

COMPARING DIFFERENCES IN MOUNTAIN AND VALLEY PRECIPITATION

NETWORKS IN LAKE COUNTY, OREGON

by

Rob Allerman¹ and Jon Lea²

ABSTRACT

Precipitation sites in Lake County, Oregon include mountain (Snow-Telemetered Network) and valley (Cooperative Observers Network) locations. Often times the percent of monthly totals for these two networks are published separately. These numbers should not be published separately due to the equal importance these networks have in determining stream flow forecasts and water supply. Simple linear regression equations comparing monthly precipitation and adjacent streamflow totals show this to be the case.

INTRODUCTION

Water is a limited resource in the interior regions of the western U.S. and the proper management of this limited resource can only be achieved through complete knowledge of the precipitation that falls within a basin. A holistic view is essential to the proper management of the ecosystem of this region. The interior drainages of Lake County, Oregon are no exception. There are numerous state and federal agencies monitoring precipitation in this basin, primarily the National Weather Service (NWS), cooperative observers network (CON) and the Natural Resources Conservation Service (NRCS), Snow Telemetered network (SNOTEL). The SNOTEL network has a relatively high density of stations in mountainous areas (generally above 5000 feet) in the western half of the basin but there are no sites in the eastern half of the basin. The CON network is sparsely located throughout the entire basin with no stations in the mountainous areas. The CON network measures less precipitation due to the lower elevation and their location east of the mountains, while, the SNOTEL network measures more precipitation due to its higher elevation and relative location to the prevailing westerlies. These differing volumes of precipitation, which often come from different storm types, can lead to misinterpretation of the basin wide average monthly precipitation that comes about when just one network is used.

¹ Hydrologist for NRCS Snow Surveys, 101 S.W. Main #1300 Portland, Oregon 97204-3221

² Hydrologist for NRCS Snow Surveys, 101 S.W. Main #1300 Portland, Oregon 97204-3221

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COMPARING PRECIPITATION AND STREAMFLOW

To determine the importance of both precipitation networks the following investigation was conducted. In this study seven precipitation stations, four from the SNOTEL network, and three from the CON network were chosen. The location of the sites in these networks can be seen in figure 1. Precipitation data from 1981 through the current year were used for both data sets because of SNOTEL's limited record. Precipitation and adjacent streamflow were compared for the same seasons (i.e. winter to winter, summer to summer). The Coefficient of Determination (R^2) was used as the primary indicator of the degree of comparison.

The results of these comparisons can be seen in table 1. It was found that that mountain sites compared better to streamflow in the winter months. In the remaining three seasons the cooperative observers network compared better. Adel, a CON site, had the highest R^2 value of .84 in the Fall, while, Paisley, another CON site, had a R^2 value of .01. Fall, winter and summer R^2 values were higher than spring values. In general, values between the two networks are closely related.

CONCLUSION

This paper has shown that both networks in the Lake County basin are of equal importance when it comes to determining water supply for the Lake County Basin. A misinterpretation of monthly precipitation totals will occur if the two previously discussed networks are kept separate. It can be further compounded if released to the public through the media. It remains up to the press and the government agencies to work together to release numbers that do not confuse the public and reflect the true precipitation amounts. In the era of ever tightening budget, it becomes painfully clear, that separate precipitation networks can be considered inefficient. An efficient management of the ecosystem of this basin can only be accomplish through a policy that balances cost effectiveness and risk reduction and this can only be done with the use of both networks.

