

# Overview/Agenda

- Nutrient pollution in Vermont's major watersheds
- Approach (and funding) for addressing nutrient pollution
- Accomplishments (*Clean Water Investment Report*)



# Nutrient Pollution Impairs Rivers, Lakes and Streams

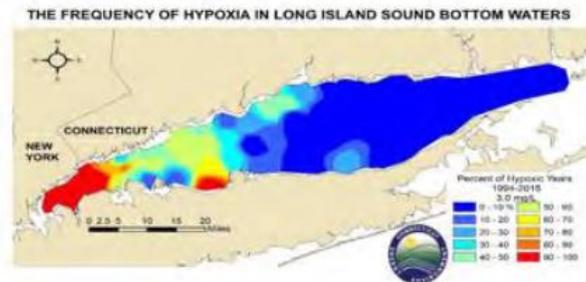
**Phosphorus TMDLs for Vermont Segments of Lake Champlain**



**Lake Memphremagog Phosphorus TMDL**

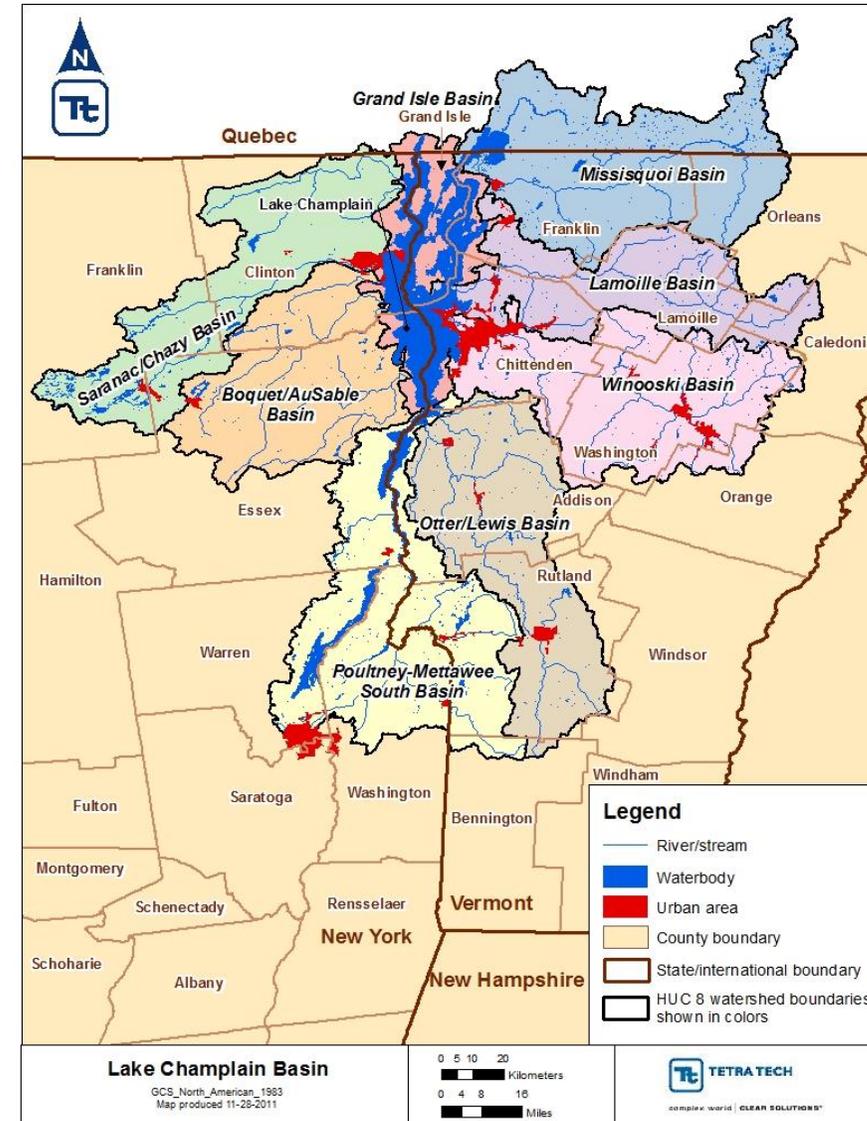


**Nitrogen TMDL for Dissolved Oxygen in Long Island Sound**

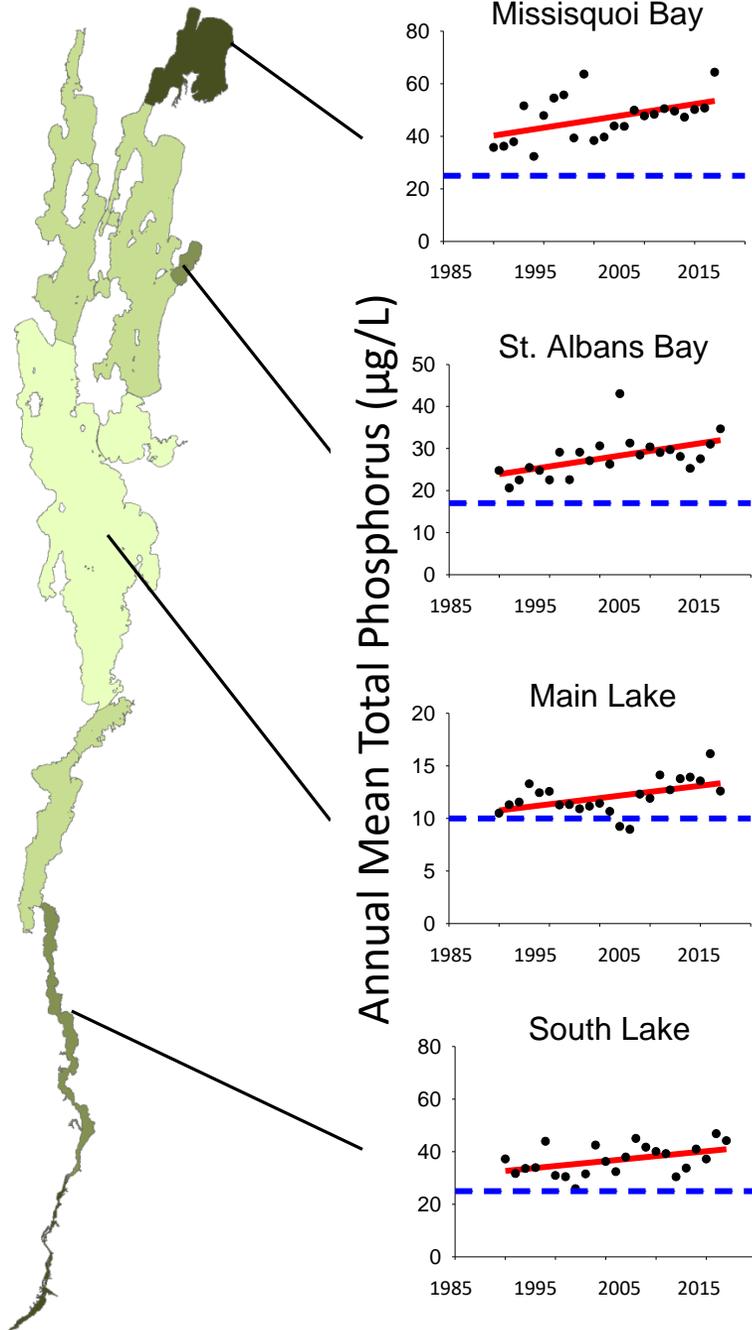


# Lake Champlain Statistics

- 8,234 square mile watershed
  - 56% (VT); 37% (NY); 7% (Quebec)
  - Drains nearly half the land area of Vermont
- 120 miles long
- Surface area of 435 square miles
- Maximum depth of 400 feet
- 6<sup>th</sup> largest (natural) lake in the US
- Drinking water source for 200,000 people
- Residents:
  - 571,000 in total; 390,000 in Vermont
  - More than 100,000 dairy cows



# Trends in Lake Champlain Phosphorus Concentrations



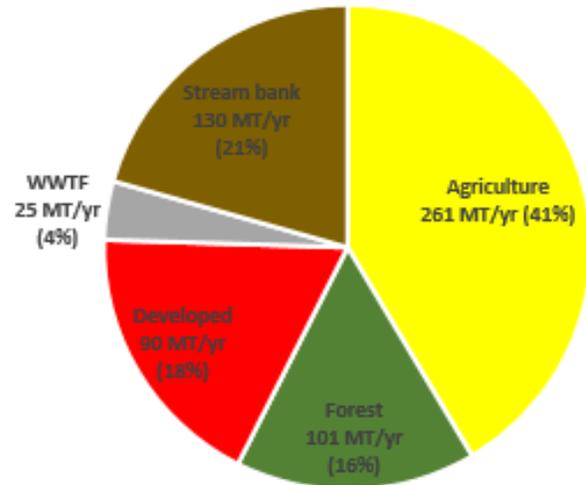
— Trend line  
- - - Water quality standard

