

MEMORANDUM

To: ESHMC

From: Stacey Taylor, Idaho Water Resources Research Institute

Date: June 8, 2009

Subject: Tributary underflow for ESPAM 2.0

This memo discusses the changes made to the tributary underflow file (Trib_Underflow_V2_6_3_09.csv) for ESPAM 2.0 and the tributary underflow shapefile (Trib_Underflow_V2.shp).

There are 22 basins treated as tributary underflow to the Eastern Snake River Plain Aquifer. The tributary underflow file for ESPAM 1.1 (Reconstructd_Briggs_Trib.dbf) included values relative to six-month stress periods. For ESPAM 2.0, these values were adjusted to account for the one-month stress periods. All basins (except for the Portneuf River) were adjusted from the six-month stress periods to the one month stress period by dividing the value by the number of days in six months (182.625 days) and then multiplying by the number of days in the corresponding month (i.e. 31 days for January and 30 days for April). Due to changes in the model boundary near the Portneuf River Valley, the values in ESPAM 1.1 needed to be altered for ESPAM 2.0.

According to John Welhan's (2006) report on the lower Portneuf River Valley, a value of 5.4 ± 0.1 billion gal/yr represents underflow from the Mink Creek, Gibson Jack Creek, and City-Cusick Creek watersheds through the Portneuf Gap. It is assumed that recharge from the eastern side of the value is negligible. A value of 5.4×10^9 gal/yr was used as the underflow value for the Portneuf River in the tributary underflow file for ESPAM 2.0.

Slight changes were made to the tributary underflow shapefile as shown in Figure 1 below to insure the line features were inside the ESPAM 2.0 model cells. These changes were made since small changes were introduced to the model boundary. In Figure 1, the blue cells represent ESPAM 2.0 while the white cells are cells that were included in ESPAM 1.1 and no longer included as active cells in ESPAM 2.0. Figure 2 zooms in on the Portneuf area of the model to show where the changes were made between ESPAM 1.1 and ESPAM 2.0. Tributary underflow in ESPAM 1.1 applied to all cells spanned by the black lines and the lines shown in blue are the changes that were made for ESPAM 2.0.

