

Upper Big Creek Priority Watershed Road Inventory and Hydrologic Conductivity Assessment

Blue Canyon, Sierra National Forest

Cody Ellis-Herring



Photo By: Cody Ellis-Herring. July 2016.

Table Of Contents

Acknowledgements..... Page 3

Executive Summary..... Page 3

Project Objective..... Page 3-4

Project Approach..... Page 5

Project Outcome..... Page 5

Conclusion..... Page 5-6

Appendices..... Page 7-8

Acknowledgments:

This project was supported by Hispanic-Serving Institution's Education Program Grant no. 2015-38422-24058 from the USDA National Institute of Food and Agriculture. I would like to attribute a special thanks to the project supervisor Alan Gallegos, Southern Sierra Province Geologist, Sierra National Forest, along with the entire Water Resources and Policies Initiatives and USDA Forest Service staff who made this opportunity possible.

Executive Summary:

This purpose of this project is to collect road data to determine hydrologically connected road segments within the Big Creek Watershed (see figure 1). The data that is collected from this three-year project will be used to develop a scheduled maintenance plan in order to modify the current roads to reduce the amount of hydrologically connected road segments within the Big Creek Watershed. These hydrologically connected roads are contributing to extensive sediment discharge into the local stream channels that drain directly into Pine Flat Reservoir.

Project Objectives:

The Upper Big Creek Watershed is a high priority restoration watershed, located in the Dinkey Collaborative Forest Landscape Restoration Project Area in the Sierra National Forest. There are at least 100 road channel crossings in the Upper Big Creek watershed and 136 miles of road that are hydrologically connected to the stream systems (see figure 2). These stream systems are experiencing excess sediment discharge from the road surface erosion because of the design of the

current road systems, water bars, and other road drainage efforts throughout the watershed which allow water to pass under the roads and directly into stream channels (see figure 4). Reducing sediment discharge into these stream systems has been identified in the action plan for the Big Creek Watershed, a tributary to the Kings River which drains into Pine Flat Reservoir.

Throughout this internship with USDA Forest Service, I have reassured my career pathway and feel confident about my current field of study, Geology. As there are not many positions with USDA Forest Service as a Geologist there are other positions available such as, Hydrologist, Soil Scientist, and even some opportunities to working with Engineering that would meet my qualifications upon obtaining my degree. This internship has allowed me to apply many of the scientific skills I have learned throughout my educational career while working closely with professionals in these fields.

The primary goals and objectives of this project were to try and complete road inventory assessments on the southwestern section of the Upper Big Creek Watershed. During the course of the summer, my partner Jovany Canchola and I were making exponential progress on the project and began to return to some of the locations where previous interns did not finish collecting data because of physical barriers such as fallen trees, and previous road conditions, etc. As we continued to make progress on the project, we were actually able to complete the entire watershed for the Upper Big Creek Watershed area.

Project Approach:

When deciding how to approach this project we decided with our supervisor that it would be the most efficient to conduct our assessments on the roads that were the furthest away first. We believed that by doing this we would create less driving for our supervisor, or future interns if anyone had to go back into the field to collect more data. By doing this we were able to complete many of the sub-watersheds in time to go back and continue into other areas in Upper Big Creek and complete the entire watershed project this summer. Some of the issues we ran into were primarily because of the tree mortality in the area. We had to constantly be aware of our surroundings and make sure that the areas we were driving, or hiking into were not exposed with hazard trees that would potentially drop.

Project Outcomes:

Upon completion of the field data and viewing the results, my partner and I found that many of the roads in the watershed are not hydrologically connected and many of the drain systems are working properly. However, our field area is the epicenter for tree mortality in the Sierra National Forest and the negative effects from this can create potential problems in the drain systems for the stream channels in the near future.

Conclusions:

As a final statement to the Upper Big Creek Priority Watershed Road Inventory and Hydrologic Assessment, my partner and I believe that the Upper Big Creek Watershed is prone to excess sedimentation into the stream channels as a

result of the current road designs in the Blue Canyon area (see figure 3). We strongly believe that efforts to redesign the roads in this watershed will help to decrease erosion of roads and help prevent further surface road erosion into our stream channels and Pine Flat Reservoir.

