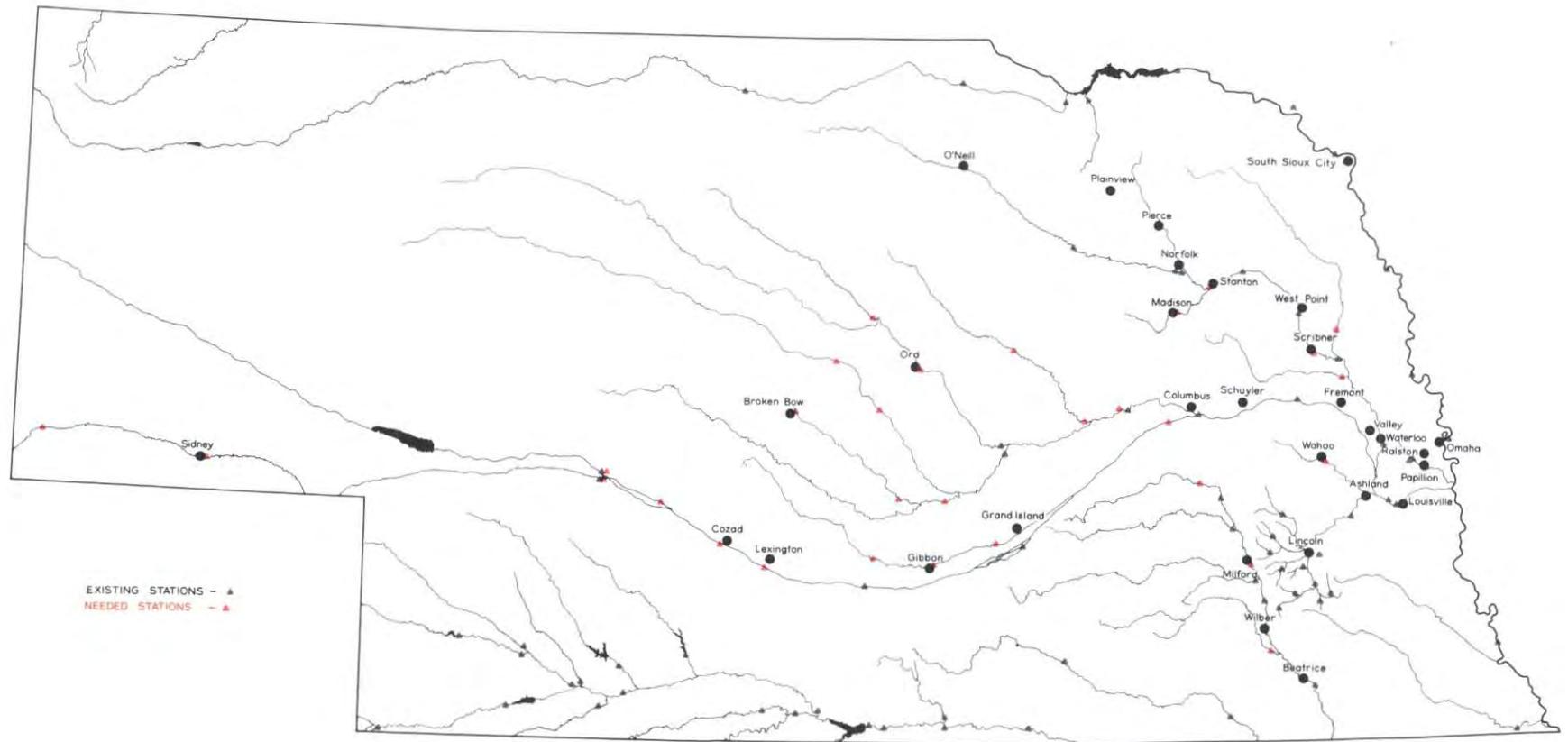


FIGURE 2

PRECIPITATION MEASUREMENT STATIONS

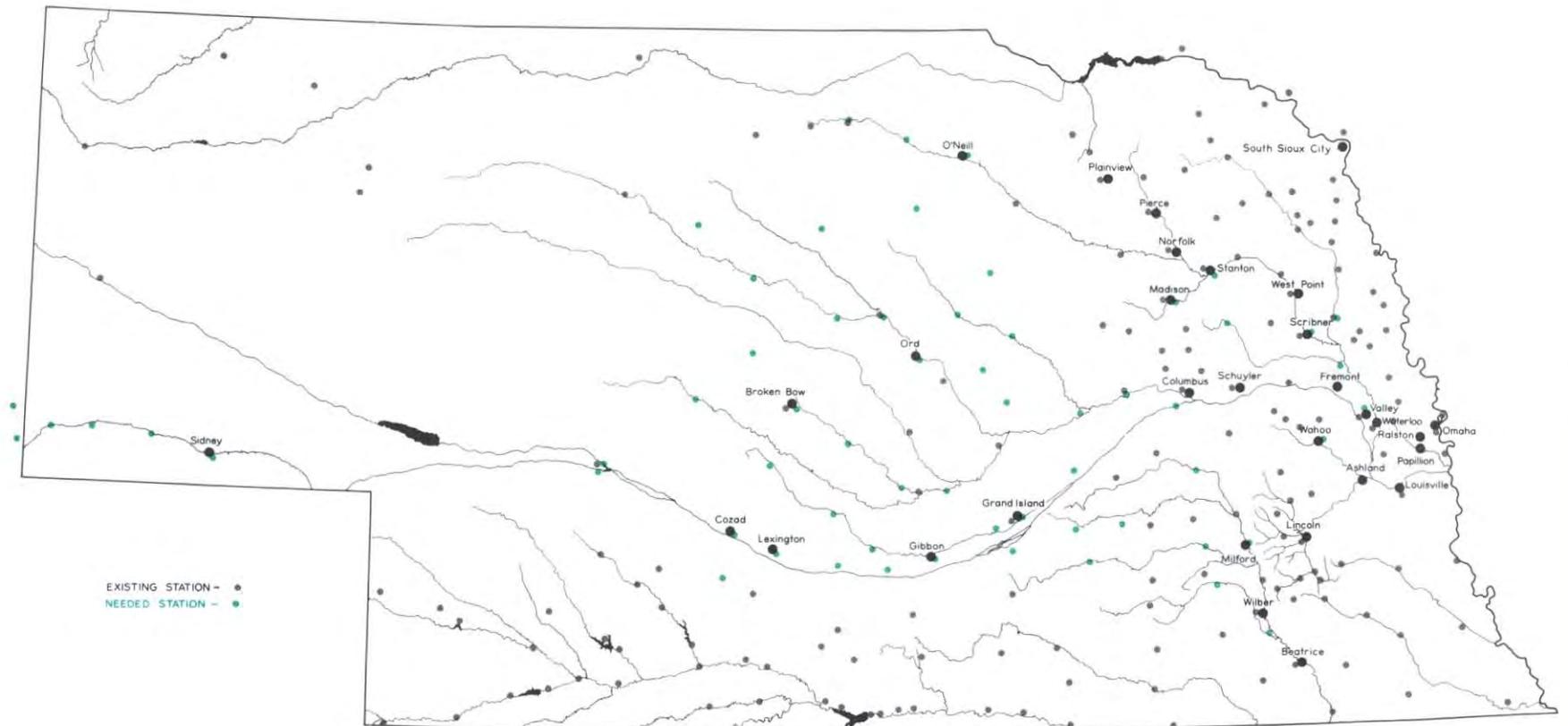


FIGURE 3

These particular improvements as well as operation and maintenance of the completed system should be funded through the Nebraska Soil and Water Conservation Commission. The collection of precipitation and streamflow data should be in cooperation with the Weather Bureau and Geological Survey respectively.

Because of the lack of knowledge of the local situation at the state level, local emergency requests are difficult to anticipate and evaluation of the effect of projected flood crests is impossible. To overcome this, flood problems of each community with a history of flood damage should be investigated by a team including

