



# Restoration and Lake Management Program for Lake Oscawana

## Presented to: LOCA

Stephen Axinn, President – Lake Oscawana Civic Association

Dr. Fred Lubnow – Princeton Hydro

August 17, 2008

# Agenda

---

- Toward a Lake Restoration and Management Plan
- Comprehensive Restoration and Management Plan
- NYS DEC TMDL for Phosphorus
- Development of the Management Plan
- Summary of Long-Term Lake and Watershed Conditions
- Recommended Strategy and Funding Plan
  - In-Lake Nutrient Load
  - Vegetation Management
  - Watershed Management
  - Program Management
  - Lake Management – Estimated Cost Summary

# Toward a Restoration and Lake Management Program

---

- Since 2002, LO has been considered “impaired” by NYS (under the Federal Clean Water Act)
  - Requiring a Total Maximum Daily Load (TMDL) computation for Phosphorus
  - This TMDL was completed by NYS EPA in 2008.
- Conditions have steadily deteriorated in terms of water quality, in lake-vegetation, *E. coli* and fecal coliform contamination and other factors that adversely affect the market value of properties with lake-rights.
- For over 20 years the Town has conducted weed harvesting operations, but conditions have not improved
- These conditions had long been recognized by the Town’s limnologist
- Although the Town of Putnam Valley has a long history of annual monitoring data on LO, LOCA believed that an analysis of such data with a recommended management plan -- *focused on a set of action steps* -- was needed to address a number of years of decline in the water quality at the Lake.
- In early 2007, Lake Oscawana Civic Association (LOCA) defined the need for development of a comprehensive lake management plan.

# Comprehensive Restoration and Management Plan

---

- The LOCA Board of Directors initiated a formal RFP process with area limnologists to engage one for creation of a Lake Management Plan
- LOCA hired Princeton Hydro, based upon its reputation performing similar studies and its engagement in various lake restoration programs in Putnam County as well as other NY, NJ and PA lakes.
- The idea of comprehensive implies that the management plan needs to consider actions across various areas including:
  - Nutrient Loads
  - Vegetation Conditions
  - Watershed (septic and stormwater runoff)
- The funding for creation of the Lake Management Plan has come from individual contributions by LO residents
  - Various fund raising efforts over the last 12-16 months have collected most of the cost of the Plan
  - Note: We still have a shortfall relative to the cost of the Plan – contributions welcome

# Comprehensive Restoration and Management Plan

---

- Lake Oscawana is a vital part of the Town's tax base.
  - Property Owners with Lake Rights represent 14.4 % of the total assessed value by right to LO

***Lake Oscawana homeowners and property owners stand to loose tremendous value in their real-estate investments and quality of recreational activities if the Lake conditions go unaddressed.***

# NYS DEC TMDL for Phosphorus

- In June, 2008 NYS DEC completed its Total Maximum Daily Load (TMDL) computation
- A TMDL addresses ONLY watershed contribution---it does not address in-lake phosphate contamination.
- The TMDL recommends an approx 10% reduction in P-load from current levels – focused on Septic Systems and Stormwater Management
- It also recommended formation of a Septic Control District

Table 6. Total Annual Phosphorus Load Allocations for Lake Oscawana<sup>1</sup>

Source	Total Phosphorus Load (lbs/yr)		% Reduction
	Current	Allocated	
Agriculture	7	6	9%
Developed Land (non-regulated MS4 stormwater)	49	44	10%
Septic Systems	313	284	9%
Forest, Wetland, Stream Bank, and Natural Background	141	141	0%
<b>LOAD ALLOCATION</b>	<b>509</b>	<b>475</b>	<b>7%</b>
Point Sources	0	0	0%
Developed Land (regulated MS4 stormwater)	153	125	18%
<b>WASTELOAD ALLOCATION</b>	<b>153</b>	<b>125</b>	<b>18%</b>
<b>LA + WLA</b>	<b>663</b>	<b>600</b>	<b>9%</b>
Margin of Safety	MOS of 10% built into the TMDL endpoint		
<b>TOTAL</b>	<b>663</b>	<b>600</b>	<b>9%</b>

# Development of the Management Plan

---

- Dr. Fred Lubnow -- Director of Aquatic Programs at Princeton Hydro manages PH's lake restoration and management projects -- has led the creation of the LO Management Plan
- Princeton Hydro utilized annual measurement data collected over a 20 year period by the Town's Limnologist (Dr. George Knocklein) as well as special studies (by Dr. Ken Wagner and Dr. Robert Kortmann) The draft plan has been presented to the Town's Advisory Committee [and approved in principal].
- Public meetings were held and widely attended at which Dr. Fred Lubnow reported to the public. These meetings were televised on Channel 20 and the Town's website.

# Summary of Long-Term Lake and Watershed Conditions

---

- Internal loading accounts for slightly over half of the annual phosphorus load of Lake Oscawana.
- Stormwater and septic systems account for the majority of the external phosphorus load. Lawn and garden fertilizer accounts for much of the remainder.
- Stream #4 (sub-watershed 1) generates the largest TP loads and is one of the high priority locations for watershed management.
- Recommendations of the Management Plan are consistent with those of the TMDL.

