



Barr Engineering Company  
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Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO

## Memorandum

**To:** Bassett Creek Watershed Management Commission  
**From:** Barr Engineering Company  
**Subject:** Item 6E – Wirth Lake TMDL Update  
**Date:** July 8, 2009  
**Project:** 23/27 051 2009 003

### 6E. Wirth Lake TMDL Update

#### Recommended/requested Commission action:

1. Forward the Commission's recommendations to the MPCA regarding the completion of waste load allocations on a categorical or individual basis and a waste load allocation for MDOT.

#### Wirth Lake TMDL Update

Attached are the following:

1. An email from the MPCA summarizing the results of the June 22, 2009 Wirth Lake TMDL stakeholder meeting and their recommendations regarding the Implementation Plan and Waste Load Allocations for Wirth Lake;
2. An email from the Minneapolis Park & Recreation Board regarding a waste load allocation for MDOT.
3. An email from the MPCA responding to the Minneapolis Park & Recreation Board's comments.
4. Barr's presentation to the June 22 stakeholder meeting.

**Karen Chandler**

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**From:** Greg Wilson  
**Sent:** Wednesday, July 08, 2009 9:42 AM  
**To:** Karen Chandler  
**Subject:** FW: Wirth Lake TMDL Status

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**From:** Zadak, Chris [mailto:Chris.Zadak@state.mn.us]  
**Sent:** Tuesday, July 07, 2009 11:12 AM  
**To:** Len Kremer  
**Cc:** Michael Welch; Greg Wilson  
**Subject:** RE: Wirth Lake TMDL Status

Hi Len--

I can't promise any kind of a meeting summary in time for your commission mtg. However, you might want to provide a copy of Greg's presentation and my e-mail below???

We have two options, I believe, for accounting for the loading from backflow: 1) explain in the TMDL that it is based on the understanding that the backflow structure will be installed and be effective (and therefore more clearly demarcates the watershed) and so we need only assign allocations to the "upstream" MS4s or 2) assign zero allocations to the "downstream" MS4s. I think it really makes little difference; either way essentially says no loading from downstream, but for purposes of moving forward I lean toward #1. It is similar how we're approaching Lk Nokomis, which now has that inflatable weir preventing Minnehaha Ck flow from entering the lake. I'll confer internally before proceeding.

The categorical vs. individual question is much less important here since we'll basically hold the MS4s to current loading. Individual loads probably make more sense given this situation, in my view, since no cooperation is called for.

We talked at the meeting that we did not see the need for additional stakeholder meetings; instead have the last meeting be the public meeting.

Thanks. -Chris

-----Original Message-----

**From:** Len Kremer [mailto:LKremer@barr.com]  
**Sent:** Tuesday, June 30, 2009 2:34 PM  
**To:** Zadak, Chris  
**Cc:** Michael Welch  
**Subject:** RE: Wirth Lake TMDL Status

Chris

Will there be a summary of the 6/22 meeting prepared that we can send to the Bassett Commissioners in the next meeting packet? How will the issue of the backflow from the creek be handled in the TMDL since the backflow consists of runoff from seven MS4's in addition to the four MS4's in the Wirth Lake watershed? Are you looking for input from the BCWMC on the issue of a categorical vs individual waste load allocation for the Wirth Lake TMDL? Will there be any additional stakeholder meetings for the Wirth Lake TMDL other than the public meeting after the draft TMDL report is available?  
Thanks-Len

---

**From:** Zadak, Chris [mailto:Chris.Zadak@state.mn.us]

**Sent:** Wednesday, June 24, 2009 11:23 AM

**To:** beth.neuendorf@dot.state.mn.us; joliver@ci.golden-valley.mn.us; Loomis@ci.golden-valley.mn.us; barbara.loida@dot.state.mn.us.; joel.settles@co.hennepin.mn.us; Marcey.Westrick@state.mn.us; nick.proulx@dnr.state.mn.us; Brown, Tim; Lois.Eberhart@ci.minneapolis.mn.us; Byrne, Pat; dstauner@ci.new-hope.mn.us; Black, Ginny; Michael Welch

**Cc:** Greg Wilson; Len Kremer; Bassett Creek Recording Administrator; Erdmann, John

**Subject:** Wirth Lake TMDL Status

Hello--

To bring some closure to the discussion at the 6-22-09 stakeholder meeting I have taken some time to review the findings and have discussed the results and relevant TMDL policy with staff internally. At this time here is what we are concluding:

- Based on the modeling and data analysis by Barr it appears that Wirth Lake can meet the in-lake phosphorus standard of 40 ug/L if the backflow issue is addressed. Secchi disk targets will also be met. Chlorophyll-a targets are less clear, though it appears that 3 of the last 4 years data meet the standard (similar to P) with somewhat more variability (compared to P) in the few years before that. These results support drafting the TMDL with an equation as presented for the "no backflow" scenario. This means holding the contributing "upstream" MS4s (i.e., those shown in the watershed figure in the presentation) to current loading.

- In the monitoring section of the TMDL (which lays out a general approach for monitoring to evaluate progress toward achieving goals) we will indicate something along the lines that if the lake is not meeting its standards the TMDL would likely be reopened and wasteload allocations reevaluated. We will state that based on current information, the WLA for Mn/DOT would most likely be the one to be reduced, given our understanding of relative actions for stormwater controls among the MS4s.

- Separate from the TMDL it is worth noting the information below provided by Mike Trojan of our stormwater program in regards to future possible work to Hwy 55:

There are provisions in both the ms4 and construction stormwater permits to cover a situation where MnDOT does future work on Highway 55.

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construction permit, page 12 (Permanent treatment) and pg. 20 (final stabilization)  
<http://www.pca.state.mn.us/publications/wq-strm2-51.doc>

- Next steps include drafting of the TMDL report and setting up a public meeting prior to public noticing the TMDL. I will try to keep you informed of the status as we go. Also, I will also try to get the webpage updated and particularly get Barr's presentation posted there (some of you already received that directly from Greg).

Thanks.

Chris Zadak  
MPCA  
Regional Division - Watershed Section  
520 Lafayette Rd. N.  
St. Paul, MN 55155  
Direct: **New #--651-757-2837**  
Toll free: 800-657-3864  
Fax: 651-297-8676

**Karen Chandler**

---

**From:** Greg Wilson  
**Sent:** Wednesday, July 08, 2009 9:43 AM  
**To:** Karen Chandler  
**Subject:** FW: Wirth Lake TMDL Status

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**From:** Brown, Timothy P. [mailto:tbrown@minneapolisparcs.org]  
**Sent:** Wednesday, June 24, 2009 3:00 PM  
**To:** Zadak, Chris; beth.neuendorf@dot.state.mn.us; joliver@ci.golden-valley.mn.us; Loomis@ci.golden-valley.mn.us; barbara.loida@dot.state.mn.us.; joel.settles@co.hennepin.mn.us; Marcey.Westrick@state.mn.us; nick.proulx@dnr.state.mn.us; Lois Eberhart; Byrne, Pat; dstauner@ci.new-hope.mn.us; Black, Ginny; Michael Welch  
**Cc:** Greg Wilson; Len Kremer; Bassett Creek Recording Administrator; Erdmann, John; Schmidt, Michael P.; Pilger, Debra L.; Lois Eberhart; Jeff Lee  
**Subject:** RE: Wirth Lake TMDL Status

Chris,

Thanks for following up the discussion that took place on Monday. The TMDL study resulted in the illumination of an excellent opportunity for us to take a big step forward in improving Wirth Lake, that being the prevention of backflow from the creek into the lake.

