Questions?
Dave Morgan
U.S. Geological Survey
10615 SE Cherry Blossom Dr.
Portland, OR 97216
503.251.3263
dsmorgan@usgs.gov

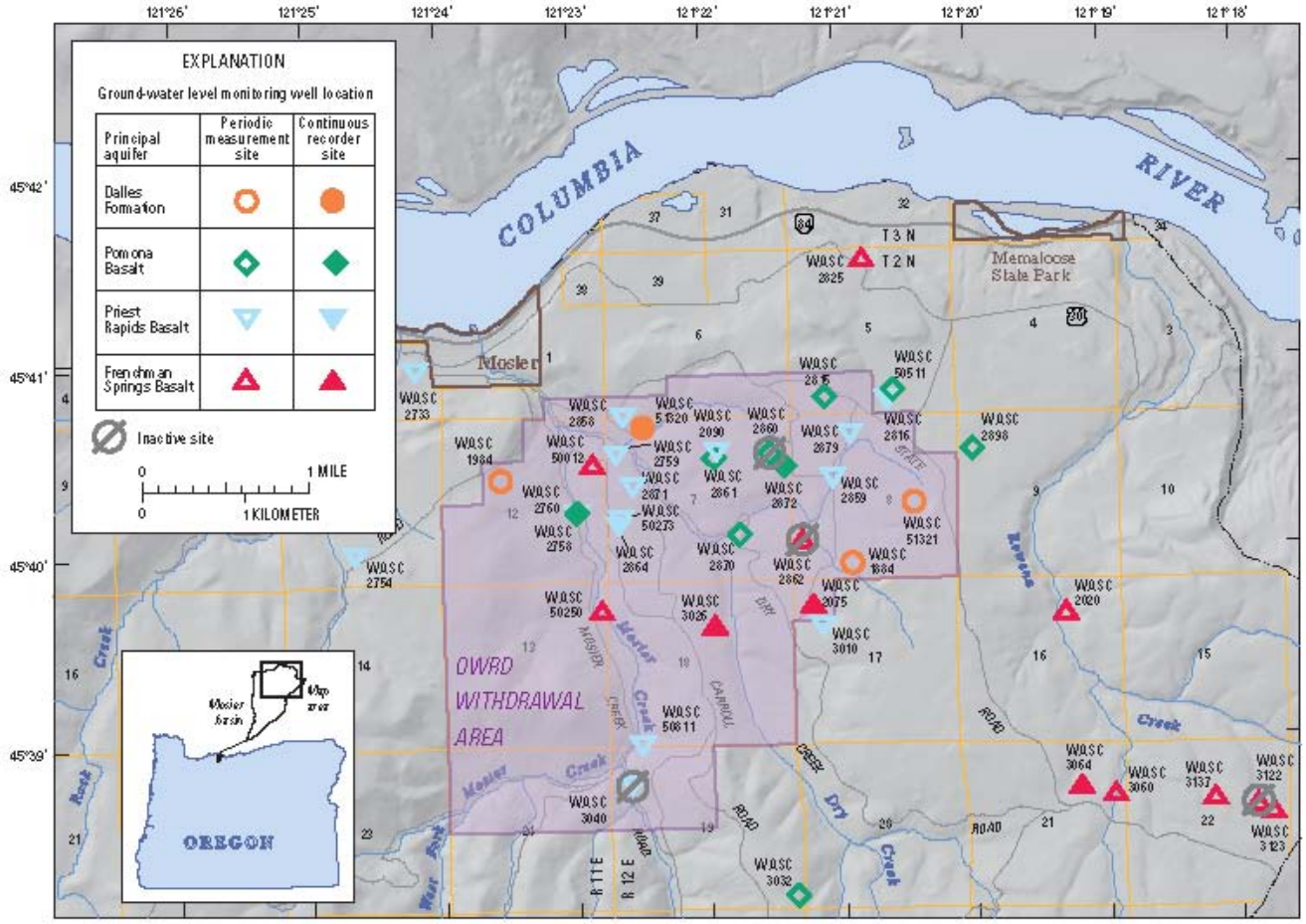
Mosier Ground-Water Project Update

Mosier Watershed Council Meeting, March 8, 2007

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 available from the project web page (http://or.water.usgs.gov/projs_dir/mosier/index.html). The entire water level history for each of the 35 wells in the network is accessible using the map interface (see figure 1 below) or table.



