

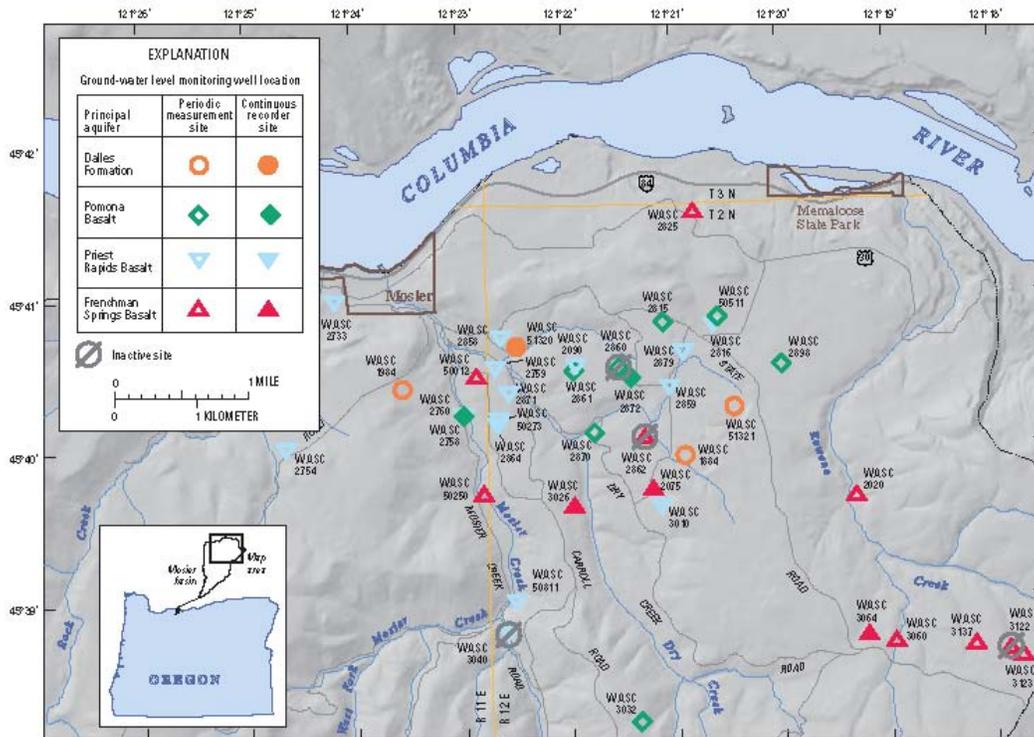
Mosier Ground-Water Project Update

Mosier Watershed Council Meeting, September 14, 2006

Ground-Water Level Monitoring

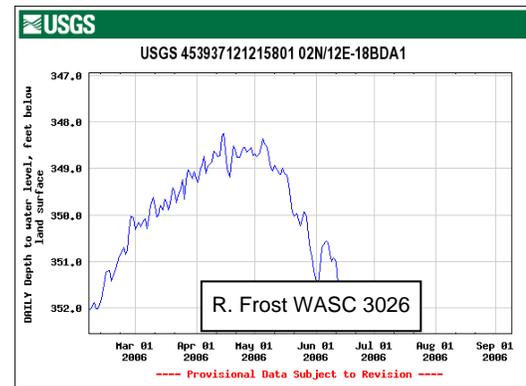
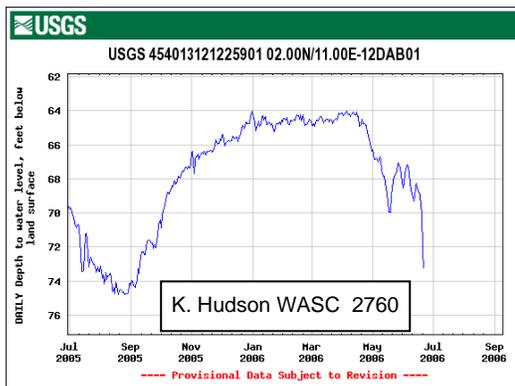
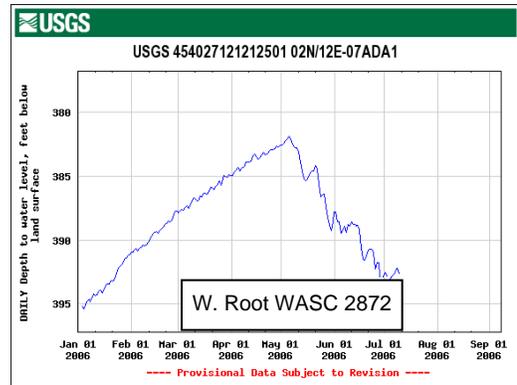
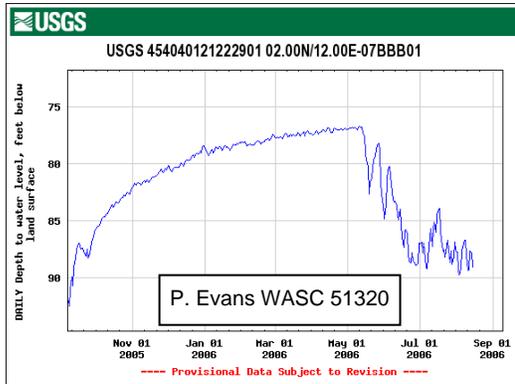
Goal: Monitor water levels in wells to evaluate changes over times scales ranging from hours to decades. These measurements will help understand the effects of climate, development and other factors on the ground-water resource.

