USFS Region 6, Gifford Pinchot National Forest, Mount St. Helens National Volcanic Monument 2014

Project Title	Lewis River Side Channel III
Agency	US Forest Service Gifford Pinchot National Forest Mount St. Helens Ranger District
Project Manager	Adam Haspiel (360) 449-7833 ahaspiel@fs.fed.us
Project Approved By	Aquatic Coordination Committee (April 12, 2012)
Project Funding	ACC Funding $50,000 USFS Funding $59,000 Partner Funding $ 4,400 **Project Total $113,400**
Project Description (work completed)	In 2014 the Gifford Pinchot National Forest used funds from PacifiCorp and Cowlitz PUD to supply equipment, operators, and labor for construction of the Lewis River Side III Instream Habitat Restoration project. This was a side channel located on US Forest Service lands. Work included placing approximately 300 pieces of Large Woody Material, to create 31 complex structures to restore fish habitat. The structures were designed to alter stream flows and modify stream morphology, including pool depth, overhanging banks, and by slowing water to drop and capture mobile sediment. The project objectives were to: • Improve habitat complexity • Create resting areas for spawning adult salmon and steelhead • Improve holding pools for juvenile salmon, steelhead and bull trout. • Improve overwintering habitat for juvenile fish • Collect gravel and improve spawning habitat A 35 acre logging unit was developed as part of the Peppercat timber sale for instream restoration activities. The unit was thinned for the project using standard logging techniques such as chainsaws for cutting trees down, and pushing trees over with a logging shovel to keep the tree bole intact with rootwads. Trees were transported via log trucks to a staging area at the beginning of a spur road off the 2590 road, about 1.2 miles

	from the project area. Trees were transported to the project site from the staging area with a rubber tired skidder. Trees from Peppercat unit 21were used to create diverse and complex structures. Approximately 5 to 15 pieces of large woody material (LWM) were used at each structure location to form complex habitat. Structures were placed along stream margins, protruding no more than 40 percent into the stream channel to minimize excessive water shear stress and create a meandering thalweg. Key pieces of wood at each location were anchored into the streambanks using an excavator to dig trenches up to 40 feet long, and bury the wood. Other pieces of LWM were interwoven into these key pieces and riparian vegetation. A small side channel had several small structures placed in it as part of the overall project. Structures were built to address specific needs and improve the conditions at each location, such as pool creation or collection of spawning gravels.
Partners	**Mount St. Helens Institute.** The Mount St. Helens Institute established baseline data for sediment and cross-sectional morphology in 2014. Surveyors used Stream Channel Reference Sites (Harrelson et. al., 1994) as the standard surveying protocol. Cross-sectional benchmarks were established above margin structures to capture the effect of pool formation or gravel capture depending on the structure intent. **PacifiCorp and Cowlitz PUD.** The utilities provided funding for the project.
Workforce	Adam Haspiel, USFS Fisheries Biologist Bryce Michaelis, USFS Fisheries Technician
Contractors	O'Malley Brothers Corporation Gresham Oregon

Problems Encountered	Access 1.0 miles from project site made long turn around times for skidding logs. Excavator through a track at uppermost end of side channel, making bringing tools to it cumbersome.

Figure 1. Picture of Structure 9

Figure 2 Map of Project Area

Post-implementation Status Report

Lewis side channel 3 Fish Habitat Restoration

Partnership between Mount St. Helens Institute and USFS Region 6, MSHNVM

Prepared by: Abigail Groskopf, MSHI Science Education Director and Jacob Sleasman, MSHI Fisheries Lead

November 2014

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Project Summary

The Lewis Side Channel 3 Creek Fish Habitat Restoration project resulted in the construction of 31 complex Large Woody Material (LWM) structures over 0.5 miles of the entire length of the side channel. These LWM structures are designed to increase diversity in the side channel, provide winter refuge from high flows and increase spawning habitat for Chinook, Coho, and Steelhead Trout.

Reconnaissance surveys conducted for this project occurred during September and October of 2012. Water flows into the side channel from the river year round, the amount is controlled by a large log jam at the head of the channel, and an outlet to the river is always present, providing easy access into and out of the side channel. The side channel varies between 20 and 30 feet in width, and is well protected by a stable island.

The conclusion of the EDT analyses suggests habitat diversity and side channel habitat is one of the highest concerns in this reach and should respond well to restoration activities. Concern rating were high for habitat diversity, and moderate for hatchery fish competition, food availability, and sediment. The ACC Synthesis Matrix rated this section of the river as having medium restoration potential and as a Primary Coho population area.

This project is funded by PacifiCorp Aquatic Coordination Committee.

Site Location and Description

Lewis Side Channel 3, located in the Gifford Pinchot National Forest is a half mile long side channel around 3.5 miles upstream of the Swift Reservoir. Access to the site is by parking on the 90 and walking down the decommissioned 310 road and down a steep trail to the site.

Figure 2: Map of project area

Goals and Objectives

Project goals include:

1. Create at least 25 structures using 300 pieces of Large Woody Material.
2. Formation of at least 25 stable quality pools over 2 feet in depth with cover elements associated with each structure.
3. Spawning gravel bed formed at structures.

Community Outreach

The Mount St. Helens Institute provides community outreach in a number of different ways. The Youth Stream program engages underserved youth, ages 8-18 in watershed education and introduces youth to restoration and monitoring in the Gifford Pinchot National Forest. Through engaging hands-on lessons, youth learn about water quality, fish biology, watershed dynamics and the effects of the1980 eruption n the riverine ecosystems.

The Mount St. Helens Institute provided an internship for an undergraduate student. The Intern gained surveying, monitoring and education skills that equip them for an active career in science and/or education and have an opportunity to make a visible difference on their public lands.

Table 1: 2014 Community Engagement

Community Type	Individuals Participating	Actual Hours Served
Youth Stream Team	15	40
Adult (undergraduate) Volunteer	-	
MSHI Interns	2	40
Total	17	80

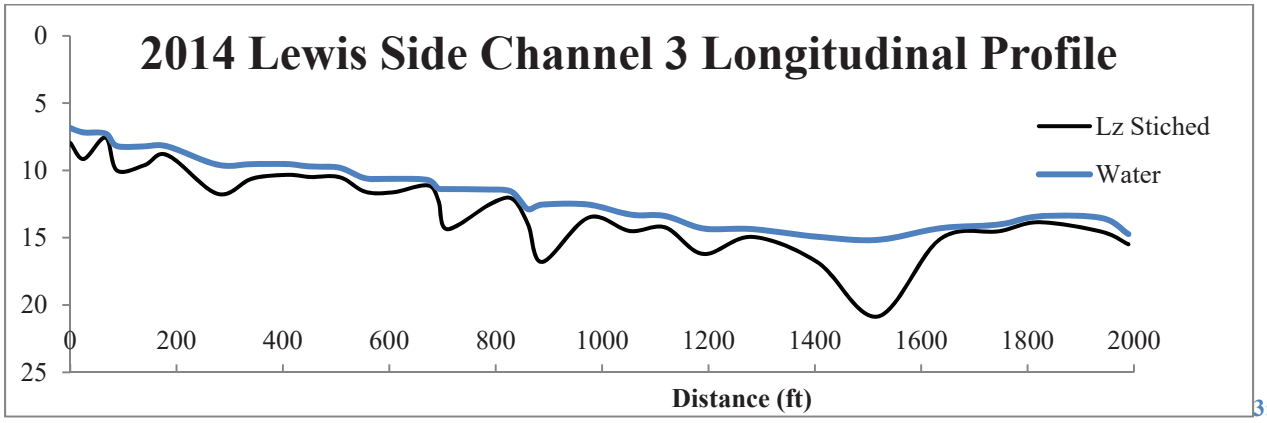
Monitoring Methodology

To capture the effects of the complex structures cross-section(s) were established at a key point within the structure. Only structures that were designed to alter geomorphology (pools, gravel-beds) were surveyed. Two benchmarks for each cross-section were placed in live trees so they will last for many years. Throughout the reach there are several structures that are on opposite banks and in close proximity, which warranted one or two cross-sections going through both structures. Each structure group has an accompanying Wolman Pebble Count. A longitudinal profile was determined from an established benchmark at the upper extent of the project area. A longitudinal profile measures the elevation changes following the thalweg (the deepest continuing line in the stream channel). It is important to note that due to stream/ thalweg meandering the longitudinal profile is not only a measure of distance and elevation, but also of sinuosity. From the longitudinal profile pool depths and pool:riffle counts can be assessed. Surveyors used *Stream Channel Reference Sites* (Harrelson et. al., 1994) as the standard surveying protocol. Photos were taken at all structures (including bank stabilization structures) above the structure looking downstream, opposite the structure, and below the structure looking upstream.

