TACTICAL BASIN PLANNING

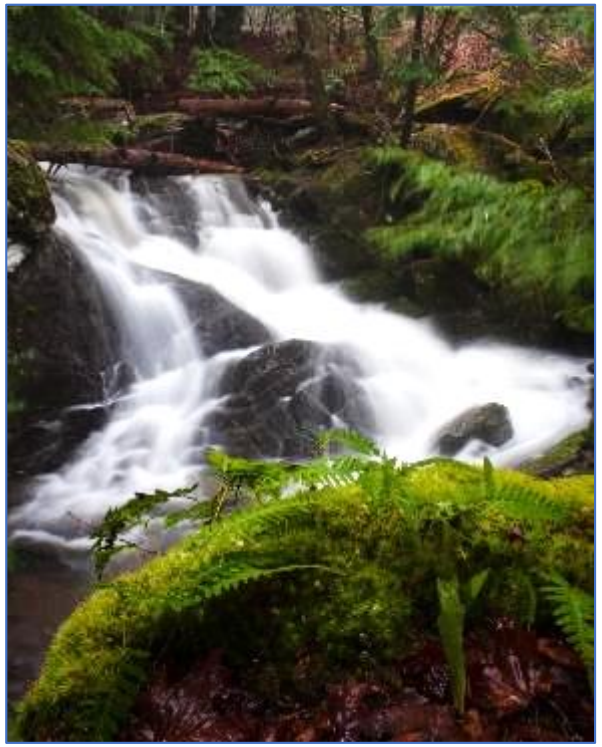
to Support Project Prioritization and Implementation

Neil Kamman
Monitoring, Assessment and Planning Program

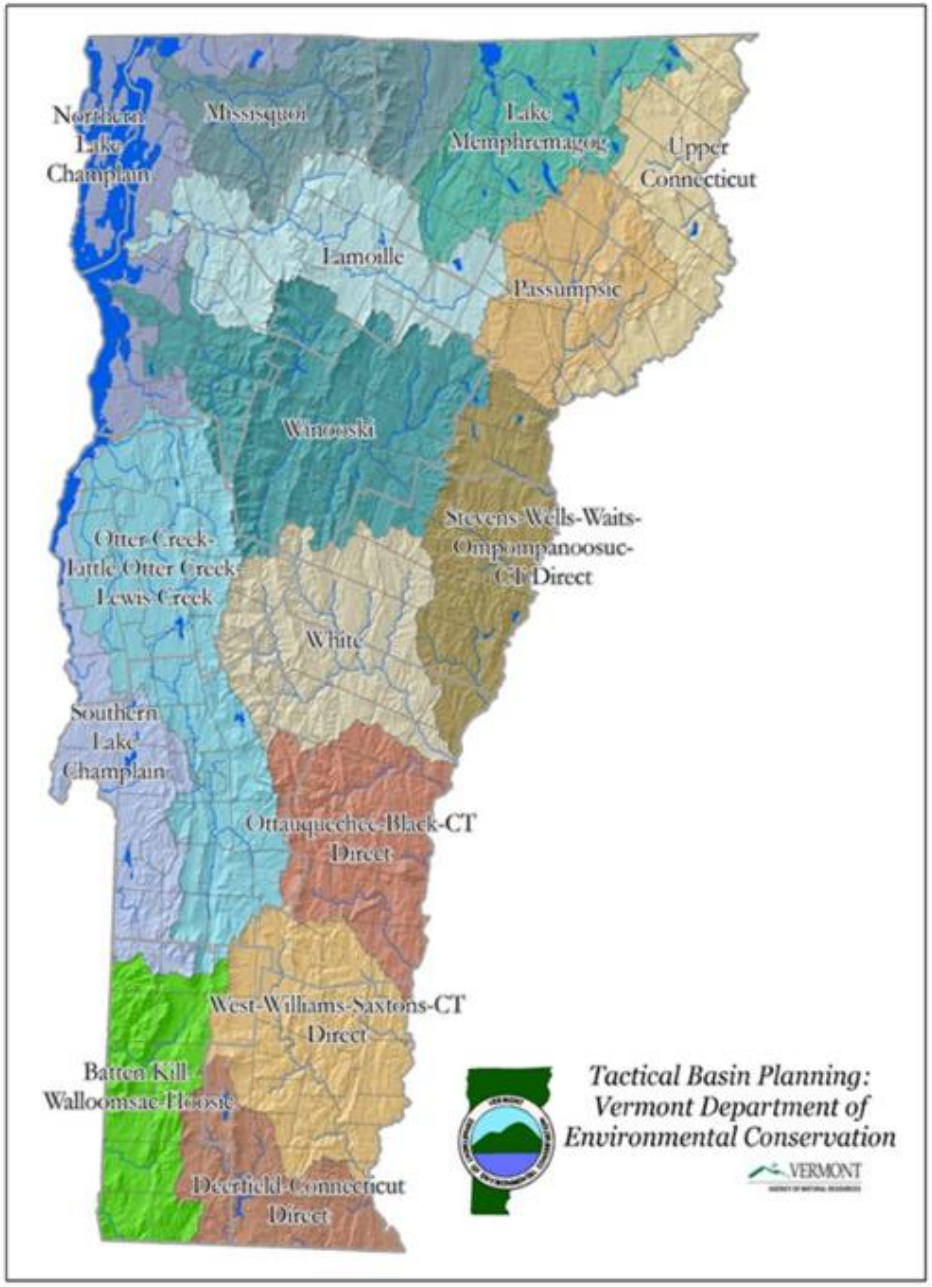
House and Senate Committees on Transportation
Senate Committee on Natural Resources

