Ground Water Investigation Program

Bitterroot Valley

Presented by
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Bitterroot Valley, Hamilton to Florence: wells in 1900
Bitterroot Valley, Hamilton to Florence: wells in 1950
Bitterroot Valley, Hamilton to Florence: wells in 2012
Florence Area

Data Collection
- Groundwater and surface water elevations
- Surface water flows
- Ditch loss
- Water Chemistry
Eightmile Drainage

1954

2009
Eightmile Creek Drainage
Threemile Creek Drainage
Water Budget Components

Consumptive use (acre-feet)
(all diversions, precipitation subtracted from monthly estimates)

Eightmile Creek
- Pivot: 145
- Flood: 75
- Sprinkler: 600
- Domestic: 890

Threemile Creek
- Pivot: 190
- Flood: 4470
- Sprinkler: 4640
- Domestic: 1190

Pivot: 8%
Flood: 4%
Sprinkler: 35%
Domestic: 53%

Pivot: 2%
Flood: 42%
Sprinkler: 44%
Domestic: 12%
Eightmile versus Threemile hydrogeology

Aquifer properties

Eightmile Creek: Lower yield wells – more drawdown
BUT
Limited well interference
Stream depletion more localized, BUT
Creek may be disconnected part of the year

Threemile: Depletion of more than one stream possible
Less likely to extend SD outside immediate area

Land use

Eightmile Creek: Transition from agriculture to domestic
Limited recharge from canals, less from irrigation

Threemile: Canal loss and irrigation return flow important
Pumping Scenarios in Eightmile Creek
Eightmile Creek Depletion

Depletion Rate (gpm)

1,000 feet from stream

600 gpd all year
10 gpm for 8 hours/day, 90 days per year

Hydraulic Conductivity = 10 feet per day
Eightmile Creek Depletion

Depletion Rate (gpm)

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Hydraulic Conductivity = 10 feet per day

2,640 feet from stream
Pumping Scenarios in Threemile Creek
Depletion Rate (gpm)

**1,000 feet from stream**
- 600 gpd all year
- 10 gpm for 8 hours/day, 90 days per year

**2,640 feet from stream**
- Hydraulic Conductivity = 100 feet per day
Stream segments depleted by pumping

- 1000 feet
- 2640 feet
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- 1000 feet
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Summary

• Hydrogeologic conditions much different between nearby drainages
  local data are very important

• Depletion rates and timing vary with distance from a stream

• Stream depletion models benefit considerably with improved hydrology data

• Additional data collection in Eightmile Creek
Shallow Aquifer Investigation
Stevensville Area

Purpose
Examine the feasibility of supplementing surface water irrigation supplies with groundwater.

• Existing information
• Collect groundwater and surface water elevation data
• Water Budget
• Groundwater Flow Model
Monitoring Network
Groundwater / Surface Water Interaction

Gaining stream/ditch
Streams/ditches gain water from inflow of groundwater

Loosening stream/ditch
Streams/ditches lose water to groundwater
Connected system

Loosening stream/ditch
Streams/ditches lose water to groundwater
Disconnected system

Bank Storage
Stream levels higher than groundwater
Varies seasonally
Groundwater flow and pumping near a stream

Cross Section View

Pumping a well will create a cone of depression
If pumping near a stream lowers the water table to a level lower than the stream, then water may be induced from the stream into the subsurface.