The Oxbow
FROM THE NORTH DAKOTA STATE WATER COMMISSION

Quantifying Wetland Restoration and Impoundment Costs: Facing Reality

By: Dr. Steven Shultz

Numerous water impoundment and wetland restoration programs costing millions of dollars have been initiated and are continually being proposed in the Prairie Pothole Region of North Dakota and Minnesota. The multiple objectives of such programs often include flood control, water quality improvements, and the creation of wildlife and recreational habitat.

To better evaluate and plan such restoration/impoundment projects, accurate benefit-cost analyses are needed to ensure the wise use of public funds. Such benefit-cost analyses themselves require reliable estimates of the costs of implementing water impoundment and wetland restoration programs. These costs can be divided into both structural construction costs, and land purchase or rental costs. Unfortunately, information about the actual construction and land procurement costs associated with wetland restoration and impoundment projects in the region are seldom well documented or understood.

To improve the situation, this article summarizes efforts to assemble and summarize both estimated and observed structural construction and land procurement costs associated with wetland restoration/impoundment projects in the region. These include: the Available Storage Acreage Program (ASAP) in the Devils Lake basin of North Dakota, and the North Ottawa Restoration Project in northwestern Minnesota.

Structural Construction Costs

In 1992, the Minnesota Board of Water and Soil Resources estimated that structural wetland restoration costs (excluding land purchase costs) ranged from $95 per acre to $3000 per acre. Other published estimates of structural restoration costs for flood control purposes in Minnesota have been noted to be $1,500 per acre for previously drained depressional wetlands, and $2,750 for wetlands with outlet control devices (which increase storage capacity). The large scale Alice Lake Wetland Restoration Project in North Dakota, which involved using dikes and outlet flow structures across 3,500 wetland acres, was noted to cost $930,000, or $265 per acre, excluding land acquisition costs. These relatively low costs can be explained by economies of scale gained by restoring so many wetland acres within a single complex. Finally, in the ASAP storage program in the upper Devils Lake basin, farm fields were converted to temporary storage basins at an average cost of $8 for each acre foot of water stored.

Land Procurement Costs

It is often assumed when planning and evaluating restoration/impoundment projects that landowners will sell or rent their land for the going local market values. However, an analysis of 156 Devils Lake ASAP program rental contracts from 1996 to 1999 where landowners rented their land for temporary water storage on an annual basis, showed that high premiums, well above local market rates, were demanded by landowners. Average rental values paid to farmers were $81 an acre, which was 153 percent higher than average county rental values ($32/acre), and 88 percent higher than maximum reported county rental values ($43/acre).

Soil productivity within townships where rental contracts were located was not found to differ significantly from county-wide soil productivity measures. While some premium above local rates would be expected for such a project to account for potential risks associated with saturated land, these observed premiums appear to be extreme, especially considering the fact that the project was intended to help alleviate lower watershed flooding within the same region. The ASAP program has since evolved into the Extended Storage Acreage Program – now consisting

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of ten-year contracts, making the program more cost effective.

Land purchases have recently been completed with the North Ottawa restoration and impoundment project in the upper reaches of the Bois de Sioux watershed in northwestern Minnesota. Independent land appraisals of approximately $900 each were required, and landowners eventually agreed to sell their land for values that were on average 10 percent higher than appraised values. Therefore, it appears that landowners are willing to accept lower premiums if land is bought outright (rather than rented), but such purchases can be expensive, especially as they must occur at the outset of a project. For example, land purchase costs with the North Ottawa project totaled almost $2.5 million, which corresponds to almost 20 percent of the total project cost.

There are currently several large wetland restoration and impoundment storage projects being evaluated and promoted in the Red River Basin, including the 'Waffle' Project, which involves the temporary storage of water in agricultural fields to reduce springtime flooding events in the Red River Valley. Many of these projects assume that landowners will sell their land to the project at the going market rate, or in some cases for free. The empirical evidence of the land procurement costs for restoration/storage projects in the region indicates that these assumptions are very likely invalid. In order to ensure the economic feasibility of future water storage projects in the region, it is strongly recommended that the true costs of enlisting landowner participation in such programs be accounted for. ■

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COMMISSION MEETING MINUTES

The North Dakota State Water Commission (Commission), chaired by Governor John Hoeven, acted on several items of business and was given status reports on continuing water management projects and programs at the August 6, 2003, meeting in Grand Forks. In action items, the Commission approved:

• Funding in the amount of $15,607,185.65 for the Grand Forks flood control project. This brings the state's total contribution to $52 million. *That is the maximum amount the State Water Commission can provide for that project as approved by the 1999 Legislative Assembly in Senate Bill 2188.*

• A Southwest Pipeline Project water service contract with the City of Golva. Golva is located 14 miles south of Beach, and would be served by construction of the Medora-Beach phase of the project.