Phosphorus levels in the lake are above the allowable standards

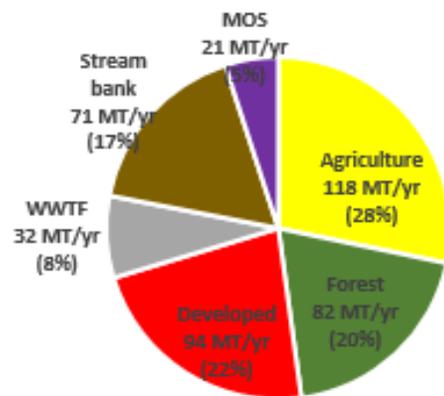
Vermont has taken many important actions, especially in the last 10 years, but much remains to be done

Cleaning up the lake ecosystem is complex and recovery will take time

Base Load  
631 Metric Tons/Year



Vermont Reduction  
Required = 213 mt/yr (34%)



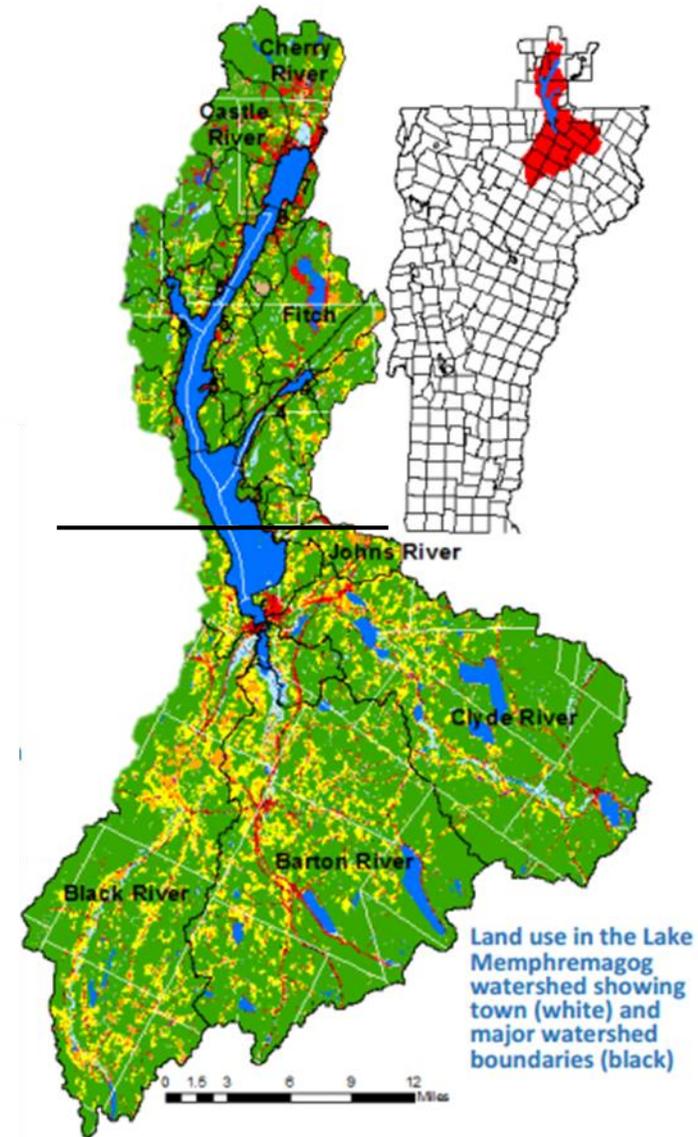
TMDL Loading Capacity and Allocations  
418 Metric Tons/yr

34% phosphorus reduction over 20 years in Lake Champlain

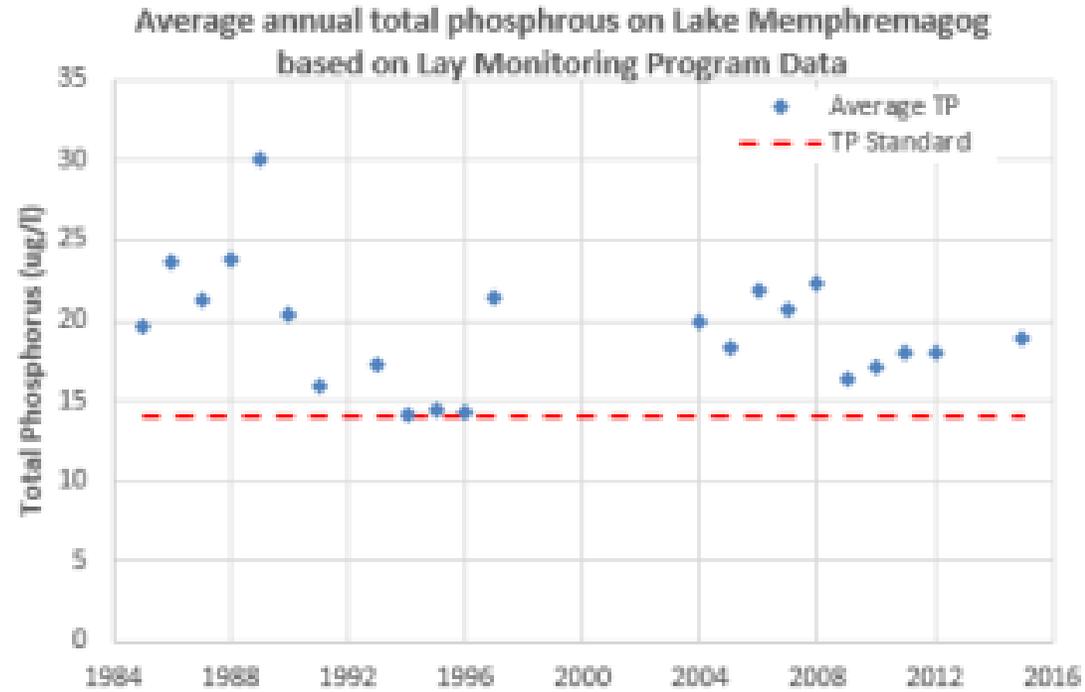


# Lake Memphremagog Statistics

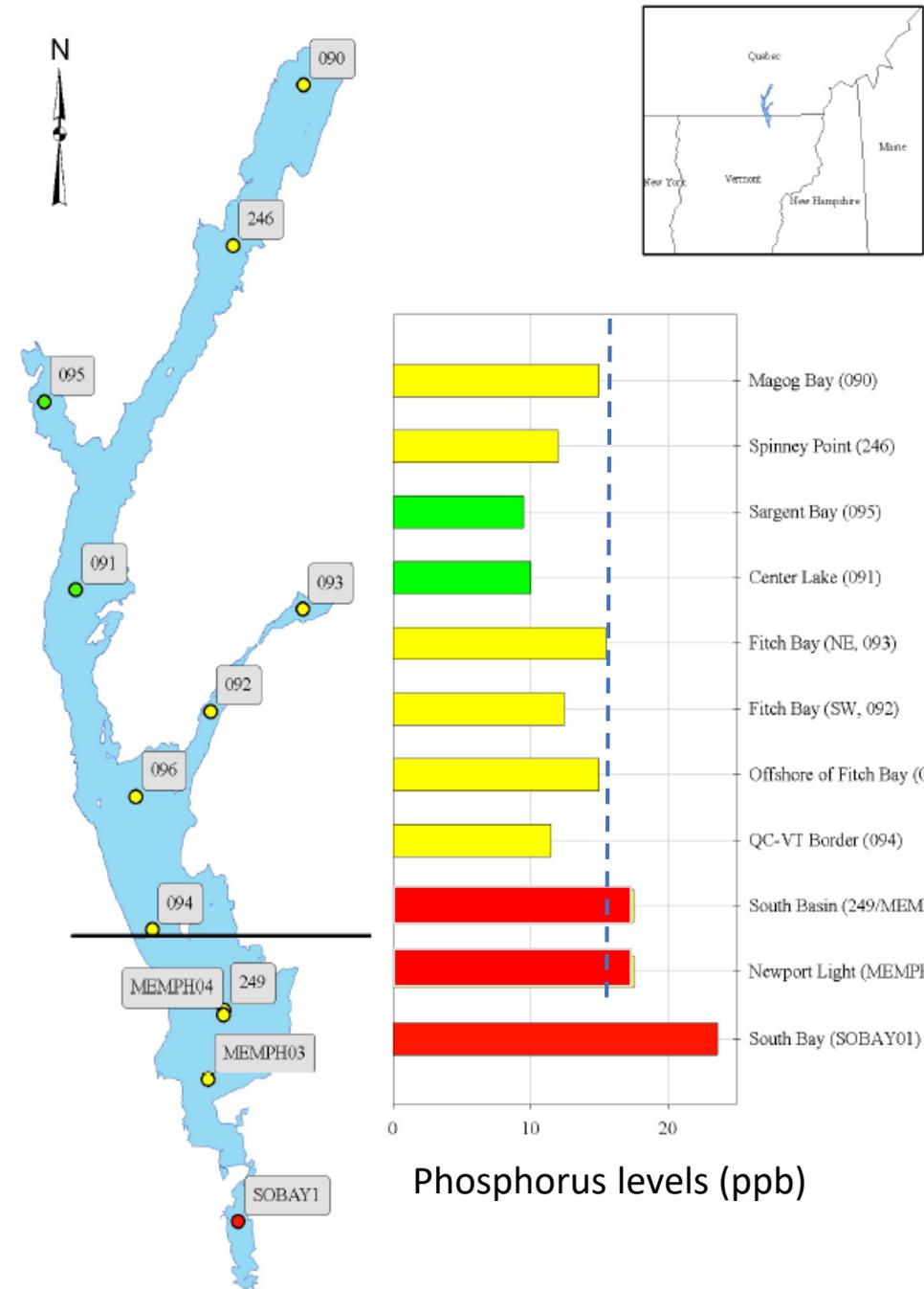
- 687 square mile watershed
  - 71% (VT); 29% (Quebec)
  - Nearly  $\frac{3}{4}$  of the surface area of the Lake is in Quebec
- 31 miles long
- Maximum depth of 350 feet
  - 3<sup>rd</sup> deepest lake in Vermont
- Drinking water source for 200,000 people, mostly in Quebec

