Reclassification of Lake Raponda

Using Nutrient Criteria to Increase Protections for High Quality Waters Under VT's Water Quality Standards

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VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
LAKES & PONDS PROGRAM

Presentation Overview

1. **Snapshot of Vermont Lakes**
   - Status of Vermont's Waters
   - Changing Trophic Status in VT lakes
   - Lay Monitoring Program Data

2. **Vermont Water Quality Standards**
   - Principles & Designated Uses
   - Combined Nutrient Criteria
   - Rationale for Reclassification

3. **Increasing Protection via Reclassification**
   - Listing Methodology
   - Management Implications & Benefits
   - Septic >1,000 gpd prohibition in Class A Waters
   - Engagement with Towns & Local Associations

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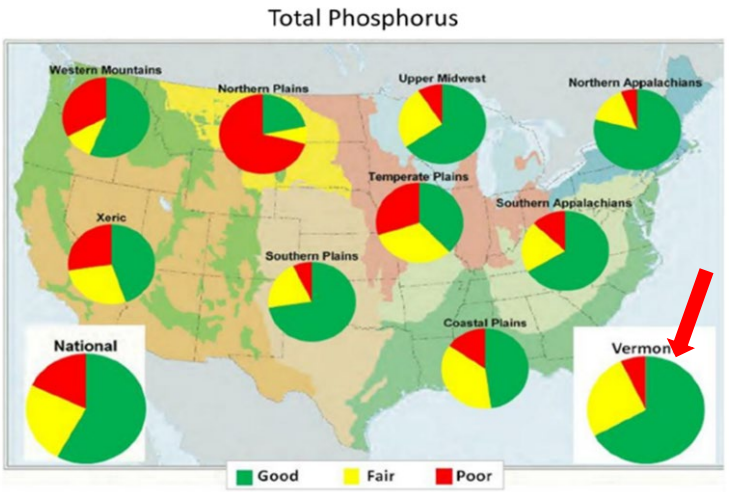
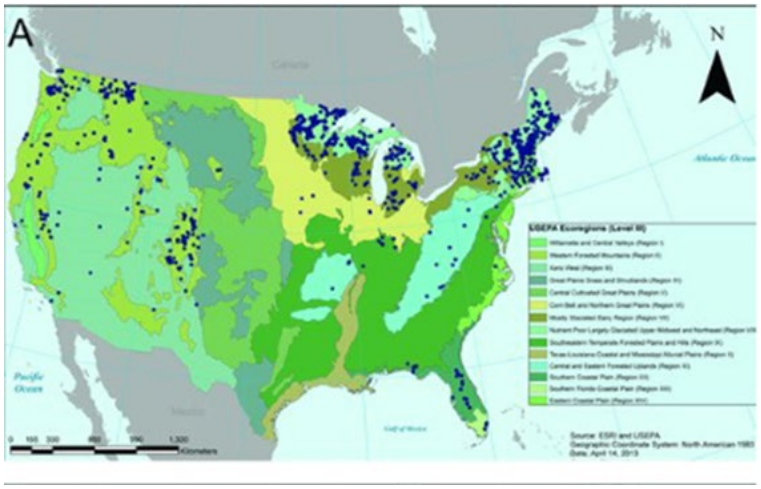
Status of Vermont's Waters

Vermont has over 800 lakes and ponds

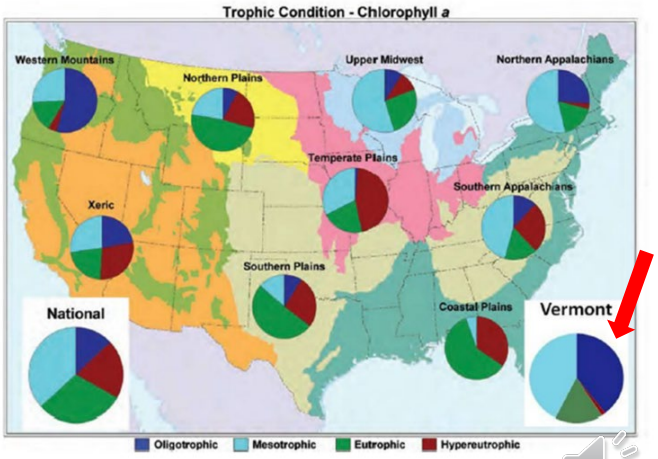
Vermont is stewarding lakes with a high proportion in "Good Condition" for phosphorus





