Eighteenmile Creek Seepage Study
August 26-28, 2008

A seepage study was conducted August 26 through 28, 2008 by IDWR staff. The study consisted of measuring surface water flows (stream flows, diversion rates, return flows and tributary inputs) in Eighteenmile Creek in order to quantify gaining and losing reaches. During the two-day study 39 measurements or observations were taken, including measurements of diversions, stream flows, tributaries, and return flows. Typically seepage studies are conducted by measuring all surface water flows associated with a stream from the headwaters to the mouth. During this study, we took advantage of land owner and irrigator interest and met several of the irrigators at their diversions. Without the local knowledge of the land owners and irrigators, we would not have been able to find the diversions and ditch channels or to discern them from spring and irrigation return flow channels. Parts of Eighteenmile Creek were very complex, and this study does not effectively represent the actual small scale hydrology, but rather gives a better understanding of broad reach characteristics.

Above all diversions, Eighteenmile Creek flows out of a steep, confined mountain reach into a willow complex on BLM land (Figure 1). The stream flow was measured at 2.2 cfs near the upper most diversion, EM19, which was off. The uppermost four diversions were off during the three day seepage study; these-diversions are probably only used during high flows. Eighteenmile Creek gains 1.3 cfs before the first active diversion EM15 diverts 0.3 cfs. The riparian area along the stream changes in this reach as well with less willows, a smaller channel, and a loss in flow (1.3 cfs from EM16 to EM13).. From EM13 to above EM10A and EM10B the stream gained 3.7 cfs; we did not visit Divide Creek nor did we see the EM12 diversions but were told by the landowner that both were dry. For the upper part of the Eighteenmile Creek we relied on Mr. Whittaker to locate the channel and diversions.

Eighteenmile Creek gains flow in the reach below EM8 to EM9 due to a complex of return flows, spring channels, and general wetland area; this reach was very complex and we relied heavily on the local knowledge of the irrigators (Mr. Drake and Mr. Wilson) to locate diversions, return flows, and the main channel. Downstream of EM9 to EM2, Eighteenmile Creek gained 12 cfs and 8 cfs was diverted for irrigation during this study. From NAIP imagery it appears that many of the springs and reach gains are related to Tenmile Creek, Clear Creek, and upstream diversions (Figure 2).

The lowest reach of Eighteenmile Creek, below the pivot associated with EM3, is dry sagebrush flat with very little riparian vegetation. Downstream of EM2 to EM1, Eighteenmile Creek lost 0.7cfs.

