

Our Mission

The Mirror Lake Protective Association

was founded in 1991 to protect and preserve Mirror Lake, its wildlife and wildlife habitat, and to promote knowledge about the lake, its history, and related activities.



Introductions



Mirror Lake



Spirit of New Hampshire

Dick Byrd, Nancy Byrd, Beth Urda
(Norma Milne)



Lake Host Grant



**CLEAN BOATS
CLEAN WATERS**

**Before Launching
AND Before Leaving Here:**

| | | |
|--|--|--|
| CLEAN off any mud, plants and animals from boats, trailers and equipment. | DRAIN your boat and equipment away from the water. | DRY anything that comes into contact with the water. |
|--|--|--|

This applies to all watercraft, motorized and non-motorized.

Never release plants, fish or animals into a body of water unless they came out of that body of water.

Original illustration used with permission from New Hampshire Department of Fish and Game.

It is **ILLEGAL** to transport and introduce invasive aquatic species in New Hampshire. Violators are subject to fines.

 Please report suspected invasive aquatic species sighting to NHDES at 603-271-3503

Communication

MLPA website



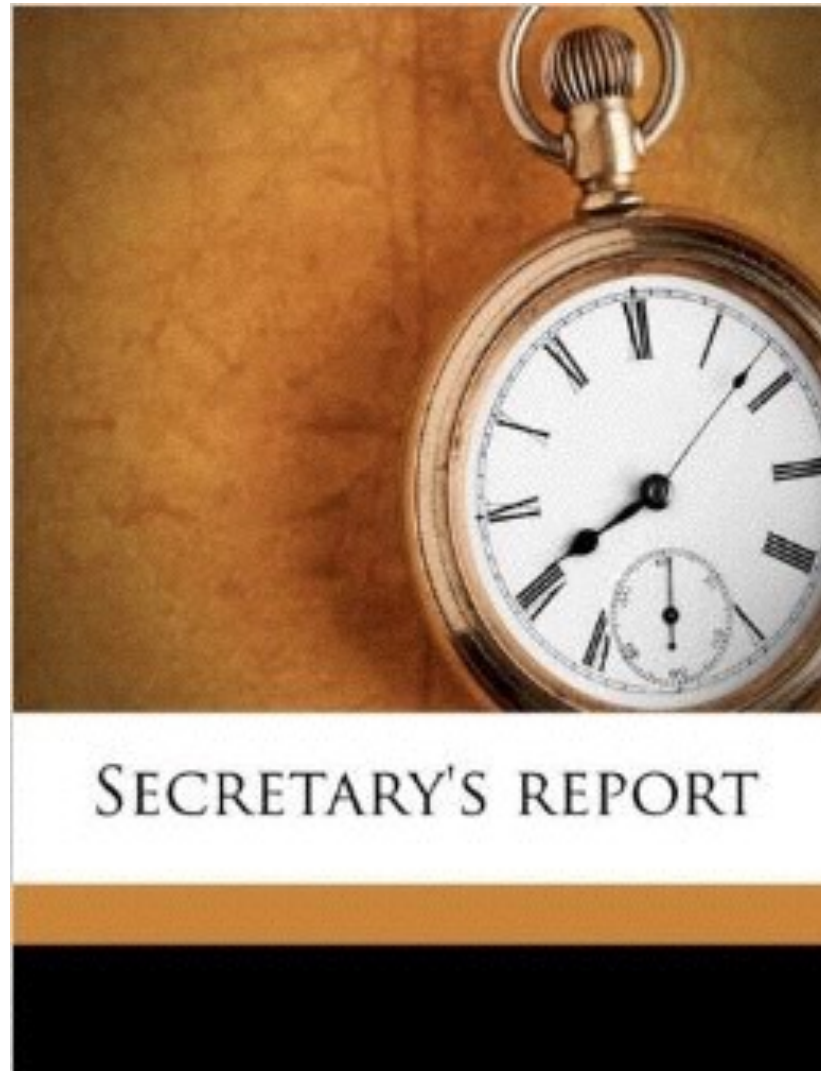
facebook

Keep It Up!

Everybody do your part;
Collectively, make a difference for Mirror Lake!



Julie Tryder



Alison Jones

Treasurer
Report



Summary of MLPA Activity 6/22/14 – 6/20/15

| PRIMARY Account Reconciliation: | | SPECIAL Account Reconciliation: | |
|--|--------------------|---------------------------------|--------------------|
| Beginning Balance | \$17,568.43 | Beginning Balance | \$4,807.61 |
| Deposits | \$6,475.70 | Deposits/Transfers | \$10,220.00 |
| Checks/Transfer to Special Account | -\$2,442.42 | Checks | -\$7,363.00 |
| Balance 6/20/15 | \$21,601.71 | Balance 6/20/15 | \$7,664.61 |
| Income by Category | | Total Deposits: | |
| Member Dues & Contributions | \$5,295.70 | Primary: | \$6,475.70 |
| Bocce Tournament Fundraising Event | \$1,180.00 | Special: | \$9,420.00 |
| From State NH Treasury | \$9,420.00 | Combined: | \$15,895.70 |
| Total | \$15,895.70 | | |
| Expenditures by Category | | Total Expenditures | |
| Administrative Overhead | \$697.42 | Primary: | \$1,642.42 |
| Donations/Charity | \$650.00 | Special: | \$7,363.00 |
| Water Testing | \$220.00 | Combined: | \$9,005.42 |
| State Fees | \$75.00 | | |
| Scientific Studies & Consultation Design | \$7,363.00 | Gain since 6/21/14: | \$6,890.28 |
| Total | \$9,005.42 | | |
| Income exceeded expenditures by: | \$6,890.28 | | |

