

Idaho Department of Water Resources



Open-File Report



Trail Creek Seepage Survey

By  
Dennis Owsley  
November 2017



A seepage survey was conducted on the lower 4 miles of Trail Creek on October 5, 2017. Trail Creek is a tributary stream to the Big Wood River with a confluence near the town of Ketchum, Idaho (Figure 1). The purpose of the seepage survey was to determine and quantify any gains or losses that occur within this section of the creek.

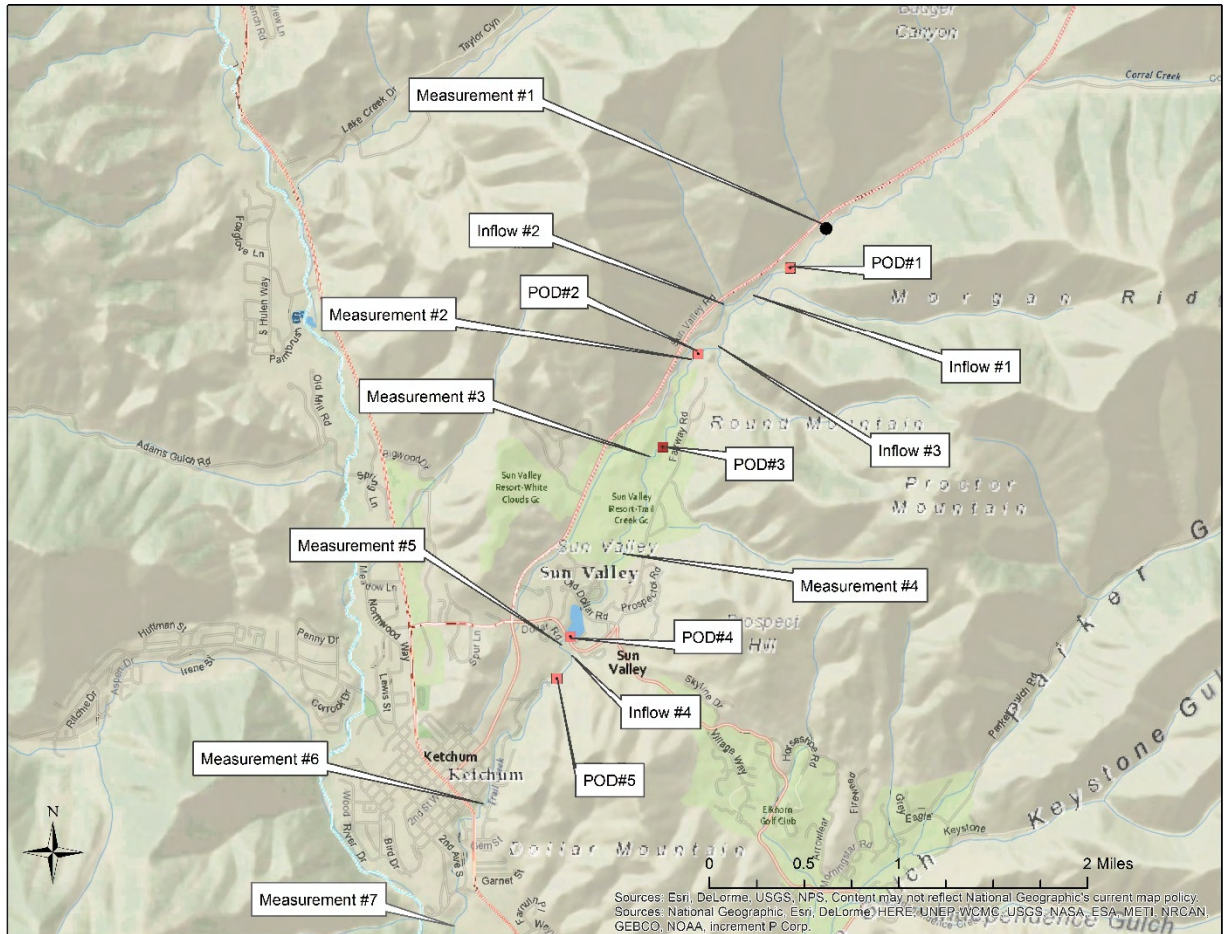


Figure 1. Map showing the location of the seepage survey and measurement locations.

