

Responsiveness Summary to Comments Received on the draft 2022 Vermont List of Priority Waters, including the 303(d) List of Impaired Waters (Part A) and Other Priority Waters Lists (Parts B, D, E, and F)

The Vermont Department of Environmental Conservation (DEC) established and noticed a public comment period upon the release of the draft 2022 Vermont List of Priority Waters, including the 303(d) List of Impaired Waters (Part A) and Other Priority Waters Lists (Parts B, D, E, and F). The public comment period extended from April 18 through June 3, 2022. The public notice stated a person may request a public informational meeting regarding any draft decision during the public notice; no requests were received. DEC contacted and met with several parties directly impacted by the new listings on Part A to provide further detail on the proposed listing. At the close of the public comment period, DEC had received written comments from the following parties:

Commenter	Received
Stowe Mountain Resort & Spruce Peak Realty (SMR/SPR) via email from Bear Creek Environmental (BCE) and Downs Rachlin Martin PLLC (duplicate comments)	5-31-2022
US EPA Region 1	5-4-2022

Part A and Part B Comments

1. Comment: SMR/SPR

West Branch of Little River (RM 7.5 to RM 8.0)

Considerable field investigation was conducted in spring 2012 to develop and prioritize actions to improve water quality in the reach of the West Branch of Little River located in the vicinity of Stowe Mountain Resort. Best management practices were implemented during fall 2012 to upgrade the stormwater system, to protect and maintain riparian buffers, and to make modifications to snowplowing, snow piling, and sand operations.

In recent years, there has been a trend toward improved water quality at this station in both the water quality and the biological data. The water quality monitoring data for RM 8.0 and RM 7.5 for freshet events has reflected low turbidity values in recent years. The West Branch at river mile 8.0 met Class B(2) biocriteria in 2021 resulting in good to very good biological integrity. There have been two consecutive years (2020 and 2021), where the macroinvertebrate community at river mile 8.0 has met Class B(2) biocriteria. The West Branch station, RM 7.4, located just downstream of the listed impaired reach, has met the Class B(2) biocriteria annually starting in 2016, when it was first sampled.

In conclusion, we are requesting the West Branch of the Little River section from RM 7.5 to RM 8.0 not be included on the final 2022 303d list for the following reasons:

- Best management practices were implemented in 2012 to improve water quality;
- There has been a trend toward improved water quality in the reach within the resort;

- The draft 2022 303d list does not reflect biological data that was collected in 2021 at RM 8.0. The river has met Class B(2) biocriteria in the past two consecutive years within the listed impaired section and has met Class B(2) biocriteria immediately below the impaired listed segment in all six of the years monitored.

Response:

The 2021 biological data for West Branch Little River was not available for consideration at the time DEC staff reviewed sites for impairment delisting in late fall 2021. In response to this comment and follow-up conversations with SMR and BCE, DEC staff reviewed the biological data and supporting habitat and water chemistry data. DEC staff agrees that biological data from the impaired section of the West Branch of the Little River supports delisting based on the Vermont Surface Water Assessment and Listing Methodology. All macroinvertebrate data associated with the lower extent of the impairment listing has met B(2) biocriteria since 2017, and data from the upper extent of the impairment listing has met B(2) biocriteria for the two most recent years, 2020 and 2021.

Listing action: Remove West Branch Little River from Part B of the Priority Waters List.

2. Comment: SMR/SPR

Little Spruce Brook

Water quality monitoring of streams in the vicinity of Stowe Mountain Resort has been taking place since 2000. Due to its small size, Little Spruce Brook has only been monitored for water chemistry parameters and not biological monitoring. This monitoring program has been approved by Department of Environmental Conservation (DEC) biologists over the years. In 2020 and 2021, the DEC reversed its position and sampled the biological community using a macroinvertebrate kick net technique. The kick net samples were processed and evaluated using the Small High Gradient (SHG) biocriteria. Based on DEC data, Little Spruce Brook resulted in “fair” biological integrity when evaluated using the SHG biocriteria in both 2020 and 2021. Little Spruce Brook has been listed on the draft 2022 303d list based on aquatic life support as an impaired use.

The SHG biocriteria were developed using Vermont reference streams with drainage areas that averaged 10.5 km² and ranged from 0.6 km² to 95 km². Little Spruce Brook is so small that it doesn’t show up on the Vermont Hydrography Dataset (VHD stream layer). Based on a watershed delineation using a digital elevation model, the drainage area of Little Spruce Brook at the mouth is 0.45 km², which is outside the range of drainage areas of streams included to develop the SHG biocriteria. For this reason alone, Little Spruce Brook should not be listed on the Part A 303d list.

