

# Ground Water Investigation Program Bitterroot Valley

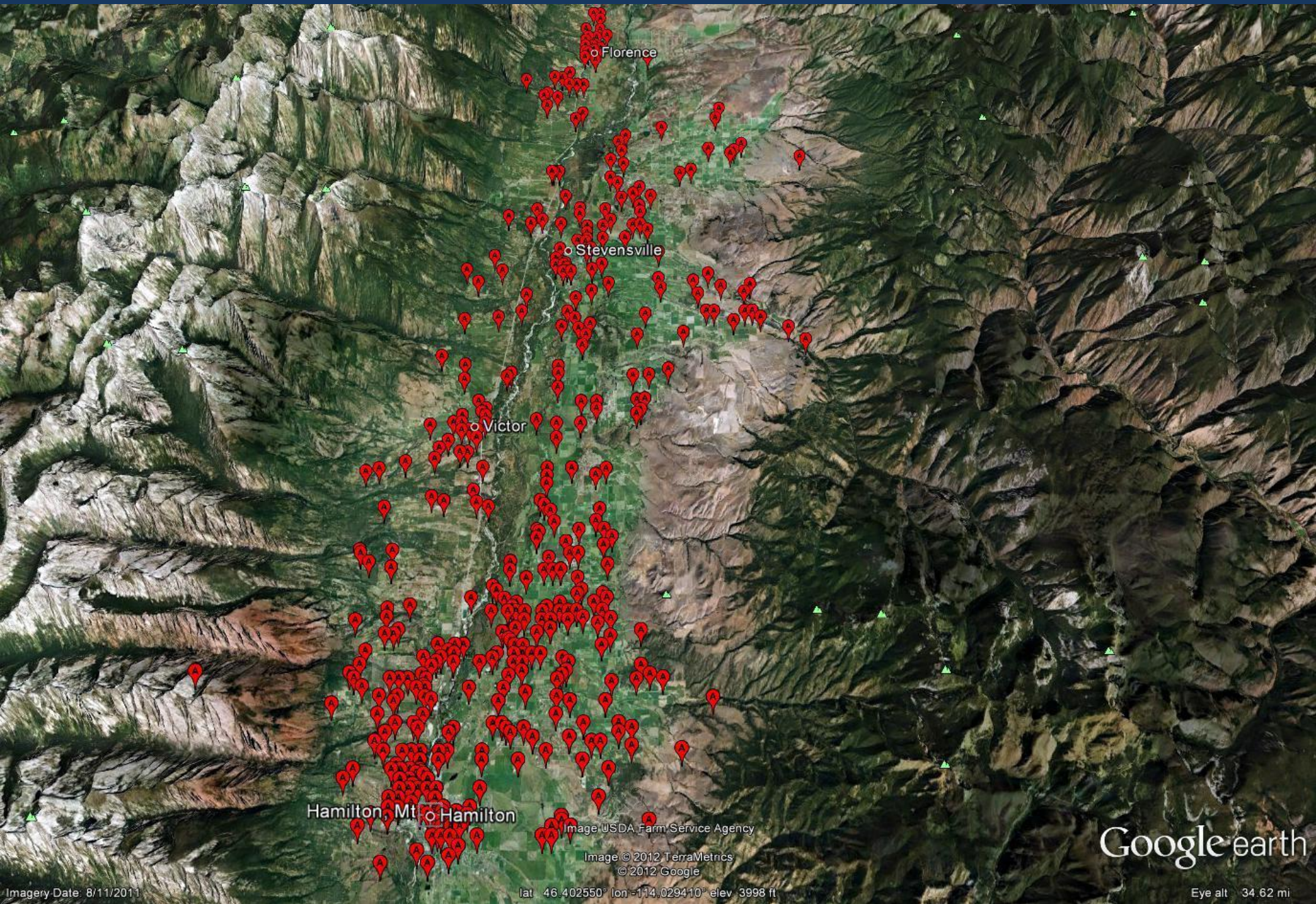


Bitterroot River, Woodside Crossing, April 26, 2012

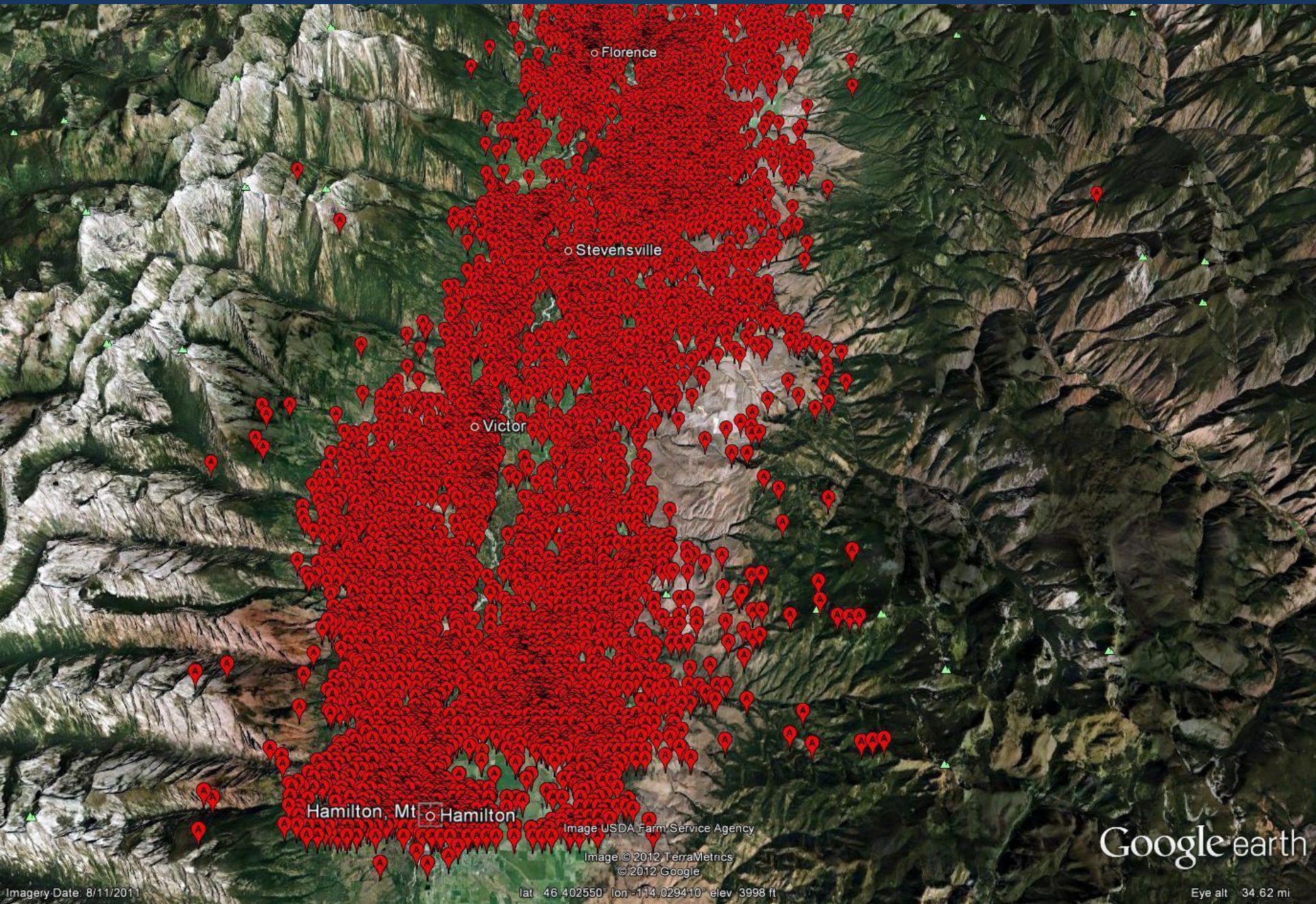
# Bitterroot Valley, Hamilton to Florence: wells in 1900