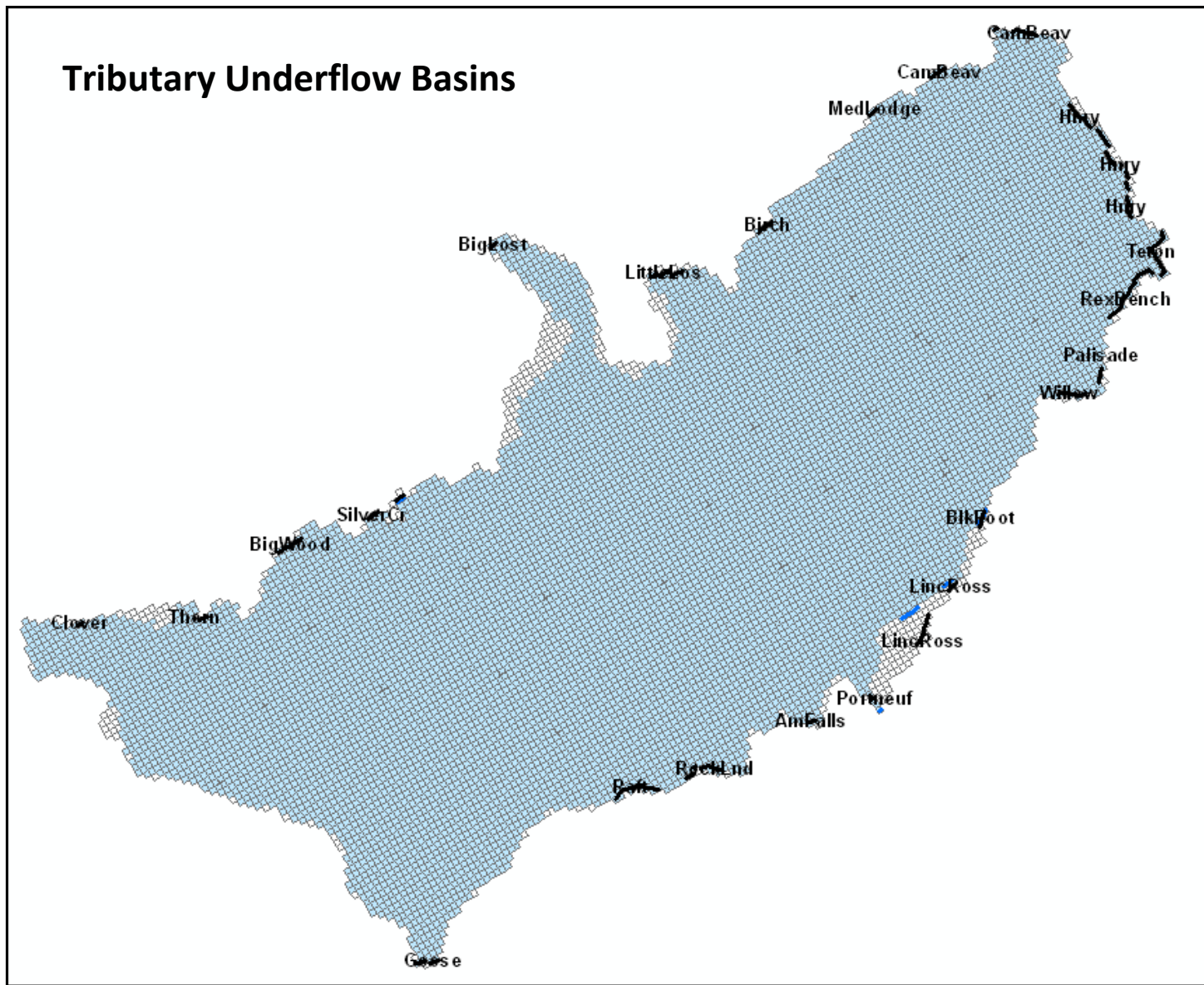


Figure 1. ESPAM 1.1 and ESPAM 2.0 active cells showing the tributary underflow basins.

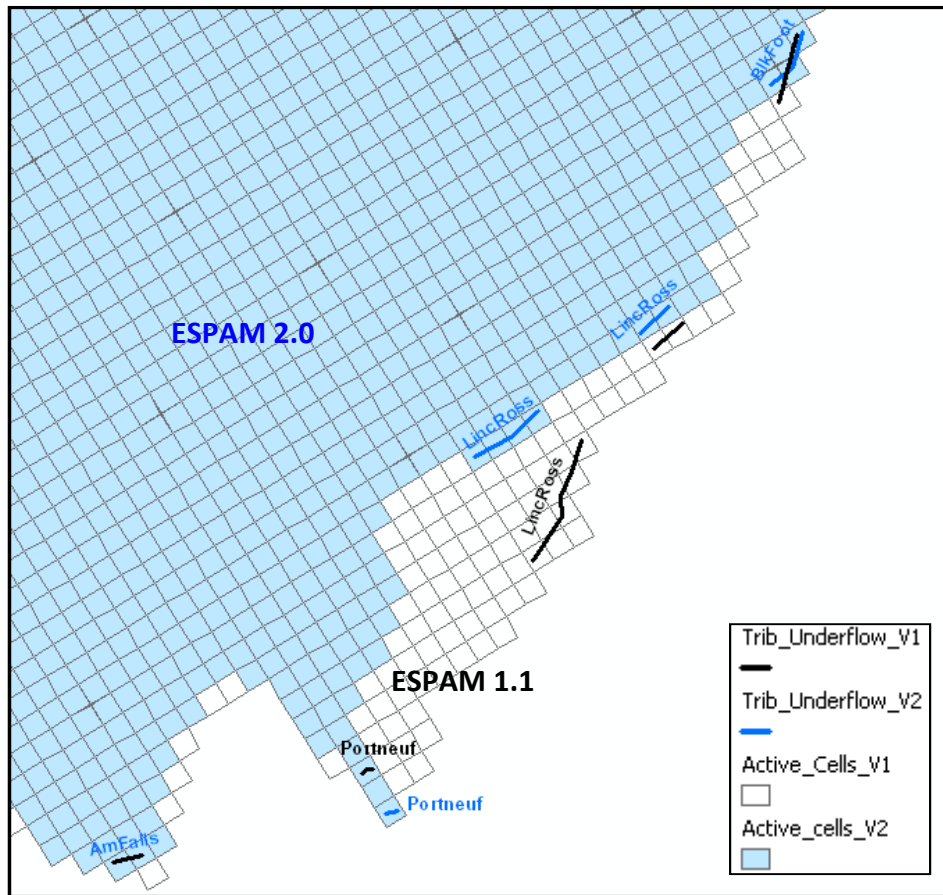


Figure 2. Changes made to the tributary underflow file for ESPAM 2.0.

Reference

Welhan, J., 2006. Water Balance and Pumping Capacity of the Lower Portneuf River Valley Aquifer, Bannock County, Idaho; Idaho Geological Survey Staff Report 06-5.