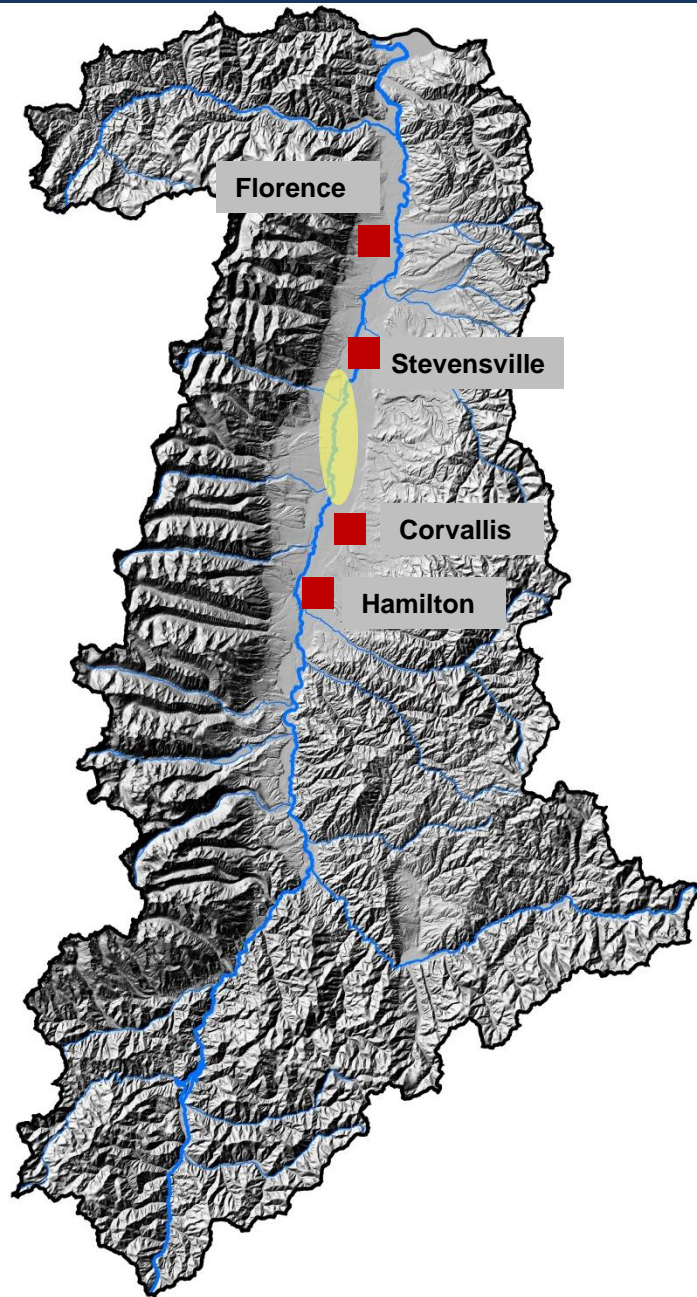


Ground Water Investigation Program

Bitterroot Valley

Presented by
Ginette Abdo

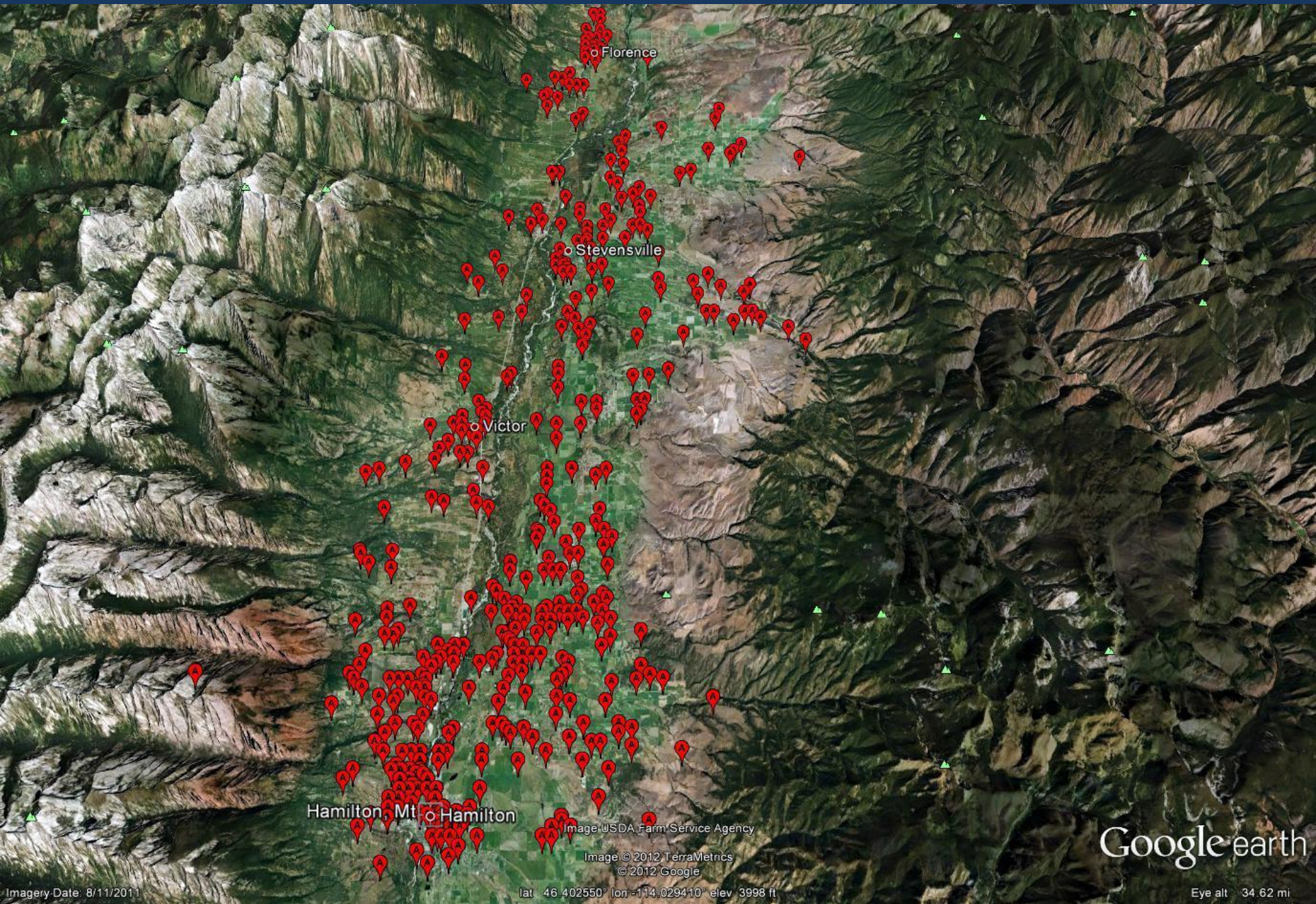