On behalf of our organization and our constituents though I am very disappointed that the hard work and money invested by the MPRB, the City of Golden Valley, and the BCWMC is serving as a reward to MNDOT for avoiding their responsibilities here. It appears as if the TMDL implementation plan will require another project for the BCWMC and its partners. And despite the predicted shortfall in results, will not require a long identified need to be addressed at Hiway 55, and will not require MNDOT to mitigate their nutrient discharge to the lake in any manner what-so-ever. And of course, we disagree with comments made at the meeting from BCWMC members and MNDOT reps that Wirth Lake is not a priority, or that either the outlet improvements or treatment for highway runoff are a waste of taxpayer dollars.

Please help me understand your conclusions on this so I can explain it to our Board:

I thought I understood that the TMDL process would result in proportional load reduction requirements for all of the contributing permittees. Am I mistaken on this or is there some other aspect of this I'm missing?

If there are no load reductions required, does this mean Wirth Lake is no longer considered impaired?

Will the MPCA be allowing this "monitor and watch" approach at other lakes where modeling

predicts implementation will result in near success, or where the WQ trend is to the better?

Because MNDOT is allowed to delay and/or defer their load reduction based on monitoring, will they be required to pay for that monitoring?

Thanks for your update.

Tim P. Brown, P.E.  
Environmental Operations Manager  
Minneapolis Park and Recreation Board  
3800 Bryant Avenue South  
Minneapolis MN 55409  
612-313-7782

-----Original Message-----

**From:** Zadak, Chris [mailto:Chris.Zadak@state.mn.us]

**Sent:** Wednesday, June 24, 2009 11:23 AM

**To:** beth.neuendorf@dot.state.mn.us; joliver@ci.golden-valley.mn.us; Loomis@ci.golden-valley.mn.us; barbara.loida@dot.state.mn.us.; joel.settles@co.hennepin.mn.us; Marcey.Westrick@state.mn.us; nick.proulx@dnr.state.mn.us; Brown, Timothy P.; Lois Eberhart; Byrne, Pat; dstauner@ci.new-hope.mn.us; Black, Ginny; Michael Welch

**Cc:** Greg Wilson; Len Kremer; Amy Herbert; Erdmann, John

**Subject:** Wirth Lake TMDL Status

Hello--

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Thanks.

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**Karen Chandler**

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**Sent:** Wednesday, July 08, 2009 9:43 AM  
**To:** Karen Chandler  
**Subject:** FW: Wirth Lake TMDL Status

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**From:** Zadak, Chris [mailto:Chris.Zadak@state.mn.us]  
**Sent:** Thursday, June 25, 2009 10:50 AM  
**To:** Brown, Tim; beth.neuendorf@dot.state.mn.us; joliver@ci.golden-valley.mn.us; Loomis@ci.golden-valley.mn.us; barbara.loida@dot.state.mn.us.; joel.settles@co.hennepin.mn.us; Marcey.Westrick@state.mn.us; nick.proulx@dnr.state.mn.us; Lois Eberhart; Byrne, Pat; dstauner@ci.new-hope.mn.us; Black, Ginny; Michael Welch  
**Cc:** Greg Wilson; Len Kremer; Bassett Creek Recording Administrator; Erdmann, John; Schmidt, Michael P.; Pilger, Debra L.; Lois Eberhart; Jeff Lee  
**Subject:** RE: Wirth Lake TMDL Status

Tim--I appreciate your seeking clarification. Below (in red) I will try to speak to your questions. Hope this helps. Please contact me if you would like to discuss this further. -Chris

-----Original Message-----

**From:** Brown, Timothy P. [mailto:tbrown@minneapolisparcs.org]  
**Sent:** Wednesday, June 24, 2009 3:00 PM  
**To:** Zadak, Chris; beth.neuendorf@dot.state.mn.us; joliver@ci.golden-valley.mn.us; Loomis@ci.golden-valley.mn.us; barbara.loida@dot.state.mn.us.; joel.settles@co.hennepin.mn.us; Marcey.Westrick@state.mn.us; nick.proulx@dnr.state.mn.us; Lois Eberhart; Byrne, Pat; dstauner@ci.new-hope.mn.us; Black, Ginny; Michael Welch  
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On behalf of our organization and our constituents though I am very disappointed that the hard work and money invested by the MPRB, the City of Golden Valley, and the BCWMC is serving as a reward to MNDOT for avoiding their responsibilities here. It appears as if the TMDL implementation plan will require another project for the BCWMC and its partners. And despite the predicted shortfall in results, will not require a long identified need to be addressed at Hiway 55, and will not require MNDOT to mitigate their nutrient discharge to the lake in any manner what-so-ever. And of course, we disagree with comments made at the meeting from BCWMC members and MNDOT reps that Wirth Lake is not a priority, or that either the outlet improvements or treatment for highway runoff

are a waste of taxpayer dollars.

Please help me understand your conclusions on this so I can explain it to our Board:

I thought I understood that the TMDL process would result in proportional load reduction requirements for all of the contributing permittees. Am I mistaken on this or is there some other aspect of this I'm missing?

The main purpose of the TMDL is to solve the equation so we meet the water quality standard. I think we have a very uncommon situation with this lake: solid data analysis identifying a major causative factor with a relatively doable fix (backflow of high P water under high flow; install outflow control) that when implemented will appear to result in the lake meeting the water quality standard. Typically with projects it takes a multi-pronged approach (involving proportional loading reductions), but again that doesn't appear to be the case here.

If there are no load reductions required, does this mean Wirth Lake is no longer considered impaired?

Technically there will be loading reductions required: the loading coming from downstream MS4s. Wirth Lk will no longer be considered unimpaired after it successfully goes through a delisting evaluation. That basically means a review sometime in the future of the previous 10 years of data showing the average in-lake P as well as one of the response variables (Secchi or chlorophyll-a) meeting the standard. Also, the delisting process looks at the data trend and if the most recent years appear to be trending up (suggesting it may be declining in quality) then we would not want to delist only to see it reappear as impaired in the near future.

Will the MPCA be allowing this "monitor and watch" approach at other lakes where modeling predicts implementation will result in near success, or where the WQ trend is to the better?

Actually "monitor and watch" is a part of the impaired waters process for all water bodies, whether they're near to achieving the standard or for the more long-term impaired water situations to track implementation effectiveness and progress. Again, the Wirth situation is unusual: we will be able to more quickly evaluate the effect of the backflow fix and see if our TMDL allocations are appropriate.