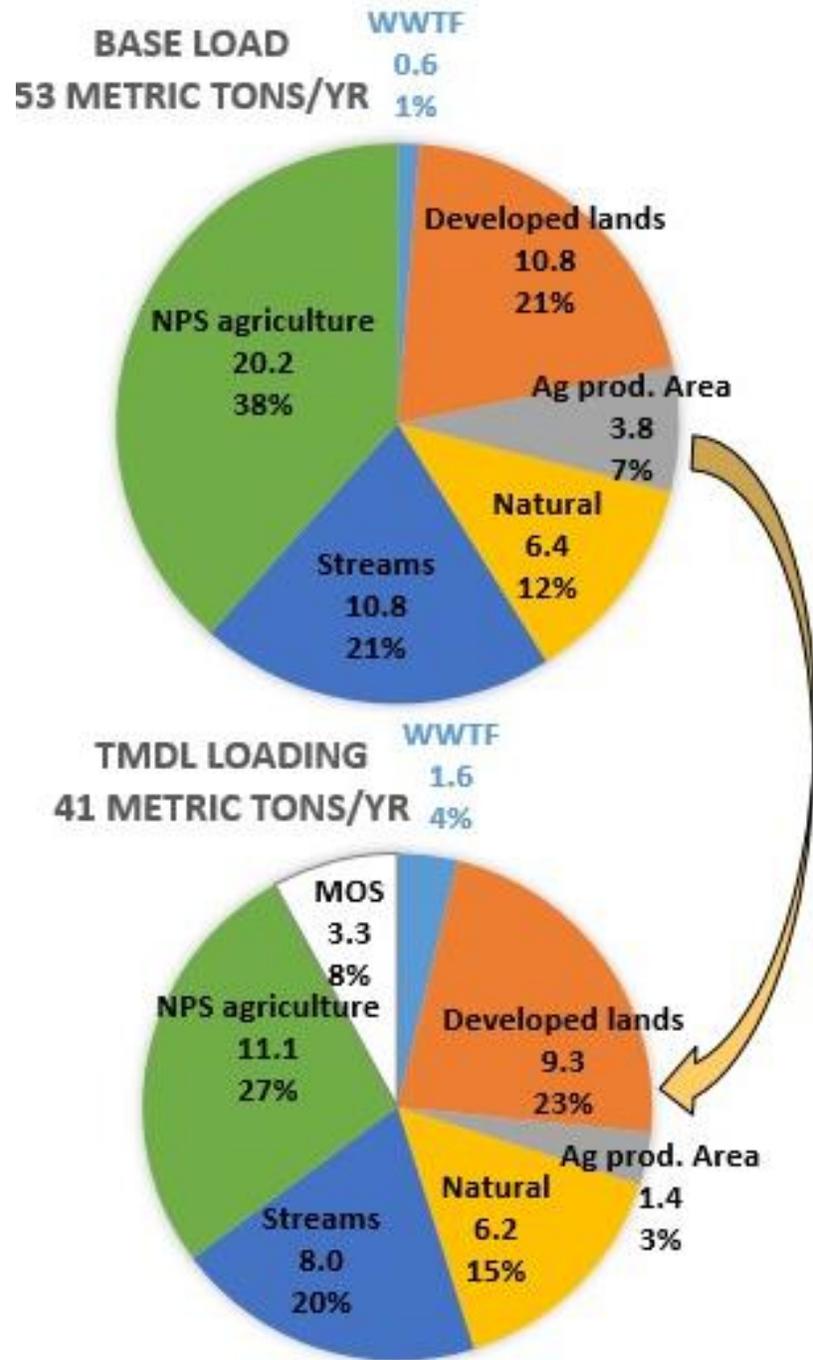


# Phosphorus Loading to Lake Memphremagog



Land use	Percent of VT watershed
Developed	6%
Agricultural	17%
Forest/Wetland	77%



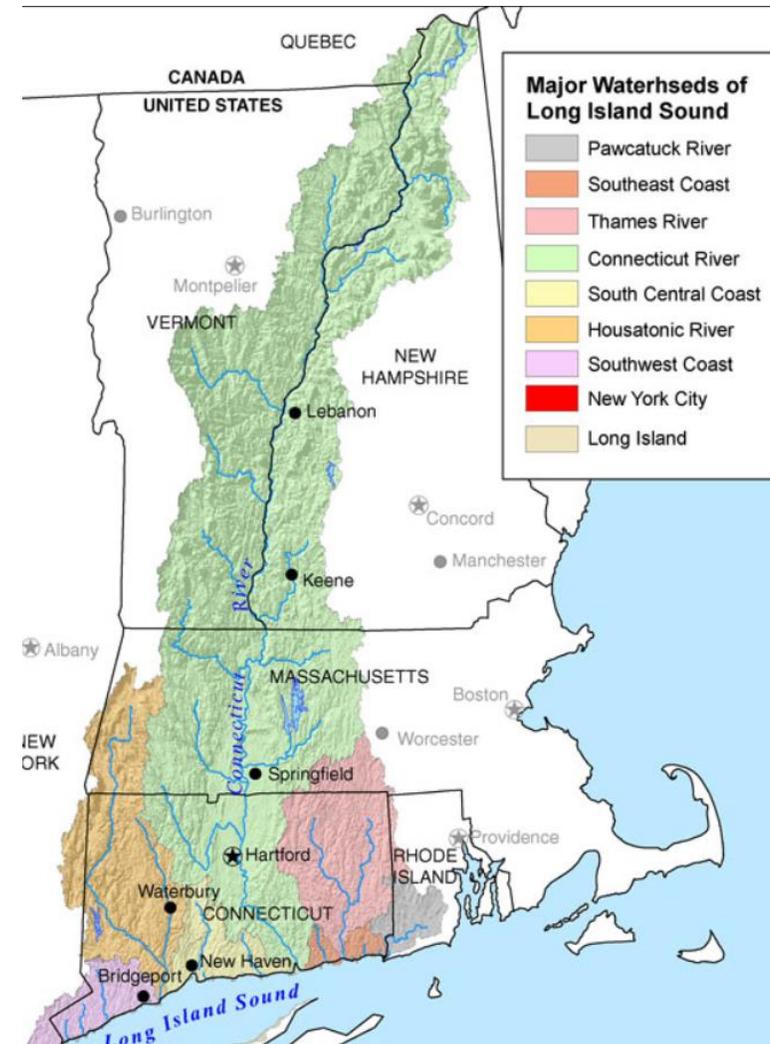


29% phosphorus reduction needed in Lake Memphremagog

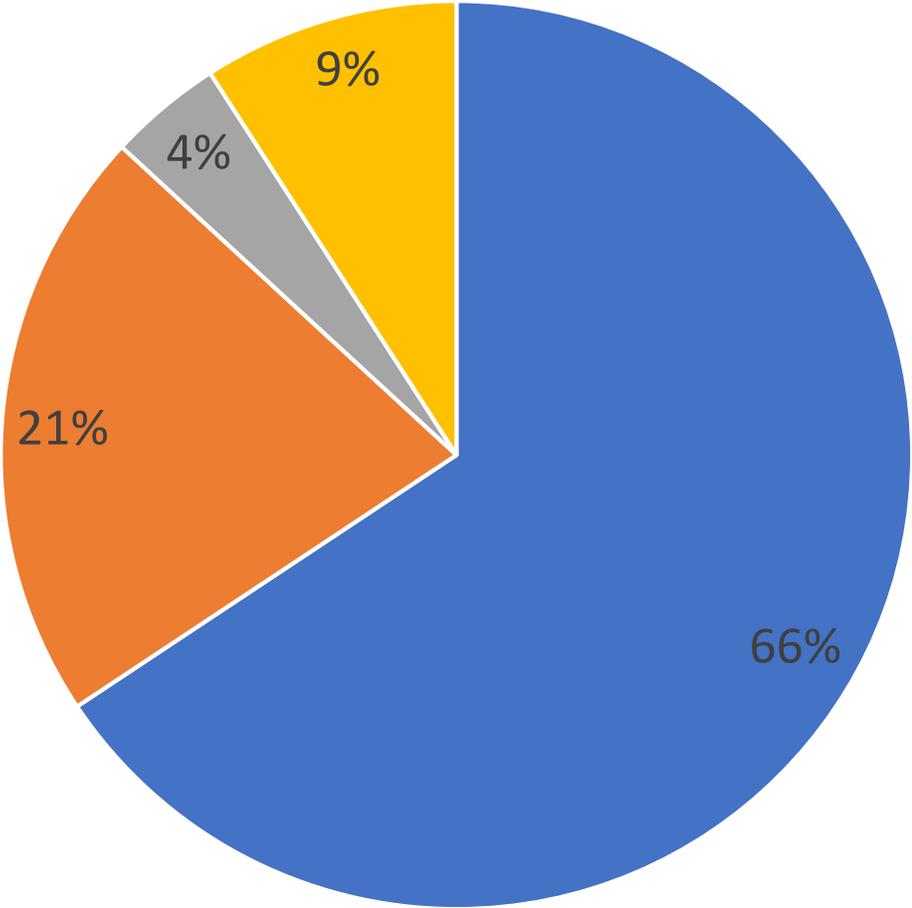


# Connecticut River/Long Island Sound Statistics

- 42% of Vermont is in the Connecticut River watershed
- Connecticut River is 410 miles long with over 250 miles along Vermont
- Connecticut River drains to Long Island Sound
- Nitrogen pollution from Vermont contributes to dissolved oxygen (DO) impairment in the Long Island Sound