gabdo@mtech.edu



Bitterroot Valley, Hamilton to Florence: wells in 1900



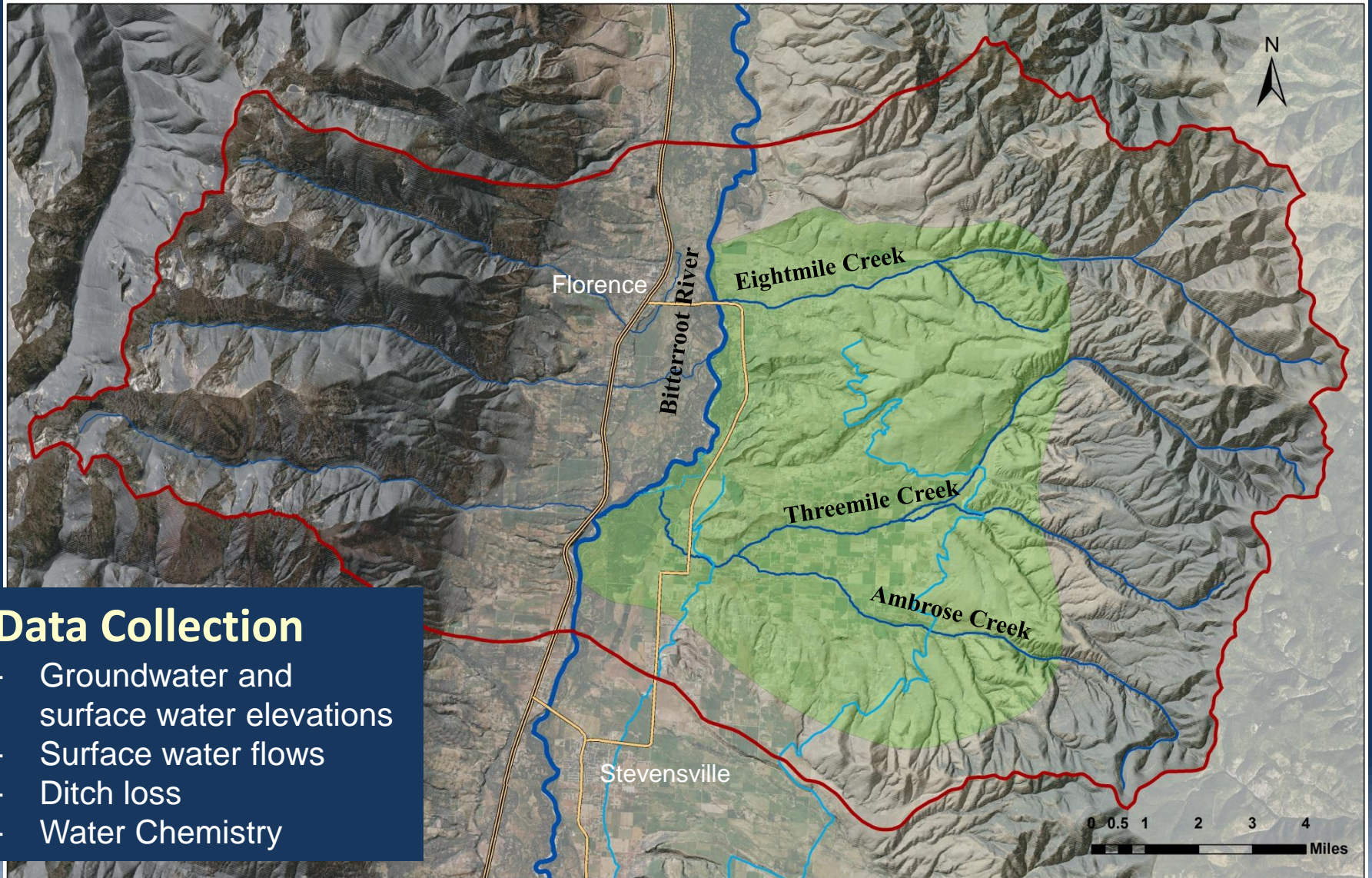
Bitterroot Valley, Hamilton to Florence: wells in 1950



