



MY3 Monitoring Report

Owen Farms Mitigation Site
Transylvania County, NC

French Broad River Basin
Cataloging Unit 06010105

NCDMS Project No. 100064
NCDMS Contract No. 7532
NCDMS RFP No. 16-007334
(Issued 9/8/2017)

USACE ID: SAW-2018-01165

DWR ID: 20181033

Data Collected: March and August 2023

Prepared for:



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This Year 3 Monitoring Report has been written in conformance with the requirements of the following:

- Federal rule for compensatory mitigation project sites as described in the Federal Register, Title 33 Navigation and Navigable Waters, Volume 3, Chapter 2, Section § 332.8, paragraphs (c)(2) through (c)(14).
- NCDEQ Division of Mitigation Services IN-Lieu Fee instrument signed and dated July 28, 2010.



February 16, 2024

Paul Wiesner
Western Regional Supervisor
North Carolina Department of Environmental Quality
Division of Mitigation Services, Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

Re: MY3 Monitoring Report Comments
Owen Farms Stream and Wetland Mitigation Site
French Broad River Basin; CU# 06010105 – Transylvania County
DMS Project ID No. 100064
Contract No. 7532
SAW-2018-01165

Mr. Wiesner,

As per your letter concerning the Owen Farms Stream and Wetland Mitigation Site MY3 Report, we have updated the report and addressed your comments as follows:

Response to DMS Comments

1: General: Please review the DMS notes and confirm that all requests, IRT questions and full delivery provider commitments from the 2023 credit release meeting have been addressed and included in the final MY3 (2023) report. *DMS/IRT questions have been reviewed and addressed.*

2: Section 1.2 – Background: *“Additionally, 1.396 acres of wetlands have been enhanced,...”*. Please update the report text to 1.540 acres per the IRT approved mitigation plan and Table 1. *Acreage in Section 1.2 has been updated accordingly.*

3: Section 2.2.2 Vegetation & Section 3.0 Maintenance and Adaptive Management Plans: Section 2.2.2 reports replanting in February 2023 & Section 3.0 reports replanting in January 2023. Please review and update the discrepancy in the report. *Discrepancy in Section 2.2.2 has been updated accordingly. The site was replanted in February 2022, following repair activities in January 2022. A small amount of replanting was also completed in January 2023 following repair activities in November 2022. Table 5 has also been updated to help add clarity.*

4: Section 2.2.2 Vegetation: Is existing Fescue considered a project vegetation concern within the conservation easement? Are any ring sprays around planted vegetation proposed in future monitoring years? Please address in the comment responses and update the report text accordingly. *Although fescue is present in the easement it is not jeopardizing survivability of planted or native vegetation. Ring sprays around planted vegetation are not necessary and not planned at this time.*

5: Table 5. Project Activity and Reporting History: Morphological surveys and vegetation surveys were completed at separate times/ dates in MY3(2023); please update the table to identify the separate survey



dates. Based on the report text, morphological surveys were completed in March 2023. 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. Please include all MY3(2023) maintenance activities in the table including beaver dam removal and project invasive treatments. *Activities and corresponding dates have been updated in Table 5. We prefer to collect morphological data prior to leaf-out. Morphological surveys will be completed again in March 2025 during MY5 to maintain consistency.*

6: Table 8. Visual Vegetation Assessment: The table reports 0% encroachment; however, minor livestock encroachment was identified and observed during a December 6, 2023, DMS site visit. Please review the table and update the report accordingly. *Table 8 updated to reflect livestock encroachment within easement area.*

7: Figure 7.4: Please update the “Daily Rainfall Totals” line in the graph legend. It currently reads “Series1”. *Graph legend title has been updated.*

8: Table 13: A bankfull event is reported for MY3(2023) on 12/15/2022. Please explain why this is not considered a MY2(2022) bankfull event. Please update the report accordingly. *Table updated to accurately portray bankfull event as occurring in MY2. Section 2.2.3 was also updated to reflect this change.*

9: Table 14. Wetland Hydrology Summary: In the Performance Standard line of the table, please report that the success criteria is 12% of the growing season and list the growing season dates from the IRT approved mitigation plan. *Comments have been updated accordingly in the summary table.*

10: Figures 8.1 – 8.6 Groundwater gauge data graphs: Please review and confirm that the data reported is accurate and the graph callouts are correct. As an example, the Gauge 1 (Figure 8.1) callout shows occurrences of the groundwater line well below the “12 inches below surface” line. Please also be consistent with the graph colors utilized. Figure 8.6 has a green “Wetlands 5, Gauge 5 line”. Please review and update the report and graphs accordingly. *Graph data has been reviewed and updated for accuracy and callouts have been updated accordingly.*

11: December 6, 2023: Property Boundary Inspection Observations& Required Action Items:

- The easement corners were adequately monumented with stamped aluminum caps. The caps were typically flush with the ground surface making them easy to locate.
- Three witness posts were missing/damaged. The U-channel post at platted corner 72 at the top of UT7 has been damaged by highway maintenance. The post at platted corner 31 on the west side of wetland 1 could not be located. The fencepost used to witness platted corner 35 at the southwest corner of the UT2A crossing corridor is located too far from the actual corner monument.
- Several signs were absent, missing nails, rotated, bent or otherwise damaged. The signs were fastened to the wooden fence posts with galvanized roofing nails. Many of the damaged signs were on posts where the nails had backed out of the post. The locations of damaged or missing signs are shown on the .kmz provided to Davey.
- Signs were incorrectly attached to trees with roofing nails driven flush to the tree.



- In-line marking was not visible in portions of the wooded areas.
- Signs were installed outside the easement along the fence line between platted corners 1 and 30 (between the top of UT1 and Wetland 1).
- A yearling steer was observed inside the easement near platted corner 85. Cattle access to this area has created a visible trail along the fence between corners 83 and 86. No exit gate could be found during the inspection, so the cow remained inside the easement. Notification of the occurrence was provided by DMS at the time of the inspection.
- There are multiple locations where relic fencing is located within the conservation easement. The fencing consists of multi-strand barbed wire or woven wire attached to wooden posts, T-posts and trees. The wire has been removed from some of the fence segments leaving only the metal T-posts as remnants.
- Two sections of silt fence are located within the easement on the east side of the site along Highway 281.
- A metal 55-gallon drum is located in the French Broad in the southeast section of the site.
- Based on a review with Davey staff (Ben Furr) it was unclear if livestock currently have access to portions or all of UT1 due to uninstalled and/ or damaged fencing.

12: Required Action Items in MY4 (2024):

- Repair/install witness posts at the three locations identified.
- Repair/install all damaged or missing signs. DMS has consistently observed that roofing nails do not perform well as fasteners for attaching signs to wooden posts and recommends using screw type fasteners such as 2 ½ inch hex head sheet metal roofing screws rated for exterior treated lumber applications for the repair.
- DMS recommends replacement of all tree sign fasteners with 16d aluminum nails such as the 3 ½ inch by 0.177 inch by 11/32-inch head aluminum nails from Kaiser Aluminum 800-633-3156. Please watch the DMS instructional video before correcting the signage <https://youtu.be/7dE7edd3V5M> . It is a five-minute video originally created during the NC Ecosystem Enhancement Program era and helps visualize the preferred method for attaching signs to trees.
- In-line marking was not visible along many of the wooded boundary sections and visibility of the boundary needs to be improved. Due to the thick nature of the wooded areas, DMS recommends installing signs on prominent boundary trees visible from a distance and blazing the trees with yellow survey paint. A few signs should be made visible from Highway 281 and all other wooded areas where the signs are absent/not visible.
- Remove signs installed outside the easement along the fence line between platted corners 1 and 30 (between the top of UT1 and Wetland 1).



- Notify the landowner that cattle are accessing the easement. Identify all locations where cattle are gaining access and encroaching into the easement and repair the exclusion fencing. Remove any fallen trees or limbs from the fence and repair any damage.
- Remove internal fencing wire and associated metal T-posts.
- Remove silt fence sections along Highway 281.
- Remove the metal 55-gallon drum located in the French Broad and properly dispose.
- Review documents and walk all of UT1 to determine if livestock potentially have access to the conservation easement. Determine livestock access and add or repair fencing (as necessary) to exclude livestock from the project's conservation easement. Additional signage may be warranted if additional fencing is installed.

DRG notes the aforementioned observation comments and will complete the following maintenance actions requested by DMS.

If you have any questions or need additional information, please do not hesitate to give me a call (919.588.9663).

Sincerely,

Davey Resource Group, Inc.

A handwritten signature in blue ink, appearing to read "Ben Furr".

Ben Furr
Area Manager



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1.0 Project Summary

1.1 Location and Setting

The Owen Farms Mitigation Site (Site) is located approximately 3 miles north of Lake Toxaway in Transylvania County, NC.

Directions from Asheville, NC:

From Asheville, NC: Travel on I-26 east to exit 40 (NC-280 W/Airport Road) and merge on to NC-280 W, continue for 15.9 miles; continue straight onto US-64 W (NC-280 W becomes US-64 W), go 3.9 miles; turn right to stay on US-64 W; continue on US-64 W for 14.9 miles; turn right on Blue Ridge Road, continue for 5.4 miles and the Site entrance will be on the left.

The Site is located in the Blue Ridge Belt Physiographic Province of North Carolina.

1.2 Background

In October 2020 HDR|ICA restored approximately 3,180 linear feet of stream, enhanced approximately 5,172 linear feet of stream (125 linear feet of Enhancement I; 5,047 linear feet of Enhancement II), and preserved 423 linear feet of stream at the Owen Farms Mitigation Site. Additionally, 1,540 acres of wetlands have been enhanced, 0.35 acres of wetlands have been re-established, and 0.97 acres of wetlands have been rehabilitated at the Site. The Site provides many ecological functional uplifts within the French Broad River Basin. Project goals were established based on the French Broad RBRP (NCEEP 2009), and on-Site data collected during the existing conditions survey. Site specific goals and objectives were developed to provide the highest practical potential for functional uplift based on NC SAM and NC WAM analyses of streams and wetlands on Site.

1.3 Preconstruction Conditions

Streams

The Site was cleared prior to 1951 and has been utilized for agricultural purposes including pasture and row crops. Prior to construction cattle had access to the majority of streams on Site. The streams on Site exhibited the following conditions prior to construction:

- Portions of WFFBR had been straightened to maximize agricultural practices on the property. The channel exhibited actively eroding banks due to cattle hoof shear and many of the channel's riffles and pools had experienced significant deposition of fine material from the eroded channel banks. The large majority of the channel displayed little to no deeply rooted bank or riparian vegetation. Where a woody buffer had been present, it was commonly only one tree wide, with vegetation typically sparse at best. Many of the trees within the one-tree buffer had been undercut because the channel had incised below the rooting depth.
- UT 5 was dammed and ponded immediately downstream of a culvert passing under Silverstein Road. Downstream of the pond, UT 5 had been straightened and channelized to its confluence with the West Fork French Broad River (WFFBR).
- With the exception of the upstream most 248 feet, UT 7 had an absent to minimal buffer. The downstream half of UT 7 appeared to have been modified for agricultural practices and ditched along the edge of the valley as evidenced by an incised channel and spoil piles adjacent to the banks.



- UT 8 was fairly stable except for the downstream most 40 feet of the reach which experienced down cutting to match the invert elevation of WFFBR at the confluence. In the downstream portion of the reach there was little to no deeply rooted vegetation along the banks. The banks had been lined with old bricks by the landowner in an attempt to prevent further mass wasting as the channel continues to incise and undercut the banks.
- UT 4a was significantly incised due to a headcut approximately 20 feet upstream of its confluence with UT 4.
- UT 1, UT 2, UT 2a, UT 3, UT 2b, UT 4, UT 4b, UT 6, UT 6a, UT 7a, and UT 7b are all first or second order, spring fed, perennial tributaries which exhibited mild to moderate instability due to cattle hoof shear and limited buffer presence in some areas before construction and planting activities.

Wetlands

Prior to construction cattle had access to all of the wetlands on Site. The wetlands on Site exhibited the following conditions prior to construction:

- Wetland W3 is the largest wetland within the Site (1.8 acres) and is divided into two distinct wetland types: Riverine Swamp Forest and Floodplain Pool. The Riverine Swamp Forest portion of W3 had a significantly altered vegetative community compared to reference condition. This portion of W3 consisted solely of herbaceous vegetation which was dominated by common rush and served as a cattle pasture. Fecal matter and cattle tracks were present throughout the wetland. The Floodplain Pool portion of W3 formed in a relic meander scroll of WFFBR. UT 5 flowed through the eastern portion of the Floodplain Pool prior to its confluence with WFFBR. Cattle had unrestricted access to the entirety of W3.
- Wetland W5 was a relic Headwater Forest wetland area adjacent to UT 7. Prior to construction the channelization and placement of spoil along the floodplain made it so W5 no longer supported wetland hydrology. Cattle access also altered the vegetative structure and ground surface condition.
- Wetland W1 is a Riverine Swamp Forest that is heavily influenced by beaver. Prior to construction activities, cattle had full access to W1.
- Wetlands W2, W4, W6, W6A, W7, W8, and W9 are all headwater wetlands that had experienced alterations to the vegetative structure and significant fecal matter inputs due to cattle access.

2.0 Annual Monitoring

2.1 Monitoring

Table 3 in Appendix A outlines all the monitoring components, methods, quantity, and frequency of data to be collected for the Site. A visual representation of all monitoring devices can be found in the MY3 Current Conditions Plan View (CCPV) (Figures 2.1 – 2.9). Monitoring and data collection occurred between March 30 and November 13, 2023.

2.2 Results and Discussion

This section documents the conditions observed in Year 3 monitoring. Areas that were repaired in February and November of 2022 were assessed in 2023 for stability. Areas of minor to severe bank and toe erosion that occurred after repairs in February 2022 were repaired in November 2022. Photographs of select repaired areas can be found in Figures 3.31 – 3.50 and Appendix F.



2.2.1 Stream Stability

Cross section geometry along WFFBR has remained consistent with the As-Built condition. Repaired areas have remained stable over the course of MY3 monitoring period. Visual observation of stream banks indicates that WFFBR has stabilized after repairs in November 2022. Herbaceous and woody stream bank vegetation has significantly increased during the MY3 monitoring period. Evidence of stream stability can be seen in Figures 4.1-4.14 and Figures 5.1-5.14.

UT 8 cross sections remain largely unchanged over the past monitoring year. Cross section surveys show changes in channel geomorphology between MY0 and MY1. However, geomorph surveys indicate that the channel has found equilibrium between MY1 and MY3 and has remained stable over the past two monitoring periods. A tree was discovered across the channel near cross section 7 in August 2023. The tree is not impeding channel flow nor impacting bank stability.

Cross sections along UT 7 remain largely unchanged over the last monitoring year. The restored reach appears stable and functioning as intended. It is worth noting that three small beaver dams were discovered at STA 12+10, STA 12+85 and STA 13+45 on UT 7. Beaver dams were removed in August 2023. Visual observations do not indicate instability of stream banks due to the presence of the beaver dams.

While the banks of UT 5 remain stable, the beaver dam that was discovered and removed at station 18+25 during MY2 monitoring period was rebuilt after geomorph surveys in March 2023. The beaver dam was removed in August 2023 after trapping events in July 2023. Beaver dams had not been rebuilt on UT 5 or UT 7 as of last site visit on December 5, 2023. Cross section surveys show changes in channel geomorphology between MY0 and MY1. However, geomorph surveys indicate that the channel has found equilibrium and has remained stable over the past three monitoring periods with no aggradation or degradation being observed. The table below summarizes previous repairs for clarity.

Station	Damage Type	Repair Type	Repair Date	Repair Stability
10+00 – 10+40	Erosion (right bank)	Sod matting	Nov. 2022	Stable
10+70 – 11+25	Erosion (right bank)	Sod matting	Nov. 2022	Stable
13+90 – 14+50	Erosion (right bank)	Sod matting, boulder toe	Nov. 2022	Stable
15+35 – 15+65	Erosion (right toe)	Boulder toe	Nov. 2022	Stable
16+10 – 16+75	Erosion (left bank)	Sod matting	Nov. 2022	Stable
22+35 – 22+95	Erosion (right toe)	Boulder toe	Nov. 2022	Stable
25+15 – 25+50	Erosion (right toe)	Boulder toe	Nov. 2022	Stable
10+75	Scour	On site material fill	Dec. 2021	Stable
11+10	Scour (left floodplain)	On site material fill	Dec. 2021	Stable
13+00	Scour (right floodplain)	On site material fill	Dec. 2021	Stable
15+50	Scour (right floodplain)	On site material fill	Dec. 2021	Stable
16+25 – 18+50	Scour (left bank)	On site material fill	Dec. 2021	Stable
25+75	Scour (right bank)	On site material fill	Dec. 2021	Stable
28+50	Scour (left bank)	On site material fill	Dec. 2021	Stable
10+65 – 10+95	Erosion (right bank)	Coir matting	Dec. 2021	Stable
12+61 – 12+67	Erosion (left bank)	Coir matting	Dec. 2021	Stable
18+63 – 18+75	Bank failure (left bank)	Coir matting	Dec. 2021	Stable
18+55 – 18+90	Bank failure (right bank)	Coir matting	Dec. 2021	Stable



2.2.2 Vegetation

Year 3 vegetation plot data can be found in Table 9 of Appendix C. The average density of planted stems across the site is 486 stems per acre, which exceeds Year 3 success criteria of 320 planted stems per acre. Plot 12 continues to fail to meet Year 3 criteria due to a dense herbaceous vegetative layer outcompeting the planted bare roots. It is worth noting that Plot 12 is located in the Swamp Bog Complex planting area, and it is not uncommon for this community to be dominated by shrubby and herbaceous species. Plot 12 exhibited 100 percent herbaceous coverage dominated by species such as common rush (*Juncus effusus*), various sedges (*Carex* spp.), knotweed (*Polygonum* spp.), wool grass (*Scirpus cyperinus*), ironweed (*Vernonia fasciculata*), and golden rod (*Solidago* sp.). It was anticipated in the Mitigation Plan that this community may exhibit a lower stem density than the rest of the Site. Plot 12 will be visually assessed during Year 4 monitoring to determine if any volunteer stems have established after an additional year of growth. Vegetation plot 11, one of the three random plots on Site, was located in the Swamp Bog Complex. It also failed to meet Year 3 criteria at 243 stems per acre and was comprised of 67% hazel alder. The herbaceous community in Plot 11 was similar to what was observed in Plot 12. Findings between plot 11 and 12 confirm expectations noted in the Mitigation Plan about the Swamp Bog vegetative community. It is also worth noting that visual stem densities in the swamp bog complex are low. This is not presented in the Current Conditions Plan View figures or in the Visual Vegetation Condition table as it was anticipated in the Mitigation Plan and discussed in prior monitoring reports.

Volunteer stems of hazel alder in Plot 3 continue to dominate the plot, comprising 53% of species diversity in Plot 3, mostly in the areas affected by beaver dam flooding in MY2. Four new volunteer stems were observed in Plot 3 during the MY3 vegetation survey. Provided that the beaver dam on UT2 is not rebuilt in between MY3 and MY4, DRG anticipates stem composition to diversify over the subsequent monitoring periods.

While Plot 10 is exceeding Year 3 success criteria in stem density, the mortality experienced by the plot as a result of dense herbaceous growth resulted in the plot being comprised of 60% white oak (*Quercus alba*). DRG anticipates volunteer stems to establish in the subsequent monitoring years, increasing species diversity within the plot.

Plot 16, the second random plot on Site, was located within the wetland expansion area of W3. Results from the MY3 survey indicate that this area has a stem density of 486 stems per acre. DRG observed 4 different species within the plot.

As a result of the repairs made to the floodplain along the left and right bank of West Fork French Broad River in January 2022, DRG replanted approximately 733 bareroot stems within the repaired and disturbed areas in February 2022. Vegetation plot 19, the third random vegetation plot on-site, was located within the replanted area along the right floodplain of WFFBR. Results of the MY3 survey indicate that this area has a stem density of 526 stems per acre.

Approximately 0.49 acres of the WFFBR floodplain have sparse herbaceous vegetation and are represented as Areas of Vegetative Concern in Figures 2.1-2.9 in Appendix B. The majority of bare areas observed are confined to areas that were disturbed during repairs made in January 2022. As a result of poor soil quality in the disturbed areas herbaceous growth has been slow to establish. Woody vegetation in these areas is a growing season behind the rest of the Site since it was replanted in February 2022.



Chinese privet (*Ligustrum sinense*) and Multiflora rose (*Rosa multiflora*) were observed within the easement boundary along the floodplain of West Fork French Broad, UT1, UT2, UT4, UT5, UT7, and W3. Multiflora rose was treated using Roundup Custom® in March and August 2023. Small areas of cattail were observed within the channel of UT5 and was treated with Roundup Custom® in August 2023. Invasive species will be monitored and treated as needed throughout the remainder of the monitoring period.

2.2.3 Stream Hydrology

All monitored streams have experienced continuous flow within tributaries and has been documented for at least 30 consecutive days. To date, stream flow gauge data indicates that the site did not experience a bankfull event during Year 3; however, UT8 recorded a bankfull event December 15, 2022, which was not reported in the MY2 report. Hydrologic data for UT7 indicates a spike in water depth around June 14, 2023 that show water levels to at or above bankfull: this is indicative of the time when beaver dams were constructed and is a false representation of a bankfull event. Stream hydrologic data between November 10, 2022 and November 23, 2023 can be seen in Figures 7.1 - 7.4 (Appendix E).

2.2.4 Wetland Hydrology

Wetland W3 re-establishment are exceeding success criteria, experiencing groundwater levels within 12 inches of the soil surface for at least 23% of the growing season, or 47 consecutive days over the Year 3 monitoring period (Figures 8.1-8.3, Appendix E).

Gauge data indicate that ground water within the wetland rehabilitation area has remained within 12 inches of the soil surface for 49% of the growing season, or 102 consecutive days over the Year 3 monitoring period (Figure 8.4, Appendix E) in the wetland expansion areas depicted on the CCPV Figures in Appendix B.