# Nitrogen Loading from Vermont to Long Island Sound via the Connecticut River



■ Atmospheric Deposition  
■ Developed Lands/Roads

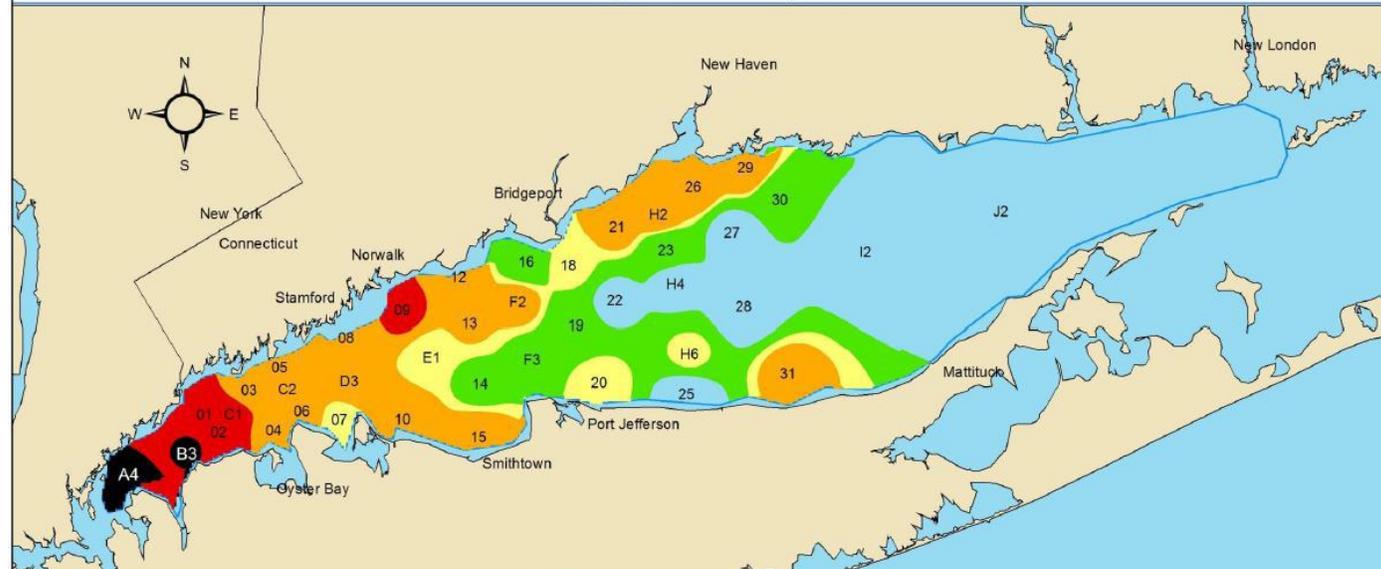
■ Agricultural Lands  
■ Municipal Wastewater

# Long Island Sound Nitrogen TMDL

- Basin-wide load reduction target is 58.5%
- TMDL study underway to refine required reductions regionally



Dissolved Oxygen in Long Island Sound Bottom Waters  
August 14 - 16, 2012



The 2012 August Hypoxia Survey was conducted 14-16 August. Forty-one stations were sampled using the R/V John Dempsey. Bottom water dissolved oxygen concentrations were below 4.8 mg/L at 34 stations. A total of 23 stations were below 3.0 mg/L, four of those were below 2.0 mg/L, and two were below 1.0 mg/L. The lowest concentration was observed at A4 (0.90 mg/L). After 3 years without any DO values below 1.0 mg/L (last time was in 2008), both A4 and B3 went severely hypoxic. The area of bottom water affected by hypoxia (DO <3.0mg/L) is 288.5 square miles (747.1 sq km) compared to 130.3 square miles (337.6 sq km) in 2011 and 0 square miles (0 sq. km) in 2010. The area of bottom water with DO less than 1.0 mg/L is 17.7 square miles (45.8 sq km).

Dissolved Oxygen	Severity of impact
0.0 - 0.99	Severe
1.0 - 1.99	Moderately severe
2.0 - 2.99	Moderate
3.0 - 3.49	Marginal
3.5 - 4.79	Interim management goal
4.8+	Excellent - Supportive of marine life

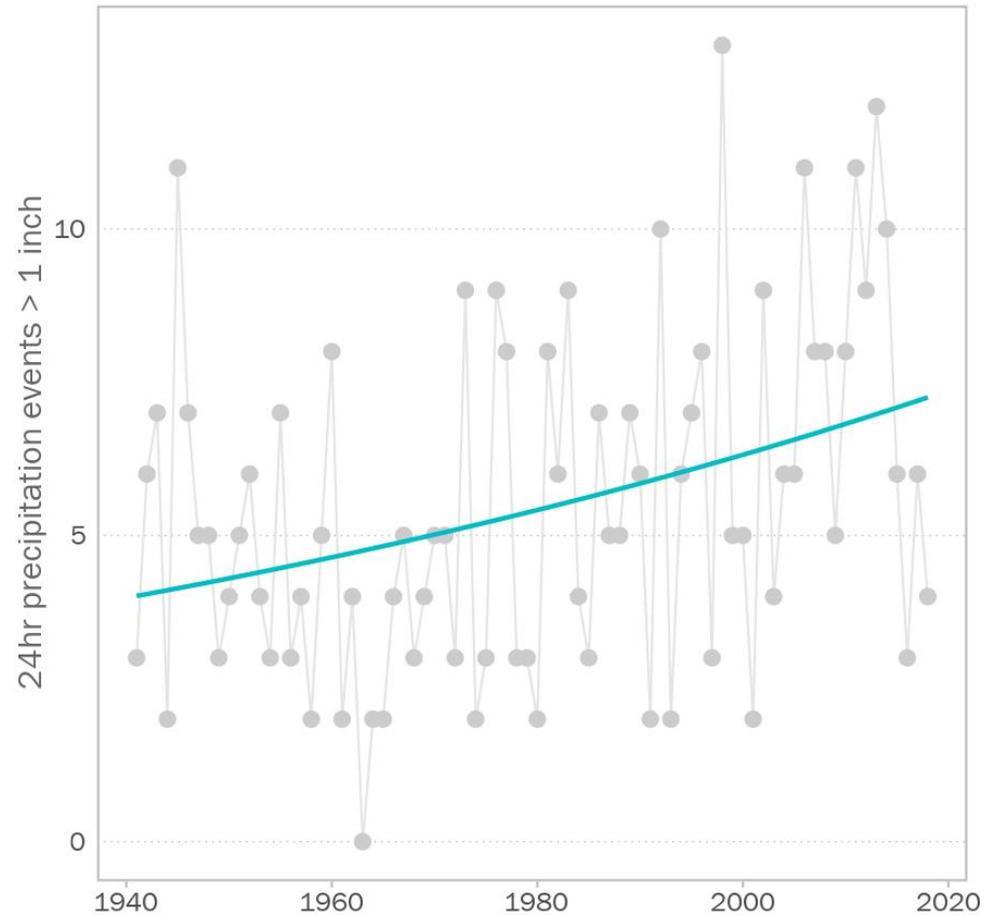
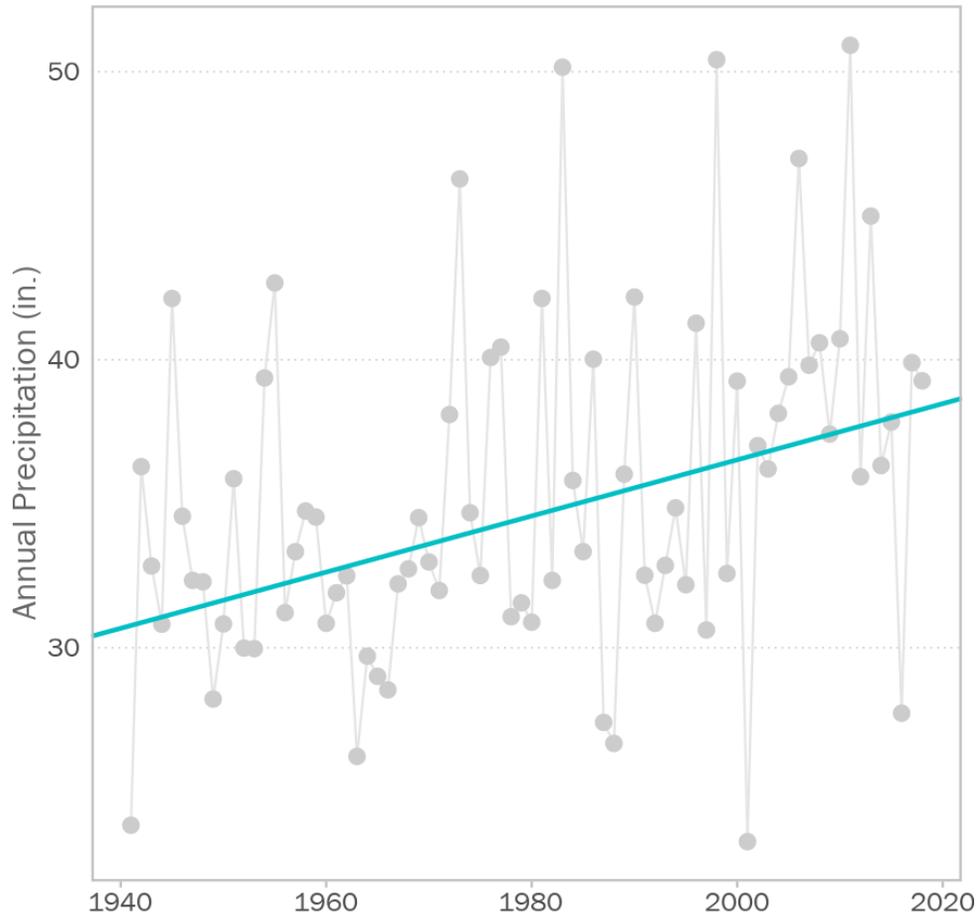
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# What is Driving Nutrient Pollution in Vermont?

