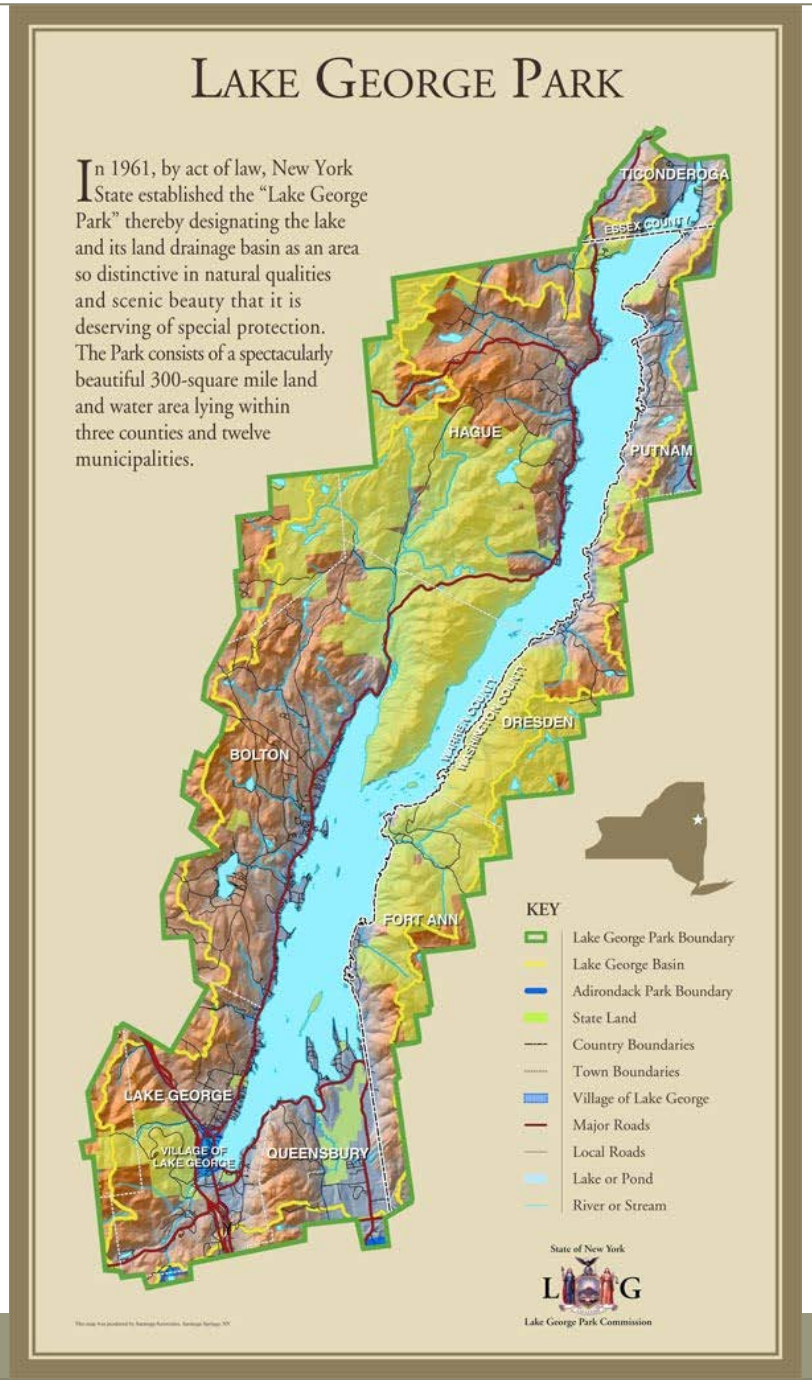
Stormwater Regulations in the Lake George Basin

EXISTING WATER QUALITY, REGULATORY CONTROLS, & MODIFICATIONS BEING CONSIDERED FOR 2019

What is the Lake George Park Commission?

The Lake George Park Commission is a NYS agency established to oversee and manage the unique resources of the "Lake George Park" especially the lake's superior water quality.

To do so, the Commission is conveyed special authority and responsibility by New York State. The Commission's programs fill critical gaps to ensure the lake's protection and encourage cooperation among the many public and private entities whose common goal is the lake's preservation.