Tactical Basin Planning is a Process

- **Protect the Best**



- **Restore the Rest**

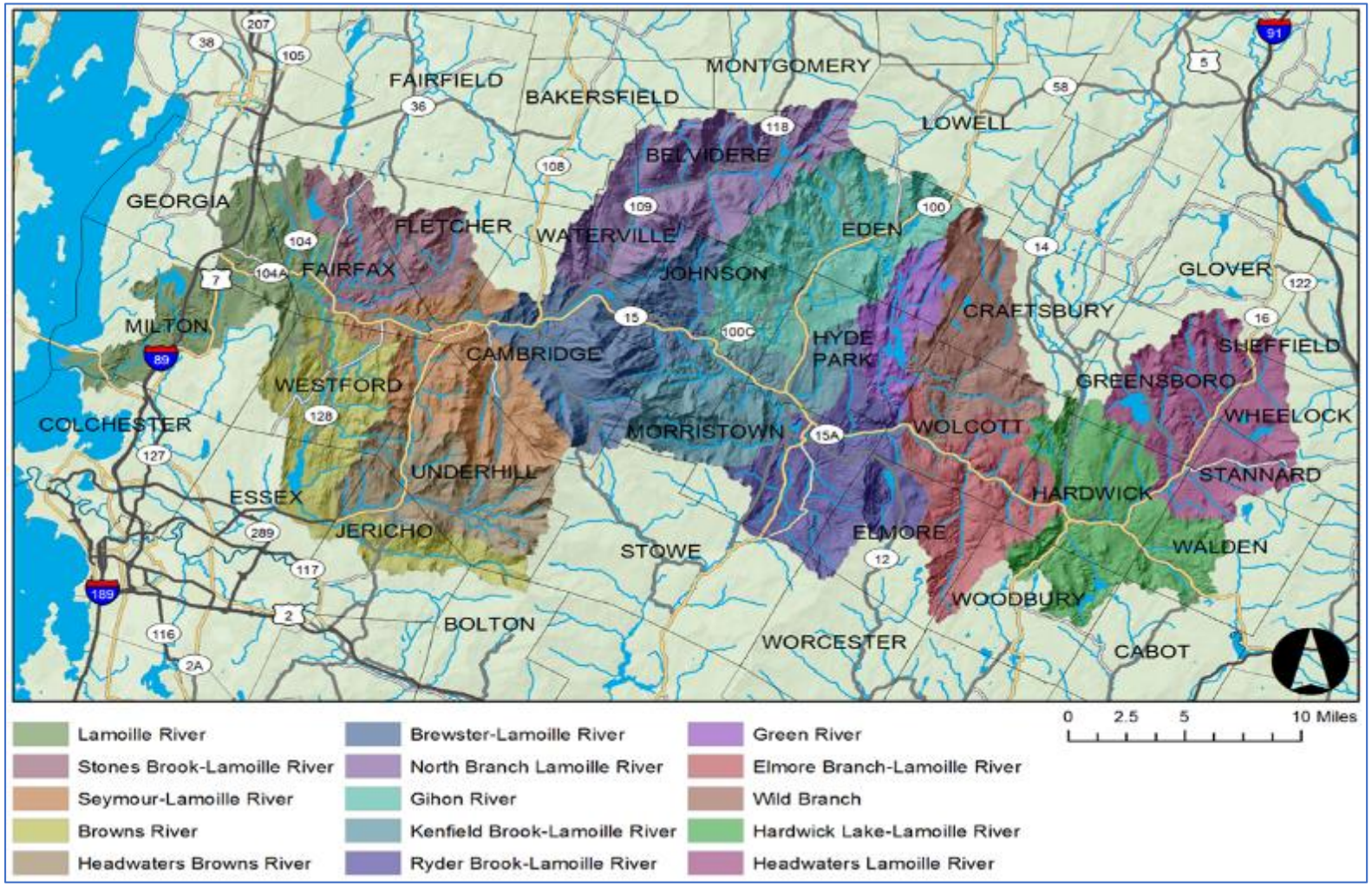


Tactical Basin Planning

- 15 Planning Basins
- 5 Planners
- 5-year cycle
- 3 Phases:
  - Monitoring & assessment
  - Planning
  - Implementation

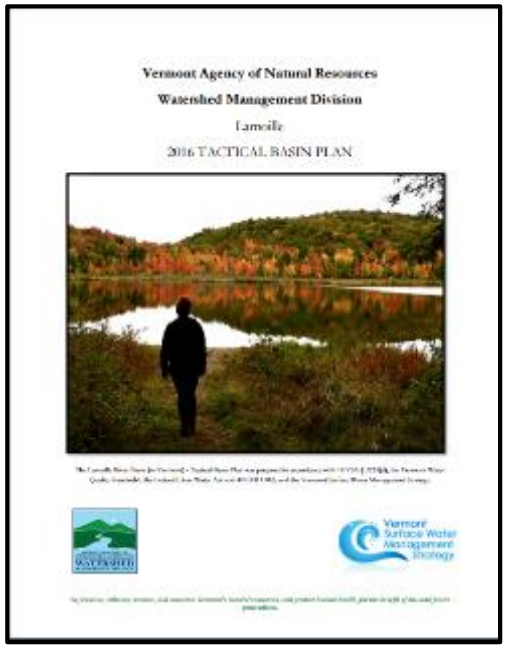
WATERSHED MANAGEMENT DIVISION

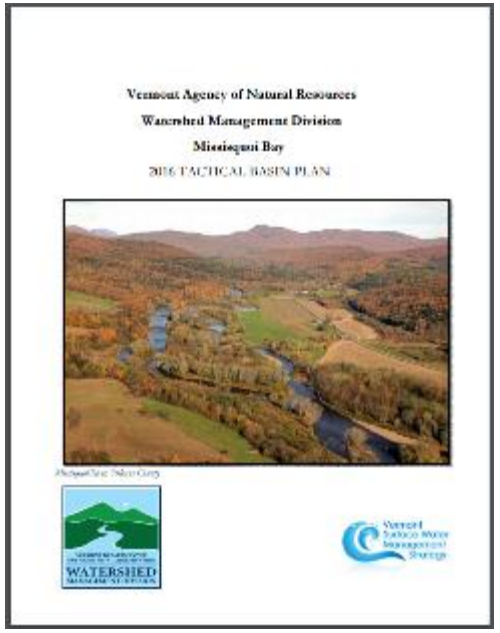
Watersheds…


FAIRFIELD
BAKERSFIELD
MONTGOMERY
LOWELL
BELVIDERE
GEORGIA
FLETCHER
WATERVILLE
EDEN
FAIRFAX
JOHNSON
GLOVER
CRAFTSBURY
MILTON
CAMBRIDGE
HYDE PARK
SHEFFIELD
WESTFORD
GREENSBORO
COLCHESTER
MORRISTOWN
WOLCOTT
WHEELOCK
UNDERHILL
STANNARD
ESSEX
HARDWICK
JERICHO
ELMORE
STOWE
WALDEN
WOODBURY
BOLTON
WORCESTER
CABOT
0 2.5 5 10 Miles
Lamoille River
Brewster-Lamoille River
Green River
Stones Brook-Lamoille River
North Branch Lamoille River
Elmore Branch-Lamoille River
Seymour-Lamoille River
Gihon River
Wild Branch
Browns River
Kenfield Brook-Lamoille River
Hardwick Lake-Lamoille River
Headwaters Browns River
Ryder Brook-Lamoille River
Headwaters Lamoille River

