

MEMORANDUM

To: Eastern Snake Plain Aquifer Model Enhancement Project Technical
Committee
From: Bryce Contor
Date: 9/23/2002
Re: Non-Irrigated Recharge for Minor Land Use Types

This memo is to request input on details of the non-irrigated lands recharge calculations, before we start processing the nearly than 200 GIS grid maps that describe precipitation within the calibration period. Input is specifically invited concerning recharge calculations on the four percent of the study area that is classified as water, wetlands, cities, or dry farms illustrated in the attached map. Non-irrigated recharge on the rest of the study area will be calculated according to the procedures outlined in DDW-015 for lava rock, thin soil, and thick soil.

The spatial extent of the minor classifications is determined by the GIS data set SRBAS91LU, which is based on LANDSAT images (see Design Document DDW-015). Recharge classifications “cities” and “dry farms” are taken directly from the data set. Most of the water classified in SRBAS91LU represents lakes and reservoirs, although some wider areas of the Snake River are represented as water” Other streams and rivers were too small to appear in the satellite image and were not classified. The lands identified as water, forested wetlands and non-forested wetlands were combined into one category. This combined category was then divided into recharge classification “water and wetlands,” which are those areas for which recharge is calculated as part of the non-irrigated lands process, and classification “excluded water and wetlands,” for which recharge is calculated elsewhere in the water budget.

The “excluded water and wetlands” classification includes water surfaces associated with the Snake River and its reservoirs, which will have their recharge incorporated into the reach gains and losses calculations. It also includes reservoirs and regulating ponds associated with canals, whose recharge will be included in canal leakage or irrigated lands recharge calculations. Lake Murtaugh and the portion of the Twin Falls Southside canal that crosses the study area will be represented directly as “other recharge,” to be described in Design Document DDW-019. The final category of lands within the “excluded water and wetlands” classification includes wetlands along the lower Snake River within the incised canyon, which do not impact the regional aquifer.

The areal extent of these different recharge classifications and the recharge rates used are summarized in Table 1.

Table 1. Recharge Classifications

Classification	Acres	Percent of Study Area	Recharge Rate
Dry Farm	95,000	1.3 %	zero
Excluded Water and Wetlands	80,000	1.1 %	zero
Water and Wetlands	65,000	0.9 %	Precipitation minus three feet/year
Cities and Industrial Areas	48,000	0.7 %	Negative 1.2 feet/year

The recharge rate for dry farms is based on the assumption that dry farming is only possible where deep soils allow capture of virtually all precipitation, and that dry farms are managed to maximize this capture. Excluded water and wetlands are calculated at a rate of zero because their recharge is applied in other parts of the model.

The rate for water and wetlands is based the assumption that wetlands are interconnected with the aquifer and their evapotranspiration represents an aquifer withdrawal. This is supported by the observation that wetlands only appear in classification SRBAS91LU where shallow or perched aquifers are believed to exist. Precipitation is added back in as a recharge assuming it will offset aquifer extraction. The extraction rate was based upon evapotranspiration estimates reported by S.A. Goodell in Water Use on the Snake River Plain, Idaho and Eastern Oregon, USGS Professional Paper 1408-E, 1988. She reported 24 to 28 inches annually for greasewood, rabbit brush, and saltgrass wetlands, 36 to 50 inches per year for willow and cottonwood wetlands, and 37 inches per year for a shallow water body (Mud Lake). The value of three feet per year is selected to represent this range.

The rate for cities and industrial areas was obtained by dividing Goodell's total ground water pumping for cities and industry in the counties on the eastern plain by the acres represented as urban or industrial in dataset SRBAS91LU. The average rate was rounded down to 1.2 feet of extraction to compensate for some recharge from precipitation. This rate was very close to the current extraction rate for Pocatello (1.3 feet), though less than the current rate for Idaho Falls (2.2 feet), according to data provided by Carroll Aamold, city water engineer for Idaho Falls. Since Idaho Falls is one of the larger cities in the study area and Mr. Aamold indicated that larger cities usually have higher use rates, no adjustment was made to the rate obtained using the USGS data. This calculation assumes that treated effluent is discharged to the river or evaporated in ponds, which Mr. Aamold confirmed is true for all the large towns within the study area.

Please return any input, comments or suggestions by October 7, 2002. You may direct comments to:

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Please e-mail if you would like to receive a copy of a GIS shapefile to better explore the classification map.

Recharge Classifications