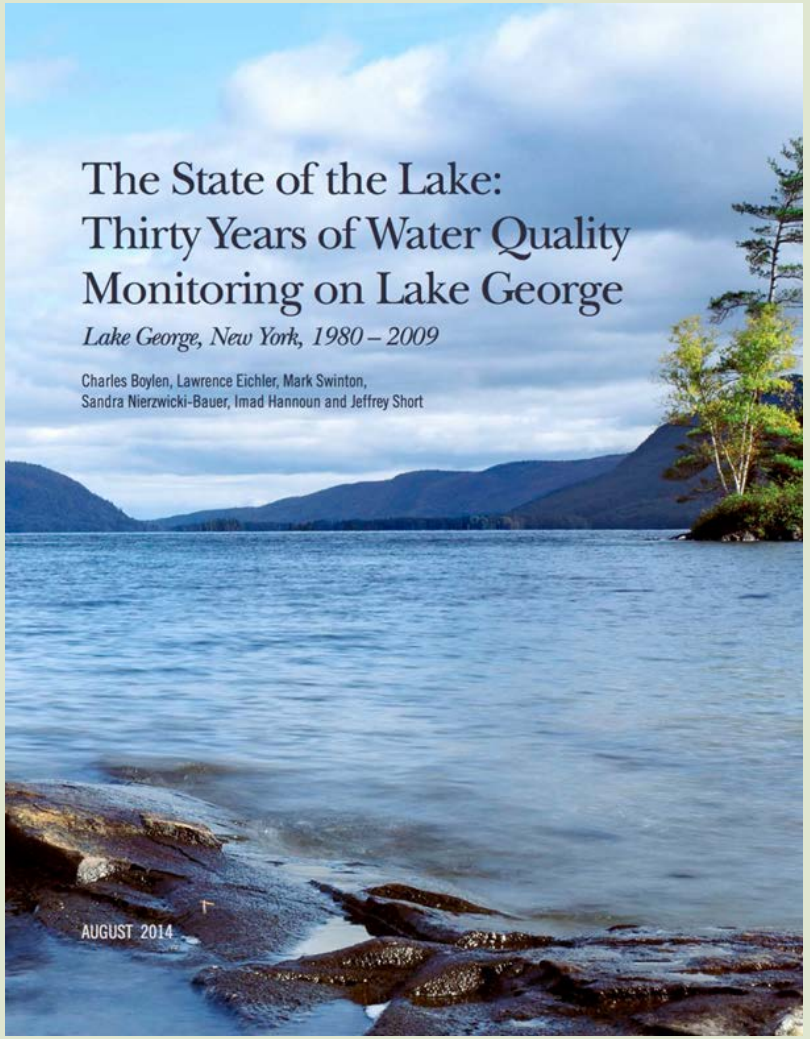


Stormwater Runoff and Water Quality

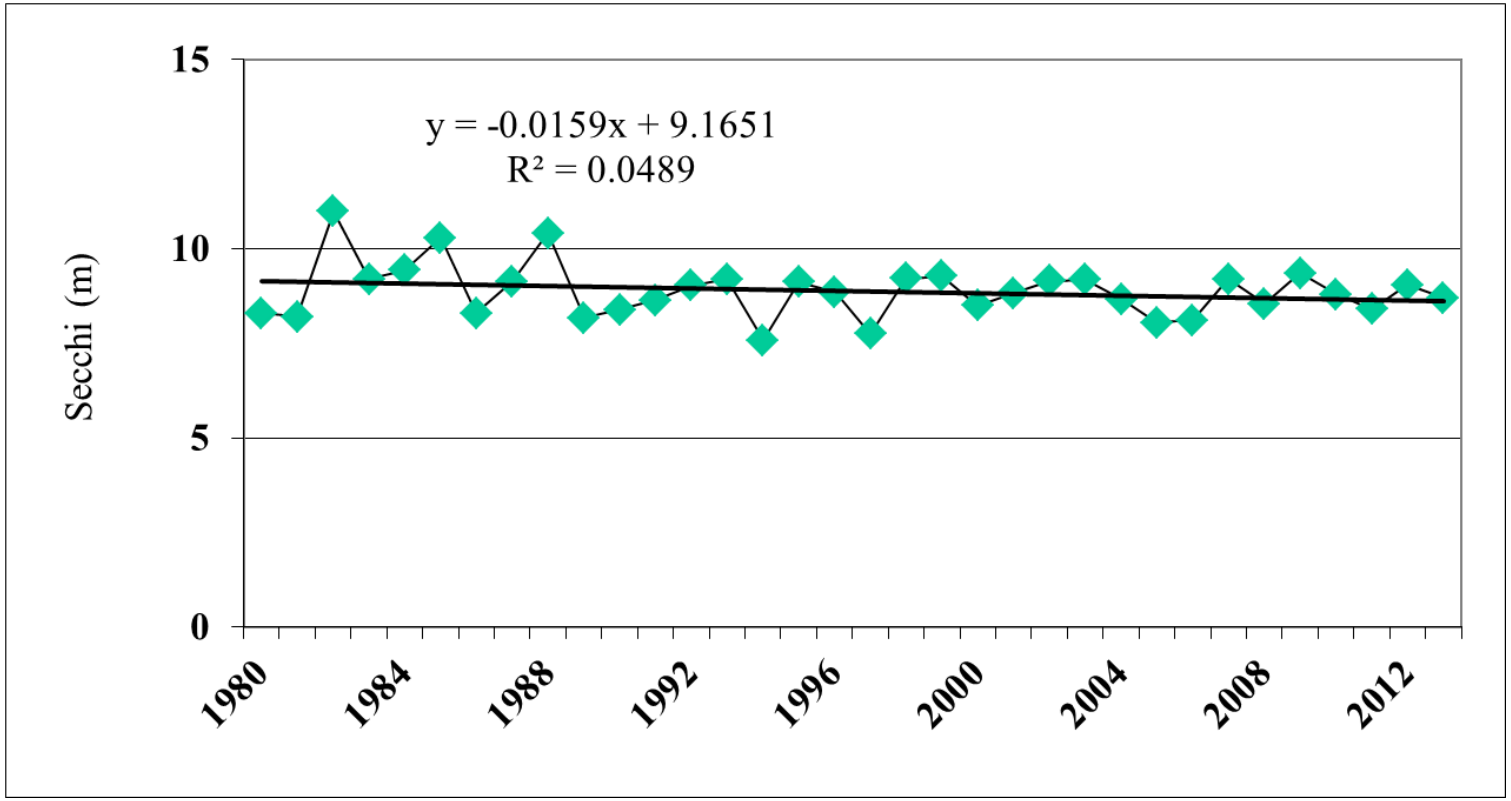
- “Nation’s largest source of water quality problems”, EPA
- Pollutants in stormwater runoff are the single largest impact to Lake George water quality and clarity
- Primary pollutants: phosphorus, nitrogen, sediment, chlorides

Science, Not Opinion

- Studies documenting this fact are many, including
  - National Urban Runoff Program – Lake George Report (1983)
  - The Plan for the Future of the Lake George Park (1987)
  - Stearns and Wheeler Phosphorus Budget Report (2001)
  - State of the Lake Report – 30 Years of LG Monitoring (2014)
  - Many more…