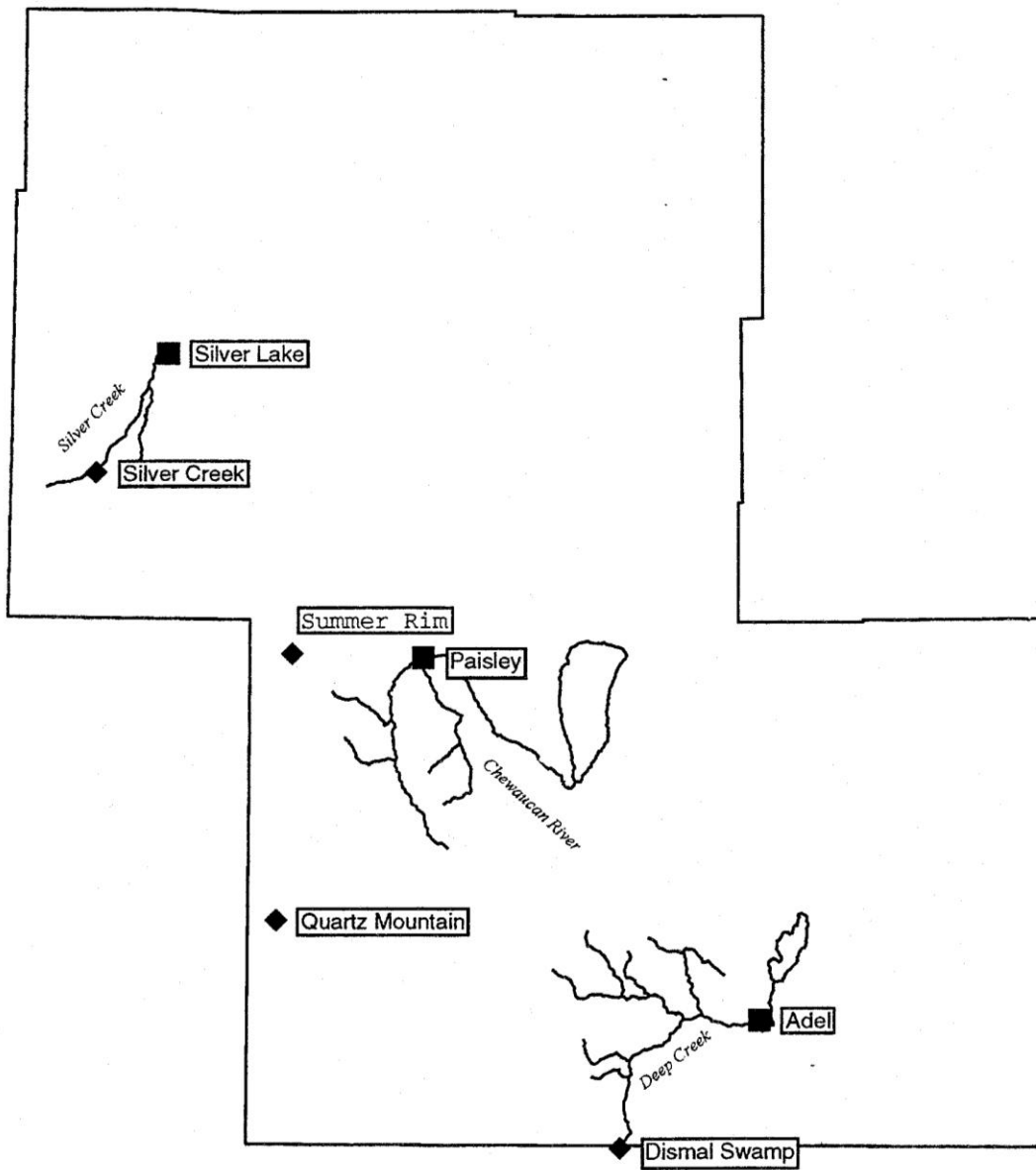
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Precipitation Networks in Lake County, Oregon (Figure 1)



Comparing Seasonal Precipitation and Streamflow Using Simple Linear Regression Equations

Site Name	Winter R ²	Spring R ²	Summer R ²	Fall R ²	Average
Adel/Deep Creek	0.10	0.17	0.31	0.84	0.38
Dismal Swamp/Deep Cr.	0.42	0.03	0.15	0.54	0.29
Quartz Mt./Chewaucan	0.56	0.07	0.02	0.69	0.34
Paisley/Chewaucan	0.73	0.01	0.48	0.75	0.50
Summer Rim/Chew.	0.30	0.05	0.77	0.48	0.40
Silver Creek/Silver Cr.	0.24	0.03	0.83	0.24	0.34
Silver Lake/Silver Cr.	0.35	0.03	0.75	0.35	0.37
SNOTEL Averages	0.43	0.05	0.44	0.49	0.34
CON Averages	0.40	0.07	0.51	0.61	0.42

Table 1