Pelican Lake Enhancement Project Overview

August 6, 2015

Pelican Lake (Wright Co.) is considered by many Minnesota waterfowl biologists, hunters, and birders to be one of the very few large shallow lakes in Minnesota that serves as primary spring and fall migration habitat for diver duck species like lesser scaup (bluebill), canvasback, redhead, and ring-necked duck. These species of waterfowl are generally understood to be the most at risk, on a national scale, due to their specific migration needs. Pelican Lake is a very unique geographical migration "stepping stone" for these species of waterfowl as well as for other waterfowl (puddle ducks, geese, trumpeter swans, etc.) and wetland wildlife. As a result of these considerations, Pelican Lake was designated as a state wildlife lake in 1977.

Prior to 2004, game fish of a size to support a sport fishery in Pelican Lake did not exist as moderate to severe winter fish kills occurred routinely every 3-5 years. Pelican Lake had not experienced a severe winter fish kill since 2001 until just recently during the winter of 2013-14. Lake flooding (higher lake levels) and more moderate winters (lower snow levels and milder temperatures) had attributed to this reduced severe winter fish kill frequency, thus allowing enough sunlight to penetrate the ice and preventing oxygen levels in the lake from dropping too low where fish may not survive. In addition to concerns for wildlife habitat, consistent lake flooding of 2-3 feet over the DNR established ordinary high water (OHW) level, has also caused concern from area farmers with flooded fields and tile/ditch systems. Wright County Highway Department has spent many thousands of dollars repairing, re-vetting and raising roadbeds around Pelican Lake from flooded conditions. On numerous occasions roads have been closed for extended periods. As a consequence to lake flooding issues numerous organized meetings with lake landowners, conservation agencies and elected officials have occurred the last 20 years. These meetings and a conservation work group formed in 2005, helped shape the current plans for water level management.

The quality of lake habitat has deteriorated over the past 25 years due to flooding conditions. Nutrient loading (phosphorous), wave action and black bullhead expansion has caused the lake to consistently become highly turbid. In most years, of the last 3 decades, the high degree of turbidity and subsequent loss of sunlight penetration in the water column have prevented rooted aquatic plants in over 95% of the lake from growing. Diverse aquatic plant beds are vital for direct duck food source, substrate for invertebrates (another highly important food source), and stabilization of lake bottom. More noticeable and as important to waterfowl for breeding and escape cover, has been the large loss of cattails and bulrushes in the lake.

The Pelican Lake Work Group that was formed in 2005 and met numerous times that year. Following work group recommendations, MN-DNR, Section of Wildlife and Ducks Unlimited funded a Pelican Lake Outlet Feasibility Study that was completed in April of 2006, which outlined water level management of the lake as practical and feasible providing downstream mitigation measures were completed beforehand. A mandated environmental assessment worksheet (EAW) evaluation was completed with a positive record of decision on January 15, 2009. A public input meeting was held April 9, 2008 in the St. Michael High School auditorium with close to 300 people attending. Returned survey questionnaires indicated about 70% support for plans to manage water levels on Pelican Lake for wildlife habitat improvement and flooding control.

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In recent years, concerns have been raised predominately by some of the many fishermen that recreated on the lake that lowering lake levels will increase the possibility of winter fish kills with the subsequent loss of some fish. Returning Pelican Lake to a more normal frequency of winter fish kills is one objective of the project to achieve water quality and wildlife habitat improvements. It is important to note that with or without water level management, Pelican Lake will at some point in the future have a winter fish kill like it recently did during the winter of 2013-14. Managing water levels on Pelican Lake occurred **after** this natural winter fish kill took place. Another potential component of this project is to consider predator fish (northern pike, bass, etc.) stocking, post-drawdown, as a management technique to keep the black bullhead population at a low level.

With the notable exception of some fishermen, tremendous support for the Pelican Lake Enhancement Project has been received, which includes the Wright County Board of Commissioners, City of St. Michael, Buffalo and Monticello Township, lake landowners, local duck hunters, wildlife enthusiasts, many local conservations groups, and others. The bulk of our effort on Pelican Lake is about lake water quality improvement and very few people seem to argue with that.

The proposed Pelican Lake Enhancement Project includes the elements or phases described below:

St. Michael Meadows Wetland Restoration (**Phase 1**) - The first phase of project construction involves restoration of the partially-drained 180 acre St. Michael Meadows Wetland. This wetland restoration proposes hydrologic restoration by a combination of converting existing ditches to meandering channels and constructing an outlet weir. The St. Michael Meadows Wetland is being restored to attentuate or reduce storm flows to downstream reaches of Regal Creek (i.e., former Wright County Ditch No. 21), provide water quality treatment, and serve as a potential wetland mitigation site. The restoration of the St. Michael Meadows Wetland is expected to take approximately six months and is proposed to be completed during the winter and during frozen soil conditions. In addition, construction of a high velocity fish barrier is also proposed where the proposed new stream channel crosses Jamison Avenue and there is a relatively high gradient reach greater than three percent (3%). This fish barrier would limit migration of fish upstream into Pelican Lake from the Crow River and from other downstream water bodies. This velocity fish barrier is proposed to be constructed by replacing the existing culvert under Jamison Avenue with a larger culvert with a slope that achieves a velocity of seven feet per second over a horizontal distance of at least 50 feet.

