

Weaver, Mathew

From: Weaver, Mathew
Sent: Wednesday, June 15, 2011 10:45 AM
To: Peppersack, Jeff
Subject: WR License 01-7103 (Gem Lake Harbor Subdivision)

Jeff,

I had a chance to look through the technical work done by Michele regarding the Gem Lake Harbor water right license. This is the project with a Snake River flow through component into an old quarry pit that has been converted into a harbor on the river near Idaho Falls. Michele's work looks to be quite good she has utilized a standard engineering practice for estimating flow rate through the inlet culvert. All of her assumptions seem reasonable and based on the evidence in the file. After reviewing Michele's work and the file a few things jump out at me, however, I don't think they warrant making any modifications to what has been proposed.

- (1) Brockway has built a rating curve based on flow measurements at a box culvert located between a significantly large upper pool in the harbor and the lower pool. I would suspect that there is a high likelihood that Brockway's current meter measurements are being affected by either back water effects from the lower pool if river stage is rising (decreasing velocities) or drainage affects from the upper pool if river stage is falling (inflating velocities). Based on a Snake River daily hydrograph for days that Brockway current metered the site to construct their stage-discharge relationship, three days represented days of little change in flow rate in the River. The fourth day (6/17/2010) was conducted on a day of significant falling stage in the river, perhaps suggesting that their current meter results on the 6/17/2010 are overly high as they capture some component of upper pool drainage and therefore should not be used in the stage-discharge relationship.
- (2) The figure below depicts flow rate (Q) and velocity (V) versus head (H) across the inlet culvert to the harbor as established by Michele. The Q vs. H looks reasonable and even comports to a significant degree with field measurements by Brockway. However, for the Q vs. H relationship to be real, so to would the V vs. H relationship have to be real. Which indicates that on the days Brockway visited the site they should have witnessed velocities at the culvert of 1.70 fps (H = 0.08 ft), 3.46 fps (H = 0.33 ft), and 5.86 fps (H = 0.945 ft). This does not seem to agree with the conditions observed in the field.
- (3) I think the key to really understanding this system resides in a continuous measurement of flow rate through the inlet culvert over an extended period of time—ideally a full year. This will tell us exactly what the flows into the system are (or out of the system if backwater affects reach to the culvert) and how they change through time with changing river stage. This is probably not practicable at this time for the current license. However, if Brockway pursues a third permit as they indicate they intend to do, we could make this a requirement condition on the future permit.

I hope you found this helpful, let me know if you have any follow up questions.

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