The new gauge that was installed provide hydrologic data for areas extending beyond the delineated boundaries of W3 has exceeded success criteria for Year 3, experiencing groundwater levels within 12 inches of the surface for 49% of the growing season, or 101 consecutive days.

Gauge 4, located within the enhancement area of W5, shows water levels within 12 inches of the soil surface for 41% of the growing season, or 85 consecutive days during the Year 3 monitoring period (Figure 8.5, Appendix E). Data from Gauge 5, located in the re-establishment area of W5, shows groundwater levels within 12 inches of the soil surface for approximately 32% of the growing season, or 65 consecutive days over the Year 3 monitoring period (Figure 8.6, Appendix E).

Hydrographs presented in Figures 8.1-8.6 represent gauge data collected between November 13, 2022 and November 13, 2023.

3.0 Maintenance and Adaptive Management Plans

Areas that were repaired in November 2022 were replanted in January 2023. All repaired areas showed increased amounts of herbaceous and woody vegetation during the Year 3 monitoring period. DRG does not anticipate the need for any repairs on WFFBR in Year 4.

A section of downed fence was discovered along the right bank of UT4 due to a fallen tree in March 2023. DRG removed the tree and repaired the fence at the time of discovery. Photos of the repaired fence can



be found in Appendix C, Figures 3.36-3.37. Calves were observed within the easement due to downed or damaged fencing and/or kissing gates. DRG addressed this issue with the property owner and repaired fencing. DRG also nailed wooden boards across the kissing gate entry points to prevent future cattle access through kissing gates.

Chinese privet and multiflora rose were treated on the Site during the Year 3 monitoring period. Invasive species on the Site will be monitored and treated as needed throughout the monitoring period.



4.0 References

- HDR Engineering, Inc. of the Carolinas 2020. Mitigation Plan Owen Farms Mitigation Site. Transylvania County, North Carolina. January 31, 2020.
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- Schafale, Michael P., Weakley, Alan S. Classification of the Natural Communities of North Carolina. Third Approximation. 1990. North Carolina Natural Heritage Program, Raleigh, NC.
- The Applied Climate Information System (ACIS). 2022. *WETS Station: Brevard, NC*.
<http://agacis.rcc-acis.org/?fips=37175>
- US Army Corps of Engineers (USACE), North Carolina Interagency Review Team (NCIRT). 2016. *Wilmington District Stream and Wetland Compensatory Mitigation Update*.
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Appendix A – General Project Information



Table 1. Owen Farms Mitigation Site (DMS Project No. 100064) 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							
West Fork French Broad River (WFFBR)*	1799.000	1799.000	Cold	R	1.00000	1,799.000	Full channel Restoration, buffer planting, livestock exclusion, permanent easement
West Fork French Broad River (WFFBR)	705.000	705.000	Cold	EII	2.50000	282.000	Bank stabilization along the left bank, buffer planting, livestock exclusion, and permanent easement
UT 1*	764.000	764.000	Cold	EII	4.00000	191.000	Buffer planting, livestock exclusion, and permanent easement
UT 2	923.000	923.000	Cold	EII	3.50000	263.714	Buffer planting, livestock exclusion, and permanent easement
UT 2A*	546.000	546.000	Cold	EII	2.50000	218.400	Buffer planting, livestock exclusion, and permanent easement
UT 2B	75.000	75.000	Cold	EII	2.50000	30.000	Buffer planting, livestock exclusion, and permanent easement
UT 3	125.000	125.000	Cold	EI	1.50000	83.333	Stabilization of channel dimension and profile, buffer planting, livestock exclusion, and permanent easement
UT 4*	809.000	809.000	Cold	EII	2.50000	323.600	Buffer planting, livestock exclusion, and permanent easement
UT 4A	472.000	472.000	Cold	EII	2.30000	205.217	Stabilization of channel dimension and profile near confluence with UT 4, buffer planting, livestock exclusion, and permanent easement
UT 4B	178.000	178.000	Cold	EII	4.00000	44.500	Buffer planting, livestock exclusion, and permanent easement
UT 5*	827.000	827.000	Cold	R	1.00000	827.000	Full channel Restoration, buffer planting, livestock exclusion, permanent easement
UT 6	114.000	114.000	Cold	P	10.00000	11.400	Preservation
UT 6A	206.000	206.000	Cold	P	10.00000	20.600	Preservation
UT 7	417.000	417.000	Cold	R	1.00000	417.000	Full channel Restoration, buffer planting, livestock exclusion, permanent easement
UT 7	439.000	439.000	Cold	EII	3.50000	125.429	Buffer planting, livestock exclusion, and permanent easement
UT 7A	103.000	103.000	Cold	P	10.00000	10.300	Preservation
UT 7B	136.000	136.000	Cold	EII	2.50000	54.400	Buffer planting, livestock exclusion, and permanent easement
UT 8	137.000	137.000	Cold	R	1.00000	137.000	Full channel Restoration near confluence with WFFBR, buffer planting, livestock exclusion, permanent easement
					Total:	5,043.893	
Wetland							
Wetland Group 1 (W1-W9)	1.540	1.396	R	E	2.00000	0.770	Planting, livestock exclusion, permanent easement
Wetland Group 2 (W3 and W5)	0.350	0.350	R	REE	1.00000	0.350	Raising invert of adjacent tributaries and filling abandoned channels; livestock exclusion, planting, and removal of spoil
Wetland Group 3 (W3)	0.970	0.970	R	RH	1.50000	0.647	Planting, livestock exclusion, permanent easement; restoring adjacent tributaries to increase frequency of floodwaters accessing wetland
					Total:	1.767	

*Length of streams flowing through utility easements or agricultural crossings has been deducted from As-Built and Original Mitigation Plan footage and credits

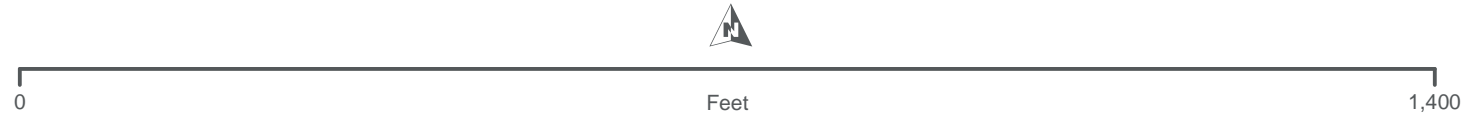
Project Credits

Restoration Level	Stream			Riparian	Non-Rip	Coastal
	Warm	Cool	Cold	Wetland	Wetland	Marsh
Restoration	N/A	N/A	3,180.000	N/A	N/A	N/A
Re-establishment				0.350	N/A	N/A
Rehabilitation				0.647	N/A	N/A
Enhancement				0.770	N/A	N/A
Enhancement I	N/A	N/A	83.333			
Enhancement II	N/A	N/A	1,738.260			
Creation				N/A	N/A	N/A
Preservation	N/A	N/A	42.300	N/A	N/A	N/A
Totals	N/A	N/A	5,043.893	1.767	N/A	N/A

Total Stream Credit 5,043.893
 Total Wetland Credit 1.767



Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community



PROJECT ASSET MAP
OWEN FARMS MITIGATION SITE
 FIGURE 1.0
 OWEN FARMS MY3 CURRENT CONDITIONS PLAN VIEW



Table 2. Project Goals, Performance Criteria, and Functional Improvements

Goal	Treatment	Functional Uplift	Performance Criteria	Measurements	Monitoring Results
Restore/enhance streams within the Site so that they are neither aggrading nor degrading	Restore a stable dimension, pattern, and profile. Install fencing to exclude cattle.	Reduction of nutrients and sediment to downstream locations, reduction of shear stress, and improved hydraulic function.	Entrenchment Ratios should be ≥ 2.2 . BHR should not exceed 1.2. BHR should not change more than 10% in any given monitoring interval. Riffle section W/D ratios should remain within the range of the appropriate stream type.	Cross-section monitoring and visual inspections.	Stream dimensions have remained stable throughout the site over the past year. All cross sections $BHR \leq 1$.
Provide/ enhance flood attenuation.	Restore several existing streams as primarily a Priority I restoration where bankfull and larger flows can access the floodplain. Construct floodplain bench on WFFBR.	Increase attenuation of floodwaters, increase biogeochemical cycling and recharge riparian wetlands.	Four bankfull events in separate monitoring years.	Flow gauges (Pressure transducers), and visual inspection.	During the 2023 MY, only UT 8 experienced a bankfull event.
Restore/enhance aquatic, semi-aquatic, and riparian habitat.	Restore native vegetation to the stream channel banks, wetlands, and the adjacent riparian corridor.	Treatment of nutrient enriched surface runoff from adjacent pastureland, increased bank stability and increased habitat.	Minimum of 320 stems/ac present at MY-3. Minimum of 260 stems/ac present at MY-5. Minimum of 210 stems/ac present at MY-7. Trees should average 6 feet in height at MY-5 and 8 feet in height at MY-7. Bog Complex communities may exhibit lower stem density and height.	Vegetation plots will be monitored annually between July 1st and leaf fall using the CVS protocol.	Plots 11 and 12 fail to meet density requirements. Plots 3, 10, and 20 fail to meet diversity requirements.
Restore/Enhance Wetlands within the Site to remove hydrologic impairments	Reconstruct above bankfull stream channel flows to riparian wetlands and re-grade topography to remove spoil and overburden material.	Restoration of riparian habitat, treatment of nutrient enriched runoff from adjacent pastureland, increased flood attenuation.	Groundwater elevation within 12 inches of the ground surface for at least 12% of the growing season (April 7 - October 30).	Groundwater monitoring gauges.	All wetlands are meeting performance criteria
Restore and connect riparian habitat with adjacent natural communities.	Conservation easement establishment.	Protect Site from encroachment in conservation easement.	Prevent Easement Encroachment.	Visual inspection.	Damaged fencing resulted in short term cattle access to areas within the easement. Fencing has been repaired and cattle removed from easement area



Table 3. Monitoring Plan Components

Parameter	Monitoring Method	Quantity	Frequency	Notes
Dimension	Riffle Cross Sections	UT5 (2) UT7 (1) UT8 (1) WFFBR (4)	Years 1, 2, 3, 5 & 7	
	Pool Cross Sections	UT5 (2) UT7 (1) UT 8 (1) WFFBR (2)	Years 1, 2, 3, 5 & 7	Bank pins may be installed in areas of concern.
Pattern	Visual	None	twice per year	Bank pins may be installed in areas of concern
Profile	Visual	None	twice per year	Additional profile measurements may be required if problems are identified during the monitoring period
Substrate	Visual	None	Annual	There should be an absence of any significant trend in the aggradational or depositional potential of the channel
Surface Water Hydrology	Flow Gage (Pressure Transducer)	UT5 (1) UT7 (1) UT8 (1) WFFBR (1)	twice per year	Measuring devices will be inspected/downloaded at each site visit to document occurrence of bankfull events and ensure device function
Groundwater Hydrology	Groundwater Gages	5 Site gauges, 2 Reference Gauges	Annual	Data will be downloaded at each site visit. One reference gauge will be located in W3 Rehabilitation area and also serve to monitor flood events in this area of the site. The second reference gauge will be located in the enhancement portion of W5.
Vegetation	CVS Level 2	Vegetation plots will be placed on ~2% of the planted area (17 permanent, 10x10 meter plots; 3 random plots of equal size)	Years 1, 2, 3, 5 & 7	Vegetation will be monitored using the Carolina Vegetation Survey (CVS) protocols. GPS coordinates and orientation of random plots will be provided in the annual monitoring reports and plot locations will be depicted on the Current Condition Plan View maps.
Invasive and nuisance vegetation	Visual		twice per year	Locations of exotic and nuisance vegetation and the occurrence of beaver dams and approximate inundation limits will be mapped
Project Boundary	Visual		twice per year	Fence damage, vegetation damage, boundary encroachments, etc. will be mapped
Culverts and Crossings	Visual		Twice per year	Blockages and/or erosion around culverts and crossings will be mapped and noted in monitoring reports.



Table 4. Project Attributes

Project Attribute Table				
Project Name		Owen Farms Mitigation Site		
County		Transylvania		
Project Area (acres)		25		
Project Coordinates (latitude and longitude (decimal degrees))		35.183902, -82.937970		
Project Watershed Summary Information				
Physiographic Province		Blue Ridge Mountains		
River Basin		French Broad		
USGS Hydrologic Unit 8	06010105	USGS Hydrologic Unit 14	06010105010020	
DWR Sub-basin		0601010501		
Project Drainage Area (acres)		3,795		
Project Drainage Area Percentage of Impervious Area		2		
Land Use Classification		Agricultural/Pasture		
Reach Summary Information				
Parameters	WFFB	UT 4	UT 5	UT 6
Pre-project length (feet)	1,975	731	652	114
Post-project (feet)	1,799	809	827	114
Valley confinement (Confined, moderately confined, unconfined)	Unconfined	Confined	Confined	Confined
Drainage area (acres)	3,795	30.6	45.2	21.7
Flow regime	Perennial	Perennial	Perennial	Perennial
NC DWR Water Quality Classification	B, TR	B	B	B
Dominant Stream Classification (existing)	B4	B4	B4	B4
Dominant Stream Classification (proposed)	C4	C4	C4	C4
Dominant Evolutionary Class (Simon) if applicable				
Thermal Regime	Cold	Cold	Cold	Cold
Reach Summary Information Continued				
Parameters	UT 7	UT 8	UT 1	UT 2
Pre-project length (feet)	372	49	764	
Post-project (feet)	417	137	764	923
Valley confinement (Confined, moderately confined, unconfined)	Confined	Confined	Confined	Confined
Drainage area (acres)	32.1	41	19.5	18.6
Flow regime	Perennial	Perennial	Perennial	Perennial
NC DWR Water Quality Classification	B	B	B	B
Dominant Stream Classification (existing)	B4	B4	B4	B4
Dominant Stream Classification (proposed)	C4	C4	B4	B4
Dominant Evolutionary Class (Simon) if applicable				
Thermal Regime	Cold	Cold	Cold	Cold
Reach Summary Information Continued				
Parameters	UT 3			
Pre-project length (feet)	125			
Post-project (feet)	125			
Valley confinement (Confined, moderately confined)	Confined			
Drainage area (acres)	<1			
Flow regime	Intermittent			
NC DWR Water Quality Classification	B			
Dominant Stream Classification (existing)	E4			
Dominant Stream Classification (proposed)	E4			
Dominant Evolutionary Class (Simon) if applicable				
Thermal Regime	Cold			
Wetland Summary Information				
Parameters	Applicable?	Resolved?	Supporting Docs?	
Water of the United States – Section 404	Yes	Yes	PCN	
Water of the United States – Section 401	Yes	Yes	PCN	
Endangered Species Act	Yes	Yes	CE	
Historic Preservation Act	Yes	Yes	CE	
Coastal Zone Management Act (CZMA or CAMA)	No	N/A	N/A	
Essential Fisheries Habitat	No	N/A	N/A	



Table 5. Project Activity and Reporting History

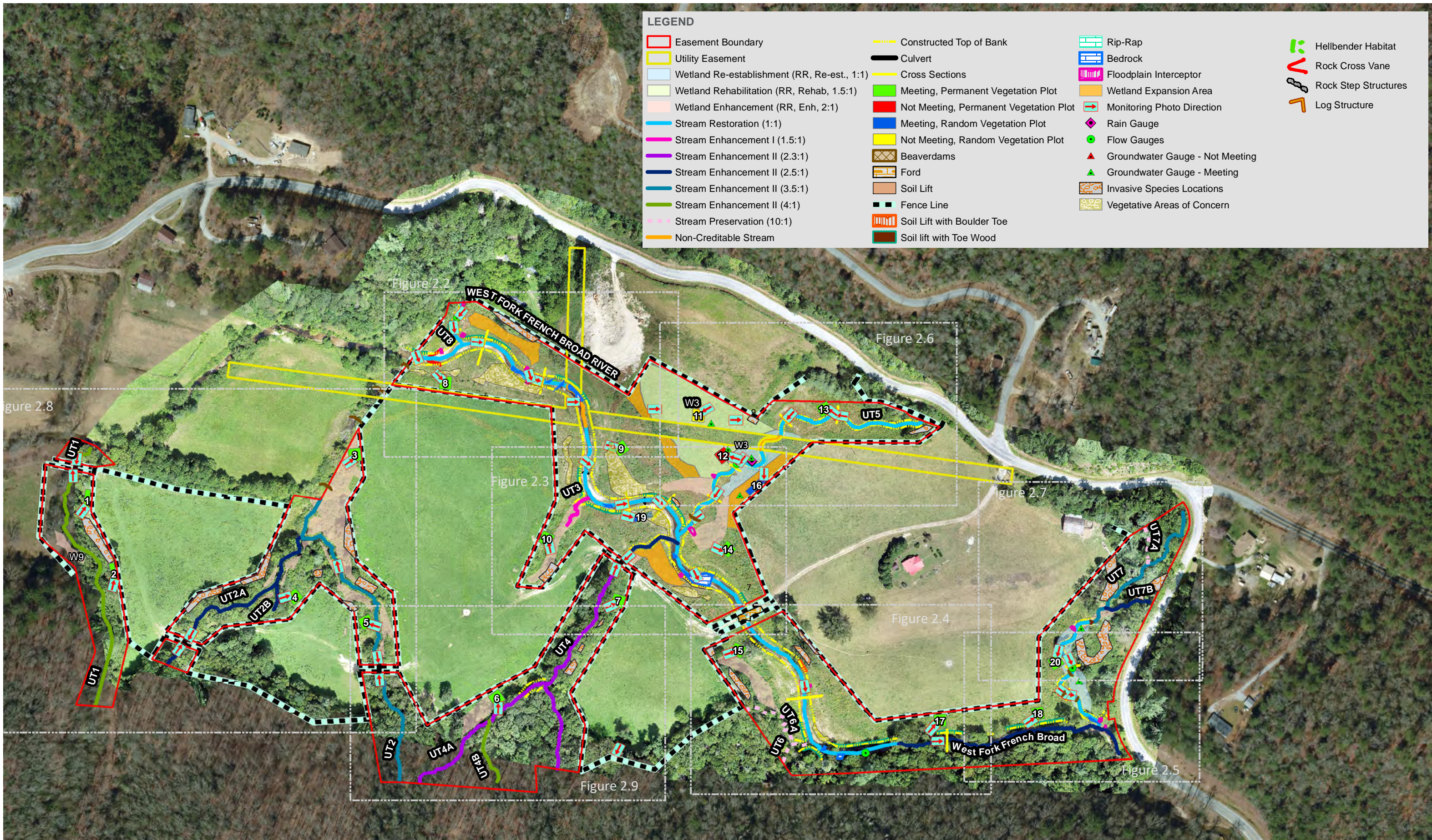
Activity or Report	Data Collection Complete	Completion or Delivery
Mitigation Plan	Jan-20	Jan-20
Final Design – Planting and Construction Plans	Jan-20	Feb-20
Construction	---	7-Oct-20
Repair Activities Complete	---	15-Jan-21
Bare Root and Lifestake Plantings for Entire Project Area	---	22-Jan-21
Mitigation Plan/As-built (Year 0 Monitoring-Baseline)	25-Feb-21	31-Mar-21
Year 1 Monitoring (2021)	29-Sep-21	24-Jan-22
Year 2 Monitoring (2022)	19-Aug-22	21-Feb-23
Repair Grading Activities Complete		Jan-22
Repair Planting Activities Complete		Feb-22
Invasive Species Herbicide Treatment		15-Aug-22
Repair Grading Activities Complete		Nov-22
Year 3 Monitoring (2023)		15-Feb-24
Repair Planting Activities Complete		1-Jan-23
Morphological Survey	30-Mar-23	Mar-23
Vegetation Survey	23-Aug-23	Aug-23
Beaver Dam Removal	Aug-23	Aug-23
Year 4 Monitoring		
Year 5 Monitoring		