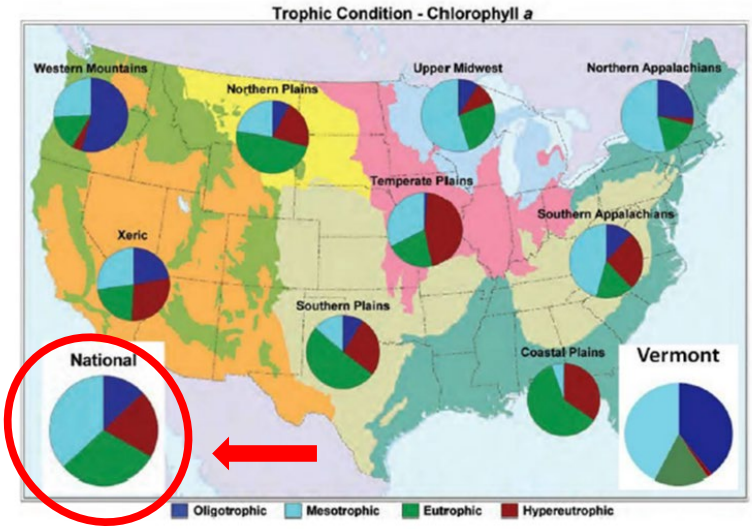
Vermont is stewarding some of the clearest lakes in the nation; Stephens et al., 2015

2007 NLA: Vermont is stewarding a higher proportion of oligotrophic than the rest of nation except Western Mountains



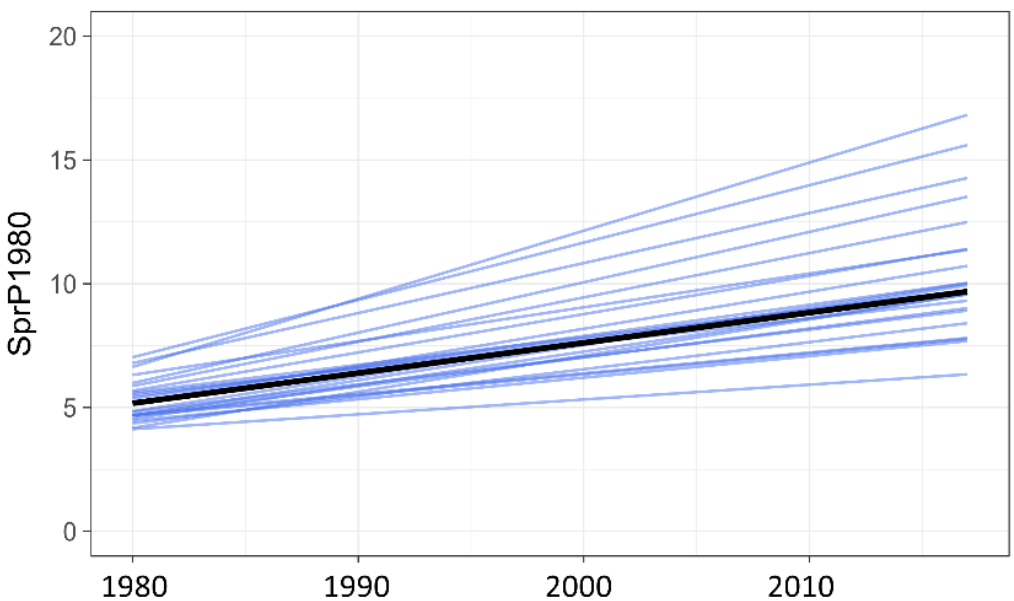
Changing Trophic Status in Lakes

Lakes are classified into trophic levels based on the amount of available nutrients in the water that support productivity



2017 National Lakes Assessment Data:

- Percentage of USA's Lakes Eutrophic / Hypereutrophic
  - 2007: Around half
  - 2017: Around 2/3
- Only 10% of the Nation's Lakes are Oligotrophic



Oligotrophic Lakes Spring TP Concentrations

Vermont seems to be **losing its oligotrophic lakes** as well; they have doubled in spring TP over the period from 1980-2017

Table 1. Percentages of Lakes for Which Spring or Summer TP is Predicted to have Increased, Decreased, or Remained Stable (No Change) Based on the Linear Mixed Effects Model.

