WRPI: Water Resources and Policy Initiatives

Final Report

Stream Condition Inventory

Cottonwood Campground—Lake Elizabeth Canyon Stream, CA

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Acknowledgments

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First and foremost, I wanted to thank my professor, Dr. Orme without her compassion for her students this opportunity would not have been possible without her. Thank you! I would also like to thank my supervisor/mentor Kelsha Anderson USFS, her willingness to help and guide her interns was remarkable. Thank you, Jamie Uyehara and the department in general for receiving me with open arms at the USFS—Natural Resources. Lastly, thank you to the WRPI staffs for being responsive and helpful throughout the internship term.

Executive Summary

Throughout my term with the U.S forest Service (USFS) I was assigned on several projects that varied in length of completion. During commencement weeks I handled water rights, federal water rights that were entered and updated throughout the Angeles Forest region. The project included, field work, data entry, water use inventory, and reporting any areas of concern regarding impacted water runoffs. Secondary projects were partnered with biology that consisted of Arroyo Toad suitability analysis in Alder Creek—Angeles Forest district. The survey is done by physical observation of the topography allocated within the creek such as bank slope stability, sediment grain size, signs of aquatic fauna, and gradient. The intent of this survey is to note and determine if the sampled locations are suitable for the Arroyo Toad and if they are at higher risk. The final project was most significant for water resource and was in San Francisquito Canyon adjacent to Santa Clarita, CA. It concluded with a Stream Condition Inventory (SCI), SCI is critical when monitoring conditions of a stream when considering long term assessments (Frazier et. al, 2005). This project was exciting, yet nerve wrecking since it was my first time conducting an SCI, but our USFS supervisor had much confidence in us. In addition, there was no prior data recorded for the area of interest, so my colleagues and I had to make sure it was done to the best of our abilities.

Project Objectives

The project and location are of major importance because of archeological artifacts that remain from the St. Francis Dam that collapsed in 1928. Briefly, St. Francis Dam was a curved concrete dam that broke ground in 1924 that supplied and regulated a reservoir for the city of Los Angeles (Harrison, 2016) It is recognized as the second-largest disaster in California history.

The study site is north from the city of Santa Clarita and is projected to have built a historical monument in commemoration of the lives lost from the mass floods caused by St. Francis dam.

Conducting an SCI survey is significant for several reasons. First, no prior data is recorded in the area. Second, the large masses of concrete debris from the dam removal physically alters the flow of San Francisquito Creek and acts as natural rock surface in guiding the streams direction of flow. Lastly assessing this survey will provide significant findings of data for the area prior to having little or no interaction with the public. The SCI will provide crucial data that will evidently coordinate the actions made for a possible historical monument of the dam in the future.

This project has provided me with opportunities to gain hands on experience with new skills and different methods of approach. I came in with an idea of what the USFS is about and my expectations were exceeded as the USFS offers a variety of way to develop for young individuals. As I have finalized my internship term, I am more motivated than ever before to continue in the same career path and hopefully work for an environmental/conservation organization.

Project Approach

The project consisted from a variety of methods to satisfy the data needed for future monitoring. Briefly, A Stream Condition Inventory (SCI) (Frazier et. al, 2005) survey was conducted in San Francisquito Creek of the Sierra Pelona mountains between July 24, 2018 through July 31, 2018. The total reach for this survey is approximately 1,571 feet. All measurements were taken in tenths of feet. The study site is adjacent to San Francisquito Canyon

Road with an abandoned road near the creek owned by LADWP. In regard to vegetation, most of the vegetation is either dried out or impacted from previous fires; except areas with presence of water. A variety of physical data were collected, including a longitudinal profile, monumented cross sections, particle size distribution, stream cover shading, bank stability, large woody debris, and pool tail fine sediment. Basic water chemistry data was collected, including total dissolved solids, pH, conductivity and water temperature. BMI (benthic macroinvertebrate) samples were also collected.