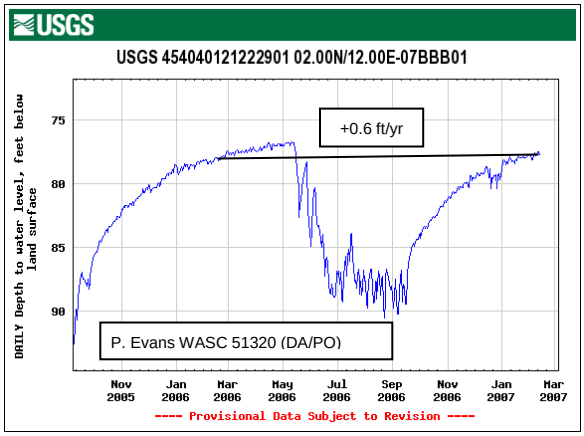
1. --Map of monitoring well locations.

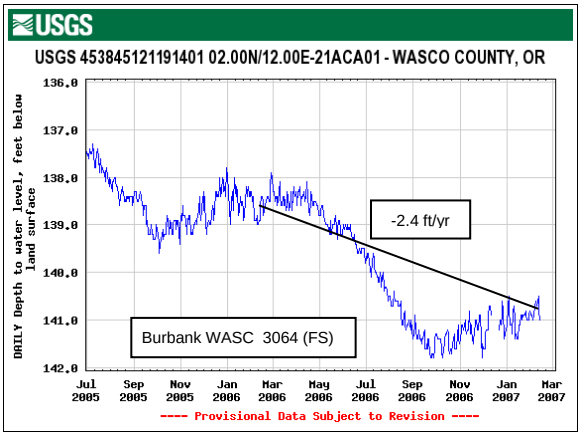
Conditions:

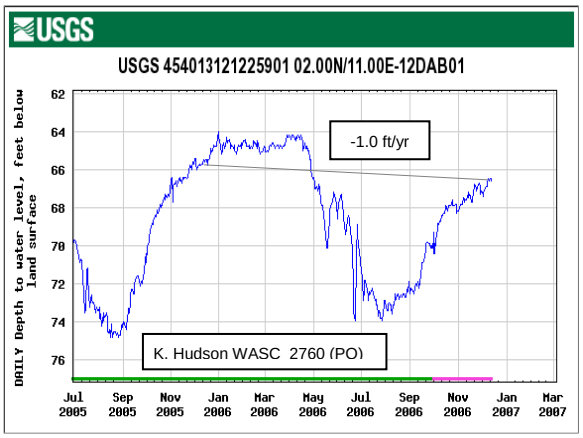
The four hydrographs below show the water level record from wells where we have installed continuous monitors. We have over one year of record now and have seen the effects of one complete irrigation season. Seasonal drawdown in the Pomona and Dalles in 2006 was about 10 feet (WASC 51320, WASC 2760). Mid-February levels are very close to February 2006 levels in these wells.

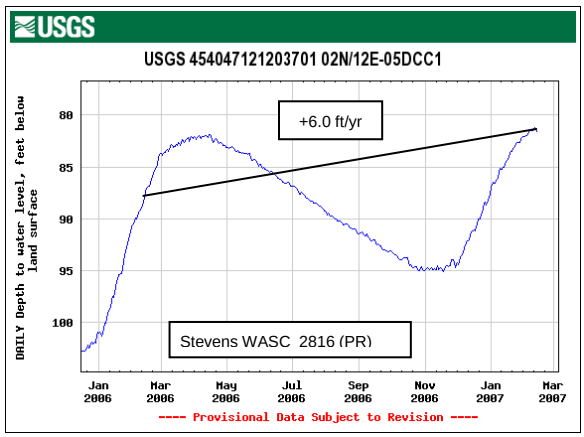
A Frenchman Springs well on Sevenmile Hill (WASC 3064) has declined 2.4 ft since February 2006. This well declined an average of 0.6 ft/yr from 1986-2004, but has averaged 2.3 ft/yr since 2004. It not clear at this point if the declines are due primarily to local pumping by domestic wells or irrigation pumping.

