

The background of the slide is a photograph of a lake with green trees on the left side. The text is overlaid on a dark blue rectangular area.

**Clearwater River Watershed District**

**October 11, 2006**

**Cedar, Albion, Swartout &  
Henshaw Lakes Improvement  
Project**

**Public Hearing**

# Chronology

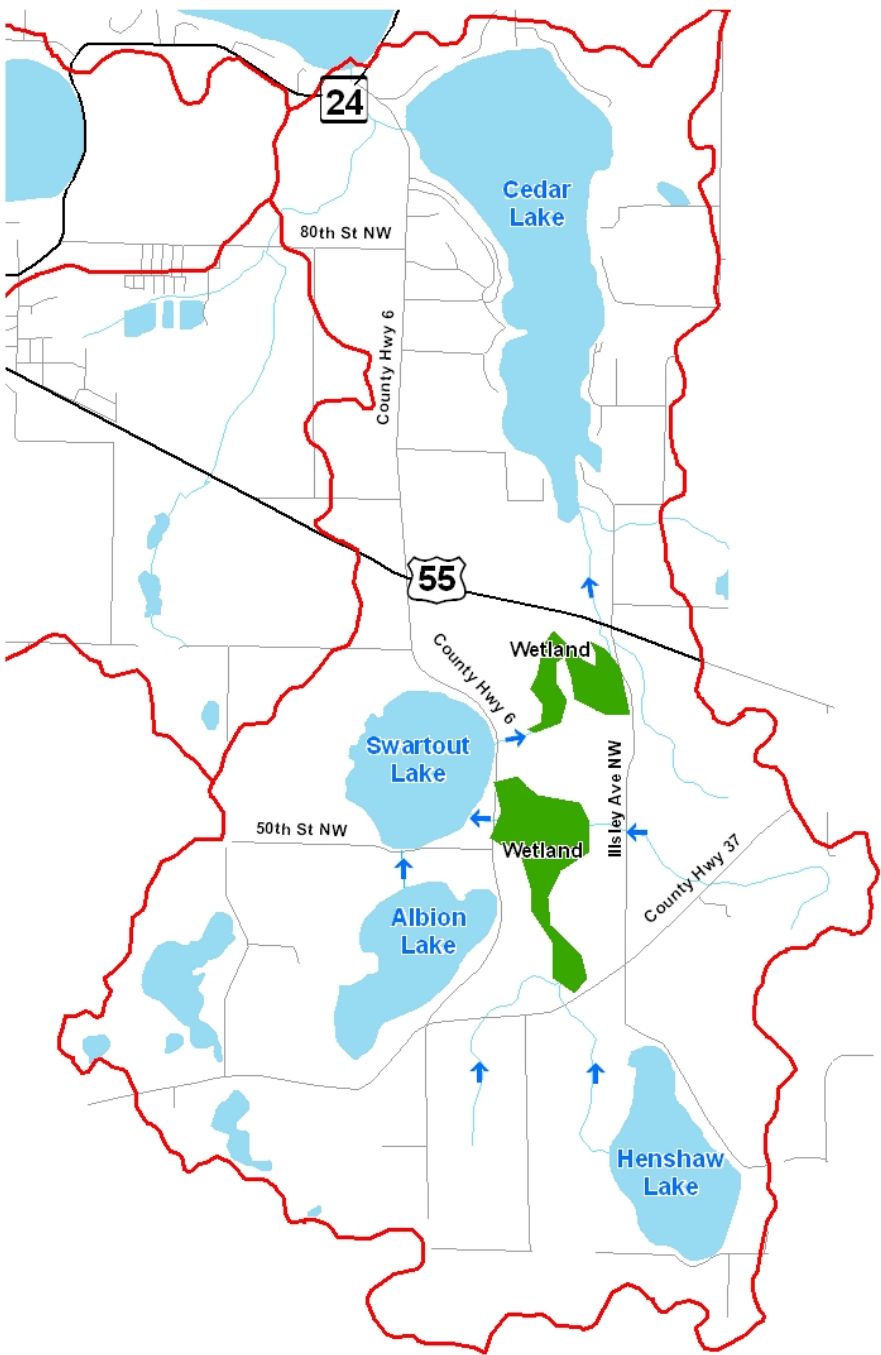
- Long-term sampling begins 1993
- Special Cedar Lake Monitoring 2003-2004
- Public Info Meeting Summer 2005 to Identify Options
- Public Info Meeting Summer 2006 Present Options
- Cedar Lake Conservation Club Petitions CRWD July 12, 2006