Annual MLPA Community Donations

| | |
|-------------------------------------|-------|
| Friends of Libby Museum | \$50 |
| Loon Preservation Association | \$100 |
| Lakes Region Conservation Trust | \$100 |
| New Hampshire Lakes Assoc. | \$300 |
| Lake Winnepesaukee Watershed Assoc. | \$100 |

Mirror Lake Water Quality

- Presenting information known as of June 12, 2015
- - Nancy Byrd



Mirror Lake Phosphorus Goal

8.5 μ g/L



*Are we
meeting
our target?*

2014 Data on Hand

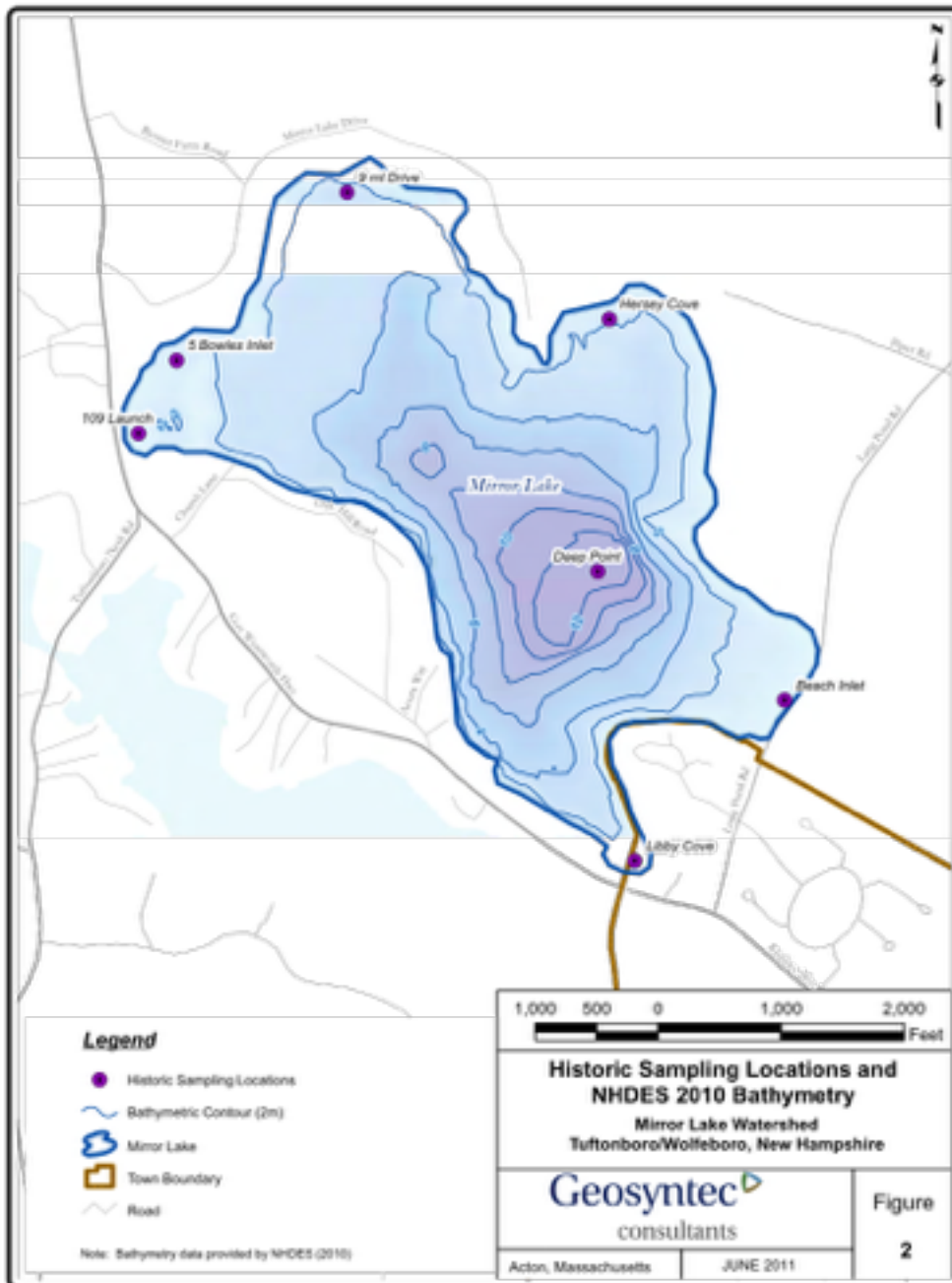
- Sampling/lab results for 2014 season for University of New Hampshire Lakes Monitoring Program
- “Volunteer Lake Assessment Program Mirror Lake Report” from Department of Environmental Services (data gathered by Beth Urda)
- “Mirror Lake 2014 Sampling Highlights” from UNH –an excellent report

Main sources of phosphorus?

Main Sources are:

- Minerals through weathering and mining
- Death, decay, animal waste (including septic)
- Internal to sediments in lake and tributaries
- Particles carried by air

- Mirror Lake Sampling Locations and Bathymetry



Total Phosphorus

2014 Data from the Deep point

| | | Integrated | | Bottom | |
|---|--------------|-------------------|---------------|-----------------|---------------|
| | Site | Date | (ug/L) | Depth(m) | (ug/L) |
| • | 3 Deep Point | 5/28/2014 | 10.9 | 12 | 15.1 |
| • | 3 Deep Point | 6/17/2014 | 11.9 | 13.5 | 15.2 |
| • | 3 Deep Point | 7/18/2014 | 11.1 | 13.5 | 127.3 |
| • | 3 Deep Point | 8/20/2014 | 10.3 | 12.75 | 21.9 |
| • | 3 Deep Point | 9/12/2014 | 10.6 | 9.5 | 30.9 |
| • | 3 Deep Point | 10/9/2014 | 10.5 | 11.5 | 24.4 |

Avg Integrated 10.9 Average Bottom 39.1 (17.9 excluding 127.3)

