

Logging Camp Creek (Klickitat River Subbasin, Washington) Rapid Aquatic Habitat Assessment Stream Report



Confederated Tribes and Bands of the Yakama Nation
Yakama Nation Fisheries Program, Yakima/Klickitat Fisheries Project
Klickitat Sub-basin Research, Monitoring, and Evaluation Project
Klickitat Watershed Enhancement Project
Klickitat Field Office
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Klickitat, WA 98628



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Prepared by:

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Yakima Klickitat Fisheries Project-Klickitat Monitoring and Evaluation Project (KM&E) and Klickitat Watershed Enhancement Project (KWEP) - Rapid Aquatic Habitat Assessment Stream Report

Stream: Logging Camp Creek

LLID: 1212072457826

Basin: Klickitat River

HUC Number: 17070106

Ecoregion: Columbia River Gorge

Watershed Area: 12.1 km²

Survey Dates: Reach 1- May 9, 2011

Reach 2- May 10 & 12, 2011

Reach 3- May 23, 2011

Survey Crew: Reach 1-Nicolas Romero and David Lindley

Reach 2-Nicolas Romero and David Lindley

Reach 3-Nicolas Romero and David Lindley

Report Prepared By: Kory G. Kuhn and Nicolas Romero

Introduction:

The Rapid Aquatic Habitat Assessment Protocol (RAHAP) is designed to provide quantitative information on stream habitat and fish distribution at the watershed scale. Data collected from the stream inventory surveys are used to provide baseline information for fisheries biologists, hydrologists, and foresters to guide natural resources management and land use practices on Yakama Nation Southern Ceded lands. This protocol establishes hierarchical spatial context and fish habitat relationships at habitat unit, reach, and basin scales. The spatially continuous method is useful when the scale(s) necessary to detect pattern are unknown. This level of pattern detection is useful to managers for refining study designs; locating, identifying, and prioritizing projects; and establishing reference or control sites for project design. Existing stream inventory protocols were reviewed during the development of the RAHAP methodology. Upon review, two widely used Pacific Northwest stream classification systems, Washington Timber, Fish, and Wildlife (TFW) Monitoring Program and the Aquatic Inventory Project (AIP), were incorporated into the RAHAP methodology (Moore et al. 2010, Pleus et al. 1999, and Schuett-Hames et al. 1999).

RAHAP quantifies both the abiotic and biotic state of aquatic habitat. The abiotic components are: geomorphic reach segments, habitat units, bedrock features, wood pieces, wood jams, and streamflow. These physical parameters are coupled with a separate one-pass fish survey that ties fish abundance to habitat. The geomorphic reach and habitat unit level delineation methodology was derived primarily from AIP (Moore et al. 2010). The wood piece and wood jam inventories follow protocols established by

Schuett-Hames et al. 1999. Yakama Nation Fisheries personnel identified bedrock features as habitat of interest and subsequently developed survey methodologies. Refer to Romero and Lindley 2012 for the complete RAHAP protocol.

Stream Level Description:

The Logging Camp Creek habitat survey began at the confluence with the Klickitat River (rkm 15.1) and extended upstream approximately 1.9 kilometers. The habitat survey ended at a 25-meter cascade barrier that delineated the upstream extent of salmonid anadromy. Three reaches were delineated over the length of the habitat survey. A valley transition from wide to narrow delineated Reach 1 from Reach 2 and a tributary junction delineated Reach 2 from Reach 3. A narrow valley was the dominant valley form encountered. The stream channel was generally constrained by alternating hillslope and terraces.

Four side channels were encountered on the survey. The stream gradient was 9.3%. The total wetted area for both primary and secondary channels combined was 6,344.7 m². The primary channel average wetted and bankfull widths were 3.1 and 4.9 meters, respectively. Boulder and cobble were the dominant substrate accounting for approximately 72% of the substrate area. Cascade was the most common geomorphic unit delineated, comprising 56% of the wetted area and 52% of the survey length. A total of 38 pools were quantified. The average residual pool depth was 0.33 meters. No pools possessed a maximum depth ≥ 1 meter. The total number of pools/kilometer was estimated at 19.3. Pool frequency was measured at 10.7 (bankfull widths/pool).

Douglas fir and Oregon White Oak were the most common upslope trees. Big Leaf Maple and Red Alder were the dominant and sub-dominant riparian vegetation, respectively. The canopy covered approximately 83% of the wetted area. A total of 93 large wood pieces were counted resulting in a frequency of 4.71 pieces/100 meters and a volume of 4.44 m³/100 meters. Deciduous trees accounted for 67 of the 93 pieces and approximately 56% of the wood volume. Logs accounted for 80 of the 93 pieces and 78% of the wood volume. Of the 93 large wood pieces, 53, 68, 63, and 51 were located completely or partially in the wetted channel, within bankfull but outside of the wetted channel, above the bankfull channel, and flood plain/terrace, respectively. The majority of large wood pieces were unstable (77%). Of the pieces exhibiting a level of stability, rooted, buried, and pinned stability forms were observed in 14%, 7%, and 5% of the pieces, respectively. Six large wood pieces functioned as a pool forming agent. Large wood pieces were most commonly oriented perpendicular (42%) followed by downstream (31%), upstream (16%), and parallel (11%). No large wood jams were observed on the survey.

A total of 6 distinct bedrock features were quantified. The cumulative measured length was 49.2 meters. The dominant cross-sectional shape was ledge and slope. All of the bedrock features projected into the wetted channel and two features functioned as a hydraulic surface control.

Reach Level Descriptions:

Reach 1 began at the confluence with the Klickitat River (RK 15.1) and extended upstream 404.1 meters. A valley transition from wide to narrow delineated the end of Reach 1. The reach was characterized by a wide alluvial fan valley. The stream channel was constrained by an incised bankfull channel. The reach gradient was 6.9%. One side channel was encountered in the reach.

The total wetted area quantified in the primary channel was 404.1 m². The average wetted and bankfull widths for the primary channel were 2.9 and 5.9 meters, respectively. Cobble was the dominant reach substrate accounting for approximately 37% of the reach wetted area. Gravel, boulder, and sand comprised an additional 31%, 19% and 11% of the quantified substrate, respectively. Riffles were the most common geomorphic unit delineated comprising 79% of the reach wetted area and 65% of the reach length. A total of 2 pools were quantified in the primary channel. The average primary channel residual pool depth was 0.34 meters. No pools were had a depth ≥1 meter. The number of primary channel pools/kilometer was estimated at 4.9. Pool frequency for the primary channel was measured at 34.4 (bankfull widths/pool).

Oregon White Oak and Big Leaf Maple were the dominant and sub-dominant riparian vegetation in the primary channel, respectively. The canopy covered approximately 44% of the primary channel wetted area and 40% of the secondary channel wetted area. A total of 9 large wood pieces were counted resulting in a frequency of 2.2 pieces/100 meters and a volume of 3.6 m³/100 meters. Of the 9 large wood pieces, 5, 9, 9, and 5 were located completely or partially in the wetted channel, within bankfull but outside of the wetted channel, above the bankfull channel, and flood plain/terrace, respectively. Deciduous trees accounted for all 9 of the large wood pieces and 100% of the wood volume. Logs accounted for 7 of the 9 pieces and 93% of the wood volume. Seven of the wood pieces were unstable and two were rooted. Large wood pieces were most commonly oriented perpendicular (56%) followed by downstream (22%), and upstream (22%).

In addition to the primary channel, one side channel was encountered on the survey. The total wetted area quantified for the secondary channel was 18.3 m². The side channel consisted of 1 habitat unit and extended upstream 8.7 meters. There were no pools quantified for the secondary channel.

Reach 2 began 404.1 meters upstream from the confluence with the Klickitat River (rkm 15.1) and extended upstream 1,348.8 meters. A tributary junction delineated the end of Reach 2. A narrow v-shaped valley was the dominant valley form encountered. The stream channel was generally constrained by alternating hillslope and terraces. The reach gradient was 9.7%. Three side channels were encountered on the survey.

The total wetted area quantified for the primary channel was 4,588.5 m². The average wetted and bankfull widths for the primary channel were 3.2 and 4.8 meters, respectively. Boulder and cobble were the dominant substrates accounting for approximately 76% of the substrate area. Gravel comprised an additional 15% of the quantified substrate. Cascades were the most common geomorphic unit delineated comprising 68% of the reach wetted area and 64% of the reach length. A total of 29 pools were quantified in the primary channel. The average primary channel residual pool depth was 0.34

meters. No pools had a depth ≥ 1 meter. The total number of pools/kilometer was 20.7. Pool frequency in the primary channel was measured at 9.8 (bankfull widths/pool).

Douglas fir and Oregon White Oak were the most common upslope trees. Big Leaf Maple and Red Alder were the dominant and sub-dominant riparian vegetation, respectively. The canopy covered approximately 92% of the primary channel wetted area. A total of 71 large wood pieces were counted resulting in a frequency of 5.3 pieces/100 meters and a volume of $4.8 \text{ m}^3/100$ meters. A total of 15 key pieces were identified accounting for 73% of the quantified wood volume (m^3). Logs accounted for 61 of 71 pieces and approximately 75% of the wood volume. Deciduous derived large wood accounted for 45 of 71 pieces and approximately 40% of the wood volume. Of the 71 large wood pieces, 40, 50, 46, and 39 were located completely or partially in the wetted channel, within bankfull but outside of the wetted channel, above the bankfull channel, and flood plain/terrace, respectively. The majority large wood pieces were unstable (75%). Of the pieces exhibiting a level of stability, rooted, buried, and pinned stability forms were observed in 14%, 9%, and 7% of the pieces, respectively. Five pieces functioned as a pool forming agent. Large wood pieces were most commonly oriented perpendicular (41%), downstream (31%), upstream (18%), and parallel (10%).

A total of 5 distinct bedrock features were quantified in the primary channel. The measured length was 34.2 meters. The quantified bedrock features were comprised of 4 ledges and 2 slopes. Five of the bedrock features projected into the wetted area and one feature functioned as a hydraulic surface control.

In addition to the primary channel, three side channels were encountered on the survey consisting of one unit each. The total wetted area quantified for the secondary channel was 78.8 m^2 . The side channels had a total length of 49.5 meters. There were no pools quantified for the secondary channel.

Reach 3 began 1,752.9 meters upstream from the confluence with the Klickitat River (rkm 15.1) and extended upstream 162.1 meters. A high gradient cascade fish barrier delineated the end of Reach 3. A narrow v-shaped valley was the dominant valley form encountered. The stream channel was generally constrained by hillslope. The reach gradient was 12.3%. No side channels were encountered in the reach survey.

The total wetted area quantified for the primary channel was 476.8 m^2 . The average wetted and bankfull widths for the primary channel were 2.9 and 4.2 meters, respectively. Boulder and Cobble were the dominant substrate accounting for 75% of the substrate area. Gravel comprised an additional 17% of the quantified substrate. Cascades were the most common geomorphic unit delineated comprising 58% of the reach wetted area and 53% of the reach length. A total of 7 pools were quantified in the primary channel. The average primary channel residual pool depth was 0.30 meters. No pools had a depth ≥ 1 meter. The number of primary channel pools/kilometer was estimated at 43.2.

