



# United States Department of the Interior

U. S. GEOLOGICAL SURVEY

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April 5, 2017

## Memorandum

To: Sean Vincent  
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Water Management Department, Idaho Power Company

From: David M. Evetts  
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Subject: Intent to move USGS Gaging Station 13172500, Snake River nr Murphy, ID, and discontinue USGS Gaging Station 13172455, Snake River Below Bypass, nr Murphy, ID.

USGS Gaging Station 13172500, Snake River nr Murphy, ID has been in operation since 1912, providing invaluable hydrologic information about the Snake River between Swan Falls Dam and Brownlee Reservoir to multiple users. It is the reference gage used for the Swan Falls Agreement (1984) establishing minimum average daily flow requirements for key periods of the year, and it is used to assist dam operators in flow regulation through the Swan Falls Dam located approximately 4 miles upstream of the current gage location. Due to the stream gage's importance and heavily relied on data, accuracy is a crucial requirement. This accuracy has become increasingly difficult to maintain and has become suspect over the past several years due to increased macrophyte growth and degradation of the control downstream of the gage. These factors have led to increased measurement activity and excessive shifting to maintain the stage discharge relationship at this site. The shifting applied to the discharge record makes it very difficult to maintain the accurate publication of record on a real-time basis that is needed to ensure Swan Falls Agreement compliance by all parties involved. (Wood, M.S., Williams, M.L., Evetts, D.M., and Vidmar, P.J., 2014, Evaluation of seepage and discharge uncertainty in the middle Snake River, southwestern Idaho: U.S. Geological Survey Scientific Investigations Report 2014-5091, 34 p., <http://dx.doi.org/10.3133/sir20145091>).

In response to the ever increasing need for accurate data and the suspect stability of the control at the Murphy site, the USGS, in cooperation with Idaho Department of Water Resources and Idaho Power Company, added an additional gage 13172455, Snake River Below Bypass, nr Murphy, ID in 2015. Gage 13172455 is located three miles upstream of the current Murphy gage location and approximately one mile downstream of the Swan Falls Dam. Gage 13172455 was installed in a location that limits the potential impact of sedimentation, scour, and macrophyte plant growth on the control while monitoring the same water passing the current Murphy gage site.

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The intent was that this site would provide more accurate, reliable data without the need for the excessive shifting experienced at the current Murphy gage site (13172500)

Simultaneous measurements have been made at both the bypass site (13172455) and Murphy site (13172500) since 2015 to ensure continuity and lack of inflow or outflow between the sites. To date, 14 comparison measurements have been made at both sites, indicating strong correlation between the two sites with an  $R^2$  value of .9913. The relationship is essentially a 1:1 ratio showing no cumulative inflow or outflow between the two sites, verifying that the “same water” is being measured at both locations. Percent difference between measurements at the two sites varied from -2.1% to 5.8% with an average deviation of 1.56%, which is well below the accepted potential measurement error of +/- 5%.

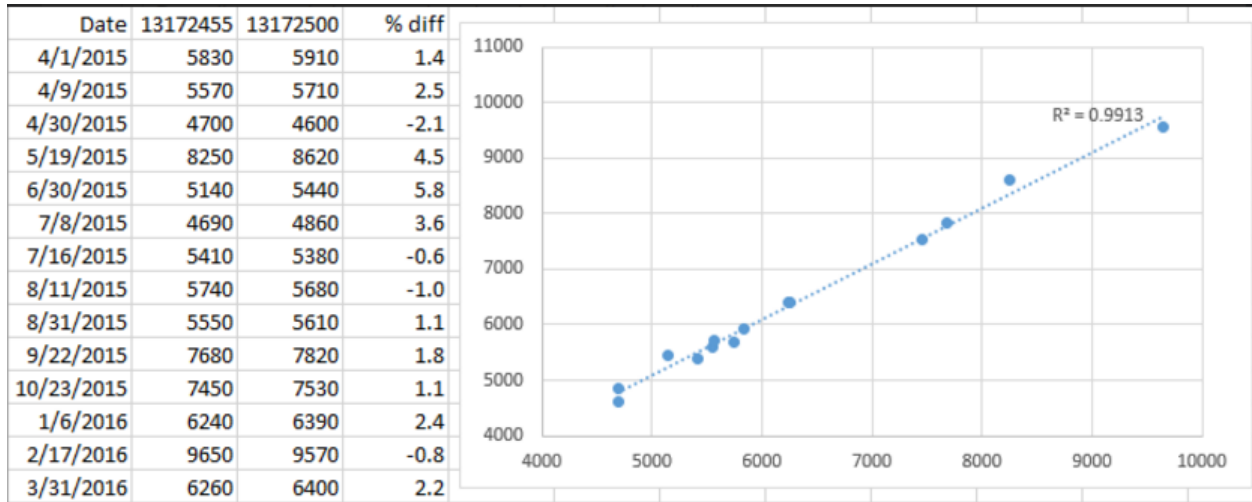


Figure 1 Flow (cfs) measurement comparison between Station 13172455 and 13172500 between April 1, 2015 and March 31, 2016.

Analysis for the discharge record from April 1, 2015 to March 31, 2016 was reviewed. The control at this site seems very stable, needing no shifts to be applied to the current stage discharge rating. Discharge was computed “rating direct” for the entire period and verified by 18 measurements that were all within 2.5% of the rated discharge at the gage.

Based on the comparison stated above and the quality of record produced at site 13172455, effective April 1, 2017, the USGS will change the location of Station 13172500, Snake River near Murphy, ID to the current location of station 13172455, Snake River below Bypass nr Murphy, ID. The current station description for station #13172500 will be changed to reflect the location of the new site. Site data at the new site location from April 3, 2015 on will be merged with the old site location’s historical values. Data collected at the old site location from April 3, 2015 to present will be moved to a separate data descriptor for historical preservation.

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The historic station descriptions will not be changed. The station manuscript for station 13172500 will also be updated to include documentation of the site change. Once the information is changed and continuity of data is verified, station #13172455 will be discontinued and archived.

If you have any questions or concerns please contact me a [devetts@usgs.gov](mailto:devetts@usgs.gov) or 208-387-1316.

Cc Kyle Blasch  
Douglas Ott