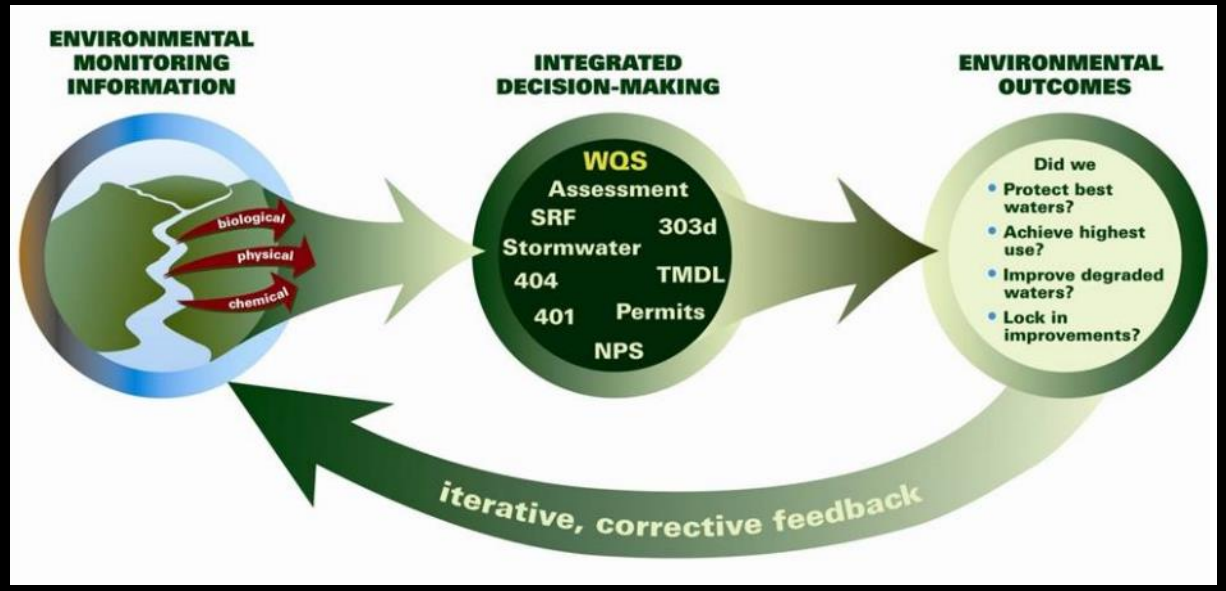
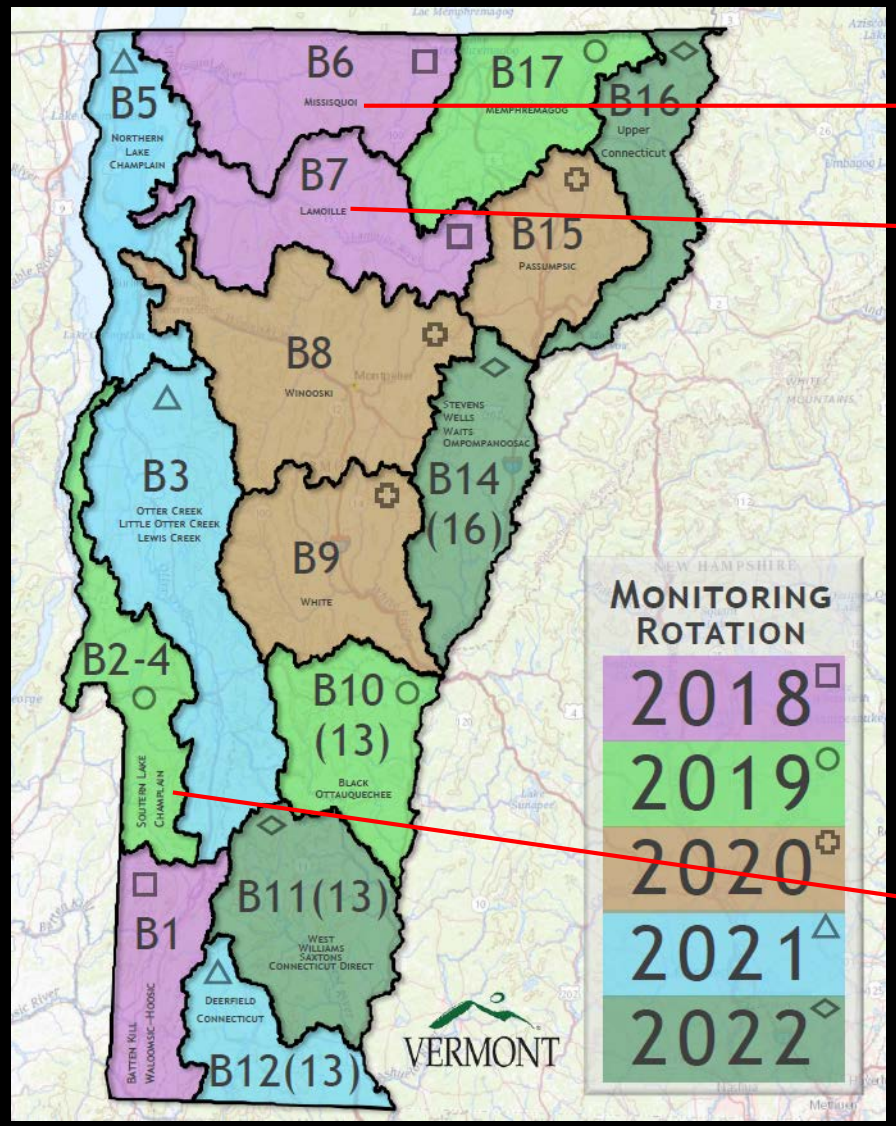


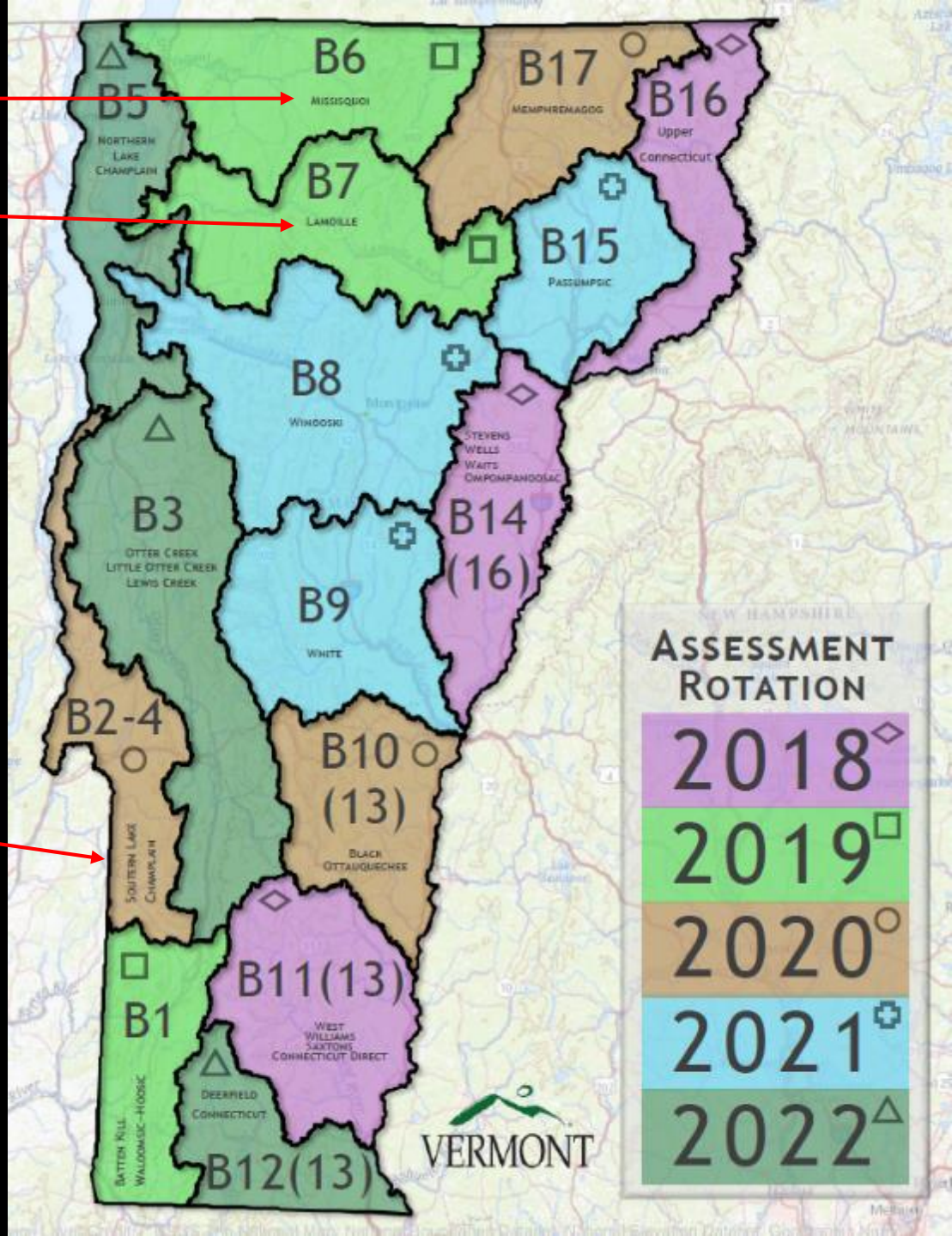
Tactical Basin Planning, Project Identification, and Project Prioritization