Bitterroot Valley, Hamilton to Florence: wells in 2012



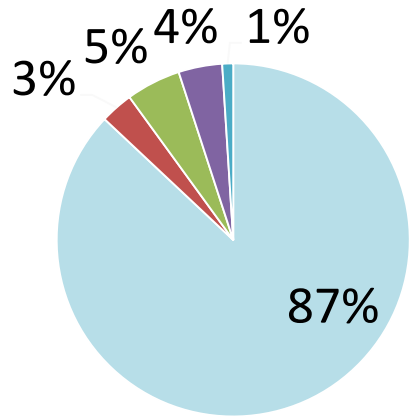
Florence Area



Data Collection

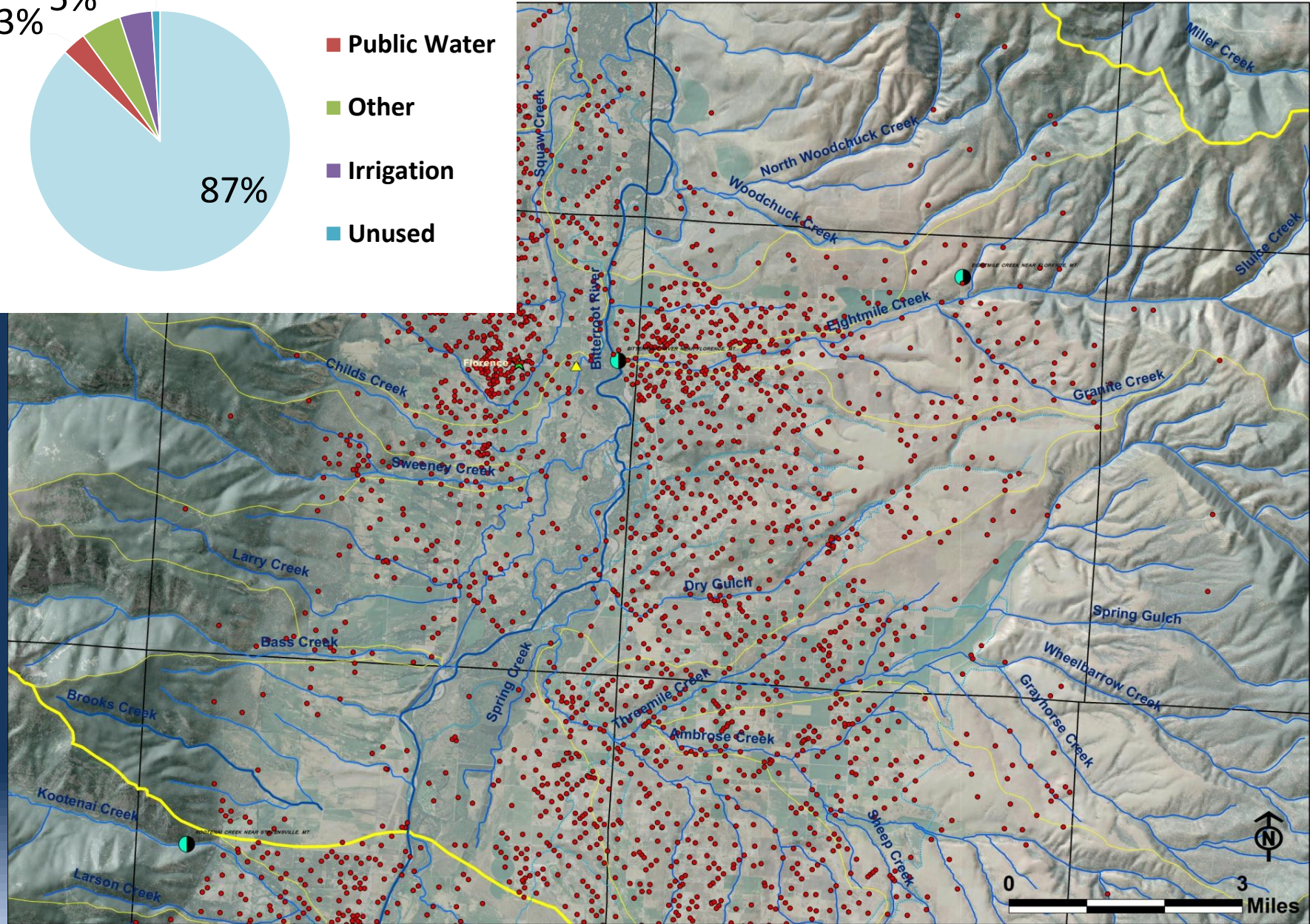
- Groundwater and surface water elevations
- Surface water flows
- Ditch loss
- Water Chemistry