Results and Analysis

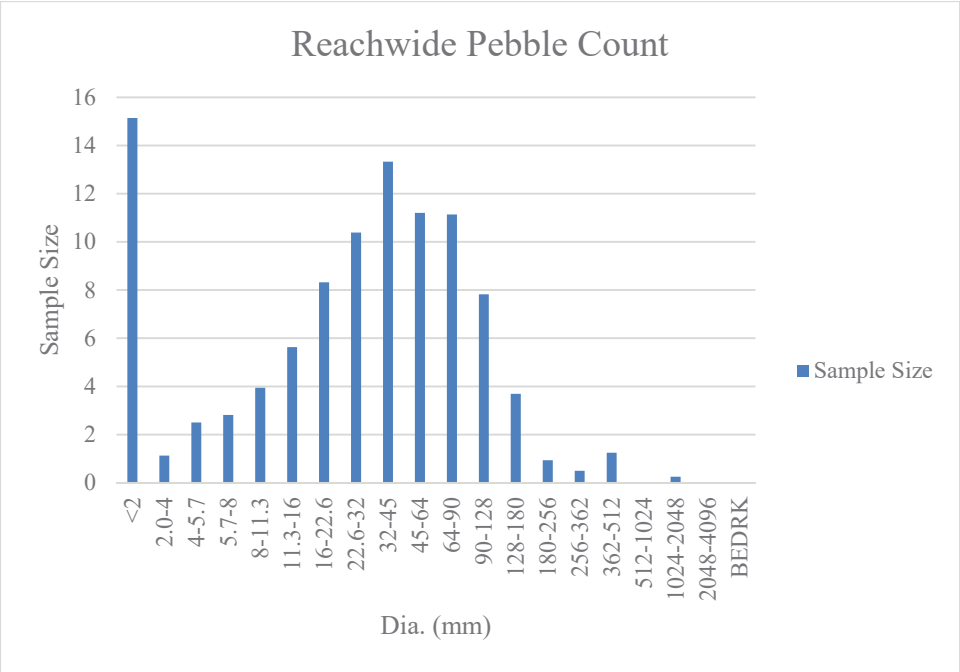
A baseline longitudinal survey was conducted prior to the restoration installations. Immediately following the installations, baseline cross-sectional surveys and pebble counts were conducted.

The baseline longitudinal project is shown in Figure 2. Within the project reach there are 4 distinct pools with a base flow water depth of 2 feet or deeper, and a residual pool depth of at least 1.0 feet. The pool: riffle ratio is 1:2.25, Slope is 0.38%.



3: Lewis Side Channel 3 2014 Longitudinal Profile (0-2000 ft.)

Baseline post-installation survey of substrate size distribution confirms previous data and reconnaissance reports. Throughout the Lewis Side Channel 3 restoration reach substrate size is moderate, with an average median substrate size of 27 mm and a D84 of 74 mm.



3: Lewis Side Channel 3 Reach-wide Substrate Size Distribution

ST #	D50	D84
1 & 2	19	64
3	29	76
4	28	83
5 & 6	15	47
7	38	61
12 & 13	25	53
15 & 16	25	51
17 &18	30	84
19	29	65
20 & 21	26	75
22	32	87
24 & 25	17	88
26 & 27	22	97
28	54	130

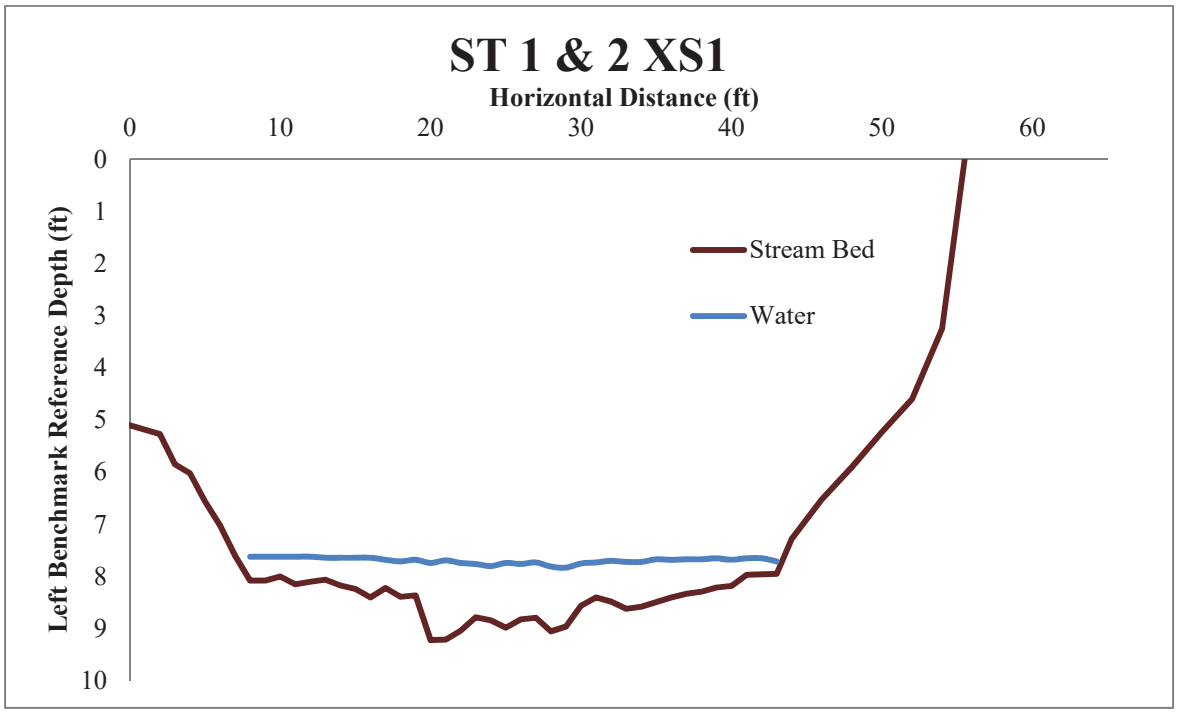
4: Table showing median and 84 percentile substrate sizes for each restoration structure.