Douglas fir and Oregon White Oak were the most common upslope trees. Big Leaf Maple was the dominant and sub-dominant riparian vegetation. The canopy covered approximately 93% of the primary channel wetted area. A total of 12 large wood pieces were counted resulting in a frequency of 7.4 pieces/100 meters and a volume of $4.7 \text{ m}^3/100$ meters. A total of 3 key pieces were identified

accounting for 61% of the quantified wood volume (m^{-3}). Logs accounted for approximately 75% of the wood volume. Deciduous derived large wood accounted for all the quantified wood. Of the 12 large wood pieces, 8, 8, 7, and 6 were located completely or partially in the wetted channel, within bankfull but outside of the wetted channel, above the bankfull channel, and flood plain/terrace, respectively. The majority large wood pieces were unstable (92%) followed by a single rooted piece. One piece functioned as a pool forming agent. Large wood pieces were most commonly oriented downstream (41.7%), perpendicular (33%), u and parallel (25%).

A single bedrock feature was quantified in the primary channel. The measured length was 15.0 meters. The bedrock feature consisted of ledge, slope, and cliff characteristics. The bedrock feature projected into the wetted area and functioned as a hydraulic surface control.

References:

Moore, K. K. Jones, J. Dambacher, and C. Stein. 2010. Aquatic Inventories Project: Methods for Stream Habitat Surveys. Oregon Department of Fish and Wildlife, Aquatic Inventories Project, Conservation and Recovery Program, Corvallis, OR 97333.

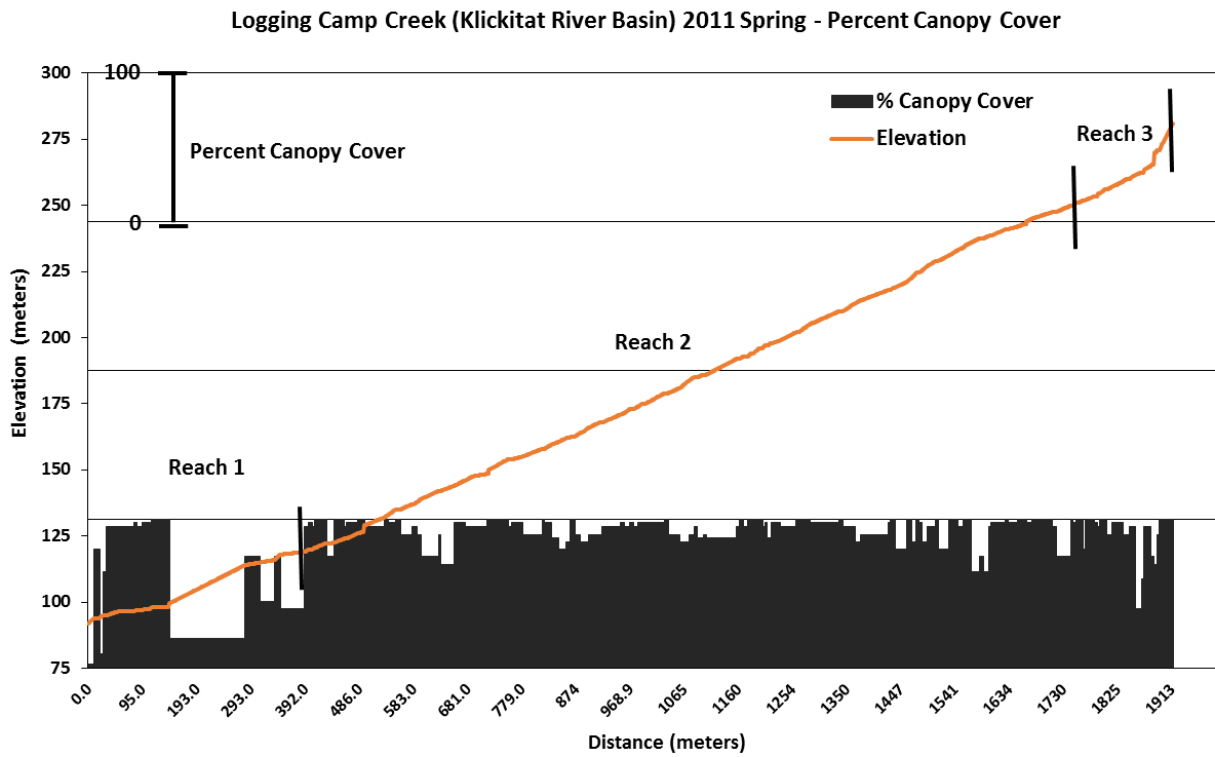
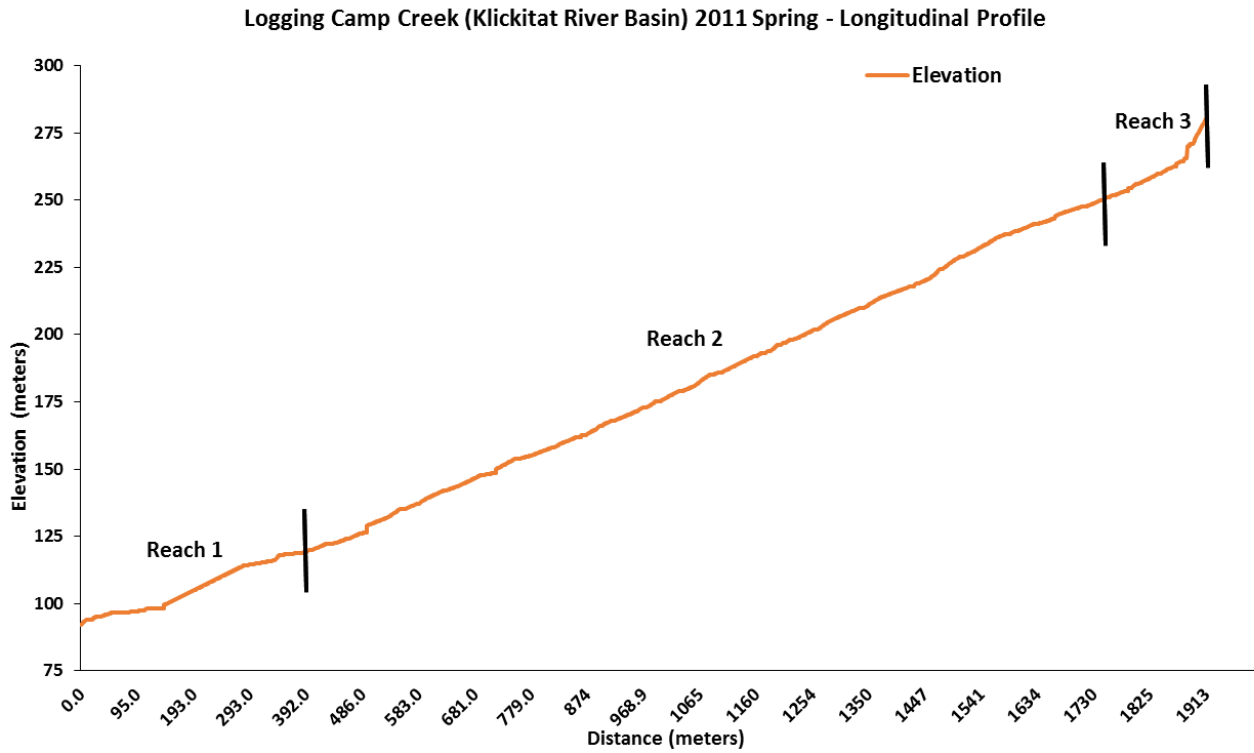
Plues, A.E., D. Schuette Hames, and L. Bullchild. 1999. TFW Monitoring Program methods manual for the habitat unit survey. Prepared for the Washington State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-00-003. DNR #105.

Romero, N., and Lindley, D. 2012. Rapid Aquatic Habitat Assessment Protocol: Methods for Stream Inventory Surveys. Yakima/Klickitat Fisheries Project (YKFP). Yakama Nation, Fisheries Program, Klickitat Washington.

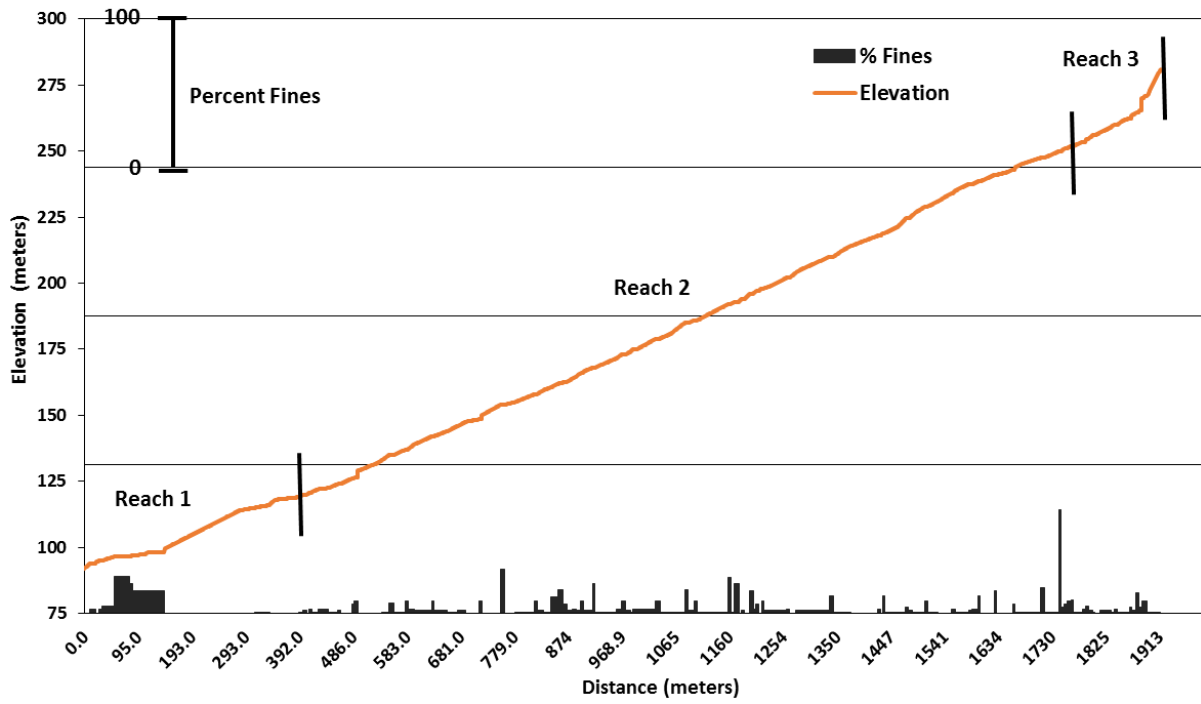
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Schuett-Hames, D., A.E. Pleuse, and D. Smith. 1999. TFW Monitoring Program method manual for the salmonid spawning habitat availability survey. Prepared for the Washington State Dept. of Natural Resources under the Timber, Fish, and Wildlife Agreement. TFW-AM9-00-007. DNR #109. November.