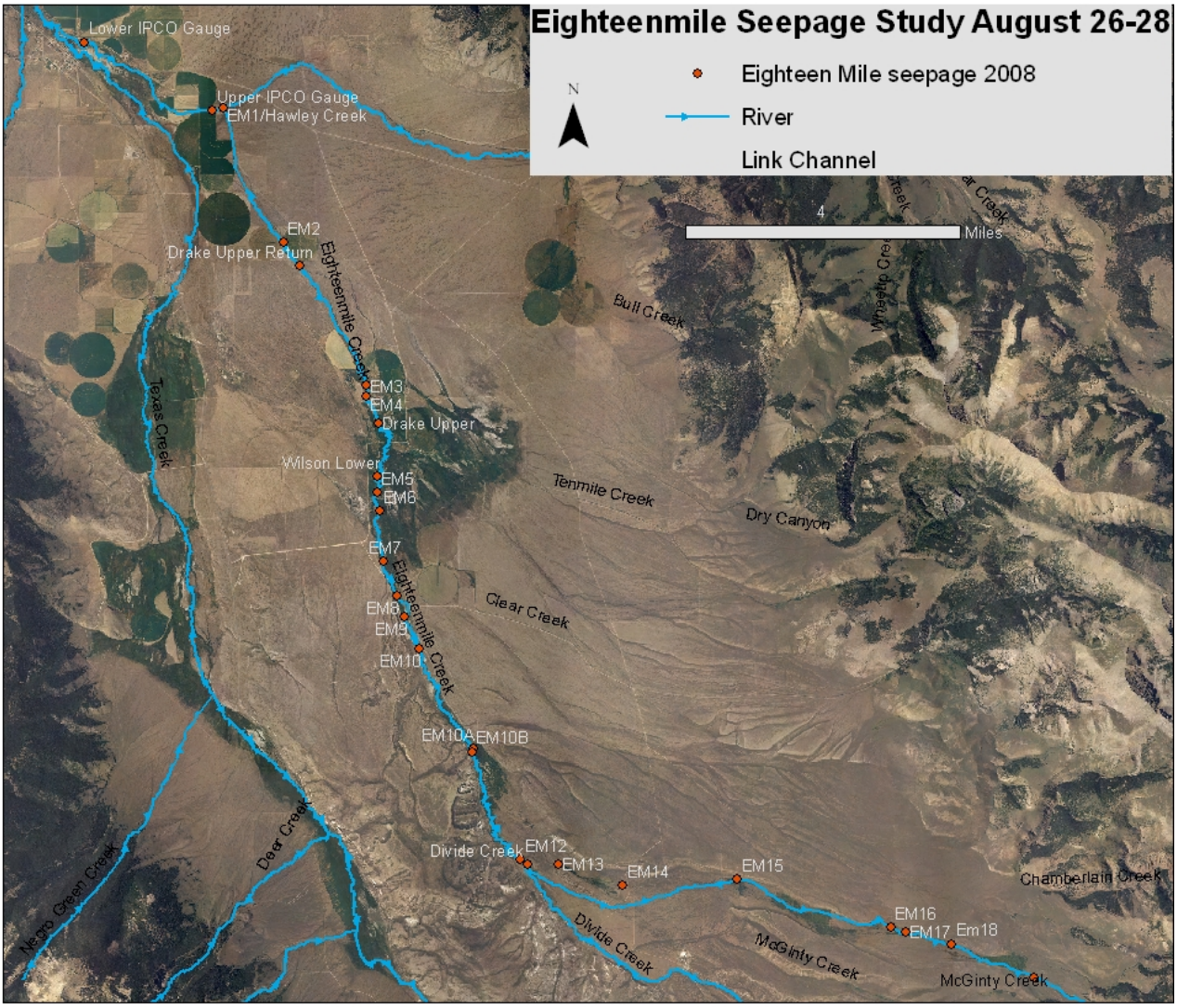

Figure 1. Map of Eighteenmile Creek with important surface water features labeled.