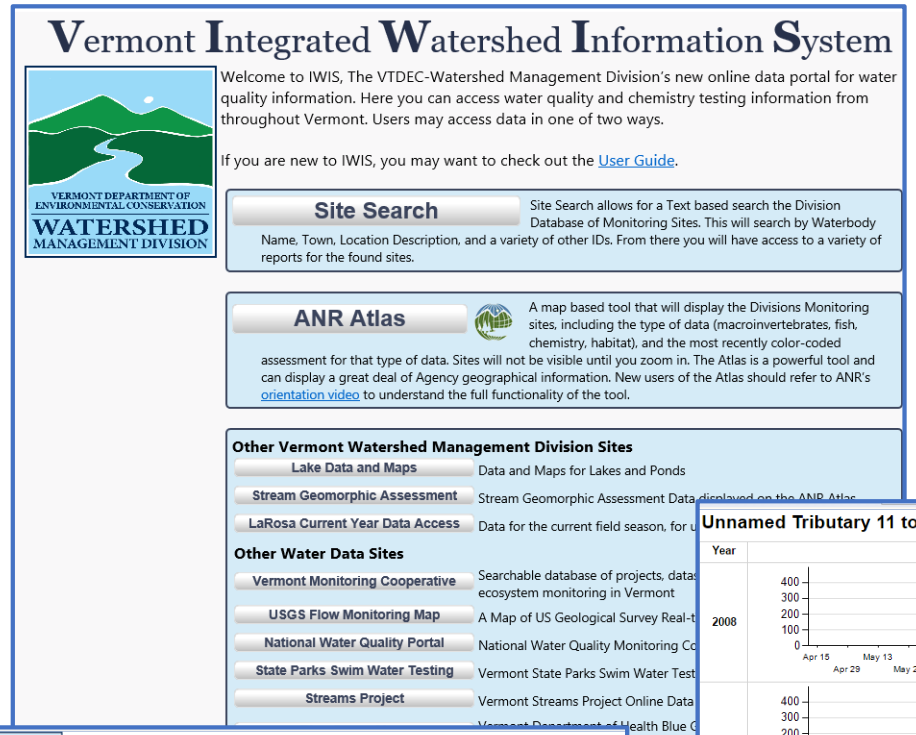
Steps to Tactical Basin Planning

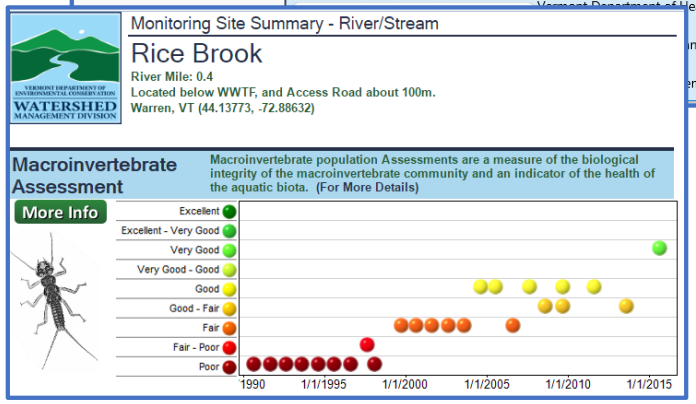
- Water testing results
- Stream condition studies
- Sector-specific assessments
- Phosphorus runoff models
- List actions and projects
- Prioritize
- Identify partners and funding
- Implement projects
- Continually update project status

