April 16, 2013

To: **White Bear Lake Conservation District Board**
From: **Lake Level Resolution Committee**
Subject: **Recommendations for Addressing the Declining White Bear Lake Water Levels**

Introduction

White Bear Lake has been experiencing record low water levels. In order to address these water levels, the White Bear Lake Conservation District partnered with neighboring communities to fund a study prepared by the United States Geological Survey (USGS). Although a final version of the USGS study has not been published, some of the findings in the study indicate that a connection exists between the bottom of White Bear Lake and the underlying Prairie du Chien aquifer. Based on this finding, the WBL Conservation District established the Lake Level Resolution Committee (LLRC), to investigate options for increasing the water level in White Bear Lake. The LLRC investigated several options and this document provides a summary of the options that the LLRC supports for future action. It should be noted that the LLRC is very concerned about the current condition of the lake and our opinion is that immediate action must be taken to stop the drop in lake level.

One of the greatest unknowns for the options to restore the lake level for White Bear Lake includes the regulatory process, approval process, funding options, etc. There are many local, regional and statewide stakeholders for each of the options to restore the lake level for White Bear Lake. However, it is currently unclear who has authority to approve each of these options as well as who has the authority to approve the funding for these options. Therefore, the regulatory, funding and approval processes may be the single largest unknown at this time as well as the longest timeline for restoring the lake level for White Bear Lake.

Analysis of Options

The options that were investigated can be divided into two types:

- options that have the primary objective of adding water to augment the amount of water in the lake and thereby increase the water level in the lake; and
- options that reduce the use of the Prairie du Chien aquifer and thereby reduce the amount of water leaking from the lake which would increase the water level in the lake

The LLRC's opinion is that multiple options will need to be implemented concurrently for maximum effect. For example, long-term augmentation with large volumes of water would become counterproductive if current withdrawals from the Prairie du Chien

aquifer continue and increase unabated. Continued and increasing withdrawals would further reduce the level of the aquifer, resulting in increasing leakage of water from the lake, requiring ever-increasing volumes of augmentation that may be unsustainable. Several of the options require extensive, detailed feasibility studies by professional hydrologists and engineers. The LLRC is not qualified to undertake such studies. These studies need to be funded and undertaken pursuant to legislation of the Minnesota Legislature. The White Bear Lake Conservation District should advocate for the passage of this funding legislation. In order for any of the options to be successful, they must be implemented on a regional basis, and the discussion in this document assumes regional implementation.

A summary of the options follows:

- **Augmenting White Bear Lake with surface water from SPRWS**
    - Augments the water level in White Bear Lake
    - The addition of an external water source to White Bear Lake would allow the water level in the lake to be controlled within a designated range
    - This option requires a large water source with adequate volume to provide the necessary water, and the Mississippi River has adequate flow
    - The SPRWS currently utilizes the Mississippi River as a water source, and the intake system has excess capacity
    - There are several items that need to be investigated in order to determine if this option is feasible, for example the cost of a system to pump water from the SPRWS system to White Bear Lake, the ideal connection point for the SPRWS system and White Bear Lake, the best route for a transmission main from the SPRWS system to White Bear Lake, concerns about invasive species, etc.
    - **Attachment B** identifies items suggested to be evaluated in a feasibility analysis
    - Some next steps for this option include advocating for a feasibility analysis to be performed to provide detailed information for this option

- **Augmenting White Bear Lake with commercial discharge water**
    - Augments the water level in White Bear Lake
    - An industrial facility adjacent to White Bear Lake utilizes groundwater from the Prairie du Chien aquifer as a source of water in the plant processes
    - A large volume of this water is utilized for non-contact cooling water, and is currently discharged into Goose Lake after a single pass through the cooling water process
    - This water could be rerouted to be discharged into White Bear Lake to augment the water in the lake
    - Although it is a relatively small flow of water, the source is adjacent to White Bear Lake

- There are several items that need to be investigated in order to determine if this option is feasible, for example the cost to change the current discharge location to White Bear Lake, the reliability of the source water relative to the cost of the infrastructure, etc.
- **Attachment B** identifies items suggested to be evaluated in a feasibility analysis
- Some next steps for this option include advocating for a feasibility analysis to be performed to provide detailed information for this option

