FINAL
MY2 (2023) MONITORING REPORT

LAUREL SPRINGS STREAM AND WETLAND MITIGATION SITE

Avery County, North Carolina
French Broad River Basin
Cataloging Unit 06010108

DMS Project No. 100122
Full Delivery Contract No. 7890
DMS RFP No. 16-007725 (issued 11/13/18)
USACE Action ID No. SAW-2019-00835
DWR Project No. 2019-0865

Data Collection: January 2023-November 2023
Submission: February 2024

Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1652

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ENVIRONMENTAL QUALITY

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Response to DMS Comments – MY2 (2023)
Laurel Springs Stream and Wetland Mitigation Site
Avery County, North Carolina, French Broad River Basin: Cataloging Unit 06010108
DMS Project No. 100122
Full Delivery Contract No. 7890
DMS RFP No. 16-007725 (issued 11/13/18)
USACE Action ID No. SAW-2019-00835
DWR Project No. 2019-0865

Comments Received (Black Text) & Responses (Blue Text)

General:

1. Please ensure that project monitoring equipment is checked prior to the start of the growing season and at least quarterly thereafter to confirm that it is functioning properly and collecting data through the full growing season/ monitoring year. In future monitoring years, please collect data for the entire growing season. MY2 (2023) data collection appears to have ended in September 2023.
   Response: Understood. Prior to each growing season and at least quarterly thereafter, all monitoring equipment will be inspected and repaired/replaced as necessary. Gauge data for the entire growing season will be reported in future submittals.

2. Please title the project summary 'Executive Summary' to match the footer or revise the footer.
   Response: The footer was revised to "Monitoring Summary".

Report:

1. Executive Summary: "*No encroachment was observed during the year 2 (2023) monitoring period.*" Encroachment was observed during the 10/18/23 DMS property boundary inspection. Please review and update the report accordingly.
   Response: The observed encroachment areas were added to the monitoring summary, CCPV, and Table 5.

2. Executive Summary: "*The driveway culvert on UT-2 was installed as designed and is stable, however due to IRT concern expressed during the October site visit baffles will be added to enhance aquatic organism passage.*" Please also provide a timeframe for the proposed culvert work to be completed.
   Response: The proposed timing of Q1 2024 was added to this statement.

3. Executive Summary: "*Ten 5m x 2m temporary herbaceous plots were documented during MY2 (2023). All 10 plots recorded a species count of 4 or more different species within each plot (Appendix B).*" Please discuss and note the IRT approved herbaceous plot success criteria.
   Response: The passage was revised to read: "Due to floodplain soils being of the Nikwasi series, scattered openings dominated by herbs and shrubs are likely to develop overtime. These areas are expected to be less than an acre in size and encompass less than 20% of the Site. As such, nine 5m x 2m temporary herbaceous plots were documented in herbaceous dominated areas during MY2 (2023). All 9 plots met the IRT established success criteria of 4 or more species present. See Table A for success criteria and Appendix B for herbaceous plot data."

4. Executive Summary: In the Year 2 (2023) Monitoring Summary please indicate the Adaptive Management Plan was approved and give the date of approval; reference where the communications (IRT comments and RS's responses) are in the Appendices. In the Wetlands section, please add the date of the 2023 IRT site visit; "*During a 2023 IRT Site visit, it was noted…".*
   Response: A reference to the adaptive management plan date of approval (November 29, 2923) was added to the vegetation section, and the AMP and corresponding IRT communications in Appendix F were referenced. Additionally, the October 18, 2023 date of the IRT site visit was added to the passage in the Wetlands section.

5. Table 2. Summary: Goals, Performance, and Results –DMS recommends updating the goals/performance table to reflect the current monitoring table guidance (October 2020), to reflect measurement method and cumulative monitoring results for each item; this is available on the DMS website at: https://www.deq.nc.gov/about/divisions/mitigation-services/vendors/templates-guidelines-tools-projects
   Response: Table 2 was updated to conform to the 2020 monitoring table guidance.

6. Table C; Section 3.3 Vegetative Assessment; CCPV Maps: Herbaceous plot performance (Appendix B Table 9) should be discussed in the report text and included in Table C since it was part of the approved mitigation plan. Please discuss and note the IRT approved herbaceous plot success criteria. Only nine (9) herbaceous plots are shown on the CCPV map; however, ten (10) were reported. Please review and update the report accordingly.
   Response: Only 9 herbaceous plots were measured. Plots 9 and 10 were inadvertent duplicates. This has been resolved. Additionally, the 9 herbaceous plots have been added to the Vegetation Parameters section in Table C, and a brief discussion of the plots and success criteria was added to Section 3.3.

7. Table C: The table reports "*16 permanent plots and 3 temporary plots spread across the Site*"; however, 16 permanent plots; 10 temporary plots; and 10 herbaceous plots were reported in MY3 (2023). Please review and update the table accordingly.
   Response: No temporary vegetation plots were proposed in the approved mitigation plan. The 3 temporary plots in MY1 and 10 in MY2 were measured to assess the need for and success of supplemental planting efforts. A footnote was added to this table and Table 2 indicating, "Temporary vegetation plots may be measured as required by an adaptive management plan or requested by IRT."

8. Section 3.1 Stream Assessment: "*Morphological surveys for MY2 were conducted on April 14, 2023, and no stream areas of concern were identified.*" Please consider collecting morphological data later in the growing season so it represents the full monitoring year. If collected earlier, data collection dates should be consistent each year to allow a full year between surveys.
   Response: Understood. Stream morphological measurements will be collected at approximately the same time each year during ensuing monitoring years.

9. Section 3.4 Monitoring Year 2 Summary: "*The small encroachment area observed during MY1 was addressed, and the easement was re-marked.*" Please update as encroachment was observed in this same area during DMS's 10/18/23 property boundary inspection.
   Response: A discussion of the 2023 encroachment was added to Section 3.4.

10. CCPV Map (Figure 1) and Asset Map (Figure 2): The CCPV & Asset maps are not georeferenced; please provide georeferenced maps with the revised deliverable.
    Response: Figures 1 and 2 were re-exported to include georeferenced properties. These have been included in the final digital submittal.

11. Table 5. Visual Vegetation Assessment & CCPV Maps: Please update the table and CCPV maps as encroachment was observed during DMS's 10/18/23 property boundary inspection. Please confirm that the invasives reported in the project monitoring summary are minimal and below the 0.10-acre mapping threshold. If above the mapping threshold, they should be reported in the table and CCPV sheets.
    Response: Table 5 and the CCPV were updated to include encroachment observed during the 10/18/23 DMS boundary inspection. The invasives treatments that occurred on 6/28/23 and 9/19/23 were spot treatments of areas well below the 0.10-acre mapping threshold.

12. Laurel Springs MY2 (2023) Photo Logs (vegetation plots): Please provide dates that the photos were taken. Are the transect photos from the temporary vegetation plots or the herbaceous plots?
    Response: The date the plot photos were taken (September 21, 2023) was added to the plot photo log header. The transect photos are from the temporary (woody) vegetation plots.

13. Laurel Springs Fork Creek Crest Gauge (2023 Data): Please provide a graph legend and include the bankfull elevation line.
    Response: The bankfull elevation line was added to the crest gauge graph, and a legend was provided.

14. Appendix B Table 9 - Temporary Herbaceous Vegetation Plot Data: Please include the common names of the species identified and add a table footnote indicating the IRT approved success criteria for the herbaceous plots.
    Response: A column was added for common names, and a footnote was added indicating that success criteria require 4 species present per plot.

15. Appendix C – Crosse section UT3, XS - 7: In the report text, please briefly discuss XS-7 / UT3 and what the variation from as-built and source of the pool filling (approx. 1 foot) might be. At the 4/18/2023 IRT Credit Release Meeting, Cross Sections 4, 7, and 14 were pointed out by the IRT and should be reviewed and considered in the revised MY2(2023) report text.
    Response: The following discussion was added to Section 3.1 "Stream Assessment": "Cross-sections 4, 7, and 14 were pointed out by the IRT at the April 18, 2023 credit release meeting due to varying degrees of aggradation since MY0. These are pool cross-sections in a highly dynamic mountain stream system. Shortly after Site construction, a great deal of streambed substrate transport was observed as the newly constructed stream settled and adapted to the high energy flows that characterize steep, high elevation streams. This sediment deposition does not reflect a greater sediment issue within the Site. It is a natural step in the early successional processes that occur after a stream has been restored. It is expected that substrate transport will continue to be observed in this system during the ensuing monitoring period, including potential scour in these pools as more high flow events occur onsite."

16. Appendix D – Groundwater Gauge Graphs: Please include brackets in the graphs showing the start and end date for the maximum consecutive days reported.
    Response: Brackets were added to the maximum consecutive days for each gauge.

17. Appendix D - Figure D1: Please QAQC the rain data; Swamp Grape project was listed in the raw data files. Please make sure the rain data applicable to Laurel Springs is reported.
    Response: The rain data was confirmed to be from an onsite gauge at Laurel Springs. The reference to Swamp Grape was mistakenly carried over from an older template. It has been corrected.

18. Appendix F: IRT Correspondence: WRC (Andrea Leslie) provided additional guidance regarding the proposed culvert baffles on 1/2/2024 via email. Please include this additional correspondence in the Appendix (attached) and consider during installation.
    Response: This email is now included in Appendix F and will be considered during baffle installation.

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Field Inspection

General: DMS Conducted a property boundary inspection on 10/18/23 and submitted the inspection report and .KMZ file to RS on 10/30/23. Inspection and action items noted include:

10/18/2023 Field Inspection:

- The easement corners were monumented with stamped aluminum caps.
- Signs on trees had steel fasteners presenting a chain saw safety concern.
- Multiple signs and witness markers appear to conflict or are awkwardly placed.
- Roads and trails were noted inside of the CE and were not located on the recorded survey plat.
- Several areas within the CE area have active mowing/cutting encroachment.
- Old fencing and construction related sediment control silt fencing t-posts noted inside of the CE area.
- Corner and boundary line markings were not within the required specification.
- Easement encroachments and deficiencies were observed.
- Debris piles noted inside of the CE area.

Action Items:

1. Monitor the site boundary and maintain compliance throughout the monitoring period.
   Response: Regular boundary monitoring will continue on a regular basis with compliance actions taken as necessary to ensure easement integrity and maintain standards relevant to Contract #7890 / RFP 16-007725; specifically, DMS guidance title "Survey Requirements for Full Delivery Projects Version 08/13/13" attached here for reference and accessed via the following link:
   https://www.deq.nc.gov/about/divisions/mitigation-services/vendors/templates-guidelines-tools-projects
   and selecting "Project--> Historic Templates" which downloads a spreadsheet. With an original contract date of 5/17/2019, the contract standards are "CE Survey Specs" dated 8-13-2013. Please note that some DMS boundary comments submitted on 10/30/23 reference standards are not applicable to this contract. Through the actions taken in 2023 and planned work in Q1 2024 (detailed in comment responses below), RS believes that the site will meet the required contract standards for boundary marking.

2. Remove all agricultural debris located within the CE area. See KML for areas noted on the recent visit.
   Response: Debris is scheduled to be removed from the noted locations in Q1 2024 and will be detailed in the MY3 (2024) Monitoring Report.

3. Replace all tree sign fasteners with aluminum nails. Examples were provided at the time of our inspection. The 3 ½ inch by 0.177 inch by 11/32-inch head aluminum nails were purchased from Kaiser Aluminum 800-633-3156.
   Response: RS appreciates the intent of this request; however, this standard is not part of Contract #7890 / RFP 16-007725 and does not apply to this site. RS believes that all current fasteners meet the contract requirements but will favor aluminum nails if any signs/fasteners require replacement during the monitoring period due to incidental damage or failure.

4. Old fencing inside of CE needs to be removed along with any sediment control silt fencing t-posts used during the project construction phase. See KML for specific areas noted on recent visit.
   Response: Fencing is scheduled to be removed from the noted locations in Q1 2024 and will be detailed in the MY3 (2024) Monitoring Report.

5. Missing witness posts need to be installed. The KML describes southwestern corner missing witness post and one other post was noted as being down on the ground.
   Response: The noted points are corner #48 and #43. Those witness posts will be corrected in Q1 2024 and will be detailed in the MY3 (2024) Monitoring Report with photographic documentation. In addition, RS will add high visibility witness posts along the roadside boundary where terrain and vegetation have obscured the original marking. These posts will be added at ~200' intervals.

6. Where awkward signage is noted on the KML, clean up so that it is clear to the observer where the boundary is located. The boundary should be marked so that someone without a GPS and map can reasonably navigate the perimeter of the project during leaf off season.
   Response: Noted, see response to comment 5 for additional marking occurring in Q1 2024. Once the Q1 2024 work is completed, the boundary will be reviewed for compliance with contract standards and will be maintained to meet those standards.

7. Where encroachments are noted in the KML, a conversation with the adjacent landowner is required to inform them to cease the behavior causing the encroachment. This conversation needs to be summarized in an email and sent to the DMS Project Manager (Wiesner).
   Response: Noted. Landowner communications with Mr. Wise have been summarized in an email to DMS which is included immediately following this comment response letter.

8. Recommend the Provider (RS) watch this video before attempting to correct the signage https://youtu.be/7dE7edd3V5M. It is a five-minute video originally created during the N.C. Ecosystem Enhancement Program era. It will help them visualize what our expectation looks like.
   Response: Noted. The boundary has been reviewed for compliance with contract standards and will be maintained to meet those standards.

9. The easement boundary should be marked no less than every 200 feet. Where marking falls short of this objective, additional signs should be added.
   Response: Noted, see response to comment 5 for additional marking occurring in Q1 2024. The boundary has been reviewed for compliance with contract standards and will be maintained to meet those standards.

10. The Provider (RS) should decommission and block all roads and trails located inside of the Conservation Easement to avoid any future use. The roads and trails noted inside of the Conservation Easement were not located on the recorded survey plat and should not be utilized in the future.
    Response: Noted. These trails are no longer in use and access points have been blocked.

Raymond Holz

From: Matthew Harrell
Sent: Wednesday, February 14, 2024 3:28 PM
To: Wiesner, Paul
Cc: Raymond Holz; JD Hamby
Subject: Laurel Springs_100122: Boundary inspection report- Action Item #7

Hi Paul,

Action item #7 from the boundary inspection report indicated that we should send you a summary email of our correspondence with Mr. Wise regarding easement encroachments adjacent to his property. Here is that summary:

1. Soon after construction a boundary oversight by RS was found which consisted of a shed within the easement. RS coordinated with Mr. Wise to remove this shed and he was cooperative throughout the process.
2. During the 10-19-2022 site visit to conduct maintenance work, specifically to remove the shed and other debris from the easement near the adjacent landowner's house, project manager JD Hamby presented a new map with updated aerial photography to the neighbor and explained how past maps with outdated imagery were confusing as to the location of the boundary due to the changes in vegetation and removal of a hedge row. It was explained to the neighbor that RS was adding new wooden posts to mark the corners of the easement more clearly, along with t-posts in between, in order to plainly mark where the easement boundary lay, and to protect the replant area from any more encroachments with a mower. The neighbor was understanding and agreeable.
3. During a March 2023 site visit additional boundary marking was added along the edge of Mr. Wise's yard. He was present during a portion of this work and seemed to understand the easement boundary and the relevant restrictions.
4. During an October 2023 site visit additional mowing/scalloping in the easement along Mr. Wise's yard was observed. JD Hamby conferred with Mr. Wise about this issue in person. It was decided that RS would add a physical barrier (ie rope or horse tape) along the boundary to make it clear to any contractor or other person mowing the yard that the easement area was off limits and no longer to be mowed. Mowing along the easement boundary was challenging due to the steep grade which limited equipment mobility and contributed to some scalloping. A continuous visual barrier was agreed upon as a viable solution. This visual/ physical barrier is to be installed in Q1 2024.

Thank you,

Matthew Harrell | Project Manager
Davey Mitigation
P: 252-299-1655
E: matthew.harrell@davey.com

DAVEY
MITIGATION

13 August 2013

Survey Requirements for Full Delivery Projects
Version 08/13/13

The full delivery provider (Provider) shall furnish one point of contact) as a central point of communication for easement acquisition. The easement boundary shall mimic the boundary provided within the technical proposal. The Provider shall contact the Project Manager at the Ecosystem Enhancement Program (EEP) to discuss any variations in the easement boundary from the technical proposal prior to proceeding with the acquisition. The conservation easement template, Full Delivery Conservation Easement Version 08/13/13, is located at the following link: http://portal.ncdenr.org/web/eep/fd-forms-templates.

Conservation Easement Boundary Design and Fencing Requirement

1) The configuration of any survey should simplify the project boundary and reduce the number of corners. Corners shall be no less than 200 feet apart without prior approval. A strong preference for fewer longer lines must prevail over many short lines when considering the placement of lines and corners. Wetland delineations and measurements from the top of bank should serve as tools to help draw the conservation easement boundary but should rarely be used as the boundary itself.

2) Woven wire or barbed wire fences are required on sites with livestock access to areas adjacent to the conservation easement. Any fencing along the conservation easement boundary shall be installed on the conservation easement boundary and shall conform to Natural Resources Conservation Service specifications**, except that metal posts must not be used for fencing.** Woven Wire Fence and Barbed Wire Fence Specifications as of 02/14/12 can be found at http://portal.ncdenr.org/web/eep/fd-forms-templates. At least five strands of galvanized barbed wire must be used. Either a gate or a y-shaped opening at least three feet in width must be installed every one thousand feet on at least one side of the project. Woven wire or barbed wire fencing must be attached to pressure treated posts or other wood of equal life and strength. Fences shall not impede the future use of the parent tract, and must be located so as to provide for long-term maintenance of the fence by the Grantor without impacting the rest of the conservation easement area. **The State is not responsible for maintenance of fencing.** Maintenance zones shall extend into the Conservation Easement Area no more than ten feet from the conservation easement boundary. Survey pins and caps are required on each corner as described elsewhere in this document. Installation of the fence shall not disturb the survey pins or caps. The interior of the maintenance zone shall be marked with durable permanent markers, such as t-posts, at each corner. Fences, maintenance zones and fence openings shall be shown on the survey plat (plat). **Please note that maintenance zones cannot count towards widths required for compensatory mitigation credit.**

3) All existing easements or rights-of-way that affect the project must be shown on the plat. Please refer to this link for examples: http://portal.ncdenr.org/web/eep/fd-forms-templates. When pre-existing easements and rights-of-way run parallel to the outer edge of the conservation easement, make the boundaries contiguous and exclusive.

Survey and Boundary Marking

1) All surveys shall meet the Standards of Practice for Land Surveying in North Carolina as described in Title 21, Chapter 56 of the North Carolina Administrative Code.

2) The Provider shall show the existing property corners, nearby easements, dwellings, roadways, streams and creeks on the survey plat. The Provider shall also show all easements that are within 100 feet of proposed conservation easement boundary lines. Manholes and power poles shall also be shown on the plat.

3) The Provider shall set 5/8" rebar 30" in length with 3-1/4" aluminum caps on all easement corners. Caps shall meet EEP specifications (Berntsen RBD5325 imprinted with NC State Logo # B9087 or equivalent). After installation, caps shall be stamped with the corresponding number from the table of coordinates that is required in paragraph 6 below.

4) The Provider shall place a 6-foot tall durable witness post at each corner in the conservation easement boundary. Witness posts shall be placed within the conservation easement area. Posts shall be made of material that will last a minimum of 20 years. The Provider shall attach a conservation easement sign to each witness post and place additional signs at no more than 200-foot intervals on long boundary lines. When appropriate, the Provider shall mark existing trees with conservation easement signs and/or blaze property lines at approximate eye level. Please see EEP portal for examples at http://portal.ncdenr.org/web/eep/fd-forms-templates.

5) All surveys shall be tied to the North Carolina State Plane Coordinate System NAD83 (NSRS2007) per the Standards of Practice for Land Surveying in North Carolina, Title 21 NCAC 56.1602(g), **regardless of whether the property is or is not within 2,000 feet of a geodetic monument** and with application of 21-56.1607 GLOBAL POSITIONING SYSTEM SURVEYS or 21-56.1603 CLASSIFICATION OF BOUNDARY SURVEYS.

6) The Provider shall send an Adobe Acrobat (.pdf) copy and an Arc GIS file of the preliminary plat to the EEP Project Manager and the State Property Agent by electronic mail. The title block shall read, "Conservation Easement Survey for the State of North Carolina, Ecosystem Enhancement Program", survey sheet number, and shall contain the SPO parcel ID number, EEP project name and number. The title block shall contain the name of the landowner, location, date surveyed, scale of the drawing, name, address, registration number and seal of the surveyor. **A table of coordinates (northing and easting) for all property corners must be included on the plat**. All corners shall be numbered consecutively starting with number 1. If multiple parcels comprise a single project, assign a unique number to each property corner within the project. The text metes and bounds description for each tract of the surveyed areas shall be provided on standard letter sized paper and titled "Exhibit A".

7) After written approval has been received from the SPO and EEP, the Provider shall record the final approved plat and obtain all necessary approvals from the county review officer.

8) The Provider shall send one copy of the recorded plat to Blane Rice, State Property Office, Mail Service Center 1321, Raleigh, NC, 27699-1321. The Provider shall also send one copy of the final recorded plat in the following formats: a legible Adobe Acrobat (.pdf) copy, digital files in CAD (.dwg) format and Arc GIS format to the EEP Project Manager and to the following at

the State Property Office: Blane.Rice@doa.nc.gov and Jeff.Mulligan@doa.nc.gov. All files must be geo-referenced and projected in NC State Plane Coordinates, NAD83 (NSRS 2007), in US Survey Feet. The CAD and Arc GIS files must contain a closed polygon of the conservation easement shape and must contain a polygon layer in addition to the line work

9) For tips on creating GIS compatible CAD drawings, please see ESRI's Creating Compatible CAD Data for ArcGIS.

10) Digital files submitted to EEP shall follow the guidance document Format, Data Requirements and Content Guidance for Electronic Drawings Submitted to EEP.

Laurel Springs -- Year 2 (2023) Monitoring Summary

General Notes

- During the October 18, 2023 DMS boundary inspection, three small areas of encroachment (0.008 total acres) were observed along the northern easement boundary near the easement break on UT 3. Additional boundary marking was added and the area will be replanted during the Q1 2024 AMP action. These areas are depicted on Figure 1 and are quantified in Table 5 (Appendix A).
- No evidence of nuisance animal activity (i.e., heavy deer browsing, beaver, etc.) was observed.
- An offsite DOT culvert upstream of UT1 sustained storm damage and rock was added to stabilize the culvert and repair the perched condition. See Appendix A.
- The driveway culvert on UT-2 was installed as designed and is stable, however due to IRT concern expressed during the October 18, 2023 site visit, baffles will be added Q1 2024 to enhance aquatic organism passage. See Appendix F.

Streams

- All stream restoration reaches were stable and exhibited no signs of erosion, and all structures were stable (Appendix C).
- Three bankfull events were documented during the year 2 (2023) monitoring period for a total of 6 bankfull events during 2 monitoring years (Table 11, Appendix D).
- UT 2 showed evidence of channel formation during the year 2 (2023) monitoring period, with the stream flow gauge capturing 94 consecutive days of flow (Table 13, Appendix D).

Vegetation

- Measurements of all 16 permanent plots and 10 temporary plots resulted in an average of 240 planted stems/acre. Additionally, 10 of the 26 individual plots met the MY3 stem density requirement during MY2 (Appendix B).
- Due to continued stem-density issues reflected in the MY2 vegetation data, RS will implement a site-wide adaptive management plan during the 2023/2024 dormant season. The 2023 Adaptive Management Plan was approved November 29, 2023 and is detailed, along with corresponding IRT communications, in Appendix F.
- Due to floodplain soils being of the Nikwasi series, scattered openings dominated by herbs and shrubs are likely to develop over time. These areas are expected to be less than an acre in size and encompass less than 20% of the Site. As such, nine 5m x 2m temporary herbaceous plots were documented in herbaceous dominated areas during MY2 (2023). All 9 plots met the IRT established success criteria of 4 or more species present. See Table A for success criteria and Appendix B for herbaceous plot data.

Wetlands

- Ten of the thirteen groundwater gauges met success criteria for the year 2 (2023) monitoring period (Table 12, Appendix D). During the October 18, 2023 IRT Site visit, it was noted that the area surrounding gauges 2 and 3 are obvious wetlands and that a gauge malfunction is likely the cause of the lack of wetland hydrology at these gauges. Axiom confirmed a malfunction with the Site barometer, which caused somewhat erratic readings through the first half of the growing season on all gauges. The barometer was replaced on June 28, 2023 and has been functioning properly since.
- Based on communications with the IRT in 2022, RS has moved gauges 6, 9, 11, and 12 into creditable wetland reestablishment areas during the 2022/2023 dormant season. Also, gauge 1 was moved into the wetland enhancement area, as depicted in Figure 9 of the approved Mitigation Plan.
-

Summary of Monitoring Period/Hydrology Success Criteria by Year

Gauge	12% Hydroperiod Success Criteria Achieved - Max Consecutive Days During Growing Season (Percentage)						
	Year 1 (2022)	Year 2 (2023)	Year 3 (2024)	Year 4 (2025)	Year 5 (2026)	Year 6 (2027)	Year 7 (2028)
1*	Yes 45 days (19.1%)	Yes 209 days (88.6%)					
2	No 2 days (0.9%)	No 3 days (1.3%)					
3	No 17 days (7.2%)	Yes 14 days (5.9%)					
4	Yes 167 days (71.1%)	Yes 209 days (88.6%)					
5	Yes 46 days (19.6%)	Yes 75 days (31.8%)					
6*	Yes 236 days (100%)	Yes 209 days (88.6%)					
7	Yes 236 days (100%)	Yes 209 days (88.6%)					
8	Yes 119 days (50.6%)	Yes 209 days (88.6%)					
9*	Yes 236 days (100%)	Yes 99 days (41.9%)					
10	Yes 65 days (27.7%)	Yes 209 days (88.6%)					
11*	Yes 45 days (19.1%)	Yes 44 days (18.6%)					
12*	Yes 236 days (100%)	No 15 days (6.4%)					
13	Yes 236 days (100%)	Yes 209 days (88.6%)					

*During the MY0 review, the IRT requested that gauges be moved into creditable wetland areas to more accurately represent what was presented in the detailed mitigation plan (Appendix F). During the 2022/2023 dormant season, gauges 6, 9, 11, and 12 were moved into creditable wetland reestablishment areas, and gauge 1 was moved into the nearby wetland enhancement area.

Site Maintenance Report (2023)

Invasive Species Work	Maintenance work
6/28/2023: Spot treatments: Japanese Knotweed, Multiflora rose, Ligustrum. 09/19/2023: Spot treatments: Japanese Knotweed, Bittersweet, Barberry, Multiflora rose.	Week of 3/12/23: Supplemental planting, old fence removal, additional boundary marking. 7/12/23: Additional boundary marking. 8/8/23: Added rock at DOT culvert entering site at UT-1 where storm damage caused perching.

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APPENDICES

1 PROJECT SUMMARY

Restoration Systems, LLC (RS) has established the North Carolina Division of Mitigation Services (NCDMS) Laurel Springs Stream and Wetland Mitigation Site (Site). The Site is on one contiguous parcel along the cold-water Fork Creek and unnamed tributaries to Fork Creek in the Southern Crystalline Ridge and Mountains Ecoregion of North Carolina. Located in the French Broad River Basin, cataloging unit 06010108, the Site is in the Targeted Local Watershed (TLW) 06010108010020 and North Carolina Division of Water Resources (NCDWR) subbasin number 04-03-06. The Site is not located in a Local Watershed Plan (LWP), Regional Watershed Plan (RWP), or Targeted Resource Area (TRA). Site watersheds range from approximately 0.02 of a square mile (12 acres) on UT2 to 1.32 square miles (847 acres) at the Site's outfall.

1.1 Project Background, Components, and Structure

Located approximately 8 miles southwest of Linville and 7 miles northeast of Spruce Pine in southern Avery County, the Site encompasses 29.19 acres. Mitigation work within the Site included 1) stream restoration, 2) stream enhancement (Level I), 3) stream enhancement (Level II), 4) stream preservation, 5) wetland reestablishment, 6) wetland rehabilitation, 7) wetland enhancement, 8) wetland preservation, and 9) vegetation planting. The Site is expected to provide 4231.827 cold water stream credits and 3.688 riparian wetland credits by closeout (Table 1, Page 2). A conservation easement was granted to the State of North Carolina and recorded at the Avery County Register of Deeds on October 19, 2020.

Before construction, land use at the Site was characterized by disturbed forest, cow pasture, and hay fields. Site design was completed in February 2021. Construction started July 12, 2021, and ended with a final walkthrough on October 15, 2021. The Site was planted on January 12-13, 2022. Completed project activities, reporting history, completion dates, and project contacts are summarized in Tables 14-15 (Appendix E).

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Table 1. Laurel Springs Stream and Wetland Mitigation Site (ID-100122) Project Mitigation Quantities and Credits

Project Segment	Original Mitigation Plan Ft/Ac	As-Built Ft/Ac	Original Mitigation Category	Original Restoration Level	Original Mitigation Ratio (X:1)	Credits		Comments
Stream								
Fork Cr - A	91	92	Cold	EI	1.50000	60.667		
Fork Cr - B	2250	2242	Cold	R	1.00000	2,250.000		
UT 1	234	233	Cold	R	1.00000	234.000		
UT 2A	25	25	Cold	P	10.00000	2.500		
UT 2 - A	184	184	Cold	P	10.00000	18.400		
UT 2 - B	198	199	Cold	EII	2.50000	79.200		
UT 2 - C	467	463	Cold	R	1.00000	467.000		
UT 3A	103	103	Cold	P	10.00000	10.300		
UT 3 - A	265	265	Cold	P	10.00000	26.500		
UT 3 - B	248	250	Cold	EII	5.00000	49.600		
UT 3 – C	183	183	Cold	EI	1.50000	122.000		
UT 3 - D	233	223	Cold	R	1.00000	233.000		
UT 4 - A	541	541	Cold	P	10.00000	54.100		
UT 4 - B	112	110	Cold	R	1.00000	112.000		
UT 5 - A	60	60	Cold	P	10.00000	6.000		
UT 5 - B	67	67	Cold	P	10.00000	6.700		
					Total:	**3,731.967**		
Wetland								
Wetland Reestablish	7.656	7.656	R	REE	1.00000	7.656		
Wetland Rehabilitation	1.845	1.845	R	RH	NA*	0.000		
Wetland Enhancement	0.148	0.148	R	E	NA*	0.000		
Wetland Preservation	0.198	0.198	R	P	NA*	0.000		
					Total:	**7.656**		

*Wetland Rehabilitation, Enhancement, and Preservation acreage are not being included in credit calculations. These areas are being utilized by the wider buffer tool to generate additional stream credit

Project Credits

	Stream			Riparian	Non-Rip	Coastal
Restoration Level	Warm	Cool	Cold	Wetland	Wetland	Marsh
Restoration			3,296.000			
Re-establishment				3.688**		
Rehabilitation						
Enhancement						
Enhancement I			182.667			
Enhancement II			128.800			
Creation						
Preservation			124.500			
Wider Buffer Tool			499.860			
Totals	**0.000**	**0.000**	**4,231.827**	**3.688**	**0.000**	**0.000**

**** DMS contract is for 3.688 WMUs; therefore, excess wetland credit has been used for wider buffer tool calculations.**

Total Stream Credit **4,231.827**
Total Wetland Credit **3.688**

Table 2: Summary: Goals, Performance and Results

Goal	Objective/Treatment	Likely Functional Uplift	Performance Criteria[%]	Measurement	Cumulative Monitoring Results
Minimize downstream flooding to the maximum extent possible.	• Construct a new channel at historic floodplain elevation to restore overbank flows • Remove drain tiles and agriculture ditches • Plant woody riparian buffer • Deep rip floodplain soils to reduce compaction and increase soil surface roughness • Protect riparian buffers with a perpetual conservation easement	• Disperse high flows on the floodplain • Increase biogeochemical cycling within the system • Recharge riparian wetlands	• BHR not to exceed 1.2 • Document four overbank events in separate monitoring years • Livestock excluded from the easement • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria • Conservation Easement recorded	• 16 cross-section surveys • 16 perment vegetation plots with temporary plots as necessary* • 13 groundwater gauges • 1 crest gauge on Fork Creek	• All XS met success criteria - 2022, 2023 • 11 of 13 gauges met - 2022, 10 of 13 gauges met -2023 • 9 of 26 plots met - 2022, 8 of 26 plots met - 2023 • 3 BF -2022, 3 BF 2023
Increase stream stability within the Site so that channels are neither aggrading nor degrading.	• Construct channels with the proper pattern, dimension, and longitudinal profile • Remove livestock from the property • Construct stable channels with the appropriate substrate • Upgrade piped channel crossings • Plant woody riparian buffer • Stabilize stream banks	• Reduce sediment inputs from bank erosion • Reduce shear stress • Improve overall hydraulic function	• Cross-section measurements indicate a stable channel with the appropriate substrate • Visual documentation of stable channels and structures • BHR not to exceed 1.2 • < 10% change in BHR in any given year • Livestock excluded from the easement • Attain Vegetation Success Criteria	• 16 cross-section surveys • 16 perment vegetation plots with temporary plots as necessary*	• All XS met success criteria - 2022, 2023 • 9 of 26 plots met - 2022, 8 of 26 plots met - 2023
Remove direct nutrient and pollutant inputs from the Site and reduce contributions to downstream waters.	• Remove agricultural livestock and reduce agricultural land/inputs • Install marsh treatment areas • Plant woody riparian buffer • Restore/enhance jurisdictional wetlands adjacent to Site streams • Provide surface roughness and reduce compaction through deep ripping/plowing. • Restore overbank flooding by constructing channels at historic floodplain elevation.	• Reduce floodplain sediment inputs from runoff • Reduce nutrient inputs by permanently removing livestock • Increase bank stability	• Livestock excluded from the easement • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria	• 13 groundwater gauges • 16 perment vegetation plots with temporary plots as necessary* • 9 temporary herbaceous vegetation plots	• 11 of 13 gauges met - 2022, 10 of 13 gauges met -2023 • 9 of 26 plots met - 2022, 8 of 26 plots met - 2023 • 9 of 9 herbaceous plots met - 2023
Improve instream and streamside habitat.	• Construct stable channels with the appropriate substrate • Plant woody riparian buffer to provide organic matter and shade • Construct a new channel at historic floodplain elevation to restore overbank flows • Protect riparian buffers with a perpetual conservation easement • Restore/enhance jurisdictional wetlands adjacent to Site streams • Stabilize stream banks • Install in-stream structures	• Decrease stream bed incision • Increase bank stability • Increase LWD and organic material in streams • Plant hardwood stems throughout riparian buffer area • Restore riparian wetlands within the adjacent floodplain.	• Cross-section measurements indicate a stable channel with the appropriate substrate • Visual documentation of stable channels and in-stream structures • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria • Conservation Easement recorded	• 16 cross-section surveys • 13 groundwater gauges • 16 perment vegetation plots with temporary plots as necessary* • 9 temporary herbaceous vegetation plots • 1 crest gauge on Fork Creek	• All XS met success criteria - 2022, 2023 • 11 of 13 gauges met - 2022, 10 of 13 gauges met -2023 • 9 of 26 plots met (2022), 8 of 26 plots met - 2023 • 9 of 9 herbaceous plots met - 2023 • 3 BF -2022, 3 BF 2023

[%] Success criteria is detailed in Table A.

* Temporary vegetation plots may be measured as required by an adaptive management plan or requested by IRT.

Table 3. Project Attributes

Project Information					
Project Name	Laurel Springs Site				
Project County	Avery County, North Carolina				
Project Area (acres)	29.19				
Project Coordinates (latitude & latitude)	35.9913, -81.9837				
Planted Area (acres)	16.2				
Project Watershed Summary Information					
Physiographic Province	Blue Ridge				
Project River Basin	French Broad				
USGS HUC for Project (14-digit)	6010108010020				
NCDWR Sub-basin for Project	04-03-06				
Project Drainage Area (acres)	846.7				
Percentage of Project Drainage Area that is Impervious	<2%				
CGIA Land Use Classification	Managed Herbaceous Cover & Hardwood Swamps				
Reach Summary Information					
Parameters	**Fork Cr**	**UT 1**	**UT 2**	**UT3**	**UT 4**
Pre-Project Length (linear feet)	2401	234	926	1002	685
Post-Project Length (linear feet)	2334	233	870	1024	650
Valley Classification & Confinement	Alluvial, moderately confined	Alluvial, moderately confined	Alluvial, confined	Alluvial, confined	Alluvial, confined
Drainage Area (acres)	847	193	12	23	13
NCDWR Stream ID Score	--	--	25.5	22.5	33.5
Perennial, Intermittent, Ephemeral	Perennial	Perennial	Perennial/ Intermittent	Perennial/ Intermittent	Perennial
Thermal Regime	Cold	Cold	Cold	Cold	Cold
NCDWR Water Quality Classification	WS-IV, Tr				
Existing Morphological Description (Rosgen 1996)	Cg 4	Eg 4	Bg 5/6	Bg 5	B 4
Proposed Stream Classification (Rosgen 1996)	Ce 3/4	Ce 3/4	B 3/4	B 3/4	B 4
Existing Evolutionary Stage (Simon and Hupp 1986)	II/III	II/III	IV	II	I/II
Underlying Mapped Soils	Nikwasi loam, Reddies fine sandy loam,	Nikwasi loam	Chandler-Micaville complex	Chandler-Micaville complex	Chandler-Micaville complex
Drainage Class	poorly, moderately well	poorly	somewhat excessively	somewhat excessively	somewhat excessively
Hydric Soil Status	hydric, nonhydric (may contain hydric inclusions)	hydric	nonhydric	nonhydric	nonhydric
Parameters	**Fork Cr**	**UT 1**	**UT 2**	**UT3**	**UT 4**
Valley Slope	0.0271	0.0291	0.1047	0.0992	0.0992
FEMA Classification	NA	NA	NA	NA	NA
Native Vegetation Community	Montane Alluvial Forest and Swamp Forest-Bog Complex				
Watershed Land Use/Land Cover (Site)	87% forest, 11% agricultural land, <2% low density residential/impervious surface				
Watershed Land Use/Land Cover (Reference Channel)	95% forest, 3% agricultural land, <2% low density residential/impervious surface				
Percent Composition of Exotic Invasive Vegetation	<5%				

Wetland Summary Information	
Parameters	**Wetlands**
Wetland acreage	8.3 acre drained & 2.61 acres degraded
Wetland Type	Riparian riverine
Mapped Soil Series	Nikwasi
Drainage Class	Poorly drained
Hydric Soil Status	Hydric
Source of Hydrology	Groundwater, stream overbank
Hydrologic Impairment	Incised streams, compacted soils, livestock, ditches, drain tile
Native Vegetation Community	Montane Alluvial Forest and Swamp Forest-Bog Complex
% Composition of Exotic Invasive Vegetation	<5%
Restoration Method	Hydrologic, vegetative, livestock
Enhancement Method	Vegetative, livestock

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States-Section 401	Yes	Yes	JD Package (Mitigation Plan, App D)
Waters of the United States-Section 404	Yes	Yes	JD Package (Mitigation Plan, App D)
Endangered Species Act	Yes	Yes	CE Document (Mitigation Plan, App E)
Historic Preservation Act	Yes	Yes	CE Document (Mitigation Plan, App E)
Coastal Zone Management Act	No	--	NA
FEMA Floodplain Compliance	Yes	Yes	CE Document (Mitigation Plan, App E)
Essential Fisheries Habitat	No	--	CE Document (Mitigation Plan, App E)

1.2 Success Criteria

Monitoring and success criteria for stream restoration should relate to project goals and objectives identified from on-site NC SAM and NC WAM data collection. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving success criteria. The following summarizes Site success criteria.

