MEMORANDUM

To: ESPAM2 Modeling Files, Diversions & Returns
Fr: Bryce Contor
Date: 29 October 2009~~3 September 2009~~

Re: Mapping diversions to irrigated lands, ESPAM2

This is a follow-up to a similar memo from July 10, 2009. It has been modified based on valuable input from Tony Olenichak of Water District 01. Additional modifications made in October 2009 are tracked in this font/color in the memo. The primary change was to move the Farmer Friend from Letter L to Letter H in the Figures and Tables. This changes its diversions from Entity IESW022 to IESW020, and eliminates the unknown contributions from Entity 22 diversions to Entity 20 that were diagrammed in the earlier memo. As explained below, I believe no changes are needed to entity boundaries or irrigated-lands data sets.

Figure 1 is a map of the spatial layout of irrigation entities IESW009, IESW020, IESW022, IESW035 and IESW055. Individual canals or companies are assigned to entities based on the place-of-use polygons from water rights and the service-area polygons from IDWR data set "irrigation_companies.shp," obtained during ESPAM1.1. In many places, service areas and place of use overlap. Because of the way the model calculates recharge, each location on the map must correspond to only one irrigation entity. Consequently, I have had to arbitrarily assign some locations to one entity or the other when there is an overlap. I also used point of diversion and canal-location data, but when there was a conflict I relied upon place of use or service area.

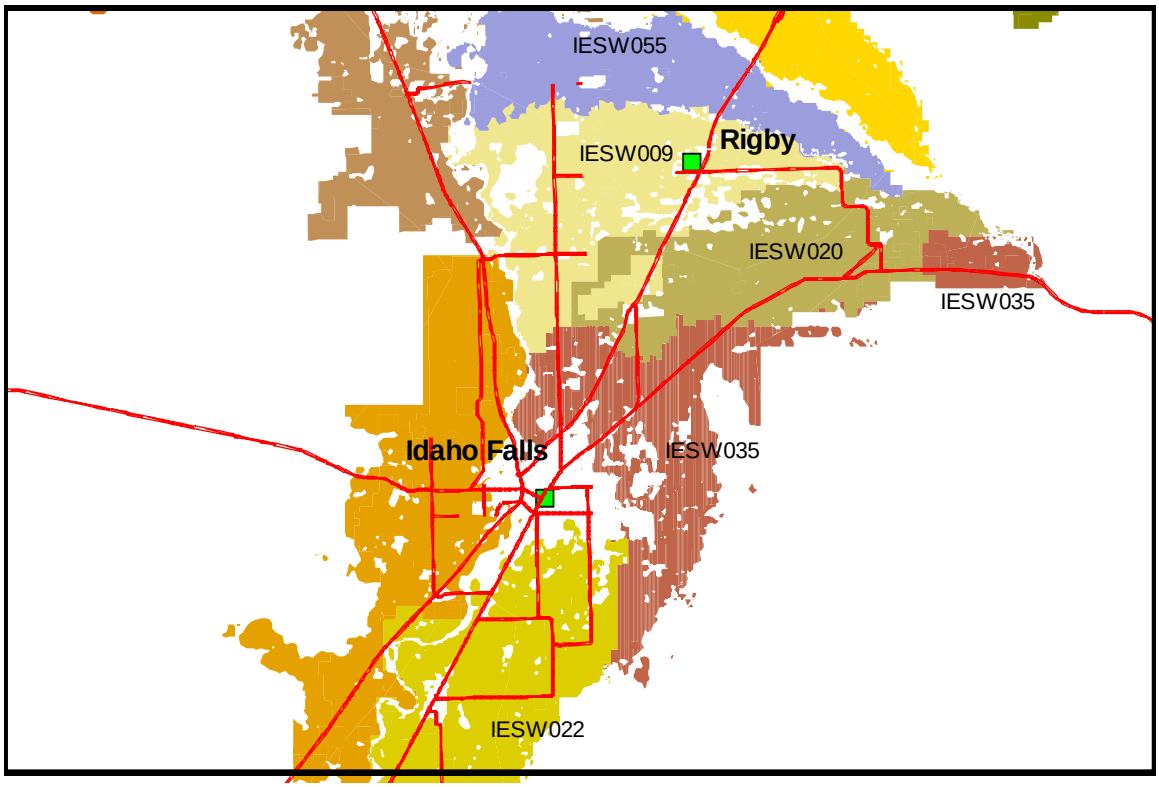

Figure 1. Map of selected irrigation entities, ESPAM2

There is little overlap of IESW055 upon other service areas. There is some overlap between IESW009 and IESW020, as well as between IESW022 and IESW035. There is significant overlap between companies or canals in IESW035 and IESW020.