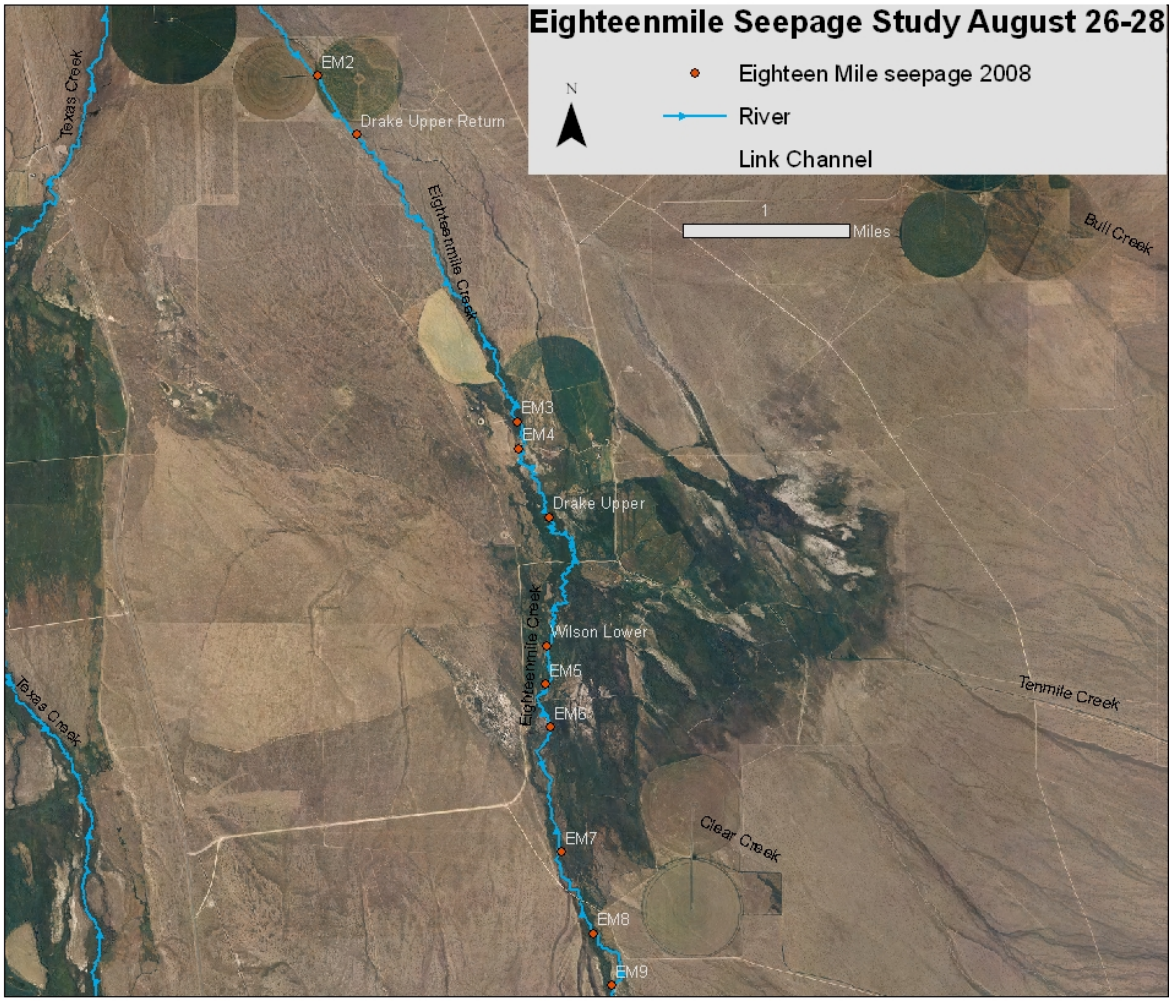

Figure 2. Detailed areal view of Eighteenmile Creek displaying area where reach gains and springs are associated with Clear Creek, Tenmile Creek, and diversion returns.

Main stream location	Trib/diversion location	Discharge	Q diverted out	Trib/diversion Q in	Eightteenmile Creek Q	Seepage	Point_X	Point_Y	Date and time	Notes
Above EM19		**2.20**			2.20					
	Em19	0.00	0.00				2573529	1476307		EM19 does not have a headgate, is diverted off of south side of Eighteen Mile Creek probably only during high flows.
Below EM19		2.20			2.20					35ft downstream of EM19.
Above EM18		2.20			2.20					
	Em18	0.00	0.00				2571602	1477087		
Below EM18		**3.47**			3.47					
Above EM17		3.47			3.47		2571050	1477216	8/26/2008 3:40pm DLS	EM17 and EM18 are dry.
	EM17	0.00	0.00				2570533	1477354		
Below EM17		3.47			3.47					
Above EM19 to Below EM17						1.27				
Above EM16		3.48			3.48		2520270	1477476	8/26/2008 3:14pm	
	EM16	0.00	0.00				2570187	1477477		
Below EM16		**3.48**			3.48					
Above EM15		**2.65**			2.65					
	EM15	0.30	0.30				2566601	1478590	8/26/2008 2:20pm	Estimate of flow
Below EM15		2.35			2.35		2566202	1478624	8/26/2008 2:00pm	Springs in willow complex upstream
Above EM14		1.89			1.89		2564068	1478444	8/26/2008 12:50pm	Narrow and shallow, upstream of public road and Whittakers fence line.
	EM14	1.50	1.50				2563934	1478448	8/26/2008 1:20pm	Diversion is not consolidated, dispersed with side channels so we did not measure. Main Eighteen Mile was only a trickle as seen in photos.
Below EM14		**0.39**			0.39					
Above EM16 to Below EM14						-1.28				
Above EM13		**0.39**			0.39					
	EM13	0.31	0.31				2562415	1478959	8/26/2008 12:58pm	This is EM13 in the model.
Below EM13		0.00			0.00		2562433	1478961	8/26/2008 12:58pm	
Above Divide Ck		0.00								
	Divide Creek	0.00		0.00			2561701	1478936		
Below Divide Ck		0.00								
Above EM12		0.00								
	EM12	0.00	0.00				25615446	1479058		
Below EM12		0.00			0.00					
Above EM13 to Below EM12						-0.08				