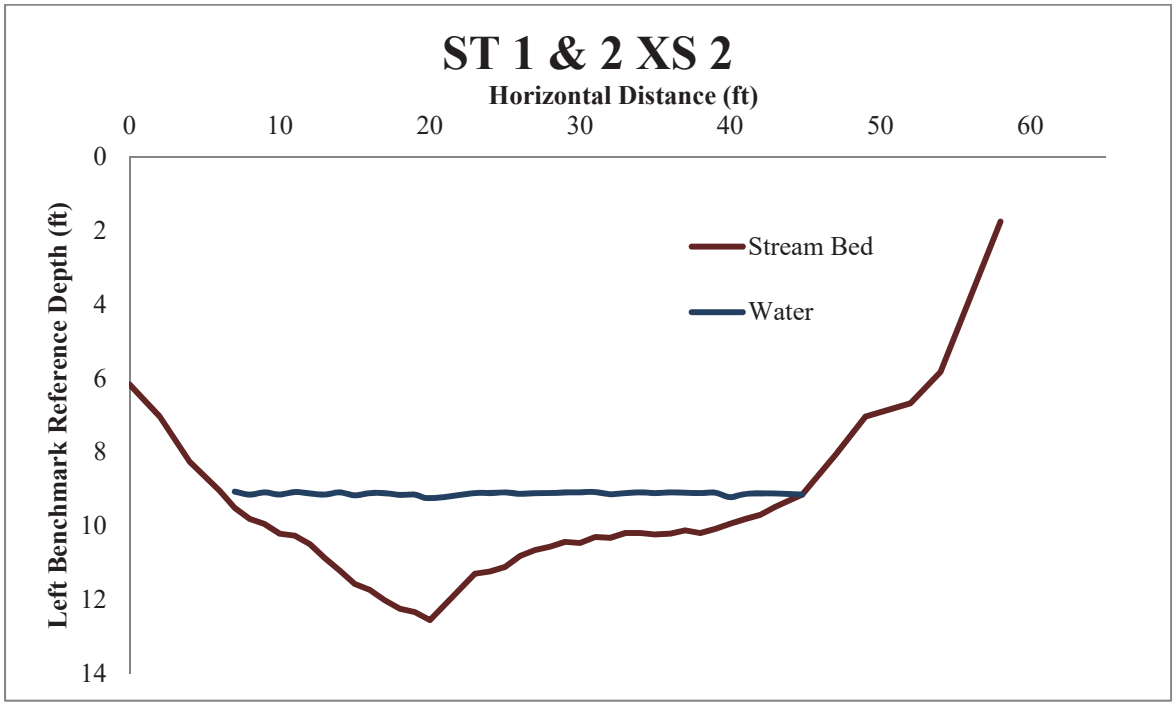
Conclusions

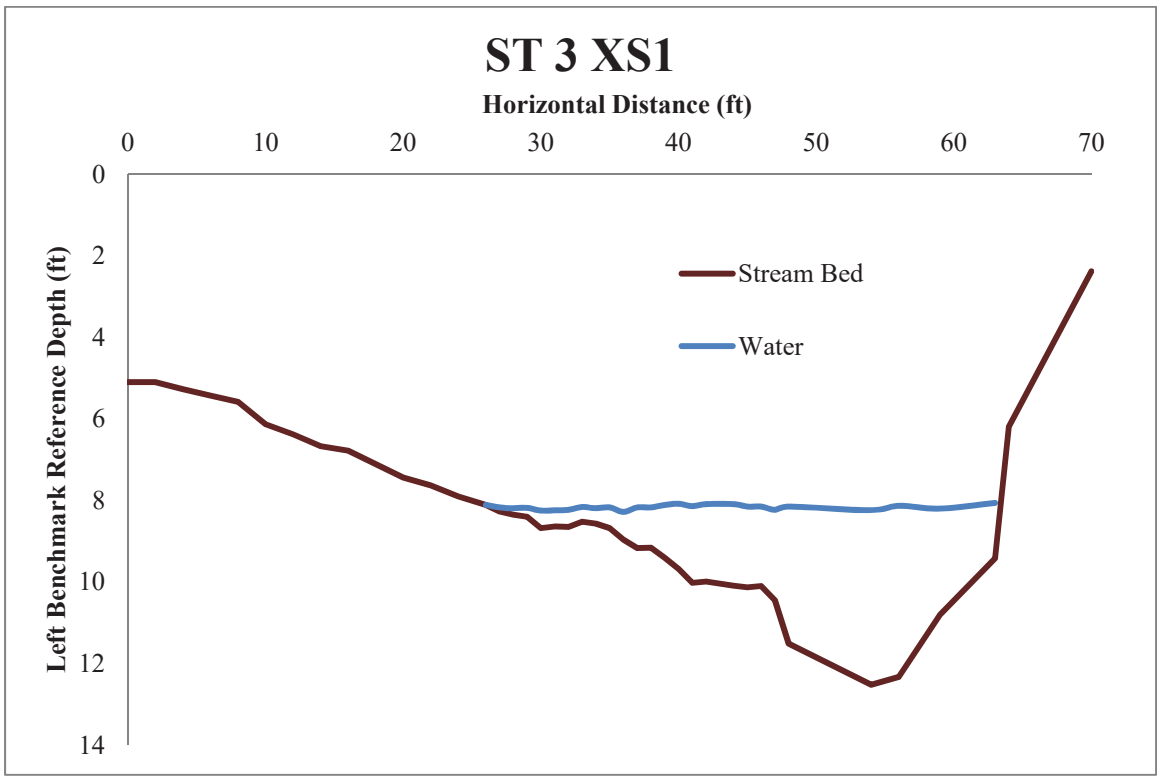
Overall the project was successfully implemented. Thirty-one complex structures were constructed, including structures designed to provide rearing habitat and spawning beds. By engaging both underserved youth and undergraduate students in on-the-ground data collection, the Mount St. Helens Institute not only more efficiently collects data but students of all ages gain invaluable job-training skills necessary in today highly competitive market.

Appendix A: Site level cross-sections and photo-documentation

Included for each complex structure are baseline cross-sectional graphs and well as post-installation photographs. Substrate graphs and additional site photos are available upon request. Photos of bank stabilization structures are available on request.