Figure 2 is a conceptual map of the various data files that represent delivery of water to three of the entities, along with the physical layout of canals and service areas. Table 1 following the figure provides a key to letter labels.

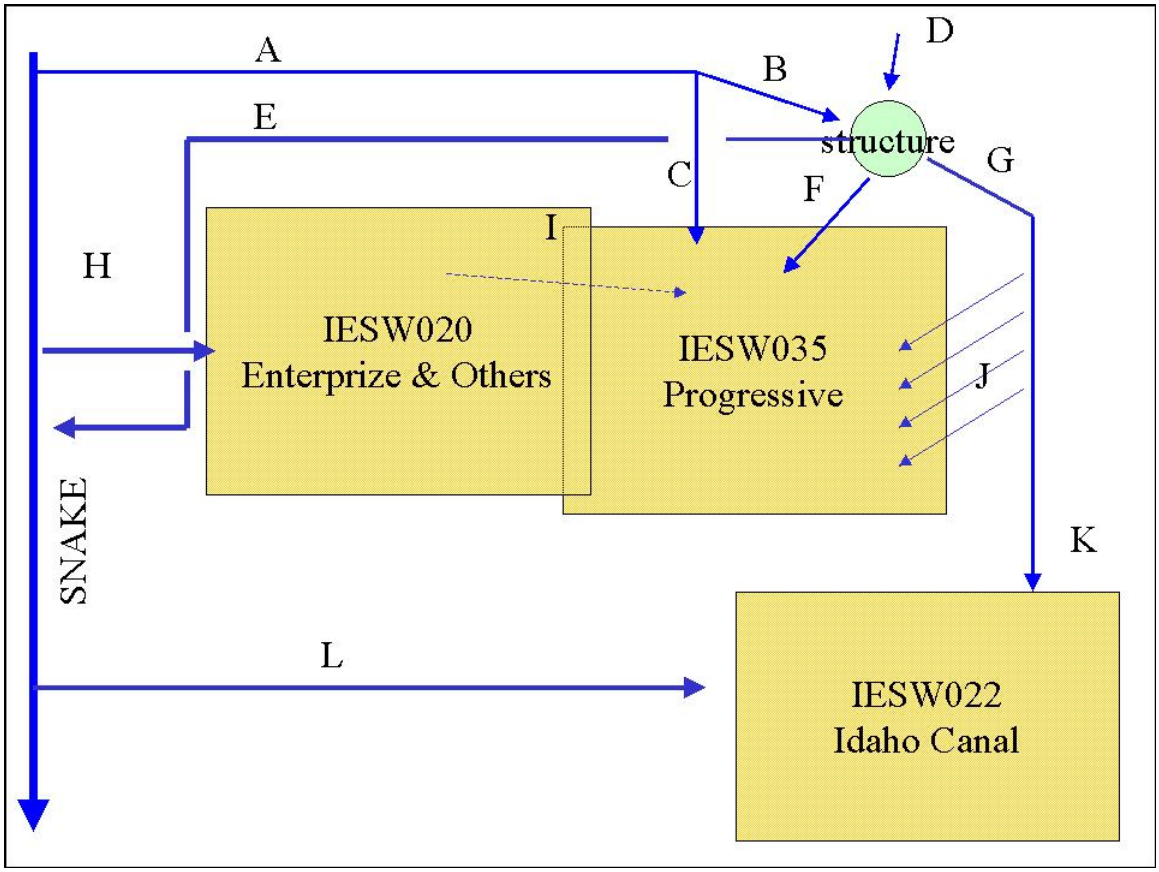

Figure 2. Conceptual map of data files for delivery to IESW020, IESW022 and IESW035.