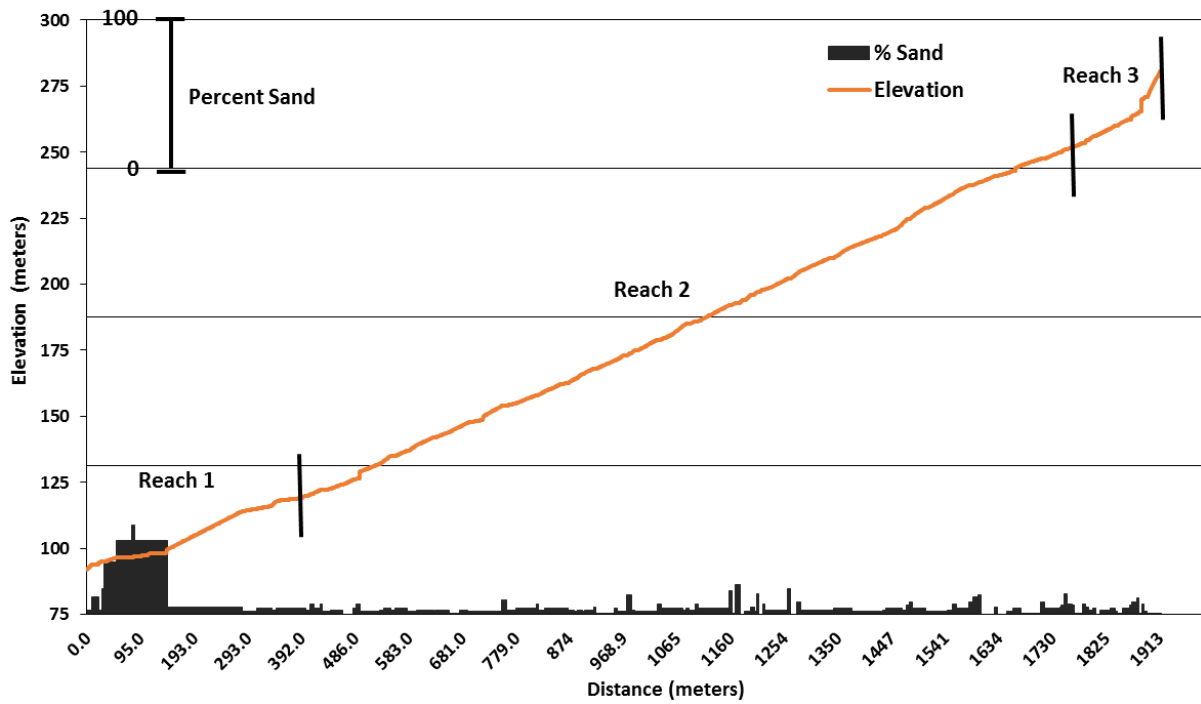
Summary Figures:



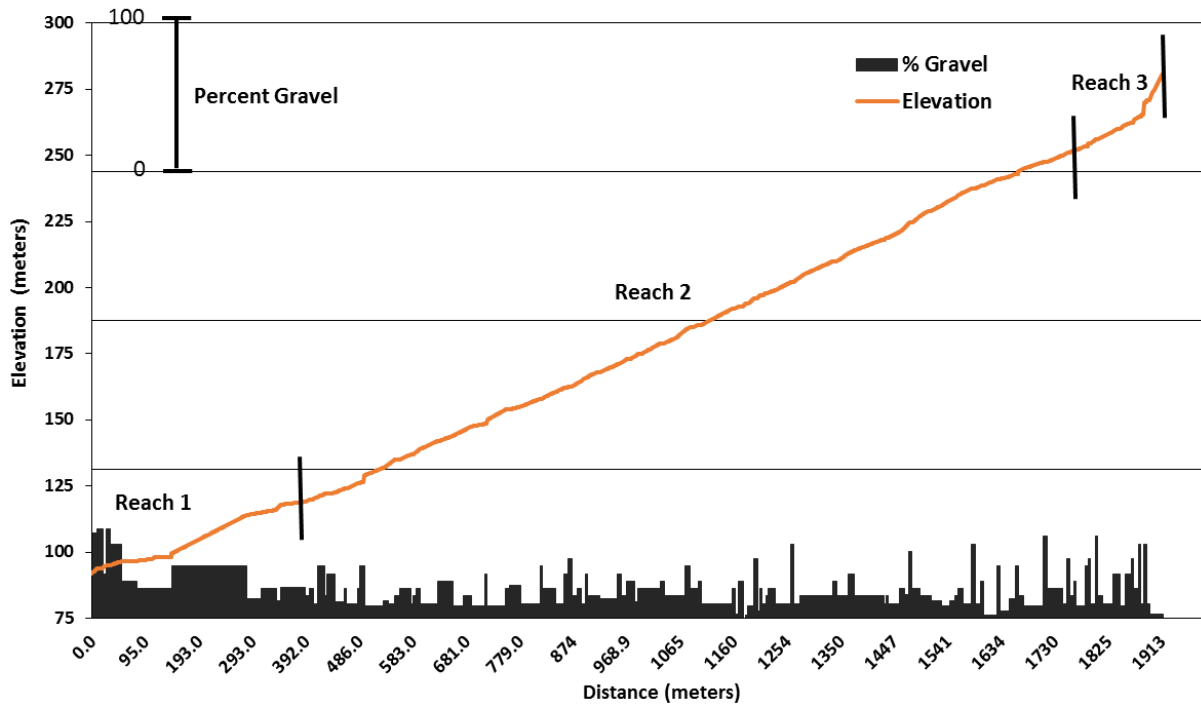
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Percent Fines Substrate



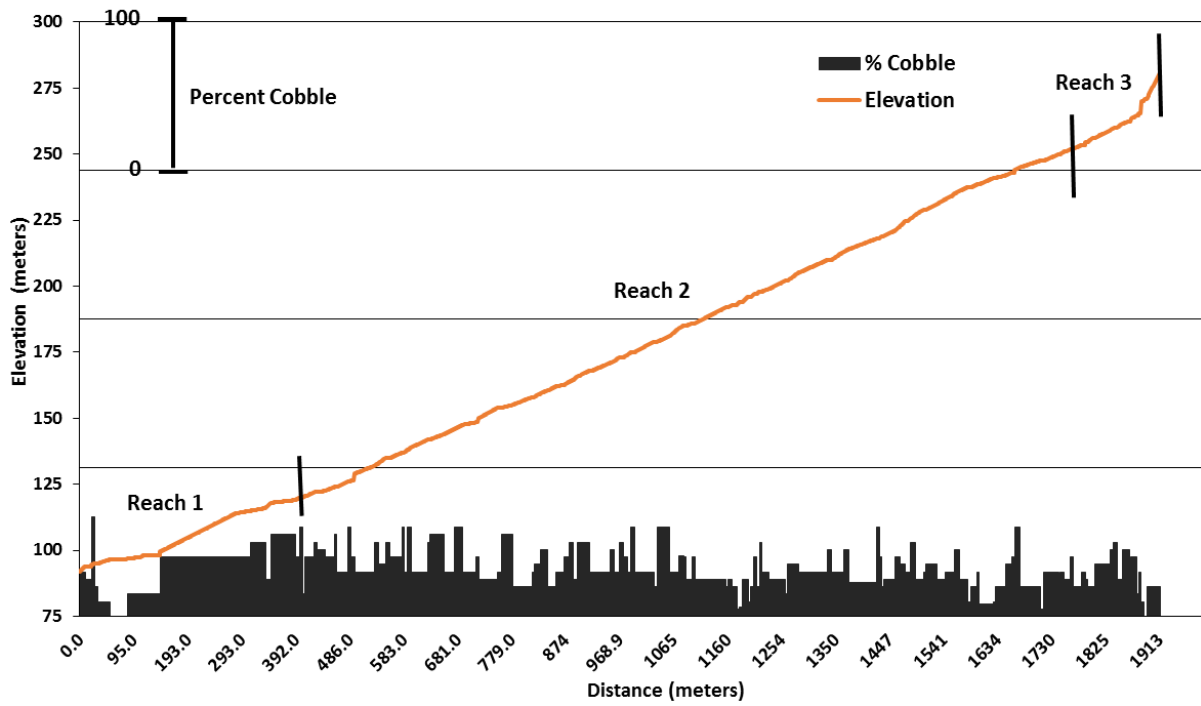
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Percent Sand Substrate



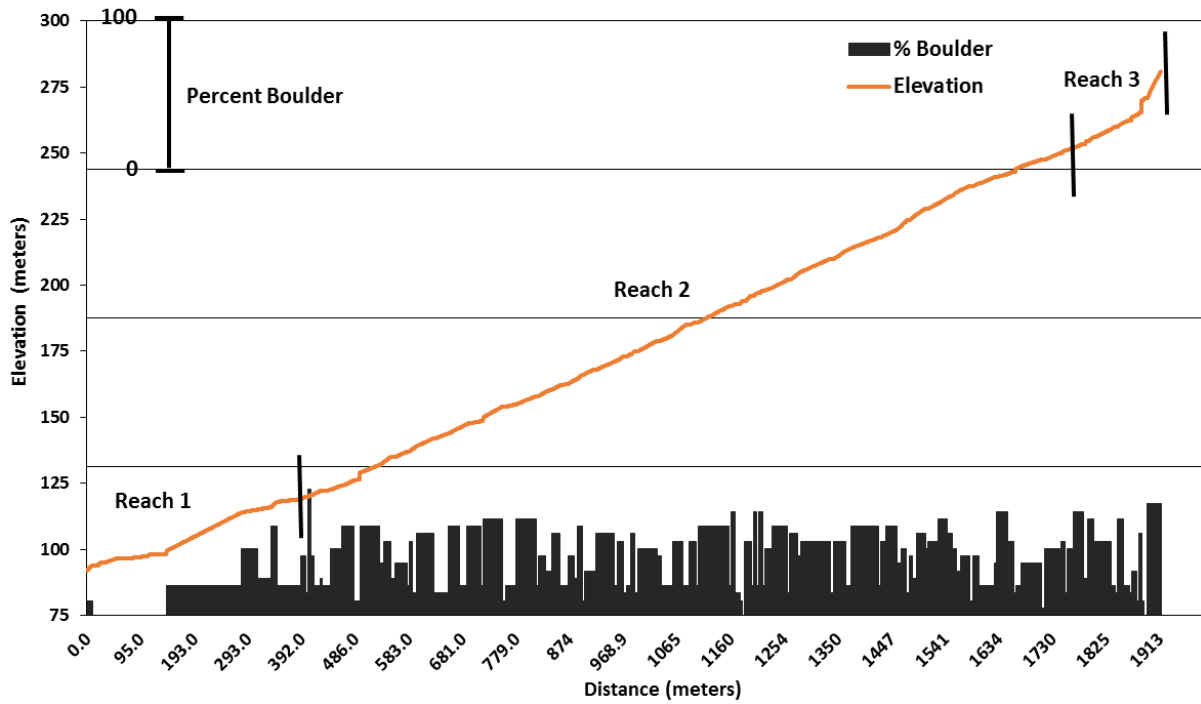
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Percent Gravel Substrate