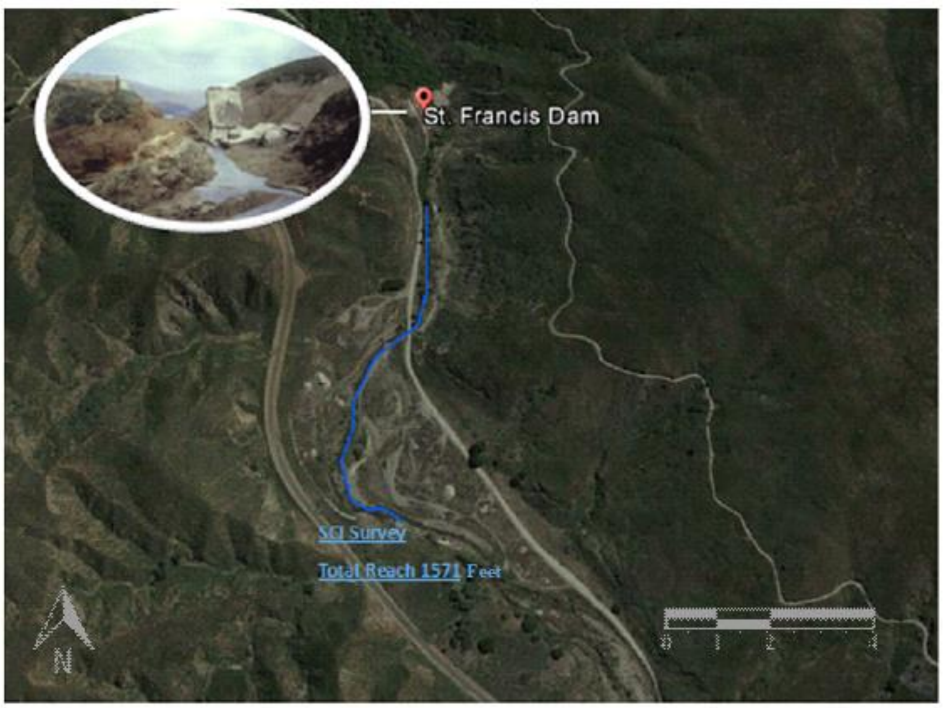

Figure 1. Study site of San Francisquito, CA

Figure 2. Near shot of the Longitudinal Profile at San Francisquito, CA

Methods

Benthic Macroinvertebrate (BMI)

Three random samples were collected at each cross section. A total of 6 samples were collected from cross section 2 and 3. The channel was dry at cross section 1, therefore no BMI samples were collected in this area. A tape measure was placed in the stream at a length of 20 feet, 10 feet upstream and 10 feet downstream between each cross section. Random numbers were generated, to determine stations of sample collection.

Cross Section

Three monument riffle cross sections were selected in the surveyed reach. Cross section 1 was established to accommodate multiple side channels within the area. Cross section 2 was established in the middle of the reach. Cross section 3 was established upstream of a road bridge.

Longitudinal Profile

The longitudinal profile was started downstream and tied into the lower monument with a series of turning points. Once the height of the instrument was established, the tripod was setup along the banks and points were taken in the thalweg through the entire reach when there was a change in the morphology of the streambed and then tied to the upper monument with turning points.

Pebble Count

There were five pebble counts conducted in the surveyed reach with a total of 400 samples measured. One at each cross section and one done approx. every 13 feet along the longitudinal profile tape. The B axis was used to measure all samples.

Stream Shading

Using a Solar Path Finder, measurements were collected at every 31 feet in order to quantify the amount of canopy cover on the stream banks. The month that was utilized in the Solar Path Finder was July.