Table 1
Label Key for Figure 2

Letter	File Number	File Name	Comment
A	130379.75a 130375.05a	Eagle Rock Canal Anderson Canal	Snake River inflow to Progressive
B	130370.77a	Eagle Rock Canal above Willow Creek near Ririe (The Dump)	Eagle Rock Dump. Canal inflow (Snake River water) to Willow Creek/Sand Creek
C	(none)	(none)	Remaining Snake River flow delivered to Progressive service area (part of flow measured as "A" above).
D	130580.00a	Willow Creek near Ririe	Willow Creek inflow to structure. The "histupsnak08" file is missing 2008 data, but this site is available on the USGS website as 13058000 and it has 2008 data.

Letter	File Number	File Name	Comment
E	130585.20a	Willow Creek floodway channel near Ucon	Water delivered to Snake River and not charged as diversions to any water right
F	130585.30a	Willow Creek below floodway near Ucon (USGS name); Progressive Willow Creek (WD01 name)	Willow Creek water delivered to Progressive service area.
G	130585.10a	Sand Creek near Ucon (USGS name); Progressive Sand Creek (WD01 name)	Sand Creek water delivered to Progressive service area, to private rights within progressive, or beyond Progressive to Idaho Canal service area.
H	130379.85a 130380.25a 130380.30a 130380.50a 130380.55a 130380.65a 130380.85a 130380.95a 130380.98a ~~130381.45a~~ 130383.87a 130383.88a 130379.80a	Enterprize Butler Island Ross and Rand Steele Harrison Cheney Rudy (& Boomer) Boomer Kite & Nord ~~Croft pump~~ Nelson Mattson Craig Farmers Friend	IESW020 diversions from Snake River. These should be in the diversions spreadsheet for IESW020. (This list originally included 130381.45a, Croft Pump. An earlier e-mail from Tony Olenichak suggested this should be in IESW055, which we confirmed with the water-right place of use.)
I	(none)	flows from Enterprize into Willow Creek	

Letter	File Number	File Name	Comment
J	(several)	Diversions from Sand Creek to headgates within Progressive service area	Ferguson, Sargent-Summers, Orval Avery etc.
K	130585.15a	Sand Creek Delivery to Idaho Canal	Part of supply to IESW022. Should be included in IESW022 in the diversions spreadsheet.
L	130571.45a 130595.25a 130694.99a	Idaho Snake R. Valley Misc. diversions	These files should also be assigned to IESW022 in the diversions spreadsheet. File 130694.99a (miscellaneous diversions Shelley to Near Blackfoot) is split 50/50 between IESW022 and IESW030 (west of the Snake River, not diagrammed here).
M	130585.49a 130599.99a	Pump diversions, Willow Creek below Ririe Pump diversions, Snake River, Willow Creek to Shelley	These are not included in the figures, but we did add them to IESW035.

The concern in apportioning diversions to irrigation entities is to avoid double counting of water. I propose using "H" above for IESW020, and "K" and "L" for IESW022. For IESW035, I'd like to simplify accounting for the split of the Eagle Rock & Anderson water, and the re-diversion of Sand Creek water at the "J" locations. I propose drawing a conceptual box around entity IESW035 as shown in Figure 3, and accounting for net diversions as shown in Table 2 using only those flows that cross the dashed boundary.