The St. Michael Meadows Wetland will be restored to improve water quality, attenuate peak flow rates in downstream reaches of Regal Creek, and provide potential wetland banking and mitigation credits. Previously, the St. Michael Meadows Wetland was ditched, drained, and used for sod farming. In the past 15 years, the St. Michael Meadows Wetland has been hayed. The project proposes restoration of the St. Michael Meadows Wetland by raising the grade of Regal Creek through the wetland to encourage sheet flow across the wetland and by installing a water control weir at the outlet into Regal Creek. The restoration of the St. Michael Meadows Wetland will result in a large reduction of sediment and phosphorous loading and a lower biological oxygen demand (BOD) to the downstream reaches of Regal Creek. A total of approximately 180 acres of existing wetland would be partially or fully restored as part of the St. Michael Meadows Wetland restoration.

Status of Phase 1 as of August 6, 2015: Survey has been completed by Ducks Unlimited. Construction design is pending. Significant progress has been made acquiring priority WMA parcels in the Meadows basin since 2011. Work continues on acquiring remaining identified tracts. Construction is tentatively planned for fall 2017.

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Stabilization of Lower Regal Creek to the Crow River (**Phase 2**) - The second phase of project construction involves the stabilization of the lower reaches of Regal Creek to the Crow River. A variety of stabilization techniques may be used including altering the stream channel, adding meanders, slope stabilization, vegetative management, riprap, and establishing of protective riparian buffers. The Lower Regal Creek stabilization was originally planned to begin the year following completion of the restoration of the St. Michael Meadows Wetland and take approximately six months to complete. Downstream of the St. Michael Meadows Wetland, Regal Creek descends into the Crow River valley. Within moderate gradient reaches, channel scour and stream bank erosion threaten Regal Creek, as well as public and private infrastructure. The existing condition of Regal Creek results in part from contribution of local and regional stormwater runoff, particularly from increases in peak flow rates. Adjacent residential land use and past agricultural land uses adjacent to the creek have contributed to loss of riparian buffers and destabilization of stream banks and steep slopes. The proposed project would stabilize the downstream portion of Regal Creek before additional flows are released from Pelican Lake. Regal Creek stabilization, during this construction phase, will emphasize a combination of bioengineering, instream grade control and revetments, possible remeandering of straightened reaches, and local stormwater management. These techniques or measures would also be associated with incorporating protective stream buffers requiring the involvement or participation by local landowners.

Status of Phase 2 as of August 6, 2015:

Survey and construction design is completed. Land control easements have been completed. Of the 5 identified stabilization sites, four have been completed. The fifth site is planned for fall 2015 construction.

Restoration of existing stream channel from Regal Creek to the St. Michael Meadows Wetland and construction of primary outlet route (**Phase 3**) - The third phase of project construction involves the temporary outlet of water from Pelican Lake using Regal Creek, from the north side of School Lake to the west side of the St. Michael Meadows Wetland. The primary Pelican Lake outlet route will be utilized later to outlet Pelican Lake once it is constructed starting just north of School Lake, under Regal Creek and extending southeast to a private ditch continuing east to the St. Michael Meadows Wetland. Several portions of this stream channel may be routed through pipes as an alternative to open cut channels. The length of pipe will be dependent on detailed construction plans and easement acquisition provisions. Once the primary outlet route is complete for Phase 3, it will convey flows from Pelican Lake, while avoiding a stretch of Regal Creek until it reaches the St. Michael Meadows Wetland. Regal Creek will continue receiving local stormwater runoff. Wetlands restorations within the flood prone zone of the primary outlet route will improve water quality while providing wildlife habitat. Near the lower portion of this primary outlet route, upstream of the outfall into the St. Michael Meadows Wetland, a fish barrier at Jamison Avenue and Iffert Avenue N.E. will be constructed to restrict fish movement from downstream portions of Regal Creek to Pelican Lake. The new outlet route will take six months to one year to construct.

Status of Phase 3 as of August 6, 2015:

Pre-survey work has been completed by Ducks Unlimited. Construction design is complete.
Land control easements and fee title acquisitions are complete. Construction is planned for fall 2015.