Mirror lake Near Shore Inter-Site Comparison

| Near-shore Sampling Station | Average (range) Total Phosphorus (ppb) | Average (range) Chlorophyll <i>a</i> (ppb) |
|--|---|---|
| 4 Hersey Cove | 9.0 ppb (range: 7.4 – 10.6) | 3.3 ppb (range: 2.4 – 5.1) |
| 5 Bowles Inlet | 9.0 ppb (range: 7.5 – 10.5) | 2.8 ppb (range: 2.4 – 3.9) |
| 7 Beach Inlet | 11.4 ppb (range: 8.2 – 22.4) | 3.3 ppb (range: 1.8 – 5.2) |
| 8 Libby Cove | 8.3 ppb (range: 6.7 – 9.5) | 3.1 ppb (range: 2.2 – 4.4) |
| 9 M.L. Drive | 8.4 ppb (range: 7.3 – 9.3) | 3.2 ppb (range: 2.5 – 4.6) |
| 10 109 Launch | 9.7 ppb (range: 8.5 – 12.0) | 3.4 ppb (range: 2.7 – 4.5) |

Source: UNH Cooperative Extension

Rain Gardens Have Helped!



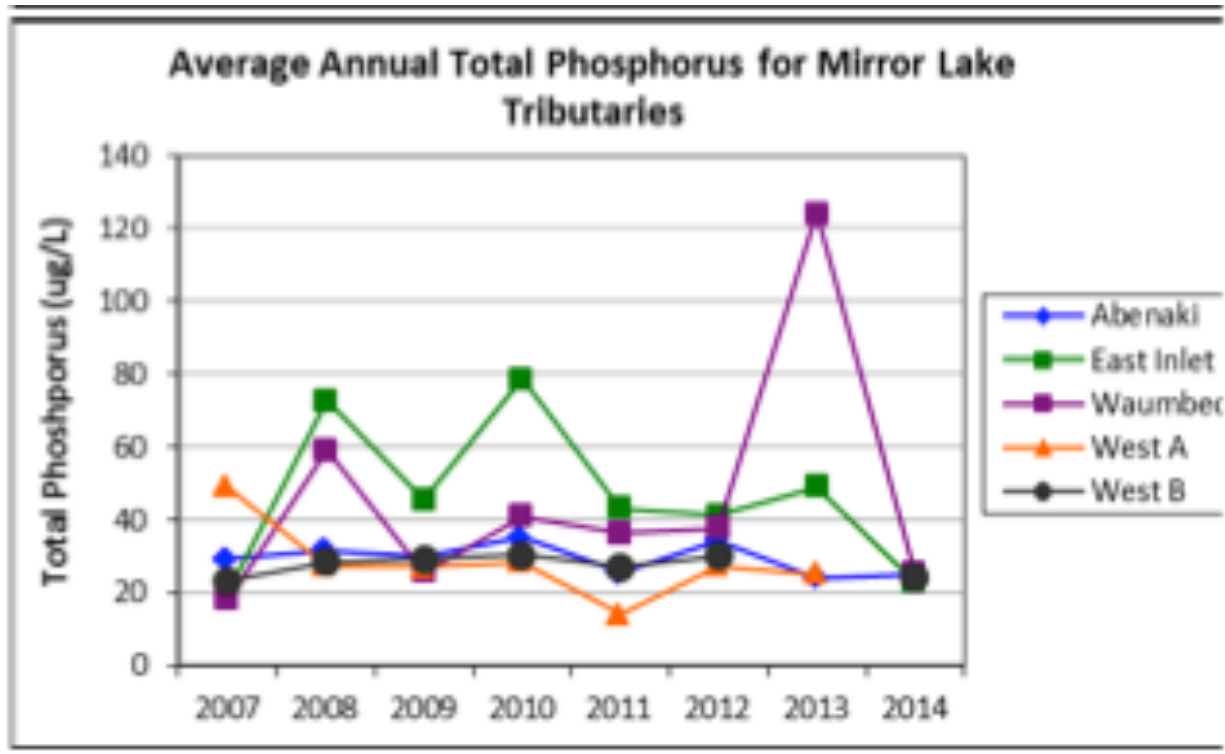
The data from Tributaries

Average Water Quality

Station name *Total Phosphorus (TP - $\mu\text{g/L}$)*

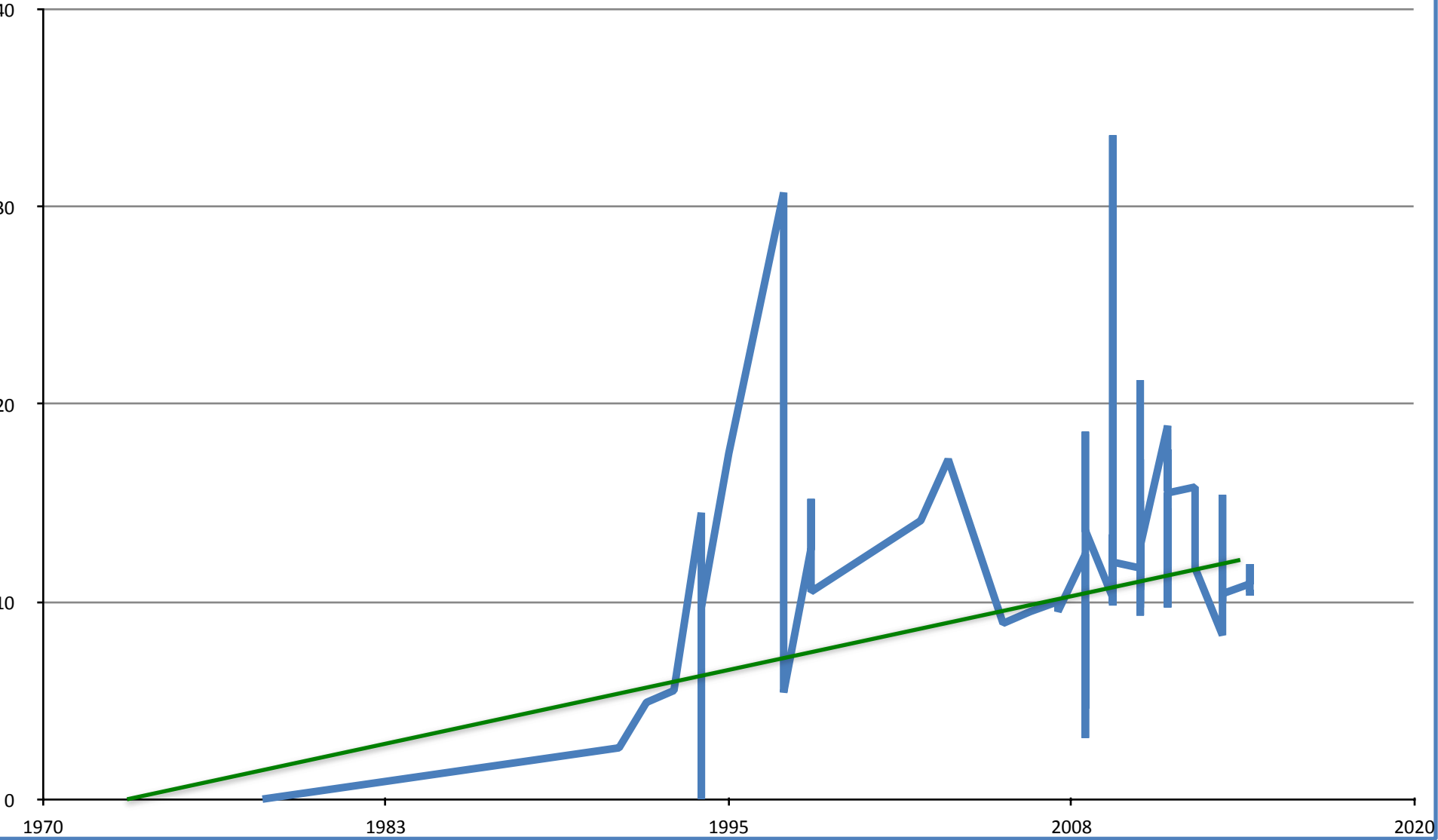
- Abenaki Lagoon 25
- East Inlet 23
- Waumbeck Rd. 25
- West Inlet 23

