

# WMWA Workshop

## Nutrient Management



# *Nutrient Management*

- *Identify Problem Nutrient(s)*
  - *Identify Nutrient Source*
  - *Determine Required Reduction Level*
  - *Identify Management Strategies*
  - *Implement Strategies*
- 
- The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of blue and yellow, creating a sense of movement and depth.

# Why Do It?

- *Clean Water Act*
  - *Improve Water Quality*
  - *Protect Fishery*
  - *Protect Property Values*
  - *Protect State Economy*
    - *4 Billion Dollar Industry*
- 
- The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of blue and green, creating a sense of movement and depth.

# Clean Water Act – Federal Law

- Clean Water Act requires waterbodies to meet “fishable and swimmable” standards
- CWA implemented through NPDES Permit Program (EPA)
- NPDES Program requires SWPPP Permits and where appropriate TMDL Studies (MPCA)
- **TMDL Implementation Plans** must be incorporated into SWPPP Plans (Municipal)
- SWPPP Permits (MPCA) require compliance with WLA and LA (Municipal)

**STOP  
CLOSED**



*Based on recent monitoring for E. coli bacteria  
Serious risk of illness may be present*

**THIS AREA IS CLOSED  
TO SWIMMING**

FOR MORE INFORMATION:

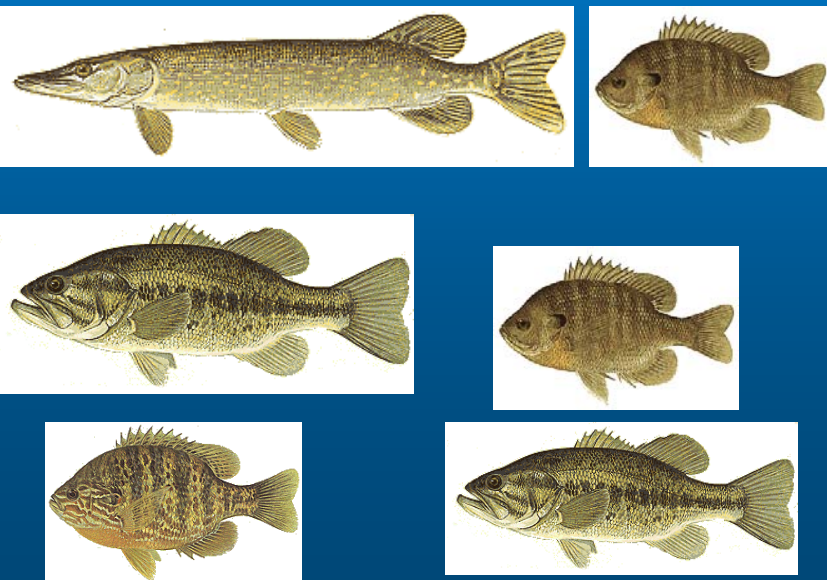
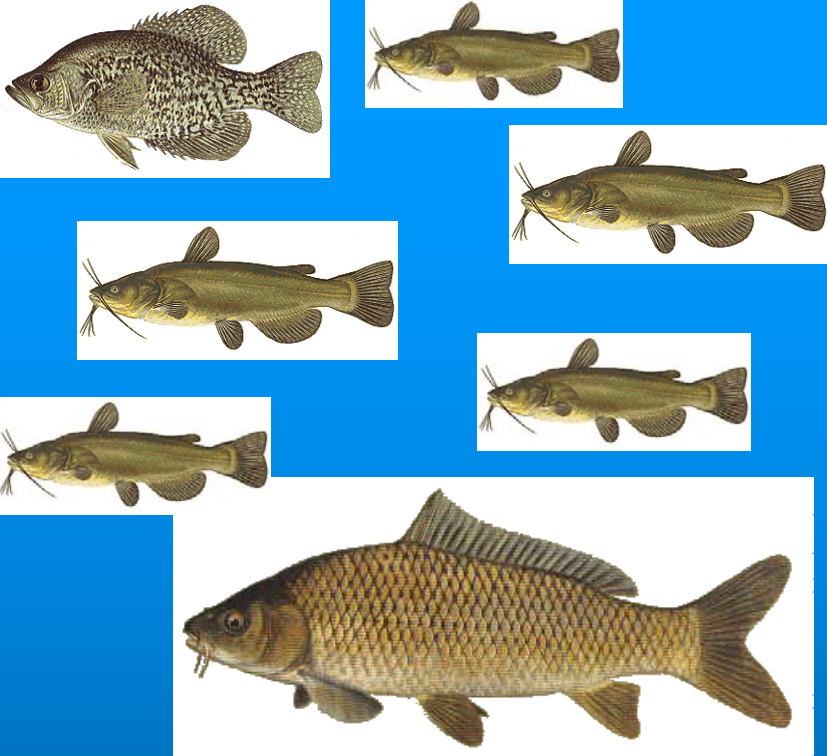
1-800-441-4636 ext. 1460