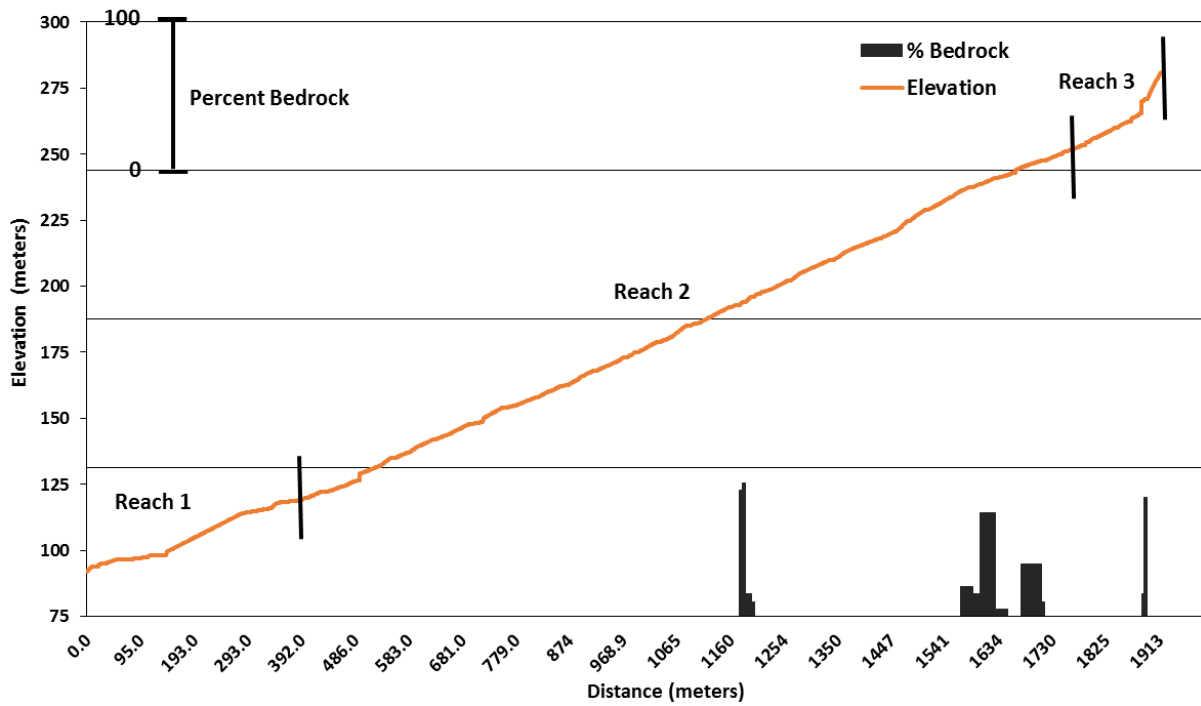
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Percent Cobble Substrate



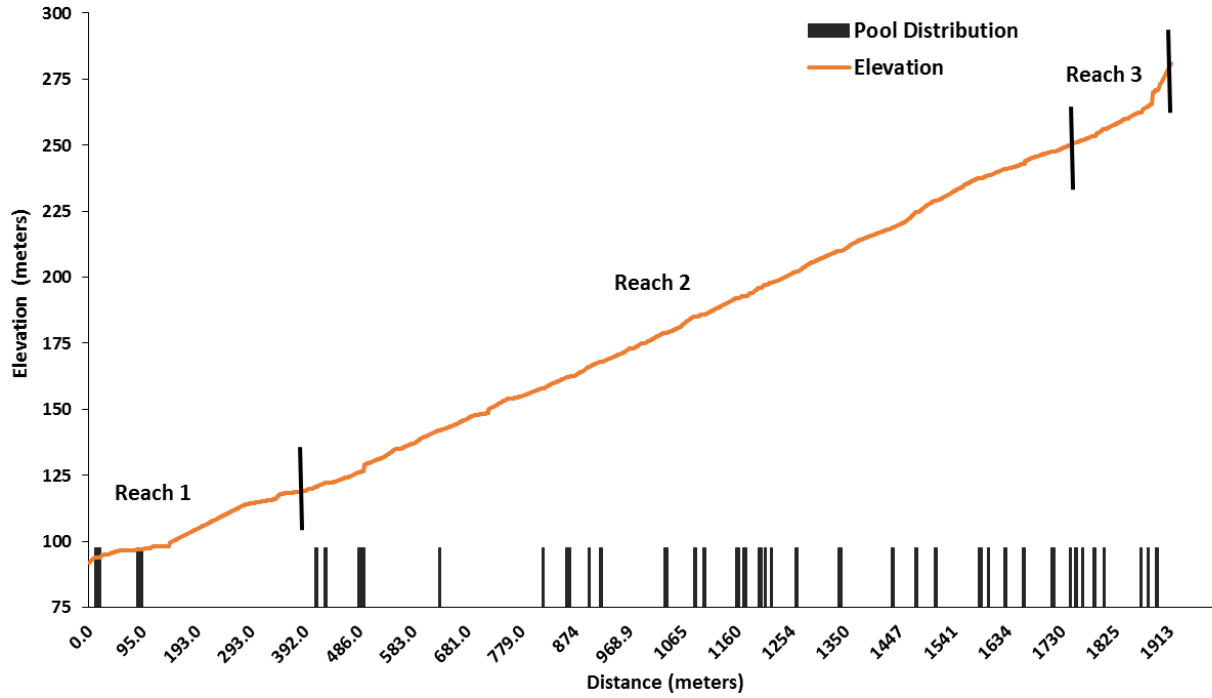
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Percent Boulder Substrate



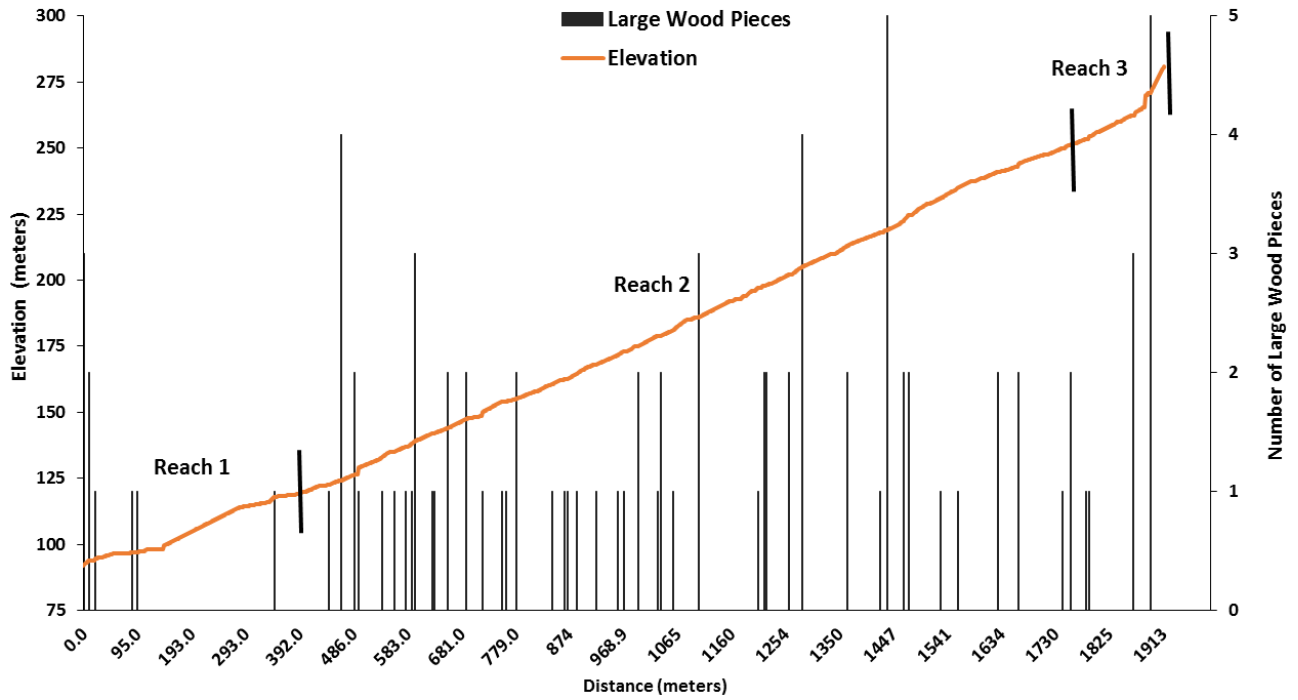
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Percent Bedrock Substrate



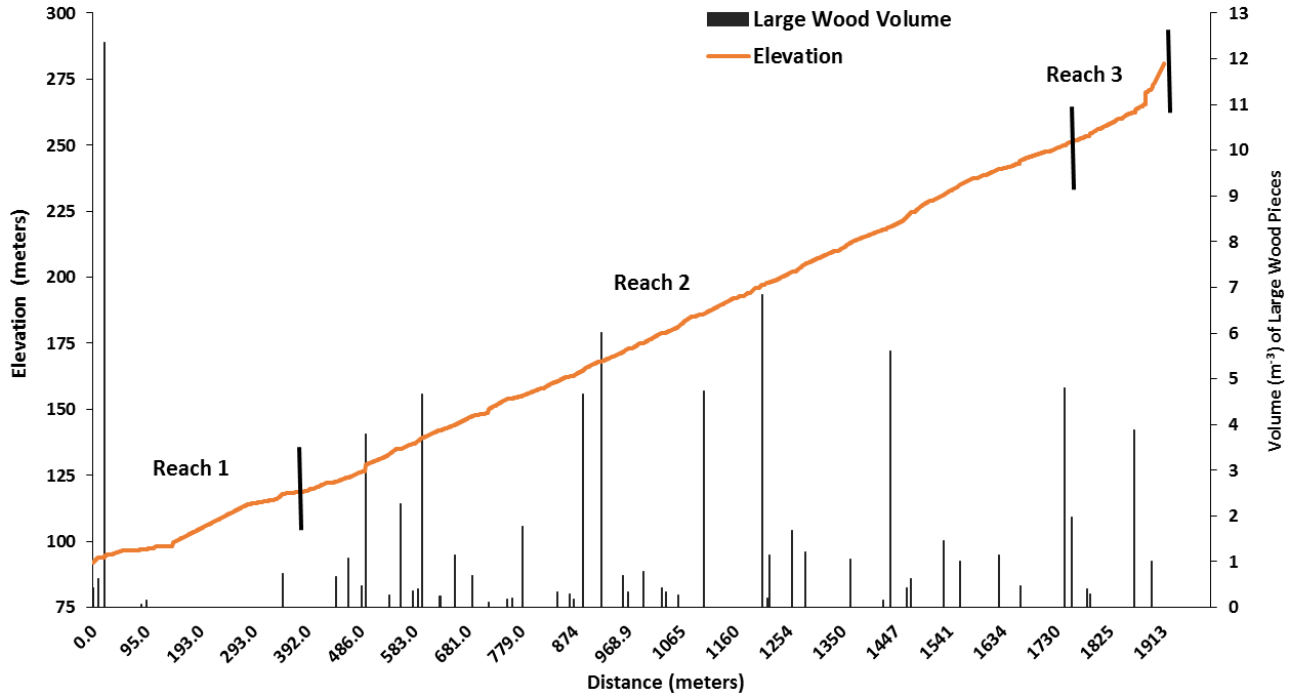
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Pool Distribution



