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Mosier Ground-Water Project Update

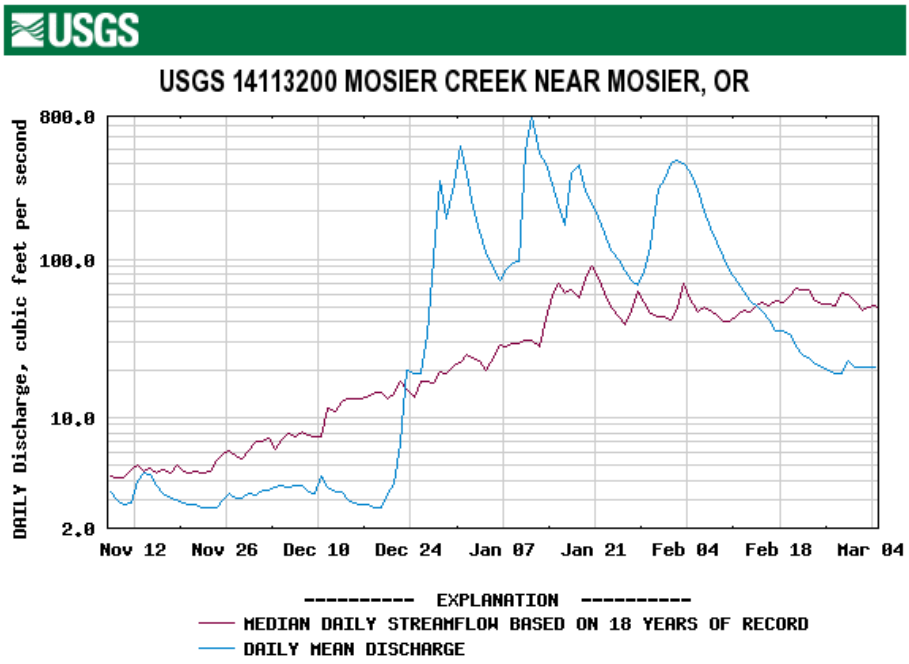
Mosier Watershed Council Meeting, March 9, 2006

Stream Flow Monitoring

Goals: (1) Monitor flow at Mosier Creek gaging station to evaluate how flows have changed since 1963-81 period when gage was last in operation. (2) Measure flows at other sites on Mosier Creek to determine where ground-water enters or surface-water leaves the creek. Evaluate seasonal and long-term changes since 1962 and 1986 when last measurements were made.

Progress: the gage operated continuously through the last 3 months. Several storm events from late December through early February resulted in peak flows over 300 cfs. Gaging records for the 2005 water year were reviewed and prepared for publication in the USGS Annual Data Report.

Plans: We will make the next set of stream gain-loss measurements in late April or early May. The goal is to have stable flow conditions prior to the irrigation season if possible.



Well logging

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

Progress: Video log run on Stevens well where we installed a water level recorder in December.

Plans: We are coordinating with the City engineer (John Grimm) and geologist Mark Yinger to run logs on the new and old City wells this spring. Construction of the new well is scheduled to begin as soon as conditions are dry enough for the drill rig to move into the site.

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:

- We installed 2 additional recorders (Stevens and Frost). There are a total of six recorders now operating.
- We field located another 5 wells to fill in gaps in the network.
- 27 wells measured bimonthly (February). 4 additional wells measured quarterly by OWRD.
- All historic water level data is being compiled for wells that have been measured at various times over the past 40 years.
- Long-term water levels trends (refer to handout):
    - Pomona wells (2872 and 2861). Levels reached lowest point in 1993-95, then recovered 50-60 feet. Declines began again in 1998-99 and present water levels are 5-10 feet below 1993-95 levels. Total decline since 1960s is now 200+ feet at Francois well.
    - Priest Rapids wells (2759, 2815, and 3010). Orchard Tract wells have declined at steady rate of 4.0-4.5 ft/year since pumping began in mid-1970's. Total decline since 1975 is now 130 feet at Dayl Ann well. Outside Orchard Tract withdrawal area water levels appear to be controlled by climate (Morgan well).
    - Frenchman Springs wells (2020, 50012). Orchard Tract wells have declined at mean rate of 4-5 ft/year since 1996, although rate at Reed well may be tapering off. Outside Orchard Tract water levels appear to be controlled by climate (Dancer well).
- Short-term water level trends (handout)
    - Dalles Formation wells (51320): Level has recovered about 15 feet since monitoring started in September. Pumping declines in the Pomona may be causing declines in the lower part of the Dalles. Stay tuned…
    - Pomona (Hudson): Declines peaked in late August; rapid recovery through October, then more gradual.
    - Priest Rapids (3064, 2816): Short record from 2816 in Orchard Tract shows 13 feet of recovery since mid-December. On Seven-Mile Hill well 3064 shows only small variation—probably due to climate.
    - Frenchman Springs wells (2075):Seasonal variation at 2075 is 12-15 feet. Not enough data to determine long-term rate of decline.

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Plans: Continue bi-monthly measurements (April, June) and operation of 6 recorder sites. The spring synoptic measurement will be postponed until spring 2007. We are currently monitoring about 35 wells (including OWRD wells). This represents the majority of available wells and may be adequate to construct the water levels maps needed for the project. We will evaluate this over the summer and make a decision on the need for synoptic measurements.

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: We have begun constructing preliminary geologic cross-sections.

Plans: Analyze well logs. Identify the elevation of interflows, interbeds, fracture zones at each well. Code information into geologic data base and use to construct maps.

Estimate Ground-Water Pumping

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

Progress: Discussion with growers at December Council meeting have led us to modify the original approach. With the variety of pumps, variable frequency drives, cycle-stop valves, and application methods in use, the most accurate way to determine current ground-water use in the valley is to meter as many wells as possible.

|We visited most of the irrigation wells in the valley Feb. 21-23 and met with growers to get information on the wells and permission to monitor pumping. There are currently 4 wells with meters that irrigate about 240 acres. We plan to install meters on another 8-10 wells that irrigate about 500-600 acres. The Wasco County SWCD has agreed to help fund the purchase of meters so that we can use this approach.

Plans:. We will begin installation of meters at the end of March. The equipment we plan to use will digitally record the well pumping rate (see illustration below). We will visit the wells periodically and download the data to computer. We will provide the data to each grower throughout the season

1. Seametrics turbine-style flow meter with logger and computer.

Watershed Modeling

Goal: A model is being constructed for the Mosier Creek watershed that simulates processes including precipitation, snow accumulation and melt, interception, runoff, evaporation, transpiration, and infiltration. The model will be used primarily to estimate the fraction of precipitation that is available to recharge the ground-water system.

Progress: The model requires long-term climate data from as many nearby weather stations as possible. We have obtained data for four stations (Hood River, Parkdale, The Dalles, and Dufur) for the period 1953 to present. The model needs a complete record for each site so we have been working on estimating missing periods of record.

Plans: Continue to prepare data for the watershed model. Data need include climate, soils, geology, vegetation, elevation, slope and aspect.