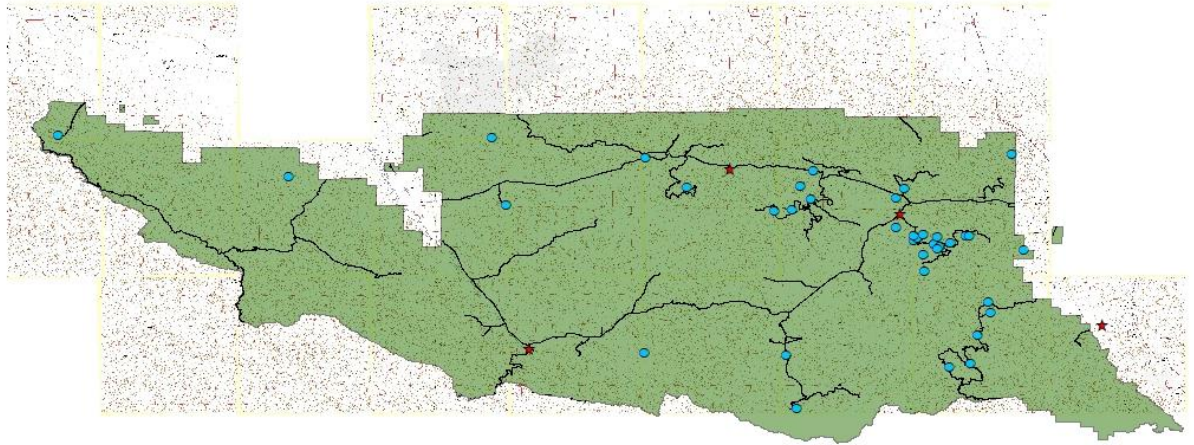


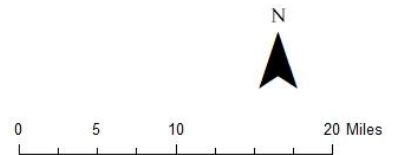
Compliance of the Mt. Pinos Ranger District Water Rights

Mount Pinos District Water Rights



Legend

- Water Rights
- ★ Mt. Pinos Stations
- Mt. Pinos Roads
- Mt. Pinos District



Map By: Victoria Woods

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June 5th – August 8th

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The water rights project was under the supervision of the Mount Pinos District Ranger, Brad Turberville and by Resource Officer, Ivana Noell. We were also advised by Forest Service employees Greg Thompson and, Loreigh Brannan who both helped identify possible locations where the water rights might be situated.

An acknowledgement to Victoria Woods who worked with me on this project and without her skills and experience the project would not have been as successful. Thank you for your hard work and cheerful disposition.

I would also like to acknowledge the two volunteers who helped us early on in our internship: Mark Subbotin who helped to get us familiar with our surroundings and taught us what to look for in the search for springs and Susanne Green who helped us locate some of our water rights.

I would like to acknowledge the other interns working at the Mount Pinos Ranger station who accompanied and helped us find many of the springs along with letting me help and learn on their own projects; Sophia Heston, Eli Grinberg, and Angela Garelick.

Executive Summary:

The purpose of the project was to report on the various water rights that the Mt. Pinos Ranger district, a district of the Los Padres National Forest, and to compile a list of water rights to be recommended for conversion to instream use. Working with my coworker Victoria woods we began by mapping out the water rights using topographic maps. Once that was completed we visited the sites located and made notes on the licensed use; such as wildlife, stockwatering, fire, or domestic use; developments associated with the water right, and the environment surrounding the spring. To measure the flow rate, a necessary component of the report process, a one quart bottle in conjunction with a timer were used to obtain the flow rate in the appropriate value: gallons per day (GPD). All of this information was then used to update the files that the forest service used to store the information regarding each individual water right. After all the water rights had been reported on the average consensus was that the forest had more water than noted

previously from last year's surveys. This finding was then supported by previous observations of flora and fauna benefiting from the water rights. Due to this and other factors many of the springs recommended for conversion to instream use remained recommended with a few more water rights added.

Project Objectives

As described by the State, water rights are a legal designation to a limited amount of water to be used in a beneficial manner diverted from a specific water system as described in a license. Due to the extended drought that California is currently enduring the report process for these water rights is of critical value so the state can ensure that all used water resources being used in a beneficial and productive manner. From the Forest Service's perspective, the reporting process is vital in complying with the state water board and to aid in the conservation of California's water along with keeping the rights. This is because most of the water rights in the Mt. Pinos Ranger district are appropriative

water rights and thus have five years of no-use before the state enacts revocation making reporting an essential step in license maintenance.