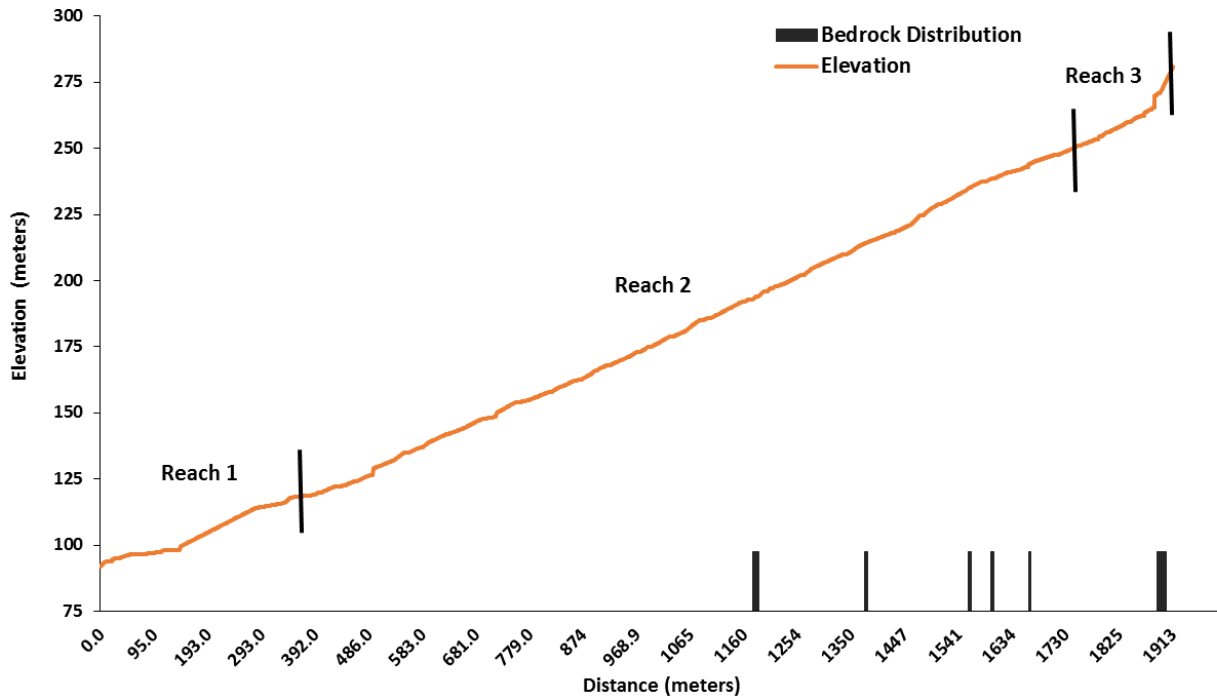
Logging Camp Creek (Klickitat River Basin) 2011 Spring- Large Wood Piece Distribution



Logging Camp Creek (Klickitat River Basin) 2011 Spring- Large Wood Volume (m3) Distribution



Logging Camp Creek (Klickitat River Basin) 2011 Spring- Bedrock Distribution



Summary Tables:

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek
Report Date: 09/29/2020
Start Location: 45.78269072, -121.208144
Start Elevation: 92.0 m
Reach Forming Agent: Tributary Junction

Reach: 1
Survey Date: 5/09/2011
End Location: 45.78299364, -121.2131246
End Elevation: 120.0 m
Reach Ending Agent: Valley Transition

CHANNEL SUMMARY

<u>Channel Type</u>	<u>No. Units</u>	<u>Channel Characteristics (m)</u>			<u>Dry Units</u>
		<u>Length (m)</u>	<u>Area (m²)</u>	<u>Gradient %</u>	
Primary	20	404.1	1,182.4	6.9	0
Secondary	1	8.7	18.3	-	0

<u>Channel Type</u>	<u>Unit</u> <u>Avg. Length</u>	<u>Channel Dimensions (m)</u>			
		<u>Avg. Wetted</u> <u>Width</u>	<u>Avg. Bankfull</u> <u>Width</u>	<u>LB Undercut</u> <u>Bank Length</u>	<u>RB Undercut</u> <u>Bank Length</u>
Primary	20.2	2.9	5.9	6.5	5.9
Secondary	8.7	2.1	-	0.0	0.0

Substrate Summary

<u>Hab Type</u>	<u>Substrate Percent Wetted Area</u>						<u>Substrate Wetted Area</u>					
	<u>Fin</u>	<u>Snd</u>	<u>Grv</u>	<u>Cbl</u>	<u>Bld</u>	<u>Bdrk</u>	<u>Fin</u>	<u>Snd</u>	<u>Grv</u>	<u>Cbl</u>	<u>Bld</u>	<u>Bdrk</u>
Pools	8.5	29.5	41.5	20.4	0.0	0.0	3.3	11.6	16.3	8.0	0.0	0.0
Glides	18.3	39.1	27.3	12.9	2.4	0.0	17.7	37.9	26.4	12.5	2.4	0.0
Runs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riffles	1.0	8.4	33.1	40.1	17.4	0.0	9.6	77.6	307.0	372.7	161.6	0.0
Rapids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cascades	0.0	2.8	13.6	35.6	47.9	0.0	0.0	3.8	18.5	48.4	65.3	0.0
Steps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Backwater	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alcoves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Iso Pools	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Obscured	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Culverts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.6	10.9	30.7	36.8	19.1	0.0	30.9	130.8	368.2	441.6	229.2	0.0

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 2

Report Date: 09/29/2020

Survey Date: 5/10, 5/12/2011

Start Location: 45.7830845, -121.2131829

End Location: 45.78672166, -121.2273898

Start Elevation: 120.0 m

End Elevation: 250.8 m

Reach Forming Agent: Valley Transition

Reach Ending Agent: Tributary Junction

CHANNEL SUMMARY

Channel Characteristics (m)

<u>Channel Type</u>	<u>No. Units</u>	<u>Length (m)</u>	<u>Area (m²)</u>	<u>Gradient (%)</u>	<u>Dry Units</u>
Primary	114	1,348.8	4,588.5	9.7	-
Secondary	3	49.5	78.8	-	-

Channel Dimensions (m)

<u>Channel Type</u>	<u>Unit</u> <u>Avg. Length</u>	<u>Avg. Wetted</u> <u>Width</u>	<u>Avg. Bankfull</u> <u>Width</u>	<u>LB Undercut</u> <u>Bank Length</u>	<u>RB Undercut</u> <u>Bank Length</u>
Primary	11.8	3.2	4.8	8.1	8.2
Secondary	16.5	1.6	-	0.0	0.0

Substrate Summary

<u>Hab Type</u>	<u>Substrate Percent Wetted Area</u>						<u>Substrate Wetted Area</u>					
	<u>Fin</u>	<u>Snd</u>	<u>Grv</u>	<u>Cbl</u>	<u>Bld</u>	<u>Bdrk</u>	<u>Fin</u>	<u>Snd</u>	<u>Grv</u>	<u>Cbl</u>	<u>Bld</u>	<u>Bdrk</u>
Pools	11.7	7.5	29.2	28.5	21.4	1.8	49.5	31.7	124.0	120.8	90.7	7.5
Glides	8.7	3.3	17.9	47.1	16.4	6.6	11.4	4.3	23.4	61.6	21.5	8.7
Runs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riffles	1.4	3.7	20.0	46.1	28.9	0.0	13.4	36.4	197.4	453.9	284.7	0.0
Rapids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cascades	1.3	2.7	11.8	27.0	53.6	3.6	40.8	83.2	368.9	845.0	1,675.2	113.5
Steps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Backwater	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alcoves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Iso Pools	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Obscured	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Culverts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.5	3.3	15.3	31.7	44.4	2.8	115.1	155.5	713.6	1,481.3	2,072.1	129.7

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 3

Report Date: 09/29/2020

Survey Date: 5/23/2011

Start Location: 45.78679014, -121.2274457

End Location: 45.78708946, -121.2292169

Start Elevation: 250.8 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

CHANNEL SUMMARY

Channel Characteristics (m)

<u>Channel Type</u>	<u>No. Units</u>	<u>Length (m)</u>	<u>Area (m²)</u>	<u>Gradient (%)</u>	<u>Dry Units</u>
Primary	26	162.1	476.8	12.3	-
Secondary	0	-	-	-	-

Channel Dimensions (m)

<u>Channel Type</u>	<u>Unit Avg. Length</u>	<u>Avg. Wetted Width</u>	<u>Avg. Bankfull Width</u>	<u>LB Undercut Bank Length</u>	<u>RB Undercut Bank Length</u>
Primary	6.2	2.9	4.2	3.9	2.0
Secondary	-	-	-	-	-

Substrate Summary

<u>Hab Type</u>	<u>Substrate Percent Wetted Area</u>						<u>Substrate Wetted Area</u>					
	<u>Fin</u>	<u>Snd</u>	<u>Grv</u>	<u>Cbl</u>	<u>Bld</u>	<u>Bdrk</u>	<u>Fin</u>	<u>Snd</u>	<u>Grv</u>	<u>Cbl</u>	<u>Bld</u>	<u>Bdrk</u>
Pools	6.6	7.3	35.4	23.4	15.2	12.0	5.2	5.7	27.8	18.4	11.9	9.4
Glides	4.8	3.5	32.1	31.3	24.7	3.6	1.8	1.3	11.8	11.5	9.1	1.3
Runs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riffles	0.9	3.7	23.2	40.9	31.3	0.0	0.8	3.2	20.0	35.2	27.0	0.0
Rapids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cascades	1.9	2.2	8.0	24.2	63.7	0.0	5.3	5.9	22.0	66.7	175.5	0.0
Steps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Backwater	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alcoves	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Iso Pools	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Obscured	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Culverts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.7	3.4	17.1	27.6	46.9	2.3	13.0	16.1	81.6	131.8	223.5	10.8

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1

Report Date: 09/29/2020

Survey Date: 5/09/2011

Start Location: 45.78269072, -121.208144

End Location: 45.78299364, -121.2131246

Start Elevation: 92.0 m

End Elevation: 120.0 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Valley transition

HABITAT SUMMARY

Geomorphic Habitat Type Summary

Habitat Type	Primary Channel (PC)					Secondary Channel (SC)				
	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)
Pools	2	20.3	1.9	39.1	3.3	0	0.0	0.0	0.0	0.0
Glides	4	44.8	2.1	96.9	8.2	0	0.0	0.0	0.0	0.0
Runs	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Riffles	9	263.1	3.4	928.5	78.5	0	0.0	0.0	0.0	0.0
Rapids	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Cascades	3	44.7	3.1	117.9	10.0	1	8.7	2.1	18.3	100
Steps	1	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Backwater	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Alcoves	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Isolated Pools	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Obscured	1	31.2	-	-	-	0	0.0	0.0	0.0	0.0
Dry Channel	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Culvert	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Total	20	404.1	2.9	1,182.4	100	1	8.7	2.1	18.3	100

Pool Summary

Variable	Total Pool #	PC Pool #	SC Pool #	# Pools/KM	# PC Pools/KM	# SC Pools/KM
All Pools	2	2	0	4.8	4.9	0.0
Pools ≥1m	0	-	-	-	-	-
Pool frequency (channel widths/pool)	35.1	34.4	-			
Residual pool depth (avg)	0.34	0.34	-			