Because MNDOT is allowed to delay and/or defer their load reduction based on monitoring, will they be required to pay for that monitoring?

The PCA does not say who must or should pay for in-lake monitoring.

Thanks for your update.

Tim P. Brown, P.E.

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MPCA

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Direct: **New #--651-757-2837**  
Toll free: 800-657-3864  
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# Wirth Lake

## Nutrient Impairment Total Maximum Daily Load (TMDL) Study

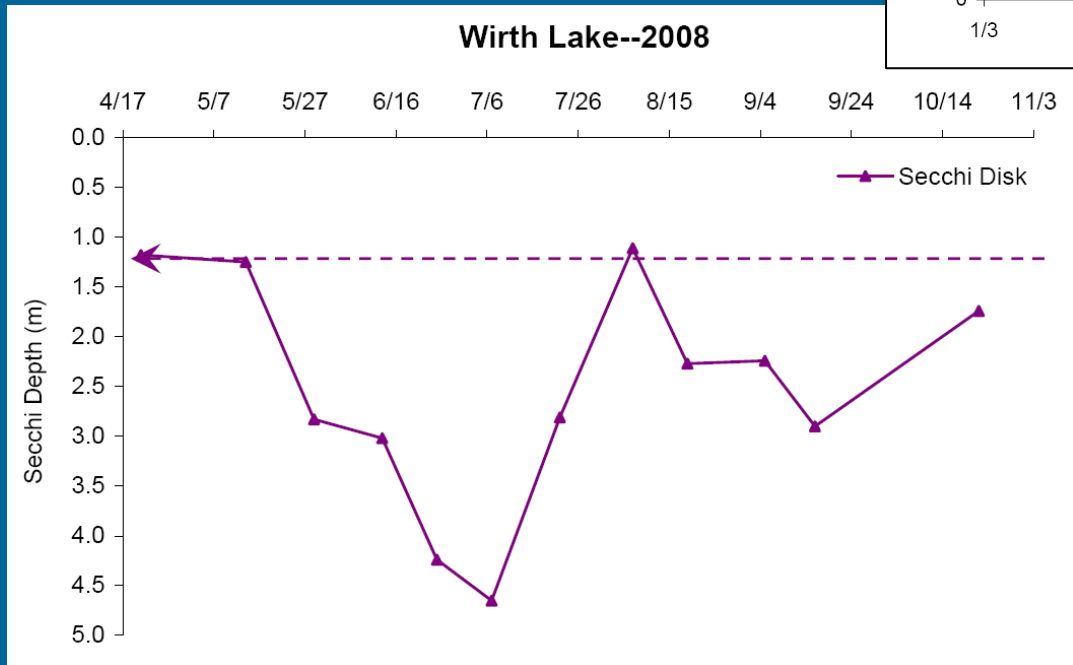
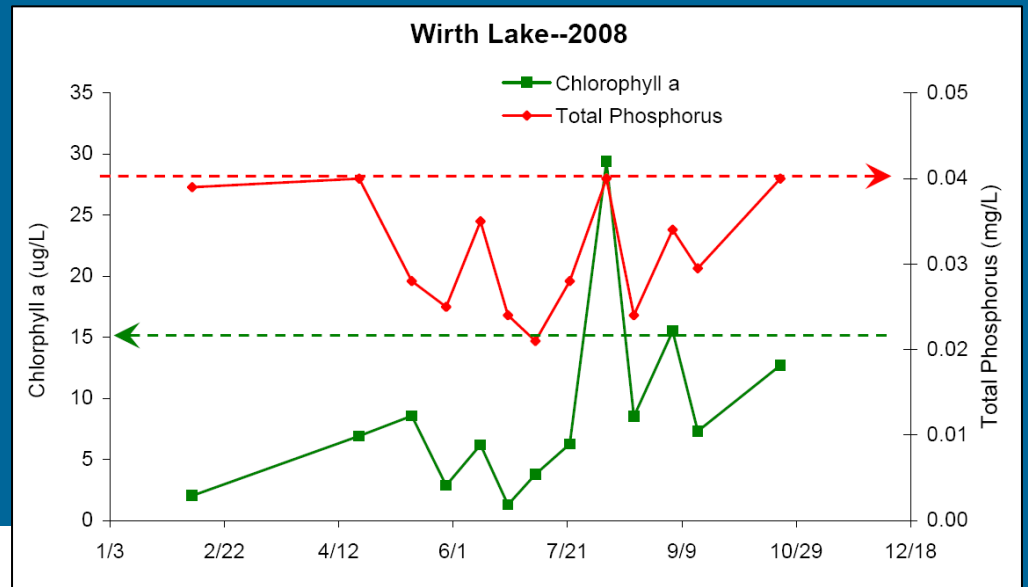
Barr Engineering Company

June 22, 2009

## *Overview of Work Tasks*

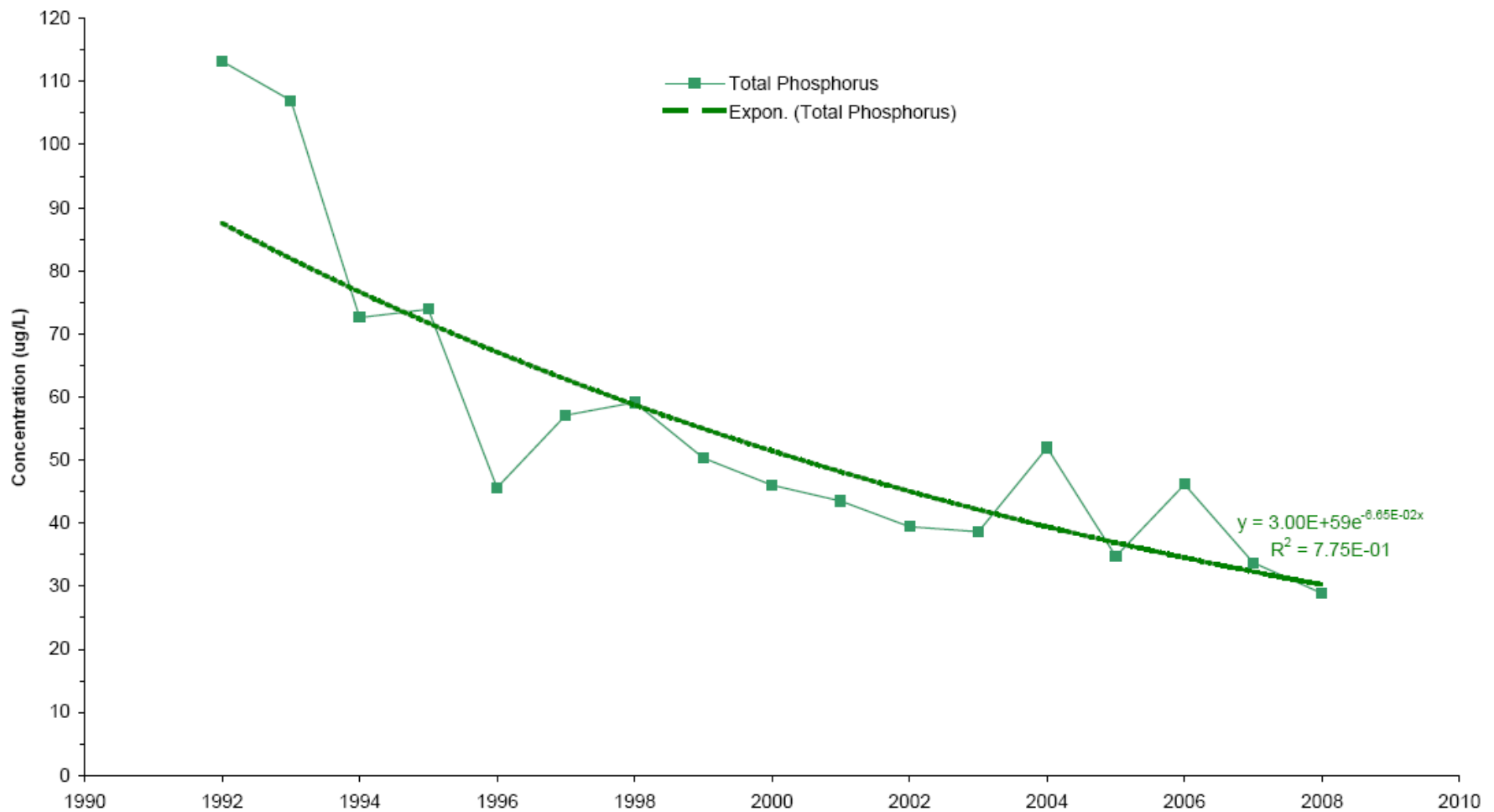
- Existing lake water quality relative to the goals
- Develop watershed and in-lake modeling
  - Calibrated to existing conditions
  - **Determine allowable load/develop allocations**
- **Recommend load reduction alternatives/Implementation Plan**
- TMDL Report and Monitoring Plan