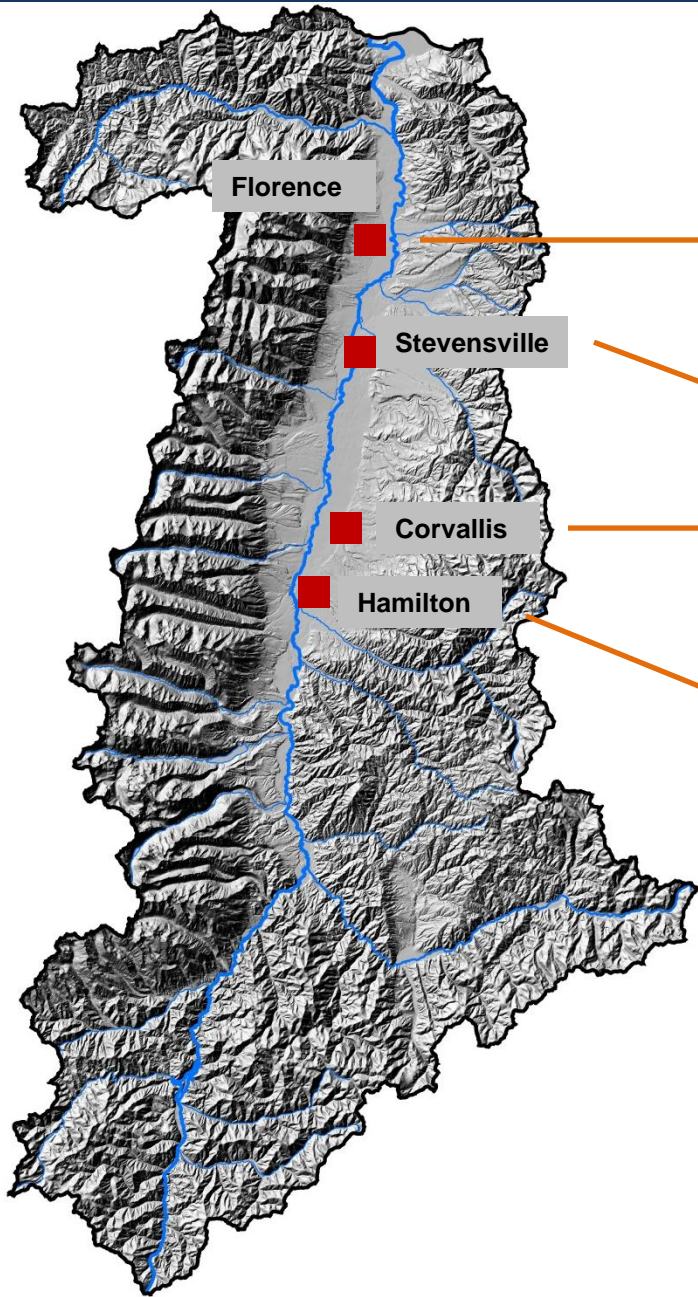


# Bitterroot Valley, Hamilton to Florence: wells in 1950



# Bitterroot Valley, Hamilton to Florence: wells in 2012





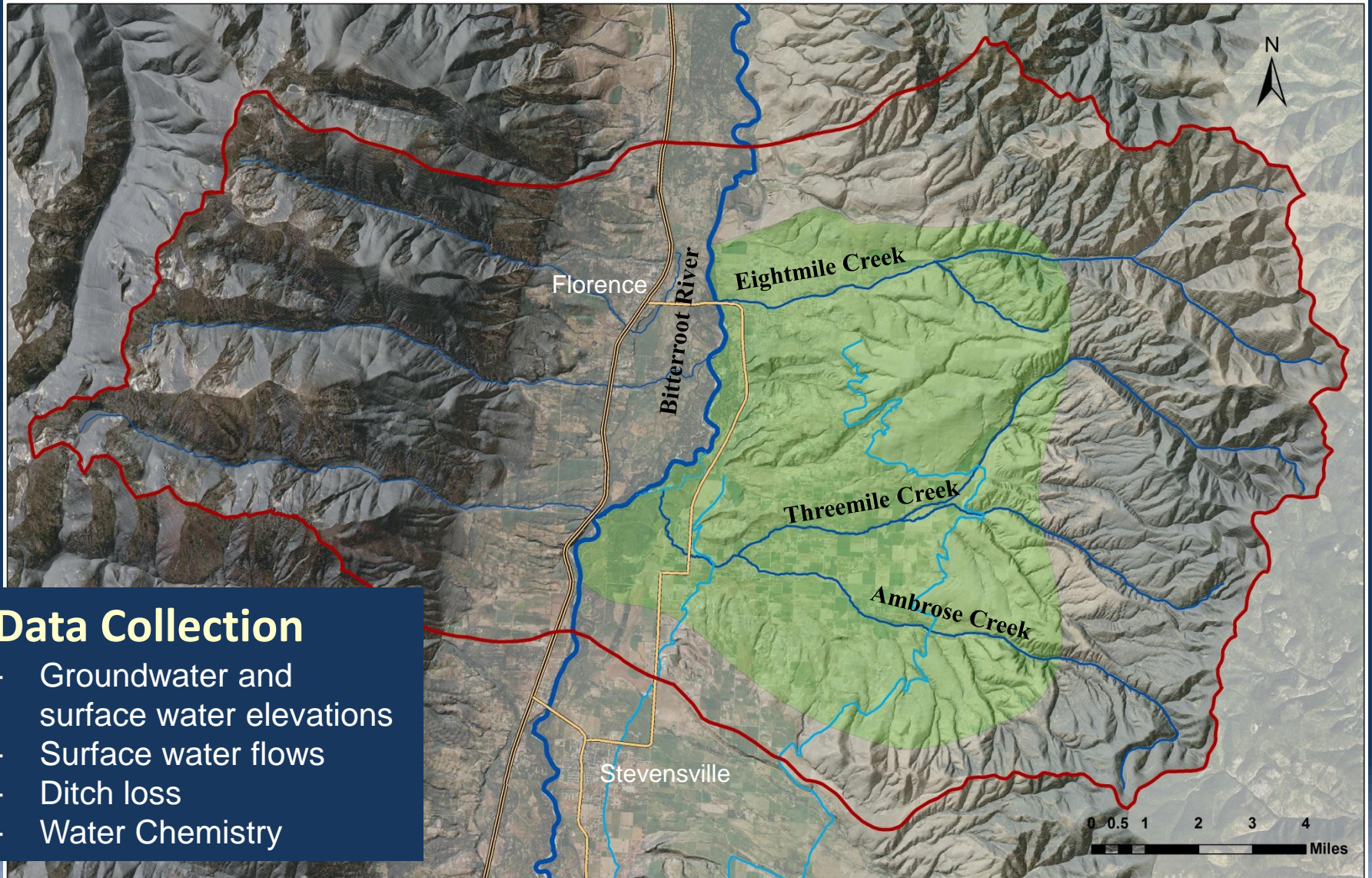
Florence

Stevensville

Corvallis

Hamilton

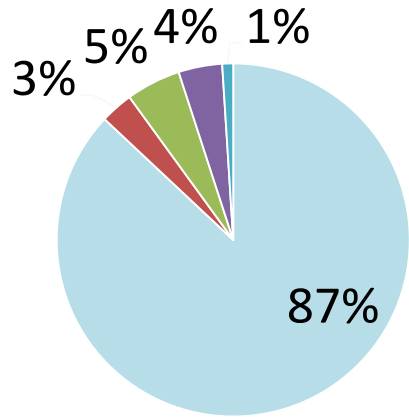
# Florence Area



## Data Collection

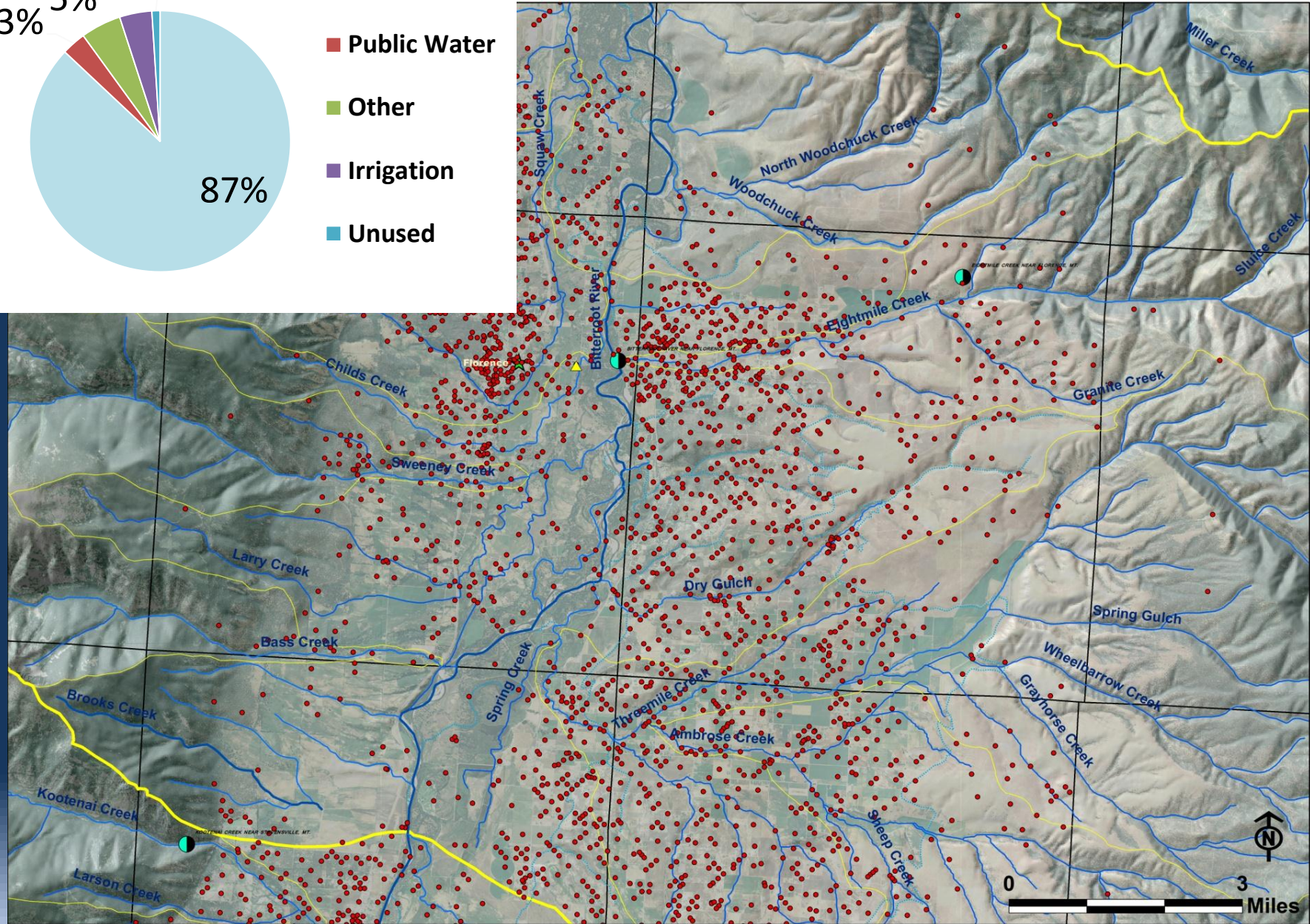
- Groundwater and surface water elevations
- Surface water flows
- Ditch loss
- Water Chemistry

