# Perspectives on Lake Management in the Village of Tuxedo Park

*Tuxedo Lake, Wee Wah Lake and Little Wee Wah Lake*

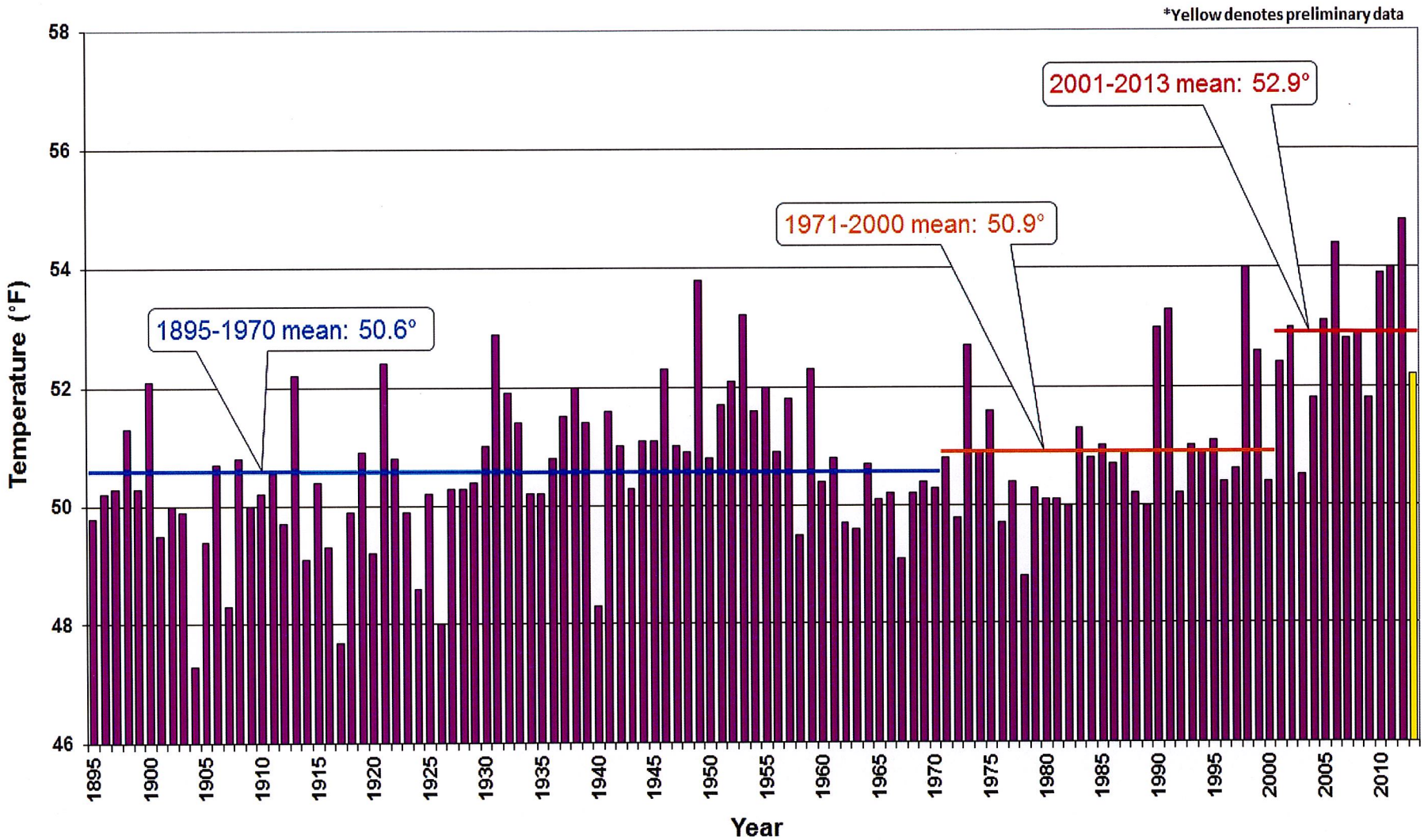
Allied Biological

February 6, 2014

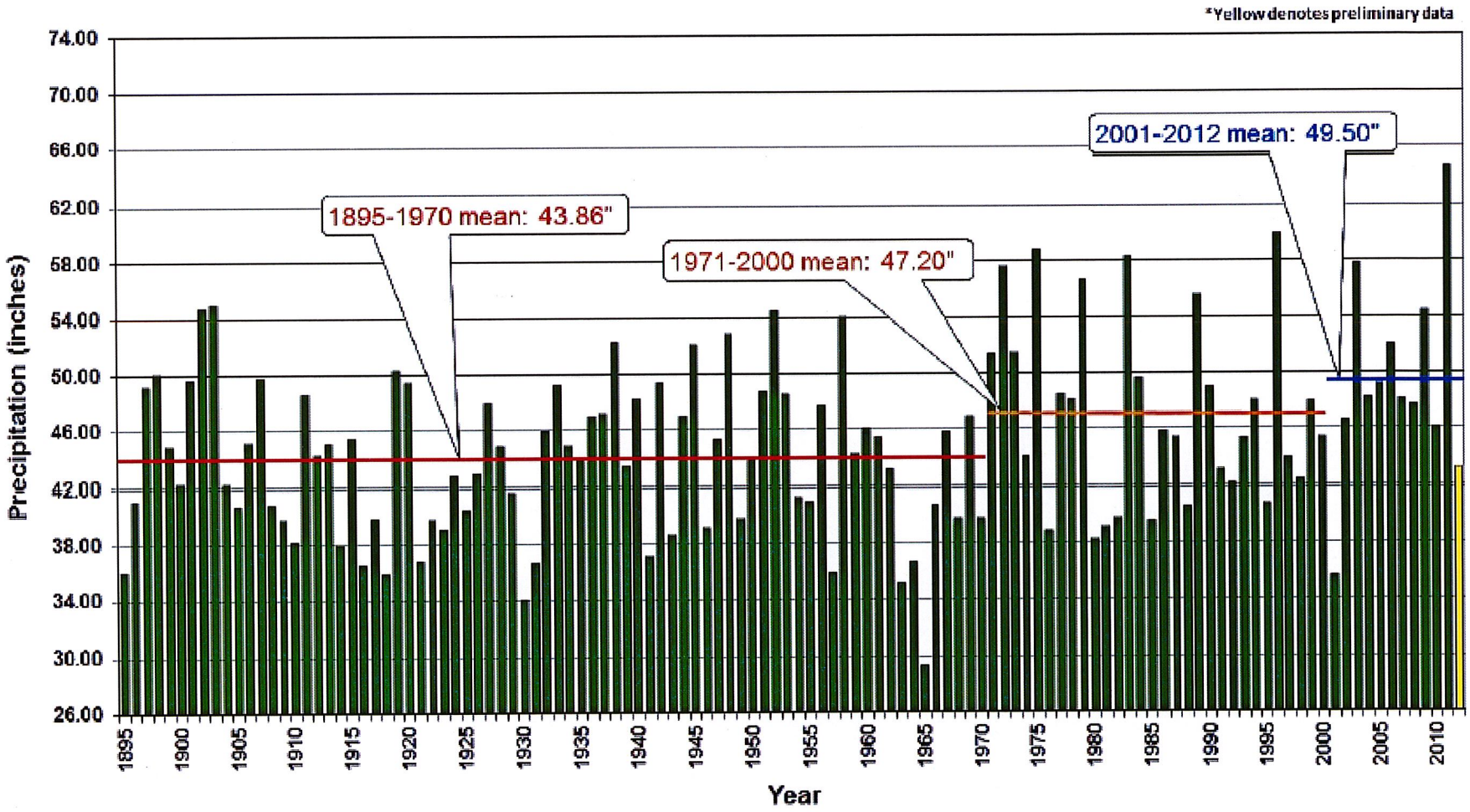
# A Recent History

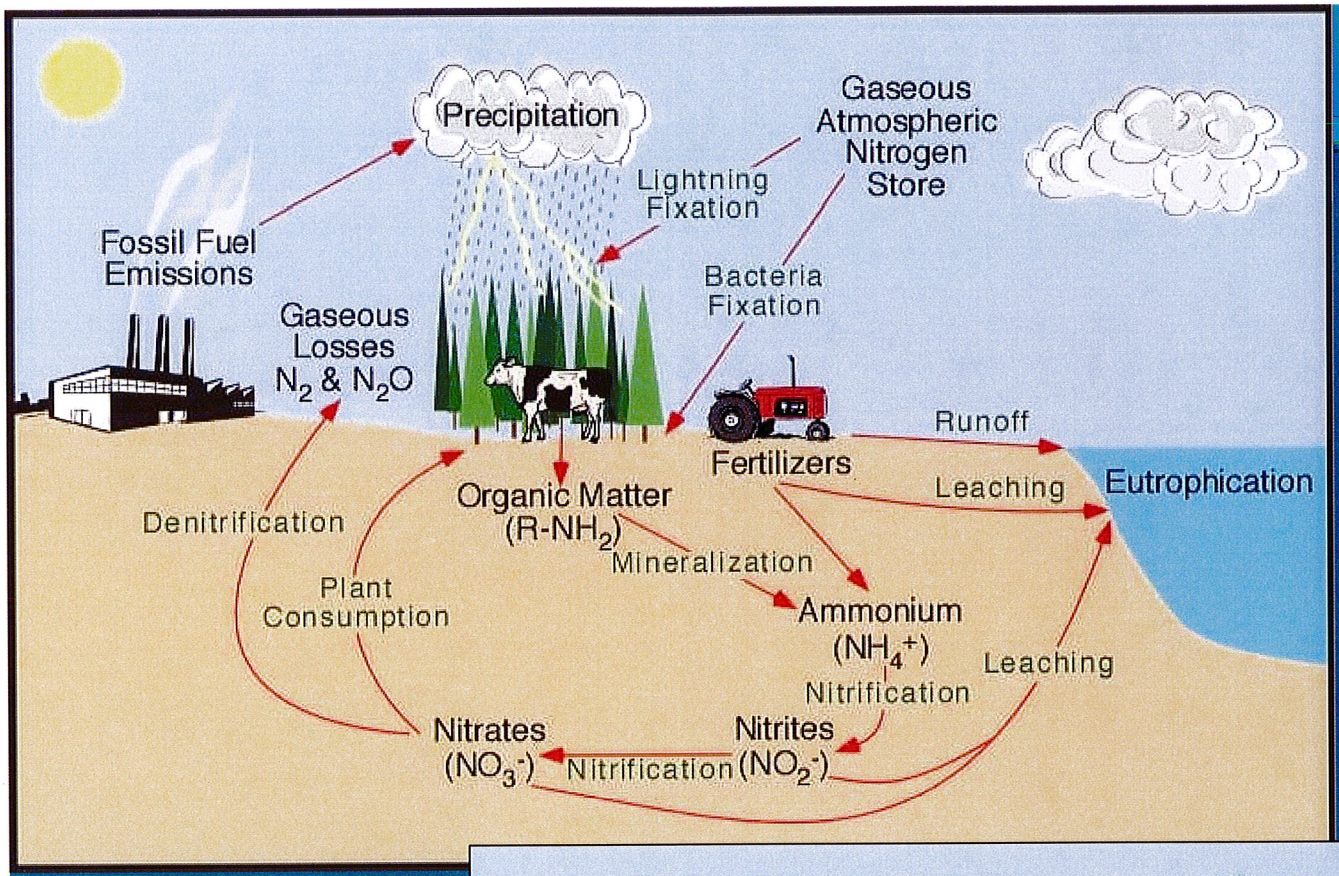
- 1997 Fishery Study (ABI)
- 2008/2009 Lakes Management Plan (PH)
- 2008-2012 & 2014 CSLAP (Volunteer)
  - NYSDEC Sponsored Volunteer WQ Monitoring Program
- 2011 Discovery of EWM in Tuxedo Lake (Volunteer)
- Retained a Lake Management Firm (ABI)
- 2011/2012 Aquatic Plant Mapping Surveys (ABI)
- 2012 Bathymetry/Sediment Mapping at Wee Wah Lake
- 2012-2014 Stream Biological Assessments (WAA)
- 2012-2014 EWM Hand Pulling Program (AIM)
- 2013 Water Quality Assessment (ABI)
- 2013 "Watershed Survey" and Tuxedo Lake Survey (ABI)
- 2013/2014 Historical WQ Report and Database (ABI)

