

Forest Health and Water Quality

CASSANDRA CASARES

SAN DIEGO MESA COLLEGE

JUNE 2017-AUGUST 2017

ADVISOR: TODD HAMILTON, USDA FOREST SERVICE

Table of Contents

Acknowledgments.....	3
Executive Summary.....	3
Project Objectives.....	4
Project Outcomes.....	7
Conclusions.....	8
Appendices.....	10

Acknowledgments

This project was supported by the Hispanic-Serving Institutions Education Program no.2015-3842224058 from the USDA National Institute of Food and Agriculture. Under the Water Resources and Policy Initiatives, my nine weeks consisted of working for the Forest Service in Shasta-Trinity under forester Todd Hamilton. Todd Hamilton organized our summer to be part of his extensive data collecting project for the Shasta-Trinity National forest. This project is intended to analyze the health stance of the forest trees, ecosystems and water quality.

Executive Summary

Water Resources and Policy Initiatives represents all 23 campuses of the California State University (CSU) system to help the state of California address the water challenges our state and Earth are encountering due to the climate changes. Through water research, education, community assistance, environmental stewardship and conservation my summer project with the USDA, Forest Service under forester Todd Hamilton, consisted of collecting Forest Inventory. My assignment, alongside my work partner were to compile a sum of measurements of tree heights, tree diameters, average number of seedlings and saplings, and the percentage of woody shrub cover on forest floor. My work colleague and myself were required to hike out 8 hours a day into the Shasta-Trinity forest to collect data on stands that were randomly appointed by Todd Hamilton and these sections of data will help analyze the health of the forest in a large scale. The maintenance and conservation decisions will be made to better protect and grow the living

conditions of the trees, wild life and water quality once a prescription is made on how to conserve the forest.

Project Objectives

The WRPI internship was introduced to me through the SEEDS program at the junior college I attend, San Diego Mesa college. There I was given the support and guidelines about the application process for WRPI. STEM-engagement for the enrichment of diverse students (SEEDS) is funded directly from the USDA, which lead me to an understanding of where my environmental studies degree could take me. I learned about the various sub areas of science related fields pertaining to the USDA in food security, food hunger and sustainability. The connections to the USDA-NIFA give disciplines to the SEEDS students, such as myself, opportunities in the work fields through internships such as WRPI. This summer I agreed to be a seasonal Forest Service intern and engage in hands on, boots on the ground conservation project in Shasta-Trinity Forest.

The project with Todd Hamilton, the only forester on the Shasta-Trinity forest unit, needed workers such as myself and my work colleague to hike through forest terrain and collect stand exams. We were part of his research project to collect stand exam data in regards to the health stance of the forest. Stand exams are the average number of trees within a 16.7' radius of a piece of land which illustrates the average tree heights, tree diameters, tree longevity and the average woody shrub cover on the forest ground. We were to cover well over 100 plots of land to see the average mortality rate on Chalk Summit mountain in Big Bend California. The beginning of this summer's internship, my goals once informed about my assignment for the next eight

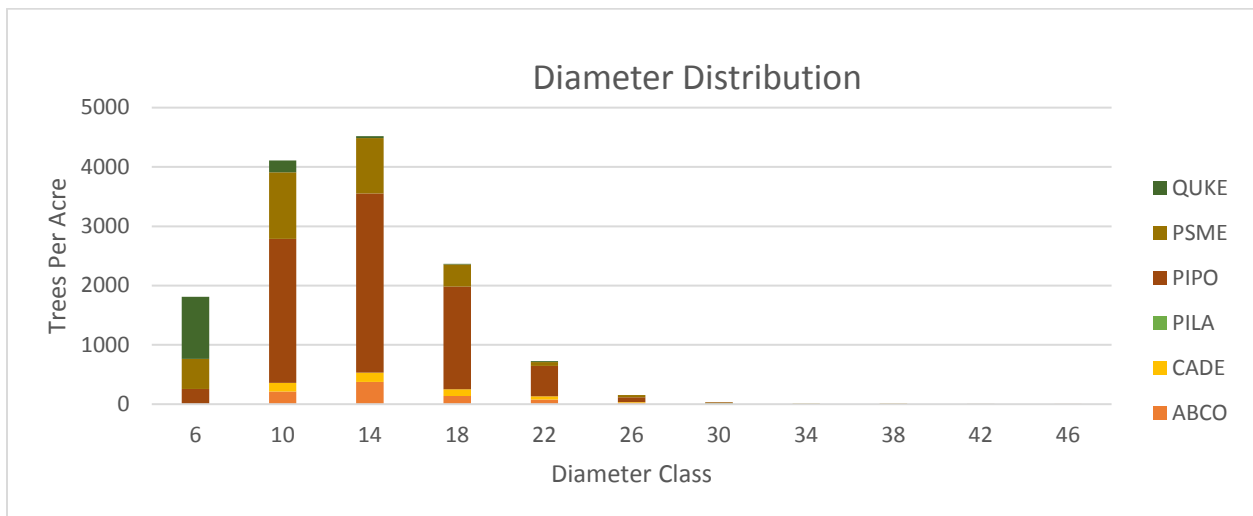
weeks, was simple. I wanted to soak in every task that was going to be given to me physically, mentally, academically and sociably. I wanted to enjoy a full summer out in a community and culture I was not familiar with and become exposed to what are the local community and Forest Service concerns in and around forest lands in Shasta-Trinity. Census Reporter states Big Bend has a population of 94 people, people who are known to solely live off the land and live within the means of a remote town with one store and one fire station. I needed to understand not only the concerns of the Forest Service for our trees but the concerns of what the community wants from the Forest Service as a government unit who has been branded the stereotype of logging and not protecting the balance of ecosystems and water quality. Today, I recognize the past perceptions of the Forest Service was to cut trees for profit and presently, the Forest Service is here to restore our new forest and keep a balance within ecosystems and maintain water quality for all lakes and river that run through our forests.