# Current water quality



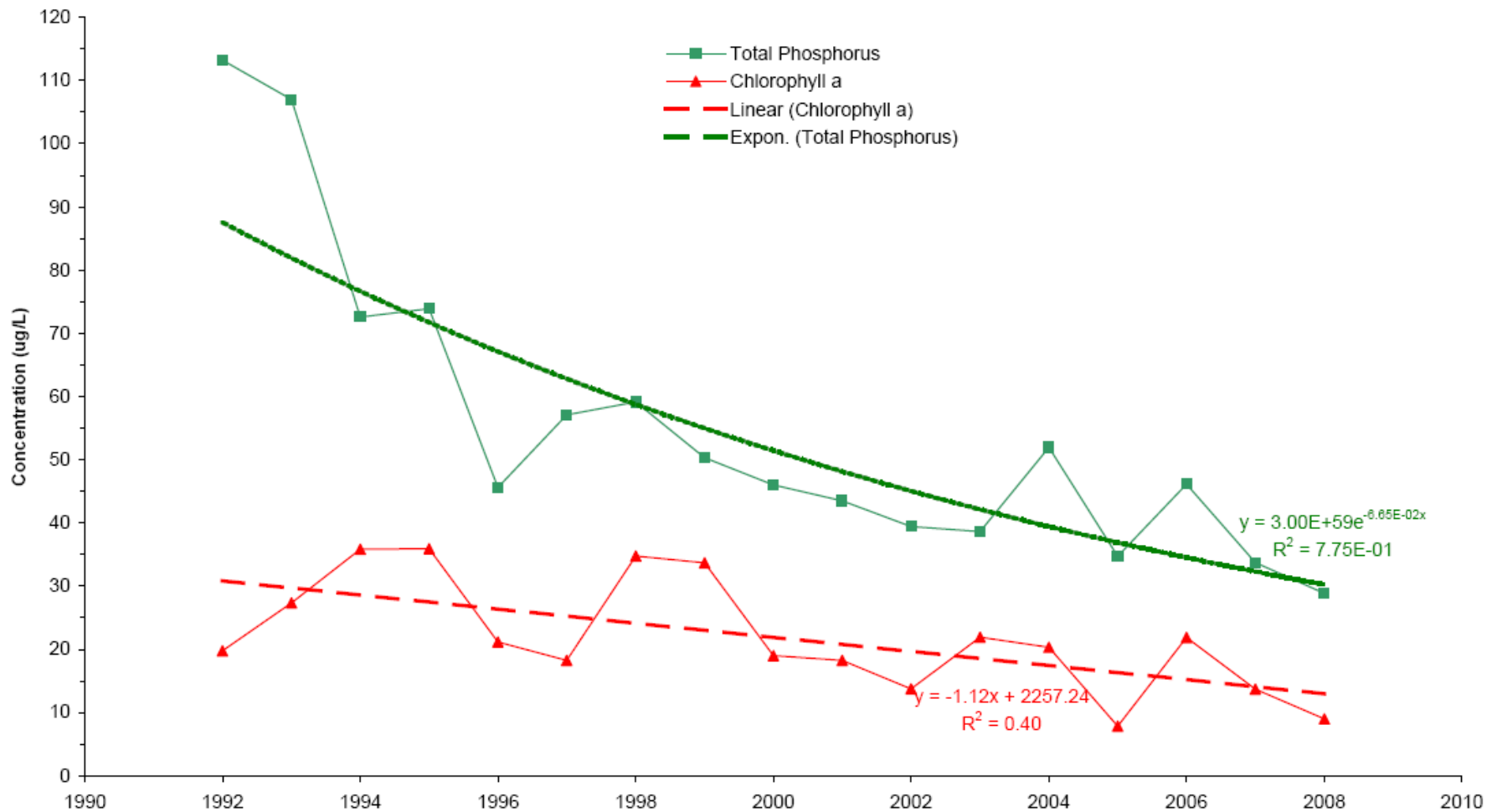
# Historical water quality

Wirth Lake Growing Season (May-Sept) Water Quality, 1992-2008



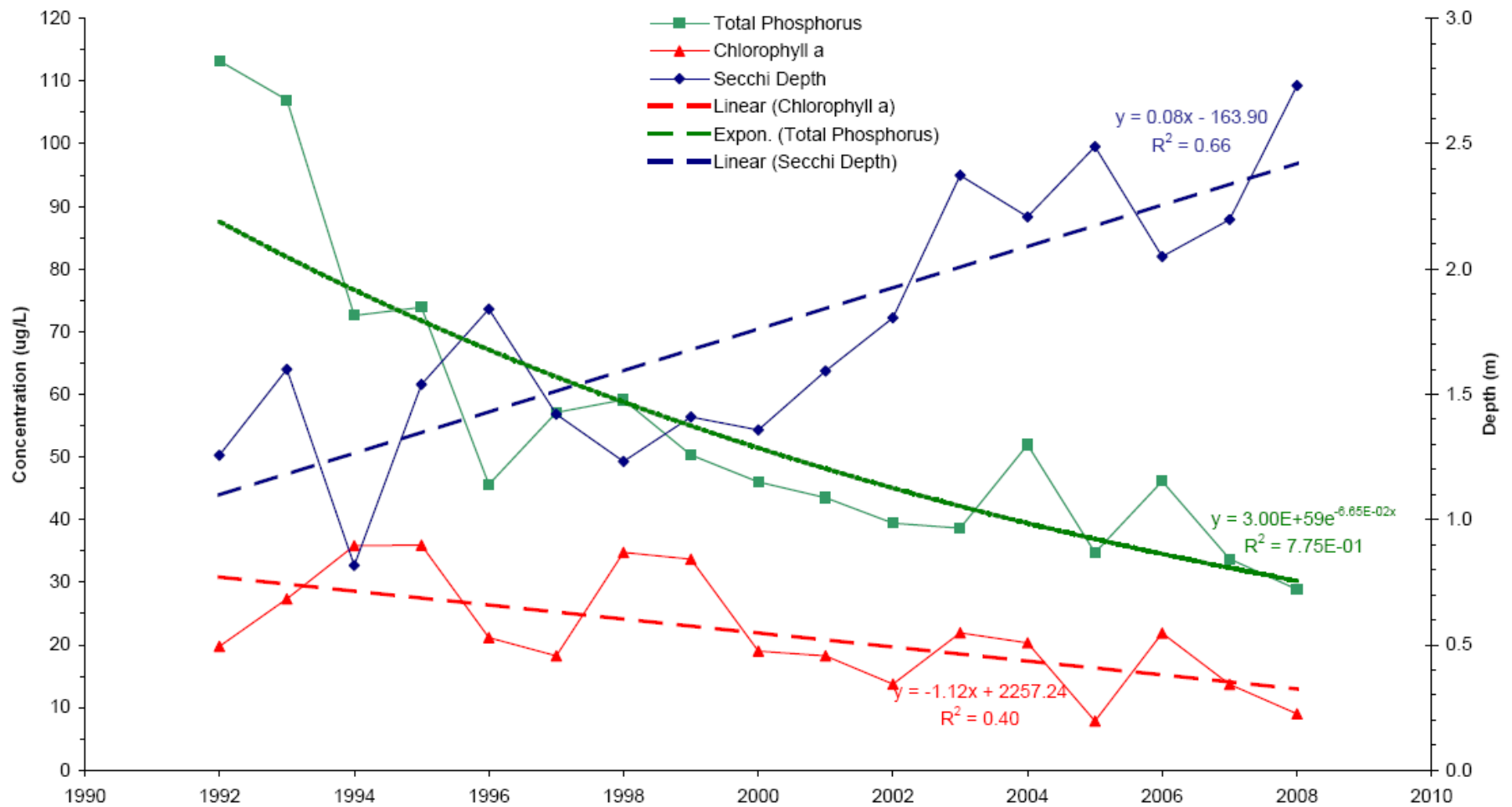
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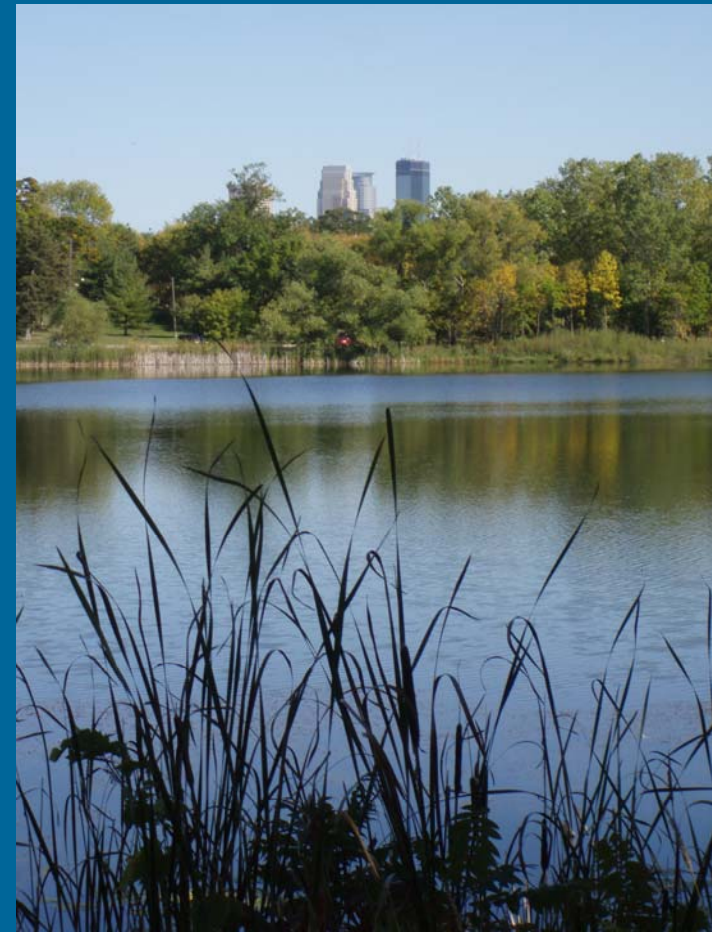
# Historical water quality

Wirth Lake Growing Season (May-Sept) Water Quality, 1992-2008



## *Current water quality/goals*

- Goals for North Central Hardwood Forests ecoregion
  - 40 ug/L total phosphorus
  - 15 ug/L chlorophyll-a
  - 1.2 meters Secchi transparency
- Existing lake water quality
  - Met the criteria for all three parameters during four of the last seven years
  - Good relationship between Avg. TP and water year precipitation