Progress: Ground-water level data are now available from the project web page (http://or.water.usgs.gov/projs_dir/mosier/index.html). The entire water level history of each of the 35 wells in the network is accessible by a clickable map (see figure 1 below) or table.



1. --Map of monitoring well locations.

Conditions: Water levels have declined 4-10 feet since irrigation pumping began in late April to early May. The hydrographs below show data from 4 of the 7 continuous recorder sites in the basin.



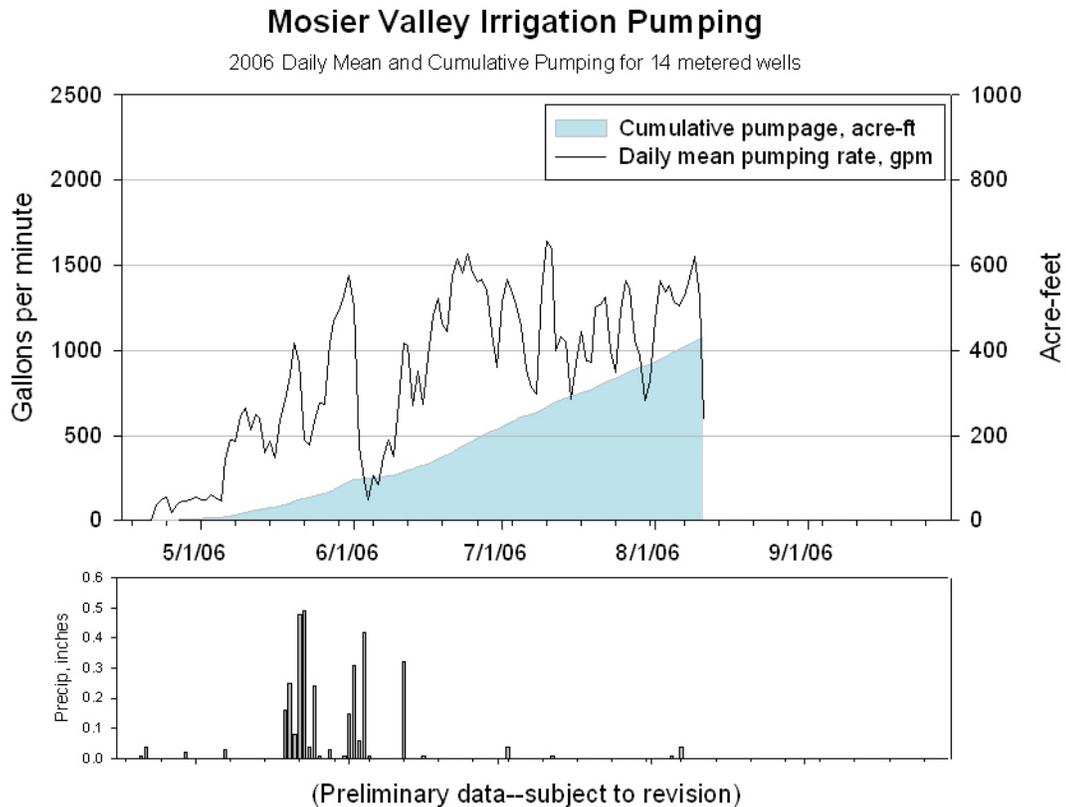
Estimate Ground-Water Pumping

Goals: Measure and/or estimate ground-water withdrawals for irrigation in the 2006 growing season.