Measurement crews operated a StreamPro Acoustic Doppler Current Profiler (ADCP) and/or a SonTek Flow Tracker to measure flow rates. Each crew collected flow measurements at the pre-determined locations, starting at the furthest upstream location and worked downstream. Measurement equipment was selected based on flow conditions and stream channel cross sections at each particular site. Some locations did not provide suitable cross sections to accurately operate the StreamPro, therefore, the hand held Flow Tracker was used.

IDWR records indicate that five water right Points of Diversion (POD) with Trail Creek as the source of water exist within the section of the creek that the seepage run was conducted. In addition, four tributary drainages to Trail Creek were identified as potential sources of inflow to the system within the identified section. All five PODs and the four tributary streams were inspected and/or measured to account for all inflows and diversions that were occurring on the day of the seepage run. In addition, the Sun Valley Water and Sewer District (SVWSD) operates eight shallow ground water wells within the

reach of interest for this seepage investigation. Pumping records of the wells were provided by Pat McMahon of the SVWSD and are included in Appendix A. The locations of the wells have not been verified to help estimate any potential influence the wells that were pumping may have had on the results of the survey.

Location #1 was the furthest upstream measurement location and was measured first. The measurement site was a footbridge across Trail Creek at the National Forest Service Boundary Creek Campground. This location provided a suitable site for a StreamPro measurement. USGS Stream Gage #13137300 was located just upstream from location #1. Flow measured with the Stream Pro was 37.6 cfs, with the gage reporting a range of flow of 37.8 to 39.4 cfs (provisional data) during the timeframe of the measurement (Table 1).

Table 1. Summary of measured flows in cfs.

Measurement Location	Stream Mile	StreamPro	Flow Tracker1	Flow Tracker2	Average	Gain (+) or Loss (-)	Net Gain (+) or Loss (-)
#1 – Boundary Creek Campground	0.0	37.6	NA	NA	37.6	0	0
POD #1	0.3	NA	6.2	NA	6.2	NA	NA
#2 - Restaurant	0.6	34.8	NA	NA	34.8	+3.4	+3.4
#3 - Golf Lane	1.1	37	32	NA	34.5	-0.3	+3.1
#4 – Golf Course	1.6	36	32.5	35	34.5	0	+3.1
Golf Course Inflow	1.6	NA	1.5	NA	1.5	0	NA
#5 – Below Dam	2.2	34.6	NA	NA	34.6	-1.4	+1.7
#6 – Leadville Street	3.2	33.7	33	NA	33.4	-1.2	+0.5
#7—Near Mouth	3.8	32	32	NA	32	-1.4	-0.9

Approximately 0.5 miles downstream from the Boundary Creek Campground measurement location, a surface water diversion for the Sun Valley Golf Course was located (POD #1). This diversion was active and the flow rate near the head gate off of Trail Creek was measured at 6.2 cfs, using a Flow Tracker.

Location #2 was located near the golf course restaurant at the northern end of the golf course property. Location #2 was approximately 0.6 miles downstream from Location #1. Flow in Trail Creek at location #2 was measured with a Stream Pro at 34.8 cfs. POD #2 was identified near the measurement location #2 and was found to be inactive. Inflows #1, #2, and #3 were all located between measurement locations #1 and #2, and all three were dry.

Location #3 was located on the Sun Valley Golf Course and accessed off of Golf Lane approximately 0.5 miles downstream from Location #2. POD #3 was located near this measurement site and was found to be inactive. The flow was measured with a StreamPro and a Flow Tracker at 37 and 32 cfs, respectively. The average flow at this location was 34.5 cfs.

Location #4 was located on the Sun Valley Golf Course and access to the measurement location was a golf cart bridge that crosses Trail Creek. Location #4 was approximately 0.5 miles downstream from measurement Location #3. Two Flow Tracker measurements were taken at the golf cart bridge, and a Stream Pro measurement was taken approximately 100 yards upstream of the golf cart bridge. The

measurements ranged from 32.5 to 36 cfs, with an average of 34.5 cfs. Two return flows from the golf course irrigation practices were observed near this measurement location. One return was visually estimated to be less than 0.5 cfs, and one return flow was approximated by measuring the cross sectional area of the return and the velocity using a Flow Tracker. The estimated discharge into Trail Creek from these two return flows was 1.5 cfs.