Reported Well Use

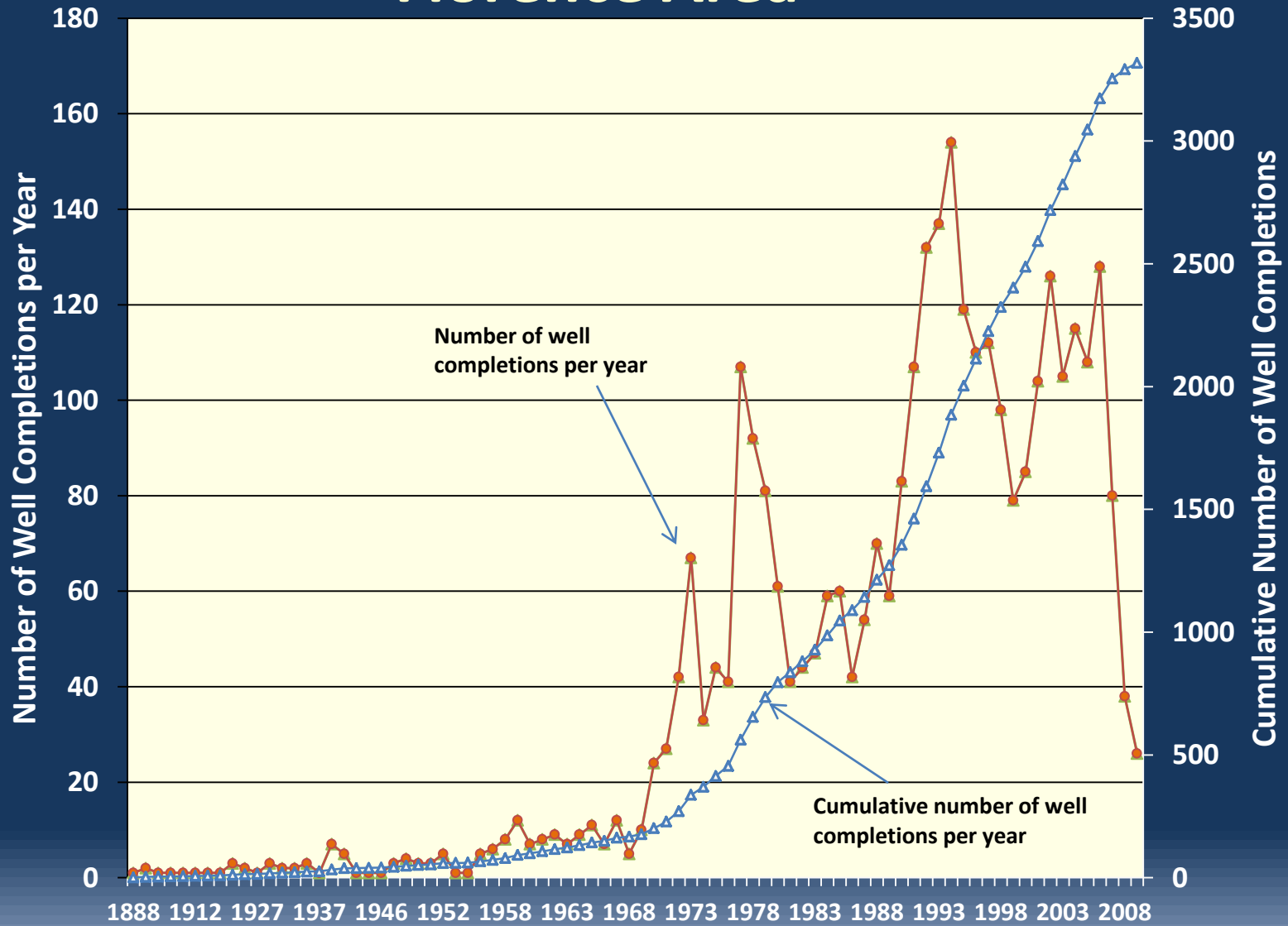


- Domestic
- Public Water
- Other
- Irrigation
- Unused

Florence Area

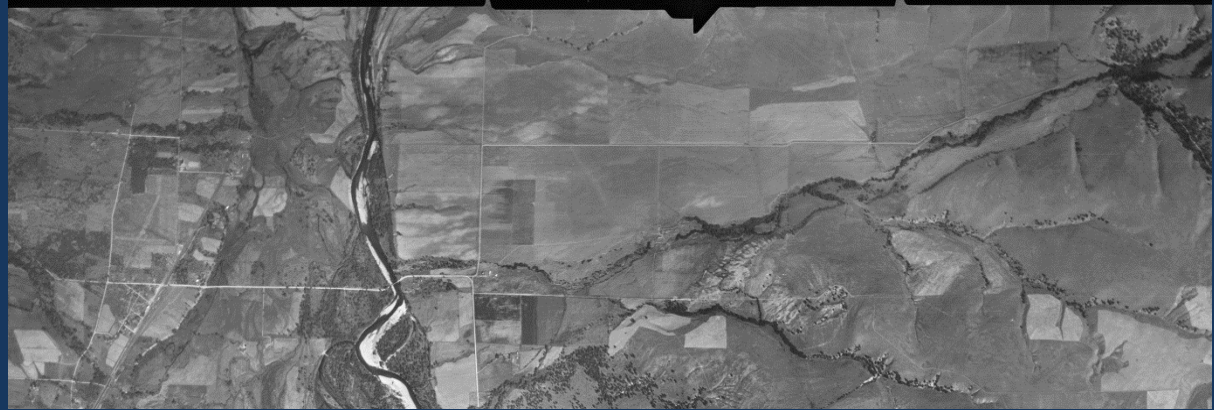


Well Completions Florence Area

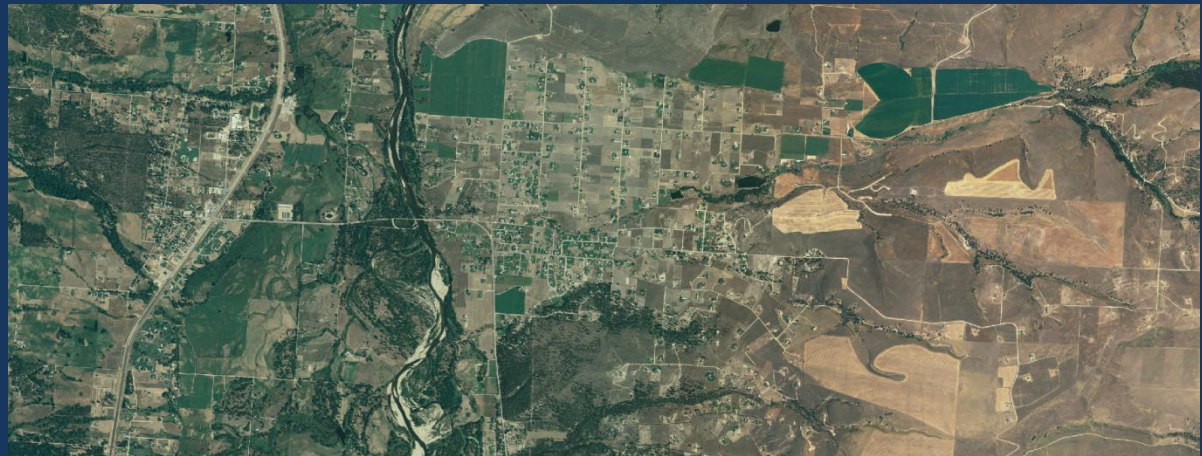


Eightmile Drainage

1954



2009



Threemile Drainage

