Lake Winnipesaukee Watershed Management Plan

Project Update: September 2010

A Phased Approach to a Comprehensive Plan

People in Partnership with Lake Winnipesaukee

Partners

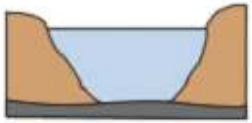
- Lake Winnipesaukee Watershed Association
- Lakes Region Planning Commission
- North Country Resource Conservation & Development Area Council
- Belknap County Conservation District
- University of New Hampshire Center for Freshwater Biology & Cooperative Extension
- Plymouth State University – Center for the Environment
- NH Dept. of Environmental Services
- Municipalities
- Other Organizations

Funding

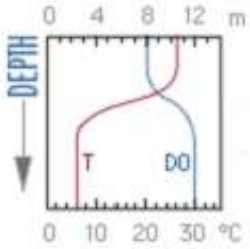
- NH DES – 319 Program
- NOAA – Watershed Planning
- Water Quality Monitoring
  - Town of Meredith
  - City of Laconia
  - Town of Gilford
  - Plymouth State University – Center for the Environment

Why develop a Lake Winni WMP?

What are the key components of a watershed management plan?



Physical Features



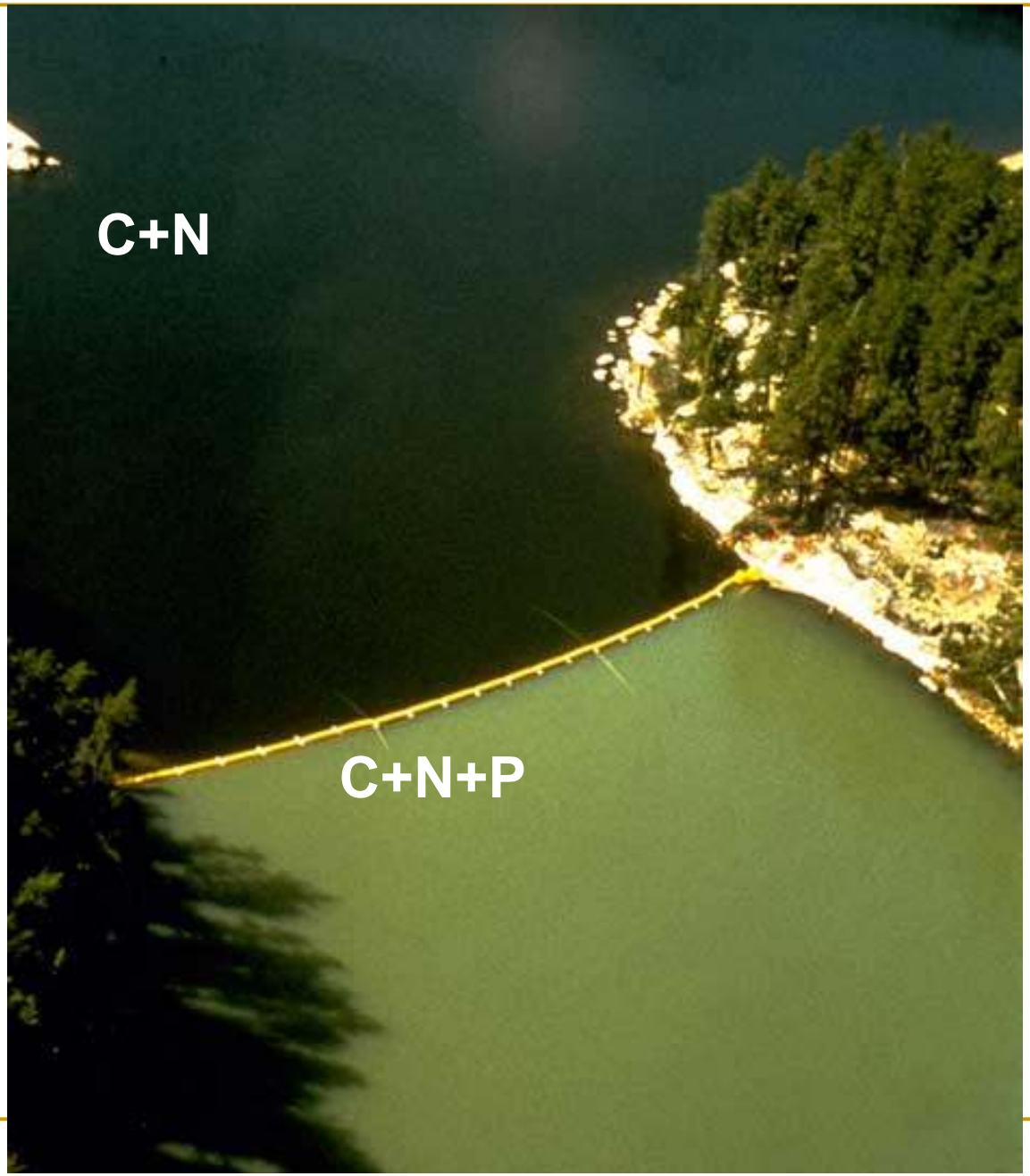
Chemical Features

Lake Biology

Watershed Management

Lake Winnipesaukee Watershed Management Plan

Primary concern is watershed phosphorus loading and its impact on lake water quality.



Phosphorus: Important Limiting Nutrient

From: Schindler ELA, Ontario CA 1973

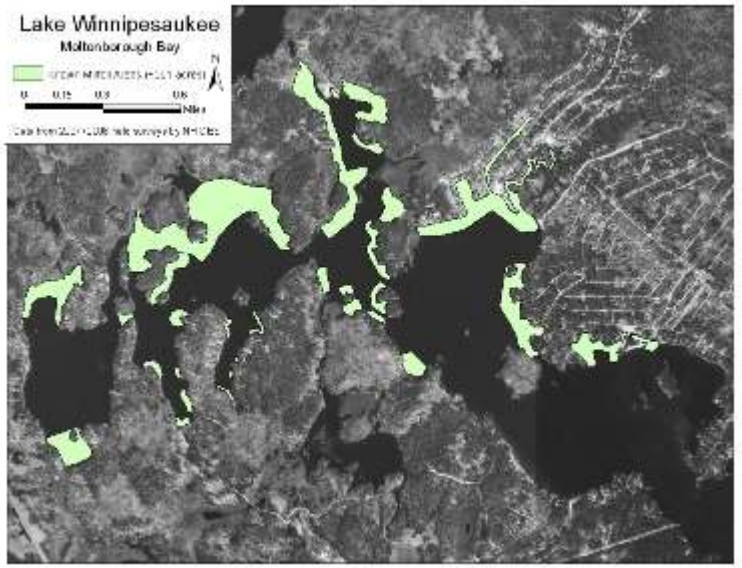
Why Phosphorus?

Algal blooms (including cyanobacteria)