# Reported Well Use

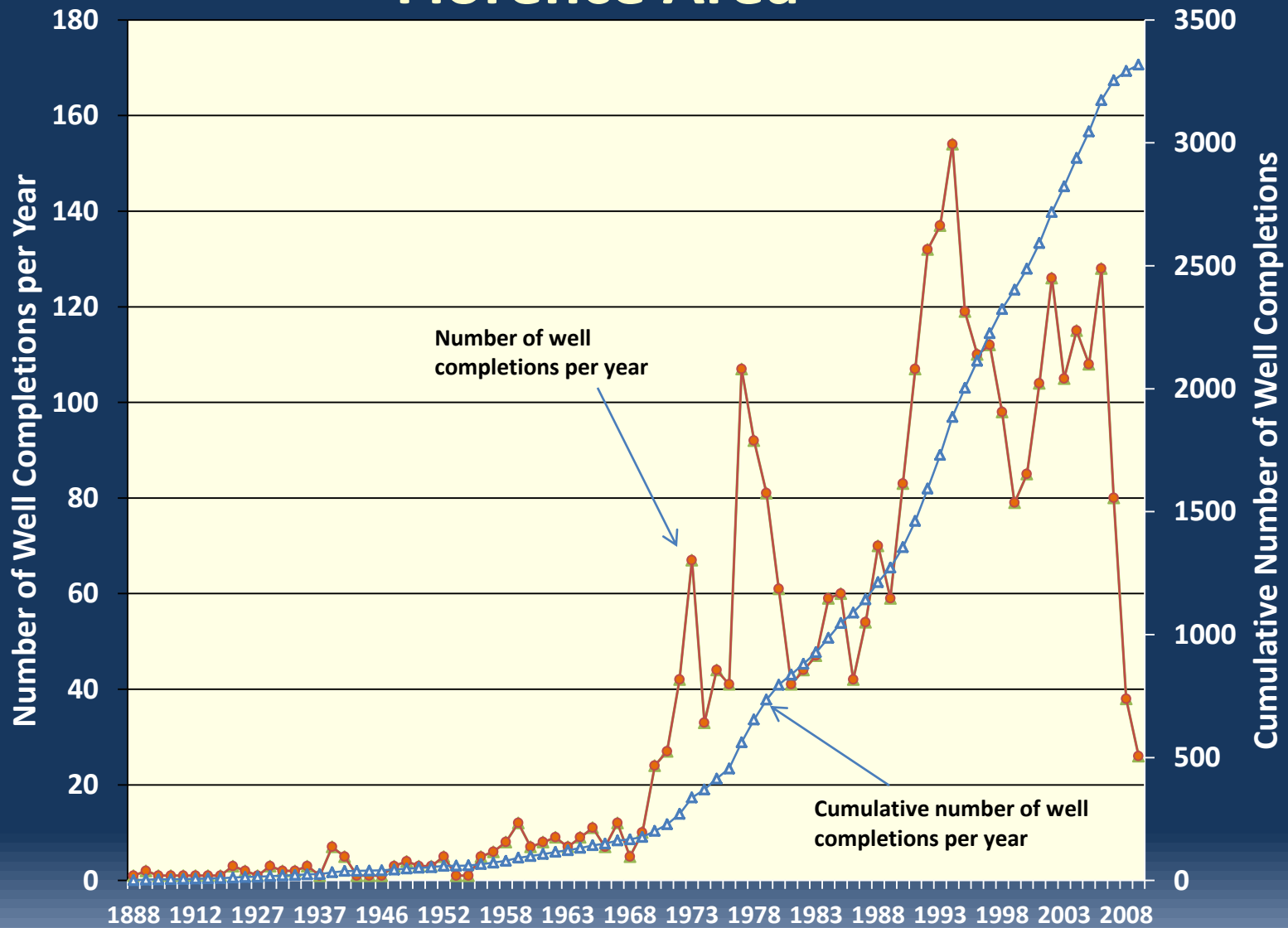


- Domestic
- Public Water
- Other
- Irrigation
- Unused

# Florence Area



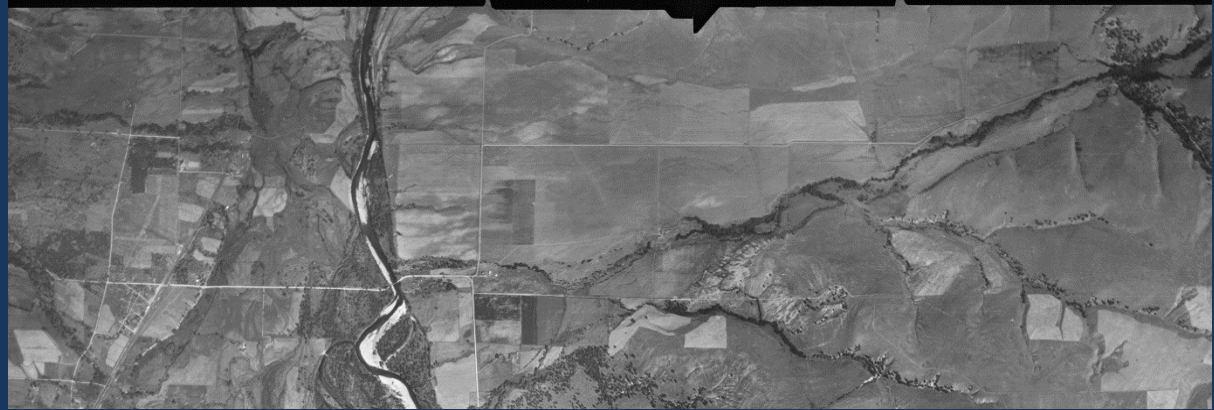
# Well Completions Florence Area



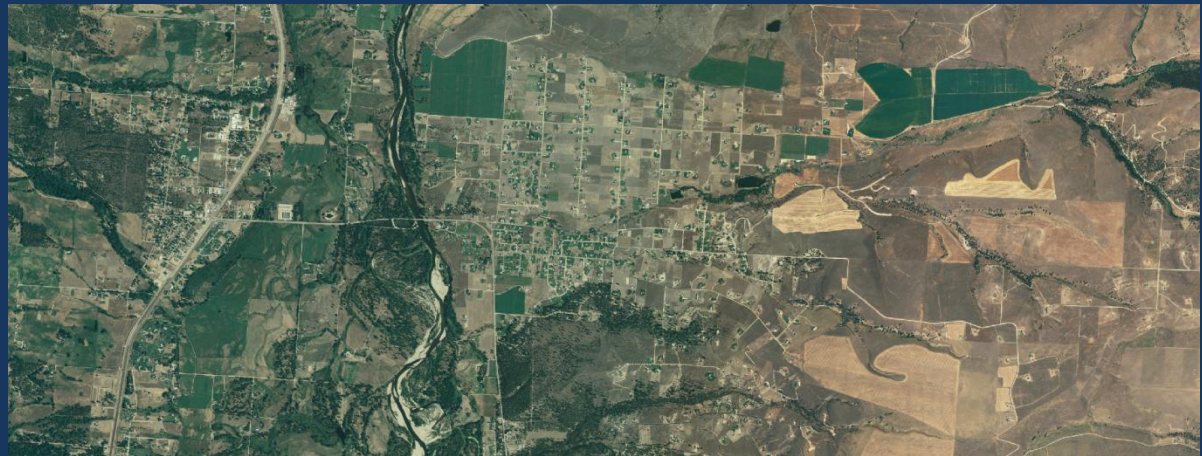


# Eightmile Drainage

1954



2009



# Threemile Drainage

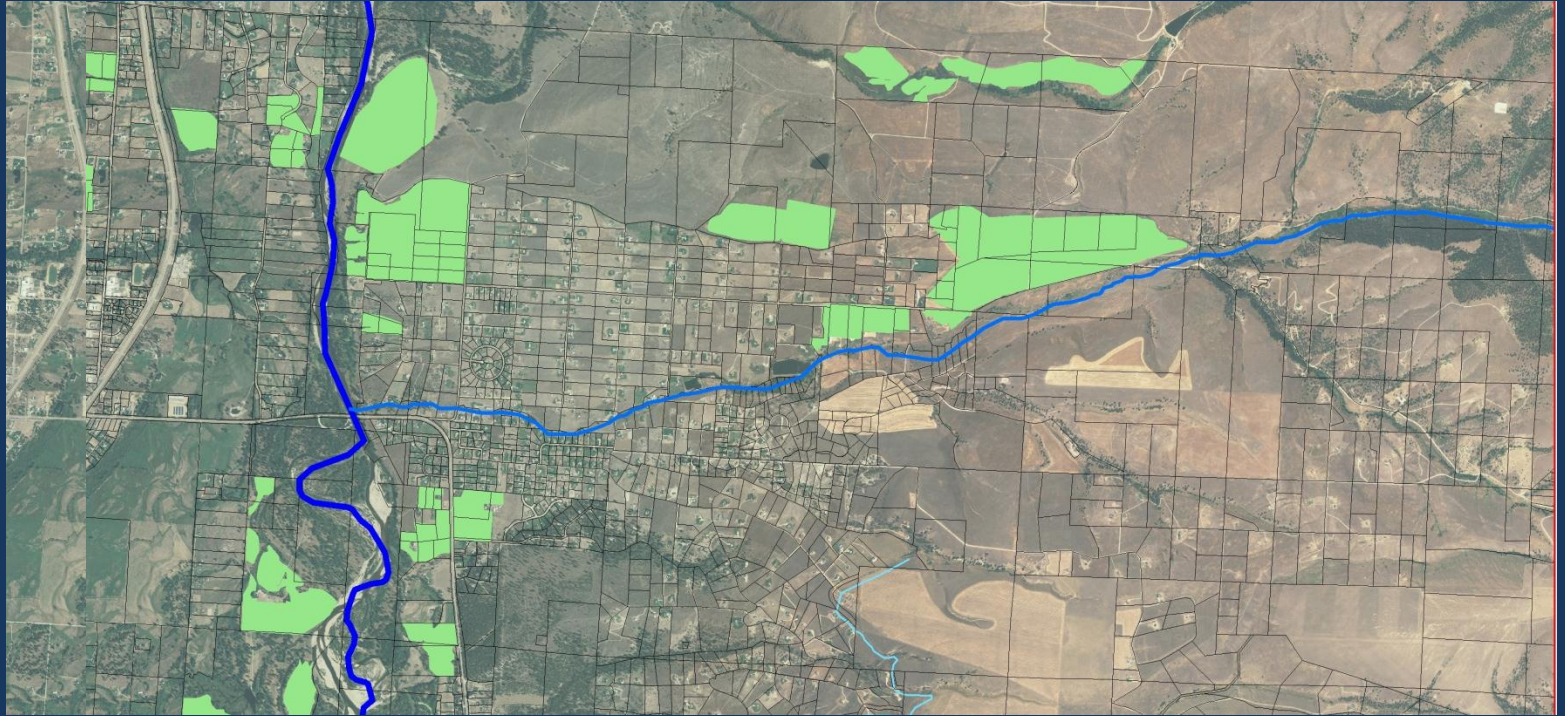
2009



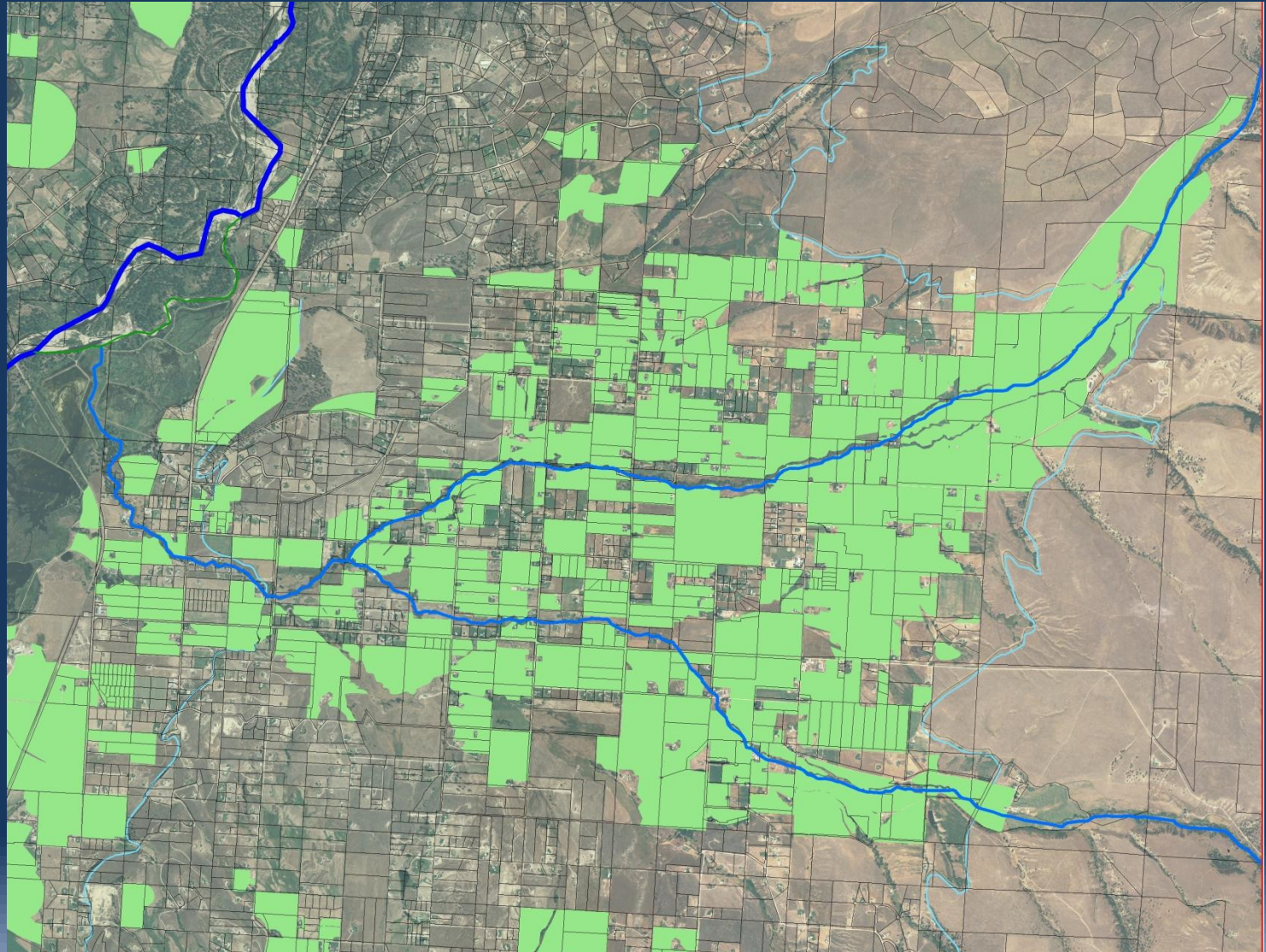
1954



# Eightmile Creek Drainage



# Threemile Creek Drainage



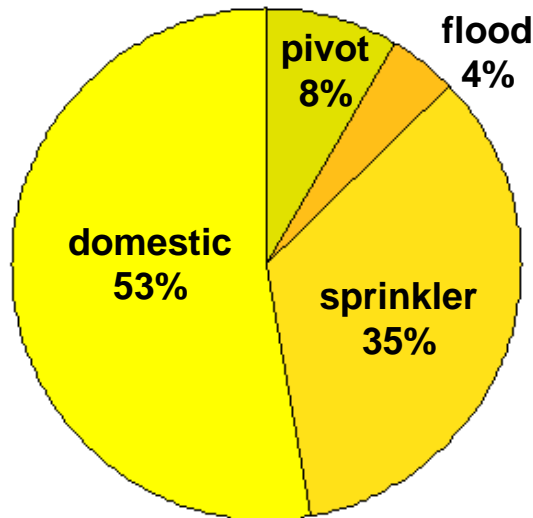
# Water Budget Components

## Consumptive use (acre-feet)

(all diversions, precipitation subtracted from monthly estimates)