Despite the apparent ease of this task most of the water rights were created during the 1950's or earlier and, aside from the license documentation was either finite or absent. Several water rights were updated last year over the summer by an intern which allowed us to have recent information about the water rights. He also created a layout for surveying and measuring methods that we modified in order to suit our needs. From the data he left behind were valuable information such as GPS coordinates, photos, and travel instructions. The remaining water rights that he had not surveyed the data had not been updated for many years, and for a handful of water rights all that was recorded was the topographic quad and section number. In response to this lack of information we utilized forest service employees and their knowledge of the area in order to get a better idea of where these water rights might be.

Overall, the goal for this project was to update the existing information that was available about the water rights, and to report this information to the State Water Board on eWRIMs in compliance with their requests. We also wanted to update the information in the files for each water right to ensure that they were complete and consistent for the Mount Pinos District. This was important to ensure that all of the water rights have consistent information and that the information be available to Forest Service employees who may be interested in the location or water status of the various springs and other water sources.

As a last step for this project we also were tasked with updating the existing information within the files and to report our findings through eWRIMs to the State Water Board. The reasoning for updating the existing water right information was so that they could have consistent formatting and descriptions. This way if a Forest Service Employee has any interest in finding any of the water rights they have the information necessary in order to locate them.

These tasks then allowed me to get more familiar with the Forest Service and its inner workings. On how fast or slow certain actions can take within the government and allowing me to have valuable field work experience needed for a Wildlife Biologist position with the Forest service. This job surveying the water rights also allowed me to understand in better detail the impacts of law on both water systems and on ecosystems as a whole. Giving me a whole new perspective on both California's drought and for working with the USDA Forest Service.

Methods

In terms of the project's procedure the idea that Victoria and myself had was based off the a previous intern's work. Last year's intern used a pint bottle to calculate flow and made a new survey format in order to more accurately describe his data. We found his format to be helpful however we sought to improve on his design by adding more detail to the descriptions and coordinates.

Before any inspections were conducted we used any previous data collected in order to evaluate the logistics of each spring. Once in there at the site we'd mark the spot with a Garmin eTrex Legend C handheld GPS along with recording basic environmental information. To aid in the environmental analysis and for the overall condition of the water right photos were taken for the dual purpose of helping convey information and for the navigation of next year's interns.

After all the information was gathered we would record flow rate. To do this we used a one-quart bottle, different from the one-pint bottle previously used, and placed it directly below a source of flow. We would then time it to see how long it would take to fill. Procedurally we would do this three times to create an average and standard error. After we would convert the average into gallons per day (GPD) using this equation:
(insert equation)

Once the GPD was calculated we would reference the water right license for the maximum permitted use before reporting it on the eWRIMS online database. The report generated after inputting the data in eWRIMS then can be added to the water right folder with our survey report.

Project Outcome

At the end of our project we had surveyed most of the water rights with only two unvisited. Our general consensus was that the water rights were flowing at rates higher than last year. To express this, we used figure 1 (below) to categorize the water rights based on condition during the time we surveyed (June-July 2017). Rights that were found to have no water present in the soil or as standing water were termed "Dry/No Flow" (n=1). If there were dense stands of vegetation and moist soil the water rights were categorized as "Soil Moisture" (n=8). Lastly if there was any visible water they would be

categorized as “Standing Water” (n=12) if the water had no flow and “Flowing” (n=12) if there was water flow.

