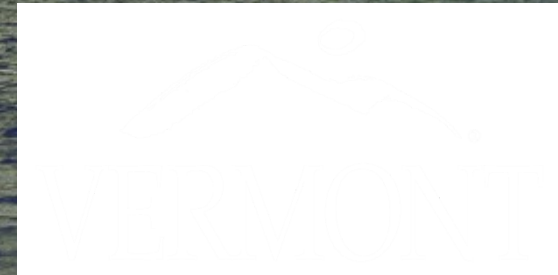


Water Quality in Vermont

**Julie Moore, Secretary
Agency of Natural Resources
January 27, 2017**



Why We Need Clean Water

- **Use and enjoyment of Vermonters**
 - Drinking water
 - Swimming
 - Fishing
- **Support tourism, at annual spending of \$2.5 billion**
 - Lake Champlain a key attraction for visitors
 - Second home-owners in towns bordering the Lake spend \$150 million annually
 - Overnight visitors in Champlain Valley spend over \$300 million annually
 - Day visitors spend \$30 million annually
- **Maintain property values**
- **Integral to the Vermont brand**
 - Our environment is our economy

Human Activity Can Harm Our Waters



“All-In” Approach

Wastewater Treatment



Forestry



Runoff from Developed Land



River Channels



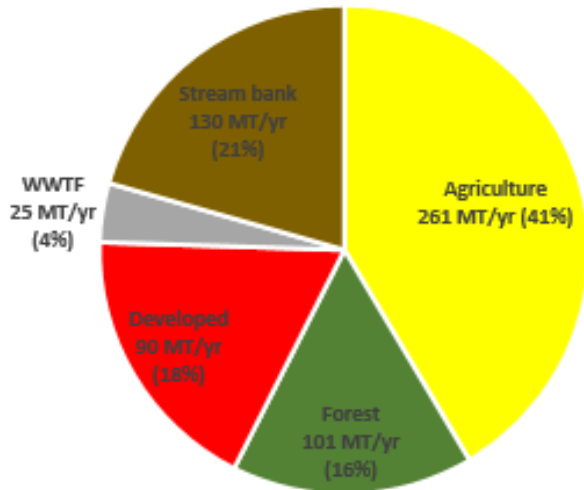
Roads



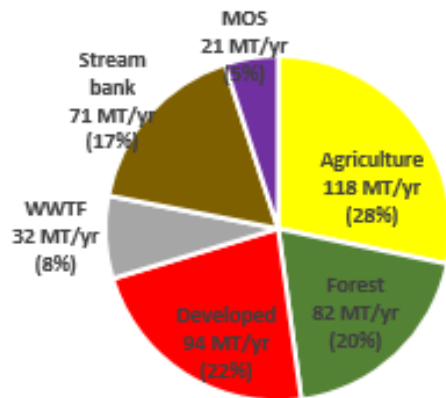
Agriculture



Base Load
631 Metric Tons/Year



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



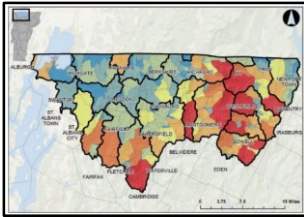
TMDL Loading Capacity and Allocations
418 Metric Tons/yr

34% phosphorus
reduction over
20 years

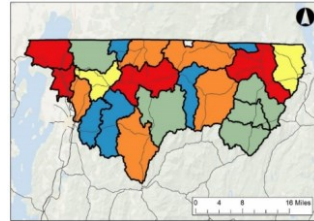


Modeling assists with implementation of regulatory programs that control nutrient pollution