The 2022 draft 303d list suggests the cause for the impairment is pollutants in urban stormwater with stressors to the aquatic biota including chloride, iron, sedimentation, and erosion. The listing of sedimentation and erosion as a stressor is unsubstantiated. Based on my recent site visit of April 26, 2022, Little Spruce Brook was noted to have a well vegetated riparian corridor with stable bed and banks. There is no evidence that erosion is causing sedimentation that is contributing to impairment of aquatic life. In addition, turbidity data collected during rain and snow melt events over the five years (*Bear Creek Environmental, LLC, 2021. Stowe Mountain Resort, SMR 2000 Community Plan, Water Quality*

Management Plan, 2020 Monitoring Report, May 28, 2021, 55 pp. plus appendices.) has resulted in low turbidity levels, providing additional support that sedimentation and erosion are not stressors.

Water Chemistry data collected by the Vermont DEC has shown that total iron concentrations collected at Little Spruce Brook at river mile 0.1 are less than 100 ug/L and are well below the chronic criteria for protection of aquatic life, which is listed in the 2017 Vermont Water Quality Standards (VWQS) as 1000 ug/L.

Monitoring data has shown elevated chloride values in Little Spruce Brook; however, only one sample has exceeded the Vermont Water Quality Standard of 230 mg/L listed as the chronic criteria for protection of Aquatic Life. In order to be placed on the 303d list of impaired waters, the stream needs to consistently not meet the Vermont Water Quality Standards, and in this instance, one sample does not meet this requirement. The elevated chloride concentrations are from the use of deicing agents. Spruce Peak Realty recognizes the chloride values are elevated and is working to develop and implement a snowplowing and snow storage plan, as well as train personnel regarding application of deicing agents.

In summary, there is not sufficient data to list Little Spruce on the 303d list. We are requesting Little Spruce Brook not be included on the final 2022 303 list for the following reasons:

- The SHG is not applicable to such a small watershed;
- Over the 20 years of monitoring of Little Spruce Brook, biomonitoring has not been required or conducted at this station until recent monitoring (2020 and 2021) by Vermont DEC;
- There is no evidence that sedimentation and erosion are stressors;
- Water chemistry monitoring has shown elevated concentrations of chloride, but only one sample exceeded the VWQS.
- Spruce Peak Realty is taking steps to reduce concentrations of chloride within the Little Spruce watershed by modifying plowing and snow storage that were previously in close proximity to Little Spruce Brook.

Response:

- The comments note that the range of streams used to create the original SHG biocriteria was 0.6-95 km².

This was the range of reference streams available when the SHG biocriteria were developed, approximately 20 years ago. Since then, DEC biologists have collected thousands more samples statewide, including many from watersheds less than 0.6 km². DEC staff apply SHG criteria and assess perennial streams with watersheds smaller than 0.6 km². Very small streams may require changes to expected SHG thresholds based on best professional judgment. Little Spruce Brook (LSB) was sampled in 2020 and 2021, during abnormally dry and/or drought conditions in this region, and in late summer when baseflows are often near annual lows. In both 2020 and 2021, LSB had adequate flow and wetted width.

- The comments note that monitoring of LSB was not requested by DEC over the previous 20 years as part of approved monitoring programs.

Historically, the primary focus of monitoring (including biological monitoring) in the greater Big

Spruce watershed was on iron and iron precipitate in the mainstem Big Spruce Brook. The absence of a request to monitor LSB for macroinvertebrates is not a reversal in position, nor does it preclude current and future monitoring of the stream.

- The comments note no evidence of sedimentation and erosion, as well as iron are stressors in Little Spruce Brook.

Iron and sediment were not listed as the specific ‘pollutants’, but as possible stressors resulting from the pollutant of urban stormwater runoff. On further review of the data, DEC staff agree iron is likely not a biological stressor in LSB, and this listing should be amended. A very high relative abundance of Oligochaeta worms (19%) was observed in 2021, which is associated with sediment deposition or excessive iron precipitate on the substrate (iron precipitate was absent in this stream). The increase in Oligochaeta from 2020 (6%) to 2021 (19%) coincided with an increase in fine sediment and gravel in the pebble counts from a combined 15% in 2020 to 29% in 2021.