DES Total Phosphorus Data from Selected Watershed Tributaries



Data taken by Beth Urda

Integrated Total Phosphorus ($\mu\text{g/L}$) by Year



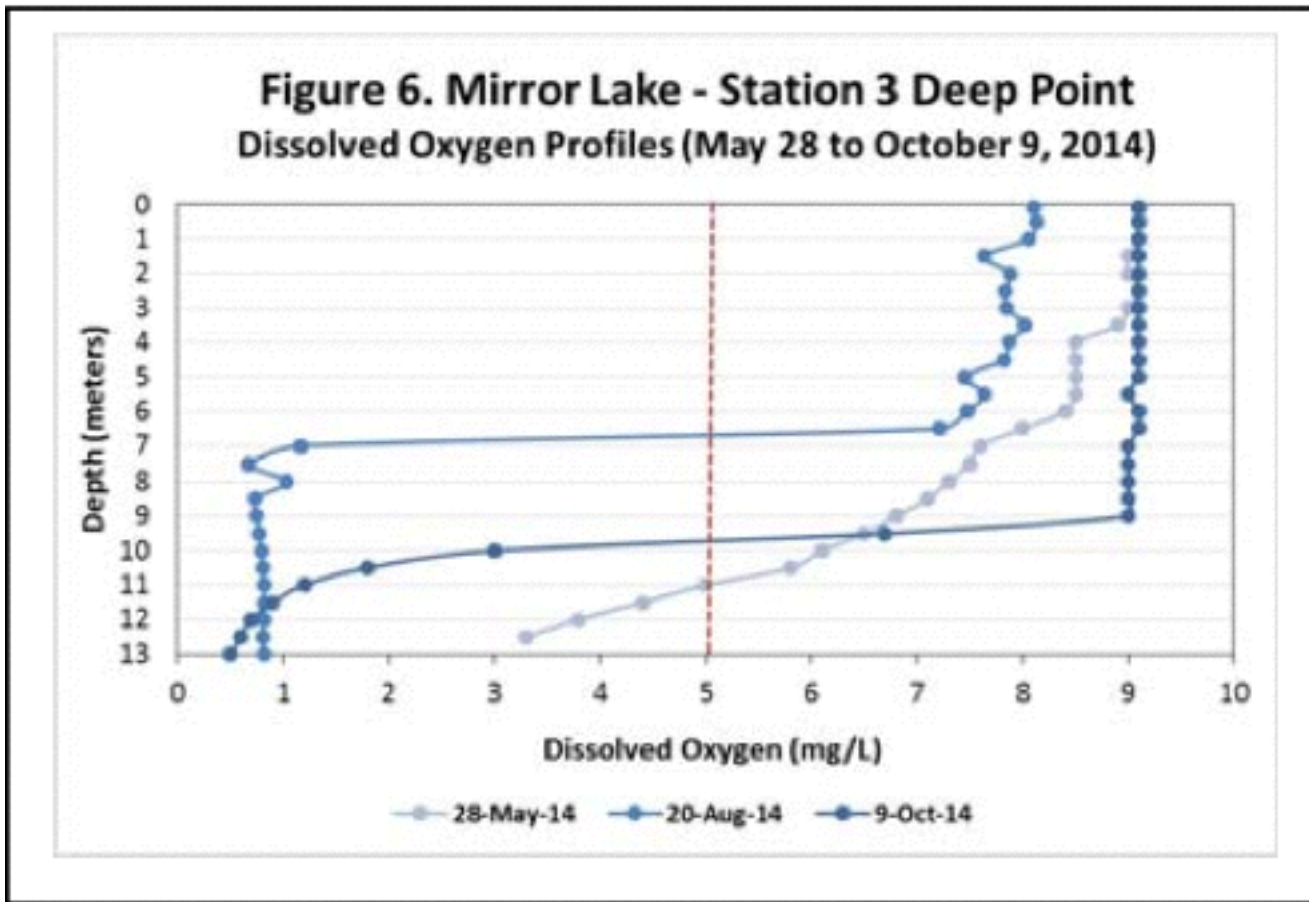


Figure 6. Monthly Mirror Lake dissolved oxygen profiles collected between May 28 and October 9, 2014. The vertical red line indicates the dissolved oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish such as trout and salmon. *Notice the decreasing dissolved oxygen concentrations near the lakebottom.*

Blue = Excellent =
Oligotrophic

Yellow = Fair =
Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

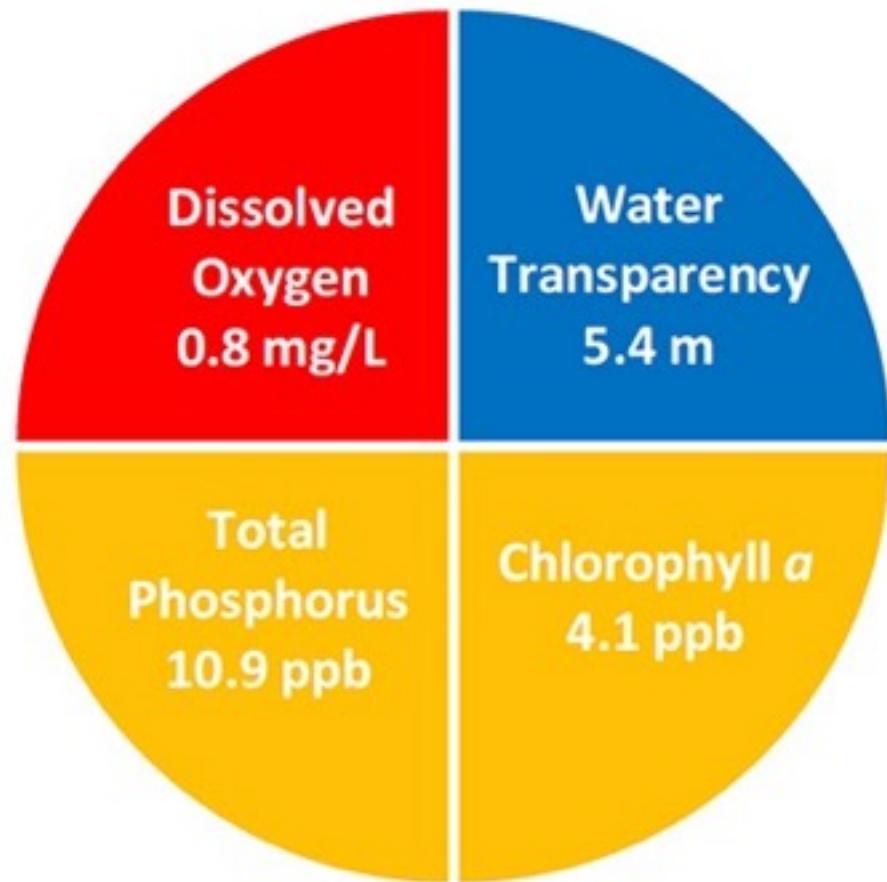


Figure 1. Mirror Lake Water Quality (2014)

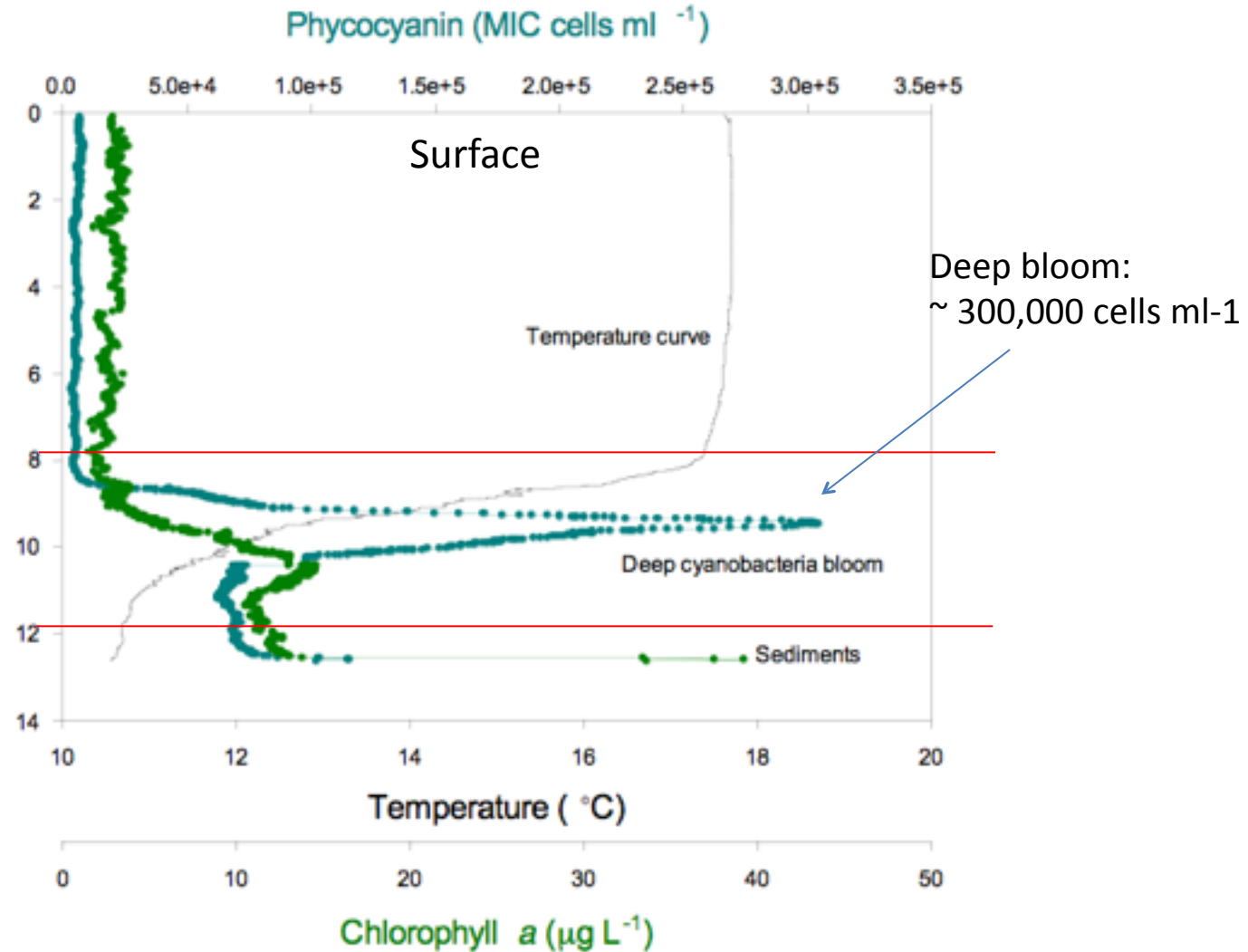
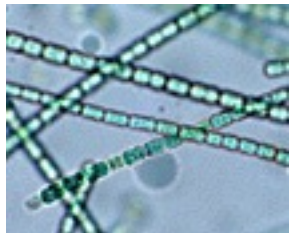
What do we do now?