Location #5 was located downstream of the dam south of Sun Valley, approximately 0.6 miles downstream from Location #4. Identifying a suitable cross section for measurement proved difficult as the reservoir had recently been drained and a significant amount of sediment had been and was currently being transported down Trail Creek. Flow measured with the Stream Pro was 34.6 cfs. POD #4 was located just upstream of this measurement site and was found to be inactive. POD #5 was located just downstream of this measurement site and was also found to be inactive.

Location #6 was located in the residential portion of the town of Ketchum, accessed at the bridge over Trail Creek on Leadville Road. This location was approximately 1 mile downstream from Measurement Location #5. Flow was measured with the Stream Pro and a Flow Tracker at 33.7 and 33 cfs, respectively. The average flow at this location was 33.4 cfs. USGS gage #13137500 was located near this measurement site and was reporting a flow of 31.3 cfs (provisional data) at the time of the measurement.

Location #7 was located near the mouth of Trail Creek and the Big Wood River, approximately 0.6 miles downstream from Location #6. Flow was measured with the Stream Pro and the Flow Tracker, both measurements were 32 cfs.

## Conclusions

Based on a review of the flow data collected in the lower 4 miles of Trail Creek, a net loss of 0.9 cfs was calculated (Figures 1 and 2). Individual reaches of Trail Creek were shown to gain or lose water to or from the aquifer. The largest gaining reach was in the upper portion of the study area with 3.4 cfs entering the stream between measurement Locations #1 and #2. The largest identified losing reach was near the mouth of Trail Creek, where a loss of 1.4 cfs was measured between measurement Location #6 and #7.

A repeat of this seepage survey in upcoming years would be beneficial to observe any differences in flow conditions.