Bank Angle/Bank Stability

A clinometer was used to determine bank angles at every 31 feet upstream. A pvc pipe was situated at the slope and a clinometer was placed on top of the pipe to determine the reading on the clinometer. Bank Stability measurement was based on a ranking scale from 1 to 3 where:

I. Stable: 75% or more cover of living plants and/or other stability components that are not easily eroded.

II. Vulnerable: 75% or more cover of living plants or more cover but have one or more instability indicators

III. Unstable: less than 75% cover and may have instability indicators, often bare or nearly bare banks composed of particle sizes too small or incohesive to resists erosion at high flows.

Project Outcomes

Considering that the project had a variety of assessments that had to be done, it was very much a success. It was an educational experience in learning how to apply these methods to collect physical data under SCI protocols. The first type of data is referred as Longitudinal Profile. The longitudinal profile characterizes channel bed gradient, water surface gradient, and depths of riffles, pools, runs, glides, rapids and step pools. The average water surface slope is required for delineating stream types. These units are important attributes that explain the characteristics of its base stratification and topography of the habitat that support the life of aquatic organisms. The data was gathered by using surveying tools like a laser level and measuring rod. It was a new experience for me as I was able to learn new tools for survey and gain experience in field work.

Figure 3. Surveying tool—laser level andmeasuring rod (red polygon).