[www.wibeaches.us](http://www.wibeaches.us)


# Productivity



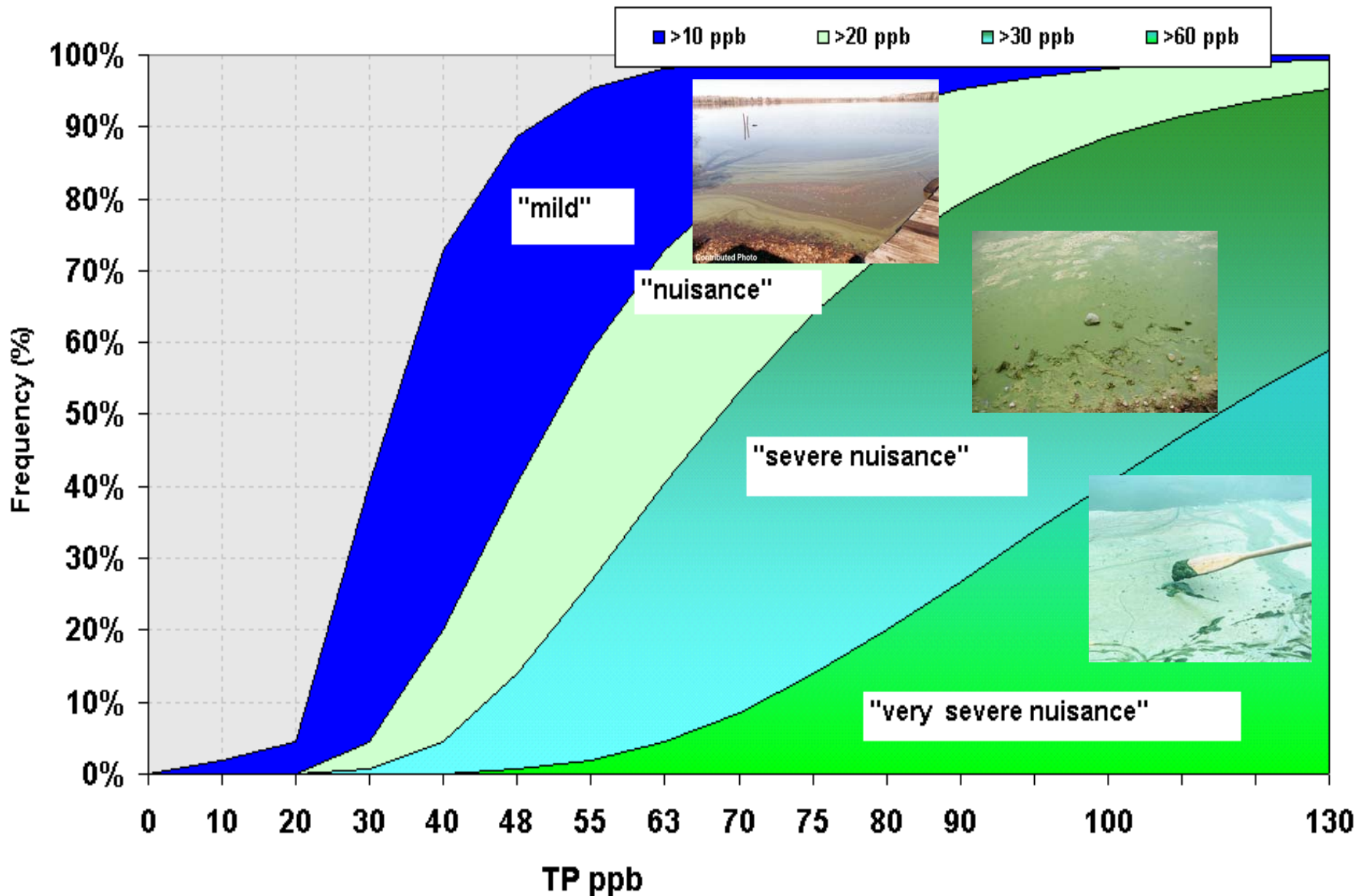




# *Nutrient Management*

- *Identify Problem Nutrient(s)*
  - *Identify Nutrient Source*
  - *Determine Required Reduction Level*
  - *Identify Management Strategies*
  - *Implement Strategies*