Ethan Swift, VT DEC Watershed Management Division, February 08, 2019

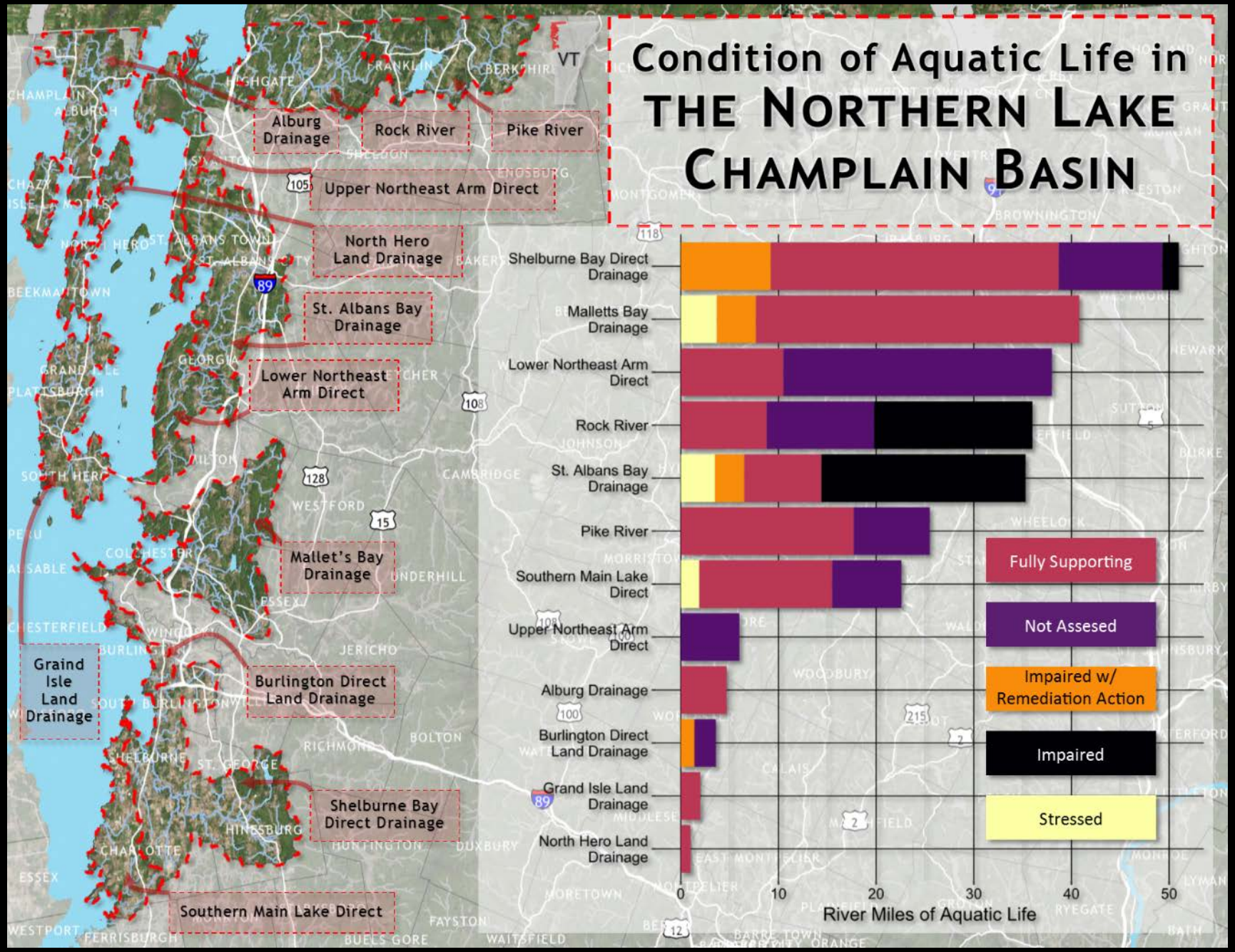
Presentation Overview

- Surface Water Monitoring and Assessment Process
- Use of Data to Inform Watershed Restoration Priorities
- Watershed Projects Database
- Sector Based Assessments
- Modeling and Mapping Tools
- Stormwater Retrofit Example of Project ID and Prioritization -soup to nuts





The purpose of the Assessment process is to categorize Vermont's surface waters as either "full support," "stressed," "altered," or "impaired." The four assessment categories and the factors and decision principles applied when evaluating data and other information to determine if a water meets the Standards; and the rationale when deciding where and how to list a particular water



Designated Uses:

Attainment of aquatic life support (bugs and fish), aquatic habitat, recreation (swimming, fishing, and boating), water supply, irrigation, etc.

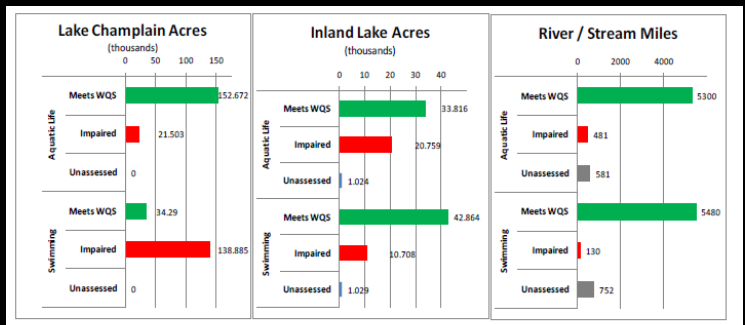
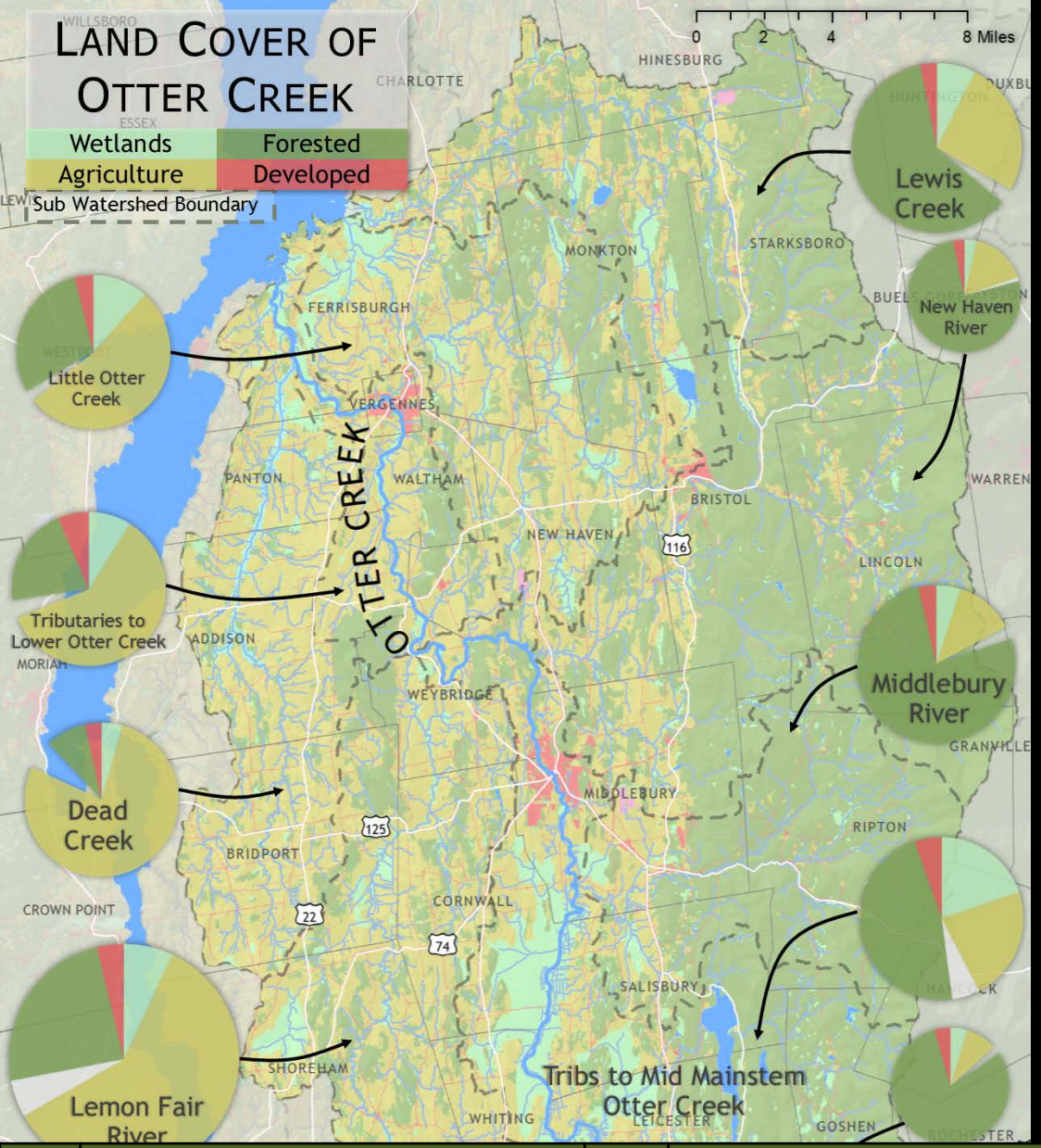
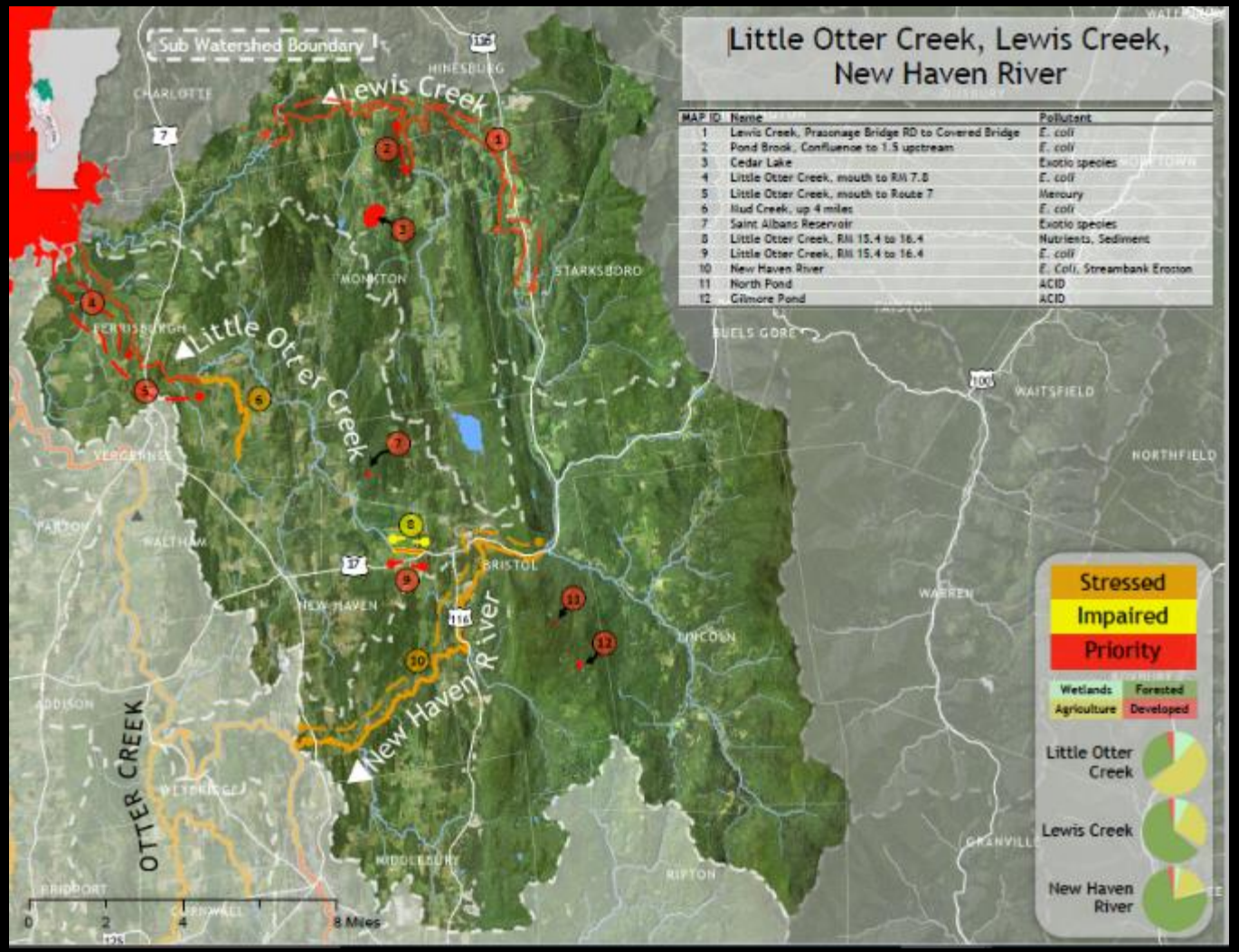