Progress: Twelve continuous recording flow meters were installed to monitor irrigation water use this year. Two other wells have standard meters installed by owners. The 14 metered wells irrigate an estimated 750 acres, or about 87% of the orchard land in the basin. The flow meters were installed in early April and read or downloaded every 2-4 weeks. They will be read one last time and removed at the end of September. Current plans are to monitor irrigation again next season. Monthly summaries of pumping for individual wells have been provided to growers and the cumulative pumping for all 14 wells has been placed on the project web page (see figure 2 below).

The total pumping rate for the 14 wells averaged about 1,200 gpm between mid-June and mid-August with peaks of over 1,500 gpm. The cumulative volume of water pumped from these wells was about 420 acre-ft by mid-August. We are working to refine our estimates of the number acres irrigated by each well, but

assuming 750 acres are irrigated by the 14 metered wells, an average of less than 7 inches of water had been applied by mid-August.



2.-- Pumping summary for the 14 wells monitored with flow meters.

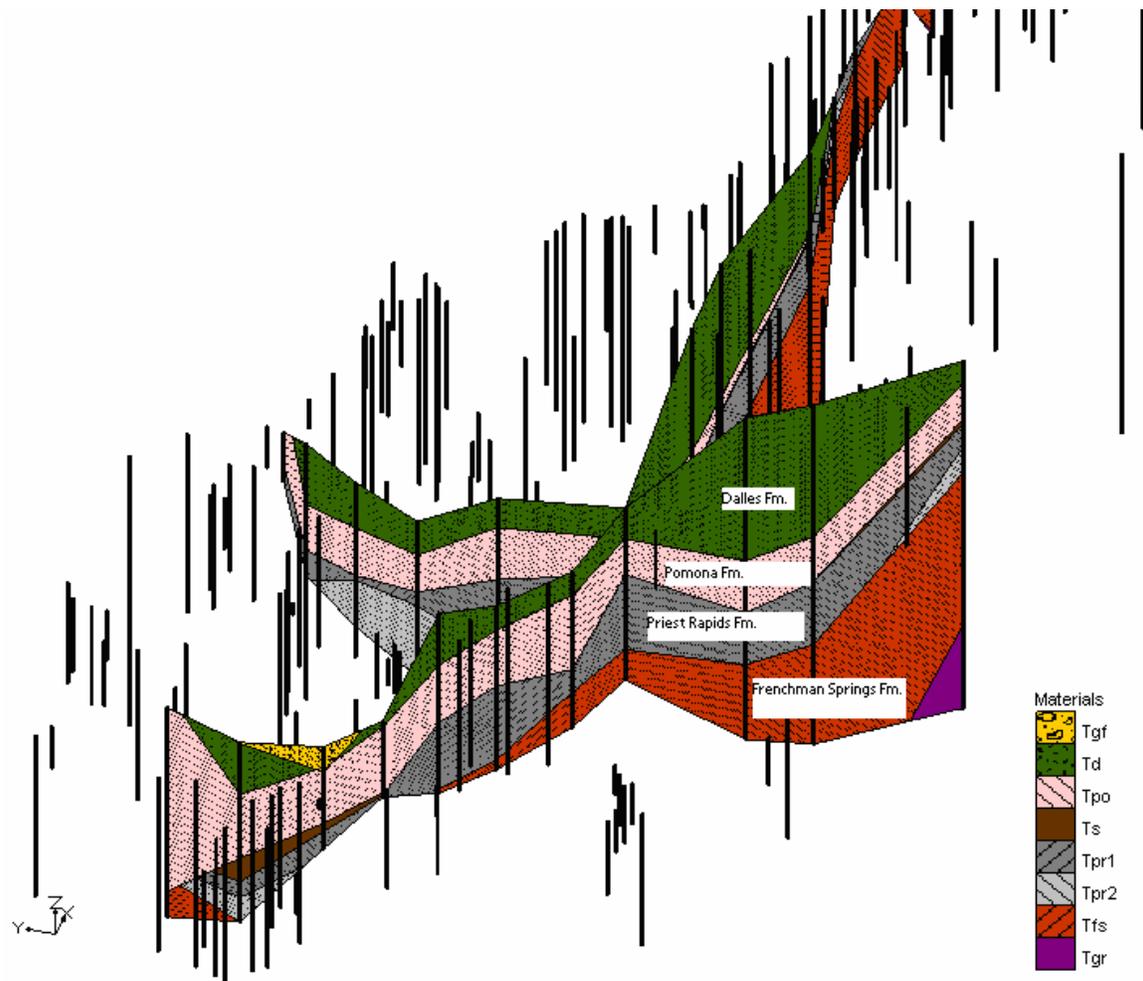
Plans: We will be interviewing growers in October to get good data on the orchards irrigated by each well. The data would include: acres, tree age, spacing, sprinkler type for each block. Someone will be calling to arrange a time to meet with growers.