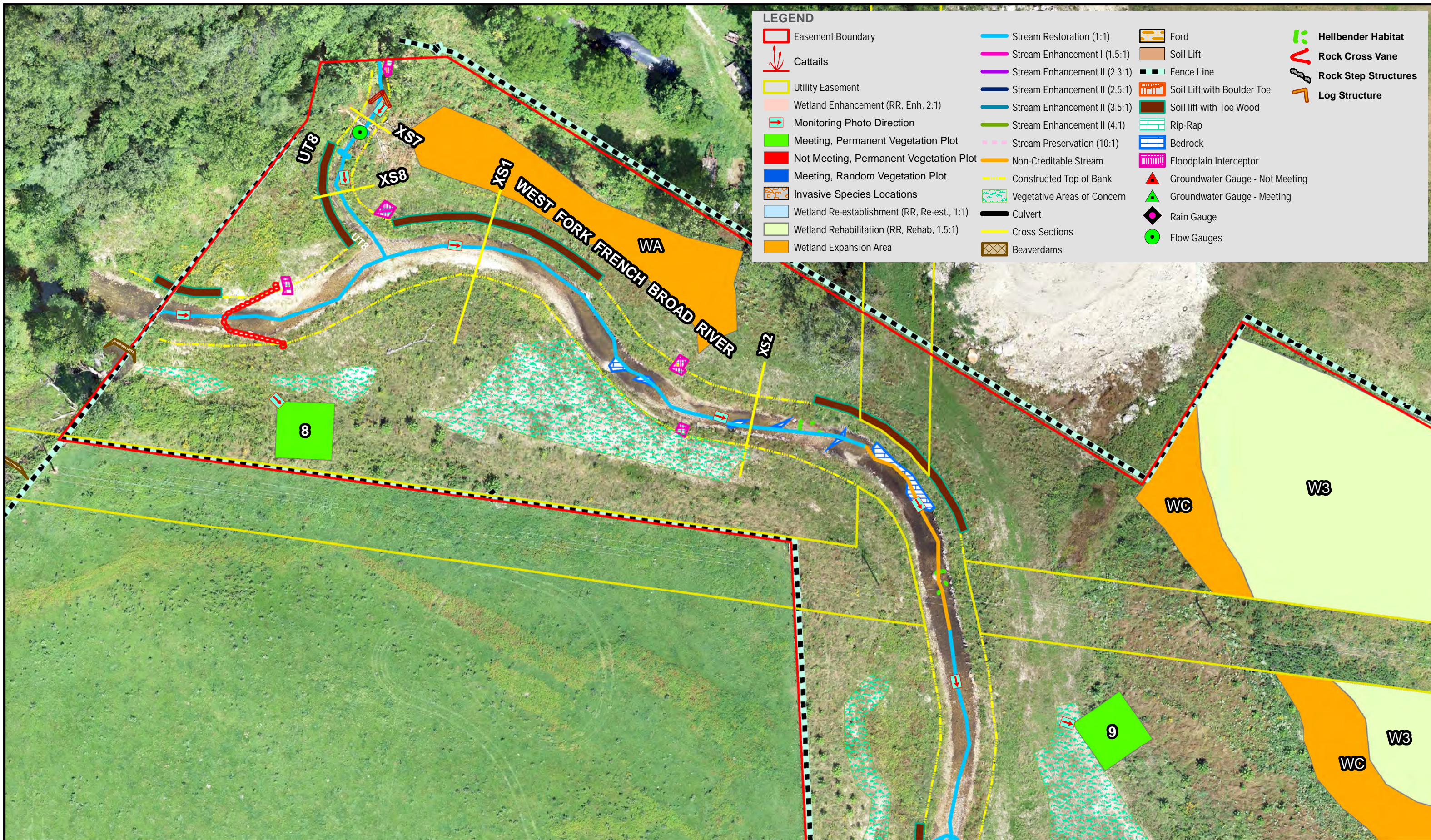
Table 6. Project Contacts Table

Designer	HDR Engineering 555 Fayetteville Street, Suite 900 Raleigh, North Carolina 27601-3034
Primary project design POC	Vickie Miller (919) 232-6600
Construction Contractor	Land Mechanics Design, Inc. 126 Circle G Lane Willow Spring, NC 27592
Construction Contractor POC	Lloyd Glover (919) 639-6132
Planting Contractor	Land Mechanics Design, Inc. 126 Circle G Lane Willow Spring, NC 27592
Planting Contractor POC	Lloyd Glover (919) 639-6132
Monitoring Performers	Davey Resource Group 3101 Poplarwood Court Raleigh, North Carolina 27604
Stream Monitoring POC	Davey Resource Group 3101 Poplarwood Court Raleigh, North Carolina 27604 Alex DiGeronimo (843) 830-1536
Vegetation Monitoring POC	Davey Resource Group 3101 Poplarwood Court Raleigh, North Carolina 27604 Michael Foster (706) 982-0403



Appendix B – Visual Assessment Data



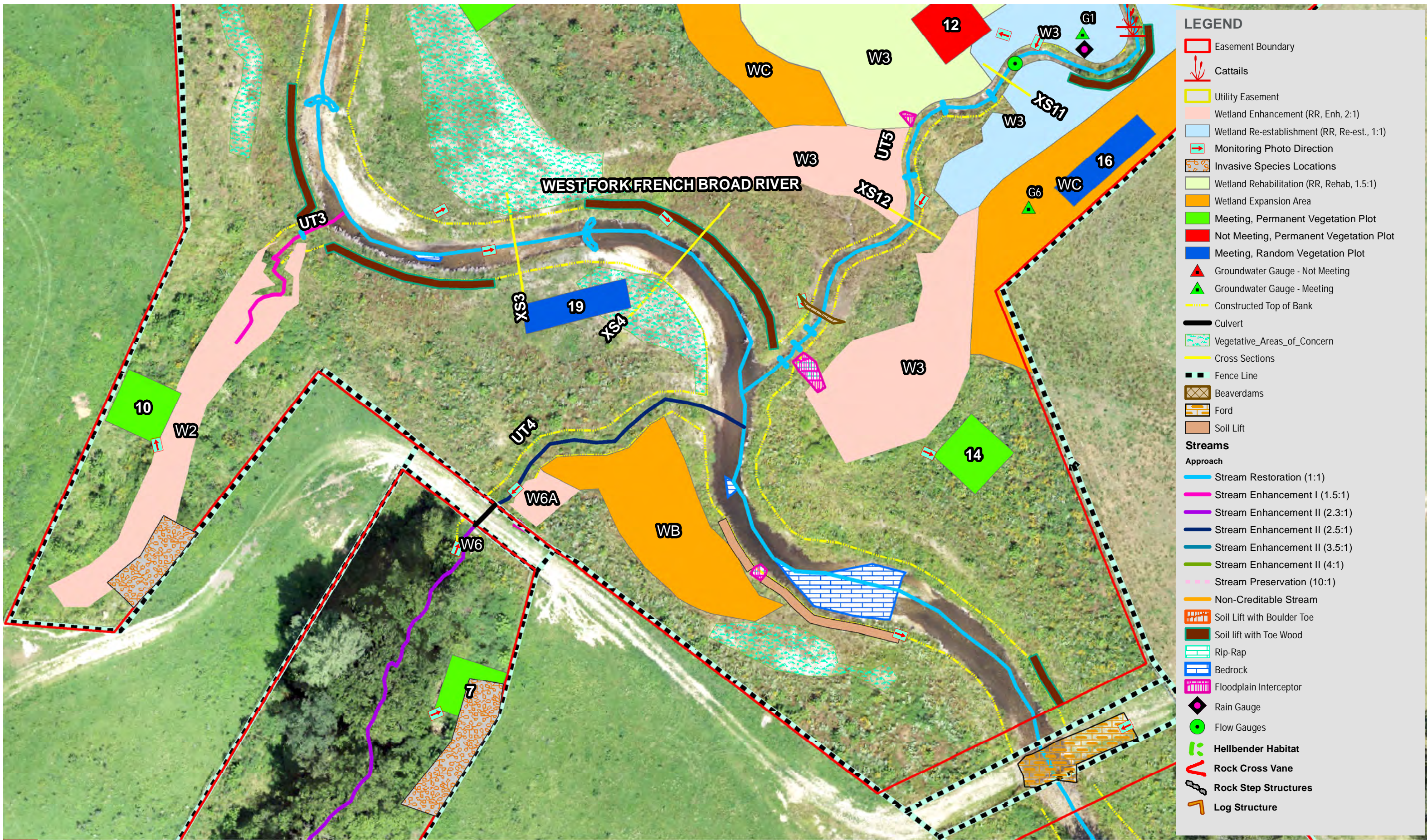


LEGEND

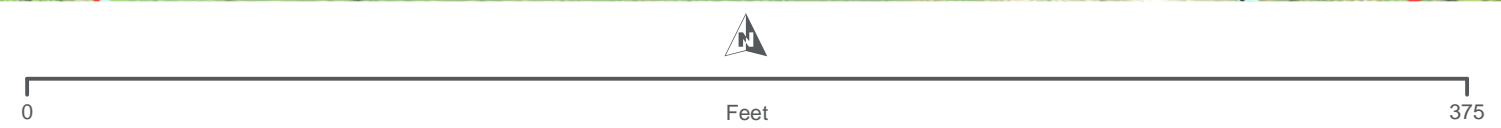
Easement Boundary	Stream Restoration (1:1)	Ford	Hellbender Habitat
Cattails	Stream Enhancement I (1.5:1)	Soil Lift	Rock Cross Vane
Utility Easement	Stream Enhancement II (2.3:1)	Fence Line	Rock Step Structures
Wetland Enhancement (RR, Enh, 2:1)	Stream Enhancement II (2.5:1)	Soil Lift with Boulder Toe	Log Structure
Monitoring Photo Direction	Stream Enhancement II (3.5:1)	Soil lift with Toe Wood	
Meeting, Permanent Vegetation Plot	Stream Enhancement II (4:1)	Rip-Rap	
Not Meeting, Permanent Vegetation Plot	Stream Preservation (10:1)	Bedrock	
Meeting, Random Vegetation Plot	Non-Creditable Stream	Floodplain Interceptor	Groundwater Gauge - Not Meeting
Invasive Species Locations	Constructed Top of Bank	Groundwater Gauge - Meeting	Rain Gauge
Wetland Re-establishment (RR, Re-est., 1:1)	Vegetative Areas of Concern	Culvert	Flow Gauges
Wetland Rehabilitation (RR, Rehab, 1.5:1)	Cross Sections	Beaverdams	
Wetland Expansion Area			

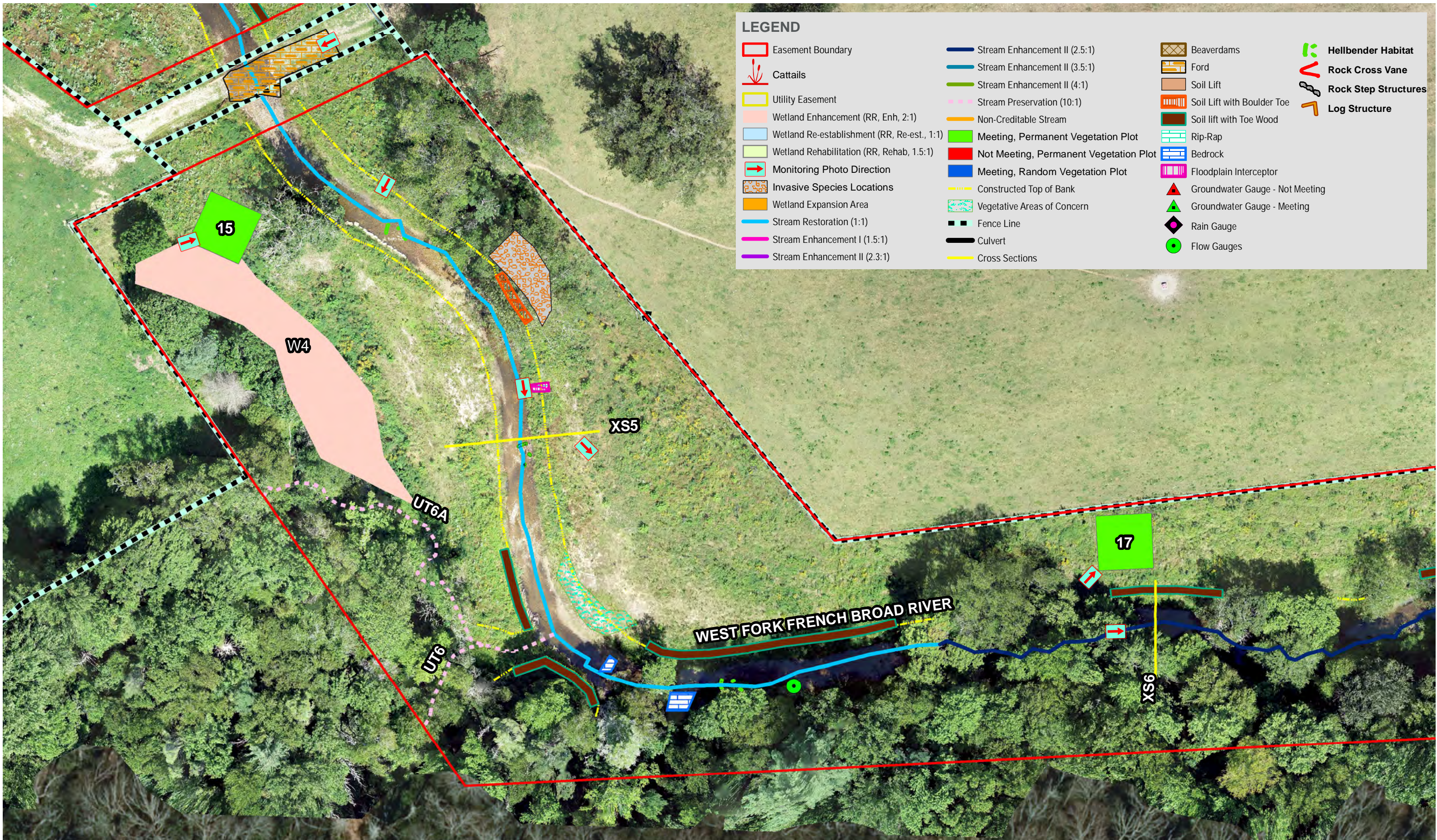


CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE
 FIGURE 2.2

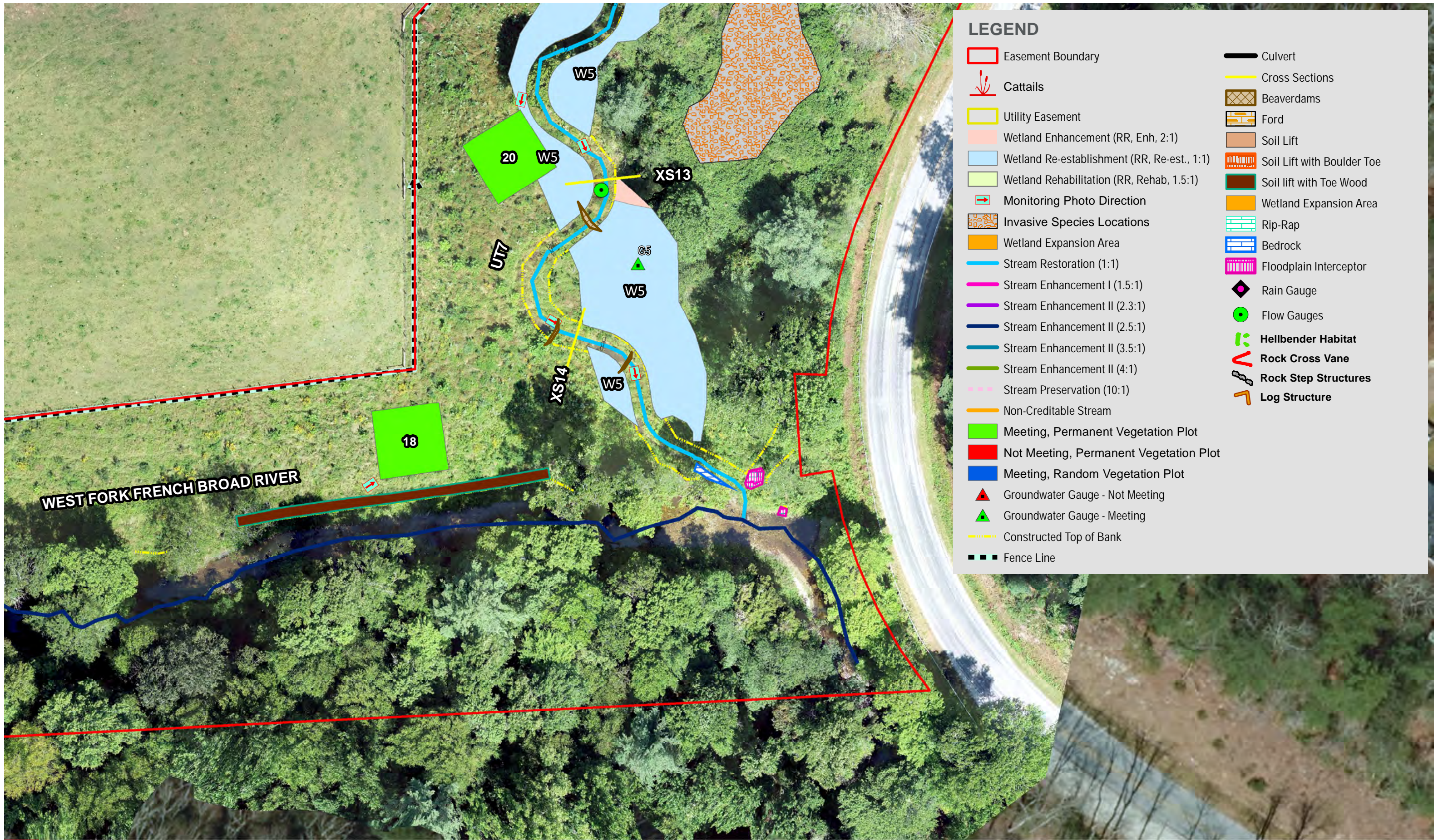


CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE
 FIGURE 2.3





CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE
 FIGURE 2.4



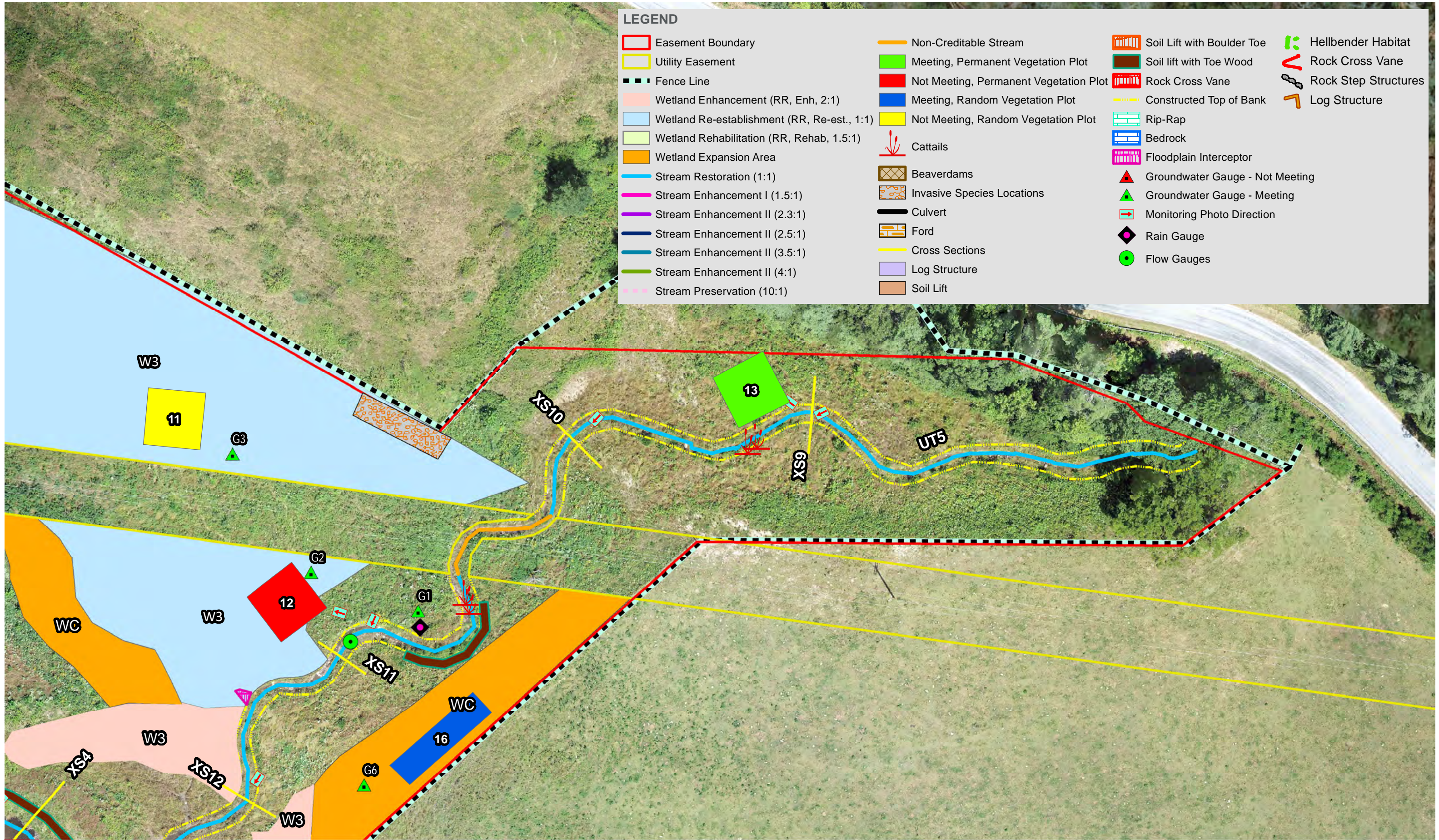
LEGEND

Easement Boundary	Culvert
Cattails	Cross Sections
Utility Easement	Beaverdams
Wetland Enhancement (RR, Enh, 2:1)	Ford
Wetland Re-establishment (RR, Re-est., 1:1)	Soil Lift
Wetland Rehabilitation (RR, Rehab, 1.5:1)	Soil Lift with Boulder Toe
Monitoring Photo Direction	Soil lift with Toe Wood
Invasive Species Locations	Wetland Expansion Area
Wetland Expansion Area	Rip-Rap
Stream Restoration (1:1)	Bedrock
Stream Enhancement I (1.5:1)	Floodplain Interceptor
Stream Enhancement II (2.3:1)	Rain Gauge
Stream Enhancement II (2.5:1)	Flow Gauges
Stream Enhancement II (3.5:1)	Hellbender Habitat
Stream Enhancement II (4:1)	Rock Cross Vane
Stream Preservation (10:1)	Rock Step Structures
Non-Creditable Stream	Log Structure
Meeting, Permanent Vegetation Plot	
Not Meeting, Permanent Vegetation Plot	
Meeting, Random Vegetation Plot	
Groundwater Gauge - Not Meeting	
Groundwater Gauge - Meeting	
Constructed Top of Bank	
Fence Line	










