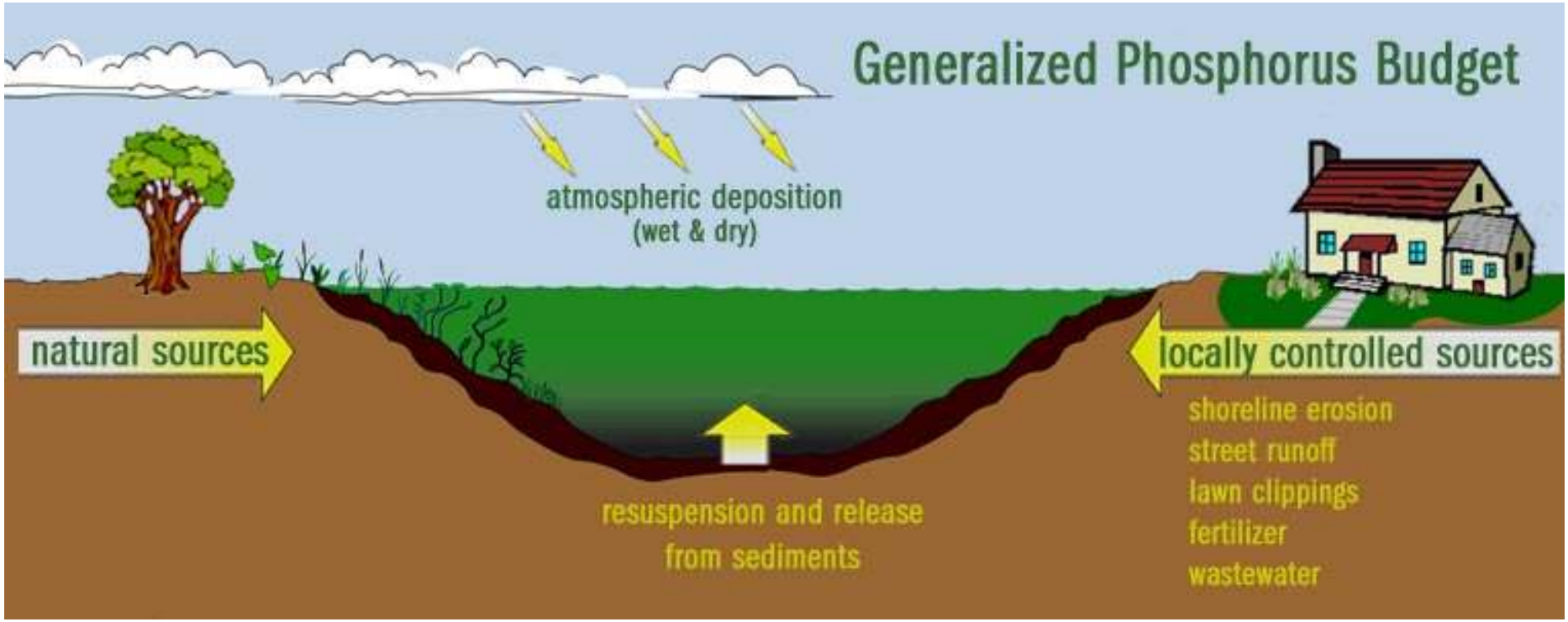
Milfoil

Increased levels of P may result in

- Decline in swimming, fishing and boating use
- Public health risk