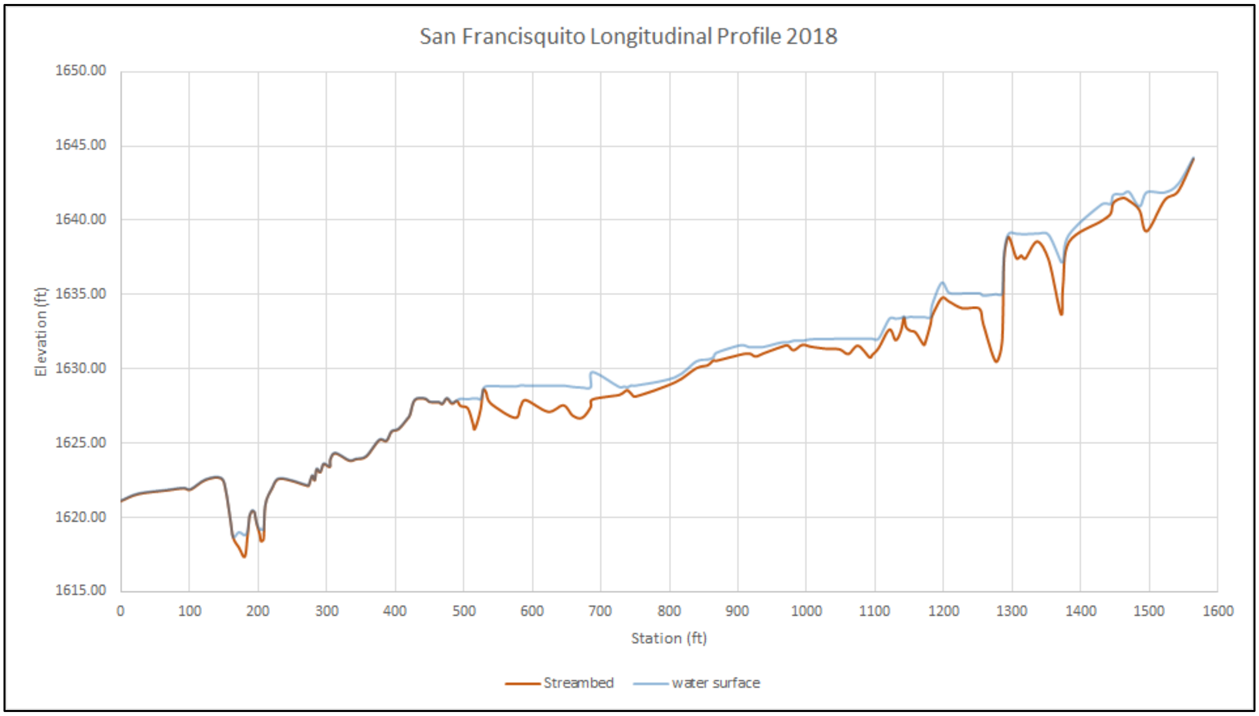

Figure 4. Longitudinal Profile of San Francisquito Creek

Another method in recording raw data for San Francisquito was by creating 3 channel cross sections that expressed the physical dimensions of the stream perpendicular to flow. They provide fundamental understanding of the relationships of width and depth, streambed and streambank shape, bankfull stage and floodprone area, etc. There were no definite results from the collection of data as this was intended for long-term assessment. But from a developmental standpoint, I was able to gain hands on experience and learned how to apply new methods in collecting data. Surveying is a skillset that I plan on becoming proficient as I wish to apply these methods to my career or master's thesis.