# Chronology

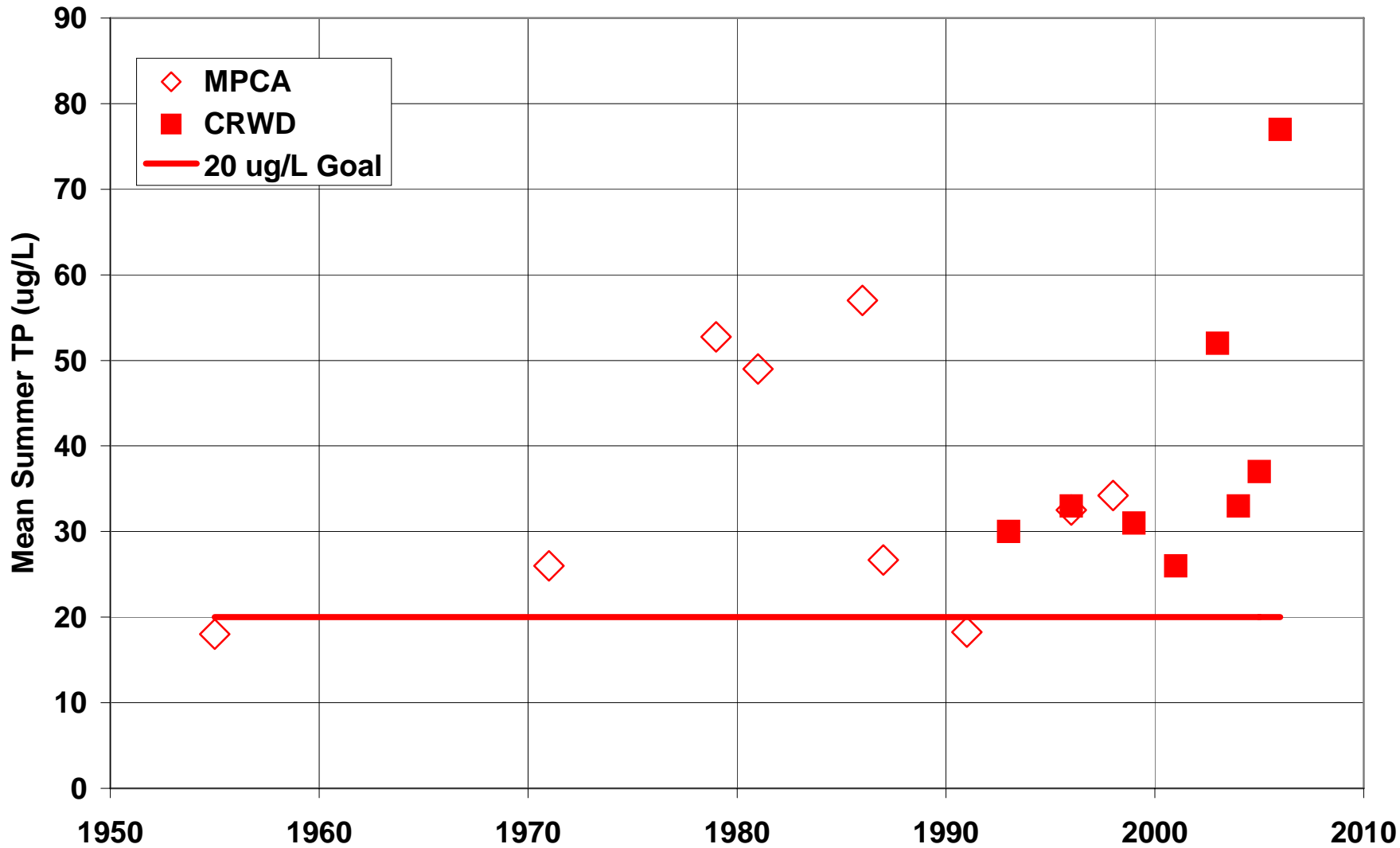
- CRWD Receives Petition and Orders Engineers Report July 12, 2006
- Engineers Report Presented to CRWD August 9, 2006
- CRWD Holds Public Information Meeting August 23, 2006
- MDNR & BWSR Conclude Plan is Practical, September 2006
- CRWD Holds Public Hearings October 11, and November 8, 2006