- **Maximize the efficiency of pump use for wells adjacent to White Bear Lake**
  - Reduces the use of the aquifer in some areas which will reduce the rate of water leaking from White Bear Lake
  - It is likely that some wells in the northeast metro area have more impact on White Bear Lake water levels than other wells
  - It may be possible to adjust the operation of these wells to minimize the impact on White Bear Lake
  - Some next steps for this option include investigation through an additional USGS study or in a feasibility analysis of this option
- **Utilize existing wells in the Mt. Simon Hinckley aquifer during the summer**
  - Some communities, for example the City of White Bear Lake, have existing wells in the Mt. Simon Hinckley aquifer
  - It may be possible to utilize existing wells in the Mt. Simon Hinckley aquifer during the summer months to minimize the impacts on White Bear Lake that result from using wells in the Prairie du Chien aquifer during this period
  - This option could be implemented immediately
  - The next step for this option is for the White Bear Lake Conservation District to work with the City of White Bear Lake to implement this option

- **Northeast Metro Area convert from aquifers to Saint Paul Regional Water Services (SPRWS) surface water for their primary source of water**
  - Reduces the use of the aquifer which reduces the rate of water leaking from White Bear Lake
  - Majority of communities in the northeast metro area utilize groundwater aquifers as the source of their water supply
  - The groundwater resource is limited and will continue to be negatively impacted if it is over utilized, and the aquifers may not be able to meet the future needs of the northeast metro area
  - In contrast to the groundwater aquifers, the volume of water that flows by the metropolitan area in the Mississippi River is enormous
  - The Saint Paul Regional Water Services (SPRWS) currently has an inlet to obtain water from the Mississippi River, and the existing capacity of the SPRWS system would be adequate to provide treated water to the northeast metro area

- The SPRWS system currently services the City of Maplewood, so the water distribution system is relatively close to the City of White Bear Lake
- There are several items that need to be investigated in order to determine if this option is feasible, for example, water quality impacts of blending water supplies, infrastructure required to service the northeast metro area, financial implications to existing infrastructure, etc.
- **Attachment B** identifies items suggested to be evaluated in a feasibility analysis
- Some next steps for this option include advocating for a feasibility analysis to be performed to provide detailed information for this option

- **<u>Conservation</u>**
  - Reduces the use of the aquifer which reduces the rate of water leaking from White Bear Lake
  - Program can begin immediately and evolve over time
  - Consists of several programs which all attempt to reduce the amount of water that is consumed
  - A water conservation program can be implemented immediately at relatively low costs
  - The LLRC has prepared a summary of effective conservation practices, and the summary is included as **Attachment A** to this report
  - Some next steps for this option include correspondence with communities in the northeast metro to encourage implementation of conservation efforts and partner with schools to lower water consumption

A summary of the various options is presented below:

Summary of Options

Option	Category
Augment WBL with raw water from SPRWS	Augment WBL water volume
Augment WBL with discharge water from adjacent commercial facilities	Augment WBL water volume
Maximize efficiency of pump use	Reduce use of aquifer
Utilize existing wells in the Mt. Simon Hinckley aquifer in the summer	Reduce use of aquifer
Utilize surface water as primary water supply	Reduce use of aquifer
Conservation	Reduce use of aquifer

Future Activities

The LLRC requests that the White Bear Lake Conservation District Board do the following:

1. Advocate for water conservation programs to be implemented by all communities in the northeast metro, as well as schools and other large water volume users.
2. Advocate for the bills that are in the State House and Senate, which would allocate funds to prepare a feasibility analysis of options and fund additional USGS study of the northeast metro area.
3. Advocate that the options discussed in this document be considered in the preparation of a scope of work for a future feasibility analysis of options for addressing the lake level in White Bear Lake or in future USGS work.
4. Advocate that a regional entity coordinate discussion and action on regional water conservation programs and regional water supply options.
5. Request documentation from the Department of Natural Resources (DNR) regarding the agencies' ability, willingness, and time frame to designate a groundwater management area around White Bear Lake. The DNR has the authority to designate these areas which would allow the DNR to limit the total annual water appropriations and uses within the designated area to ensure sustainable use of the groundwater to protect ecosystems, water quality, and the ability of future generations to meet their own needs.
6. Request that the City of White Bear Lake utilize the existing Mt. Simon Hinckley aquifer well during the summer months to reduce the amount of water extracted from the Prairie du Chien during the summer.