# Northern NJ Mean Annual Temperature (1895-2013)



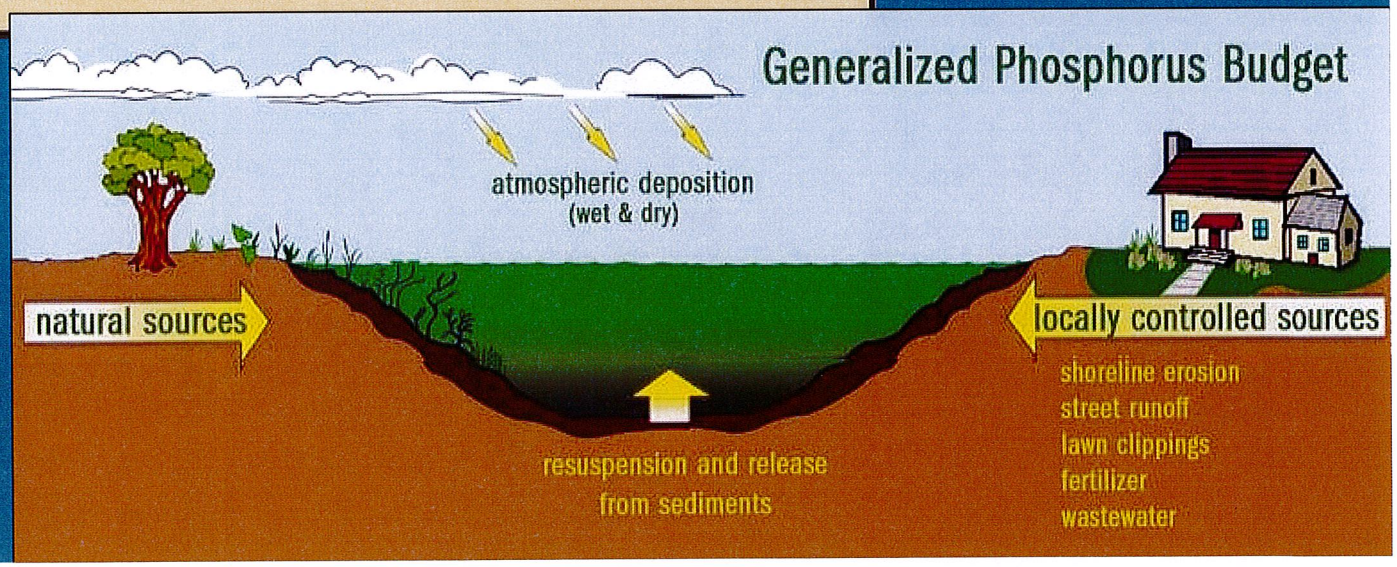
# NJ Statewide Annual Precipitation (1895-2012)