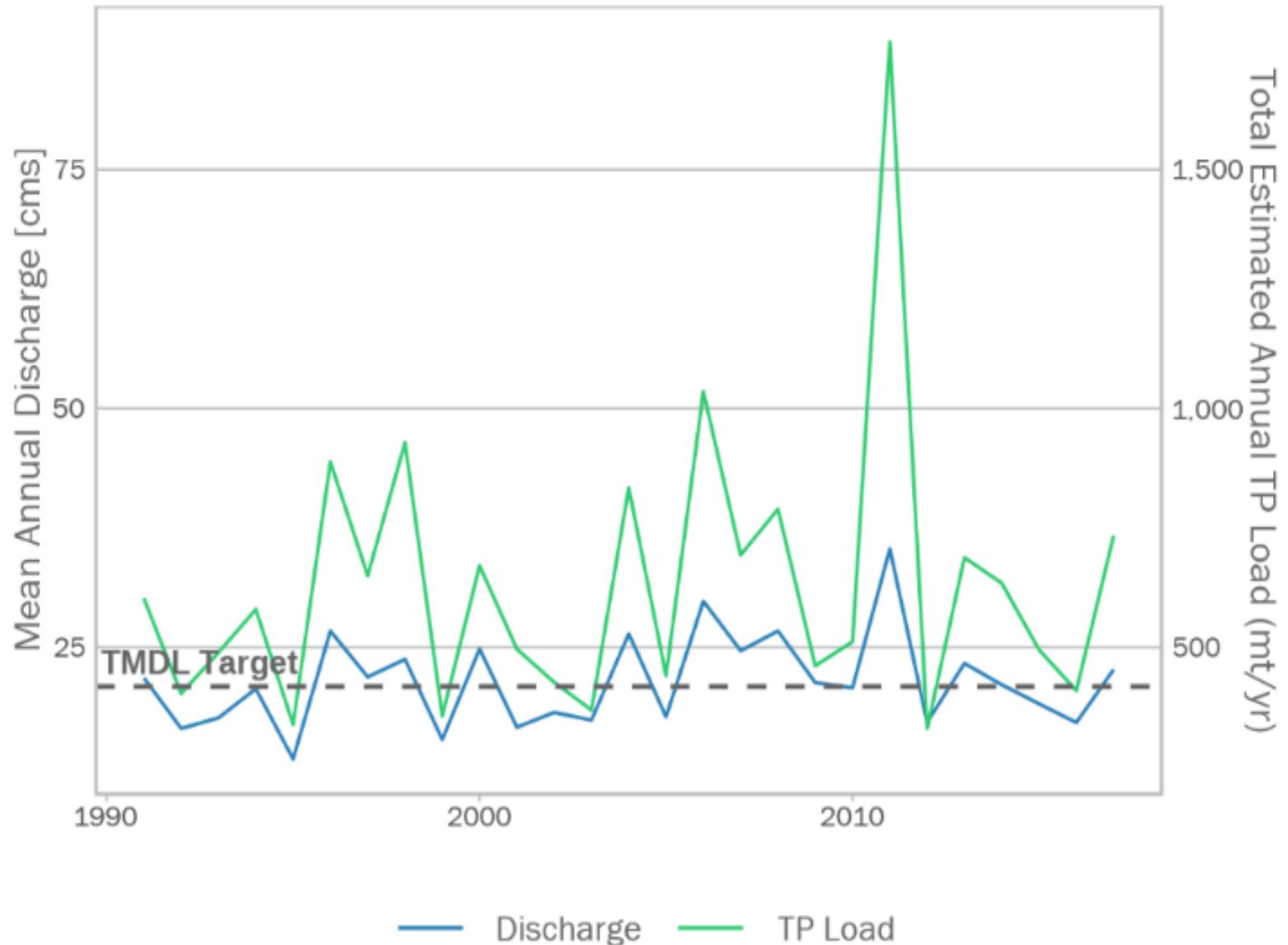
- Sewer overflows?
- Agricultural runoff?
- New construction?
  
- WEATHER!
  - More rain = more nutrients reaching our waterbodies
  - Weather is noisy, so can be hard to detect trends

# What is Driving Nutrient Pollution in Vermont?

Significant increases in frequency of intense storms and total annual precipitation.



# What is Driving Nutrient Pollution in Vermont?



# What Needs to Happen?

- Significant reduction in nutrient loading
  - Lake Champlain = 34%
  - Lake Memphremagog = 29%
  - Connecticut River/Long Island Sound = 50%+
- For perspective...
  - Chesapeake Bay = 24%
  - Gulf of Mexico = 20%
  - Lake Erie = 40%

# How Are We Going to Get There?

## An “All-In” Approach

**Wastewater Treatment**



**Forestry**



**Runoff from Developed Land**



**Floodplains and River Corridors**



**Roads**



**Agriculture**



# Combination of Mandatory and Voluntary Programs and Projects

- Mandatory - Act 64 (2015)
  - Agricultural practices
  - Stormwater runoff
    - Developed lands (3-acre permit)
    - Roads (Municipal Roads General Permit)
  - Wastewater
  - Forestry
- Voluntary (non-regulatory) – Act 76 (2019)
  - Natural resources restoration
    - Wetlands
    - Floodplains and river corridors
  - Projects that go “above and beyond” regulatory requirements

# Are Some Sectors Asked To Do More than Others?

- Multiple objectives drove the mix of programs selected, including:
  - Cost-effectiveness
    - \$ per pound of pollution controlled
  - Capacity
  - Equity
  - Sustainability
  - Programs that EPA has direct control over
    - Wastewater treatment

# How is Clean Water Work Funded?



Average Annual State Appropriations = \$50-60 M/year

# How is Clean Water Work Funded?

<b>Total FY20 Clean Water Approps</b>	<b>\$48,125,000</b>
• Clean Water Fund:	\$14,800,000
• <i>Property Transfer Tax Surcharge:</i>	<i>\$5,200,000</i>
• <i>Escheats (unclaimed bottles):</i>	<i>\$1,000,000</i>
• <i>Meals and Rooms Tax:</i>	<i>\$7,500,000</i>
• <i>Surplus FY19 Revenue:</i>	<i>\$1,100,000</i>
• Capital Bill:	\$12,100,000
• Transportation Bill:	\$7,128,000 (20% state/80% federal)
• Appropriations Bill	\$7,947,000
• <i>DEC Clean Water SRF Match</i>	<i>\$7,500,000 (100% federal)</i>
• <i>DF&amp;W Watershed Grants</i>	<i>\$35,000</i>
• <i>AAFMM Farm Agronomic Practices</i>	<i>\$412,000</i>
• LCBP/Leahy Appropriation	\$6,150,000 (100% federal)

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# Discretionary vs. Directed

- Investments are real, but not all are discretionary
- Directed = \$26.6m
  - \$13.3m for municipal wastewater, stormwater and CSOs
  - \$7.1m for transportation-related stormwater
  - \$6.2m for projects approved by LCBP
- “Discretionary” = \$21.5m
  - Existing cost share commitments; combination of statute and agency practice