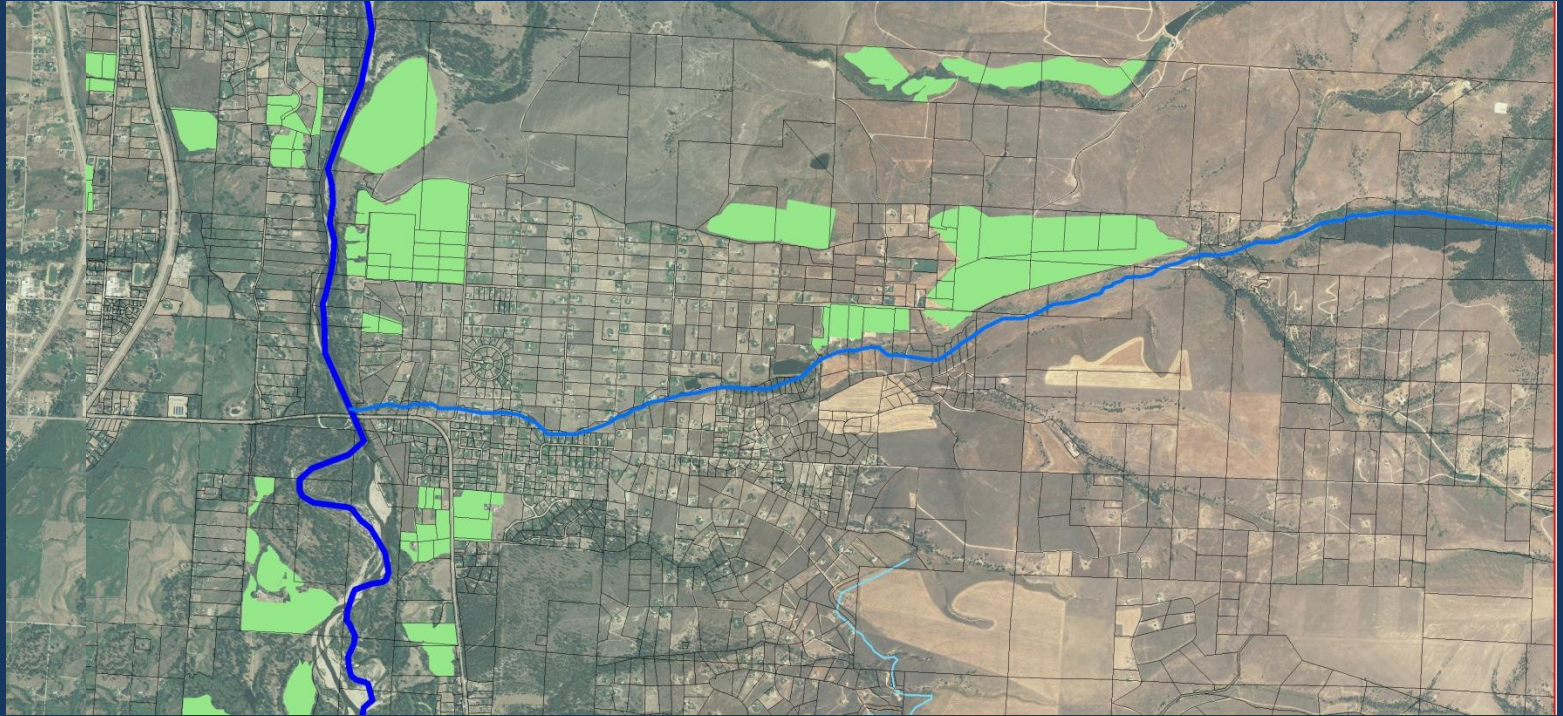
2009



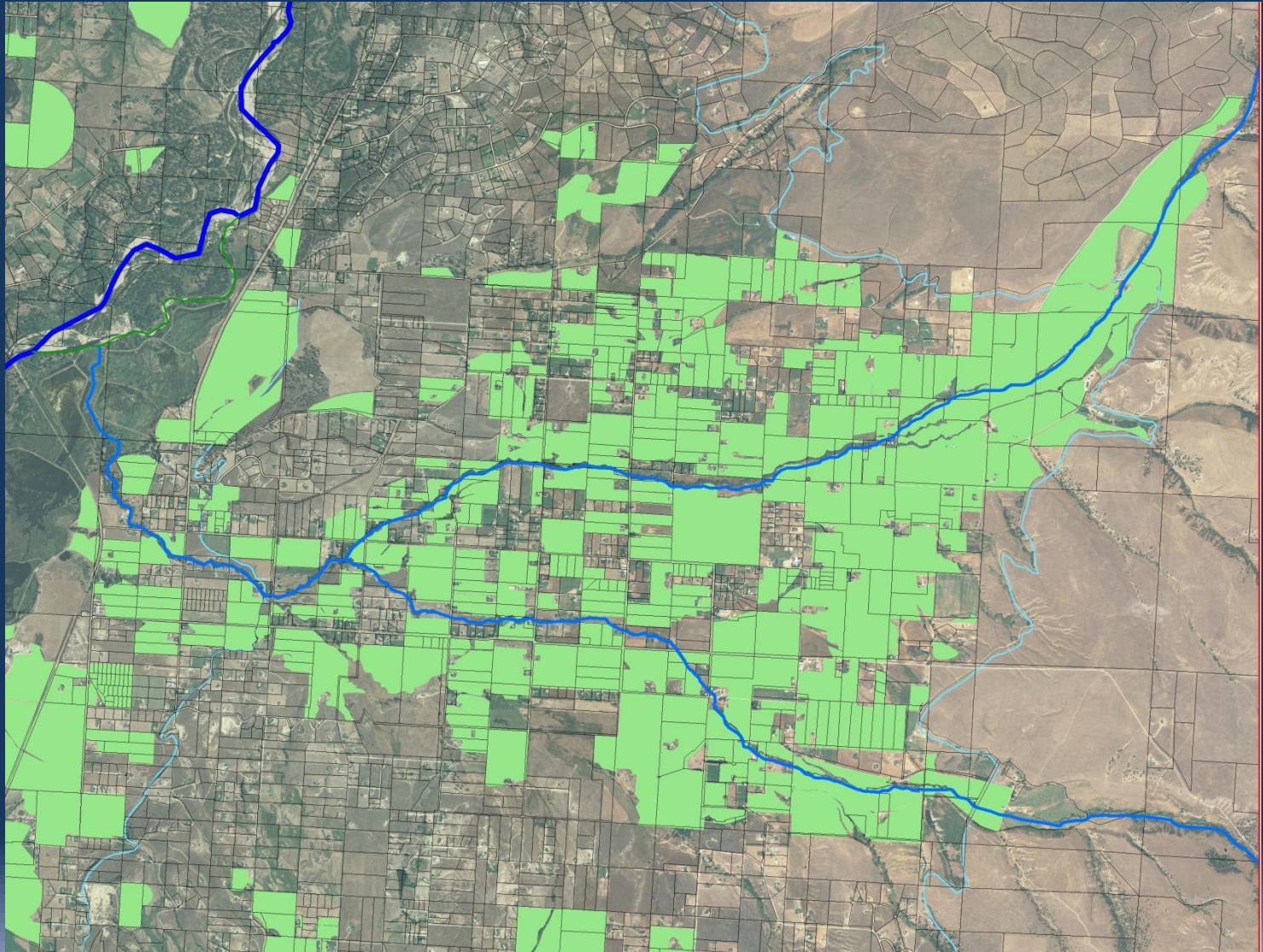
1954



Eightmile Creek Drainage



Threemile Creek Drainage



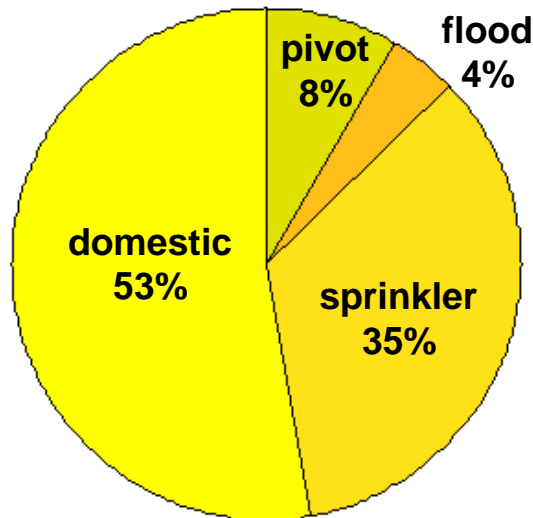
Water Budget Components

Consumptive use (acre-feet)

(all diversions, precipitation subtracted from monthly estimates)