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Construction of a Pelican Lake outlet and pump lift station at, and construction of a new stream channel from Pelican Lake to Regal Creek (**Phase 4**) The fourth phase of project construction involves the construction of an outlet at Pelican Lake, construction of a pump lift station in proximity to the Pelican Lake outlet, and construction of a new stream channel from the Pelican Lake outlet to Regal Creek (i.e., in the vicinity of the north side of School Lake and former Wright County Ditch No. 21). The Pelican Lake outlet will include construction of a stoplog weir structure with a control elevation of approximately 950.7 feet. An intake pipe will placed within the bed of Pelican Lake below elevation 944.0 feet. A pump station and force main will be installed to pump water from Pelican Lake to a point north of School Lake where Wright County Ditch No. 21 currently outlets from School Lake. Construction of the stoplog weir structure will be at the mouth of an existing ditch that flows into Pelican Lake. The top of the weir is proposed at this time to be approximately three feet wide. The stoplog weir will pass flows during normal operating periods and will be designed to manage Pelican Lake at an elevation of 950.7 feet, which is one-and-a-half feet below the existing DNR-established ordinary high water level of 952.2 feet. A pump station will be constructed at the existing edge of the eastern-most bay of Pelican Lake. A 24" intake pipe will be installed from this point for 900 feet into the lake and be set at an invert elevation of 942.0 feet. The lift station intake pipe will involve placement of a structure within the lake bed to support the intake pipe at the proper invert elevation. A short 24" forcemain will outlet into the new channel on the downstream side of a weir. Pump configurations to accomplish the drawdown will be identified and determined at a later date. The choice of pumping configurations will be based on the availability of suitable storage basins, construction costs, and operation and maintenance costs; and will be determined after more detailed plans and specifications have been developed. It is anticipated the pump configuration will either use two pumps running alternately or a single pump with a storage basin, which will discharge water via an orifice and control valve.

Status of Phase 4 as of August 6, 2015:

Pre-survey has been completed by Ducks Unlimited. Land control easements and fee acquisition are complete. The gravity water control structure was completed in December 2014. The pump station located adjacent to the gravity water control structure is planned for construction summer of 2016.

Initial Pelican Lake drawdown to 950.7 feet (**Phase 5**) The fifth phase of the project involves an initial drawdown of Pelican Lake to elevation 950.7 feet accomplished by operating the weir system constructed in the fourth phase of project construction. This initial drawdown is designed to establish the Pelican Lake water level at a new long-term Normal Water Level (NWL) of 950.7 feet. This initial drawdown to elevation 950.7 feet will occur after completion of the construction elements of Phase 4 and is expected to take approximately one to one-and-a-half years. This drawdown time could be shorter or longer, depending on precipitation conditions. Operation of the pump and weir system will occur after implementation of all downstream phases of project construction, as well as after any subsequent stabilization required before flows can be conveyed though this system. The initial drawdown is designed to release 21 cfs of water from October through March and five cfs of water from April through September.

Status of Phase 5 as of August 6, 2015:

Lake drawdown was initiated on December 18, 2014 and, except for winter stoppage in February and March 2015, has been commencing since then. The summer of 2015 had higher than average rainfall and has slowed drawdown efforts to date.

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Temporary Drawdown for Pelican Lake management to 944.0 feet (**Phase 6**) - The sixth phase of the project involves the drawdown of Pelican Lake to elevation 944.0 feet for a temporary period of time (i.e., approximately up to three years). This elevation is at an approximate low lake level elevation from the 1930s. The temporary drawdown for lake management is designed to mimic the 70-year to 100-year natural drought cycle. This drawdown for lake management is designed to restore submergent and emergent vegetation and reduce or eliminate existing population of rough fish. Historic water level data is limited for Pelican Lake, particularly during dry years. Available lake level records, beginning in approximately the 1950s indicate that that the elevation at Pelican Lake ranged from about 946.0 feet in the late 1950s to the early 1970s and then generally rose to the present range of approximately 952 to 956 feet in the early 1980s. Since the early 1980s, lake elevations have remained high (i.e., greater than the ordinary high water mark of 952.2 feet) and the elevation in September 2005 was 954.5 feet, approximately two feet below the breach runout elevation of Pelican Lake. The current lake elevation as of August 5, 2015 was 953.8 feet.

The drawdown to elevation 944.0 feet for lake management is expected to take approximately up to three years. The length of this drawdown depends in part on dry or wet conditions occurring during this phase. Once this drawdown elevation of 944.0 feet is reached, this elevation will be maintained for a minimum of one full winter and one growing season. DNR Fisheries and Wildlife Staff will then evaluate Pelican Lake to determine if the drawdown has resulted in greatly reducing invasive fish species and if other lake management objectives have been met such as revegetation of the lake bottom, establishment of emergent vegetation, and aeration of soils. Once the lake drawdown objectives have been met, the pumping will cease.

Status of Phase 6 as of August 6, 2015:

The pump station located adjacent to the existing gravity water control structure is planned for construction summer of 2016.

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