MEMORANDUM

To: ESPAM2 Model Files
Fr: Bryce Contor
Date: 22 October 2009

Re: Diversions and Returns, IESW007

In ESPAM1.1 we identified several input files from the Reach Gain and Loss Program (RGLP) data as diversions to entity IESW007, and several as return flows. In reviewing these data with ESHMC, Dick Lutz and other IDWR personnel in the fall of 2008, we became concerned about proper identification of each of the files in the RGLP data. After traveling to Shoshone and spending an afternoon with Kevin Lakey, watermaster of Water District 37, we decided to use a mass-balance inflow and outflow calculation to determine the net disappearance of water from the river, and partition it into diversions and perched river seepage. This is the same approach that was used in the Big Lost River (IESW005) in both ESPAM1.1 and ESPAM2.

We found that we could uniquely distinguish lands that received only Milner Gooding water from lands that received Wood Rivers water and mingled Wood Rivers/Milner Gooding water. We could also uniquely quantify the amount of Milner-Gooding-Only water using existing data in the RGLP. However, we could not uniquely associate Big Wood and Little Wood water to particular parcels due to unmeasured fluxes involved with the co-mingling of Big Wood water from the Richfield Canal with Little Wood water, near Richfield and the heading to the Dietrich Canal.

Consequently, we partitioned the part of ESPAM1.1 entity IESW007 that received only Milner Gooding water into new entity IESW058, and we combined the remainder of IESW007 with ESPAM1.1 entity IESW054 to form new entity IESW059. While this results in a more uniform spatial distribution of net recharge from irrigation, it greatly increases our confidence in getting the correct quantity of recharge in the water budget.

Figure 1 shows the ESPAM1.1 assignment of irrigated lands, overlaid by the ESPAM2 entity map.

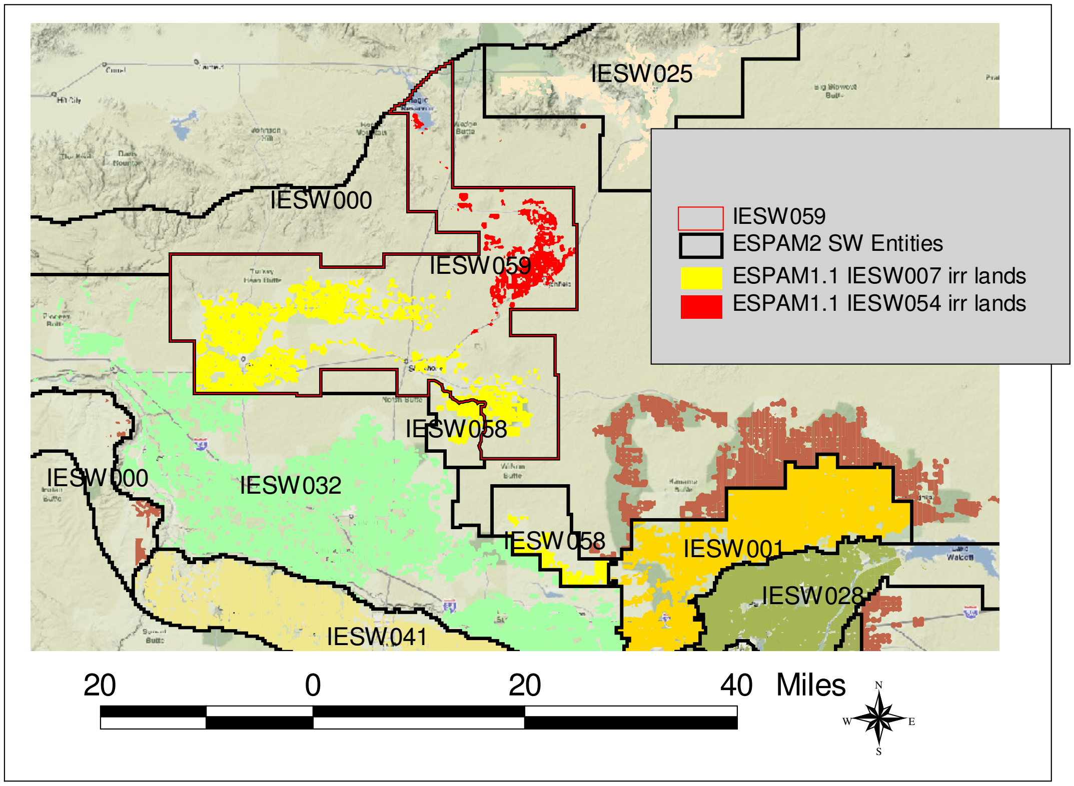

Figure 1. ESPAM1.1 and ESPAM2
surface-water irrigation entities.