# Watershed assessment

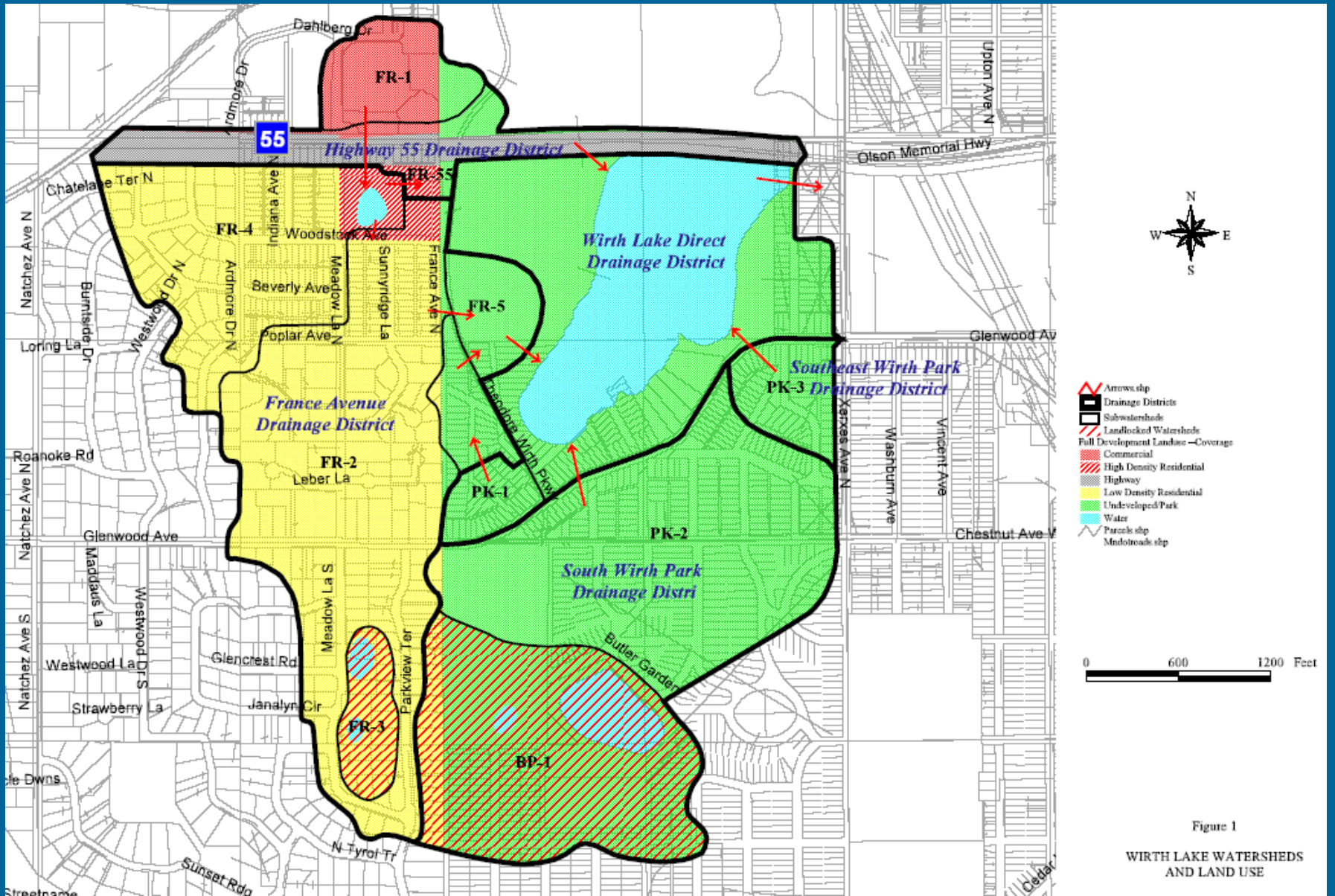