Annual Phosphorus Budget for Lake Oscawana

Sources of Pollutants	Kilograms	Pounds	Percent Contribution
Surface Runoff	194.1	428.0	19.7
Internal Loading	565.7	1,247.4	57.5
Septic Leachate	184.7	407.3	18.8
Atmospheric	40.0	88.2	4.1
<b>Total</b>	<b>984.5</b>	<b>2,170.8</b>	<b>100.0</b>

# Recommended Strategy and Funding Plan

---

- Focus areas:
  - IN-LAKE NUTRIENT LOAD
    - Alum P-Inactivation
    - Artificial Circulation
    - Selective Dredging Feasibility
  - VEGETATION MANAGEMENT
    - Mechanical Harvesting
  - WATERSHED MANAGEMENT
    - Stormwater
    - Biofilter
    - Septic Management
  - PROGRAM MANAGEMENT

# In-Lake Nutrient Load

Management Action	Estimated Costs (in 2008 Dollars)	Proposed Timeline					5-Year Total
		2008	2009	2010	2011	2012	
<b>IN-LAKE NUTRIENT LOAD</b>							
<b>Alum P-Inactivation</b>							
Sampling, bench tests, permitting	\$50,000.00						\$50,000
Implementation Costs	\$200,000.00						\$200,000
Operating Costs (post-monitoring)	additional water quality monitoring costs			\$1,000	\$1,000	\$1,000	\$4,000
<b>Metric</b>	Surface / bottom water TP concentrations, chlorophyll a concentrations and Secchi disk water clarity						
<b>Artificial Circulation</b>							
Design of System Costs	approx. \$10,000.00				\$10,000		\$10,000
Implementation Costs*	\$190,000.00				\$190,000		\$190,000
Operating Costs (per month of operation -- Elec. / Maint.)	\$2,600 / month				\$15,600	\$15,600	\$46,800
* does not include any purchase of land, if required							
<b>Metric</b>	Oxic conditions (dissolved oxygen > 1 mg/L) in the bottom waters						
<b>Selective Dredging Feasibility Analysis</b>							
Conduct Bathymetric Survey / Generate Maps and Plan	approx. \$10,000.00			\$7,800			\$7,800
Collect Sediment Samples from three sites				\$7,200			\$7,200
<b>Metric</b>	Quantification and Qualification of Sediments						

# Vegetation Management

---

Lake Oscawana - Restoration Program							
Management Action	Estimated Costs (in 2008 Dollars)	Proposed Timeline					5-Year Total
		2008	2009	2010	2011	2012	
<b>VEGETATION MANAGEMENT</b>							
<b>Mechanical Harvesting</b>							
New mechanical weed harvester	approx. \$90,000.00						\$90,000
Annual operating costs	approx. \$25,000.00			\$25,000	\$25,000	\$25,000	\$125,000
<b>Metric</b>	Acres harvested and aquatic plant biomass						

# Watershed Management

WATERSHED MANAGEMENT									
<b>Stormwater</b>									
Retrofitting of approx. 15 catch basins along West Shore Drive									
Retrofitting of approx. 25-30 catch basins in northeast section	\$90,000.00					\$45,000		\$45,000	\$90,000
Installation of large BMP adjacent to Northview Beach	\$150,000.00					\$75,000		\$75,000	\$150,000
* assume maintenance by Highway Department	\$250,000.00							\$250,000	\$250,000
<b>Metric</b>	Stormwater TP and TSS concentrations and calculated loads removed								
<b>Biofilter</b>									
New Lee Ave. Biofilter (planting, stabilization, possible retrofits)									
Initial cost to cleanup and some select plantings	approx. \$5,000.00					\$5,000		?	\$5,000
Design and implementation of biofilter project	Costs uncertain					?		?	
<b>Metric</b>	Stormwater TP and TSS concentrations and calculated loads removed								
<b>Septic Management</b>									
Formation of Septic Management District (including ordinances)									
Development of GIS-based database on septic zone of influence and watershed constraints**	no initial costs				N/A	N/A			
** does not include costs to compiling and digitizing paper database on existing septic systems	approx. \$8,000.00					\$8,000			\$8,000
<b>Metric</b>	Development of district and establishment of regulatory goals; watershed-based GIS database on septic systems								



# Lake Management – Estimated Cost Summary

---

Lake Oscawana - Restoration Program							
Management Action	Estimated Costs (in 2008 Dollars)	Proposed Timeline					5-Year Total
		2008	2009	2010	2011	2012	
IN-LAKE NUTRIENT LOAD	\$0	\$50,000	\$216,000	\$216,600	\$216,600	\$16,600	\$515,800
VEGETATION MANAGEMENT	\$0	\$115,000	\$25,000	\$25,000	\$25,000	\$25,000	\$215,000
WATERSHED MANAGEMENT PROGRAM MANAGEMENT	\$0	\$5,000	\$53,000	\$120,000	\$75,000	\$250,000	\$503,000
	\$0	\$8,500	\$8,500	\$8,500	\$8,500	\$8,500	\$42,500
<b>TOTALS - Annual and Grand</b>	\$0	\$178,500	\$302,500	\$370,100	\$125,100	\$300,100	\$1,276,300

# Appendix