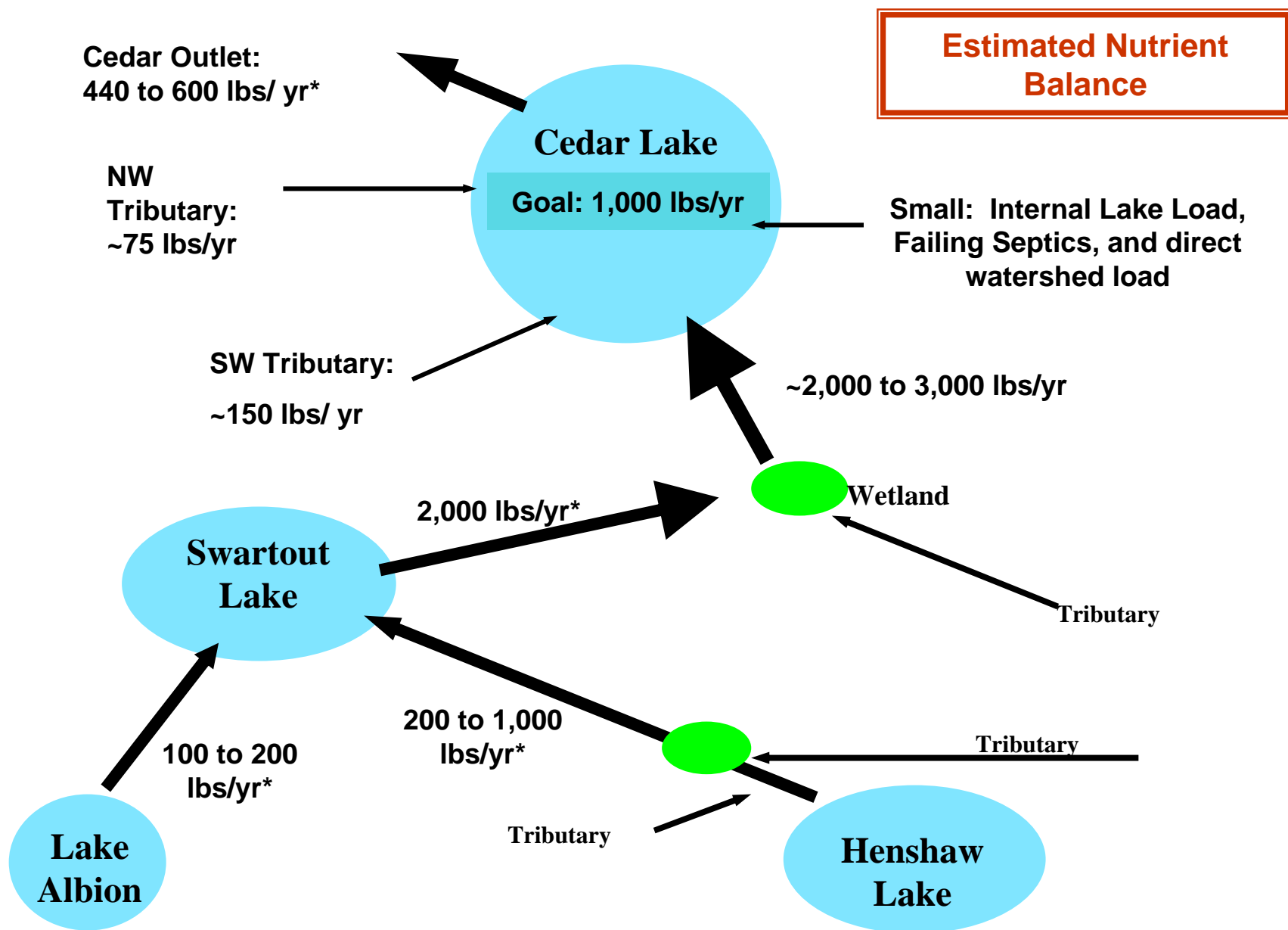
# Goal → Benefit

- Goal:
  - Reduce P load to Cedar Lake by 2,000 lbs
  - Reduce in-lake P concentrations in Cedar Lake to 20 ug/L.
  - Improve water quality in upstream lakes
- Benefits:
  - Increased water clarity in Cedar Lake (2-4 feet annual average)
