

EXECUTIVE SUMMARY

2006 Devils Lake Basin Water Management Plan



PREPARED BY:

**Devils Lake Basin Joint Water Resource Board
and the North Dakota State Water Commission**

This is only a summary of the 2006 Edition of the Devils Lake Basin Water Management Plan. For a more detailed explanation of background, issues, and goals, please reference the complete plan.

INTRODUCTION

It was determined by the Devils Lake Basin Joint Water Resource Board (Joint Board) in early 2002, that a need existed to update the 1995 plan, and to re-evaluate its objectives based on more current and enhanced data. That report supercedes the 1995 Devils Lake Basin Water Management Plan (Water Plan) that was a product of the Devils Lake Basin Conceptual Water Management Plan. When the 2002 plan was completed, it was decided by the Joint Board to update the plan at least every three years.

There are three main objectives of the 2006 update of the Water Plan; the first is to utilize local citizenry for their experience and expertise, while still employing the expertise of various state, federal, and private agencies in a non-voting, technical support role; the second is to update and adjust the Water Plan, to more accurately reflect current conditions and needs; and the last is to provide a means of measuring the accomplishments of various entities regarding stated water management goals over time.

The key to water management within the Devils Lake Basin (Basin) is planning at the watershed level, which works at restoring the viability of agriculture, ensuring flood protection for the City of Devils Lake, as well as addressing upper basin flooding, and lastly looking into recreational development for economic diversity.

Mission Statement

It is the goal of the Joint Board to develop a comprehensive, coordinated, water management plan for the Basin that will protect the economic and biological values of the Basin while providing optimum benefits for agriculture, wildlife and fisheries, outdoor recreation, economic development, and its' citizens.

Purpose of the Plan

The purpose of this document is to provide general background on water and land resources, to define water management issues, to update project needs, to state objectives, to provide strategies designed to manage the Basin in a manner that best meets the needs of all interested parties, to set clear goals to be achieved, and to measure the success of those goals and strategies over time. Once the Subject Committees and the Joint Board have approved the updated basin management plan, the process of implementation of strategies can begin.

Perhaps the most important aspect of this plan is ensuring that all relevant agencies—state, federal, and private organizations—should make a unified effort to achieve the management strategies and objectives of this plan, which will serve as a constant reminder of what actions need to be completed in the Basin.

This plan is a working plan, and in that sense will never be completely finished, and will need periodic updates. It uses a loose-leaf format to outline components of the plan so the results of future work can be added with little effort. Any changes in objectives or strategies must be approved by the Joint Board with consultation from the four Subject Committees, and will be reflected in future plan revisions.

Future Updates

The 2006 update of the Water Plan represents the conditions of the Basin at this time. The purpose of the Water Plan is to provide a convenient and accessible document that will provide the citizens of the Basin and state, federal, and private agencies with a road map of what has been done, what is being done, and what remains to be done.

While this plan intends to give a long-term vision of water management in the basin, it is the nature of water management issues to change. It is important to continue to make progress towards the Basin's long-term water management goals, while still retaining the flexibility necessary to change this plan to best meet short-term needs.

As a result, the Water Plan will be reviewed every three years, or less if necessary, by the Joint Board, with the assistance of the Subject Committees and Technical Support Groups. The Subject Committees have also recognized the need to keep their objectives, management issues, strategies and procedures current, and have set timetables for the updating of the respective sections.

Maintaining the Water Plan provides long-term guidance, but it is also a document that must be kept

current in the overall effort to resolve many of the Basin's water management problems. Many excellent studies have been initiated in the Basin, only to be forgotten or not kept updated. A good example of a study that will need to be continually updated is the Bureau of Reclamation's (Bureau) Road and Railroad Crossing Inventory for all of the main coulees in the Basin. Inventories have been completed on the Mauvais and Big Coulee (1999), Edmore Coulee & tributaries (2000-2001), Calio Coulee (2002), St. Joe Coulee (2003), Starkweather Coulee (2004), and Little Coulee (2005). The responsibility of maintaining this powerful tool for hydrologic modeling has been given to the nine counties of the Devils Lake basin with coordination by the Joint Board, and they have agreed to do so. The success of this plan is dependent upon all interests continually working together for the betterment of everyone.

THE THREE-PRONGED APPROACH

As a result of the extremely high water levels on Devils Lake and the corresponding land and property damages, the need for a solution to the current water management problems has become apparent. What is needed is a comprehensive, understandable, watershed-level plan to effect true change in the basin, which this document represents. A three-pronged approach, including upper basin water management, infrastructure protection, and an outlet to the Sheyenne River, has been developed to alleviate flooding in the Basin.

Upper Basin Water Management

The first aspect of the approach is upper basin water management. It is a common misconception that wetland restoration in the upper basin would solve the region's chronic flooding problems all by itself. A fact often overlooked is that because of the efforts of many agencies and groups, significant progress has been made in the restoration and protection of wetlands in the Basin in the past 20 years. Further, landowners have a legal right to drain their land under provisions in North Dakota state law.

In total, it is estimated that approximately 14,000 acres of wetlands have been restored, protected, or enhanced in the Basin for the dual purposes of water storage and wildlife habitat. In the future, an additional 13,000 acres of wetlands have been proposed. If all of the proposed wetland projects are eventually completed, that would bring the total of restored, and enhanced wetlands to 27,000 acres.

