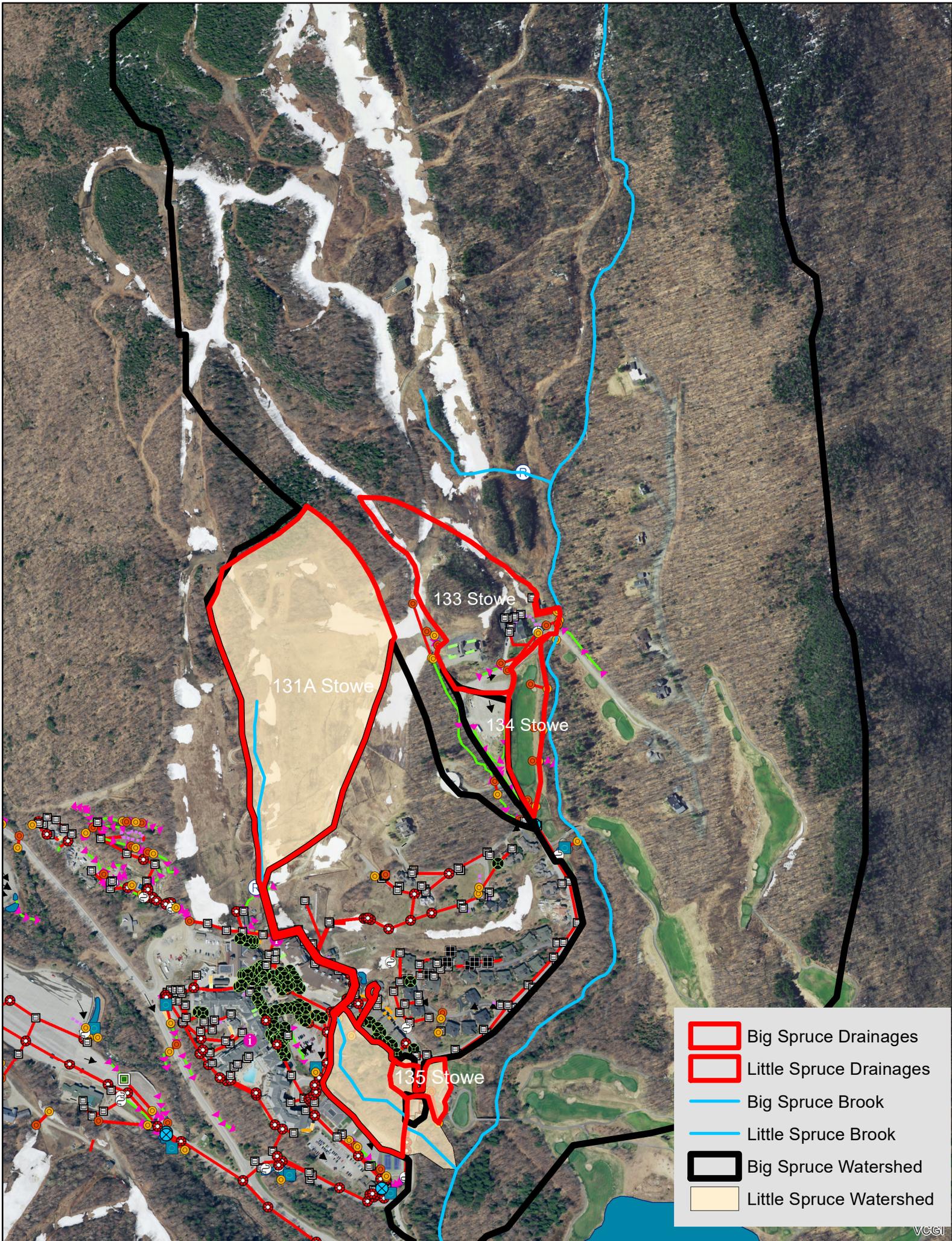


Big Spruce and Little Spruce Brook Stowe, Vermont

Big Spruce and Little Spruce Brook in Stowe Vermont have been found to be stressed by stormwater and sediment as measured by the biological community of the stream. Big Spruce Brook has also been subject to a Water Quality Remediation Plan (WQRP) for iron since 2010. There are at least 4 large stormwater discharges to the stream from the developed lands and ski trails at Stowe Mt Resort (SMR) that contribute to the degradation. The largest discharge to the stream is runoff from the Main Street ski trail to Big Spruce Brook. It has been found that the runoff from a ski trail can be significant approaching the amount of runoff from an NRCS soil type D urban lawn. A map showing the location of the discharges and possible retrofit locations on SMR land is provided.