1. Business as Usual (i.e. nothing)
2. Use stronger storm water management measures (e.g. attempt to gain better compliance with Shoreland Protection Act)
3. Better contamination control
4. Continue efforts to improve Lang Pond runoff (approve contribution for permitting)
5. Improve 109 Boat Launch and drainage into 109 Boat Launch
6. Improve oxygenation at Deep spot
7. Geosyntec recs of community septic and land conservation
8. Explore biological control
9. Other innovations we haven't thought about

Problems with Business as Usual

- Current trends will continue
- Anoxic zone will expand,
- Restricting fish habitat
- Increasing potential for cyanobacteria blooms with health consequences for all life that depends on it
- Pollution is ugly

Oscillatoria was the major genera of cyanobacteria found in Mirror Lake on October 11, 2007



Phycocyanin fluorescence reveals high levels (deep bloom) of *Oscillatoria* between 8 and 12 meters.

Report Recommendations

#1. Implement Best Management Practices

- Minimize polluted runoff and erosion
- Reduce nutrient loading



Resources

- *Landscaping at the Water's Edge: An Ecological Approach*
- *NH Homeowners Guide to Stormwater Management: Do-It-Yourself Guide to Solutions for Your Home*
- <http://des.nh.gov/organization/divisions/water/wmb/was/documents/mirror-lake-wmp-2012.pdf> http://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf>

Beth Urda

Loon Monitoring



Norma Milne

Weed Watchers



Kathy Sciarappa

Education Committee



Sources of Phosphorus



Welcome to Mirror Lake



Larry Gil

2015

Lakes Congress

Tools for Lake Management & Protection

learn, train & network with NH LAKES



Lang Pond Road



Storm Water Run Off



Proposal for \$5,000 MLPA contribution toward the design and upgrade of Lang Pond Road

In March, the Tuftonboro voters approved the reconstruction of Lang Pond Road which will reduce run off into to Mirror Lake. The plan provides for the payment to H.E. Bergeron Engineers (Bergeron) of \$8,700 to update its prior survey and to revise and modify its prior design in accordance with the Mirror Lake Watershed Committee's recommendations. This would bring the project to a point where the state permit applications, required before construction commences, could be prepared and submitted by Bergeron. The cost of the permit applications will be \$5,000 and the Board of Directors has proposed that this amount be contributed by MLPA. The Town has authorized Bergeron to commence its work, and, if the contribution for the permitting process is approved by MLPA members, the reconstruction work will be performed by the Town's Road Agent Jim Beam, this summer. Accordingly, under discussion and vote at the MLPA's annual meeting is the following resolution:

Resolved, that the Mirror Lake Protective Association (MLPA) approve the contribution of up to \$5,000 for the preparation and filing of permit applications for the reconstruction of Lang Pond Road to be paid, to or on behalf of the Town of Tuftonboro, upon approval of the Tuftonboro Board of Selectmen and the President of MLPA.

Lang Pond Road: Please vote “Yes”