This important work has been accomplished by various agencies, including the Natural Resource Conservation Service (NRCS), the North Dakota Natural Resource Trust (Trust), the North Dakota State Water Commission (Water Commission), and the United States Fish and Wildlife Service (Fish and Wildlife Service). The Joint Board has also played a significant role in continued efforts to increase upper basin storage.

In 2001, the most recent study on upper basin storage, completed by West Consultants, estimated 92,429 acres of possibly drained depressions in the Basin. This means that approximately 14 percent of possibly drained wetland acres have been restored, protected, or enhanced. Further, if the full 27,000 acres of wetlands proposed by various agencies were restored or enhanced, that would mean the restoration of nearly 29 percent of the possibly drained depressions. If approximately 14 percent of the drained wetlands in the Basin have already been restored, and restoration of 29 percent of wetlands is the eventual goal, that represents a significant amount of wetland restoration.

However, efforts to store water in the basin continue, and in 1995 the Water Plan concluded that with the proper incentives to landowners, some wetland areas in the upper basin could hold additional waters in high-flow conditions, and this has been done with the Water Commission sponsored Available Storage Acreage / Extended Storage Acreage (ASAP/ESAP) Programs, the NRCS, the Trust, and the Fish and Wildlife Service National Wildlife Refuge on Lake Alice. Various governmental agencies have, or are planning the development, management, and enhancement of wetland acres for the dual purposes of wildlife habitat and water storage.

The Water Commission enacted ASAP in 1996. This program paid landowners to store water that would have contributed to the flooding around Devils Lake. The program ran from 1996-1999 and stored 8,000-22,000 acre-feet per year at a total cost of \$3.5 million. In 2000, the ASAP evolved into the Extended Storage Acreage Program (ESAP), which involved extended (typically ten-year, rather than one-year) contracts. Under ESAP, the Water Commission signed contracts for eight sites in 2000, which covered 395 acres, and had an approximate storage volume of 800 acre-feet. Those contracts are scheduled to expire on December 31, 2008. In 2003, an additional ESAP contract was signed for 18 acres, with 35 acre-feet of storage. That contract will also run through December 31, 2008.

There have also been five different studies done in the Basin, trying to determine the actual storage of wetland depressions. The most accurate and detailed of these studies is the one completed by the Corps in 2001. However, storing surface water alone is not the whole answer.

In addition to changing the quantity of water flowing into Devils Lake, there have also been projects by various agencies that address the quality of water, not only in Devils Lake, but also in the Basin as a whole. The United States Geological Survey (USGS) has produced 22 papers on the hydrogeology of Devils Lake since the last plan was published, addressing subjects ranging from variations in water quality in Devils Lake and upper basin lakes, plankton communities, to reconstructing historical hydrological conditions.

Working with a variety of watershed maintenance projects will demonstrate the value of restoration

demonstration projects on portions of the Starkweather Coulee and will also showcase the value of different agricultural techniques, such as buffer strips (vegetation planted along watercourses to prevent erosion), or minimal tillage agriculture. These types of projects have the potential to significantly improve the quality of water entering Devils Lake. In addition to actual projects, many of the Technical Support Groups, such as the North Dakota State University Extension Service (NDSU Extension), and the NRCS, have active educational programs in place to increase the sustainability, environmental friendliness, and profit of agricultural land use practices in the upper basin. The various projects, and programs in place in the Basin demonstrate the amount of progress that has been made as a result of the 1995 plan. However, much work remains to be done. The Kenner Marsh restoration project has also been a good example of private property owners working with agencies to store water and restore habitat.

Infrastructure Protection

The second aspect of the three-pronged approach is infrastructure protection. Since 1996, Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), has paid 500 claims for the purposes of salvage, relocation, and demolition, and an additional 250 claims for the protection of existing structures, totaling over \$28 million.

In May 1999, FEMA contracted for a GPS-based risk assessment inventory of all structures around Devils Lake below 1,465 feet above mean sea level (amsl.) The inventory used digital aerial photography and Light Detection and Ranging (LiDAR), a topographical imaging technology. A total of 890 structures, valued at \$76.9 million, were identified, 139 of which are below 1,450 feet amsl (the level of protection for the City of Devils Lake's dikes). FEMA has completed this detailed risk assessment around Devils Lake. The contractor for the FEMA LiDAR project has been contracted by the state to help provide a data storage site and web-based data access point to be managed by the North Dakota Information and Technology Division.

Since September 1999, FEMA implemented a closed basin lake flood insurance endorsement replacing the temporary waivers it had been using to handle the continuous lake flooding. As of July 15, 2001, four of nine Devils Lake area NFIP participating communities opted to remain eligible for this closed basin lake flood insurance endorsement by adopting more stringent floodplain management regulations. Benson County, Minnewaukan, Creel Township, and Devils Lake now regulate development below an elevation of 1,460 feet amsl.

Most of the City of Churchs Ferry was acquired under FEMA's Hazard Mitigation Grant Program at a cost of \$4 million. Two families remain in the city at an elevation above 1,460 feet amsl. The BTR Cooperative Elevator in Churchs Ferry has chosen to relocate the

elevator five miles west of the city in Benson County through a combination of programs, including the NFIP, Hazard Mitigation Grant Program, the Economic Development Administration, the Department of Housing and Urban Development, and local funding at a cost of \$11.4 million dollars. Many of these projects were done under the local direction of North Central Planning Regional Council.

Rural acquisitions in Ramsey and Towner counties continue, affecting approximately 24 farmsteads.

