LKWA Water Quality Report

July 2018

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Teams:	Deep Site	Kevin and Sandra Kelly
	Animal Island	Carol and Rick Carlson
	West	Dave and Lisa Hutchinson

Water Quality – 2017 in Review

Very wet year

- Higher rainfall and runoff
- Some of the poorer water quality on record
- Need proper erosion control measures in place

Total rainfall	49.2” - 5” more than 39-year average
March	5^{o} below average, more accumulated snowpack
Apr/May	above average rainfall during high spring runoff period
June	above average rainfall
September	above average temperatures
October	storms twice the 39-year average, above average temperatures

Water Quality – 2017 Results

- Key indicators

		Yr/Yr	------Long term-----		
			Deep	Animal	West
• Water clarity	excellent/oligotrophic	↓	↑	–	–
• Chlorophyll a	good/mesotrophic	↑	–	↑	↑
• Phosphorus	good/mesotrophic	↑	↑	↑	↓
• Dissolved oxygen	poor/eutrophic	–	–	–	–

- Other

• Tea color	slightly colored	↑	↑	–	↑
• Alkalinity	low vulnerability				
• pH	optimal for fish growth/reproduction				

- Fluctuations over the years, stability long term

Water Quality – 2017 Recommendations

- Take action locally to minimize pollutants/runoff
  - Stormwater management - assess your property for erosion and make repairs
  - Ecologically friendly landscaping – avoid sand, know rules for tree removal, vegetative buffer, let storm water slow down and infiltrate into soil
  - Proper maintenance of septic systems
  - Limit/avoid fertilizer – test soil before fertilizing, one application per year in fall is usually sufficient, within 25’ of lake no fertilizer, 25’ to 250’ from lake use only low phosphate slow release nitrogen fertilizer
- Continue to monitor and collect data
- Add cyanobacteria sampling
- 10 Recommendations for Healthy Lakeshore and Streamside Living
- Online resources to improve runoff issues

Update: New Equipment for Accessory Testing

- Purchased conductivity meter and turbidity meter in 2017
- Established a baseline and database, looking for spikes
- Conductivity
  - Varies by lake, our lake runs around 90, around 91.5 after a storm
  - Higher with extreme weather, at end of season
  - Testing for spikes over 100
    - Readings in 200s found upstream near west end of lake – fall 2017 and late spring 2018
    - 270 found at stream outlet east of Bishop Shores area – Aug 2017
    - Around 400 found upstream at northeast side of lake – Sept 2017
    - In 140s around westernmost Red Hill properties – Aug 2017 storm
    - Spikes to 103 and 105 far west end – Sept 2017 36 hours after last precipitation
    - Spikes to 106-108 at Maple Cottages/Tamarack cove – various dates fall 2017
    - 400s and 500s from Jennifer's path through new subdivision, 200s and 300s at 20'-30' into lake – Feb 2018
- Turbidity
  - We expect values of 0.37-0.52 normally, 0.48-0.75 after a heavy storm
  - 2.0 is high for lakes, 5.0 for wetlands and streams, 10.0 requires escalation
  - Testing for values over 1.0
    - Reading of 15 at Maple Cottages/Tamarack cove – Nov 2017 storm
    - Several readings over 1.0 at west end – July 2017 and Sept 2017
    - Readings over 2.0 near sand piles – June 2018
- Note any reading at new subdivision (Maple Cottages/Tamarack) existed BEFORE developer bought the property, high numbers for both conductivity and turbidity there are related to Route 25 runoff and the culvert at Jennifer's Path. NH DES is working on a solution with NH DOT and the town of Moultonborough.
- Higher readings upstream are normal and can be from a variety of causes, in typical weather conditions the values normalize downstream before entering lake

Cyanobacteria - Facts

- Ubiquitous in NH
- Algae is the base of the food chain, but an imbalance affects water quality, lake aesthetics, can affect humans and wildlife, potential of toxins
  - Dermatoxins, hepatotoxins, neurotoxins
- Not all algae blooms are toxic, not all toxic blooms make people sick
- In the news recently
  - Lake Erie, Lake Okeechobee
  - Recent research into toxins shows probable connection to ALS
- Major drivers – hotter weather, excess nutrients
- Grow in deeper areas low in oxygen as phosphorus is released from sediment
- Kanasatka waters were tested last year – well below any level for concern

What does an algae bloom look like?

Cyanobacteria – What is LKWA Doing?

- Adding a cyanobacteria component to our testing program
  - 3 current teams – at existing and additional sites
  - Samples will be tested for phycocyanin
    - No toxic analysis
  - Will provide data on seasonal changes and concentrations
- Establishing a protocol for suspected algae blooms
  - Residents notify board members and water quality chair – email addresses are on LKWA website
  - We will notify NHDES and UNH LLMP
  - If NHDES and UNH unavailable same day, we will collect and deliver samples
  - We will follow up with residents and members

Water Quality – What Can We Do?

Can Control	Can Influence?	Cannot Control
Runoff carrying excess nutrients	Moultonborough boards	Rain – wet or dry year, severity
Efforts to educate members, neighbors, road associations	Other landowners in watershed	Temperatures
Improvements to your own property		Presence of cyanobacteria

Items we cannot control – anticipate these will get worse
Therefore, need to act on items we can control – the current status of our land is not good enough

"Are there any lake-friendly landscaping opportunities on your property?"

Does your landscaper know the rules?
https://extension.unh.edu/resources/files/Resource005519_Rep7701.pdf