Addressing the largest discharges of stormwater to the brook for the Water Quality and Channel Protection volumes will reduce contamination and stream channel erosion. It will also reduce phosphorus currently being discharged to the West Branch of the Little River, the Winooski River, and Lake Champlain.



Macroinvertebrate Site Summary

Location: Big Spruce Brook
Town: Stowe
Description: Located about 50m above confluence with Little Spruce. Below golf cart bridge 50m.
Stream Type: Small High Gradient

Location ID: 505299
Bio Site ID: 493238250003
WBID: VT08-12

Date	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
10/10/2006	207	29.5	17.5	71.7	2.77	0.50	0.89	0.41	Fair
9/7/2007	315	36.5	20.5	84.3	2.02	0.15	0.78	0.65	G-Fair
9/12/2008	125	25.5	12.0	72.0	1.58	1.50	0.87	0.44	F-Poor
9/10/2009	359	25.5	13.0	78.9	2.37	0.26	0.68	0.50	Fair
9/27/2010	64	20.0	13.0	65.5	2.36	3.13	0.77	0.53	Poor
9/21/2011	99	22.0	13.0	73.8	2.50	3.03	0.90	0.41	Poor
9/16/2012	346	38.0	20.0	56.3	3.17	1.16	0.45	0.48	Good
9/19/2013	116	30.0	16.0	68.4	2.10	0.00	0.84	0.44	F-Poor
9/22/2014	132	25.0	11.0	47.8	1.71	5.30	0.66	0.38	F-Poor
9/25/2015	241	22.0	9.0	45.1	1.99	4.56	0.70	0.35	F-Poor
9/15/2020	229	22.0	13.0	66.6	2.52	0.00	0.59	0.42	Fair
Full Support	≥ 300	≥ 27	≥ 16	≥ 45	≤ 4.5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 26	≥ 15	≥ 40	≤ 4.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 26	< 15	< 40	> 4.65	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type SHG and WQ Class B(2).

Macroinvertebrate Site Summary

Location: Little Spruce Brook	Location ID: 510093
Town: Stowe	Bio Site ID: 49323825A001
Description: At mouth of stream.	WBID: VT08-12
Stream Type: Small High Gradient	

Date	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
9/15/2020	277	36.0	12.0	67.7	2.38	5.78	0.61	0.56	Fair
Full Support	≥ 300	≥ 27	≥ 16	≥ 45	≤ 4.5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 26	≥ 15	≥ 40	≤ 4.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 26	< 15	< 40	> 4.65	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type SHG and WQ Class B(2).

Macroinvertebrate Site Summary

Location: Little Spruce Brook	Location ID: 502041
Town: Stowe	Bio Site ID: 49323825A002
Description: Located 50m below old Spruce Peak Parking lot, at top end of old state park area.	WBID: VT08-12
Stream Type: Small High Gradient	

Date	Density	Richness	EPT Richness	PMA-O	B.I.	Oligo.	EPT/EPT + Chiro	PPCS-F	Community Assessment
11/8/2001	60	22.0	5.0	33.3	4.58	15.00	0.17	0.55	
Full Support	≥ 300	≥ 27	≥ 16	≥ 45	≤ 4.5	≤ 12	≥ 0.45	≥ 0.4	
Indeterminate	≥ 250	≥ 26	≥ 15	≥ 40	≤ 4.65	≤ 14.5	≥ 0.43	≥ 0.35	
Non-Support	< 250	< 26	< 15	< 40	> 4.65	> 14.5	< 0.43	< 0.35	

*Scoring Guidelines for Stream Type SHG and WQ Class B(2).

Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Sediment Load with Current Reductions (lbs.)	Priority Action Sediment Reduction Credit	Projected Phosphorus Load (lbs.)	Water Quality Volume (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program
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LITTLE SPRUCE-STOWE

	1,4	Extended Detention Micropool at Little Spruce ski slope culvert inlet to control CPv downstream erosion	EDPMP/OF/C B		29.90	2058	80%	5.72	0.12	\$35,499	\$35,499	\$22	\$15,527	SRF
131A Stowe														
135 Stowe	4		OF		1.14	232		0.64	0.01					CWIP, SRF, LCBP

BIG SPRUCE-STOWE

133 Stowe	4		CB/WP	WQRP	9.84	1499	0%	4.16	0.08					CWIP, SRF, LCBP
134 Stowe	4		OF	WQRP	2.78	268	0%	0.74	0.02					CWIP, SRF, LCBP
271 Stowe	4		CB/WP	WQRP, 3929-9010.R	8.78	150	0%	2.08	0.04					CWIP, SRF, LCBP
Ski Trail	1,4	Add CPv EDMF below Main Street trail between Main St and Sterling	OF	WQRP	76.00	6051	80%	16.81	0.34	\$104,391		\$22	\$15,527	SRF

Target Maps

*Showing Priority Action List
Drainage Areas*

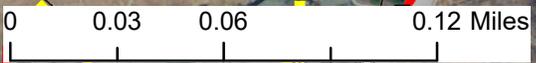
And Potential Retrofit Locations

Subwatershed: 131A
Action List: 1,4



131A

Potential for an extended detention micropool to control runoff volume at culvert inlet before it discharges to the receiving water.



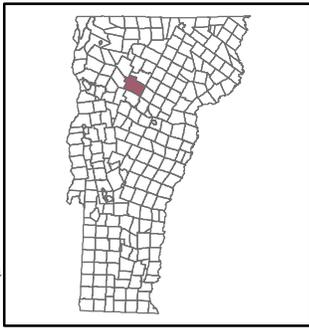
VCGI

Stowe, VT

DEC Stormwater Infrastructure Mapping Project

This map shows high priority subwatersheds which are ranked by connectedness, percent of impervious cover, field observations, and potential retrofit measures and locations.

The data shown on this map is only as accurate as the available sources and field observations allowed and should be used as a basic planning level tool only.



<p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Control Structure Treatment feature (see notes) Retrofit Unknown Point Information Point 	<p>Stormwater line</p> <ul style="list-style-type: none"> Storm line Storm line (old Sanitary line) Tunnel (storm) Combined sewer Sanitary line Swale Footing drain Under drain Roof drain Infiltration pipe French drain Trench drain Emergency spillway Stream Overland flow 	<p>NRCS Soils</p> <ul style="list-style-type: none"> A B C C/D D 	<p>SubwatershedID</p> <ul style="list-style-type: none"> Priority Subwatershed Stormwater Treatment Area Potential Stormwater Treatment Area
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Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 10/15/2021
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery



Subwatershed: Main St Ski Trail
Action List: 1,4

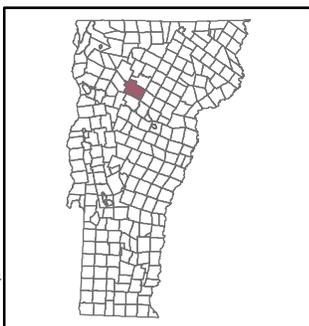


Potential for an extended detention micropool to control runoff for the channel protection volume only below Main Street trail.



Stowe, VT

DEC Stormwater Infrastructure Mapping Project



Stormwater points

- Pipe Cross (not connected)
- Catchbasin
- Dry Well
- Drop Inlet
- Grate/Curb Inlet
- Yard drain
- CB tied to sanitary sewer
- Junction Box
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Control Structure
- Treatment feature (see notes)
- Retrofit
- Unknown Point
- Information Point

Stormwater line

- Storm line
- Storm line (old Sanitary line)
- Tunnel (storm)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- Infiltration pipe
- French drain
- Trench drain
- Emergency spillway
- Stream
- Overland flow

NRCS Soils

- C
- C/D
- D

SubwatershedID

- Priority Subwatershed
- Stormwater Treatment Area
- Potential Stormwater Treatment Area

Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 10/15/2021
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery



VCGI