The North Dakota Department of Transportation (DOT) and the federal government have spent over \$178 million on improvements and maintenance for roads affected by the rise of Devils Lake. A great deal of work has been completed since 1995, and if waters continue to rise, additional funds will need to be allocated towards road improvements.

Generally, the roads have been raised to an elevation of 1,455 feet amsl; with the base wide enough to eventually go to 1,465 feet amsl and the bridges to 1,465 feet amsl. The DOT began major construction on a final route for U.S. Highway 281, which will be constructed to run west of the City of Minnewaukan, and is estimated to be complete in 2006, with a total cost of \$34.8 million.

The Corps has systematically raised the levees protecting the City of Devils Lake. Construction, beginning in 2004 and completed in the fall of 2005, raised the levee to an elevation of 1,460 feet amsl, which will provide protection from Devils Lake up to 1,454 feet amsl. The total cost for this phase of construction is estimated at \$8.5 million. Additional raises to protect to an elevation of 1,460 feet amsl, the natural outlet elevation, would require significant additions to the dike system, including widening the base of the levee. Work of this sort would likely be extremely costly, and would likely cause further problems in the community, in terms of required condemnations of privately owned property, as the next raise will require doubling the length of the dike to over 14 miles.

While the flooding around Stump Lake has not reached the same magnitude of crisis that it has on Devils Lake, the problem is becoming significant. Five farmsteads, with an estimated replacement value of approximately \$1.2 million, according to Nelson County Water Board member Ben Varnson, will be partially submerged, or made inaccessible between a lake elevation of 1,437 and 1,444 feet amsl. Similar to the City of Devils Lake, the City of Lakota gets its water supply from water lines that are under eastern Stump Lake. Another problem associated with the rising waters of Stump Lake is the flooding of roads. Varnson estimated that the total cost of either raising or moving inundated roads could range as high as \$15 million. In anticipation of funds possibly being made available for emergency rerouting, local road and county officials are developing alternate routes that may cost up to \$4.4 million. The Water Commission had \$500,000 earmarked in its budget for Nelson County flooding problems in 2005.

Of that amount, \$250,000 was to cover road repairs at 100 percent cost-share, and the remaining \$250,000 will be allocated for various water projects.

The North Dakota State Park System has four parks next to the lake. The Narrows State Recreation Area was flooded in 1995 and is not currently in use, and Grahams Island State Park, Shelters Grove, and Black Tiger Bay Parks have flooded facilities, but remain open. Replacement facilities have been reconstructed at Grahams Island State Park. The relocation project is now complete, and \$1.5 million has been spent to relocate campsites, public facilities, roads, and boat ramps. A recent \$3.5 million road raise to keep Grahams Island State Park has been completed. However, between 1,450 and 1,455 feet amsl, county access road to the park will be lost, with only the main road remaining open. At 1,455 feet amsl, the entire park area of Shelters Grove, excluding the shop, will be completely flooded. Any lake elevation above 1,448 feet amsl will force the park to close. If the lake reaches 1,449 feet amsl, which it did in both 2004 and 2005, all of the land area of Black Tiger Bay State Recreation Area is flooded.

Several areas adjacent to Highways 20 and 57 are not currently flooded by Devils Lake because the roads are acting as dikes. In March, 2005, the DOT closed Highway 20 along the south shore of Devils Lake (near St. Michael) due to seepage that was occurring through the roadbed. State officials were alerted of the problem when a local resident reported seeing water flowing from the base of the roadbed. In addition, it was possible to see areas where the flowing water had actually eroded a path through the ice on the downstream side of the road. After extensive monitoring, which included test drilling along the base of the roadbed, it was determined that Highway 20 was safe, and it was reopened for travel in April, 2005. The roadway continues to remain open for travel, but it is under frequent observation. The DOT, in consultation with other state agencies, has been considering several alternatives to repair the problem. It is anticipated that the most viable option, is to build a seepage and stability berm on the downstream side of the road embankment. This will essentially amount to the installation of fill and a collection pipe that will more safely divert the seepage away from the roadbed. In August 2005, Senator Kent Conrad successfully persuaded the Federal Highway Administration to appropriate \$70 million to shore up roads acting as dikes around Devils Lake. This amount will fund 95 percent of the needed repairs.

Over \$1 million has been spent, primarily by FEMA, to relocate pipes and pump stations to keep the Ramsey County rural sewer system operable. Unfortunately, this has not been enough to prevent damage to the water transmission system that supplies the City of Devils Lake. Devils Lake receives its water supply from a well field located on the Spirit Lake Nation, approximately 18 miles to the southeast. Nearly one-third of the transmission pipeline is underwater, and this system is in danger of failure. If a failure occurs, potable

water would be unavailable to the city for an indefinite period. Preliminary estimates for new water source development and treatment range from \$10 million to \$30 million. The City of Devils Lake has secured water rights to an aquifer south of Devils Lake, and has received \$500,000 in grants thus far.

Outlet to the Sheyenne River

The State of North Dakota has constructed an outlet project from Devils Lake to the Sheyenne River. An outlet is the third and final prong of the solution.

The first phase of the project is capable of pumping up to 100 cubic feet per second (cfs), with the potential for expansion to 300 cfs. The outlet project consists of two pumping stations, 3.3 miles of pipe, and 9.4 miles of open channel.