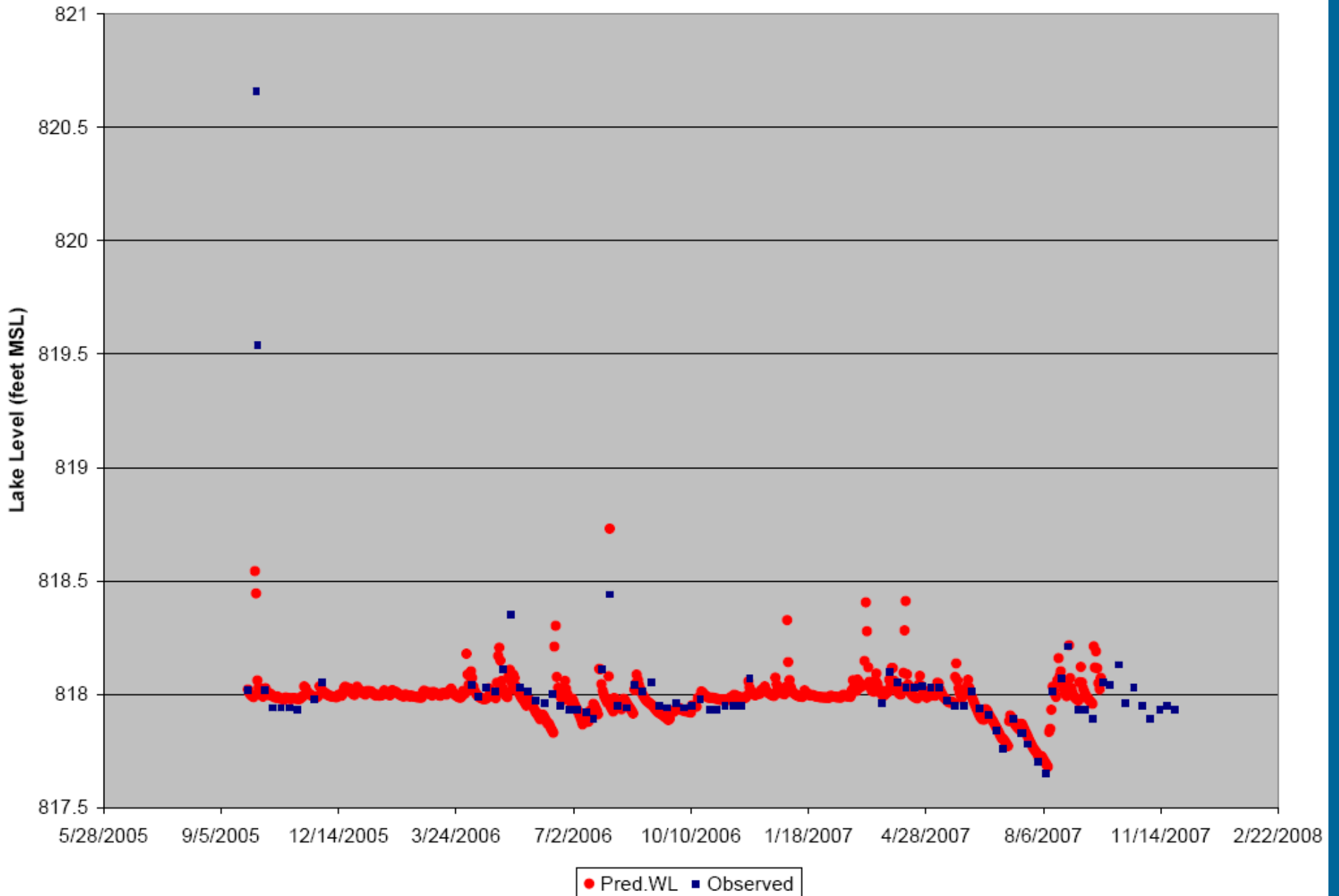
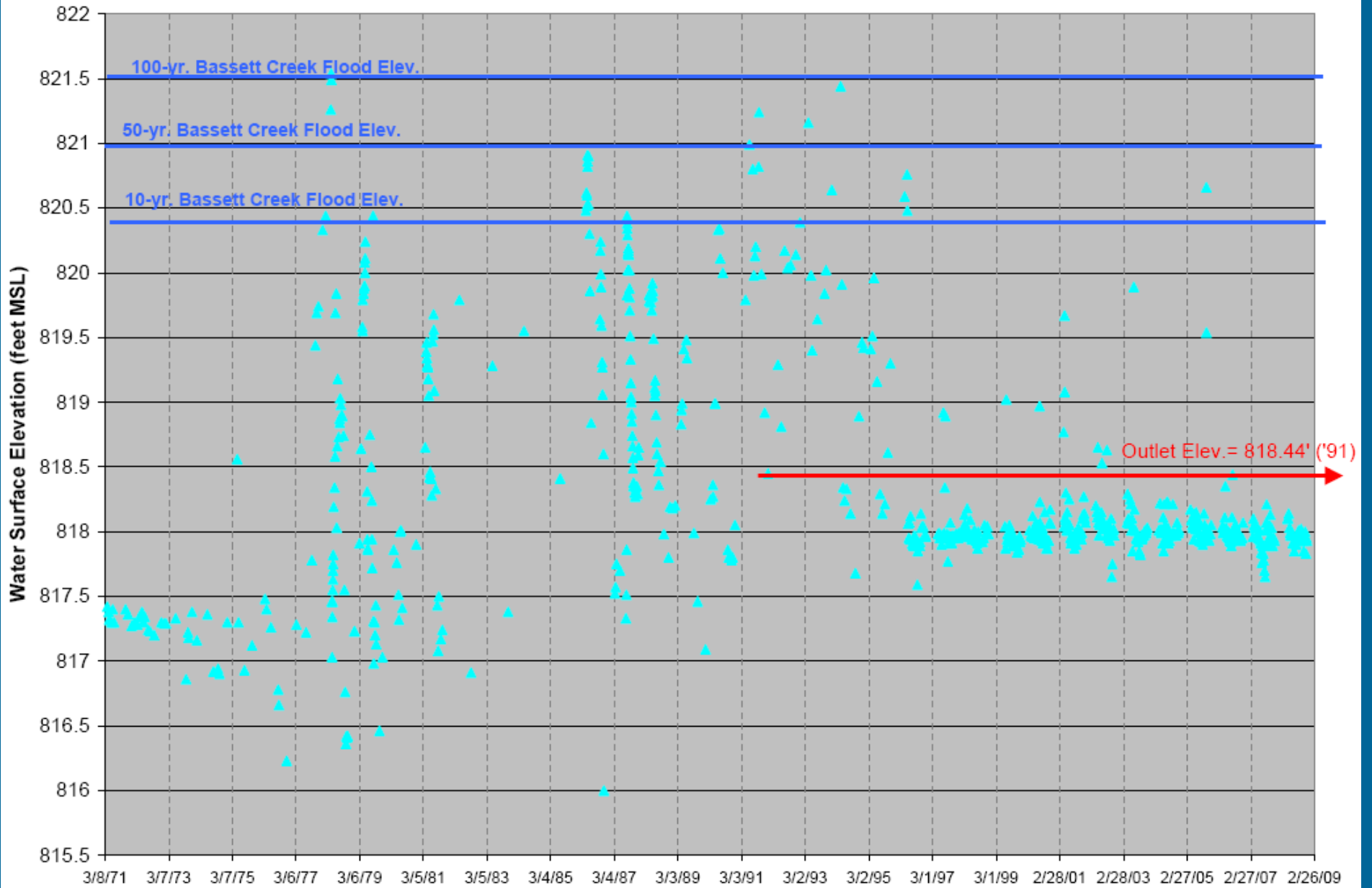