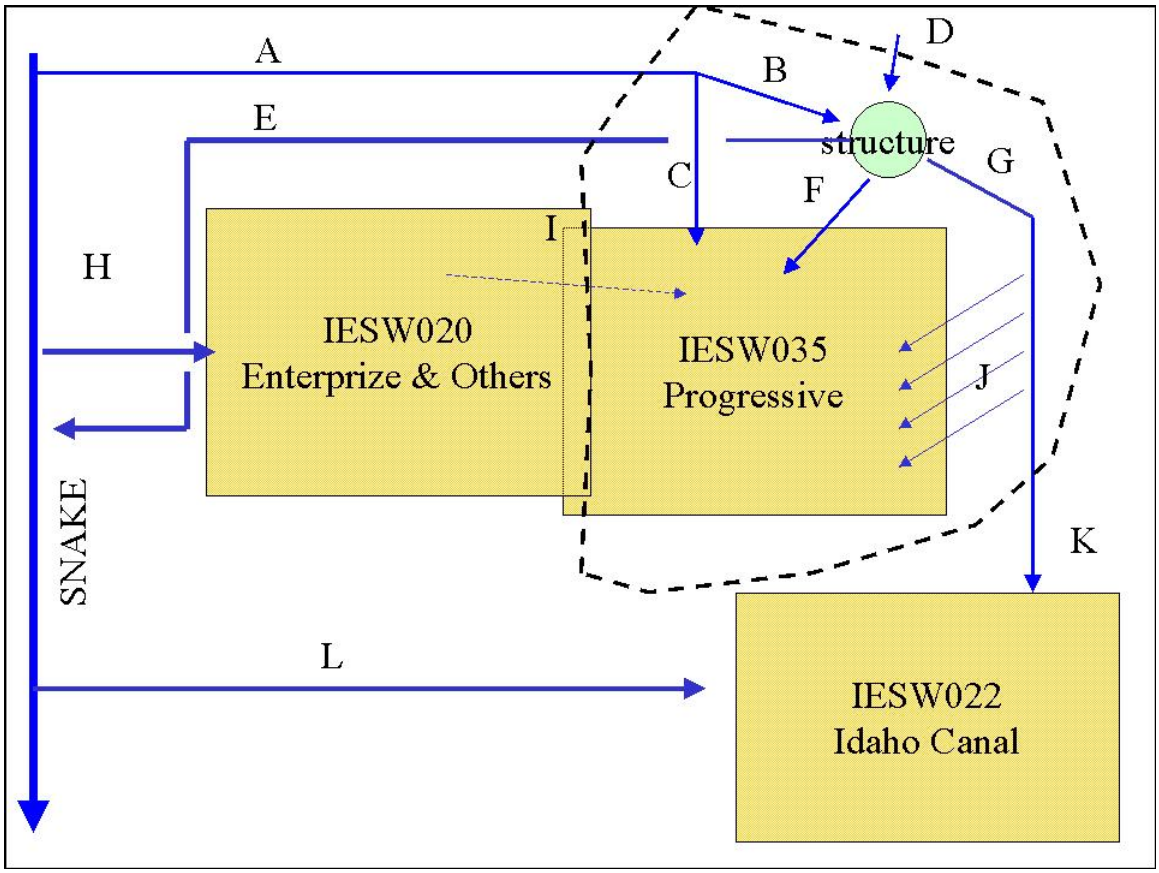

Figure 3. Conceptual "box" (dashed line) for calculating deliveries to IESW035.

Table 2
Calculation of Deliveries to IESW035

Letter	Add or Subtract	Comment
A	Add	Snake River inflows
D	Add	Willow Creek inflows
E	Subtract	Floodway spill back to Snake river
I	Ignore	Assume these deliveries are rediverted either to IESW020 lands or to overlap lands within IESW035. By ignoring them here, they will remain part of calculated diversions to IESW020.
K	Subtract	While this is eventually delivered for irrigation, it is subtracted from IESW035 to avoid double counting (it is part of deliveries to IESW022, as shown in Table 1).
M	Add	Misc. pump diversions not shown in figures.

Changing Farmers Friend to IESW020 raises a concern whether the entity boundaries make sense, since the original mapping of entities and assignment of diversions was based on service areas or places of use. As mentioned above, some service areas overlap and we sometimes had to make arbitrary assignments of lands to one entity or another. Before committing to the change suggested by Olenichak, I reviewed the GIS of service areas, water-right places of use, and entity boundaries for IESW020 and Farmers Friend. This is illustrated in Figure 4.