Work on the outlet began in October 2002, with the construction of a pumping pad and an access road to the future location of the Round Lake Pump Station. In 2003 and 2004, construction continued, and the State of North Dakota was granted a Section 402 Permit by the North Dakota Department of Health (Health Department) for operation of the state outlet. Operation of the outlet will be constrained by water quality and quantity effects on the Sheyenne River. A lawsuit appealing the 402 Water Quality permit was heard in State District Court, overruled, appealed, and that appeal was finally denied in the summer of 2005.

Operation of the outlet is limited by the permit to only operate under the following conditions: outlet flow additions shall not cause Sheyenne River flow at the outlet discharge point to exceed 600 cfs; seven-day average sulfate concentration measured in samples from the downstream monitoring location shall not exceed 300 mg/l; the pH at the downstream monitoring station should remain within the range of 7.0 to 9.0; outlet discharge not to exceed a maximum discharge of 100 cfs (50 cfs during the first year of operation), nor operate outside of the approved seven-month operating period (May through November).

Major construction on the outlet was completed in August 2005, and it was successfully operated for a brief period of time shortly thereafter.

The "Fourth Prong"

While a three-pronged process is being used by the State of North Dakota to deal with flooding problems in the Basin, a frequently overlooked impact is the effect that flooding has had on the economy of the Basin. With over 81,000 acres of farmland inundated, and numerous other impacts to the local and statewide economy, a fourth prong, economic development was developed through the efforts of the Joint Board. Local officials, businesses, and entrepreneurs in the Basin have worked hard in the last decade toward that end, through efforts such as increasing regional awareness of the many recreational opportunities that the Basin has to offer, drawing people from outside the state.

Some progress has been made in this area, with the Economic Development Subject Committee outlining objectives and strategies in this area. The majority of the work on economic recovery and revitalization has been done at the local level. For example, a report prepared in 2000 by CEO Praxis for the City of Devils Lake and the Mayor's Business Committee, and an economic summit held in Devils Lake in 2000 with over 20 state and federal agencies represented, demonstrates progress in this area. Significant economic development efforts continue to be made by individual community economic development organizations and through partnerships developed since the summit was held.

However, economic revitalization and recovery efforts are often limited by a lack of funding and technical expertise. The small number of programs in this area highlights the need for local citizens, state, federal, and private agencies to focus more of their energy in the future on this vital area. Solving the water management problems of the Basin is not only vitally important to the economic future the communities and residents of the Basin, but has important impacts on the economic viability of the entire state of North Dakota.

SUBJECT COMMITTEE RECOMMENDATIONS

Through a series of meetings in 2005, the Subject Committees reviewed recommendations developed in the previous plan, and reevaluated them based upon current conditions.

AGRICULTURE

Goals

1. Ensure that the rights of property owners are protected.
2. Increase both the economic and environmental benefits of agriculture through the implementation of better land and water management practices.
3. Provide flood protection for private and public lands sufficient to protect against a specific flood event.
4. Develop specific plans and goals, for the Joint Board and the sub-basin advisory boards, in order to promote better conservation management practices.
5. Identify local, state and federal regulations that can help or hinder implementation of the Water Plan.
6. Increase farm income through increased commodities production using better water management practices, such as the development of the Upper Basin Water Utilization Test Project.

Specific Actions to be Accomplished or Initiated Prior to the 2008 Water Plan

1. The Joint Board should take the lead role in working with all appropriate entities to achieve the goal (mentioned under Agriculture in the 2002 plan) of planting all of the major coulees in the Basin with buffer strips.

2. Secure funding to compensate landowners for inundated acres in the basin.
3. Develop feedlot zoning regulations on a basin-wide level. These regulations can be based upon similar regulations that have been developed by Benson, and Ramsey Counties.
4. Develop an additional 1,000 acre-feet of floodwater storage in the basin.

Accomplishments Since the 2002 Water Plan

1. Requested and received an opinion from the State Attorney General on the issue of ownership of inundated land after waters have receded. This is an issue that has been of some concern to Basin landowners, and was referenced under Agriculture in the 2002 plan.

ECONOMIC DEVELOPMENT

Goals

1. Capitalize on the economic resources of the Basin regardless of water levels.
2. Create a basin-wide economic development effort utilizing existing Basin economic development organizations.

Specific Actions to be Accomplished or Initiated Prior to the 2008 Water Plan

1. Complete campground facilities for the Lake Upsilon recreational area in Rolette County.
2. Hold annual economic development meetings between economic entities of the Basin annually in December.
3. Create a minimum of ten new internships in the Basin annually prior to the 2008 update of the DLBWMP with the dual purposes of creating jobs in the Basin, and making people more interested in living there.
4. Support the development of the Heart of North America Trail system prior to 2008.

Accomplishments Since the 2002 Water Plan

1. A small business development center (SBDC) developed in the Basin. Between 2003 and 2005, 2,295 hours were spent assisting 469 businesses within the Basin.
2. In the summer of 2005 nine interns were placed in the region by the Northeast North Dakota Internship Program. In 2006, commitments have been received for five intern positions for Cavalier County, five from Forward Devils Lake, and three from Towner County.
3. Increasing levels of cooperation and coordination among Basin economic development entities in the realm of pooling of resources, and talent, and focusing on the unique values of each area. Examples of these partnerships include: a partnership between Towner County, Cavalier County, Ramsey County, and the City

of Rolla; and work between three regional planning councils, North Central, Red River, and Souris River.