• Preauthorization of the State Engineer to award a contract for the construction of the Belfield Reservoir, which is part of Southwest Pipeline Project Contract 5-9.

• Interim financing, provided through the Resources Trust Fund, for the local share of the Northwest Area Water Supply Project– Rugby Phase II.

• Award of Devils Lake Emergency Outlet Project Contract 2, to Park Construction Inc., in the amount of $766,614. Contract 2 will include 3.2 miles of 300 cfs capacity open channel construction.

• Funding in the amount of $302,000 for the Devils Lake Upper Basin Water Utilization Test Project. This test project will determine if irrigation can be used as a viable option for flood control in the Devils Lake basin by reducing the amount of water that reaches Devils Lake by utilizing it for irrigation in the upper portions of the basin.

• Continuation of the current cost-share policy for culverts, which includes funding only for those culverts installed as part of drain projects.

• Funding in the amount of $28,470 for a Digital Aerial Survey Phase IV project, that is part of a Maple River flood insurance study.

• Cost share for Grand Forks County Drains 27 and 27A and Traill County Drain 13 in the amounts of $49,537, $7,775, and $89,072, respectively. Approval of funding for Traill County Drain 13 is conditional upon the availability of funds, approval of the project's final design, and issuance of the required drain permit.

• Funding in the amount of $18,750 for snagging and clearing on the Tongue River in Pembina County.

• Funding in the amount of $36,000 to the North Dakota Water Education Foundation for the *ND Water* magazine. The Commission's contribution goes toward the Oxbow and Primer portions of the magazine, and toward distribution costs.

• Funding in the amount of $200,000 to the Non-point Source Pollution Program of the North Dakota State Department of Health's Environmental Health Division for state match in the Section 319 program. The Environmental Protection Agency's Section 319 program is a federal funding source for programs designed to improve water quality by decreasing non-point source pollution. ■

Harmon Lake
An Oasis for Morton County

By Patrick Fridgen

Anyone that has ever been involved in the development of a large-scale water project knows that they don't just happen overnight. That was certainly the case with Square Butte Dam Number 6, or the Harmon Lake project, as it is now more commonly known. Thanks to decades of hard work by local officials and various government agencies, a project that at times seemed more like the shimmering mirage of an oasis in the desert is finally going to become a reality. The Harmon Lake Recreation Area is going to be developed, with construction efforts to strip the base of the pool and dam beginning in September.