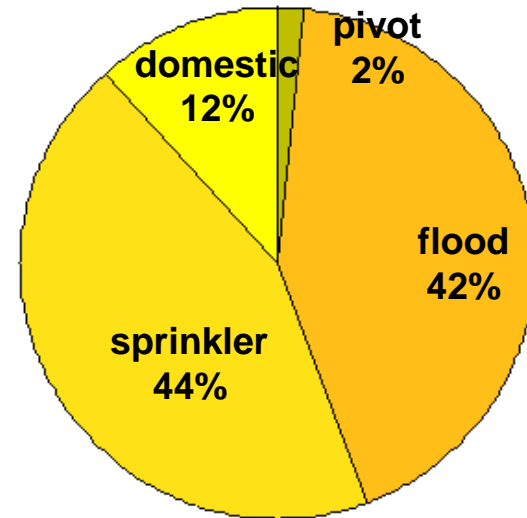
### Eightmile Creek

Pivot	145
Flood	75
Sprinkler	600
Domestic	890



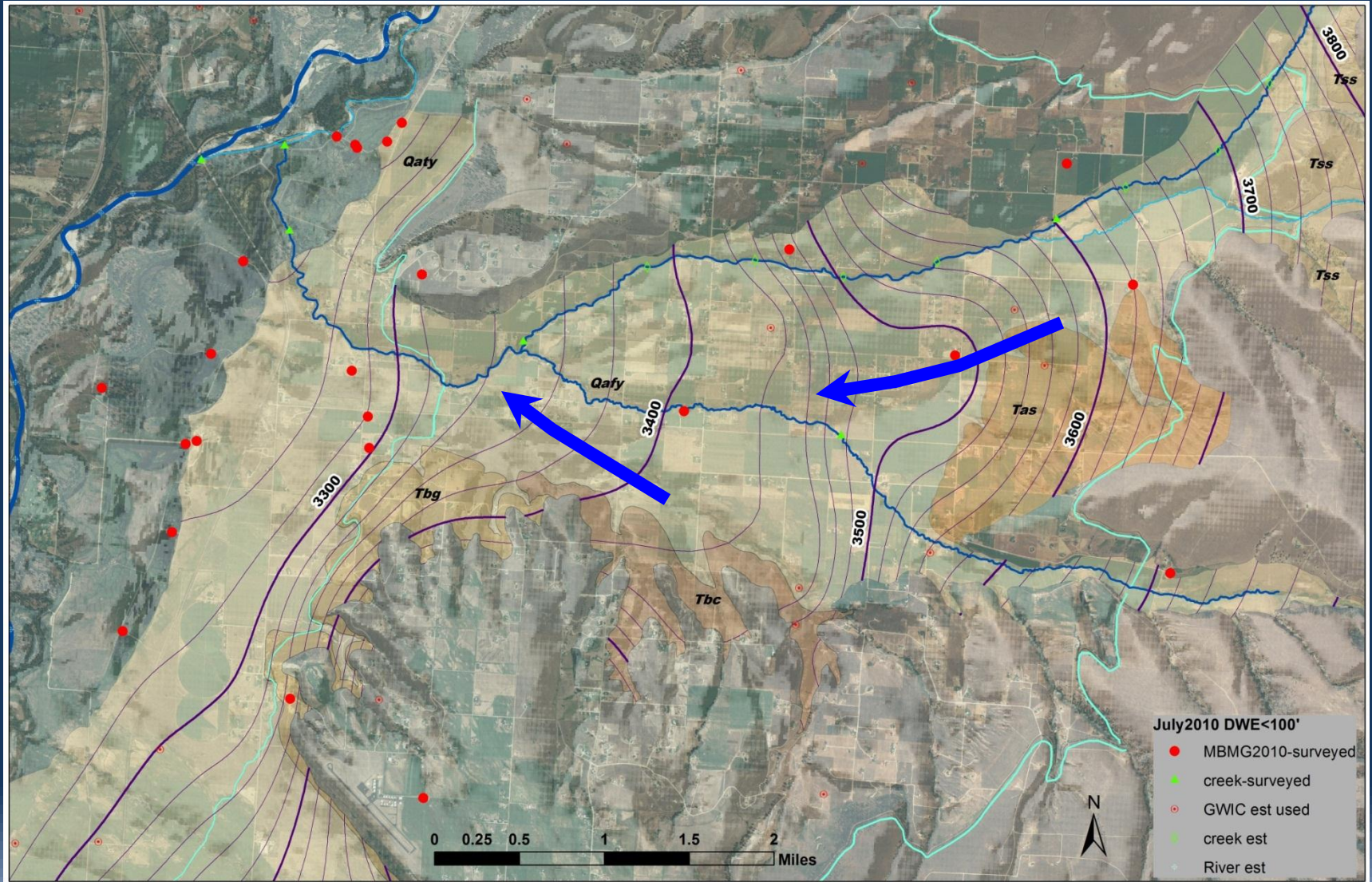
### Threemile Creek

Pivot	190
Flood	4470
Sprinkler	4640
Domestic	1190



# Threemile Creek

## Groundwater Flow



# 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

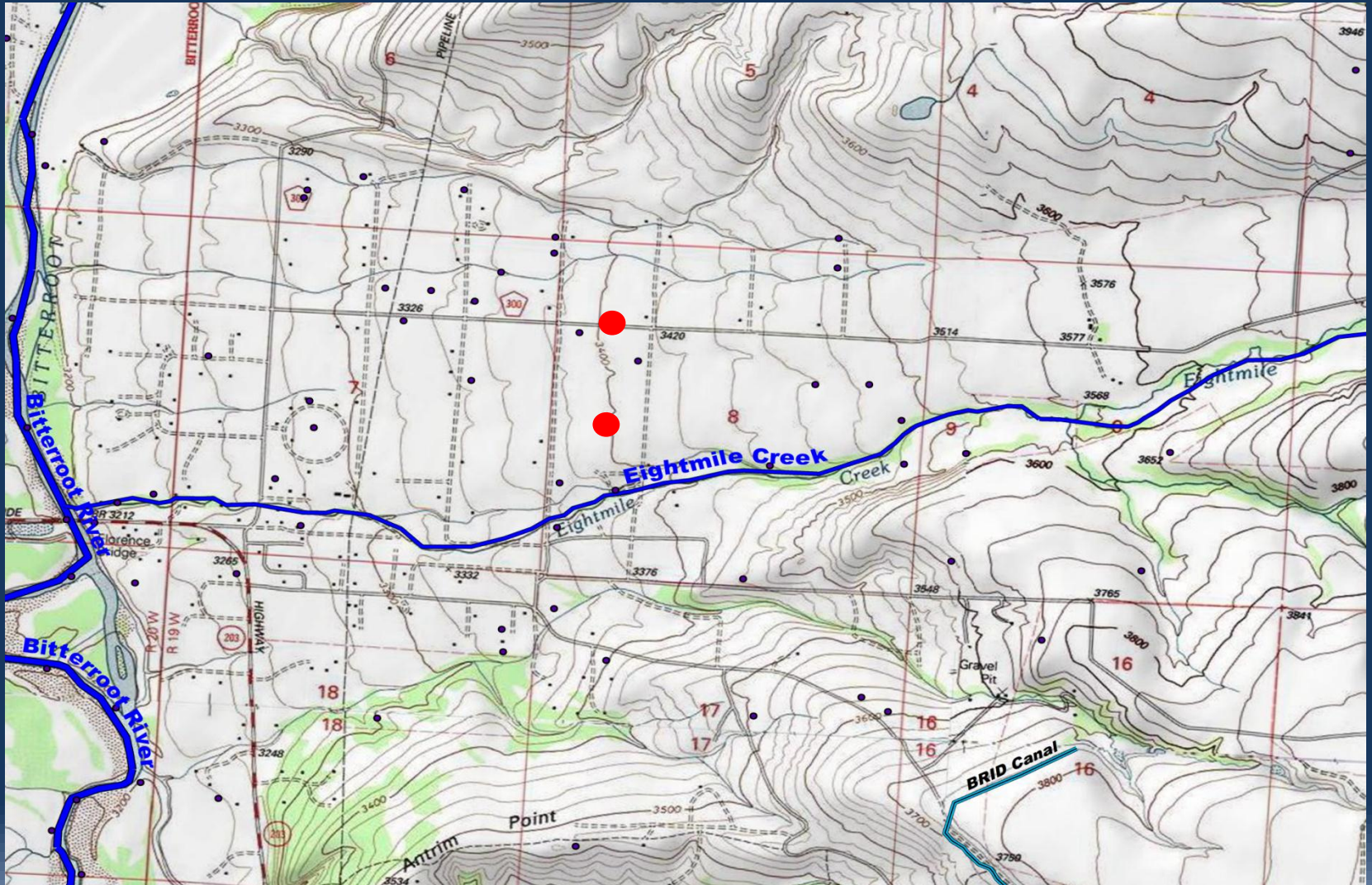
Threemile: Depletion of more than one stream possible  
Less likely to extend SD outside immediate area

## Land use

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

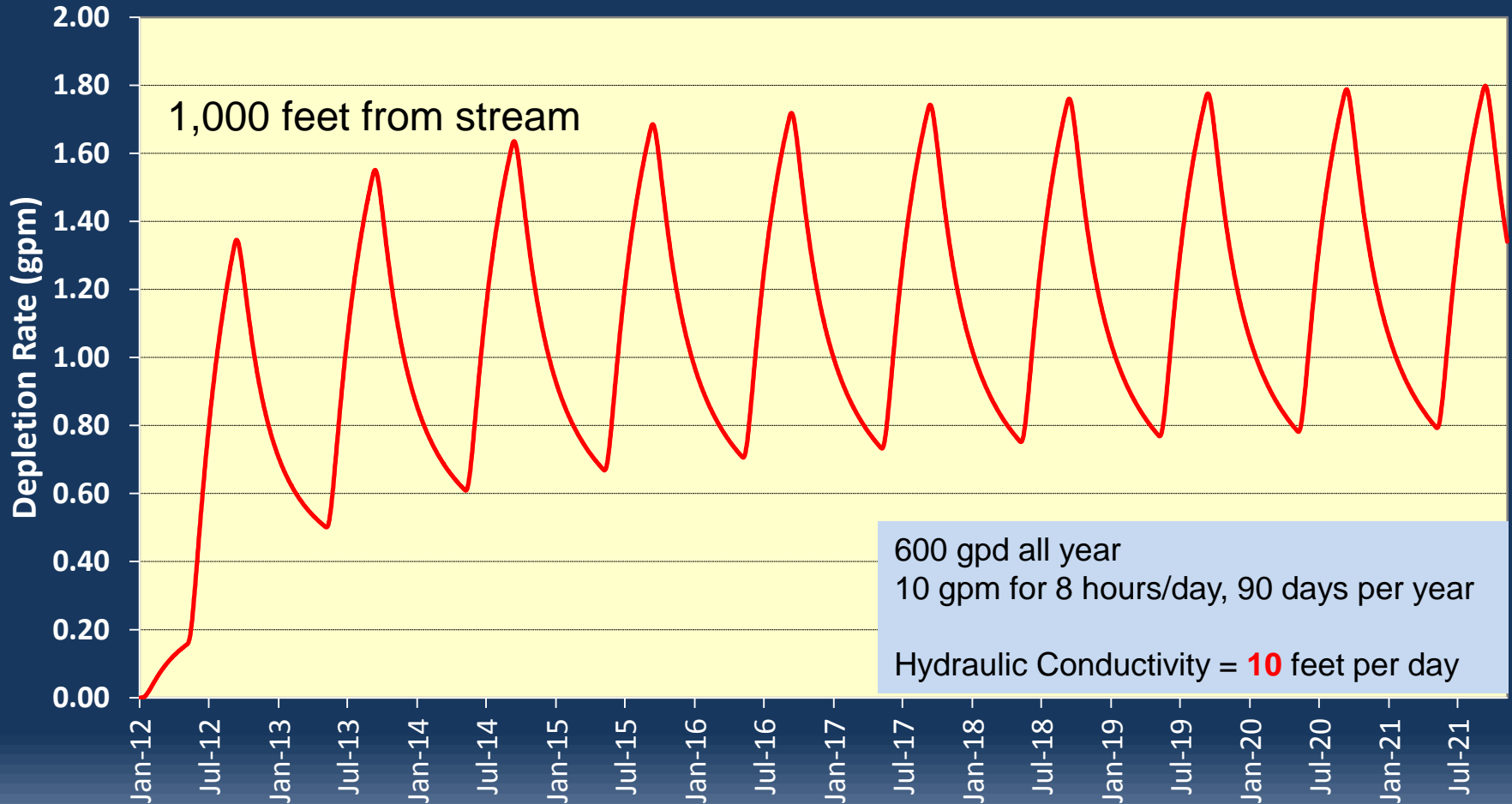
Threemile: Canal loss and irrigation return flow important