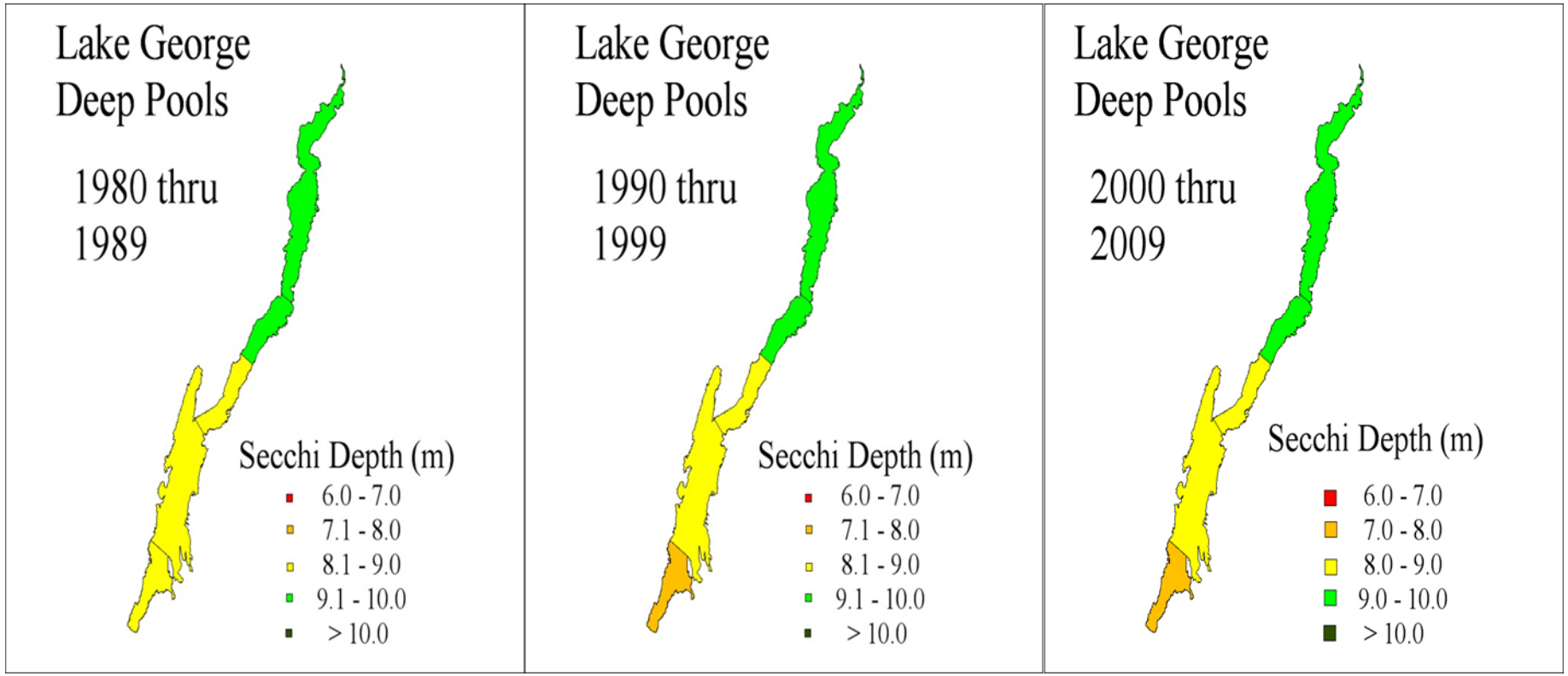
Reductions in water clarity



- Lakewide, transparency has shown a decline of 6% over 30 years

Source: “The State of the Lake Water Quality: Highlights of Over 30 Years of Research 1980-2013”, presentation by Lawrence Eichler, Darrin Freshwater Institute

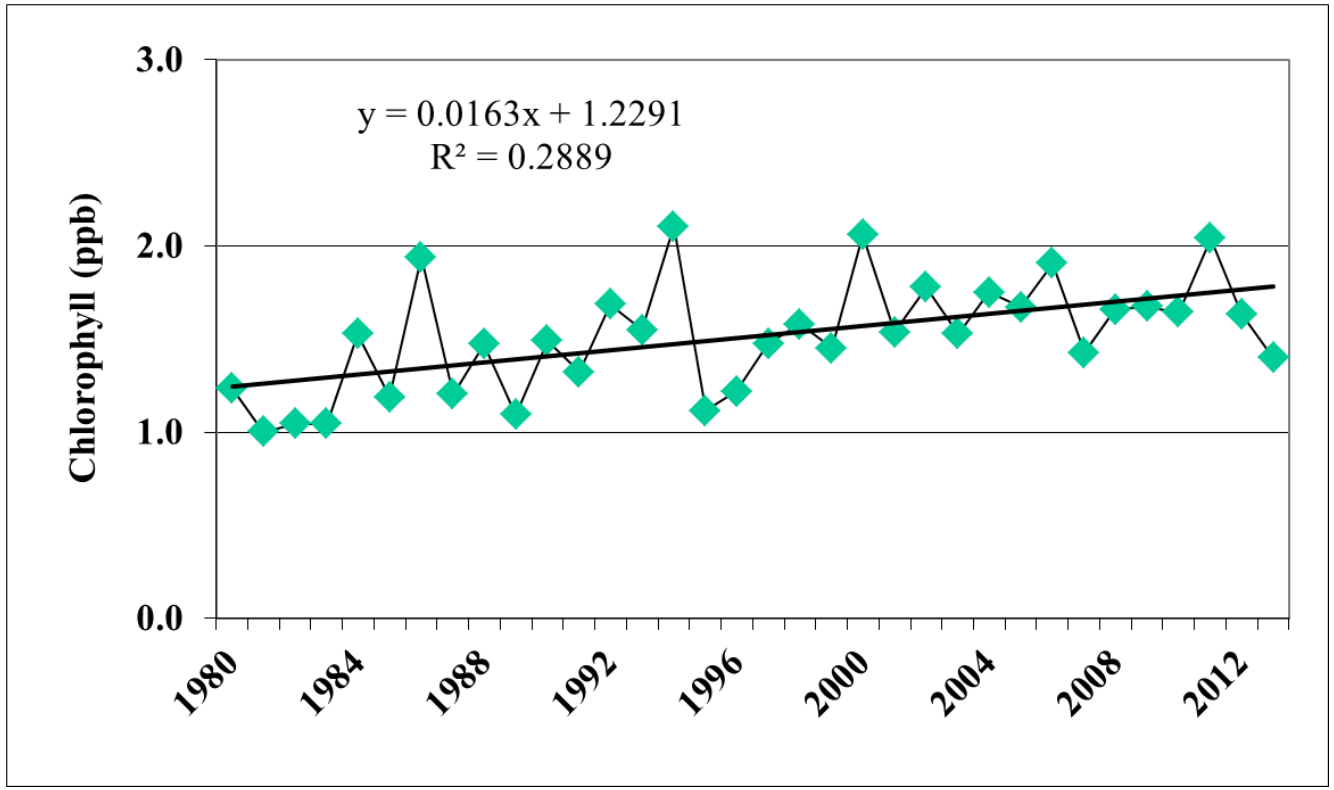
Reductions in water clarity



- Secchi disk data show a decline in transparency over time
- Rate of decline is similar in all basins
- A clear south to north gradient in transparency is present
- Difference of 1.6 m from south to north
- Increased algal production may account for the difference

Source: “The State of the Lake Water Quality: Highlights of Over 30 Years of Research 1980-2013”, presentation by Lawrence Eichler, Darrin Freshwater Institute