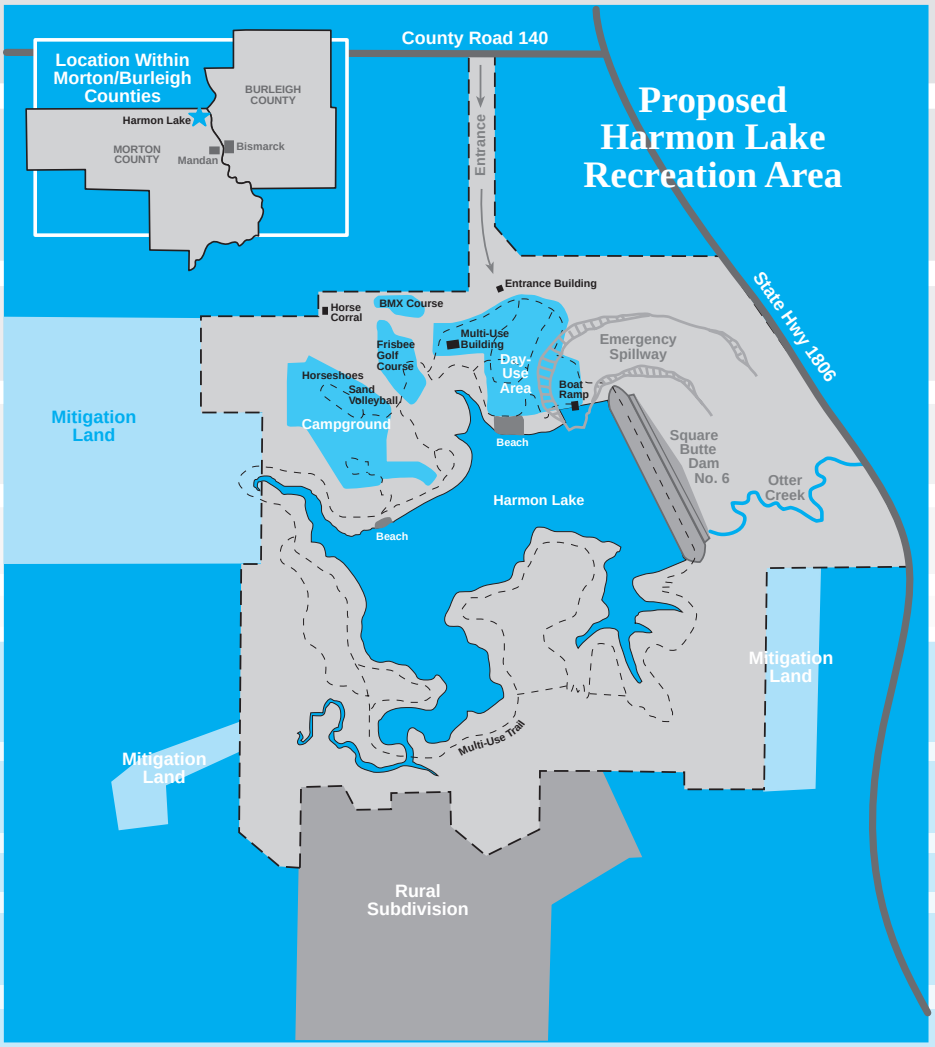
History of Harmon Lake

The idea for the Harmon Lake Recreation Area originally evolved from the development of the Square Butte Creek watershed work plan, which was published by the Soil Conservation Service in 1969. That 1969 watershed plan also called for the construction of additional dams, and two floodways. Since then, three dams and one floodway have been completed. One major project that was in the original watershed plan, was a dam near Center, North Dakota. That project has fallen by the wayside because of various problems with land-rights acquisitions.

The original plan for Square Butte Dam Number 6 was for a single-purpose flood control structure. However, in the late 1970s, the Morton County Water Board, chaired at that time by Andy Mork, realized that the potential existed to develop a water-based recreation facility that would also serve the need for downstream flood control.

With that idea in mind, the Morton and Oliver County Water Boards and Soil Conservation Districts began working with North Dakota's congressional delegation to modify the original 1969 work plan. It wasn't until 1995 that a supplemental work plan and Environmental Assessment were completed to allow for the development of a

A panoramic view of the future site of Harmon Lake Recreation Area and Square Butte Dam 6, looking mainly west.



multi-purpose water-based recreation and flood control project. With the work plan modified, the project sponsors then sought a federally required U.S. Army Corps of Engineers Section 404 Permit, along with the necessary funding to complete the project. The project sponsors also started the process of working with the Inter-agency Watershed Workgroup to develop an acceptable mitigation package, which ultimately proved to be an extremely difficult obstacle, delaying the project even further.

Overcoming Hurdles

As with any large-scale water project, getting all interests to agree on a suitable mitigation package proved to be a major obstacle. In general terms, to mitigate for a project means that the project sponsor must make up for, or replace, environmental amenities that may be damaged or destroyed while developing a given project. In the case of Harmon Lake, portions of several sections of land that were once home to wildlife, trees, and grasslands, will ultimately be flooded with the creation of the reservoir. Thus, in order to "mitigate," or replace what will be lost, the project sponsors had to agree to a mitigation package which included the purchase of three tracts of land that were designated as Wildlife Mitigation Areas, totaling 233 acres. These tracts are located right next to, and contiguous with, the 750 acres that have been purchased for development of the recreation site. In addition, approximately 330 acres located on the west, east, and south sides of the reservoir have been designated as limited-use recreation areas to be managed primarily for wildlife. Though agreeing to the terms of the mitigation package was difficult to say the least, securing the land rights to actually implement the mitigation measures was equally as trying.