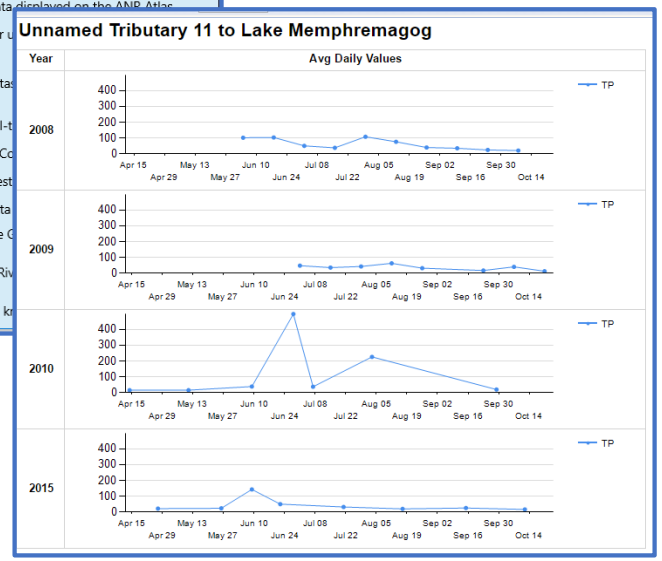


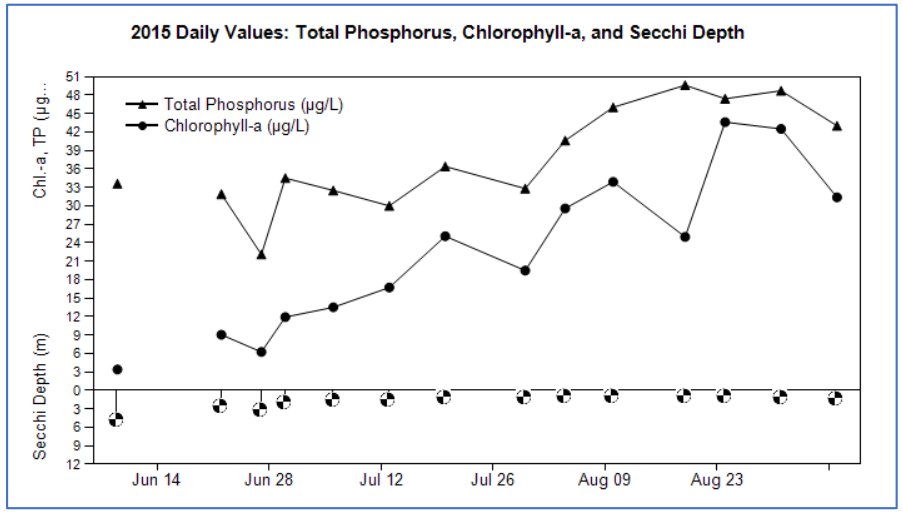


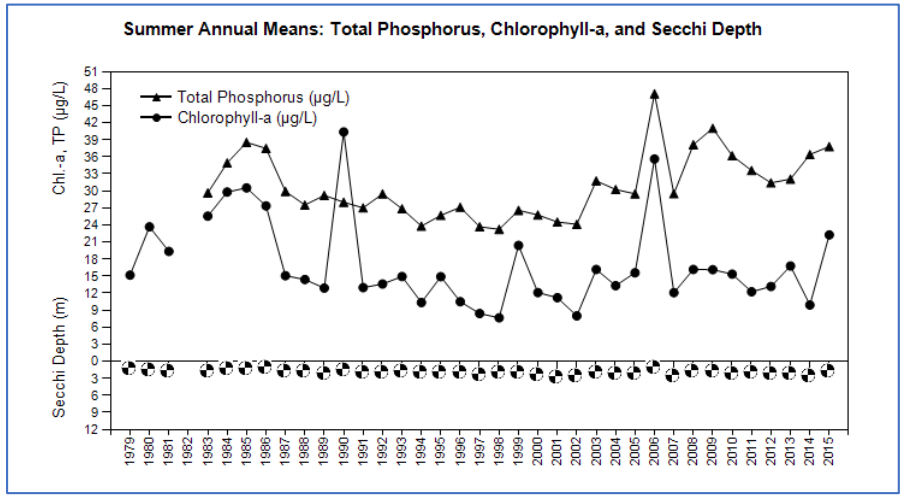
Online Water Quality Data



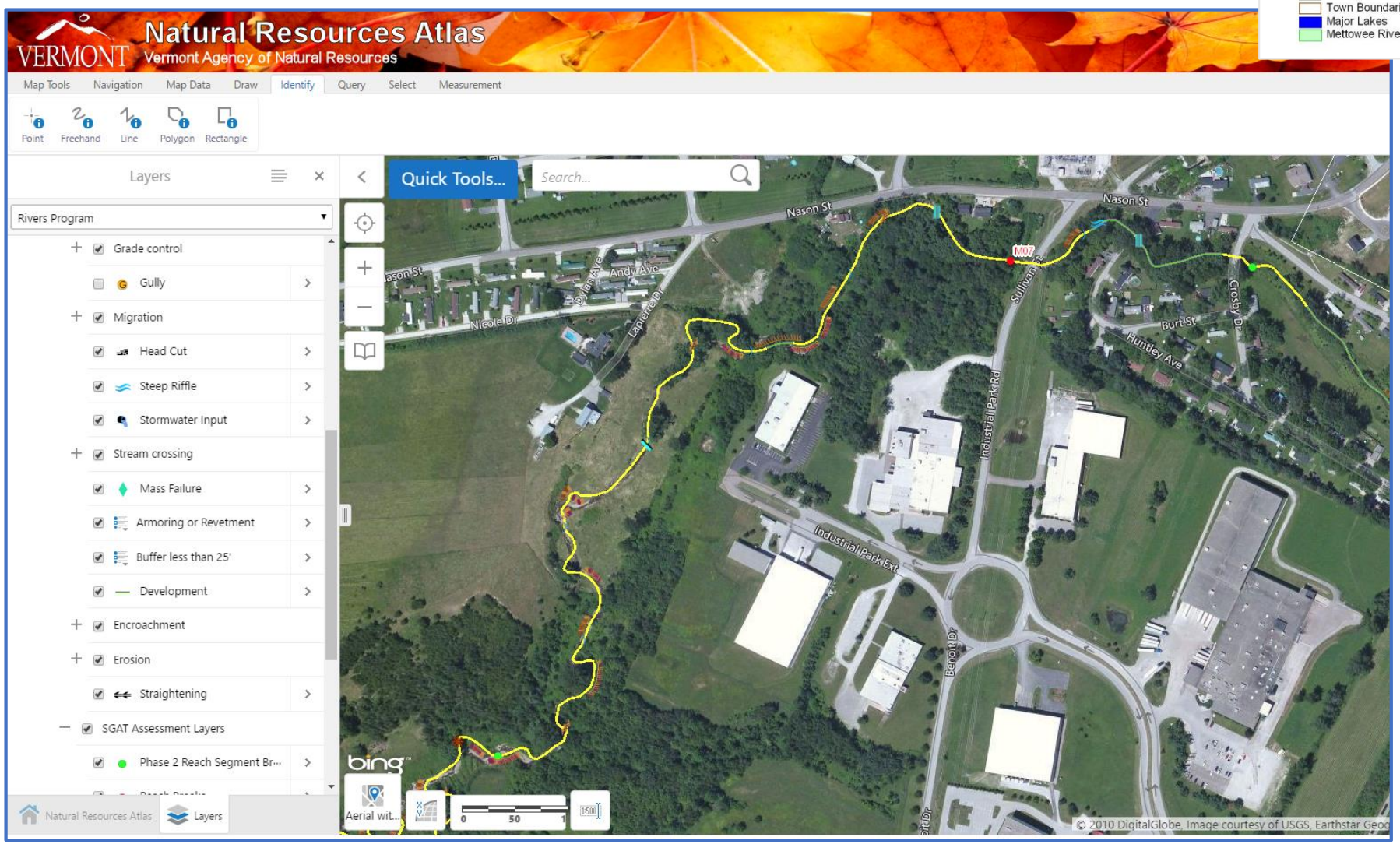


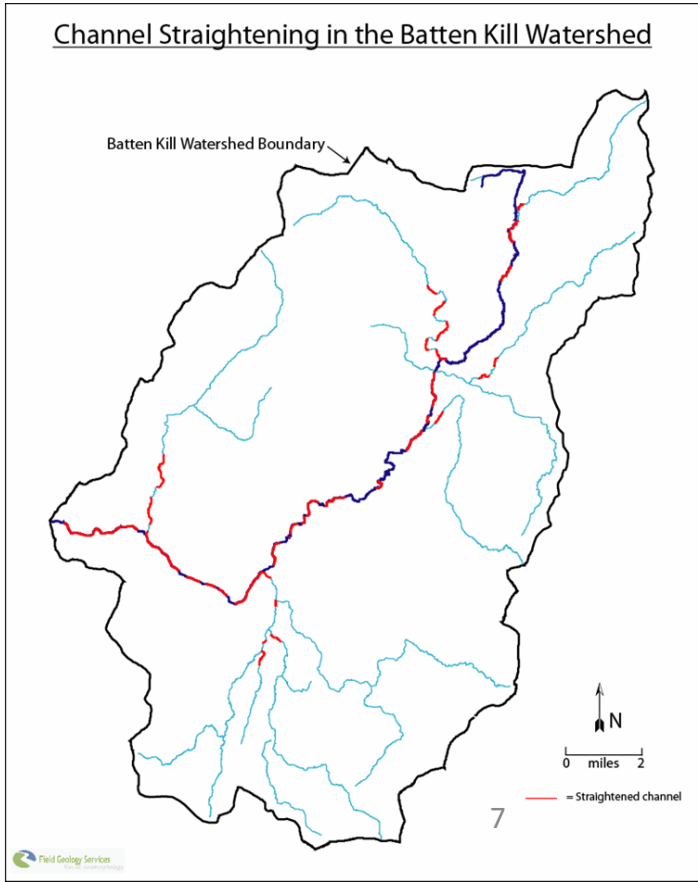






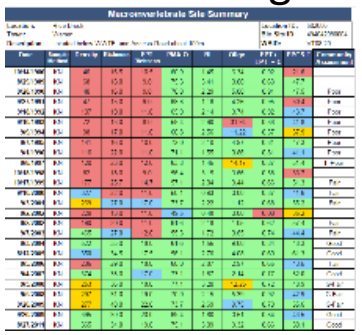
Online Geomorphic Condition Data





Sector-specific assessments:

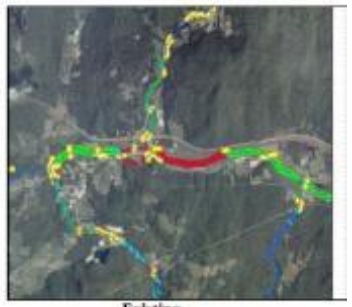
Water Quality Monitoring



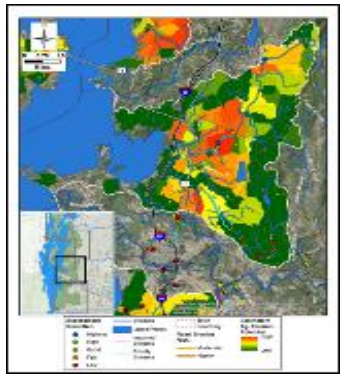
Road Inventory and Erosion Risk

Stormwater Master Plans

Stream Geomorphic Condition



Agricultural Assessments



Town Zoning and Corridor Protection

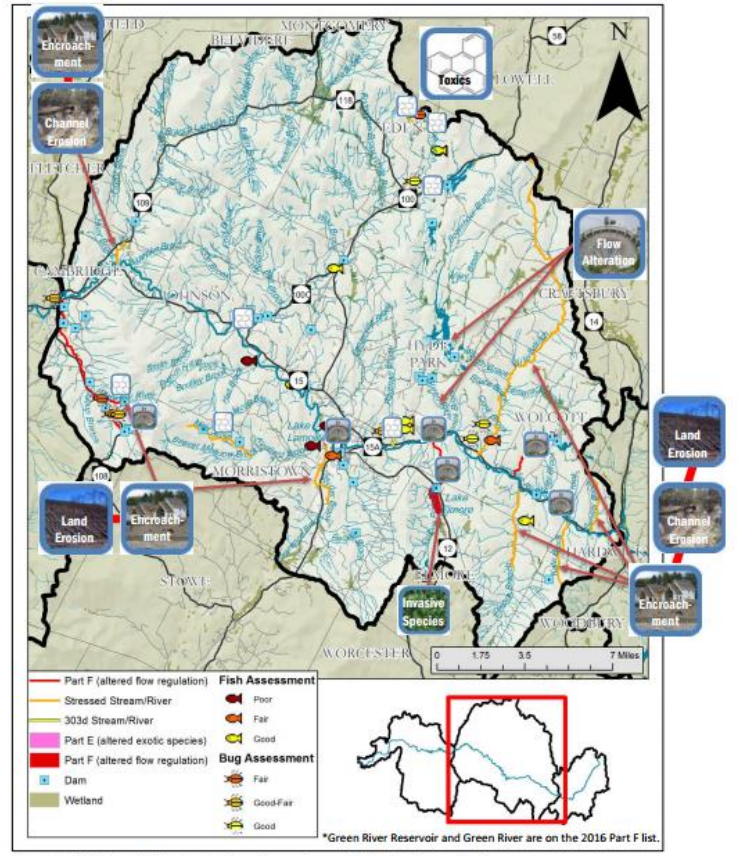
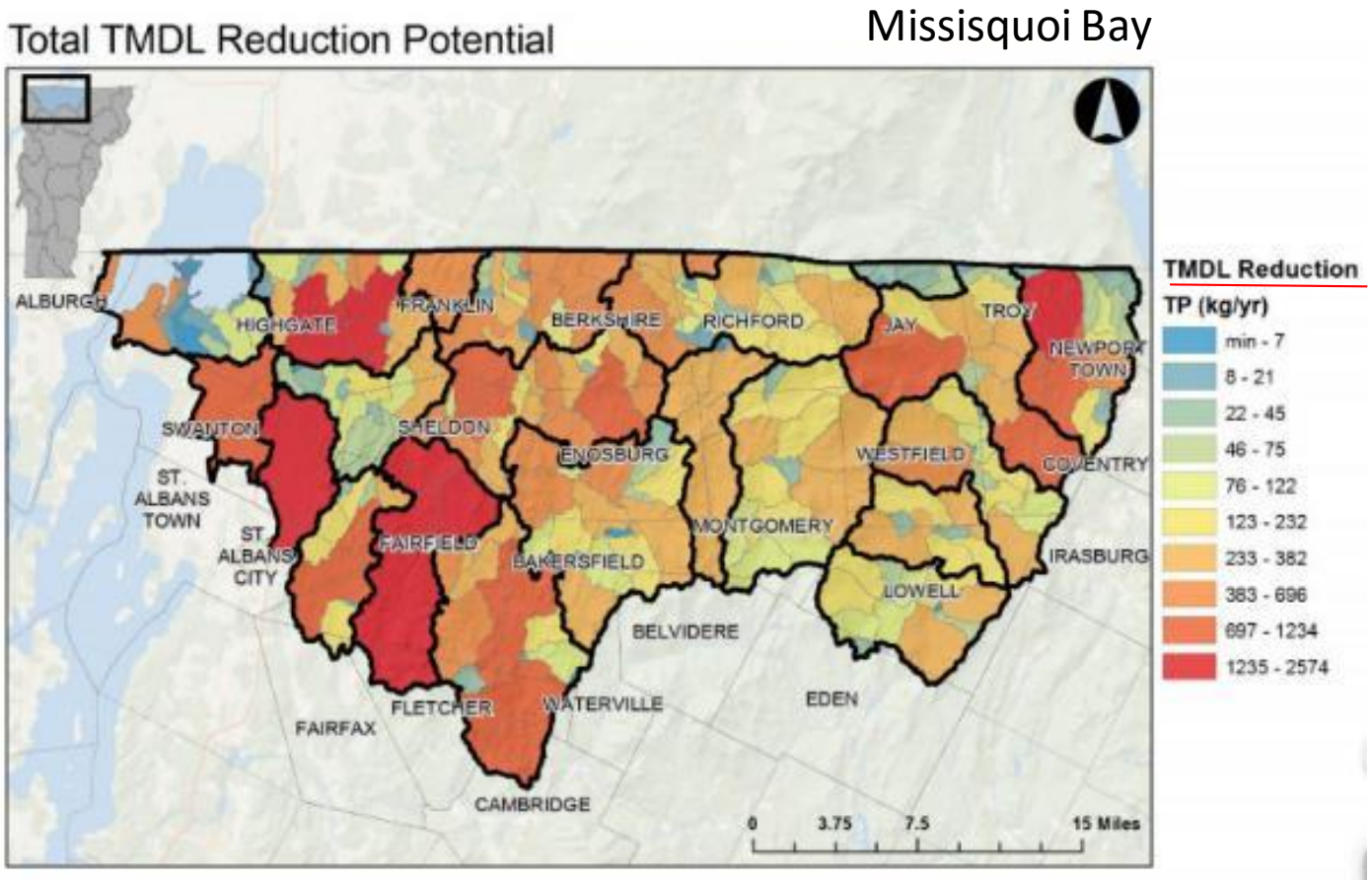


Figure 5. Middle Lamoille basin priority surface waters and related water quality stressors.

Phosphorus models to support Lake Champlain TMDL



Tactical plans describe phosphorus control opportunities to achieve the Lake Champlain TMDL

- Municipal roads
- State Roads and developed lands
- MS4 communities
- Other developed lands
- Agriculture
- Forestry

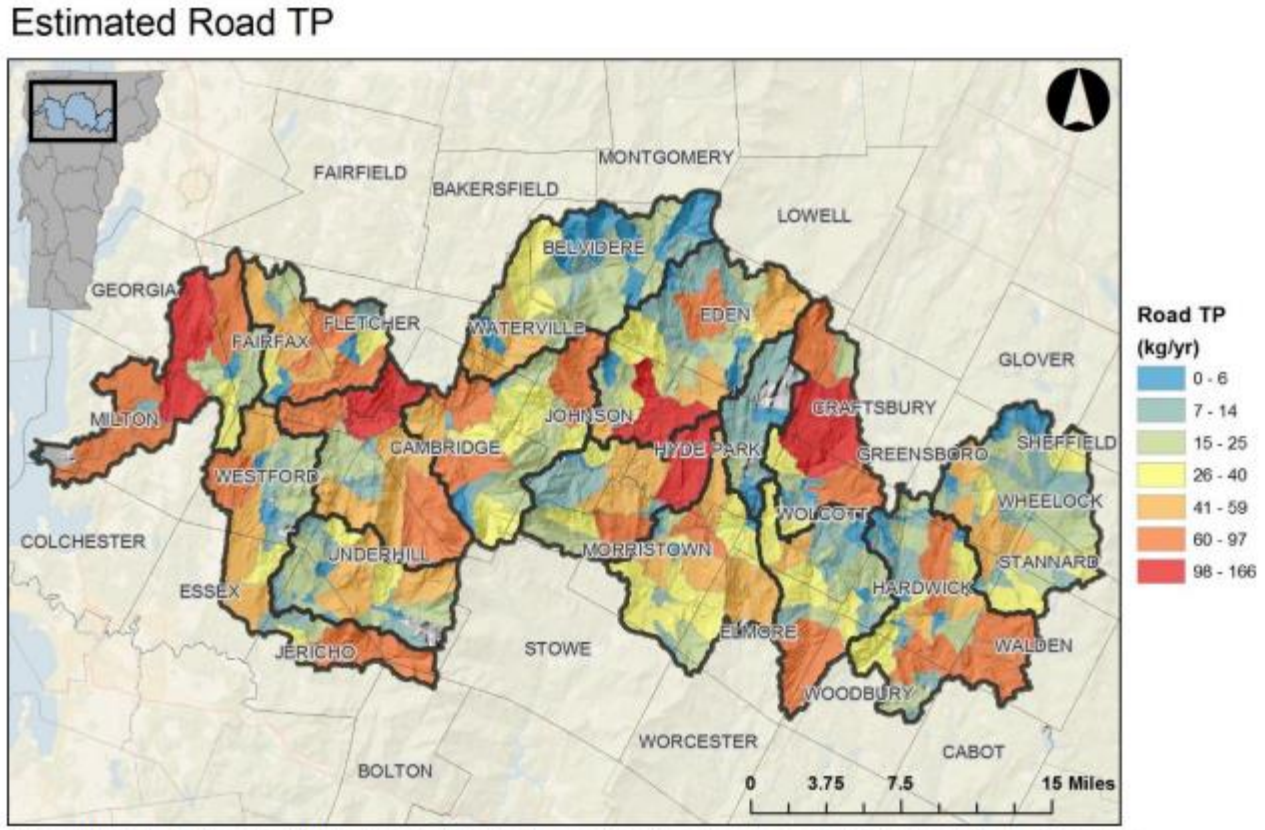
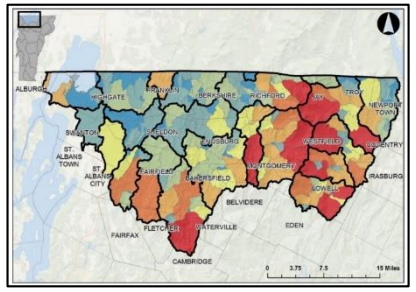