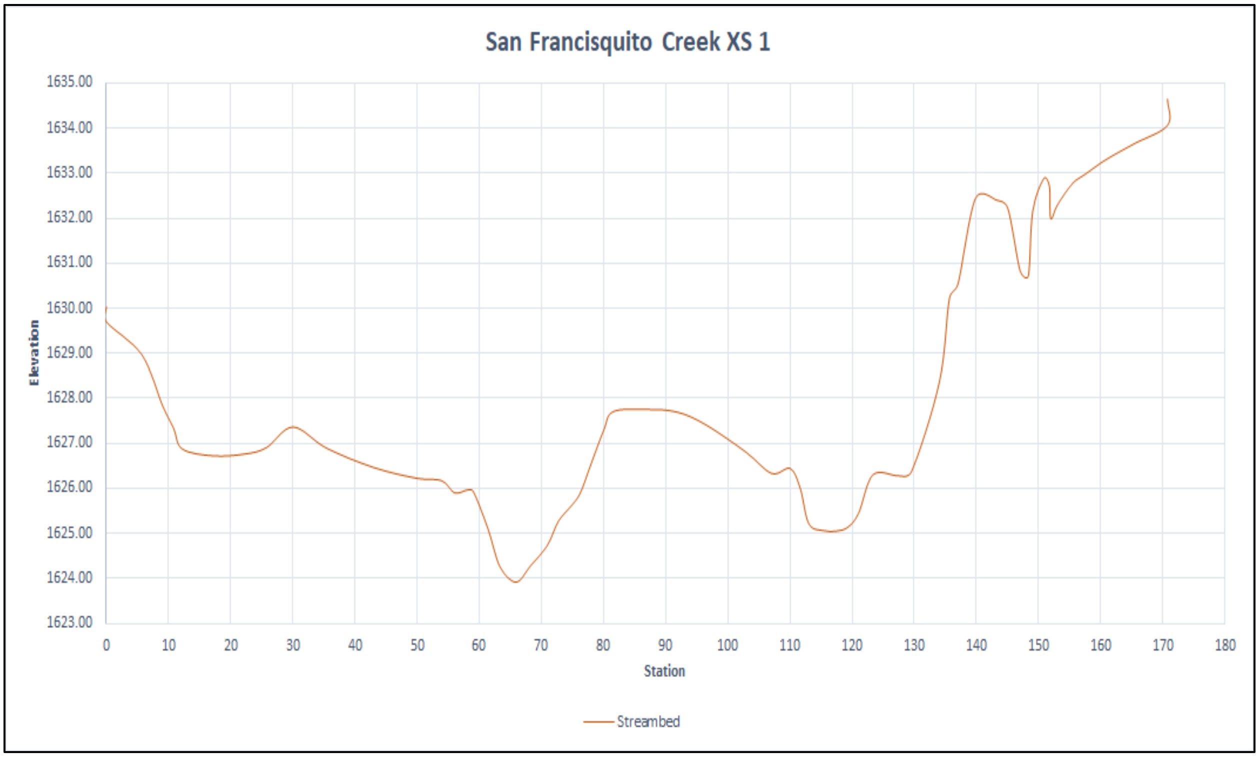

*Figure 5. **Cross section 1** of San Francisquito Creek*

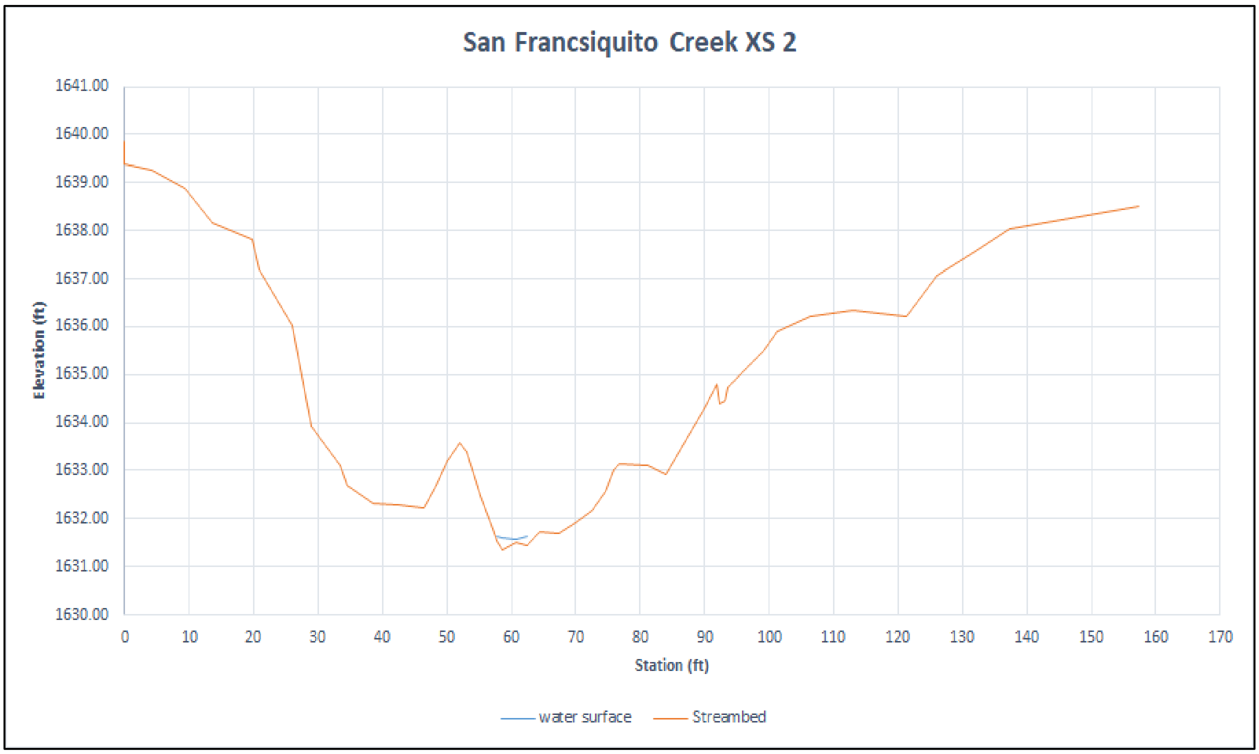

*Figure 6. **Cross section 2** of San Francisquito Creek*

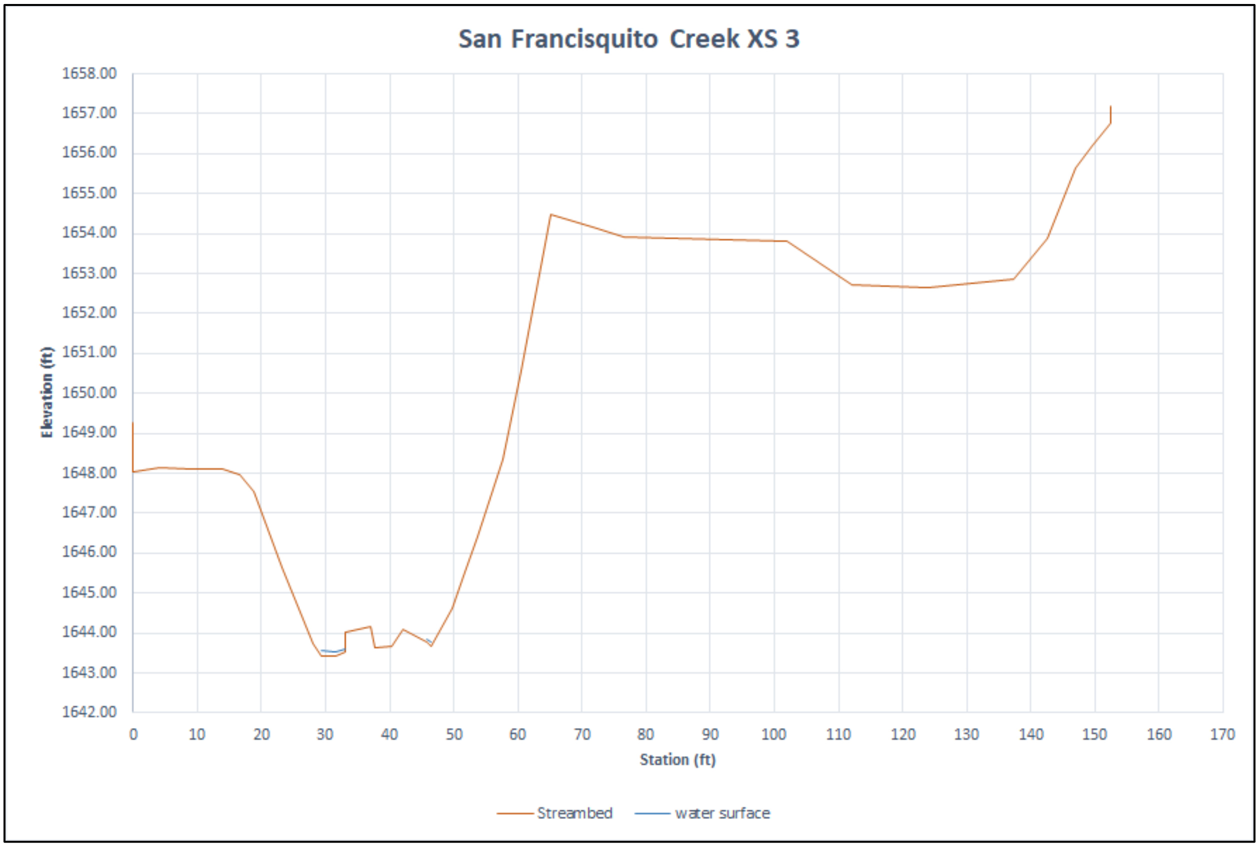

*Figure 7. **Cross section 3** of San Francisquito Creek*

<u>Conclusion</u>

SCI protocol incorporated a variety of assessments from physical landscape survey to biological and chemistry data collection of the study site. I played a major role in the collection of the data and the San Francisquito project had an impact in my development as I feel more confident in surveying and assessing environmental analysis. For further research, I would propose in monitoring and reassessing the San Francisquito Creek during the wet seasons (Winter). Monitoring at different seasons would provide essential data to compare the creek at different quantities of flowing water due to seasonal precipitation. Experiential learning internship has strengthened my ability to perform fieldwork with confidence and has provided me with the experience I have been longing for. This opportunity has strengthened my interest in working for the environmental sector. The internship was a positive experience in my academic and personal life, I have engaged with inspirational professionals that have encouraged me to pursuit a career with the US Department of Agriculture (*USDA*) or National Park Service (*NPS*); truly blessed with the opportunity and I would highly recommend to incoming students.