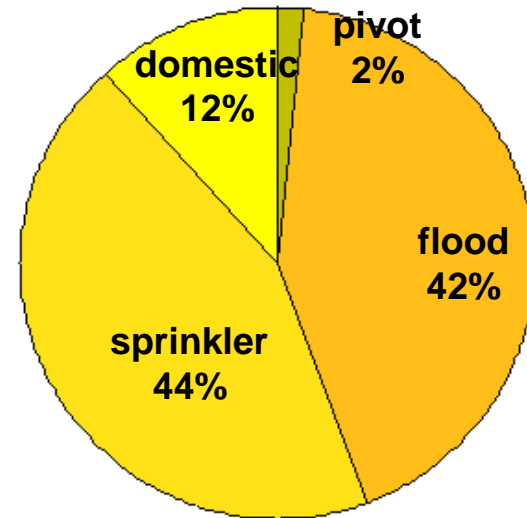
Eightmile Creek

Pivot	145
Flood	75
Sprinkler	600
Domestic	890



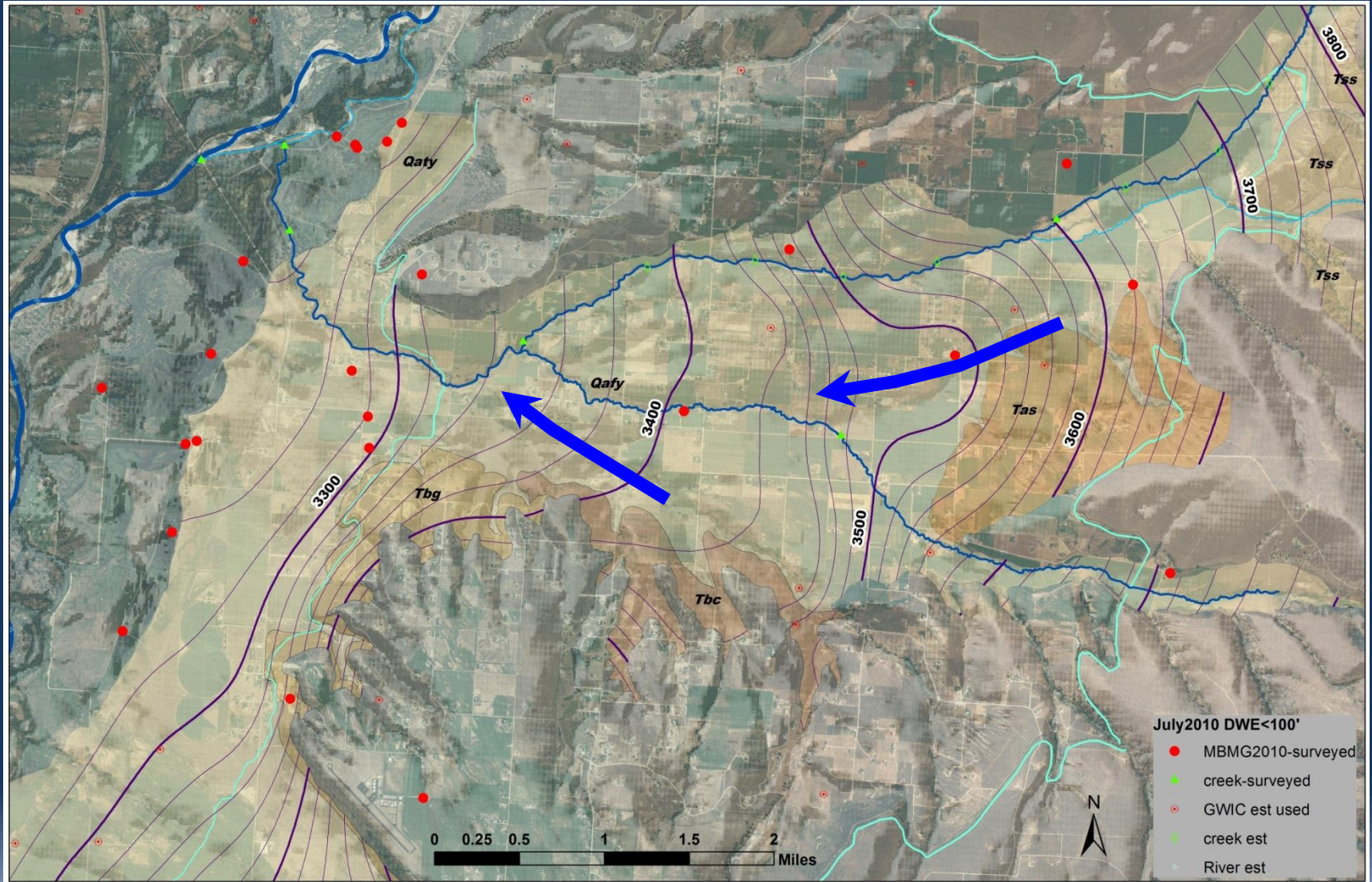
Threemile Creek

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

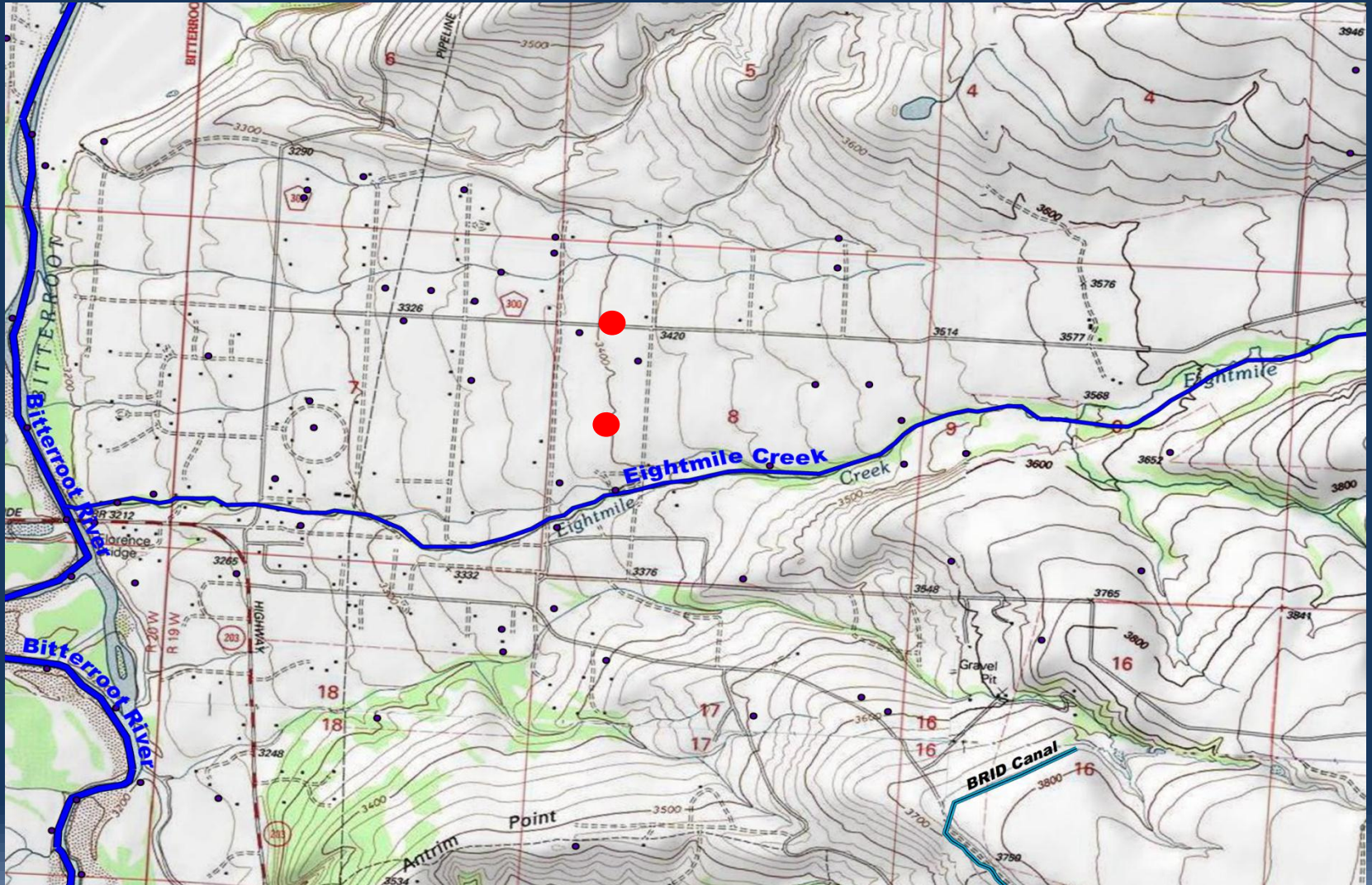
Threemile: Depletion of more than one stream possible
Less likely to extend SD outside immediate area

