

Title of project:

Assessing The Physical, Biological, and Chemical Impacts of Stream Communities Before and After Fish Passage Removal in The Los Padres National Forest.



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USDA Forest Service

Dates of Internship:

June 13th – August 12th 2016

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To all of the employees of the USDA Forest Service for welcoming me with open arms and always being willing to teach me anything I wanted to know.

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Executive Summary:

This Internship in the magnificent Los Padres National Forest Santa Barbara Ranger District was composed of a wide variety of experiences and learning opportunities. The main project that was worked on was stream sampling conducted throughout the Santa Barbara Ranger District and San Rafael Wilderness. The sampling consisted of measuring data such as PH and dissolved oxygen in streams (if there is water). Over the Summer we attempted to sample many streams, however with the severe drought conditions present in the Los Padres National Forest, there was only a handful of streams to be sampled.

This Internship that was based in the Forest Service took part during the beginning of fire season as well. Fires such as the Sherpa and Pine fire took place in the Santa Barbara Ranger District and surrounding areas. Due to this factor, sometimes the interns and I were put on the back burner as all of the forest service employees were called out to the fires. This resulted in many days of helping at the front desk at the Los Prietos Ranger Station due to understaffing from the fires. During times of working in the Los Prietos Ranger Station, we worked on a series of tasks issued to us from the staff such as horse fence repair and cleaning out of fire hydrant valves.

Project Objectives:

This Internship for me was just an opportunity to get my feet wet in a potential field of Geology, Hydrology. This Internship will help build my resume and show experience with working for the United States Government. Originally, I was to be learning from and to be supervised by the Los Padres National Forest Hydrologist. Unfortunately, the Hydrologist transferred forests before the start of the internship, drastically altering the tasks available to us. This left our supervisor, whom is a fisheries biologist, to try and fill the shoes of a Hydrologist. Although our supervisor did an outstanding job with what was on their plate, I felt that the internship did not meet as many of the expectations I had to learn about Geology. Our supervisor also had their hands full with other interns, and fires. This resulted in there being no tasks whatsoever for us interns except front desk service at the Los Prietos Ranger Station.

The main objective was to sample a series of creeks over an extended period of time in order to collect data into and put it into the form of excel spreadsheets that would provide our supervisor a more up to date idea of the current status of the streams in the forest.

Project Approach:

In the early days of our project we spent most of our time looking at detailed maps of roads and the forest in order to figure out how to get to these isolated streams in the middle of the Los Padres. When we did go out to these streams, we spent most of the day sometimes just looking for enough water to collect data from. We then proceeded to place ten-meter marker flags along a one-hundred-meter expanse down the stream. At each marker we collected current speed, wetted width, substrate size, and canopy cover. At the zero and one-hundred meter flags we collected PH, dissolved oxygen, temperature, and stream slope. All of this data collected was written down on a printed out spreadsheet which was later typed out on excel.

Project Outcomes:

Through the experience of the project, we collected much needed data for the fisheries biologist. In streams that use to have deeper, more habitable pools we discovered we almost all of them were completely dried up or stagnant due to the severity of the drought. This posed an alarming situation for the forest, since water is not moving, there has been a gargantuan buildup of fire debris and Hyperion flora in the stream beds, impeding the movement of almost all organisms present in the pools. The standstill of some of these streams has resulted in pools of water that do not meet the requirements for any fish to survive in. This has resulted in a large population of invertebrates, both aquatic and terrestrial. Many lessons were also learned during this internship, during the summer temperatures in the Santa Ynez area were almost always over ninety degrees Fahrenheit, resulting in many close encounters with dehydration and heat exhaustion do to the heat and lack of preparation.

Table 1. Physical and chemical parameter values for creeks with water present.

Courtesy of Steve Flores.

Stream	Reach	Current	Canopy	Water	Dissolved	Conductivity	pH	Substrate	Pool
	Depth	Speed	Cover	Temperature	Oxygen			Size	Riffle
	(m)	(m·sec ⁻¹)	(%)	(°C)	(mg·L ⁻¹)	(μS·cm ⁻¹)		(Φ)	Ratio
Fox Creek	0.10±0.02	0.05±0.02	97.0±0.83	18.3±0.95	7.98±0.40	513.5±13.50	8.26±0.09	-3.90±2.48	5.39
Black Canyon Creek	0.06±0.02	0.00±0.00	86.0±2.55	20.7±2.80	6.32±1.45	1740.0±37.00	7.85±0.41	-1.94±1.58	45.95
Escondido Creek	0.18±0.15	0.01±0.00	96.0±0.87	16.2±0.30	6.47±0.29	677.0±7.00	7.86±0.14	-3.52±2.16	3.35
Alder Creek	0.23±0.10	0.02±0.01	95.0±0.91	17.1±0.30	5.36±1.10	728.5±0.50	8.295±0.37	-5.12±1.37	2.13

