

## NDSWC 1998 Devils Lake Basin Wetland Drainage Study

Summary of work completed April 1998 and performed by Stan Hansen and Mark Geringer, North Dakota State Water Commission.

Between 1996 and 1998, the State Water Commission conducted a study of all legal and potentially illegal wetland drainage in the Devils Lake basin. Supplemental funding was provided by a grant from the Environmental Protection Agency. Substantial technical assistance was provided by Bureau of Reclamation staff.

The basis of this study was a section by section analysis of nearly 100 percent of the land area within the Devils Lake basin boundary utilizing Natural Resource Conservation Service wetland maps. Based on the wetland delineations from these maps, approximately 23,000 wetlands had been drained. These drained wetlands had a surface area of about 41,000 acres. The average size of each wetland is less than 2 acres.

Not all drained wetlands contribute water to Devils Lake. Many smaller closed sub-basins are contained within the Devils Lake basin. Drained wetlands in such a closed sub-basin would drain into larger wetlands or small lakes that typically do not overflow and, therefore, do not flow to Devils Lake. However, some typically closed-basin wetlands are starting to contribute to downstream runoff as the wet cycle continues to fill these areas to their overflow level. **This analysis assumed that all drained wetlands DO contribute to Devils Lake.** Using this assumption will cause the analysis to represent an upper bound to the number of wetlands, the area affected, and the volume of water stored that are related to Devils Lake flooding.

How much water volume is involved? Judging from the 2-acre average size of each drained wetland and the flat topography in the basin, it is thought that storage potential is limited. **An average depth of 2 feet for each wetland was assumed for this analysis. It was further assumed that the drains were 100 percent efficient in removing all water from the wetland and the wetland was empty upon restoration.** Two feet of water retained on 41,000 acres of restored wetlands in the Devils Lake basin would provide about 82,000 acre-feet of storage for the initial filling. That would be equivalent to about 6-inches of elevation on Devils Lake at its current level.

The precise impact on the water level of Devils Lake if all drains in the Devils Lake basin were closed would be the difference between the amount of water "consumed" to evaporation, transportation, and seepage of the water in the wetlands versus the same factors applied to the water in Devils Lake. Therefore, the amount of elevation difference is probably less than 6-inches.

The study assumed that a simple earthen plug would be used to restore the drained wetland. The cost to close the drains was estimated at \$450 per wetland. Time required would be one full summer construction season plus any time required for legal actions required where landowners challenged the closures. Installation of the plugs, with administration would likely exceed \$11.3 million. Compensation to landowners, crop damages, access to sites during construction and legal fees would be added to this. All costs to plug drained wetlands was estimated at about \$31.4 million with annual payment costs of about \$2 million.

The following provides a synopsis of study findings:

Drained Wetlands

Number	23,000
Area	41000 acres
Volume	82,000 acre-feet

Restored Wetlands Water Retention Capacities

Initial filling	82,000 acre-feet
Annual thereafter	31,200 acre-feet

Cost: \$31.4 million initial with \$2 million annual thereafter

Estimated B/C: 0.2 to 1 This was calculated by measuring the damages that could be averted around Devils Lake versus the project implementation and operations cost. It does not include economic impact to regional agribusiness.