4. Worked to gain funding for flood protection of the Grahams Island State Park road, and Wood Ruten bridge.
5. Construction was initiated on a recreational area on Lake Upsilon in Rolette County, through completion of the development of a beach and picnic area.

RECREATION

Goals:

1. Stabilize Devils Lake to enhance recreational opportunities in the Basin.
2. Develop recreational opportunities in the Basin.

Specific Actions to be Accomplished or Initiated Prior to the 2008 Water Plan

1. Maintain knowledge of, and active involvement where possible in future water permitting issues that have the potential to impact the waters of the Basin. This should be pursued with the long-term goal of water management at the Basin level.
2. Encourage the assembly of information related to the development of a Devils Lake recreational district.
3. Encourage the development of joint recreational groups, patterned on the groups that resulted from the recommendations of the 2002 Economic Development Committee.
4. Encourage the holding of annual meetings, beginning in 2005, where recreational opportunities can be discussed.
5. Encourage the development of a master list of recreational opportunities throughout the Basin, possibly through the use of the summer internship program.

Accomplishments Since the 2002 Water Plan

1. Worked to gain funding for flood protection of the Grahams Island State Park road, and Wood Ruten bridge.
2. Economic Development and Finance, a division of the State Department of Commerce, has begun to take a stronger role in promoting tourism throughout North Dakota.
3. The Devils Lake Flooding Brochure, which provide information on recreation in and around Devils Lake, was updated in 2005.
4. An additional campground was constructed and a comfort station was relocated at Grahams Island State Park, and new facilities built at Black Tiger Bay for a total cost of approximately \$350,000.
5. Construction on the Heart of Dakota Trail system has begun.
6. The Devils Lake Basin Water Stewardship Award was created to recognize significant efforts in water resource management.

WILDLIFE AND FISHERIES

Goals:

1. Enhance grassland, woodland and wetland acreages for the betterment of wildlife and fisheries production in the Basin.
2. Manage water quality for the benefit of Basin fisheries and wildlife.
3. Encourage continuation and intensification of agricultural conservation practices that are beneficial to agriculture, wildlife and fisheries in the Basin.
4. Implement programs that encourage increased youth participation in hunting, fishing and outdoor recreation.
5. Improve communication between agricultural and outdoor interest groups.
6. Joint Board should endorse, support and promote ANS control efforts as it relates to Basin waters.

Specific Actions to be Accomplished or Initiated Prior to the 2008 Water Plan

1. Support the efforts of various agencies and groups, as coordinated by the Joint Board, to prevent the possible introduction of ANS into the Basin via the Billings Lake area connection or any other interbasin water transfer points.
2. The Joint Board should work with the NDGF and other agencies to secure the appointing of a representative from the Joint Board on the State ANS Committee.

Accomplishments Since the 2002 Water Plan

1. Additional perch were stocked in Devils Lake in 2005 at the request of local angling interests.
2. Regular estimates of habitat quality and acreage are being conducted.
3. All of the funds available through the Waterbank Program in the Basin have been utilized.
4. The Joint Board, in cooperation with the USGS, the Red River Joint Board, and the Water Commission, have funded the collection, and analysis of water quality in the Basin over the past decade.
5. Water quality data has been collected on the Edmore and Mauvais coulees, and other areas, to determine a baseline on conditions in areas that might potentially be affected by CAFOs.
6. A State ANS Task Force was developed in 2005.
7. A survey of potential interbasin water transfer points in the basin was completed in 2005.
8. A cost-shared survey of the Billings Lake interbasin transfer location was completed in 2005, with an engineering analysis expected to be complete in early 2006.

Results and Developments Since the 2002 Plan

There has been a great deal of work done by many different state, federal, and private agencies since the 2002 plan was completed. Projects have focused on water storage, water quality, habitat restoration, wildlife enhancement and restoration, infrastructure protection, and the extensive background work required for the construction of the outlet and the heavily altered Missouri River diversion project (Red River Valley Water Supply Project). As a result, the Basin is perhaps the most exhaustively studied region in North Dakota.

The following section details some of the major projects and dollars spent studying the Basin, and potential repercussions of the Devils Lake outlet. Beyond what is listed here, each of these organizations along with many others, have devoted innumerable man-hours of study and research in the Basin.

Bureau of Reclamation

The Bureau, part of the United States Department of the Interior, has a mission statement of "...to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public." In line with these goals, the Bureau has recently completed a "Road and Railroad Crossing Inventory" for the Edmore, Mauvais, Big Coulee, St. Joe, Little, and Calio Coulees. This project is important, as it will greatly enhance the ability of agencies and individuals to design more accurate hydrological models of the Basin. The Bureau has also done a wetlands inventory and drained wetlands water storage capacity estimation for the St. Joe-Calio Coulee sub-basin of the Basin.

Devils Lake Basin Joint Water Resource Board

The Joint Board has been extremely active in water management issues since the 1995 Water Plan was originally published. Since the 1995 plan was published, the Joint Board has worked extensively with various state, federal, and private agencies on a multitude of projects, both large and small.

The Joint Board has been involved a myriad types of projects and studies, including; water quality, water storage, flood management, wetland inventories, the State Water Plan, sedimentation studies for several points along the south side of Devils Lake, water control structure maintenance and improvements.

The Joint Board cooperatively funds a downstream outlet acceptance position, and an engineering position with the State Water Commission.