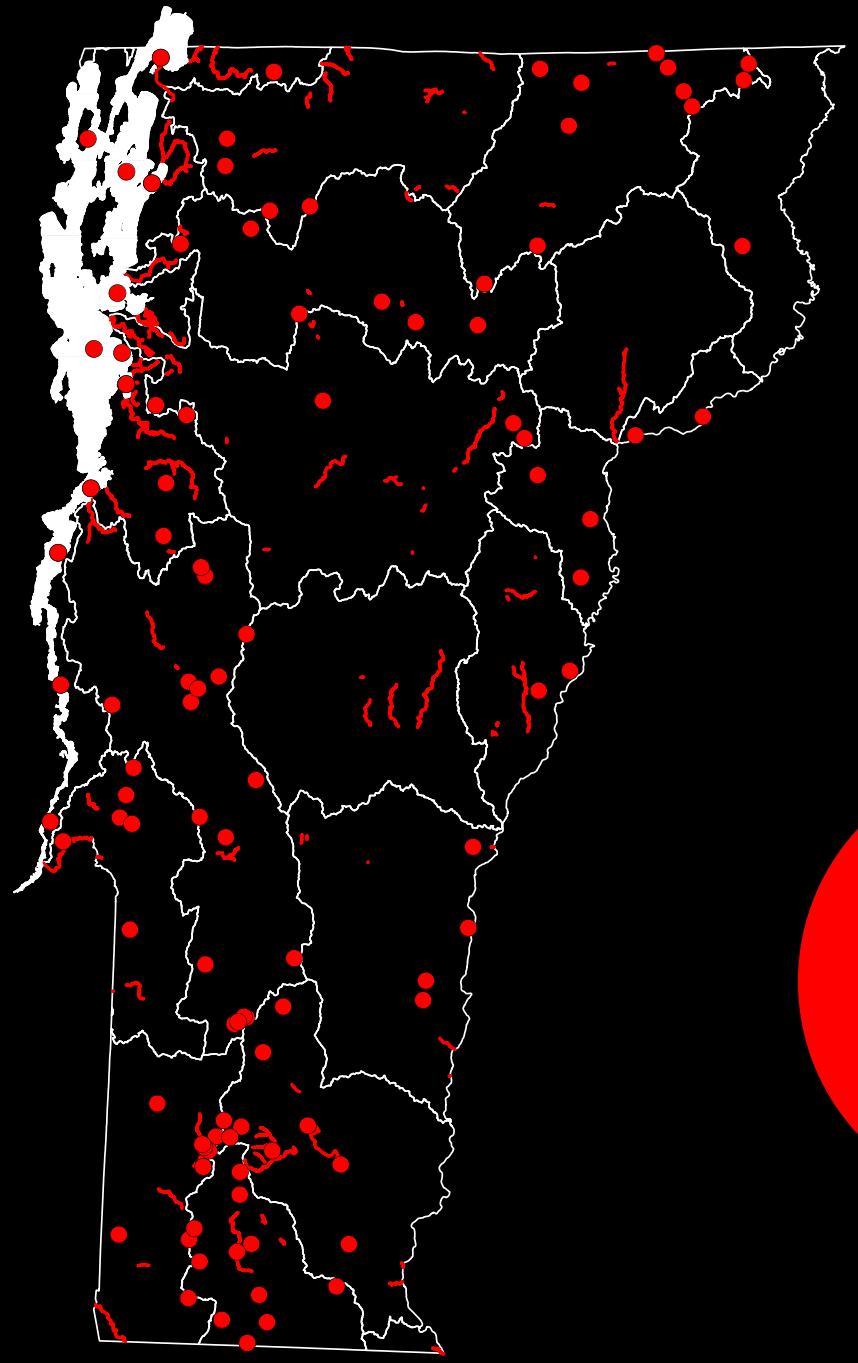
Figure 1. Assessment of Aquatic Life and Swimming Uses in Vermont Lakes and Rivers.





VT03-01	OTTER CREEK, MOUTH OF MIDDLEBURY RIVER TO PULP MILL BRIDGE (4.0 MI)	E. COLI	AGRICULTURAL RUNOFF, POSSIBLE FAILED SEPTIC SYSTEMS, MIDDLEBURY CSOs
VT03-08	LEWIS CREEK, PARSONAGE BRIDGE RD (LCR19.5) TO COVERED BRDGE (LCR7.3)	E. COLI	AGRICULTURAL RUNOFF
VT03-08	POND BROOK, FROM LEWIS CREEK CONFLUENCE UPSTREAM (1.5 MILES)	E. COLI	AGRICULTURAL RUNOFF
VT03-12	MIDDLEBURY RIVER, FROM MOUTH UPSTREAM 2 MILES	E. COLI	AGRICULTURAL RUNOFF, LIVESTOCK, POSSIBLE FAILED SEPTIC SYSTEMS

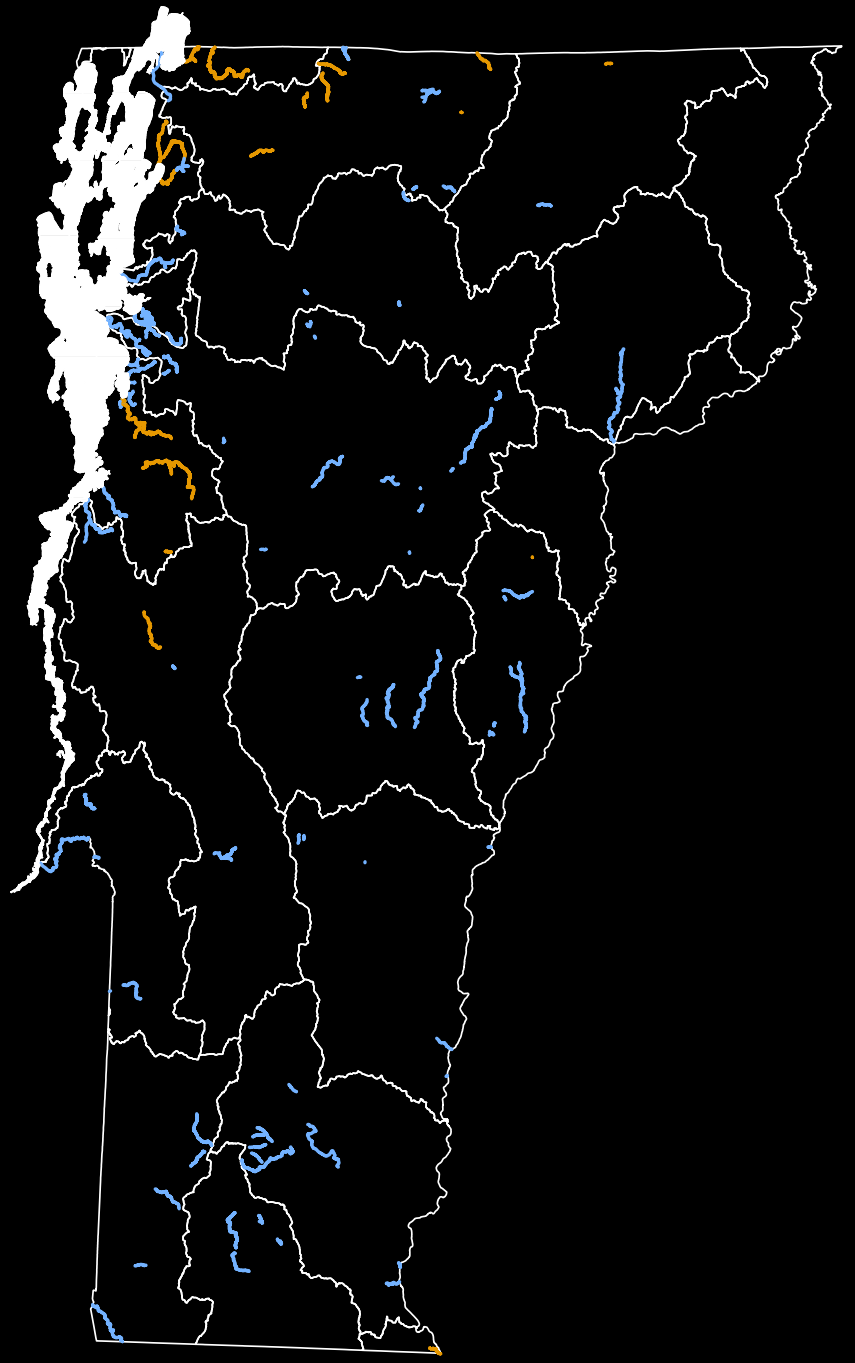
How are stressors, in the form of land use activities and the pollutants they beget, contributing to use attainment and assessed condition?