# Nitrogen Cycle

# Phosphorus Cycle



# Watershed Survey

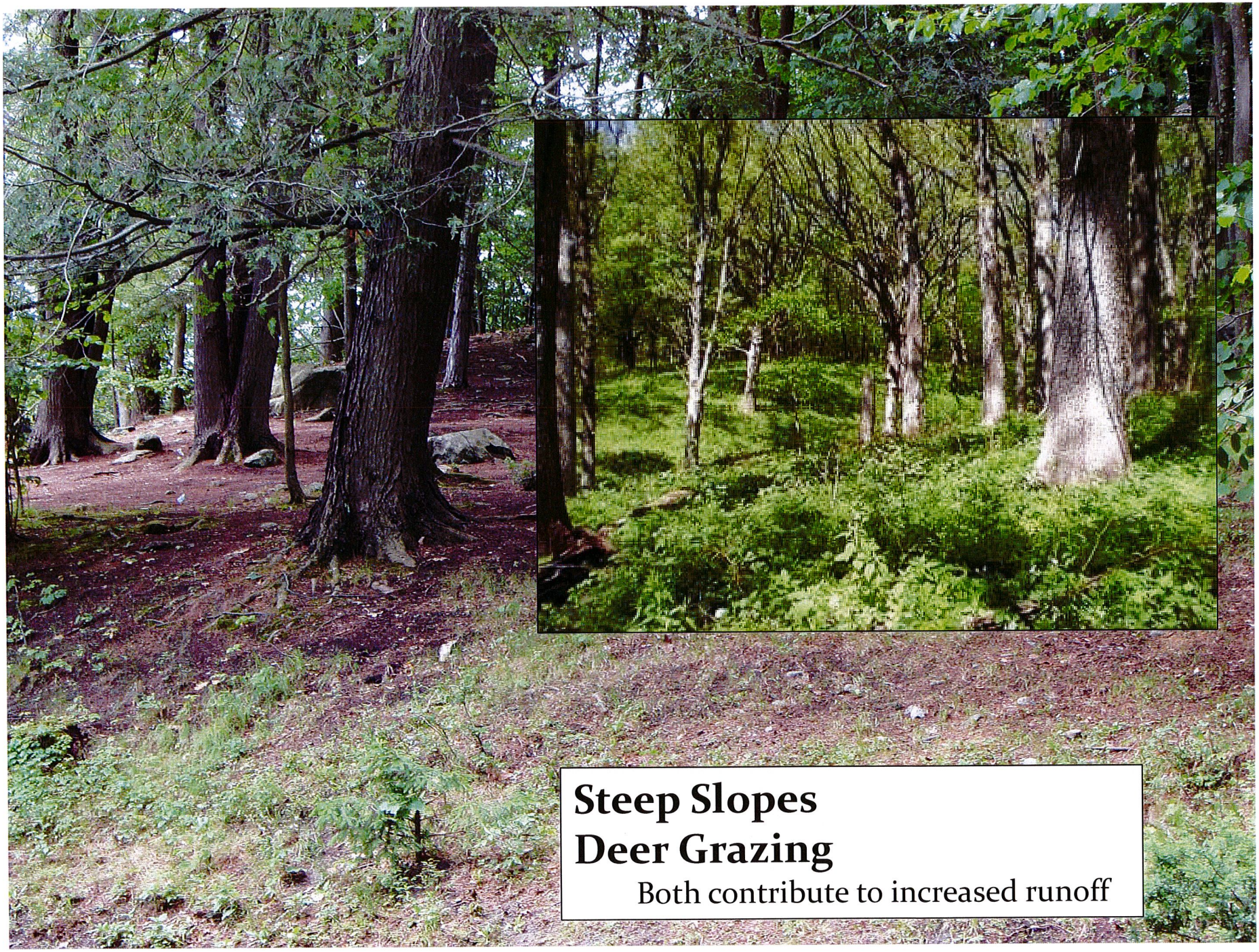
- Started with a Review of the 2008/2009 Study
- Field Survey Conducted on 6/3/13
  - Requested by the Village
- Inspected the smaller lakes on foot
- Boat survey of perimeter of Tuxedo Lake
  - S. Goodfellow, L. Neuhauser, J. Ledwith, S. Heywood
- Discussed BMP's
  - Concluded that an annual on the water survey would be beneficial to the Board members

# 2008/2009 Tuxedo Park Lakes Management Plan

- **Outstanding Reference Document**
  - WQ Data Analysis
  - Biological Baseline Study
  - Watershed Programs
- **Action Plans (2010) for All Three Lakes (handouts)**
- **Longer Term Recommendations**
  - Need to Review and Re-evaluate Priorities
  - Shift from crisis management to proactive management