As an environmental science major I only understood what human impact has done to our Earth's atmosphere on a large scale, such as climate change but did not know the relationship between forest health and water quality. According to the USDA office of Communications, there are 100 million dying trees on 7.7 million acres of California drought stricken forests (Office of Communications, USDA). Todd Hamilton, my mentor, is set out to create a prescription that will help conserve the trees that are in our Shasta-Trinity forest which are suffering from bark beetle infestation and sever mortality. It is important as people, that we understand how our California forests filter our water when the snow melt comes down the mountains and when rain fall happens. Healthy forests act as filters for our water and refill underground aquifers, sustain watershed sustainability and provide crucial habitat for fish and wildlife. Forest trees provide a service to the balance of life within the forest and to all life.

Week to week our tasks were to clock in eight hours of (CSE) common stand exams. My co-worker and I would head up road 37 at seven in the morning to beat the Big Bend heat, which on average was 90 degrees. Hiking through the forest required protective helmets and vests with CSE equipment that helped us attain our data; compasses, wind up measure taps, spray paint to mark our trees and a yard stick to mark our center of our plot radius. Daily, we had a goal of completing 8 plots within each stand, sometimes depending how much brush there was to get through between our starting point and our plot it would take all day to finish 4-6 plots within our 8-hour day. Our mentor Todd, discussed with my coworker and I the old customs of what the Forest Service used to provide, to produce lumber for commercial. With time, he also illustrated the environmental consciousness came about as people began understanding the importance of tree within our forests ecosystems. The Forest Service became a service to tree health, wild life, fish and water quality. With that, Todd believed it was important to implement the cultural customs, practices and traditions of Native tribes to restore our forest health. We had a day where my coworker and I, Todd and one of the Archeologist met with the Medeci tribe out in Big Bend. Three of the tribal council members were generous with their time to hike through the forest with us to discuss the reasons for their forest restorations while listening to the Forest Service customs on how to restore forest health. Our project goal is to help collect data for Todd Hamilton for him to come to a prescription on how to keep our forest healthy and balanced while introducing traditional Native American back into the ways of maintain healthy trees, fish, wildlife and water quality.

Project Outcomes

Coming to the end of the 8-week project, we gathered all our data and implemented them into an excel sheet that would display what our health stance of the forest would look like, depending on which species of trees were more abundant in certain areas and what their average diameters were. Large diameter trees signified strong healthy trees that could either be cut down for commercial profit or cut to help other trees surrounding the area to grow at a much faster rate. To have large diameter tree means the forest is closer to providing old growth forest like characteristics. Our forests at one point were 4 feet diameters and larger and currently the forest is on the small scale. Here I provided the averages of tree heights to trees per acre according to the species of trees that are thriving the most and not thriving as well as they could:



After the 8 weeks of working as a seasonal full time Forest Service intern, I learned about the importance of how Forest Health affect or quality of water, fish, wildlife and all ecosystems

within our Shasta-Trinity forest. Our forest trees, not only in California or the United States National Forest, but the rest of the world's forest, play a role as a filter system for our planet's water quality. As our society is growing more as technology is advancing, humans are neglecting the main mineral, water. With the health stance of our forests in California, it will become costlier to filter our water and more difficult to filter water in a timely manner for the cities, towns and communities who all need water as a life source. Healthy growing trees can reduce large wild fires because the soil is moist and not at risk to burn in the hot summers, and create other balances within the wildlife and fish ecosystems.

Conclusions

After hours of hiking through thick brush in 90-degree weather for 8 hours a day in Big Bend California and collecting data upon data so that we can understand how our forest is living. There are over 100 million dying trees in California and that is crucial to our state because we supply an abundance of foods from our agribusiness and water quality is important for our state to produce the various foods we grow and raise all while giving the people the quality water they deserve. More attention is to be focused in our country's forest. Our National forests are part of our world's lungs and filters of our atmosphere. Without healthy trees, our water and air quality will deplete entirely and is happening today due to droughts, deforestation and logging for solely commercial usage. This experiential learning internship has furthered my career goals as an Environmental Studies major. I have a better understanding, on a larger scale how they quality of our forest affect our water quality which will impact those who can attain high quality water versus those who cannot. This experience with the USDA, Forest Service has inspired me to go

into environmental law and challenge the issues surrounding our natural resources. It is important for me to know that my government is providing a service to our forest lands so that states, cities, towns and communities can have clean water, air, a balanced ecosystem within their forests so that the quality of all life can prosper.

Appendices

USDA Office of Communications. “New Aerial Survey Identifies More Than 100 Million Dead Trees in California.” *New Aerial Survey Identifies More Than 100 Million Dead Trees in California* | *US Forest Service*, U.S Forest Service , 16 Nov. 2016, www.fs.fed.us/news/releases/new-aerial-survey-identifies-more-100-million-dead-trees-california

“Healthy Forests.” *Sierra Nevada Conservancy*, Sierra Nevada Conservancy , 20 Mar. 2017, www.sierranevada.ca.gov/our-region/healthy-forests.