WASC 2816 pumps from the Priest Rapids aquifer and showed a 6 ft *increase* in water level over the last 12 months. This well is separated from the main aquifer by a fault and responds primarily to local pumping and recharge. We observed that this well was not heavily used in 2006.



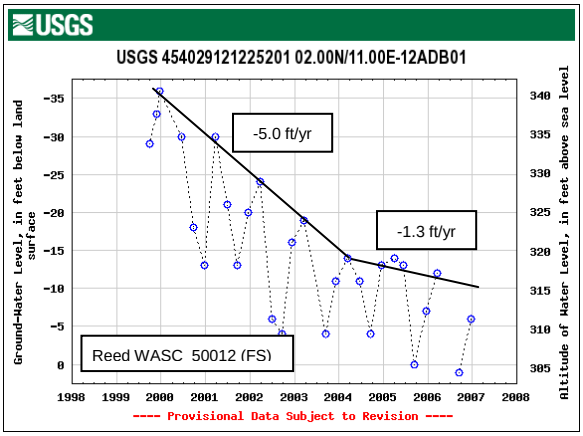


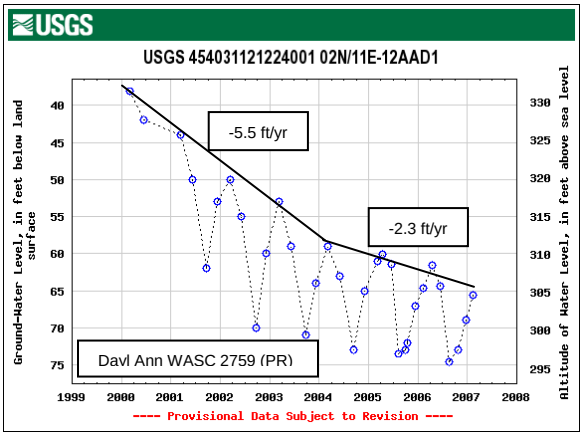




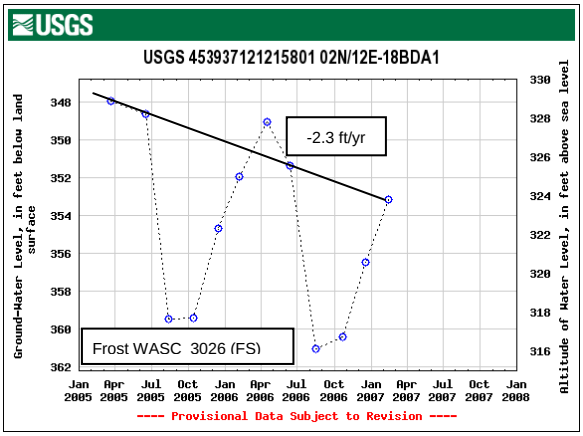
Conditions (con't):

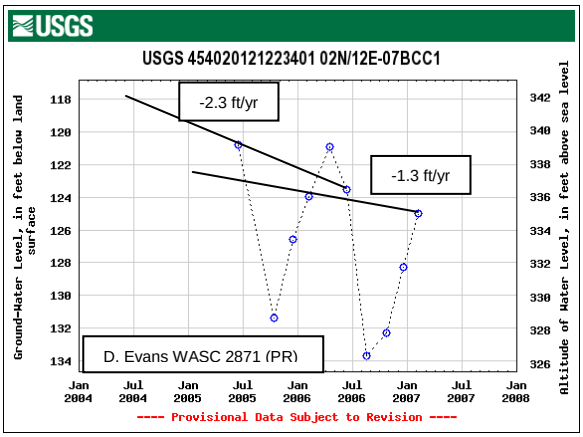
There has been a decrease in the rate of water level decline in at least two monitoring wells within the Withdrawal Area. Long-term monitoring wells WASC 50012 and 2759 were declining at about 5 ft/yr from 2000-2003. Water level monitoring since 2004 shows that the rate of decline has slowed to 1.3 to 2.3 ft/yr. The reduced rate of decline could be due to: reduced pumping, increased recharge, or reduced ground-water discharge to streams and springs.



