Water Rights Report 2018: Mount Pinos Ranger District, Los Padres National Forest

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Introduction

A Water Right is the legal use of water for beneficial and non-wasteful use. Since 1914, the Water Rights Permitting and Licensing Program is the only method to obtain a legal license to divert water from its source to an area for beneficial use. Every water right has a source, normally a spring, where water is naturally flowing or is stored, and an area where water from the source is diverted for use. The Mount Pinos Ranger District, within the Los Padres National Forest, has 36 water rights. 30 are appropriative rights and 6 are supplemental rights. Appropriative water rights are water diversions that can be used or stored. Supplemental water rights are water diversions contiguous to the stream source and the water use and storage has to be bordering the stream source as well. Every water right have specific types of uses, and are allowed a maximum amount of water to be diverted for each type of uses as described on the official License of Diversion and Use of Water. Every water rights have a five year-no use policy before the license is revoked by the state. Since the Mount Pinos Ranger District have no authority to sell or lose their water rights, annual reporting and documentation of every water rights is crucial for the district to maintain their water rights.

The purpose of this project is to assist the Mt Pinos Ranger District in completing their annual water rights report. The project consists of two parts; field survey, and documentation. The field survey consists of assessing the condition of the structures that are used to divert water, measuring the flow rate of each spring, and obtaining pictures of the area. Data gathered on the field are compiled to complete a water rights survey sheet and an online water rights report. The main objective of the survey sheet is to provide information regarding the condition of the water rights and to provide directions to help others locate each water rights. Finally, an online report completed through electronic Water Rights Information Management System (eWRIMS), is required to certify that the current water rights are being used as is intended and that the amount of water diverted does not exceed the amount that are allowed. In addition, we are also required to provide a list of springs that we recommend changing to instream use. Instream use is simply the use of the water rights to enhance the local environment and wildlife.

Methodology

To ensure consistency and efficiency, we implemented methodologies from previous surveys. This involved taking flow measurements using a stop watch and a 8 oz pyrex measuring cup . In addition, we had find the exact location of the spring using coordinates from the license and applying them on a topographic map to ensure that future surveys can find the exact location of the spring. When completing the online report we keep many of the same information from the previous surveys such as permitted uses. The only section from the online

reporting that changed was the rate of diversion. If the rate of diversion that we measured on the field was greater than the allowable diversion rate as stated on each respective water rights license than we would apply the max diversion rate, otherwise we would input our measured flow rate.

The Pyrex measuring cup was placed under flowing water, preferably under a running pipe, and timed with the stopwatch until it filled up to 2 ounces. If the conditions of the flowing water in the spring source flowed easily, then the procedure was repeated multiple times, minimum of three trials, to ensure accuracy of the readings. An average flow rate calculated in gallons per day, GPD, was than calculated to better represent flow of the system.

However, our ability to utilize the Pyrex and measuring cup was only viable when water was flowing sufficiently from a pipe or structure. During our survey, most of the wells and troughs did not contain flowing water. Therefore, a new technique was devised to quantify flow in the absence of flowing water. Due to the apparent dryness of the well, we had to quantify flow rate by indirectly estimating flow based on vegetation. Flow rate in GPD was given based on the amount of vegetation present, the health and vigor of the vegetation, and the density of the vegetative area. Although this technique is completely subjective, their were several steps taken to ensure that our estimate was as precise as possible.

To give us an idea of how much water could affect a given area, flow rate from several water rights were estimated with the help of Ivana Noell, who's background in botany provided insight into the amount of GPD that could potential exist in a given water right system. We learned that not only was the amount and distribution of vegetation was important to consider, but we must also take into consideration the species of vegetation present and what aspect the vegetation and springs resided. Some species of plants require a greater deal of water than others and some plant species require a certain degree of moisture to exist. North aspects generally hold more moisture than their South facing counterpart. In addition we took consideration of the soil. The higher the soil moisture the more water is expected to flow in the system. The vast majority of the 2018 water rights had no measurable flow so our flow rate was primarily estimated based on the vigor, density, and species of vegetation, whereas aspect and soil moisture are secondary line of evidences used in conjunction with vegetative characteristics to provide a more refine estimate. For example, if we estimated the GPD of a water rights to be 80 GPD than this number could fluctuate slightly based on soil moisture and aspect. If the water right has some soil moisture and reside on a North-Facing aspect than the GPD might increase to 100 GPD.

Before venturing to the field, we were required to locate the water rights on a topographic map. This was achieved by using information provided from previous surveys and those that are on the licenses. On the license, the location of the spring was delineated using the provided township, row, and section number. With this information a marker can be placed on the topographic map. Then by utilizing the scale of the map, latitude and longitude of said

marker can be calculated. Calculation of latitude and longitude was only done if the previous water rights survey were unable to find the spring. Otherwise, latitude and longitude was already provided for every spring which was ground truthed on the field using a Garmin eTrex. Three water rights required calculation of latitude and longitude because the previous two surveys were unable to find these water rights. One of these water rights, Long Dave Canyon Spring, was successfully located by using a new set of latitude and longitude .

