

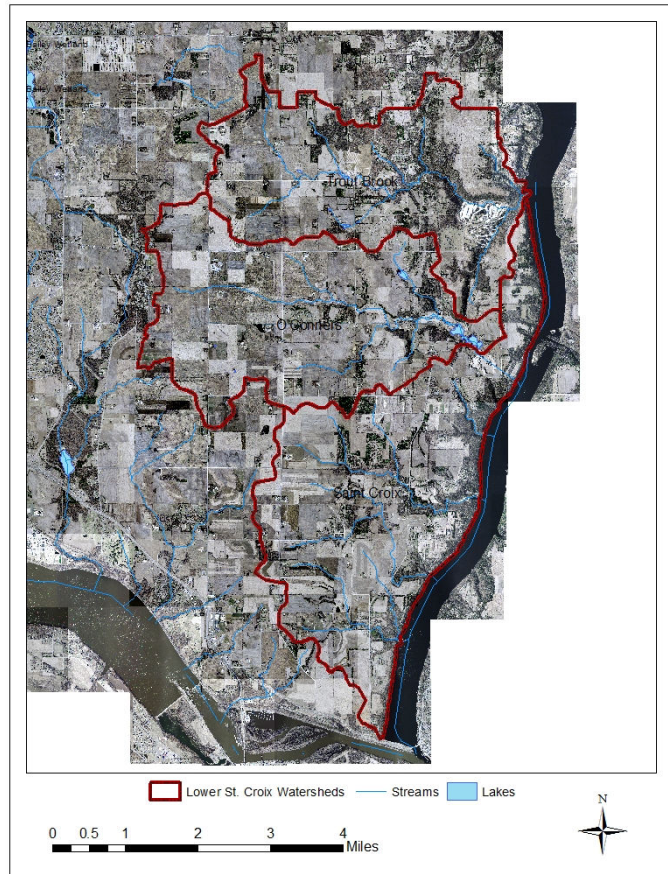
# 2011 Monitoring Report; Lower St. Croix Watershed

SWWD’s Lower St. Croix watershed (LSC) covers roughly one fourth of the District and includes the Trout Brook, O’Conner’s, and Saint Croix subwatersheds (Map 1). The Trout Brook and Saint Croix subwatersheds drain to Lake St. Croix while the O’Conner’s subwatershed is currently land locked.

This report summarizes the 2011 monitoring results for the LSC. SWWD’s monitoring programs are based on a Regional Assessment approach. By following a regional approach, monitoring is focused on key resources and watershed outlets throughout the District. Key resources of the LSC currently monitored by SWWD include O’Conner’s Lake and Trout Brook.

Lake water quality is monitored through participation in the Metropolitan

Council’s Citizen Assisted Monitoring Program (CAMP). Trout Brook is monitored with the use of an automated monitoring station that collects flow data and periodic water samples which are used in assessing water quality throughout the monitoring season. 2011 Monitoring results are presented for O’Conner’s Lake and Trout Brook regional assessment locations below.



**Map 1: Lower St. Croix Watershed**

## O’Conner’s Lake

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DNR ID #82-0200	Municipality: Denmark Township
Surface Area: 23 Acres	Watershed Area: 6,018 Acres
Mean Depth:	Maximum Depth: 11 feet
SWWD Maximum Allowable Phosphorus Load: Pending	
SWWD Trophic State Index (TSI) Goal: Pending	

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O’Conners Lake (Map 2) sits at the end of O’Conners Creek in a closed basin. The lake collects drainage from approximately 6,000 acres of agricultural and rural residential lands and drains into bedrock. O’Conners Lake and Creek were added to SWWD jurisdiction in 2010; however, monitoring through the CAMP program began in 2005.

Additional data for Armstrong Lake is available through the Metropolitan Council

Map 2: O’Conner’s Lake

([http://es.metc.state.mn.us/eims/lakes/list\\_parm.asp](http://es.metc.state.mn.us/eims/lakes/list_parm.asp)) and MN Department of Natural Resources (<http://www.dnr.state.mn.us/lakefind/index.html>), or by contacting SWWD.