  - Decrease P concentrations in Cedar Lake
  - Decrease frequency and intensity of nuisance algae blooms
  - \$7,100/ unit benefit \$2.6 Million total benefit from project



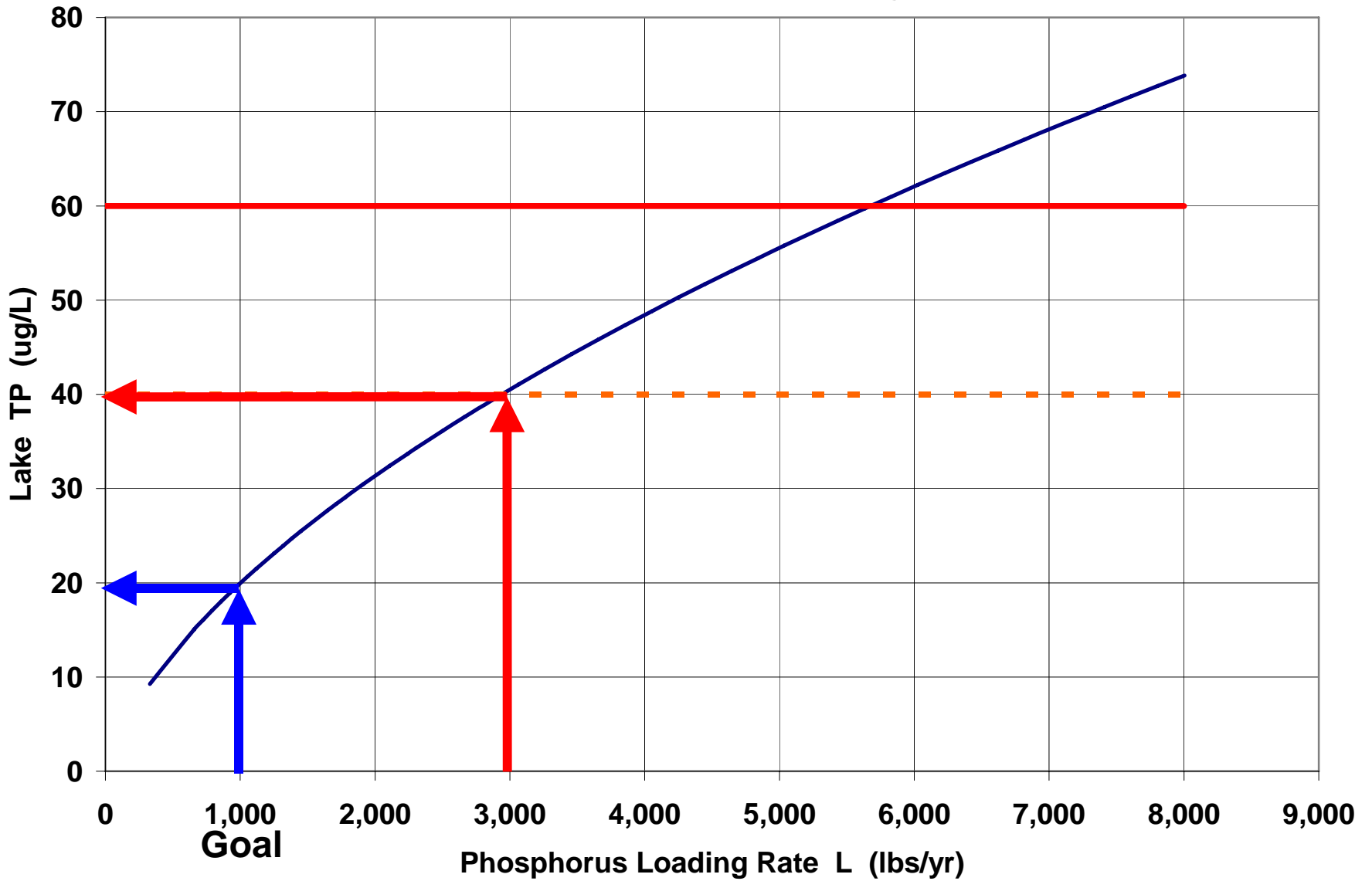
# Cedar Lake Mean Summer TP Concentrations (ug/L)