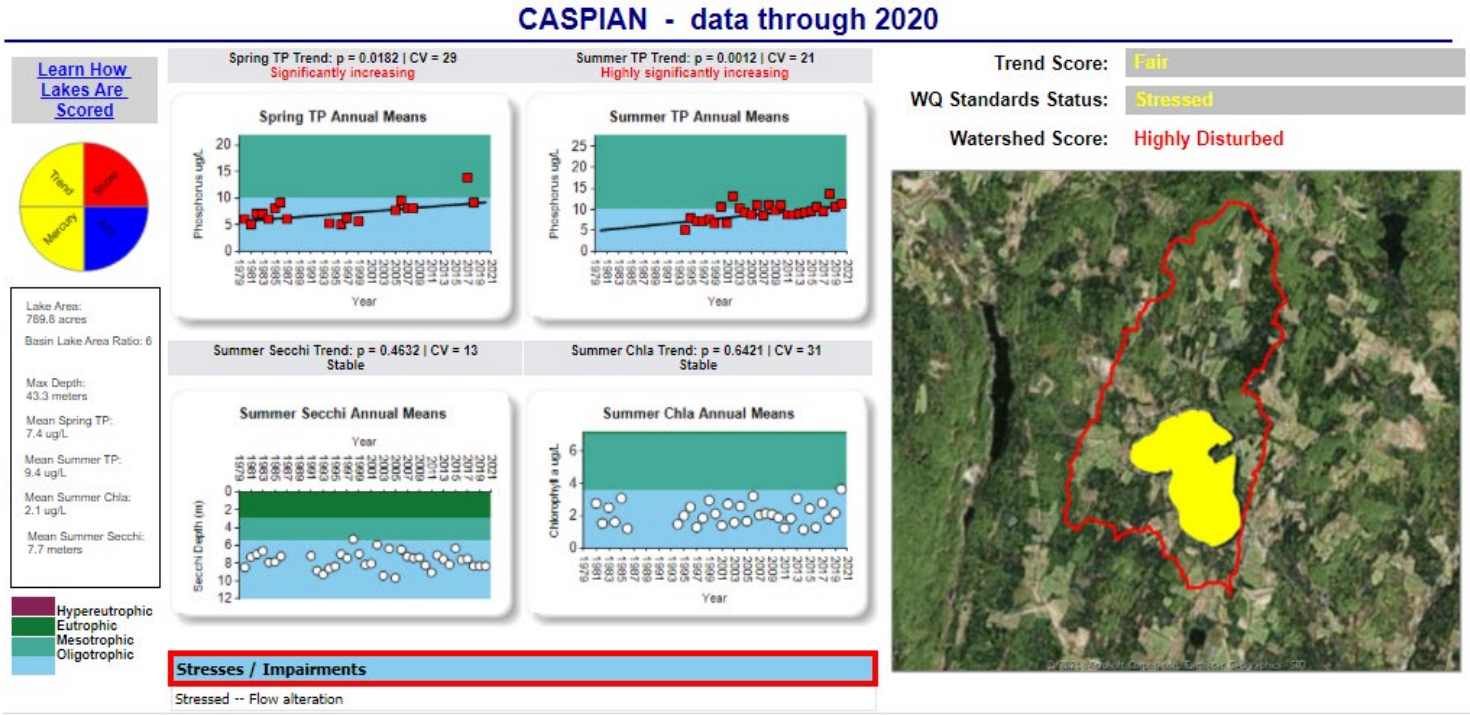
	Increased (%)		Decreased (%)		No Change (%)	
Trophic Status	Spring TP	Summer TP	Spring TP	Summer TP	Spring TP	Summer TP
Eutrophic	0	0	8	6	92	94
Mesotrophic	38	90	0	0	62	10
Oligotrophic	100	100	0	0	0	0

Vermont Lay Monitoring Program Data

Lay Monitoring Program has trained volunteers since 1979 to conduct lake water quality sampling on more than 100 lakes and 40 stations in Champlain

- Program leads to summer mean values for Total Phosphorus, Chlorophyll A, Secchi (water clarity) calculated from ≥8 samples

- This data is used to monitor trends on lakes, for designating lakes as impaired, and as the basis to establish policy and statute



Vermont Water Quality Standards

The Vermont Water Quality Standards establish designated uses, management objectives, and minimum criteria for all surface waters; waters are classified independently for each designated use:

- **Aquatic biota and wildlife** that may utilize or are present in the waters;
- **Aquatic habitat** to support aquatic biota, wildlife, or plant life;
- The use of waters for **swimming, boating, fishing** and related recreational uses;
- The use of waters for the enjoyment of **aesthetic conditions**;
- The use of the water for **public water source** or for **irrigation** of crops and agricultural uses.

There are four possible classifications of Vermont surface waters:

A(1) excellent.	**A(2) public water source;**
B(1) very good;	**B(2) – good;**

All waters at or below 2,500 feet are designated Class B(2) for all uses, unless ***specifically designated*** via reclassification as Class A(1), A(2), or B(1) for any use.