WEST FORK FRENCH BROAD RIVER



CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE
 FIGURE 2.5



LEGEND

-  Easement Boundary
-  Utility Easement
-  Wetland Enhancement (RR, Enh, 2:1)
-  Monitoring Photo Direction
-  Invasive Species Locations
-  Wetland Re-establishment (RR, Re-est., 1:1)
-  Wetland Rehabilitation (RR, Rehab, 1.5:1)
-  Wetland Expansion Area
-  Groundwater Gauge - Not Meeting
-  Groundwater Gauge - Meeting
-  Constructed Top of Bank
-  Fence Line
-  Culvert
-  Cross Sections
-  Beaverdams
-  Ford
-  Meeting, Permanent Vegetation Plot
-  Not Meeting, Permanent Vegetation Plot
-  Meeting, Random Vegetation Plot
-  Not Meeting, Random Vegetation Plot
-  Stream Restoration (1:1)
-  Stream Enhancement I (1.5:1)
-  Stream Enhancement II (2.3:1)
-  Stream Enhancement II (2.5:1)
-  Stream Enhancement II (3.5:1)
-  Stream Enhancement II (4:1)
-  Stream Preservation (10:1)
-  Non-Creditable Stream
-  Soil Lift
-  Soil Lift with Boulder Toe
-  Soil lift with Toe Wood
-  Rip-Rap
-  Bedrock
-  Wetland Expansion Area
-  Floodplain Interceptor
-  Rain Gauge
-  Flow Gauges
-  Hellbender Habitat
-  Rock Cross Vane
-  Rock Step Structures
-  Log Structure



CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE
 FIGURE 2.7

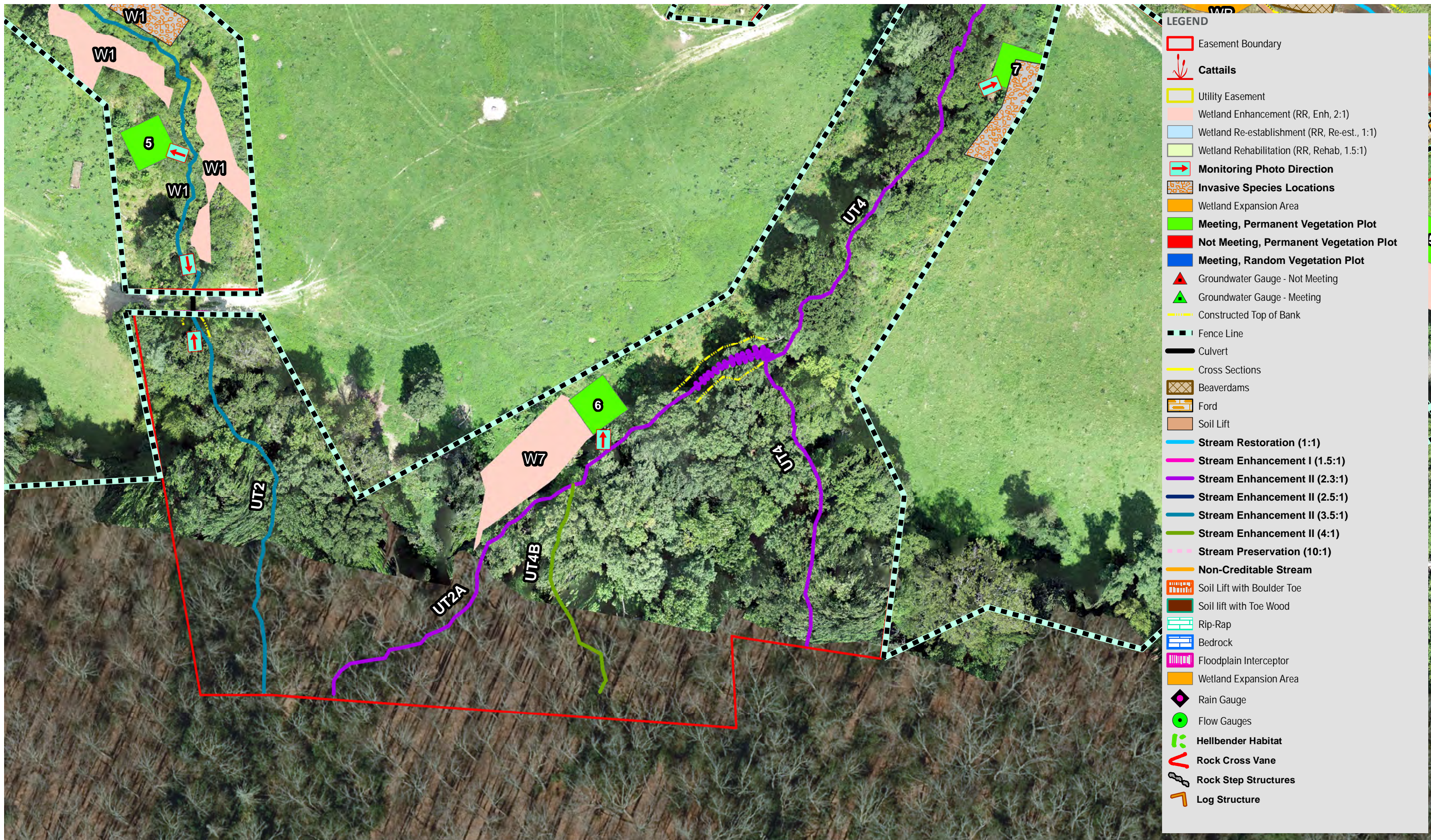
LEGEND

- Easement Boundary
 - Utility Easement
 - Wetland Enhancement (RR, Enh, 2:1)
 - Monitoring Photo Direction
 - Invasive Species Locations
 - Wetland Re-establishment (RR, Re-est., 1:1)
 - Wetland Rehabilitation (RR, Rehab, 1.5:1)
 - Wetland Expansion Area
 - Meeting, Permanent Vegetation Plot
 - Not Meeting, Permanent Vegetation Plot
 - Meeting, Random Vegetation Plot
 - Groundwater Gauge - Not Meeting
 - Groundwater Gauge - Meeting
 - Constructed Top of Bank
 - Fence Line
 - Culvert
 - Cross Sections
 - Beaverdams
 - Ford
 - Soil Lift
 - Soil Lift with Boulder Toe
- Streams**
- Stream Restoration (1:1)
 - Stream Enhancement I (1.5:1)
 - Stream Enhancement II (2.3:1)
 - Stream Enhancement II (2.5:1)
 - Stream Enhancement II (3.5:1)
 - Stream Enhancement II (4:1)
 - Stream Preservation (10:1)
 - Non-Creditable Stream
 - Soil lift with Toe Wood
 - Rip-Rap
 - Bedrock
 - Wetland Expansion Area
 - Rain Gauge
 - Flow Gauges
 - Hellbender Habitat
 - Rock Cross Vane
 - Rock Step Structures
 - Log Structure



CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE

FIGURE 2.8



CURRENT CONDITIONS PLAN VIEW
OWEN FARMS MITIGATION SITE
 FIGURE 2.9



Table 7.1 Visual Stream Stability Assessment

Visual Stream Stability Assessment

Reach WFFB

Assessed Stream Length 1799

Assessed Bank Length 3598

Date Assessed: 8/23/2023

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 <u>NOT</u> 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 <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	16	16		100%



Table 7.2 Visual Stream Stability Assessment

Visual Stream Stability Assessment

Reach UT4
 Assessed Stream Length 809
 Assessed Bank Length 1618
 Date Assessed 8/23/2023

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 <u>NOT</u> 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.	14	14		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	14	14		100%



Table 7.3 Visual Stream Stability Assessment

Visual Stream Stability Assessment

Reach UT5
 Assessed Stream Length 827
 Assessed Bank Length 1654
 Date Assessed 8/23/2023

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.	23	23		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)	23	23		100%



Table 7.4 Visual Stream Stability Assessment

Visual Stream Stability Assessment

Reach UT6

Assessed Stream Length 114

Assessed Bank Length 228

Date Assessed 8/23/2023

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 <u>NOT</u> 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.	2	2		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	2	2		100%



Table 7.5 Visual Stream Stability Assessment

Visual Stream Stability Assessment

Reach UT7

Assessed Stream Length 417

Assessed Bank Length 834

Date Assessed 8/23/2023

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.	10	10		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	10	10		100%



Table 7.6 Visual Stream Stability Assessment

Visual Stream Stability Assessment

Reach UT8
Assessed Stream Length 137
Assessed Bank Length 274
Date Assessed 8/23/2023

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 <u>NOT</u> 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 <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	3	3		100%

Table 8. Visual Vegetation Condition

Assessment

Visual Vegetation Assessment

Planted acreage 14.26

Data Assessed 8/23/2023

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.49	3.4%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10 acres	0.00	0.0%
Total			0.49	3.4%
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			0.49	3.4%
Easement Acreage 25.0				
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	0.70	2.8%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	0	15' of loose fencing near ford crossing allowed cattle access inside of easement.	

*Low stem densities observed only in Swamp Bog complex. See section 2.2.2 for details



Appendix C – Vegetation Plot Data



Table 9. Vegetation Plot Data

Planted Acreage	14.26
Date of Initial Plant	2021-01-22
Date(s) of Supplemental Plant(s)	NA
Date of Current Survey	8/23/2023
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 12 F		Veg Plot 13 F		Veg Plot 14 F		Veg Plot 15 F		Veg Plot 17 F		Veg Plot 18 F		Veg Plot 20 F		Veg Plot 11 R	Veg Plot 16 R	Veg Plot 19 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	Planted	Total	Planted	Total	Planted	Total	Planted	Total			
Species Included in Approved Mitigation Plan	<i>Alnus serrulata</i>	hazel alder	Tree	OBL					9																																				
	<i>Aronia arbutifolia</i>	red chokeberry	Shrub	FACW																																									
	<i>Betula alleghaniensis</i>	yellow birch	Tree	FACU					1	2																																			
	<i>Betula lenta</i>	sweet birch	Tree	FACU																																									
	<i>Betula nigra</i>	river birch	Tree	FACW	1	1																																							
	<i>Carya cordiformis</i>	bitternut hickory	Tree	FACU																																									
	<i>Carya ovata</i>	shagbark hickory	Tree	FACU		1																																							
	<i>Cephalanthus occidentalis</i>	common buttonbush	Shrub	OBL																																									
	<i>Cornus florida</i>	flowering dogwood	Tree	FACU																																									
	<i>Hamamelis virginiana</i>	American witchhazel	Tree	FACU																																									
	<i>Lindera benzoin</i>	northern spicebush	Tree	FAC																																									
	<i>Liriodendron tulipifera</i>	tuliptree	Tree	FACU	2	3	2	6	1	2	2	2	3	3	1	1	1	1	1	2	1	3																							
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	3	3	1	1	1	1	1	1	6	7	5	5	3	4	4	4	3	3																							
	<i>Quercus alba</i>	white oak	Tree	FACU	1	1	1	1					2	3	4	4	6	6	2	2																									
<i>Sambucus canadensis</i>	American black elderberry	Tree																																											
<i>Ulmus americana</i>	American elm	Tree	FACW					2	2	1	1																																		
Sum	Performance Standard				6	9	9	13	4	17	7	8	14	15	13	13	7	8	12	13	4	11	10	10	4	5	15	17	12	15	11	13	9	9	11	12	11	11	6	12	13				
Post Mitigation Plan Species	<i>Sassafras albidum</i>	sassafras	Tree	FACU				4																																					
Sum	Proposed Standard				6	9	9	13	4	17	7	8	14	15	13	13	7	8	12	13	4	11	10	10	4	5	15	17	12	15	11	13	9	9	11	12	11	11	6	12	13				
Mitigation Plan Performance Standard	Current Year Stem Count				9	13	17	8	15	13	8	13	11	10	5	17	15	13	9	12	11	6	12	13																					
	Stems/Acre				364	526	648	324	607	526	324	526	445	364	202	688	607	526	364	486	445	243	486	526																					
	Species Count				5	5	6	4	4	4	4	6	5	3	4	7	7	6	5	5	3	3	4	4																					
	Dominant Species Composition (%)				33	35	53	38	47	46	50	31	27	60	40	29	33	38	33	42	45	67	50	38																					
	Average Plot Height (ft.)				3	2	3	4	7	5	7	4	4	3	2	2	4	4	3	4	5	5	4	1																					
% Invasives				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				9	13	17	8	15	13	8	13	11	10	5	17	15	13	9	12	11	6	12	13																					
	Stems/Acre				364	526	648	324	607	526	324	526	445	364	202	688	607	526	364	486	445	243	486	526																					
	Species Count				5	5	6	4	4	4	4	6	5	3	4	7	7	6	5	5	3	3	4	4																					
	Dominant Species Composition (%)				33	35	53	38	47	46	50	31	27	60	40	29	33	38	33	42	45	67	50	38																					
	Average Plot Height (ft.)				3	2	3	4	7	5	7	4	4	3	2	2	4	4	3	4	5	5	4	1																					
% Invasives				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.

Meeting Success Criteria
 Not Meeting Success Criteria



Table 10 Vegetation Performance Standards Summary Table

Vegetation Performance Standards Summary Table												
	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	364		5	0	526		5	0	648		6	0
Monitoring Year 2	364		5	0	486		6	0	486		6	0
Monitoring Year 1	364		6	0	486		6	8	931		7	0
Monitoring Year 0	486		6	0	526		6	0	405		5	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	324		4	0	607		4	0	526		4	0
Monitoring Year 2	405		4	0	567		4	0	648		4	0
Monitoring Year 1	445		5	0	607		4	0	648		4	0
Monitoring Year 0	445		5	0	567		4	0	648		4	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	324		4	0	526		6	0	445		5	0
Monitoring Year 2	405		5	0	445		5	0	405		5	0
Monitoring Year 1	445		6	0	607		6	0	445		6	0
Monitoring Year 0	445		6	0	648		6	0	607		6	0
	Veg Plot 10 F				Veg Plot 12 F				Veg Plot 13 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	364		3	0	202		4	0	688		7	0
Monitoring Year 2	607		5	0	243		4	0	769		7	0
Monitoring Year 1	567		5	0	243		4	0	567		4	0
Monitoring Year 0	607		5	0	243		4	0	729		5	0
	Veg Plot 14 F				Veg Plot 15 F				Veg Plot 17 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	607		7	0	526		6	0	364		5	0
Monitoring Year 2	567		7	0	688		6	0	364		5	0
Monitoring Year 1	486		6	0	648		5	0	405		5	0
Monitoring Year 0	810		8	0	769		5	0	526		5	0
	Veg Plot 18 F				Veg Plot 20 F				Veg Plot Group 1 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	486		5	0	445		3	0	243		3	0
Monitoring Year 2	486		5	0	405		3	0				
Monitoring Year 1	324		4	0	283		3	0				
Monitoring Year 0	648		5	0	648		4	0				
	Veg Plot Group 2 R				Veg Plot Group 3 R							
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives				
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3	486		4	0	526		4	0				
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0												

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

Figures 3.1 – 3.47: Vegetation Plot Photographs and Site Aerial Photographs



3.1 Vegetation Plot 1 : 8/23/2023



3.2 Vegetation Plot 2 : 8/23/2023



3.3 Vegetation Plot 3 : 8/23/2023



3.4 Vegetation Plot 4 : 8/23/2023



3.5 Vegetation Plot 5 : 8/23/2023



3.6 Vegetation Plot 6 : 8/23/2023

Figures 3.1 – 3.47: Vegetation Plot Photographs and Site Aerial Photographs



3.7 Vegetation Plot 7 : 8/23/2023



3.8 Vegetation Plot 8 : 8/23/2023



3.9 Vegetation Plot 9 : 8/23/2023



3.10 Vegetation Plot 10 : 8/23/2023



3.11 Vegetation Plot 11 : 8/23/2023



3.12 Vegetation Plot 12 : 8/23/2023

Figures 3.1 – 3.47: Vegetation Plot Photographs and Site Aerial Photographs



3.13 Vegetation Plot 13 : 8/23/2023



3.14 Vegetation Plot 14 : 3/16/2022



3.15 Vegetation Plot 15 : 8/23/2023



3.16 Vegetation Plot 16 : 8/23/2023



3.17 Vegetation Plot 17 : 8/23/2023



3.18 Vegetation Plot 18 : 8/23/2023

Figures 3.1 – 3.48: Vegetation Plot Photographs and Site Aerial Photographs



3.19 Vegetation Plot 19 : 8/23/2023



3.20 Vegetation Plot 20 : 8/23/2023



3.21 Aerial overview of West Fork French Broad River looking upstream: 8/24/2023



3.22 Aerial overview of the of UT8 and West Fork French Broad River confluence: 8/24/2023



3.23 Aerial overview of UT3 and West Fork French Broad River confluence: 8/24/2023



3.24 Aerial overview of UT5 and West Fork French Broad River confluence: 8/24/2023

Figures 3.1 – 3.48: Vegetation Plot Photographs and Site Aerial Photographs



3.25 Aerial overview UT5: 8/24/2023



3.26 Aerial overview UT7: 8/24/2023



**3.27 UT1 Culvert looking downstream:
3/30/2023**



**3.28 UT1 Culvert looking upstream:
3/30/2023**



**3.29 UT2A Culvert looking downstream,
3/30/2023**



**3.30 UT2A Culvert looking upstream:
3/30/2023**



Figures 3.1 – 3.48: Vegetation Plot Photographs and Site Aerial Photographs



**3.31 UT2 Culvert looking downstream:
3/30/2023**



**3.32 UT2 Culvert looking upstream:
3/30/2023**



3.33 UT2 Single Thread Channel: 3/30/2023



**3.34 UT4 Culvert looking downstream:
3/30/2023**



**3.35 UT4 Culvert Crossing looking upstream:
3/30/2023**



3.36 Downed fence line along UT4: 3/30/2023



Figures 3.1 – 3.48: Vegetation Plot Photographs and Site Aerial Photographs



3.37 Repaired fence line along UT4:
3/30/2023



3.38 Beaver dam located on UT5 at STA 18+25:
6/30/2023



3.39 Aerial photo of broken beaver dam on
UT5 at STA 18+25: 8/24/2023



3.40 Beaver dam on UT7 below XS14: 6/30/2023



3.41 Broken beaver dam on UT7 above XS14:
6/30/2023



3.42 Repaired area near STA 10+00 WFFBR:
3/30/2023



Figures 3.1 – 3.48: Vegetation Plot Photographs and Site Aerial Photographs



**3.43 Juncus sod mat between STA 13+90
- 14+50: 8/23/2023**



**3.44 Woody vegetation along WFFBR at STA
15+25: 8/23/2023**



**3.45 Juncus sod mat repair at STA 16+50
WFFBR: 6/30/2023**



**3.46 Aerial photo of Swamp Bog Complex:
8/24/2023**



**3.47 Juncus sod mat repair at STA 22+35
6/30/2023**



**3.48 Aerial photo of dead multiflora in Swamp
Bog Complex**



Appendix D – Stream Geomorphology Data

Figures 4.1 – 4.14: Cross Section Photos



**4.1 West Fork French Broad Cross
Section 1: 3/30/2023**



**4.2 West Fork French Broad Cross
Section 2: 3/30/2023**



**4.3 West Fork French Broad Cross
Section 3: 3/30/2023**



**4.4 West Fork French Broad Cross
Section 4: 3/30/2023**



**4.5 West Fork French Broad Cross
Section 5: 3/30/2023**



**4.6 West Fork French Broad Cross
Section 6: 3/30/2023**

Figures 4.1 – 4.14: Cross Section Photos



**4.7 UT 8 Cross Section 7:
3/30/2023**



**4.8 UT 8 Cross Section 8:
3/30/2023**



**4.9 UT 5 Cross Section 9:
3/30/2023**



**4.10 UT 5 Cross Section 10:
3/30/2023**



**4.11 UT 5 Cross Section 11:
3/30/2023**



**4.12 UT 5 Cross Section 12:
3/30/2023**



Figures 4.1 – 4.14: Cross Section Photos



4.13 **UT 7 Cross Section 13:**
3/30/2023



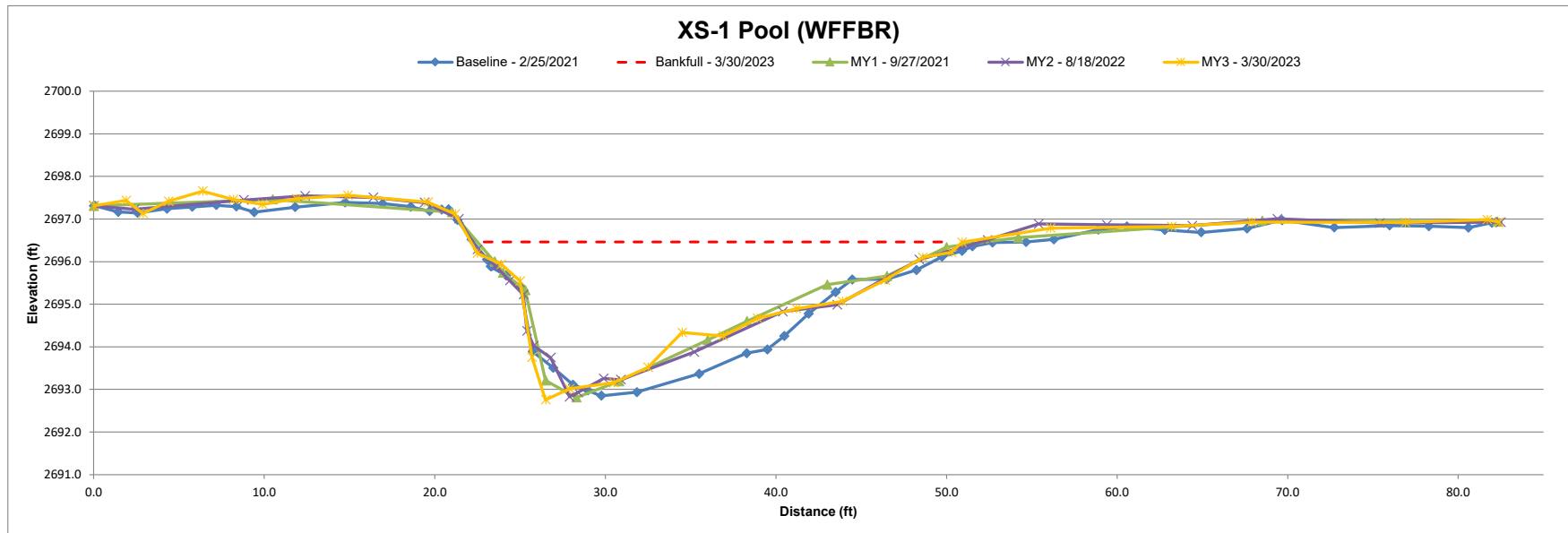
4.14 **UT7 Cros Section 14:**
3/30/2023



Figures 5.1 – 5.14 Monitoring Cross Section Plots

Figure 5.1 Cross Section 1

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 1 (WFFBR)
Drainage Area (Acres)	3,795
Date	3/30/2023
Field Crew	MAF, WDB