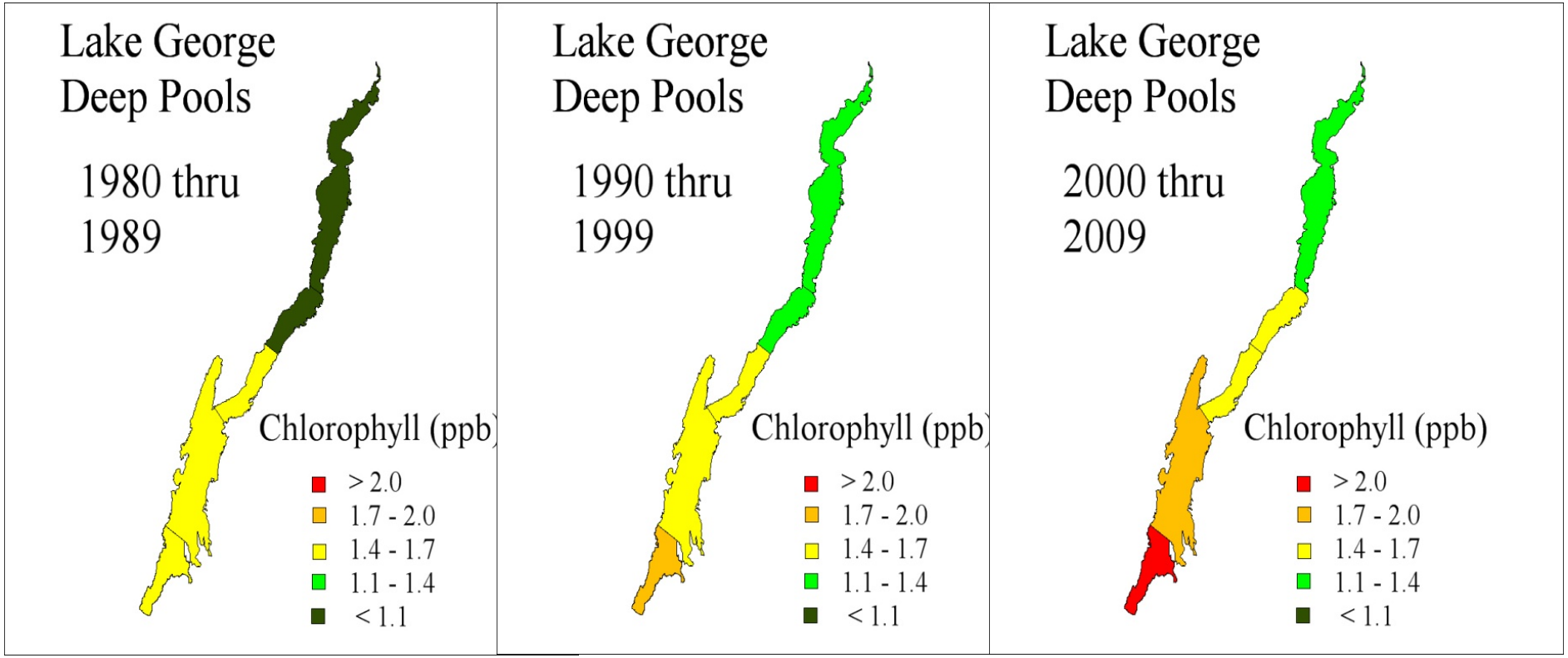
Increased Chlorophyll Levels Observed



- Chlorophyll increased lake-wide by 33% over 30 years
- Indicative of increased primary productivity

Source: “The State of the Lake Water Quality: Highlights of Over 30 Years of Research 1980-2013”, presentation by Lawrence Eichler, Darrin Freshwater Institute

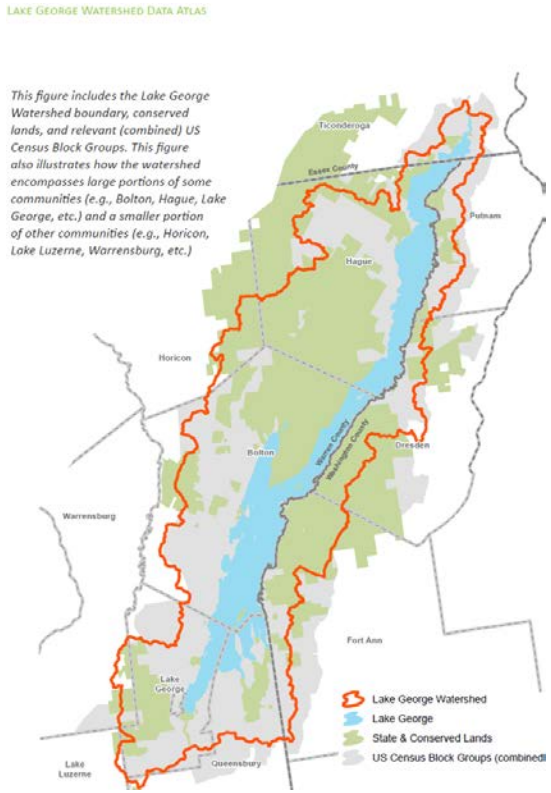
Increased Chlorophyll Levels Observed



- Chlorophyll levels show a strong south to north gradient
- The differences between basins are increasing over time

Source: “The State of the Lake Water Quality: Highlights of Over 30 Years of Research 1980-2013”, presentation by Lawrence Eichler, Darrin Freshwater Institute

Trends in Water Quality Correlate with Development



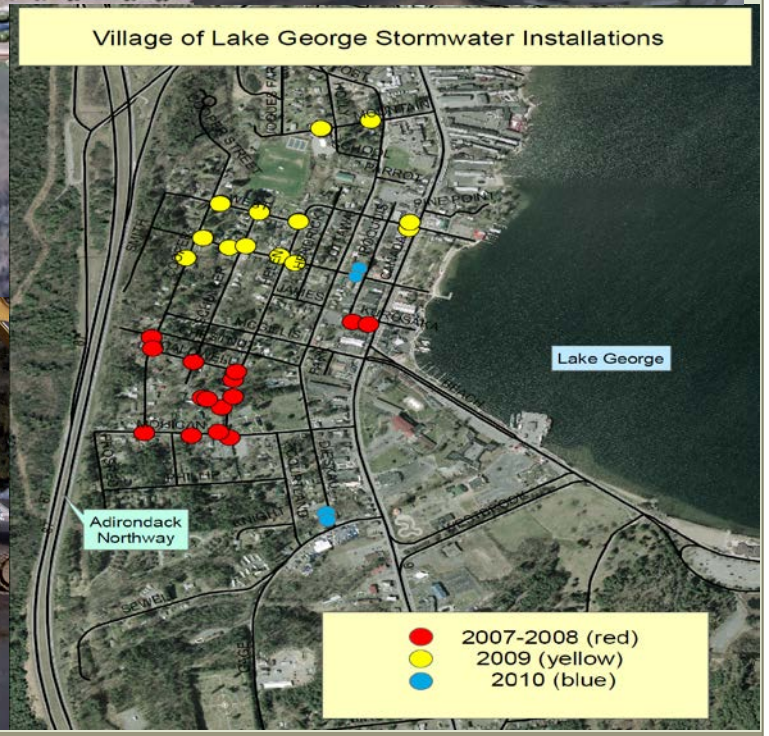
Municipality	Watershed Acres	Impervious Category	Watershed Acres	(%) Town Watershed	(%) Total
Bolton	32,835	Built or Hardscape	1,190.8	3.6%	7.5%
		Maintained Landscape	206.0	0.6%	
		Dev. Open Space & Cleared	1,076.5	3.3%	
Dresden	9,273	Built or Hardscape	132.0	1.4%	3.3%
		Maintained Landscape	19.8	0.2%	
		Dev. Open Space & Cleared	152.7	1.6%	
Fort Ann	11,521	Built or Hardscape	132.8	1.2%	3.0%
		Maintained Landscape	3.4	0.0%	
		Dev. Open Space & Cleared	210.0	1.8%	
Hague	29,728	Built or Hardscape	652.7	2.2%	4.5%
		Maintained Landscape	52.1	0.2%	
		Dev. Open Space & Cleared	623.7	2.1%	
Horicon	3,633	Built or Hardscape	12.6	0.3%	0.4%
		Dev. Open Space & Cleared	0.9	0.0%	
Lake George (T)	14,270	Built or Hardscape	1,139.2	8.0%	16.9%
		Maintained Landscape	259.9	1.8%	
		Dev. Open Space & Cleared	1,017.2	7.1%	
Lake George (V)	383	Built or Hardscape	222.4	58.1%	95.1%
		Maintained Landscape	61.2	16.0%	
		Dev. Open Space & Cleared	80.6	21.0%	
Lake Luzerne	223	Built or Hardscape	5.3	2.4%	4.5%
		Dev. Open Space & Cleared	4.8	2.2%	
Putnam	5,528	Built or Hardscape	131.5	2.4%	5.2%
		Maintained Landscape	19.7	0.4%	
		Dev. Open Space & Cleared	135.6	2.5%	
Queensbury	8,623	Built or Hardscape	528.7	6.1%	18.6%
		Maintained Landscape	219.1	2.5%	
		Dev. Open Space & Cleared	860.2	10.0%	
Ticonderoga	2,979	Built or Hardscape	197.9	6.6%	27.1%
		Maintained Landscape	87.5	2.9%	
		Dev. Open Space & Cleared	522.3	17.5%	
Warrensburg	1,864	Built or Hardscape	7.8	0.4%	0.4%
Total Watershed	120,860	Built or Hardscape	4,353.8	3.6%	8.2%
		Maintained Landscape	928.6	0.8%	
		Dev. Open Space & Cleared	4,684.6	3.9%	