- The comments note that only one sample exceeded the Vermont Water Quality Standards (WQS) chronic criteria of 230 mg/l, and that this lack of consistency precludes the listing of the stream.

The WQS chronic and acute chloride criteria for the protection of aquatic biota allow for streams to be listed solely based on chloride data without biological data. DEC proposes LSB be listed based on the failure of the macroinvertebrate community to meet B(2) SHG criteria. Chloride is acknowledged as a primary stressor; it is not the basis of the listing. Both DEC data and recent peer reviewed literature provide evidence that chloride concentrations much lower than 230 mg/l can adversely affect macroinvertebrate communities and suggest that loss of sensitive taxa can occur at concentrations as low as 50-90 mg/l. The average baseflow concentration in LSB was 183 mg/l. Sensitive Ephemeroptera (mayfly) taxa can be the first species affected by chloride (and correlated issues with impervious runoff). Typically an important part of SHG communities, mayflies were absent from LSB in 2020, and only two taxa were recorded at a relative abundance of 1.6% in 2021. DEC appreciates SPR’s actions to remedy excess chloride loading to the stream through snow and ice management practices.

Listing action: Remove iron from Little Spruce Brook as a stressor but retain “Pollutant in urban stormwater” as the pollutant in Part A of the Priority Waters List.

3. **Comment:** SMR/SPR

Big Spruce Brook

It is important to understand the history of the 303d listing of Big Spruce Brook to understand why Big Spruce Brook should not be included on the 2022 303d list. Big Spruce Brook was originally placed on the Part C of the 2008 Vermont List of Priority Waters by the Agency of Natural Resources (ANR) and was listed “as in need of further assessment” to determine compliance with the Vermont Water Quality Standards (VWQS). In 2010, Big Spruce Brook was moved to Part B of the Vermont Priority Water List, based on monitoring data from the previous four years. The Agency of Natural Resources issued a 1272 order on May 6, 2010 to serve as a water quality remediation plan to address sources of iron and sediment identified in Big Spruce Brook.

Following the issuance of the 1272 order in 2010, improvements were completed to remediate a local iron seep adjacent to the Club House and to improve stormwater management to reduce sediment impacts. Despite these remediation efforts, both Big Spruce monitoring stations have shown little improvement. In May 2015, extensive iron seeps were documented that are contributing to impairment of the macroinvertebrate community. These iron seeps do not appear to be related to construction activities at Spruce Peak, and have likely existed for many years. Bear Creek Environmental conducted a stream reconnaissance with Steve Fiske, Aquatic Biologist with the Vermont Department of Environmental Conservation (VDEC) during September 2015 and noted iron seeps are strong, extensive in length, and are in steep locations that are not accessible. Big Spruce Brook from river mile 0.2 to river mile 0.3 was listed as impaired on the 2016 Final Part B List of Priority Surface Waters due to sediment and iron. Big Spruce Brook from river miles 0.3 to 0.8 was listed on the Part A List of Priority Surface Waters due to multiple iron seeps from unknown causes. In 2018 the entire Big Spruce watershed was removed from the 303(d) list of impaired waters “due to reassessment of sediment cause parameter and the identification of a natural source of Iron” (State of Vermont, 2018).

Big Spruce Brook (Stowe) between river mile 0.2 and 0.8 does not fully support aquatic life and the enjoyment of aesthetic conditions. River mile 0.2 to 0.3 was on the TMDL alternative list of impaired waters due to the cause parameters sediment/siltation and Iron from land development at Stowe Mountain Resort. Several non TMDL remediation actions for both sediment and iron have been implemented but little improvement has been observed. Biological assessment in 2016 indicated sediment/siltation is not a cause parameter and reaffirmed the iron cause parameter. Iron pollution is feeding a bacterial mat that disrupts the trophic structure of the macroinvertebrate community. River mile 0.3 to 0.8 was on the 303 (d) list of impaired waters requiring a TMDL due to the cause parameter Iron. We are now aware that Big Spruce Brook lies upon the Hazens Notch Formation (HNF). The HNF is dominated by rusty weathering schist and gneiss that is leaching Iron and Sulfur to the streams above it. The entire Big Spruce Brook is now removed from the 303(d) list of impaired waters due to the reassessment of sediment cause parameter and the identification of a natural source for Iron. 43°41'09.3"N 73°18'42.0"W (State of Vermont, Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division. 2018. State of Vermont 2018 Water Quality Integrated Assessment Report, Clean Water Act Section 303(b) Report. 52 pp. Available at: https://dec.vermont.gov/sites/dec/files/documents/WaterQualityAssessmentReport_305b_2018.pdf).