Table 1 shows the surface-water flows that were used to calculate flux into and out of IESW059. Figure 2 shows approximate locations of the measuring points.

Table 1
Identification of Surface-water Fluxes
Shown in Figure 1

Letter	Feature	Flow (relative to IESW059)	Notes
A	Big Wood below Magic	In	
B	Little Wood near Richfield	In	
C	Thorn Creek	In	Estimated from historic data from Lee Peterson, former watermaster
D	Dry Creek	In	Estimated from historic USGS data

Letter	Feature	Flow (relative to IESW059)	Notes
E	Milner-Gooding Canal above Little Wood	In	This is an outflow from IESW058 (Milner-Gooding above Wood Rivers)
F	X-Waste near Gooding	In	This is an outflow from IESW032 (Northside)
G	Malad River near Gooding	Out	From USGS gage data

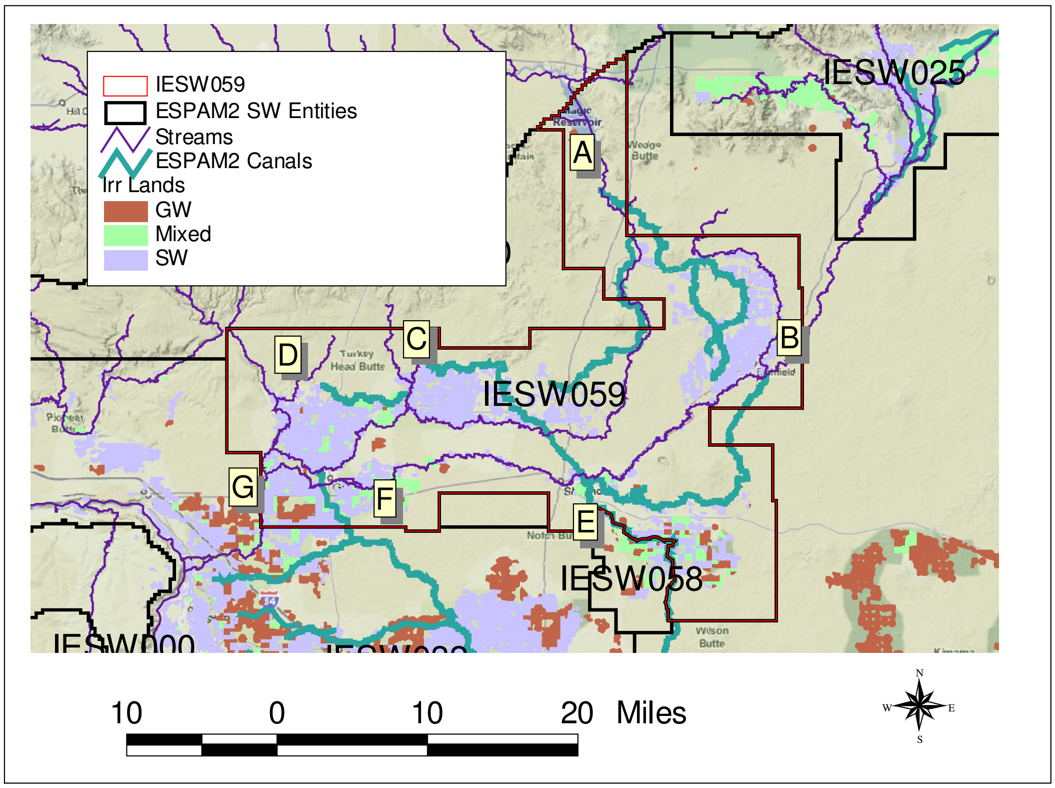

Figure 2. Entity IESW059 with locations of described fluxes.

The calculated difference between all the inflows and outflows is actually the net sum of diversions, returns, river gains and river losses. We estimated net perched seepage and applied this volume as perched seepage to the Big Wood and Little Wood rivers, while subtracting it from the net diversions calculation. Therefore, the sum of perched seepage and IESW059 diversions will be equal to the net mass balance calculated from the flows identified in Table 1.

Assuming that there are no winter-time diversions, we attributed all winter-time net difference between inflows and outflows to perched-river seepage. During summertime months, we used average wintertime values to predict summertime perched river seepage.

This representation of perched seepage changes only the spatial distribution of the representation of recharge. The water budget – the net volume of water available to satisfy crop ET and to recharge the aquifer – is governed entirely by the mass balance of the fluxes listed in Table 1.