1. Local officials such as the mayor, city engineer, superintendent of utilities, medical director, civil defense director, and planning director
2. County officials such as the civil defense director, county supervisors, county engineer and the planning director
3. Representatives of the Nebraska Soil and Water Conservation Commission, the State Civil Defense Office and the Department of Health
4. Other technical persons qualified to evaluate and recommend action concerning the community's flood hazards
5. Local officials responsible for the operation of flood control projects

6. Assigned agency personnel (See Step 2)

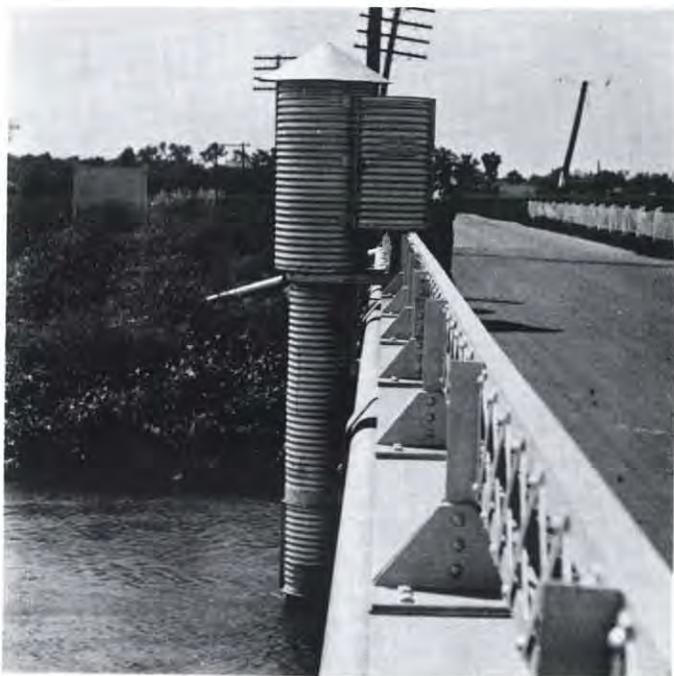
Subsequent to the investigation, a report should be prepared for use by local and state officials detailing:

1. What permanent remedial steps should be taken to protect against flooding
2. What temporary action may be necessary for varying degrees of flooding
3. Names, addresses and telephone numbers of local and state officials

This information would enable prompt evaluation of difficulties to be expected under predicted flood conditions and the preparation of local plans for appropriate protective measures to be taken in advance of the arrival of the flood crest.

The report should be presented to local officials with a full explanation of the report's contents. Information concerning the report should be disseminated through the news media. Each community report should be reviewed periodically to maintain current information.

The general activities of the team responsible for development of community reports should be directed by the Adjutant General's Department with technical development of the reports under the direction of the Nebraska Soil and Water Conservation Commission.



Stream Level Gaging Station



Precipitation Measurement Station

STEP 2. ACTION DURING THE FLOOD PERIOD

EVALUATION

The State Emergency Operating Center is operated by the Adjutant General's Department during flood emergencies to coordinate flood fighting and assistance activities at all levels. Effective communication must be maintained between local officials in the flooded area and the Emergency Operating Center to enable requests for assistance to be rapidly and efficiently evaluated and answered. Only pertinent confirmed information should be transmitted.



Emergency Operations Center

While the existing general communications network for issuing flood warnings is excellent, confusion is common in the heat of crises. Reports are received from city, county and state police; Game Commission and Highway Department personnel; local officials; and a variety of individuals. At times, the best confirmed information on local

conditions is that collected by news reporters and received by the Emergency Operating Center over the news wires.

Requests from communities for assistance should be directed to the State Emergency Operating Center when local resources are exhausted or expected to soon be overtaxed. The types of assistance requested will vary but may include emergency evacuation, power generation, skilled labor, chlorination equipment, medical supplies, law enforcement, sandbagging, and others.

Assistance from the state, to be of most value, must be made readily available. This is particularly true in the case of the flood fighting period when an hour delay may make any efforts futile.

Prompt reaction to the varied requests that may be made requires that:

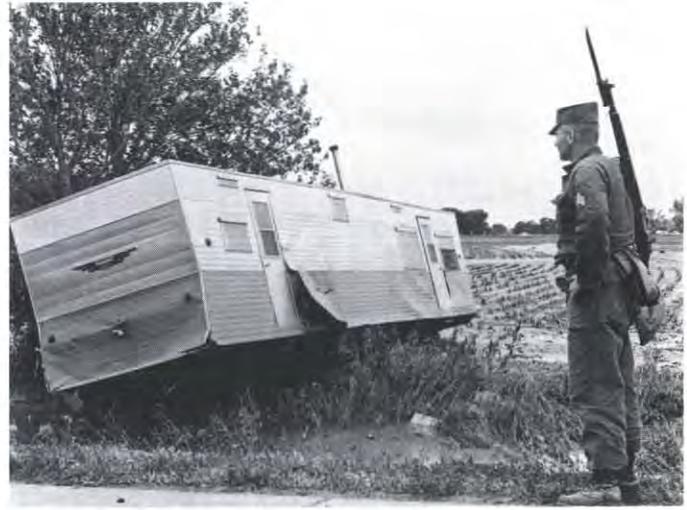
- (a) Certain materials commonly requested should be stockpiled in strategic locations ready for immediate use.
- (b) Location and availability of less commonly needed items should be known in advance.
- (c) Transportation requirements for men and materials must be anticipated and appropriate arrangements made.
- (d) Emergency funds and authorities must be available for immediate use by administrative decision.

Present assistance is directed toward evacuation, rescue, law enforcement and other immediate action involving danger to life. Sufficient staff and funds have not been provided for flood emergency operations to enable assistance in the protection of property and little stockpiling of materials has been accomplished.

The successful rendering of emergency assistance in flood fighting in the past must be credited more to the ingenuity and resourcefulness of the Civil Defense Agency staff than to any existing state determination to reduce losses through adequate plans and advance preparation.