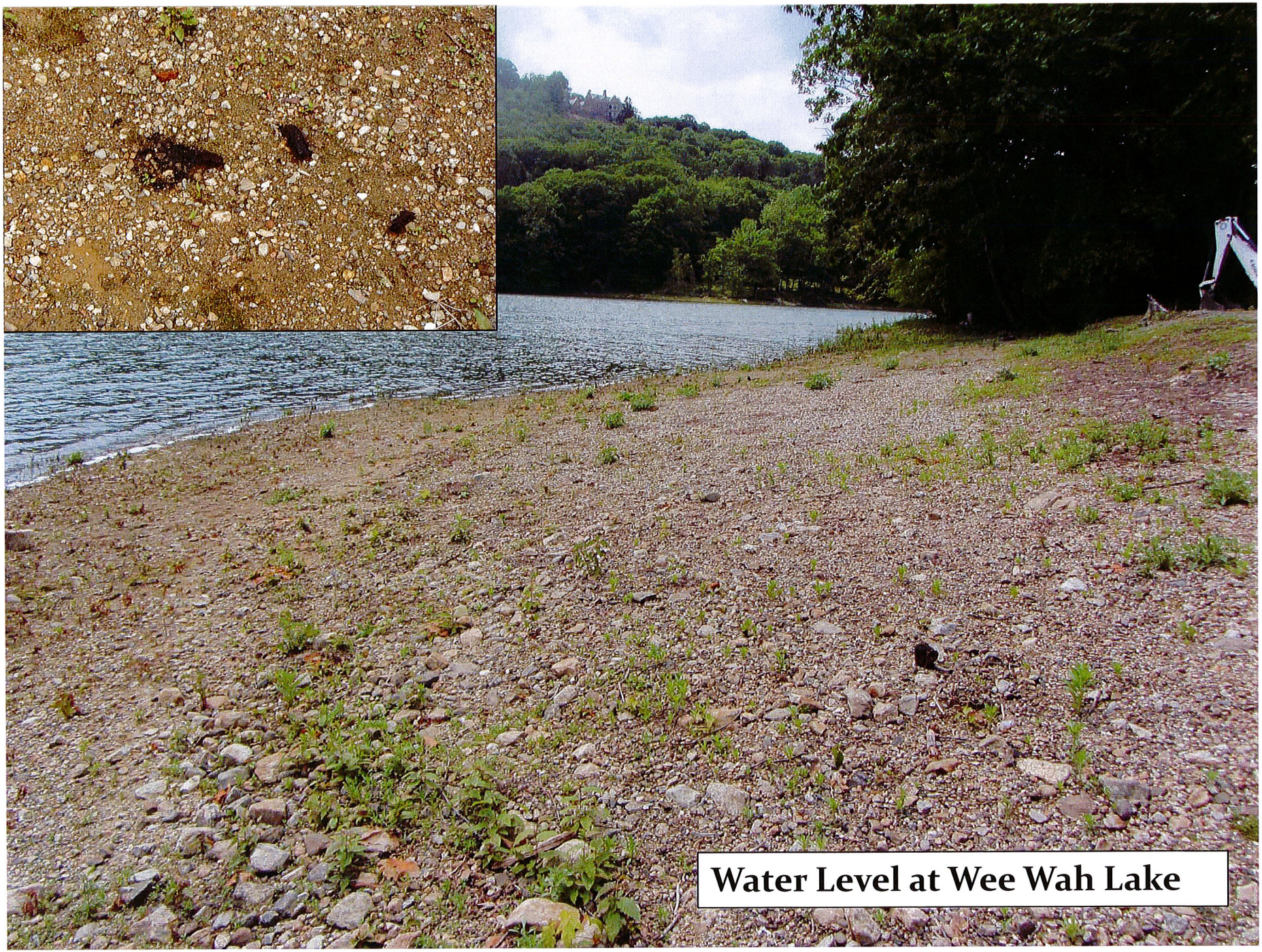
Rain Garden at Little Wee Wah Lake

Erosion at Little Wee Wah Lake


Steep Slopes
Deer Grazing
Both contribute to increased runoff

Wee Wah Lake Sink

Wee Wah Lake Exposed Sediment



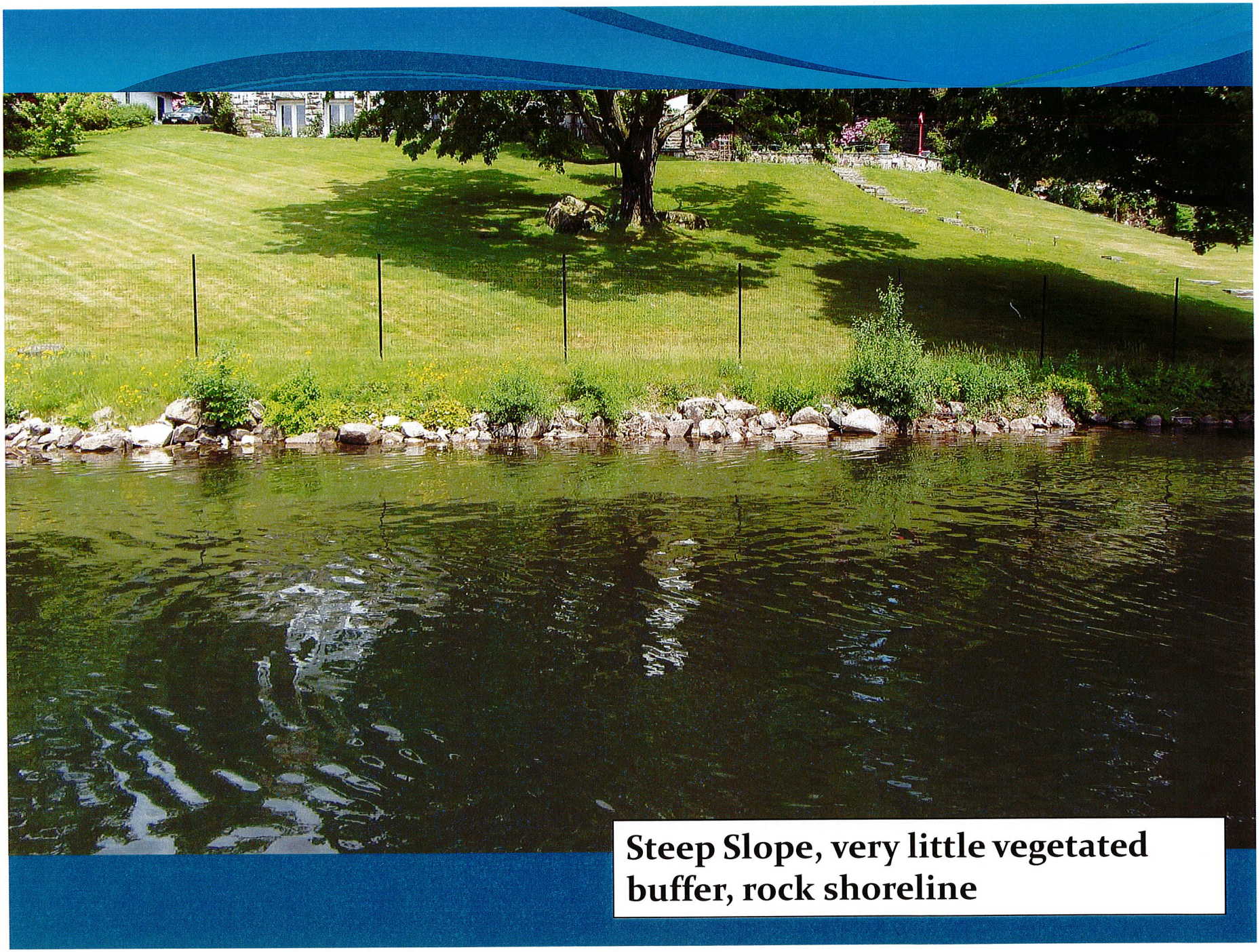
Water Level at Wee Wah Lake