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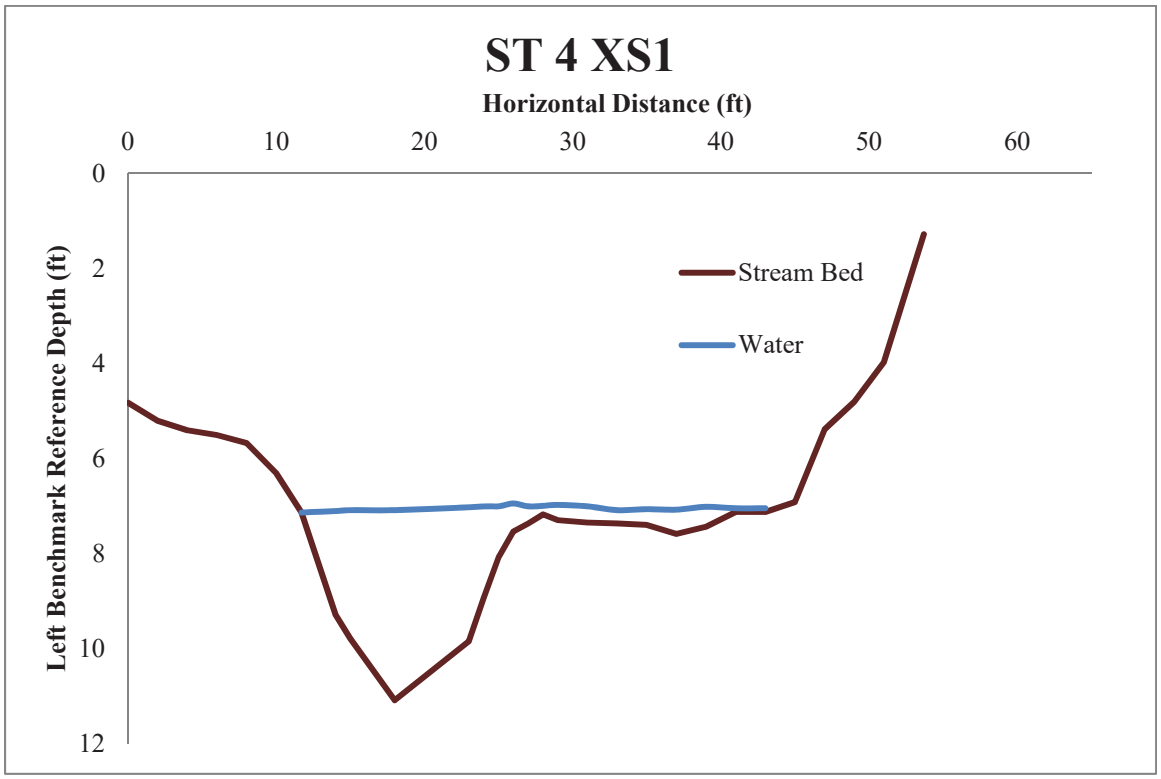
4
6
8
10
12
14
Stream Bed
Water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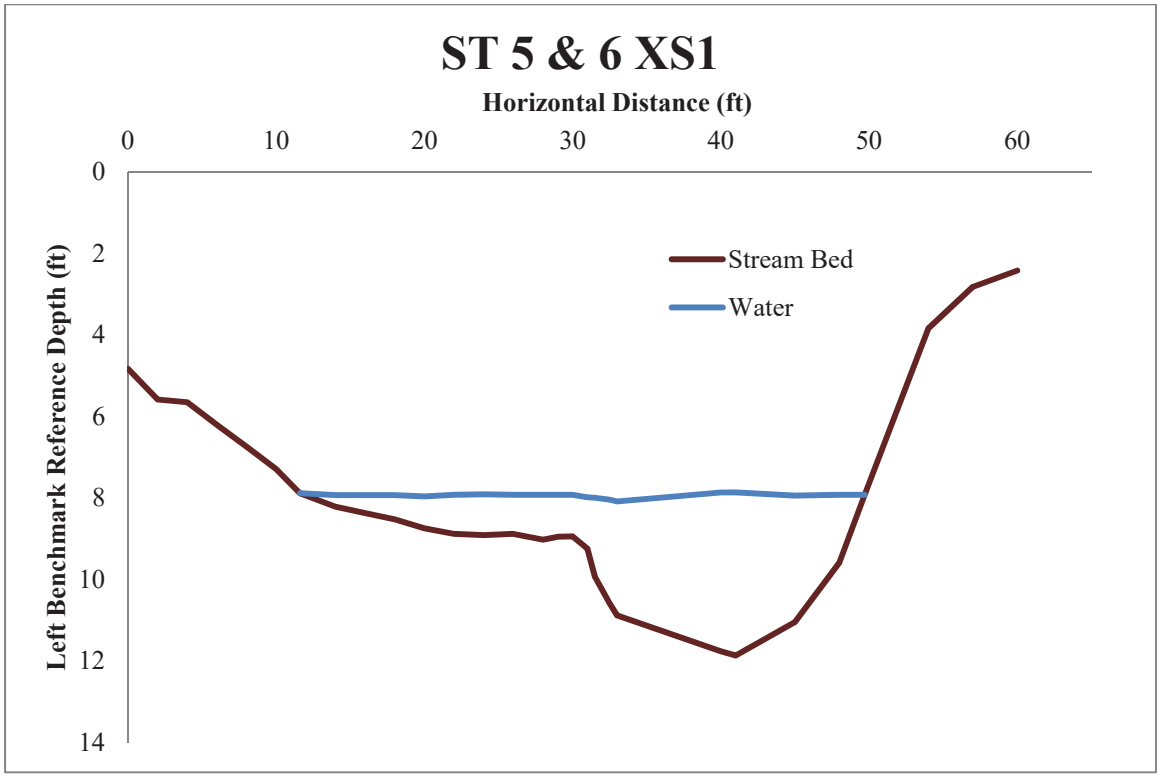
12
Stream Bed
Water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Stream Bed
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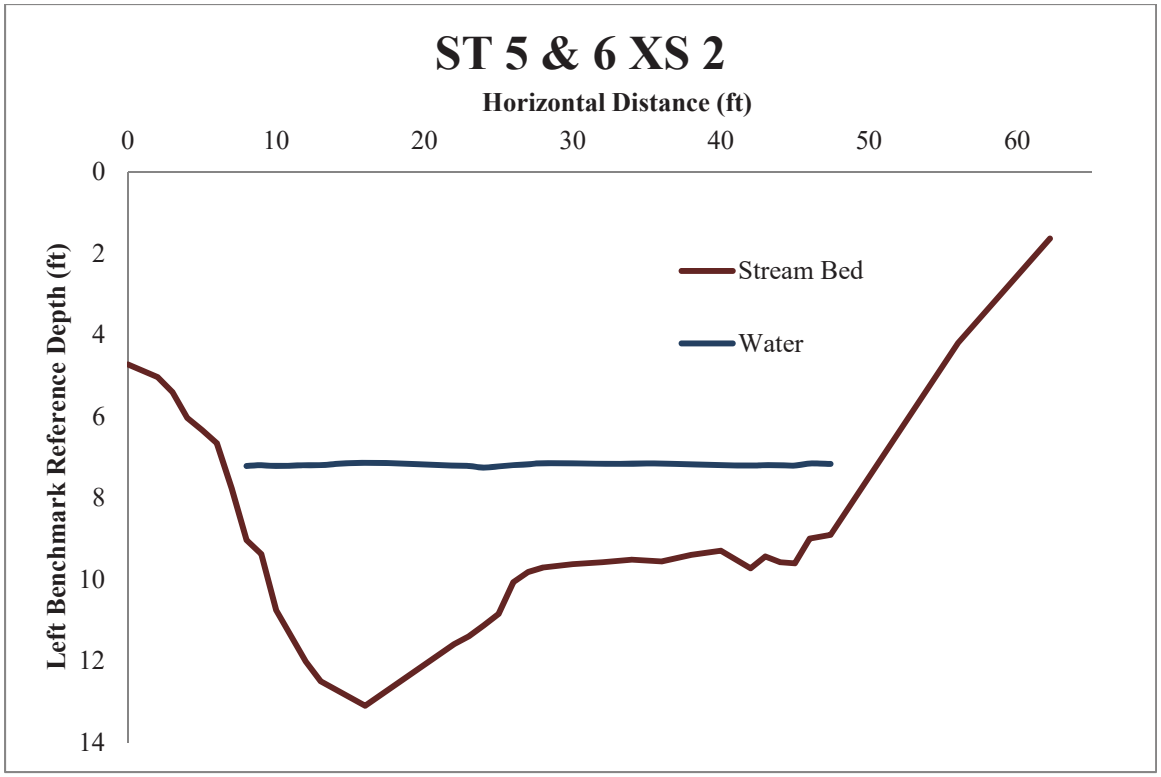
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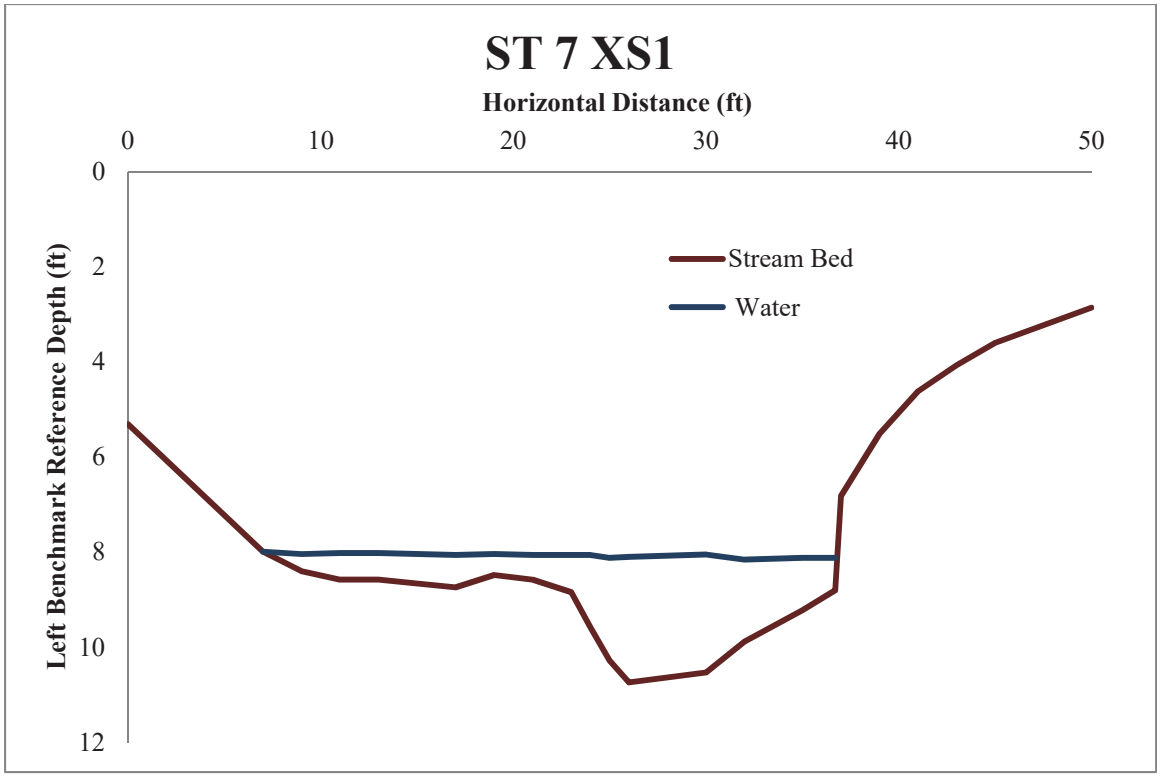
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Stream Bed
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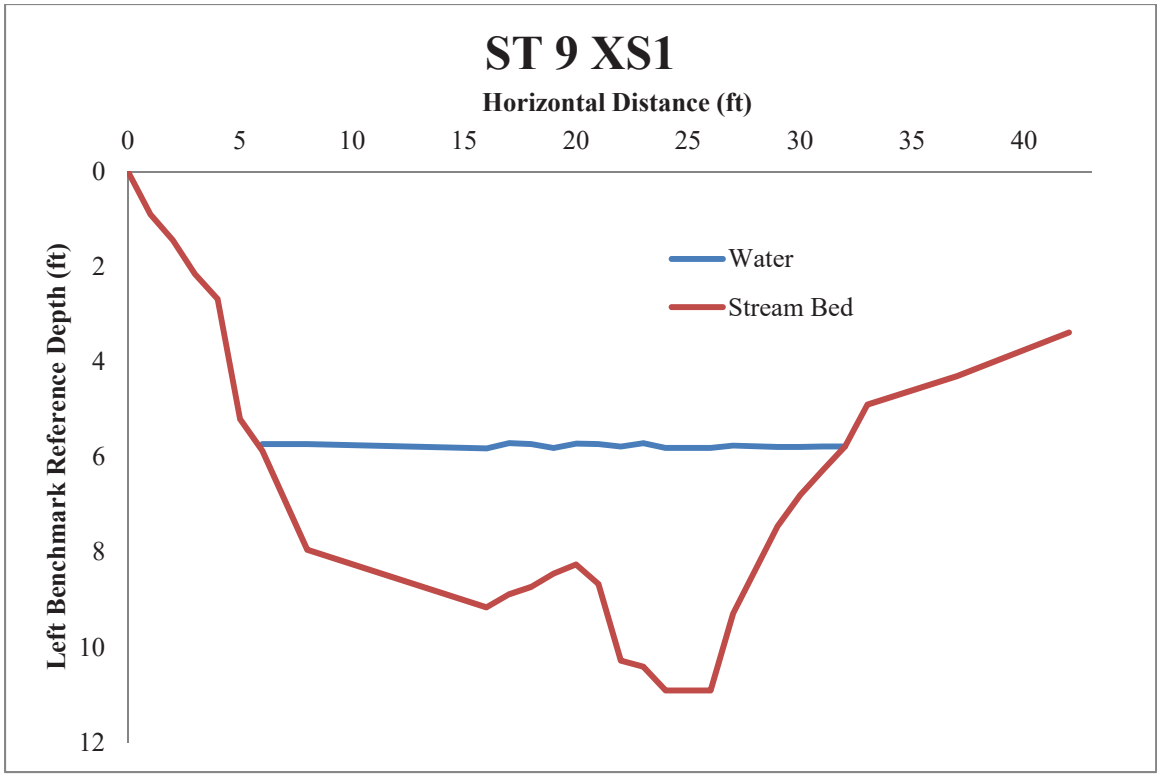
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4
6
8
10
12
Water
Stream Bed