Appendices:

Figure 1: Field Area: Blue Canyon, Sierra National Forest.

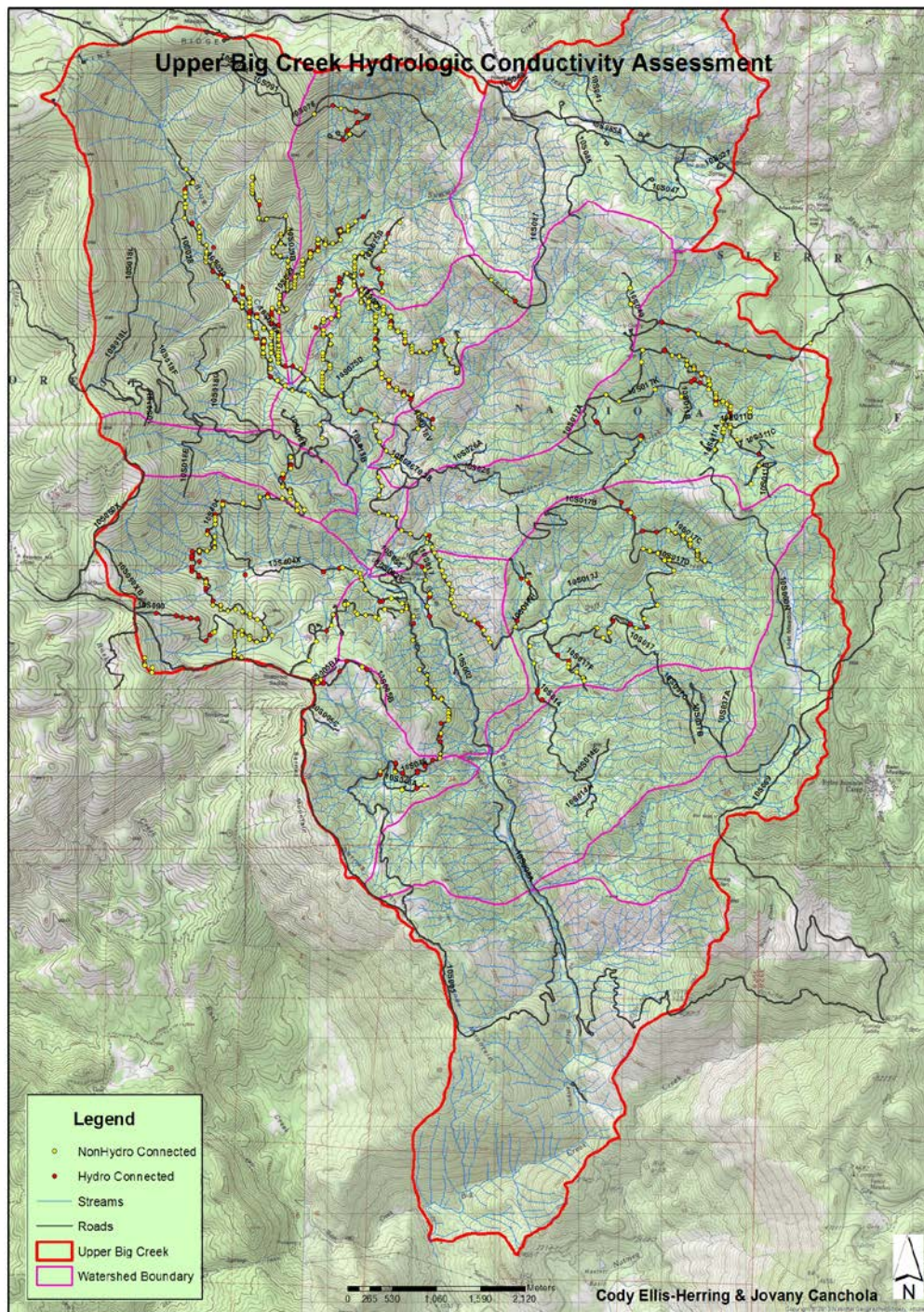




Figure 2: 100inch culvert near Bretts Mill WorkStation.



Figure 3: Segment of Road 10S090, showing signs of surface erosion



Figure 4: Overside Drain filled with debris.



Figure 5: Shotgunned culvert off roadside with and outlet drop.