IMPAIRED WATERS

418.4 Miles

116 Lakes Units



AGRICULTURAL SOURCES

OTHER SOURCES

Project Identification and Prioritization

Projects are identified and prioritized based on:

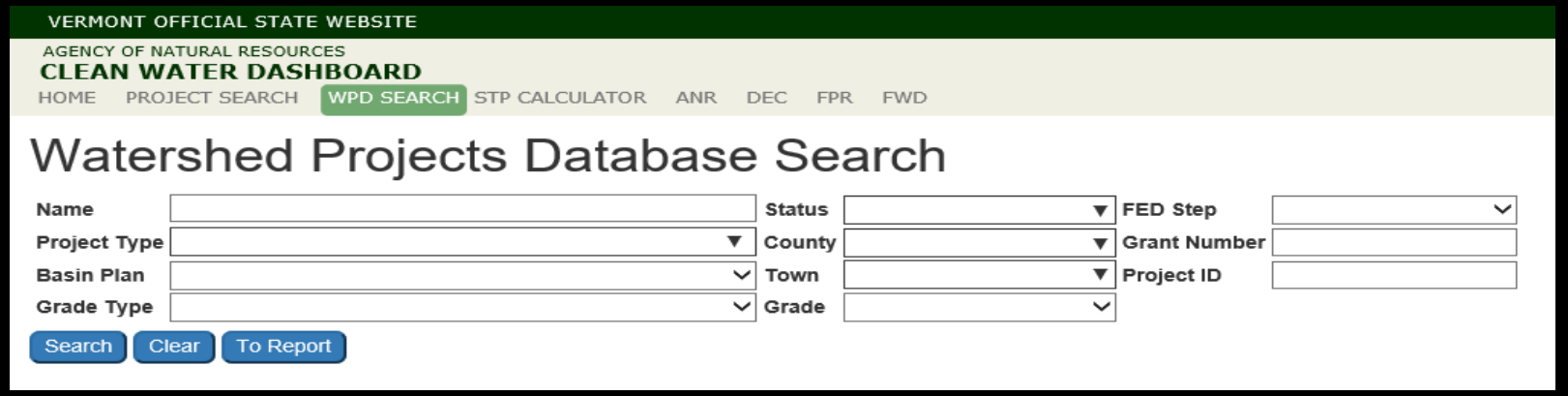
- Surface water condition (esp. listing – impaired, stressed, etc), and where WQ condition is integrated with
- Priorities ID'ed in a sector based assessment (i.e., stormwater master plans, river corridor plans)
- ID'ed through modeling (clean water roadmap confirms, etc.)
- And if known (quantifiable) environmental benefits – with estimated nutrient and sediment reduction

Project Identification and Prioritization

Watershed Projects Database:

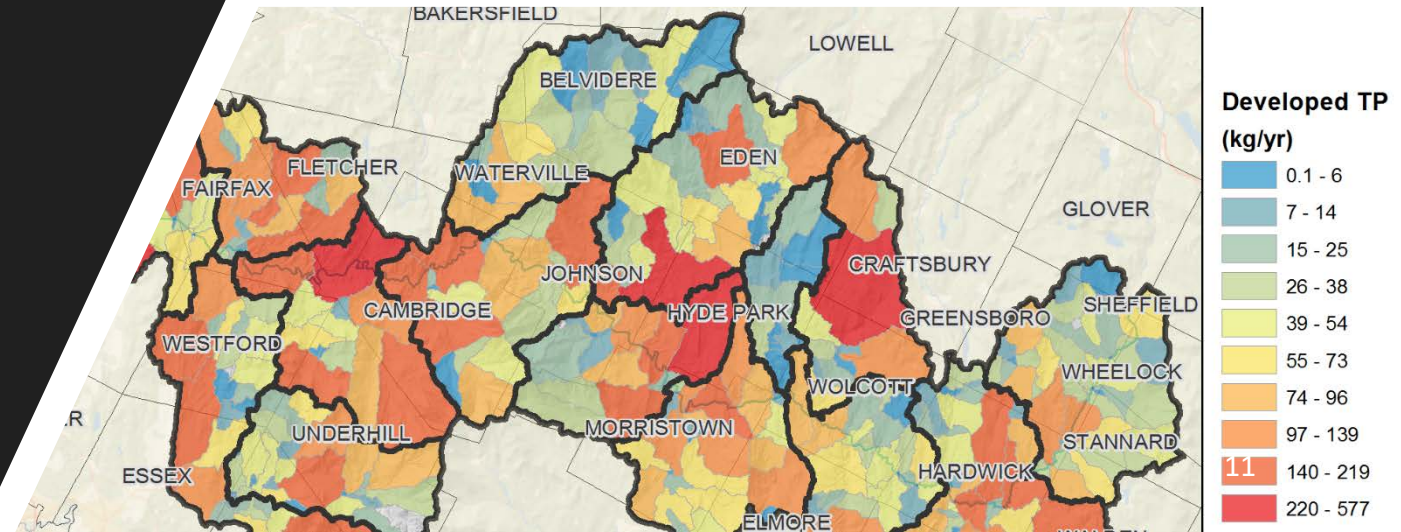
Key Points

- Project priorities are not necessarily static
- As BMPs get implemented those priorities may change, given their importance for implementation based on more recent WQ monitoring data
- We may also have updated sector based assessments – highlighting emerging priorities as conditions change (i.e., adaptive management)
- Some projects remain high priorities (e.g., longer term river restoration efforts or where enhanced stormwater BMP implementation is still required to meet the TMDL target load reductions following iterative reporting cycles)

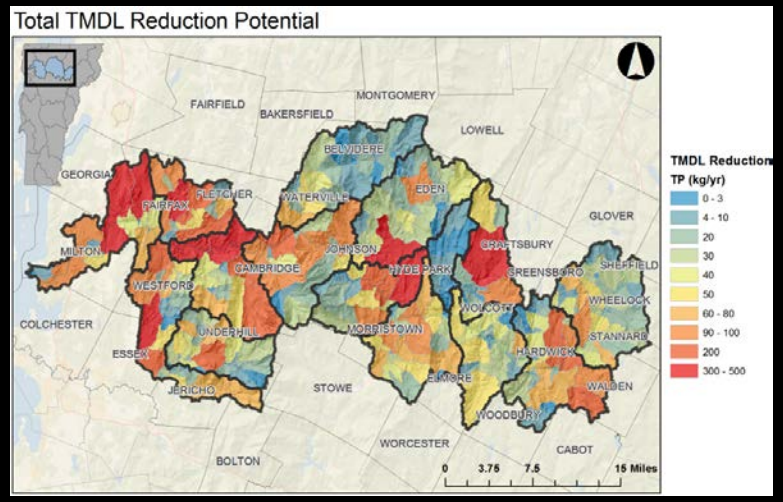


Modeling: Clean Water Roadmap/ CW Blueprint

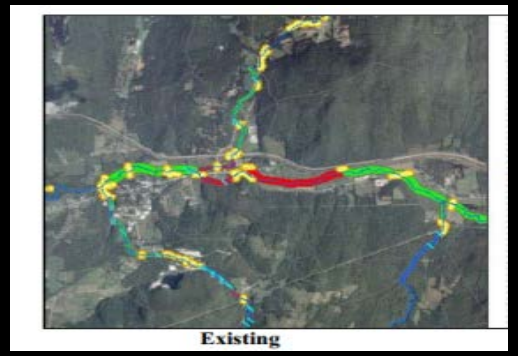
1. The Clean Water Roadmap: DEC's modeling Tool to assist in targeting & tracking TMDL, Act 64 implementation
2. Water Quality Blueprint scores:
   - Conservation Value
   - Water Quality Impact
   - Combined scores
3. Relevant spatial layers (streams, towns)
4. Landscape features (soils, slopes, land use)



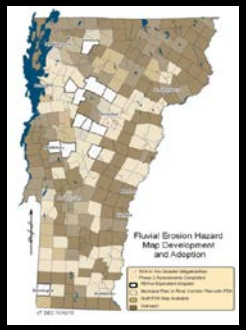
Compile and Integrate Sector Based Assessments to inform Project Identification and Prioritization



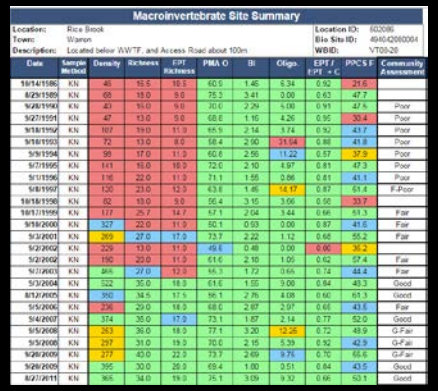
Stream Geomorphic Condition



Town Zoning and Corridor Protection



Water Quality

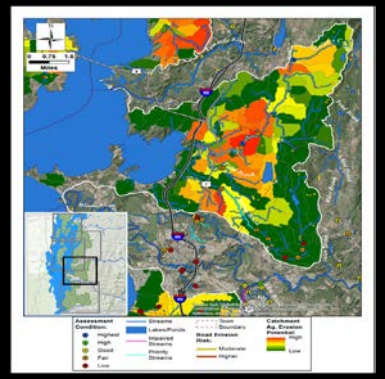


Macroinvertebrate Site Summary

Location: Rice Brook
Town: Warren
Description: Located below WWTF, and Access Road about 100m
Location ID: 602080
Bio Site ID: 4940-42060004
WBID: VT09-26