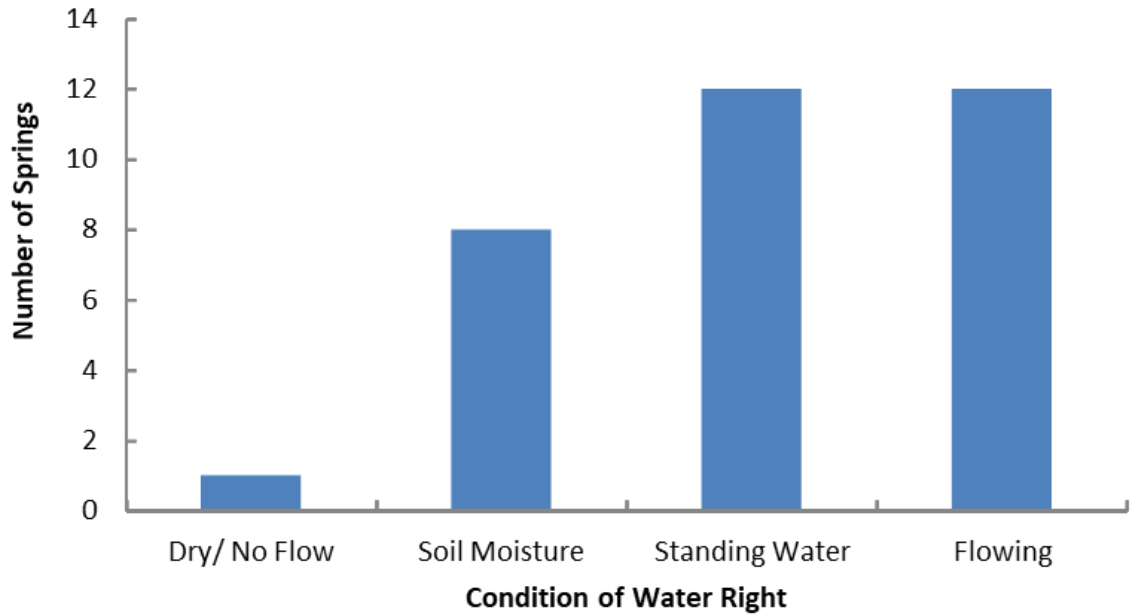


Figure 1. All of the visited water rights (n=33) categorized by condition at the time of surveying. Categories were broken down by amount of water present, ranging from dry to flowing. The majority of springs had water flowing (n=12) or at least standing water in pools (n=12).

Previously a different categorization method was used by using “dry”, “limited use”, and “high use”. For water rights that were considered “Dry” there was no presence of water while “limited use” were classified as having 1-10 GPD and lastly “High Use” as having more than 65 GPD. We had found that these were not clear or applicable to the data that we had collected, thus the categories used above were generated to better convey our data.

To compare the results of this year’s findings with data collected in 2016 springs previously categorized as “limited use” were inspected to comprehend the differences between 2016 and 2017 data yields (Figure 2). From this comparison, all previously listed springs had shown increased flow rates with the exception of one. Kings Camp spring showed a flow rate 3.5 GPD lower than in 2016. This decrease could have been expressed by measurement error or due to the transpirational needs of the visible increase in plants at the site which would consume more water when compared to last year.

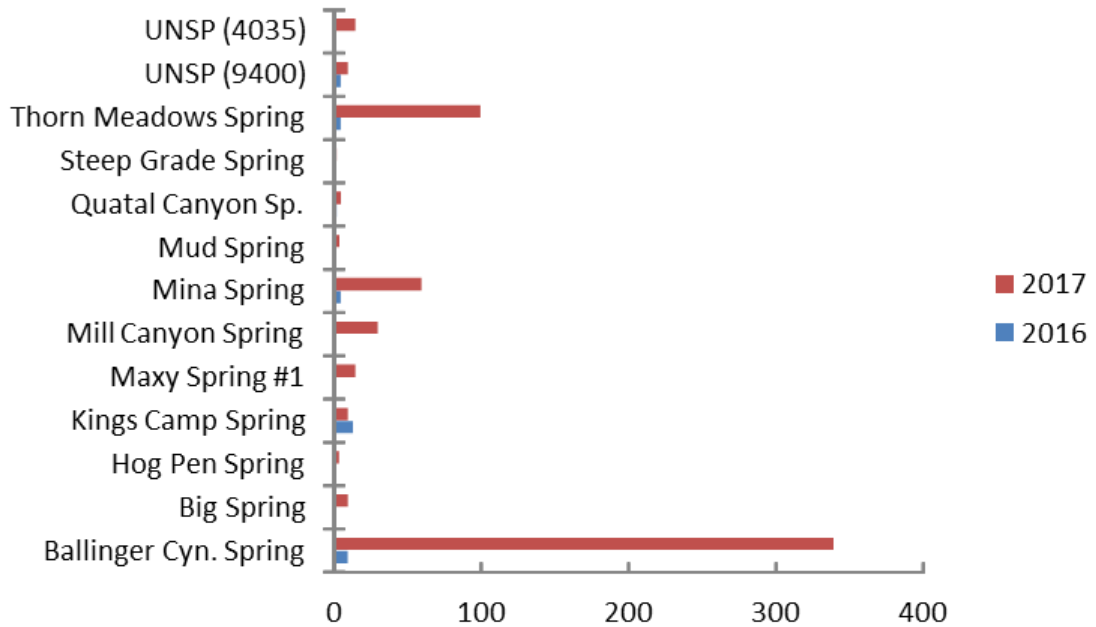


Figure 2. Flow rates for water rights that were reported as limited usage (1-10 GPD) in 2016. For these springs, the flow rates generally increased in 2017, taking many of them out of the 1-10 GPD range.