- Decline in property values
- Increase in public expenditures to address water quality impairment



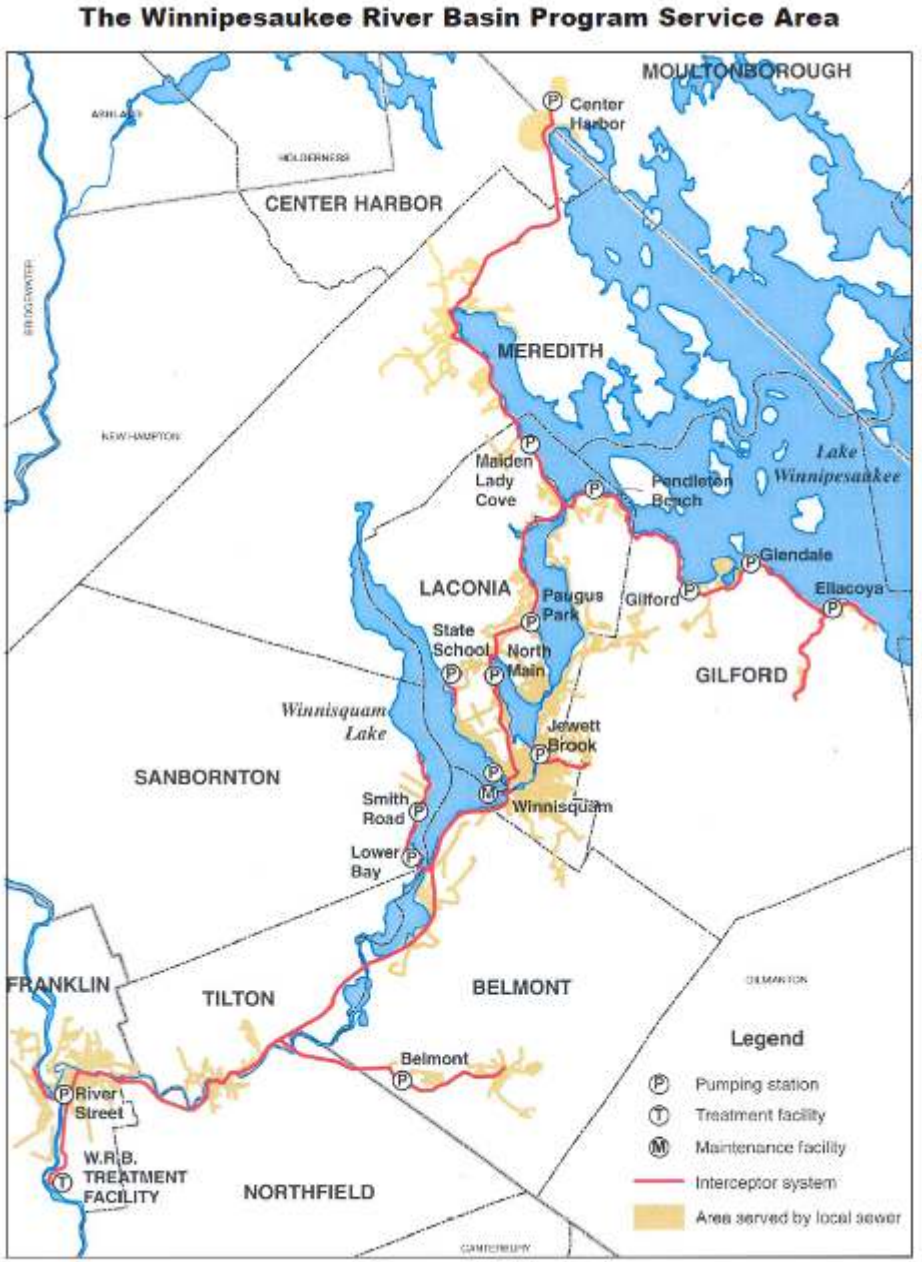
What are sources of P?