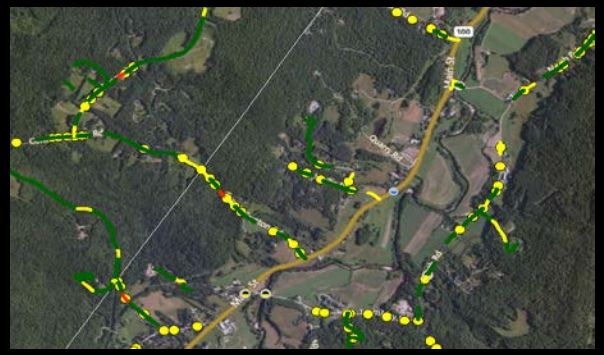
Date	Sample Method	Density	Richness	EPT Richness	PMA O	BI	Oligo	EPT / EPT + C	POCET	Community Assessment
10/14/1986	KN	46	16.5	10.5	60.9	1.46	5.34	0.92	21.6	
8/29/1989	KN	68	19.0	9.0	75.3	3.41	9.00	0.63	47.2	
9/28/1990	KN	43	15.0	9.0	30.0	2.29	5.00	0.91	47.5	Poor
9/27/1991	KN	47	13.0	9.0	68.6	1.16	4.26	0.95	30.6	Poor
9/18/1992	KN	107	19.0	11.0	65.5	2.14	5.74	0.92	43.7	Poor
9/16/1993	KN	72	13.0	8.0	58.4	2.90	31.64	0.88	41.8	Poor
9/9/1994	KN	98	17.0	11.0	60.6	2.56	11.22	0.57	37.9	Poor
9/7/1995	KN	141	16.0	10.0	72.0	2.10	4.97	0.81	47.3	Poor
9/11/1996	KN	116	22.0	11.0	71.1	1.55	0.86	0.61	45.1	Poor
9/8/1997	KN	120	23.0	12.0	63.8	1.46	14.17	0.87	61.2	F-Poor
10/19/1998	KN	82	13.0	9.0	90.4	3.15	3.66	0.56	33.7	
10/17/1999	KN	177	25.7	14.7	57.1	2.04	3.44	0.66	51.3	Fair
9/19/2000	KN	327	22.0	11.0	50.1	0.53	0.00	0.87	41.6	Fair
9/3/2001	KN	269	27.0	17.0	73.7	2.22	1.12	0.68	55.2	Fair
9/2/2002	KN	229	13.0	11.0	49.6	0.48	0.00	0.00	35.2	
9/2/2002	KN	190	23.0	11.0	61.6	2.10	1.09	0.62	57.4	Fair
9/17/2003	KN	365	27.0	12.0	55.3	1.72	0.66	0.74	44.4	Fair
9/3/2004	KN	522	35.0	16.0	61.6	1.55	9.00	0.84	49.3	Good
8/12/2005	KN	360	34.5	17.5	56.1	2.76	4.08	0.60	61.3	Good
9/5/2006	KN	236	29.0	16.0	68.0	2.87	2.07	0.68	43.6	Fair
9/4/2007	KN	374	36.0	17.0	73.1	1.87	2.14	0.77	52.0	Good
9/5/2008	KN	263	36.0	16.0	77.1	3.20	12.26	0.72	49.9	G-Fair
9/5/2008	KN	297	31.0	19.0	70.6	2.16	5.39	0.92	42.9	G-Fair
9/28/2009	KN	277	40.0	22.0	73.7	2.69	9.75	0.72	65.6	G-Fair
9/29/2009	KN	395	30.0	20.0	69.4	1.00	0.51	0.84	43.6	Good
8/27/2011	KN	365	34.0	19.0	75.1	3.09	9.32	0.66	53.1	Good

Agricultural Assessments



Stormwater Master Planning

Road Inventory and Erosion Risk



Watershed Projects Explorer

Displaying Projects in the VT Watershed Projects Database

Tactical Basin Planning & Watershed Projects

The Tactical Basin Planning process identifies water quality priorities statewide. The **Vermont Watershed Projects Database** (WPD) provides basin planners with a way to track and store priorities identified in Tactical Basin Plans that are not being tracked by other means.

A total of 5009 viable projects were listed in the database as of 12/6/2018. 4323 (86%) have been identified for development and 686 (14%) have been completed or are in the funding queue. Of the 86% ready for development, 67% (n=2894) have discrete locations.

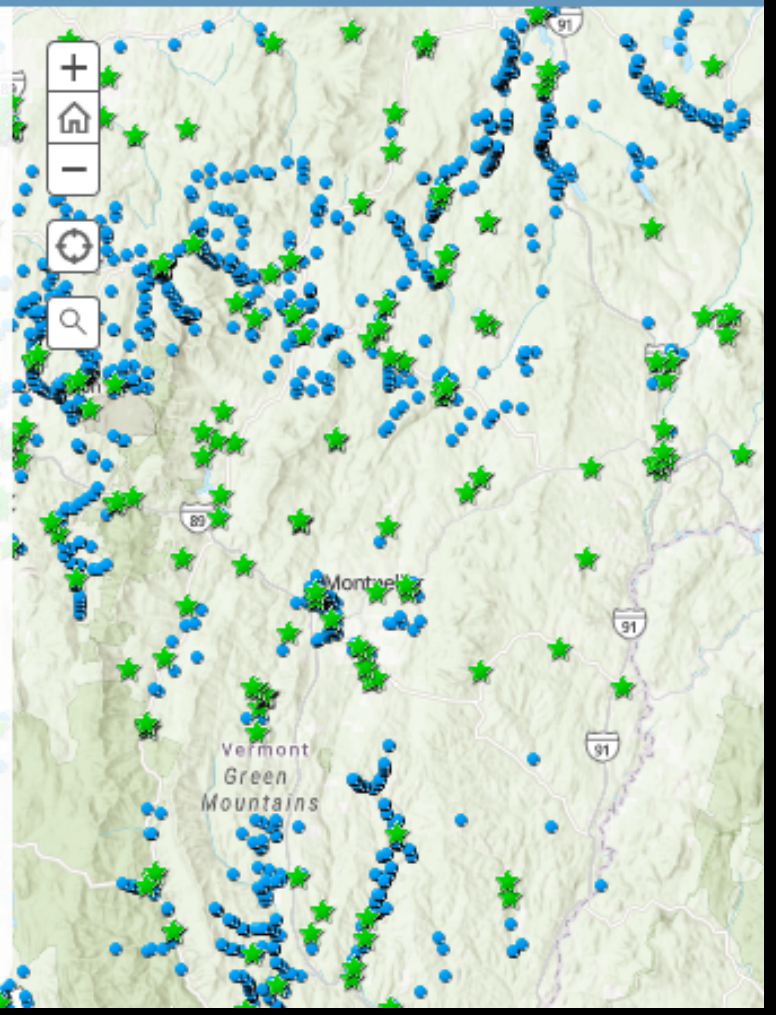
The WPD includes projects in all stages of development. For example, of the **4323 projects identified for development**, 2189 (51%) require **preliminary design**, 565 (13%) require **final design**, 910 (21%) require **implementation** and the remaining 659 (15%) are **planning projects** that include education and outreach, wetland mapping, hazard mitigation, research, assessments, inventories, and technical assistance.

In the majority of cases, some level of funding is also necessary to secure landowner, municipal, and/or regulatory support.

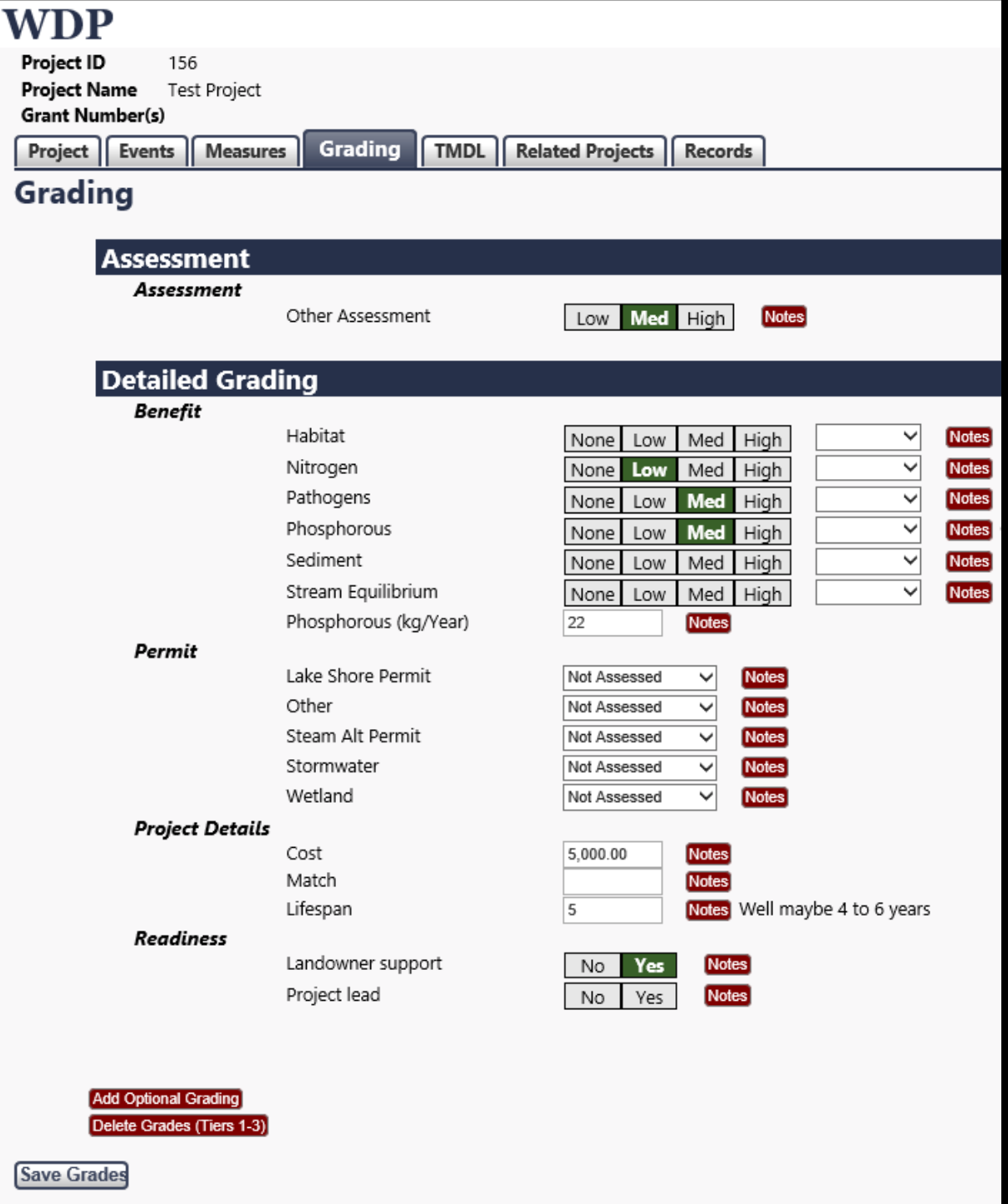
Only projects with discrete locations that were identified for development, not including low to medium priority culvert projects, are displayed on this map. Projects that are town- or basin-wide cannot be included on the map at this time.