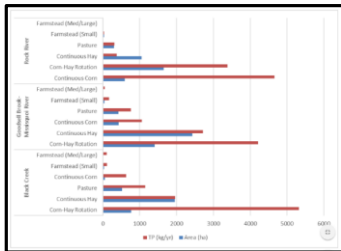
Forests



State roads/facilities



Agriculture



Wastewater treatment facilities

Facility (name ID)	Permit expiration date	Planned permit re-issuance year	Design flow MGD	WQV (MM) (MM)	Current permitted load (kg P/yr)	TMDL WQV (kg P/yr)	2013 flow (kg P/yr) / Percent of Design flow	Treatment type	# of CSOs	Receiving water
Fairfax (D-124)	5/30/10	2017-18	0.074	0.001(A)	0.537	0.533	0.001 / 41%	Aerated lagoon	0	Lamoille River
Jeffersonville (D-133)	3/31/10	2015-18	0.077	0.001(C)	0.533	0.206 / 4%	Aerated lagoon	0	Lamoille River	
Johnson (D-140)	3/31/10	2017-18	0.270	0.020(B)	0.224	0.120 / 54%	Sequential batch reactor	0	Glyph River	
Montpelier (D-135)	12/31/13	2015-18	0.550	0.040(B)	0.363	0.311 / 40%	Sequential batch reactor	0	Lamoille River	
Wilton (D-125)	12/31/10	2017-18	1.000	0.010(B)	0.829	0.345 / 29%	Sequential batch reactor	0	Lamoille River	
Warwick (D-144)	12/31/09	2015-18	0.331	0.021(B)	0.410	0.230 / 39%	Aerated lagoon	0	Lamoille River	
WPM Waterworks (D-120)	4/30/11	2017-18	0.425	NA	0.393	0.315 / 28%	Activated Sludge w/primary clarifier and fine filter	0	Lamoille River	

Local roads

Town	Painted Roads (kg/yr)	Unpaved Roads (kg/yr)	Town	Painted Roads (kg/yr)	Unpaved Roads (kg/yr)
Bakersfield	332.3	263.4	Jay	249.3	70.1
Belvidere	---	---	Lowell	316.6	67.4
Berkshire	291.3	144.4	Montgomery	302.7	119.3
Cambridge	108.4	53.3	Newport	256.2	104.4
Eden	4.7	---	Richford	280.3	81.0
Enosburgh	357.8	177.4	Sheldon	240.9	56.7
Fairfax	0.1	---	St. Albans	87.1	43.5
Fairfield	398.4	232.5	Swanton	398.6	27.0
Fletcher	11.0	10.6	Troy	210.2	58.1
Franklin	247.8	59.4	Westfield	196.7	43.9
Highgate	402.9	66.4			
Total loading from all roads (kg/yr)				6374	
Total reduction based on overall				2180	

Three-acre parcels

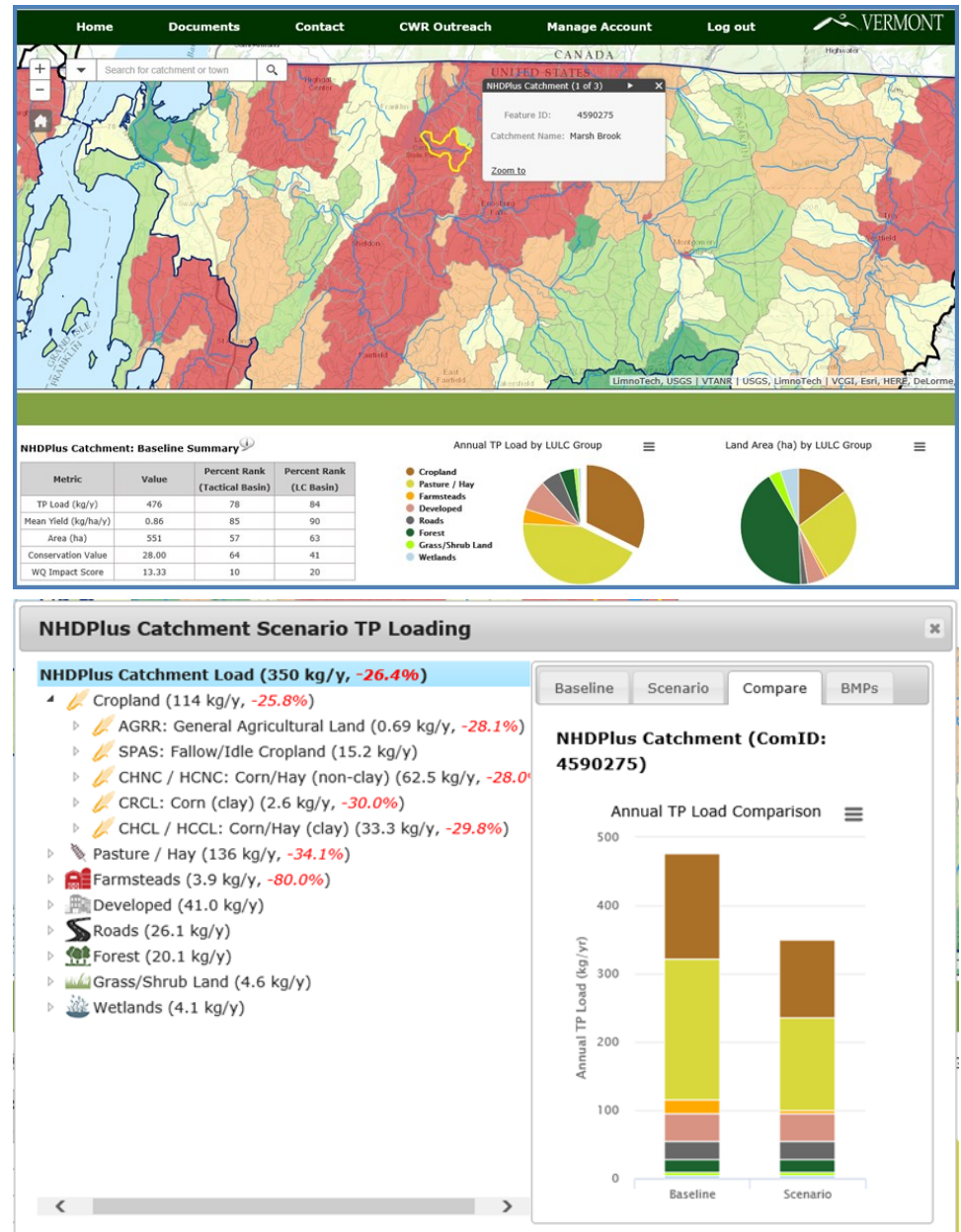
Town	Parcels (#)	Impervious (acres)
Eden	1	0.1
Highgate	8	75.5
Jay	4	74.0
Lowell	2	22.0
Montgomery	2	15.8
Richford	4	25.6
Swanton	8	38.1
Troy	1	3.6
Total	30	254.7