Attachment A
Water Conservation Information

Water Conservation Information

"Running water" used to be seen only in streams and rivers. Every gallon had to be carried by hand from springs, streams, wells, to homes, barns, animals, fields, for drinking, washing, bathing, cooking, cleaning, irrigating crops. We had to "work" hard to get that sustaining elixir of life, and so we used it sparingly and efficiently. We gave this limited resource the respect it deserved, because when it was used up, we had to labor again, day after month, after year, into infinity to keep the water "running".

Now we have piped "running water". It's running out of millions of faucets, showers, toilets, sprinklers, hoses, leaking pipes, clothes and dishwashers, restaurants, motels, golf courses, businesses, wastewater treatment plants. Our water systems pump quickly and quietly unseen, from ground water, aquifers, rivers, lakes, everywhere, enabling instant access to homes, business and commercial enterprises. It's so effortless that it appears we can turn on the faucets and the water will run forever.

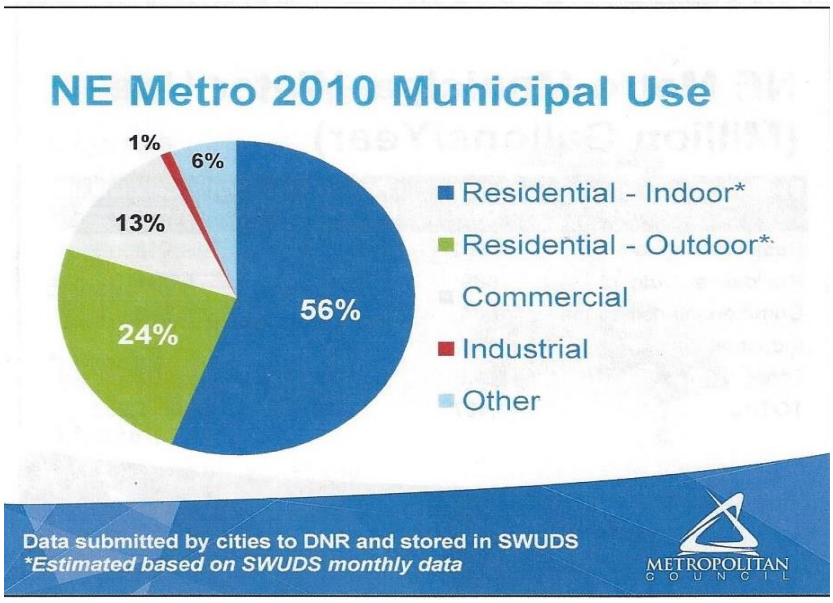
However, the reality is: water is a limited and precious resource. We can choose to waste it at will, as many do now, or to preserve it for our children's, children's children. Success lies in our daily, sustained choice to control running water with the touch of our brains and our hands. This is water conservation.

A. Water Systems

Municipal water systems have a vast array of specific water conservation measures at their disposal. See www.epa.waterconservationguidelines.com
See 2 successful city/region wide water conservation systems below.
1. http://ipswichriver.org/water-friendly-demonstrations/balancing-the-water-budget/
2. Massachusetts Water Resources Authority, www.mwra.state.ma.us. Click on Water System, Water Conservation and Efficiency, Demand Management Report.

B. Residential, Business, Commercial, and Other Uses

Efforts by all water users are key to effective water conservation. NE Metro 2010 Municipal Water Use in the chart below, shows Residential –Indoor, 56%, and Outdoor, 24% use, representing 80% of total municipal water use. Business, commercial, and other uses of water are the remaining 20%. Continuing information, education, and motivation to action by all users is essential to successful community water conservation efforts. The White Bear Lake Area Chamber of Commerce plans to spearhead business water conservation immediately in Summer, 2013. See www.20gallonchallenge.com for a successful city wide water conservation program for residences and businesses in San Diego County Water Authority, CA.