Table A. Success Criteria

Streams
• All streams must maintain an Ordinary High-Water Mark (OHWM), per RGL 05-05. • Continuous surface flow must be documented in intermittent reaches each year for at least 30 consecutive days. • Bank height ratio (BHR) cannot exceed 1.2 at any measured cross-section. • BHR at any measure riffle cross-section should not change by more than 10% from baseline condition during any given monitoring period. • The stream shall remain stable, and all other performance standards shall be met through four separate bankfull events, occurring in separate years, during the monitoring years 1-7. • Intermittent streams will demonstrate at least 30-days consecutive flow.
Wetland Hydrology
• Annual saturation or inundation within the upper 12 inches of the soil surface for, at a minimum, 12 percent of the growing season during average climatic conditions.
Vegetation
• Within planted portions of the Site, a minimum of 320 stems per acre must be present at year 3; a minimum of 260 stems per acre must be present at year 5; and a minimum of 210 stems per acre must be present at year 7. • Trees must average 6 feet in height at year 5 and 8 feet in height at year 7 in each plot. • Planted and volunteer stems are counted, provided they are included in the approved planting list for the Site; natural recruits not on the planting list may be considered by the IRT on a case-by-case basis. • Areas of herbaceous vegetation establishment will have a minimum of four species present.

2 METHODS

Monitoring will be conducted by Axiom Environmental, Inc. Annual monitoring reports of the data collected will be submitted to the NCDMS by Restoration Systems no later than December 31 of each monitoring year data is collected. The monitoring schedule is summarized in the following table.

Table B. Monitoring Schedule

Resource	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Streams	X	X	X		X		X
Wetlands	X	X	X	X	X	X	X
Vegetation	X	X	X		X		X
Visual Assessment	X	X	X	X	X	X	X
Report Submittal	X	X	X	X	X	X	X

2.1 Monitoring

The monitoring parameters are summarized in the following table.

Table C. Monitoring Summary

Stream Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Stream Profile	Full longitudinal survey	As-built (unless otherwise required)	All restored stream channels	Graphic and tabular data.
Stream Dimension	Cross-sections	Years 1, 2, 3, 5, and 7	Total of 16 cross-sections on restored channels	Graphic and tabular data.
Channel Stability	Visual Assessments	Yearly	All restored stream channels	Areas of concern will be depicted on a plan view figure with a written assessment and photograph of the area included in the report.
	Additional Cross-sections	Yearly	Only if instability is documented during monitoring	Graphic and tabular data.
Bankfull Events	Continuous monitoring of surface water gauges and/or trail camera	Continuous recording through the monitoring period	One surface water gauge on UT2	Surface water data for each monitoring period
	Visual/Physical Evidence	Continuous through the monitoring period	One crest gauge on Fork Creek	Visual evidence, photo documentation, and/or rain data.
Wetland Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Wetland Re-establishment	Groundwater gauges	Yearly with the growing season defined as March 1-October 22	13 gauges spread throughout restored wetlands	Soil temperature at the beginning of each monitoring period to verify the start of the growing season, groundwater and rain data for each monitoring period
Vegetation Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Vegetation establishment and vigor	Permanent vegetation plots 0.0247 acres (100 square meters) in size; *CVS-EEP Protocol for Recording Vegetation*, *Version 4.2* (Lee et al. 2008)	As-built, Years 1, 2, 3, 5, and 7	16 permanent plots spread across the Site*	Species, height, planted vs. volunteer, stems/acre
	Temporary 5m x 2m herbaceous vegetation plots	Years 2, 3, 5, and 7, if necessary	Temporary plots in areas observed to be dominated by herbs and shrubs[&]	Species only

Note: Volunteer species on the approved planting list must be established for 2 years to count towards success and will be subject to height standards.

* Temporary vegetation plots may be measured as required by an adaptive management plan or requested by IRT.

[&] Number of herbaceous plots will be determined by the approximate acreage of areas observed to be dominated by herbs and shrubs.

3 MONITORING YEAR 2 – DATA ASSESSMENT

Annual monitoring and site visits were conducted between February 2023 and November 2023 to assess the condition of the project. Stream, wetland, and vegetation criteria for the Site follow the approved success criteria presented in the Mitigation Plan and summarized in Section 1.2; monitoring methods are detailed in Section 2.0.

3.1 Stream Assessment

Morphological surveys for MY2 were conducted on April 14, 2023, and no stream areas of concern were identified. All streams within the Site are stable and functioning as designed, with minimal changes from MY0 measurements. Cross-sections 4, 7, and 14 were pointed out by the IRT at the April 18, 2023 credit release meeting due to varying degrees of aggradation since MY0. These are pool cross-sections in a highly dynamic mountain stream system. Shortly after Site construction, a great deal of streambed substrate transport was observed as the newly constructed stream settled and adapted to the high energy flows that characterize steep, high elevation streams. This sediment deposition does not reflect a greater sediment issue within the Site. It is a natural step in the early successional processes that occur after a stream has been restored. It is expected that substrate transport will continue to be observed in this system during the ensuing monitoring period, including potential scour in these pools as more high flow events occur onsite.

Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data.

Additionally, the UT2 stream gauge captured 94 consecutive days of stream flow (Table 13, Appendix D).

3.2 Wetland Assessment

Summary of Monitoring Period/Hydrology Success Criteria by Year

Year	Soil Temperatures/Date Bud Burst Documented	Monitoring Period Used for Determining Success	12 Percent of the Monitoring Period
2022 (Year 1)	March 1, 2022*	March 1-October 22 (236 days)	28 days
2023 (Year 2)	March 1, 2023**	March 1-October 22 (236 days)	28 days

*Based on observed/documented bud burst on the Site on March 1, 2022, and soil temperature of 44.20°F documented March 1, 2022, and not dropping below 43.19°F thereafter.

**Based on observed/documented bud burst on the Site on March 7, 2023, and soil temperature of 46.20°F documented on March 1, 2023. Although the soil temperature dropped below 41°F for 3 days in mid-March (40.95°F, 40.18°F, and 40.26°F on March 16, 21, and 22, respectively), it climbed above 46 again within 3 days (March 25). Observed bud burst onsite indicates that the period of biological activity had already begun March 1, and this short drop in soil temperature did not likely affect the growing season start date.

Ten of the thirteen groundwater gauges met success criteria for the year 2 (2023) monitoring period (Table 12, Appendix D). During a 2023 IRT Site visit, it was noted that the area surrounding gauges 2 and 3 are obvious wetlands and that a gauge malfunction is likely the cause of the lack of wetland hydrology at these gauges. AXE confirmed a malfunction with the Site barometer, which caused somewhat erratic readings through the first half of the growing season on all gauges. The barometer was replaced on June 28, 2023 and has been functioning properly since. Rainfall data from an on-site gauge shows average rainfall for the year through September compared with the 30-year 30-70th percentile data at a nearby WETS station (Figure D1, Appendix D), and it is expected that all site wetlands would have met performance standards had the barometer functioned properly.

During the MY0 review, the IRT expressed concern that several groundwater gauges were installed in different credit areas than originally proposed and approved in the Site's Mitigation Plan. Gauges 6, 9, 11, and 12 were moved into creditable wetland reestablishment areas, and gauge 1 was moved into the nearby wetland enhancement area.

3.3 Vegetative Assessment

The MY2 (2023) vegetative survey was completed on September 21, 2023. Measurements of all 16 permanent plots and 10 temporary plots resulted in an average of 240 planted stems/acre. Additionally, 10 of the 26 individual plots met the MY3 stem density requirement during MY2 (Appendix B). Due to low stem density observed during MY1, RS supplementally planted 2.67 acres of the site, predominantly along upland slope (Acidic Cove Forest) areas including a 0.107-acre area of easement encroachment, with 1800 bare-root stems during the dormant season 2022/2023 (Remedial Planting Plan (Q1-2023), Appendix F). Due to continued stem-density issues reflected in the MY2 vegetation data, RS will implement a site-wide adaptive management plan during the 2023/2024 dormant season. The 2023 Adaptive Management Plan includes supplementally planting 13 acres of the Site at a density of 200 stems per acre. The plan was approved by the IRT on November 29, 2023, and is detailed in Appendix F. Areas proposed for supplemental planting are depicted on Figure 1 (Appendix A).

Due to floodplain soils being of the Nikwasi series, scattered openings dominated by herbs and shrubs are likely to develop over time. These areas are expected to be less than an acre in size and encompass less than 20% of the Site. As such, nine 5m x 2m temporary herbaceous plots were documented in herbaceous dominated areas during MY2 (2023). All 9 plots met the IRT established success criteria of 4 or more species present. See Appendix B for herbaceous plot data.

3.4 Monitoring Year 2 Summary

Except for planted bare-root vegetation, the Site is performing well. All stream reaches are functioning as designed, and Site wetlands are trending toward success. The Site is meeting project goals.

The small encroachment area observed during MY1 was addressed, and the easement was re-marked, however, several new areas (0.008 total acres) of encroachment were observed in the same area during an October 18, 2023 DMS boundary inspection. Additional marking has been added and the area will be planted during the Q1 2024 AMP action. These areas are depicted on Figure 1 and are quantified in Table 5 (Appendix A).

4 REFERENCES

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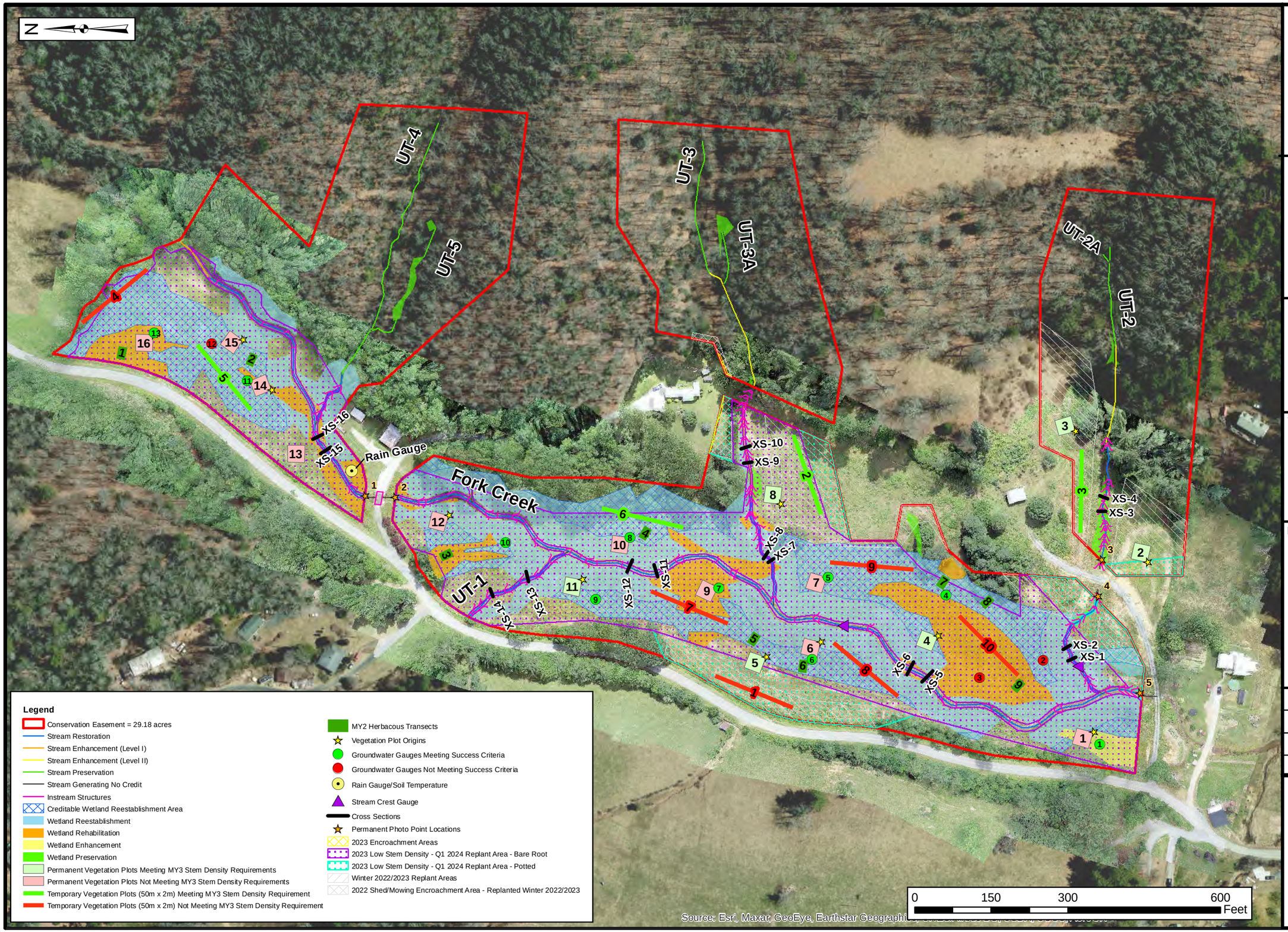
Appendix A: Visual Assessment Data

Figure 1. Current Conditions Plan View
Figure 2. Asset Map
Table 4A-E. Visual Stream Morphology Stability Assessment Table
Table 5. Vegetation Condition Assessment Table
Vegetation Plot Photographs
Site Photo Log



Legend

- Conservation Easement = 29.18 acres
- Stream Restoration
- Stream Enhancement (Level I)
- Stream Enhancement (Level II)
- Stream Preservation
- Stream Generating No Credit
- Instream Structures
- Creditable Wetland Reestablishment Area
- Wetland Reestablishment
- Wetland Rehabilitation
- Wetland Enhancement
- Wetland Preservation
- Permanent Vegetation Plots Meeting MY3 Stem Density Requirements
- Permanent Vegetation Plots Not Meeting MY3 Stem Density Requirements
- Temporary Vegetation Plots (50m x 2m) Meeting MY3 Stem Density Requirement
- Temporary Vegetation Plots (50m x 2m) Not Meeting MY3 Stem Density Requirement
- MY2 Herbacous Transects
- Vegetation Plot Origins
- Groundwater Gauges Meeting Success Criteria
- Groundwater Gauges Not Meeting Success Criteria
- Rain Gauge/Soil Temperature
- Stream Crest Gauge
- Cross Sections
- Permanent Photo Point Locations
- 2023 Encroachment Areas
- 2023 Low Stem Density - Q1 2024 Replant Area - Bare Root
- 2023 Low Stem Density - Q1 2024 Replant Area - Potted
- Winter 2022/2023 Replant Areas
- 2022 Shed/Mowing Encroachment Area - Replanted Winter 2022/2023

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

CURRENT CONDITIONS PLAN VIEW

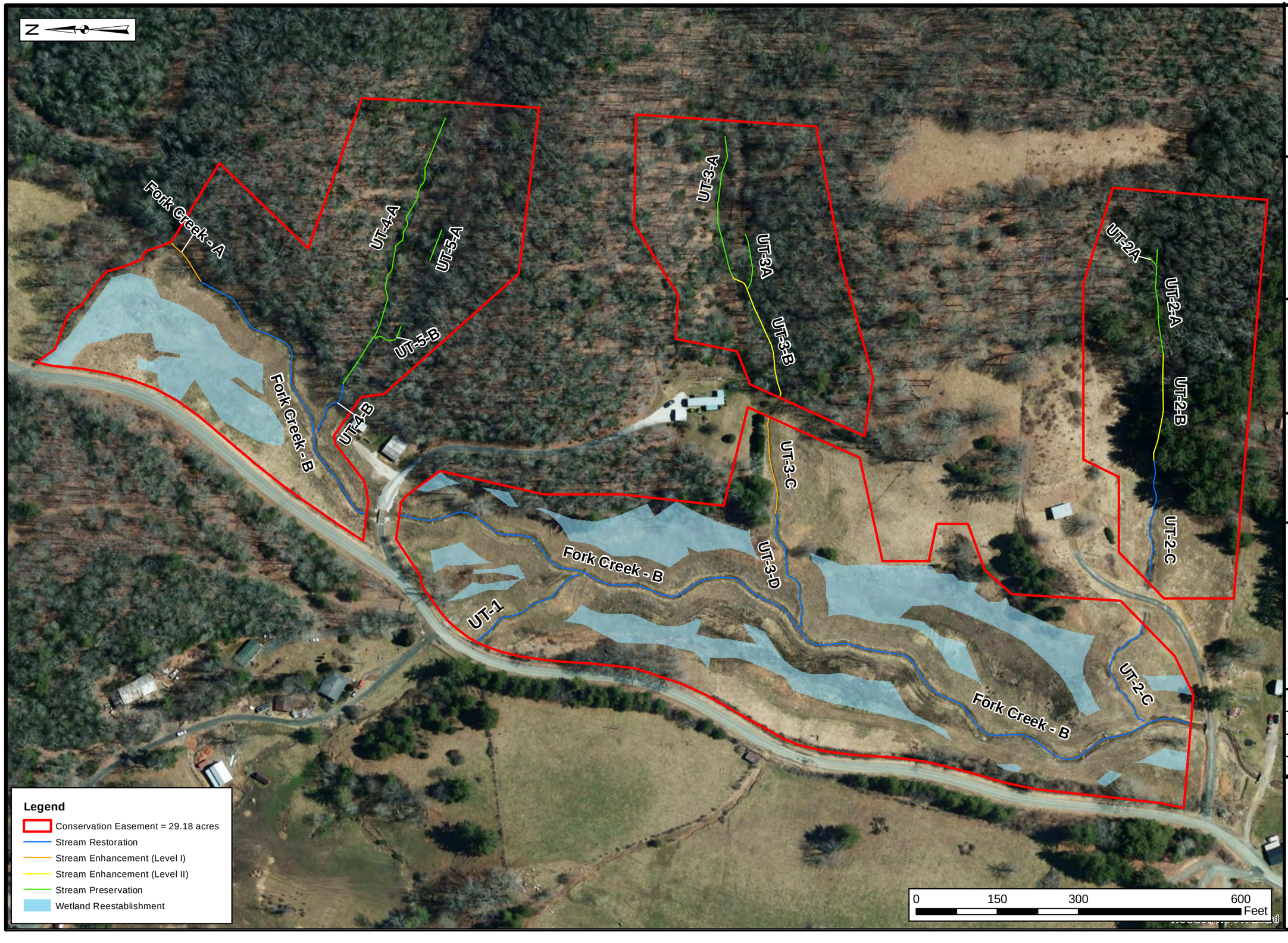
Notes:

1. Background Imagery Source: 2022 aerial photography provided by the NC OneMap program (online, provided by the NC Geographic Information Coordination Council) overlain by July 2023 drone imagery

Drawn by:	PHP
Date:	FEB 2024
Scale:	1:2000
Project No.:	19-009

FIGURE

1



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

ASSET MAP

Notes:

1. Background Imagery Source: 2022 aerial photography provided by the NC OneMap program (online, provided by the NC Geographic Information Coordination Council)

Drawn by:	KRJ
Date:	FEB 2023
Scale:	1:2000
Project No.:	19-006

FIGURE

2

Table 4A. Visual Stream Stability Assessment

Reach: Fork Creek

Assessed Stream Length: 2334

Assessed Bank Length: 4668

Survey Date: September 25, 2023

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	45	45		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	45	45		100%

Table 4B. Visual Stream Stability Assessment

Reach UT 1

Assessed Stream Length 233

Assessed Bank Length 466 Survey Date: September 25, 2023

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	8	8		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	8	8		100%

Table 4C. Visual Stream Stability Assessment

Reach UT 2

Assessed Stream Length 662

Assessed Bank Length 1324 Survey Date: September 25, 2023

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	18	18		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	18	18		100%

Table 4D. Visual Stream Stability Assessment

Reach UT 3

Assessed Stream Length 656

Assessed Bank Length 1312 Survey Date: September 25, 2023

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	16	16		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	16	16		100%

Table 4E. Visual Stream Stability Assessment

Reach UT 4

Assessed Stream Length 110

Assessed Bank Length 220 Survey Date: September 25, 2023

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	**Surface Scour/Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
				Totals	0	100%
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	3	3		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in DMS monitoring guidance document)	3	3		100%

Table 5. Visual Vegetation Assessment

Planted acreage **16.2** Survey Date: October 18, 2023

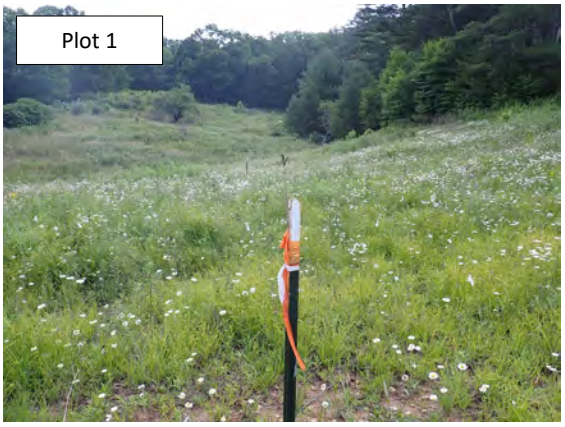
Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10acres	13.00	80.2%
	Total		13.00	80.2%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10 acres	0.00	0.0%
	Cumulative Total		13.00	80.2%

Easement Acreage **29.19**

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary.	0.10 acres	0.00	0.0%
Easement Encroachment Areas	Three small areas of encroachment observed in/near areas of previous landowner encroachment.	none	3 Encroachments noted (0.008 ac)	

Laurel Springs Site
MY2 (2023) Vegetation Monitoring Photographs (taken September 21, 2023)

Plot 1

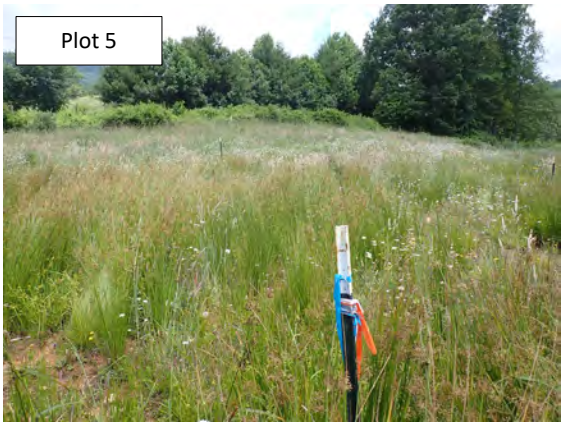


Plot 2

Plot 3

Plot 4

Plot 5



Plot 6

Plot 7

Plot 8

Laurel Springs Site
MY2 (2023) Vegetation Monitoring Photographs (taken September 21, 2023)

Plot 9

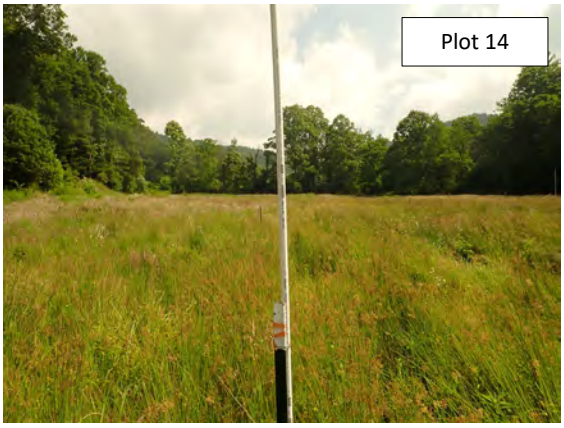
Plot 10

Plot 11

Plot 12

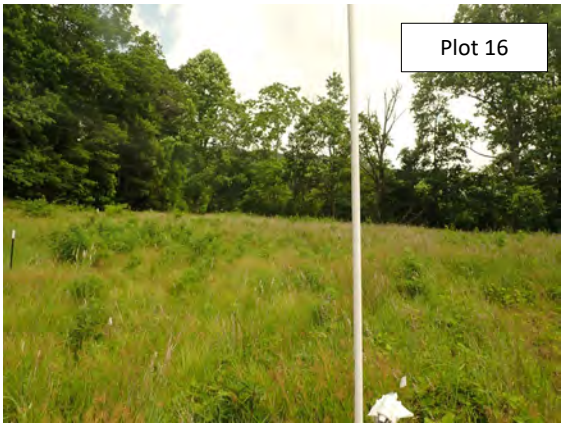
Plot 13

Plot 14



Plot 15

Plot 16



Laurel Springs Site
MY2 (2023) Vegetation Monitoring Photographs (taken September 21, 2023)

Transect 1

Transect 2

Transect 3

Transect 4

Transect 5

Transect 6

Transect 7

Transect 8

Laurel Springs Site
MY2 (2023) Vegetation Monitoring Photographs (taken September 21, 2023)

Transect 9

Transect 10

Laurel Springs
MY-02 (2023) Photo Log

Permanent Photo Point 1: Fork Creek Bridge Crossing
Upstream End, Facing Downstream (Taken 6/28/23)

Permanent Photo Point 2: Fork Creek Bridge Crossing
Downstream End, Facing Upstream (Taken 6/28/23)

Laurel Springs
MY-02 (2023) Photo Log

Permanent Photo Point 3: UT-2 Piped Crossing
Upstream End, Facing Downstream (Taken 2/19/23)

Permanent Photo Point 4: UT-2 Piped Crossing
Downstream End, Facing Upstream (Taken 2/19/23)

Laurel Springs
MY-02 (2023) Photo Log

Permanent Photo Point 5: Fork Creek Downstream Piped Crossing (Taken 2/23/23)

Photo 6: Easement Boundary Signage (Taken 9/25/23)

Laurel Springs
MY-02 (2023) Photo Log

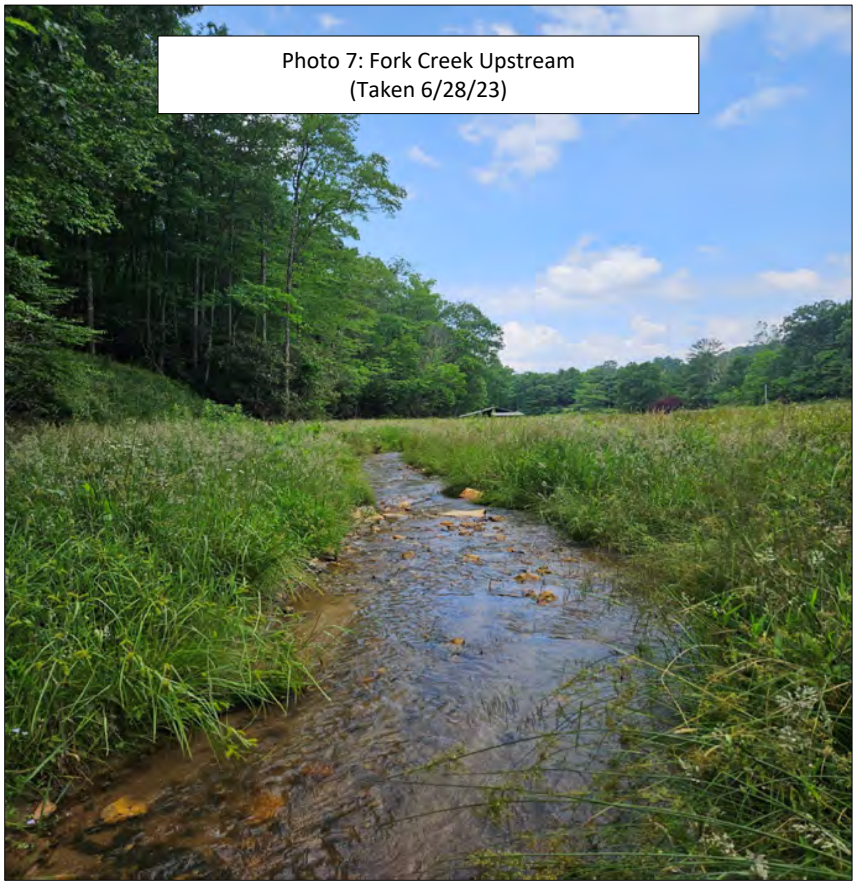


Photo 7: Fork Creek Upstream
(Taken 6/28/23)

Photo 8: Fork Creek Lower Reach Overview
(Taken 9/25/23)

Laurel Springs
MY-02 (2023) Photo Log

Photo 9: Fork Creek Lower Reach
(Taken 2/20/23)

Photo 10: Fork Creek Upper Reach
(Taken 9/25/23)

Laurel Springs
MY-02 (2023) Photo Log

Photo 11: UT-1
(Taken 6/28/23)

Photo 12: UT-1 Wetlands
(Taken 6/28/23)

Laurel Springs
MY-02 (2023) Photo Log

Photo 13: UT-2 Upper Reach
(Taken 6/28/23)

Photo 14: UT-2 Lower Reach
(Taken 6/28/23)

Laurel Springs
MY-02 (2023) Photo Log

Photo 15: UT-3
(Taken 6/28/23)

Photo 16: Wetland Area Adjacent to UT-3
(Taken 6/28/23)

Laurel Springs
MY-02 (2023) Photo Log

Photo 17: Upper Reach of Fork Creek and UT-4
(Taken 9/25/23)

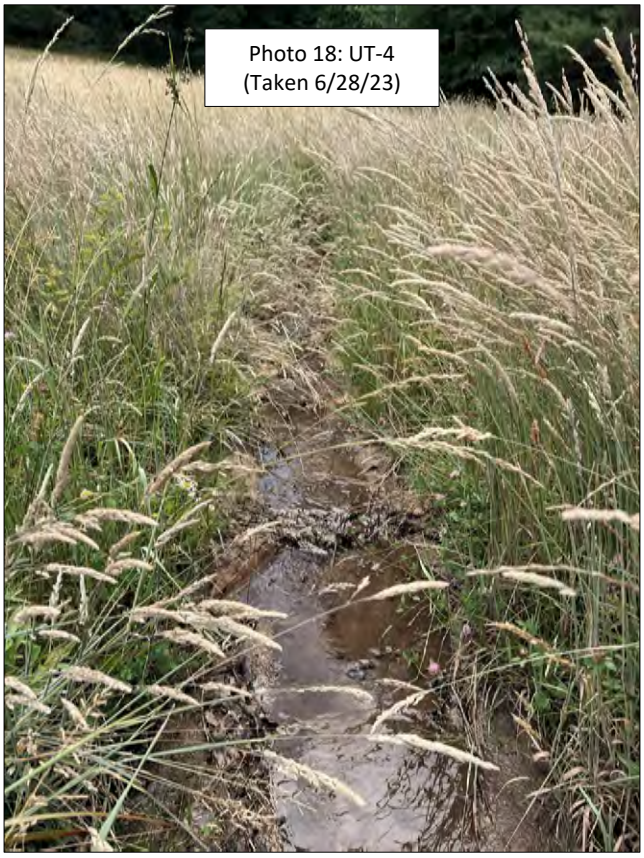


Photo 18: UT-4
(Taken 6/28/23)

Laurel Springs
MY-02 (2023) Photo Log

Photo 19: Bud Burst of Hamamelis virginiana.
Photo Taken 3/7/23

Photo 20: Bud Burst of Liriodendron tulipifera
Photo Taken 3/7/23

Appendix B: Vegetation Data

Table 6A. Planted Bare-Root Woody Vegetation
Table 6B. Permanent Seed Mix
Table 7. Vegetation Plot Counts and Densities
Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool
Table 9. Temporary Herbaceous Vegetation Plot Data

Table 6A. Planted Bare Root Woody Vegetation
Laurel Springs Mitigation Site

Vegetation Association		Montane Alluvial Forest*		Acidic Cove Forest*		Stream-side Assemblage**		TOTAL
Area (acres)		9.0		4.7		2.5		16.2
Species	**Indicator Status**	**# planted***	**% of total**	**# planted***	**% of total**	**# planted****	**% of total**	**# planted**
Cherry birch *(Betula lenta*)	FACU	500	8%	600	18.75%	1500	15.96%	2600
Eastern hemlock (*Tsuga canadensis*)	FACU	400	6.4%	600	18.75%	--	--	1000
Red oak (*Quercus rubra*)	FACU	650	10.4%	650	20.31%	--	--	1300
White oak (*Quercus alba*)	FACU	550	8.8%			550	5.85%	1100
White pine (*Pinus strobus*)	FACU	600	9.6%			--	--	600
Yellow birch *(Betula alleghaniensis*)	FACU	200	3.2%			300	3.19%	500
Scarlet oak (*Quercus coccinea*)	FAC	600	9.6%	500	15.63%	--	--	1100
Tulip poplar (*Liriodendron tulipifera*)	FAC	450	7.2%	600	18.75%	1100	11.70%	2150
River birch (*Betula nigra*)	FACW	500	8%	--	--	950	10.10%	1450
Sycamore (*Platanus occidentalis*)	FACW	600	9.6%	--	--	1500	15.96%	2100
Silky dogwood (*Cornus amomum*)	FACW			--	--	600***	6.38%	600
Black willow (*Salix nigra*)	OBL			--	--	800***	8.51%	800
Elderberry (*Sambucus nigra*)	OBL	--	--	--	--	400***	4.26%	400
Buttonbush (*Cephalanthus occidentalis*)	OBL	--	--	--	--	400***	4.26%	400
^Common ninebark (*Physocarpus opulifolius*)	FACW	--	--	--	--	300***	3.19%	300
^Arrowwood viburnum (*Viburnum dentatum*)	FAC	400	6.4%			400	4.26%	800
^Bitternut hickory (*Carya cordiformis*)	FACU	800	12.8%					800
^American hazelnut (*Corylus americana*)	FACU					600	6.38%	600
^Red spruce (*Picea rubens*)	FACU			250	7.81%			250
TOTAL		**6250**	**100%**	**3200**	**100%**	**9400**	**100%**	**18850**

^Species added post-mitigation plan approval

* Planted at a density of 680 stems/acre.

** Planted at a density of 2720 stems/acre.

*** These species were live staked and planted along the stream channels – A total of 2500 live stakes were planted in addition to the 6900 bare-root Stream-Side Assemblage planting.