Geologic Framework

Goal: Construct a three-dimensional geologic representation of the aquifer system in the Mosier Valley. The representation will be constructed by mapping the extent, thickness and properties of the basalt aquifers and other geologic units. This framework will be put into the ground-water simulation model.

Progress: Geologic data for 273 wells has been compiled and put into a GIS data format. The data for each well includes the elevation of the tops of each aquifer and confining unit (aquitard). We are now preparing 2-dimensional cross-sections that will be used to construct the 3-dimensional representation that goes into the ground-water model. Figure

3 below shows two sections through the study area along with some of the locations wells where data have been compiled.



3.--Preliminary geologic sections in the Mosier basin.

Plans: We plan to add more wells to the geologic database in areas where information is lacking. For each well we will use the driller's report to identify the elevation of interflows, interbeds, fracture zones at each well. Additional sections will be constructed and finally a fully 3-D geologic model will be prepared.

Well logging

Goals: 1) Collect information on geology and water-bearing properties of aquifers, 2) measure leakage through boreholes of comingling wells.

Progress: We attempted to run geophysical logs on the new City well, however, due to problems keeping the borehole open, the driller was unable to allow us access.

Plans: Geophysical logs will be run on the old City well prior to repairs scheduled for November. This will give us quantitative information on the rate of leakage between

aquifers through the borehole. We are also attempting to get permission to log another deep well in the lower part of the valley this fall.

Surface Water Monitoring

Goals: Compare flows of Mosier Creek to 1963-81 period, including low flows, annual flows, flow recession characteristics, response to climate, comparison with other basins. Assess ground water entering or surface water leaving creek (seepage).

Progress: 1) Continue streamflow and temperature monitoring. Low flows in 2006 were about 25% greater in 2006 compared to 2005. 2) Seepage measurements: Completed two seepage measurements in 2006 (May and August). These measurements, in conjunction with measurements made in 2005 and in previous study provide indications of gains and losses. Stream temperature and conductance data collected in 2005-2006 provide further indication of gaining and losing reaches of the stream. 3) Analysis of historic low flow data is continuing, and will be using water-use data to help understand trends in low flows.

Plans: Prepare streamflow and stream temperature data for publication. Continue analysis of historic trends in low flows.

Surface Water Modeling

Goals: Use surface water model to estimate recharge to ground water system. The model uses daily precipitation and maximum/minimum air temperature. These inputs are distributed over the entire basin. Flow is routed to the stream depending on characteristics of the topography, soils, geology, and vegetation. The goal is to balance a budget of the inputs (rain/snow) and the outputs (streamflow, evaporation, and ground-water recharge) at the gage location. Of the outputs, the recharge part will be used as input to the ground-water flow model.

Progress: We are working on verification of the climate data based on long-term climate sites in Hood River, Parkdale, The Dalles, and Dufur for 1953-2005, and other shorter-term data available at several locations in and outside the Mosier basin.

Plans: Begin model calibration on the historic (and current) streamflow record, using part of the record for calibration, and part for model verification. Expand model basin to include area between the gage and mouth of Mosier Creek.

Other Plans

- Analyze data and prepare a presentation for the December Watershed Council meeting. All work to date will be presented with preliminary findings.