C. Education in Schools

Local K-12 schools are extremely important for water conservation and motivation, to instill in young people respect and conservation habits early, so they will become automatic. The community needs to enable the schools to engage students in awareness, education, and action, and align school curriculum with community goals for preservation of precious water resources. See www.mwra.state.ma.us, School Program for one successful example among many.

D. Media Coverage of Water Conservation Initiatives and Activities

During this regional water conservation campaign, every day members of the NE Metro community should encounter at least one water conservation success story, tip, picture, ad, reminder, motivation, presentation, conversation, example to keep engaged in the goal of water conservation. Every informational technology including print media, commercial and public/cable TV, motivational handouts, visuals including pictures, posters, booths (summer festivals, like Marketfest), power point presentations, community meetings, radio, websites, computer and smart phone technologies, should be used. The goal is to engage the NE Metro in effective water conservation action.

E. Regional Conservation Tool

The Metropolitan Council has information available on their website with suggestions for the public to utilize in their water conservation efforts. See http://www.metrocouncil.org/Wastewater-Water/Planning/Water-Supply-Planning/Water-Conservation-Toolbox.aspx?source=child

Attachment B
Suggested Scope Items for a Feasibility Analysis

Scope Items for Conversion from Groundwater to Surface Water as Primary Water Supply

- Requests for information and data from individual communities in Study Area;
- Preparation of preliminary GIS mapping for the overall Study Area and for each community within the Study Area;
- Analysis of future estimated water demand projections;
- Meet with St. Paul Regional Water Services (SPRWS) staff to discuss their present and future water system capacities for potentially supplying treated water through potential interconnections;
- Meet with each of the individual communities located within the Study Area and review their community water system in detail;
- Review water system mapping for potential interconnections;
- Study potential interconnections and determine feasible locations based upon available land, easements, and potential easements identified by each of the interconnecting communities.
- Prepare GIS mapping for existing and potential interconnecting water mains for Study Area.
- Determine system operating pressures (hydraulic grade lines) and operating conditions for each existing water distribution system.
- Develop potential trunk water distribution system layouts between interconnecting communities based on future water projections and input from communities.
- Obtain available hydraulic distribution system models from communities that have prepared models, convert models to common modeling platform (software), and analyze models to determine minimum size of interconnecting water mains, predicted water pressures, and hydraulic balance (equal filling of reservoirs, etc.) through extended period simulations.
- Produce illustrations for hydraulic modeling results for system pressures and extended period simulations based on future water projections.
- Determine required booster station pumping capacities and potential locations for water booster pumping stations and metering vaults at interconnections based on future water projections and input from communities.
- Estimate costs of potential water main interconnections, utility easements, booster pumping stations, and metering vaults to meet future water demands.
- Study and estimate long term operation and maintenance costs of water booster pumping stations and metering vaults at interconnections.

Scope Items for Augmentation of White Bear Lake with Water from SPRWS

- Quantities of augmentation required to raise and maintain level of White Bear Lake to average normalcy of approximately 923.42, taking into consideration quantities likely to be lost, particularly due to leakage caused by withdrawals of groundwater from the Prairie du Chien aquifer;
- Cost-benefit analysis of comparing systems designed to raise level to average normalcy of approximately 923.42 feet within 2 years, 4 years, and 6 years;
- Quality of augmentation water and impact on quality of water in White Bear Lake, including an analysis of options to control invasive species in the augmentation water;
- Proposed routing of water piping;
- Pumping required to meet elevation differences between augmentation source and White Bear Lake;
- Schedule for implementation;
- Required governmental approvals and permits;
- Costs of engineering, implementation, and ongoing operation;
- Sources of funding

Scope Items for Augmentation of White Bear Lake with Industrial Discharge Water from Non-Contact Cooling Water

- Temperature concerns of discharged water;
- Identify impacts associated with chemical addition at the industrial facility;
- Impact on Goose Lake;
- Cost-benefit analysis if industries future use and discharge is reduced 50% due to operation changes;
- Proposed routing of water piping;
- Schedule for implementation;
- Required governmental approvals and permits;
- Costs of engineering, implementation, and ongoing operation;
- Sources of funding