- 
- The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of blue and yellow, creating a sense of movement and depth.

# Chlorophyll-a interval frequency versus total phosphorus.



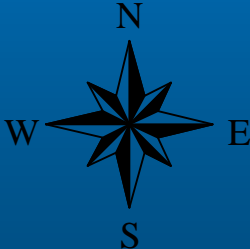
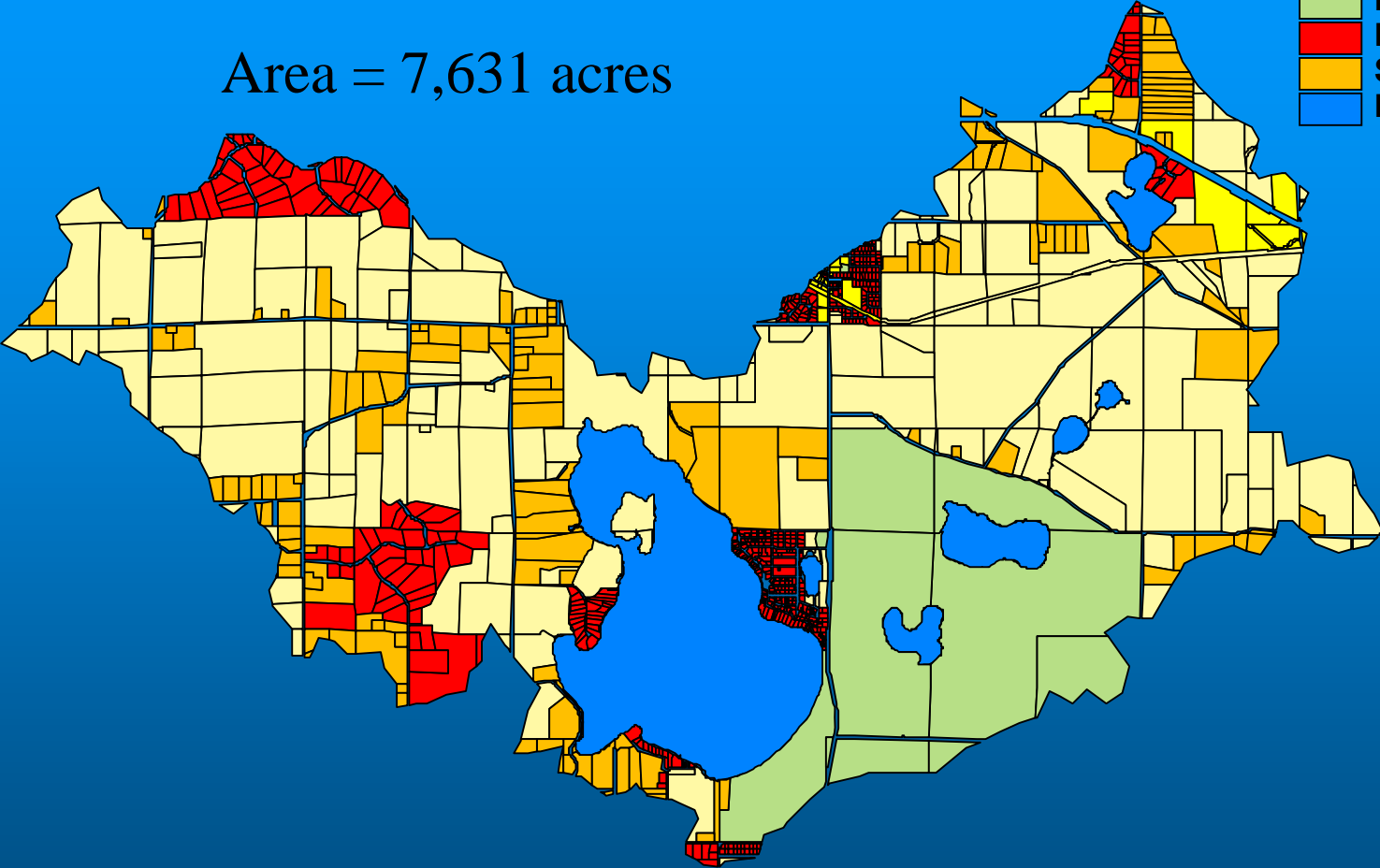
# *Nutrient Management*