**Canada Geese at Tuxedo Lake**
**65 observed on Dam**

# Canada Geese and Nutrient Loading

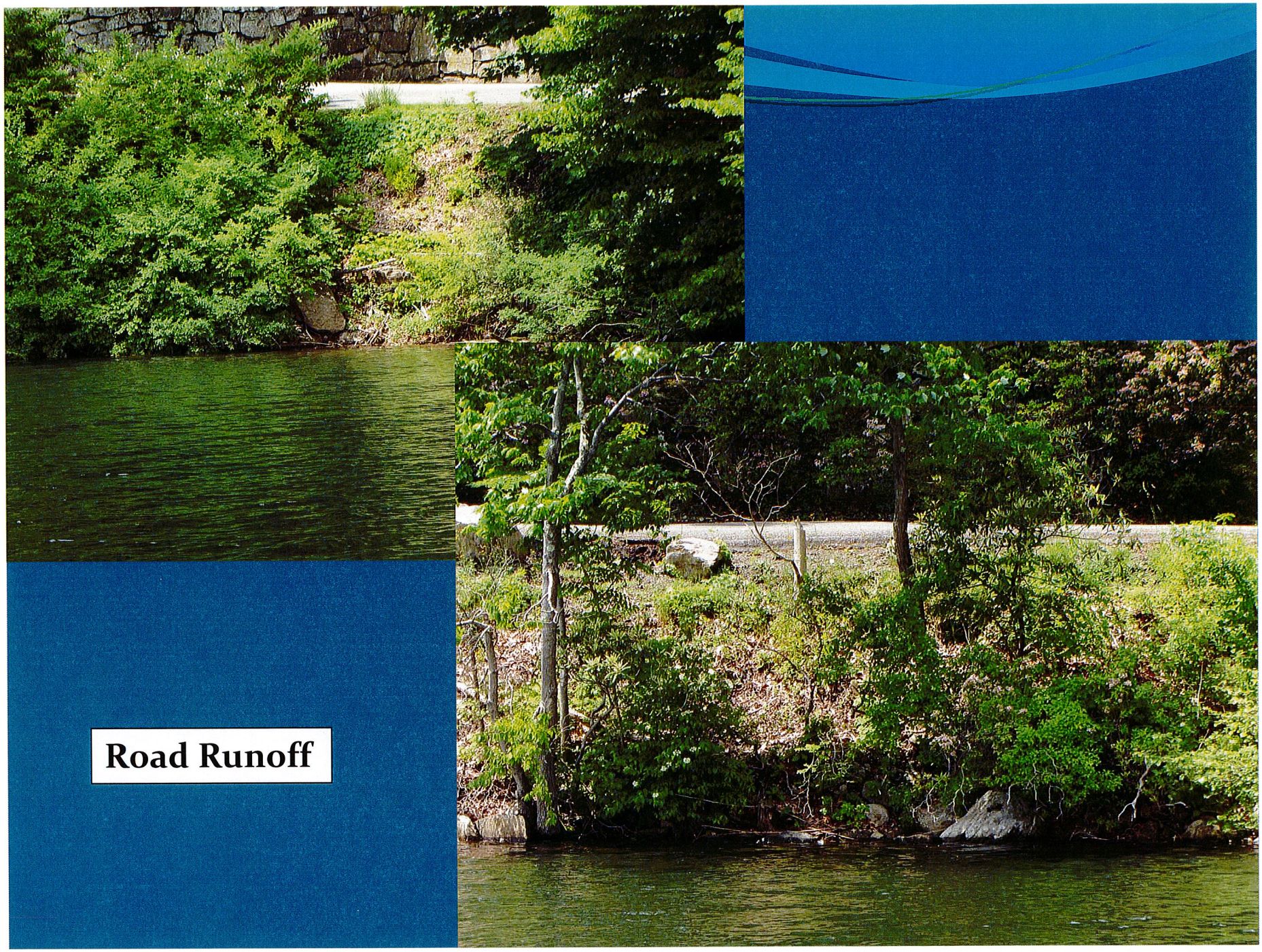
- Consume 4 lbs. of grass/day
  - Produce 3 lbs of fecal matter a day
    - 4.4% is N, and 1.3% is TPO4
  - Each goose produces 0.039 lbs of TPO4/day
  - Each goose produces 0.132 lbs of N/day
- **65 geese produce 2.535 lbs of TPO4 and 8.58 lbs. of N per day!**
- Impacts to Wee Wah and Little Wee Wah Lake
- Swimming Impacts
  - Can elevate fecal coliform bacteria counts
  - Provide a vector for swimmer's itch

Source: www.des.nh.gov



Steep Slope, very little vegetated buffer, rock shoreline

A Better Vegetated Buffer


Road Runoff