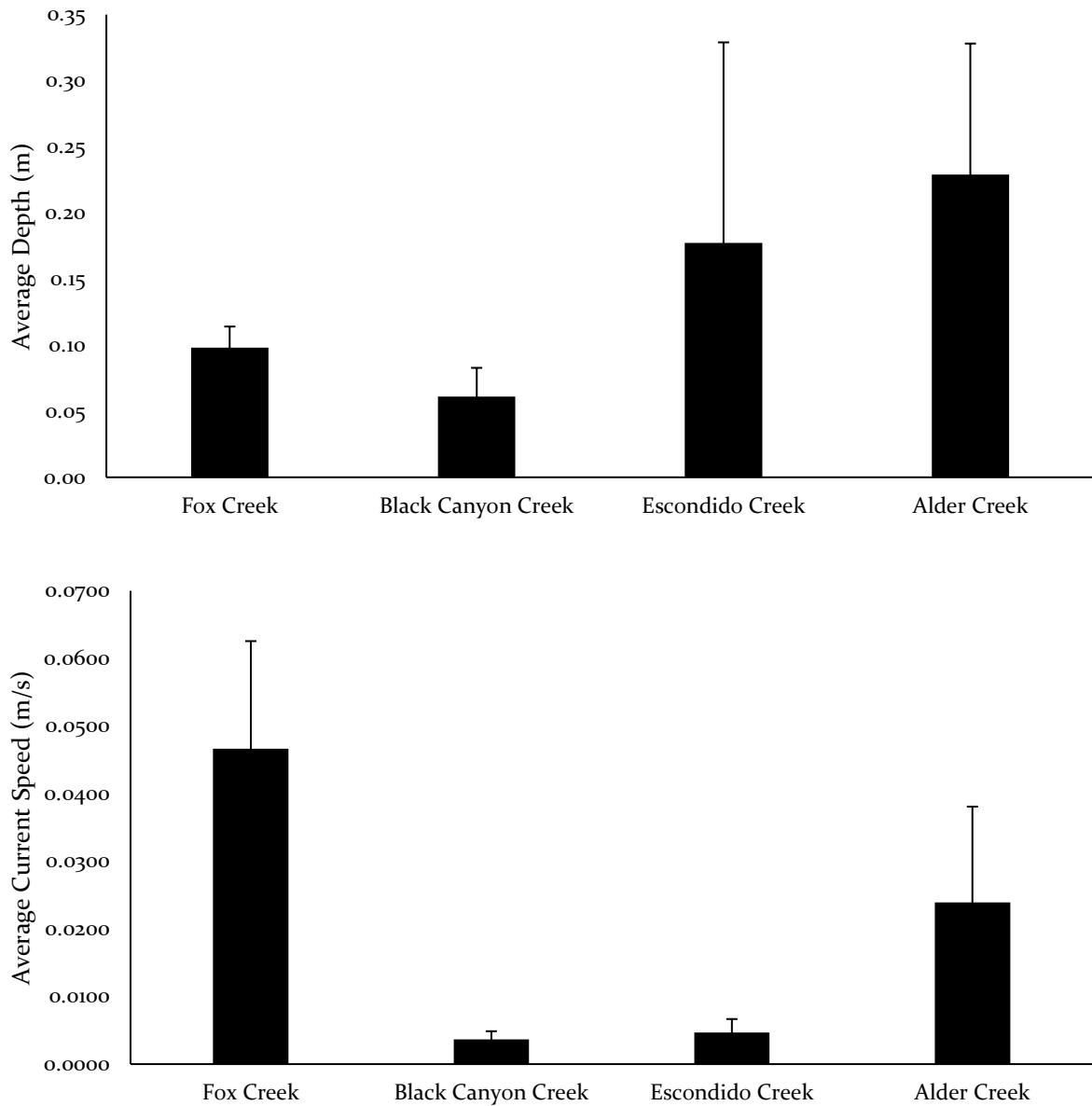
Conclusions:

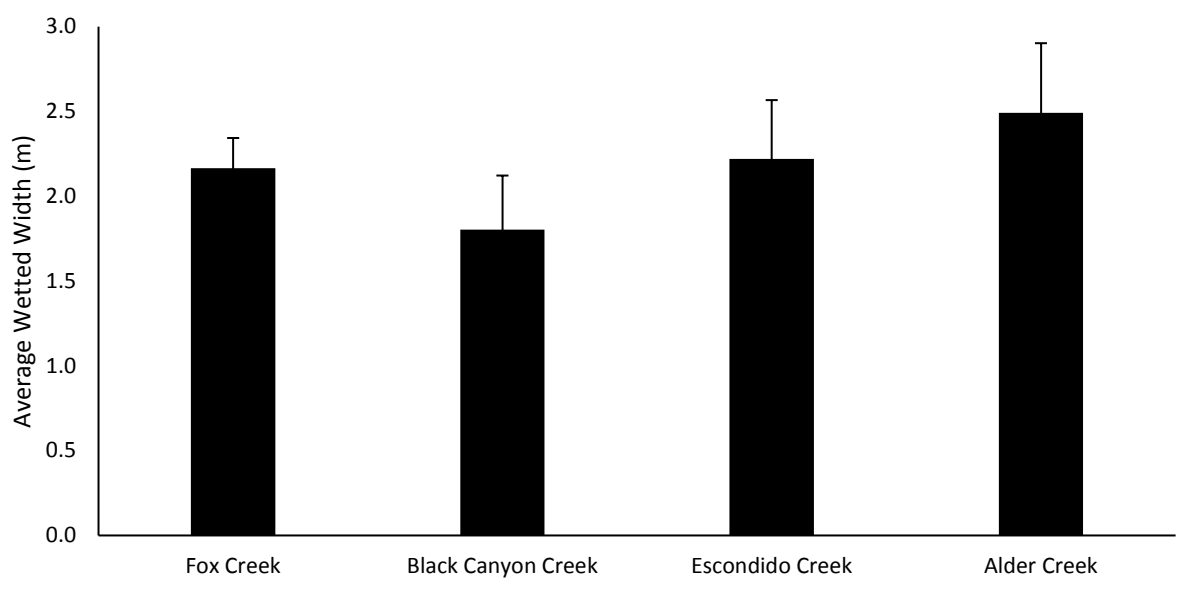
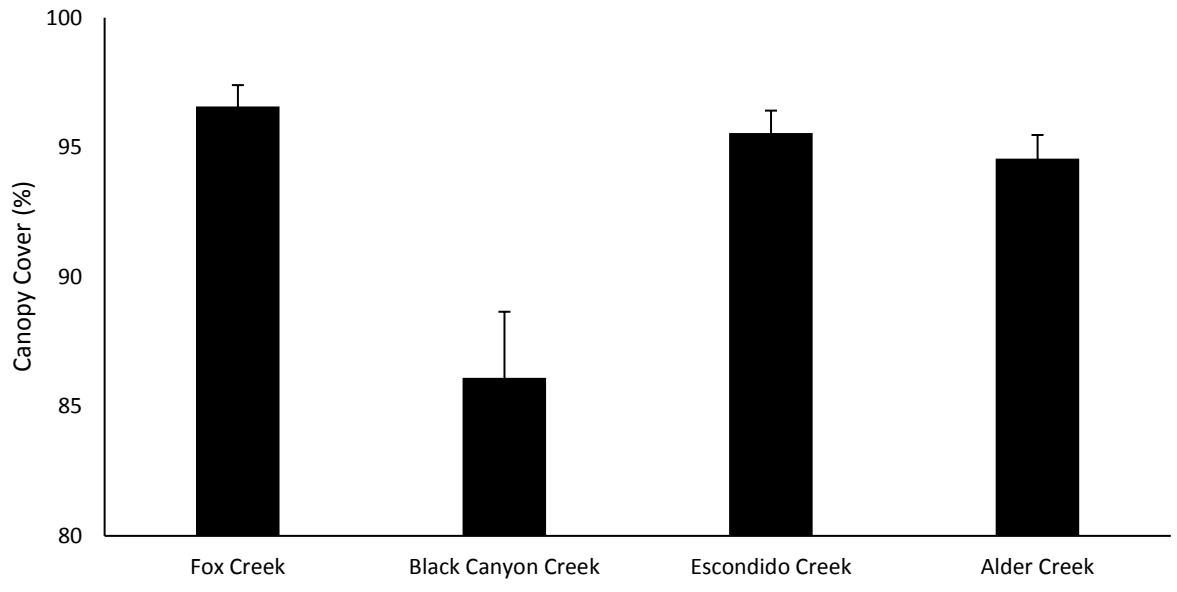
The project I and the other interns embarked on helped benefit the forest service for years to come. Through the data we have collected and provided to our supervisor, the forest service now has a better idea of how the drought and consistent fires are affecting the biological and physical factors of the stream communities. Research should definitely be continued over the years so that a larger clearer image of Southern California's drought devastation can be provided in order to hopefully come up with a resolution. This Internship has provided me with plenty of field experience, future connections and many fun memories that will last a life time for me. This internship has furthered my experience with the USDA and will hopefully open up doors for me as I work toward becoming a geologist.