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 2

Report Date: 09/29/2020

Survey Date: 5/10, 5/12/2011

Start Location: 45.7830845, -121.2131829

End Location: 45.78672166, -121.2273898

Start Elevation: 120.0 m

End Elevation: 250.8 m

Reach Forming Agent: Valley Transition

Reach Ending Agent: Tributary Junction

HABITAT SUMMARY

Geomorphic Habitat Type Summary

Habitat Type	Primary Channel (PC)					Secondary Channel (SC)				
	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)
Pools	29	133.4	3.1	424.2	9.2	0	0.0	0.0	0.0	0.0
Glides	9	46.5	2.8	130.7	2.8	0	0.0	0.0	0.0	0.0
Runs	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Riffles	26	302.5	3.1	929.1	20.2	2	32.5	1.7	56.7	72.0
Rapids	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Cascades	45	866.4	3.4	3,104.5	67.7	1	17.0	1.3	22.1	28.0
Steps	5	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Backwater	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Alcoves	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Isolated Pools	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Obscured	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Dry Channel	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Culvert	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Total	114	1348.8	3.2	4,588.5	100	3	49.5	1.6	78.8	100

Pool Summary

Variable	Total Pool #	PC Pool #	SC Pool #	# Pools/KM	# PC Pools/KM	# SC Pools/KM
All Pools	29	29	0	20.7	21.5	-
Pools ≥1m	0	0	0	-	-	-
Pool frequency (channel widths/pool)	10.1	9.8	-			
Residual pool depth (avg)	0.34	0.34	-			

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 3

Report Date: 09/29/2020

Survey Date: 5/23/2011

Start Location: 45.78679014, -121.2274457

End Location: 45.78708946, -121.2292169

Start Elevation: 250.8 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

HABITAT SUMMARY

Geomorphic Habitat Type Summary

Habitat Type	Primary Channel (PC)					Secondary Channel (SC)				
	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)
Pools	7	26.2	3.1	78.4	16.4	0	0.0	0.0	0.0	0.0
Glides	4	14.6	2.5	36.8	7.7	0	0.0	0.0	0.0	0.0
Runs	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Riffles	4	34.7	2.5	86.1	18.1	0	0.0	0.0	0.0	0.0
Rapids	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Cascades	6	86.6	3.2	275.4	57.8	0	0.0	0.0	0.0	0.0
Steps	5	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Backwater	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Alcoves	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Isolated Pools	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Obscured	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Dry Channel	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Culvert	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Total	26	162.1	2.9	476.7	100	0	0.0	0.0	0.0	0.0

Pool Summary

Variable	Total Pool #	PC Pool #	SC Pool #	# Pools/KM	# PC Pools/KM	# SC Pools/KM
All Pools	7	7	0	43.2	43.2	-
Pools ≥1m	0	0	0	-	-	-
Pool frequency (channel widths/pool)	-	-	-	-	-	-
Residual pool depth (avg)	0.30	0.30	-	-	-	-

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1-3

Report Date: 09/29/2020

Survey Date: 5/9-5/10, 5/12, 5/23/2011

Start Location: 45.78269072 -121.208144

End Location: 45.78708946, -121.2292169

Start Elevation: 92 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

STREAM CHANNEL AND HABITAT SUMMARY

Channel Summary

Channel Type	No. Units	Total Length (m)	Wetted Area (m ²)	Avg Width (m)	Avg Bankfull Width (m)	% Gradient	% Fin	% Snd	% Grv	% Cbl	% Bldr	% Bdrk
PC	160	1,915.0	6,247.6	3.1	4.5	9.3	2.5	4.8	18.4	32.2	39.9	2.3
SC	4	58.2	97.1	1.7	-	-	1.6	5.0	15.4	42.0	35.9	0.0

Geomorphic Habitat Type Summary

Habitat Type	Primary Channel (PC)					Secondary Channel (SC)				
	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)	No. Units	Length (m)	Avg. Width (m)	Wetted Area (m ²)	% Wetted Area (m ²)
Pools	38	179.9	3.0	541.8	8.7	0	0.0	0.0	0.0	0.0
Glides	17	105.9	2.6	264.4	4.2	0	0.0	0.0	0.0	0.0
Runs	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Riffles	39	600.3	3.1	1,943.7	31.1	2	32.5	1.7	56.7	58.4
Rapids	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Cascades	54	997.7	3.4	3,497.8	56.0	2	25.7	1.7	40.4	41.6
Steps	11	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Backwater	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Alcoves	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Isolated Pools	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Obscured	1	31.2	-	-	-	0	0.0	0.0	0.0	0.0
Dry Channel	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Culvert	0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Total	160	1,915.0	3.1	6,247.7	100	4	58.2	1.7	97.1	100

Pool Summary

Variable	Total Pool #	PC Pool #	SC Pool #	# Pools/KM	# PC Pools/KM	# SC Pools/KM
All Pools	38	38	0	19.3	19.8	-
Pools ≥1m	0	0	0	-	-	-
Pool frequency (channel widths/pool)	10.7	10.4	-			
Residual pool depth (avg)	0.33	0.33	-			

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1

Report Date: 09/29/2020

Survey Date: 5/09/2011

Start Location: 45.78269072, -121.208144

End Location: 45.78299364, -121.2131246

Start Elevation: 92.0 m

End Elevation: 120.0 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Valley Transition

RIPARIAN AND LARGE WOOD PIECES SUMMARY

Riparian Characteristics

<u>Type</u>	<u>Total Canopy Cover Area (m²)</u>	<u>Total % Canopy Cover</u>	<u>Unit Avg. % Canopy Cover</u>	<u>Dom Canopy Species</u>	<u>Sub-dom Canopy Species</u>
Primary	519.9	44.0	72.6	White Oak	Big Leaf Maple
Secondary	7.3	39.9	40.0	White Oak	Ponderosa Pine

Large Wood Piece Inventory Summary

<u>Channel Type</u>	<u>Primary Channel</u>	<u>#Pieces</u>	<u>Volume (m³)</u>	<u>Pieces/100 m</u>	<u>Volume (m³)/100 m</u>
Primary	All Pieces ¹	9	14.4	2.2	3.6
	Key Pieces ²	1	12.3	0.2	3.1
	Logs	7	13.4	1.7	3.3
	Rootwads	2	0.9	0.5	0.2
	Conifer	0	0.0	0.0	0.0
	Deciduous	9	14.4	2.2	3.6
Secondary	All Pieces ¹	0	0.0	0.0	0.0
	Key Pieces ²	0	0.0	0.0	0.0
	Logs	0	0.0	0.0	0.0
	Rootwads	0	0.0	0.0	0.0
	Conifer	0	0.0	0.0	0.0
	Deciduous	0	0.0	0.0	0.0

¹Large Wood Piece (≥2 m x ≥0.10 m dia.); ² Minimum Qualifying Key Pieces (≥2.5 m³)

Large Wood Piece Zone Location Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Zone 1 (%)</u>	<u># Zone 2 (%)</u>	<u># Zone 3 (%)</u>	<u># Zone 4 (%)</u>
Primary	9	5 (55.6)	9 (100)	9 (100)	5 (55.6)
Secondary	0	-	-	-	-

*Pieces may span multiple zones

*Zone 1 (wetted channel); Zone 2 (within bankfull); Zone 3 (above bankfull); Zone 4 (flood plain/terrace/hillslope)

Large Wood Piece Stability and Pool Forming Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Rooted (%)</u>	<u># Buried (%)</u>	<u># Pinned (%)</u>	<u># Unstable (%)</u>	<u># Pool Forming (%)</u>
Primary	9	2 (22.2)	0 (0.0)	0 (0.0)	7 (77.8)	0 (0.0)
Secondary	0	-	-	-	-	-

Large Wood Piece Orientation Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Parallel (%)</u>	<u># Perpendicular (%)</u>	<u># Downstream (%)</u>	<u># Upstream (%)</u>
Primary	9	0 (0.0)	5 (55.6)	2 (22.2)	2 (22.2)
Secondary	0	-	-	-	-

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 2

Report Date: 09/29/2020

Survey Date: 5/10-, 5/12/2011

Start Location: 45.7830845, -121.2131829

End Location: 45.78672166, -121.2273898

Start Elevation: 120.0 m

End Elevation: 250.8 m

Reach Forming Agent: Valley Transition

Reach Ending Agent: Tributary Junction

RIPARIAN AND LARGE WOOD PIECES SUMMARY

Riparian Characteristics

<u>Type</u>	<u>Total Canopy Cover Area (m²)</u>	<u>Total % Canopy Cover</u>	<u>Unit Avg. % Canopy Cover</u>	<u>Dom Canopy Species</u>	<u>Sub-dom Canopy Species</u>
Primary	4,229.4	92.2	93.8	Big Leaf Maple	Red Alder
Secondary	76.6	97.2	96.7	Big Leaf Maple	Red Alder

Large Wood Piece Inventory Summary

<u>Channel Type</u>	<u>Primary Channel</u>	<u>#Pieces</u>	<u>Volume (m³)</u>	<u>Pieces/100 m</u>	<u>Volume (m³)/100 m</u>
Primary	All Pieces ¹	71	64.3	5.3	4.8
	Key Pieces ²	15	46.8	1.1	3.5
	Logs	61	47.9	4.5	3.5
	Rootwads	10	16.4	0.7	1.2
	Conifer	26	38.8	1.9	2.9
	Deciduous	45	25.4	3.3	1.9
Secondary	All Pieces ¹	1	1.4	2.0	2.9
	Key Pieces ²	1	1.4	2.0	2.9
	Logs	1	1.4	2.0	2.9
	Rootwads	0	-	-	-
	Conifer	0	-	-	-
	Deciduous	1	1.4	2.0	2.9

¹Large Wood Piece (≥2 m x ≥0.10 m dia.); ² Minimum Qualifying Key Pieces (≥1.0 m³)

Large Wood Piece Zone Location Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Zone 1 (%)</u>	<u># Zone 2 (%)</u>	<u># Zone 3 (%)</u>	<u># Zone 4 (%)</u>
Primary	71	40 (56.3)	50 (70.4)	46 (64.8)	39 (54.9)
Secondary	1	0 (0.0)	1(100)	1(100)	1(100)

*Pieces may span multiple zones

*Zone 1 (wetted channel); Zone 2 (within bankfull); Zone 3 (above bankfull); Zone 4 (flood plain/terrace/hillslope)

Large Wood Piece Stability and Pool Forming Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Rooted (%)</u>	<u># Buried (%)</u>	<u># Pinned (%)</u>	<u># Unstable (%)</u>	<u># Pool Forming (%)</u>
Primary	71	10 (14.1)	6 (8.5)	5 (7.0)	53 (74.6)	5 (7.0)
Secondary	1	0 (0.0)	0 (0.0)	0 (0.0)	1 (100)	0 (0.0)

Large Wood Piece Orientation Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Parallel (%)</u>	<u># Perpendicular (%)</u>	<u># Downstream (%)</u>	<u># Upstream (%)</u>
Primary	71	7 (9.9)	29 (40.8)	22 (31.0)	13 (18.3)
Secondary	1	0 (0.0)	1 (100)	0 (0.0)	0 (0.0)

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 3

Report Date: 09/29/2020

Survey Date: 5/23/2011

Start Location: 45.78679014, -121.2274457

End Location: 45.78708946, -121.2292169

Start Elevation: 250.8 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

RIPARIAN AND LARGE WOOD PIECES SUMMARY

Riparian Characteristics

<u>Type</u>	<u>Total Canopy Cover Area (m²)</u>	<u>Total % Canopy Cover</u>	<u>Unit Avg. % Canopy Cover</u>	<u>Dom Canopy Species</u>	<u>Sub-dom Canopy Species</u>
Primary	441.0	92.5	88.6	Big Leaf Maple	Big Leaf Maple
Secondary	0	-	-	-	-

