

Memorandum

To: Valley Branch Watershed District Board of Managers
From: Nathan Campeau, PE, Water Resources Engineer
Subject: Lake Olson and Lake DeMontreville Emergency Drawdown Procedure
Date: February 22, 2019, revised February 26, 2019
Project: 23820045.01 2019 010
c: Melissa Imse, Susannah Torseth, Jeff Brower, John Hanson

Introduction

Manager Sewell received a request from a few property owners to look at the drawdown formula for Lake Olson and Lake DeMontreville. This memorandum provides background on the formula and the approved operations plan.

Requested Manager Action

None

Background

In 1987, the Valley Branch Watershed District (VBWD) constructed Project 1007, a flood control project that provides an outlet for many landlocked and flood-prone lakes in the northwest portion of the watershed (including Lake Olson and Lake DeMontreville), directing water to a Minnesota Department of Transportation (MNDOT) storm sewer along Interstate 94 and, ultimately, to the St. Croix River.

As part of the project, several of the constructed outlets to the lakes and other water bodies included adjustable weirs so that lake levels could be adjusted, as needed. The weirs are typically 6-inch-high wooden stoplogs stacked on top of one another; although, in the case of the Lake Olson and Eagle Point Lake outlets, the wooden stoplogs have been replaced with aluminum stoplogs.

The Minnesota Department of Natural Resources (MNDNR) permitted Project 1007 and set an outlet elevation for each lake. In the case of Lake Olson (which also controls Lake DeMontreville), the outlet elevation is set at 928.5 feet. The outlet elevation can only be lowered in emergency situations to mitigate flood risk, as set forth in the December 28, 1990, "Operating Plan for Lake Olson," which was a required plan as part of the MNDNR permit for Project 1007. The operating plan for Lake Olson is attached to this memo.

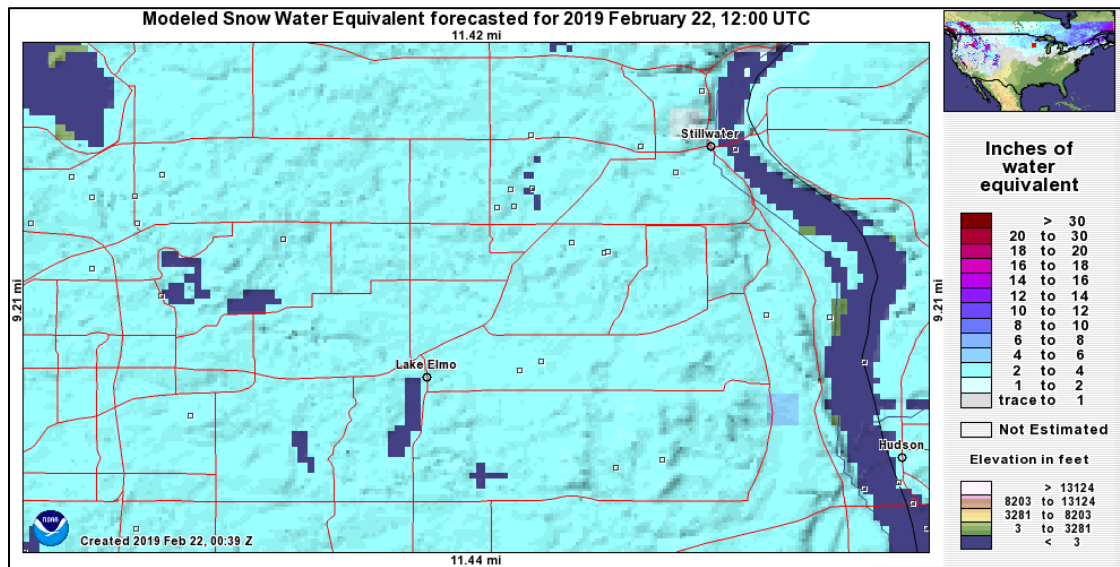
The operating plan details the procedures for lowering the weir to draw down Lake Olson (and ultimately Lake DeMontreville). The lakes can only be lowered between February 15 and April 15 in response to the water equivalent of snowpack. If the water equivalent of the snowpack is measured over 4 inches, then a drawdown is allowed to certain elevation targets detailed in the operating plan.

VBWD set those drawdown elevation targets by calculating the watershed area tributary and runoff depths to each lake and evaluating those volumes against the flood storage volume capacity of that lake. In addition, it was understood in the operations plan that upstream lakes can be drawn down, which impacts downstream lakes. Therefore, target levels are listed and monitoring of the snowpack and water levels is required during drawdown.

Drawing down any lake has the potential to cause or exacerbate flooding impacts further downstream. VBWD is currently performing hydrologic and hydraulic modeling of the Project 1007 system downstream of Lake Olson, which will help it better understand the implications of potential drawdowns on downstream residents, property, and infrastructure.