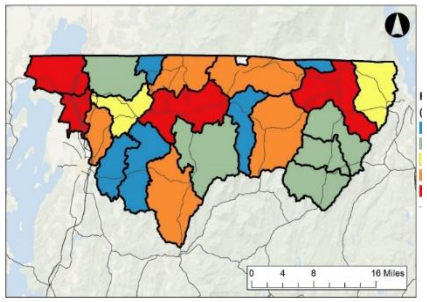
Figure WLA-2. Estimated SWAT loading from all paved and unpaved roads in the Lamoille basin at the catchment scale. Bolded lines represent the HUC12 watersheds.

We use the modeling to assist implementation of regulatory programs that control nutrient pollution

Forests



State roads/facilities



"MS4" communities

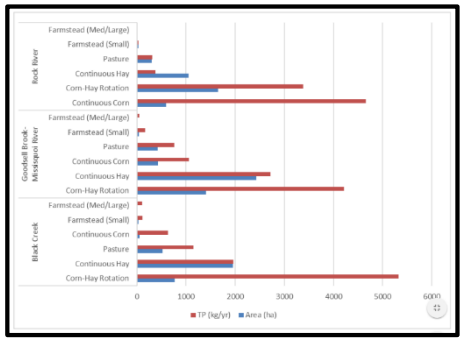
represents portions of the municipality that drains to the Lamoille basin.

MS4 Municipality	Paved road (excluding Vtrans managed roads) (kg/yr)	Unpaved roads (kg/yr)	Other developed lands (kg/yr)
Essex	30	37	260
Milton	181	18	373

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

Agriculture



Local roads

Town	Paved Roads (kg/yr)	Unpaved Roads (kg/yr)	Town	Paved Roads (kg/yr)	Unpaved Roads (kg/yr)
Bakersfield	332.5	263.4	Jay	249.5	70.1
Belvidere	---	---	Lowell	316.6	67.4
Berkshire	291.5	144.4	Montgomery	302.7	119.3
Cambridge	108.4	53.3	Newport Town	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 Town	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			

Wastewater treatment facilities

Facility (permit ID)	Permit expiration date	Planned permit re-issuance year	Design flow MGD	IWC[1] 7Q10 /LMM	Current permitted load (mt P/yr)	TMDL WLA (mt P/yr)	2015 Flow (MGD)[2] / Percent of Design Flow	Treatment type	# of CSOs	Receiving water
Fairfax (3-1194)	9/30/10	2017-18	0.078	0.001/< 0.001	0.539	0.539	0.033 / 42%	Aerated lagoon	0	Lamoille River
Jeffersonville (3-1323)	3/31/10	2017-18	0.077	0.001/< 0.001	0.532	0.532	0.036 / 47%	Aerated lagoon	0	Lamoille River
Johnson (3-1149)	3/31/09	2017-18	0.270	0.029/0 .012	0.224	0.224	0.120 / 44%	Sequential batch reactor	0	Gihon River
Morrisville (3-1155)	12/31/13	2017-18	0.550	0.018/0 .007	0.352	0.352	0.221 / 40%	Sequential batch reactor	0	Lamoille River
Milton (3-1203)	12/31/10	2017-18	1.000	0.010/0 .004	0.829	0.829	0.245 / 25%	Sequential batch reactor	0	Lamoille River
Hardwick (3-1143)	12/31/09	2017-18	0.371	0.023/0 .009	0.410	0.410	0.220 / 59%	Aerated lagoon	0	Lamoille River
PBM Nutritionals (3-1209)	6/30/12	2017-18	0.425	NA	0.352	0.352	0.125 / 29%	Activated Sludge upgrade to Movable Bed Bio Reactor	0	Lamoille River

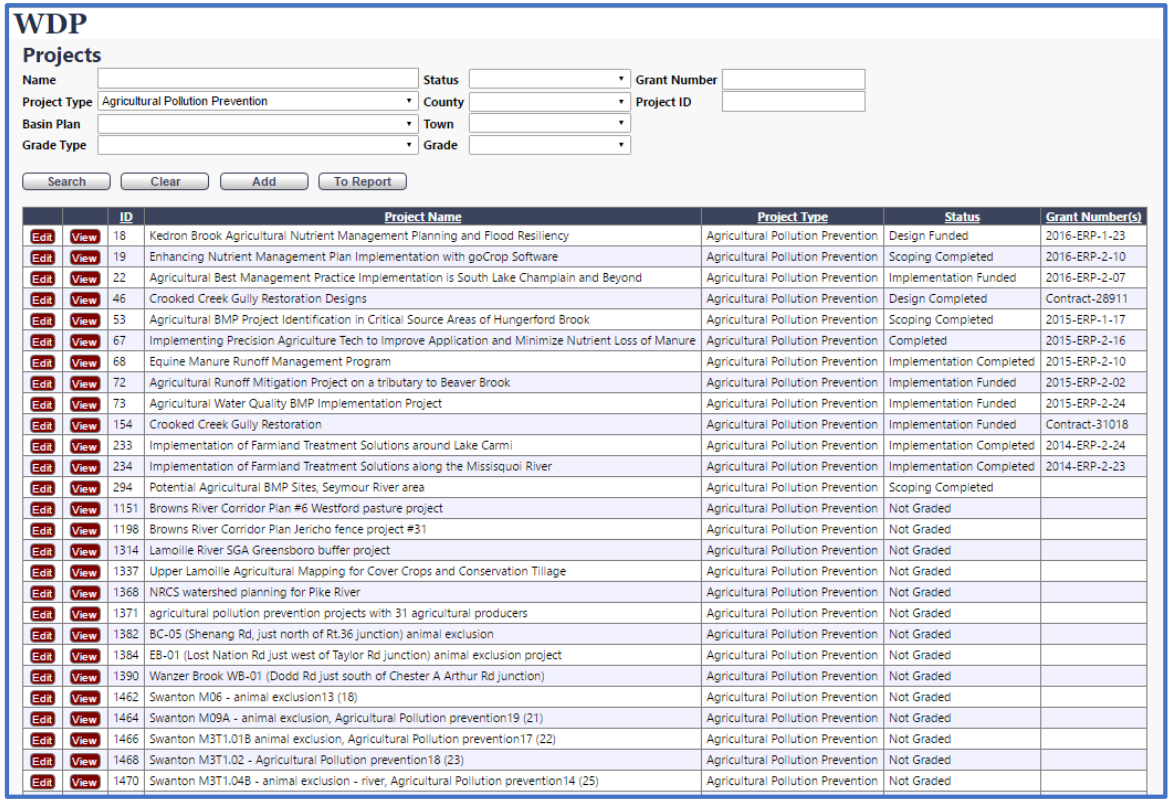
- Allows each tactical basin plan to express the estimated total load, and "sub-allocation" associated with each regulated sector within the TMDL.
- Produce estimates of P loss by land use AND regulatory program
- These estimates are expressed at appropriate geographic scales.
- "Critical Catchment maps"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

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION WATERSHED MANAGEMENT DIVISION

The Role of the Community

- ✓ Identify water quality issues – what did we miss?
- ✓ Assist in targeting strategies
- ✓ Formulate a collaborative approach
- ✓ Be Involved in implementation.