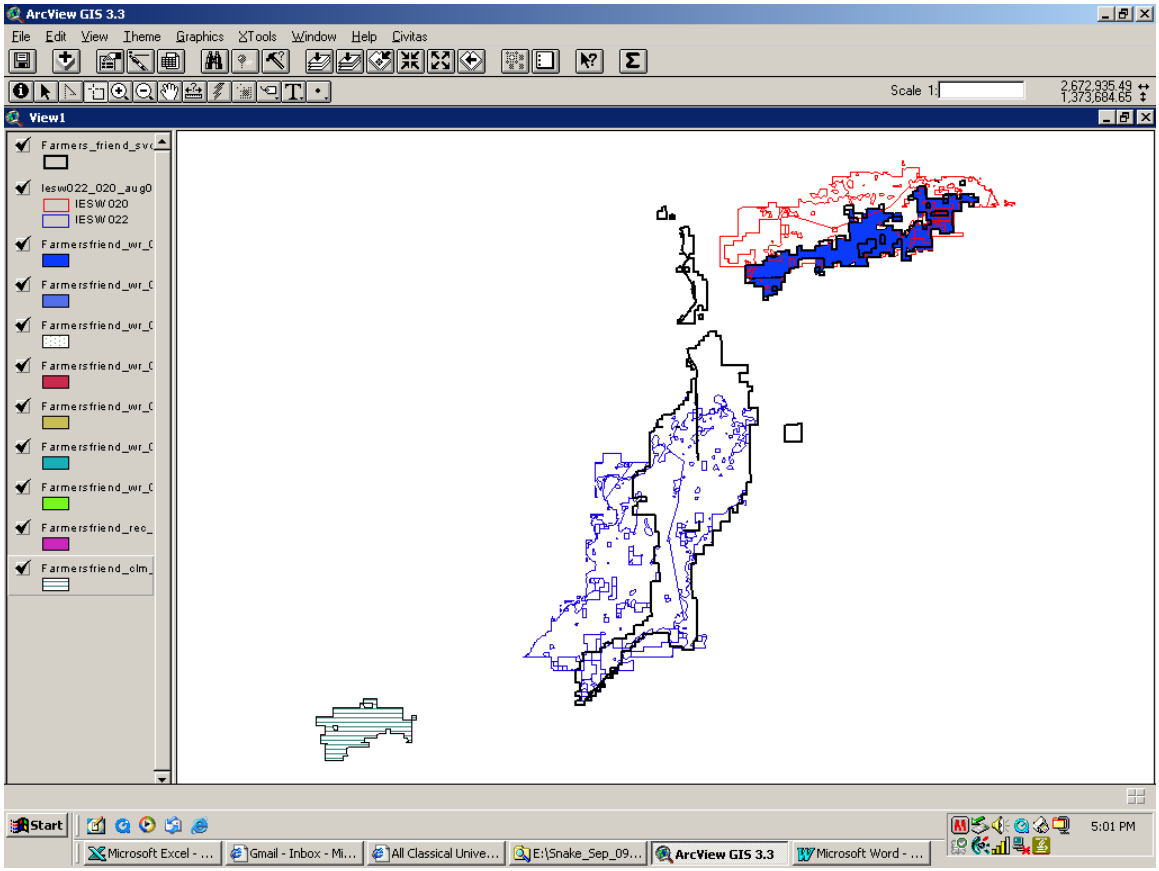

Figure 4. GIS analysis of proposed reassignment of Farmers Friend from IESW022 to IESW020.

The fine red lines represent the borders of ESPAM2 entity IESW020, and the fine blue lines are the borders of IESW022. The heavy black lines represent the service area boundaries of Farmers Friend from "irrigation_companies.shp." Based on these data, we had originally assigned Farmers Friend to IESW022.

The colored polygons are water-right, claim or recommendation places of use for the water rights (or the progeny of water rights) assigned to Farmers Friend diversion 130379.80a in the 1999 Water District 01 diversions book. All but one

of the polygons underlie the dark blue polygon that is near or within IESW020.[1] The green striped polygon is the exception; it is the claimed place of use for water right 01-10091. ~~which appears[2] to be the successor to water right 01-00117AK. Water District 01 book associated 01-00117AK with the Farmers Friend.~~ I had originally associated this water right with Farmers Friend but Shelley Keen of IDWR confirmed that this was an error; the green striped polygon should NOT be considered part of Farmers Friend.

Also note that IDWR periodically updates the "irrigation companies" shapefile. Since the first draft of this memo we've obtained a new download of the data set. The large area shown as Farmers Friend in black in Figure 4, overlapping the blue outline of IESW022, is NOT included in the newest representation of Farmers Friend service area.

~~This change appears to have been due to a transfer. Though the place of use is quite large, the diversion rate of 01-10091 is only 0.099 cfs, so the effect is minor.~~

Based on this analysis, I accepted Tony Olenichak's recommendation to move the Farmers Friend diversions to IESW020, and made no further changes to the Entity GIS data.

In ESPAM2 we completed a significant amount of work similar to this for many entity service areas and diversion assignments. However, I recommend an even more thorough review for ESPAM3. We may wish to consider assigning some funding to Water District 01 so that District personnel can devote additional time and effort to make sure these assignments are correct.

[1] The parts of IESW020 not covered by the dark blue polygon are covered by places of use of other canals in item "H" of Table 1.
[2] I may have erred in this search; I'm not skilled in interpreting the IDWR pedigrees.