Source: lake.access project

What are sources of P?

Nitrates are also a pollutant of concern with failing septic systems



What are sources of P?

What are sources of P?

What do we need to know to make informed decisions?

- What is the current water quality?
  - ✓ Water quality data analysis
- How much do we P now?
  - ✓ Estimation of pollutant loads based on land use
- How can we limit our P in the future?
  - ✓ Pollutant load reductions from implementation of best management practices
  - ✓ Restoration of impaired sites

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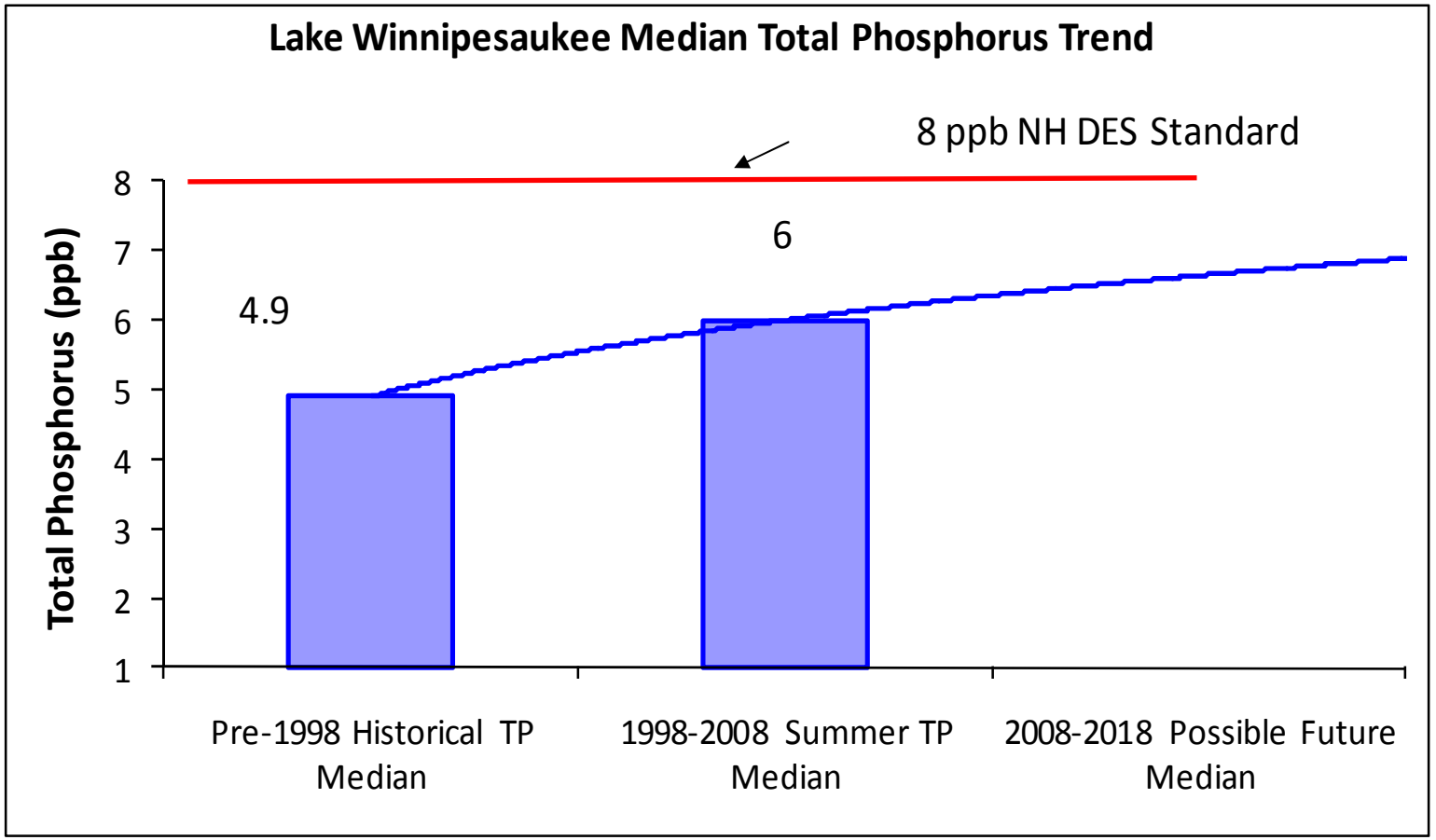