## STATE AND FEDERAL GRANT MATCH

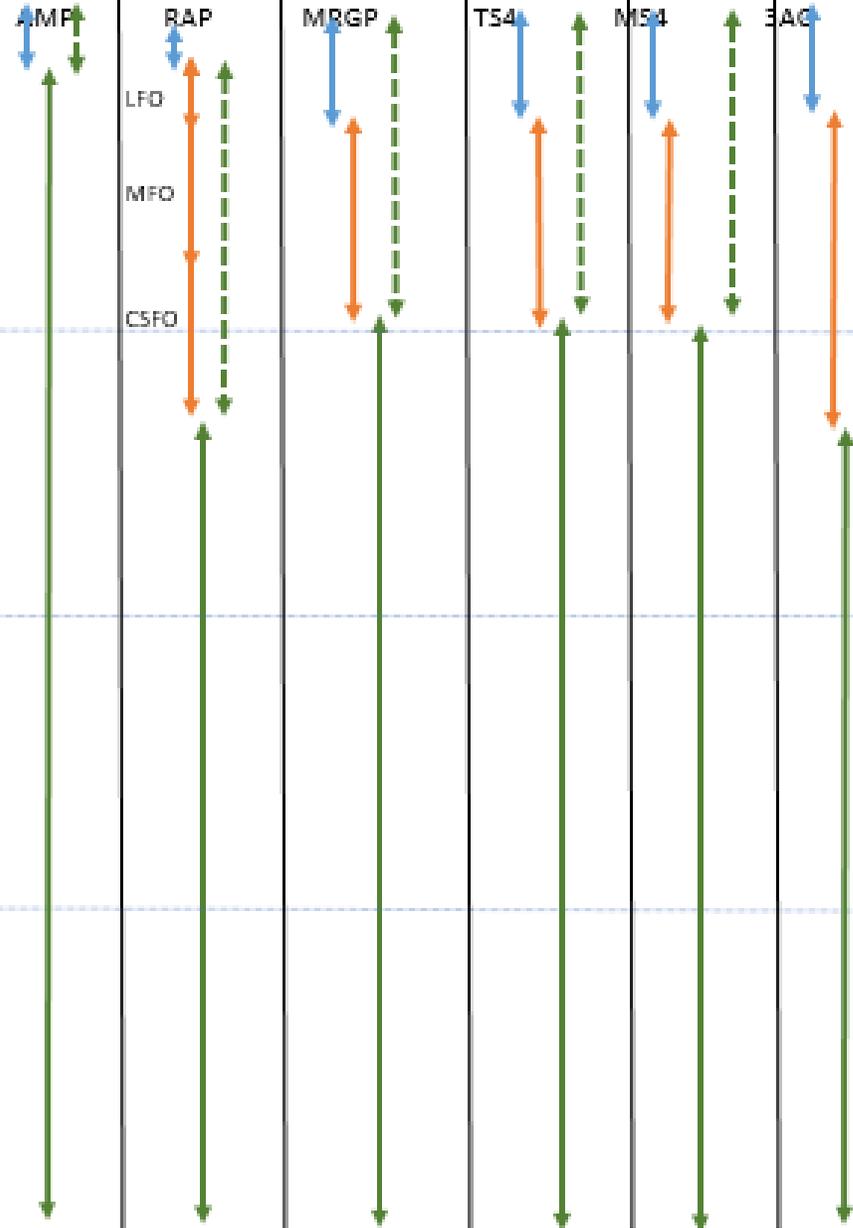
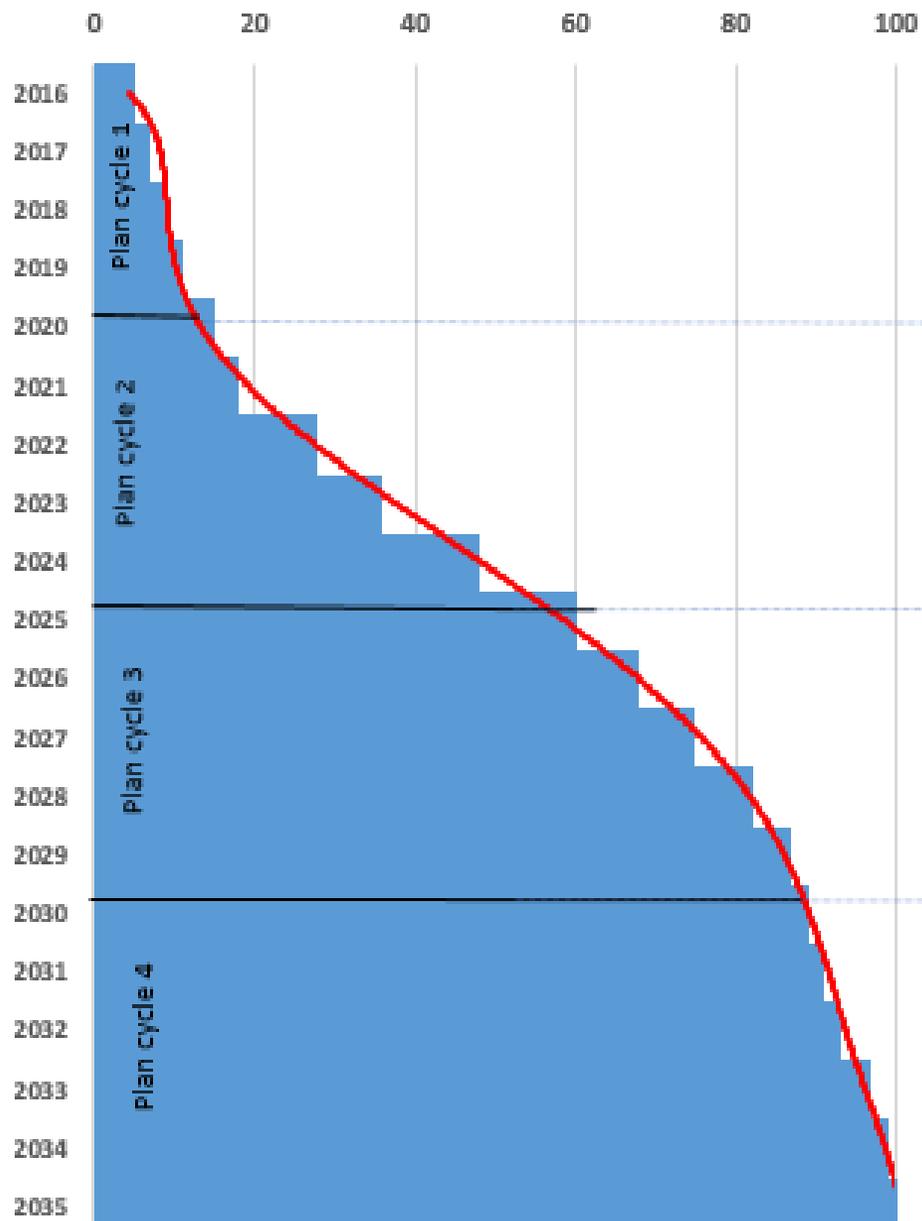
Sector	Owner Type	Required or Voluntary?	Typical Match
Wastewater/CSOs	Public	Required	35%
Agriculture	Private	Required/Voluntary	90%
State Highways	Public	Required	100%
Municipal Roads	Public	Required	50-80%
Developed Lands	Public	Required	50%
Developed Lands	Public	Voluntary	80-100%
Developed Lands	Private	Required	0%
Developed Lands	Private	Voluntary	80-100%
Developed Lands	Public-private partnership	Required	50%
Natural Resources Restoration	Public or private	Voluntary	80-100%

# Will it Really Take 20 Years?

- YES!!
- Federal (TMDL) target is established and provides clear direction
  - Significant reductions are need
- Early years have been characterized by planning and putting systems in place
  - Implementation is accelerating
- Progress will:
  - Not come in neat increments of pollution reduced per dollar spent
  - Be complicated by climate change as total rainfall and rain intensity increase

