

# The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

## Eye kept on high hazard dams in state

By Jason Boyle

Dams must endure some of nature's most powerful forces, so they can and occasionally do fail. Since most residents of North Dakota live near a major stream or river, impacts of a dam failure can be quite significant. High hazard dams are especially of concern. The two most common causes of earthen embankment dams failing are excessive seepage through a dam causing soil movement, and water overtopping the dam due to a flood event. Generally, a change in previous conditions is an indication that there may be problems at a dam. Specifically, an increase in seepage, an increasing wet area, misalignment of the top of the dam, sliding of earthen material, and separation of pipe joints are a few signs that a dam may be unstable and unsafe.

To prevent failure, all high hazard dams in North Dakota are thoroughly inspected a minimum of once every five years. The frequency of the inspection varies with the size of the dam and the owner. For example, the large federal dams in the state are inspected by federal teams every year. State funded dams that are high hazard are typically inspected by the North Dakota State Water Commission every one to three years. The North Dakota State Water Commission has a two-person inspection team. An average inspection on a high hazard dam takes about a half day to complete. After the inspection is complete, a report is written and

sent to the dam owner with any problems or recommendations. Additionally, every high hazard dam in North Dakota receives at least a general visual inspection to catch any problems that may have occurred with the spring rise in water levels.

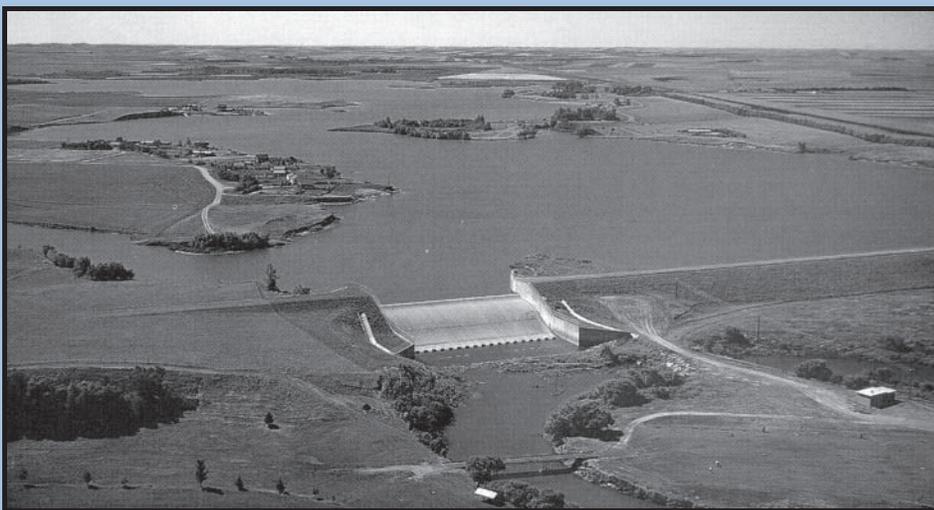
High hazard dams, as defined in the North Dakota Dam Design Handbook, are those dams "located upstream of developed and urban areas where failure may cause serious damage to homes, industrial and commercial buildings and major public utilities. There is a potential for the loss of more than a few lives if the dam fails." The Interagency

Committee on Dam Safety defines dams with high hazard potential as, "those where failure or mis-operation will probably cause loss of human life." There are currently less than 30 such dams in North Dakota. When compared to the rest of the United States, which has over 11,000 dams with a high hazard potential, North Dakota has relatively few for its geographic size.

Federal hazard classes include low, significant, and high, while the State of North Dakota uses a low, medium, and high class designation. Factors that determine the classification are the potential for loss of life, and the extent of economic and environmental losses incurred if a dam fails. A dam is classified by completing a dam break analysis, which involves using computer software, field inspections to determine downstream temporary and permanent populations, U.S. Geological Survey 7.5 Minute Series topographic maps, and engineering judgment.

The owner of a dam is responsible

Heart Butte Dam in southwestern North Dakota is one of the state's high hazard dams.



North Dakota State Water Commission  
David A. Sprynczynatyk, State Engineer  
900 East Boulevard • Bismarck, ND 58505 • (701)328-2750  
<http://www.swc.state.nd.us/>

Brett Hovde, Editor

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for putting together an Emergency Action Plan. The Emergency Action Plan (EAP) is a document that clearly and concisely explains what steps should be taken when an emergency situation occurs. The EAP contains a notification flowchart, flood inundation map, and defines specific responsibilities should a failure or potential failure situation occur. An EAP is a living document that should be continually updated

with current names and phone numbers of individual contacts. Testing and exercising the EAP for realistic scenarios is also an important step in maintaining readiness for emergency situations. The operators of all dams that hold back greater than 1000 acre-feet of water (325 million gallons) are required by the North Dakota Administrative Code 89-08-04-01 and the North Dakota Century Code 61-03-21 to annually

submit an operation plan that must contain emergency procedures and warning plans.