By-law Change



Bill Tryder

Membership



Nominating Committee



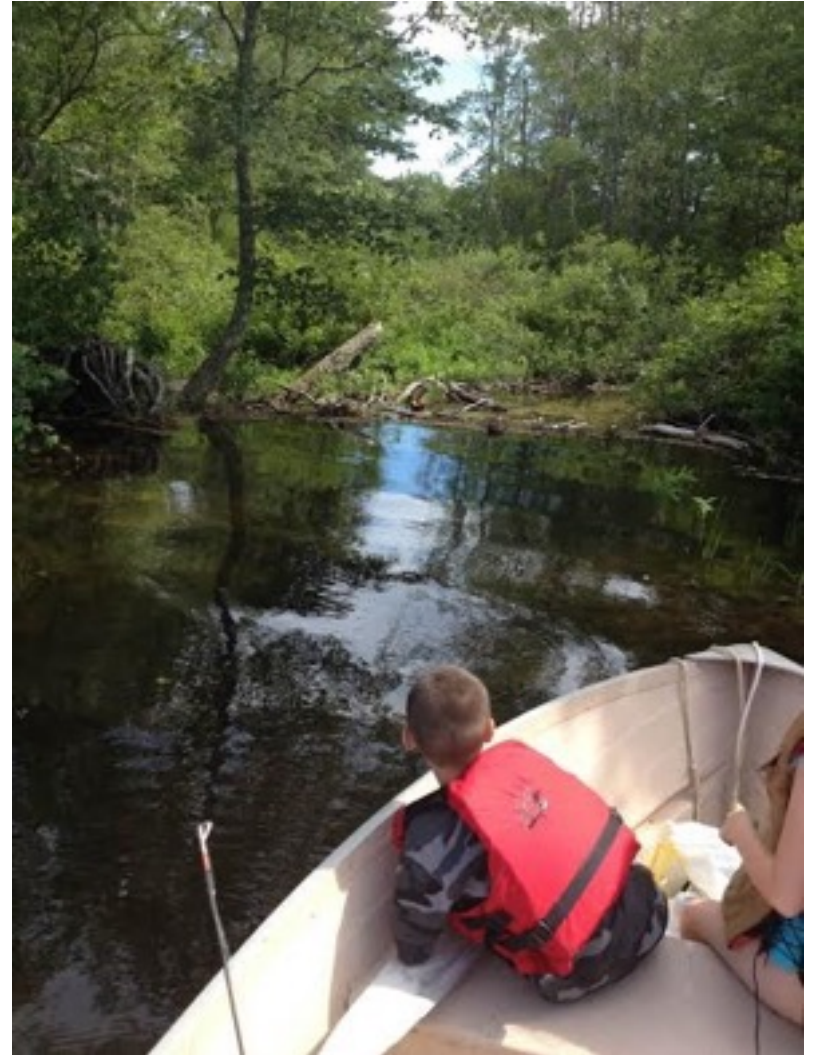
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MLPA 2015



Beaver Dam Causes High Water



Land Development

- Auction and purchase by affiliate of Mary Hersey's 2 lots in March, 2015
- 100 acres 90% encumbered by conservation easement to USA
- 12.5 acres by "beach"
 - possibility 3 or 4 lots?
- How will development on Mirror Lake impact its water quality?



Source Type, lbs P, % of load

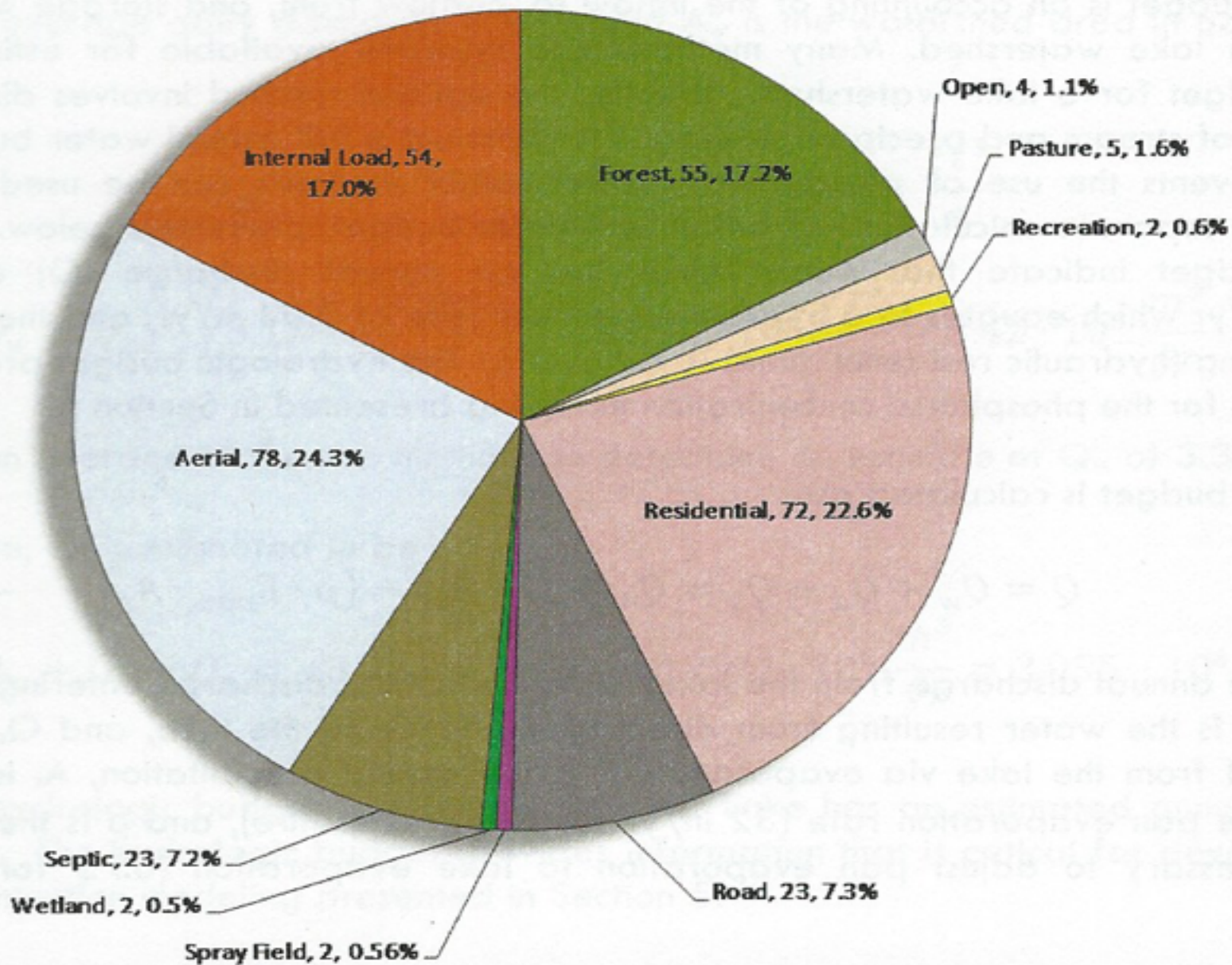


Figure 10. Current (2011) Mirror Lake Phosphorus Budget.