Table 6B. Permanent Seed Mix
Laurel Springs Stream and Wetland Mitigation Site

Scientific Name	Common Name	%	Scientific Name	Common Name	%
Asclepias incarnata	Swamp milkweed	0.3	*Helianthus angustifolius*	Narrowleaf sunflower	0.8
Agrostis gigantea	Redtop	16	*Heliopsis helianthoides*	False sunflower	1.2
Agrostis hyemalis	Winter bentgrass	4	*Hibiscus moscheutos*	Swamp rose mallow	0.8
Agrostis stolonifera	Creeping bentgrass	4	*Juncus effusus*	Soft rush	0.6
Carex lurida	Shallow sedge	3.22	*Lespedeza capitata*	Round-headed bush clover	0.8
Carex vulpinoidea	Fox sedge	10	*Lespedeza virginica*	Slender lespedeza	0.8
Chamaecrista fasciculata	Partridge pea	1.6	*Liatris spicata*	Dense blazing star	0.8
Chamaecrista nictitans	Sensitive partridge pea	0.8	*Mimulus ringens*	Allegheny monkeyflower	0.06
Chrysanthemum leucanthemum	Oxeye daisy	4	*Monarda fistulosa*	Wild bergamot	0.2
Coreopsis lanceolata	Lance-leaved coreopsis	4	*Panicum virgatum*	Switchgrass	4
Coreopsis tinctoria	Plains coreopsis	4	*Pycnanthemum tenuifolium*	Slender mountain mint	0.2
Cosmos bipinnatus	Garden cosmos	0.8	*Rhexia virginica*	Handsome-Harry	0.06
Desmodium canadense	Showy tick-trefoil	0.8	*Rudbeckia hirta*	Black-eyed Susan	4
Echinacea purpurea	Purple coneflower	2.4	*Scirpus cyperinus*	Woolgrass	0.06
Elymus virginicus	Virginia wildrye	8.6	*Silphium perfoliatum*	Cup plant	0.8
Eupatorium coelestinum	Blue mistflower	0.4	*Symphyotrichum puniceum*	Purplestem aster	0.1
Eupatorium perfoliatum	Common boneset	2.5	*Tridens flavus*	Purpletop tridens	16
Glyceria striata	Fowl manna grass	0.1	*Vernonia noveboracensis*	New York ironweed	0.2
Helenium autumnale	Common sneezeweed	0.2	*Verbena hastata*	Blue vervain	0.8
			Total		100

Table 7. Planted Vegetation Totals
Laurel Springs Stream and Wetland Mitigation Site

Plot #	Planted Stems/Acre	Success Criteria Met?
1	81	No
2	364	Yes
3	405	Yes
4	607	Yes
5	486	Yes
6	0	No
7	202	No
8	526	Yes
9	40	No
10	162	No
11	324	Yes
12	243	No
13	202	No
14	81	No
15	243	No
16	121	No
T1	40	No
T2	486	Yes
T3	486	Yes
T4	243	No
T5	405	Yes
T6	324	Yes
T7	40	No
T8	40	No
T9	40	No
T10	40	No
Average Planted Stems/Acre	**240**	**No**

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool

Planted Acreage	16.2
Date of Initial Plant	2022-01-13
Date(s) of Supplemental Plant(s)	2023-02-01
Date(s) Mowing	NA
Date of Current Survey	2023-09-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F		Veg Plot 11 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC							2	2							1	1			1	1	1	1
	Betula nigra	river birch	Tree	FACW																						
	Betula sp.										1	1							2	2						
	Liriodendron tulipifera	tuliptree	Tree	FACU	1	1	3	3	6	6	1	1	1	1												
	Pinus strobus	eastern white pine	Tree	FACU					4	4	3	3							1	1						
	Platanus occidentalis	American sycamore	Tree	FACW									2	2					3	3			1	1		
	Quercus alba	white oak	Tree	FACU									3	3												
	Quercus coccinea	scarlet oak	Tree								4	4					1	1								
	Quercus rubra	northern red oak	Tree	FACU			1	1									3	3	3	3						
	Quercus sp.						7	7			4	4	2	2					2	2	3	3			1	1
	Tsuga canadensis	eastern hemlock	Tree	FACU					1	1			1	1					1	1						
	Ulmus americana	American elm	Tree	FACW																						
Sum	Performance Standard				1	1	11	11	11	11	15	15	9	9	0	0	4	4	13	13	3	3	2	2	2	2
Post Mitigation Plan Species	Carya cordiformis	bitternut hickory	Tree	FACU									3	3												
	Corylus americana	American hazelnut	Shrub	FACU													1	1								
	Morus rubra	*red mulberry*	*Tree*	*FACU*							*4*							*1*		*1*						
	Viburnum dentatum	southern arrowwood	Tree	FAC	2	2																	3	3	10	10
Sum	Proposed Standard				3	3	11	11	11	11	15	15	12	12	0	0	5	5	13	13	3	3	5	5	12	12
Mitigation Plan Performance Standard	Current Year Stem Count					1		11		11		15		9		0		4		13		3		2		2
	Stems/Acre					40		364		405		607		364		0		162		526		40		81		81
	Species Count					1		3		3		6		5		0		2		7		1		2		2
	Dominant Species Composition (%)					67		64		55		21		25		0		50		21		100		60		83
	Average Plot Height (ft.)					2		1		2		1		1				2		1		1		2		1
	% Invasives					0		0		0		0		0				0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					3		11		11		15		12		0		5		13		3		5		12
	Stems/Acre					81		364		405		607		486		0		202		526		40		162		324
	Species Count					2		3		3		6		6		0		3		7		1		3		3
	Dominant Species Composition (%)					67		64		55		21		25		0		50		21		100		60		83
	Average Plot Height (ft.)					2		1		2		1		1				1		1		1		2		2
	% Invasives					0		0		0		0		0				0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)

Planted Acreage	16.2
Date of Initial Plant	2022-01-13
Date(s) of Supplemental Plant(s)	2023-02-01
Date(s) Mowing	NA
Date of Current Survey	2023-09-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 12 F		Veg Plot 13 F		Veg Plot 14 F		Veg Plot 15 F		Veg Plot 16 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R	Veg Plot 4 R	Veg Plot 5 R	Veg Plot 6 R	Veg Plot 7 R	Veg Plot 8 R	Veg Plot 9 R	Veg Plot 10 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC			2	2																
	Betula nigra	river birch	Tree	FACW							1	1					2		2					
	Betula sp.				2	2																		
	Liriodendron tulipifera	tuliptree	Tree	FACU	2	2			2	2	4	4	1	1	1	6	7	7	2	2			1	1
	Pinus strobus	eastern white pine	Tree	FACU																				
	Platanus occidentalis	American sycamore	Tree	FACW			5	5			1	1	3	3				2	6	4				
	Quercus alba	white oak	Tree	FACU												1	2			1		2		
	Quercus coccinea	scarlet oak	Tree																					
	Quercus rubra	northern red oak	Tree	FACU												4			1					
	Quercus sp.				1	1					1	1					2							
	Tsuga canadensis	eastern hemlock	Tree	FACU																				
	Ulmus americana	American elm	Tree	FACW												1								
Sum	Performance Standard				5	5	7	7	2	2	7	7	4	4	1	12	13	9	11	7	0	2	1	1
Post Mitigation Plan Species	Carya cordiformis	bitternut hickory	Tree	FACU	1	1																		
	Corylus americana	American hazelnut	Shrub	FACU																				
	Morus rubra	*red mulberry*	*Tree*	*FACU*																				
	Viburnum dentatum	southern arrowwood	Tree	FAC					1	1										1	3			
Sum	Proposed Standard				6	6	7	7	3	3	7	7	4	4	1	12	13	9	11	8	3	2	1	1
Mitigation Plan Performance Standard	Current Year Stem Count					5		7		2		7		4	1	12	13	9	11	7	0	2	1	1
	Stems/Acre					202		202		40		243		121	40	486	486	243	405	283	0	40	40	40
	Species Count					3		2		1		4		2	1	4	4	2	4	3	0	1	1	1
	Dominant Species Composition (%)					33		71		67		57		75	100	50	54	78	55	50	100	100	100	100
	Average Plot Height (ft.)					1		2		2		1		2	1	1	2	2	1	2		2	1	2
	% Invasives					0		0		0		0		0	0	0	0	0	0	0		0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					6		7		3		7		4	1	12	13	9	11	8	3	2	1	1
	Stems/Acre					243		202		81		243		121	40	486	486	243	405	324	40	40	40	40
	Species Count					4		2		2		4		2	1	4	4	2	4	4	1	1	1	1
	Dominant Species Composition (%)					33		71		67		57		75	100	50	54	78	55	50	100	100	100	100
	Average Plot Height (ft.)					1		2		2		1		2	1	1	2	2	1	2	2	2	1	2
	% Invasives					0		0		0		0		0	0	0	0	0	0	0	0	0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 9. Temporary Herbaceous Vegetation Plot Data

Plot #	Species Count*	Success Criteria Met?	Taxa Identified	Common Name
1	4	Yes	*Juncus effusus* *Cyperus sp.* *Carex* sp. *Vernonia noveboracensis*	Soft Rush Nutsedge Sedge New York Ironweed
2	4	Yes	*Carex sp.* *Juncus effuses* *Pycnanthemum sp* *Trifolium repens*	Sedge Soft Rush Mountain Mint White Clover
3	5	Yes	*Carex sp.* *Eupatorium perfoliatum* *Juncus effusus* *Peltandra virginica* *Pycnanthemum sp*	Sedge Common Boneset Soft Rush Green Arrow Arum Mountain Mint
4	6	Yes	*Juncus effusus* *Carex* sp. *Eupatorium perfoliatum* *Ranunculus sp.* *Trifolium repens* *Vernonia noveboracensis*	Soft Rush Sedge Common Boneset Buttercup White Clover New York Ironweed
5	5	Yes	*Carex sp.* *Cicuta maculata* *Juncus effuses* *Pycnanthemum sp* *Vernonia noveboracensis*	Sedge Spotted Water Hemlock Soft Rush Mountain Mint New York Ironweed
6	4	Yes	*Carex sp.* *Juncus effusus* *Peltandra virginica* *Vernonia noveboracensis*	Sedge Soft Rush Green Arrow Arum New York Ironweed
7	4	Yes	*Carex* sp. *Eupatorium perfoliatum* *Ranunculus sp.* *Trifolium repens*	Sedge Common Boneset Buttercup White Clover
8	5	Yes	*Carex* sp. *Eupatorium perfoliatum* *Packera aurea* *Ranunculus sp.* *Trifolium repens*	Sedge Common Boneset Golden Ragwort Buttercup White Clover
9	4	Yes	*Asclepias incarnata* *Carex sp.* *Eupatorium perfoliatum* *Juncus effusus*	Swamp Milkweed Sedge Common Boneset Soft Rush

* Success criteria require a minimum of 4 species present per plot.

Appendix C: Stream Geomorphology Data

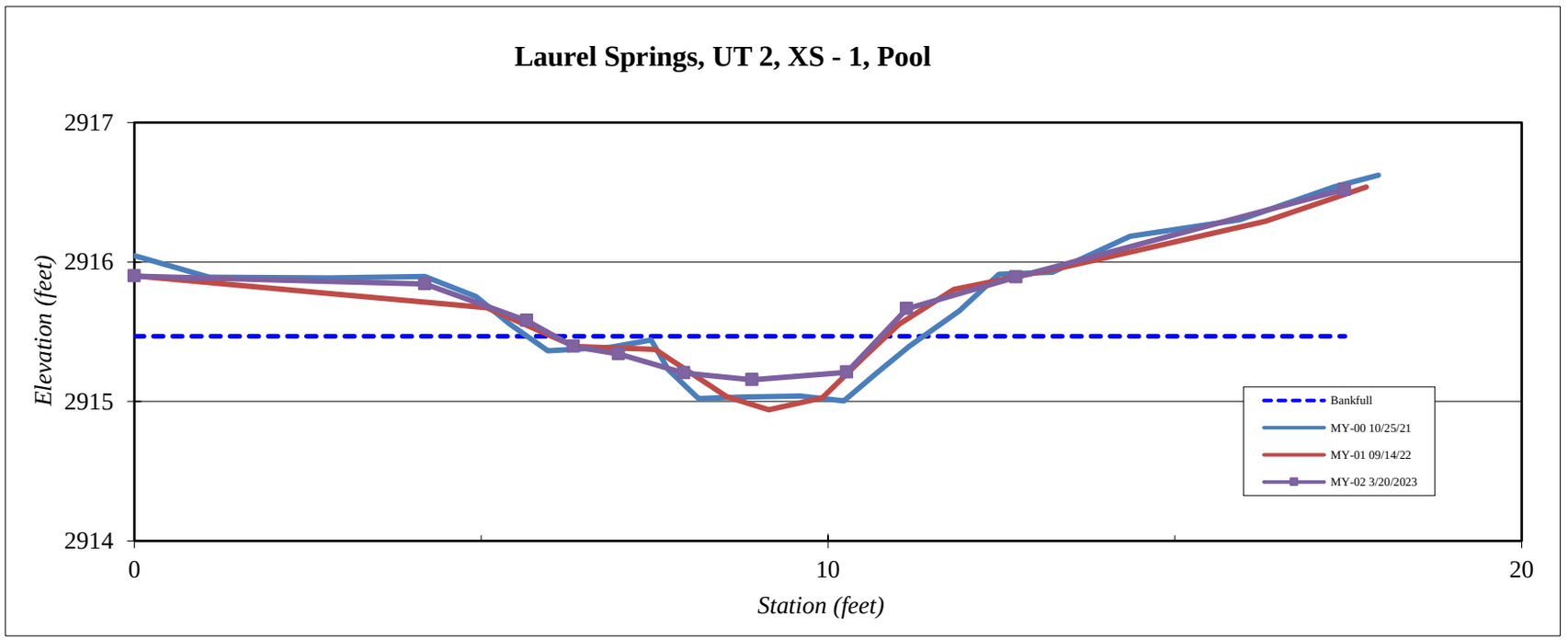
Cross-Sections with Annual Overlays
Table 10A-D. Baseline Stream Data Summary Tables
Table 11A-B. Cross-Section Morphology Monitoring Summary

Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT2, XS -1, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2915.7
4.2	2915.6
5.7	2915.3
6.3	2915.1
7.0	2915.1
7.9	2914.9
8.9	2914.9
10.3	2914.9
11.1	2915.4
12.7	2915.7
17.5	2916.4

SUMMARY DATA	
Bankfull Elevation:	2915.2
Bank Hieght Ratio:	0.77
Thalweg Elevation:	2914.9
LTOB Elevation:	2915.1
LTOB Max Depth:	0.3
LTOB Cross Sectional Area:	0.8

Stream Type	E/C 5

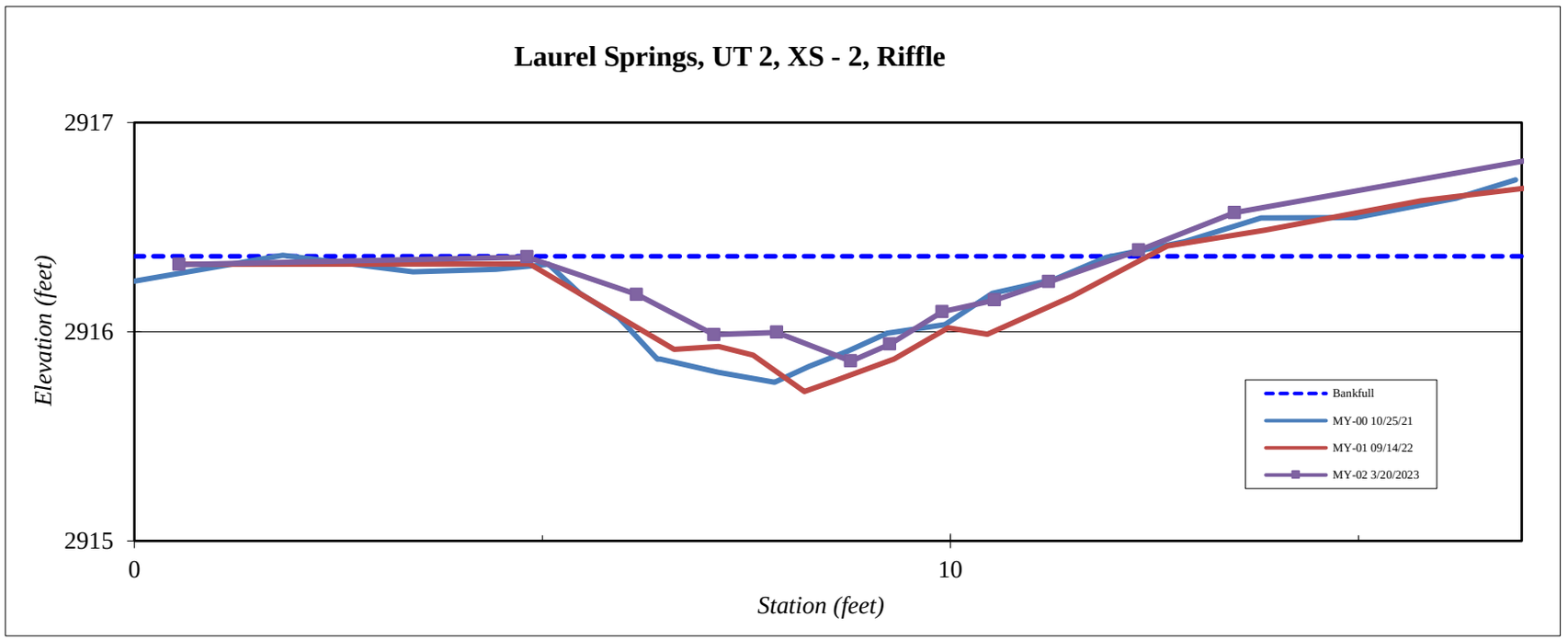


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT2, XS -2, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.6	2916.2
4.8	2916.2
6.2	2916.0
7.1	2915.8
7.9	2915.8
8.8	2915.7
9.3	2915.7
9.9	2915.9
10.5	2916.0
11.2	2916.1
12.3	2916.3
13.5	2916.5
17.6	2916.8

SUMMARY DATA	
Bankfull Elevation:	2916.2
Bank Hieght Ratio:	0.99
Thalweg Elevation:	2915.7
LTOB Elevation:	2916.2
LTOB Max Depth:	0.6
LTOB Cross Sectional Area:	2.0

Stream Type	E/C 5

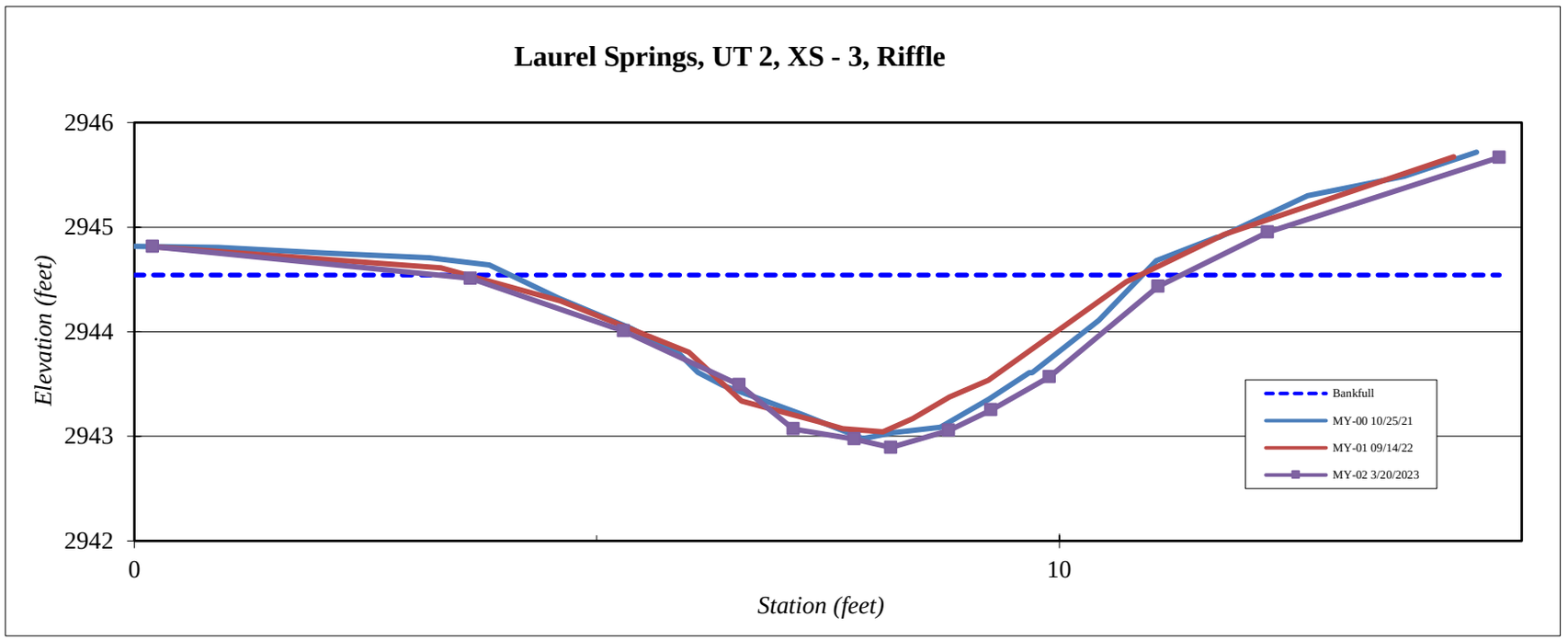


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT2, XS -3, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.2	2945.0
3.6	2944.7
5.3	2944.1
6.5	2943.5
7.1	2943.0
7.8	2942.9
8.2	2942.8
8.8	2943.0
9.3	2943.2
9.9	2943.6
11.1	2944.6
12.3	2945.2
14.8	2946.0

SUMMARY DATA	
Bankfull Elevation:	2944.7
Bank Hieght Ratio:	0.93
Thalweg Elevation:	2942.8
LTOB Elevation:	2944.6
LTOB Max Depth:	1.7
LTOB Cross Sectional Area:	6.8

Stream Type	E/C 5

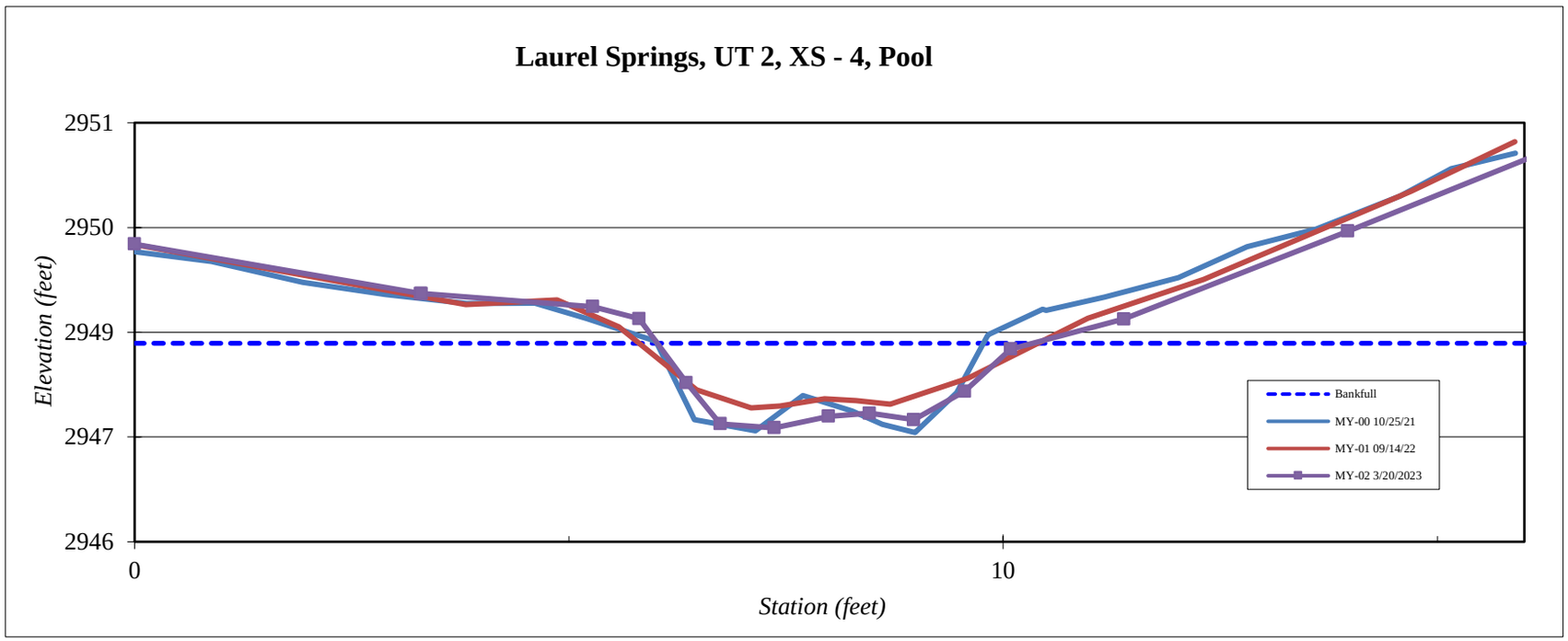


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT2, XS -4, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2949.6
3.3	2949.0
3.3	2949.0
5.3	2948.9
5.8	2948.7
6.4	2948.1
6.7	2947.6
7.4	2947.6
8.0	2947.7
8.5	2947.7
9.0	2947.7
9.6	2948.0
10.1	2948.4
11.4	2948.7
14.0	2949.7
16.4	2950.6

SUMMARY DATA	
Bankfull Elevation:	2948.5
Bank Hieght Ratio:	0.93
Thalweg Elevation:	2947.6
LTOB Elevation:	2948.4
LTOB Max Depth:	0.9
LTOB Cross Sectional Area:	2.5

Stream Type	E/C 5

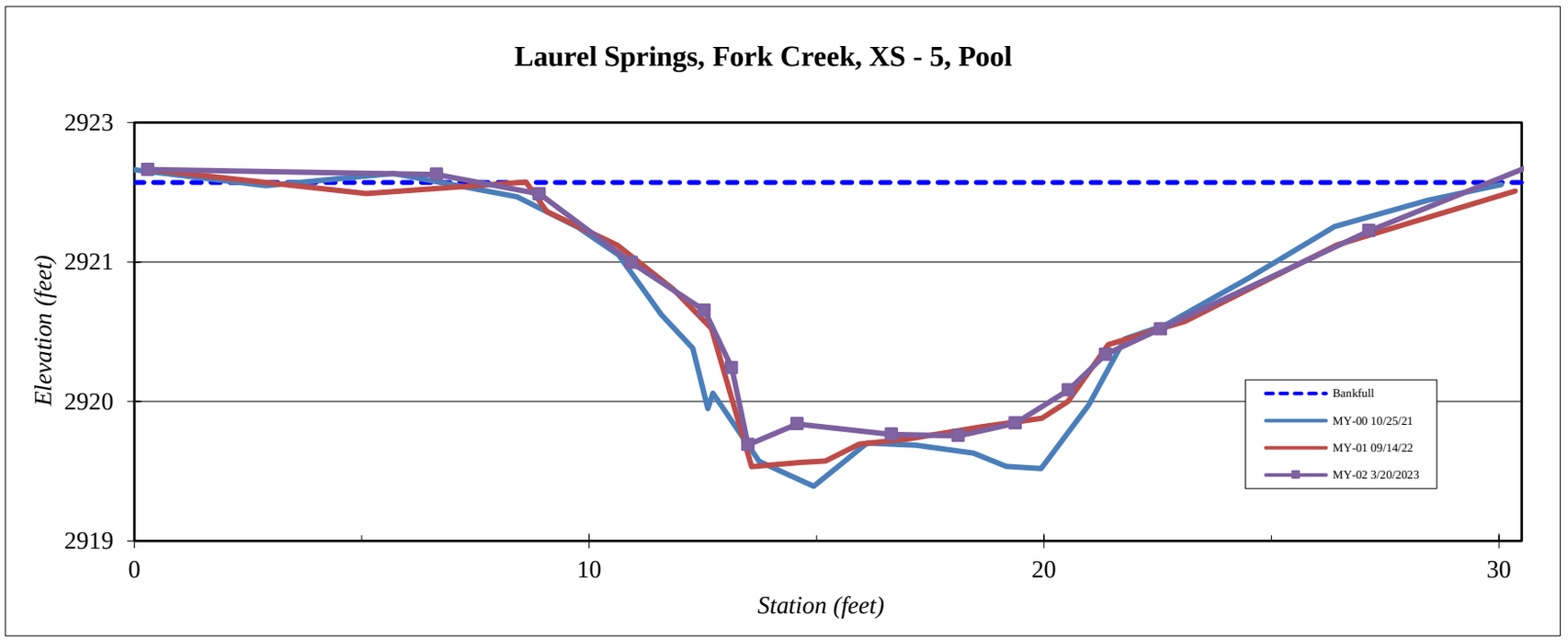


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	Fork Creek, XS -5, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
30.4	2922.0
0.3	2922.2
6.6	2922.2
8.9	2922.0
10.9	2921.5
12.5	2921.1
13.1	2920.6
13.5	2920.0
14.6	2920.2
16.6	2920.1
18.1	2920.1
19.4	2920.2
20.5	2920.4
21.4	2920.7
22.6	2920.9
27.1	2921.7
30.7	2922.2

SUMMARY DATA	
Bankfull Elevation:	2922.1
Bank Hieght Ratio:	0.95
Thalweg Elevation:	2920.0
LTOB Elevation:	2922.0
LTOB Max Depth:	2.0
LTOB Cross Sectional Area:	22.5

Stream Type	E/C 5

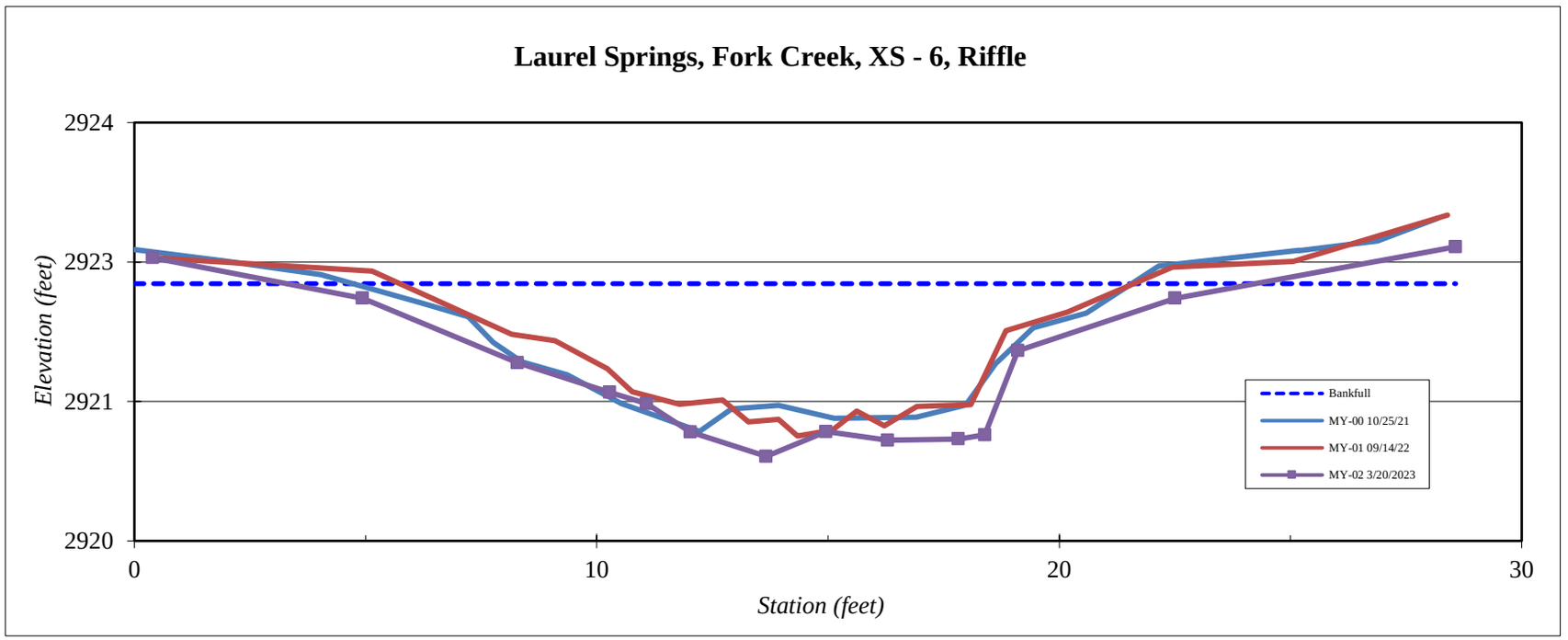


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	Fork Creek, XS -6, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.4	2922.6
4.9	2922.3
8.3	2921.8
10.3	2921.5
11.1	2921.4
12.0	2921.2
13.7	2921.0
15.0	2921.2
16.3	2921.2
17.8	2921.2
18.4	2921.2
19.1	2921.9
22.5	2922.3
28.6	2922.7

SUMMARY DATA	
Bankfull Elevation:	2922.4
Bank Hieght Ratio:	0.92
Thalweg Elevation:	2921.0
LTOB Elevation:	2922.3
LTOB Max Depth:	1.3
LTOB Cross Sectional Area:	12.4

Stream Type	E/C 5

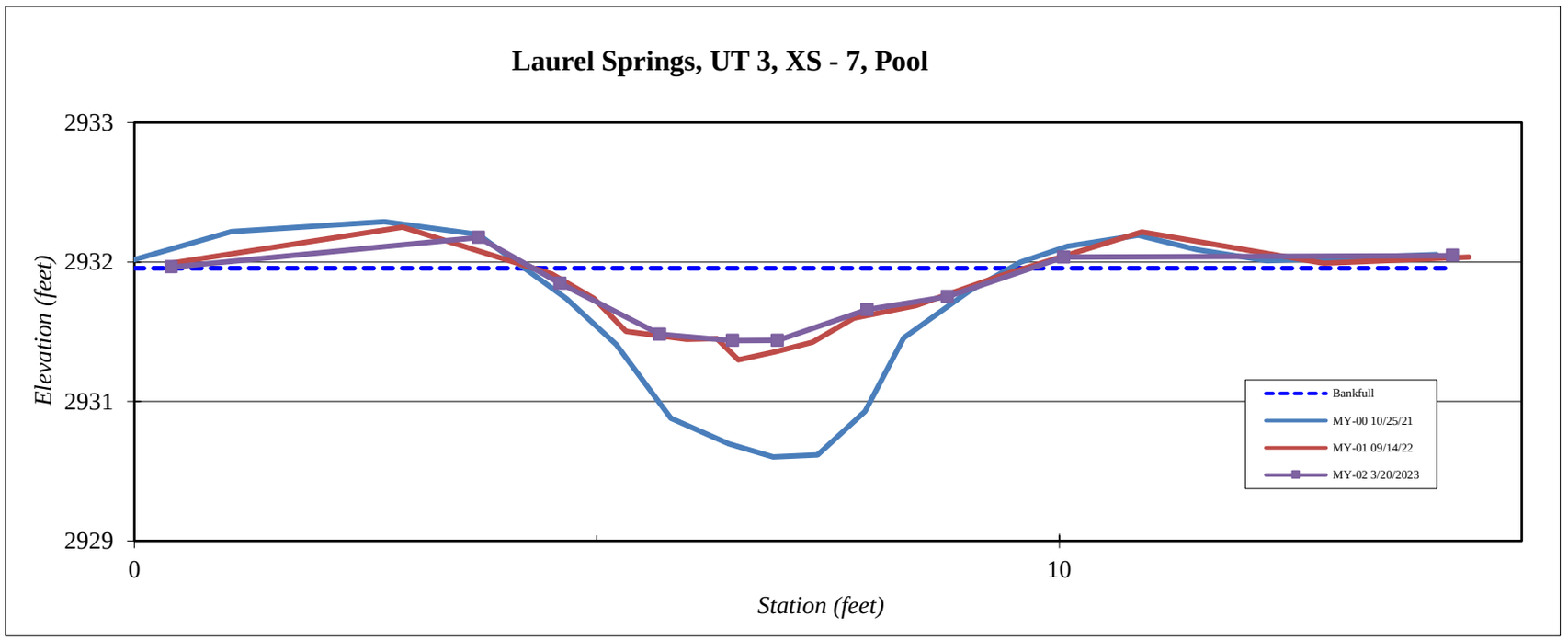


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT3, XS -7, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.4	2931.6
3.7	2931.8
4.6	2931.5
5.7	2931.1
6.5	2931.0
7.0	2931.0
7.9	2931.3
8.8	2931.4
10.0	2931.7
14.3	2931.7

SUMMARY DATA	
Bankfull Elevation:	2931.6
Bank Hieght Ratio:	1.02
Thalweg Elevation:	2931.0
LTOB Elevation:	2931.6
LTOB Max Depth:	0.6
LTOB Cross Sectional Area:	2.0

Stream Type	E/C 5

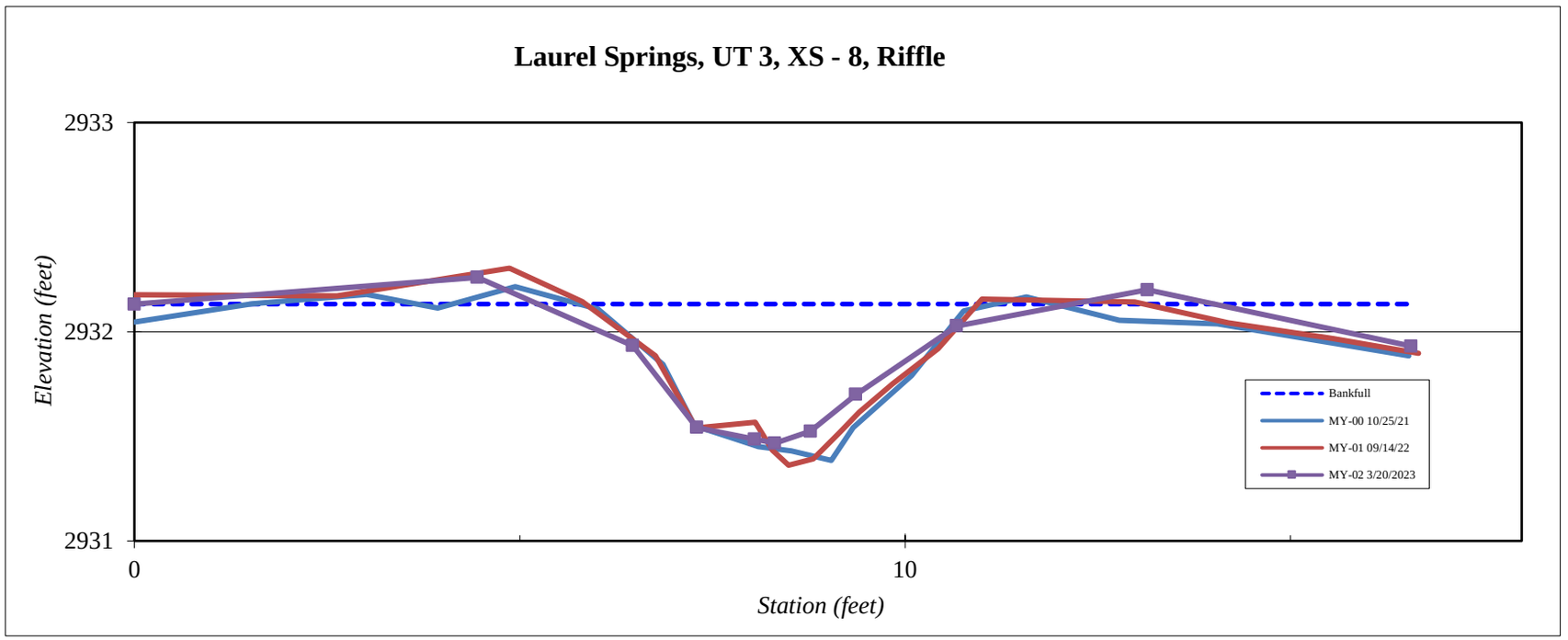


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT3, XS -8, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2932.5
4.5	2932.6
6.5	2932.3
7.3	2931.8
8.0	2931.8
8.3	2931.7
8.8	2931.8
9.4	2932.0
10.7	2932.4
13.1	2932.6
16.6	2932.3

SUMMARY DATA	
Bankfull Elevation:	2932.5
Bank Hieght Ratio:	0.84
Thalweg Elevation:	2931.7
LTOB Elevation:	2932.4
LTOB Max Depth:	0.6
LTOB Cross Sectional Area:	1.7

Stream Type	E/C 5

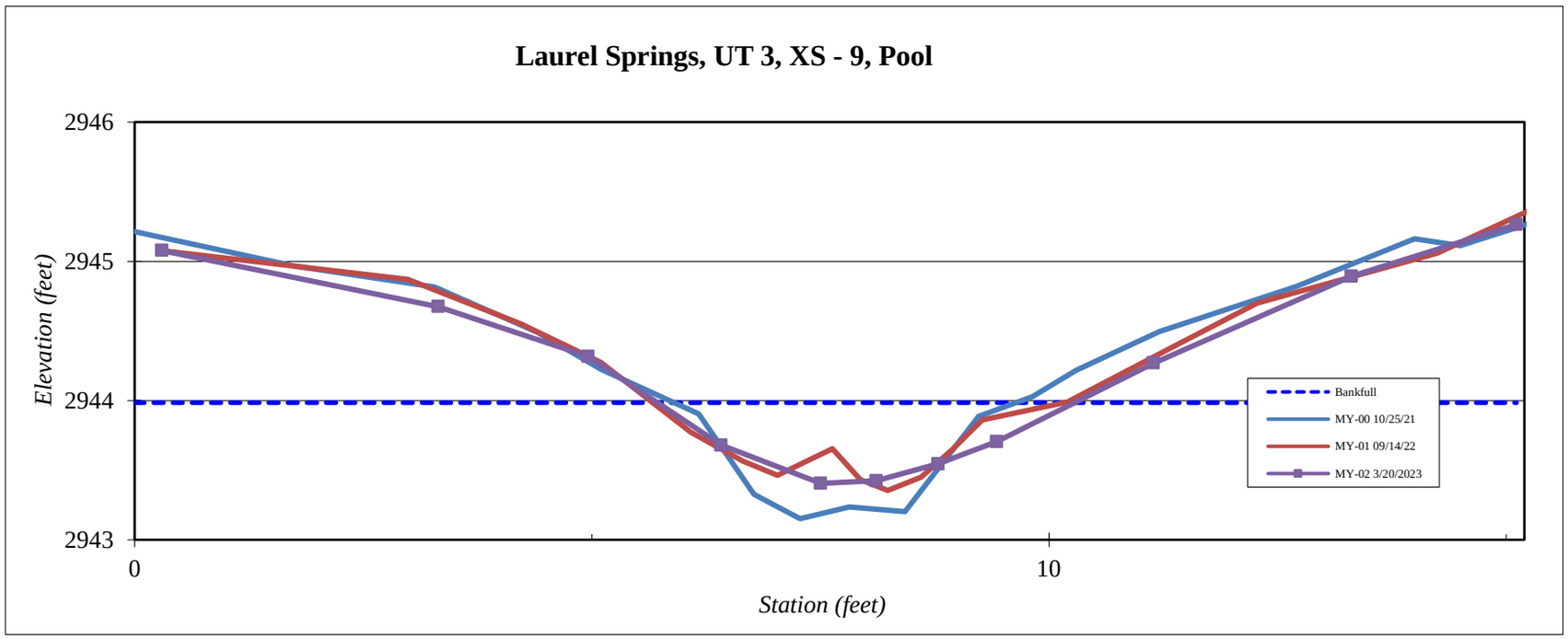


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT3, XS -9, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.3	2945.3
3.3	2944.8
5.0	2944.4
6.4	2943.7
7.5	2943.4
8.1	2943.4
8.8	2943.6
9.4	2943.7
11.1	2944.4
13.3	2945.1
15.1	2945.5

SUMMARY DATA	
Bankfull Elevation:	2944.1
Bank Hieght Ratio:	1.50
Thalweg Elevation:	2943.4
LTOB Elevation:	2944.4
LTOB Max Depth:	1.0
LTOB Cross Sectional Area:	3.6