Whenever a construction project will result in any amount of fill being dumped or placed in a waterway, the U.S. Army Corps of Engineers requires that the project sponsor acquire a Clean Water Act, Section 404 Permit. Because this is certainly the case with the Harmon Lake project, which among other things will include the construction of a dam on a waterway, a 404 permit was required. In almost every instance, the Army Corps' Section 404 permitting process moves at what seems a snails pace. In the case of the Harmon Lake project, it took the sponsors more than two years to acquire their 404 permit.

On June 12, 2003, the Morton County Water Resource District overcame their final obstacle when the State Water Commission approved their cost-share request for $500,000, which accounted for the last piece of funding required to move forward with construction of the dam. The total estimated cost of the Harmon Lake project, which includes both the dam and the recreation area, is $11.1 million. In breaking down the costs, $6.2 million is attributed to the cost of the dam, and $4.9 million is the cost of the recreation area. The federal government has agreed to cover 77.65 percent of project costs for the dam, with the remainder being covered by local and state funds. The cost of the recreation features will be split 50/50 between federal and local interests. In addition, the City of Mandan has tentatively agreed to contribute to the project, and a request has also been made with Bismarck to assist with funding.

Reservoir & Recreation Area

Located on Otter Creek, approximately nine miles north of Mandan on Highway 1806, Square Butte Dam 6 and Harmon Lake Recreation Area will provide an excellent recreation destination for people in Bismarck-Mandan and the surrounding area. In addition, housing developments that are relatively close to the future Harmon Lake are progressing at a phenomenal rate. Families looking for unique locations to build new homes have shown tremendous interest in the Harmon Lake area and those that have lived in the area for years are also anxiously awaiting the completion of the project.

Phase I of the Square Butte Dam 6 construction is scheduled to begin in September, 2003. The dam will be constructed in two phases, the last to be completed in 2006. The Harmon Lake Recreation Area will be constructed in unison, including five phases, the first beginning in 2004 and the last being completed in 2007.

The Square Butte Dam Number 6 structure itself will be 67 feet high and 2,100 feet long. At its normal operating pool, Harmon Lake will cover about 144 acres and have a maximum depth of 38 feet. Comparatively, Harmon Lake will be much larger than McDowell Dam, Fish Creek Dam, and Crown Butte dam, which are all relatively close to the Bismarck-Mandan area. Conversely, Harmon Lake will only be about half the size of Sweet Briar Dam (see Local Site Comparisons). Like these other sites in the area, the Game and Fish Department has been asked to stock Harmon Lake to provide fishing opportunities for visitors at the recreation site.

Local Site Comparisons

Site	Surface Acres	Drainage Area (square miles)	Depth (feet)
McDowell Dam	56.0	6.15	41.4
Fish Creek	55.5	10.25	54.0
Crown Butte	37.7	6.50	34.2
Sweet Briar	270.0	154.00	39.5
Harmon Lake	144.4	35.20	38.0

The Harmon Lake Recreation Area will be nothing less than first-rate. When completed, it will boast:

- Spacious overnight camping areas, including 80 stalls with power and 25 with water hook-ups.
- A highly visible entrance building for check-ins and informational purposes.
- A four-season, multi-use building with adequate parking and a lakeside deck, with the capacity to accommodate 200 people.
- A beach area, with two volleyball courts, a playground, two shelters, and a bath house with showers.
- A boating area, with a two-lane boat ramp, courtesy dock, nearby restrooms, and a fish cleaning station with running water.
- Horseback riding facilities, with corrals and watering facilities, and expansive areas for riding.
- A 52,000 square foot sporting area able to accommodate soccer, softball, football, etc.
- A seven-mile trail around the reservoir that will connect with the Legacy Trail that is planned north of Mandan along Highway 1806.

Because of the relentless pursuit of this project by water board members like Andy Mork, Alfred Underdahl and Lloyd Huber; agency people like Wes Wiedenmeyer of the USDA, Natural Resource Conservation Service; water resource consultants like Ron Sando; and countless others too numerous to mention; this oasis that they will call Harmon Lake in northeast Morton County will be anything but a mirage. For those out there that have struggled for years to get a large-scale water project off the ground, it may provide some comfort to know that dreams do come true – the Harmon Lake project is without a doubt living proof.

Thank you to Andy Mork and Ron Sando, who contributed comments and insight toward the completion of this article.