The online reporting was completed through eWRIMS RMS (Electronic Water Rights Management System Report Management System). Flow measurements taken on the field were used for the online reporting. Everything else was kept the same as the previous two surveys because nothing important has changed since then. Our recommendation for instream use was based on whether the water rights was on an active allotment, and if whether or not the water rights still serve its permitted uses as stated on the license. If the water rights is on an active allotment than it cannot change to instream use. However, if the water rights is on an inactive allotment and can no longer provide its intended service than the water right has the potential to be converted to instream use.

Results

Overall, the average flow rate of 2016 to 2018 is significantly different in comparison to one another. The average flow rate of 2017 is 108.4 GPD, whereas the average flow rate of 2016 is 35.5 GPD, and the average flow rate of 2018 is 78.8 GPD. This suggest that the entire Mount Pinos Ranger District may have received less precipitation from the summer of 2017 to the summer of 2018. Although the decrease in flow is startling in a drought prone area, flow rate in certain areas are higher in 2018 than it was in 2016 and 2017 (see table in figure 1). Springs near or at Alamo Mountain, Organization Camp, and Hungry Valley showed higher flow rate this year than it had in the past two years. Dutchman, the spring at the highest elevation showed an increase from 0 GPD in 2016 to 100 GPD in 2017 and a further increase to 120 GPD in 2018. Kings Camp near the base of Alamo Mountain showed a significant increase from 10 GPD in 2017 to 80 GPD in 2018. All the springs between Kings Camp and Dutchman spring showed an increase in flow rate. Flow rate on the Organization Camp and Hungry Valley showed an immense increase from previous years. Therefore, although there have been a significant decrease of flow rate in the Mount Pinos Ranger District, some areas of the district shows a significant increase in flow.

A list of water rights with the potential to be converted to instream use was compiled based on the structural integrity of the system used to divert water, and type of allotment the water right resided (see table figure 2). Instream use is the usage of water in the stream so that it benefits the environment and wildlife. For an existing water right to convert to instream use, a petition code 1707 must be filed with the state water board. This states that water under that

right can be used within its natural system without forbearing the water right itself. In our case, some of the sites we visited were degraded beyond use and so water is no longer diverted for its intended usage. Some water rights have deteriorated piping systems, troughs, and wells which, in most cases, provided water for vegetation and wildlife instead of its intended uses. In cases where the water rights bypassed its diverting developments, its structural system have deteriorated to where it can no longer transfer water so the water is consequently left to flow naturally, it can potentially be recommended to instream use. The last requirement for the water rights to qualify for conversion to instream use is whether or not the water rights are on an active allotment. Active allotments have stakeholders that require the use of water for stock watering. Any water rights, no matter is physical condition, cannot be recommended for instream use if it resides on an active allotment. Below is a table with the application ID, name, diversion rate, licensed, measured flow rate, and justification of some of the water rights that are recommended for instream use.

Discussion

Although our survey attempted to keep the same methodologies as the past two survey, a key issue arises that significantly influenced the result of our flow measurement. First of all, each survey decided to represent a spring with no flowing water differently. For the 2016 survey, many of the springs were dry and thus no flow was visible from the piping. Springs that did not have any visible flow were assigned 0 GPD. Contrary to 2016, in 2017 many of the springs had flowing water and so measurements were successfully measured. Some springs in 2017 had no flow and so the estimation of flow was based on the present vegetation and the degree of soil moisture. However, during our 2018 survey, most of the springs had no flowing water even though water was present in the trough and wells. We implemented the same strategy as the 2017 survey when estimating GPD from water rights with no visible flow. However, the amount of springs whom flow rate was estimated using this technique was higher in 2018 survey than for the 2017. Estimate of flow based on vegetation and soil moisture was absent from the 2016 survey. Therefore, flow rate of 2017 is based heavily on measureable flow whereas flow rate in 2018 is heavily based on our best estimate of vegetation growth and vigor, and soil moisture.

One minor detail that could potentially make future surveys more efficient and productive is to implement standardization in the survey sheet, field equipment, and survey methodologies. For our 2018 survey, we tried our best to replicate the survey from 2016 and 2017 to better provide consistent data. However, such as estimating GPD from vegetation and soil moisture, there are differences in our methodologies that make comparing data from 2016 to 2018 survey less than favorable. In addition, survey sheets from this and past survey are remarkably different from one another. A standardized survey sheet to be used by future

interns with all the appropriate data for updating eWRIMS is a valuable tool that can increase work efficiency. This survey including the previous surveys lacked standardization that could have provided more consistent data. The use of standardization with a clear and definable method of measurement could provide better analytical capabilities and a higher work efficiency.