Stream Type	E/C 5

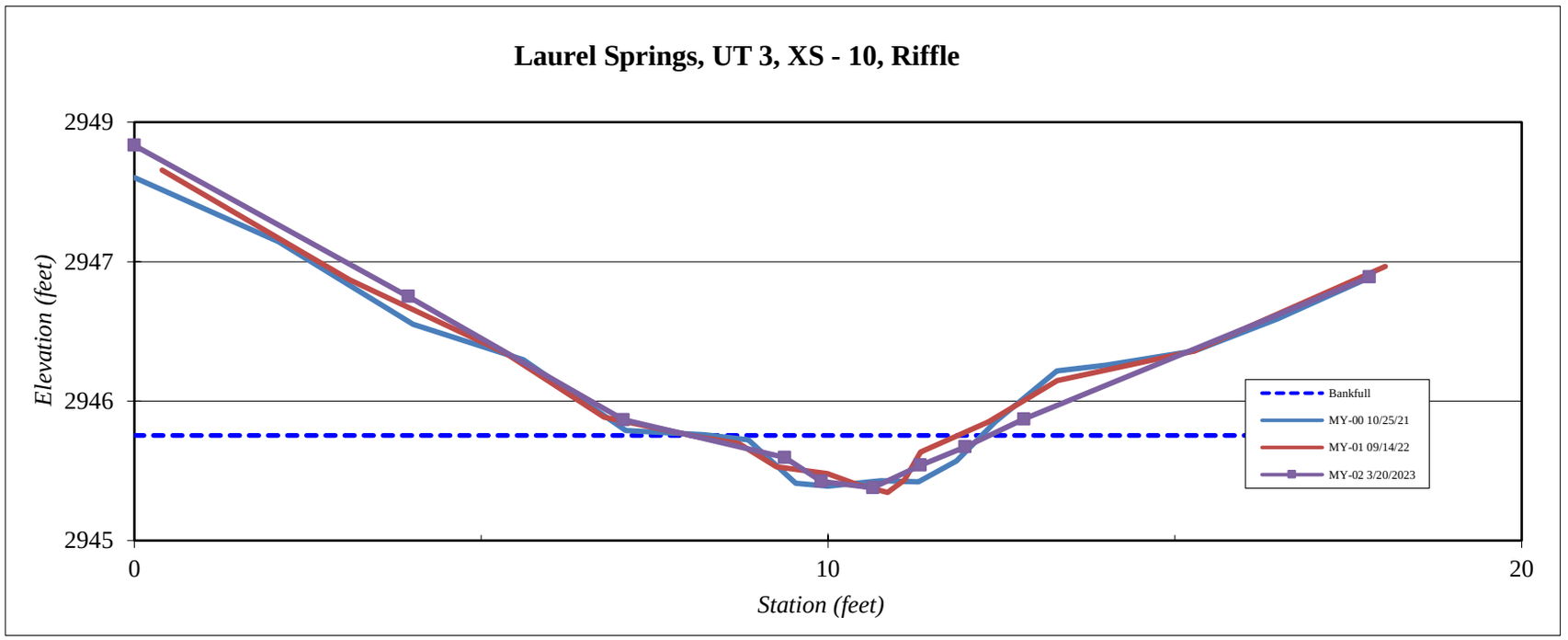


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT3, XS -10, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2948.4
4.0	2947.2
7.0	2946.2
9.4	2945.9
9.9	2945.7
10.6	2945.6
11.3	2945.8
12.0	2946.0
12.8	2946.2
17.8	2947.3

SUMMARY DATA	
Bankfull Elevation:	2946.1
Bank Hieght Ratio:	1.31
Thalweg Elevation:	2945.6
LTOB Elevation:	2946.2
LTOB Max Depth:	0.6
LTOB Cross Sectional Area:	1.6

Stream Type	E/C 5



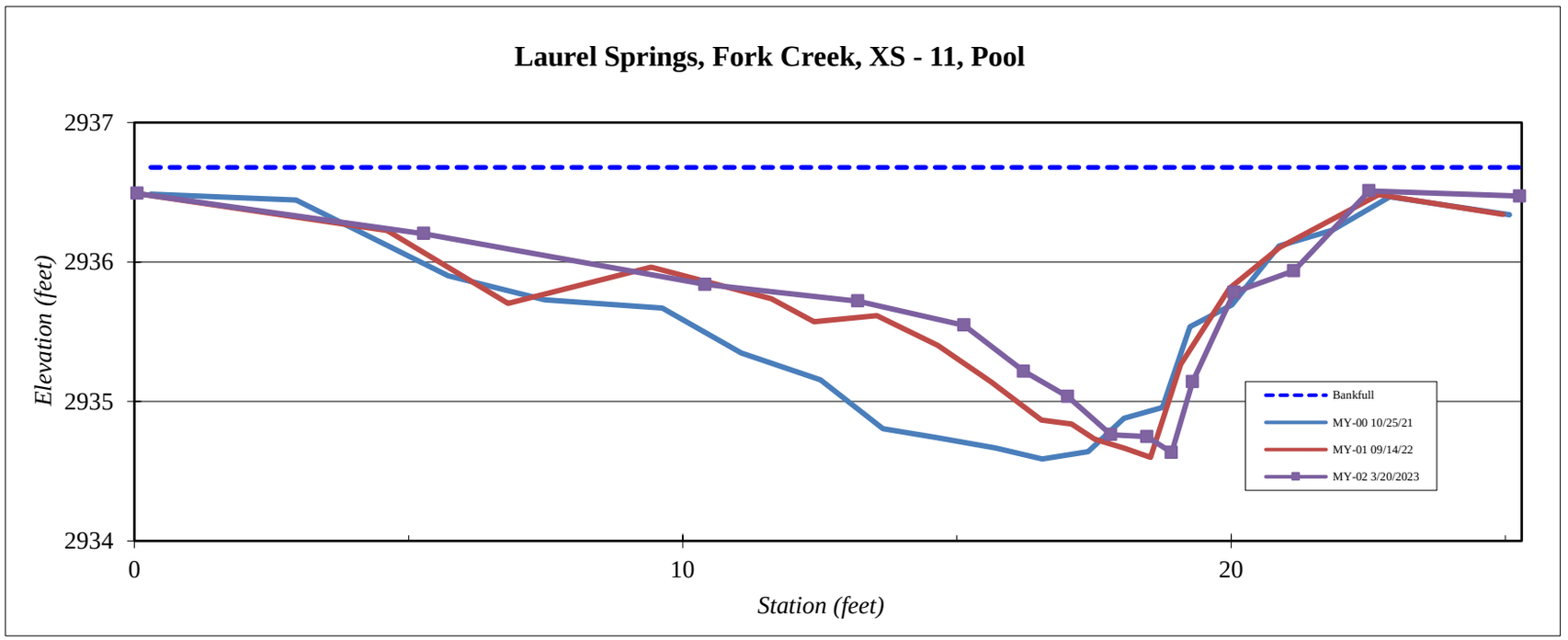
Elevated bank height ratio is due to natural substrate movement within a very small channel. This is not an area of concern.

Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	Fork Creek, XS -11, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
-0.3	2936.7
5.0	2936.4
10.1	2936.0
12.9	2935.8
14.8	2935.7
15.9	2935.3
16.7	2935.1
17.5	2934.8
18.2	2934.7
18.6	2934.6
19.0	2935.2
19.8	2935.9
20.8	2936.1
22.2	2936.7
25.0	2936.7

SUMMARY DATA	
Bankfull Elevation:	2936.9
Bank Hieght Ratio:	0.77
Thalweg Elevation:	2934.6
LTOB Elevation:	2936.4
LTOB Max Depth:	1.8
LTOB Cross Sectional Area:	10.4

Stream Type	E/C 5

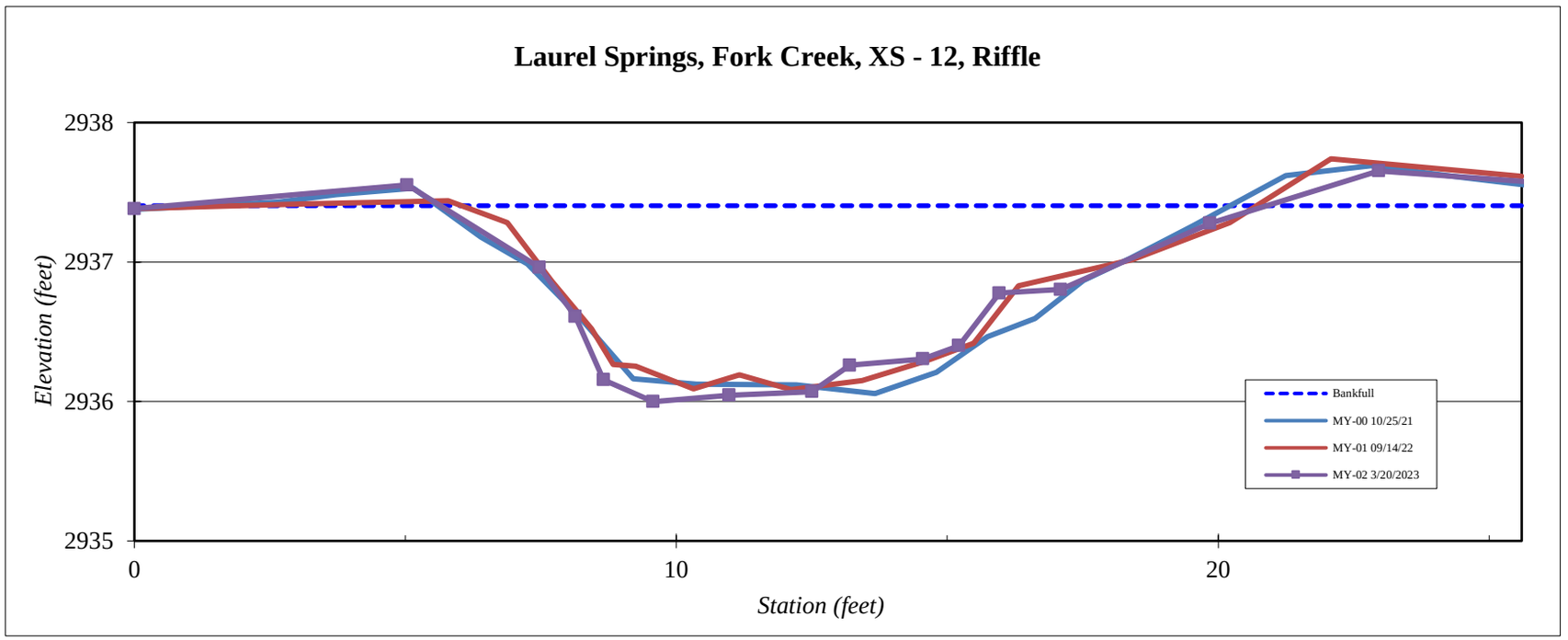


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	Fork Creek, XS -12, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2937.7
5.0	2937.9
7.5	2937.3
8.1	2936.9
8.7	2936.3
9.6	2936.2
11.0	2936.2
12.5	2936.2
13.2	2936.5
14.6	2936.5
15.2	2936.6
16.0	2937.0
17.1	2937.1
19.8	2937.6
23.0	2938.0
25.8	2937.9

SUMMARY DATA	
Bankfull Elevation:	2937.8
Bank Hieght Ratio:	0.91
Thalweg Elevation:	2936.2
LTOB Elevation:	2937.6
LTOB Max Depth:	1.4
LTOB Cross Sectional Area:	11.5

Stream Type	E/C 5

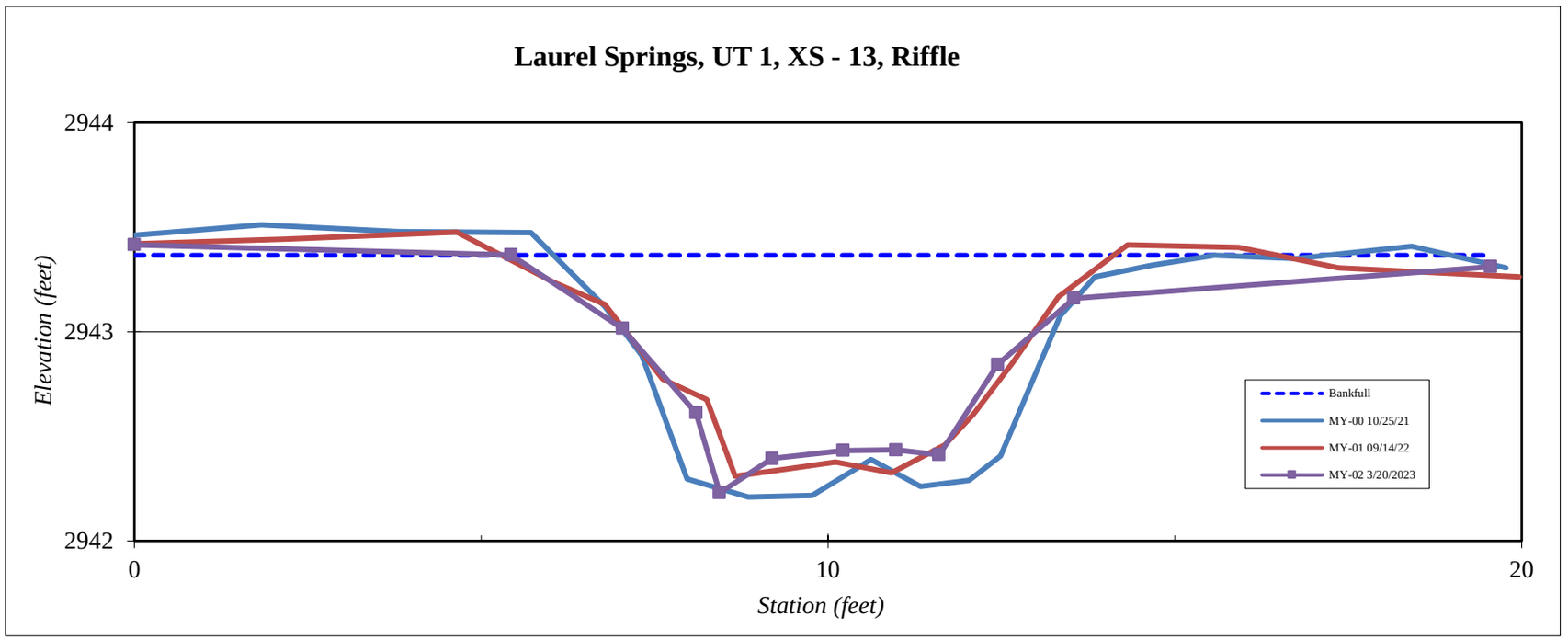


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT1, XS -13, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2943.4
5.4	2943.4
7.0	2943.0
8.1	2942.5
8.4	2942.1
9.2	2942.3
10.2	2942.3
11.0	2942.3
11.6	2942.3
12.4	2942.8
13.5	2943.1
19.6	2943.3

SUMMARY DATA	
Bankfull Elevation:	2943.4
Bank Hieght Ratio:	1.00
Thalweg Elevation:	2942.1
LTOB Elevation:	2943.4
LTOB Max Depth:	1.3
LTOB Cross Sectional Area:	6.4

Stream Type	E/C 5

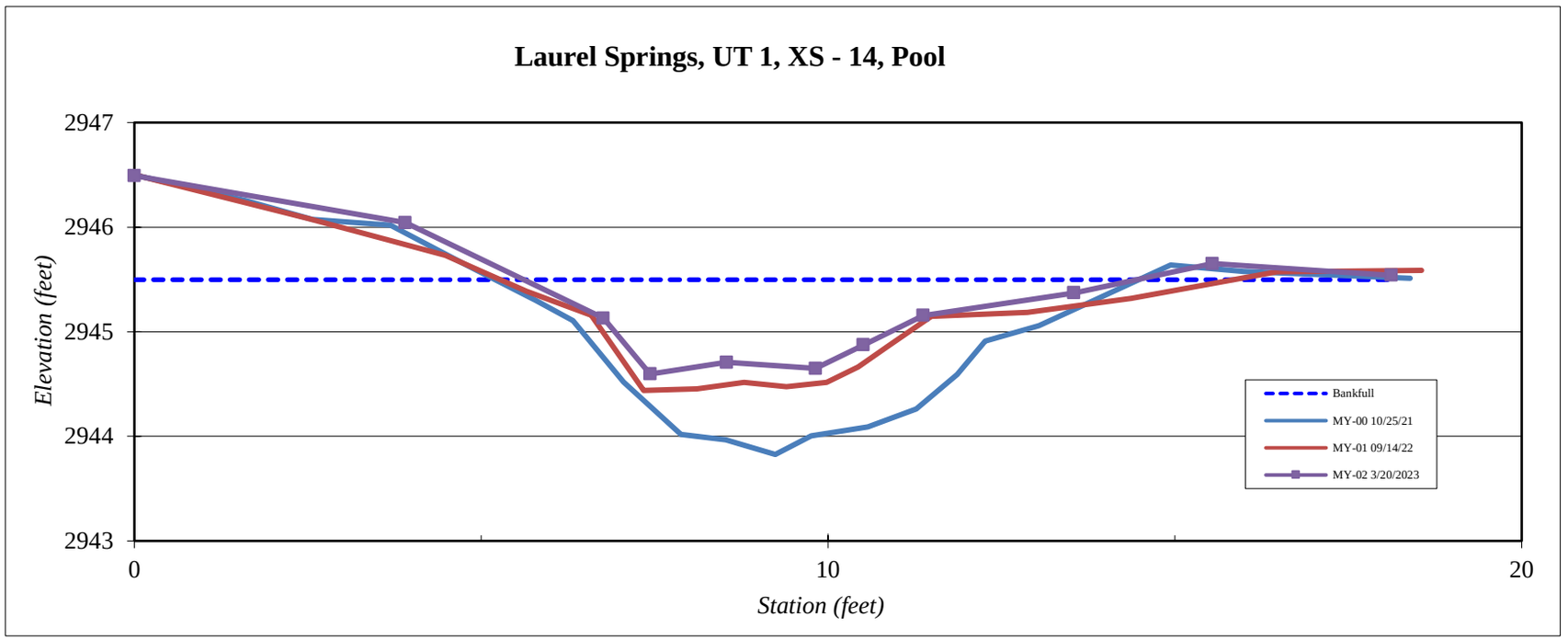


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	UT1, XS -14, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2946.9
3.9	2946.4
6.8	2945.4
7.4	2944.8
8.5	2944.9
9.8	2944.8
10.5	2945.1
11.4	2945.4
13.5	2945.6
15.5	2945.9
18.1	2945.8

SUMMARY DATA	
Bankfull Elevation:	2945.8
Bank Hieght Ratio:	0.86
Thalweg Elevation:	2944.8
LTOB Elevation:	2945.6
LTOB Max Depth:	0.9
LTOB Cross Sectional Area:	3.5

Stream Type	E/C 5

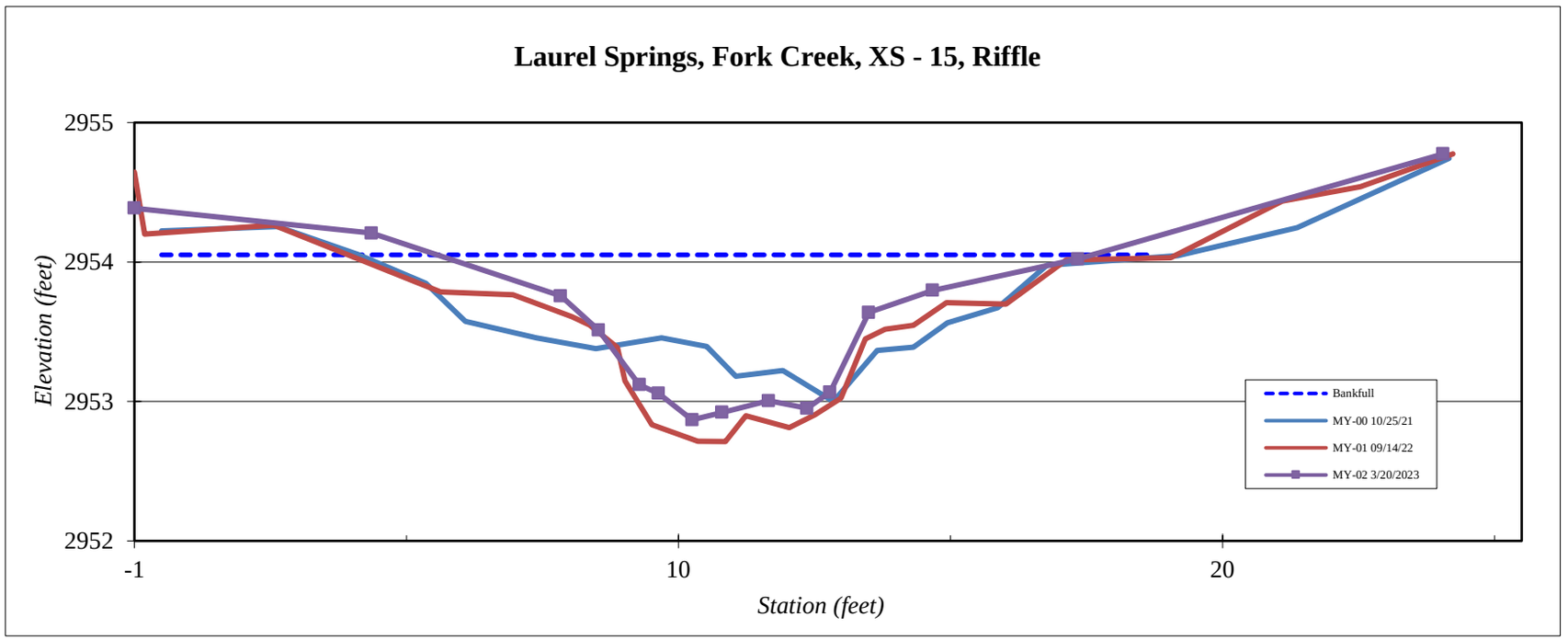


Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	Fork Creek, XS -15, Riffle
Feature	Riffle
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
0.0	2946.9
3.9	2946.4
6.8	2945.4
7.4	2944.8
8.5	2944.9
9.8	2944.8
10.5	2945.1
11.4	2945.4
13.5	2945.6
15.5	2945.9
18.1	2945.8

SUMMARY DATA	
Bankfull Elevation:	2954.3
Bank Hieght Ratio:	0.97
Thalweg Elevation:	2953.0
LTOB Elevation:	2954.3
LTOB Max Depth:	1.3
LTOB Cross Sectional Area:	6.7

Stream Type	E/C 5



Site	Laurel Springs
Watershed:	French Broad River Basin, 06010108
XS ID	Fork Creek, XS -16, Pool
Feature	Pool
Date:	3/20/2023
Field Crew:	Smith, Perkinson

Station	Elevation
-0.3	2954.7
5.7	2954.9
7.8	2955.0
8.6	2954.7
9.5	2954.0
10.5	2953.9
11.5	2954.0
12.4	2953.9
13.6	2953.2
14.1	2954.5
14.8	2954.7
17.7	2955.3
20.3	2955.6

SUMMARY DATA	
Bankfull Elevation:	2955.1
Bank Hieght Ratio:	0.97
Thalweg Elevation:	2953.2
LTOB Elevation:	2955.1
LTOB Max Depth:	1.8
LTOB Cross Sectional Area:	6.9

Stream Type	E/C 5

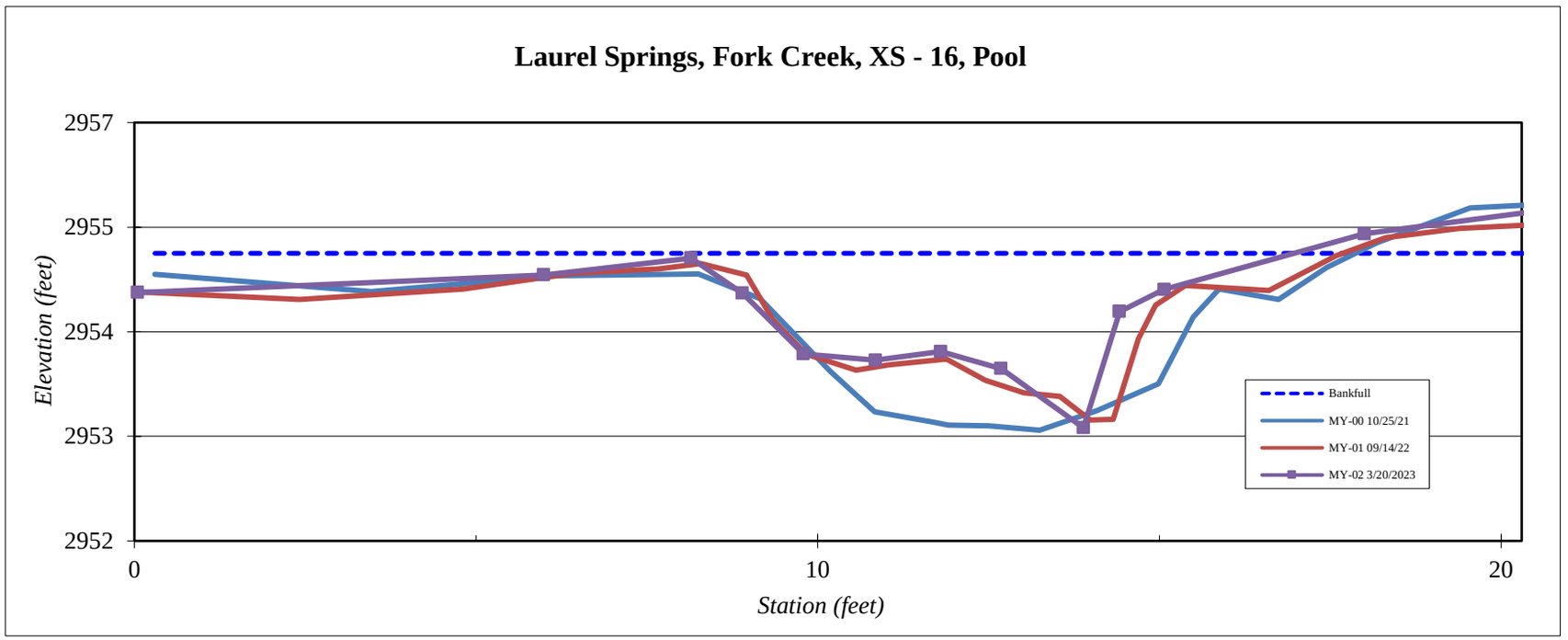


Table 10A. Baseline Stream Data Summary Laurel Springs - Fork Creek										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	11.7	17.2		25.1		15.1	17.4	12.3	19.7	3
Floodprone Width (ft)	18	100		100		50	150	200	200	3
Bankfull Mean Depth (ft)	0.8	1.1		1.6		1.1	1.3	0.6	0.9	3
Bankfull Max Depth (ft)	1.2	2.1		2.5		1.4	1.9	1.1	1.5	3
Bankfull Cross Sectional Area (ft^2)	18.9	18.9		18.9		7.3	18.9	7.1	14.6	3
Width/Depth Ratio	7.3	15.9		31.4		12	16	15.5	26.6	3
Entrenchment Ratio	0.9	5.1		8.5		3.3	8.6	10.2	16.2	3
Bank Height Ratio	**1**	**1.3**		**2.8**		**1**	**1.2**	**1.0**	**1.0**	3
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Cg					Ce		Ce		
Bankfull Discharge (cfs)	99					99		99		
Sinuosity (ft)	1.05					1.15		1.15		
Water Surface Slope (Channel) (ft/ft)	0.0258					0.0236		0.0236		
Other										

Table 10B. Baseline Stream Data Summary Laurel Springs - UT 1										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	6.4	8.1		15.36		9.9	11.4	7.5	7.5	1
Floodprone Width (ft)	16	100		100		50	150	100.0	100.0	1
Bankfull Mean Depth (ft)	0.5	1		1.3		0.7	0.8	0.8	0.8	1
Bankfull Max Depth (ft)	1.4	2		2.4		0.9	1.2	1.2	1.2	1
Bankfull Cross Sectional Area (ft^2)	8.1	8.1		8.1		8.1	8.1	6.2	6.2	1
Width/Depth Ratio	4.9	8.2		30.6		12	16	8.9	8.9	1
Entrenchment Ratio	2	8.8		15.6		5.1	13.2	13.4	13.4	1
Bank Height Ratio	**1**	**1.5**		**2.1**		**1**	**1.2**	**1.0**	**1.0**	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Eg					Ce		Ce		
Bankfull Discharge (cfs)	39.5					39.5		39.5		
Sinuosity (ft)	1.01					1.15		1.15		
Water Surface Slope (Channel) (ft/ft)	0.0288					0.0253		0.0253		
Other										

Table 10C. Baseline Stream Data Summary Laurel Springs - UT 2										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	4.4	5.8		9.8		4.6	5.4	6.7	7.2	2
Floodprone Width (ft)	11	17		22		20	30	75.0	75.0	2
Bankfull Mean Depth (ft)	0.2	0.4		0.4		0.3	0.4	0.3	1.1	2
Bankfull Max Depth (ft)	0.5	0.8		0.8		0.4	0.6	0.6	1.9	2
Bankfull Cross Sectional Area (ft^2)	1.8	1..8		1.8		1.8	1.8	2.1	7.7	2
Width/Depth Ratio	11	17.4		49		12	16	7.7	21.3	2
Entrenchment Ratio	2	2.3		4.5		4.3	5.6	10.5	11.2	2
Bank Height Ratio	**1**	**1.5**		**2**		**1**	**1.2**	**1.0**	**1.0**	2
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Bg					B		Bc		
Bankfull Discharge (cfs)	7.7					7.7		7.7		
Sinuosity (ft)	1.02					1.05		1.05		
Water Surface Slope (Channel) (ft/ft)	0.1026					0.0997		0.0997		
Other										

Table 10D. Baseline Stream Data Summary Laurel Springs - UT 3										
Parameter	**Pre-Existing Condition (applicaple)**					**Design**		**Monitoring Baseline (MY0)**		
Riffle Only	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	3	3.7		4.2		4.9	5.7	3.3	4.7	2
Floodprone Width (ft)	5.5	6		50		20	30	7.0	75.0	2
Bankfull Mean Depth (ft)	0.5	0.6		0.7		0.4	0.4	0.3	0.5	2
Bankfull Max Depth (ft)	0.7	0.8		1.4		0.5	0.6	0.4	0.8	2
Bankfull Cross Sectional Area (ft^2)	2	2		2		2	2	0.9	2.3	2
Width/Depth Ratio	4.3	6.2		8.4		12	16	9.7	12.1	2
Entrenchment Ratio	1.5	2		11.9		4.1	5.3	2.1	16.0	2
Bank Height Ratio	**1.4**	**1.7**		**2.6**		**1**	**1.2**	**1.0**	**1.0**	2
Max part size (mm) mobilized at bankfull										
Rosgen Classification	Bg					B		Bc		
Bankfull Discharge (cfs)	8.7					8.7		8.7		
Sinuosity (ft)	1.04					1.05		1.05		
Water Surface Slope (Channel) (ft/ft)	0.0954					0.0945		0.0945		
Other										

Table 11A. Monitoring Data - Cross Section Morphology Monitoring Summary
(Laurel Springs/ DMS:100122)

	UT 2 - Cross Section 1 (Pool)							UT 2 - Cross Section 2 (Riffle)							UT 2 - Cross Section 3 (Riffle)							UT 2 - Cross Section 4 (Pool)							Fork Cr - Cross Section 5 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2915.09	2915.14	2915.21					2916.14	2916.10	2916.22					2944.80	2944.85	2944.69					2948.50	2948.59	2948.48					2921.99	2922.06	2922.11				
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00	0.97	0.77					1.00	0.85	0.99					1.00	1.08	0.93					1.00	1.08	0.93					1.00	0.99	0.95				
Thalweg Elevation	2914.69	2914.61	2914.86					2915.539	2915.49	2915.65					2942.922	2943.00	2942.83					2947.52	2947.78	2947.57					2919.647	2919.81	2919.98				
LTOB[2] Elevation	2915.09	2915.13	2915.13					2916.136	2916.00	2916.22		`			2944.80	2945.00	2944.57					2948.50	2948.66	2948.42					2921.994	2922.04	2922.02				
LTOB[2] Max Depth (ft)	0.40	0.51	0.27					0.60	0.51	0.56					1.88	2.00	1.74					0.99	0.87	0.85					2.35	2.24	2.03				
LTOB[2] Cross Sectional Area (ft[2])	1.1	1.03	0.75					2.1	1.53	2.03					7.7	9.20	6.79					2.7	3.05	2.47					24.5	24.16	22.53				

	Fork Cr - Cross Section 6 (Pool)							UT 3 - Cross Section 7 (Pool)							UT 3 - Cross Section 8 (Riffle)							UT 3 - Cross Section 9 (Pool)							UT 3 - Cross Section 10 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2922.56	2922.64	2922.42					2930.97	2931.56	2931.59					2932.44	2932.46	2932.48					2943.97	2944.09	2944.06					2946.02	2946.07	2946.06				
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00	0.92	0.92					1.00	0.97	1.02					1.00	1.04	0.84					1.00	0.96	1.50					1.00	0.95	1.31				
Thalweg Elevation	2921.22	2921.19	2921.02					2930.078	2930.85	2931.00					2931.64	2931.61	2931.73					2943.12	2943.35	2943.41					2945.65	2945.60	2945.64				
LTOB[2] Elevation	2922.56	2922.52	2922.30					2930.97	2931.54	2931.60					2932.44	2932.49	2932.36					2943.97	2944.07	2944.38					2946.02	2946.05	2946.19				
LTOB[2] Max Depth (ft)	1.34	1.34	1.28					0.89	0.69	0.60					0.81	0.88	0.63					0.85	0.72	0.98					0.37	0.45	0.55				
LTOB[2] Cross Sectional Area (ft[2])	14.4	12.43	12.35					1.9	1.80	2.02					2.3	2.46	1.70					1.8	1.68	3.55					0.9	0.81	1.55				

	Fork Cr - Cross Section 11 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2936.55	2936.76	2936.93				
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00	0.98	0.77				
Thalweg Elevation	2934.57	2934.58	2934.62				
LTOB[2] Elevation	2936.55	2936.71	2936.39				
LTOB[2] Max Depth (ft)	1.98	2.13	1.77				
LTOB[2] Cross Sectional Area (ft[2])	19.2	18.16	10.35				

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth -** These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 11B. Monitoring Data - Cross Section Morphology Monitoring Summary
(Laurel Springs/ DMS:100122)

	Fork Cr - Cross Section 12 (Riffle)							UT 1 - Cross Section 13 (Riffle)							UT 1 - Cross Section 14 (Pool)							Fork Cr - Cross Section 15 (Riffle)							Fork Cr - Cross Section 16 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2937.72	2937.79	2937.75					2943.24	2943.38	2943.36					2945.11	2945.61	2945.77					2954.23	2954.15	2954.31					2954.72	2955.00	2955.10				
Bank Height Ratio_Based on AB Bankfull[1] Area	1.00	1.00	0.91					1.00	1.03	1.00					1.00	1.04	0.86					1.00	1.09	0.97					1.00	0.92	0.97				
Thalweg Elevation	2936.23	2936.26	2936.16					2942.061	2942.17	2942.08					2943.881	2944.57	2944.75					2953.12	2952.80	2952.97					2953.19	2953.30	2953.21				
LTOB[2] Elevation	2937.72	2937.79	2937.61					2943.244	2943.42	2943.36		`			2945.11	2945.65	2945.63					2954.23	2954.27	2954.28					2954.72	2954.87	2955.05				
LTOB[2] Max Depth (ft)	1.49	1.53	1.45					1.18	1.25	1.29					1.23	1.07	0.88					1.10	1.47	1.30					1.53	1.57	1.84				
LTOB[2] Cross Sectional Area (ft[2])	13.5	13.54	11.52					6.2	6.56	6.44					4.6	4.93	3.49					7.1	8.54	6.65					7.4	6.33	6.93				

Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area							
Bank Height Ratio_Based on AB Bankfull[1] Area							
Thalweg Elevation							
LTOB[2] Elevation							
LTOB[2] Max Depth (ft)							
LTOB[2] Cross Sectional Area (ft[2])							

The above morphology parameters reflect the 2018 guidance that arose from the mitigation technical workgroup consisting of DMS, the IRT and industry mitigation providers/practitioners. The outcome resulted in the focus on three primary morphological parameters of interest for the purposes of tracking channel change moving forward. They are the bank height ratio using a constant As-built bankfull area and the cross sectional area and max depth based on each years low top of bank. These are calculated as follows:

1 - **Bank Height Ratio (BHR)** takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation. For example if the As-built bankfull area was 10 ft2, then the MY1 bankfull elevation would be adjusted until the calculated bankfull area within the MY1 cross section survey = 10 ft2. The BHR would then be calculated with the difference between the low top of bank (LTOB) elevation for MY1 and the thalweg elevation for MY1 in the numerator with the difference between the MY1 bankfull elevation and the MY1 thalweg elevation in the denominator. This same process is then carried out in each successive year.