Land use

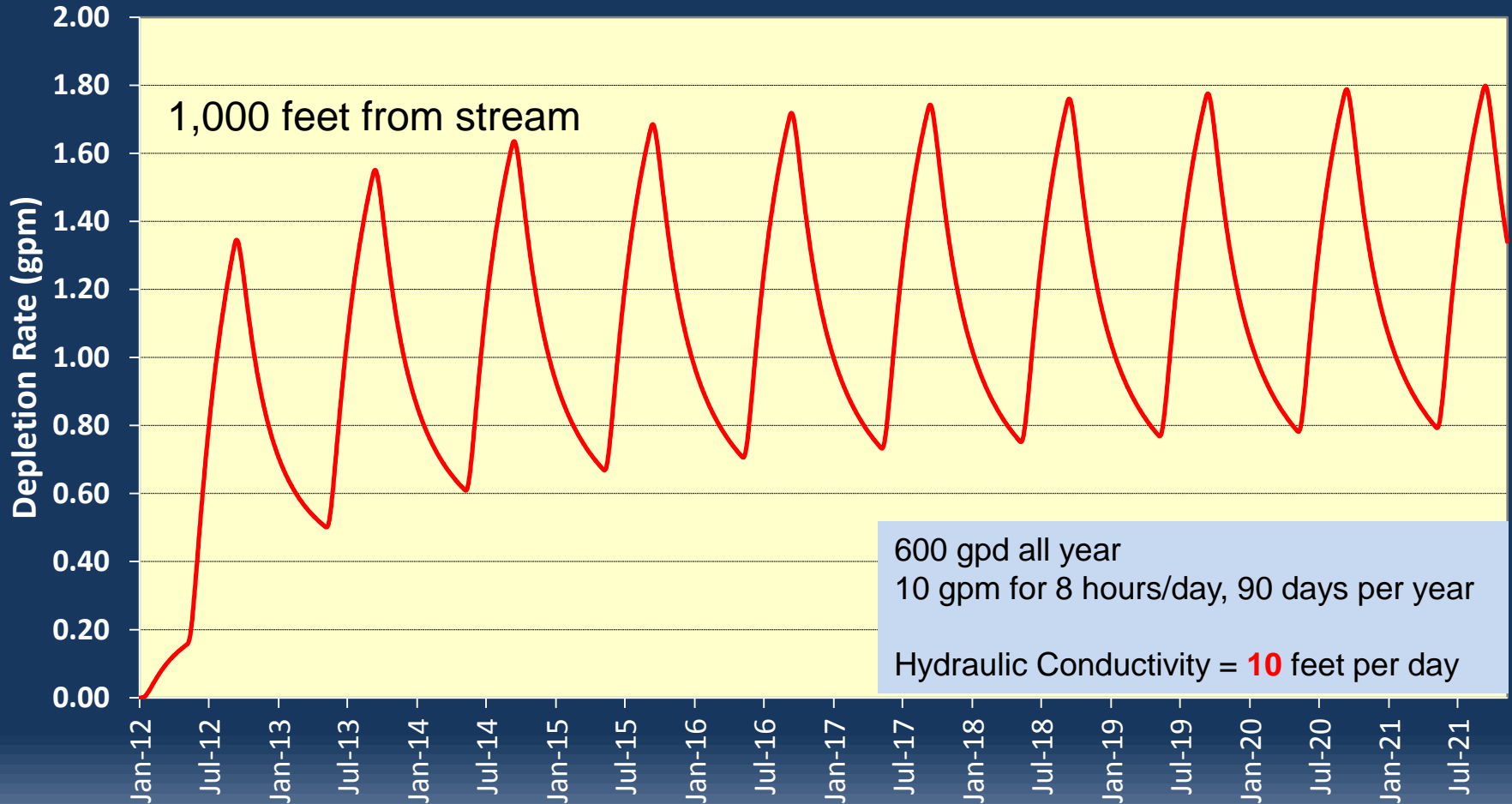
Eightmile Creek: Transition from agriculture to domestic
Limited recharge from canals, less from irrigation

