<u>East Fork San Gabriel River</u>

Camp 19: Stream Condition Inventory

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Internship 6/5/17- 8/2/17

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Executive Summary:

A stream condition inventory survey was performed on the East Fork of the San Gabriel River between the dates of 6/5/2017 and 8/2/2017. The Location of this survey was located at Camp 19 in the Angeles National Forest in front of the California Department of Corrections and Rehabilitation facility off the East Fork road in Azusa, CA. The total stream survey reach is 1,348 feet. The physical data that was collected, includes: longitudinal profile, cross sections, particle size distribution, shading, bank angle, turbidity, water temperature and air temperature.

Project Objectives:

1) Longitudinal Profile

The longitudinal profile characterizes water surface gradient and depths of riffles, pools, runs, and rapids. Longitudinal profiles are measured in the downstream direction. Five 300-foot measuring tape was laid along the center of the channel to obtain the length of stream that was being surveyed. Distances along the measuring tape are recorded as stations. These measurements are taken with a rod and level (Shown in figure 1) at major breaks in the bed topography such as mid-pool, riffle, or runs. The average water surface slope is required for determining stream types. Shown on Table 1.

Table 1.

Longitudinal Profile	Station (ft)	Water Depth (ft)	(Left/Right) Slope (°)
Start Reach	0		
Cross Section 1	12	0.94	21/3
Pool Tail	15	1.62	30/25
Mid pool	40	2.10	10/28
Head of pool	220	1.34	13/14
Riffle	481		16/22
Cross section 2	524		10/16
Riffle	568.7		24/25
Mid run	765	2.24	40/10
Cross Section 3	787.2		30/10
Bottom Main	834.5		40/20
Channel	997.5	0.50	30/10
Mid riffle	1,096	0.94	35/5
Top Riffle	1,246	0.82	40/70
Mid Run	1,320		50/60
End of Reach	1,348		

2) Cross Section

Channel cross section measurements express the physical dimensions of the stream perpendicular to flow. They provide fundamental understanding of the relationships of width and depth, streambed and streambank shape, and bankfull stage and flood prone areas. One 300 ft. measuring tape was laid across three separate locations that had a fast water flow habitat. Measurements were taken with a rod and level at major stations. Measurements such as bankfull, significant slope change, at water's edge, undercut banks, and channel bars. Three cross sections were surveyed within the reach shown in table 2.

Table 2. Cross Section dimensions of surveyed reach on East Fork San Gabriel River.

	X-Sec 1	**X-Sec 2**	**X-Sec 3**
Bankfull Width (ft)	59.2	156.2	79.9
Entrenchment 1	1.38	1.15	1.5
Entrenchment 2	0	1.33	0.09
Max BF Depth	1.4	3.88	2.34
Cross Section Area (ft^3)	93	307.4	270
Width/Depth	42.2	40.25	34.1

3) Particle Size Distribution

Streambed cobbles and gravel are the formation of channel morphology. These materials can account for channel stability, resistance to high flowing water, and can move sediment throughout the channel. This can be very important to fish and frogs that are becoming endangered. Some species endangered are the Red and Yellow legged frog and the Santa Ana Sucker fish. Particle size distribution can change over time as a result of natural management. Particle size surveys were conducted at each of the cross sections survey shown in table 3.

Table 3.

	X-Sec 1 (45.1-64 mm)	X-Sec 2 (32.1-45 mm)	X-Sec 3 (64.190 mm)
Largest amount of Particle Size	29	12	22

4) Shading and Stream Temperature

Stream temperatures have impacts on health, behavior, and survival of aquatic organisms and is strongly influenced by streamside shading. Stream shading is measured using a Solar Pathfinder. (Shown in figure 2)The instrument is used by holding it 0.3m above the water while facing south. This instrument takes some time to get used to. On the Pathfinder a shadow can be seen from the nearby trees. A calendar is printed on the Pathfinder. The shadow from the trees will fall on the calendar. From there he/she will be able to find the amount of shade that is being provided at that specific month. Table 4 summarizes the stream shading along the surveyed reach of Camp 19 at San Gabriel River.

Table 4. Shade along Camp 19 at San Gabriel River.

Shade Calculations	
High	100%
Average	40%
Low	1%

5) Water Chemistry

Turbidity is the measure of cloudiness in water. Some material that can cause water to be turbid include clay, silt, algae, plankton and other microscopic organisms. The instrument used for measuring turbidity it is called a turbid meter.(Shown in figure 3) When taking a measurement one has to hold the end of the turbid meter in the water at approximately 1 inch away from rocks or other debris. One also has to stand very still so no silt or algae is stirred up to obtain an accurate reading.

Table 5. Water Chemistry

Turbidity	1.69 NTU
Air Temperature	72.0ºF
Water Temperature	20.5ºC

Project Outcomes

Given results from the particle distribution analysis, longitudinal profile, and cross section, it is determined the reach is a D stream type. These streams are dominated by gravel and small to medium size rocks. It has a moderate width/depth ratio of >40, and a slope greater than 0.02. These types of streams have the following generalized characteristics:

- Alluvial channels
- Low gradient
- Well defined floodplains
- Riffle-pool bed morphology

Conclusion

Fluvial geomorphology is the study of the form and function of streams and the interaction between streams and the landscape around them. Every procedure in this study contributed to the process of learning more about our water systems. Stream morphology is dynamic and is constantly changing. Stream morphology influences flooding patterns, erosion rates, streamflow and sediment movement and deposition. As human impact and climate change continue to alter the streams ecosystem, knowledge gained through stream morphology monitoring will help habitat availability and erosion rates. This internship has given me knowledge working with the water system. I have seen first-hand how humans can create such a big impact on the forests natural environment. 16 wildlife species are endangered and 23 species are reported sensitive in the Angeles National Forest. It is very important that our streams are being monitored and taken care of. This river provides drinking water for the people in the Angeles area and needs to be free from harmful chemicals and water borne bacteria.

Appendices:

Figure 1: Rod and level

https://www.amazon.com/DEWALT-DW096PK-Automatic-Optical-Carrying/dp/B0001LQLEW

Figure 2: Solar Pathfinder.

http://www.ccdemo.info/SolarPower/BackyardSolarPower.html

Figure 3: Turbid meter

http://www.rshydro.co.uk/water-quality-monitoring-equipment/water-quality-testing-equipment/portable-water-quality-meters/portable-turbidity-meter/