- Similar to water quality, land development has a strong south to north gradient
- Areas with more development are associated with decreased water quality
- In the south basin, 19% of the watershed contains 43% of the hardscape/impervious

Source: “Lake George Watershed Atlas”, 2016, Lake George Association

We can do Better & We have been doing Better

- History of Public works projects
- NYS DOS and NYS DEC grants
  - >$10 million to Lake George projects in the past decade.
  - More than any other lake in NYS
  - Significant funds directed to address runoff from highways, local roads, pubic properties
- Great partnerships
  - State, County, Town, SWCD, LCLGRPB, Fund, LGA



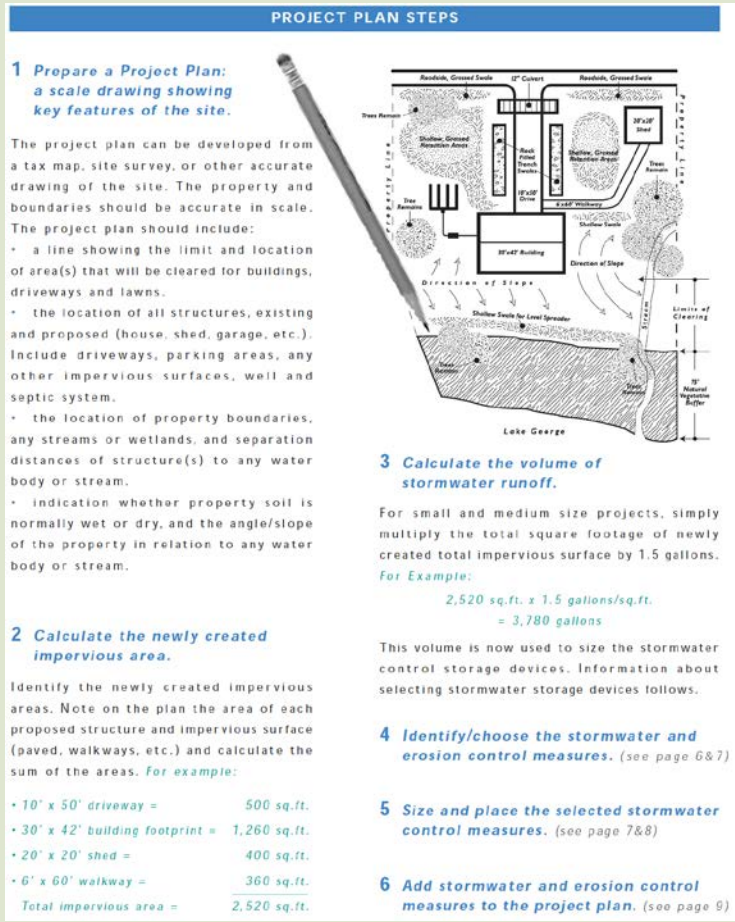
We can do Better & We have been doing Better

- Great local, professional resources
  - Educate the community
  - Incentivize water quality improvement projects & design
  - Facilitate projects

- Examples
  - Fund's Do It Yourself Water Quality
  - LGA's Lake Saving Projects
  - WCSWCD's Watershed & Retrofit Assessments

Systematic Approach: Commission Stormwater Regulations

- Effective September 1990
- Key Elements
  - Low Threshold of Jurisdiction
    - 1,000 sqft of new impervious area, or
    - 5,000 sqft of land disturbance
  - Post Construction SWCM's Limiting Offsite Impacts through onsite Volume Control



PROJECT PLAN STEPS

1 Prepare a Project Plan: a scale drawing showing key features of the site.

The project plan can be developed from a tax map, site survey, or other accurate drawing of the site. The property and boundaries should be accurate in scale. The project plan should include:

- a line showing the limit and location of area(s) that will be cleared for buildings, driveways and lawns.
- the location of all structures, existing and proposed (house, shed, garage, etc.). Include driveways, parking areas, any other impervious surfaces, well and septic system.
- the location of property boundaries, any streams or wetlands, and separation distances of structure(s) to any water body or stream.
- indication whether property soil is normally wet or dry, and the angle/slope of the property in relation to any water body or stream.

2 Calculate the newly created impervious area.

Identify the newly created impervious areas. Note on the plan the area of each proposed structure and impervious surface (paved, walkways, etc.) and calculate the sum of the areas. *For example:*

• 10' x 50' driveway =	500 sq.ft.
• 30' x 42' building footprint =	1,260 sq.ft.
• 20' x 20' shed =	400 sq.ft.
• 6' x 60' walkway =	360 sq.ft.
Total impervious area =	2,520 sq.ft.

3 Calculate the volume of stormwater runoff.

For small and medium size projects, simply multiply the total square footage of newly created total impervious surface by 1.5 gallons.

