

Date | January 16, 2012

To | Board of Managers

Contact info | CLFLWD

cc | Doug Thomas

Contact info | CLFLWD Administrator

From | Greg Graske, P.E.

Contact info | EOR

and Lisa Tilman, P.E.

EOR

Regarding | Bone Lake Fish Barriers

Background

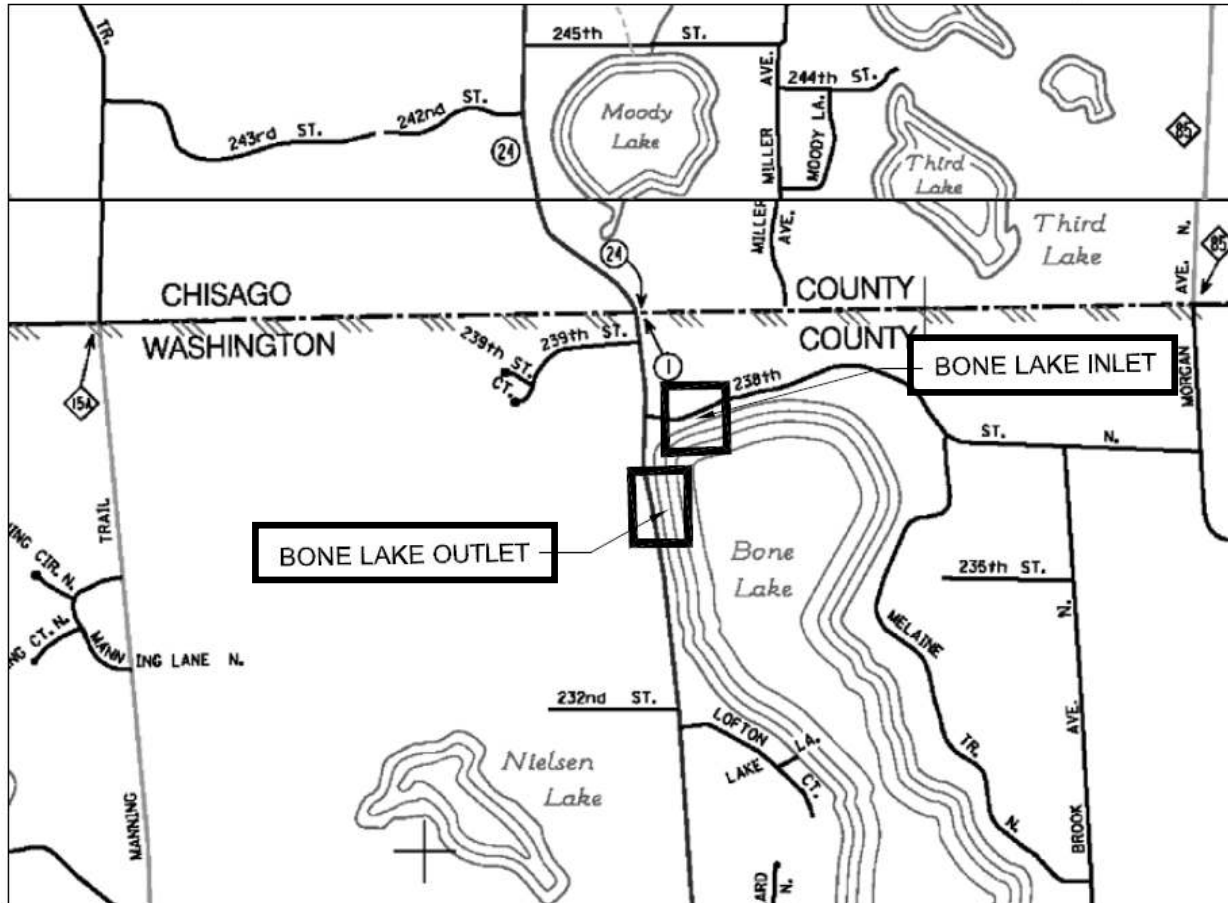
CLFLWD applied for and received a Conservation Partners Legacy Grant to complete the design and construction of three fish barriers, two at Bone Lake and one at Moody Lake. The fish barriers at Bone Lake have been designed, however the low velocity barrier at the Moody Lake inlet was found to be infeasible due to the limited amount of head that could be allowed at the site without impacting the cross-road (245th Street). Other types of barriers could be explored here, however after discussions with the DNR this location is low priority compared to the other two (Bone Lake outlet and inlet), and removing this barrier should not impact the effectiveness of the other barriers on Bone Lake. DNR also indicated that this change will not affect grant eligibility or amount.

The proposed project is the installation of two low velocity fish barriers: one at the outlet to Bone Lake and one at the north inlet to Bone Lake. The design incorporates an innovative low-velocity design that has been recommended by the DNR with the goals of limiting upstream and downstream carp movement while maintaining flows and water levels. The fish barriers are intended to prevent upstream migration of carp into Bone Lake, out of Bone Lake into Moody Lake, and to prevent their downstream migration after spawning.

The fish barriers will allow management of the fish population for water quality improvement and will limit lake and wetland disturbance by rough fish to result in water quality and habitat improvements. Rough fish disturbance has been found to decrease water quality and limit waterfowl and other habitat opportunities. Limiting rough fish access to the lakes and wetlands is expected to result in improved habitat.

