

Studying the Effects of Adding Streamwood to Indian Creek, a Second Order Stream

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Abstract

In the early 1900s, logging practices were causing the stream to straighten. We are just now noticing the negative effects this has on the ecosystem. The stream's temperature is vital for the ecosystem to function; straight streams are shown to be warmer causing a decline in organism survival. Yakama Nation Fisheries is adding streamwood (SW) to streams to help solve this problem.

We hypothesize that adding SW into the streams will not only improve the water quality in the streams but the ecosystem around the stream. Our study investigates the effects of adding SW to streams.



Methods

Habitat Survey

We measured the stream to quantify the fish habitat above and below streamwood (SW). We gathered several types of measurements: the number of habitat units (riffles and pools) and each of their lengths, widths, and depths.

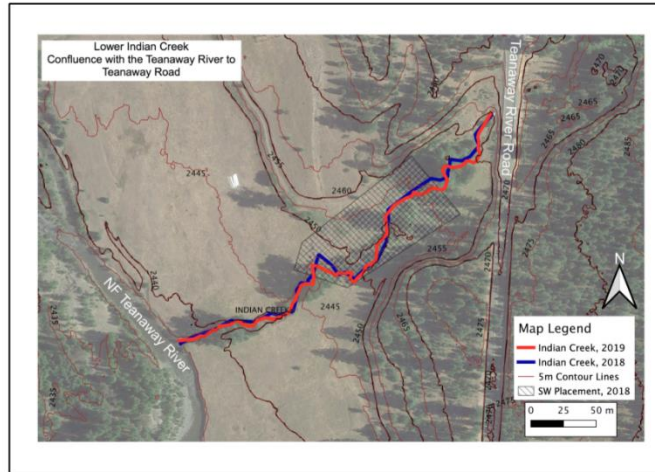
Pebble Count (Substrate)

We measured the size of the stream sediment above and below the SW. We used the Wolman pebble count method to gather unbiased data in order to identify the stream sediment sizes.

Stream Mapping

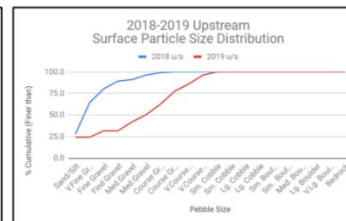
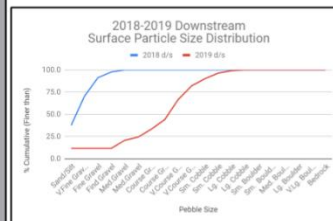
Using a GPS, we gathered data points along the stream's thalweg to map the current stream flow and path. This allowed us to compare the length, sinuosity, and shape of the stream over time.

2018-2019 Stream Map

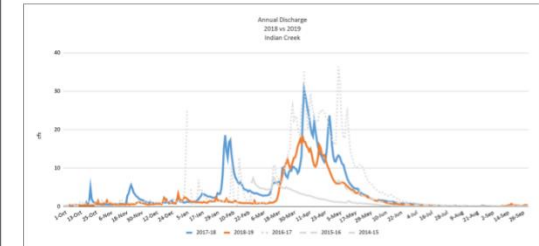


Description	Downstream			Upstream			Full Reach		
	2018	2019	Difference	2018	2019	Difference	2018	2019	Difference
Valley Length (m)	114	114	0	74	74	0	106	196	0
Stream Length (m)	131	134	+3	89	103	+14	371	383	+12
Gradient	0.24	0.24	0.00	0.01	0.01	0.00	0.05	0.05	0.00
Sinuosity	1.15	1.18	+0.03	1.20	1.39	+0.19	1.89	1.95	+0.06
Pools per 20 meters	2.3	5.2	+2.9	5.6	4.9	-0.7			
Riffles									
average length (m)	11.5	11.4	-0.1	5.7	10.5	+4.8			
average depth (m)	0.14	0.11	-0.03	0.16	0.16	0			
average width (m)	1.4	4.5	+3.1	1.9	2.8	+0.9			
Pools									
average length (m)	6.3	8.3	+2.0	7.2	5.1	-2.1			
average max depth (m)	0.3	0.3	0.0	0.3	0.3	0			
average width (m)	1.4	3.5	+2.1	1.9	2.9	+1.0			

2018-2019 Substrate Particle Size



2018-2019 Flow Map



Discussion

We hypothesize that adding stream wood will:

- Force the stream to meander, adding length
- Improve fish habitat (pools and riffles)
- Alter the substrate composition

In 2018, we collected baseline measurements on Indian Creek. 2019 was our second year of data collection. We will continue to collect data annually and hope to see improved results.

Throughout all our data collection we saw more improvement upstream than downstream. The full stream's sinuosity improved. The median pebble size for upstream and downstream both saw improvement between the two years. In 2018, there was more flow than in 2019, but at certain times of the year showed similar results. Since there was less stream flow this year than last year we expect to see less changes in the stream.