What is the current water quality?

	Existing Water Quality			
	Waukewan	Meredith Bay	Paugus Bay	Saunders Bay
Total P (ug/L)	7.1	6.3	5	5.4
Chl a (ug/L)	2.5	1.9	2.1	1.5

Above data represent the median P values for all sites combined in each bay for the last 10 years.

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How much do we P now? Lake Sustainability

Its the LOAD that's important!

P LOAD (Mass of P) =

P concentration in tribs & runoff x volume of water from tribs & runoff

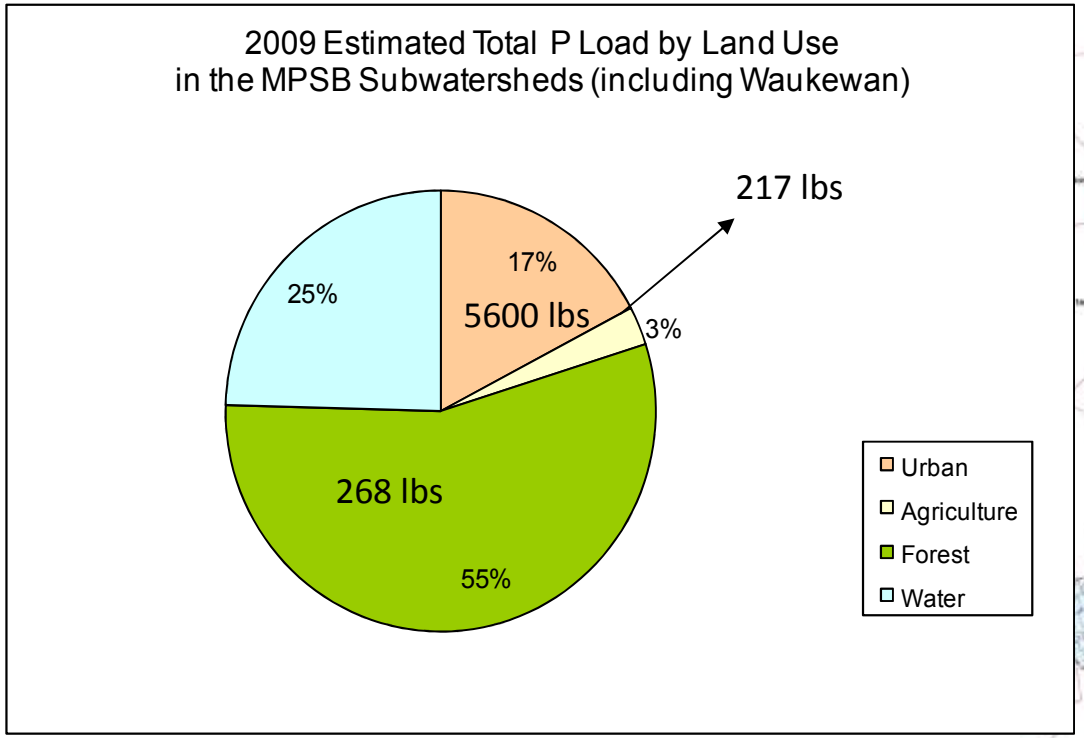
MORE LOAD = FASTER EUTROPHICATION

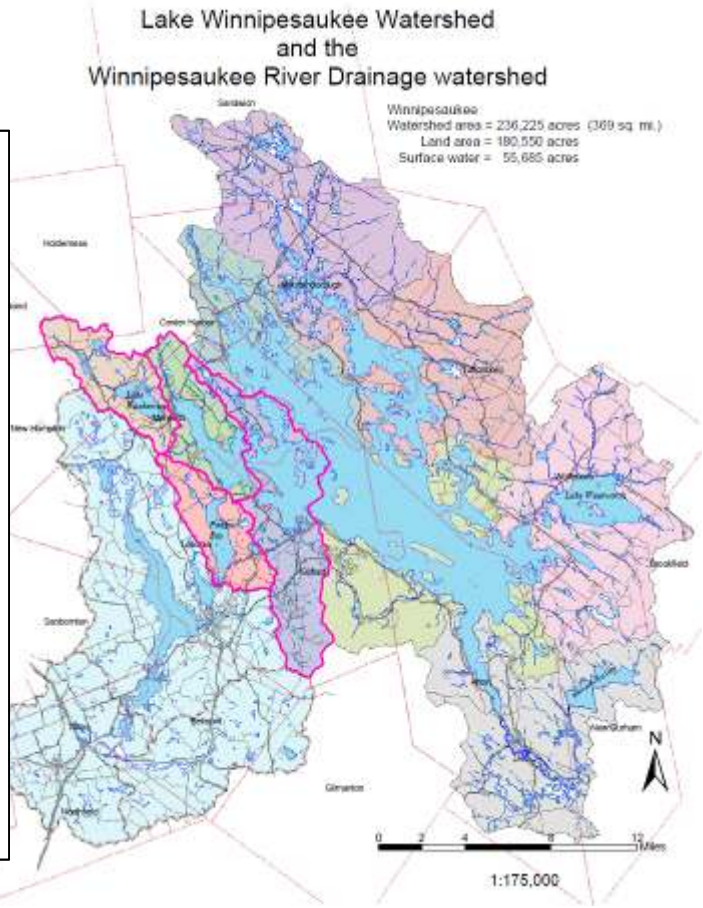
- Landscape change causes more load*
- Human activity causes more load*

*Unless Best Management Practices are put in place and maintained

Sustainability is obtained when human activity in the lake watershed is managed so that eutrophication occurs at a no greater rate than natural eutrophication.