Owners of high hazard dams in North Dakota include the U.S. Bureau of Reclamation, the U.S. Corps of Engineers, the U.S. Fish and Wildlife, the Natural Resource Conservation Service, and various water resource districts, cities and private entities. ■



## COMMISSION MEETING MINUTES

The North Dakota State Water Commission (Commission), chaired by Governor Edward T. Schafer, acted on several items of business and was given status reports on continuing water management projects and programs at the July 14 meeting in Bismarck.

The Commission approved several cost-share requests for water development projects throughout the state.

- Cost-share for the reconstruction of Cass County Drain #21 was approved in the amount of \$136,000. The remaining \$68,750 of requested cost-share was deferred until the next biennium.

- A project involving the construction of Cass County Drain #29A was approved for cost-share in the amount of \$136,000. The remaining \$113,745 requested for cost-share must wait until the next biennium. The drain will be located immediately west of Argusville.

- The Maple River and Rush River Joint Water Resource Districts were approved for cost-share for an Interstate 94 Swan Creek diversion. The approved cost-share was \$70,000, or 35 percent of the

eligible project costs.

- Cost share of \$136,000 was provided to the Steele County Water Resource District for county drain #4. The total requested cost-share was \$159,395, thus the remaining \$23,395 was deferred until next biennium. Todd Sando presented the project to the Commission. He explained that the project consists of cleaning and enhancing existing section line roads and railroad right-of-way ditches.

The Commission concurred that the level of funding currently provided by the state for ring dikes is not adequate enough for all landowners to take advantage of the program. With that, the Commission approved an additional 15 percent cost-share (in addition to the previous 25 percent) for rural ring dikes. However, the Commission expressed the importance of involving a local entity cost-share. Therefore, the additional 15 percent is contingent upon an equal cost-share match by a local entity. The Commission then requested the Red River Joint Water Resource Board to seek an attorney general's opinion confirming its spending authority to participate in the cost-share of rural ring dike projects.

With the Southwest Pipeline Project, the Commission approved sole source amendments to the water contracts for the cities of

Scranton and Beach. Under a sole source service, users agree to utilize pipeline water exclusively.

Governor Schafer directed the State Engineer and his staff to continue with the development of a new prioritization process for water projects, which is being written for the Water Development Biennial Report. The prioritization process, as currently drafted, provides the ability to base funding decisions on project merits and their expected benefits to the state. The process will provide structure to the decision-making process, while still allowing the Commission's discretion in special circumstances.

The Commission adopted the position that federal hydropower, allocated for irrigation development as part of the Pick-Sloan Missouri Basin Program, be allocated and utilized for irrigation, and be made available for rural water systems. The Commission also supported Congressional authorization of allocation of federal hydropower for irrigation districts at the firm or preference power rate utilized for other preference customers.

And finally, the Commission unanimously supported a resolution of appreciation for Gary D. McDowall, who retired May 31, 2000. Gary served the State of North Dakota for 31 years; 4 years with the Department of Transportation, and the following 27 years with the State Water Commission. Happy retirement, Gary! ■



# THE WATER PRIMER

## DROUGHT: Did you know...?

By Pat Fridgen

Because of frequent flooding and excessive moisture throughout the State of North Dakota in recent years, it is difficult to even think about drought. However, drought is a part of North Dakota's natural climatic cycle, and *will* happen again. The only question is how soon.

The following drought-related facts help remind us of the trying times that drought can bring, and emphasize the need for drought preparedness in North Dakota:

■ From 1896 to 1995, drought occurred 100 times out of those 100 years in at least some portion of the United States.

■ At a more local level, at least some part of the Missouri River Basin experienced severe drought conditions 90 of those same 100 years.

■ The national average for annual losses associated with drought ranges between \$6 and \$8 billion. Average losses associated with flooding account for \$2.4 billion, and hurricanes, about \$3 billion annually.

■ Between the years 1932 and 1940, each of those years had 30 consecutive days without any water flowing in the Red River at Fargo. Today, the City of Fargo relies almost exclusively on the Red River for their drinking water and industrial water needs.



STATE HISTORICAL SOCIETY

■ In the peak of the 1934 drought, over 65 percent of the United States was plagued by extreme drought. More recently, about 36 percent of the United States experienced extreme drought in 1988.

■ The total agricultural, energy, water, ecosystem and other economic sector-related losses during the 1988-89 drought in the United States was estimated at \$39 billion, making it the most expensive natural disaster in United States history.

■ According to the Bureau of Reclamation, the 2050 population estimate for Fargo is about 192,600. If Fargo were to experience a 1934 type drought with its expected 2050 population, the total estimated municipal and industrial water shortage would be almost 25,000 acre feet (or 8,150,000,000 gallons) per year.

■ A University of Colorado scientist found that paleoclimatic records of the last 4000 years indicate the 1930s Dust Bowl, and 1950s droughts were not unusual events, and suggest that we can expect to have several droughts of at least that magnitude in the future.

■ The State of North Dakota has already started a comprehensive drought planning process. When completed, the plan will provide direction for monitoring drought conditions and implementing drought mitigation efforts in North Dakota. ■