When previously labeled “high usage” springs were also compared to get a better understanding of the changes between 2016 and 2017 (Figure 3). Two of the springs had shown an increase in GPD when compared to 2016 however, one spring, Scott Russel, expressed a loss of GPD in the 2017 survey. The reason of which this deviation from the trend is not clear however, a likely conclusion would be measurement error. Despite the low amount of springs previously listed as “high use”, 12 water rights showed more than 65 GPD when surveyed in 2017 which would indicate that the forest has significantly more water this year.

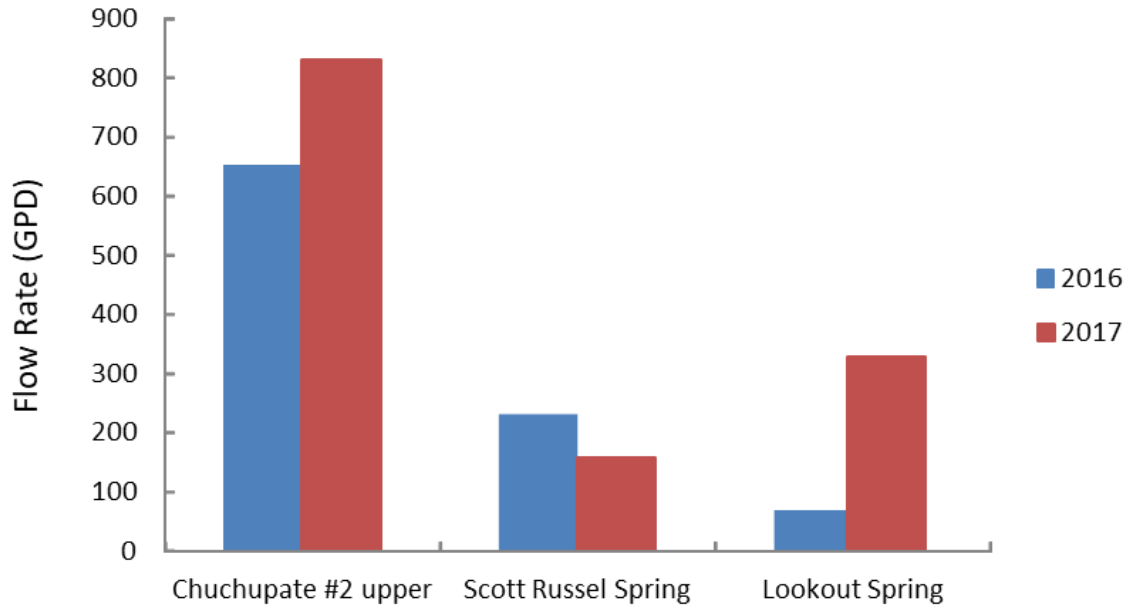


Figure 3. Flow rates for water rights that were reported as high usage (>65 GPD) in 2016. For these high usage springs, the flow rates remained high and increased in 2017 for Chuchupate #2 upper and Lookout Spring. Although the flow rate is lower in 2017 for Scott Russel than it was in 2016, the spring still has a relatively high flow (158 GPD).

Of the 10 previously listed as “dry” in 2016 all of them had shown improved flow rates. In figure 4 the comparison between the two years is displayed except for Hovden Spring which due to its extreme increase in flow rate could not be shown in the same display with the other springs.