Figure 1  
WIRTH LAKE WATERSHEDS  
AND LAND USE

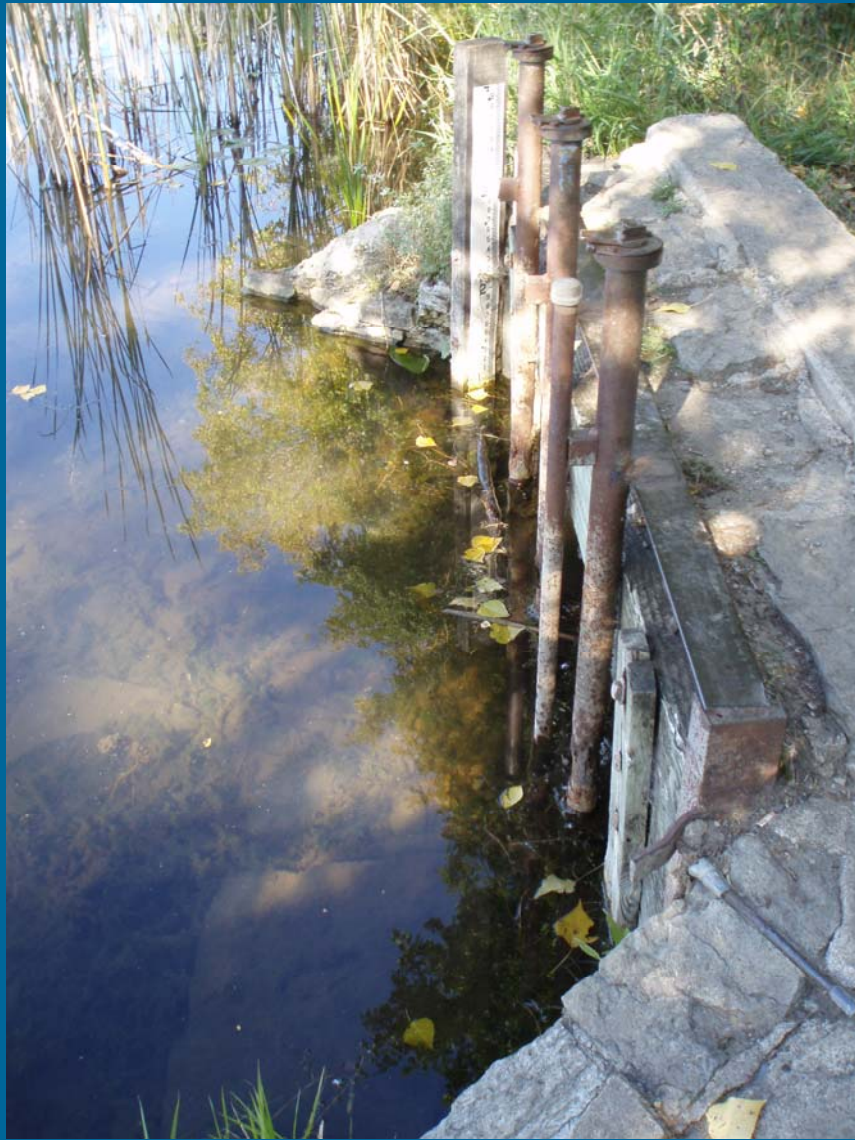
### Wirth Lake Water Balance Calibration