# Pumping Scenarios in Eightmile Creek

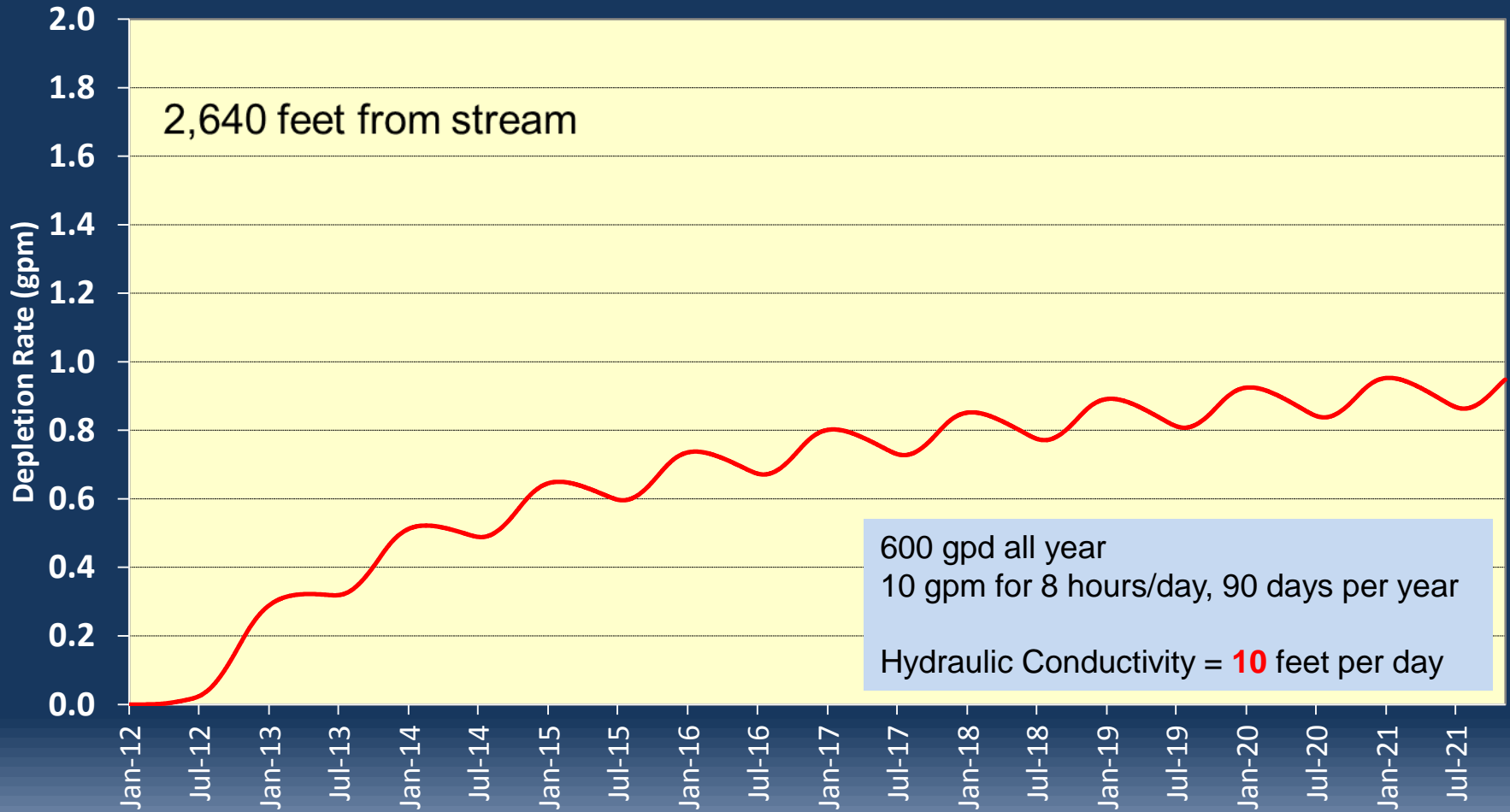




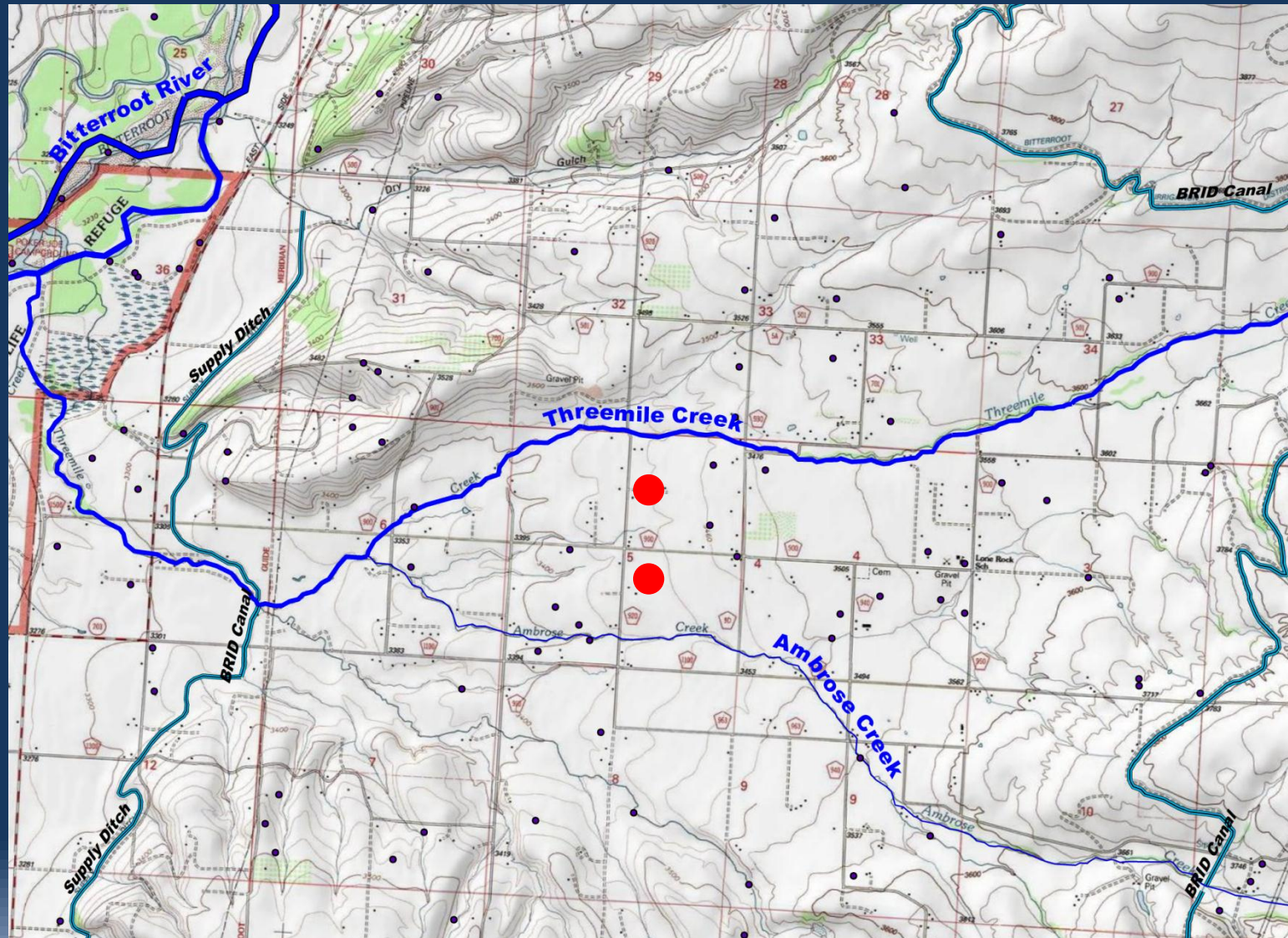
# Eightmile Creek Depletion

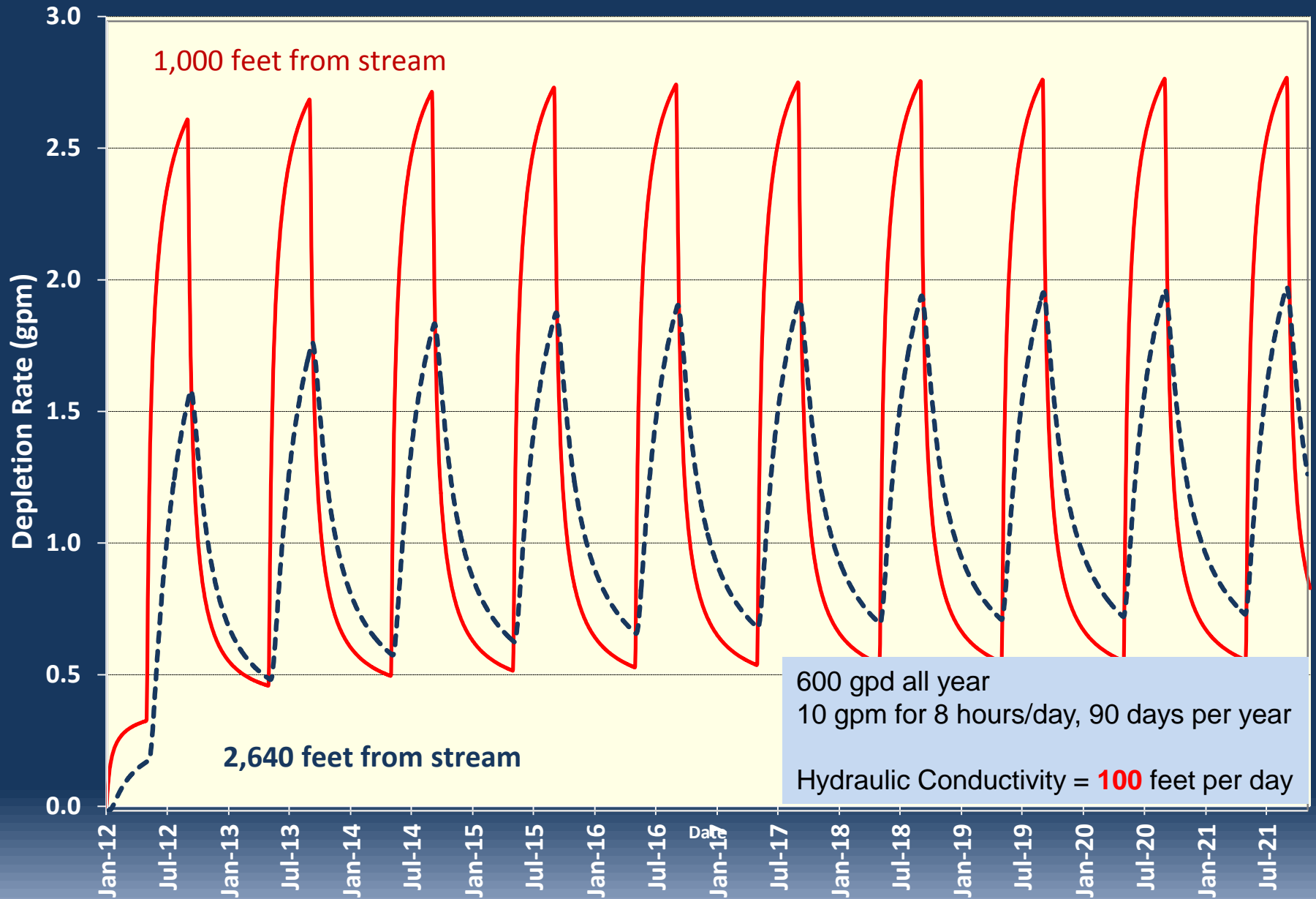


# Eightmile Creek Depletion





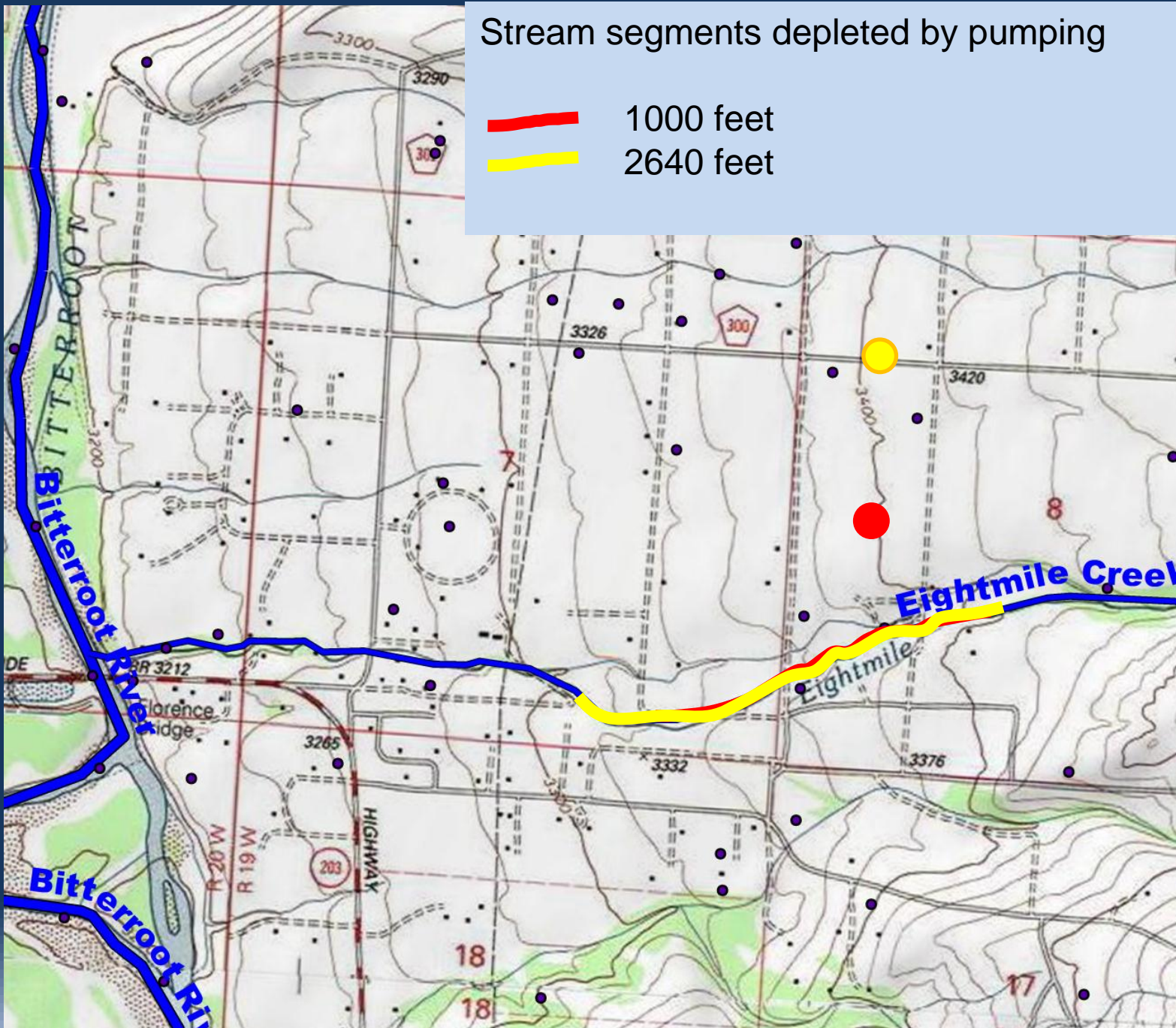