O’Conner’s Lake exhibits characteristics similar to other closed basin systems. Historically, water levels drop slowly during prolonged dry stretches and rise rapidly during wet years (2005, 2010). Water quality is typically a major concern for lakes in closed basin systems as nutrients and pollutants continue to accumulate over time. There are significant ( $p < 0.01$ ) year to year differences in all eutrophication measures at O’Conner’s Lake; however there is no consistent upward or downward trend. Annual lake grades, as assigned by the Metropolitan Council, for O’Conner’s Lake are listed in Table 1. After relatively poor water quality conditions in both 2009 and 2010, water quality was improved in 2011 with only occasional nuisance conditions.

SWWD does not have in lake water quality goals for O’Conner’s Lake at this time. The lake does currently meet State Standards; however, eutrophication measures (Figures 2-4) appear to

Figure 1: O’Conner’s Lake Surface Elevation



be very dynamic. Not enough is currently known about the lake to understand why. We will continue to closely watch O'Conner's Lake.

Figure 2: In-lake Total Phosphorus Concentration at O'Conner's Lake

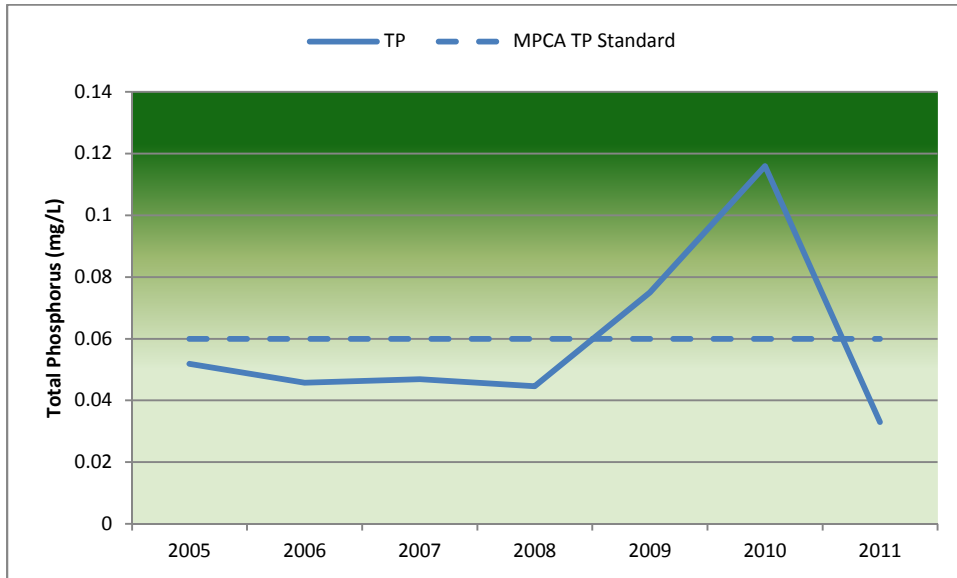


Figure 3: In-lake Chlorophyll a Concentration at O'Conner's Lake

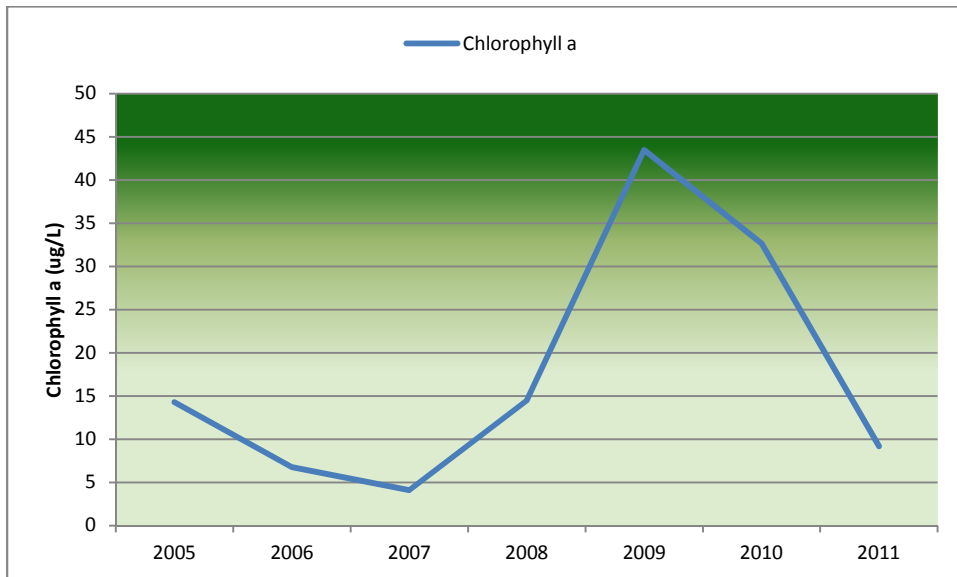


Figure 4: In-lake Secchi Transparency at O'Conner's Lake

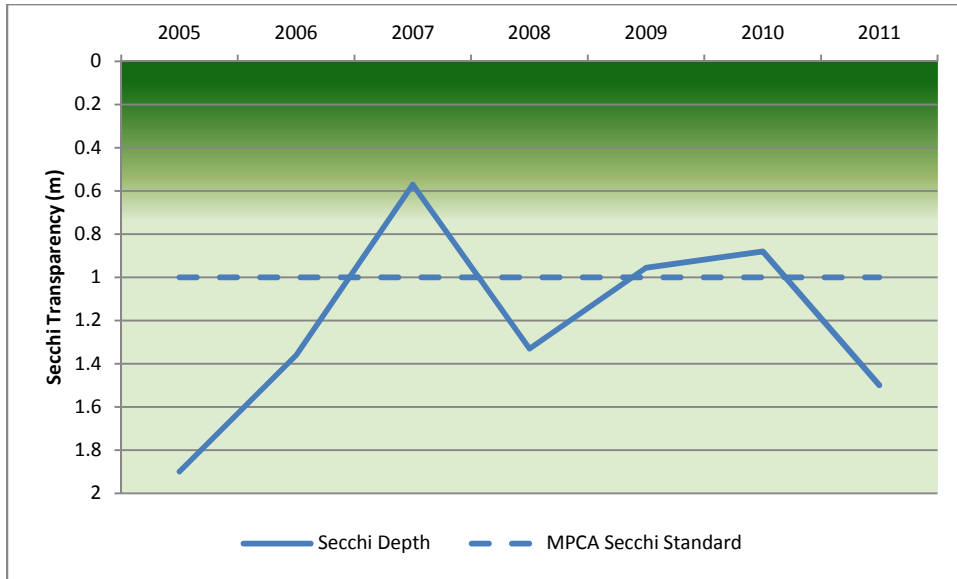


Table 1: Annual Lake Grades for O'Conner's Lake

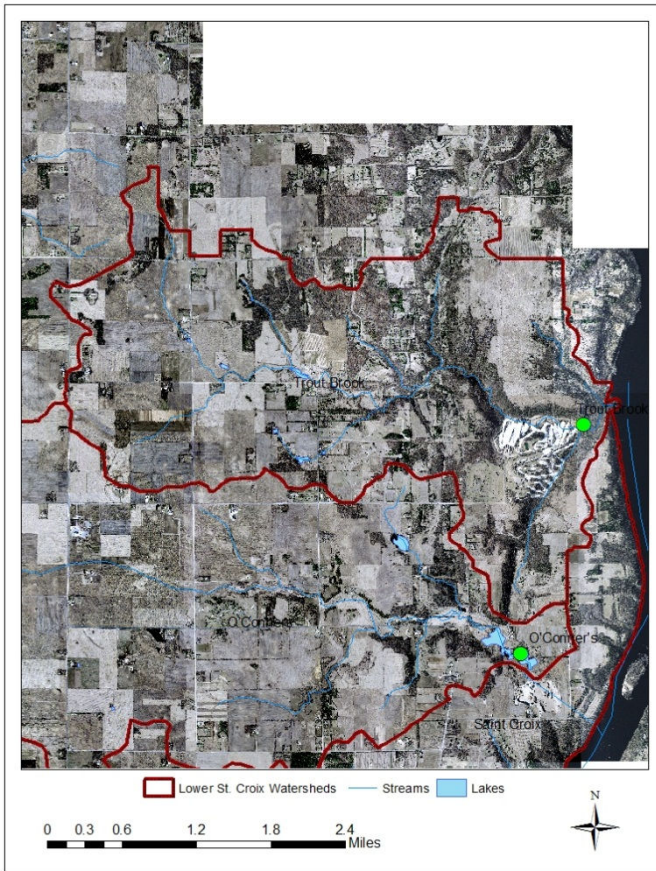
Parameter	Trophic Status	Lake Grade							
		05	06	07	08	09	10	11	
<b>Total Phosphorus</b>	55; eutrophic	C	C	C	C	D	D	C	
<b>Chlorophyll</b>	52; eutrophic	B	A	A	B	D	C	A	
<b>Secchi Transparency</b>	54; eutrophic	C	C	F	C	D	D	C	
<b>Overall</b>	eutrophic	C	B	C	C	D	D	C	