- Allows each tactical basin plan to express the estimated total load, and “sub-allocation” associated with each regulated sector within the TMDL.
- Produce estimates of P loss by land use AND regulatory program
- These estimates are expressed at appropriate geographic scales.
- “Critical Catchment maps” for each regulated sector
- Great planning and communication tool.

Program Highlights

- Online phosphorus planning/mapping program - coming in March, 2017
- Funded by Keurig GMCR with support from TNC, DEC, and others
- Presents online maps of phosphorus pollution and appropriate reduction practices.
- Can be used to map phosphorus reduction projects from DEC's database for public.

Clean Water Roadmap



Tactical basin plans present continually-refreshing lists of actions and projects

WDP Home Help

Projects

Name Status Grant Number

Project Type County Project ID

Basin Plan Town

Grade Type Grade

	ID	Project Name	Project Type	Status	Grant Number(s)
Edit View	161	Regional Hydroseeder Program	Stormwater Equipment - Roads	Implementation Funded	2017-CWF-2-02
Edit View	26	Rankin Farm River Corridor Easement	River Corridor Easement	Implementation Funded	2016-ERP-3-01
Edit View	140	Winooski Trees for Streams/Riparian Buffer Restoration, 2016	Riparian Planting - River	Implementation Funded	2016-ERP-2-15
Edit View	127	Jericho Stormwater Master Plan	Stormwater Master Planning	Scoping Funded	2016-CWF-1-04
Edit View	93	Hardwick Stormwater Master Plan	Stormwater Master Planning	Scoping Funded	2016-CWF-1-03
Edit View	60	Selawsky River Corridor Easement: Wild Branch - Phase 2	River Corridor Easement	Implementation Completed	2015-ERP-3-08
Edit View	61	Jeffersonville Easement Acquisition	River Corridor Easement	Implementation Funded	2015-ERP-3-07
Edit View	59	Selawsky River Corridor Easement: Wild Branch	River Corridor Easement	Scoping Completed	2015-ERP-3-06
Edit View	52	Hurteau River Corridor Easement, Lamoille River	River Corridor Easement	Implementation Completed	2015-ERP-3-03
Edit View	58	Hyde Park Stormwater Improvement Project	Stormwater	Implementation Funded	2015-ERP-2-20
Edit View	87	Implementation of Road Erosion BMPs along Class IV Roads	Road Project	Implementation Completed	2015-ERP-2-17
Edit View	68	Equine Manure Runoff Management Program	Agricultural Pollution Prevention	Implementation Completed	2015-ERP-2-10
Edit View	57	Cambridge Trail Bridge Replacement and Floodplain Restoration	Floodplain/Stream Restoration	Implementation Funded	2015-ERP-2-01
Edit View	235	Brewster River Stream Geomorphic Assessment and Corridor Planning	River Corridor Planning	Scoping Completed	2014-ERP-2-22
Edit View	238	Statewide Trees for Streams/Riparian Buffer Restoration, 2014-2015	Riparian Planting - River	Implementation Completed	2014-ERP-2-01
Edit View	274	Jeffersonville Riparian Corridor Easement	River Corridor Easement	Implementation Completed	2013-ERP-3-04.1
Edit View	92	Georgia Deer Brook Gully Stormwater Project	Stormwater	Scoping Graded	
Edit View	94	Upper Lamoille Bridge and Culvert Upgrades	Road Project	Discovery	
Edit View	96	Scribner Bridge over Gihon River	Road Project	Scoping Completed	
Edit View	98	Bryan Pond Dam Removal	Dam/Structure Removal	Scoping Completed	
Edit View	110	Hardwick Road Erosion Inventory	Road Erosion Control Inventory	Scoping Graded	
Edit View	111	Stannard Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
Edit View	112	Walden Road Erosion Inventory	Road Erosion Control Inventory	Scoping Graded	