Conclusion

Data from our 2018 survey suggests that the Mt Pinos Ranger District is relatively dry in comparison to the 2017 survey but less dry from the 2016 survey. Although on average the entire district is drier than the previous year, some parts, mainly in Alamo Mountain, contain considerably more moisture. Due to the lack of standardization, comparison of flow rate from each survey with one another could be less precise than as desired. Therefore, standardization of equipment, methodologies, and survey sheets can increase the consistency of the data to allow for a more concise and reliable analysis.

Figures

Application ID	Name	Justification
A008573	Chuchupate upper 1	Dry and underground
A010335	Upper San Emigdio Spring	Not being diverted from the source, water supporting wildlife
A009400	UNSP	No longer developed
A012162	Big Springs	Only remaining use is wildlife
A012163	Dutchman Spring	Only remaining use is wildlife
A012164	Kings Camp Spring	Only remaining use is wildlife
A013465	Quatal Canyon Underflow	Only remaining use is wildlife
A017907	Mill Canyon Spring	Not being diverted from the source, water supporting wildlife
A018126	Tifft Spring	Spring has bypassed developments, supporting wildlife
A018423	Mud Spring	Only Remaining use is wildlife
A020700	Long Dave Canyon Spring	Spring has bypassed developments, supporting wildlife

A020701	Maxey Canyon Spring	Spring has bypassed developments, supporting wildlife
A020702	Double Barrel Spring	Spring has bypassed developments, supporting wildlife
A020704	Switchback Spring	Only being used by wildlife
A020705	Corral Spring	Only Remaining use is wildlife
A020706	Obermeyer Spring	Only Remaining use is wildlife
A020707	Lookout Spring	Only Remaining use is wildlife
A020708	Roadside Spring	Only Remaining use is wildlife
A020709	Hovden Spring	Only being used by wildlife
A021114	Twin Spring	Only being used by wildlife
S003580	Single Pine Spring	Only use is wildlife
S013990	Campo Alto	Only use is wildlife

Figure 1; Table showing the water rights we recommended for instream use. All the water rights listed are on inactive allotments and their structural integrity have deteriorated to the point that water is no longer diverted for its intended use as listed their respective licenses.

		Flow (GPD)			
Water Licence	Name	2016	2017	2018	General Location
A003777	UNSP	0	5	?	Frazier Mountain
A008573	Chuchupate Upper 1	0	0	5	
A009480	Chuchupate Upper 2	652	829.59	515.7	
A020708	Roadside Spring	1	292	6.8	
A020707	Lookout Spring	67.5	328.02	260.6	
A020704	Switchback Spring	0	5	50	
A020705	Corral Spring	0	10	10	
A020706	Obermeyer Spring	0	15	30	
A020709	Hovden Spring	0	754.58	56	
A18126	Tifft Spring	0	30	100	

A020701	Maxey Canyon Spring	1	15	35	
A020702	Double Barrel Spring	0	115.65	10	
A020700	Long Dave	?	?	80	
A011915	Cold Spring	0	75	20	Cuddy Valley
A021117	Scott Russel Spring	230	158	128	
A010335	Upper San Emigdio	15	15	135	Organization
A009400	UNSP	5	10	150	Campground
A004918	Mina Spring	5	60	40	Mount Pinos
A017907	Mill Canyon Spring	5	30	15	
A021114	Twin Spring	0	30	20	
A013465	Quatal Canyon Spring	2.25	5	5	Quatal Canyon
A018423	Mud Spring	5	4	25	
S013990	Camp Alto	0	5	11.1	Cerro Noroeste
S006369	Steep Grade	2	2	20	Lockwood Valley
A012563	Thorn Meadows	5	100	30	
A004035	UNSP	1	15	120	Hungry Valley
S003580	Single Pine	?	3	5	
A012164	Kings Camp	13.5	10	80	Mount Alamo
A018323	Barrel Spring	13.5	3	10	
A012162	Big Spring	1	10	200	
A012163	Dutchman	0	100	120	
S003449	Johnson Canyon	100	200	100	Fort Tejon
S007741	Ballinger Canyon	10	340.07	110	Ballinger Canyon
A016031	Hog Pen Spring	1.65	3.75	?	
S003548	UNSP	?	?	?	
A012554	Tennison	?	?	?	
	Average GPD	35.5125	108.4442424	79.78064516	

Figure 2; Table showing the flow rate (in gallons per day, GPD) of every water rights. UNSP, Hog Pen, and Tennison have no data because 2016-2018 surveys were not able to reach the destination. The highlighted water rights represent those that showed a significant change of flow from 2017 where green means increase and red means a decrease of flow.

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