Watershed Projects Funded

2018 Projects Ready for Development



Google map based mapping application very similar to the Clean Water Dashboard



Grading Projects

- Tier 1
  - Water Quality Data
  - Sector Based Assessments
  - Modeling and Mapping information
  - Lack of natural resource and regulatory constraints
- Tier 2
  - Block Grants
  - ERP Grant Proposals
  - Partner Grading
    - Hazard mitigation
    - Transportation and ACCD

    (e.g., Better Connections, Designated Downtown)
- Tier 3
  - Addressing the backlog of projects in WPD

    Coordinating with partners to map out and identify the high priority projects

Basic Example of automatically generated report using WPD #, Address, or Lat/Long info

WPD ID#: 2329

Project Name: Allen Brook School Pond Retrofit

Project Type: Stormwater Implementation

Enter an address to find on the map:

Find

Click the map to get the Lat/Long.

44.44777 -73.09684999999997 Save Coordinates

This report is provides guidance to evaluate the natural resource feasibility of a project in the Watershed Projects Database. The probability of jurisdiction represents the likelihood of the project to

General Basin Information

Tactical Basin Name	Watershed Body ID	Planner
Winooski	Tributaries to Lower Winooski (VT08-02)	Karen Bates: 802-490-6144
Town	**County**	
Williston	Chittenden	
Waterbody Status	**Waterbody Name**	**Problem**
Impaired	Allen Brook	Stormwater runoff, land development; erosion
TMDL Loading Info	**Catchment #**	**Basin Percent Rank**
Yes	4578812	94

Natural Resource Regulatory Contact Information

Lakes & Ponds - Lake Shoreland Scientist		Probability of Jurisdiction
Michaela Stickney: 802-490-6117		Low
Rivers - Floodplain Manager		**Probability of Jurisdiction**
Rebecca Pfeiffer: 802-490-6157		Low
Rivers - Stream Alteration Engineer		**Probability of Jurisdiction**
Chris Brunelle: 802-777-5328		Low
Wetlands - Wetland Ecologist		**Probability of Jurisdiction**
Tina Heath: 802-490-6202		High
Stormwater - Stormwater Analyst	**Permit #**	**Probability of Jurisdiction**
Winn Wilson: 802-490-8019	1-1230	High
Act 250 Coordinators	**Permit #**	**Probability of Jurisdiction**
Rachel Lomonaco: 802-879-5658	4C0971	High
Stephanie Monaghan: 802-879-5662		

Giorgetti Park Stormwater Mitigation Project (Rutland City)

Waterbody ID	ADB Code(s)	Segment Name/ Description	Pollutant(s)	Use(s) Impaired	Surface Water Quality Problem(s)	TMDL Priority
VT03-14	01	EAST CREEK, MOUTH TO 0.2 MI (BELOW CSO DISCHARGE PTS #2 AND #9)	E. COLI	CR, AES	RUTLAND CITY COLLECTION SYSTEM CSO	L
	04	**TENNEY BROOK, MOUTH TO RM 1.0	UNDEFINED	ALS	FAILED BIO CRITERIA; STRESSORS INCLUDE TEMPERATURE, NUTRIENTS AND DEVELOPED LAND RUNOFF	L

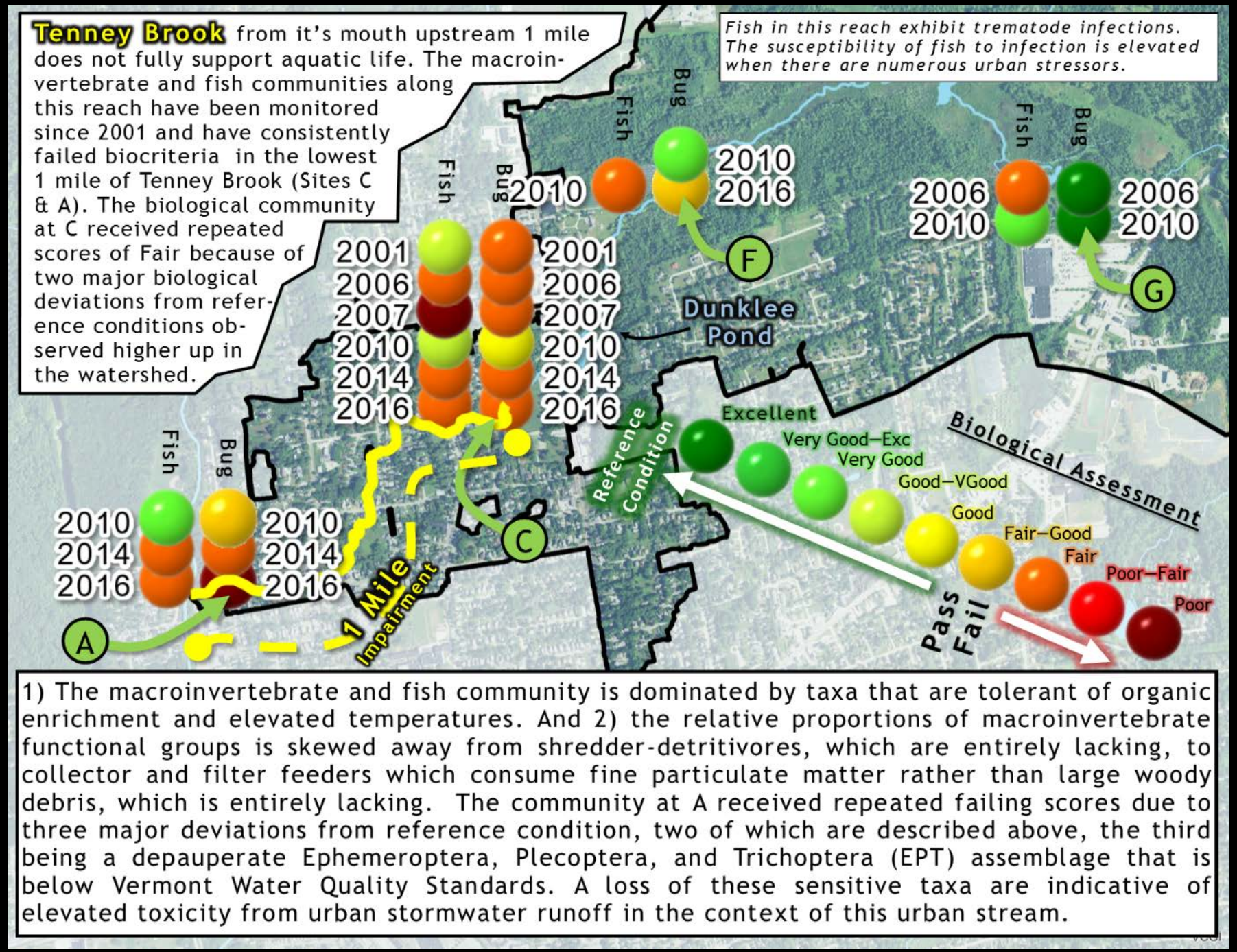
TENNEY BROOK, FROM EAST CREEK UPSTREAM	TEMP, STORMWATER,CHANGED HYDROLOGY	ALS	URBAN IMPACTS

Water Quality status condition:

- East Creek impaired (nutrients, sediment, and pathogens from Combined Sewer Overflows (CSO), stormwater
- Tenney Brook (tributary to East Creek) also impaired (nutrient enrichment, sedimentation, thermal modification)