For Example:

2,520 sq.ft. x 1.5 gallons/sq.ft. = 3,780 gallons

This volume is now used to size the stormwater control storage devices. Information about selecting stormwater storage devices follows.

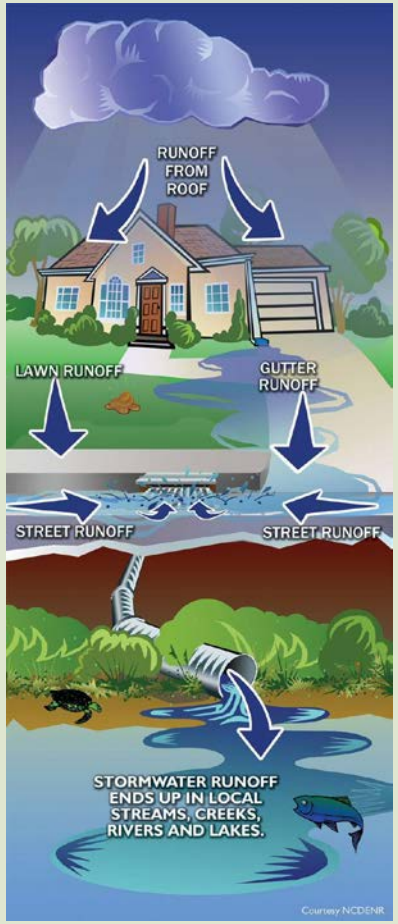
4 Identify/choose the stormwater and erosion control measures. *(see page 6&7)*

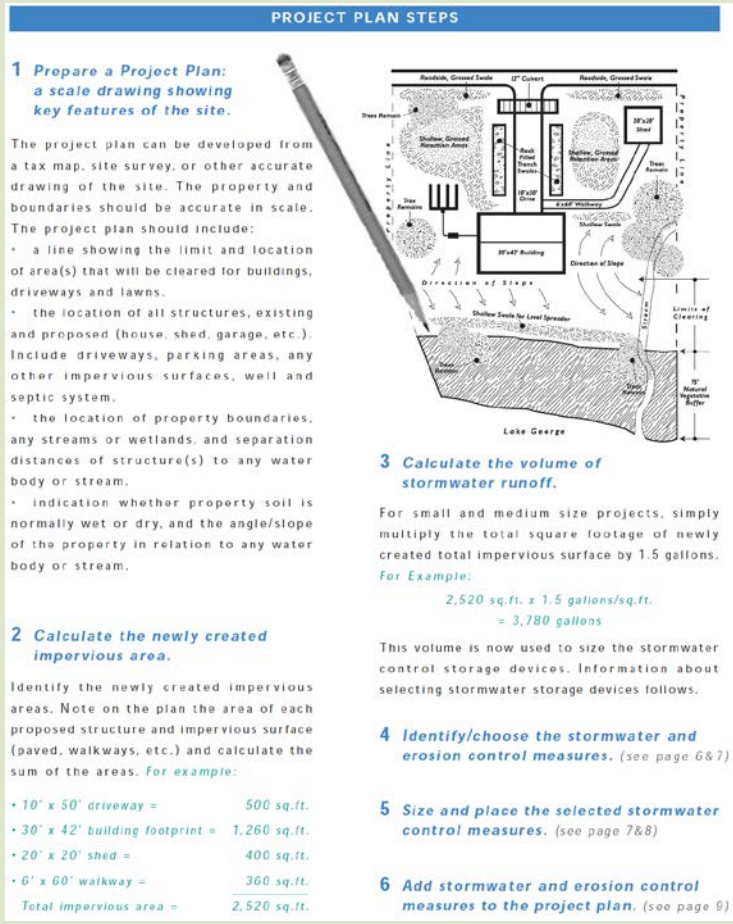
5 Size and place the selected stormwater control measures. *(see page 7&8)*

6 Add stormwater and erosion control measures to the project plan. *(see page 9)*

Commission Stormwater Regulations

- Minor Projects
  - <15,000 sqft land disturbance
  - Infiltration Device Performance:
    - 1.5 gallons / sqft Impervious Area
- Major Projects
  - >15,000 sqft land disturbance
  - Akin to Full SWPPP
  - Infiltration Device Performance
    - 10-yr/24-hr Storm Volume
    - 25-yr/24-hr Storm Rate
  - Retrofit existing development





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Bending The Curve on the Lake's WQ Trends

- For the first time in 20+ years, the Commission is conducting a full evaluation of its regulations, and seeing where they can be improved
- Current condition still leads to slow decline
- How do we change?

- Timber Harvesting
- Fertilizers
- SW Device Setbacks
- SW Retrofits
- Stream Corridors

Proposed Changes to the Regulations:

Five Key Provisions

1. Timber Harvesting

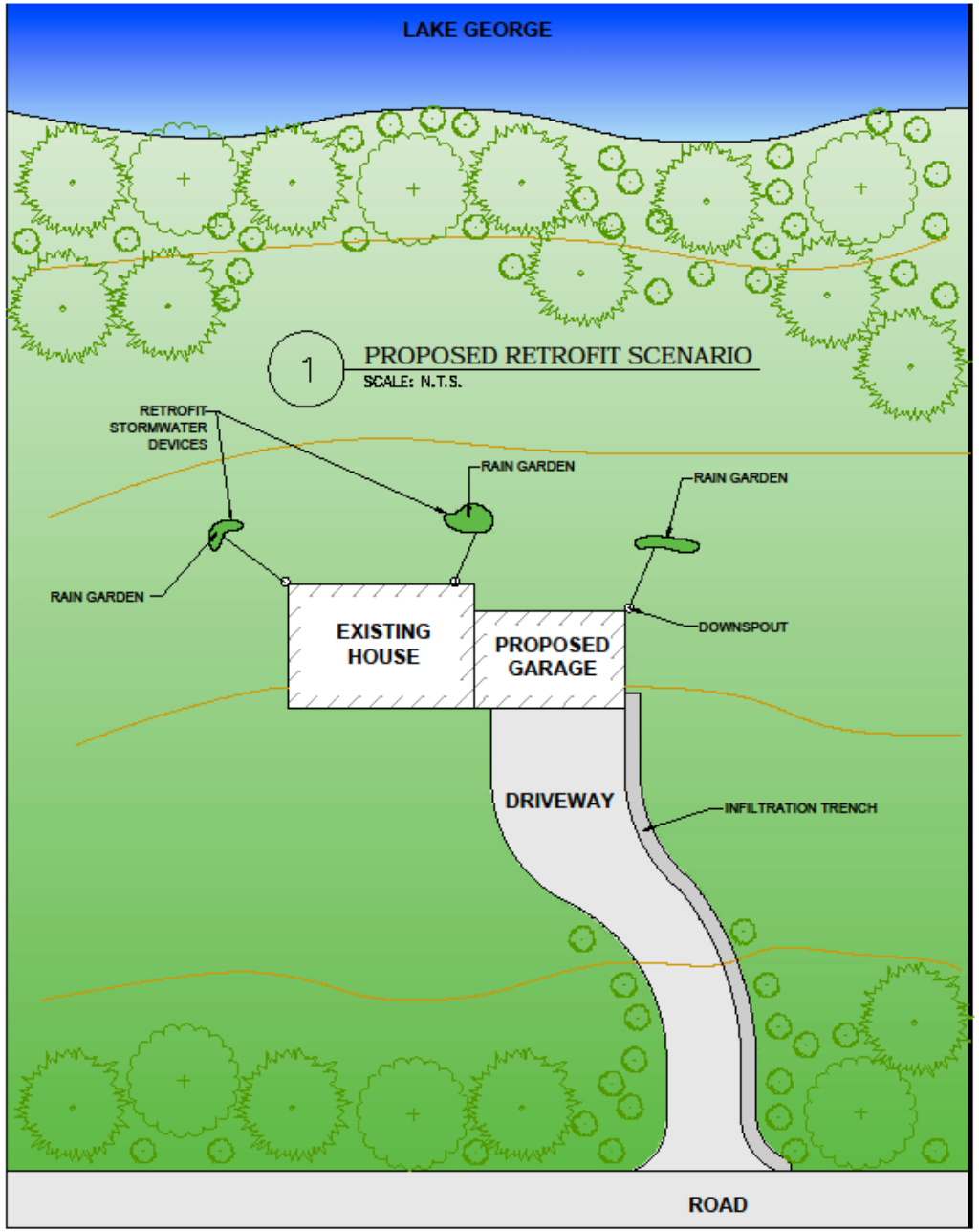
- Regs <u>already</u> require conservation plans, but approved by outside parties.
- New regulation will require LGPC or delegated municipality to approve logging plans before activity occurs
- Logging regulations not well understood or followed: Enforcement more common than compliance
- Maintain existing standards, achieve improved results: Less violations, better practices on the land