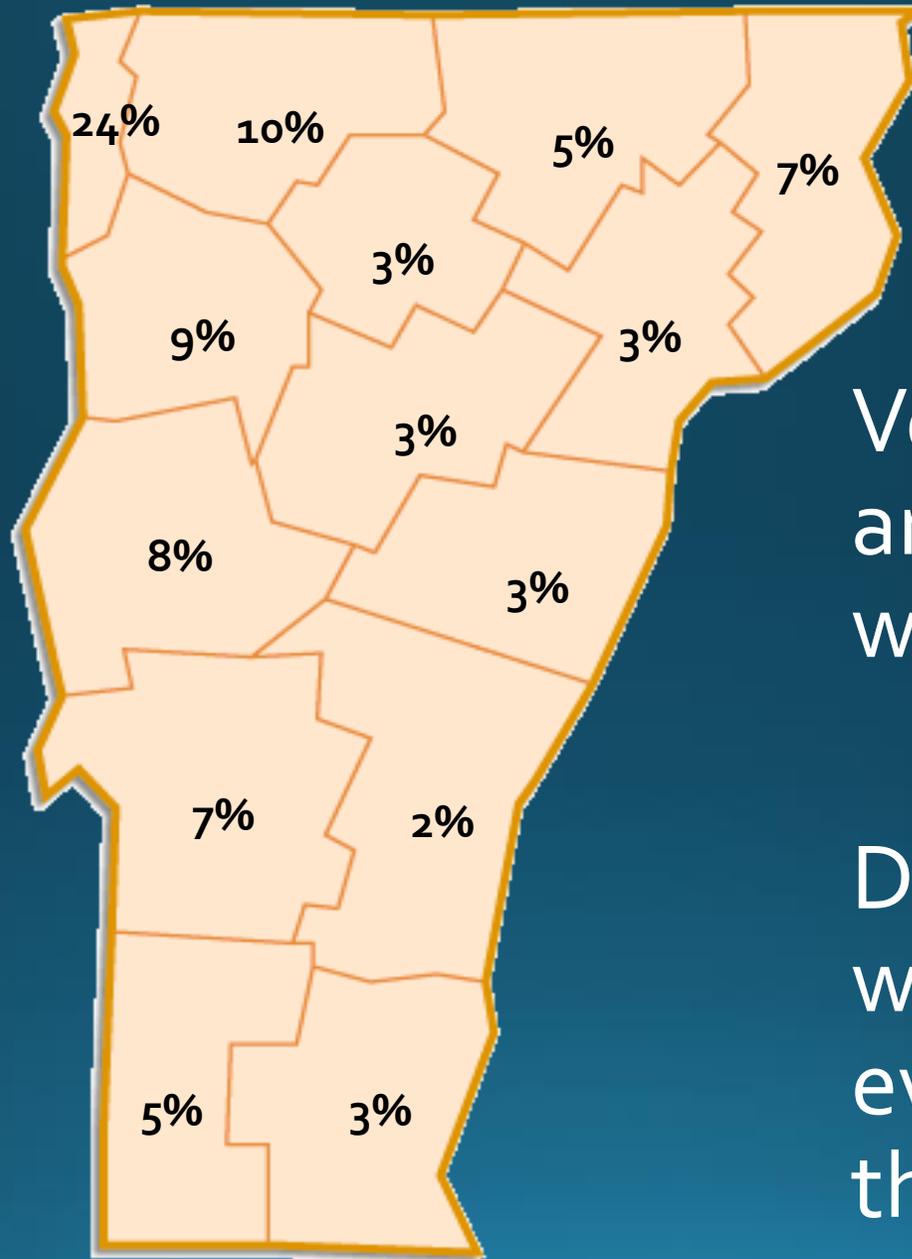
# Regulatory Program Timeline

## Hypothetical Phosphorus Reduction Curve (%)



# Wetlands

From pre-settlement to 1980, Vermont lost 35% of wetland area.



Vermont is around 4% wetland today

Distribution of wetland is not even throughout the State.

Wetlands provide a variety of important functions and values, which ANR's rules seek to protect



Flood Control



Water Quality



Fish Habitat



Wildlife



Rare Species



Natural Communities



Education & Research



Recreation



Aesthetics



Erosion Control

# Wetland Identification

- Review on maps/desktop; staff confirm on foot



Hydric Soils



Hydrophytic  
Vegetation



Hydrology

# *Presumed* Jurisdictional Wetlands

- Any wetland on the VSWI map is jurisdictional
- Any wetland contiguous or connected to the VSWI mapped wetland
- Any wetland that is the same type and size as what is on the VSWI maps (1/2 acre or larger)



- Adjacent to a stream, lake, pond, or river
- Vernal pools
- Special and unique wetlands like bogs or fens

# Wetlands: A brief (recent) history

- Under 10 V.S.A. § 905(b)(18), ANR administers a program to identify and protect significant wetlands, and issue permits for any activity that will “unduly adversely affect the functions and values of any significant wetland.”
- During the 2019 Legislative session, the Administration proposed a suite of amendments to increase clarity and consistency in the permitting process :
  - Define “wetlands” consistent with the U.S. Army Corps of Engineers  
*“Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”*
  - Define Class II wetlands according to a list of objective physical characteristics (e.g., size)
  - Clearly define activities triggering permitting jurisdiction
    - Dredging, draining, filling, cutting

# Wetlands: A brief (recent) history, cont.

- Wetlands bill spent most of the session in the Senate Agriculture Committee
  - The Committee's primary focus was on permitting exemptions for various agricultural activities
- The overhaul to Chapter 37 was not voted out of Committee, but there were a few wetland-related amendments adopted in H.525 (Act 64 of 2019):
  - Wetland scientist licensure requirements
  - \$200 maximum permitting fee for "water improvement projects" \$5,000 for permanent structures used for farming, and
  - The creation of the Legislative Study Committee on Wetlands
  - Directed AAFM to revise the Required Agricultural Practices

# Wetlands: A brief (recent) history, cont.

The Legislative Study Committee on Wetlands was charged with submitting a report that addressed four issues:

(1) whether the definition of “wetlands” should be amended, including whether the definition of wetlands under State wetlands law should be based on objective criteria such as size or location;

(2) the standard by which the State shall review a permit application for the disturbance of a wetland or wetland buffer;

(3) proposed exemptions from regulation under State wetlands law for specific activities, including:

(A) whether land on which farming or a subset of farming is conducted should be excluded from the definition of “wetlands” subject to State regulation or should be exempt from wetlands permitting under State law; and

(B) whether the exemptions under State wetlands law should be consistent or similar to the exemptions under federal wetlands law; and

# Wetlands, Next Steps

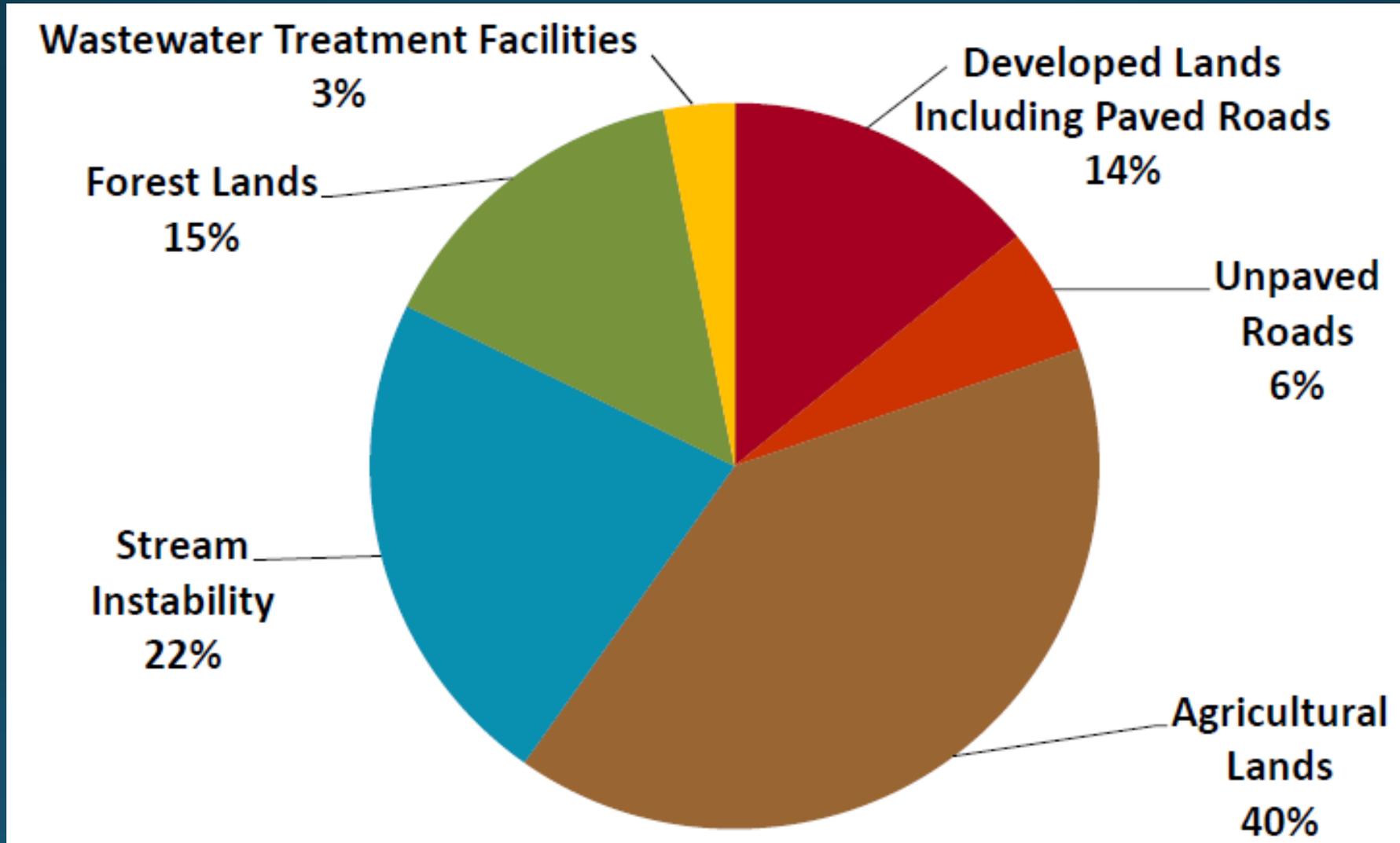
- Legislative Study Committee on Wetlands ultimately recommended no legislative action be taken at this time to amend the wetland statutes
  - Awaiting AAFM proposed rule revisions to the RAPs to address farming activities in wetlands
  - ANR will continue to meet with Wetlands Stakeholder Group to flesh out changes to increase clarity and consistency in the permitting process