Rescue operations



Law enforcement

PROPOSED IMPROVEMENTS

To improve state-local liaison during the emergency, one person should be available in each community with the technical knowledge to evaluate the local situation with detached perspective and insure that requests for state assistance are justified. At the state level, a pool of persons having the necessary skills and training for flood fighting should be organized. Assistance should be requested from both federal and state agencies in providing suitable personnel. Each person should be oriented to the state-wide flood emergency plan and assigned responsibility for particular communities. The improbability of extremely widespread flooding would make multiple assignments possible. Participation of assigned personnel would include attendance at orientation meetings and assistance in preparation of the community plan of action for flood emergencies (see Step 1—Pre-Flood Preparation) as well as flood duty. The responsibilities of such trained persons during a flood would include:

- (a) Advise local officials of flood projections from the Emergency Operations Center and interpretation of these data using the prepared community report.
- (b) Advise local officials as to technical procedures of flood fighting and emergency methods of flood proofing.
- (c) Provide knowledgeable situation reports from the flood area to the Emergency Operations Center to permit first attention to the most serious problems.

The pool of trained persons for liaison should be jointly developed and trained by the Nebraska Soil and Water Conservation Commission and the Adjutant General's Department but operate under the direction of the Adjutant General's Department during emergencies.

Interviews should be held with communities that have experienced severe flooding to supplement present information as to types of planning and assistance that may be required. Based on this information, local ability to implement a "community plan of action" (Step 1—Pre-Flood Preparation) should be evaluated. Needed stockpiles of materials should be determined and procured by the State Civil Defense Agency.

A damage control team of trained personnel separate from the previously described personnel should be developed to deal with particularly severe localized situations. This team should have priorities of transportation and communication and be authorized in advance to take appropriate emergency action including contracting for materials, employing labor and equipment and the expenditure of emergency funds.

Interviews held with communities should be under the direction of the Adjutant General's Department. The specialized damage control team should be developed and trained by the Nebraska Soil and Water Conservation Commission but should operate under the direction of the Adjutant General's Department during emergencies. Funding should be provided through the Adjutant General's Office.

STEP 3. POST-FLOOD ACTION

EVALUATION

Subsequent to the flood, state and federal assistance may be required to facilitate the economic recovery of the community. The State role in this post-flood period should include:

- (a) Provision of information necessary for requesting Presidential declaration of a disaster area
- (b) Coordination and distribution of information concerning types of assistance available to individuals, businesses and units of government from federal sources
- (c) Care of injured and displaced
- (d) Restoration of vital services
- (e) Emergency repairs

Points (a), (b) and (c) above are being carried out exceedingly well at the present time but no authority or funds exist to effectively carry out restoration, or, to discharge the responsibility of emergency repair (e). Individual agencies, both state and federal, have limited authorities and funds for repair, and they fall far short of the demand for dealing with many common situations. **In many cases, present authorities prevent action until a troublesome situation becomes an expensive minor emergency.**

Soon after completion of an emergency operation, the principals involved, representing each element of the emergency force, should meet to determine the weaknesses made apparent during the crisis and to arrange appropriate modifications in operating procedures.

No such planned critiques of flood emergency operations are presently held.

PROPOSED IMPROVEMENT

Additional authority and funds should be provided to assist individuals and local units of government to make certain types of emergency repairs where the public interest is involved.



Community recovery operations

Owing to the technical nature of anticipated repairs, this authority and necessary funding should be under the direction of a technically oriented agency.

Future flood emergencies should be followed by critiques sponsored and directed by the Adjutant General's Department.



RECOMMENDATIONS FOR ACTION

BY THE GOVERNOR

1. Implement the action outlined in Step 1—**Pre-Flood Preparation**—including directing the participation of the named state agencies and requesting the participation of the named federal agencies.
2. Provide funding from the Governor's Emergency Fund to staff the Flood Warning and Community Action Program until the Legislature has the opportunity to provide the needed funds.
3. Assign responsibility for the organization, training and leadership of a flood fighting team as described in Step 2—**Action During the Flood Period**—to the Nebraska Soil and Water Conservation Commission, and direct the participation of other state agencies as necessary to provide assistance in manpower, travel, communications and other fields.
4. Request the assistance of federal agencies and direct the cooperation of state agencies in providing personnel required for liaison as described in Step 2—**Action During the Flood Period**.

BY THE LEGISLATURE

1. Authorize and fund a Flood Warning and Community Action Program to supplement the existing flood control and flood plain regulation programs.
2. Provide legislative authority for the emergency repair of private or public property where the public interest is threatened.
3. Provide, under legislative authority, for the continuation of the interim actions recommended to the Governor.