# Pumping Scenarios in Threemile Creek







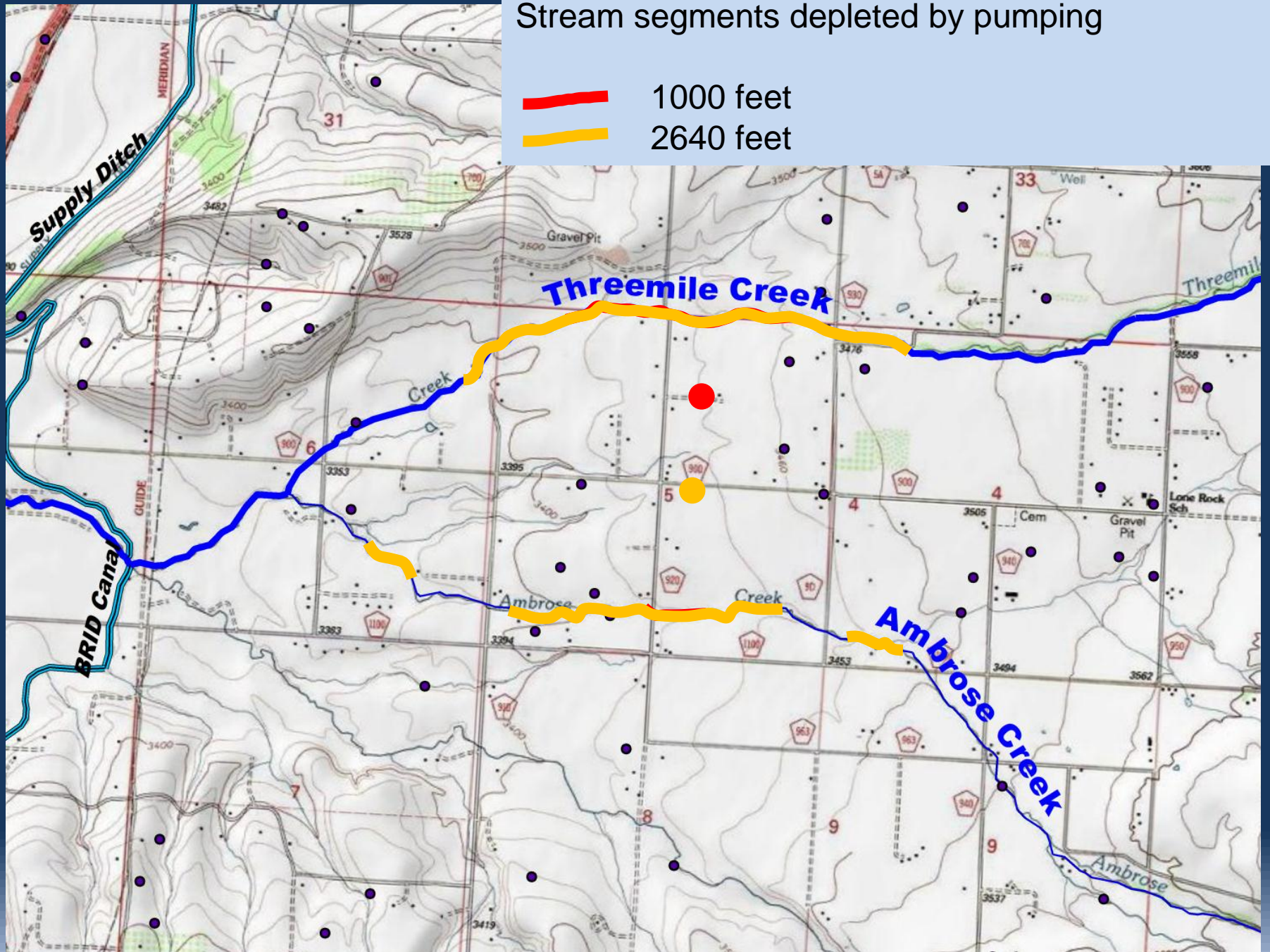
# Stream segments depleted by pumping

-  1000 feet
-  2640 feet



# Stream segments depleted by pumping

-  1000 feet
-  2640 feet



# 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



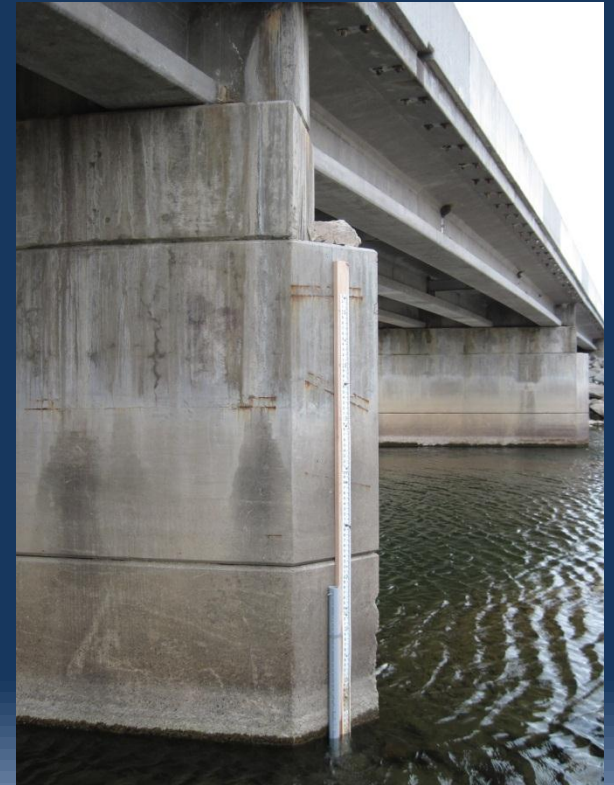