# Stormwater

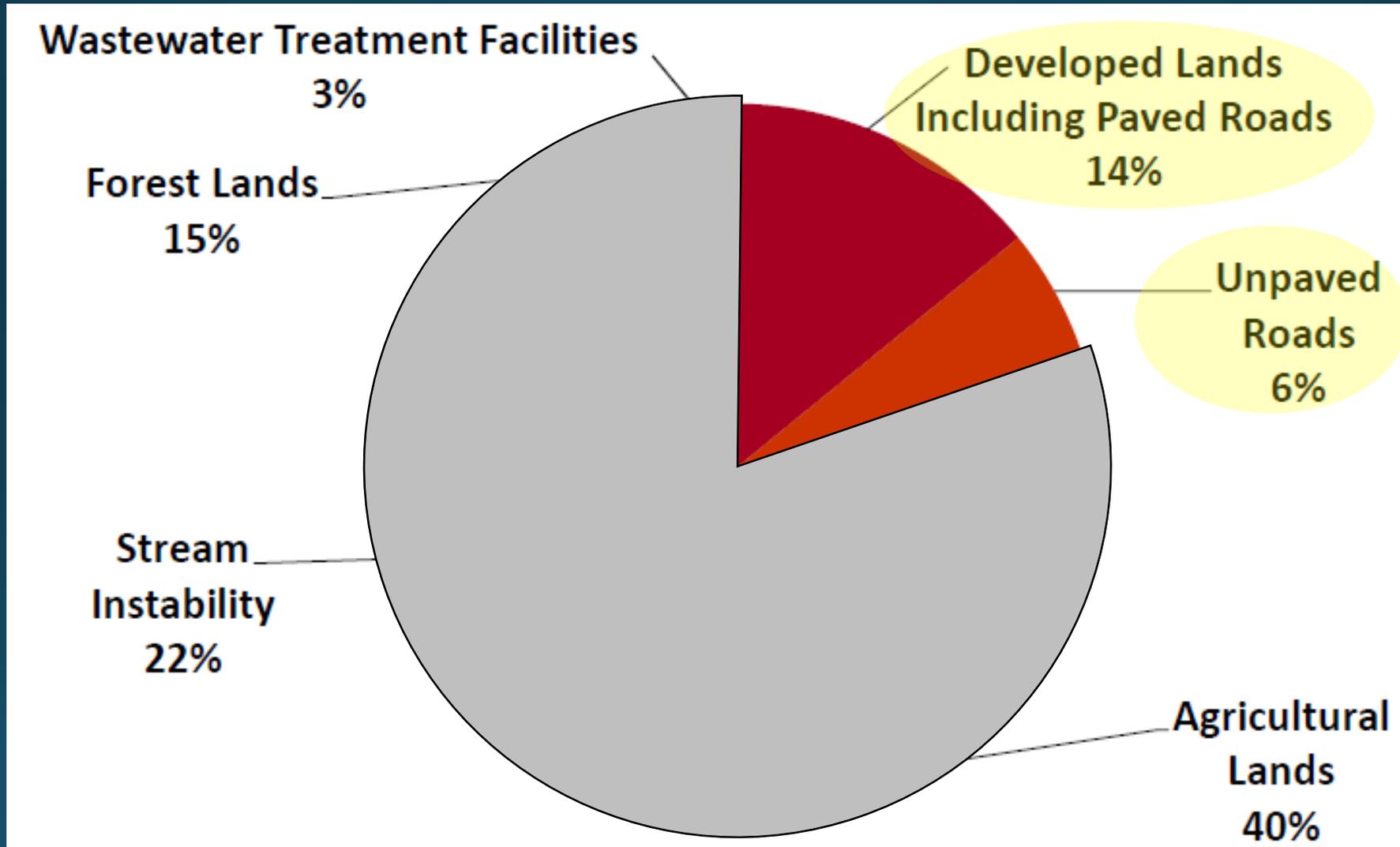
# Impervious Surfaces

- 60,000 acres, statewide –roughly
- < 10% are currently regulated

# Sources of Phosphorus in the Vermont-portion of the Lake Champlain Basin



# Sources of Phosphorus in the Vermont-portion of the Lake Champlain Basin



# Stormwater Pollutant Loading

- Lake Champlain TMDL requires a 21% reduction from “Developed Lands”
- How will it be achieved?
  - Municipal Roads General Permit
  - MS<sub>4</sub> General Permit
  - TS<sub>4</sub> General Permit
  - **3-Acre General Permit**

# 3-Acre Sites

- Single tract with  $\geq 3$  acres of impervious surface with no permit, or a pre-2002 permit; or,
- A project on one or more tracts with a pre-2002 stormwater permit for  $\geq 3$  acres of impervious surface;
- And, adjacent impervious surfaces where part of a related operation, e.g. a campus



- ❖ Roughly 1,000 sites statewide; half are previously permitted
- ❖ Letters sent directly to landowners outlining next steps

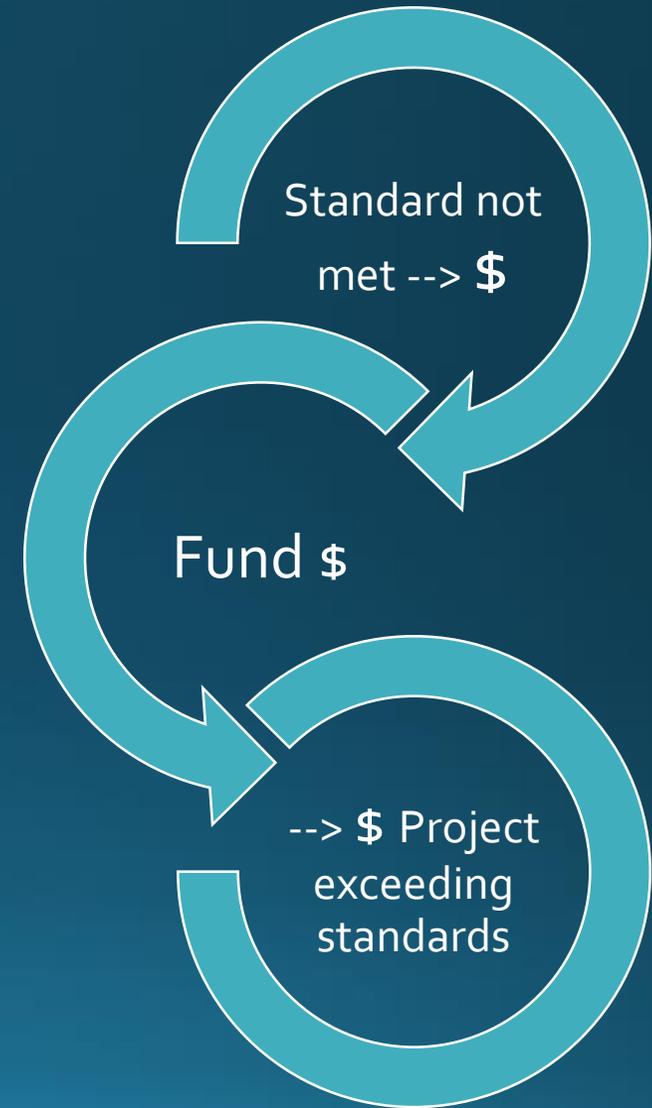
# 3-Acre General Permit

## Requirements

- Retrofit stormwater system consistent with redevelopment standard in 2017 Vermont Stormwater Management Manual
- Maximize treatment on site, subject to Engineering Feasibility Analysis (EFA)
  - Don't need to:
    - Purchase additional land
    - Pump stormwater
    - Construct in flood plains or wetlands
- If (and only if) unable to meet standards on site → pay offsets or stormwater impact fees

# Stormwater Impact Fees

- Impact fees - pay if you can't treat
  - Channel Protection Volume
    - \$25,000 per acre of impervious Surface
  - Redevelopment Standard (50% of Water Quality Volume)
    - $\$25,000/\text{acre} * (\text{required volume} - \text{actual volume})$
    - $\$25,000/\text{acre} * (50\% - 0\%) = \$12,500/\text{acre}$



# General Permit, Next Steps

- Public comment closed December 2, 2019
  - MANY comments received
  - Anticipate issuing final GP in late-Q1 2020
- Key Comments on General Permit
  - Schedule for 3-Acre sites
    - All 3-acre sites need permit coverage by the end of 2023
  - Funding to support implementation
    - Working to establish package of grants and subsidized loans to support engineering, design, and implementation costs
    - Agency will release funding plan before any applications are required