Large Wood Piece Inventory Summary

<u>Channel Type</u>	<u>Primary Channel</u>	<u>#Pieces</u>	<u>Volume (m³)</u>	<u>Pieces/100 m</u>	<u>Volume (m³)/100 m</u>
Primary	All Pieces ¹	12	7.6	7.4	4.7
	Key Pieces ²	3	4.6	1.9	2.8
	Logs	11	5.7	6.8	3.5
	Rootwads	1	1.9	0.6	1.2
	Conifer	0	-	-	-
	Deciduous	12	7.6	7.4	4.7
Secondary	All Pieces ¹	0	-	-	-
	Key Pieces ²	0	-	-	-
	Logs	0	-	-	-
	Rootwads	0	-	-	-
	Conifer	0	-	-	-
	Deciduous	0	-	-	-

¹Large Wood Piece (≥ 2 m x ≥ 0.10 m dia.); ² Minimum Qualifying Key Pieces (≥ 1.0 m³)

Large Wood Piece Zone Location Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Zone 1 (%)</u>	<u># Zone 2 (%)</u>	<u># Zone 3 (%)</u>	<u># Zone 4 (%)</u>
Primary	12	8 (66.7)	8 (66.7)	7 (58.3)	6(50.0)
Secondary	0	-	-	-	-

*Pieces may span multiple zones

*Zone 1 (wetted channel); Zone 2 (within bankfull); Zone 3 (above bankfull); Zone 4 (flood plain/terrace/hillslope)

Large Wood Piece Stability and Pool Forming Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Rooted (%)</u>	<u># Buried (%)</u>	<u># Pinned (%)</u>	<u># Unstable (%)</u>	<u># Pool Forming (%)</u>
Primary	12	1 (8.3)	0 (0.0)	0 (0.0)	11 (91.7)	1 (8.3)
Secondary	0	-	-	-	-	-

Large Wood Piece Orientation Summary

<u>Channel Type</u>	<u>Total Pieces</u>	<u># Parallel (%)</u>	<u># Perpendicular (%)</u>	<u># Downstream (%)</u>	<u># Upstream (%)</u>
Primary	12	3 (25.0)	4 (33.3)	5 (41.7)	0 (0.0)
Secondary	0	-	-	-	-

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1-3

Report Date: 09/29/2020

Survey Date: 5/9-5/10, 5/12, 5/23/2011

Start Location: 45.78269072 -121.208144

End Location: 45.78708946, -121.2292169

Start Elevation: 92.0 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

STREAM RIPARIAN AND LARGE WOOD PIECES SUMMARY

Riparian Characteristics

Type	Total Canopy Cover Area (m ²)	Total % Canopy Cover	Unit Avg. % Canopy Cover	Dom Canopy Species	Sub-dom Canopy Species
Primary	5,190.2	83.1	90.4	Big Leaf Maple	Red Alder
Secondary	83.9	86.4	82.5	Big Leaf Maple	Red Alder

Large Wood Piece Inventory Summary

Channel Type	Primary Channel	#Pieces	Volume (m ⁻³)	Pieces/100 m	Volume (m ⁻³)/100 m
Primary	All Pieces ¹	92	86.2	4.8	4.5
	Key Pieces ²	19	63.8	1.0	3.3
	Logs	79	66.9	4.1	3.5
	Rootwads	13	19.2	0.7	1.0
	Conifer	26	38.9	1.4	2.0
Secondary	Deciduous	66	47.3	3.5	2.5
	All Pieces ¹	1	1.4	1.7	2.4
	Key Pieces ²	1	1.4	1.7	2.4
	Logs	1	1.4	1.7	2.4
	Rootwads	0	0	0	0
	Conifer	0	0	0	0
	Deciduous	1	1.4	1.7	2.4

¹Large Wood Piece (≥2 m x ≥0.10 m dia.); ² Minimum Qualifying Key Pieces (≥1.0 and 2.5 m⁻³)

Large Wood Piece Zone Location Summary

Channel Type	Total Pieces	# Zone 1 (%)	# Zone 2 (%)	# Zone 3 (%)	# Zone 4 (%)
Primary	92	53 (57.6)	67 (72.8)	62 (67.4)	50 (54.3)
Secondary	1	0 (0.0)	1 (100)	1 (100)	1 (100)

*Pieces may span multiple zones

*Zone 1 (wetted channel); Zone 2 (within bankfull); Zone 3 (above bankfull); Zone 4 (flood plain/terrace/hillslope)

Large Wood Piece Stability and Pool Forming Summary

Channel Type	Total Pieces	# Rooted (%)	# Buried (%)	# Pinned (%)	# Unstable (%)	# Pool Forming (%)
Primary	92	13 (14.1)	6 (6.5)	5 (5.4)	71 (77.2)	6 (6.5)
Secondary	1	0 (0.0)	0 (0.0)	0 (0.0)	1 (100)	0 (0.0)

Large Wood Piece Orientation Summary

Channel Type	Total Pieces	# Parallel (%)	# Perpendicular (%)	# Downstream (%)	# Upstream (%)
Primary	92	10 (10.9)	38 (41.3)	29 (31.5)	15 (16.3)
Secondary	1	0 (0.0)	1 (100)	0 (0.0)	0 (0.0)

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek	Reach: 1
Report Date: 09/29/2020	Survey Date: 5/09/2011
Start Location: 45.78269072, -121.208144	End Location: 45.78299364, -121.2131246
Start Elevation: 92.0 m	End Elevation: 120.0 m
Reach Forming Agent: Tributary Junction	Reach Ending Agent: Valley Transition

LARGE WOOD JAM SUMMARY

Large Wood Jam Inventory Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u># Pieces</u>	<u>Avg # Pieces</u>	<u>Jam Frequency¹</u>	<u># Jams/KM</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

¹Jam frequency (total bankfull channel widths/jam)

Large Wood Jam Composition Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Total Pieces</u>	<u>Large Wood Piece Size</u>				<u>#Rtwd Key Pieces</u>	<u>#Log Key Pieces</u>
			<u>#Rootwad (Dia≥20cm)</u>	<u>#Log (Dia≥10>20cm)</u>	<u>#Log (Dia20<50cm)</u>	<u>#Log (Dia≥50cm)</u>		
Primary	0	-	-	-	-	-	-	-
Secondary	0	-	-	-	-	-	-	-

Large Wood Piece Zone Location and Pool Forming Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u># in Wetted Channel Area</u>	<u># in Bankfull Channel Area</u>	<u># in Flood plain/Terrace</u>	<u># Pool Forming</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

*A jam was assigned to wetted or bankfull zone if a LWD piece extended 0.1 meters into a zone

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 2

Report Date: 09/29/2020

Survey Date: 5/10-, 5/12/2011

Start Location: 45.7830845, -121.2131829

End Location: 45.78672166, -121.2273898

Start Elevation: 120.0 m

End Elevation: 250.8 m

Reach Forming Agent: Valley Transition

Reach Ending Agent: Tributary Junction

LARGE WOOD JAM SUMMARY

Large Wood Jam Inventory Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u># Pieces</u>	<u>Avg # Pieces</u>	<u>Jam Frequency¹</u>	<u># Jams/KM</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

¹Jam frequency (total bankfull channel widths/jam)

Large Wood Jam Composition Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Total Pieces</u>	<u>Large Wood Piece Size</u>				<u>#Rtwd Key Pieces</u>	<u>#Log Key Pieces</u>
			<u>#Rootwad (Dia≥20cm)</u>	<u>#Log (Dia≥10>20cm)</u>	<u>#Log (Dia20<50cm)</u>	<u>#Log (Dia≥50cm)</u>		
Primary	0	-	-	-	-	-	-	
Secondary	0	-	-	-	-	-	-	

Large Wood Piece Zone Location and Pool Forming Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Wetted Channel Area (%)</u>	<u>Bankfull Channel Area (%)</u>	<u>Flood plain/Terrace Area (%)</u>	<u>Pool Forming (%)</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

*A jam was assigned to wetted or bankfull zone if a LWD piece extended 0.1 meters into a zone

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 3

Report Date: 09/29/2020

Survey Date: 5/23/2011

Start Location: 45.78679014, -121.2274457

End Location: 45.78708946, -121.2292169

Start Elevation: 250.8 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

LARGE WOOD JAM SUMMARY

Large Wood Jam Inventory Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u># Pieces</u>	<u>Avg # Pieces</u>	<u>Jam Frequency¹</u>	<u># Jams/KM</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

¹Jam frequency (total bankfull channel widths/jam)

Large Wood Jam Composition Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Total Pieces</u>	<u>Large Wood Piece Size</u>					<u>#Rtwd Key Pieces</u>	<u>#Log Key Pieces</u>
			<u>#Rootwad (Dia≥20cm)</u>	<u>#Log (Dia≥10>20cm)</u>	<u>#Log (Dia20<50cm)</u>	<u>#Log (Dia≥50cm)</u>			
Primary	0	-	-	-	-	-	-	-	
Secondary	0	-	-	-	-	-	-	-	

Large Wood Piece Zone Location and Pool Forming Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Wetted Channel Area (%)</u>	<u>Bankfull Channel Area (%)</u>	<u>Flood plain/Terrace Area (%)</u>	<u>Pool Forming (%)</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

*A jam was assigned to wetted or bankfull zone if a LWD piece extended 0.1 meters into a zone

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1-3

Report Date: 09/29/2020

Survey Date: 5/9-5/10, 5/12, 5/23/2011

Start Location: 45.78269072 -121.208144

End Location: 45.78708946, -121.2292169

Start Elevation: 92.0 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

STREAM LARGE WOOD JAM SUMMARY

Large Wood Jam Inventory Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u># Pieces</u>	<u>Avg # Pieces</u>	<u>Jam Frequency¹</u>	<u># Jams/KM</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

¹Jam frequency (total bankfull channel widths/jam)

Large Wood Jam Composition Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Total Pieces</u>	<u>Large Wood Piece Size</u>					<u>#Log Key Pieces</u>
			<u>#Rootwad (Dia≥20cm)</u>	<u>#Log (Dia≥10>20cm)</u>	<u>#Log (Dia20<50cm)</u>	<u>#Log (Dia≥50cm)</u>	<u>#Rtwd Key Pieces</u>	
Primary	0	-	-	-	-	-	-	-
Secondary	0	-	-	-	-	-	-	-

Large Wood Piece Zone Location and Pool Forming Summary

<u>Channel Type</u>	<u>Total Jams</u>	<u>Wetted Channel Area (%)</u>	<u>Bankfull Channel Area (%)</u>	<u>Flood plain/Terrace Area (%)</u>	<u>Pool Forming (%)</u>
Primary	0	-	-	-	-
Secondary	0	-	-	-	-

*A jam was assigned to wetted or bankfull zone if a LWD piece extended 0.1 meters into a zone

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1

Report Date: 09/29/2020

Survey Date: 5/09/2011

Start Location: 45.78269072, -121.208144

End Location: 45.78299364, -121.2131246

Start Elevation: 92.0 m

End Elevation: 120.0 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Valley transition