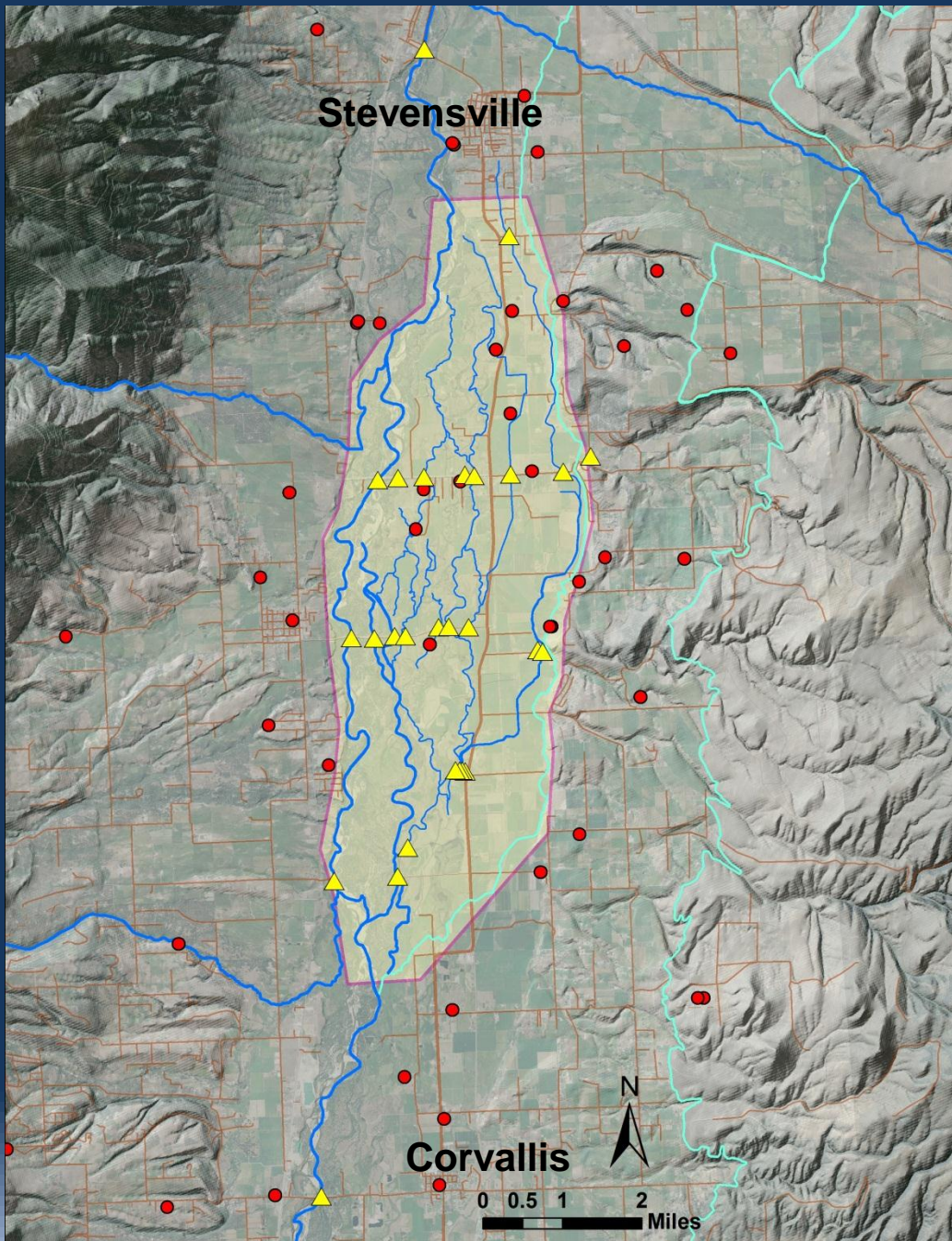
### Purpose

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

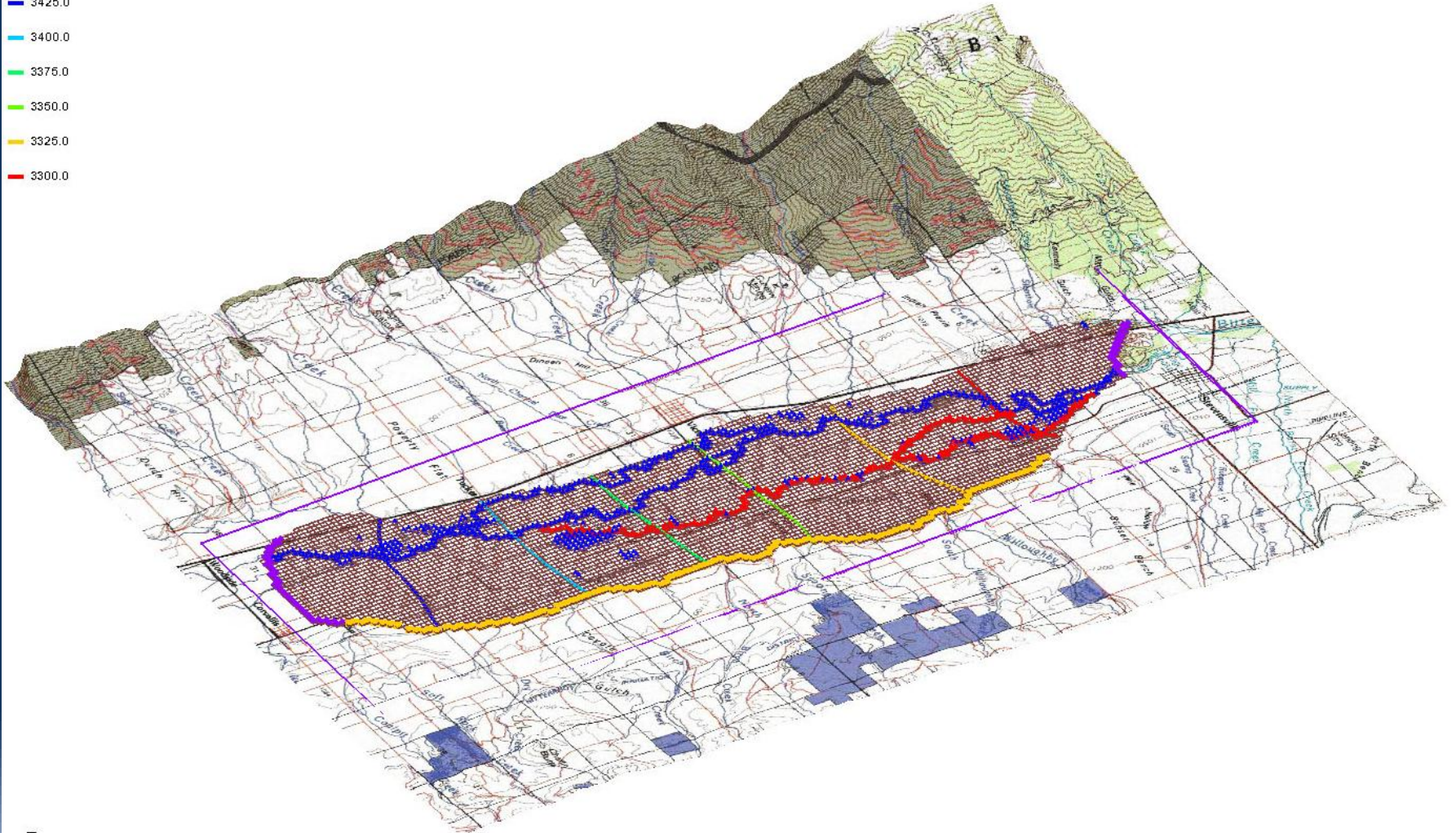


# Monitoring Network



Head

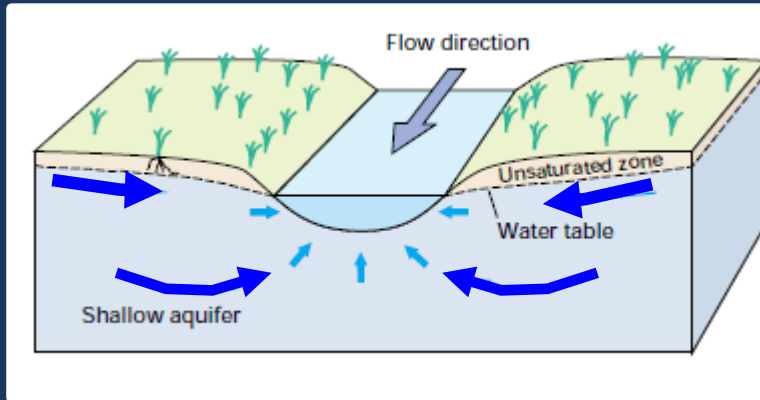
- 3425.0
- 3400.0
- 3375.0
- 3360.0
- 3325.0
- 3300.0



