

*Meeting Notes Future of Freeborn Lake*  
*Freeborn City Hall on September 17, 2015*

*6:30 pm to 8:30 pm*

The objective of this meeting was to review proposed management strategies for improving water quality, habitats and fish and wildlife-based recreation for Freeborn Lake. A draft plan was made available to attendees. There were no changes suggested to the meeting notes from August 20. The Arrowhead Park public access for Freeborn Lake was briefly discussed as a follow-up to the August meeting. Sue Miller noted that the County intended to work with the Department of Natural Resources (DNR) access program to renovate this access and improve accessibility. As noted in August, development of the DNR public access requires further assessment.

The remainder of the meeting was devoted to specific management proposals for the lake. Management actions and measurable factors that might trigger implementation of the strategies were discussed as summarized below.

The planning and implementation timelines for permitting; dam replacement; fish barrier construction; and associated lake level and fish management were also noted. Advisory group comments to the proposed plan will be taken through the October 15 meeting. Afterwards a final draft will be prepared for agency and full public review and comment. The public review and public hearing are expected to be completed in winter. Final outlet design plans and permit applications for the project will be submitted to appropriate regulatory agencies by early spring targeting construction to begin in summer or fall. Outdoor Heritage Legacy funding for the outlet project has been identified by Ducks Unlimited, Inc. pending the outcome of lake management planning and permitting. Funding for a rotenone treatment will be sought through upcoming DNR project planning processes.

The goal of management is to provide improved water quality and high quality fish and wildlife habitat in Freeborn Lake. With public access and portions of its shoreline protected and managed for public benefit Freeborn Lake should be a priority to also have good water quality and aquatic habitat. The lake suffers from invasive fish species, nutrient loading and altered hydrology.

Five management objectives are identified to enhance and maintain aquatic habitats within Freeborn Lake: 1) Provide an effective fish barrier and an operable dam; 2) Improve and maintain high quality fish and wildlife habitat in Freeborn Lake; 3) Increase



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populations and relative abundance of northern pike and yellow perch; 4) Improve and maintain water quality parameters for total phosphorous (< 90 ppb), Chlorophyll a (< 30 ppb) and Secchi disk transparency (> 2.3 ft.) to attain aquatic recreational use standards for shallow lakes in the Western Corn Belt Plains Ecoregion; 5) Promote healthy watershed practices and habitat complexes around Freeborn Lake.

Immediate actions are to incorporate an effective fish barrier on the Cobb River and replace the existing outlet dam with a structure allowing water level management. At the time of construction the lake would be lowered in winter and summer to facilitate dam replacement, rough fish removal and regeneration of native aquatic plants.

A velocity-tube fish barrier is feasible downstream of the outlet dam at County State Aid Highway (CSAH) 6. This type of fish barrier can be used as a road crossing and is preferred for simplicity and ease of maintenance. The existing CSAH 6 road crossing of the Cobb River will be replaced with a new culvert having adequate flow characteristics to deter upstream migrations of common and other invasive carp. Installation of a culvert/fish barrier requires water permits and permissions to maintain a barrier to the movements of aquatic species.

The outlet dam for Freeborn Lake is deteriorating and exhibits condition problems. It also is a factor in water quality issues; however, a dam is needed to maintain the lake. Final dam design plans, an operational plan, a cooperative agreement with Freeborn County, and other requirements are necessary to allow dam replacement and water management. The new dam will have the same control (full service level) the current structure was designed to maintain. It will have a variable crest feature (usually stop-logs) so water level management and drawdowns can be implemented. The new structure should pass the same amount of water at full service as the existing dam. A channel from the dam into the basin will be needed to facilitate temporarily lowering water levels. Construction and operation of the dam will require necessary permits.



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Minnesota statutes and rules provide options for processes to facilitate the use of temporary drawdowns to improve water quality and aquatic habitats for lakes. For Freeborn Lake the most appropriate option is Minnesota Statute 103G.408 which allows drawdowns to improve water quality and aquatic habitat when the public water is a shallow lake to be managed for fish, wildlife, or ecological purposes by the Commissioner of the DNR. The process includes giving notice and holding a public hearing. Management and permitting will be based on an approved, comprehensive management plan. Although not required by law, Freeborn County and the DNR intend to maintain a formal lake advisory committee and process for involving interested citizens when significant management actions are proposed.

