Bohannon Creek Seepage Study
September 16-17, 2008

A seepage study was conducted September 16 and 17, 2008 by IDWR staff. The study consisted of measuring surface water flows (stream flows, diversion rates, return flows and tributary inputs) in Bohannon Creek and East Fork Bohannon Creek in order to quantify gaining and losing reaches. During the two day study, thirty-five measurements or observations were taken, including measurements of the mouth of the East Fork Bohannon Creek (Figure 1; Table 1). The Wimpy Creek injection to East Fork Bohannon Creek was not located, none of the East Fork diversions were being used during the study, and the EF1 diversion does not appear useable.

During the study BC10 and BC3 diverted the entire flow. Below BC3 the channel was nearly dry gaining approximately 0.5cfs to the mouth. Overall Bohannon Creek gains flow downstream of the dewatered reach below BC8 to BC3, but currently this stream is disconnected from the Lemhi River during irrigation season (Table 2).

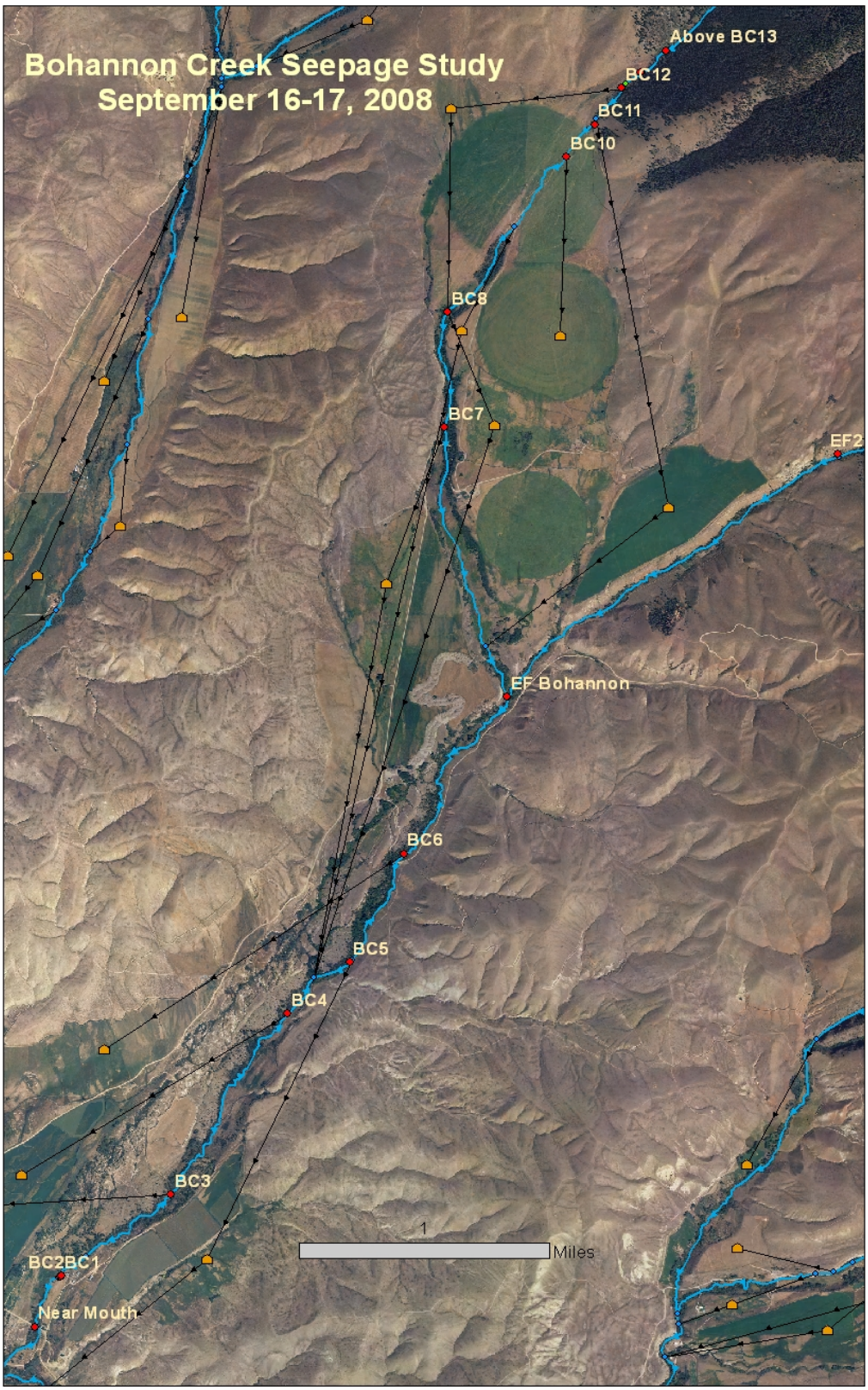

Figure 1. Map of Bohannon Creek with important surface water features labeled. Black lines with arrows represent diversion channels and the yellow shapes represent user nodes in the MIKE Basin Model.