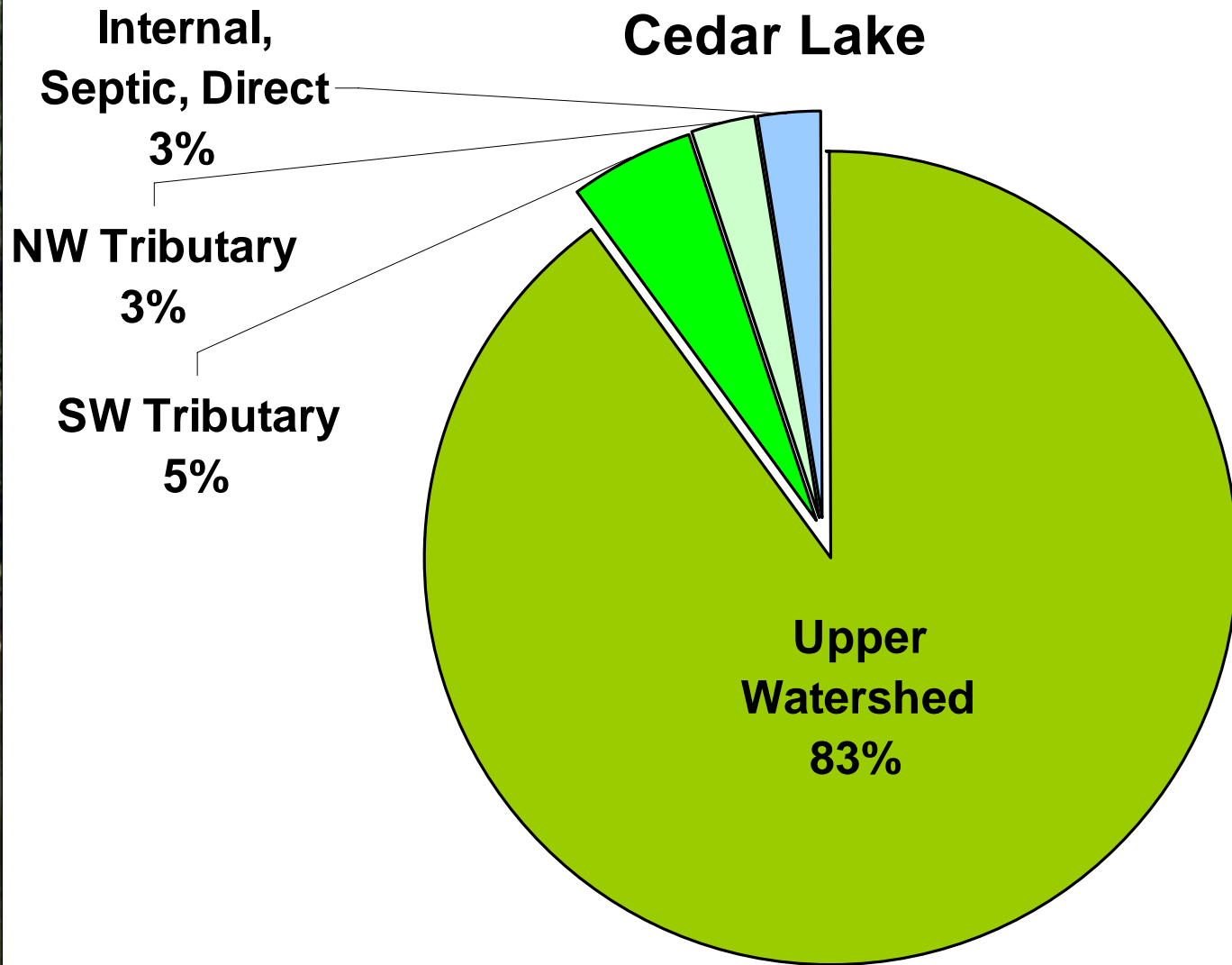


Phosphorus loads are estimated using measured TP concentrations, gauged flows. Loads from Cedar, Henshaw, Albion and Swartout Lakes are verified using historical average runoff for the CRWD watershed from past reports.