APPENDICES:

APPENDIX A

Figure 2. Average stream depth, current speed, canopy cover and wetted width for Fox, Black Canyon, Escondido and Alder Creeks on the LPNF.



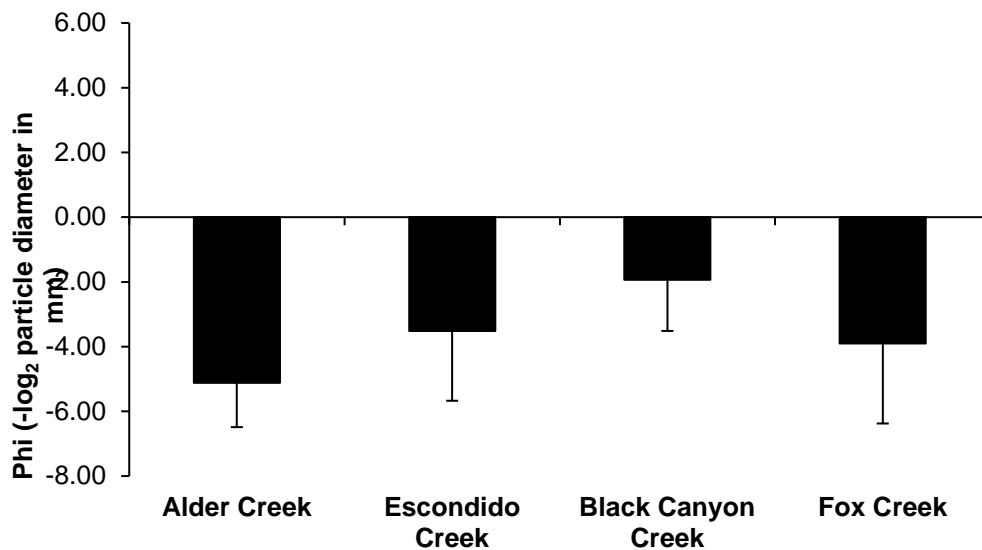


APPENDIX B

Table 2. Wentworth Scale (Φ) values

Boulder	-8
Large Cobble	-7
Small Cobble	-6
Large Pebble	-5
Small Pebble	-4
Coarse Gravel	-3
Medium Gravel	-2
Fine Gravel	-1
Very Coarse Sand	0
Coarse Sand	1
Medium Sand	2
Fine Sand	3
Very Fine Sand	4
Silt	5

Figure 3. Average substrate diameter at sampled streams.



APPENDIX C

Figure 4 - Downstream and Upstream View at Escondido Creek

Escondido Creek - July 15, 2016

Santa Barbara County, California

Coordinates: 34.47761, -119.5672



Figure 5 - Downstream and Upstream View at Black Canyon Creek

Black Canyon Creek - July 11, 2016

Santa Barbara County, California

Coordinates: 34.63214, -119.7657

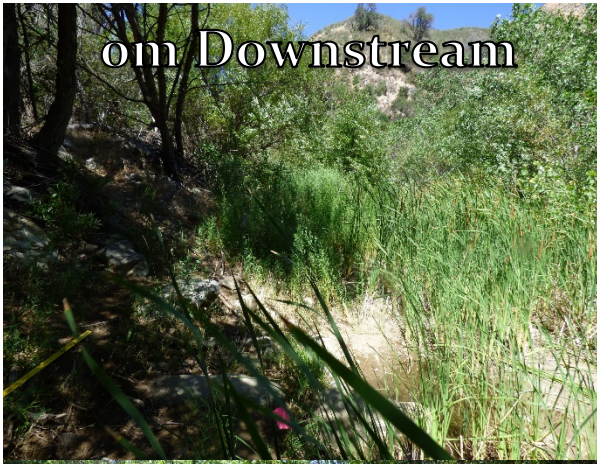


Figure 6 - Downstream and Upstream View at Alder Creek

Alder Creek - July 27, 2016

Santa Barbara County, California

Coordinates: 34.482978, -119.495123



Figure 7 - Dowsntream and Upstream View at Fox Creek

Fox Creek - July 11, 2016

Santa Barbara County, California

Coordinates: 34.485475, -119.529084



0m Downstream



100m Downstream



0m Upstream