Biological monitoring of Big Spruce Brook was temporarily discontinued in 2016 due to extensive iron seeps that impact the biological community and are infeasible to remediate. The Vermont DEC conducted kick net sampling in 2020 and 2021 and found the stream was not meeting Class B(2) biocriteria, when evaluated using the SHG biocriteria. Big Spruce Brook is listed on the draft 303(d) Part A list from the confluence to river mile 0.3 as impaired for Aquatic Life Use; and chloride, iron, sedimentation and erosion are listed as stressors to the community.

Based on the data available, the most likely stressor to the Big Spruce Brook aquatic biota is iron. Chloride concentrations at Big Spruce River miles 0.3 and 0.2 are elevated above background, but are typically less than 100 mg/L and are well below the VWQS of 230 mg/L. While the DEC suggests in their memorandum (State of Vermont, Agency of Natural Resources, Watershed Management Division,

Memorandum to 2022 Listing File, Assessment Status of Big Spruce Brook and Little Spruce Brook (Stowe)) dated April 6, 2022 that the high percentage of worms in kick net samples in 2020 and 2021 is “suggestive of sediment issues”. The DEC’s habitat data indicates the fine sediments were low and water quality data collected by Bear Creek Environmental reflects low turbidity values during freshet events. For this reason, sediment and erosion do not appear to be playing a significant role. We are in agreement with the DEC’s conclusion in 2018 that iron pollution is disrupting the trophic structure of the macroinvertebrate community; however, the iron seeps are in areas that are in areas that are infeasible to remediate.

We are requesting the DEC remain consistent with their action in 2018 to leave Big Spruce Brook off the 303d list due to lack of evidence of sediment and siltation and the infeasibility to remediate the Brook for iron pollution.

Response:

- A primary argument proposed for not listing the impairment of Big Spruce Brook (BSB) from the mouth to the confluence with Little Spruce Brook (LSB) is that the source of impairment at RM 0.2 is due primarily to the downstream effects of upstream iron seeps in BSB (RM 0.3-RM 0.8), rather than the effects of ‘pollutants in urban stormwater’ sourced from impervious areas in LSB, which include chloride and sediment.

DEC concurs that stressors related to iron in upstream reaches of BSB are also likely contributing to the biological degradation seen at RM 0.2. Iron seeps upstream are leading to high iron concentrations and excessive iron precipitate in those reaches. The iron precipitate at upstream locations has been shown to degrade substrate habitat to an extent where many sensitive taxa are lost, and the precipitate is colonized by a high relative abundance of Oligochaeta. Water quality degradation is likely continuing downstream; lack of sensitive taxa and excessive Oligochaeta in those reaches could be contributing factors for the degradation found at RM 0.2. DEC also believes that the chloride and stormwater associated with impervious surfaces in LSB may be contributing to the biological degradation at BSB RM 0.2. Chloride concentrations are diluted at this reach compared to LSB, with an average baseflow concentration of 73.4 mg/l. While this concentration is not high enough to be the sole stressor to the biological community, it is at a level that can adversely affect macroinvertebrates as mentioned above, and likely also contributes to the low EPT richness at RM 0.2. While sediment indicators in the habitat data were low at BSB 0.2, Oligochaeta were at high relative abundance in LSB, and increased significantly at both sites in 2021. These patterns create some difficulty with attributing the relative contributions of stressors from both LSB and upper reaches of BSB to the poor biological condition at RM 0.2; therefore, DEC will seek additional data to further refine the assessment.

- The second argument proposed is that the stream should not be listed as impaired because the upstream degradation caused by iron is infeasible to remediate, and/or may be caused by naturally occurring iron due to underlying geology.

EPA requires the documentation of impairments regardless of whether they can be remediated.

Listing action: Big Spruce Brook from the confluence to Little Spruce Brook will not be listed in 2022.

4. Comment: USEPA R1VT05-10, Burlington Bay Barge Canal, impairment for xylene and toluene

EPA requests that Vermont provide information about progress made in the restoration of these impairments.