Drawdown Procedures

Each winter, Barr monitors the snowpack and water equivalent for the VBWD using the National Oceanographic and Atmospheric Administration's (NOAA) online mapping tool, which NOAA updates daily. As of February 22, 2019, the water equivalent of snowpack of the watershed tributary to Lake Olson and Lake DeMontreville is somewhere between 2 and 4 inches. While that does not trigger a drawdown, that does trigger more aggressive monitoring of conditions, which VBWD has already initiated in 2019. The figure below shows the water equivalent of the snowpack as of February 22, 2019.



NOAA Snow Water Equivalent Map of the VBWD General Area as of February 22, 2019

If additional monitoring is needed, Barr first requests on-the-ground reports from adjacent organizations, such as the Ramsey-Washington Metro Watershed District. If other organizations cannot provide the information or it is close to the 4-inch water-content trigger, Barr sends staff to perform the monitoring.

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If the water equivalent of the snowpack triggers action on any lake, the VBWD Board implements the emergency drawdown procedures, which include notifying the MNDNR, Minnesota Department of Transportation, and local municipalities of the intent to perform a drawdown as well as issuing press releases and installing thin ice signs. VBWD hires a contractor to remove stoplogs and monitors water levels to reach the target levels allowed in each lake's operating plan, starting with the most downstream lake. Since the completion of Project 1007, VBWD has implemented emergency drawdown procedures twice.

At the time of the writing of this memo, we are monitoring the snowpack situation daily.

VALLEY BRANCH WATERSHED DISTRICT
OPERATING PLAN FOR LAKE OLSON
December 28, 1990

INTRODUCTION

This revised plan is submitted by the Board of Managers of the Valley Branch Watershed District to replace the May 25, 1988 operating plan, which fulfilled Condition 22 of Permit 86-6269, issued August 1, 1986. It will set an operating plan for the Lake Olson outlet structure.

Because Lakes Olson and DeMontreville are hydraulically connected, the Lake Olson outlet structure also controls the level of Lake DeMontreville. The tributary area of Lakes Olson and DeMontreville is 4,250 acres and the combined surface area of the two lakes is 263 acres. The normal operating level of the lakes is at Elevation 928.5 feet.

GOALS

The goals of this operating plan are as follows:

1. To reduce the threat of flooding on Lakes Olson and DeMontreville, especially under spring snowmelt conditions.
2. To maintain, to the greatest degree possible, a summer pool at Elevation 928.5 feet or higher.

PROCEDURE

The plan of operation will be adopted tentatively for a period of one year and reviewed at that time before permanent adoption. It will be reviewed thereafter on a two-year basis.

PROPOSED PLAN OF OPERATION

1. Except as noted below, the control elevation shall be 928.5 feet.
2. During the period from February 15 to April 15 of each year the level of Lakes Olson and DeMontreville may be lowered. Drawdown levels shall be determined from Table 1, based upon snowpack measurements, with consideration given to upstream lake levels. For example, if upstream lake levels are low, the water level of Lakes Olson and DeMontreville may not need to be lowered as much as shown in Table 1. Conversely, if

upstream lake levels are high, the water level of Lakes Olson and DeMontreville may need to be lowered more than what snowpack measurements alone would dictate. Snowpack and upstream lake levels shall be measured before drawdown and continued at weekly intervals during drawdown. Target elevations shall be adjusted according to Table 1 as snowpack and lake levels change. The regional hydrologist shall be notified five working days prior to initiation of drawdown.

RESPONSIBLE PARTIES

It is anticipated that operation will be relatively infrequent. The Board of Managers will direct the operation of the control structures. Actual operation will be carried out by the City of Lake Elmo crews, if available, or by a District representative.

In the event of an emergency, the following persons may be contacted, in the order indicated.

<u>Name</u>	<u>Address</u>	<u>Telephone #</u>
Allen Dornfeld	2867 Hamlet Ave. N. Oakdale, MN 55128	777-5590 (H)
William Rohrer	2989 Lake Elmo Ave. N. Lake Elmo, MN 55042	770-2806 (H) 227-6500 (W)
Russell Kirby	13270 4th Street N. Stillwater, MN 55082	436-6151 (H)
Ray Brenner	2525 East 18th Ave. North St. Paul, MN 55109	777-3241 (H) 540-9628 (W)
Gordon Moosbrugger	13956 10th Street N. Stillwater, MN 55082	436-5522 (H) 224-3879 (W)
Karen Chandler	Barr Engineering Co. 7803 Glenroy Road Bloomington, MN 55439	897-5503 (W) 593-1936 (H)

TABLE 1
 VALLEY BRANCH WATERSHED DISTRICT
 PROPOSED PLAN OF OPERATION
 FOR
 LAKE OLSON OUTLET STRUCTURE
 February 15 - April 15

<u>Water Equivalent of Snow, Inches*</u>	<u>Lake Level Target Elevation**</u>
6 or more	926.5
more than 5 but less than 6	927.5
more than 4 but less than 5	928.0
more than 3 but less than 4	928.5

REMAINDER OF YEAR

The outlet structure control elevation will be maintained at Elevation 928.5 feet.

* To be determined in accordance with VBWD "Snowpack Monitoring Plan" dated February 2, 1988.

** All elevations are referenced to local MNDNR datum as described in permit. This may not coincide with USGS 1929 Mean Sea Level Datum.