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



WDP

Projects

Name | Status | Grant Number
Project Type: Agricultural Pollution Prevention | County | Project ID
Basin Plan | Town
Grade Type | Grade

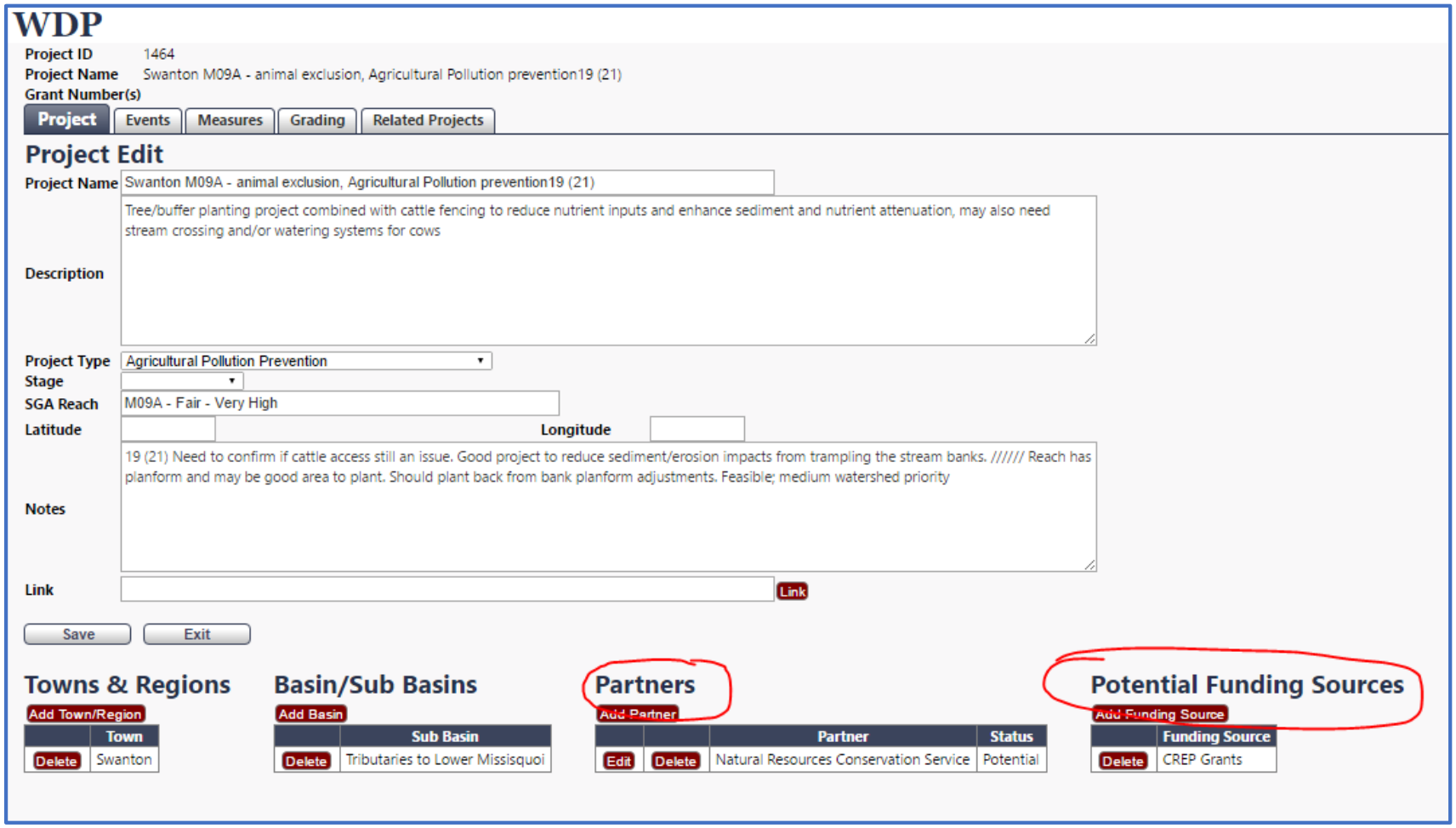
Search | Clear | Add | To Report

		ID	Project Name	Project Type	Status	Grant Number(s)
Edit	View	18	Kedron Brook Agricultural Nutrient Management Planning and Flood Resiliency	Agricultural Pollution Prevention	Design Funded	2016-ERP-1-23
Edit	View	19	Enhancing Nutrient Management Plan Implementation with goCrop Software	Agricultural Pollution Prevention	Scoping Completed	2016-ERP-2-10
Edit	View	22	Agricultural Best Management Practice Implementation is South Lake Champlain and Beyond	Agricultural Pollution Prevention	Implementation Funded	2016-ERP-2-07
Edit	View	46	Crooked Creek Gully Restoration Designs	Agricultural Pollution Prevention	Design Completed	Contract-28911
Edit	View	53	Agricultural BMP Project Identification in Critical Source Areas of Hungerford Brook	Agricultural Pollution Prevention	Scoping Completed	2015-ERP-1-17
Edit	View	67	Implementing Precision Agriculture Tech to Improve Application and Minimize Nutrient Loss of Manure	Agricultural Pollution Prevention	Completed	2015-ERP-2-16
Edit	View	68	Equine Manure Runoff Management Program	Agricultural Pollution Prevention	Implementation Completed	2015-ERP-2-10
Edit	View	72	Agricultural Runoff Mitigation Project on a tributary to Beaver Brook	Agricultural Pollution Prevention	Implementation Funded	2015-ERP-2-02
Edit	View	73	Agricultural Water Quality BMP Implementation Project	Agricultural Pollution Prevention	Implementation Funded	2015-ERP-2-24
Edit	View	154	Crooked Creek Gully Restoration	Agricultural Pollution Prevention	Implementation Funded	Contract-31018
Edit	View	233	Implementation of Farmland Treatment Solutions around Lake Carmi	Agricultural Pollution Prevention	Implementation Completed	2014-ERP-2-24
Edit	View	234	Implementation of Farmland Treatment Solutions along the Missisquoi River	Agricultural Pollution Prevention	Implementation Completed	2014-ERP-2-23
Edit	View	294	Potential Agricultural BMP Sites, Seymour River area	Agricultural Pollution Prevention	Scoping Completed	
Edit	View	1151	Browns River Corridor Plan #6 Westford pasture project	Agricultural Pollution Prevention	Not Graded	
Edit	View	1198	Browns River Corridor Plan Jericho fence project #31	Agricultural Pollution Prevention	Not Graded	
Edit	View	1314	Lamoille River SGA Greensboro buffer project	Agricultural Pollution Prevention	Not Graded	
Edit	View	1337	Upper Lamoille Agricultural Mapping for Cover Crops and Conservation Tillage	Agricultural Pollution Prevention	Not Graded	
Edit	View	1368	NRCS watershed planning for Pike River	Agricultural Pollution Prevention	Not Graded	
Edit	View	1371	agricultural pollution prevention projects with 31 agricultural producers	Agricultural Pollution Prevention	Not Graded	
Edit	View	1382	BC-05 (Shenang Rd, just north of Rt.36 junction) animal exclusion	Agricultural Pollution Prevention	Not Graded	
Edit	View	1384	EB-01 (Lost Nation Rd just west of Taylor Rd junction) animal exclusion project	Agricultural Pollution Prevention	Not Graded	
Edit	View	1390	Wanzer Brook WB-01 (Dodd Rd just south of Chester A Arthur Rd junction)	Agricultural Pollution Prevention	Not Graded	
Edit	View	1462	Swanton M06 - animal exclusion13 (18)	Agricultural Pollution Prevention	Not Graded	
Edit	View	1464	Swanton M09A - animal exclusion, Agricultural Pollution prevention19 (21)	Agricultural Pollution Prevention	Not Graded	
Edit	View	1466	Swanton M3T1.01B animal exclusion, Agricultural Pollution prevention17 (22)	Agricultural Pollution Prevention	Not Graded	
Edit	View	1468	Swanton M3T1.02 - Agricultural Pollution prevention18 (23)	Agricultural Pollution Prevention	Not Graded	
Edit	View	1470	Swanton M3T1.04B - animal exclusion - river, Agricultural Pollution prevention14 (25)	Agricultural Pollution Prevention	Not Graded	