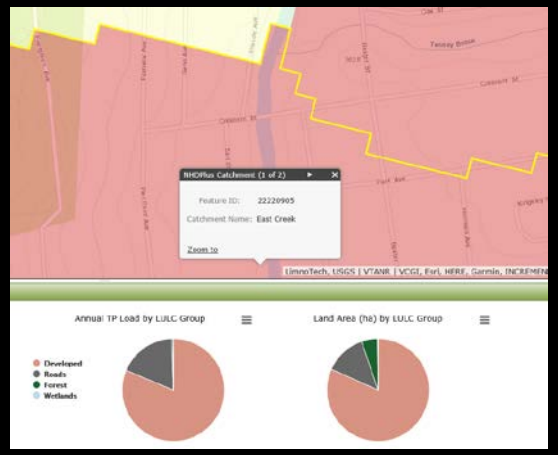
2018 Assessment and Listing Process

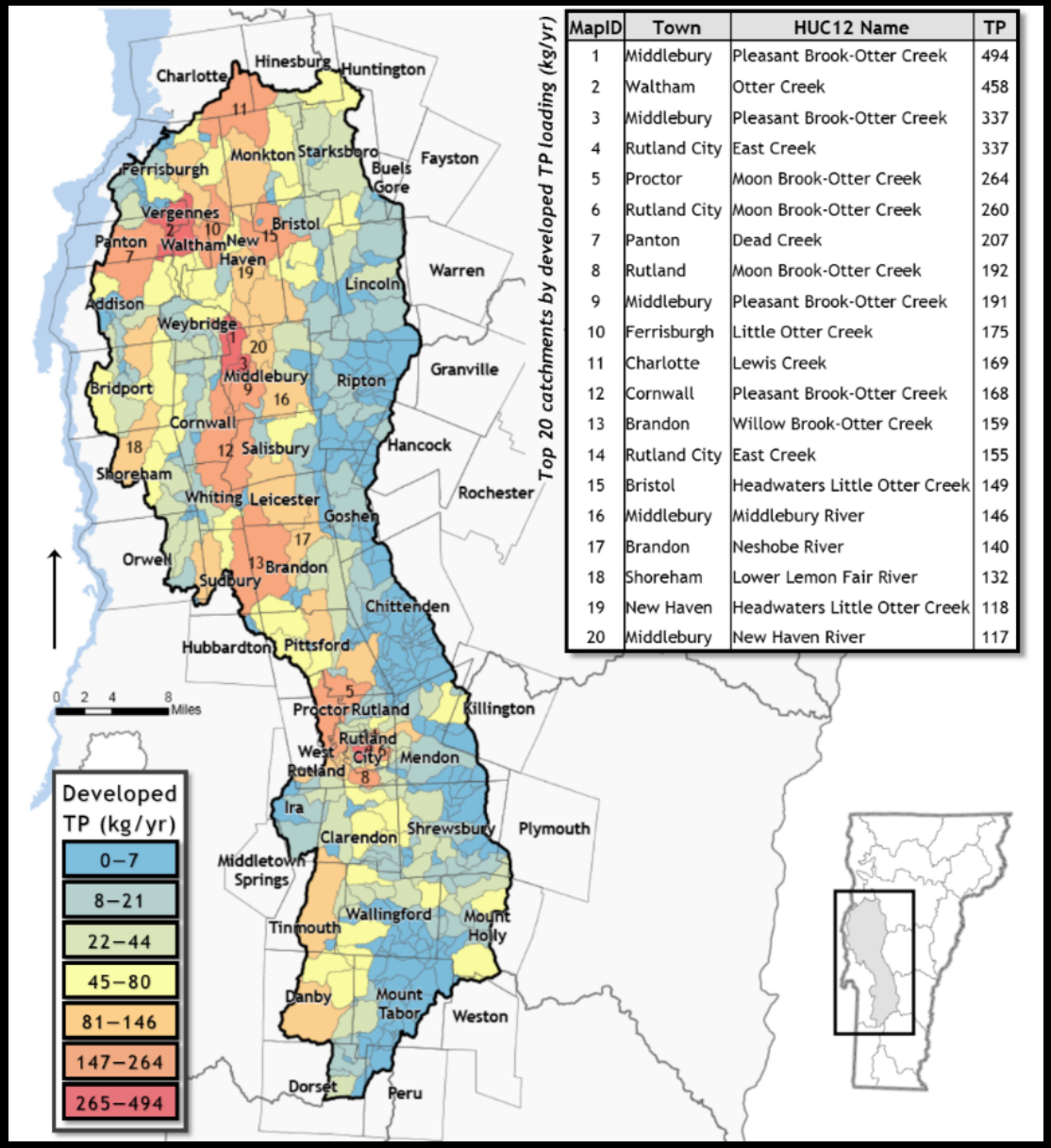
- Tenney Brook listed as “stressed” in 2014 due to non-attainment of Vermont Water Quality Standards for Aquatic Life Use
- Tenney Brook added to the 2018 State List of Impaired Waters (e.g., the 303(d) List)



Modeling and Monitoring Data (CWR) Supports Project

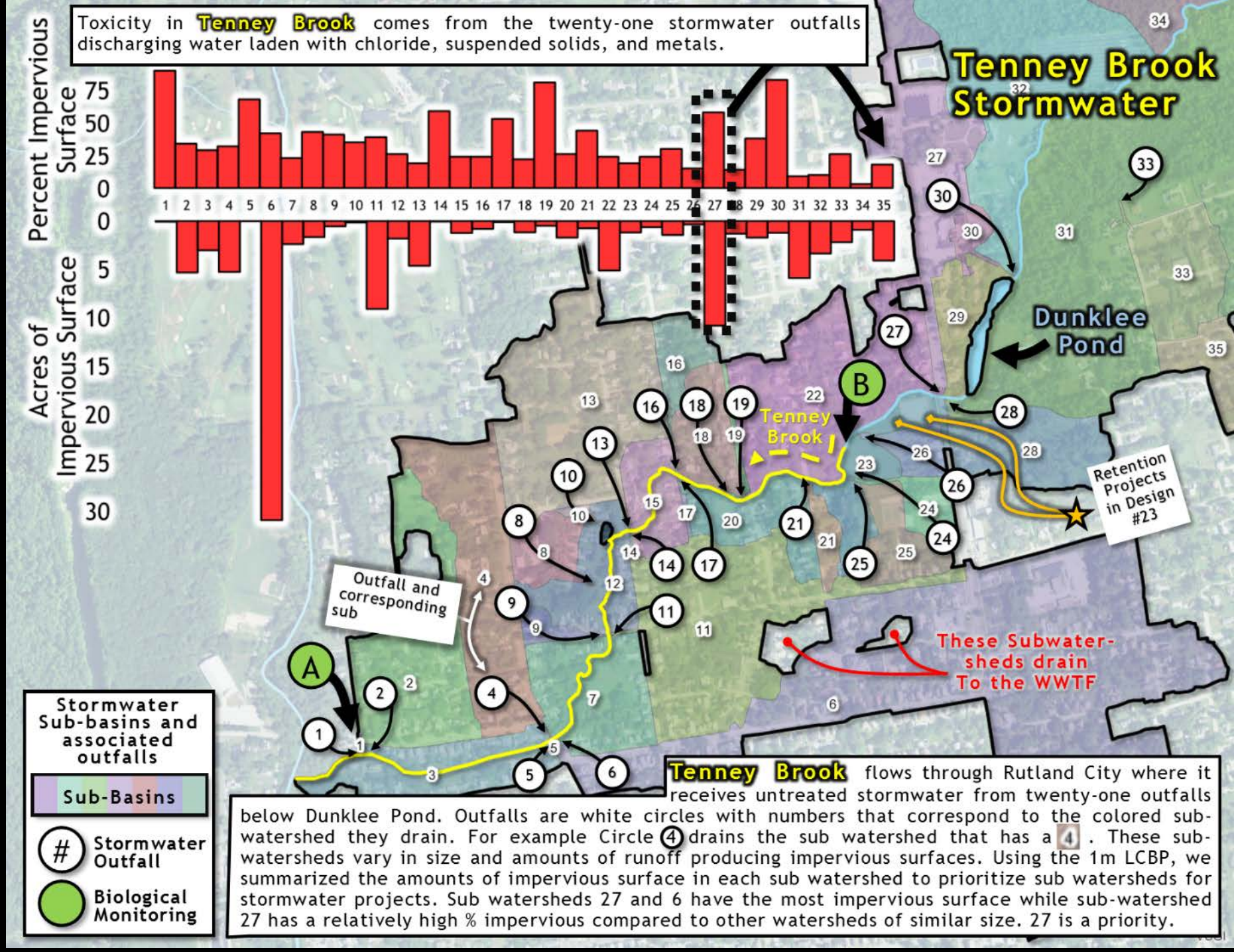
Clean Water Roadmap modeling output based on land use/ land cover, soil type, slope, and proximity to water





MapID	Town	HUC12 Name	TP
1	Middlebury	Pleasant Brook-Otter Creek	494
2	Waltham	Otter Creek	458
3	Middlebury	Pleasant Brook-Otter Creek	337
4	Rutland City	East Creek	337
5	Proctor	Moon Brook-Otter Creek	264
6	Rutland City	Moon Brook-Otter Creek	260
7	Panton	Dead Creek	207
8	Rutland	Moon Brook-Otter Creek	192
9	Middlebury	Pleasant Brook-Otter Creek	191
10	Ferrisburgh	Little Otter Creek	175
11	Charlotte	Lewis Creek	169
12	Cornwall	Pleasant Brook-Otter Creek	168
13	Brandon	Willow Brook-Otter Creek	159
14	Rutland City	East Creek	155
15	Bristol	Headwaters Little Otter Creek	149
16	Middlebury	Middlebury River	146
17	Brandon	Neshobe River	140
18	Shoreham	Lower Lemon Fair River	132
19	New Haven	Headwaters Little Otter Creek	118
20	Middlebury	New Haven River	117