# Trout Brook

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Municipality: Denmark Township, Afton    Watershed Area: 2,240 Acres  
TMDL Maximum Allowable Phosphorus Load: 0.55 lbs/ac/yr

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**Map 3: Trout Brook**

The Trout Brook regional assessment monitoring station (Map 3) was established in 2011 and is used to assess the 2,240 acre Trout Brook watershed and loading to Lake St. Croix. The Trout Brook watershed was historically forested. Much of the watershed is now agricultural lands with some areas transitioning to residential. Additionally, a significant portion of the Trout Brook riparian zone is now used for parking and recreation at the Afton Alps ski area.

The primary purpose of the Trout Brook site is to assess the water quality of water draining out of the Trout Brook watershed to Lake St. Croix and evaluate the effectiveness of planned water quality improvement projects throughout Afton Alps and the larger Trout Brook watershed. SWWD does not currently have a total phosphorus loading standard for the Trout Brook watershed. However, one will be established upon completion of the Lake St. Croix TMDL and Implementation

Plan.

The Draft Lake St. Croix TMDL plan predicts loading from the Trout Brook watershed under 1990s conditions to be approximately 1900 lbs/yr and proposes a reduction to approximately 1230 lbs/yr, or 0.55 lbs/ac/yr in order to restore Lake St. Croix.

SWWD's annual loading data is summarized in Table 2. Based only on one year of monitoring data, phosphorus loading at the Trout Brook regional assessment location is approximately 915 lbs, or 0.41 lbs/ac/yr. Although, we expect there to be some additional TP loading between the Trout Brook monitoring site and Lake St. Croix (forested floodplain), it appears likely that total TP load from Trout Brook in 2011 met the proposed TMDL. However, SWWD will continue to monitor loading at Trout Brook to confirm compliance with the soon to be finalized Lake St. Croix TMDL.

In addition to nutrients, SWWD analyzes water quality samples for various pollutants. Water samples collected during storm events at the Trout Brook site routinely exceed State standards for copper, lead, and suspended solids, likely reflecting the influence of parking areas at Afton Alps Ski Area through which Trout Brook flows. E. coli levels are also a concern at Trout Brook which is being added to the State's 2012 impaired waters list due to high levels of E. coli observed in 2007 and 2008. In 2011, E. coli levels did meet state standards. All flow and water quality data for the Trout Brook site is available by contacting the South Washington Watershed District.

**Table 2: Annual Loading Summary for Trout Brook**

<b>Year</b>	<b>Annual Precipitation (in)</b>	<b>Projected Runoff (ac-ft)</b>	<b>Projected Annual TP (lbs)</b>	<b>TP Loading Rate (lbs/ac/yr)</b>	<b>Projected Annual TSS (lbs)</b>	<b>TSS Loading Rate (lbs/ac/yr)</b>
<b>2011</b>	26.91	1061	915	.41	188922	84.3

Note: Annual loads are calculated using the Army Corps of Engineers FLUX32 Load Estimating Software, 2.95 Beta.