ST 12 & 13 XS1
Horizontal Distance (ft)
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50
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Left Benchmark Reference Depth (ft)
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6
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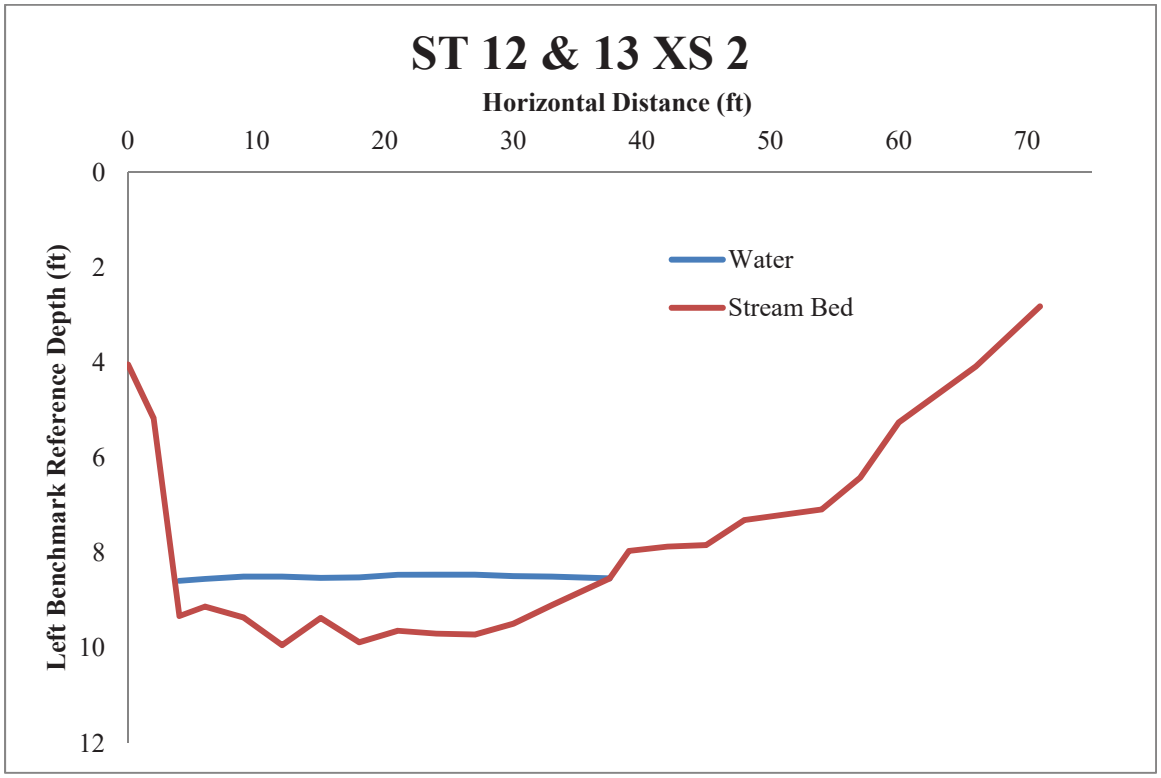
Water