- All projects that have a potential water quality benefit are entered into an online database
- Projects are prioritized with partner input (RPCs, Cons. Districts).
- Database summaries are publicly available.
- Ready projects meeting key criteria become the highest priority for funding.

Tactical basin plans identify key partners and funding, when known

WDP Home Help

Project ID 92 [Exit](#)
Project Name Georgia Deer Brook Gully Stormwater Project
Grant Number(s)

Project [Events](#) [Measures](#) [Grading](#) [Related Projects](#)

Project View

Project Name Georgia Deer Brook Gully Stormwater Project

Description
A series of connected underground storm drains and catch basins in the vicinity of the intersection of Route 7 and 104a in Georgia outfalls in to an area of erodible soils forming a gully that discharges sediment into Deer Brook. A project has been designed to stabilize the gully to mitigate severe erosion caused by stormwater runoff with a rock lined outfall. Eroding AOT culverts should also be replaced.

Project Type Stormwater

SGA Reach Deer Brook mouth to 2.5 miles upstream

Latitude 44.69574 **Longitude** -73.10653

Notes
Old plans need to be reviewed and redesigned to account for any changes. The designs should be reviewed by the Rivers Program. Source: Deer Brook Gully Remediation and Stormwater Treatment Georgia, Vermont, Summary Report, February 2007.

Link [Link](#)

[Exit](#)

Town
Georgia

Basin/Sub Basins
Tributaries to Lower Mid Lamoille
Lamoille River Basin

Partners	
Partner	Status
Vermont Agency of Transportation	Active
Friends of Northern Lake Champlain	Active
Vermont Department of Environmental Conservation	Active

Potential Funding Sources
Funding Source
Ecosystem Restoration Program
Clean Water Fund

DEC's basin plans support prioritization of projects for funding

Online Basin Plan Documents



Hudson River Drainage Basin:
[Battenkill, Hoosic, Walloumsac](#)

Lake Champlain Drainage Basin:
[Southern Lake Champlain *](#)
[Otter, Little Otter, Lewis Creeks](#)
[Northern Lake Champlain](#)
[Missisquoi Bay †](#)
[Lamoille](#)
[Winooski](#)

Connecticut River Drainage Basin:
[White](#)
[Ottawauschee, Black †](#)
[West, Williams, Saxtons †](#)
[Deerfield †](#)
[Stevens, Wells, Waits, Ompompanoosic †](#)
[Passumpsic](#)
[Upper Connecticut River](#)

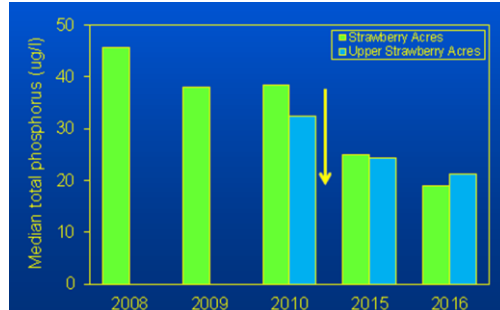
Lake Memphremagog Drainage Basin:
[Lake Memphremagog, Coaticook, Tomfobia](#)

Online Implementation Tables

Project ID	Project Name	Project Type	Status	Cost (Millions)
201	Upper Lamoille Bridge and Culvert Upgrade	Road Project	Discovery	
202	Essex Road Dam Removal	Dam Removal	Discovery	
203	Steward Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
204	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
205	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
206	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
207	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
208	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
209	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
210	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
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213	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
214	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
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246	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
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248	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
249	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	
250	Wentworth Road Erosion Inventory	Road Erosion Control Inventory	Discovery	