Initial major water level drawdowns are proposed to be implemented concurrently with dam replacement both to facilitate the outlet work and to initiate ecological changes in the lake that can improve water quality. Exposing the bottom of the lake will consolidate and oxidize bottom soils, reduce nutrients available to algae in the water, and will provide better growing conditions for rooted aquatic vegetation. Lower water will help induce winter kill and/or facilitate other treatments to control rough fish.

A water level drawdown is proposed for late summer or fall of 2016 with the lake to be lowered as much as possible (>40 inches) by late fall. This drawdown would extend through winter to remove undesirable fishes. This may be used in conjunction with rotenone treatment to eradicate fish populations. It was suggested that rotenone would be primarily applied by air, since the lake is so large, shallow and would be inaccessible by boat during drawdown. Tributaries would be treated by ground applications. Fish will be scavenged or allowed to decompose naturally.

Once the dam construction is complete a growing season drawdown would actively lower water levels 30 inches to regenerate aquatic vegetation including emergent varieties (e.g., bulrushes and cattails). Based on depth measurements it is anticipated the growing season drawdown would expose about 50% of the lake basin. Perennial emergent aquatic plants may be expected to cover portions of the lake as observed in the past after natural droughts. They are predicted to occupy up to 25% of the basin at maximum extension, primarily in the shallower areas. Most species of emergent plants are relatively short-lived and dieback in a few years.



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The lake would be restocked with northern pike and other species compatible with water quality and habitat objectives. The resultant fishery should be considered “boom and bust.” Fish can grow rapidly and abundantly providing for a quick development of a quality recreational fishery.

Following major drawdown and fish removal, the first year of reflooding will be regulated to encourage establishment of desired vegetation with an objective of fully restoring lake levels to the full service level as plants mature. Refill times are dependent on prevailing climatic conditions and time of year.

Questions were asked about other means of removing phosphorous. Few techniques are available. Natural remediation is the most practical. Sediment removal is prohibitively expensive. Chemical treatments such as alum applications are expensive and would be short-lived. Growing and removing vegetation also has practical limitations. Lake aeration as a means of extending benefits of the reclamation is not recommended. Aeration would be actively opposed by DNR Fish and Wildlife staff as ineffective in a lake as shallow as Freeborn and has having the potential to harm efforts to suppress rough fish.

It was noted that lowering the lake will export substantial quantities of phosphorous to receiving waters. While this is true, the dissolved phosphorous concentrations in the water are presently very high and being exported as long as there is flow from the lake. A primary objective of the lake reclamation is to substantially reduce dissolved phosphorous over time.

It was emphasized that shallow lake conditions are not static and additional management will be needed to maintain good water quality, quality fishing and aquatic habitats. The following procedures are recommended to maintain or restore improvements. Thresholds are identified that would trigger consideration of additional management.

Relative abundance of fish species and predator-prey relationships affect the lake environment. Management will target control of rough fish and improving aquatic vegetation to improve or maintain water quality. The long-term effectiveness of rough fish



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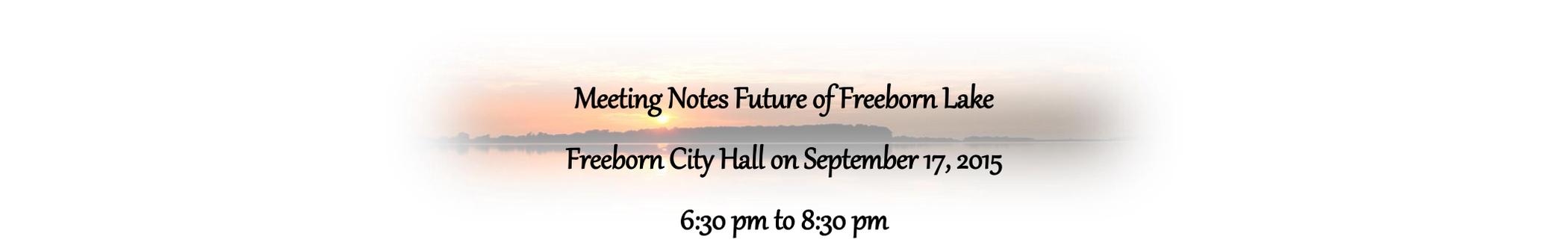
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removals is not predictable. Rough fish are tough to eradicate. Natural events such as floods and accidental or purposeful introductions by people can result in recolonizations. Experience with control in local lakes is varied.