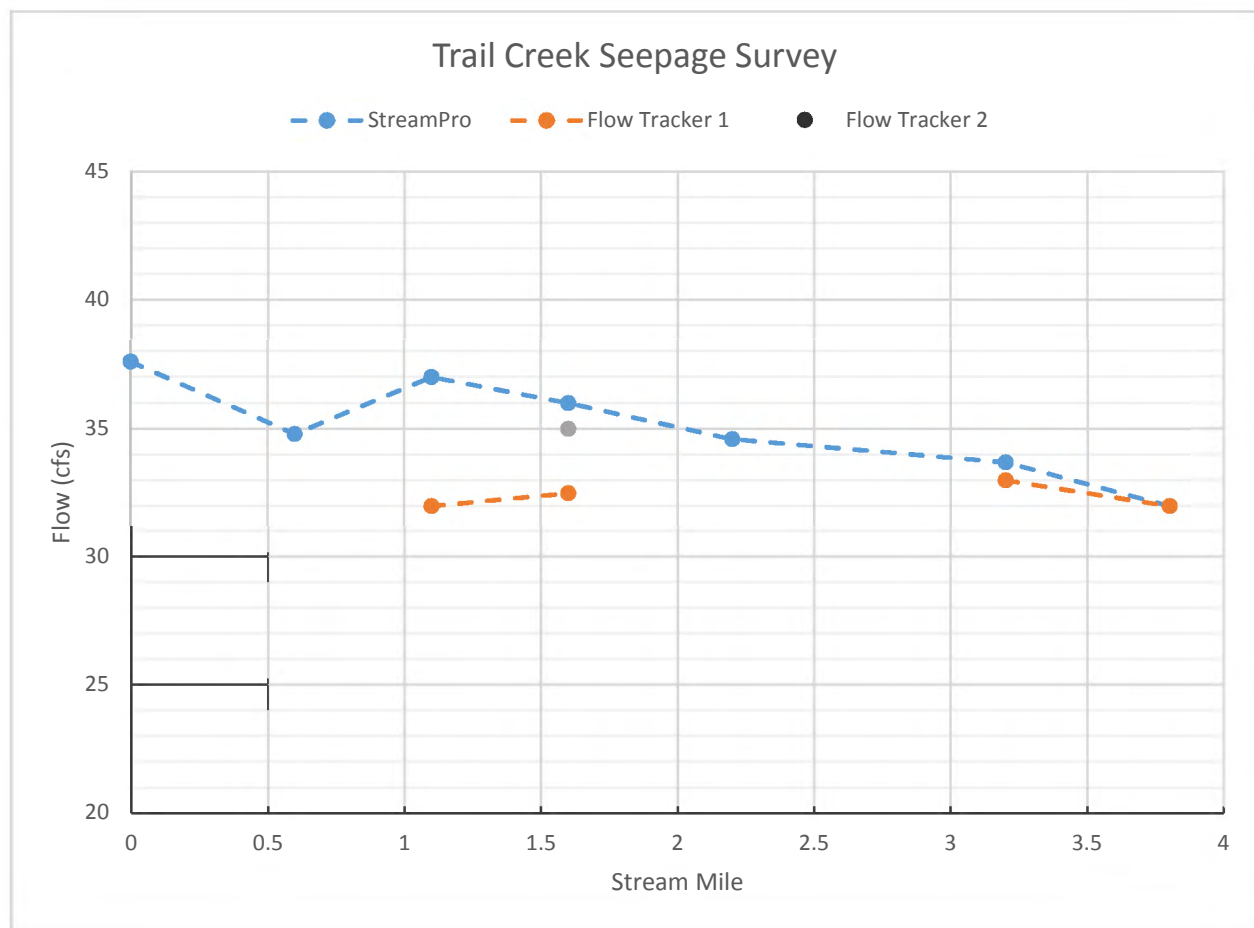


Figure 2. Graphic representation of measured flows.