# Cannfield-Bachmann Lake Response Model Cedar Lake TP vs Modeled TP Loading Rates



# Phosphorus Loading Breakdown to Cedar Lake



# Selected Alternatives





## 1. Carp Management

- Carp Migration Barriers
- Carp Harvest

## 2. Watershed BMPs

- Sedimentation Basins
- Watershed Best Management Practices

## 3. Phosphorus Removal System

-  Carp Management
-  Carp Barriers
-  P Removal
-  Sed Basin

**Cedar Lake**  
**Goal: 1,000 lbs/yr**

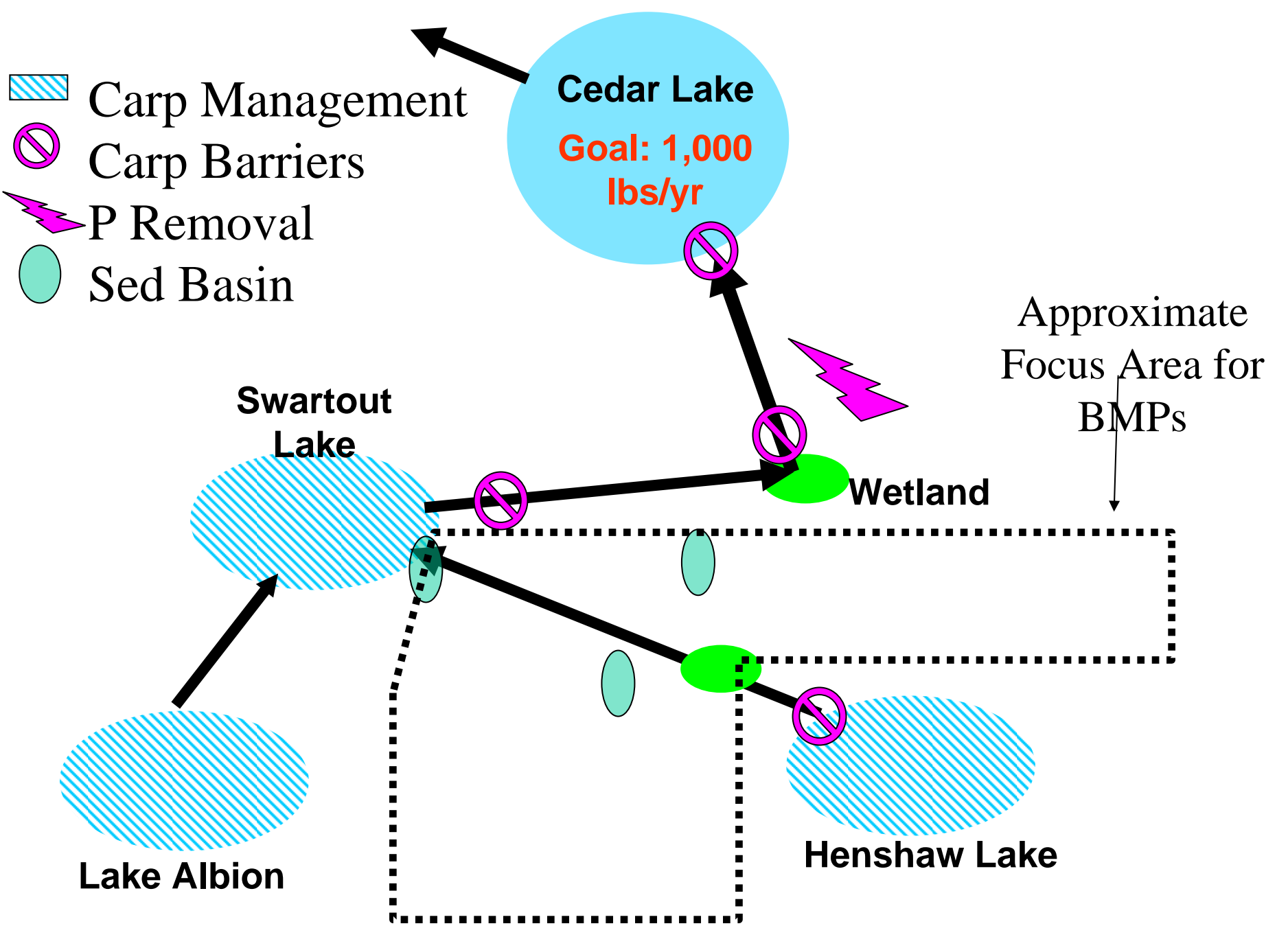
**Swartout Lake**

**Lake Albion**

**Wetland**

**Henshaw Lake**

Approximate Focus Area for BMPs



# Summary

Measure	Estimated Capital Cost	Estimated Annual O&M Cost	Estimated Efficiency (lbs TP removed from Cedar/ yr)	Estimated Load Remaining
Carp Barriers	\$76,000	\$2,000	800	2,200
Carp Harvest	\$18,000	\$9,000		
Sedimentation Basins	\$158,000	\$14,000		
Watershed BMPs	\$43,000	\$20,000		
<b>P Removal System</b>				
	\$445,000	\$35,000	1,500	700
<b>Total</b>	<b>\$740,000</b>	<b>\$80,000</b>		<b>700 &lt; 1,000 Goal</b>

# Sequence

Carp migration barriers	Winter 2006
Carp Harvest	Winter 2006-2007 (on-going)
Sedimentation Basins	Winter 2007-2008
Watershed BMPs	Winter 2006-2008
P Removal System	Winter 2007-2008

# Next Steps

- 1. October 20 , 2006 Parcel Joining Disputes due to District**
- 2. November 8, 2005: Public Hearing Continued**
- 3. November 8, 2006: Possible Board Decision**
- 4. November 8, 2006: Final Assessment Roll**
- 5. November 25, 2006: Pre-payment Deadline**