- *Identify Problem Nutrient(s)*
  - *Identify Nutrient Source*
  - *Determine Required Reduction Level*
  - *Identify Management Strategies*
  - *Implement Strategies*
- 
- The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of blue and yellow, creating a modern, flowing border.

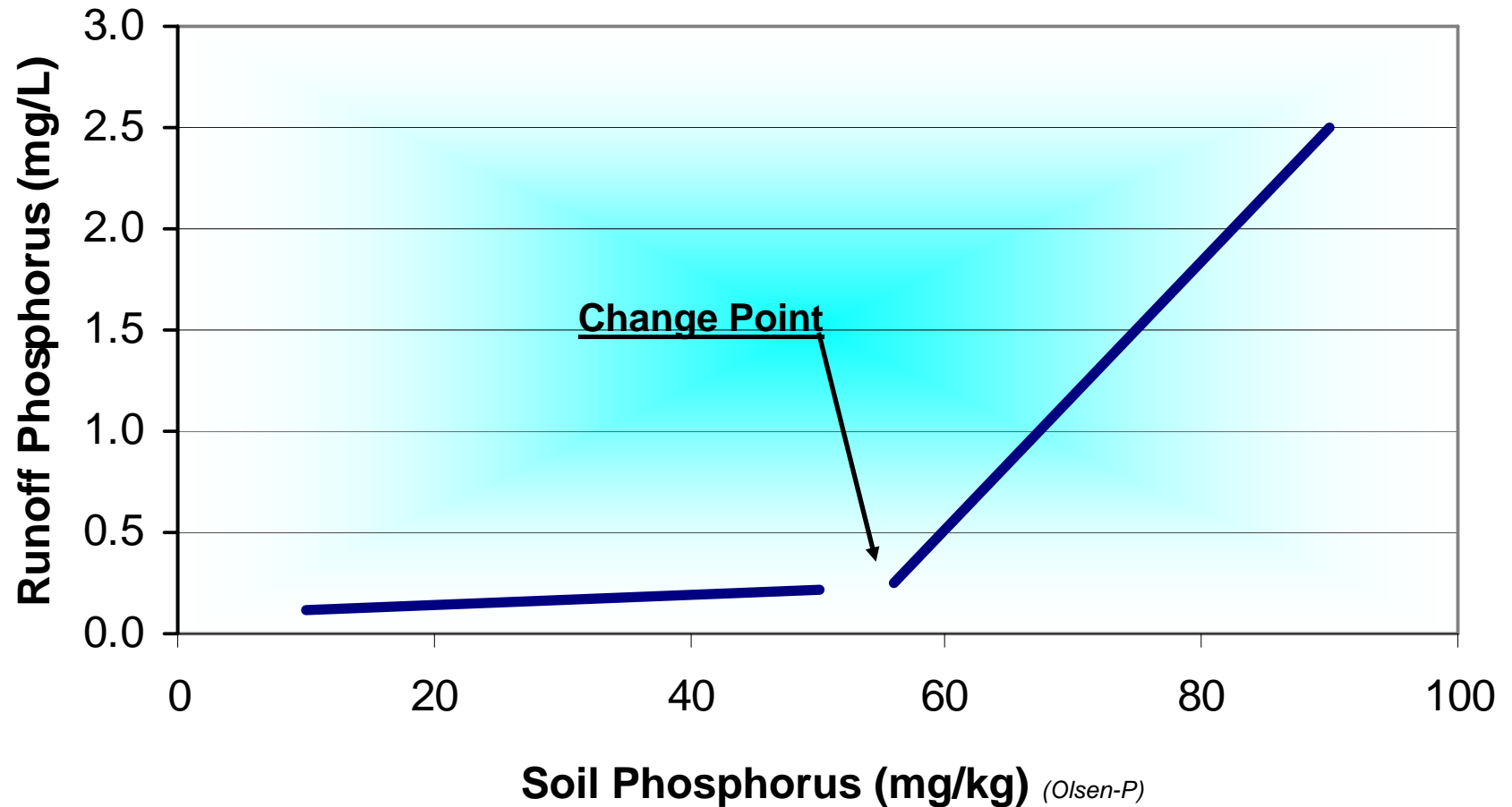
# Lake Independence Watershed

Area = 7,631 acres

- Land Use**
- Agricultural / Vacant
  - Commercial / Industrial
  - Parkland
  - Residential
  - Single Family Rural
  - Lakes