### Historical Lake Levels for Wirth Lake

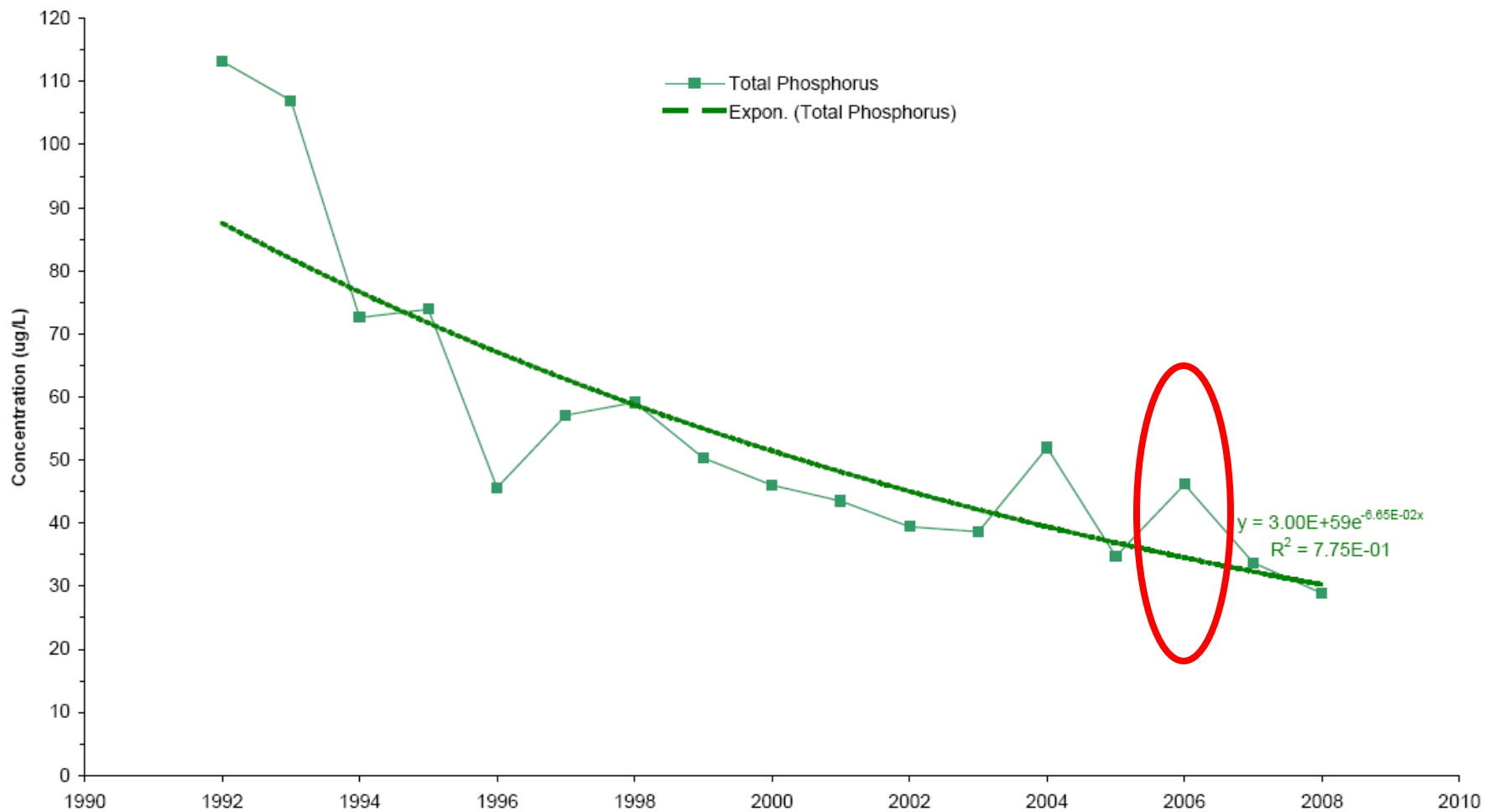


# *Wirth Lake outlet*



# "Critical conditions"

Wirth Lake Growing Season (May-Sept) Water Quality, 1992-2008



# *Calibrated In-Lake WQ Modeling— 2005-06 Water Year*

## Overall Mass Balance Based Upon Component:

## Predicted TOTAL P

<u>Name</u>	<u>Load</u> <u>kg/yr</u>	<u>%Total</u>
Watershed	30.1	45.0%
Bassett Creek backflow	24.9	37.3%
PRECIPITATION	2.8	4.2%
INTERNAL LOAD	9.0	13.5%
TRIBUTARY INFLOW	55.0	82.3%
***TOTAL INFLOW	66.8	100.0%

# *Pollutant allocations/ Implementation planning*

- In-lake phosphorus modeling used to determine allowable phosphorus loading
- Implementation
  - Model load reduction alternatives
  - Develop management recommendations for Implementation Plan/allocations
  - Develop future monitoring program to track effectiveness of implementing specific BMPs and in-lake improvements



# Floodplain modeling/Wirth Lake outlet



# *Floodplain modeling/Wirth Lake outlet*

Location	Peak Flood Elevation (ft)					
	100-Year 24-Hour Existing Conditions	100-Year 24-Hour Proposed Conditions	50-Year 24-Hour Existing Conditions	50-Year 24-Hour Proposed Conditions	10-Year 24-Hour Existing Conditions	10-Year 24- Hour Proposed Conditions
Theodore Wirth Golf Course Flood Storage Area <sup>1</sup>	824.8	824.8	824.2	824.2	822.9	822.9
Wirth Lake	820.9	821.0	820.4	820.6	819.7	820.1
Bassett Creek where Wirth Lake inflows	820.9	821.0	820.4	820.4	819.4	819.4
Bassett Creek at Glenwood Avenue	819.9	820.0	819.4	819.5	818.6	818.5
Bassett Creek at U/S face Fruen Mill Dam	817.5	817.6	817.0	817.1	816.5	816.5
Bassett Creek at M.N. & S. Railroad Bridge	816.6	816.6	815.7	815.7	814.4	814.4
Bassett Creek at B.N. Railroad Bridge	815.5	815.5	814.4	814.4	813.3	813.3
Bassett Creek at Penn Avenue	815.0	815.0	814.0	814.0	813.0	813.0

<sup>1</sup> Directly upstream of the Highway 55 control structure

# Summary of Lake WQ Modeling

	<u>2005-06 Water Year</u>					<u>2006-07 Water Year</u>	
	Obs.	Calibr.	Hwy. 55 Pond	no Creek Backflow	Hwy. 55 Pond & no Backflow	Observed	Validation
TP (ug/L)	46	46	42	38	33	34	36
Chl-a (ug/L)	21.9	21	19	17	13	13.7	15
Secchi (m)	2.1	1.6	1.8	2.0	2.4	2.2	2.2



## *Existing Load/Proposed TP Allocations*

MS4/TMDL Component	Existing 2005-06 Water Year Load (lbs.)	Proposed Allocations (lbs./year)
Golden Valley	100.2	98.9
Minneapolis	4.3	4.3
MnDOT	27.7	0
Hennepin County	2.4	2.4
Bassett Creek Backflow	54.8	0
Load Allocation	26.0	26.0
Margin of Safety	—	23.0



## *Next Steps*

- Finalize load reduction alternatives/  
Implementation Plan
  - Retrofit lake outlet
  - Highway 55 pond
- Finalize allocations
- TMDL Report and Monitoring Plan



Questions?