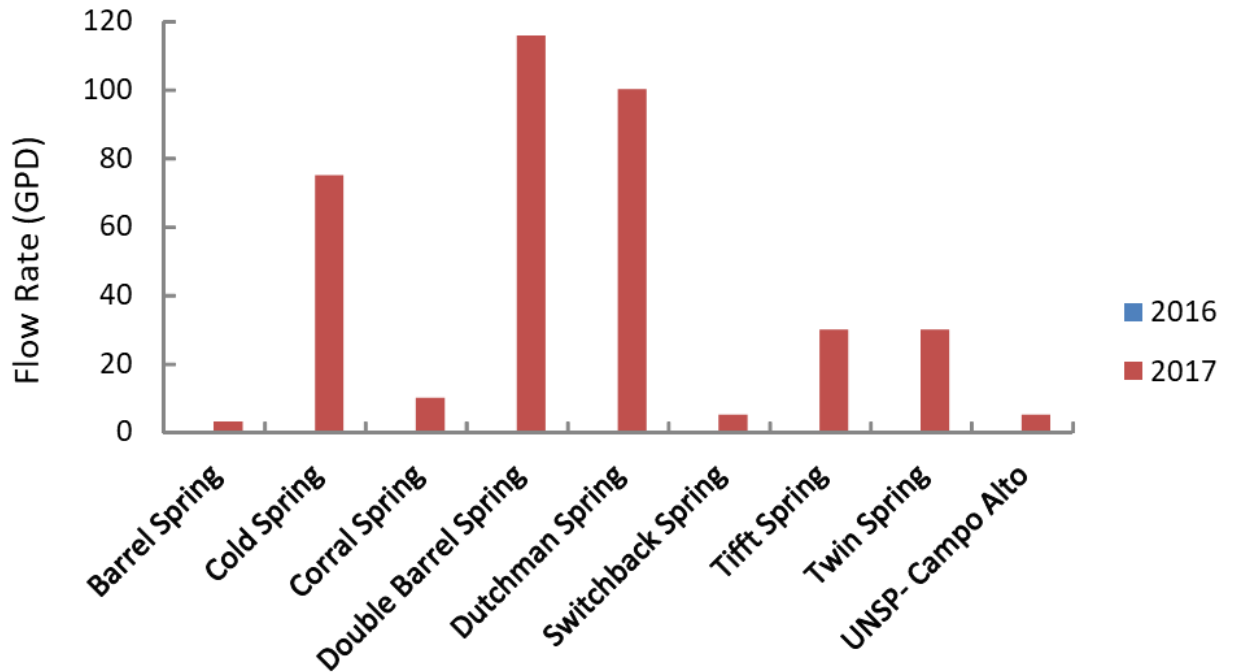


Figure 4. Flow rates for water rights that were reported as Dry in 2016. 2016 values were all zero, and therefore do not show on the graph. All springs that were reported as dry in 2016 had increased flow rates in 2017 (n=10). Hovden spring was excluded from the figure above; due to its dramatic increase of 754.58 GPD, it would not fit into the graph.

We were also tasked with recommending water rights for conversion to instream use. The idea of which is to change any diversion listed under a license to beneficially augment a natural water system or to provide resources. We made recommendations for water rights that had specific uses or were simply not being used for these uses and are now being used to benefit wildlife.

As a side project, I was also tasked with the generation of a database for all of the water rights in the district. Totaling up to around 270 water sources that had to be organized alphabetically with their legal location, forest use number, county, and the topographic map they were located in. Giving me some experience with geographic information systems (GIS), in terms of topographic maps, and more experience with excel. I had also helped collect seeds and insects for a project to create a native pollinator garden at the ranger station where I learned some plant and seed identification along with the process to create an insect collection.

Conclusions

When compared to the data collected by the previous intern the data collected for 2017 signifies a much wetter year for the forest. This is most likely due to the recent winter rains that southern California has experienced which replenished many of the formerly dry springs. These areas have also shown lush vegetation around these water ways even in July. These observations support the notion that the water status for the district overall has increased and was further expressed by the flora and fauna of the forest.

In response to the increased amount of water from the springs the flora and fauna of the region appear to be responding positively to the now available resources. As an example of this most of the springs we had visited showed an increase in vegetation since last year's survey. Most observed were riparian type vegetation like Corn Lilies and Seep Spring Monkey Flowers which grow along heavily, in comparison of the area, watered areas. A distinct spring in mind would be Twin spring which previously had a drainage with only grasses and the occasional annual plant recorded in documentation. During the 2017 survey however, the drainage was lined with Corn Lilies, Seep Spring Monkey Flowers, Stinging Nettles, and other riparian type vegetation. In response to this outburst in vegetation growth many of the higher trophic levels were also impacted such as flies, butterflies, and bees. This observation was also confirmed by Forest Service Employees and by the local newspaper which documented a near explosion in the amount of ladybugs around the Mt. Pinos Ranger District. We have also seen evidence of small mammals and several bird species using the water rights in the form of tracks and by visual observations. We did not see any large predators at the water rights but we have been notified that there were tracks at some of them so it may be likely that they are benefitting off the increased resources as well.

From this increase in water the effects can be both positive and negative on fires in the Mt. Pinos Ranger District. The vegetation may be wet longer and resist burning for a time while the water resource itself might provide firefighters with supplemental water to use. The other effect though is that due to the plant growth there will be more dry fuel once they die and that will increase fire risk. It is also important to remember that despite the sheer volume of water present when compared to previous years that California is still experiencing a drought. There is still plenty of uncertainty on the possibility of California experiencing a wet winter once again.

Overall this internship has allowed me to further delve into field work opportunities along with practicing skills vital to a Wildlife Biologist such as data collection, recording, and analysis. It also has provided me with a new perspective on water laws and their impact on the environment. The position has also allowed me to participate in other projects and also providing me experience into specimen collection and seed collection.