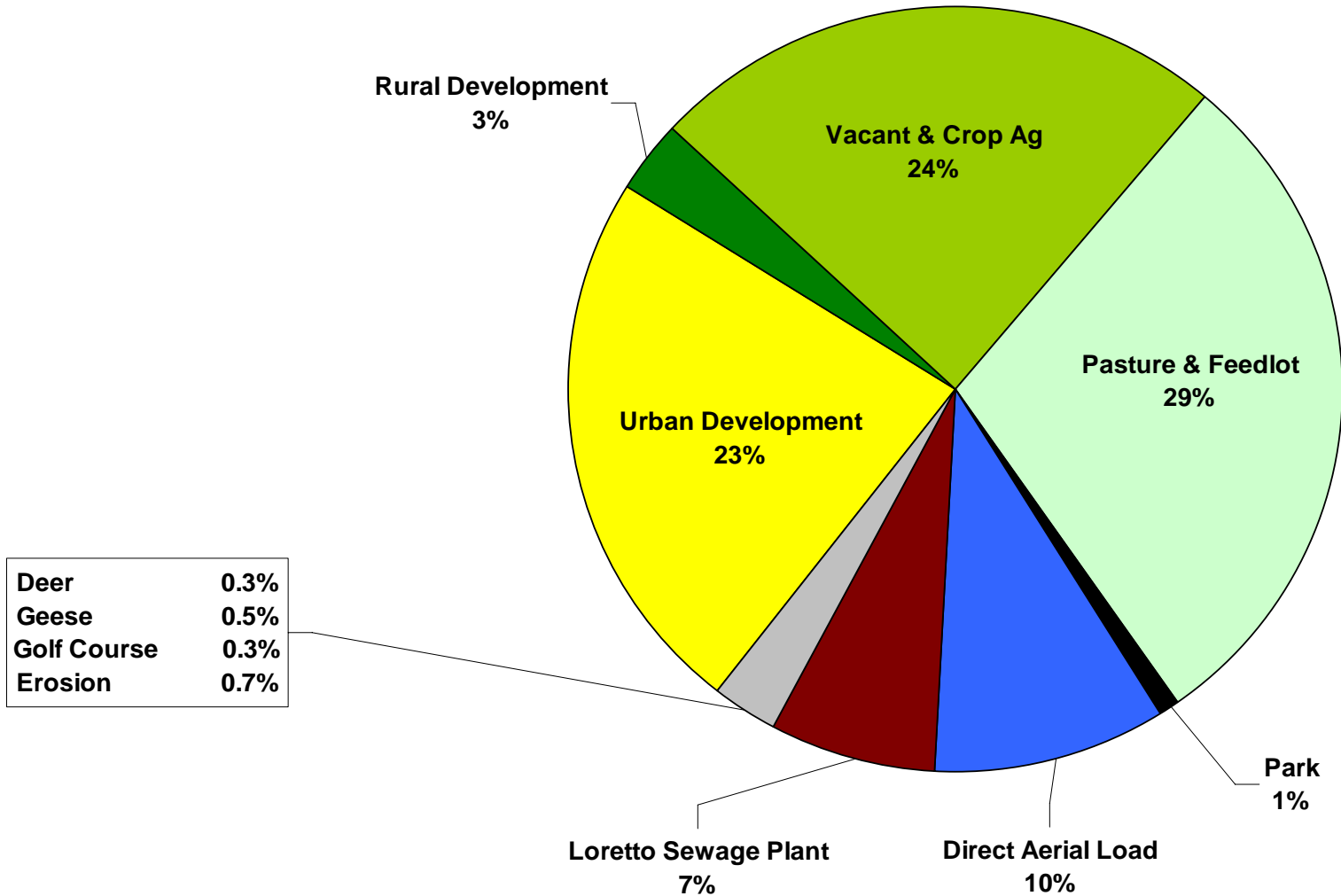
# Relationship of Soil-P Level to Runoff-P Concentration



Heckrath et al., 1995

# External Sources of Phosphorus Loading to Lake Independence

Total= 2334 lbs/year



# *Nutrient Management*

- *Identify Problem Nutrient(s)*
  - *Identify Nutrient Source*
  - *Determine Required Reduction Level*
  - *Identify Management Strategies*
  - *Implement Strategies*
- 
- The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of blue and yellow, creating a modern, flowing border.