2. Fertilizer Restrictions

- Reduce nutrient inputs
- No lawn fertilizer applications within 50 feet of a waterbody
- Apply Queensbury and Lake George fertilizer code to the entire watershed

3. Reduced Setbacks for Stormwater Practices

- Working to support all changes based on best science available
- Reduce setbacks for major projects from 100’ to 35’ from shoreline, stream or wetland
- Provides for much greater design flexibility for owners and engineers while not impacting water quality



4. Retrofitting: Making it Better

- Apply existing retrofit standard to all jurisdictional projects
  - Currently only applies to Major Projects, extend to Minor Projects
  - Infiltrate existing stormwater from a site
  - Devices sized for minimum volume control of 0.5” from all impervious areas
- Simple fixes
  - Trenches
  - Swales
  - Rain gardens
- Low cost, great impact

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50% of housing within the Lake George watershed is seasonal and over 70% of seasonal housing within the 12 towns along the lake is within the watershed.

“Lake George Watershed Atlas”, 2016, Lake George Association

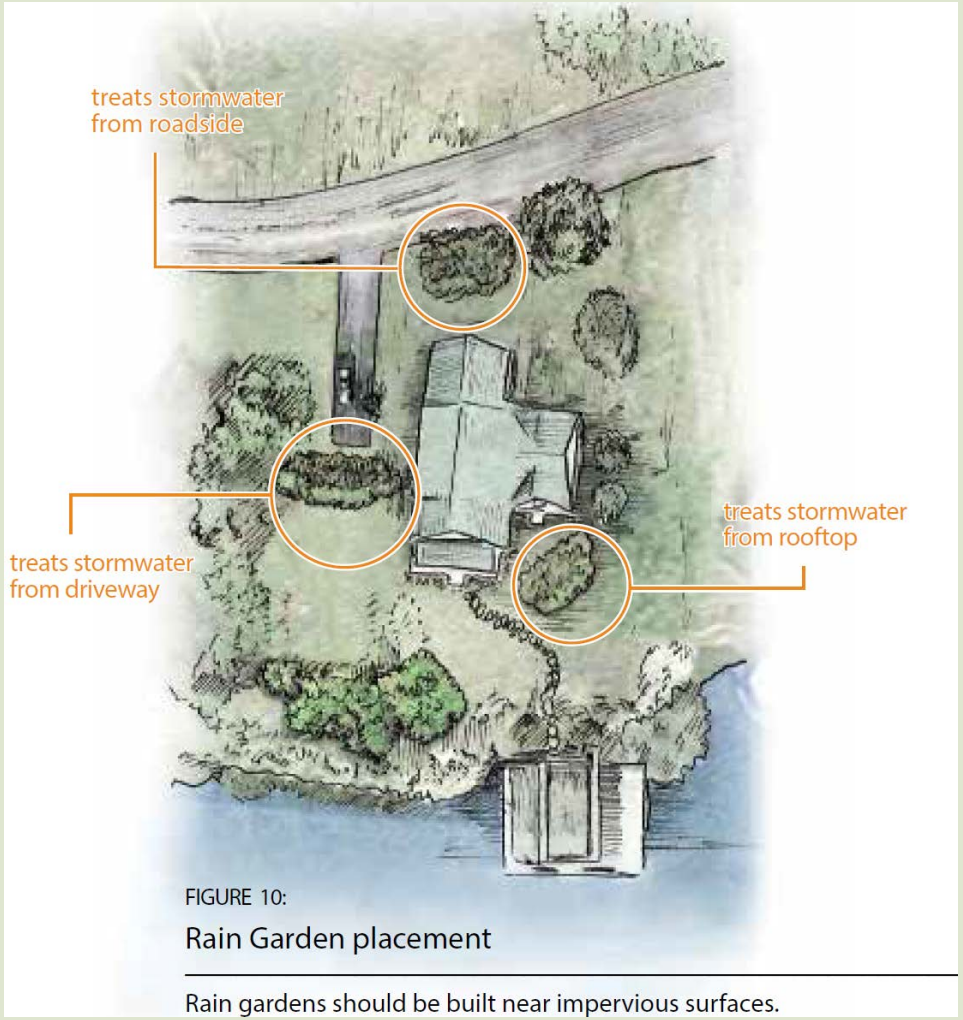

FIGURE 10:
Rain Garden placement

Rain gardens should be built near impervious surfaces.