The Joint Board has worked extensively on securing funds for an exploratory study, and test project focusing on irrigation in the Basin. The purpose of the project is to determine the feasibility of using excess waters in the Basin to both improve the profitability of agriculture, and reduce the water reaching Devils Lake. The

project is a cooperative effort between the Joint Board, the federal government, and the State Water Commission. In 2005, construction began on ten test sites. Initial operations began in the fall of 2005. Full operation will begin in early 2006.

The Joint Board has been tremendously active in the last three years, including:

- Holding Sub-Basin Advisory Board meetings for all the organized sub-basins in the Basin.
- Working to analyze the potential for an east end outlet from Stump Lake into the Sheyenne River via the Tolna Coulee.
- Working with the State Water Commission on the Sweetwater-Morrison water storage project, storing up to 3,500 acre-feet of water.
- Working with the Bureau to keep the “Road & Railroad Crossing Inventory” of all of the major coulees in the Basin up-to-date.
- Providing technical and financial assistance to various organizations in their efforts to develop tours and educational programs in the Basin.
- Working to increase public knowledge about Confined Animal Feeding Operations (CAFOs).
- Instituting a “Devils Lake Basin Water Stewardship Award,” which aims to award those people or organizations that have made a positive impact on water resource management in the Basin.
- Involved in a cooperative effort with the United States Geological Survey, the Red River Joint Board, and the State Water Commission to develop a trend analysis on water quality data collected on the coulees in the Basin.
- Developing a drainage moratorium in the Basin.
- Successfully requested an opinion on the “inundated acres” situation that is afflicting landowners around Devils Lake.
- In cooperation with the Red River Joint Board, convinced the 2005 North Dakota legislature to gain funding for the Grahams Island State Park Road raise, which kept the park open to the public.
- Worked with the NRCS on the WRAS water quality study grant in 2001-2003.
- Taking the lead on examining options on how best to deal with the Billings Lake interbasin water transfer issue.
- Successfully lobbied to have a seat on the Devils Lake Outlet Advisory Committee.

Garrison Diversion Conservancy District

On December 22, 1944, Congress authorized the Flood Control Act, later named the Pick-Sloan Missouri Basin Program. The Act called for the construction of a series of massive main stem dams, power plants and other water control and management systems to manage the waters of the Missouri River for flood control, navigation, irrigation and hydroelectric power. It was out of this program that the Garrison Diversion Conservancy District was born.

While the Garrison Diversion Project as originally envisioned is no longer a viable option, the Garrison Diversion Conservancy District has played an active role in water development in the Basin, having spent nearly \$10 million to date, with \$100,000 for the City of Maddock to restore a 4-H building impacted by flooding, \$3,750 for a Beacon Light in Minnewaukan, and more than \$9,189,000 for Ramsey County Rural Utilities.

Natural Resource Conservation Service

The NRCS provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. The NRCS maintains offices in the nine basin counties. The NRCS provides conservation planning assistance to producers in the Basin. It does this by meeting with landowners to explain and discuss the various conservation treatments and programs available, in order to counteract the negative economic and natural resource impacts that have been caused by years of flooding.

The NRCS has several programs that they administer, including the Federal Water Bank Program. In addition to these programs, the NRCS is active in educating landowners about the benefits of different types of agricultural practices, with the Sustainable Agriculture and Research Education (SARE) grant.

North Dakota Department of Health

The Health Department is committed to the protection and enhancement of the natural environment.

The Health Department Division of Municipal Facilities consists of four programs that help municipalities and other political subdivisions protect public health, safety, and the environment: the Public Water Supply Supervision (PWSS) Program; the Operator Training, Certification, and Facility Inspections (OTCFI) Program; the Drinking Water State Revolving Loan Fund (DWSRF) Program; and, the Clean Water State Revolving Loan Fund (CWSRF) Program.

The PWSS Program works with public water systems in North Dakota to ensure that drinking water meets all standards established by the Safe Drinking Water Act (SDWA). This is accomplished by monitoring for contaminants, providing operator training, reviewing plans and specifications, and providing technical assistance. The program also administers the state’s fluoridation program and provides technical assistance to private water systems.

The OTCFI Program trains and certifies persons in charge of the day-to-day operation of drinking water and wastewater facilities. Inspectors/trainers annually inspect public water and wastewater systems to ensure that facilities comply with state and federal public health standards and are properly operated and maintained.

The DWSRF Program provides low-interest loans to assist public water systems finance the infrastructure needed to comply with the SDWA. Eligible borrowers can obtain financing to construct needed water facilities at below-market interest rates. The DWSRF Program also conducts technical reviews of drinking water projects. The reviews ensure that new or modified public water facilities meet state design criteria before construction, achieve the desired public health objectives, and can be properly operated and maintained.

The CWSRF Program provides low-interest loans to fund conventional wastewater and non-point source pollution control needs. Like the DWSRF, eligible borrowers can obtain financing at below-market interest rates to build needed wastewater facilities and fund non-point pollution control projects. Also, the CWSRF Program conducts technical reviews of wastewater projects.

With respect to protection of groundwater and surface water quality, these programs collectively function to ensure that water and wastewater facilities throughout North Dakota are properly designed, operated, and maintained so that residuals from these facilities meet all applicable standards prior to release to any waterway or land. Recent projects within the Devils Lake drainage basin which illustrate this function include: force main replacement and rehabilitation of the city of Warwick's wastewater lagoon; and, improvements to address treatment residuals handling and correct uncontrolled discharges from the lime sludge pond at the Langdon Water Treatment plant.