The site is located in the City of Scandia in Washington County. The proposed fish barriers will be located at the outlet to Bone Lake, on the east side of County Road 1 (Lofton Ave) and approximately 400 feet south of 238th Street and at the north inlet to Bone Lake, on the north side of 238th Street and approximately 520 feet east of County Road 1 (Lofton Ave).

The District has obtained approvals from WCA, DNR and ACOE. There will be some wetland impacts associated with the barrier at the Bone Lake Inlet. However, these impacts have been determined to qualify for a wildlife exemption, because of the nature of the project. The City of Scandia has granted an access agreement on property that they own for the Bone Lake Inlet project. The Bone Lake outlet project is located in Washington County right-of-way. Permits from both Scandia and Washington County will be required prior to construction of the project.



Project Description

Two fish barriers have been designed: one at the outlet to Bone Lake and one at the inlet to Bone Lake that collects drainage from Moody Lake. Both barriers are proposed to be low velocity systems consisting of a drain tile system and overflow structure.

The outlet fish barrier project will involve the construction of a low velocity fish barrier connected to the culvert under County Road 1 (Lofton Ave) that acts as the outlet to Bone Lake. The inlet fish barrier project will involve the construction of a low velocity fish barrier connected to the culvert under 238th Street. The project will also involve the replacement of the existing culvert under 238th Street because the existing culvert has rusted through and will not provide a stable connection with the fish barrier. The project will involve the disturbance of the lake bed and shoreline in order to install the fish barrier system.

The fish barrier design consists of a concrete outlet structure, header pipes (half-round Stormtech chambers), a rock drain field, and thousands of feet of drain tile pipe embedded in the rock bed discharging into the header pipe. As water levels increase on the lake side the multiple flow paths through the rock and drain tile are designed to allow water to equilibrate in the header pipe, flow to the outlet structure and then into the outlet pipe. The capacity of the drain field is several times the flow rates for the 10-year event even with very small head differences across the system. The redundancies and oversized capacity is intended to keep flow rates small, limit clogging, and should clogging of sections occur allow for alternate flow paths without adversely effecting upstream water levels.

The outlet structure is a custom concrete structure that connects to the outlet pipe under the road, the header pipes connect into both sides of the structure, and an adjustable weir is included on the lake side. The culvert under County Road 1 (Lofton Ave) will not be altered. An aluminum grating is proposed over the top and over the front lip for safety and to eliminate the potential for large fish to jump over the weir. The layout sets the top of the stop logs at the 10-year elevation. The intent is to limit the times that flow is utilizing the overflow, but allow for large storm events to exit the system without affecting upstream flood levels. That exact overflow of the system could be adjusted based on monitored performance after installation. Also, should the system clog or not perform as expected the stop logs could be removed and the system would operate exactly as it does today. This limits the risk associated with this new type of fish barrier design. See also attached plan set.

The outlet fish barrier project will excavate material from a 4,582 square foot area to install the fish barrier system, but will restore the excavated area to the existing elevations. The total area of potential disturbance (includes area that won't be excavated but may be used for movement of construction equipment) will be 5,620 square feet below the OHW of Bone Lake and 4,260 square feet in the shoreland area above the OHW along 160 linear feet of shoreline.

The inlet fish barrier project will excavate material from a 5,330 square foot area to install the fish barrier system, but will restore the excavated area to the existing elevations. Of the 5,330 square feet of excavated area, 2,540 square feet is below the OHW for Bone Lake.

Erosion control will be established using BMP's as indicated on the plans. Traffic control will also be installed per plan submitted and approved by the Washington County Public Works Department and the City of Scandia.

For the outlet fish barrier, the lake bottom and shoreline will be excavated to the proposed elevation using a backhoe working from the shoreline. Excess excavated material will be hauled off site by truck. Stabilization geo-textile will then be placed in the bottom of the excavation, then 6 inches of 1 1/2 inch minus rock will be placed as pipe bedding. 8 inch perforated drain tile and the StormTech collector pipe will then be placed on the rock bedding, and 1 1/2 inch minus rock placed to 6 inches over the pipe. Then a soil separation geo-textile will be placed and the final 18 inches of rock will be placed. Final cover and restoration will include rip rap along the shoreline and topsoil and seeding on all other disturbed areas.

For the inlet fish barrier, excavation will be accomplished using a backhoe and/or low ground pressure dozer/excavators. Excess excavated material will be trucked off site. Rock bedding will be placed by backhoe, drain tile and StormTech collection system installed on the bedding and covered with 1 1/2 inch minus rock. A soil separation geo-textile will then be placed over the pipe bed and then the final 18 inches of rock will be placed over the pipe bed. Final cover and restoration will include rip rap along the shoreline and topsoil and seeding on all other disturbed areas. The existing 36 inch corrugated metal pipe culvert will be removed and replaced with a reinforced concrete pipe culvert with an inlet structure on the upstream end and a flared end section on the down stream end. The roadway will be patched with bituminous to the City specifications. See also attached plan set.

Construction is anticipated for Late Summer during low water conditions. All construction costs are anticipated to be covered by the \$283,000 Conservation Partners Legacy Grant.

Recommendation

It is recommended that the Board approve proceeding with the project and ordering a public hearing.