“Do It Yourself Water Quality”, 2010 Fund for Lake George, LG Waterkeeper

5. Stream Corridors: Apply 35' Shoreline Cutting Standard

- Multiple benefits of stream buffers
  - Reduce sediment, nutrients, stream bank erosion, flood impacts, stream temps, etc.
- Balance protection & property rights
- Proposal:
  - Apply APA shoreline cutting standards to DEC streams
  - No impervious area within 35' buffer
- Established, well-understood standard
  - Queensbury & Bolton currently apply the cutting standard to streams
- Removal Efficiency:
  - TSS: 53-95%,
  - Total P: 46-79%
  - Total N: 48-74%

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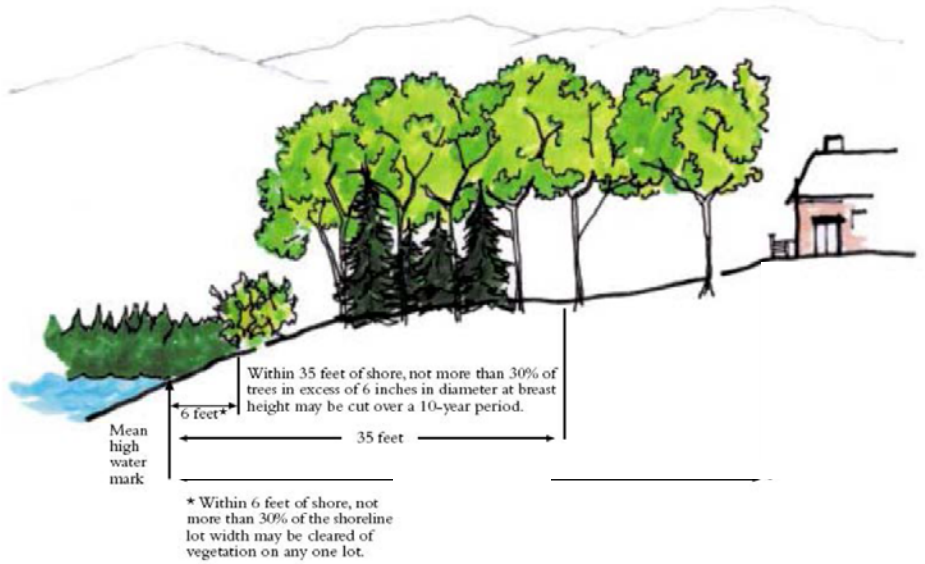
SHORELINE CUTTING RESTRICTIONS

Except to allow for the removal of diseased vegetation and rotten or damaged trees, all vegetative cutting on a parcel with shoreline on a lake, pond, or navigable river or stream must comply with the following restrictions:

(a) Within 35 feet of the mean high-water mark, no more than 30 percent of the trees in excess of six inches diameter at breast height (4½ feet above ground) may be cut over any 10-year period.

(b) Within 6 feet of the mean high-water mark, no more than 30 percent of any vegetation may be removed.



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Author	Width (m)	% Slope	% Removal of TSS
Dillaha et al (1988)	4.6	11	87
Dillaha et al (1988)	4.6	16	76
Dillaha et al (1988)	9.1	11	95
Dillaha et al (1988)	9.1	16	88
Dillaha et al (1989)	4.6	11	86
Dillaha et al (1989)	4.6	16	53
Dillaha et al (1989)	9.1	11	98
Dillaha et al (1989)	9.1	16	70
Magette et al (1989)	4.6	3.5	66
Magette et al (1989)	9.1	3.5	82

Study	Total P Removal	
	4.6 m buffer	9.1 m buffer
Dillaha et al 1988	71.5%	57.5%
Dillaha et al 1989	61%	79%
Magette et al 1987	41%	53%
Magette et al 1989	18%	46%

Table 2. Removal of Total Phosphorus by Grass Buffers.

With one exception, studies by Dillaha et al and Magette et al found a positive correlation between the width of grass riparian buffers and the ability to trap total phosphorus in surface runoff.

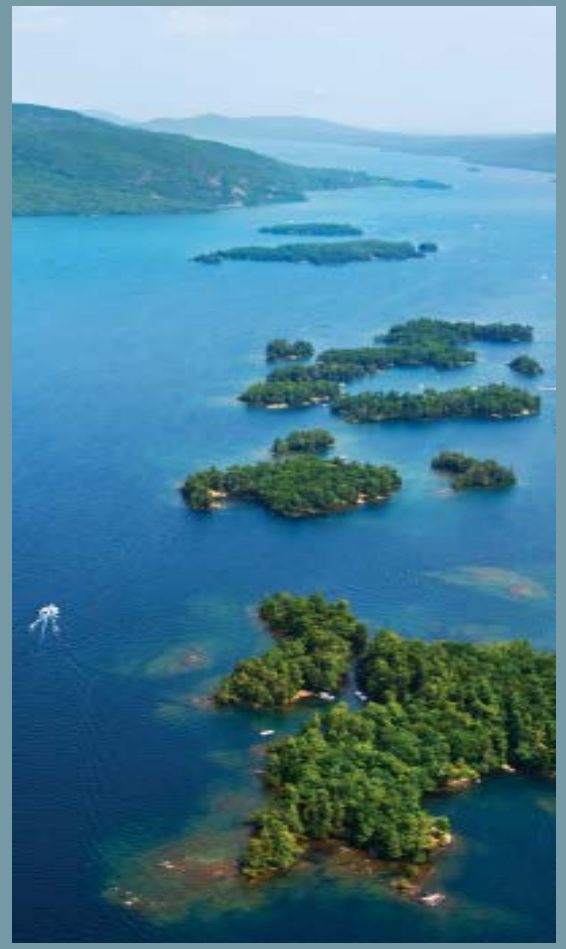
Study	Total N Removal	
	4.6 m buffer	9.1 m buffer
Dillaha et al 1988	67%	74%
Dillaha et al 1989	54%	73%
Magette et al 1987	17%	51%
Magette et al 1989	0%	48%

Table 3. Removal of Total Nitrogen by Grass Buffers.

Studies by Dillaha et al and Magette et al found a positive correlation between the width of grass riparian buffers and the ability to trap total nitrogen in surface runoff.

Source: "A Review of the Scientific Literature on Riparian Buffer Width, Extent, and Vegetation", 1999, Wenger

Bending The Curve



- Each proposed element is a simple, common sense, balanced approach
  - Timber Harvesting
  - Fertilizers
  - SW Retrofits
  - Stream Corridors
- Not overly burdensome to landowners
- In concert, these items will collectively strengthen stormwater regulation and improve water quality in the long term
- Working long-term to slow and ultimately reverse the downward water quality trend in the lake

Timeframe

- 2017 and early 2018 – Conduct several outreach and meetings with towns, stakeholders and other groups to discuss concepts
- Spring 2018 finalize complete concepts and draft set of regulations
- Summer 2018 – Public Information Sessions and Hearings
- Spring 2019 – New Regulations in place

Thank You!

Please call or email with thoughts and suggestions...

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Thank you to Carl Heilman for the aerial photography used in this presentation