# P Removal Systems

- Sedimentation pond clean out frequency: 5-10 years for sites in MN, varies based on rainfall, and is very site specific (Alum systems as often as 3 years)
- An MPCA NPDES Permit Required to operate dosing systems. The criteria are set to protect aquatic life:
  - Total iron 1,245 ug/L
  - Chloride 230 mg/L
  - Aluminum 125 ug/L – Toxicity negligible if pH > 6.0 for treated water. Benthic organism populations increased or remained constant following whole lake alum treatment.

# Other P Removal Systems

<u>System</u>	<u>Type</u>	<u>Installed</u>
Pleasant Lake	FeCl	1987
Vadnais Lake	FeCl	1988
Lambert Creek (to Vadnais Lake)	FeCl	1991
Spring Lake (CR 13 Ditch Inflow)	FeCl	1997
Tanners Lake (Maplewood)	Alum	1997
Keller (Burnsville)	FeCl	1997 (as currently operated)
Loon Lake (Waseca)	Alum	1990
Fish Lake (Eagan)	Alum	??

# Benefited Parcels

<b>Category</b>	<b>Estimated Number of Properties</b>	<b>Proposed Units of Benefit</b>	<b>Estimated Number of Units</b>
Cedar Lakeshore Property	268	1	268
Cedar Agricultural	7	0.5	3.5
Cedar First Tier	114	0.5	57
Cedar Second & Third Tier	98	0.25	24.5
Cedar Prairie Properties	8	0.125	1
Swartout Lakeshore Property	28	0.33	9.24
Swartout Agricultural	6	0.17	1.02
Swartout First Tier	11	0.17	1.87
Swartout Second & Third Tier	2	0.08	0.16
<b>Estimated Total Number of Benefited Units:</b>			<b>366</b>

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- ❖ \$2.6 Million total benefit from project