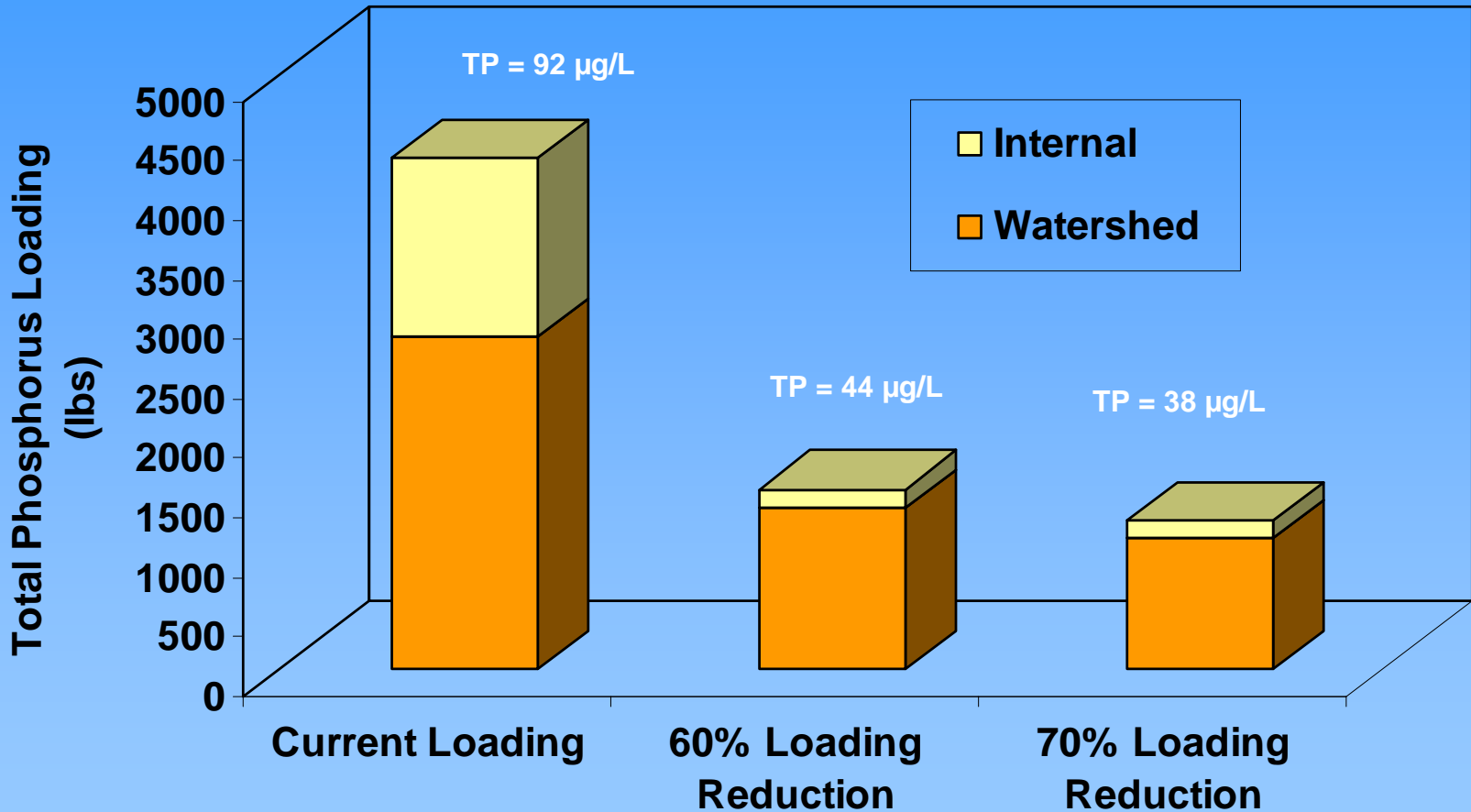
# Eutrophication Criteria under consideration for NCHF: TP, Chlorophyll-a and Secchi Depth

| Ecoregion  | TP (ppb)       | Chl-a (ppb)    | Secchi (M)      |
|--|----------------|----------------|-----------------|
| (Class 2a): *<br>Stream trout<br>des. lakes            | <u>&lt; 20</u> | <u>&lt; 6</u>  | <u>&gt; 2.5</u> |
| (Class 2b):<br>lakes, aquatic<br>rec. use              | < 40           | < 13           | > 1.5           |
| (Class 2b): *<br>shallow lakes,<br>aquatic rec.<br>use | <u>&lt; 60</u> | <u>&lt; 20</u> | <u>&gt; 1.0</u> |

\* Draft values under development / review

# Lake Sarah

## Total Phosphorus Loading



# *Nutrient Management*

- *Identify Problem Nutrient(s)*
  - *Identify Nutrient Source*
  - *Determine Required Reduction Level*
  - *Identify Management Strategies*
  - *Implement Strategies*
- 
- The bottom of the slide features a decorative graphic consisting of several overlapping, wavy lines in shades of blue and yellow, creating a modern, flowing border.

# Source Reduction







# Implementation Costs

- Plymouth Creek Pond \$1,000,000
- Plymouth Creek Stabilization \$1,000,000
- Timber Creek \$400,000
- Woods Creek \$250,000
- County Road 9/61 \$200,000
- East Side Ponds \$700,000
- Shoreline Restoration \$200,000
- Rain Gardens \$172,000
- Annual Street Sweeping \$60,000
- Curly-leaf Pondweed Control \$400,000
- **Total \$4.3 million**