Main stream location	Trib/diversion location	Discharge	Q diverted out	Trib/diversion Q in	Bohannon Creek Q	Seepage	Point_X	Point_Y	Date and Time	Notes
Above all diversions to EF										
Above BC13		6.03			**6.03**		2524224	1554385	9/16/2008 10:10am	This is the uppermost point measured.
	BC13	**2.10**	2.10							
Below BC13		3.94			**3.94**		2524059	1554239	9/16/2008 10:10am	Measurement was below overflow at pipe input for BC13.
Above BC12		**3.94**								
	BC12	0.10	0.10				2523937	1554134	9/16/2008 10:53am	Estimate
Below BC12		**3.86**								
Above BC11		3.86			3.86				9/16/2008 11:35am	Above BC11 by 30ft.
	BC11	1.77	1.77				2523766	1553893	9/16/2008 12:30pm	Cipolletti weir is warped.
Below BC11		2.09			2.09					
Above BC10		1.90			1.90				9/16/2008 12:28pm	Measured 80ft upstream of diversion structure. Steep channel with large substrate.
	BC10	1.65	1.65				2523582	1553680	9/16/2008 1:15pm	BC10 takes most of the flow. Some leaks through diversion dam (wood) and a little more spills at the pipe input. Estimate.
Below BC10		0.25			0.25				9/16/2008 1:15pm	Estimate of flow below diversion.
Above BC9		0.50			0.50		2523240	1553227	9/16/2008 1:55pm	Estimate due to shallow flows and large substrate.
	BC9	0.00	0.00				2553603	1486977	9/16/2008 1:54pm	Diversion does not look like it is used often. Maybe only during high flows.
Below BC9		0.50			0.50					
Above BC8		0.46			0.46					
	BC8	0.20	0.20				2522817	1552649	9/16/2008 2:47pm	Estimate, diversion is off but there is flow in ditch. Culvert in unscreened ditch is a barrier.
Below BC8		0.26			0.26				9/16/2008 2:18pm	Sculpin and 6inch trout near cross-section.
Above BC7		0.87			0.87					
	BC7	0.02	0.02				2522798	1551883	9/16/2008 3:20pm	BC7 is a small culvert with a Cipoletti weir just downstream of the culvert. BC11 is piped under Bohannon Creek to the BC7 ditch. Never found BC7a. 3ft Cipoletti H=0.025ft.
Below BC7		**0.84**			0.84					
Above BC7a		**0.84**								
	BC7a	0.00	0.00							
Below BC7a		0.84			0.84				9/16/2008 3:30pm	
Above all diversions to EF						0.65				
Above EF Bohannon		**1.16**			1.16					
	EF Bohannon	5.40		5.40			2523201	1550095	9/16/2008	
Below EF Bohannon		6.56			6.56				9/16/2008 4:57pm	
Above BC6		6.28			6.28				9/16/2008 6:00pm	This measurement taken again at 7.769cfs 9/17/2008 8:55am.
	BC6	0.00	0.00				2522533	1549051	9/16/2008 5:50pm	Closed headgate.
Below BC6		7.77			7.77				9/17/2008 8:55am	The 7.769cfs flow measured on 9/17/2008 is used for the flow for this point because it the same day as all measurements downstream.
Above BC5		8.42			8.42				9/17/2008 9:53am	
	BC5	2.23	2.23				2522184	1548331	9/17/2008 10:30am	
Below BC5		**6.19**			6.19					
EF Confluence to Below BC5						2.18				
Above BC4		6.05			6.05				9/17/2008 11:46am	Large boulders and tarp force most of the flow down a ditch to the headgate. At the headgate where there is additional return to the channel from the ditch.
	BC4	2.56	2.56				2521787	1547992	9/17/2008 11:20am	3ft Cipoletti downstream of screen, with a head of 0.40ft. Weir is in good shape, level and has slow entrance velocity
Below BC4		**3.50**			3.50					
Above BC3		2.95			2.95				9/17/2008 2:00pm	Diversion captures entire stream. No return from the screen. This measurement was taken 25ft upstream of the IPCO staff plate which measured 0.97 during the measurement, with the -0.08 shift the discharge from rating is 3.03.
	BC3	2.85	2.85				2520990	1546753	9/17/08 0:00	3ft Cipoletti H=0.43. No return flow from fish screen. Bohannon Creek is almost dry other than a little flow getting past the diversion dam.
Below BC3		**0.11**			0.11					
Above BC4 to below BC3						-0.68				
Above BC2		**0.27**			0.27					
	BC2	0.00	0.00						9/17/2008 1:00pm	Ditch has not been used, just a depression.
Below BC2		**0.27**			0.27					
Above BC1		0.27							9/17/2008 1:14pm	Diversion may take 1/3 of the flow. Poor measurement due to substrate size, cross-section, and low flow.
	BC1	**0.09**	0.09				2520327	1546250		
Below BC1		**0.18**			0.18					
Mouth		0.50			0.50		2520156	1545912	9/17/2008 1:28pm	Estimated flow at road culvert. No good place to measure, low flows and large substrate.
Above BC2 to Mouth						0.48				

Table 1. Summary of seepage study for Bohannon Creek, including reach gains and losses calculated from the measured flows. Locations are in the IDTM 83 projection.

Bohannon Creek Summary	**cfs**
Initial flow/input	**6.031**
Diverted rate out of Bohannon Creek	**13.562**
Tributary/injection Input	**5.400**
Cumulative reach losses	**-0.678**
Cumulative reach gains	**3.309**
Calculated output	**0.500**
Measured output	**0.500**

Table 2. Summary of Bohannon Creek seepage study.