2 - **LTOB Area and Max depth -** These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decereases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Appendix D: Hydrologic Data

Table 12. Verification of Bankfull Events

Date of Data Collection	Date of Occurrence	Method	Photo (if available)	Monitoring Year
May 23, 2022	May 23, 2022	A bankfull event was documented on the Fork Creek trail camera and stream gauge after 1.13 inches of rain fell per the on-site rain gauge.	1	MY1
August 6, 2022	August 6, 2022	A bankfull event was documented on the Fork Creek trail camera and stream gauge after 0.98 inches of rain fell per the on-site rain gauge.	2	MY1
September 5, 2022	September 5, 2022	A bankfull event was documented on the Fork Creek trail camera and stream gauge after 1.45 inches of rain fell per the on-site rain gauge.	3	MY1
September 25, 2023	May 28, 2023	A bankfull event was documented on the Fork Creek trail camera and stream gauge after 1.71 inches of rain fell per the on-site rain gauge.	4	MY2
September 25, 2023	June 20, 2023	A bankfull event was documented on the Fork Creek trail camera and stream gauge after 2.56 inches of rain fell per the on-site rain gauge.	5	MY2
September 25, 2023	August 8, 2023	A bankfull event was documented on the Fork Creek trail camera and stream gauge after 2.95 inches of rain fell per the on-site rain gauge.	6	MY2

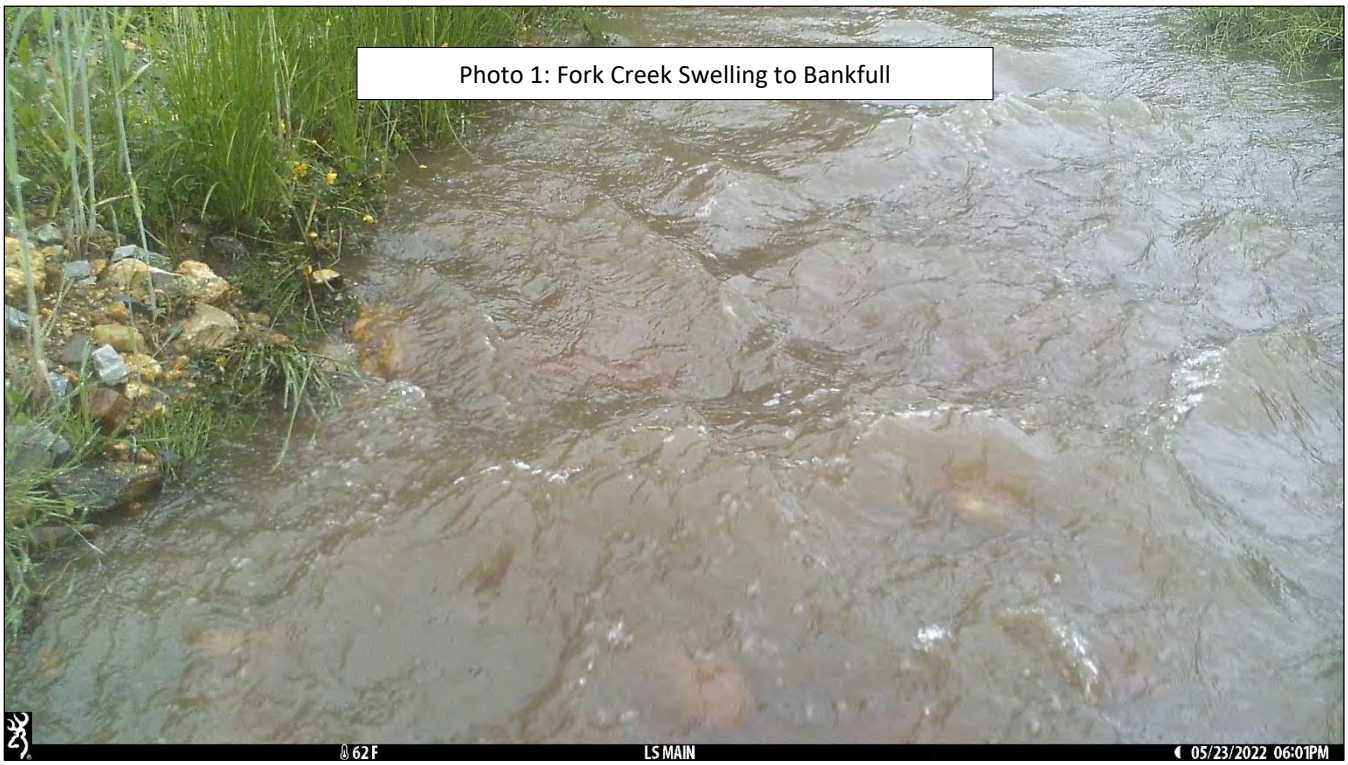


Photo 1: Fork Creek Swelling to Bankfull

Photo 2: Bankfull Event Documented on Fork Creek

Photo 3: Bankfull Event Documented on Fork Creek

Photo 4: Bankfull Event Documented on Fork Creek

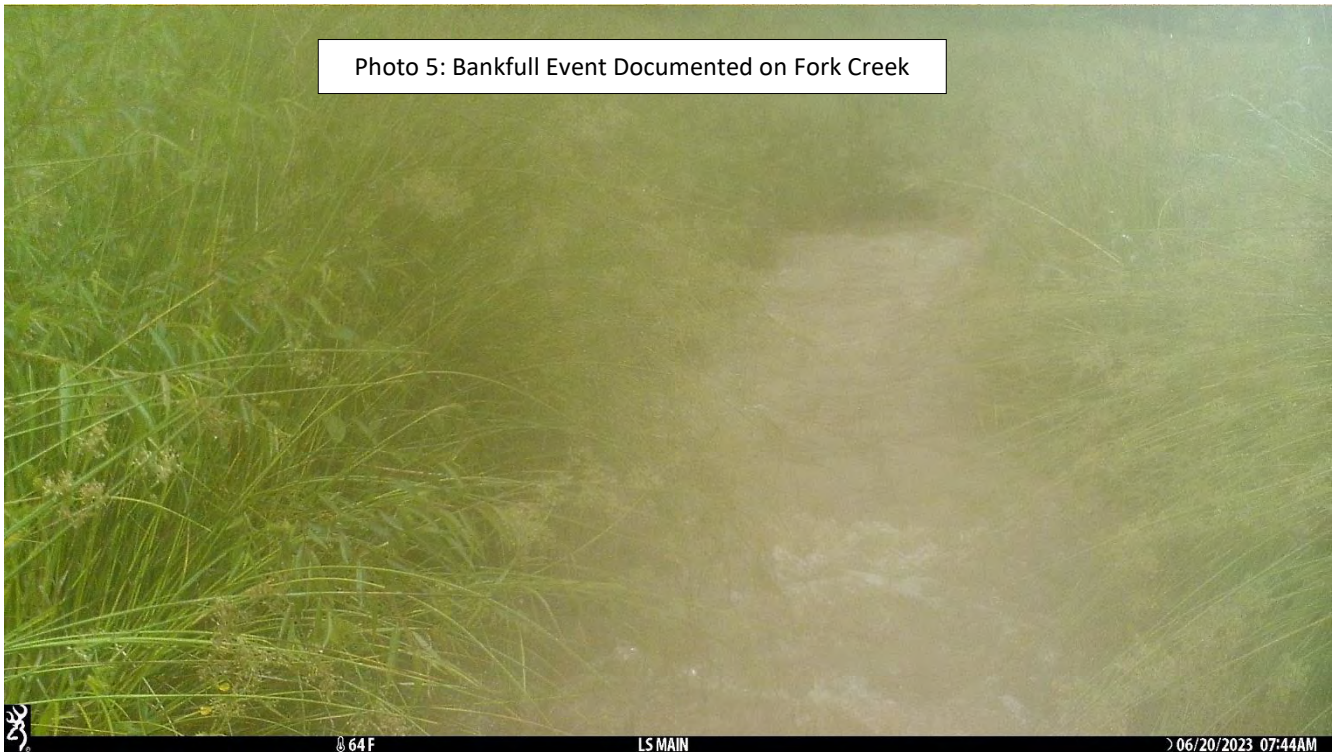


Photo 5: Bankfull Event Documented on Fork Creek

Photo 6: Bankfull Event Documented on Fork Creek

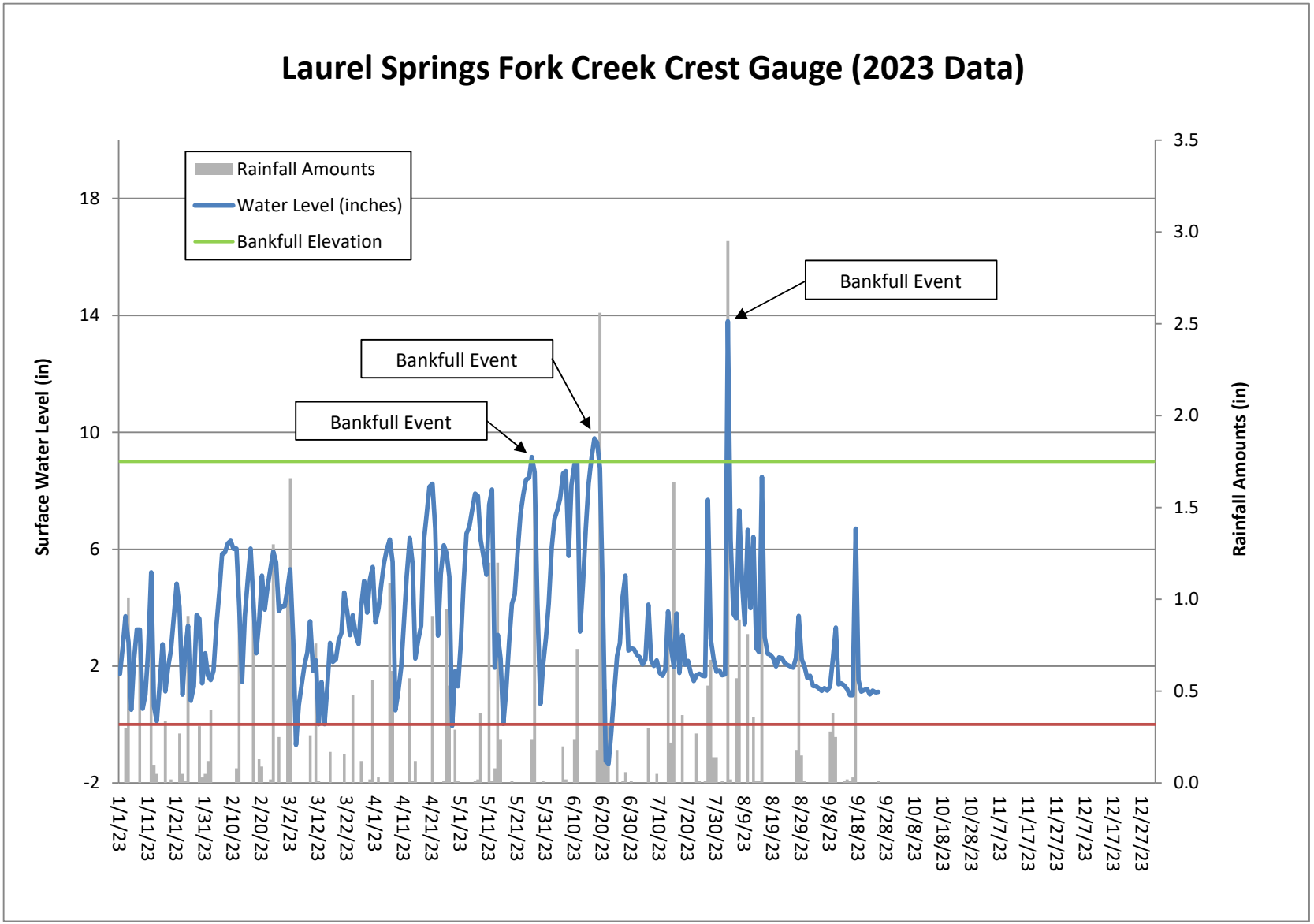
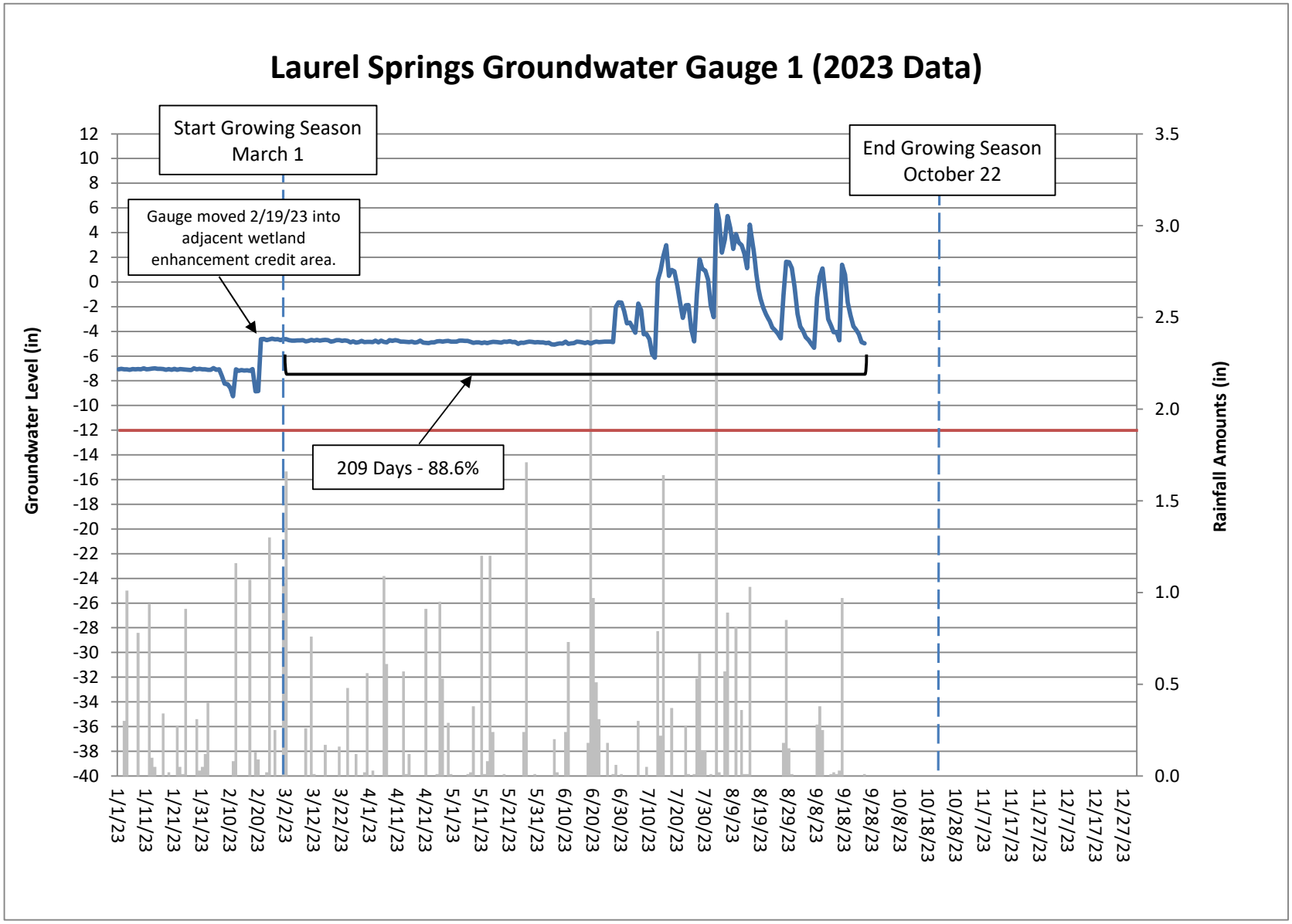

Laurel Springs Fork Creek Crest Gauge (2023 Data)
Rainfall Amounts
Water Level (inches)
Bankfull Elevation
Bankfull Event
Bankfull Event
Bankfull Event
Surface Water Level (in)
Rainfall Amounts (in)
18
14
10
6
2
-2
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
10/18/23
10/28/23
11/7/23
11/17/23
11/27/23
12/7/23
12/17/23
12/27/23

Table 13. Groundwater Hydrology Data
Summary of Monitoring Period/Hydrology Success Criteria by Year

Gauge	12% Hydroperiod Success Criteria Achieved - Max Consecutive Days During Growing Season (Percentage)						
	Year 1 (2022)	Year 2 (2023)	Year 3 (2024)	Year 4 (2025)	Year 5 (2026)	Year 6 (2027)	Year 7 (2028)
1*	Yes 45 days (19.1%)	Yes 209 days (88.6%)					
2	No 2 days (0.9%)	No 3 days (1.3%)					
3	No 17 days (7.2%)	No 14 days (5.9%)					
4	Yes 167 days (71.1%)	Yes 209 days (88.6%)					
5	Yes 46 days (19.6%)	Yes 75 days (31.8%)					
6*	Yes 236 days (100%)	Yes 209 days (88.6%)					
7	Yes 236 days (100%)	Yes 209 days (88.6%)					
8	Yes 119 days (50.6%)	Yes 209 days (88.6%)					
9*	Yes 236 days (100%)	Yes 99 days (41.9%)					
10	Yes 65 days (27.7%)	Yes 209 days (88.6%)					
11*	Yes 45 days (19.1%)	Yes 44 days (18.6%)					
12*	Yes 236 days (100%)	No 15 days (6.4%)					
13	Yes 236 days (100%)	Yes 209 days (88.6%)					

*During the MY0 review, the IRT requested that gauges be moved into creditable wetland areas to more accurately represent what was presented in the detailed mitigation plan (Appendix F). During the 2022/2023 dormant season, gauges 6, 9, 11, and 12 were moved into creditable wetland reestablishment areas, and gauge 1 was moved into the nearby wetland enhancement area.


Laurel Springs Groundwater Gauge 1 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
Gauge moved 2/19/23 into adjacent wetland enhancement credit area.
209 Days - 88.6%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
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9/8/23
9/18/23
9/28/23
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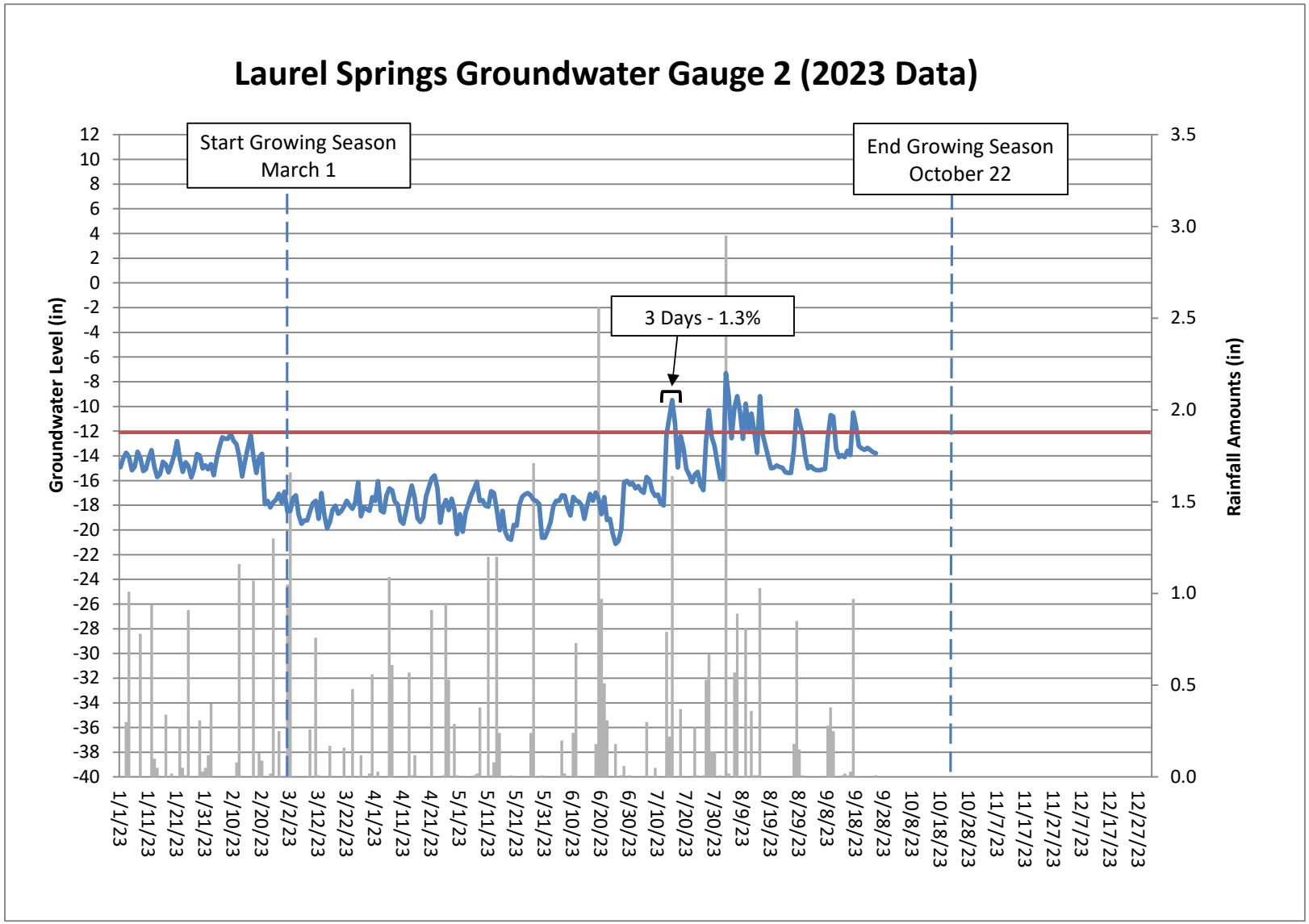
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 2 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
3 Days - 1.3%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
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7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
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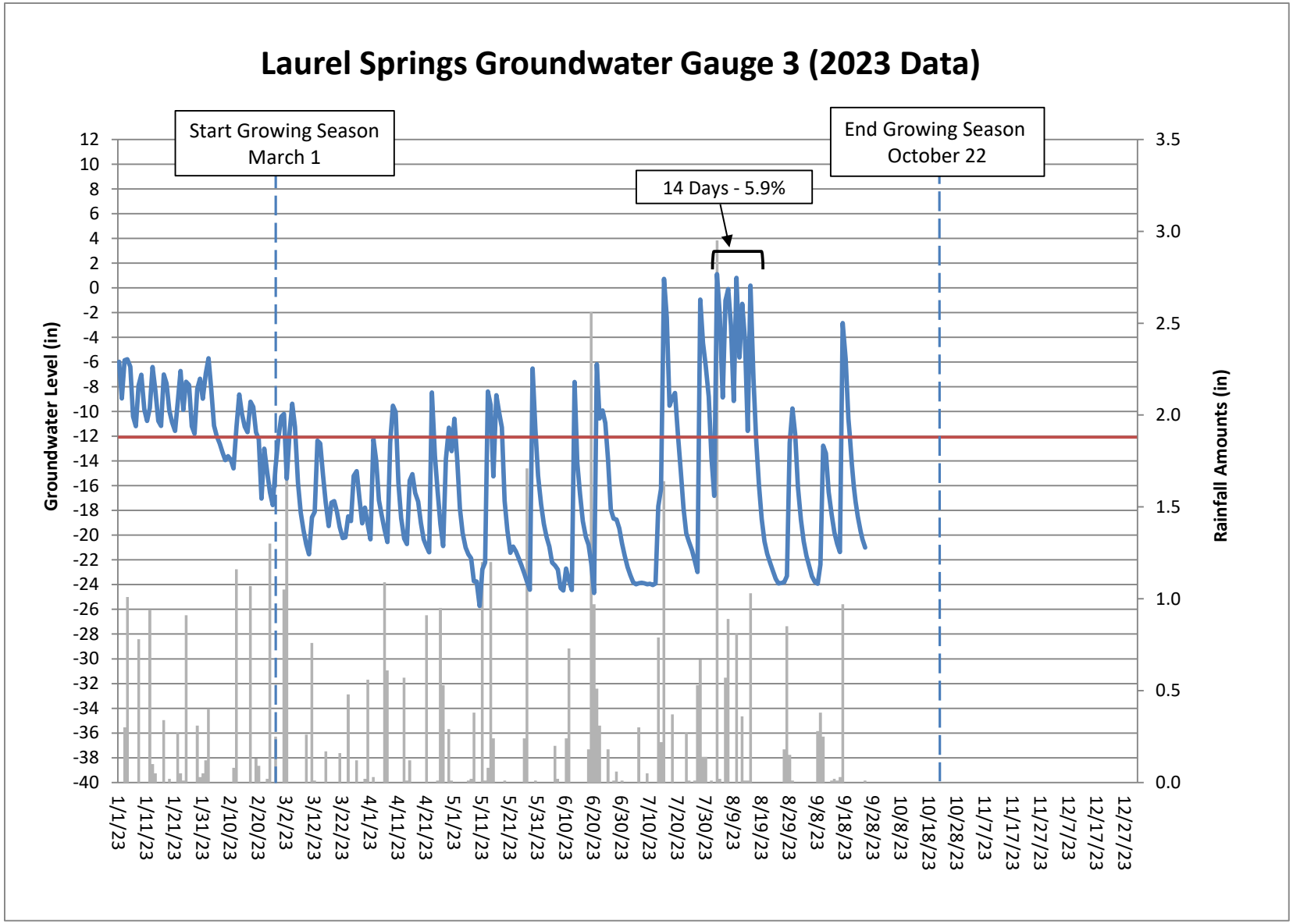
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 3 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
14 Days - 5.9%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
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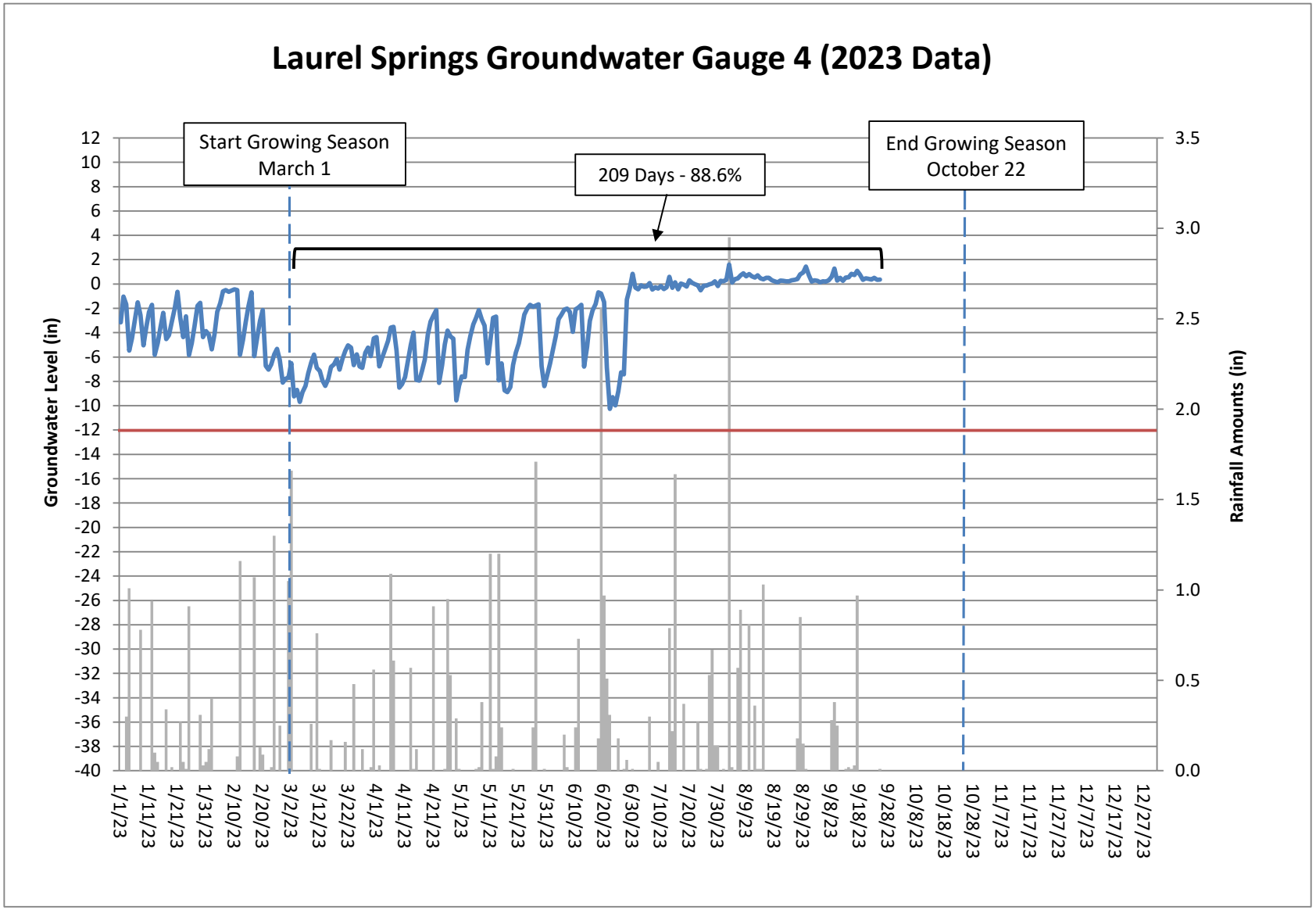
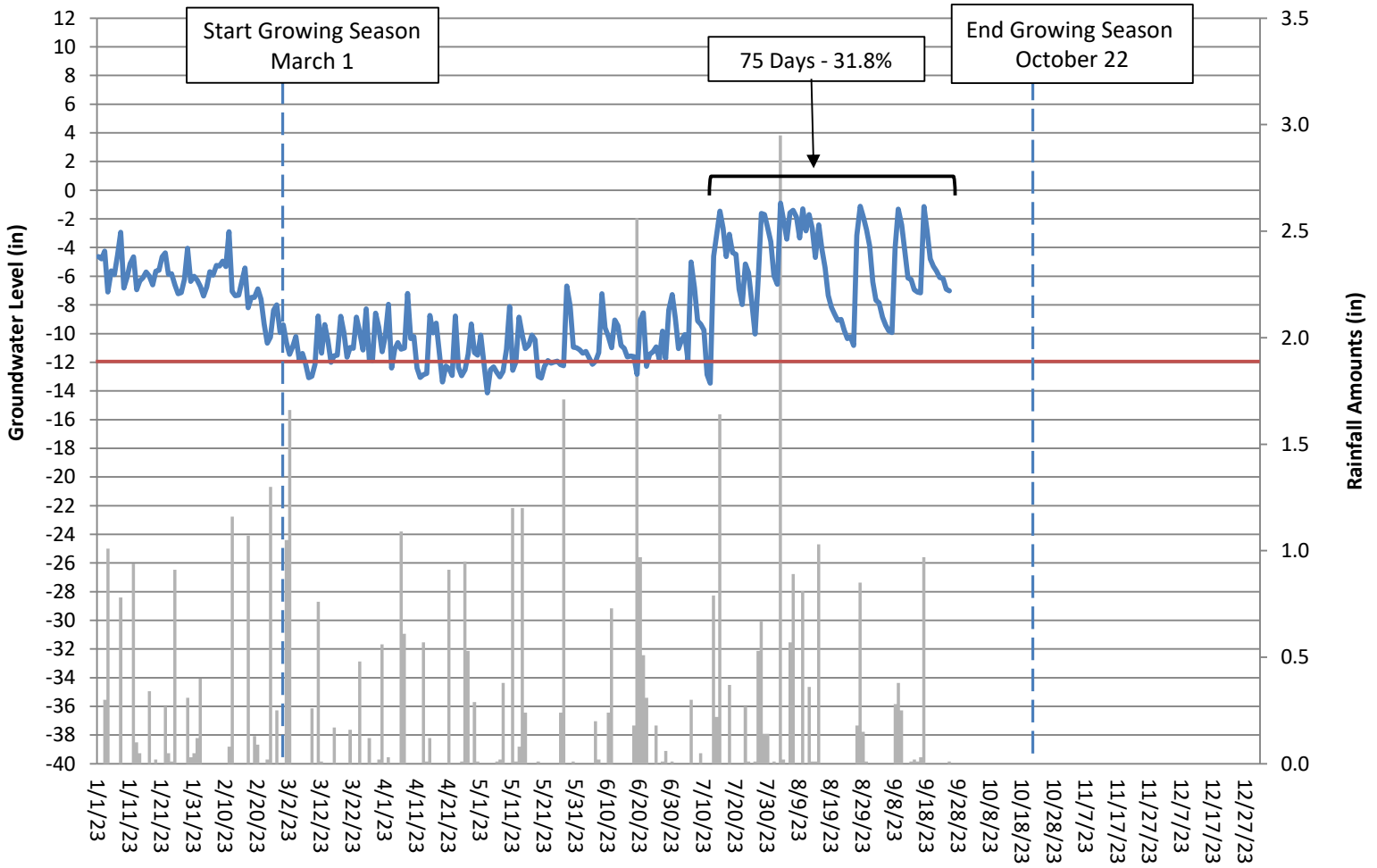
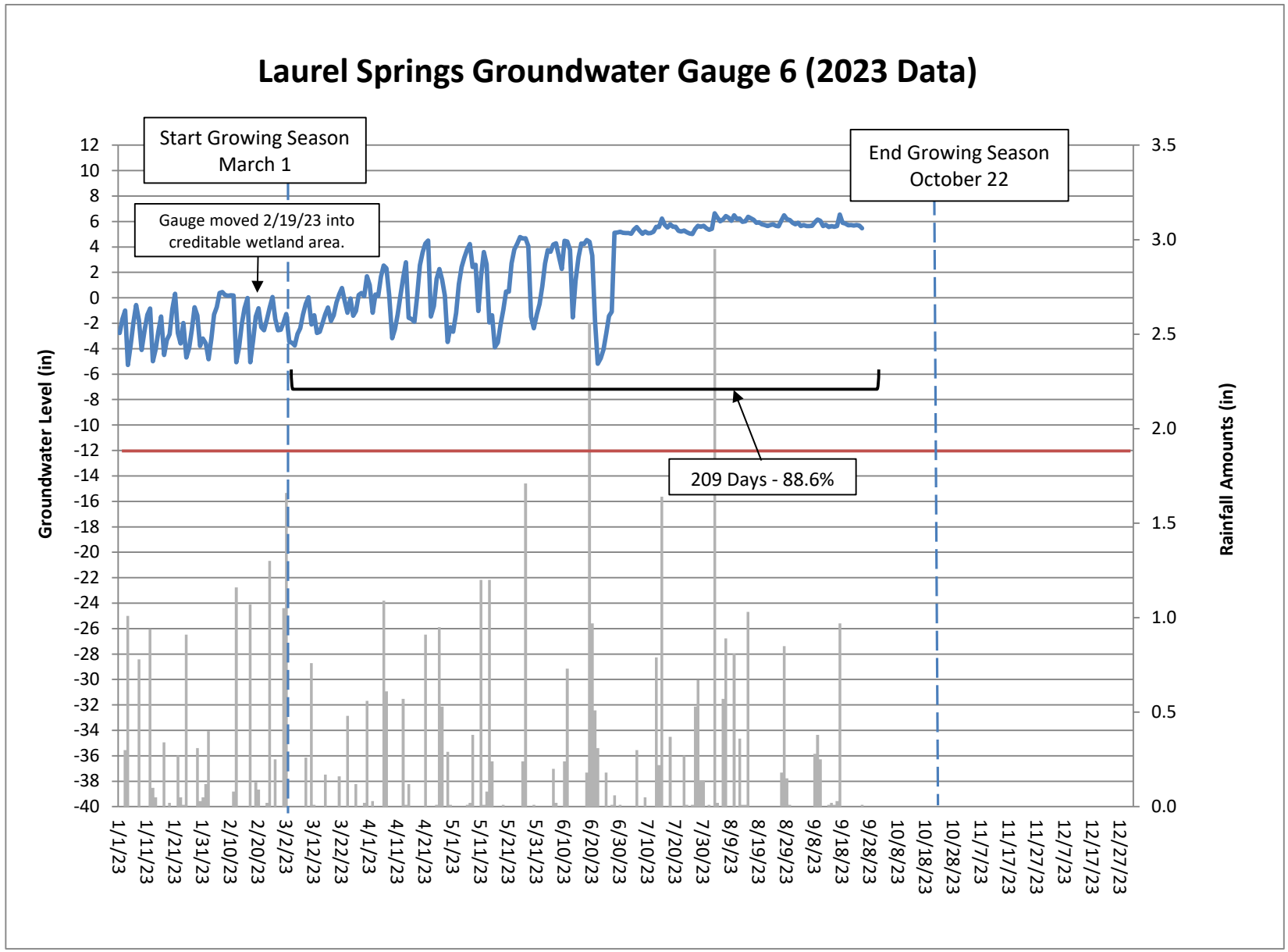
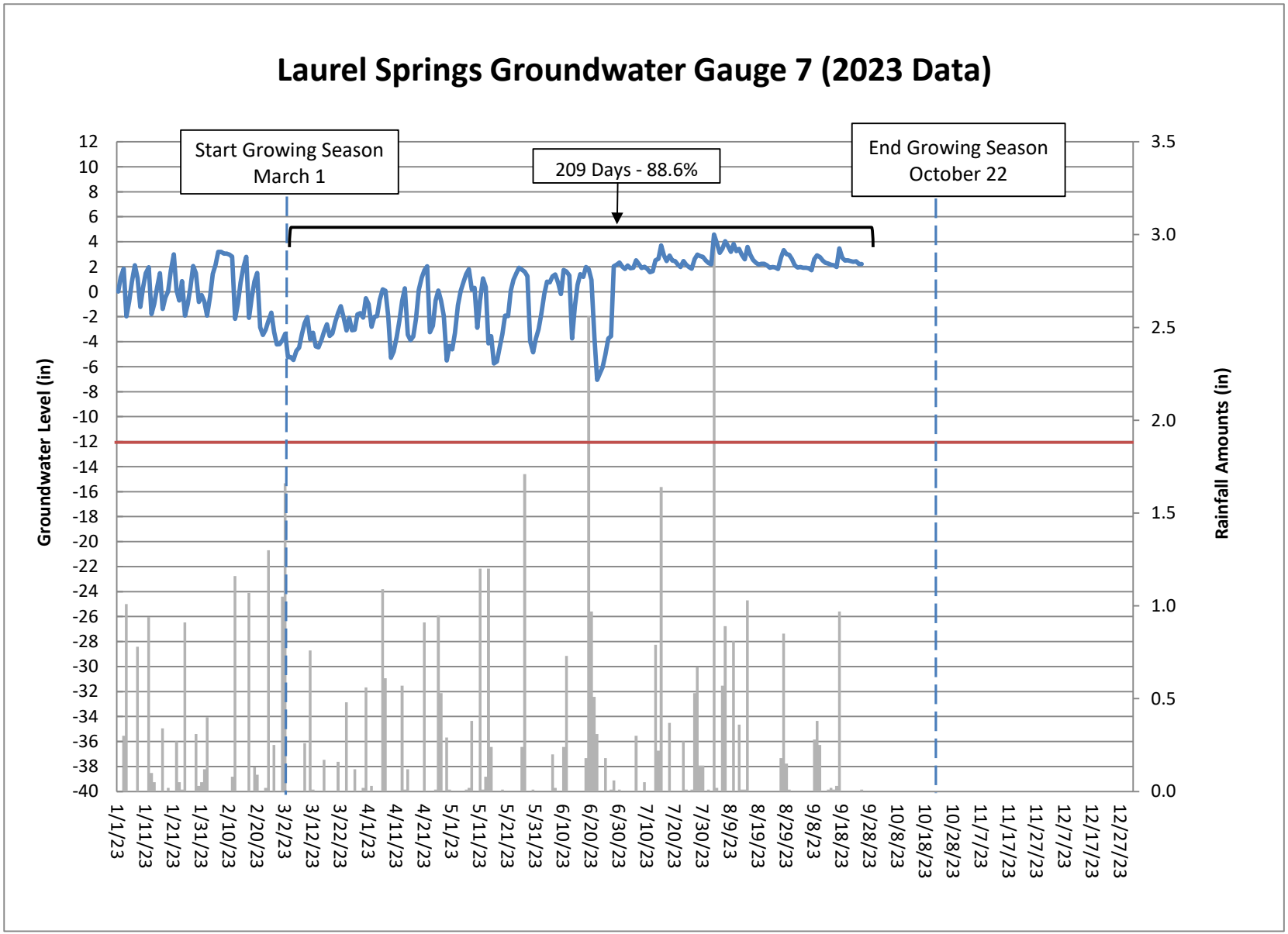
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 4 (2023 Data)
Start Growing Season
March 1
209 Days - 88.6%
End Growing Season
October 22
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
10/18/23
10/28/23
11/7/23
11/17/23
11/27/23
12/7/23
12/17/23
12/27/23

Laurel Springs Groundwater Gauge 5 (2023 Data)