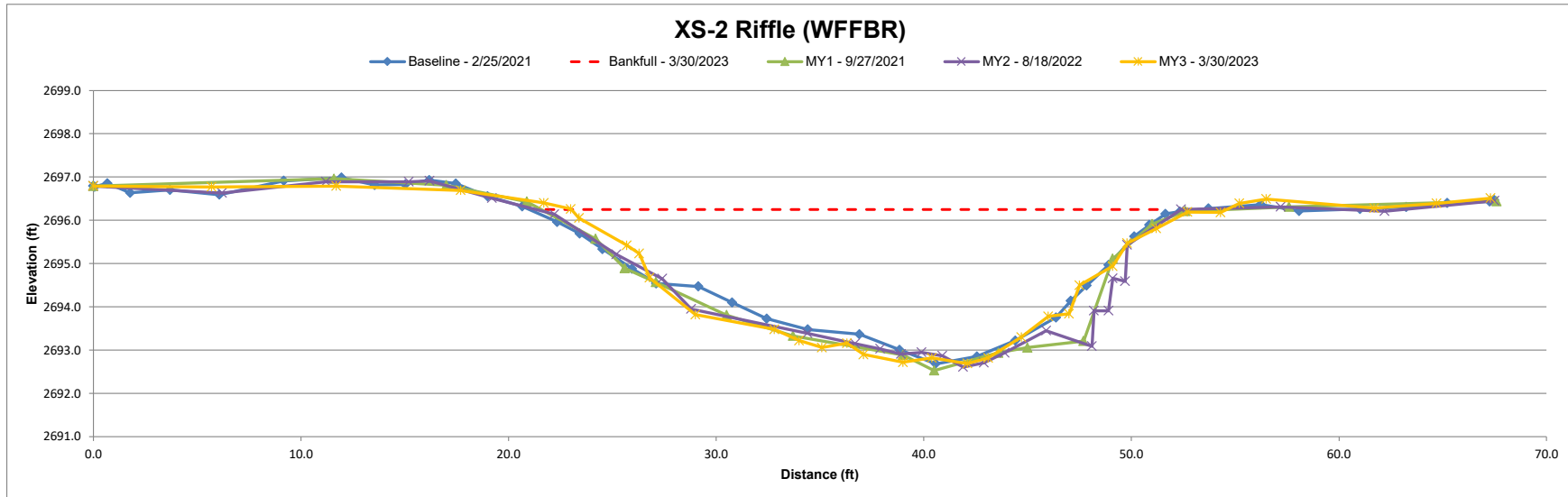
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 1 (Pool)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	--	--	--	--		
Bank Height Ratio	--	--	--	--		
Thalweg Elevation	2692.85	2692.81	2692.83	2692.76		
Low Top Of Bank Elevation	2696.45	2696.34	2696.51	2696.46		
Low Top of Bank Max Depth (ft)	3.60	3.53	3.68	3.70		
Low Top Of Bank Cross Sectional Area (ft ²)	58.72	46.68	54.47	52.20		



Figure 5.2 Cross Section 2

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 2 (WFFBR)
Drainage Area (Acres)	3,795
Date	3/30/2023
Field Crew	MAF, WDB



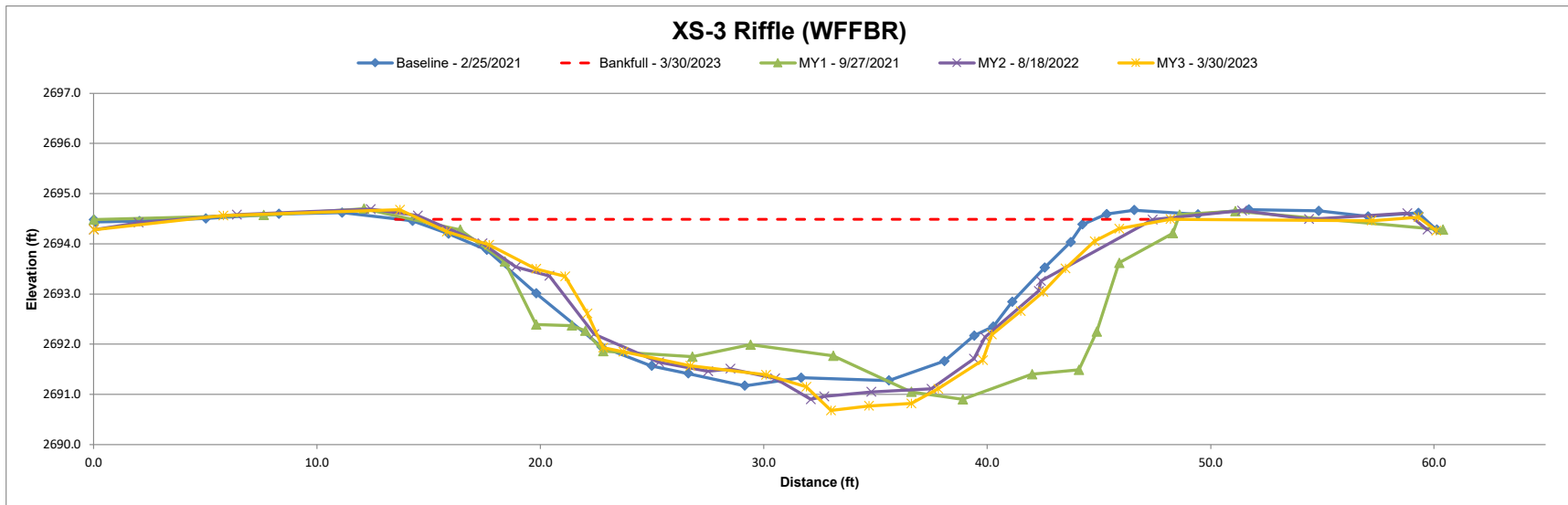
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 2 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2696.15	2695.96	2696.25	2696.18		
Bank Height Ratio	1.00	1.07	1.00	1.00		
Thalweg Elevation	2692.68	2692.53	2692.61	2692.69		
Low Top Of Bank Elevation	2696.15	2696.21	2696.25	2696.18		
Low Top of Bank Max Depth (ft)	3.47	3.68	3.54	3.54		
Low Top Of Bank Cross Sectional Area (ft ²)	61.32	69.39	70.16	65.25		



Figure 5.3 Cross Section 3

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 3 (WFFBR)
Drainage Area (Acres)	3,795
Date	3/30/2023
Field Crew	MAF, WDB



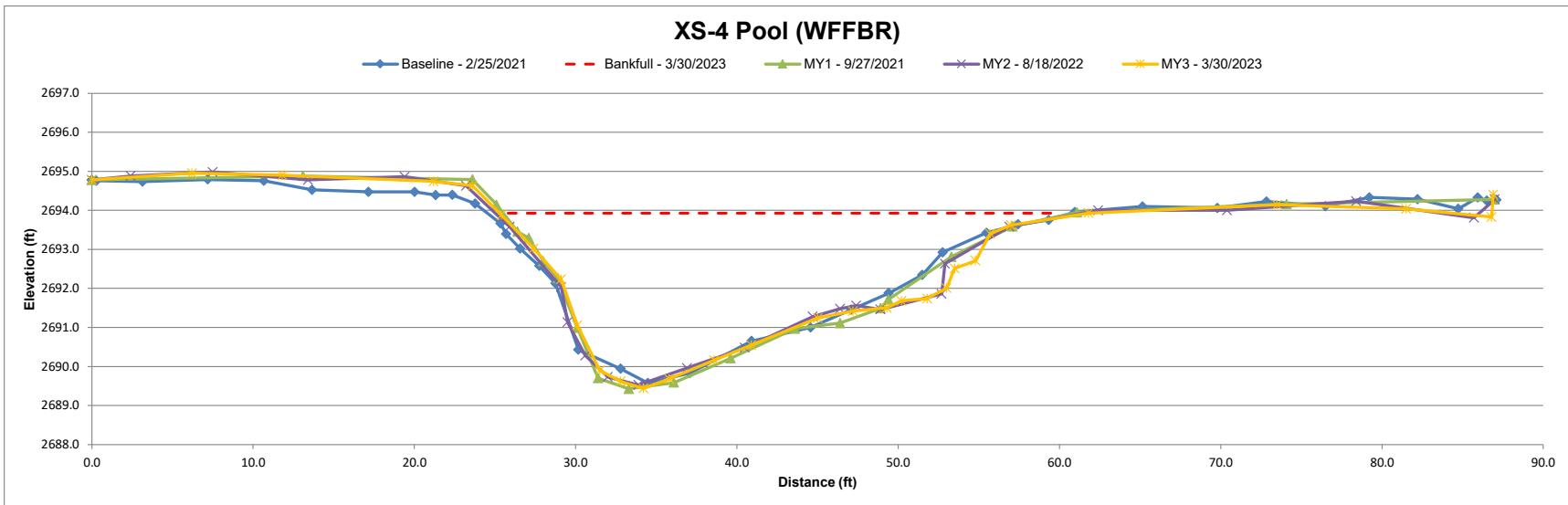
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 3 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2694.46	2694.11	2694.48	2694.49		
Bank Height Ratio	1.00	1.15	1.00	1.00		
Thalweg Elevation	2691.17	2690.90	2690.90	2690.68		
Low Top Of Bank Elevation	2694.46	2694.58	2694.48	2694.49		
Low Top of Bank Max Depth (ft)	3.29	3.68	3.58	3.81		
Low Top Of Bank Cross Sectional Area (ft ²)	65.45	80.97	68.38	69.43		



Figure 5.4 Cross Section 4

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 4 (WFFBR)
Drainage Area (Acres)	3,795
Date	3/30/2023
Field Crew	MAF, WDB



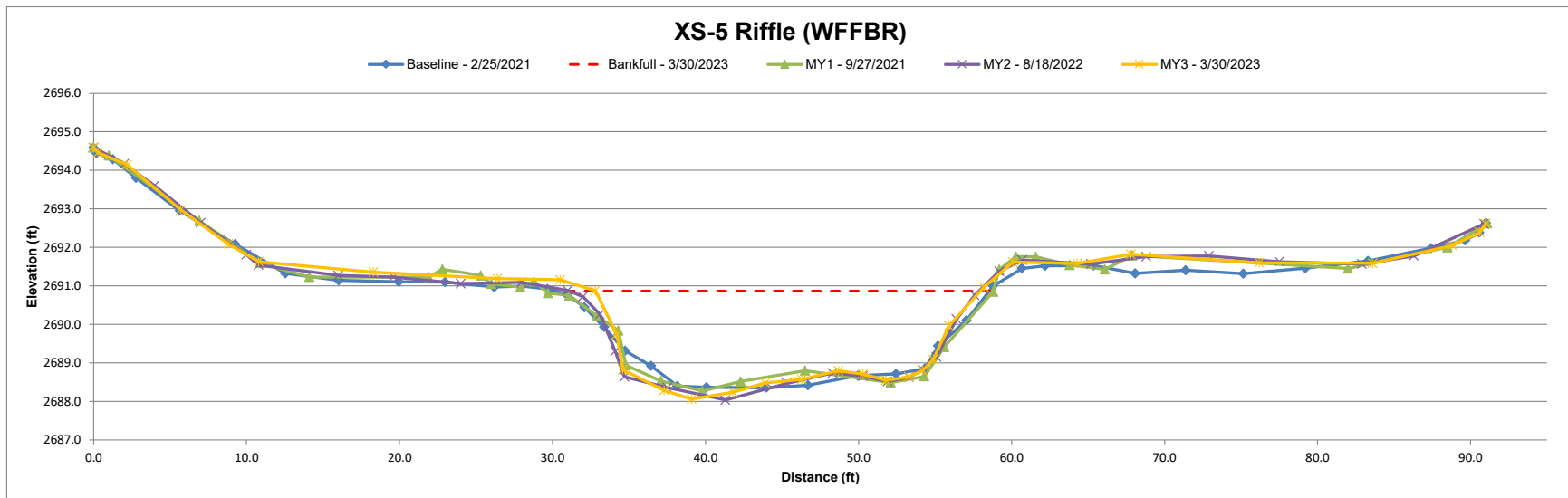
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 4 (Pool)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	--	--	--	--		
Bank Height Ratio	--	--	--	--		
Thalweg Elevation	2689.58	2689.43	2689.53	2689.44		
Low Top Of Bank Elevation	2693.64	2693.95	2693.95	2693.93		
Low Top of Bank Max Depth (ft)	4.06	4.52	4.42	4.49		
Low Top Of Bank Cross Sectional Area (ft ²)	71.83	84.77	84.93	84.40		



Figure 5.5 Cross Section 5

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 5 (WFFBR)
Drainage Area (Acres)	3,795
Date	3/30/2023
Field Crew	MAF, WDB



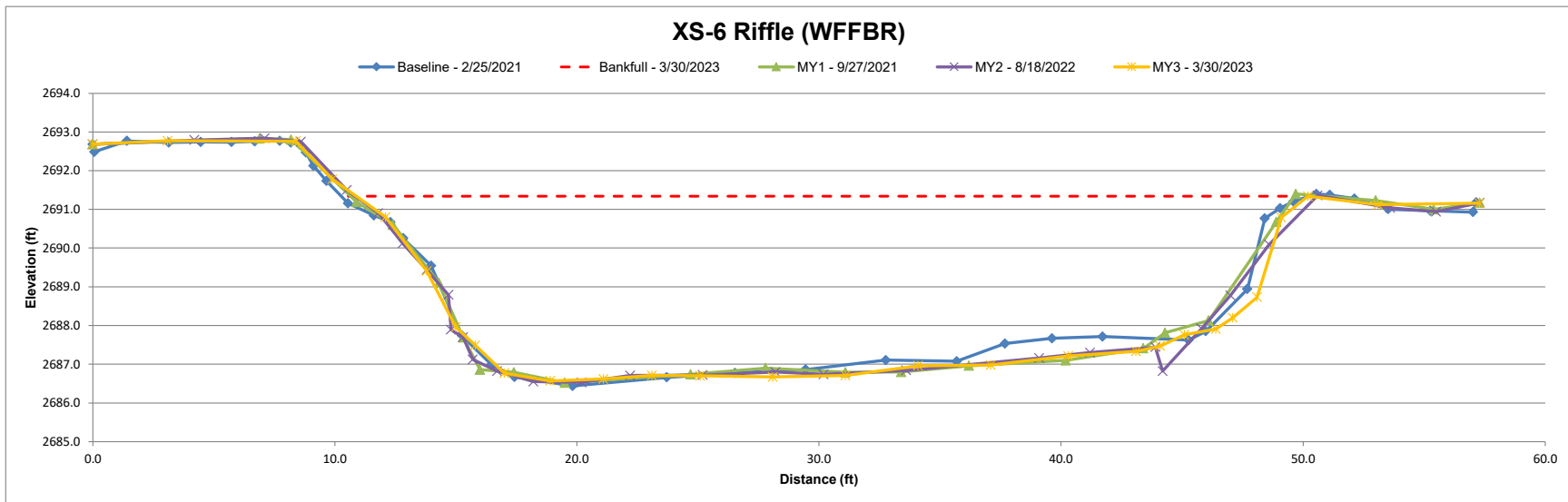
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 5 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2690.79	2690.79	2690.88	2690.87		
Bank Height Ratio	1.00	1.01	1.00	1.00		
Thalweg Elevation	2688.36	2688.27	2688.04	2688.06		
Low Top Of Bank Elevation	2690.79	2690.81	2690.88	2690.87		
Low Top of Bank Max Depth (ft)	2.43	2.54	2.84	2.81		
Low Top Of Bank Cross Sectional Area (ft ²)	49.82	50.32	53.99	51.8		



Figure 5.6 Cross Section 6

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 6 (WFFBR)
Drainage Area (Acres)	3,795
Date	3/30/2023
Field Crew	MAF, WDB



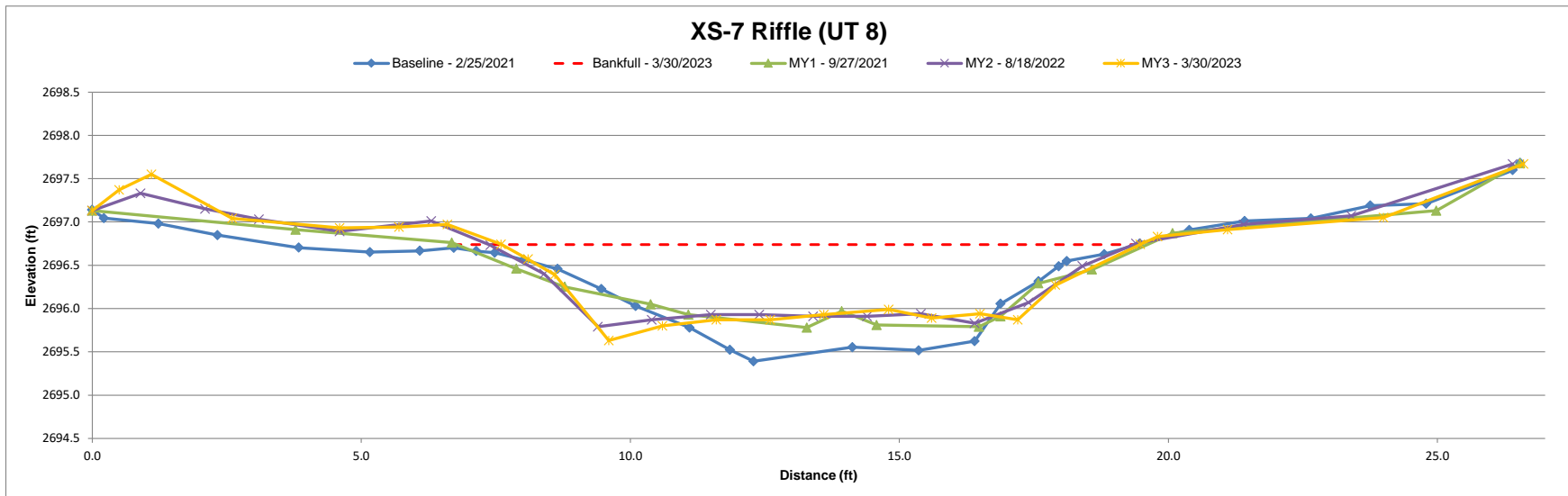
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 6 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2691.20	2691.11	2691.36	2691.33		
Bank Height Ratio	1.00	1.06	1.00	1.00		
Thalweg Elevation	2686.44	2686.52	2686.53	2686.57		
Low Top Of Bank Elevation	2691.20	2691.40	2691.36	2691.34		
Low Top of Bank Max Depth (ft)	4.76	4.88	4.83	4.77		
Low Top Of Bank Cross Sectional Area (ft ²)	138.26	149.49	150.40	150.30		



Figure 5.7 Cross Section 7

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 7 (UT 8)
Drainage Area (Acres)	41
Date	3/30/2023
Field Crew	MAF, WDB



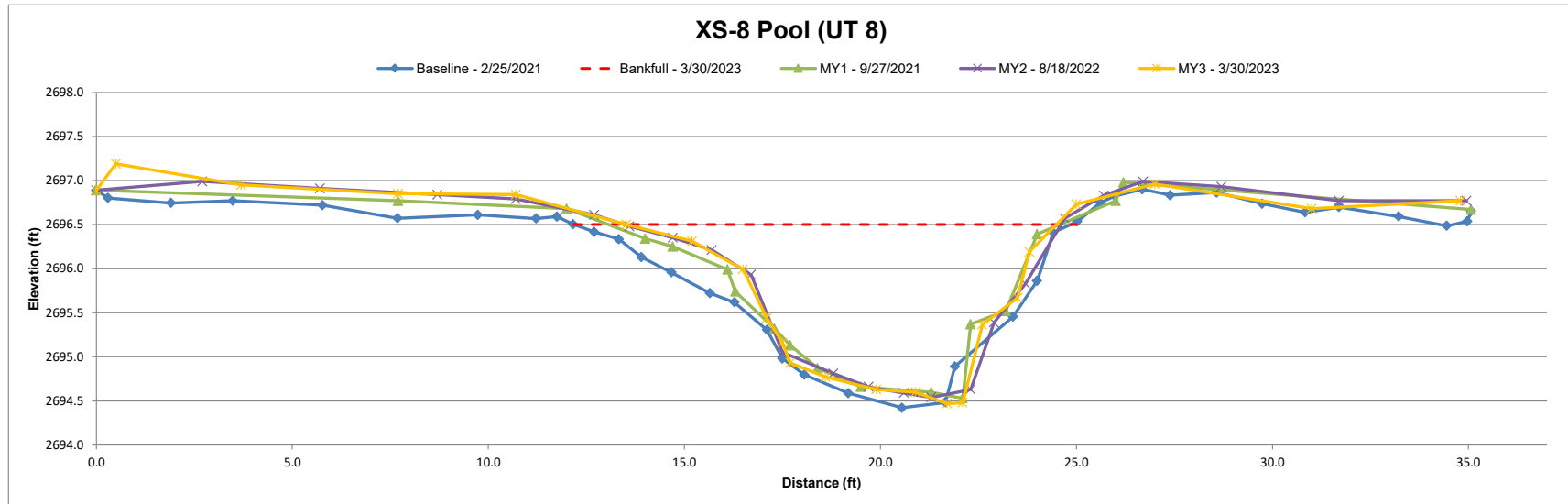
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 7 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2696.64	2696.74	2696.75	2696.74		
Bank Height Ratio	1.00	1.02	1.00	1.00		
Thalweg Elevation	2695.39	2695.78	2695.79	2695.63		
Low Top Of Bank Elevation	2696.64	2696.76	2696.75	2696.74		
Low Top of Bank Max Depth (ft)	1.25	0.98	0.96	1.11		
Low Top Of Bank Cross Sectional Area (ft ²)	8.14	8.40	8.19	8.43		