As depicted in Figure 16 below, an annual P reduction of approximately 7.4 lb/yr will be adequate to achieve the water quality goal of summer epilimnion concentrations of 8.5 $\mu\text{g/L}$. However, based on buildout projections, it will be necessary to either prevent or reduce future loads by an additional 26.4 lb/yr (total of 33.8 lb/yr) in order to maintain the water quality goal in the year 2030.

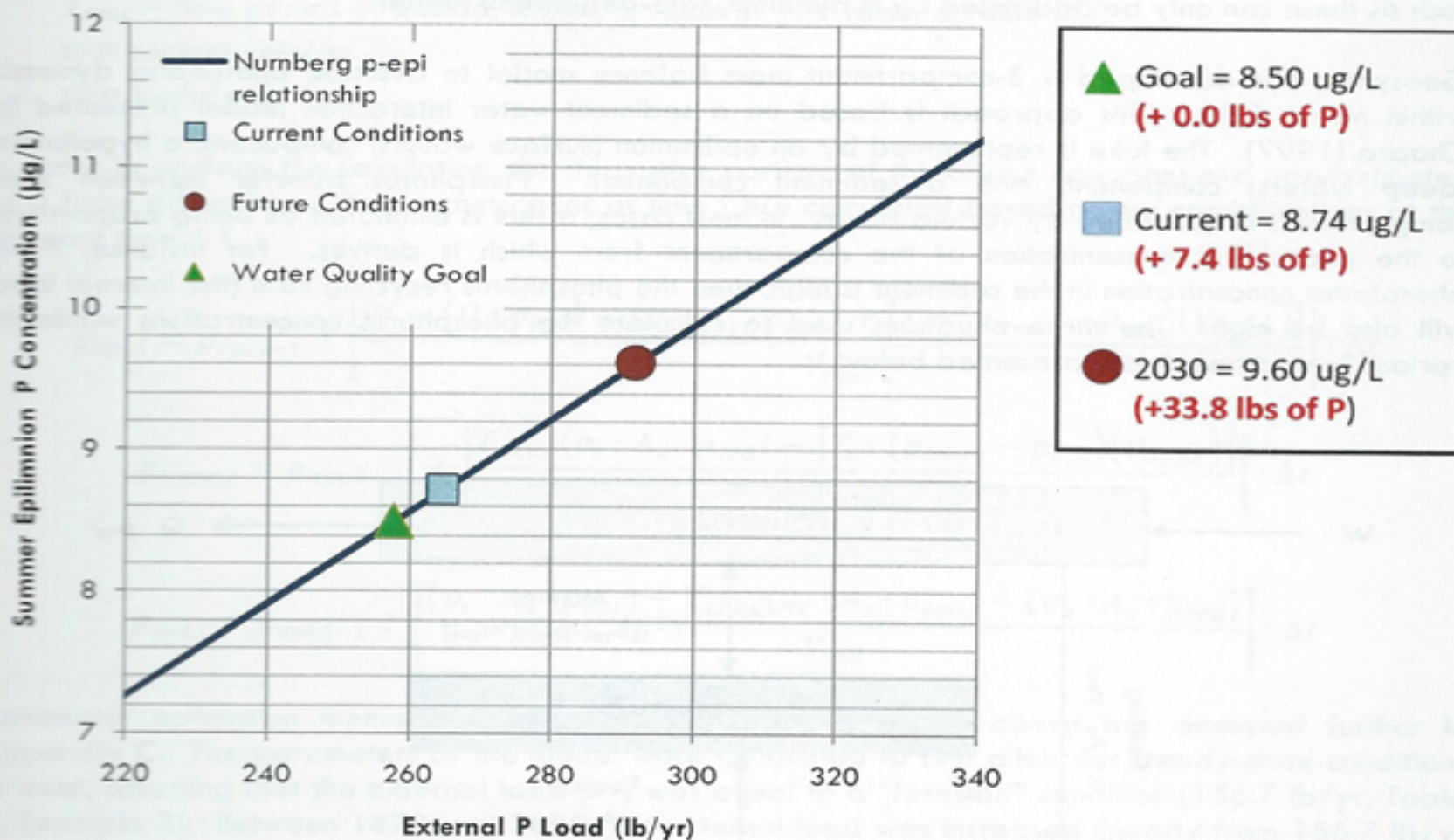
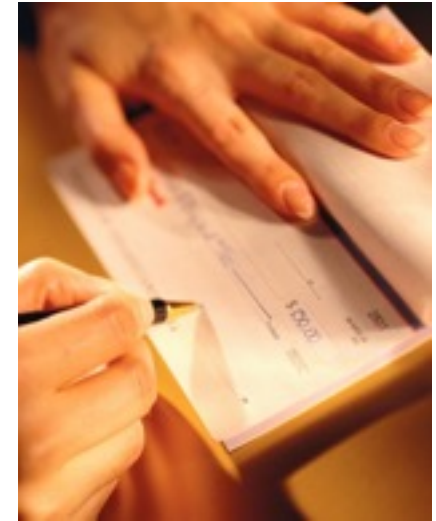


Figure 16. Current and Future conditions compared to water quality goal.

Explore Land Conservation Opportunities

No need to hide your check books!



Need 3 or 4 volunteers to participate in discussion/study Group

Questions and Closure



Thank You!

Gene Kelley, President