Stream Bed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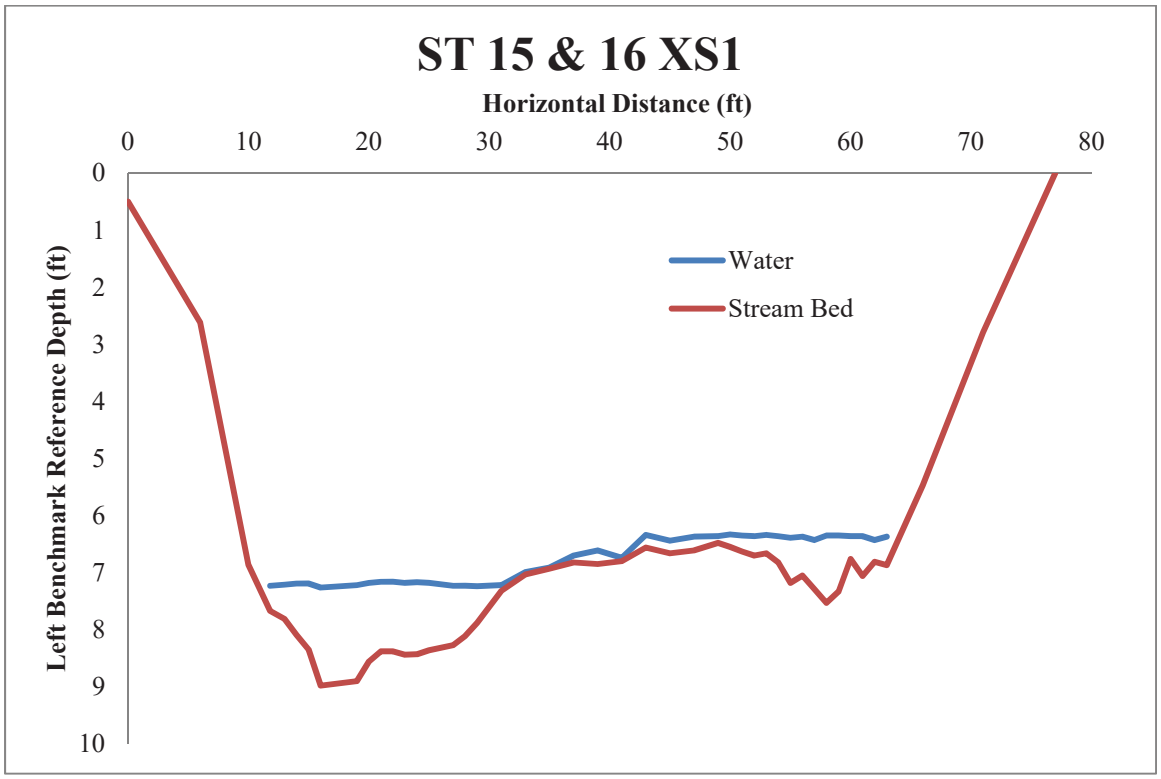
Stream Bed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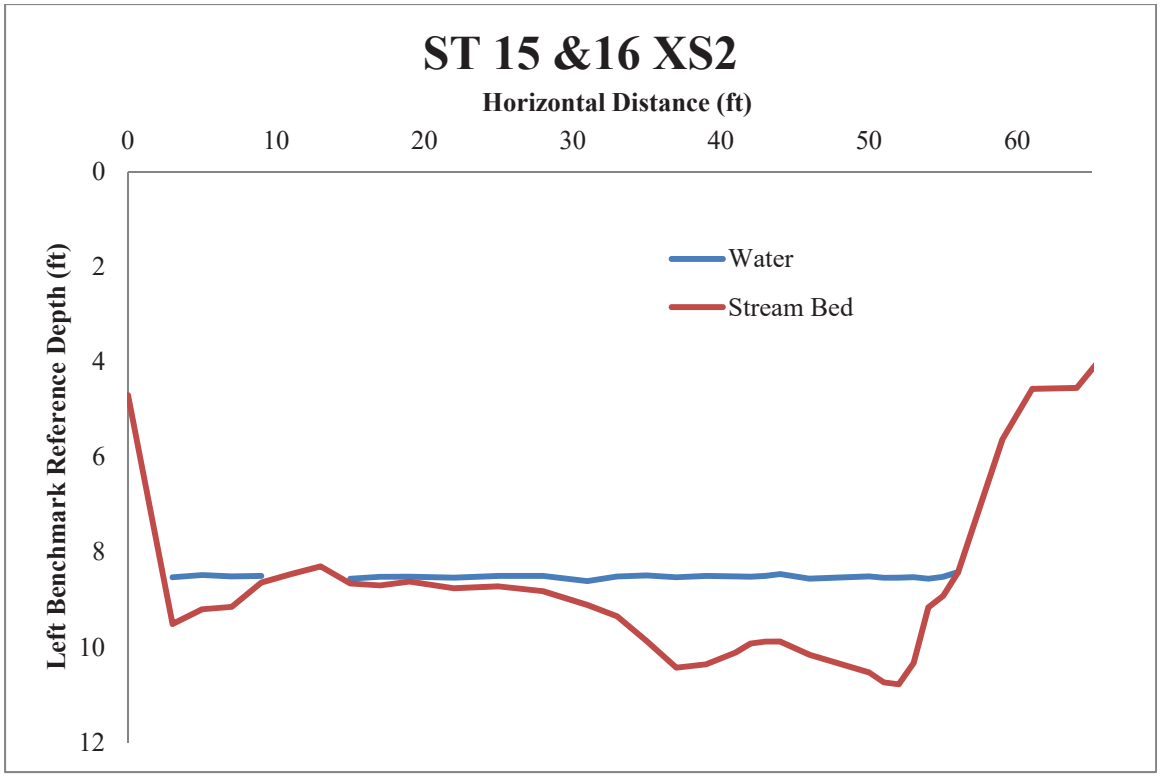
Water
Stream Bed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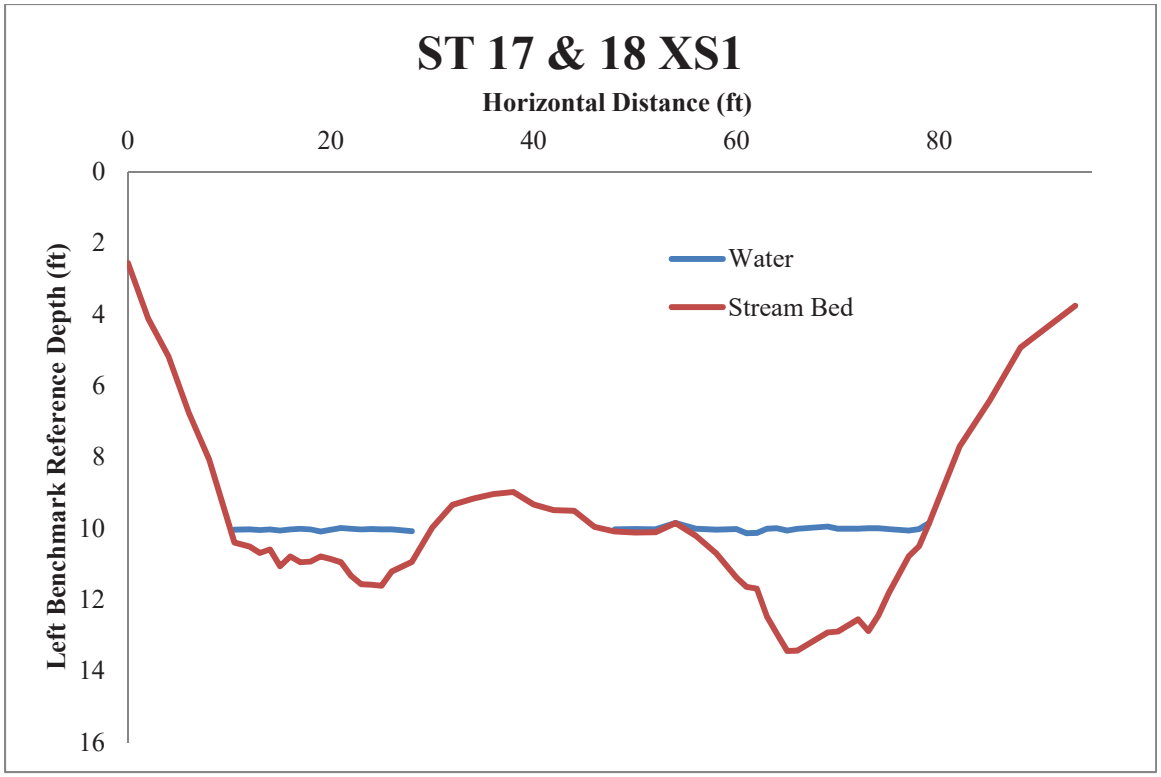
Stream Bed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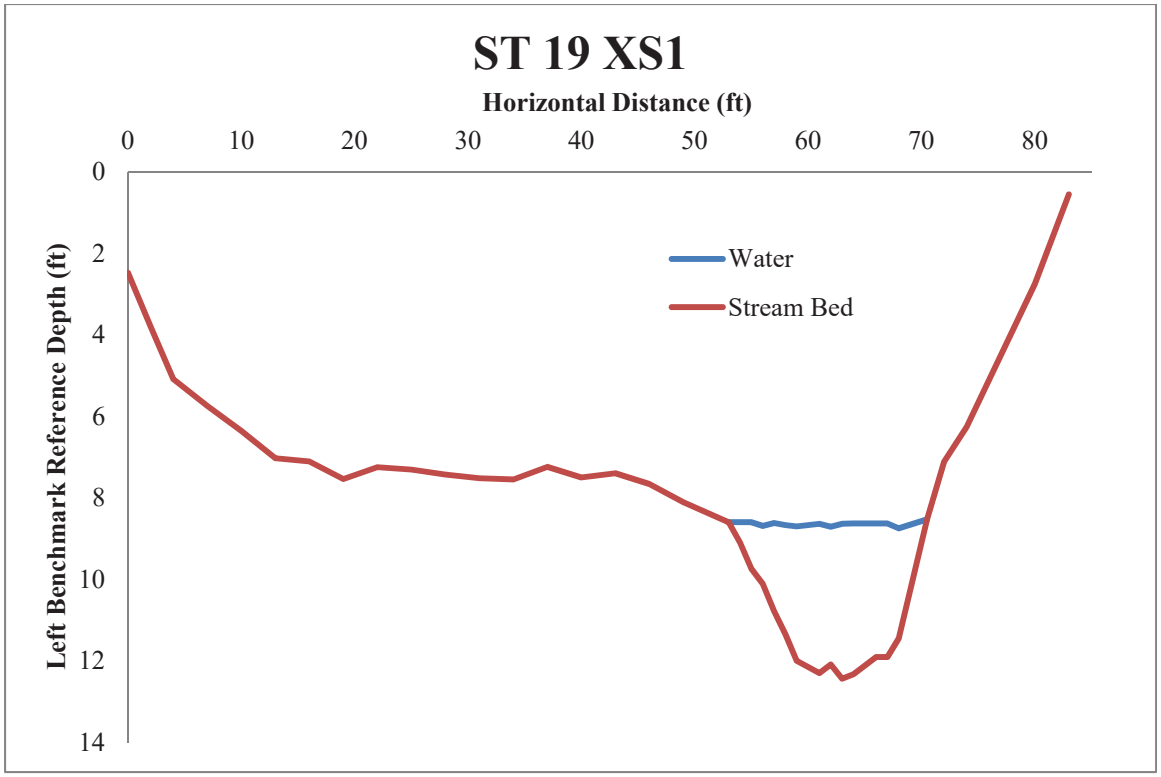