Figure 5.8 Cross Section 8

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 8 (UT 8)
Drainage Area (Acres)	41
Date	3/30/2023
Field Crew	MAF, WDB



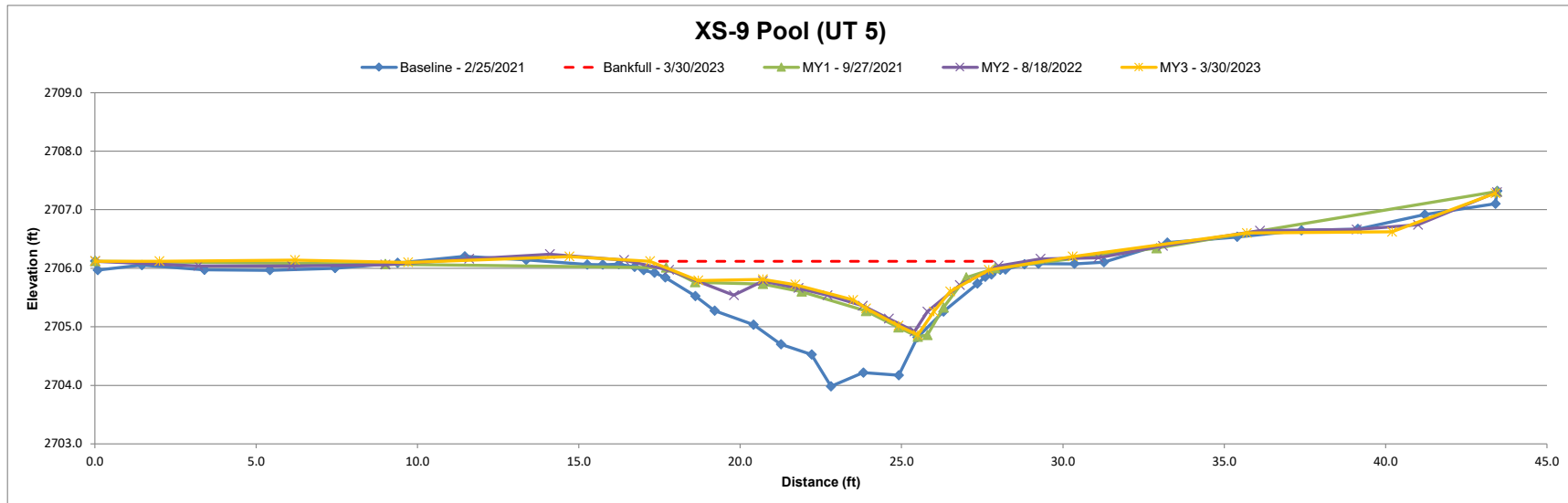
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 8 (Pool)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	--	--	--	--		
Bank Height Ratio	--	--	--	--		
Thalweg Elevation	2694.42	2694.53	2694.54	2694.5		
Low Top Of Bank Elevation	2696.50	2696.68	2696.51	2696.5		
Low Top of Bank Max Depth (ft)	2.08	1.97	1.97	2.03		
Low Top Of Bank Cross Sectional Area (ft ²)	14.19	11.96	11.94	11.9		



Figure 5.9 Cross Section 9

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 9 (UT 5)
Drainage Area (Acres)	45.2
Date	3/30/2023
Field Crew	MAF, WDB



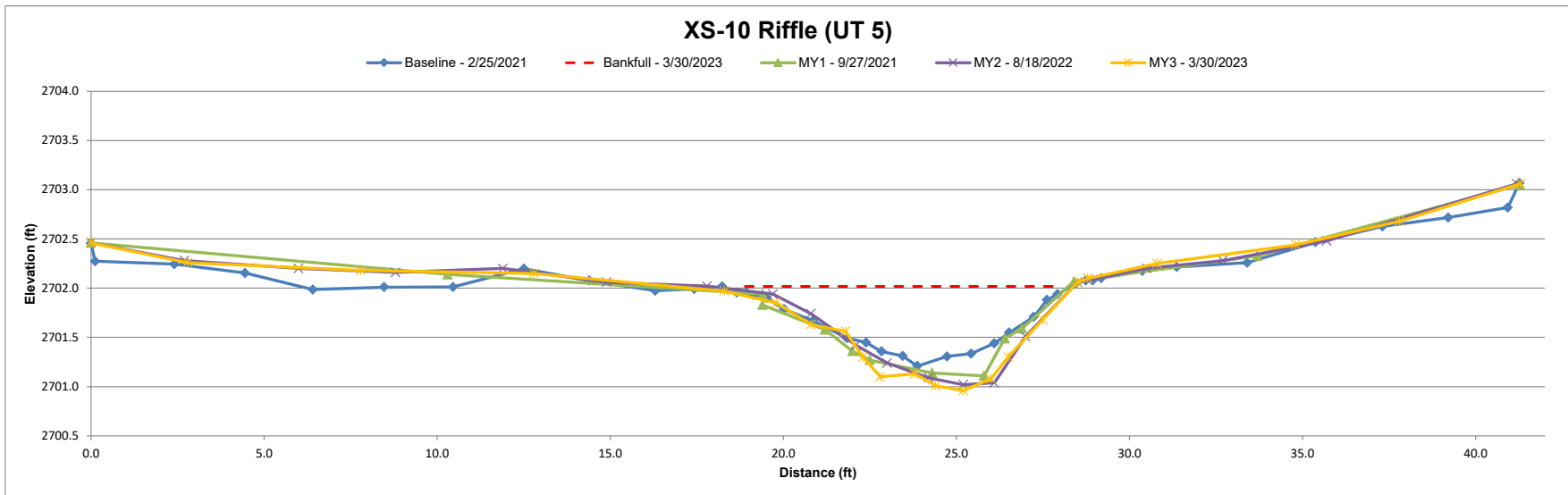
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 9 (Pool)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	--	--	--	--		
Bank Height Ratio	--	--	--	--		
Thalweg Elevation	2703.98	2704.83	2704.92	2704.86		
Low Top Of Bank Elevation	2705.97	2706.01	2706.04	2706.12		
Low Top of Bank Max Depth (ft)	1.99	1.18	1.12	1.26		
Low Top Of Bank Cross Sectional Area (ft ²)	10.89	4.96	4.90	5.55		



Figure 5.10 Cross Section 10

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 10 (UT 5)
Drainage Area (Acres)	45.2
Date	3/30/2023
Field Crew	MAF, WDB



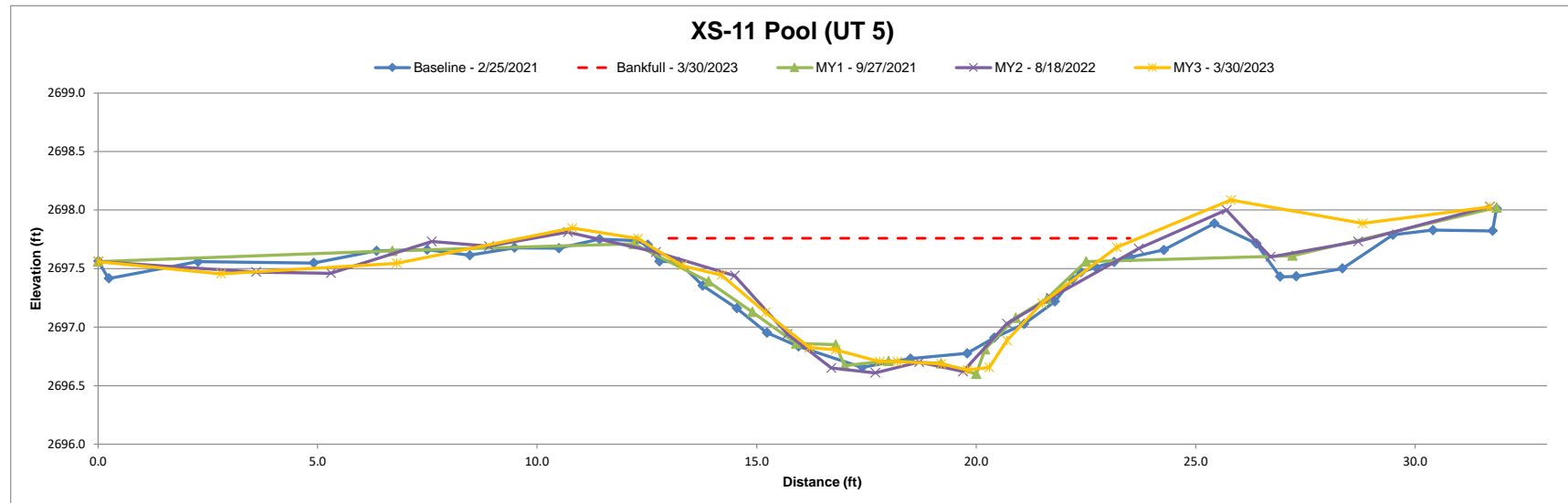
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 10 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2702.02	2701.93	2702.02	2701.97		
Bank Height Ratio	1.00	1.01	1.00	1.00		
Thalweg Elevation	2701.21	2701.11	2701.02	2700.96		
Low Top Of Bank Elevation	2702.02	2701.94	2702.02	2701.97		
Low Top of Bank Max Depth (ft)	0.81	0.83	1.00	1.01		
Low Top Of Bank Cross Sectional Area (ft ²)	4.37	4.43	5.37	5.27		



Figure 5.11 Cross Section 11

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 11 (UT 5)
Drainage Area (Acres)	45.2
Date	3/30/2023
Field Crew	MAF, WDB



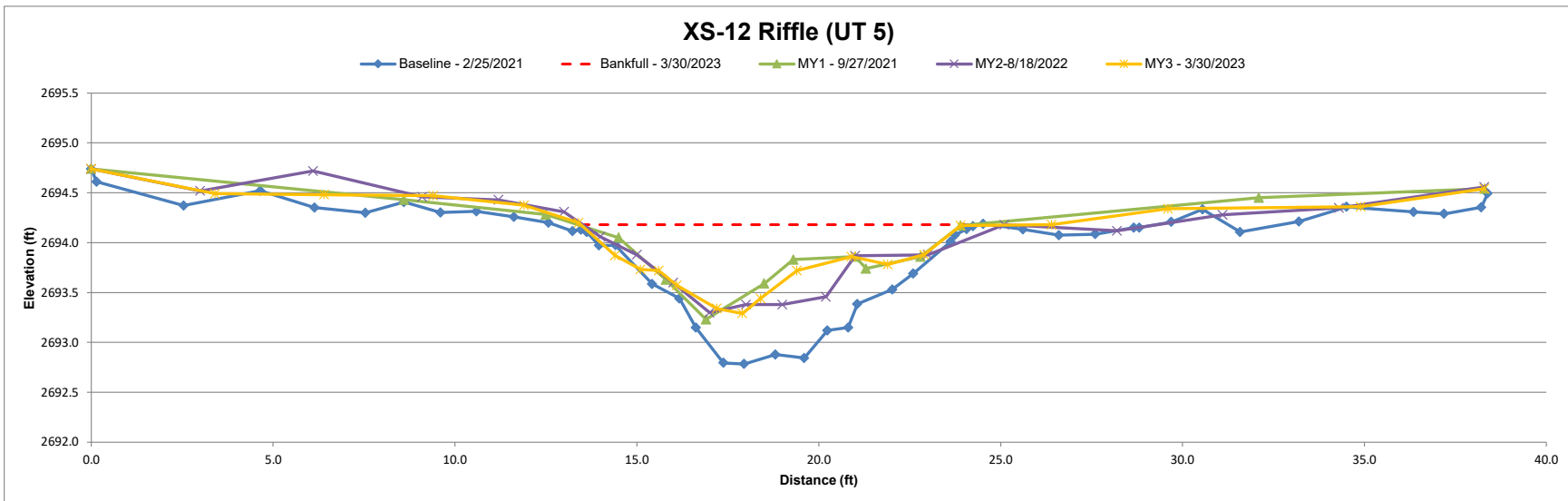
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 11 (Pool)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	--	--	--	--		
Bank Height Ratio	--	--	--	--		
Thalweg Elevation	2696.66	2996.60	2696.61	2696.64		
Low Top Of Bank Elevation	2697.47	2697.56	2697.67	2697.76		
Low Top of Bank Max Depth (ft)	0.81	0.96	1.06	1.13		
Low Top Of Bank Cross Sectional Area (ft ²)	4.75	5.40	6.55	7.32		



Figure 5.12 Cross Section 12

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 12 (UT 5)
Drainage Area (Acres)	45.2
Date	3/30/2023
Field Crew	MAF, WDB



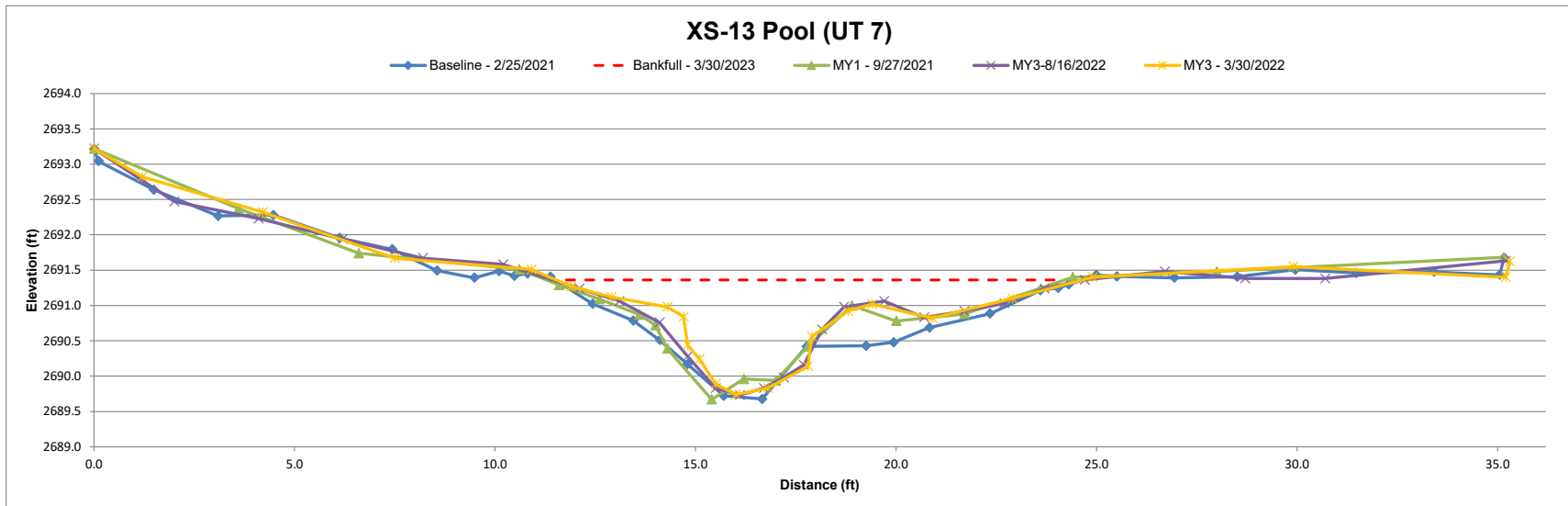
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 12 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2694.13	2694.49	2694.18	2694.17		
Bank Height Ratio	1.00	0.75	1.00	1.00		
Thalweg Elevation	2692.78	2693.23	2693.30	2693.29		
Low Top Of Bank Elevation	2694.13	2694.17	2694.18	2694.17		
Low Top of Bank Max Depth (ft)	1.35	0.95	0.88	0.88		
Low Top Of Bank Cross Sectional Area (ft ²)	7.83	4.28	5.30	4.66		



Figure 5.13 Cross Section 13

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 13 (UT 7)
Drainage Area (Acres)	32.1
Date	3/30/2023
Field Crew	MAF, WDB



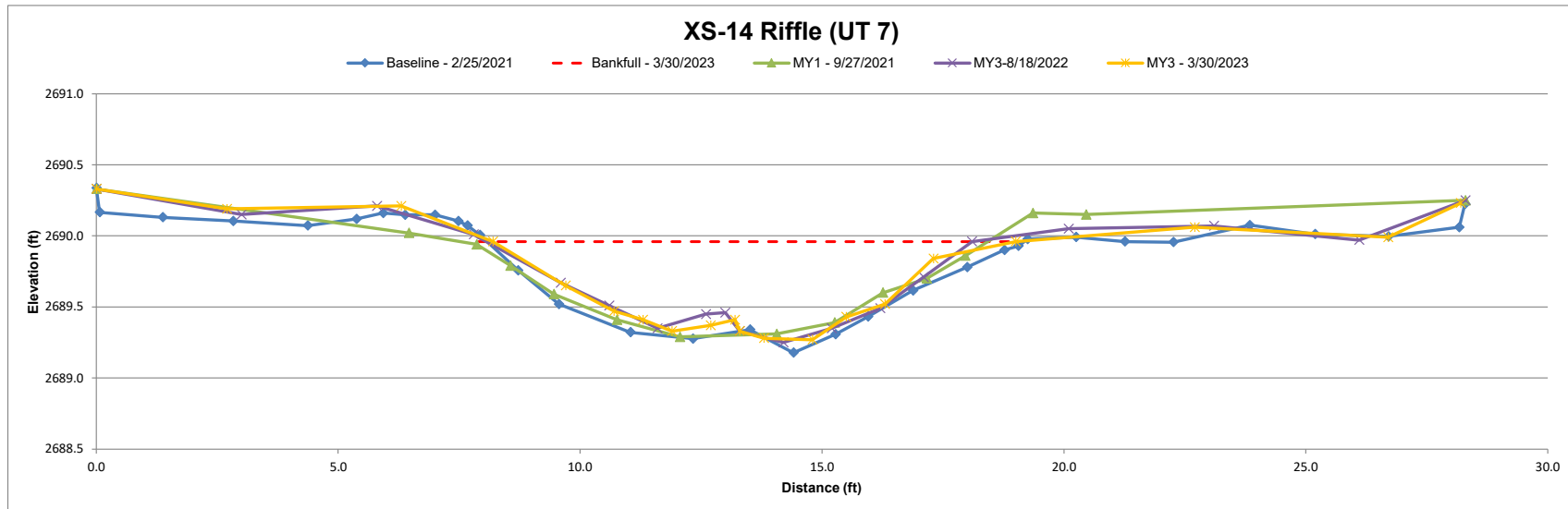
Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 13 (Pool)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	--	--	--	--		
Bank Height Ratio	--	--	--	--		
Thalweg Elevation	2689.68	2689.67	2689.73	2689.74		
Low Top Of Bank Elevation	2691.25	2691.40	2691.36	2691.4		
Low Top of Bank Max Depth (ft)	1.57	1.73	1.63	1.66		
Low Top Of Bank Cross Sectional Area (ft ²)	8.77	9.06	8.10	8.21		



Figure 5.14 Cross Section 14

River Basin	French Broad
Watershed	06010105010020
XS ID	XS 14 (UT 7)
Drainage Area (Acres)	32.1
Date	3/30/2023
Field Crew	MAF, WDB



Bankfull elevation adjusted to current monitoring year's low top of bank elevation

Dimensions	Cross Section 14 (Riffle)					
	Base	MY1	MY2	MY3	MY4	MY5
Bankfull Elevation (ft) - Based on As Built-Bankfull Area	2689.90	2689.95	2689.96	2689.96		
Bank Height Ratio	1.00	0.98	1.00	1.00		
Thalweg Elevation	2689.18	2689.29	2689.25	2689.27		
Low Top Of Bank Elevation	2689.90	2689.94	2689.96	2689.96		
Low Top of Bank Max Depth (ft)	0.72	0.65	0.71	0.69		
Low Top Of Bank Cross Sectional Area (ft ²)	4.56	4.45	4.31	4.34		