The Division Of Water Quality continues to monitor the Devils Lake chain of lake four times per year. The parameter list is extensive including chemical, physical, and biological components. Special studies are initiated on a as needed basis.

North Dakota Department of Transportation

The DOT has a mission statement of providing a transportation system that safely moves people and goods. DOT has spent over \$100 million on improvements and maintenance for roads affected by the rise of Devils Lake. Generally, the roads have been raised to an elevation of 1,455 feet amsl, with the base wide enough to eventually go to 1,465 feet amsl and the bridges to 1,465 feet amsl. The Department of Transportation recently began rerouting U.S. Highway 281, in order to avoid further flooding problems, and has been working with the Water Commission on State Highway 20, which runs along the Spirit Lake Reservation, and is being threatened by flooding-related problems as well.

North Dakota Forest Service

The North Dakota Forest Service (Forest Service) administers forestry programs statewide. Technical assistance relating to the management of private forest lands, state forest lands, urban and community forests, tree planting, and wildlife fire protection is provided by the Forest Service. The Forest Service also owns and manages approximately 13,278 acres of state forested lands. The Forest Service conducts regular surveys of Devils Lake to determine the amount of acres of forest inundated since 1995. In 2005, the Forest Service also began monitoring forested lands being inundated by Stump Lake's rapid rise.

North Dakota Game and Fish Department

The North Dakota Game and Fish Department (Game and Fish) has and continues to do a great deal of work in the Basin. Game and Fish maintains an active sports fishery on Devils Lake, and also plays an active role in providing and maintaining angler facilities such as boat ramps, and parking lots. The Game and Fish is also active in the development of land devoted to wildlife production, through programs such as the Private Land initiative (PLI) for the counties in the basin, and is still expanding the program. The Game and Fish has also funded work done through the Agriculture Department in the basin, in regards to the State Waterbank Program.

In late 2004, Game and Fish, at the request of the Joint Board, began assist the Joint Board and Water Commission on the Billings Lake biota transfer issue. Game and Fish is very concerned about the potential for carp, and the potential for other exotic aquatic species to make their way into the valuable Devils Lake fishery.

Game and Fish funded approximately \$100,000 in improvements and enlargements of facilities at Black Tiger Bay.

North Dakota Natural Resources Trust

The North Dakota Wetland Trust was established as part of the Garrison Diversion Unit Reformulation Act of 1986.

The purpose of the Trust is to preserve, enhance, restore and manage wetlands and associated wildlife habitat. In 2000, Congress enacted the Dakota Water Resources Act, that renamed the Wetlands Trust to the Natural Resources Trust and expanded the Trust's mission beyond wetlands and associated upland habitat to include conservation of grasslands and riparian areas in North Dakota. The Trust has done a lot of work in terms of wildlife and fisheries habitat, and also for sustainable agriculture.

The Trust has also developed a demonstration program, the Grand Harbor Watershed Management Project, which has taken nearly a half mile of land in the Basin, and developed and maintained it with the goals of meeting the needs of all interests; agriculture,

wildlife enthusiasts, sportsmen, and the various levels of government. In total, the Trust has restored over 21,000 acres of land in the Basin for various types of habitat, including 6,229 acres of wetlands, with 12,025 acres of uplands, and 9,214 acres of conservation tillage. The Trust has also funded soil testing for nutrient management on 5,907 acres, provided registration and travel for farmers to attend regional no-till meetings. The Trust is working with over 350 producers, and has spent over \$1,500,000 on these projects.

North Dakota Parks & Recreation Department

The North Dakota Parks and Recreation Department (Parks and Recreation) is involved with maintenance and enhancement of the three state park facilities in the basin; Grahams Island, Shelters Grove, and Black Tiger Bay. Parks in the Basin have been plagued by access issues, as water continued to rise. Despite these challenges, Parks and Recreation has worked to relocate recreational structures to keep ahead of rising water. Because of their work, park access in the basin has been reduced by the current wet cycle, but not eliminated. Parks and Recreation has spent \$570,000 in the maintenance of their facilities due to the rise of the lake.

North Dakota State University Extension Service

The NDSU Extension exists to serve the people of North Dakota. The Cooperative Extension System was established in 1914 to address through education the critical needs of the public in the areas of agriculture, family and youth. The work of the NDSU Extension continues to be extremely important to producers, families, community leaders and young people. Extension maintains a unique relationship among federal, state and county constituents. Local input into programs, combined with support and funding from state and federal partners, enables the Extension Service to truly meet the needs of people.

The NDSU Extension is active in disseminating knowledge about sustainable land use practices in North Dakota. While the NDSU Extension does not break down their projects to the basin level, their efforts have been integral in increasing the amount of land that is used for conservation tillage, and encouraging alternative crops that are more suited to the current conditions in the basin.

North Dakota State Water Commission

The Water Commission's mission is to assist in the implementation of the three-pronged approach to solving the flooding problem on Devils Lake. The Water Commission has comprehensive water management in North Dakota as its primary goal.

The Water Commission has spent \$3,500,000 on both the ASAP and ESAP programs in the Basin, which paid landowners in the upper basin to store excess

water on their land. The ASAP program stored 8,000-22,000 acre-feet per year. In 2000, ASAP evolved into the Extended Storage Acreage Program (ESAP,) which involved extended (typically ten-year, rather than one-year) contracts. Under ESAP, the SWC signed contracts for eight sites in 2000, which covered 395 acres, and had an approximate storage volume of 800 acre-feet. Those contracts are scheduled to expire on December 31, 2009. In 2003, an additional ESAP contract was signed for 18 acres, with 35 acre-feet of storage. That contract will also run through December 31, 2009.