Water
Stream Bed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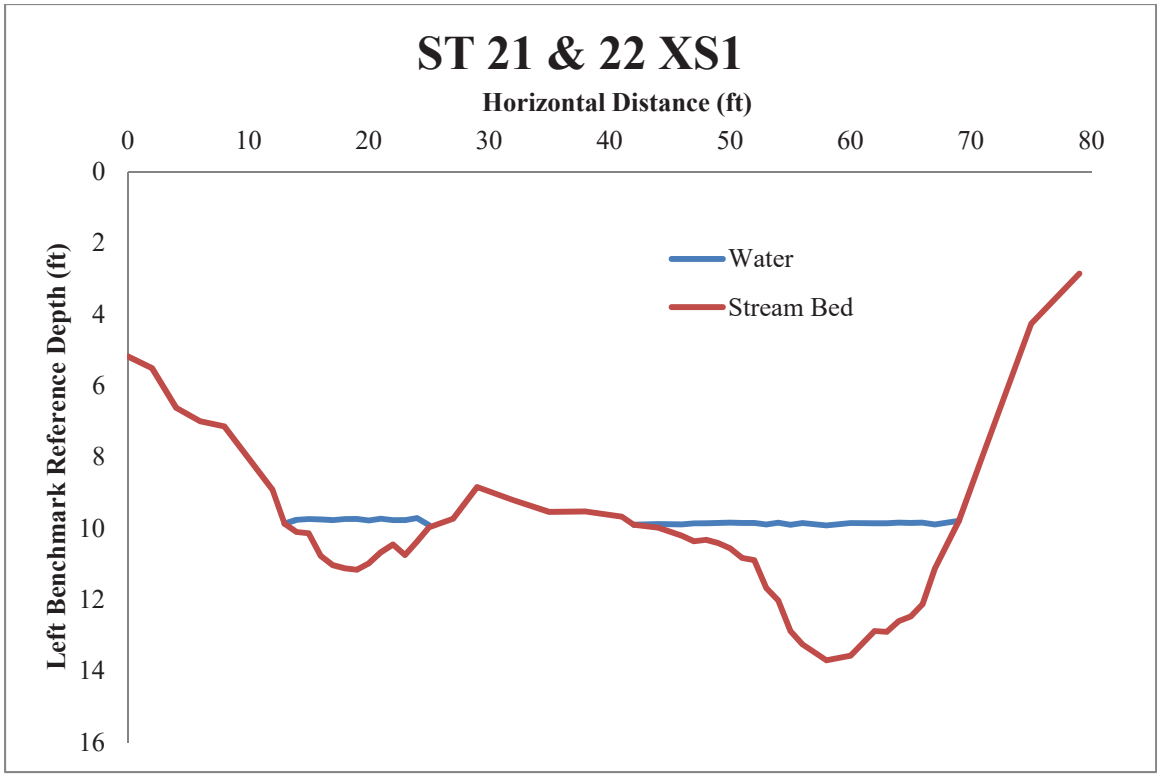
Water
Stream Bed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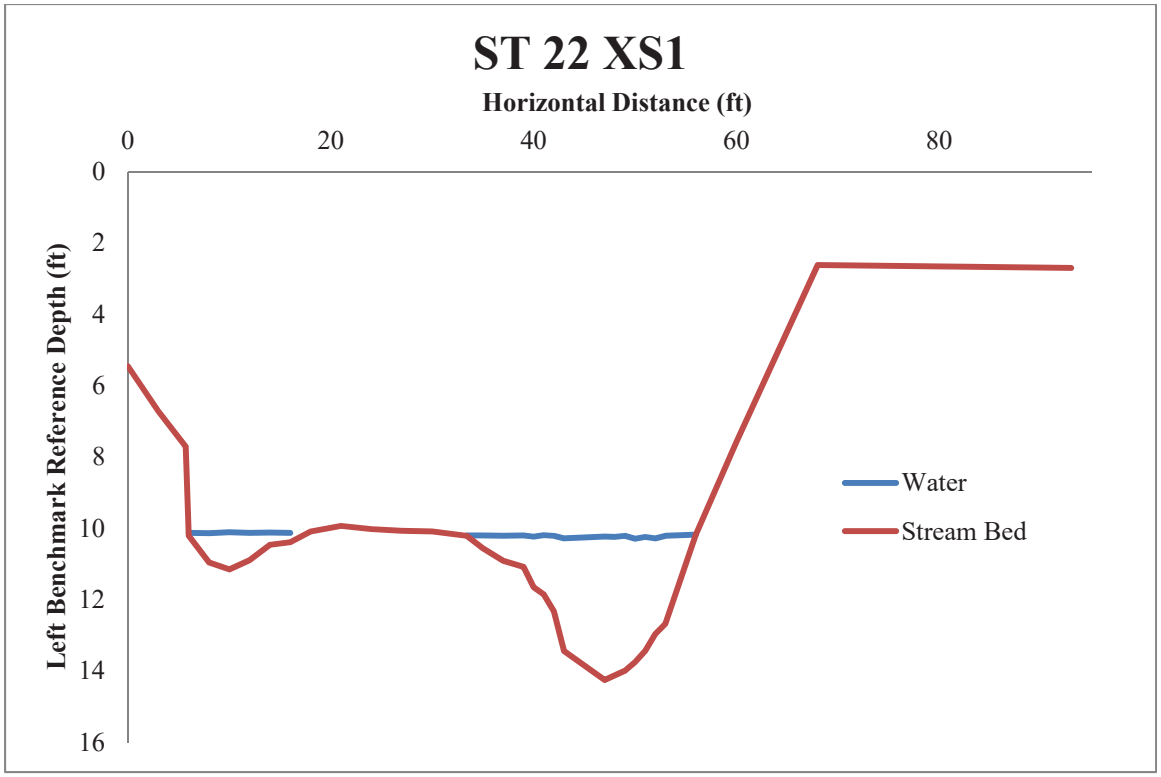
Water
Stream Bed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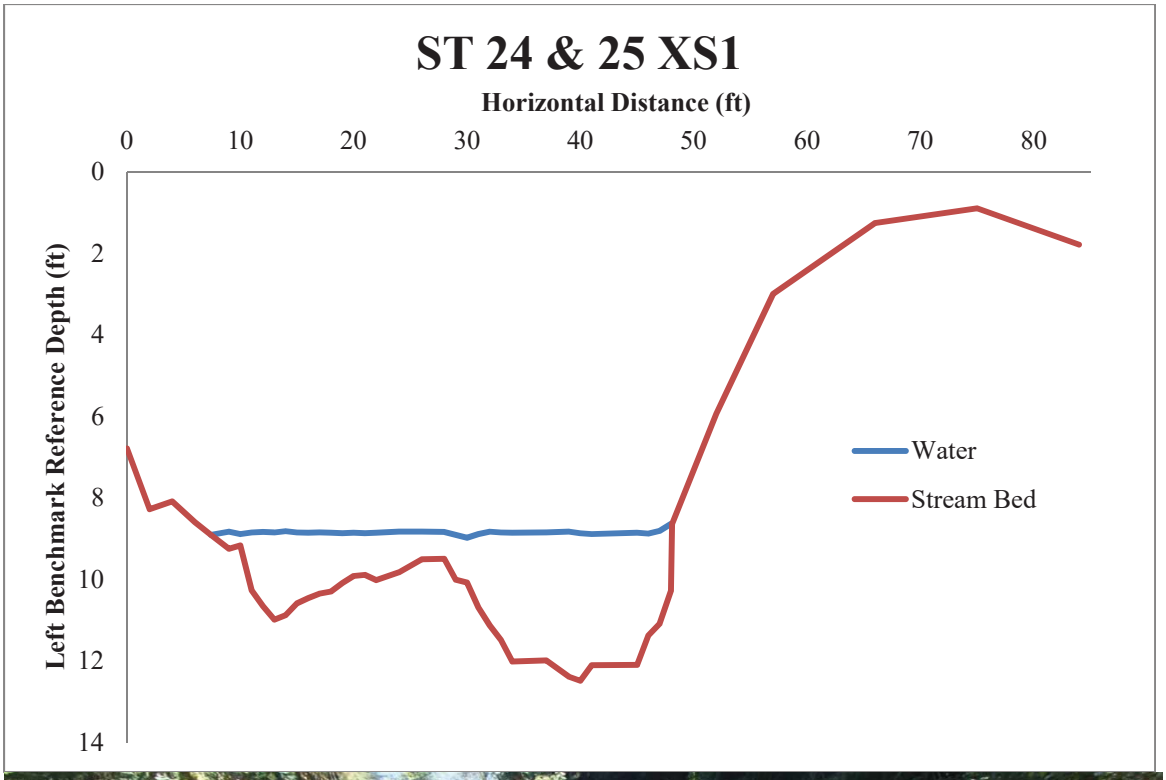