Laurel Springs Groundwater Gauge 6 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
Gauge moved 2/19/23 into creditable wetland area.
209 Days - 88.6%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
10/18/23
10/28/23
11/7/23
11/17/23
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 7 (2023 Data)
Start Growing Season
March 1
209 Days - 88.6%
End Growing Season
October 22
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
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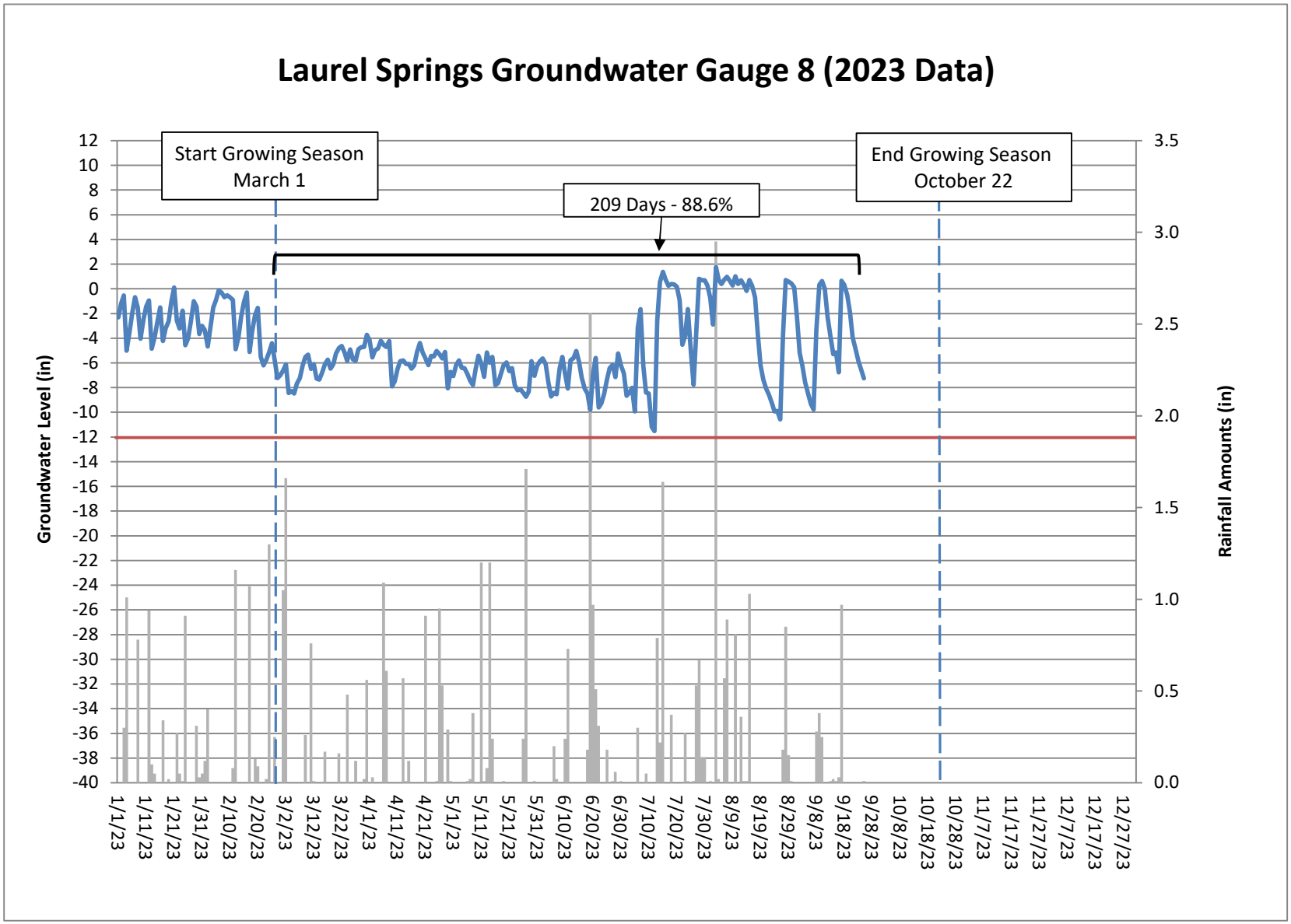
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 8 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
209 Days - 88.6%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
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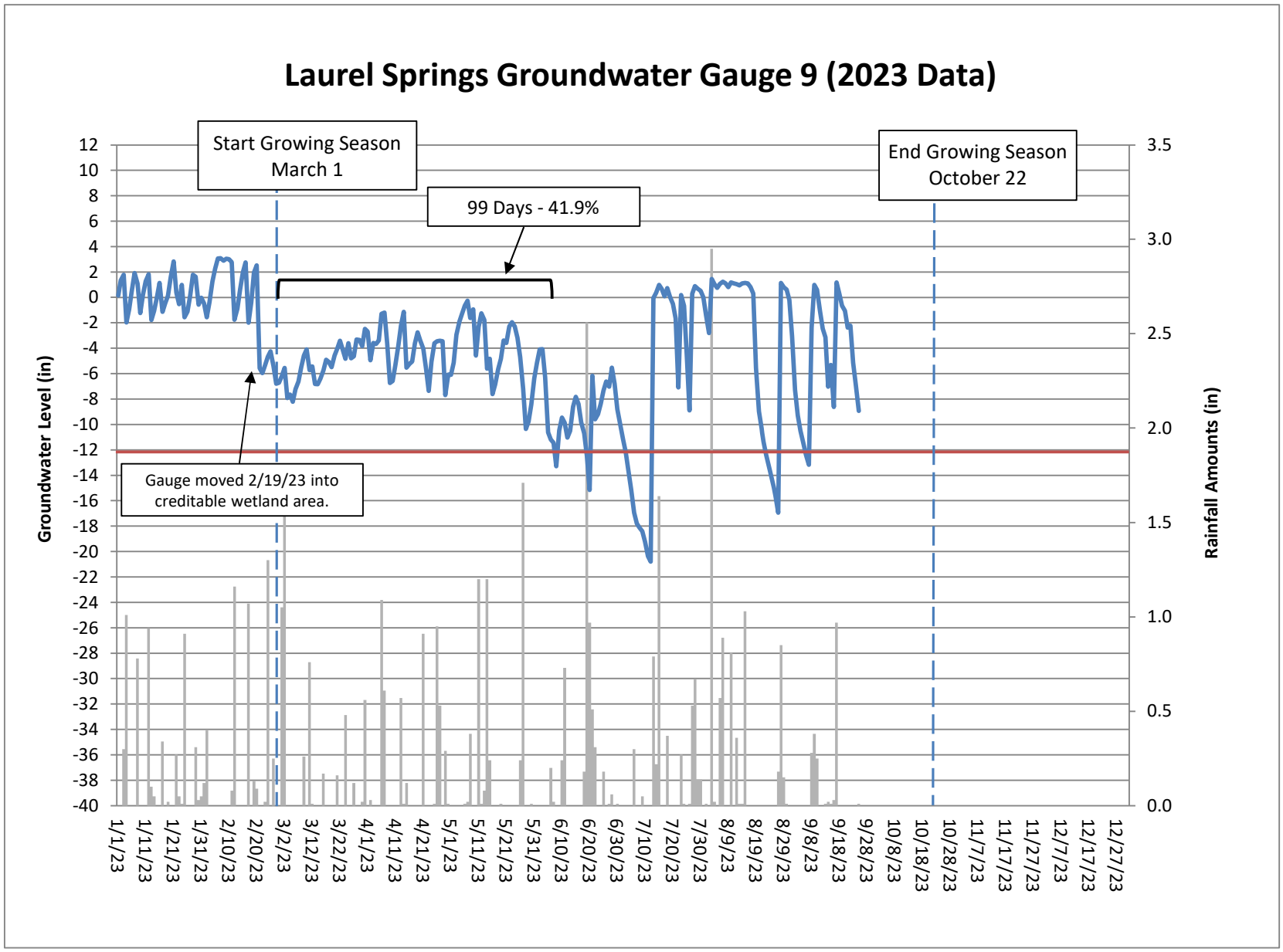
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 9 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
99 Days - 41.9%
Gauge moved 2/19/23 into creditable wetland area.
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
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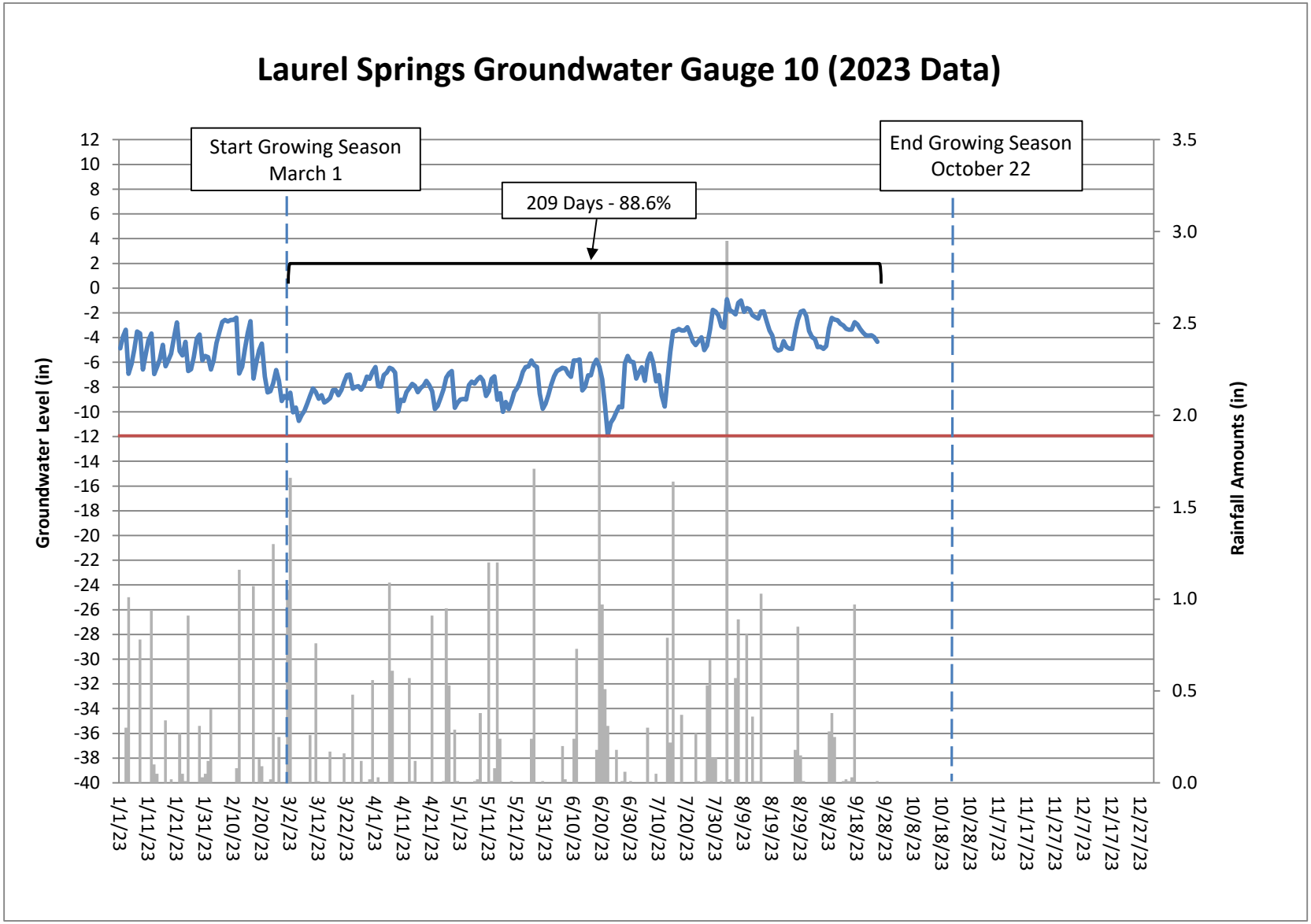
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 10 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
209 Days - 88.6%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
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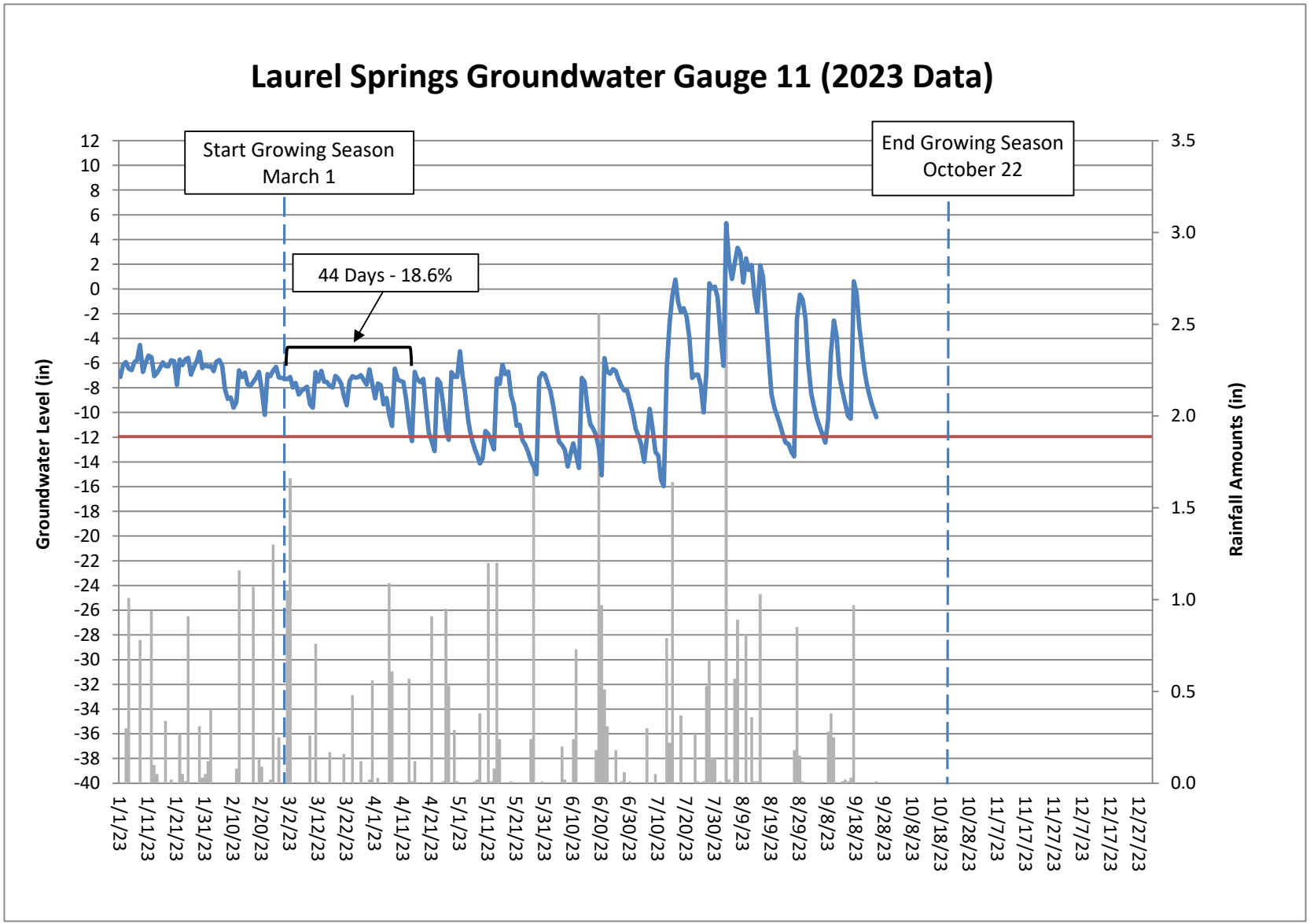
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 11 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
44 Days - 18.6%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
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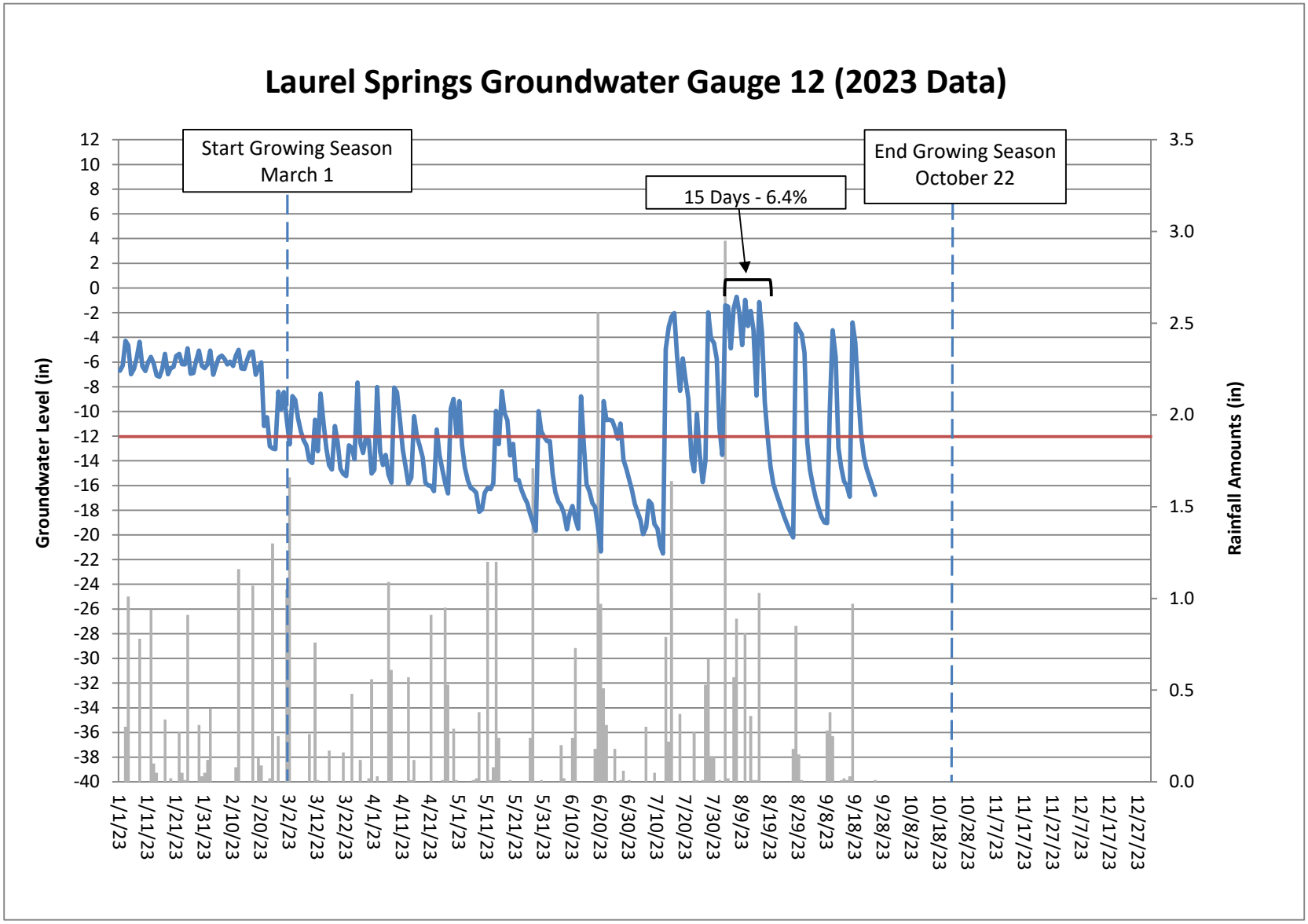
11/27/23
12/7/23
12/17/23
12/27/23


Laurel Springs Groundwater Gauge 12 (2023 Data)
Start Growing Season
March 1
End Growing Season
October 22
15 Days - 6.4%
Groundwater Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
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11/27/23
12/7/23
12/17/23
12/27/23

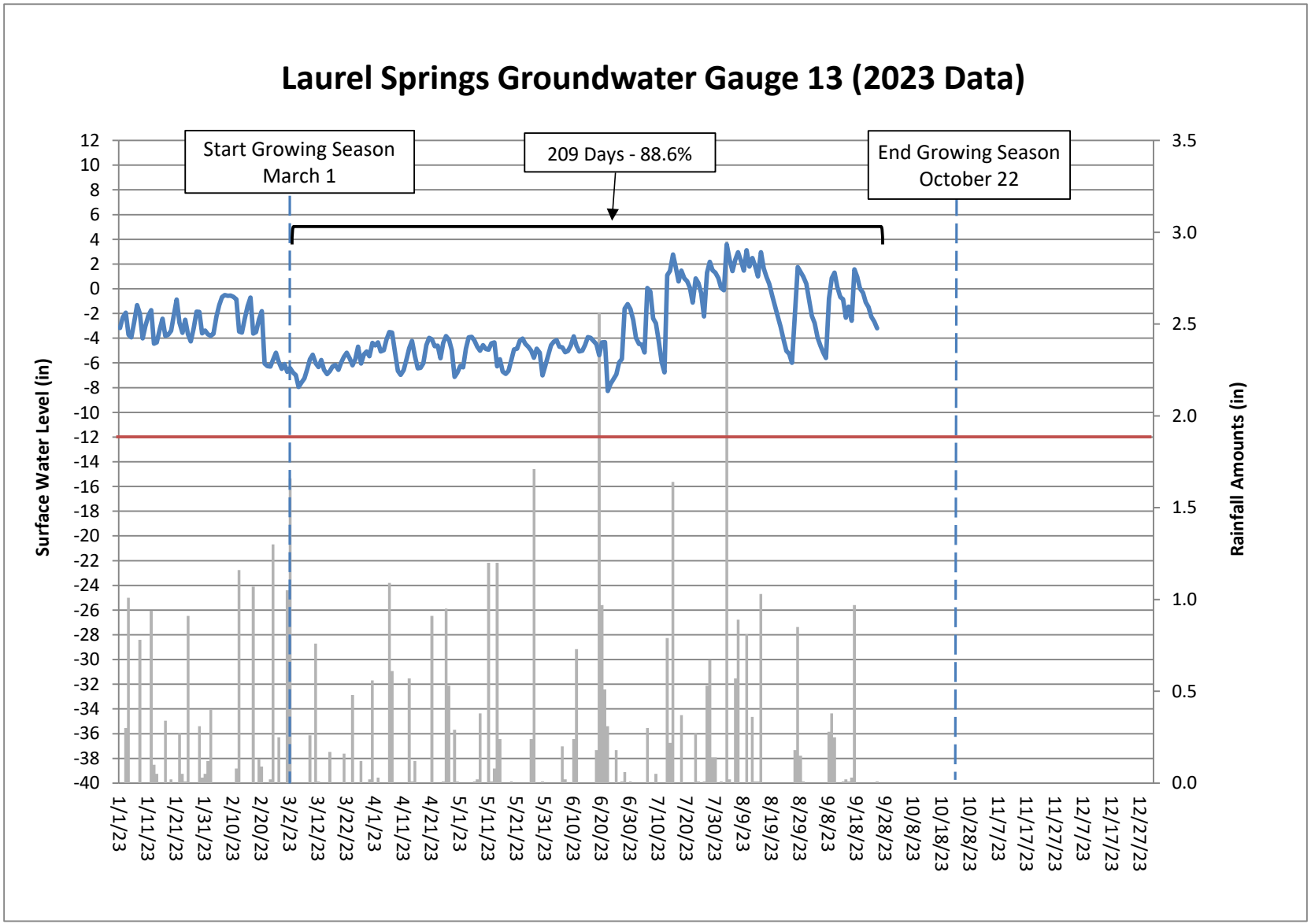

Laurel Springs Groundwater Gauge 13 (2023 Data)
Start Growing Season
March 1
209 Days - 88.6%
End Growing Season
October 22
Surface Water Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
10/18/23
10/28/23
11/7/23
11/17/23
11/27/23
12/7/23
12/17/23
12/27/23

Table 14. UT-2 Channel Evidence

UT-1 Upstream Channel Evidence	Year 1 (2022)	Year 2 (2023)
Max consecutive days channel flow	166	94
Presence of litter and debris (wracking)	Yes	Yes
Leaf litter disturbed or washed away	Yes	Yes
Matted, bent, or absence of vegetation (herbaceous or otherwise)	Yes	Yes
Sediment deposition and/or scour indicating sediment transport	Yes	Yes
Water staining due to continual presence of water	Yes	Yes
Formation of channel bed and banks	Yes	Yes
Sediment sorting within the primary path of flow	Yes	Yes
Sediment shelving or a natural line impressed on the banks	Yes	Yes
Change in plant community (absence or destruction of terrestrial vegetation and/or transition to species adapted for flow or inundation for a long duration, including hydrophytes)	Yes	Yes
Development of channel pattern (meander bends and/or channel braiding) at natural topographic breaks, woody debris piles, or plant root systems	Yes	Yes
Exposure of woody plant roots within the primary path of flow	No	No
Other:		

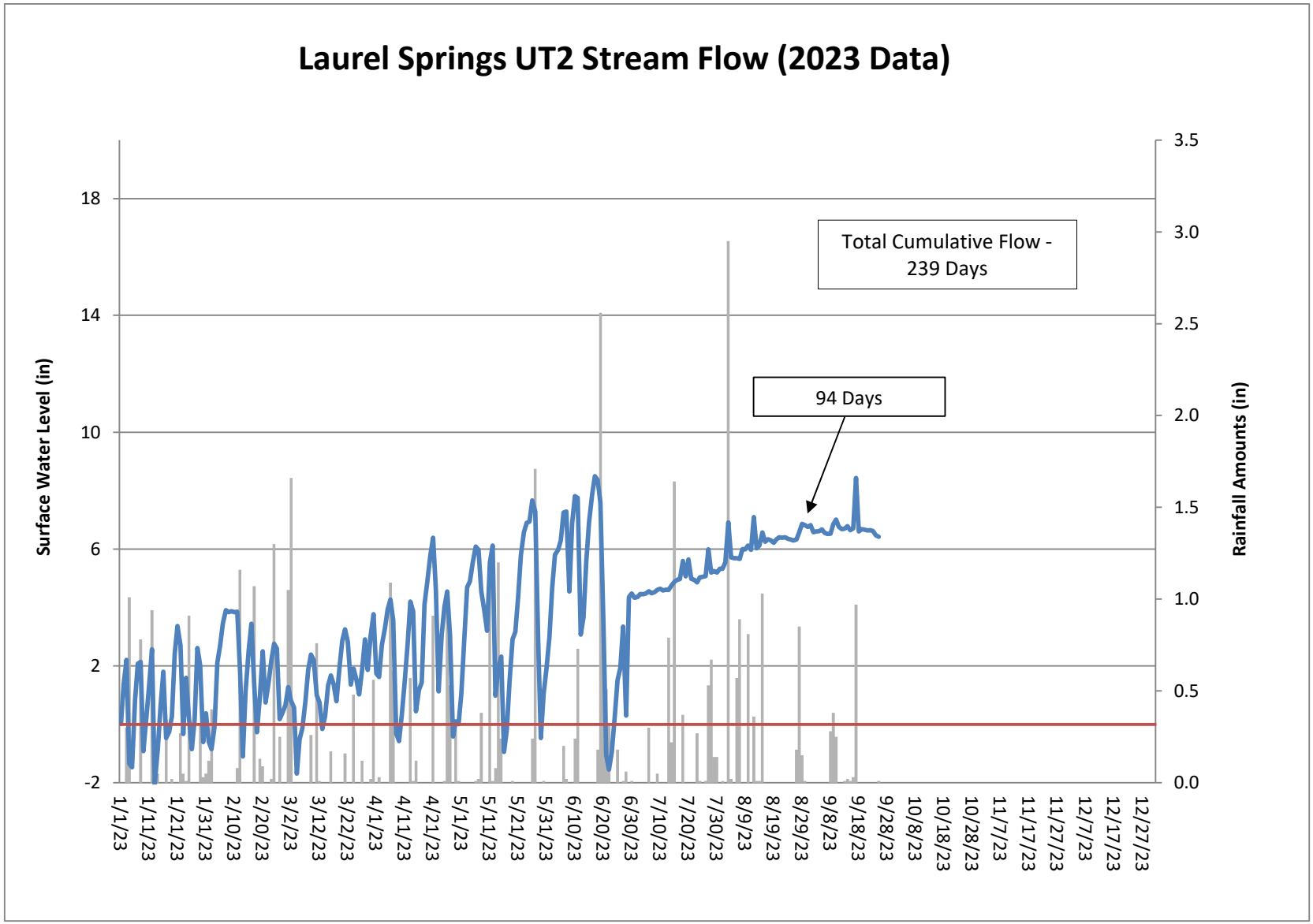
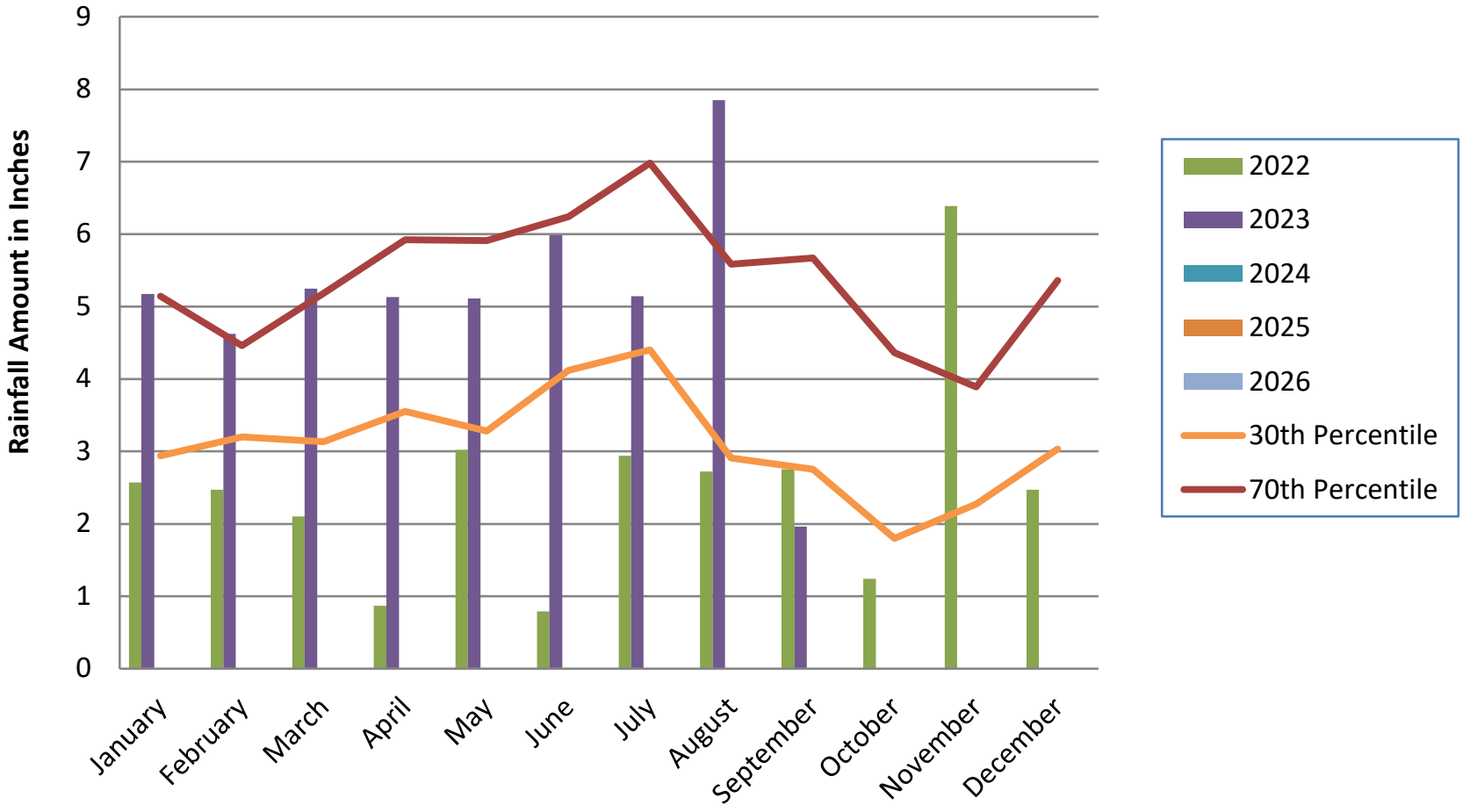
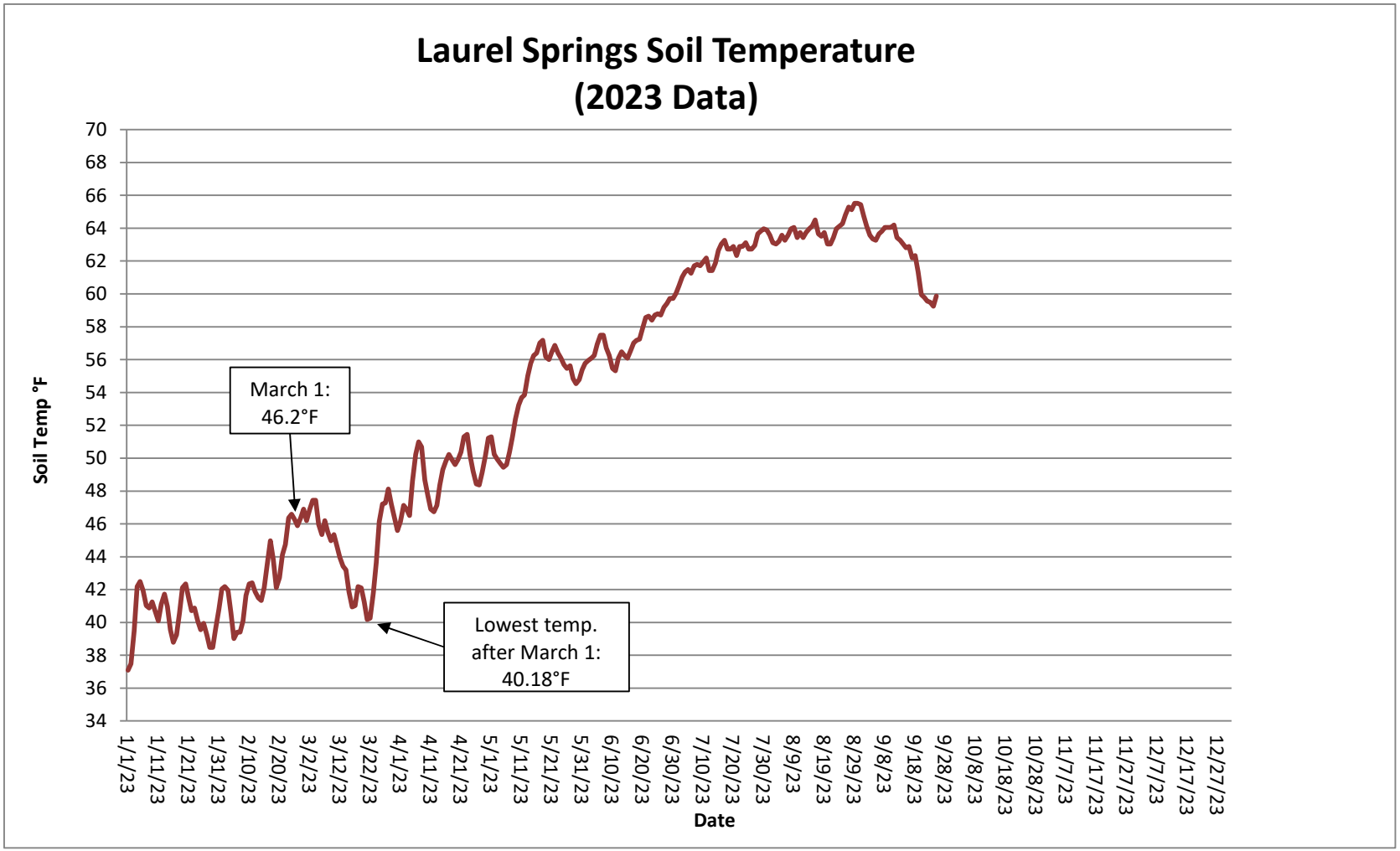

Laurel Springs UT2 Stream Flow (2023 Data)
Surface Water Level (in)
Rainfall Amounts (in)
Total Cumulative Flow - 239 Days
94 Days
18
14
10
6
2
-2
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
10/18/23
10/28/23
11/7/23
11/17/23
11/27/23
12/7/23
12/17/23
12/27/23

Figure D1: Laurel Springs
30-70 Percentile Graph for Rainfall
30-70th percentile data from WETS Station: Banner Elk, NC




Laurel Springs Soil Temperature
(2023 Data)
Soil Temp °F
70
68
66
64
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
March 1:
46.2°F
Lowest temp.
after March 1:
40.18°F
1/1/23
1/11/23
1/21/23
1/31/23
2/10/23
2/20/23
3/2/23
3/12/23
3/22/23
4/1/23
4/11/23
4/21/23
5/1/23
5/11/23
5/21/23
5/31/23
6/10/23
6/20/23
6/30/23
7/10/23
7/20/23
7/30/23
8/9/23
8/19/23
8/29/23
9/8/23
9/18/23
9/28/23
10/8/23
10/18/23
10/28/23
11/7/23
11/17/23
11/27/23
12/7/23
12/17/23
12/27/23
Date

Appendix E: Project Timeline and Contact Info

Table 15. Project Timeline

Activity or Deliverable	Data Collection Complete	Task Completion or Deliverable Submission
Technical Proposal (RFP No. 16-007725)	Mar-19	Mar-19
Institution Date (NCDMS Contract No. 100122)	NA	17-May-19
Mitigation Plan	Jul-20	11-Feb-21
Construction Plan (Grading) Completed	NA	18-Feb-21
Planting Completed	NA	13-Jan-22
As-built Survey Completed	25-Oct-20	Jun-22
MY-0 Baseline Report	Feb-22	Nov-22
Invasive Species Treatment - Japanese Knotweed, Chinese Bittersweet, Multiflora rose, Autumn Olive, Callery Pear, Japanese barberry, Cattail	NA	14-Sep-22
Encroachment (addressed during MY1)	NA	Oct-22
MY1 Monitoring Report	Nov-22	Feb-23
Supplemental planting and old fence removal	NA	12-Mar-23
Spot invasive treatments: Japanese Knotweed, Multiflora rose, Ligustrum	NA	28-Jun-23
Added rock at DOT culvert entering site at UT-1 where storm damage caused perching	NA	8-Aug-23
Spot invasive treatments: Japanese Knotweed, Bittersweet, Barberry, Multiflora rose	NA	19-Sep-23
MY2 Monitoring Report	Nov-23	Feb-24

Table 16. Project Contacts

Laurel Springs/100122	
Provider	Restoration Systems, LLC 1101 Haynes Street, Suite 211 Raleigh, NC 27604
Mitigation Provider POC	Worth Creech 919-755-9490
Designer	Axiom Environmental, Inc. 218 Snow Ave Raleigh, NC 27603
Primary project design POC	Grant Lewis 919-215-1693
Construction Contractor	Land Mechanics Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592
	Charles Hill 919-639-6132

Appendix F: IRT Correspondence

Remedial Planting Plan (Q1-2023)
2023 Adaptive Management Plan
MY2 IRT Site Visit Notes and Comment Responses
2023-2024 IRT Email Correspondence

November 30, 2022

Restoration Systems, LLC
1101 Haynes St. Suite 211
Raleigh, North Carolina
Ph: (919) 755-9490
Fx: (919) 755-9492

Kimberly Isenhour
Mitigation Project Manager, Regulatory Division
U.S. Army Corps of Engineers

Subject: Laurel Springs Mitigation Site – Remedial Planting Plan (Q1-2023)
DMS Project ID No. 100122; Full Delivery Contract No. 7890; RFP No. 16-007725 (Issuance Date 11/13/2018)
USACE Action ID No. SAW-2019-00835; DWR Project No. 2019-0865

Mrs. Isenhour,

During the 2022 growing season, Restoration Systems (RS) has observed areas of low stem densities at the Laurel Springs Mitigation Site (Site). Observed areas total 2.67 acres, which includes a 0.107-acre area of encroachment – see attached remedial planting figure. The encroachment area was partially due to a storage shed left within the easement used by the adjacent landowner. RS worked with the neighbor to remove the shed and cleared the area of all debris. Additionally, 6-inch treated fence posts were used to delineate the easement boundary in this area. A new shed was erected approximately 15 feet from the easement.

RS has ordered trees to replant the 2.67 acres at a density of 670 stems per acre. The replant areas are within the Acidic Cove Forest Association. The following species and quantities were secured for Q1-2023 planting.

Targeted Vegetation Associations: Acidic Cove Forest
Area of Replant: 2.67 Acres

Species	Indicator Status	Number of Stems
American elm (*Ulmus americana*)	FACW	600
White Oak (*Quercus alba*)	FACU	600
Persimmon (*Diospyros virginiana*)	FAC	600
Total		**1,800**

These species were listed within the approved mitigation plan but not planted within the Acidic Cove vegetation association during initial planting. These three species will add to the six species planted during initial planting for nine total species within the Acidic Cove vegetation association.