Funded projects

Phosphorus Reduction

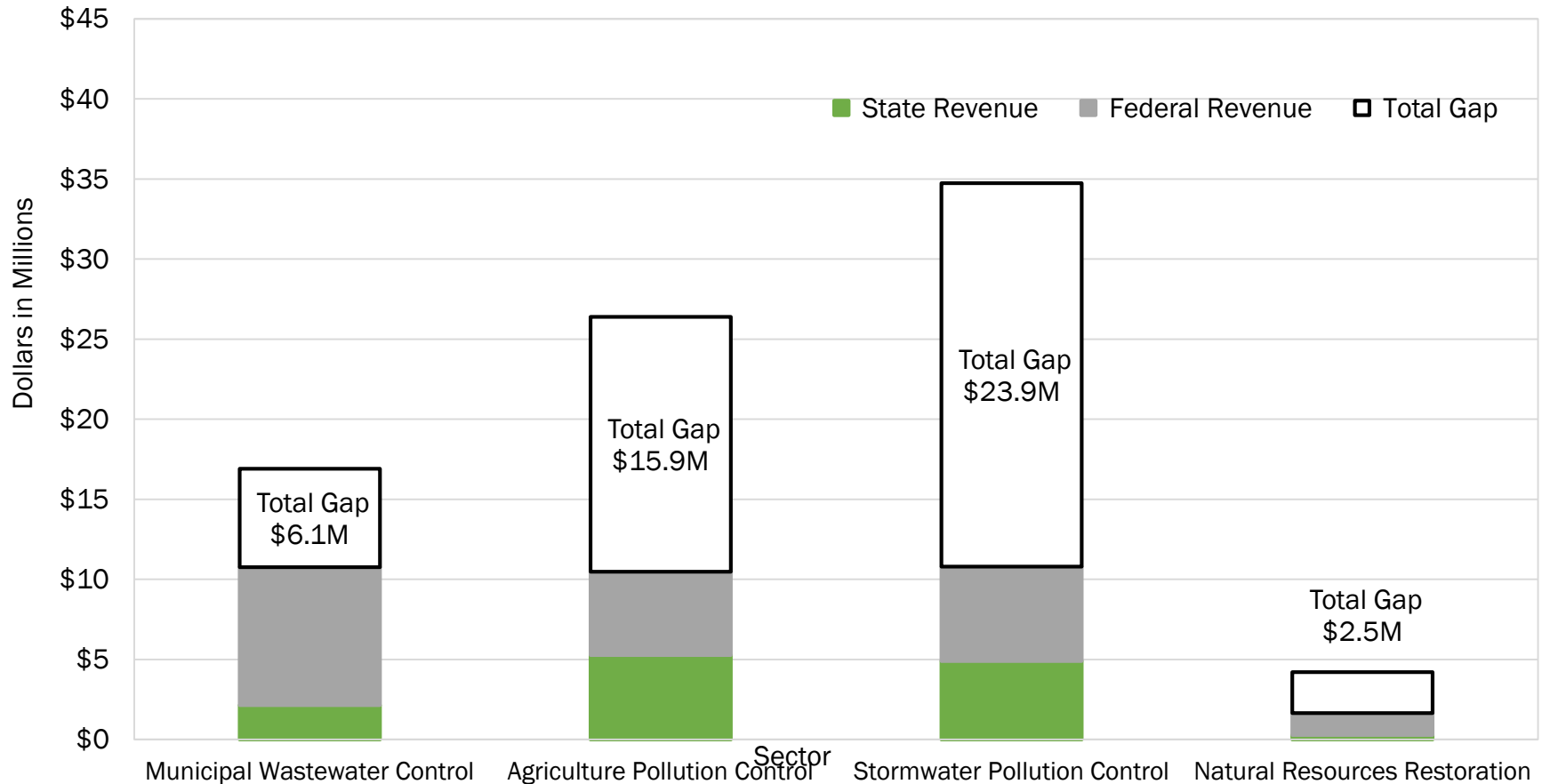


Funding for project implementation comes from many sources



... but current spending does not address full need → funding gap

Vermont Total Annualized “Tier 1” Clean Water Costs, Revenues, and Funding Gap



Annual Tier 1 Costs = \$82.2M, Annual Revenues = \$33.7M, Annual Gap = \$48.5M

Tier 1 Defined as: Incremental costs associated with TMDLs, Act 64 (2015) and CSO Policy (2016); includes public and private costs statewide

Websites:

Tactical Basin Planning

[dec.vermont.gov/watershed/map/
basin-planning](http://dec.vermont.gov/watershed/map/basin-planning)

Vermont Clean Water Initiative

cleanwater.vermont.gov/