Table 11. Monitoring Year 3 Stream Data Summary

Owen Farms Mitigation Site / DMS: 100064 - West Fork French Broad River (WFFBR), UT 5, UT 7, UT 8																																						
Parameter	West Fork French Broad River																		UT 5																			
	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)			Monitoring (MY1)			Monitoring (MY2)			Monitoring (MY3)			Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)			Monitoring (MY1)			Monitoring (MY2)			Monitoring (MY3)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Mean	Med	Max	n	Min	Max	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n
Riffle Only	28.78	38.38	38.47	47.90	3	30.00	30.00	27.52	39.11	4	28.5	42.58	4	26.94	39.81	4	25.18	39.28	4	4.38	4.38	4.38	4.38	1	8.50	8.50	8.94	10.08	2	7.46	12.48	2	8.10	10.59	2	9.96	10.41	2
Bankfull Width (ft)	47.89	56.15	51.56	69.00	3	93.00	93.00	96.35	430.60	4	96.35	430.6	4	96.35	430.60	4	96.35	430.60	4	8.00	8.00	8.00	8.00	1	100.00	100.00	60.41	491.41	2	60.41	491.41	2	60.41	491.41	2	60.41	491.41	2
Floodprone Width (ft)	1.89	2.12	2.07	2.41	3	2.14	2.14	1.81	3.54	4	1.75	3.34	4	2.00	3.78	4	2.06	3.83	4	0.66	0.66	0.66	0.66	1	0.63	0.63	0.43	0.53	2	0.42	0.42	2	0.51	0.58	2	0.45	0.53	2
Bankfull Mean Depth (ft)	2.93	3.14	3.20	3.28	3	2.63	2.63	2.43	4.76	4	2.52	4.68	4	2.84	4.83	4	2.81	4.77	4	0.95	0.95	0.95	0.95	1	0.76	0.76	0.81	0.81	2	0.69	0.91	2	1.00	1.06	2	0.88	1.01	2
Bankfull Max Depth (ft)	69.31	79.83	79.56	90.63	3	69.60	69.60	49.82	138.26	4	49.74	142.14	4	53.99	150.36	4	51.80	150.30	4	2.90	2.90	2.90	2.90	1	5.00	5.00	4.37	4.75	2	3.12	5.28	2	5.37	6.55	2	4.66	5.27	2
Bankfull Cross Sectional Area (ft ²)	11.94	18.62	18.58	25.34	3	14.00	14.00	11.05	15.20	4	12.75	19.14	4	7.91	15.39	4	10.26	16.23	4	6.64	6.64	6.64	6.64	1	13.50	13.50	16.87	23.44	2	17.76	29.71	2	19.57	20.76	2	18.79	23.13	
Width/Depth Ratio	1.25	1.49	1.44	1.79	3	3.10	3.10	3.50	14.23	4	3.38	14.2	4	3.24	14.11	4	3.83	14.59	4	1.83	1.83	1.83	1.83	1	11.80	11.80	5.99	54.94	2	4.84	65.91	2	5.70	43.28	2	6.06	47.21	2
Entrenchment Ratio	1.70	1.90	1.80	2.19	3	1.00	1.00	1.00	1.00	4	1	1	4	1.00	1.02	4	1.00	1.00	4	1.20	1.20	1.20	1.20	1	1.00	1.00	1.00	1.00	2	1.00	1.00	2	1.00	1.00	2	1.00	1.00	2
Bank Height Ratio	83					83		83			40			40			40			40																		
Max part size (mm) mobilized at bankfull	B4 / F4					C4		C4			B4			C4			C4			C4																		
Rosgen Classification	300					300		300			10			10			10			10																		
Bankfull Discharge (cfs)	1.06					1.12		1.14			1.08			1.14			1.14			1.14																		
Sinuosity (ft)	0.0034					0.0034		0.0036			0.012			0.006			0.007			0.007																		
Water Surface Slope (Channel) (ft/ft)																																						
Parameter	UT 7																		UT 8																			
	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)			Monitoring (MY1)			Monitoring (MY2)			Monitoring (MY3)			Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)			Monitoring (MY1)			Monitoring (MY2)			Monitoring (MY3)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Mean	Med	Max	n	Min	Max	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n
Riffle Only	4.71	4.71	4.71	4.71	1	9.00	9.00	10.50	10.50	1	10.47	10.47	1	10.04	10.04	1	10.80	10.80	1	11.60	11.60	11.60	11.60	1	12.00	12.00	11.37	11.37	1	12.10	12.10	1	12.08	12.08	1	11.89	11.89	1
Bankfull Width (ft)	12.80	12.80	12.80	12.80	1	130.00	130.00	71.78	71.78	1	71.78	71.78	1	71.78	71.78	1	71.78	71.78	1	17.00	17.00	17.00	17.00	1	30.00	30.00	422.23	422.23	1	422.23	422.23	1	422.23	422.23	1	422.23	422.23	1
Floodprone Width (ft)	0.57	0.57	0.57	0.57	1	0.67	0.67	0.43	0.43	1	0.43	0.43	1	0.43	0.43	1	0.40	0.40	1	0.70	0.70	0.70	0.70	1	0.92	0.92	0.72	0.72	1	0.57	0.57	1	0.68	0.68	1	0.71	0.71	1
Bankfull Mean Depth (ft)	0.74	0.74	0.74	0.74	1	0.80	0.80	0.72	0.72	1	0.65	0.65	1	0.71	0.71	1	0.69	0.69	1	0.97	0.97	0.97	0.97	1	1.11	1.11	1.25	1.25	1	0.86	0.86	1	0.96	0.96	1	1.11	1.11	1
Bankfull Max Depth (ft)	2.69	2.69	2.69	2.69	1	5.60	5.60	4.56	4.56	1	4.45	4.45	1	4.31	4.31	1	4.34	4.34	1	8.19	8.19	8.19	8.19	1	10.30	10.30	8.14	8.14	1	6.90	6.90	1	8.19	8.19	1	8.44	8.44	1
Bankfull Cross Sectional Area (ft ²)	8.26	8.26	8.26	8.26	1	13.50	13.50	24.42	24.42	1	24.35	24.35	1	23.35	23.35	1	27.00	27.00	1	16.30	16.30	16.30	16.30	1	13.00	13.00	15.79	15.79	1	21.23	21.23	1	17.76	17.76	1	16.75	16.75	1
Width/Depth Ratio	2.71	2.71	2.71	2.71	1	14.40	14.40	6.84	6.84	1	6.85	6.85	1	7.15	7.15	1	6.65	6.65	1	1.47	1.47	1.47	1.47	1	2.50	2.50	37.14	37.14	1	34.90	34.90	1	34.96	34.96	1	35.50	35.50	1
Entrenchment Ratio	3.40	3.40	3.40	3.40	1	1.00	1.00	1.00	1.00	1	1	1	1	1.00	1.00	1	1.00	1.00	1	2.79	2.79	2.79	2.79	1	1.00	1.00	1.00	1.00	1	1.00	1.00	1	1.00	1.00	1	1.00	1.00	1
Bank Height Ratio	61.7					61.7		61.7			76.8			76.8			76.8			77.8																		
Max part size (mm) mobilized at bankfull	B4					C4		C4			B4			C4			C4			C4																		
Rosgen Classification	13					13		13			45			45			45			45																		
Bankfull Discharge (cfs)	1.00					1.24		1.26			1.03			1.09			1.10			1.10																		
Sinuosity (ft)	0.0246					0.0054		0.0057			0.0379			0.0110			0.0112			0.0112																		
Water Surface Slope (Channel) (ft/ft)																																						



Table 12. Cross Section Morphology Monitoring Summary

Owen Farms Mitigation Site / DMS: 100064 - West Fork French Broad River (WFFBR), UT 5, UT 7, UT 8																																			
	Cross Section 1 (Pool - WFFBR)							Cross Section 2 (Riffle - WFFBR)							Cross Section 3 (Riffle - WFFBR)							Cross Section 4 (Pool - WFFBR)							Cross Section 5 (Riffle - WFFBR)						
	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-Bankfull1 Area	--	--	--	--				2696.25	2695.96	2696.25	2696.18				2694.46	2694.11	2694.48	2694.49				--	--	--	--				2690.79	2690.79	2690.88	2690.87			
Bank Height Ratio_Based on AB Bankfull1 Area	--	--	--	--				0.97	1.07	1.00	1.00				1.00	1.15	1.00	1.00				--	--	--	--				1.00	1.01	1.00	1.00			
Thalweg Elevation	2692.85	2692.81	2692.83	2692.76				2692.68	2692.53	2692.68	2692.69				2691.17	2690.90	2690.90	2690.68				2689.58	2689.43	2689.53	2689.44				2688.36	2688.27	2688.04	2688.06			
LTOB2 Elevation	2696.45	2696.34	2696.51	2696.46				2696.15	2696.21	2696.25	2696.18				2694.46	2694.58	2694.48	2694.49				2693.64	2693.95	2693.95	2693.93				2690.79	2690.81	2690.88	2690.87			
LTOB2 Max Depth (ft)	3.60	3.53	3.68	3.70				3.47	3.68	3.54	3.54				3.29	3.68	3.58	3.81				4.06	4.52	4.42	4.49				2.43	2.54	2.84	2.81			
LTOB2 Cross Sectional Area (ft2)	58.72	46.68	54.47	52.20				61.32	69.39	70.16	65.25				65.45	80.97	68.38	69.43				71.83	84.77	84.93	84.40				49.82	50.32	53.99	51.80			
	Cross Section 6 (Riffle - WFFBR)							Cross Section 7 (Riffle - UT 8)							Cross Section 8 (Pool - UT 8)							Cross Section 9 (Pool - UT 5)							Cross Section 10 (Riffle - UT 5)						
	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-Bankfull1 Area	2691.20	2691.11	2691.36	2691.33				2696.64	2696.74	2696.75	2696.74				--	--	--	--				--	--	--	--				2702.02	2702.02	2701.97				
Bank Height Ratio_Based on AB Bankfull1 Area	1.00	1.06	1.00	1.00				1.00	1.02	1.00	1.00				--	--	--	--				--	--	--	--				1.00	1.00	1.00				
Thalweg Elevation	2686.44	2686.52	2686.53	2686.57				2695.39	2695.78	2695.79	2695.63				2694.42	2694.53	2694.54	2694.47				2703.98	2704.83	2704.92	2704.86				2701.21	2701.02	2700.96				
LTOB2 Elevation	2691.20	2691.40	2691.36	2691.34				2696.64	2696.76	2696.75	2696.74				2696.50	2696.68	2696.51	2696.50				2705.97	2706.01	2706.04	2706.12				2702.02	2702.02	2701.97				
LTOB2 Max Depth (ft)	4.76	4.88	4.83	4.77				1.25	0.98	0.96	1.11				2.08	1.97	1.97	2.03				1.99	1.18	1.12	1.26				0.81	1.00	1.01				
LTOB2 Cross Sectional Area (ft2)	138.26	149.49	150.40	150.30				8.14	8.40	8.19	8.43				14.19	11.96	11.94	11.90				10.89	4.96	4.90	5.55				4.37	5.37	5.27				
	Cross Section 11 (Pool - UT 5)							Cross Section 12 (Riffle - UT 5)							Cross Section 13 (Pool - UT 7)							Cross Section 14 (Riffle - UT 7)													
	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-Bankfull1 Area	--	--	--	--				2694.13	2694.49	2694.18	2694.17				--	--	--	--				2689.90	2689.95	2689.96	2689.96										
Bank Height Ratio_Based on AB Bankfull1 Area	--	--	--	--				1.00	0.75	1.00	1.00				--	--	--	--				1.00	0.98	1.00	1.00										
Thalweg Elevation	2696.66	2996.60	2696.61	2696.64				2692.78	2693.23	2693.30	2693.29				2689.68	2689.67	2689.73	2689.74				2689.18	2689.29	2689.25	2689.27										
LTOB2 Elevation	2697.47	2697.56	2697.67	2697.76				2694.13	2694.17	2694.18	2694.17				2691.25	2691.40	2691.36	2691.40				2689.90	2689.94	2689.96	2689.96										
LTOB2 Max Depth (ft)	0.81	0.96	1.06	1.13				1.35	0.95	0.88	0.88				1.57	1.73	1.63	1.66				0.72	0.65	0.71	0.69										
LTOB2 Cross Sectional Area (ft2)	4.75	5.40	6.55	7.32				7.83	4.38	5.30	4.66				8.77	9.06	8.10	8.21				4.56	4.45	4.31	4.34										

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 bankfull 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 recorded and tracked above as LTOB max



Appendix E – Hydrologic Data



Figure 6. Monthly Precipitation Data

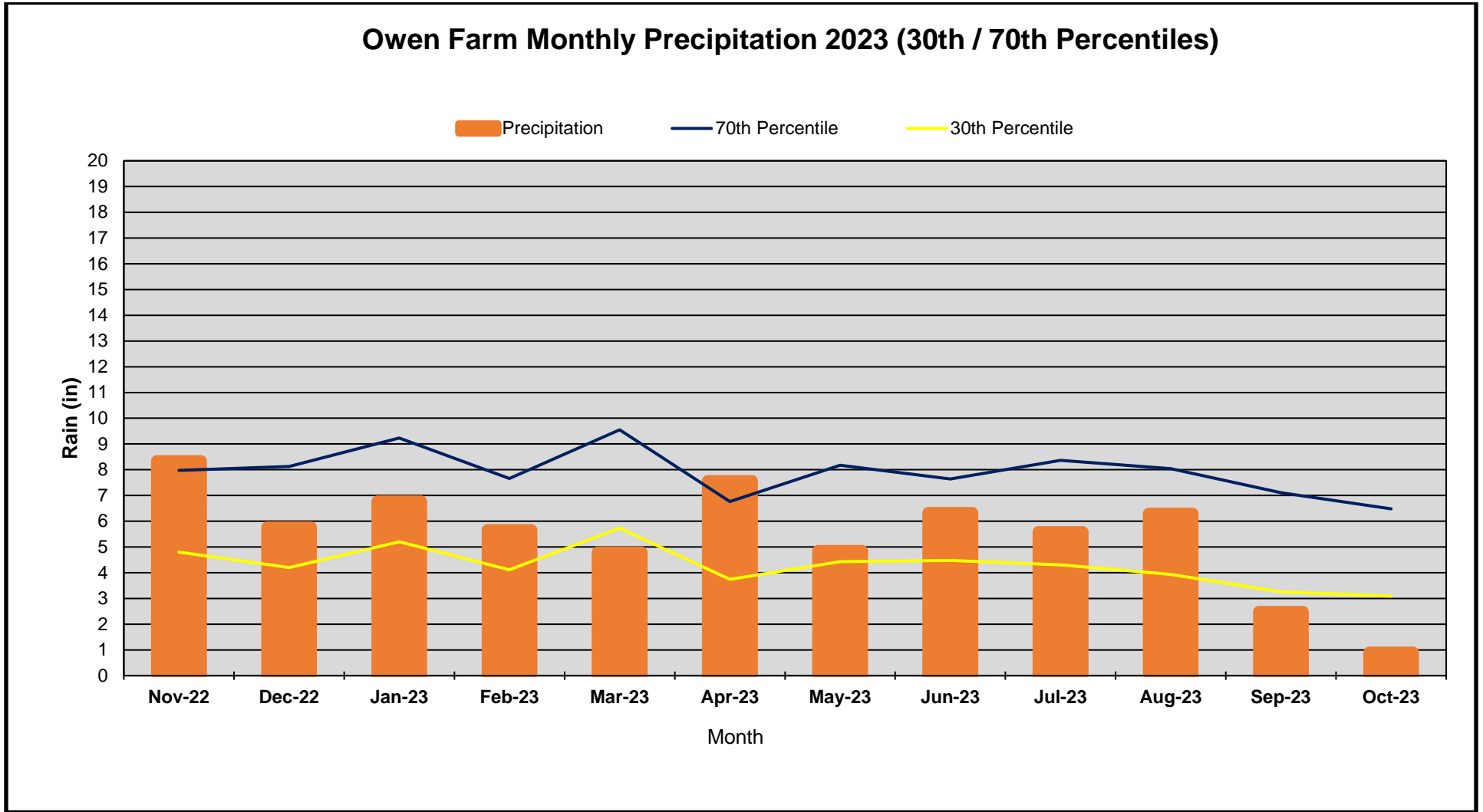
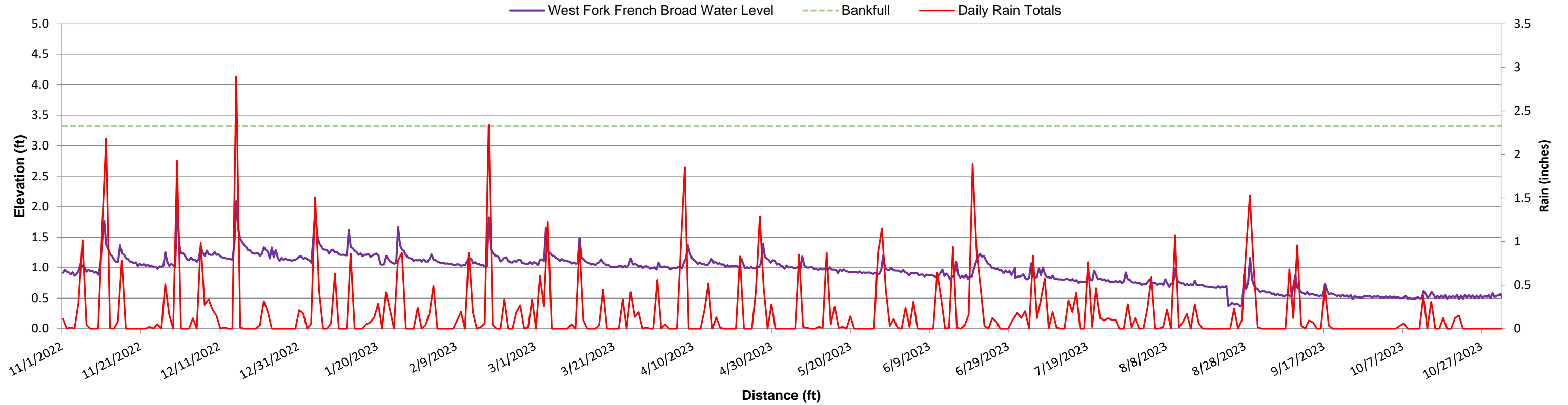




Figure 7.1 West Fork French Broad River Flow Depth



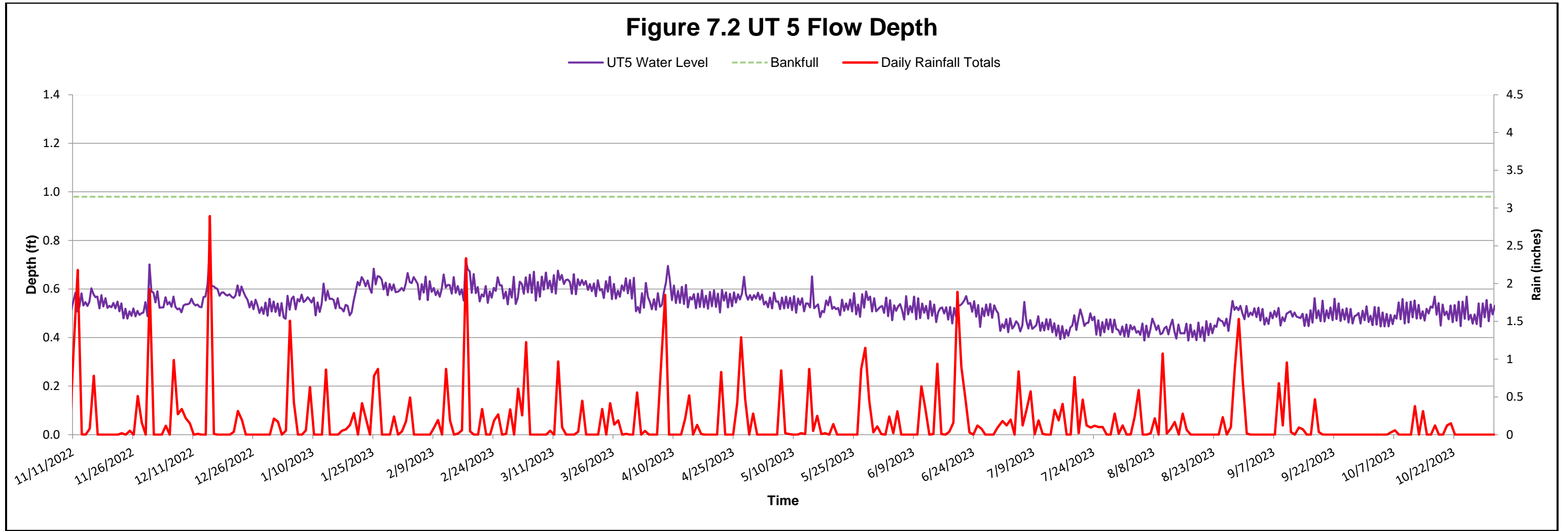




Figure 7.3 UT 7 Flow Depth

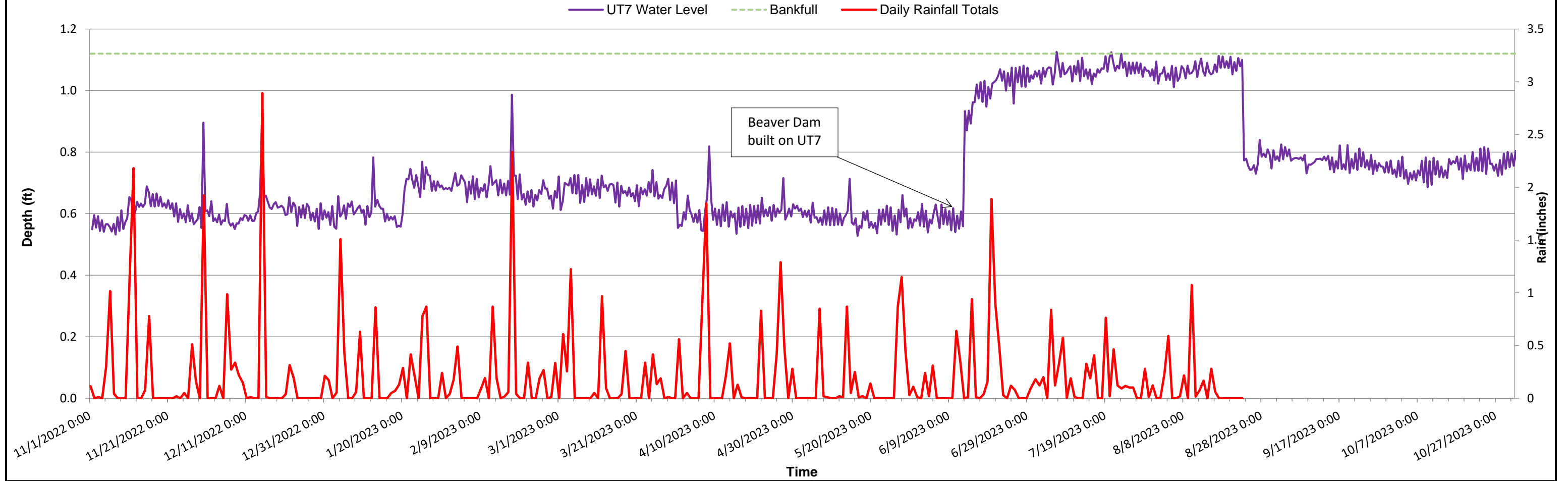




Figure 7.4 UT 8 Flow Depth

— UT8 Water Level - - - Bankfull — Daily Rainfall Totals

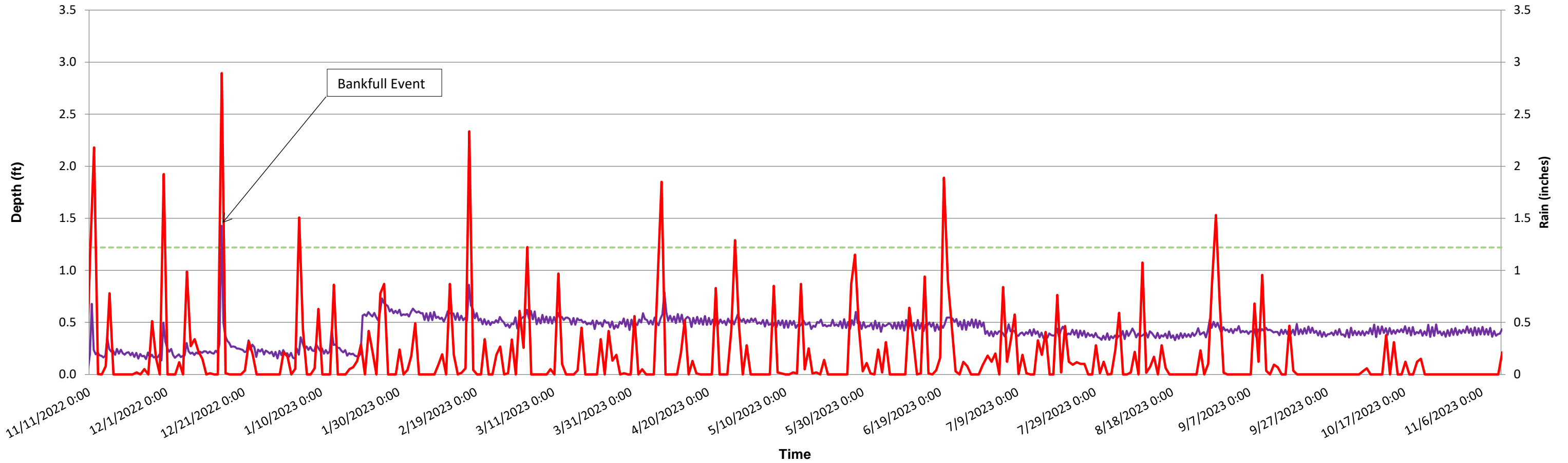




Table 13. Bankfull Events Summary

Overbank Events							
Gauge ID	MY1	MY2	MY3	MY4	MY5	MY6	MY7
West Fork French Broad	8/16/2021, 8/18/2021, 9/1/2021	2/5/2022, 5/26/2022					
UT 5	8/16/2021, 8/18/2021, 10/30/2021						
UT 7	8/16/2021, 8/18/2021	4/1/2022, 6/12/2022, 9/4/2022					
UT 8	8/16/2021, 8/18/2021, 8/31/2021, 10/7/2021	2/5/2022, 3/21/2022, 5/3/2022, 5/26/2022, 9/5/2022 12/15/2022					