The Water Commission has also co-funded a Bartlett & West Engineering study with the Joint Board on the feasibility of irrigation as a means of lowering lake levels, and enhancing crop production in the Basin. The Water Commission has also played an integral role in assisting and coordinating efforts with the Joint Board to develop and update the Water Plan and other water management projects. In 2004, the Water Commission provided \$302 thousand in funding for an irrigation test project in the basin, and provided technical assistance as well.

The Water Commission has also conducted extensive research of potential groundwater drinking water supplies for the City of Devils Lake.

The State of North Dakota is pursuing a phased implementation outlet project limited by water quality and quantity constraints from West Bay on Devils Lake to the Sheyenne River. The first phase of the project can pump up to 100 cubic feet per second, with the potential for expansion to 200 or 300 cfs later, although this would require re-permitting the project. The outlet consists of two pumping stations, 3.3 miles of pipe, and 9.4 miles of open channel. The project will utilize existing U.S. Army Corps of Engineers EIS studies, and a Council on Environmental Quality-directed biota study to assess potential downstream impacts. The final design for the entire project has been completed. Construction began in 2002, and was completed in late-summer 2005. The construction of the 100 cfs outlet cost approximately \$28 million, with an annual operation and management cost of approximately \$1 million. In late 2005, last minute agreements with the Council on Environmental Quality resulted in a gravel filter to minimize the concerns of Manitoba and Minnesota being included. The Water Commission has also developed an Erosion Mitigation Plan in order to deal with recognized concerns of downstream landowners regarding the potential for erosion resulting from the operation of the outlet.

The Water Commission also cooperatively funded a full-time engineering position with the Joint Board. Through this position, the State Water Commission is continually involved in just about every major water resource issue in the basin, considering a variety of topics, including water storage, water management, structural investigation, and many others.

United States Army Corps of Engineers

The Corps, St. Paul District, serves the citizens of the Basin in the areas of environmental enhancement, flood damage reduction, wetland regulation, recreational sites and disaster response. The Corps has spent millions of dollars studying the feasibility of and impacts from the Devils Lake emergency outlet. In pursuance of that goal, the Corps has completed or funded studies on water quality, upper basin water storage, water management, flood management, wetland inventories, sedimentation, outlet alternatives, biological inventories, cultural impacts, demographics, economic feasibility of various project options, hydrology, soils, public surveys, mitigation, Geographic Information Systems (GIS) analysis of the basin, and planning.

Since 1998, approximately \$50 million has been spent by the Corps, the State of North Dakota, and the City of Devils Lake to raise the dike system protecting the City of Devils Lake. With the completion of the 3-foot raise currently under construction, the dike will have a top elevation of 1,460 feet amsl, and be approximately 8.3 miles in length. The dike protects the City up to lake elevations of 1,454 feet amsl. The dike begins on the west side of Devils Lake near the airport, goes around the south end, and comes out by Highway 2, near Mertens Lake View Dairy.

United States Fish and Wildlife Service

The Fish and Wildlife Service is part of the Department of the Interior. The Fish and Wildlife Service is responsible for carrying out federal laws and programs that conserve fish, wildlife, and their habitats. The Fish and Wildlife Service has major responsibilities for migratory birds, endangered species, some marine mammals, and freshwater and anadromous fish.

In the Basin, the Fish and Wildlife Service manages the National Wildlife Refuge System including easement and fee title tracts, and administers the Federal Aid in Sport Fish and Wildlife Programs. An important facility is the Sullys Hill National Game Preserve, which is part of the National Wildlife Refuge System. Sullys Hill receives 38-43,000 visitors annually.

In addition to managing Sullys Hill, the Fish and Wildlife Service actively acquires land through fee title and easement, and manages wetlands for the dual purposes of water storage and wildlife/waterfowl production, including the Lake Alice Refuge. In total, the Fish and Wildlife Service has completed numerous wetland management projects within the Basin, totaling 6,433 acres in area, with potential to store 9,252 acre-feet of water, and has over 20 additional projects planned that would total 5,086 acres in area, with 9,713 acre-feet in storage, which would bring the total to 11,354 acres, with 18,843 acre-feet in storage. The Fish and Wildlife Service has also done work on a bird watching trail in the Basin.

United States Geological Survey

The USGS serves the nation by providing reliable scientific information to describe and understand the earth, minimize loss of life and property from natural disasters, manage water, biological, energy, and mineral resources, and to enhance and protect our quality of life. The USGS has played a vital role in the study of various hydrogeological aspects of the Basin. In all, the USGS has completed nearly 50 studies, or papers, on the hydrogeology of the Basin, and their work is vital in keeping decision-makers informed with the best, most up-to-date information. The USGS also is involved in stream gaging, and water quality monitoring in the basin.

The USGS is involved in a cooperative effort with the Joint Board, the Red River Joint Board, and the State Water Commission to develop a trend analysis on water quality data collected on the coulees in the basin. The United States Geological Survey is also working cooperatively with the State Water Commission on water quality gauging stations in Round Lake, and at various points in the Sheyenne River, to support the requirements of the Devils Lake outlet.

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