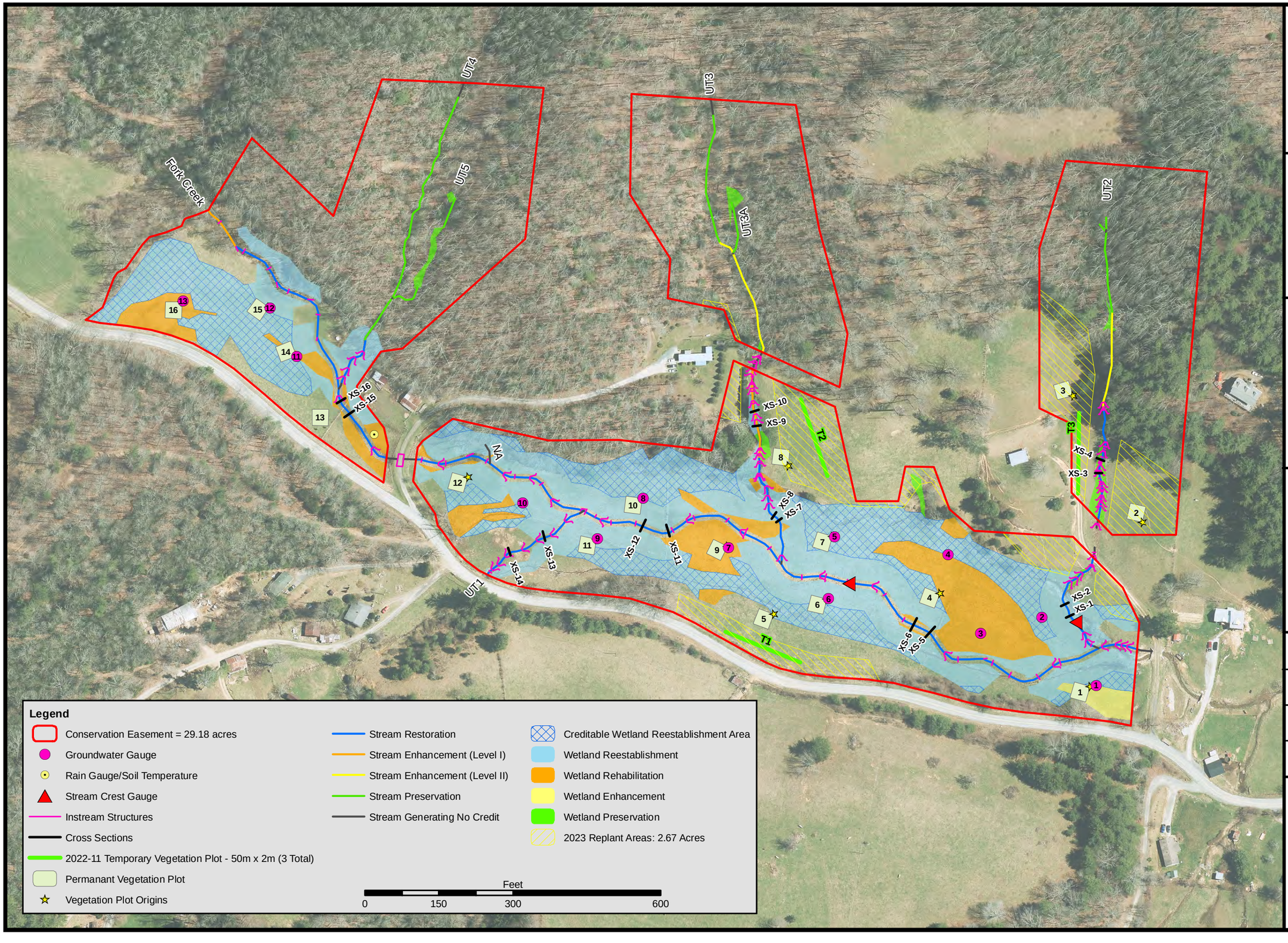
RS recognizes that additional "diversity plantings" may be desired by the IRT, and we welcome the opportunity to discuss a diversity planting effort with the IRT. RS will contact Andrea Leslie and Erin Davis in Q1-2023 to discuss this effort.

Please let me know if you have any questions or if I can provide any additional information.

Sincerely,

Raymond Holz
Operations Manager
Restoration Systems, LLC

Attachment – Remedial Planting Plan Figure



RESTORATION SYSTEMS | LLC

Prepared for:

NC DEQ
Division of Enviromental Quality

Division of Mitigation Services

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

2022/2023 REMEDIAL PLANTING PLAN

2018 NC One Map Imagery

Drawn by: RJH

Date: NOV. 2022

Scale: 1:2,200

Project No.: DMS ID: 100122

FIGURE

A

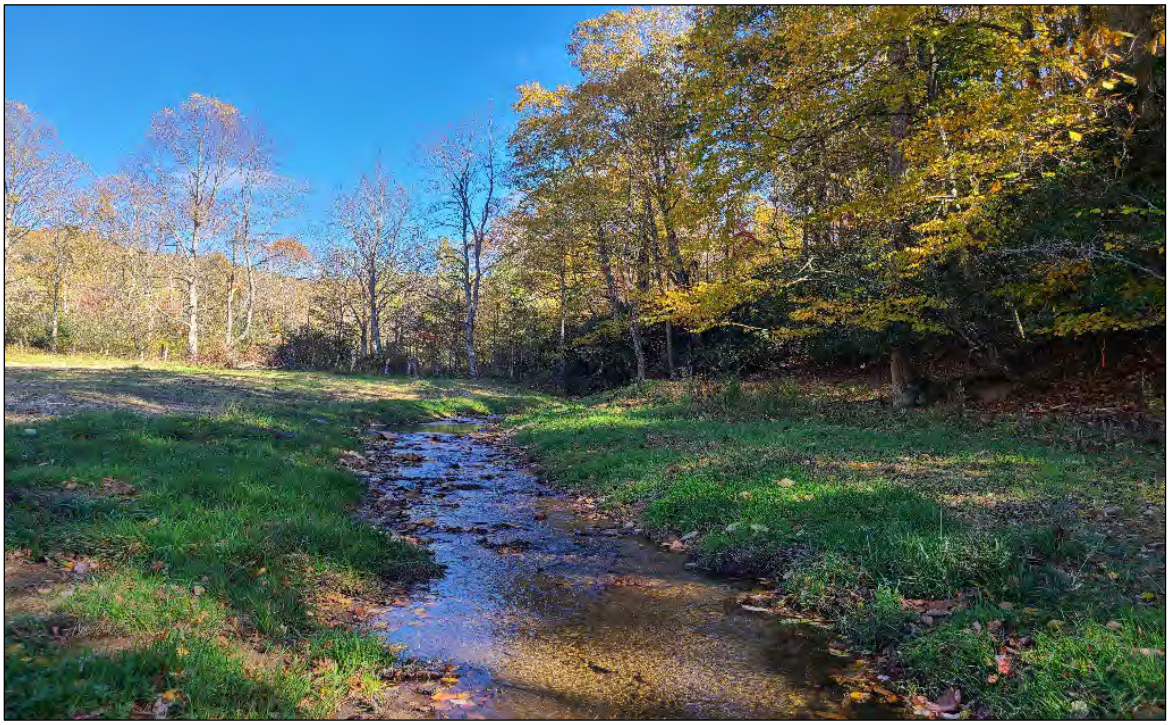
N

2023 Adaptive Management Plan

LAUREL SPRINGS STREAM AND WETLAND MITIGATION SITE

Avery County, North Carolina
French Broad River Basin
Cataloging Unit 06010108

DMS Project No. 100122
Full Delivery Contract No. 7890
DMS RFP No. 16-007725 (issued 11/13/18)
USACE Action ID No. SAW-2019-00835
DWR Project No. 2019-0865



Restoration Systems, LLC
1101 Haynes Street, Suite 211
Raleigh, North Carolina 27604
Contact: Raymond Holz
919-755-9490 (phone)
919-755-9492 (fax)

TABLE OF CONTENTS

APPENDICES

1 INTRODUCTION

Laurel Springs Stream and Wetland Mitigation Site (Site) is an NCDMS Full-Delivery site located in Avery County at coordinates 35.9941, -81.9821. The project is currently in Year 2 of Monitoring. The final mitigation plan is dated February 2021 and the Monitoring Year 1 was completed in 2022.

As noted in the Year 1 monitoring report and confirmed by a site visit in July, 2023, the Site is not currently meeting vegetation success criteria for vegetation, with an average of 220 stems/acre. Success criteria requires 320 stems/acre at year three (See Table A). Multiple factors are involved including areas of over-abundant hydrology, dense herbaceous vegetation, and some upland areas of poor soil.

Table A. Success Criteria

Streams
• All streams must maintain an Ordinary High-Water Mark (OHWM), per RGL 05-05. • Continuous surface flow must be documented in intermittent reaches each year for at least 30 consec days. • Bank height ratio (BHR) cannot exceed 1.2 at any measured cross-section. • BHR at any measure riffle cross-section should not change by more than 10% from baseline condition during any given monitoring period. • The stream shall remain stable, and all other performance standards shall be met through four separate bankfull events, occurring in separate years, during the monitoring years 1-7. • Intermittent streams will demonstrate at least 30-days consecutive flow.
Wetland Hydrology
• Annual saturation or inundation within the upper 12 inches of the soil surface for, at a minimum, 12 percent of the growing season during average climatic conditions.
Vegetation
• Within planted portions of the Site, a minimum of 320 stems per acre must be present at year 3; a minimum of 260 stems per acre must be present at year 5; and a minimum of 210 stems per acre must be present at year 7. • Trees must average 6 feet in height at year 5 and 8 feet in height at year 7 in each plot. • Planted and volunteer stems are counted, provided they are included in the approved planting list for the Site; natural recruits not on the planting list may be considered by the IRT on a case-by-case basis. • Areas of herbaceous vegetation establishment will have a minimum of four species present.

Table B. Vegetation Success Criteria from Approved Mit. Plan (2021) and Approved Supplement (2022)

Vegetation Parameters				
Parameter	**Method**	**Schedule/Frequency**	**Number/Extent**	**Data Collected/Reported**
Vegetation establishment and vigor	Permanent veg plots 0.0247 acres (100 square meters) in size; *CVS-EEP Protocol for Recording Vegetation*, *Version 4.2* (Lee et al. 2008)	As-built, Years 1, 2, 3, 5, and 7	16 plots & three (3) random transects spread across the Site	Species, height, planted vs. volunteer, stems/acre

2 PLANTING, MONITORING, AND MAINTENANCE TO DATE

2.1 MY0 Summary for Vegetation

The site was planted with 18,850 bare root stems plus 2,500 live stakes on January 13, 2022. The streamside zone was planted at a density of 2,720 stems/acre while the rest of the site was planted at 680 stems/acre. This initial effort included nineteen species of bare root. Please note that during the MY0 review process the IRT approved four species not listed in the mitigation plan for inclusion in the planted stem count.

The MY0 vegetative survey was completed on February 1, 2022. Monitoring resulted in a sitewide stem density average of 688 planted stems per acre, well above the interim requirement of 320 stems per acre required at MY3. Additionally, all 16 fixed vegetation plots met the interim success criteria. See Appendix A for complete MY0 vegetation data.

2.2 MY1 Summary for Vegetation

The MY1 vegetative survey was completed between September 14 and November 8, 2022. Measurements of all 16 permanent plots and three (3) temporary plots resulted in an average of 300 planted stems/acre. Additionally, 9 of the 19 individual plots met success criteria during MY1. See Appendix B.

Maintenance included removal of a shed from within the easement, supplemental boundary marking, and targeted invasive treatment of several species found as small patches or individual stems. A supplemental planting was conducted on March 14, 2023 over 2.67 acres of the site with 1,800 bare-root stems. The area included the 0.107-acre area of encroachment noted in the MY1 monitoring report.

2.3 MY2 Preliminary Vegetation Data

A preliminary vegetation survey was completed 6/28/2023 to assess vegetative conditions and allow the development of an adaptive management plan based on the low stem counts observed in MY1. Sitewide the average tree density was found to be 220 stems/acre. This survey included all permanent plots as well as ten random transects and nine herbaceous diversity plots.

Tree density continues to be an issue, with only three of ten temporary transects meeting success criteria and only eight of sixteen permanent plots meeting density requirements. However, all nine herbaceous plots were found to be meeting success criteria for diversity (minimum four species) and coverage. As indicated in the mitigation plan, up to 20% of the site was expected to be herbaceous dominated wetlands lacking in tree cover. See Appendix C for complete data.

Maintenance in 2023 to date has included additional boundary marking and invasive treatments. There are no significant areas where invasive species are a notable issue. There are also no notable issues from other pests such as beavers or deer.

3 PROPOSED ADAPTIVE MANAGEMENT ACTIONS

After receiving the preliminary data RS staff walked the site thoroughly to better identify the causes of low tree survival. Overall the vegetation on the site looks great. The floodplain herbaceous vegetation is lush and diverse, including both species from the seedbank and planted species. Some floodplain areas are especially wet as expected. The upland areas are also supporting a diverse though less dense herbaceous layer, and the areas of heavy cut/fill are continuing to fill in with herbaceous cover and supporting some planted woody stems. There are also numerous volunteer tree stems around the uplands and floodplain margins (mostly tulip poplar and white pine).

Unfortunately, the woody stem count is disappointingly low and does not meet success criteria. Even surviving live stakes appear to be sparse, though stream banks are well stabilized by herbaceous cover. Competition and shading are definitely an issue, particularly in the floodplain. However most planted species can be found and are becoming established in suitable niches across the site. The upland areas are more on track based on the reduced herbaceous competition and more abundant volunteer stems.

To bring the site back on track additional planting is needed. RS proposes to plant additional stock this winter across the entire restoration area to ensure the density and vigor requirements are met.

3.1 SUPPLEMENTAL PLANTINGS

A. **BARE ROOTS**: RS proposes to plant 2,600 additional bare root stems in winter 2023-2024. This planting will focus on the floodplain and stream-side assemblage, but will also encompass the lower portions of the adjacent slopes. Total planted area will include approximately 13 acres, adding an additional 200 stems/acre to the planted areas. While this exceeds the necessary density it will provide additional onsite diversity and allow a reasonable buffer for tree mortality as monitoring continues. Species from the approved mitigation plan will be used.

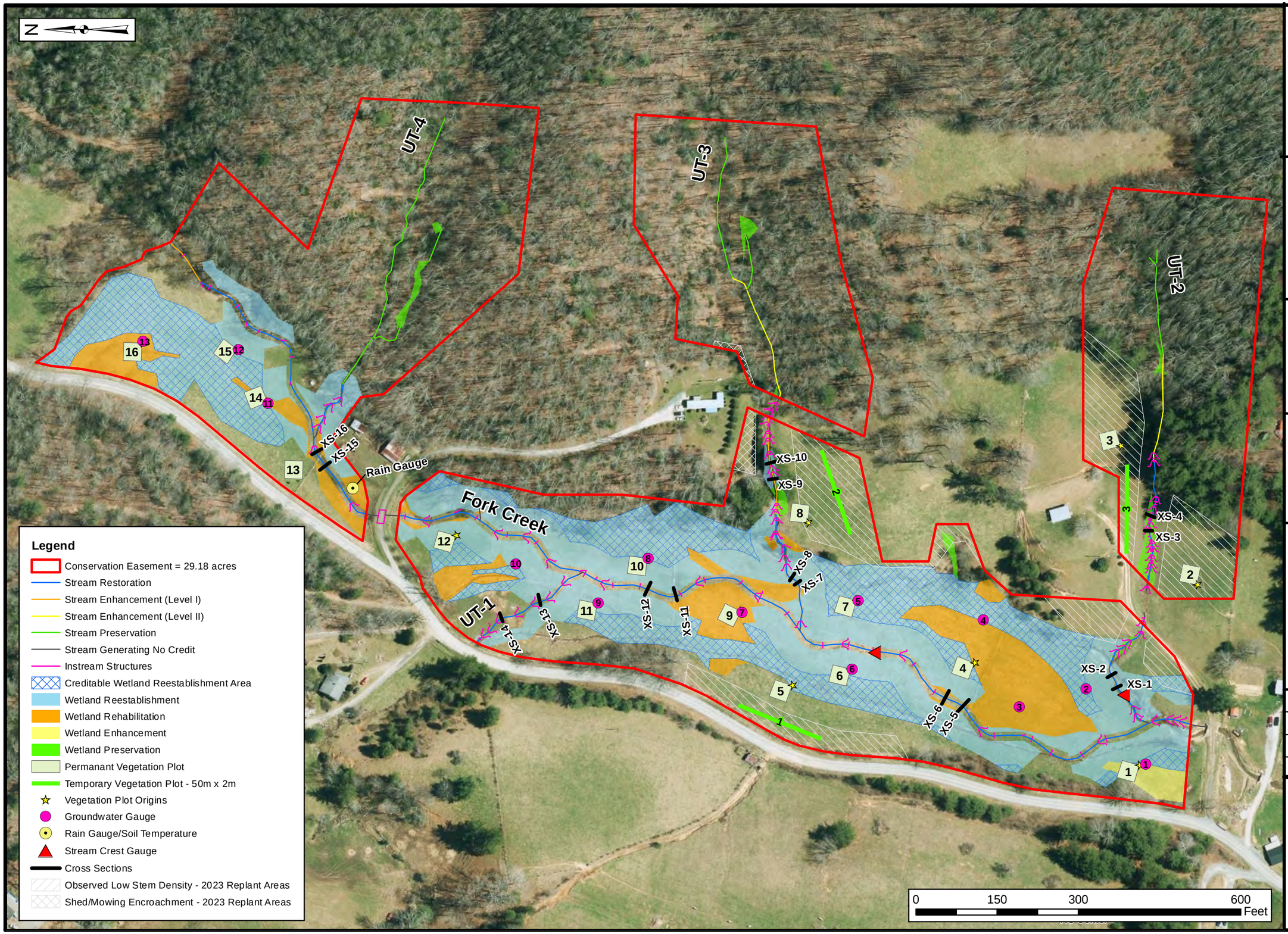
#	Species	Common
500	*Alnus serrulata*	Smooth alder
400	*Betula lenta*	Sweet birch
300	*Celtis laevigata*	Sugarberry
400	*Cornus amomum*	Silky dogwood
800	*Nyssa sylvatica*	Black gum
200	*Diospyros virginiana*	Persimmon
2,600		

B. LIVE STAKES: RS proposes to plant 1,000 live stakes in winter 2023-2024. The live stakes will be planted streamside and in areas of exceptional hydrology where herbaceous openings are expected to persist and will consist primarily of shrubby species, including button bush, elderberry, willow, ninebark, alder, and silky dogwood.

C. CONTAINERS: RS proposes to plant 150 one-gallon containerized trees, focusing the effort in upland portions of the site with especially challenging soil conditions. These upland areas overlap with the earlier replant, and while those plots are largely meeting success criteria today RS anticipates additional challenges in tree growth and vigor in those areas compared to the rest of the site. Species may include: *Tilia americana (*basswood*), Amelanchier arborea(*serviceberry*)*, *Quercus rubra (*red oak*), Quercus alba (*white oak*), Quercus coccinea (*scarlet oak*)*, and other species from the approved mitigation plan.

Appendix A

MY0 Data



Legend

- Conservation Easement = 29.18 acres
- Stream Restoration
- Stream Enhancement (Level I)
- Stream Enhancement (Level II)
- Stream Preservation
- Stream Generating No Credit
- Instream Structures
- Creditable Wetland Reestablishment Area
- Wetland Reestablishment
- Wetland Rehabilitation
- Wetland Enhancement
- Wetland Preservation
- Permanant Vegetation Plot
- Temporary Vegetation Plot - 50m x 2m
- Vegetation Plot Origins
- Groundwater Gauge
- Rain Gauge/Soil Temperature
- Stream Crest Gauge
- Cross Sections
- Observed Low Stem Density - 2023 Replant Areas
- Shed/Mowing Encroachment - 2023 Replant Areas

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

MY0 CURRENT CONDITIONS PLAN VIEW

Notes:

1. Background Imagery Source: 2018 aerial photography provided by the NC OneMap program (online, provided by the NC Geographic Information Coordination Council)

Drawn by:	PHP
Date:	NOV 2022
Scale:	1:2000
Project No.:	19-006

FIGURE

1

Table F. As-Built Planted Species and Stems

Vegetation Association		Montane Alluvial Forest*		Acidic Cove Forest*		Stream-side Assemblage**		TOTAL
Area (acres)		9.0		4.7		2.5		16.2
Species	Indicator Status	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted
~~Basswood (*Tilia americana*)~~	~~FACU~~	~~100~~	~~2%~~	~~200~~	~~6%~~	~~-~~	~~-~~	~~300~~
Cherry birch *(Betula lenta*)	FACU	~~100~~ 500	~~2%~~ 8%	~~400~~ 600	~~13%~~ 18.75%	~~500~~ 1500	~~7%~~ 15.96%	~~1000~~ 2600
Eastern hemlock (*Tsuga canadensis*)	FACU	~~100~~ 400	~~2%~~ 6.4%	~~100~~ 600	~~3%~~ 18.75%	--	--	~~200~~ 1000
Red oak (*Quercus rubra*)	FACU	~~500~~ 650	10.4%	~~300~~ 650	~~9%~~ 20.31%	--	--	~~300~~ 1300
~~White ash (Fraxinus americana)~~	~~FACU~~	~~100~~	~~2%~~	~~300~~	~~9%~~	~~--~~	~~--~~	~~400~~
White oak (*Quercus alba*)	FACU	~~100~~ 550	~~2%~~ 8.8%	~~400~~	~~13%~~	550	5.85%	~~500~~ 1100
White pine (*Pinus strobus*)	FACU	~~300~~ 600	~~2%~~ 9.6%	~~400~~	~~13%~~	--	--	~~500~~ 600
Yellow birch *(Betula alleghaniensis*)	FACU	~~100~~ 200	~~2%~~ 3.2%	~~300~~	~~9%~~	~~500~~ 300	~~7%~~ 3.19%	~~900~~ 500
~~Black gum (Nyssa sylvatica)~~	~~FAC~~	~~600~~	~~10%~~	~~100~~	~~3%~~	~~500~~	~~7%~~	~~1200~~
~~Persimmon (Diospyros virginiana)~~	~~FAC~~	~~200~~	~~3%~~	~~300~~	~~9%~~	~~--~~	~~--~~	~~500~~
Scarlet oak (*Quercus coccinea*)	FAC	~~200~~ 600	~~3%~~ 9.6%	~~100~~ 500	~~3%~~ 15.63%	--	--	~~300~~ 1100
~~Shadbush (Amelanchier arborea)~~	~~FAC~~	~~100~~	~~2%~~	~~--~~	~~--~~	~~400~~	~~6%~~	~~500~~
Tulip poplar (*Liriodendron tulipifera*)	FAC	~~600~~ 450	~~10%~~ 7.2%	~~200~~ 600	~~6%~~ 18.75%	~~500~~ 1100	~~7%~~ 11.70%	~~1300~~ 2150
~~American elm (Ulmus americana)~~	~~FACW~~	~~600~~	~~10%~~	~~100~~	~~3%~~	~~500~~	~~7%~~	~~1200~~
~~Hackberry (Celtis laevigata)~~	~~FACW~~	~~600~~	~~10%~~	~~--~~	~~--~~	~~500~~	~~7%~~	~~1100~~
River birch (*Betula nigra*)	FACW	~~600~~ 500	~~10%~~ 8%	--	--	~~500~~ 950	~~7%~~ 10.10%	~~1100~~ 1450
~~Swamp chestnut oak (Quercus michauxii)~~	~~FACW~~	~~600~~	~~10%~~	~~--~~	~~--~~	~~400~~	~~6%~~	~~1000~~
Sycamore (*Platanus occidentalis*)	FACW	600	~~10%~~ 9.6%	--	--	~~500~~ 1500	~~7%~~ 15.96%	~~1100~~ 2100
~~Tag alder (Alnus serrulata)~~	~~FACW~~	~~300~~	~~5%~~	~~--~~	~~--~~	~~400~~	~~6%~~	~~700~~
Silky dogwood (*Cornus amomum*)	FACW	~~200~~	~~3%~~	--	--	~~400~~ 600***	~~6%~~ 6.38%	600
Black willow (*Salix nigra*)	OBL	~~300~~	~~5%~~	--	--	~~400~~ 800***	~~6%~~ 8.51%	800
Elderberry (*Sambucus nigra*)	OBL	--	--	--	--	400***	~~6%~~ 4.26%	400
Buttonbush (*Cephalanthus occidentalis*)	OBL	--	--	--	--	400***	~~6%~~ 4.26%	400
^Common ninebark (*Physocarpus opulifolius*)	FACW	--	--	--	--	300***	3.19%	300
^Arrowwood viburnum (*Viburnum dentatum*)	FAC	400	6.4%			400	4.26%	800
^Bitternut hickory (*Carya cordiformis*)	FACU	800	12.8%					800
^American hazelnut (*Corylus americana*)	FACU					600	6.38%	600
^Red spruce (*Picea rubens*)	FACU			250	7.81%			250
TOTAL		~~6200~~ **6250**	**100%**	**3200**	**100%**	~~6800~~ **9400**	**100%**	~~**16200**~~ **18850**

^Species Added

* Planted at a density of 680 stems/acre.

** Planted at a density of 2720 stems/acre.

*** These species were live staked and planted along the stream channels – Total of 2500 live stakes were planted in addition to the 6900 bare-root Stream-Side Assemblage planting.

Table 7. Planted Vegetation Totals
Laurel Springs Stream and Wetland Mitigation Site

Plot #	Planted Stems/Acre	Success Criteria Met?
1	648	Yes
2	810	Yes
3	364	Yes
4	1093	Yes
5	769	Yes
6	364	Yes
7	810	Yes
8	810	Yes
9	810	Yes
10	688	Yes
11	729	Yes
12	567	Yes
13	607	Yes
14	688	Yes
15	648	Yes
16	607	Yes
Average Planted Stems/Acre	**688**	**Yes**

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool

Planted Acreage	16.2
Date of Initial Plant	2022-01-12
Date(s) of Supplemental Plant(s)	
Date(s) Mowing	
Date of Current Survey	2022-02-01
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC													1	1				
	Betula lenta	sweet birch	Tree	FACU	1	1					2	2							1	1		
	Betula nigra	river birch	Tree	FACW	10	10					3	3										
	Betula sp.						1	1			2	2	2	2	5	5	7	7	4	4	4	4
	Liriodendron tulipifera	tuliptree	Tree	FACU	2	2	4	4	3	3	2	2	2	2							8	8
	Other												1	1							1	1
	Pinus strobus	eastern white pine	Tree	FACU			1	1	4	4	4	4							1	1		
	Platanus occidentalis	American sycamore	Tree	FACW							6	6	1	1			1	1	5	5	2	2
	Quercus alba	white oak	Tree	FACU																		
	Quercus coccinea	scarlet oak	Tree								1	1					2	2				
	Quercus nigra	water oak	Tree	FAC															3	3		
	Quercus rubra	northern red oak	Tree	FACU																		
	Quercus sp.						12	12			2	2	3	3	2	2	1	1	4	4	3	3
	Tsuga canadensis	eastern hemlock	Tree	FACU			1	1	2	2			4	4					2	2		
Sum	Performance Standard				13	13	19	19	9	9	22	22	13	13	7	7	12	12	20	20	18	18
Post Mitigation Plan Species	**Carya cordiformis**	**bitternut hickory**	**Tree**	**FACU**			**1**	**1**			**4**	**4**	**5**	**5**	**1**	**1**						
	Corylus americana	**American hazelnut**	**Shrub**	**FACU**													**7**	**7**			**1**	**1**
	Viburnum dentatum	**southern arrowwood**	**Tree**	**FAC**	**3**	**3**					**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**			**1**	**1**
Sum	Proposed Standard				16	16	20	20	9	9	27	27	19	19	9	9	20	20	20	20	20	20
Mitigation Plan Performance Standard	Current Year Stem Count					13		19		9		22		13		7		12		20		18
	Stems/Acre					364		648		364		891		526		202		445		810		729
	Species Count					3		5		3		8		6		2		5		7		5
	Dominant Species Composition (%)					77		63		44		27		31		71		58		25		44
	Average Plot Height (ft.)					2		1		1		1		1		2		2		1		1
	% Invasives					0		0		0		0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					16		20		9		27		19		9		20		20		20
	Stems/Acre					486		688		364		1093		769		283		769		810		810
	Species Count					4		6		3		10		8		4		7		7		7
	Dominant Species Composition (%)					63		60		44		22		26		56		35		25		40
	Average Plot Height (ft.)					2		1		1		1		1		1		1		1		1
	% Invasives					0		0		0		0		0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)

Acreage	16.2
Plant	2022-01-12
Supplemental	
Date(s) Mowing	
Survey	2022-02-01
(ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 F		Veg Plot 13 F		Veg Plot 14 F		Veg Plot 15 F		Veg Plot 16 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC																	
	Betula lenta	sweet birch	Tree	FACU																	
	Betula nigra	river birch	Tree	FACW									1	1	3	3	7	7			
	Betula sp.				4	4			3	3	4	4	3	3			3	3		1	
	Liriodendron tulipifera	tuliptree	Tree	FACU	1	1			5	5	1	1	2	2	4	4	3	3		1	
	Other																				
	Pinus strobus	eastern white pine	Tree	FACU																	1
	Platanus occidentalis	American sycamore	Tree	FACW	2	2					6	6	2	2	1	1	2	2			
	Quercus alba	white oak	Tree	FACU															2		
	Quercus coccinea	scarlet oak	Tree																		
	Quercus nigra	water oak	Tree	FAC																	
	Quercus rubra	northern red oak	Tree	FACU																2	
	Quercus sp.				3	3	2	2	2	2	2	2	1	1	3	3			1	1	
	Tsuga canadensis	eastern hemlock	Tree	FACU									1	1	2	2					
Sum	Performance Standard				10	10	2	2	10	10	13	13	10	10	13	13	15	15	3	5	1
Post Mitigation Plan Species	**Carya cordiformis**	**bitternut hickory**	**Tree**	**FACU**	**1**	**1**			**4**	**4**											
	Corylus americana	**American hazelnut**	**Shrub**	**FACU**	**2**	**2**	**3**	**3**			**2**	**2**	**2**	**2**	**2**	**2**					
	Viburnum dentatum	**southern arrowwood**	**Tree**	**FAC**	**4**	**4**	**13**	**13**					**5**	**5**	**1**	**1**					
Sum	Proposed Standard				17	17	18	18	14	14	15	15	17	17	16	16	15	15	3	5	1
Mitigation Plan Performance Standard	Current Year Stem Count					10		2		10		13		10		13		15	3	5	1
	Stems/Acre					405		40		405		526		405		526		607	81	202	40
	Species Count					4		1		3		4		6		5		4	2	4	1
	Dominant Species Composition (%)					40		100		50		46		30		31		47	67	40	100
	Average Plot Height (ft.)					1		1		1		1		2		1		2	1	1	3
	% Invasives					0		0		0		0		0		0		0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					17		18		14		15		17		16		15	3	5	1
	Stems/Acre					688		688		567		607		688		648		607	81	202	40
	Species Count					7		3		4		5		8		7		4	2	4	1
	Dominant Species Composition (%)					12		72		36		40		29		25		47	67	40	100
	Average Plot Height (ft.)					2		2		1		1		2		1		2	1	1	3
	% Invasives					0		0		0		0		0		0		0	0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

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3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Appendix B

MY1 Data

N

UT-4

UT-5

UT-3

UT-3A

UT-2A

UT-2

Fork Creek

UT-1

XS-16

XS-15

XS-14

XS-13

XS-12

XS-11

XS-10

XS-9

XS-8

XS-7

XS-6

XS-5

XS-4

XS-3

XS-2

XS-1

Rain Gauge

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Legend

- Conservation Easement = 29.18 acres
- Stream Restoration
- Stream Enhancement (Level I)
- Stream Enhancement (Level II)
- Stream Preservation
- Stream Generating No Credit
- Instream Structures
- Creditable Wetland Reestablishment Area
- Wetland Reestablishment
- Wetland Rehabilitation
- Wetland Enhancement
- Wetland Preservation
- Permanent Vegetation Plots Meeting MY3 Stem Density Requirements
- Permanent Vegetation Plots Not Meeting MY3 Stem Density Requirements
- Temporary Vegetation Plots (50m x 2m) Meeting MY3 Stem Density Requirement
- Temporary Vegetation Plots (50m x 2m) Not Meeting MY3 Stem Density Requirement
- Vegetation Plot Origins
- Groundwater Gauges Meeting Success Criteria
- Groundwater Gauges Not Meeting Success Criteria
- Rain Gauge/Soil Temperature
- Stream Crest Gauge
- Cross Sections
- Permanent Photo Point Locations
- Observed Low Stem Density - 2023 Replant Areas
- Shed/Mowing Encroachment - 2023 Replant Areas

0 150 300 600 Feet

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

MY1 CURRENT CONDITIONS PLAN VIEW

Notes:

1. Background Imagery Source: 2022 aerial photography provided by the NC OneMap program (online, provided by the NC Geographic Information Coordination Council)

Drawn by:	PHP
Date:	FEB 2023
Scale:	1:2000
Project No.:	19-006

FIGURE

1

Table 6A. Planted Bare Root Woody Vegetation
Laurel Springs Mitigation Site

Vegetation Association		Montane Alluvial Forest*		Acidic Cove Forest*		Stream-side Assemblage**		TOTAL
Area (acres)		9.0		4.7		2.5		16.2
Species	Indicator Status	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted
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Eastern hemlock (*Tsuga canadensis*)	FACU	400	6.4%	600	18.75%	--	--	1000
Red oak (*Quercus rubra*)	FACU	650	10.4%	650	20.31%	--	--	1300
White oak (*Quercus alba*)	FACU	550	8.8%			550	5.85%	1100
White pine (*Pinus strobus*)	FACU	600	9.6%			--	--	600
Yellow birch *(Betula alleghaniensis*)	FACU	200	3.2%			300	3.19%	500
Scarlet oak (*Quercus coccinea*)	FAC	600	9.6%	500	15.63%	--	--	1100
Tulip poplar (*Liriodendron tulipifera*)	FAC	450	7.2%	600	18.75%	1100	11.70%	2150
River birch (*Betula nigra*)	FACW	500	8%	--	--	950	10.10%	1450
Sycamore (*Platanus occidentalis*)	FACW	600	9.6%	--	--	1500	15.96%	2100
Silky dogwood (*Cornus amomum*)	FACW			--	--	600***	6.38%	600
Black willow (*Salix nigra*)	OBL			--	--	800***	8.51%	800
Elderberry (*Sambucus nigra*)	OBL	--	--	--	--	400***	4.26%	400
Buttonbush (*Cephalanthus occidentalis*)	OBL	--	--	--	--	400***	4.26%	400
^Common ninebark (*Physocarpus opulifolius*)	FACW	--	--	--	--	300***	3.19%	300
^Arrowwood viburnum (*Viburnum dentatum*)	FAC	400	6.4%			400	4.26%	800
^Bitternut hickory (*Carya cordiformis*)	FACU	800	12.8%					800
^American hazelnut (*Corylus americana*)	FACU					600	6.38%	600
^Red spruce (*Picea rubens*)	FACU			250	7.81%			250
TOTAL		**6250**	**100%**	**3200**	**100%**	**9400**	**100%**	**18850**

^Species added post-mitigation plan approval

* Planted at a density of 680 stems/acre.

** Planted at a density of 2720 stems/acre.

*** These species were live staked and planted along the stream channels – A total of 2500 live stakes were planted in addition to the 6900 bare-root Stream-Side Assemblage planting.

Table 7. Planted Vegetation Totals
Laurel Springs Stream and Wetland Mitigation Site

Plot #	Planted Stems/Acre	Success Criteria Met?
1	81	No
2	526	Yes
3	364	Yes
4	891	Yes
5	364	Yes
6	0	No
7	445	Yes
8	648	Yes
9	40	No
10	283	No
11	405	Yes
12	324	Yes
13	202	No
14	202	No
15	243	No
16	162	No
T1	81	No
T2	324	Yes
T3	121	No
Average Planted Stems/Acre	**300**	**No**

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool

Planted Acreage	16.2
Date of Initial Plant	2022-01-13
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-11-08
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/S hrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC							2	2					2	2	1	1		
	Betula nigra	river birch	Tree	FACW							2	2										
	Betula sp.										1	1							2	2		
	liriodendron tulipifera																					
	Liriodendron tulipifera	tuliptree	Tree	FACU	1	1	5	5	4	4	1	1	2	2					1	1		
	Pinus strobus	eastern white pine	Tree	FACU					4	4	3	3							1	1		
	Platanus occidentalis	American sycamore	Tree	FACW							4	4	1	1			1	1	4	4		
	Quercus alba	white oak	Tree	FACU									1	1								
	Quercus coccinea	scarlet oak	Tree								1	1					1	1				
	Quercus nigra	water oak	Tree	FAC															1	1		
	Quercus rubra	northern red oak	Tree	FACU			1	1									2	2	2	2		
	Quercus sp.						8	8			3	3					3	3	2	2	3	3
	Tsuga canadensis	eastern hemlock	Tree	FACU					1	1			1	1					2	2		
Sum	Performance Standard				1	1	14	14	9	9	17	17	5	5	0	0	9	9	16	16	3	3
Post Mitigation Plan Species	Carya cordiformis	bitternut hickory	Tree	FACU							4	4	3	3								
	Corylus americana	American hazelnut	Shrub	FACU													2	2				
	Viburnum dentatum	southern arrowwood	Tree	FAC	2	2					1	1	1	1								
Sum	Proposed Standard				3	3	14	14	9	9	22	22	9	9	0	0	11	11	16	16	3	3
Mitigation Plan Performance Standard	Current Year Stem Count					1		14		9		17		5		0		9		16		3
	Stems/Acre					40		526		364		688		202		0		364		648		40
	Species Count					1		3		3		8		4		0		5		9		1
	Dominant Species Composition (%)					100		57		44		18		33		0		27		25		100
	Average Plot Height (ft.)					1		1		1		1		1				1		1		1
	% Invasives					0		0		0		0		0				0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					3		14		9		22		9		0		11		16		3
	Stems/Acre					81		526		364		891		364		0		445		648		40
	Species Count					2		3		3		10		6		0		6		9		1
	Dominant Species Composition (%)					67		57		44		18		33		0		27		25		100
	Average Plot Height (ft.)					2		1		1		1		1				1		1		1
	% Invasives					0		0		0		0		0				0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 8. Vegetation Plot Data Table from Vegetation Data Entry Tool (continued)

Planted Acreage	16.2
Date of Initial Plant	2022-01-13
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-11-08
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 F		Veg Plot 13 F		Veg Plot 14 F		Veg Plot 15 F		Veg Plot 16 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC			2	2			2	2									
	Betula nigra	river birch	Tree	FACW											1	1	1	1			
	Betula sp.								2	2										1	
	liriodendron tulipifera																			1	
	Liriodendron tulipifera	tuliptree	Tree	FACU	1	1			3	3			2	2	2	2	1	1		2	1
	Pinus strobus	eastern white pine	Tree	FACU																	4
	Platanus occidentalis	American sycamore	Tree	FACW	1	1					5	5			1	1	3	3			
	Quercus alba	white oak	Tree	FACU															2		
	Quercus coccinea	scarlet oak	Tree																		
	Quercus nigra	water oak	Tree	FAC																	
	Quercus rubra	northern red oak	Tree	FACU																3	
	Quercus sp.				1	1	1	1	2	2					1	1			1	1	
	Tsuga canadensis	eastern hemlock	Tree	FACU																	
Sum	Performance Standard				3	3	3	3	7	7	7	7	2	2	5	5	5	5	3	8	5
Post Mitigation Plan Species	Carya cordiformis	bitternut hickory	Tree	FACU	1	1			1	1											
	Corylus americana	American hazelnut	Shrub	FACU									1	1							
	Viburnum dentatum	southern arrowwood	Tree	FAC	3	3	11	11					2	2	1	1					
Sum	Proposed Standard				7	7	14	14	8	8	7	7	5	5	6	6	5	5	3	8	5
Mitigation Plan Performance Standard	Current Year Stem Count					3		3		7		7		2		5		5	3	8	5
	Stems/Acre					121		121		283		202		81		202		162	81	324	121
	Species Count					3		2		3		2		1		4		3	2	5	2
	Dominant Species Composition (%)					43		79		38		71		40		33		60	67	38	80
	Average Plot Height (ft.)					2		1		2		2		1		2		1	1	1	1
	% Invasives					0		0		0		0		0		0		0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					7		14		8		7		5		6		5	3	8	5
	Stems/Acre					283		405		324		202		202		243		162	81	324	121
	Species Count					5		3		4		2		3		5		3	2	5	2
	Dominant Species Composition (%)					43		79		38		71		40		33		60	67	38	80
	Average Plot Height (ft.)					2		2		1		2		2		2		1	1	1	1
	% Invasives					0		0		0		0		0		0		0	0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

November 30, 2022

Restoration Systems, LLC
1101 Haynes St. Suite 211
Raleigh, North Carolina
Ph: (919) 755-9490
Fx: (919) 755-9492

Kimberly Isenhour
Mitigation Project Manager, Regulatory Division
U.S. Army Corps of Engineers

Subject: Laurel Springs Mitigation Site – Remedial Planting Plan (Q1-2023)
DMS Project ID No. 100122; Full Delivery Contract No. 7890; RFP No. 16-007725 (Issuance Date 11/13/2018)
USACE Action ID No. SAW-2019-00835; DWR Project No. 2019-0865

Mrs. Isenhour,

During the 2022 growing season, Restoration Systems (RS) has observed areas of low stem densities at the Laurel Springs Mitigation Site (Site). Observed areas total 2.67 acres, which includes a 0.107-acre area of encroachment – see attached remedial planting figure. The encroachment area was partially due to a storage shed left within the easement used by the adjacent landowner. RS worked with the neighbor to remove the shed and cleared the area of all debris. Additionally, 6-inch treated fence posts were used to delineate the easement boundary in this area. A new shed was erected approximately 15 feet from the easement.