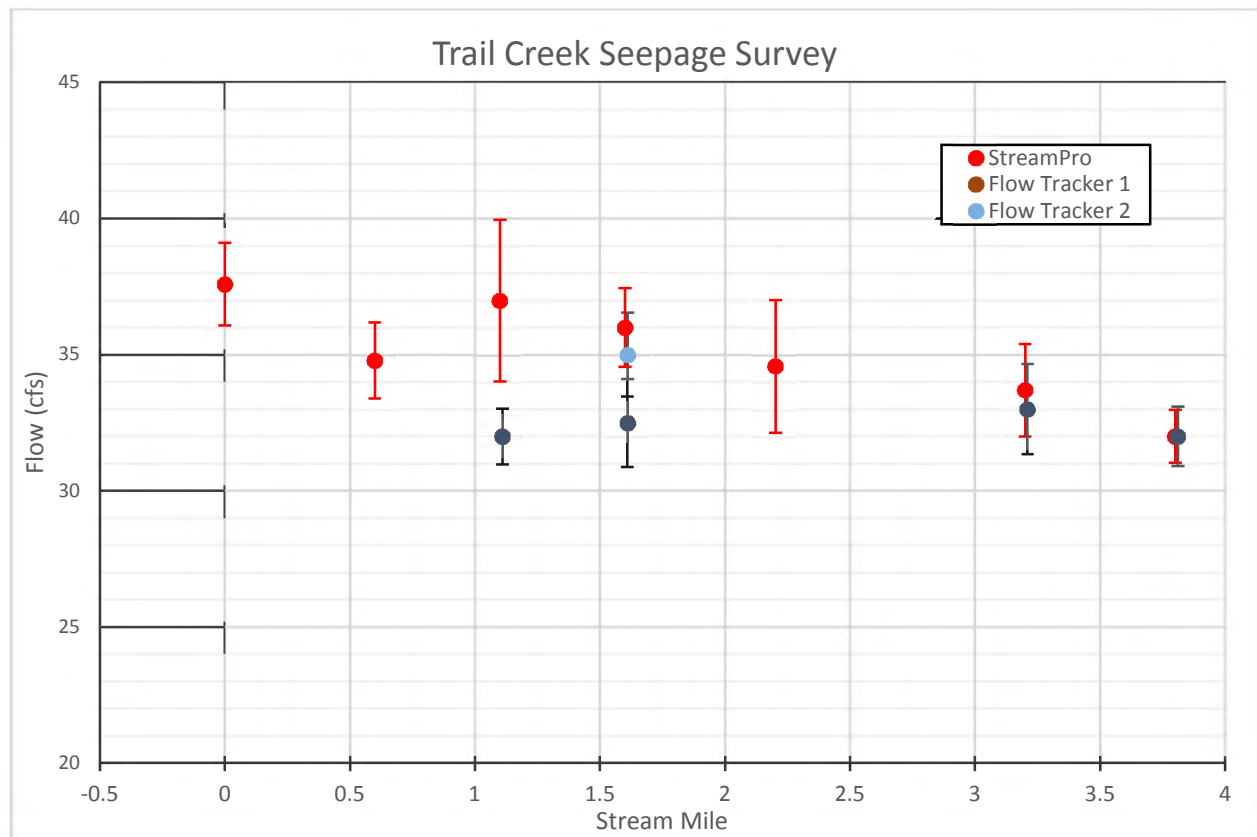
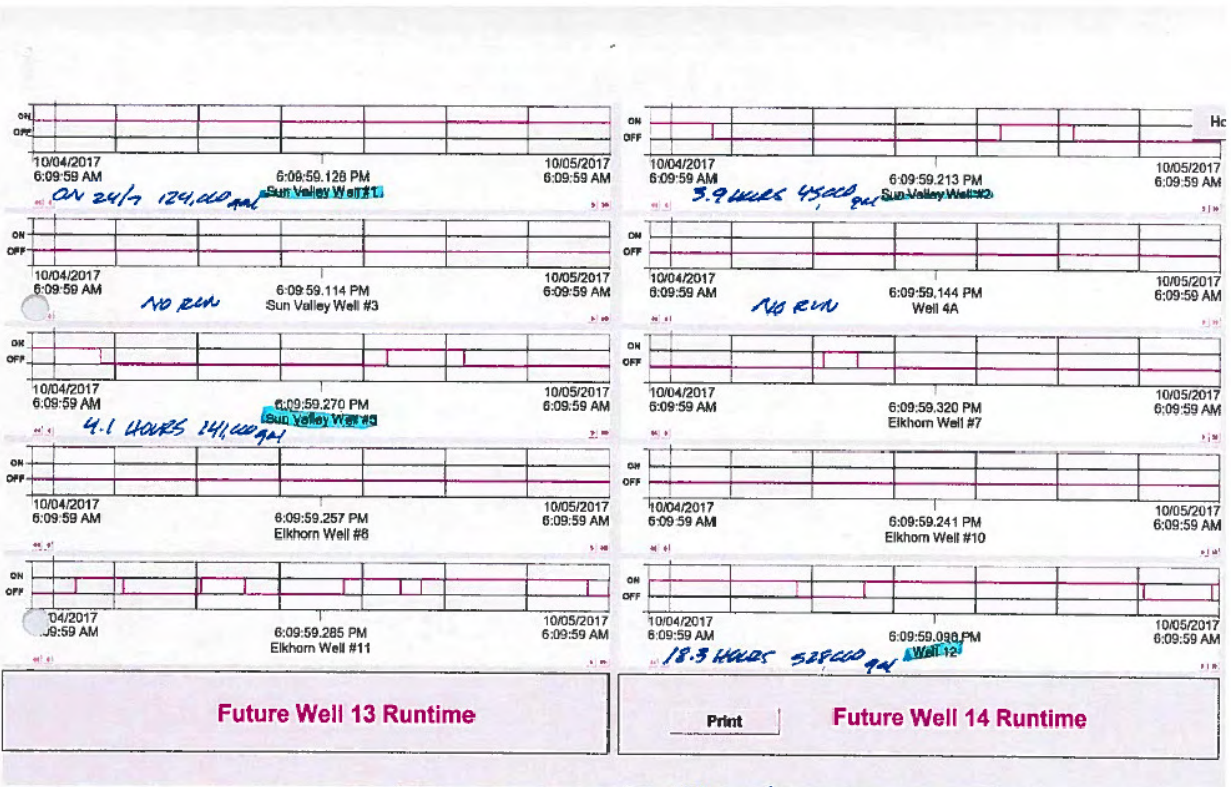


Figure 3. Graph of measured flows showing errors associated with each measurement.

# APPENDIX A

## SVSWD Pumping Schedule



WELLS 1,2,5 located between measurement points 5-6  
 well 12 located between 6-7