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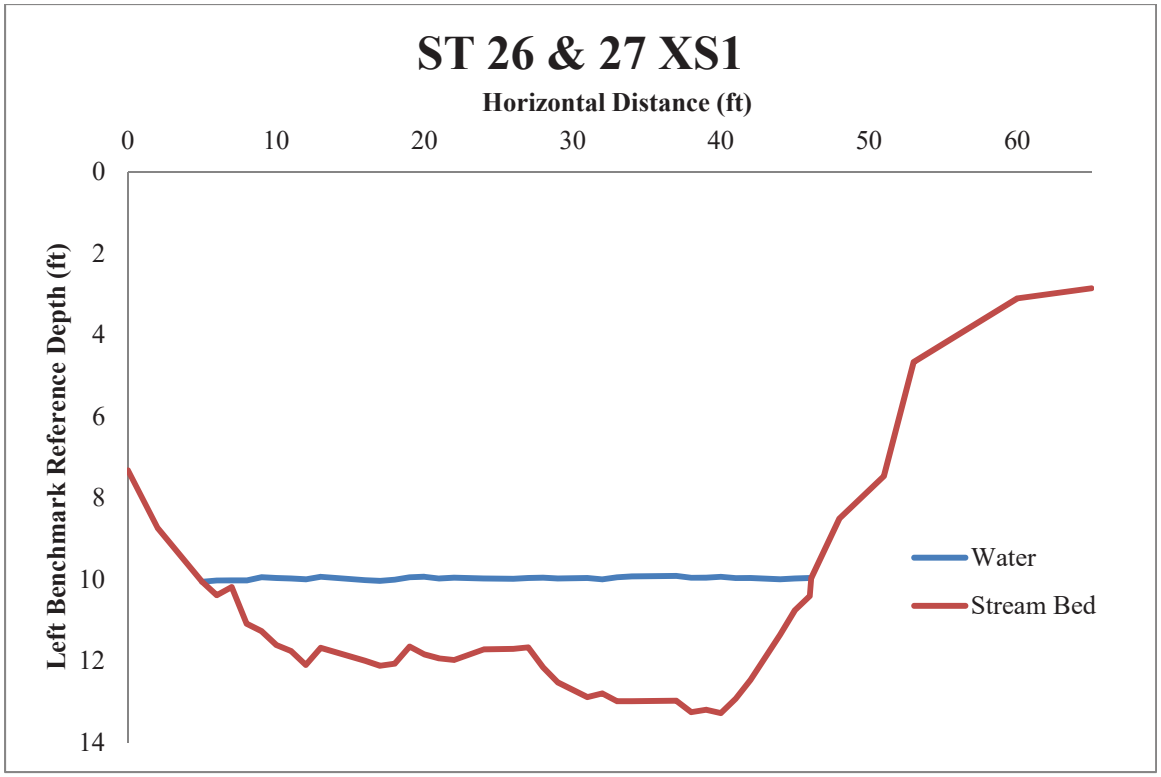
Stream Bed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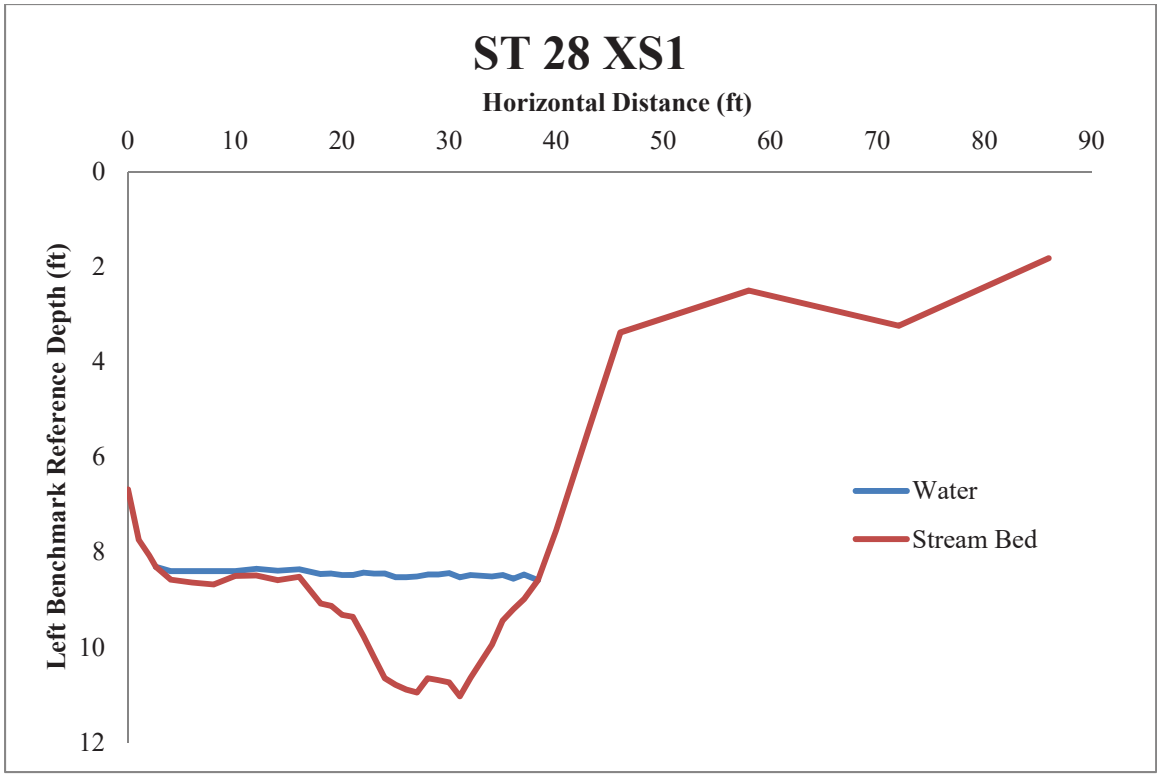
Stream Bed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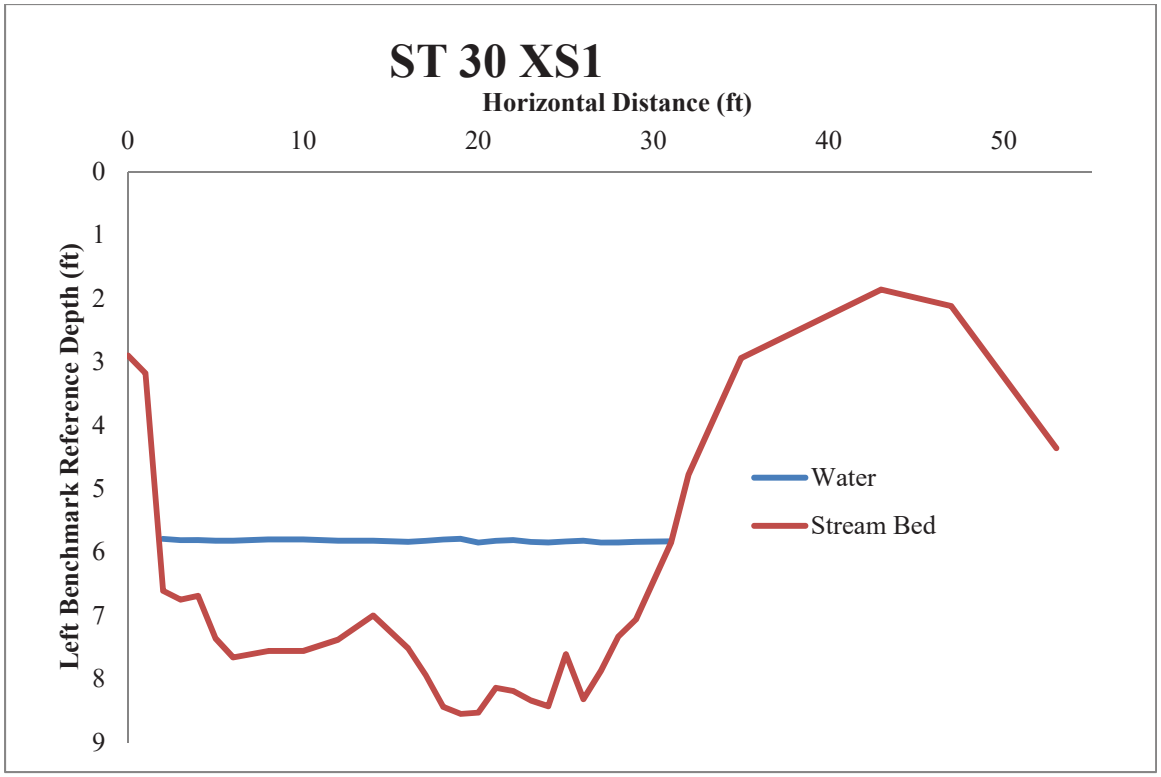
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8
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Water
Stream Bed