Above EM10A		**3.67**			3.67					
	EM10A	0.00	0.00				2560436	1481649	8/26/2008 11:10am	
Below EM10A		**3.67**								
Above EM10B		**3.67**			3.67					
	EM10B	0.31	0.31				2560408	1481573	8/26/2008 10:51am	
Below EM10B		3.36			3.36					
Above EM10		**3.36**								
	EM10	0.00	0.00				2559171	1483975	8/27/2008 10:00am	Does not look like it has been used or will be used. There is a second unused/abandoned ditch up stream.
Below EM10		3.36			3.36		2559184	1483988	8/27/2008 10:10am	Good measurement location, 30ft downstream of EM10 diversion.
Above EM9		**2.98**			2.98					
	EM9	2.88	2.88				2558836	1484731	8/27/2008 10:41am	
Below EM9		0.10			0.10				8/27/2008 11:05am	Estimate of flow remaining in creek.
Above EM10A to Below EM9						3.29				
Above EM8		**2.45**			2.45					
	EM8	0.00	0.00				2558655.5	1485228.7		EM8 does not look like it is used.
Below EM8		2.45			2.45		2558595	1485293	8/27/2008 11:45am	EM8 does not look like it is used.
	EM8b	0.60	0.60				2558810	1485096	8/28/2008 12:05pm	This is the headgate the actual point where flow is diverted from the stream is ~400yards upstream..
Below EM8b		2.00			2.00		2558634	1485255	8/28/2008 11:44am	Confluence below EM8b, estimated flows.
Above EM7		**2.57**			2.57					
	EM7	1.87	1.87				2558350	1486011	8/27/2008 12:11pm	
Below EM7		0.70			0.70				8/27/2008 12:35pm	Estimate of flow passing diversion.
Above EM6		**2.35**			2.35					
	EM6	2.35	2.35				2558247	1487216	8/27/2008 1:30pm	Looked like a rainbow (7inches) in ditch. This measurement was behind the Wilson house. This measurement is downstream of the pond near their house.
Below EM6		0.00			0.00					From Nick's sketch. This area rapidly gains flows from returns and springs. Complex channel network with return channels, diversions, and springs.
Above EM5		**3.67**			3.67					This is a measurement of all the returns and seeps downstream of EM5.
	EM5	0.00	0.00				2558198	1487625	8/27/2008	Looks like a return flow channel not a diversion.
Below EM5		3.67			**3.67**		2558242	1487747	8/27/2008 2:40pm	This measurement is below a willow complex and several channels that have been carved out of a wetland area, including irrigation returns, springs and seeps. This area was very complex, uncertain where main channel was.
Above Wilson lower ditch		**3.67**								
	Wilson's lower ditch	1.58	1.58				2558207	1487997	8/28/2008 11:30am	A rock berm forces flow down the ditch, potentially a fish barrier.
Below Wilson lower ditch		2.26			2.26		2558207	1487997	8/28/2008 12:10pm	
Above EM8 to Below Wilson Lower Ditch						8.55				

Above Drake's upper ditch		**4.69**			4.69					
	Drake's upper ditch	1.33	1.33				2558235	1489235	8/28/2008 10:20am	
Below Drake's upper ditch		3.36			3.36		2558207	1489249	8/28/2008 10:15am	Stable bank, mature willows, clean gravels.
Above EM4		3.45			3.45		2557984	1489946	8/26/2008 4:05pm	EM4 was not in use. Nick measured on the lip of a culvert.
	EM4	0.00	0.00				2557945	1489893		
Below EM4		**3.45**								
Above EM3		**3.45**			3.45					
	EM3	3.47	3.47				2557579	14090981	8/28/2008 1:20pm	Pump is located 100yds down from diversion, 2557507 1491011. There is a backwater channel below the measurement location that may contributea little flow to the pump-pond (ditch where water is pumped from).
Below EM3		0.00			0.00					
Above Drake's to Below EM3						2.55				
Above Drake Return		1.02			1.02		2556378	1492909	8/28/2008 2:35pm	
	Drake Return, from upper Drake diversion	1.32		1.32			2556388	1492917	8/28/2008 2:34pm	This is a return from the upper Drake ditch that feeds a pivot. This ditch travels over an unirrigated sage brush flat.
Below Drake return		**2.34**			2.34					
Above EM2		**2.34**								
	EM2	0.00	0.00				2556009	1493481	8/28/2008 3:05pm	Lower Drake pivot, not running does not look like it has run this year.
Below EM2		**2.34**			2.34					
Above Hawley Creek		1.65			1.65		2554572	1496561	8/26/2008 9:10am	Hawley Creek and Eighteen Mile 1 are dry.
Hawley Creek		0.00		0.00						
	EM1	0.00	0.00				2554606	1496599		
Below Hawley Creek and EM1, upper EM gauge		2.24			2.24				8/28/2008 3:40pm	Stage was measured as 7.09ft the IPCO rating will be used for the flow.
Lower EM gauge		1.41			1.41				8/28/2008 3:55pm	Near Leadore. Stage was measured as 1.45ft the IPCO rating will be used to determine the flow.
Above Drake's Return to Lower Gage near mouth						0.09				

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

Eighteenmile Creek Summary	
Initial flow/input	**2.20**
Diverted rate out of Eighteenmile Creek	**16.497**
Tributary/injection Input	**1.320**
Cumulative reach losses	**-1.359**
Cumulative reach gains	**15.751**
Calculated output	**1.413**
Measured output	**1.410**

Table 2. Summary of Eighteenmile Creek seepage study.