All waters above 2,500 ft are designated Class A(1) for all uses

All waters must continue to meet their classification criteria, otherwise they are ***listed as impaired***, and a restoration plan must be developed and implemented (i.e. Lake Champlain TMDL)

Combined Nutrient Criteria

- Combined Nutrient Criteria provides guidelines for lake (re)classification
- Numeric Criteria established for Aesthetics Uses: Total Phosphorus & Response Variables
- TP: Principal Stressor & Early Warning Indicator
- Use LMP data to determine what lakes currently meeting or failing B2 criteria, but also which lakes are meeting B1 or A1 criteria.
- State can reclassify eligible lakes "upwards" if data shows they exceed A(1) or B(1) requirements
- Consistent w/ VT's Tier 2 Antideg Program

Table 3. Combined Nutrient Criteria for Aesthetics Uses in Lakes, Ponds, and Reservoirs Lake Champlain and Lake Memphremagog[1,2]

	Class A(1)	Classes A(2) and B(1)	Class B(2)
Nutrient Concentrations			
Total Phosphorus[3] (µg/L)	12	17	18
Nutrient Response Conditions			
Secchi Disk Depth (meters)[4]	5.0	3.2	2.6
Chlorophyll-a (µg/L)[3]	2.6	3.8	7.0
pH	Not to exceed 8.5 standard units.		
Turbidity	Consistent with the criteria in § 29A-302(4) of these rules.		
Dissolved Oxygen	Consistent with the criteria in § 29A-302(5) of these rules.		

Rationale for Reclassification

Example: Lake Raponda in Vermont

- Does A(1) classification match expectations for Raponda's Aesthetic Use?
- Is 12 ug/L TP a more appropriate threshold for impairment?

Parameter	Mean Value (since '79)	A(1) Threshold	B(2) Threshold
Summer TP mean	11.4 ug/L	<12 ug/L	<18 ug/L
Secchi	3.5 m (to bottom so NA)	>5.0 m	>2.6 m
Chlorophyll A	2.6 ug/L	<2.6 ug/L	< 7.0 ug/L

So… how does reclassification increase lake protections?

- While reclassification does not guarantee that the total phosphorus levels will not be exceeded, they do put into place a mechanism for action sooner (higher likelihood of restoration success, lower cost)
- Reclassification gets Raponda the tool of legal requirements that come with listing a water as impaired and helps make funds available sooner for restoration work
- This 'increased protection' is afforded the lake even if no other legal protections are afforded

Benefits & Management Implications

Like listing a lake as impaired and developing a TMDL to restore, listing a lake as A(1) should lead to a lake-specific protection plan identifying stressors & mitigants

1. Determine lake's stressors **(phosphorus loading)** and develop a form of TMDL for the lake
2. Develop remedial intervention options
3. Seek funding & implement preferred options
4. Monitor for compliance and effectiveness

It will likely be easier to obtain funding for protection & management actions for A(1) lakes

Management Implications – Existing Prohibitions in Class A waters:

- A direct discharge of any wastes that contained organisms pathogenic to human beings.
- Indirect discharge systems (septic systems) with a design flow greater than 1,000 gallons per day
- Solid waste management facilities and application of biosolids or septage

Possible New Management Implications for A(1) Waters?:

- In lakes w/ increasing TP due to external nutrient loading, require riparian buffers on all lake tribs?

1,000 Gallons per Day limit in Class A Waters

FROM 10 VSA 1259

(d) No person shall cause a discharge of wastes into Class A waters, except for on-site disposal of sewage from systems with a capacity of 1,000 (gpd), or less, that are either exempt from or comply with the environmental protection rules, or existing systems, which shall require a permit according to the provisions of subsection 1263(f) of this title.

Vermont Water Quality Standards Appendix F

WATER QUALITY CLASSIFICATIONS (a) The classification of all waters has been established by a combination of legislative acts and by classification or reclassification decisions issued by the Water Resources Board or Secretary pursuant to 10 V.S.A. § 1253. Those waters reclassified by the Secretary to Class A(1), A(2), or B(1) for any use shall include all waters within the entire watershed of the reclassified waters unless expressly provided otherwise in the rule.

VT Indirect Discharge Rules

in Vermont, indirect discharges are defined as "Indirect Discharge means any discharge to **groundwater**, whether subsurface, land based or otherwise."