RS has ordered trees to replant the 2.67 acres at a density of 670 stems per acre. The replant areas are within the Acidic Cove Forest Association. The following species and quantities were secured for Q1-2023 planting.

Targeted Vegetation Associations: Acidic Cove Forest
Area of Replant: 2.67 Acres

Species	Indicator Status	Number of Stems
American elm (*Ulmus americana*)	FACW	600
White Oak (*Quercus alba*)	FACU	600
Persimmon (*Diospyros virginiana*)	FAC	600
Total		**1,800**

These species were listed within the approved mitigation plan but not planted within the Acidic Cove vegetation association during initial planting. These three species will add to the six species planted during initial planting for nine total species within the Acidic Cove vegetation association.

RS recognizes that additional "diversity plantings" may be desired by the IRT, and we welcome the opportunity to discuss a diversity planting effort with the IRT. RS will contact Andrea Leslie and Erin Davis in Q1-2023 to discuss this effort.

Please let me know if you have any questions or if I can provide any additional information.

Sincerely,

Raymond Holz
Operations Manager
Restoration Systems, LLC

Attachment – Remedial Planting Plan Figure

Ray Holz

From: Isenhour, Kimberly T CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>
Sent: Friday, December 09, 2022 10:08 AM
To: Ray Holz
Cc: Wiesner, Paul; Haywood, Casey M CIV USARMY CESAW (USA)
Subject: RE: Request for Additional Information/ NCDMS Laurel Springs Mitigation Site As-Built/ SAW-2019-00835/ Avery County

Follow Up Flag: Follow up
Flag Status: Completed

Hi Ray,
Thanks for the follow-up. In general, the IRT does not have any concerns with the Remedial Planting Plan or counting the bare root species towards success. WRC and DWR request that you contact them if you plan to supplement understory/shrub species next year. They would like to encourage diversity out there. Andrea Leslie did mention that American Hazelnut is not a typical riparian species and is often found on hillslopes. This species may not do well in the riparian zone. She would recommend Witch Hazel as an alternative. She also noted that Red Spruce is very elevation specific and survives in elevations in excess of 4,000 feet.
Thanks,
Kim

Kim Isenhour
Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers I 919.946.5107

-----Original Message-----
From: Ray Holz <rholz@restorationsystems.com>
Sent: Wednesday, November 30, 2022 4:26 PM
To: Isenhour, Kimberly T CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>; Wiesner, Paul <paul.wiesner@ncdenr.gov>
Cc: Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil>; Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>; 'erin.davis@ncdenr.gov' <erin.davis@ncdenr.gov>; bowers.todd@epa.gov; Youngman, Holland J <holland_youngman@fws.gov>; 'travis.wilson@ncwildlife.org' <travis.wilson@ncwildlife.org>; andrea.leslie@ncwildlife.org; Melonie Allen <melonie.allen@ncdenr.gov>; Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley2@usace.army.mil>; John Hamby <jhamby@restorationsystems.com>
Subject: [URL Verdict: Neutral][Non-DoD Source] RE: Request for Additional Information/ NCDMS Laurel Springs Mitigation Site As-Built/ SAW-2019-00835/ Avery County

To Kim and IRT Members -

Firstly, my personal and sincere apologies for the lack of QA/QC on not only the Laurel Springs As-Built/MY0 Baseline Report but also for the failure to appropriately updated all portions of the Mitigation Plan and with our ordering of non-approved bare-root species and quantities. I wholeheartedly believe the IRT's mitigation plan review and comment process results in a superior product, and it is never our intent to dismiss or disregard IRT's comments.

In this case, within the final/approved Mitigation Plan, RS failed to update the planting plan on Sheet L5.00 of the Construction Drawings; however, RS did apply the IRT's comments regarding the planting plan to Table 18 of the Mitigation Plan, which led to the discrepancy between the two.

During the bare-root tree ordering process, when species availability became an issue, RS staff charged with ordering trees did not notice or review the IRT's draft Mitigation Plan comments concerning the planting plan. Specifically, the IRT's request to cap the amount of Eastern hemlock planted. This mistake and the ordering of non-approved species caused us to review our bare-root tree ordering process in detail. We have established additional QA/QC measures as a result, which include:

1.) a full review of the IRT's mitigation plan comments while ordering trees by both personnel charged with ordering trees and the project manager, and

2.) if non-approved substitution species are required, or quantities of species change drastically due to a lack of availability, coordination with the IRT will occur immediately.

With that said, I have attached, as a single .pdf, the following items:

1. Response to IRT comments which includes revised MY0 Report and Recorded Drawing pages
2. A revised Mitigation Plan Amendment Request to count bare-root substitution species towards success criteria, and
3. A Remedial planting plan for areas of observed low-stem density within the Site's Acidic Cove Forest vegetation community

After discussing with Paul Wisner at DMS, we believe it would be best to allow the IRT to review the attached information and provide comments before updating the MY0 Report and re-posting the document.

If there are any items you wish to discuss with me directly, please feel free to email or call me at 919-604-9314.

Thank you for your time and patience.

Sincerely,

Raymond H.

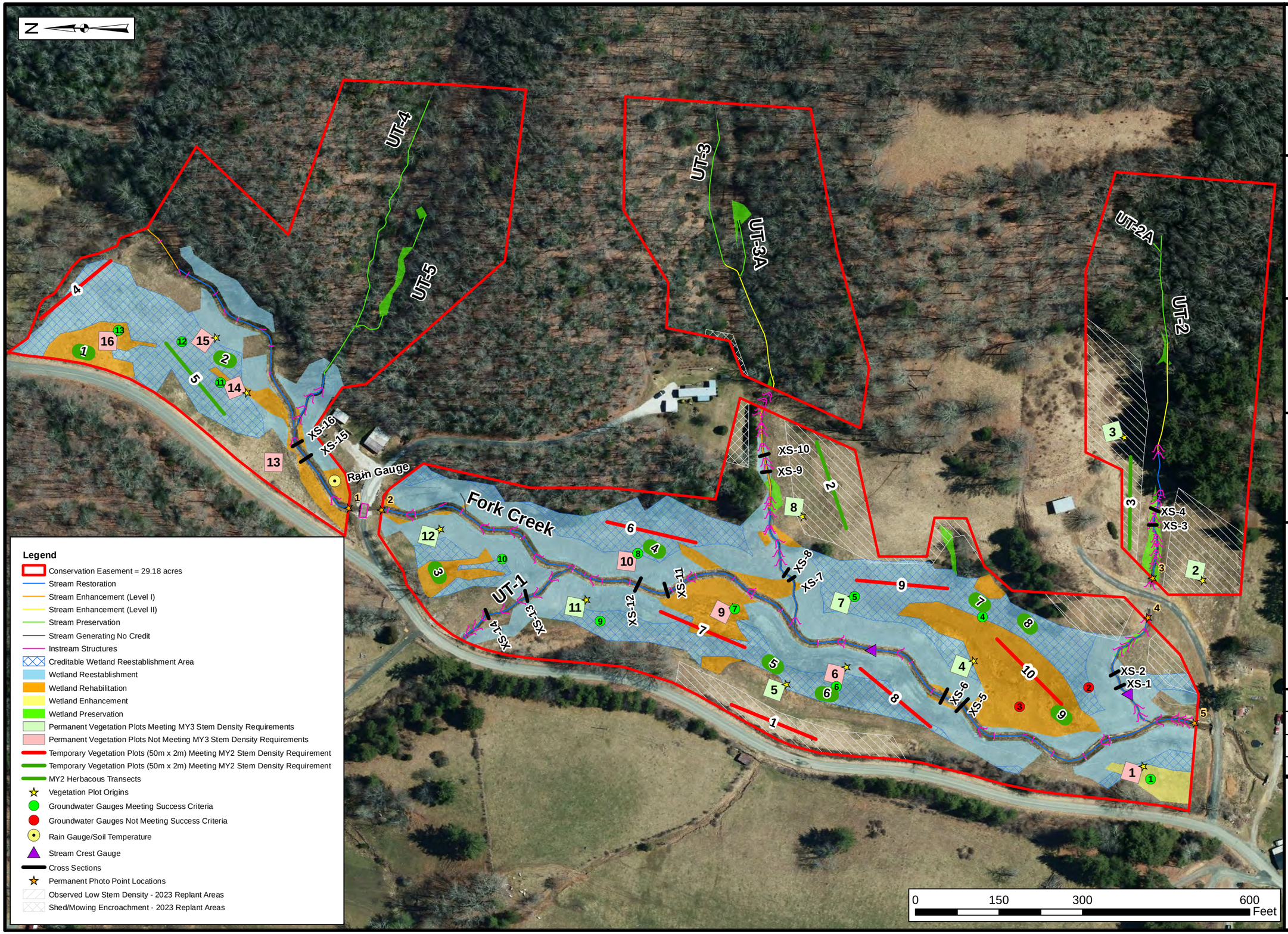
--- --- ---

Raymond J. Holz | Restoration Systems, LLC

1101 Haynes St. Suite 211 | Raleigh, NC 27604

Appendix C

MY2 Preliminary Data



Legend

- Conservation Easement = 29.18 acres
- Stream Restoration
- Stream Enhancement (Level I)
- Stream Enhancement (Level II)
- Stream Preservation
- Stream Generating No Credit
- Instream Structures
- Creditable Wetland Reestablishment Area
- Wetland Reestablishment
- Wetland Rehabilitation
- Wetland Enhancement
- Wetland Preservation
- Permanent Vegetation Plots Meeting MY3 Stem Density Requirements
- Permanent Vegetation Plots Not Meeting MY3 Stem Density Requirements
- Temporary Vegetation Plots (50m x 2m) Meeting MY2 Stem Density Requirement
- Temporary Vegetation Plots (50m x 2m) Meeting MY2 Stem Density Requirement
- MY2 Herbacous Transects
- Vegetation Plot Origins
- Groundwater Gauges Meeting Success Criteria
- Groundwater Gauges Not Meeting Success Criteria
- Rain Gauge/Soil Temperature
- Stream Crest Gauge
- Cross Sections
- Permanent Photo Point Locations
- Observed Low Stem Density - 2023 Replant Areas
- Shed/Mowing Encroachment - 2023 Replant Areas

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

MY2 EARLY CONDITIONS PLAN VIEW

Notes:

1. Background Imagery Source: 2022 aerial photography provided by the NC OneMap program (online, provided by the NC Geographic Information Coordination Council)

Drawn by:	PHP
Date:	JUNE 2023
Scale:	1:2000
Project No.:	19-009

FIGURE

1

Table 7. Planted Vegetation Totals
Laurel Springs Stream and Wetland Mitigation Site

Plot #	Planted Stems/Acre	Success Criteria Met?
1	81	No
2	364	Yes
3	405	Yes
4	769	Yes
5	486	Yes
6	0	No
7	202	No
8	567	Yes
9	40	No
10	60	No
11	83	No
12	243	No
13	202	No
14	202	No
15	243	No
16	121	No
T1	81	No
T2	324	Yes
T3	121	No
T4	243	No
T5	405	Yes
T6	324	Yes
T7	40	No
T8	40	No
T9	40	No
T10	40	No
Average Planted Stems/Acre	**220**	**No**

Planted Acreage	16.2
Date of Initial Plant	2022-01-13
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2023-06-28
Date of Current Survey	2023-06-28
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/S hrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 F		Veg Plot 13 F		Veg Plot 14 F		Veg Plot 15 F		Veg Plot 16 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R	Veg Plot 4 R	Veg Plot 5 R	Veg Plot 6 R	Veg Plot 7 R	Veg Plot 8 R	Veg Plot 9 R	Veg Plot 10 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Betula alleghaniensis	yellow birch	Tree	FAC							2	2							1	1			1	1	1	1			2	2														
	Betula nigra	river birch	Tree	FACW																											1	1						2		2				
	Betula sp.										1	1							2	2							2	2																
	Liriodendron tulipifera	tuliptree	Tree	FACU	1	1	3	3	6	6	1	1	1	1													2	2			2	2	4	4	1	1	1	6	7	7	2	2			1	1
	Morus rubra	red mulberry	Tree	FACU							4	4					1	1	1	1																								
	Pinus strobus	eastern white pine	Tree	FACU					4	4	3	3							1	1																								
	Platanus occidentalis	American sycamore	Tree	FACW									2	2					3	3			1	1					5	5			1	1	3	3				2	6	4				
	Quercus alba	white oak	Tree	FACU									3	3																								1	2			1		2		
	Quercus coccinea	scarlet oak	Tree								4	4					1	1																												
	Quercus rubra	northern red oak	Tree	FACU			1	1									3	3	3	3																		4			1				
	Quercus sp.						7	7			4	4	2	2					2	2	3	3			1	1	1	1					1	1					2						
	Tsuga canadensis	eastern hemlock	Tree	FACU					1	1			1	1					1	1																									
	Ulmus americana	American elm	Tree	FACW																																		1							
Sum	Performance Standard				1	1	11	11	11	11	19	19	9	9	0	0	5	5	14	14	3	3	2	2	2	2	5	5	7	7	2	2	7	7	4	4	1	12	13	9	11	7	0	2	1	1
Post Mitigation Plan Species	Carya cordiformis	bitternut hickory	Tree	FACU									3	3													1	1																		
	Corylus americana	American hazelnut	Shrub	FACU													1	1																												
	Viburnum dentatum	southern arrowwood	Tree	FAC	2	2																	3	3	10	10					1	1									1	3				
Sum	Proposed Standard				3	3	11	11	11	11	19	19	12	12	0	0	6	6	14	14	3	3	5	5	12	12	6	6	7	7	3	3	7	7	4	4	1	12	13	9	11	8	3	2	1	1
Mitigation Plan Performance Standard	Current Year Stem Count					1		11		11		19		9		0		5		14		3		2		2		5		7		2		7		4	1	12	13	9	11	7	0	2	1	1
	Stems/Acre					40		364		405		769		364		0		202		567		40		81		81		202		202		40		243		121	40	486	486	243	405	283	0	40	40	40
	Species Count					1		3		3		7		5		0		3		8		1		2		2		3		2		1		4		2	1	4	4	2	4	3	0	1	1	1
	Dominant Species Composition (%)					67		64		55		21		25		0		50		21		100		60		83		33		71		67		57		75	100	50	54	78	55	50	100	100	100	100
	Average Plot Height (ft.)					2		1		2		1		1				2		2		1		2		1		1		2		2		1		2	1	1	2	2	1	2		2	1	2
	% Invasives					0		0		0		0		0				0		0		0		0		0		0		0		0		0		0	0	0	0	0	0	0		0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					3		11		11		19		12		0		6		14		3		5		12		6		7		3		7		4	1	12	13	9	11	8	3	2	1	1
	Stems/Acre					81		364		405		769		486		0		243		567		40		162		324		243		202		81		243		121	40	486	486	243	405	324	40	40	40	40
	Species Count					2		3		3		7		6		0		4		8		1		3		3		4		2		2		4		2	1	4	4	2	4	4	1	1	1	1
	Dominant Species Composition (%)					67		64		55		21		25		0		50		21		100		60		83		33		71		67		57		75	100	50	54	78	55	50	100	100	100	100
	Average Plot Height (ft.)					2		1		2		1		1				2		2		1		2		2		1		2		2		1		2	1	1	2	2	1	2	2	2	1	2
	% Invasives					0		0		0		0		0				0		0		0		0		0		0		0		0		0		0	0	0	0	0	0	0	0	0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

June 2023 Herbaceous Diversity Assessment

Plot #	Species Count	Success Criteria Met?	Taxa Identified	Common
H1	4	Yes	*Juncus effusus* *Cyperus sp.* *Carex* sp. *Vernonia noveboracensis*	Soft rush Nutsedge sp. Sedge sp. Ironweed
H2	4	Yes	*Carex sp.* *Juncus effuses* *Pycnanthemum sp* *Trifolium repens*	Sedge sp. Soft rush Mountain mint White clover
H3	5	Yes	*Carex sp.* *Eupatorium perfoliatum* *Juncus effusus* *Peltandra virginica* *Pycnanthemum sp*	Sedge sp. Boneset Soft rush Green arrow arum Mountain mint
H4	6	Yes	*Juncus effusus* *Carex* sp. *Eupatorium perfoliatum* *Ranunculus sp.* *Trifolium repens* *Vernonia noveboracensis*	Soft rush Sedge sp. Boneset Buttercup White clover Ironweed
H5	5	Yes	*Carex sp.* *Cicuta maculata* *Juncus effuses* *Pycnanthemum sp* *Vernonia noveboracensis*	Sedge sp. Water hemlock Soft rush Mountain mint Ironweed
H6	4	Yes	*Carex sp.* *Juncus effusus* *Peltandra virginica* *Vernonia noveboracensis*	Sedge sp. Soft rush Green arrow arum Ironweed
H7	4	Yes	*Carex* sp. *Eupatorium perfoliatum* *Ranunculus sp.* *Trifolium repens*	Sedge sp. Boneset Buttercup White clover
H8	5	Yes	*Carex* sp. *Eupatorium perfoliatum* *Packera aurea* *Ranunculus sp.* *Trifolium repens*	Sege sp. Boneset Ragwort Buttercup White clover
H9	4	Yes	*Asclepias incarnata* *Carex sp.* *Eupatorium perfoliatum* *Juncus effusus*	Swamp milkweed Sedge sp. Boneset Soft rush

Task 1 a.) Inter-Agency Post Contract Site Visit: Site Visit Notes

Below is a list of attendees and general site visit notes.

Attendees:

USACE:
- Todd Tugwell
- Steve Kichefski

NC WRC:
- Andrea Leslie

NC DMS:
- Paul Wiesner
- Matthew Reid
- Harry Tsomides

NC DWR:
- Mac Haupt
- Maria Polizzi

Restoration Systems:
- JD Hamby

Axiom Environmental
- Grant Lewis

General Site Visit Notes:
- Vegetation adaptive management plan discussion:
  - Do not include sycamores in the 2024 replanting effort.
  - Include a map detailing the areas that will receive supplemental planting in 2024. Attached Below.
  - RS was cautioned against heavily using black willow live stakes along the channel to prevent black willows from spreading rapidly throughout the site.

Wetland Notes:
- Replace failed gauges number 2 and 3 at the bottom of the site during the winter, before the next growing season. Existing hydrology seemed to indicate the probability of collection failure, rather than reflecting a lack of soil inundation. It was also noted that RS has provided uplift to many more wetland acres than contracted due to using the with the wider buffer method calculation tool.

UT-2 Notes:
- The pipe installed in the crossing is not remaining 20% buried as is the goal. The steep nature of the channel due to site topography was determined to be the cause. RS proposed adding rock at the culvert outfall this winter and document the work with photos in the monitoring report. If this effort is unsuccessful, then rubber *"flexy baffle"* would be a possible remediation to provide cobble places to lodge in the lower reach of the pipe.

USACE Questions for October Site Visit:

1. Overall, I don't see any issues with the AMP or proposed species. It is understood that all species proposed were part of the approved mitigation plan. RS also coordinated with WRC and Erin (USACE) on species.
   Noted
2. RS mentioned a dense herbaceous layer, and poor soil on upland areas as an ongoing issue for the site. Are there any plans to do ring sprays and/or conduct any soil amendments?
   Not at this time, larger, potted plants will be planted instead.
3. The term "exceptional hydrology" was used throughout the document, is this referring to inundation?
   Yes
4. Not part of the AMP, but 2 GWG failed (2 & 3). GWG 3 is the only gauge in the large wetland rehab area at the southern end of the project.
   Noted and discussed during site visit.
5. Visit the UT1 culvert and update IRT on recently added rocks to back water up within the pipe. Is it perched/buried?
   Discussed on site and noted in the meeting minutes.

Draft AMP coordination/response:

Andrea Leslie (NCDWR) - Erin and I have reviewed the AMP. We like the planting list for the most part, and we're glad you're bringing in species that were in the mit plan but not planted. We both think that leaving white pine out of the new plantings is a good idea – you have volunteers coming in of that species and it's not the greatest riparian choice, anyway. Could you substitute persimmon instead?
Persimmon will be substituted.

Erin Davis (USACE) - I didn't see any major red flags and am generally ok with their approach and plant selection. I guess I would question why they're proposing more bareroot white pine when they note earlier numerous white pine volunteers. I would also ask that they not go crazy with willow live stakes.
Black Willow live stakes will be limited and used only in select areas of the site.

N

UT-4

UT-5

UT-3

UT-3A

UT-2A

UT-2

UT-1

Fork Creek

Legend

- Conservation Easement = 29.18 acres
- AMP Proposed Planting: Pots +/- 1.5 acres
- AMP Proposed Planting: Bare Root +/- 13 acres
- Permanent Vegetation Plots Meeting MY3 Stem Density Requirements
- Permanent Vegetation Plots Not Meeting MY3 Stem Density Requirements
- Temporary Vegetation Plots (50m x 2m) Meeting MY2 Stem Density Requirement
- Temporary Vegetation Plots (50m x 2m) Not Meeting MY2 Stem Density Requirement

0 150 300 600 Feet

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

LAUREL SPRINGS MITIGATION SITE

Avery County, NC

Title:

AMP PLANTING PLAN

Notes:

1. Background Imagery Source: 2022 aerial photography provided by the NC OneMap program (online, provided by the NC Geographic Information Coordination Council)

Drawn by:	PHP, MH
Date:	NOV 2023
Scale:	1:2000
Project No.:	19-009

FIGURE

2

From:	Leslie, Andrea J
To:	Wiesner, Paul; Steve Kichefski; Haywood, Casey M CIV USARMY CESAW (USA); Tugwell, Todd J CIV USARMY CESAW (US); Polizzi, Maria; Lewis, Grant; Wilson, Travis W.; Bowers, Todd; Youngman, Holland J
Cc:	Hamby, JD; Holz, Raymond; Tsomides, Harry; Reid, Matthew; Harrell, Matthew
Subject:	RE: [External] RE: [Non-DoD Source] Laurel Springs_DMS# 100122_USACE Action ID: SAW-2019-00835_DWR Project #: 2019-0865v1: IRT Site Visit Notes_Site Visit Date: Wednesday October 18, 2023
Date:	Tuesday, January 2, 2024 3:57:50 PM
Attachments:	image002.png image003.png image004.png image006.png image007.png

Paul and Davey folks –

I just wanted to provide a bit of input on how to install the baffles. I have seen baffles placed in straight series and also in alternate series (set to the right and left to allow a bit of sinuousity within the culvert). We think that given the size and slope of the stream, that the baffles should be placed in straight series (full width). Let me know if you would like to discuss anything further.

Andrea

Andrea Leslie
Mountain Habitat Conservation Coordinator
NC Wildlife Resources Commission
645 Fish Hatchery Rd., Building B
Marion, NC 28752
828-803-6054 (office)
828-400-4223 (cell)
www.ncwildlife.org

From: Wiesner, Paul <paul.wiesner@deq.nc.gov>
Sent: Tuesday, January 2, 2024 1:27 PM
To: Steve Kichefski <Steven.l.kichefski@usace.army.mil>; Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; Polizzi, Maria <maria.polizzi@deq.nc.gov>; Lewis, Grant <glewis@axiomenvironmental.org>; Leslie, Andrea J <andrea.leslie@ncwildlife.org>; Wilson, Travis W. <travis.wilson@ncwildlife.org>; Bowers, Todd <bowers.todd@epa.gov>; Youngman, Holland J <holland_youngman@fws.gov>
Cc: Hamby, JD <John.Hamby@davey.com>; Holz, Raymond <Raymond.Holz@davey.com>; Tsomides, Harry <harry.tsomides@deq.nc.gov>; Reid, Matthew <matthew.reid@deq.nc.gov>; Harrell, Matthew

<Matthew.Harrell@davey.com>
Subject: RE: [External] RE: [Non-DoD Source] Laurel Springs_DMS# 100122_USACE Action ID: SAW-2019-00835_DWR Project #: 2019-0865v1: IRT Site Visit Notes_Site Visit Date: Wednesday October 18, 2023

Good afternoon,

As requested, attached is Restoration System's (RS) response to the additional IRT comment provided on 11/29/2023. This will also be documented in the final MY2 (2023) report:

In an email dated 11/29/23 (See Appendix A), IRT concerns regarding the performance of the culvert in the easement break on UT-2 were highlighted, with the primary concern that the pipe was not holding a sediment bed which in turn impairs the potential passage of aquatic organisms. This culvert was installed according to the approved construction plans (see Appendix B) and has remained stable to date. No repairs have been needed or made.

Based on IRT feedback and recommendation, RS plans to install Flexi-Baffles (see Appendix C) in Q1 2024. A total of 14 baffles will be installed to provide a continuous series of pools through the culvert.

Please review the attached document for details and let us know if you any questions prior to RS completing the proposed work.

Thanks

Paul Wiesner
Western Regional Supervisor
North Carolina Department of Environmental Quality
Division of Mitigation Services
Cell: (828) 273-1673
paul.wiesner@deq.nc.gov

Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

From: Kichefski, Steven L CIV USARMY CESAW (USA) <Steven.L.Kichefski@usace.army.mil>
Sent: Wednesday, November 29, 2023 6:32 PM
To: Wiesner, Paul <paul.wiesner@deq.nc.gov>; Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; Haupt, Mac <mac.haupt@deq.nc.gov>; Polizzi, Maria <maria.polizzi@deq.nc.gov>; Lewis, Grant <glewis@axiomenvironmental.org>; Leslie, Andrea J <andrea.leslie@ncwildlife.org>; Wilson, Travis W. <travis.wilson@ncwildlife.org>; Bowers, Todd <bowers.todd@epa.gov>; Youngman, Holland J <holland_youngman@fws.gov>
Cc: Hamby, JD <John.Hamby@davey.com>; Holz, Raymond <Raymond.Holz@davey.com>; Tsomides,

Harry <harry.tsomides@deq.nc.gov>; Reid, Matthew <matthew.reid@deq.nc.gov>; Harrell, Matthew <Matthew.Harrell@davey.com>
Subject: [External] RE: [Non-DoD Source] Laurel Springs_DMS# 100122_USACE Action ID: SAW-2019-00835_DWR Project #: 2019-0865v1: IRT Site Visit Notes_Site Visit Date: Wednesday October 18, 2023

Good afternoon,
Thank you for providing the meeting minutes from our October 18, 2023, IRT site visit, including the AMP Planting Plan Figure dated Nov 2023, and the responses to the IRT comments regarding the proposed Laurel Springs Adaptive Management Plan (AMP), received August 18, 2023. The IRT has reviewed and approved the NCDMS Laurel Spring AMP. Per Section 332.8(g)(2) of the 2008 Mitigation Rule, this review followed the streamlined review process. Attached are both the AMP and the meeting minutes including IRT comment responses for reference. Please address all IRT comments as provided in my November 2, 2023 email and responded to in the meeting minutes.

One additional comment separate from the approved vegetative AMP regarding the meeting minute note about the culvert on UT-2. The IRT was concerned that the pipe was not buried in accordance with permit conditions and discussed various options including resetting the pipe, building a step pool at the pipe outlet, adding a sill at the outlet and adding baffles within the pipe. The IRT also asked whether there was any verification or photos of it being initially constructed appropriately and then sediment washing out due to slope. Please update the IRT with that response. RS was also asked to evaluate these options and update the IRT with their proposed corrective action. The meeting minutes mention adding rock at the culvert outfall this winter, but I thought some rock had already been added to the pipe outlet unsuccessfully? Is your intention to create a step pool to back water up in the pipe? Please update the IRT before this work is implemented.

Feel free to contact me with any questions.

Regards,

Steve Kichefski
Regulatory Project Manager
U.S. Army Corps of Engineers
Wilmington District, Mitigation Branch
(828)-271-7980 Ext. 4234
(828)-933-8032 cell

From: Wiesner, Paul <paul.wiesner@deq.nc.gov>
Sent: Tuesday, November 21, 2023 10:25 AM
To: Kichefski, Steven L CIV USARMY CESAW (USA) <Steven.L.Kichefski@usace.army.mil>; Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil>; Haupt, Mac <mac.haupt@deq.nc.gov>; Polizzi, Maria <maria.polizzi@deq.nc.gov>; Lewis, Grant <glewis@axiomenvironmental.org>; Leslie, Andrea J <andrea.leslie@ncwildlife.org>
Cc: Hamby, JD <John.Hamby@davey.com>; Holz, Raymond <Raymond.Holz@davey.com>; Tsomides, Harry <harry.tsomides@deq.nc.gov>; Reid, Matthew <matthew.reid@deq.nc.gov>; Harrell, Matthew <Matthew.Harrell@davey.com>
Subject: [Non-DoD Source] Laurel Springs_DMS# 100122_USACE Action ID: SAW-2019-00835_DWR Project #: 2019-0865v1: IRT Site Visit Notes_Site Visit Date: Wednesday October 18, 2023

Good morning,

The October 18, 2023, IRT site visit meeting notes for the Laurel Springs mitigation site are attached for your review.

The meeting notes address the IRT questions from the email below and include the requested supplemental planting map.

Upon your review, we look forward to receiving the IRT's formal Adaptive Management Plan (AMP) response and acceptance.

Please let us know if you have any questions, comments, or concerns.

Thanks

Paul Wiesner
Western Regional Supervisor
North Carolina Department of Environmental Quality
Division of Mitigation Services
Cell: (828) 273-1673
paul.wiesner@deq.nc.gov

Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

From: Kichefski, Steven L CIV USARMY CESAW (USA) <Steven.L.Kichefski@usace.army.mil>
Sent: Thursday, November 2, 2023 2:35 PM
To: Wiesner, Paul <paul.wiesner@deq.nc.gov>; Haywood, Casey M CIV USARMY CESAW (USA)

<Casey.M.Haywood@usace.army.mil>
Cc: Hamby, JD <John.Hamby@davey.com>; Holz, Raymond <Raymond.Holz@davey.com>
Subject: RE: [External] Notice of Adaptive Management Plan Review/ NCDMS Laurel Springs / SAW-2019-00835 / Avery County

Afternoon Paul,

Thanks to all for a good visit on the 18th, I was glad to get more familiar with this site and the project discussion make more sense having seen it in person. All of the comments/questions we had for the AMP were discussed during the visit, but I included them below for reference. Due to timing of the visit and the need for ordering plants, Erin and Andrea had previously provided some feedback to Matthew Harrell and I have included that below as well. I am waiting for the site meeting minutes before I provide the formal AMP response because it would be good to have the new planting area map they are submitting as part of the AMP review/acceptance. The project discussion about the groundwater well performance and culvert concerns were not part of the AMP which was sent out to the IRT so maybe we resolve that separately with the meeting minute response and MY report.

USACE Questions for October Site Visit:

1. Overall, I don't see any issues with the AMP or proposed species. It is understood that all species proposed were part of the approved mitigation plan. RS also coordinated with WRC and Erin (USACE) on species.
2. RS mentioned a dense herbaceous layer, and poor soil on upland areas as an ongoing issue for the site. Are there any plans to do ring sprays and/or conduct any soil amendments?
3. The term "exceptional hydrology" was used throughout the document, is this referring to inundation?
4. Not part of the AMP, but 2 GWG failed (2 & 3). GWG 3 is the only gauge in the large wetland rehab area at the southern end of the project.
5. Visit the UT1 culvert and update IRT on recently added rocks to back water up within the pipe. Is it perched/buried?

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Andrea Leslie (NCDWR) - Erin and I have reviewed the AMP. We like the planting list for the most part, and we're glad you're bringing in species that were in the mit plan but not planted. We both think that leaving white pine out of the new plantings is a good idea – you have volunteers coming in of that species and it's not the greatest riparian choice, anyway. Could you substitute persimmon instead?

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Regards,

Steve Kichefski
Regulatory Project Manager
U.S. Army Corps of Engineers
Wilmington District, Mitigation Branch
(828)-271-7980 Ext. 4234
(828)-933-8032 cell

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at https://regulatory.ops.usace.army.mil/customer-service-survey/ to complete the survey online.

From: Wiesner, Paul <paul.wiesner@deq.nc.gov>
Sent: Wednesday, November 1, 2023 11:19 AM
To: Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>; Kichefski, Steven L CIV USARMY CESAW (USA) <Steven.L.Kichefski@usace.army.mil>
Cc: Hamby, JD <John.Hamby@davey.com>; Holz, Raymond <Raymond.Holz@davey.com>
Subject: [Non-DoD Source] RE: [External] Notice of Adaptive Management Plan Review/ NCDMS Laurel Springs / SAW-2019-00835 / Avery County

Good morning Steve and Casey,

Thank you again for meeting us on October 18th at the Laurel Springs site.

RS is working on meeting minutes for the site visit, but I also wanted to check in to see if the IRT had any comments from the formal Adaptive Management Plan (AMP) review.

Thanks

Paul Wiesner
Western Regional Supervisor
North Carolina Department of Environmental Quality
Division of Mitigation Services
Cell: (828) 273-1673
paul.wiesner@deq.nc.gov

Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

From: Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>
Sent: Tuesday, August 22, 2023 12:05 PM
To: Steve Kichefski <Steven.l.kichefski@usace.army.mil>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; Isenhour, Kimberly T CIV USARMY CESAW (USA) <Kimberly.T.Isenhour@usace.army.mil>; Davis, Erin B CIV USARMY CESAW (USA) <Erin.B.Davis@usace.army.mil>; Polizzi, Maria <maria.polizzi@deq.nc.gov>; Youngman, Holland J <holland_youngman@fws.gov>; Merritt, Katie <katie.merritt@deq.nc.gov>; Bowers, Todd <bowers.todd@epa.gov>; Leslie, Andrea J <andrea.leslie@ncwildlife.org>; Wilson, Travis W. <travis.wilson@ncwildlife.org>; McHenry, David G <david.mchenry@ncwildlife.org>; Haupt, Mac <mac.haupt@deq.nc.gov>
Cc: Wiesner, Paul <paul.wiesner@deq.nc.gov>; Holz, Raymond <Raymond.Holz@davey.com>; Harrell, Matthew <Matthew.Harrell@davey.com>; Hamby, JD <John.Hamby@davey.com>
Subject: [External] Notice of Adaptive Management Plan Review/ NCDMS Laurel Springs / SAW-2019-00835 / Avery County

Good afternoon IRT,

The below referenced Adaptive Management Plan (AMP) review has been requested by NCDMS. A copy of this AMP is attached. Per Section 332.8(g)(2) of the 2008 Mitigation Rule, this review follows the streamlined review process, which requires an IRT review period of 30 calendar days. Please provide any comments by 5 PM on October 24, 2023. Comments provided after the 30-day comment deadline may not be considered. At the conclusion of this comment period, a copy of all comments will be provided to the NCIRT along with District Engineer's intent to approve or disapprove this AMP.

30 Day Comment Start: August 25, 2023

30-Day Comment Deadline: September 24, 2023

60-DE Decision: October 24, 2023

2023 is Monitoring Year 2 for this project. Upon IRT review and approval, the proposed AMP planting will be implemented in the winter of 2023/2024.

Project information:
Laurel Springs
DMS Project # 100122
RFP# 16-007725 – Issued 11/13/18
Institution Date: 5/17/2019 – Full Delivery
SAW-2019-00835
DWR# 2019-0865 v1
French Broad River Basin

Cataloging Unit 06010108
Avery County, North Carolina

Project Credits:
4,231.827 SMUs (Cold)
3.688 WMUs (Riparian)

FD Provider: Restoration Systems (RS)– Contact: Raymond Holtz, raymond.holz@davey.com , Cell: 919-604-9314
NCDEQ - DMS PM: Paul Wiesner, paul.wiesner@deq.nc.gov , (828)-273-1673

USACE POCs: USACE Bank Manager: Steve Kichefski Steven.L.Kichefski@usace.army.mil
USACE Mitigation Specialist: Casey Haywood Casey.M.Haywood@usace.army.mil

The AMP can be accessed directly on the RIBITS site here:
https://ribits.ops.usace.army.mil/ords/f?p=107:278:610475268221:::RP,278:P278_BANK_ID:5903

The AMP can be accessed directly on the DMS SharePoint site here:

IRT-DMS SharePoint Page:
https://ncconnect.sharepoint.com/sites/IRT-DMS/SitePages/Home.aspx

Laurel Springs_100122_AMP for IRT Review_2023
https://ncconnect.sharepoint.com/:b:/r/sites/IRT-DMS/Misc%20Documents/Laurel%20Springs%20(100122)/Laurel%20Springs_100122_AMP%20for%20IRT%20Review_2023.pdf?csf=1&web=1&e=ZqhyXC

Thank you,
Casey

Casey Haywood
Mitigation Specialist, Regulatory Division
U.S. Army Corps of Engineers, Wilmington District
(919) 750-7397 work cell