Additionally, Freeborn Lake is vulnerable to both winter and summer conditions that can adversely affect the fishery and lead to declining water clarity and habitat quality. An effective fish barrier at the lake's outlet will restrict natural recolonization, so stocking will be needed. Plans are to restock the lake with northern pike, yellow perch and bluegill sunfish at appropriate life stages as needed. Northern pike are a top predator adapted to shallow lake conditions. Bluegill sunfish can help control reproduction of common carp by preying on eggs. A low relative abundance of quality sized northern pike and yellow perch within the overall fish community would be one measure to determine whether stocking may be indicated.

In the long term, soil and water conservation and protection of critical habitats are important tools for sustaining water quality. Benefits will accrue to Freeborn Lake through a reduction in water and nutrient inputs and increased fish and wildlife and water-based recreation. Several programs are available to protect, restore and manage productive croplands, wetlands and grasslands. Efforts should identify and target actions that maximize public benefits for water quality, fish and wildlife habitat, recreation and sustaining agriculture.

Certain land uses, development practices and invasive species can have profound influences on the lake environment. Riparian habitats are disproportionately valuable for water quality and fish and wildlife. Shore land standards and voluntary efforts can protect near-shore areas and water quality. Compliance with recommendations and laws can help guard against introductions of invasive species. The lake plan identifies programs and educational efforts to help inform people about protecting the nearshore and lake environments. A lake-wide vegetation management plan can be developed to provide standards for aquatic vegetation management that provide for adequate lake access and water-based recreation while maintaining water quality and habitat benefits of aquatic vegetation.



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Without doubt, additional drawdowns and fish removals will be needed to maintain or attain water quality standards and habitat objectives. Water quality parameters, aquatic plants and the fish community will be surveyed periodically to monitor management response and determine when additional management is necessary. The more significant drawdowns will be discussed with the advisory group prior to implementation.

Partial drawdowns up to 18 inches below full service level are proposed as an intermediate management action. Given the difficulty of implementing full drawdowns and the inconvenience caused by them, it is beneficial to have a tool to sustain the effects of a major drawdown for a longer period of time. Partial drawdowns can be in a range from as little as 0.5 feet to up to 1.5 feet and employed during the winter or during the growing season dependent on management needs.

The following thresholds can indicate a partial drawdown may be needed: submersed vegetation found at < 60% of standard open water sample points (established in 2002); summer Secchi disk readings are less than < 2.2 feet; and the presence of carp or other undesirable fish is apparent. Objectives from which to measure management effectiveness may include: aquatic vegetation being found at  $\geq 80\%$  of the sample stations and Secchi disk measurements remain > 2.3 feet during mid-summer.

Major drawdowns are tools that replicate the effects of a significant, long-term drought. They are natural reset mechanisms for shallow lakes and are expected to be used infrequently, but they are necessary if poor water and habitat quality issues cannot be overcome by less intensive measures. Additional major growing season drawdowns may be conducted when any two of the following conditions (thresholds) are met: emergent aquatic plants occupy < 10% of the basin; aquatic plant (emergent and submersed) coverage is < 50% within the basin as determined by lake survey using standard survey points; and Secchi readings average < 2.2 feet for 2 consecutive growing seasons.

Measures of management effectiveness may include: average Secchi disk measurements > 2.3 feet during mid-summer; total phosphorous < 90 parts per billion (ppb); aquatic vegetation found at  $\geq 80\%$  of the standard sample stations. Active efforts to



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remove fish may include major winter drawdown used alone or in conjunction with fish toxicants (i.e. rotenone treatments). Winter drawdowns may be conducted when any two of the following conditions are met: presence of carp; low prevalence of northern pike and quality yellow perch; aquatic plant coverage is < 50% within the basin; Secchi readings average < 2.2 feet for 2 consecutive growing seasons and total dissolved phosphorus levels > 90 ppb.

The aims of a winter drawdown or fish removals are similar to major growing season drawdowns and also include a fish community that is balanced among species that are piscivorous (fish-eating) and fish that feed on invertebrates and/or plankton or biased toward piscivorous species (e.g., balanced among trophic levels).

Attendees were encouraged to share the draft plan broadly and to provide comments or other feedback. The next advisory group meeting will be October 15 at 6:30 to 8:30 pm at the Freeborn City Hall. The agenda will be focused on additional refinements of the draft lake management plan, comments and questions.

Those interested in the draft Freeborn Lake plan may view or download a copy from the Freeborn County website at <http://www.co.freeborn.mn.us/DocumentCenter/Home/View/1587>. Written comments may be directed to: Steve Kittelson, Wildlife Lake Specialist, 35365 800<sup>TH</sup> AVE., MADELIA, MN 56062 or electronically [steve.kittelson@state.mn.us](mailto:steve.kittelson@state.mn.us).