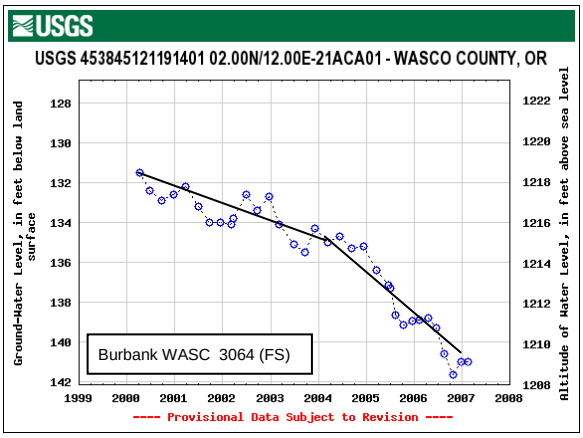


Wells with shorter records also show rates of decline in the range of 1.3-2.3 ft/yr.





Long term monitoring of a Frenchman Springs well on Sevenmile Hill shows that the rate of decline has increased in the last 3 years.



Well logging

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

Progress: We ran logs on the 620 ft well formerly owned by Don Evans on February 7-8. Unfortunately the well was blocked by fallen rock at 385 ft. We were able to obtain good information on the geology to 385 ft, but were not able to measure borehole flow to evaluate commingling. We have been working on plans to test Mosier's well #3 which is being repaired next week. The contractor has removed the pump and liner and we will run flow meter and other tests on March 12-13.

Other Tasks

- Mapping of aquifer thickness and extent is nearly complete.
- The watershed model being used to estimate recharge to the aquifers has been calibrated for the drainage area above the gauge and will now be used to estimate recharge for the entire project area (Mosier Creek+Rock Creek+Rowena Creek drainages).
- Several growers have been interviewed to obtain information needed to estimate past water use. The time each orchard came under irrigation has been estimated form interviews and water right information. The preliminary map is available for comment.
- Flow meters will be re-installed on the same wells to monitor 2007 irrigation pumping. Jennifer will be collecting the data and sending to USGS. Dave will help install meters and train Jennifer in mid-April.
- Ground-water model construction is underway. Model calibration will begin in the next few weeks and the model will be ready to use for predicting the effects of alternative water management scenarios by December. Much will be learned about the system during the calibration process.

Ground-Water Model Scenario Simulations

Models can be powerful tools because they allow decision makers to see the likely effects of potential resource management alternatives. Although the forecasts of future conditions that are based on model simulations are imprecise, the nevertheless may represent the best available decision-making information at a given time.

Before the ground-water model can be used to predict future conditions, it has to be "calibrated". Calibration is a procedure where we use the model to simulate past conditions and compare the simulated conditions with measured conditions—such as water levels or stream flow. If the simulated conditions don't match the measured conditions (within tolerances), we adjust/modify the model until the match meets tolerances. The Mosier model will be calibrated by simulating the period from about 1960-2007.

We encourage the Council and other stakeholders to begin the process of defining scenarios to be tested with the model. Once the scenarios are defined, we will prepare input files for the model, run the simulations, process and interpret the results, and prepare maps and other graphics that summarize the results. We will present the results at meetings and some of the results will be written up in the report. Because there are limited project resources, care should be prioritizing scenarios. To provide some ideas on the type of scenarios the model should be capable of simulating, we have compiled a few examples below. For each scenario we have listed the types of information that we will need to prepare the input files for the model.

Scenario	Data needed (from stakeholders group)
A. Continued pumping at 2006 rates.	None
B. Reduced pumping through conservation.	Location and amount of pumping reduction. Which wells? How much? When?
C. Reduced pumping by regulation.	Location and amount of pumping reduction. Which wells? How much? When?
D. Reduced effect of commingling wells	Location of wells repaired. When?
E. Increased municipal pumping	Location and amount of increase. How much? When?
F. Increased irrigation pumping	Location and amount of increase. How much? When?
G. Increased "exempt" pumping from housing development	Location and amount of increase. How much? When?
H. Increase recharge by Aquifer Storage and Recovery (ASR)	Location and amount of recharge.
I. Effects of prolonged drought (added to any of above)	Magnitude, frequency, and duration of droughts.