Figures 8.1 – 8.5 Wetland Groundwater Gauge Data

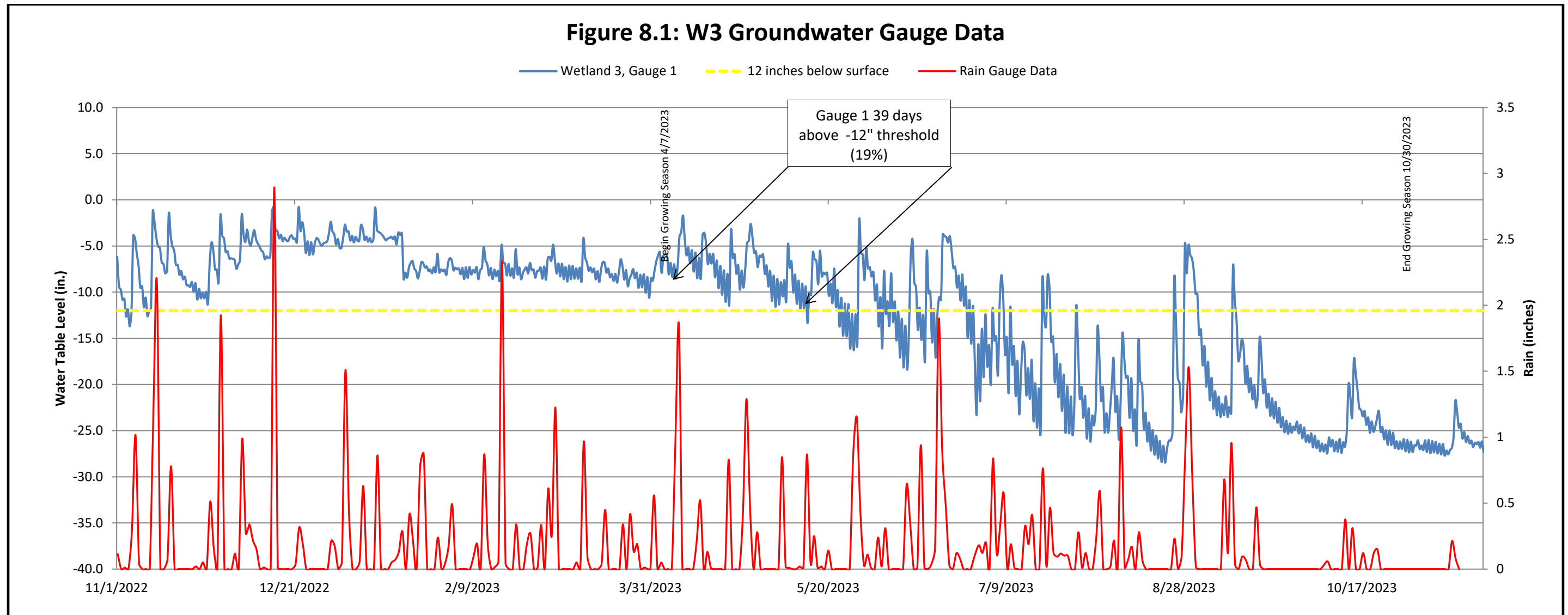




Figure 8.2: W3 Groundwater Gauge Data

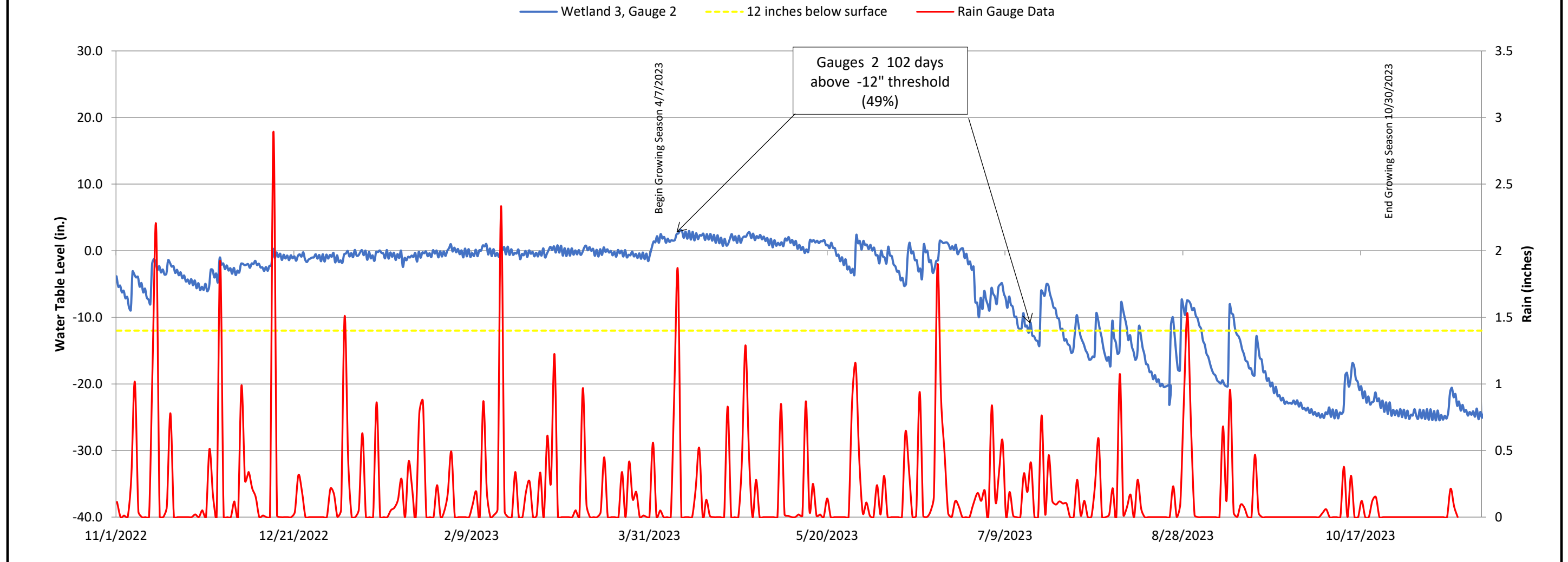




Figure 8.3: W3 Groundwater Gauge Data

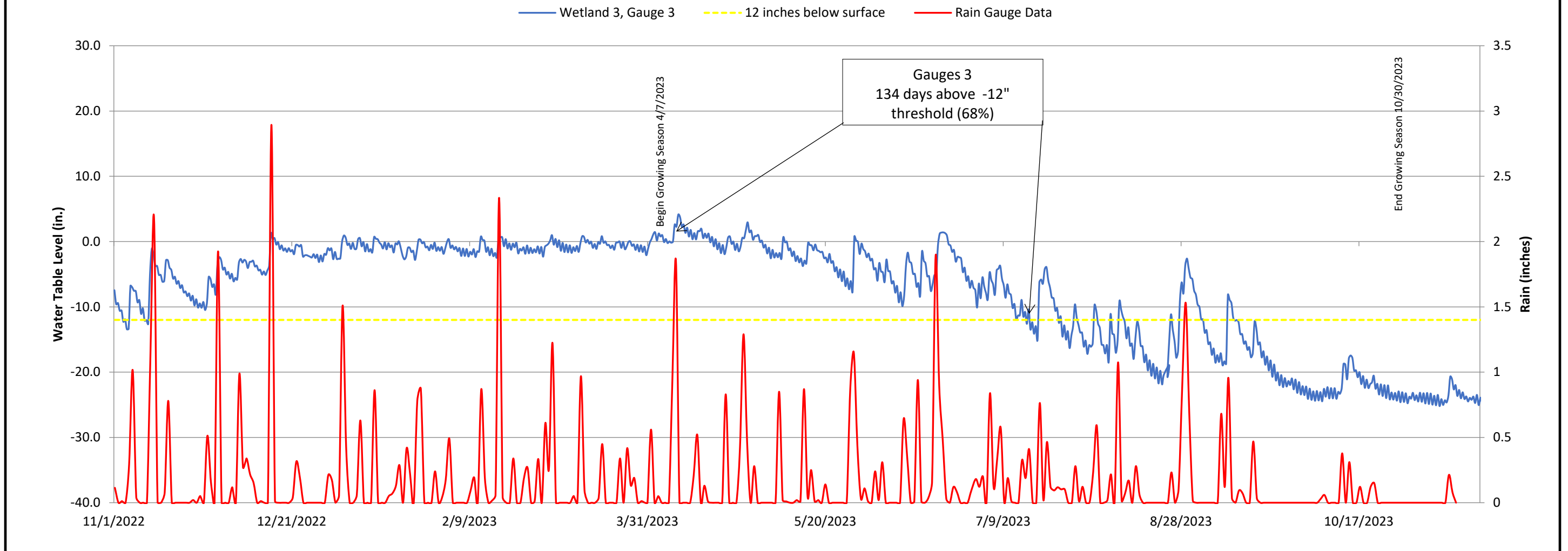




Figure 8.4: W3 Groundwater Gauge Data

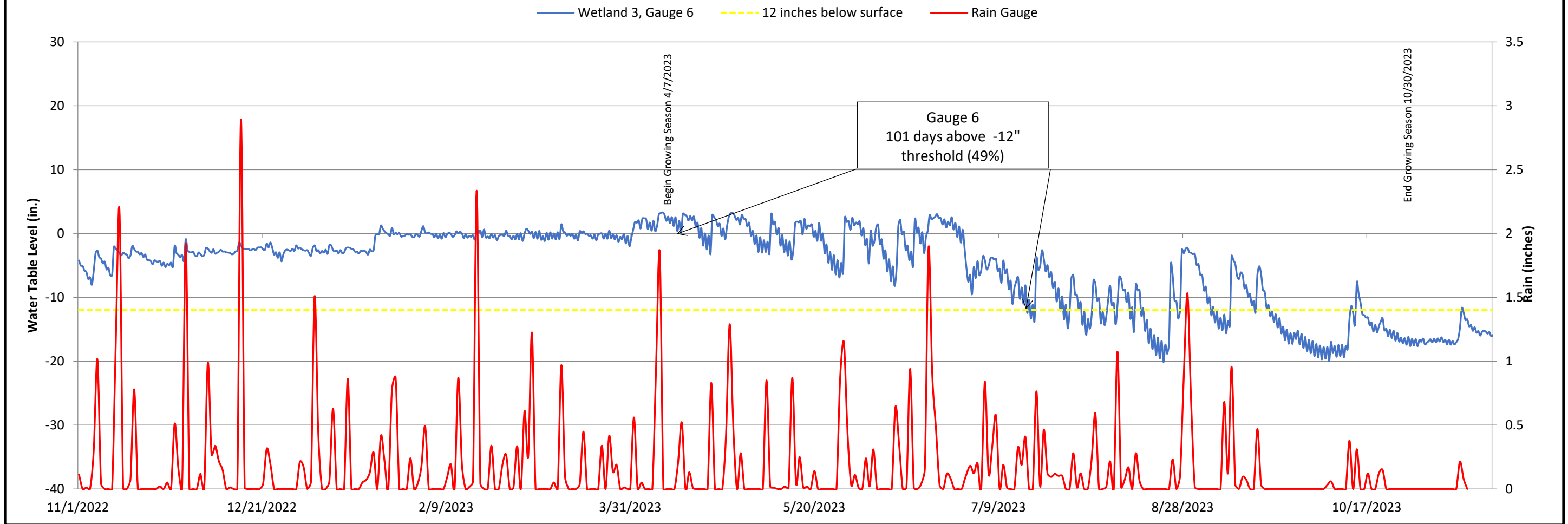




Figure 8.5: W5 Groundwater Gauge Data (Reference)

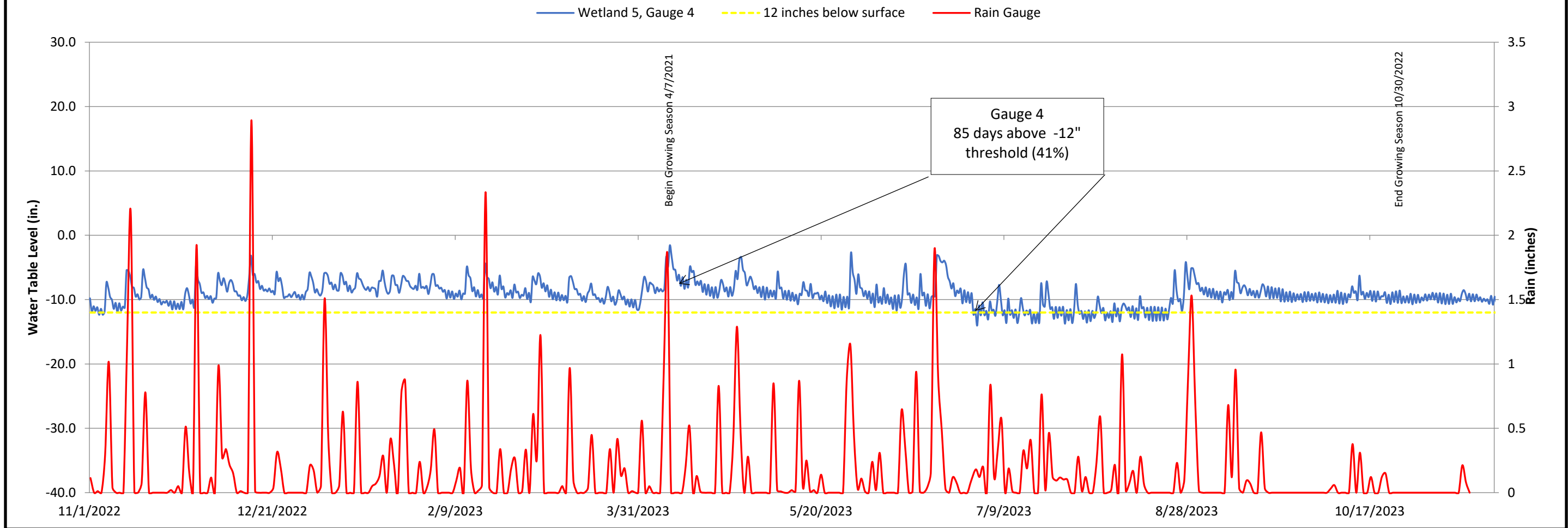


Figure 8.6: W5 Groundwater Gauge Data

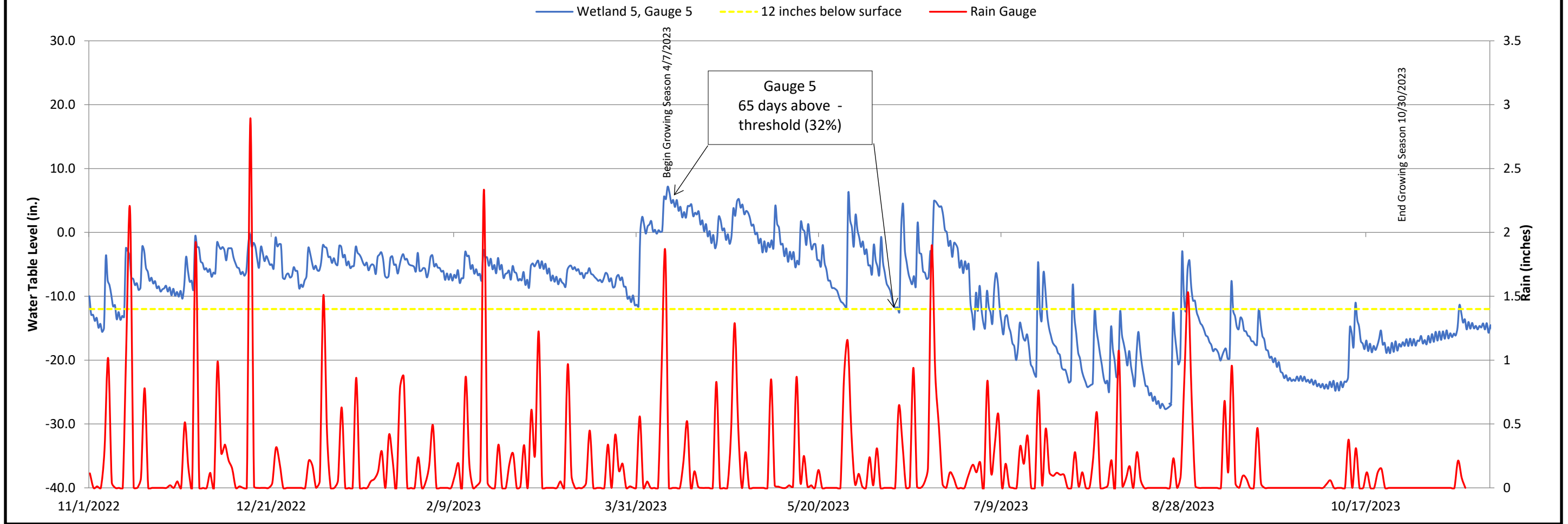




Table 14. Wetland Hydrology Summary

Monitoring Gauge	Performance Standard: 25 Consecutive Days (Success Criteria is 12% of the Growing Season) WETS Station: Brevard, NC Growing Season: 04/07 – 10/30 (206 Days)						
	Max. Consecutive Hydroperiod (%)						
	MY1 2021	MY2 2022	MY3 2023	MY4 2024	MY5 2025	MY 6 2026	MY 7 2027
W3-1	36	27	19				
W3-2	36	48	49				
W3-3	36	68	68				
W5-4 (Reference)	42	42	41				
W5-5*	3	13	32				
W3-6	n/a	69	49				

*Gauge 5 was relocated in 2022 to a more representative area within WS. It was originally installed in a localized high spot within the wetland.



Appendix F – 2023 IRT Credit Release Meeting Minutes

Meeting Minutes

Project: Owen Farms Stream and Wetland Mitigation Site (DMS # 100064, USACE: SAW-2018-01165, DWR: 2018-1033v1)

Subject: IRT Credit Release Meeting

Date: Tuesday, April 18, 2023

Location: Virtual

Attendees: NC IRT

Paul Wiesner (DMS)

Ben Furr (DRG)

Jessica Tisdale (HDR)

Virtual IRT meeting was held at 11:30am on Tuesday, April 18, 2023 to discuss the MY2 report and approve MY2 credit release. The following represents highlights of discussions that occurred during the meeting:

1. IRT requested that HDR include a stability analysis table and photos detailing the current condition of each repair area by station in the MY3 report.
2. IRT stated that HDR would need to add an additional random/mobile vegetation plot to monitor vegetation within the wetland expansion areas if we wanted to request credit for those areas in the future. IRT also suggested documenting soil data (i.e. collecting soil profiles) in the monitoring plots of wetland expansion areas.
3. IRT requested that HDR include a statement in the MY3 report explaining why Table 3 (Monitoring Plan Components) shows 5 site gauges and 2 reference gauges, but Table 14 (Wetland Hydrology Summary) only shows one reference. DRG explained that Gauges 2 and 3 in W3 serve as reference gauges for the restored portion of W3 (for groundwater). They also serve to monitor surface water within the W3 rehabilitation area.
4. IRT requested that HDR include a note on Table 14, in MY3 report, stating that Gauge 5 was moved in 2022 to a more representative area within W5.
5. IRT suggested removing the ~ symbol from the hydrograph figures in MY3 report.
6. IRT requested that HDR provide a statement in the MY3 report about calves having access inside the easement and how HDR addressed the issue (i.e. installed permanent barriers on kissing gates and repaired fencing).
7. IRT noted that Figure 2.2 of the CCPV was not accurate (it is a duplicate of Figure 2.3), and requested that HDR correct for MY3 report.

8. IRT agreed to a full credit release for MY2.