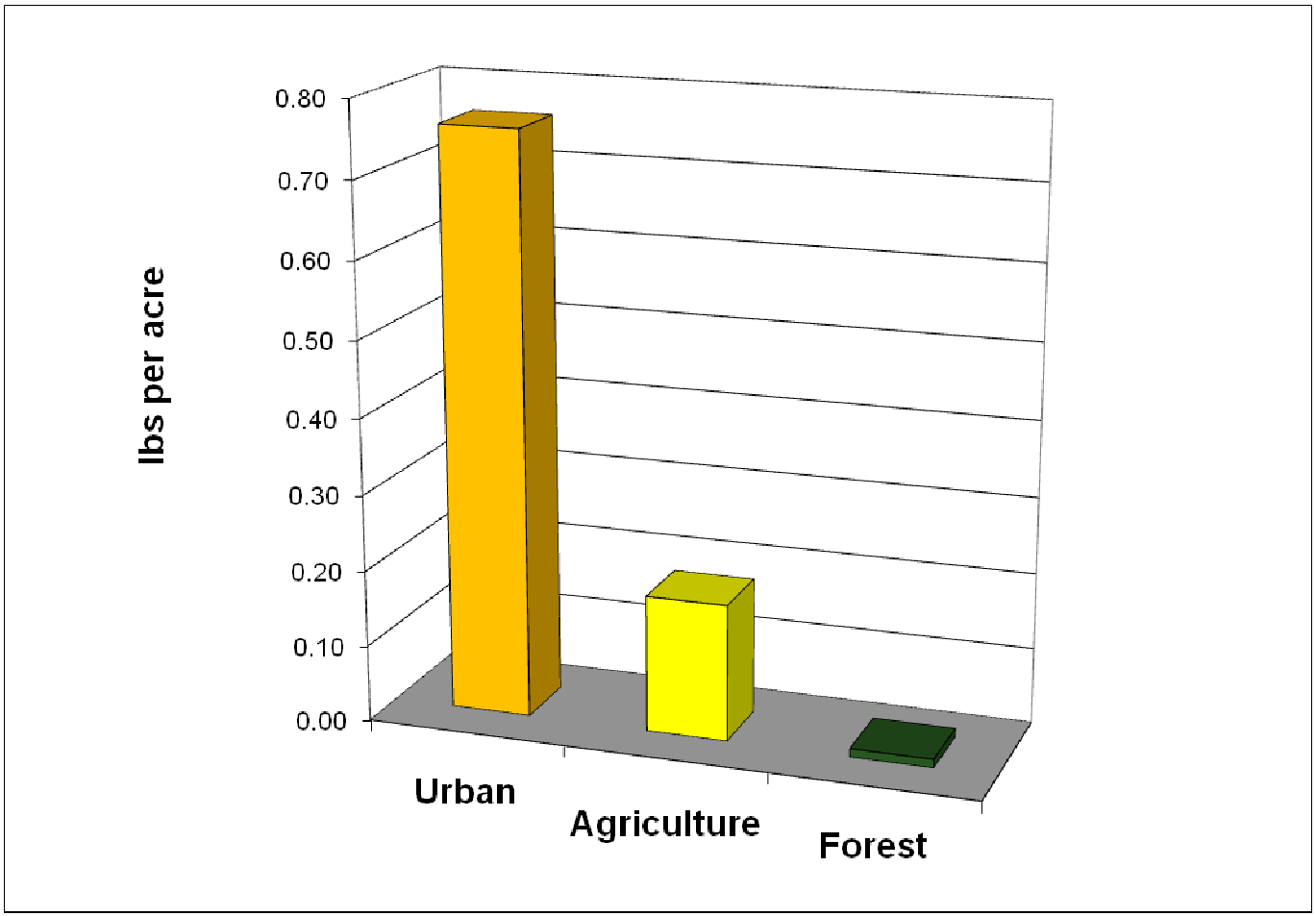
Estimated Phosphorus Loading





*Estimate of P loading generated using STEPL Model

Phosphorus Load per acre



Developed Land:

Urban areas, roads, residential

Agricultural Land:

Includes Pasture land and crops

Forested Land:

Areas covered primarily with trees

How can we limit or reduce P in the future?

- Implement best management practices
  - No phosphorus fertilizers
  - Use Low Impact Development practices
  - Vegetated Buffers along streams, wetlands, shoreland, and roads
- Identify and mitigate sites in need of restoration

Vegetative Buffers are a very effective and low cost best management practice to reduce pollutant loading to surface waters

- 40 ft buffer has a 19% TP removal efficiency
- 50 ft buffer – 26% TP removal efficiency
- 80 ft buffer – 45 % TP removal efficiency

Center Harbor - BMPs

Pavillion drainage before rain garden installation

Pavillion after rain garden installation

Swale with Bioretention basin

Kelsey Ave outfall with level spreader

Questions?

www.lakesrpc.org/lwwmp/