# Groundwater / Surface Water Interaction

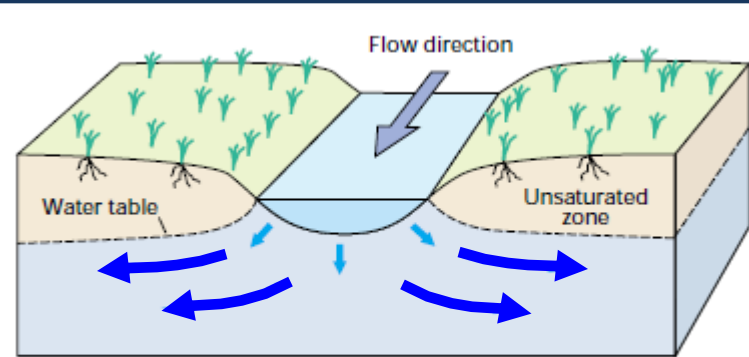
## Gaining stream/ditch

Streams/ditches gain water from inflow of groundwater



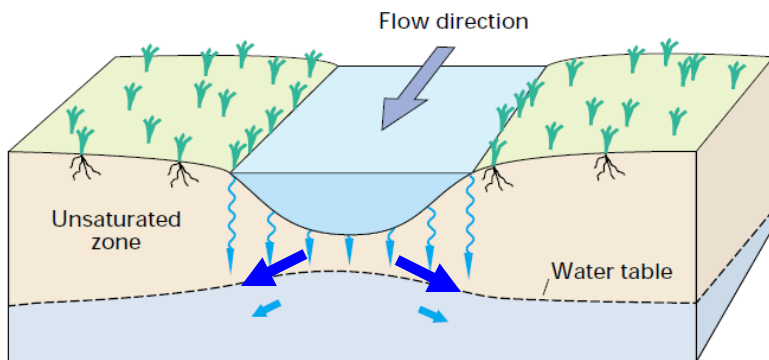
## Loosing stream/ditch

Streams/ditches lose water to groundwater  
Connected system



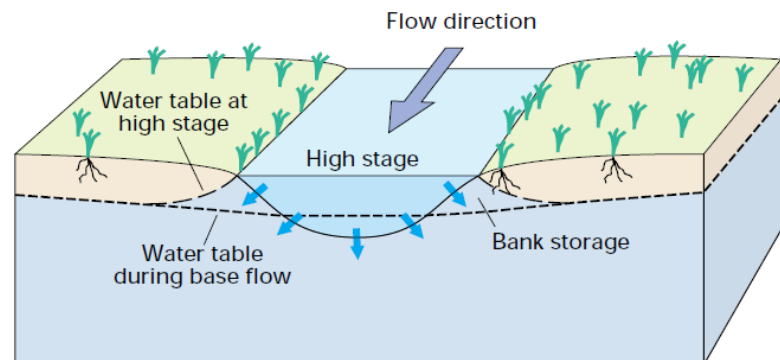
## Loosing stream/ditch

Streams/ditches lose water to groundwater  
Disconnected system



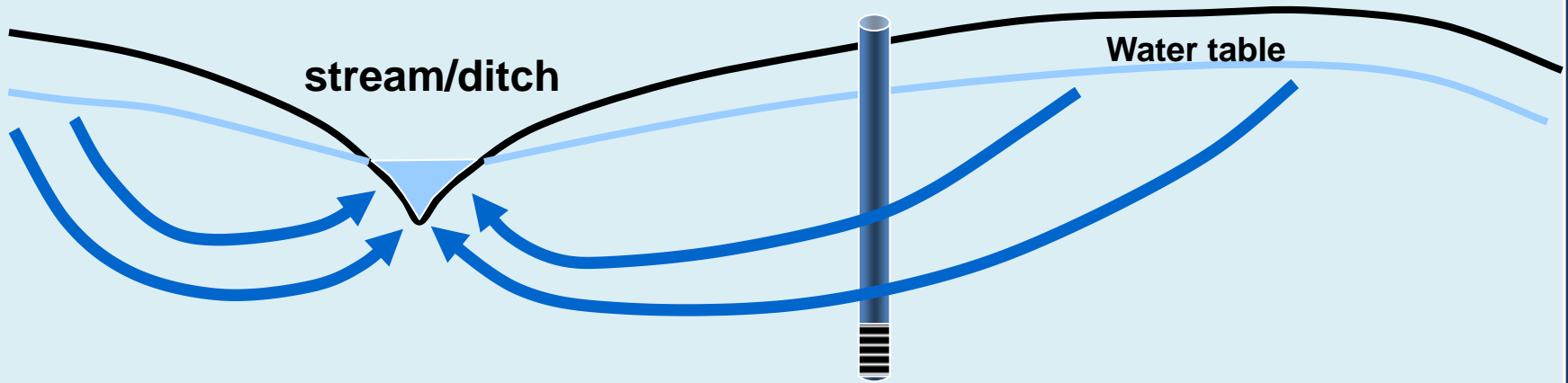
## Bank Storage

Stream levels higher than groundwater  
Varies seasonally

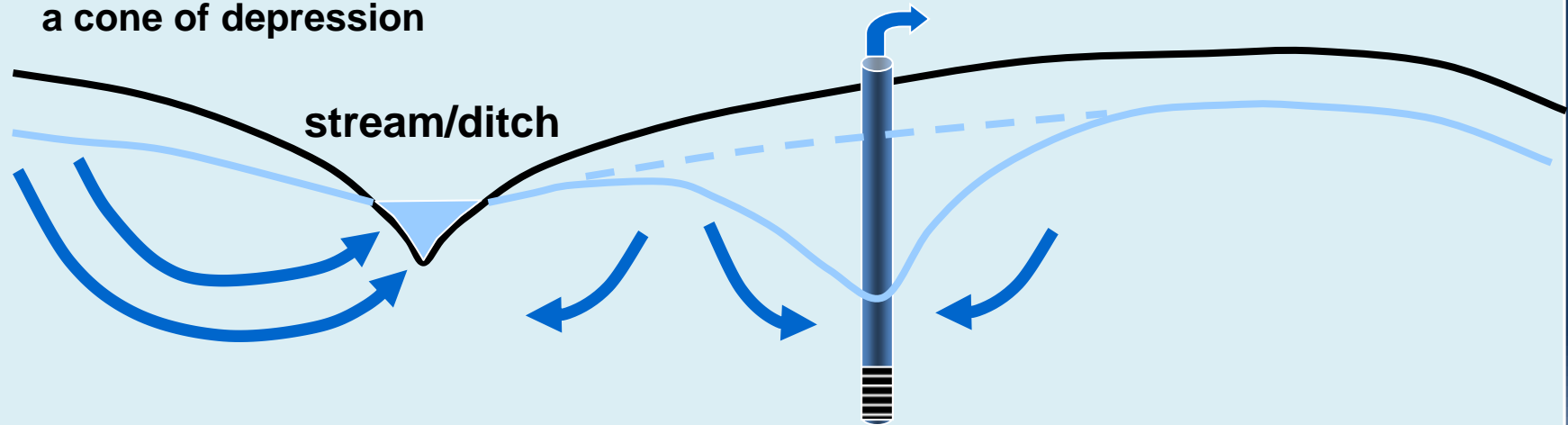


# Groundwater flow and pumping near a stream

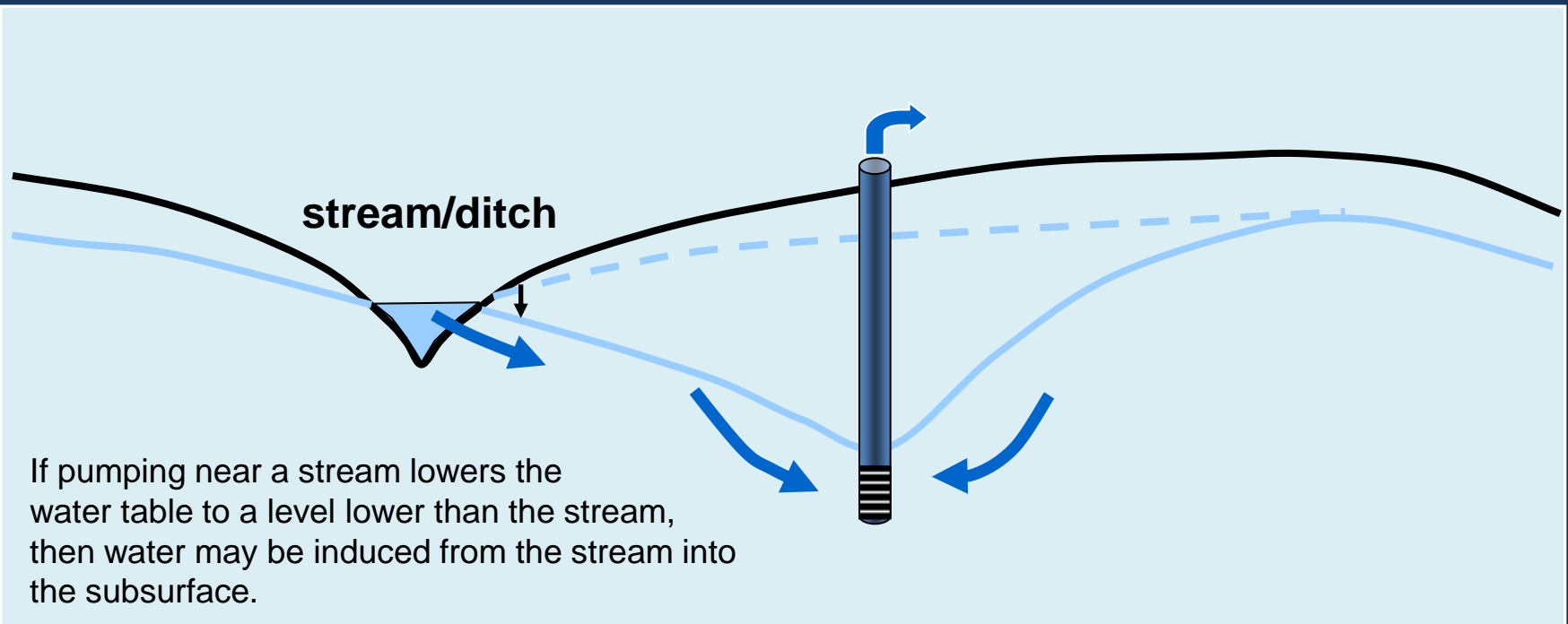
## Cross Section View



Pumping a well will create  
a cone of depression



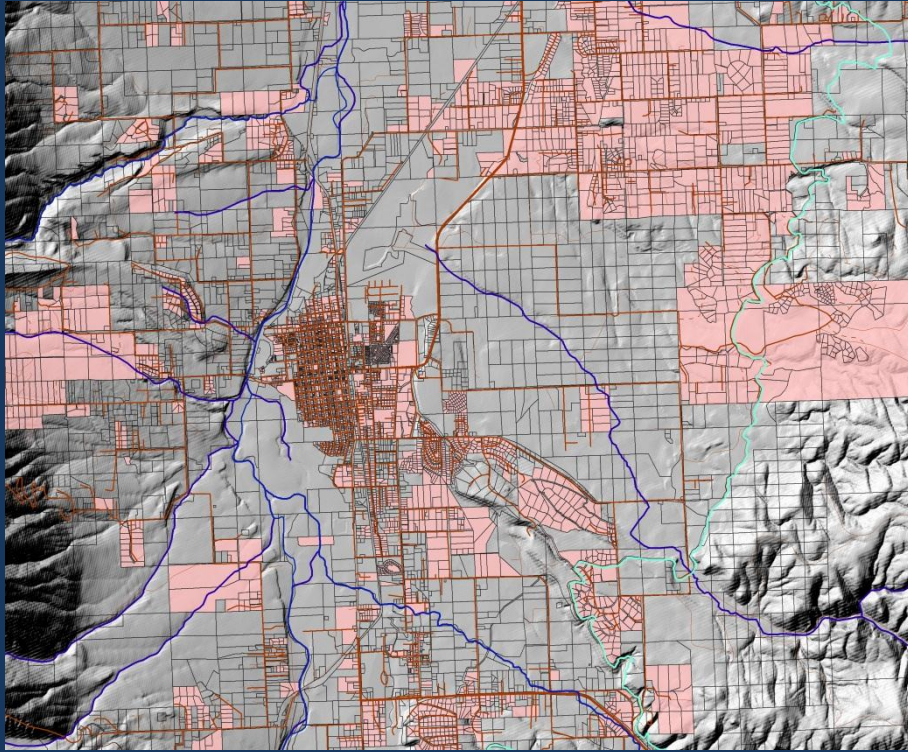
## Continued pumping ...



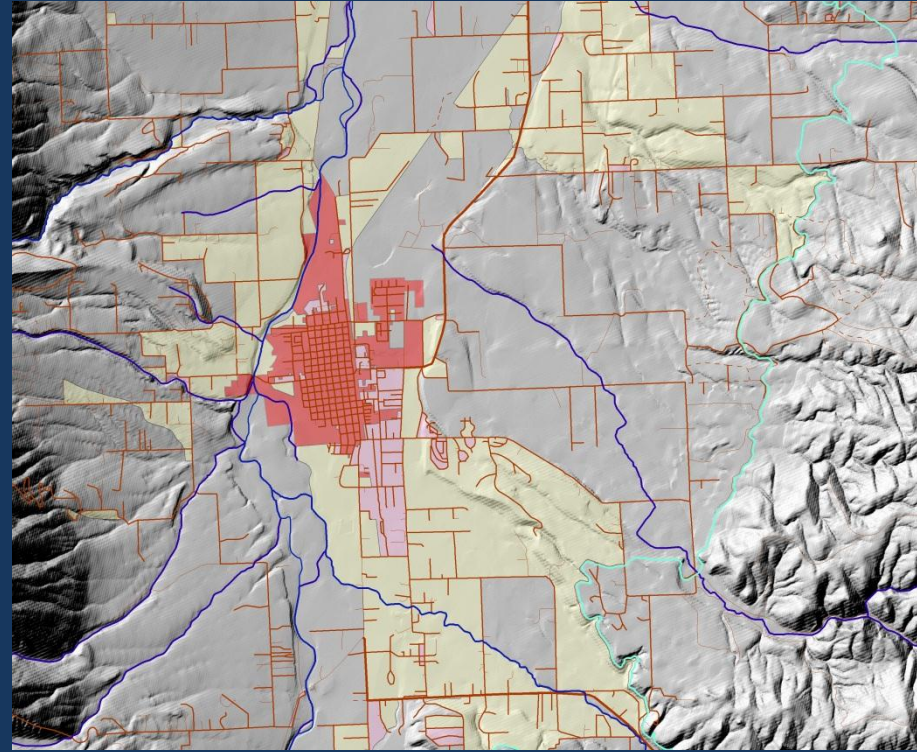
# Project Status



# Hamilton



Subdivisions



Septic System Density