Response:

The required [*“Five Year Review Report for the Pine Street Canal Superfund Site Burlington Vermont”*](#) (FYR) was produced and published by USEPA December 21, 2021 that describes the past and current conditions of various indicators of interest as related to this impairment listing. The FYR indicates:

“EPA has determined, as part of the third five-year review, that the remedy at the Pine Street Canal Superfund Site is protective of human health and the environment. All construction activities specified in the 1998 ROD (Record of Decision), 2009 ESD (Explanation of Significant Differences) and 2011 ESD are complete and operating as intended. Ecological, human health and management of migration RAOs (Remedial Action Objectives) are being met. The Performing Defendants continue to perform compliance monitoring and O&M (Operation and Maintenance) and report the results to EPA and VTDEC twice a year.”

DEC considers this substantial progress towards WQS compliance. However, the Department needs more time for a complete assessment of water quality before any move to delist is initiated. Furthermore, to allow complete transparency for any listing action to occur, DEC prefers that a complete public notice and comment period occur prior to action.

Listing action: Additional summary status information will be added to the listing

5. Comment: USEPA R1VT07-01, Lamoille River, Rt. 2 to Arrowhead Mountain Lake, impairment for dissolved oxygen

EPA notes that there is no indication that data has been collected to assess this waterbody’s impairment since 2008, and no indication of the results of that sampling. EPA requests that Vermont provide information about progress made in the restoration of these impairments.

Response: Dissolved oxygen data will be collected to determine if the aeration modification made at the dam is sufficient to comply with the appropriate water quality standards. Data and assessment listing decisions will be provided during the 2024 assessment cycle.

Listing action: No changes.

6. Comment: USEPA R1VT08-02, Unnamed Trib to Winooski River, impairments for cadmium (sic) and iron.

EPA requests that Vermont provide information about progress made in the restoration of these impairments.

Response: Remediation efforts at the South Burlington landfill are complete with an ongoing requirement of biannual surface water monitoring. As late as 2021, concentrations of iron and arsenic continue to exceed WQS. Arsenic has never exceeded the Aquatic Biota criteria for either chronic or acute exposure (190 & 360 ug/L, respectively) but does routinely exceed the human health criteria of organism consumption (1.5 ug/L) and organisms and water (0.02 ug/L), though fish and drinking water consumption from this very small stream are unlikely.

Iron concentrations continue to routinely exceed the Aquatic Biota criterion of 1.0 mg/L, but concentrations remain in the low single digits. DEC will continue to track surface water monitoring results.

Subsequent to close of the public comment period, EPA Region 1 required moving this listing from Part B (EPA Category 4b) to Part A (EPA Category 5). EPA indicated that it had resided too long on Part B without complete remediation and compliance so that it should now reside on Part A.

Listing action: This listing will be moved to Part A.

7. **Comment:** USEPA R1

VT08-08, Muddy Brook, impairments for cadmium and iron.

EPA requests that Vermont provide information about progress made in the restoration of these impairments.

Response: Remediation efforts at the Central Vermont landfill are complete with an ongoing requirement of biannual surface water monitoring. Over time, pollutants that reach surface waters are expected to decrease. The current update as posted with the draft Part B List discusses the situation whereby the reporting limit is above the pollutant criteria for cadmium. Iron has not been detected in biannual monitoring at compliance site SS-11 above the WQS criterion since 2017; therefore, DEC proposes to remove iron from the pollutant list for this impaired segment.

Subsequent to close of the public comment period, EPA Region 1 required moving this listing from Part B (EPA Category 4b) to Part A (EPA Category 5). EPA indicated that it had resided too long on Part B without complete remediation and compliance so that it should now reside on Part A.

Listing action: Remove iron as a pollutant from this listing and move to Part A.

8. **Comment:** USEPA R1

VT08-12, West Branch Little River, Rm 7.5 – 8.0. Impairment is cause unknown.

EPA requests that Vermont provide information about progress made in the restoration of these impairments. Tables 9 and 10 are referred to in the justification but not provided. While the narrative justification seems reasonable, EPA would like to see more information about progress made to fully support this water's continued placement in Category 4B.

Response: See above response to Comment 1.

Listing action: See above listing action in response to Comment 1.

9. Comment: USEPA R1

VT11-15. No. Branch Ball Mountain Brook, Stratton Lake to Kidder Brook. Impairment for manganese.

EPA notes that it is unclear whether this water body may be meeting its WQS criteria or not.

Response: This site will be revisited and reassessed during the 2024 listing cycle. Since the impairment is no longer ongoing (the source of manganese has been addressed), delisting is likely in 2024.

Listing action: Updated information will be added to the list entry regarding reassessment in 2024.