- Online Projects and Tracking
- Projects are prioritized with partner input (RPCs, NRCDs).
- Database summaries are publicly available at appropriate scale.
- Ready projects meeting key criteria become the highest priority for funding.

https://anrweb.vt.gov/DEC/IWIS/ARK/ARKReportViewer.aspx?Report=ImplementationReady

Tactical basin plans identify key partners and funding, when known



WDP

Project ID 1464
Project Name Swanton M09A - animal exclusion, Agricultural Pollution prevention19 (21)
Grant Number(s)

Project | Events | Measures | Grading | Related Projects

Project Edit

Project Name: Swanton M09A - animal exclusion, Agricultural Pollution prevention19 (21)

Description: Tree/buffer planting project combined with cattle fencing to reduce nutrient inputs and enhance sediment and nutrient attenuation, may also need stream crossing and/or watering systems for cows

Project Type: Agricultural Pollution Prevention
Stage:
SGA Reach: M09A - Fair - Very High
Latitude: Longitude:

Notes: 19 (21) Need to confirm if cattle access still an issue. Good project to reduce sediment/erosion impacts from trampling the stream banks. ////// Reach has planform and may be good area to plant. Should plant back from bank planform adjustments. Feasible; medium watershed priority

Link: Link

Save | Exit

Towns & Regions

Add Town/Region

	Town
Delete	Swanton

Basin/Sub Basins

Add Basin

	Sub Basin
Delete	Tributaries to Lower Missisquoi

Partners

Add Partner

		Partner	Status
Edit	Delete	Natural Resources Conservation Service	Potential

Potential Funding Sources

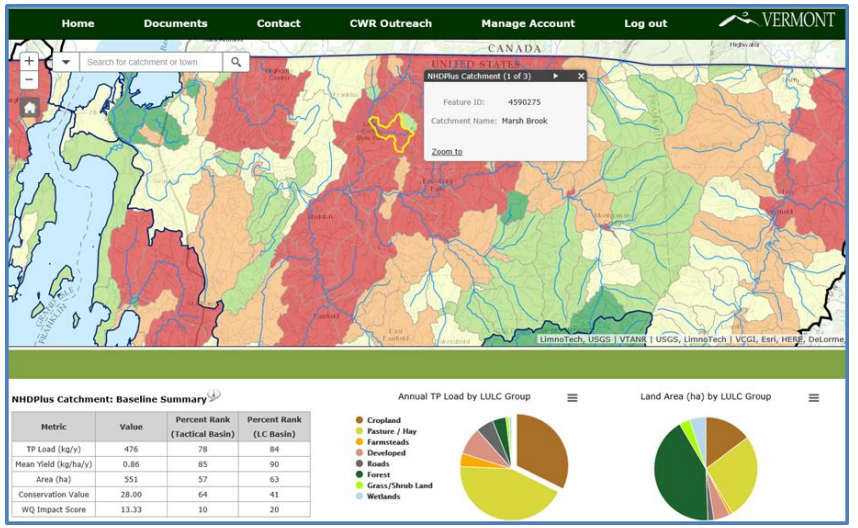
Add Funding Source

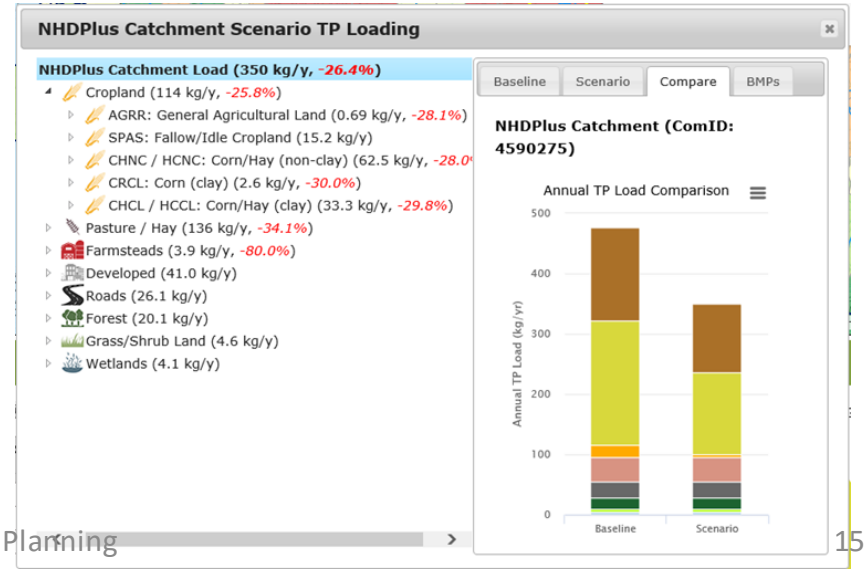
	Funding Source
Delete	CREP Grants

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 DECs database for public.

Clean Water Roadmap





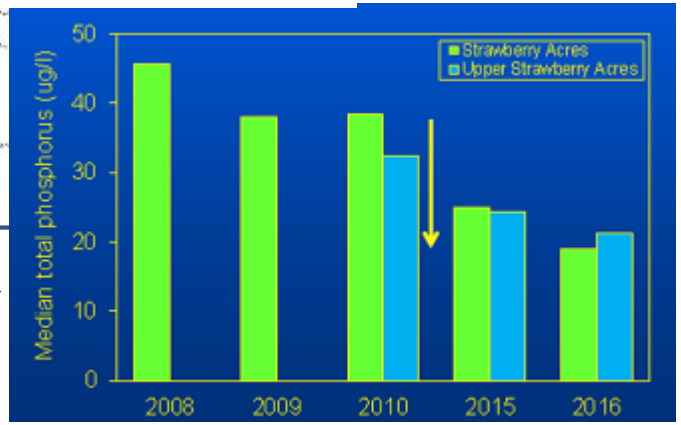
MAPP has evolved the planning program to deliver fully-integrated, online basin plans supporting funding.

Online Basin Plan Documents

Online Implementation Tables

Funded projects

Phos. reduction



For additional information

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
MONITORING, ASSESSMENT & PLANNING PROGRAM

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