BEDROCK FEATURE SUMMARY

Bedrock Feature Inventory Summary

<u>Channel Type</u>	<u>Total #</u>	<u># Left Bank Loc</u>	<u># Right Bank Loc</u>	<u># Channel Bottom Loc</u>	<u># Channel Span Loc</u>	<u>Total Length (m)</u>
Primary	0	-	-	-	-	-
Secondary	0	-	-	-	-	-

Bedrock Feature Characteristic Summary

<u>Channel Type</u>	<u># Ledge</u>	<u># Slope</u>	<u># Cliff</u>	<u># Projecting</u>	<u># Non- projecting</u>	<u># Surface Control</u>
Primary	-	-	-	-	-	-
Secondary	-	-	-	-	-	-

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 2

Report Date: 09/29/2020

Survey Date: 5/10, 5/12/2011

Start Location: 45.7830845, -121.2131829

End Location: 45.78672166, -121.2273898

Start Elevation: 120.0 m

End Elevation: 250.8 m

Reach Forming Agent: Valley Transition

Reach Ending Agent: Tributary Junction

BEDROCK FEATURE SUMMARY

Bedrock Feature Inventory Summary

<u>Channel Type</u>	<u>Total #</u>	<u># Left Bank Loc</u>	<u># Right Bank Loc</u>	<u># Channel Bottom Loc</u>	<u># Channel Span Loc</u>	<u>Total Length (m)</u>
Primary	5	1	0	5	0	34.2
Secondary	1	-	-	-	-	-

Bedrock Feature Characteristic Summary

<u>Channel Type</u>	<u># Ledge</u>	<u># Slope</u>	<u># Cliff</u>	<u># Projecting</u>	<u># Non- projecting</u>	<u># Surface Control</u>
Primary	4	2	0	5	0	1
Secondary	-	-	-	-	-	-

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 3

Report Date: 09/29/2020

Survey Date: 5/23/2011

Start Location: 45.78679014, -121.2274457

End Location: 45.78708946, -121.2292169

Start Elevation: 250.8 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

BEDROCK FEATURE SUMMARY

Bedrock Feature Inventory Summary

<u>Channel Type</u>	<u>Total #</u>	<u># Left Bank Loc</u>	<u># Right Bank Loc</u>	<u># Channel Bottom Loc</u>	<u># Channel Span Loc</u>	<u>Total Length (m)</u>
Primary	1	1	0	1	0	15.0
Secondary	0	-	-	-	-	-

Bedrock Feature Characteristic Summary

<u>Channel Type</u>	<u># Ledge</u>	<u># Slope</u>	<u># Cliff</u>	<u># Projecting</u>	<u># Non- projecting</u>	<u># Surface Control</u>
Primary	1	1	1	1	0	1
Secondary	-	-	-	-	-	-

Klickitat Monitoring and Evaluation Project Rapid Aquatic Habitat Inventory

Survey Stream: Logging Camp Creek

Reach: 1-3

Report Date: 09/29/2020

Survey Date: 5/9-5/10, 5/12, 5/23/2011

Start Location: 45.78269072 -121.208144

End Location: 45.78708946, -121.2292169

Start Elevation: 92.0 m

End Elevation: 280.6 m

Reach Forming Agent: Tributary Junction

Reach Ending Agent: Waterfall Barrier

BEDROCK FEATURE SUMMARY

Bedrock Feature Inventory Summary

<u>Channel Type</u>	<u>Total #</u>	<u># Left Bank Loc</u>	<u># Right Bank Loc</u>	<u># Channel Bottom Loc</u>	<u># Channel Span Loc</u>	<u>Total Length (m)</u>
Primary	6	2	0	6	0	49.2
Secondary	0	-	-	-	-	-

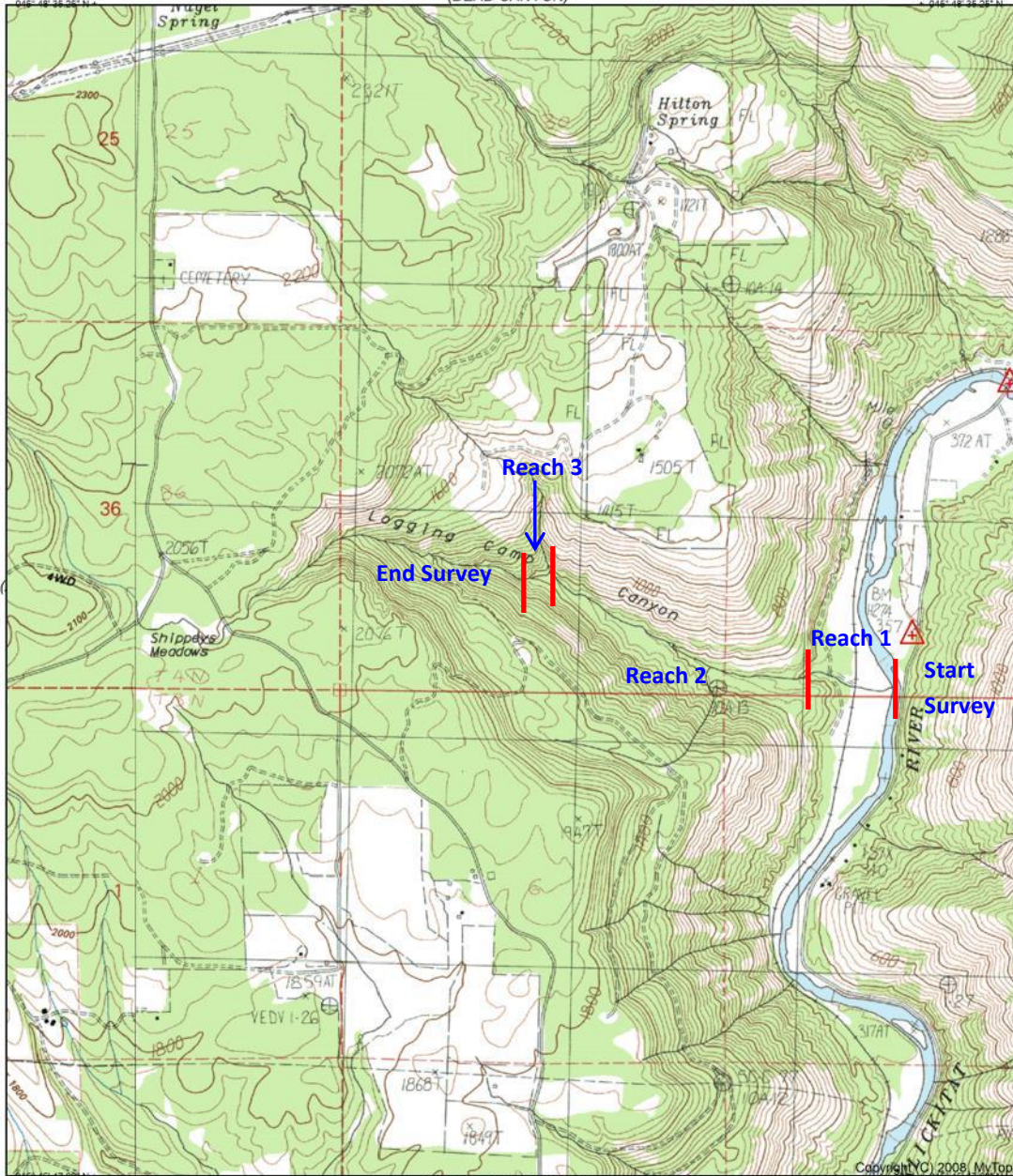
Bedrock Feature Characteristic Summary

<u>Channel Type</u>	<u># Ledge</u>	<u># Slope</u>	<u># Cliff</u>	<u># Projecting</u>	<u># Non- projecting</u>	<u># Surface Control</u>
Primary	5	3	1	6	0	2
Secondary	-	-	-	-	-	-

(CAMAS PRAIRIE)



CLICKITAT QUADRANGLE
WESTPORT/MT. ST. HELENS/MT.
ADAMS/COLUMBIA RIVER (WA)
TOPOGRAPHIC SERIES (DEAD CANYON)



(LYLE)

Produced by MyTopo Terrain Navigator
Topography based on USGS 1:24,000
Maps

North American 1983 Datum (NAD83)
Lambert Conformal Conic Projection

To place on the predicted North American
1927 move the projection lines 17M S and
92M W

Declination



(THE DALLES NORTH)
SCALE 1:24000

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM 1929

CLICKITAT, WA
1983

(THE DALLES NORTH)

Logging Camp Creek (Klickitat River Basin) 2011 Summer Habitat Survey – Reach 1 Photos



Unit1 – Upstream view of riffle at survey start



Unit 2 – Upstream view of head-cut plunge pool



Unit 6 – Downstream view of PIT tag array



Unit 7 – Upstream view of glide



Unit 14 – Upstream view of riffle



Unit 19 – Upstream view of cascade

Logging Camp Creek (Klickitat River Basin) 2011 Summer Habitat Survey – Reach 2 Photos



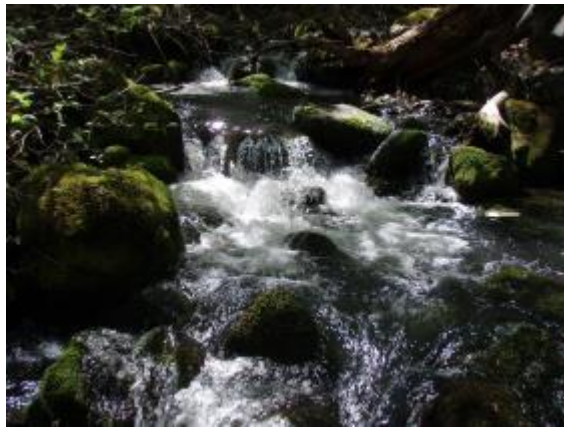
Unit 35 – Upstream view of cascade



Unit 37 – Upstream view of riffle



Unit 49 – Upstream view of glide



Unit 61 – Upstream view of cascade



Unit 73 – Upstream view of glide



Unit 75 – Upstream view of pool

Logging Camp Creek (Klickitat River Basin) 2011 Summer Habitat Survey – Reach 2 Photos



Unit 94 – Upstream view of riffle



Unit 96 – Captured smolting steelhead



Unit 100 – Upstream of dammed pool



Unit 109 – Upstream view of large wood pieces



Unit 115 – Upstream view of riffle



Units 126– Upstream view of cascade

Logging Camp Creek (Klickitat River Basin) 2011 Summer Habitat Survey – Reach 3 Photos



Unit 4 – Upstream view of cascade



Unit 7 – Upstream view of glide



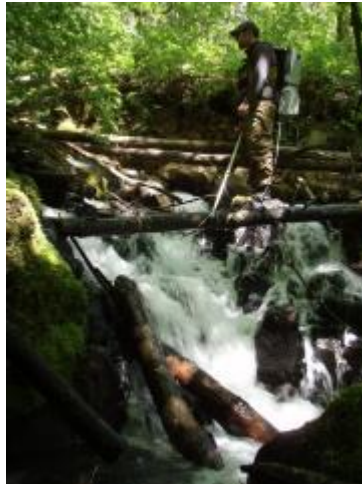
Unit 14 – Upstream view of cascade



Unit16– Upstream view of pool



Unit 19 – Captured resident *O. mykiss*



Unit 26– Upstream view of survey ending cascade