Additional Assessment (IDDE) Mapping the stormwater outfall drainage areas



Sector Based Assessment Reports

TENNEY BROOK / EAST CREEK WATERSHED – STORMWATER MASTER PLAN

RUTLAND, VERMONT

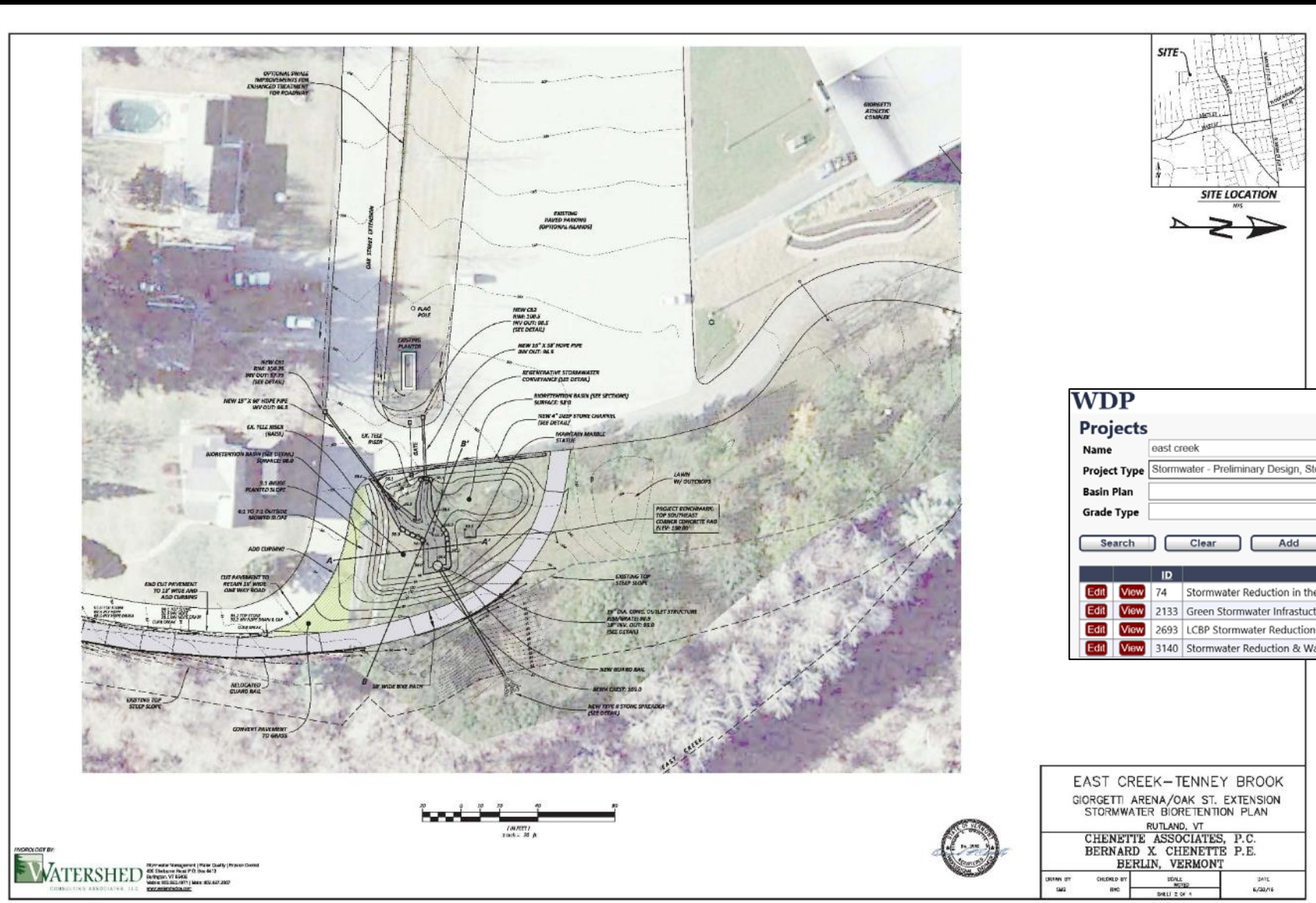
FINAL REPORT
December 2014

Criteria	Quality	Score
Impervious Acres Managed (ac)	> 20 acres	5
	10-20 ac	4
	2-10 acres	3
	1-2 acres	2
	< 1 acre	1
Channel Protection Volume Mitigated	>80%	2
	<80%	0
Relative Project Cost	<$10K	6
	$10-20K	5
	$20-50K	4
	$50-100K	3
	$100-500K	2
	$500K+	1
Volume Treated (ac-ft)	<1 ac-ft	1
	1-2 ac-ft	2
	2-5 ac-ft	3
	5-10 ac-ft	4
	10+ ac-ft	5
Annual TSS Load Mitigation (pounds)	<100 lbs	1
	100 - 1,000 lbs	2
	1,000 - 5,000 lbs	3
	5,000 - 10,000 lbs	4
	10,000 - 20,000 lbs	5
	20,000+ lbs	6
Annual TP Load Mitigation (pounds)	0-0.5 lbs	1
	0.5 - 1.0 lbs	2
	1 - 5 lbs	3
	5 - 10 lbs	4
	10 - 20 lbs	5
	20+ lbs	6

GAP	Giorgetti Arena Parking Lot	Bioretention	Bioretention practice and vegetated filter strip conveyances will be created to manage SW runoff from parking lot and part of adjacent roadway.	29	**3**

Rutland Natural Resources Conservation District

ERP funded Stormwater Design (2015)



Identified in the Watershed Projects Database

WDP Home

Projects

Name	east creek	Status	Funded, Completed	FED Step	
Project Type	Stormwater - Preliminary Design, Stormwater - Final Desi	County		Grant Number	
Basin Plan		Town		Project ID	
Grade Type		Grade			

Search | Clear | Add | To Report

		ID	Project Name	Project Type	Status	FED Step	Grant Number(s)
Edit	View	74	Stormwater Reduction in the East Creek Watershed	Stormwater - Implementation	Funded	3	2015-ERP-2-26
Edit	View	2133	Green Stormwater Infrastucture in the East Creek Watershed	Stormwater - Final Design	Completed	2	2016-CWF-1-21
Edit	View	2693	LCBP Stormwater Reduction in East Creek Watershed	Stormwater - Implementation	Funded	3	
Edit	View	3140	Stormwater Reduction & Watershed Restoration in East Creek Watershed	Stormwater - Implementation	Funded	3	

VTDEC ERP funded Implementation (2017)

ERP funded VYCC crew plants the bio-infiltration basin

VYCC assisted with planting and final landscaping

(also funded through ERP)

Clean Water Dashboard
Watershed Project Explorer
Watershed Projects Database

Clean Water Initiative Program F | Project Search

https://anrweb.vt.gov/DEC/cleanWaterDashboard/ProjectSearch.aspx

Home | Listing | Map

Project Search

Sector: Stormwater

Step:

Agency:

Town: Rutland City

County:

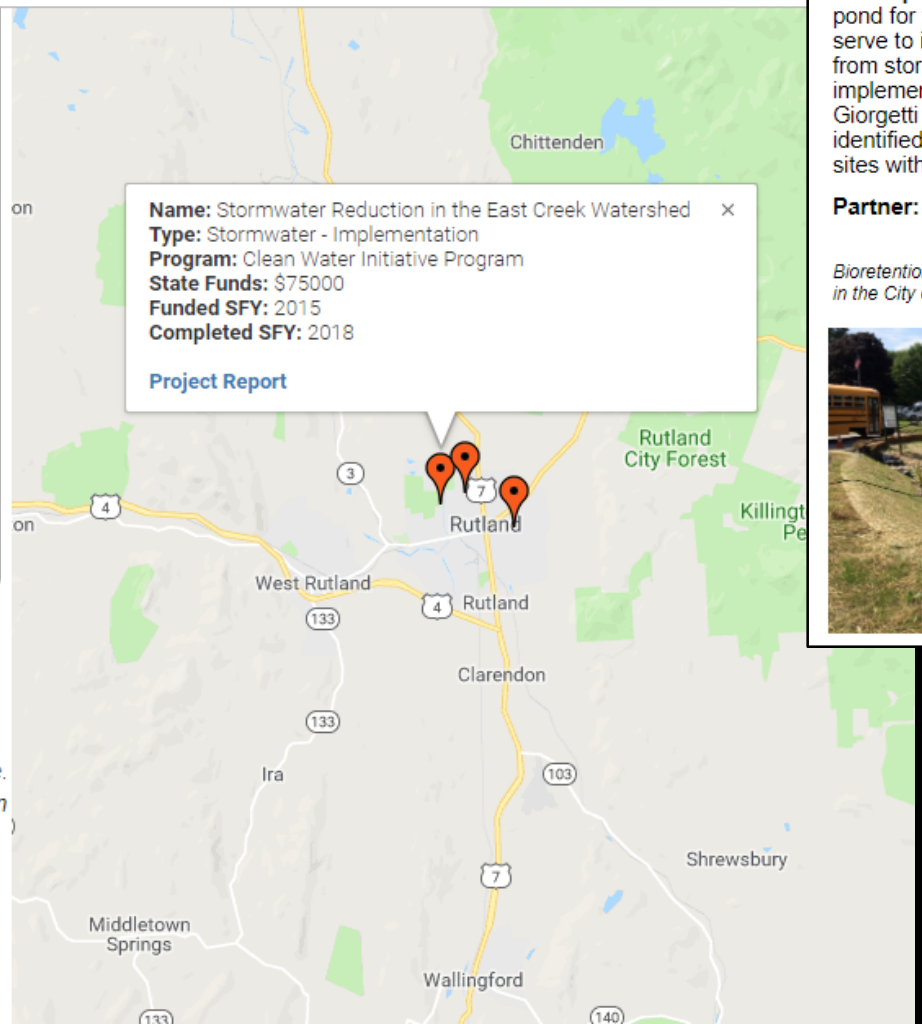
Basin Plan:

Project Status: Funded | Completed | **Both**

Search | Clear

Number of projects found: 5
Number of map points found: 3

Attention: Only projects with discrete locations are displayed on this map. Projects that are town-wide or basin-wide cannot be included on the map at this time. The following types of projects will not be displayed on the map: outreach and education, agriculture projects funded by the Agency of Agriculture Farm and Markets, assessment or project identification, equipment purchases, and others that do not have specific locations. All available projects will be displayed in the list format.



Stormwater - Implementation

Stormwater Reduction in the East Creek Watershed

AGENCY OF NATURAL RESOURCES

Towns: Rutland City

County: Rutland

Watershed: Otter Creek

State Funding: $75,000

Funding Source: Capital Fund

Description: This project implements a vegetated bioswale and a bioretention pond for the purpose of stormwater reduction in the City of Rutland, which will serve to improve water quality by allowing nutrients and pollutants to settle out from stormwater runoff before it enters the East Creek. The practices implemented include, a green swale at Preville Avenue and Bioretention at Giorgetti Park. Both are located in the East Creek watershed and have been identified in the final Stormwater Master Plan for the Tenney Brook/East Creek as sites with existing stormwater problems with potential for stormwater retrofit.

Partner: Rutland County Natural Resources Conservation District

Bioretention basin installed near Giorgetti Park in the City of Rutland

Project Status:

Funded SFY 2015

Completed SFY 2018

Results:

- 1.51 Acres of impervious surface treated
- 1.22 kg of phosphorous reduced anually, over 20 years

WDP Home

Projects

Name: east creek | Status: Funded, Completed | FED Step:
Project Type: Stormwater - Preliminary Design, Stormwater - Final Desi | County: | Grant Number:
Basin Plan: | Town: | Project ID:
Grade Type: | Grade:

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		ID	Project Name	Project Type	Status	FED Step	Grant Number(s)
Edit	View	74	Stormwater Reduction in the East Creek Watershed	Stormwater - Implementation	Funded	3	2015-ERP-2-26
Edit	View	2133	Green Stormwater Infrastucture in the East Creek Watershed	Stormwater - Final Design	Completed	2	2016-CWF-1-21
Edit	View	2693	LCBP Stormwater Reduction in East Creek Watershed	Stormwater - Implementation	Funded	3	
Edit	View	3140	Stormwater Reduction & Watershed Restoration in East Creek Watershed	Stormwater - Implementation	Funded	3	