1,000 Gallons per Day limit in Class A Waters

Implication:

- All discharge, including from a septic system, is ***considered*** to be waste into waters
- Potential Class A designation for Seymour Lake applies to the entire lake watershed
- No new septic systems greater than 1,000 gpd would be permitted anywhere in the lake's watershed

Legal Question:

- Original intent of 10 VSA 1259 was to limit development, particularly at altitudes greater than 2,500 feet (ski areas)
- Times have changed, new technologies to protect water quality more efficiently than by limiting septic design flow
- **New and large** septic systems could be beneficial to water quality or preferable to what is currently in place
- Recent US Supreme Court "County of Maui v. Hawaii Wildlife Fund," which essentially indicates that depending on the time of travel, discharges to groundwater ***may*** be discharges to surface water (states currently lack guidance on Maui)
  - ***What is the legal basis for determining that all septic systems actually discharge wastes into waters?***

Next Step:

- DEC Plans to work with VT Legislature in 2022 to seek a legislative fix on 10 VSA 1259:
  - (d) No person shall cause a discharge of wastes into Class A waters ***above 2,500 feet***, except for on-site disposal of sewage from systems with a capacity of 1,000 (gpd), or less…

1,000 Gallons per Day limit in Class A Waters

- **What types of facilities have septic systems greater than 1,000 gpd?**
  - Shared systems that serve (typically) 4 or more single family residences
  - Restaurants with greater than 25 to 40 seats, depends on meals per day
  - Overnight summer camps with >22 campers or staff
  - Campgrounds with central toilets without showers serving >20 campsites
  - Campgrounds with central toilets and showers serving >13 campsites
  - Inns or hotels w/ >20 sleeping spaces (less if meals, laundry or offsite staff living quarters)

- **Would a typical or large residence need a design flow of 1,000 gpd?**
  - Only if it has 12 bedrooms or more; A triplex with 12 bedrooms would also be > 1,000 gpd

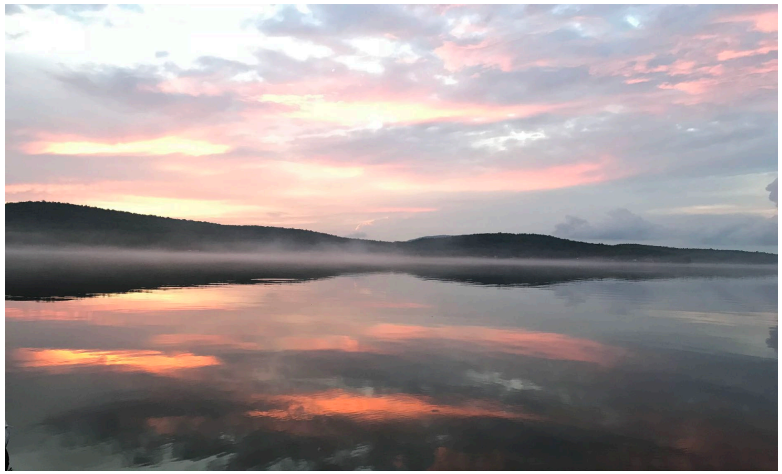
- **Are there any community septic systems serving a cluster of properties on a lakeshore?**
  - Charlotte – Thompson's Point: A >6,500 gpd Indirect Discharge System
  - Colchester: Town has delegation to run its own WW permitting program (<6,500 gpd) and issued one permit

- **Are there any septic systems with a design flow greater than 1,000 gpd that discharge directly into lakes?**
  - There are 26 in the state, 19 of which discharge into Lake Champlain. These are largely state parks, summer camps, resorts, and condominium complexes

- **Are there alternatives to water intense septic systems?**
  - A number of large facilities have started to use composting toilets, raised bed systems, aerobic treatment systems, and waterless systems, all which reduce water use; costs may be higher

Next Steps: Engagement w/ Towns & Lake Associations

- Reclassification can be initiated by Vermont DEC or via petitions from the public
- Increasing lake protections via reclassification, while not a new idea, has only been used once in VT
- VT DEC: outreach to interested / eligible lake communities and towns about lake reclassification,
- Identified seven eligible lakes w/ increasing TP and active lake associations
  - Maidstone, Caspian, **Raponda**, Willoughby, Shadow (Glover), Seymour, Echo (Charleston)
  - Substantial local interest, some concerns over management restrictions
- Exploring reclassifying same lakes for fishing uses to generate additional support
- Expect first petitions to reclassify high-quality lakes later this year
- Petitions kick off a rulemaking process, involving public hearings, legislative review, & decision



Thanks for your attention!
Questions?