Threemile: Canal loss and irrigation return flow important

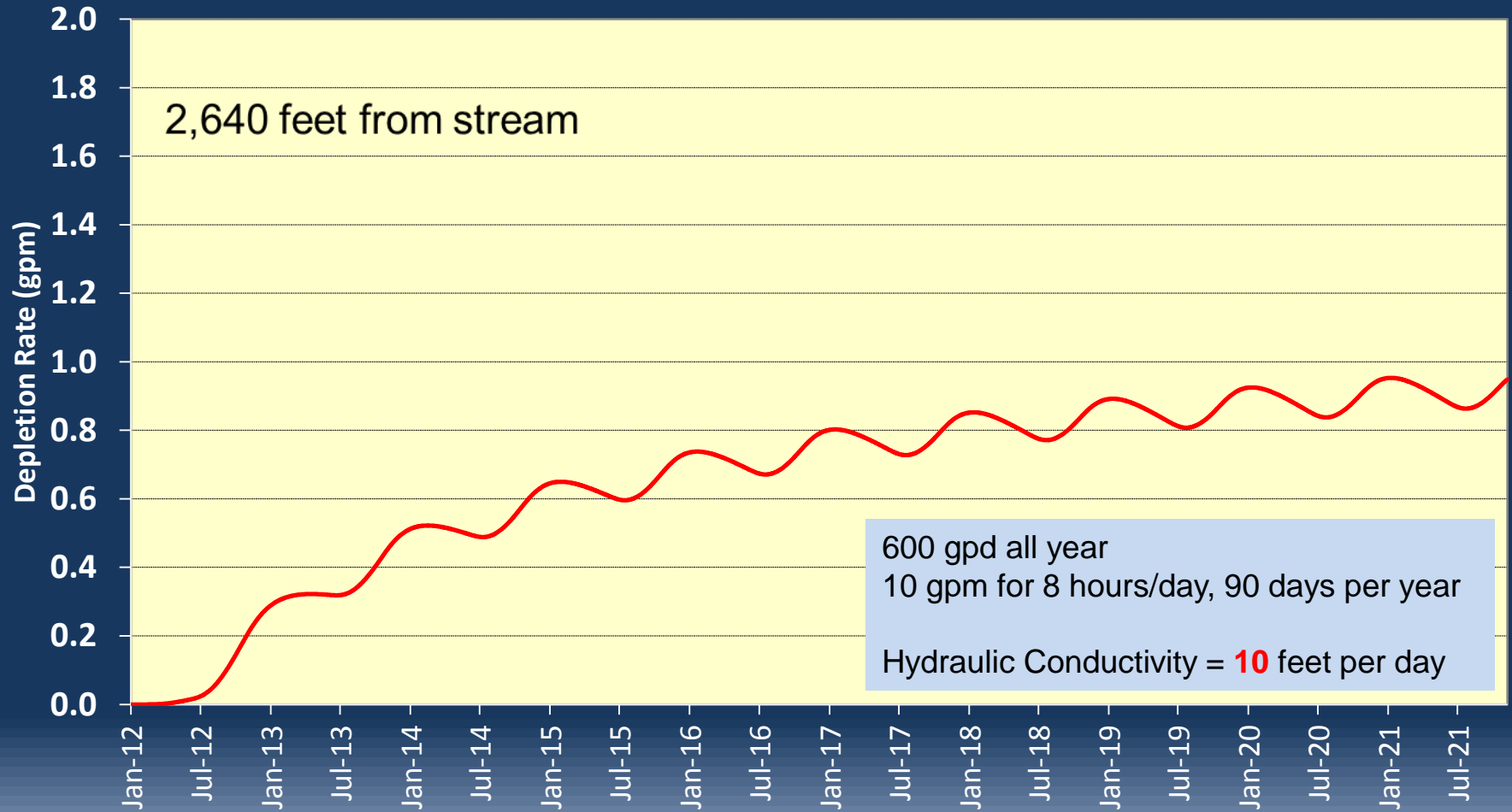
Pumping Scenarios in Eightmile Creek



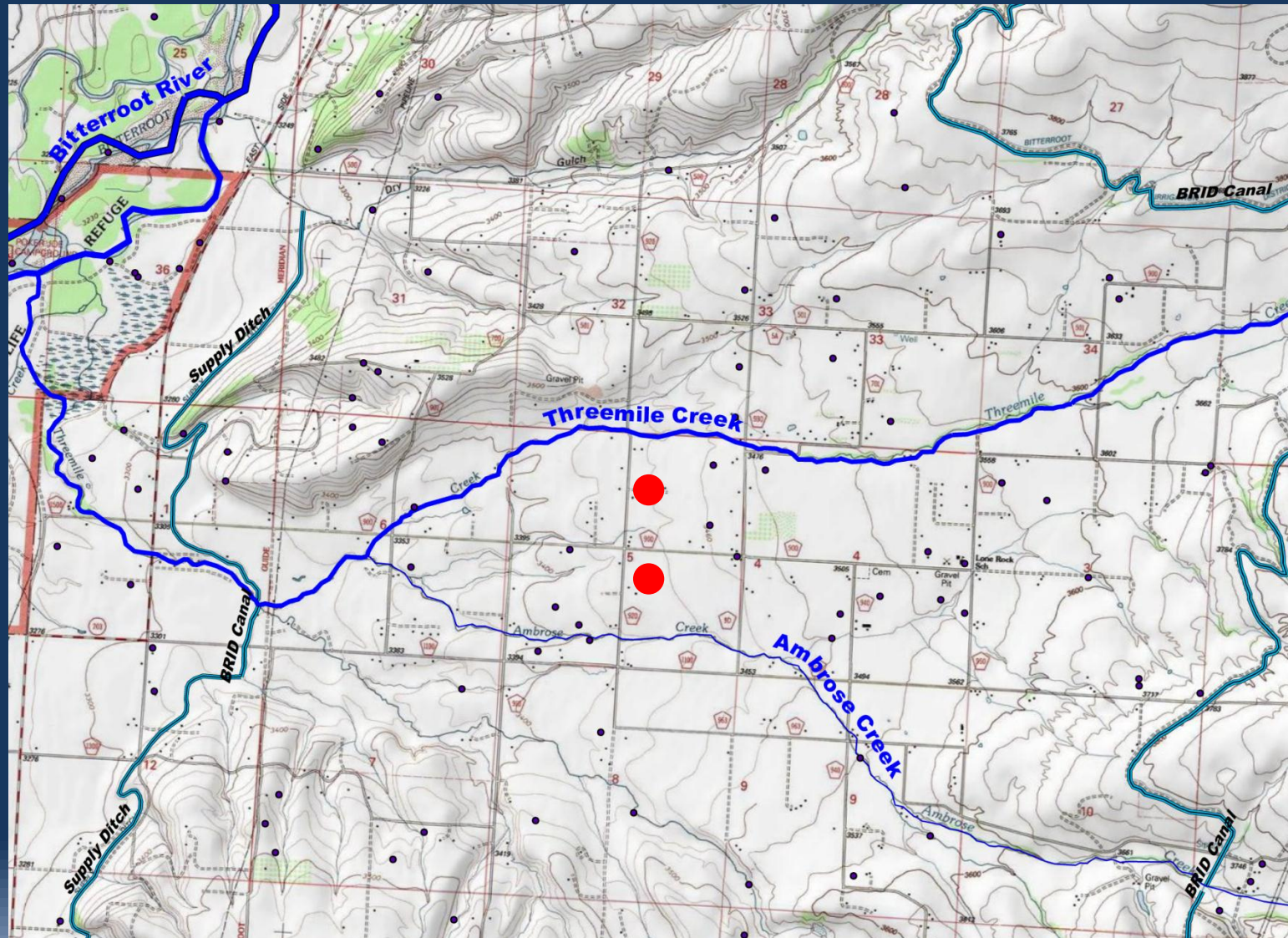
Eightmile Creek Depletion

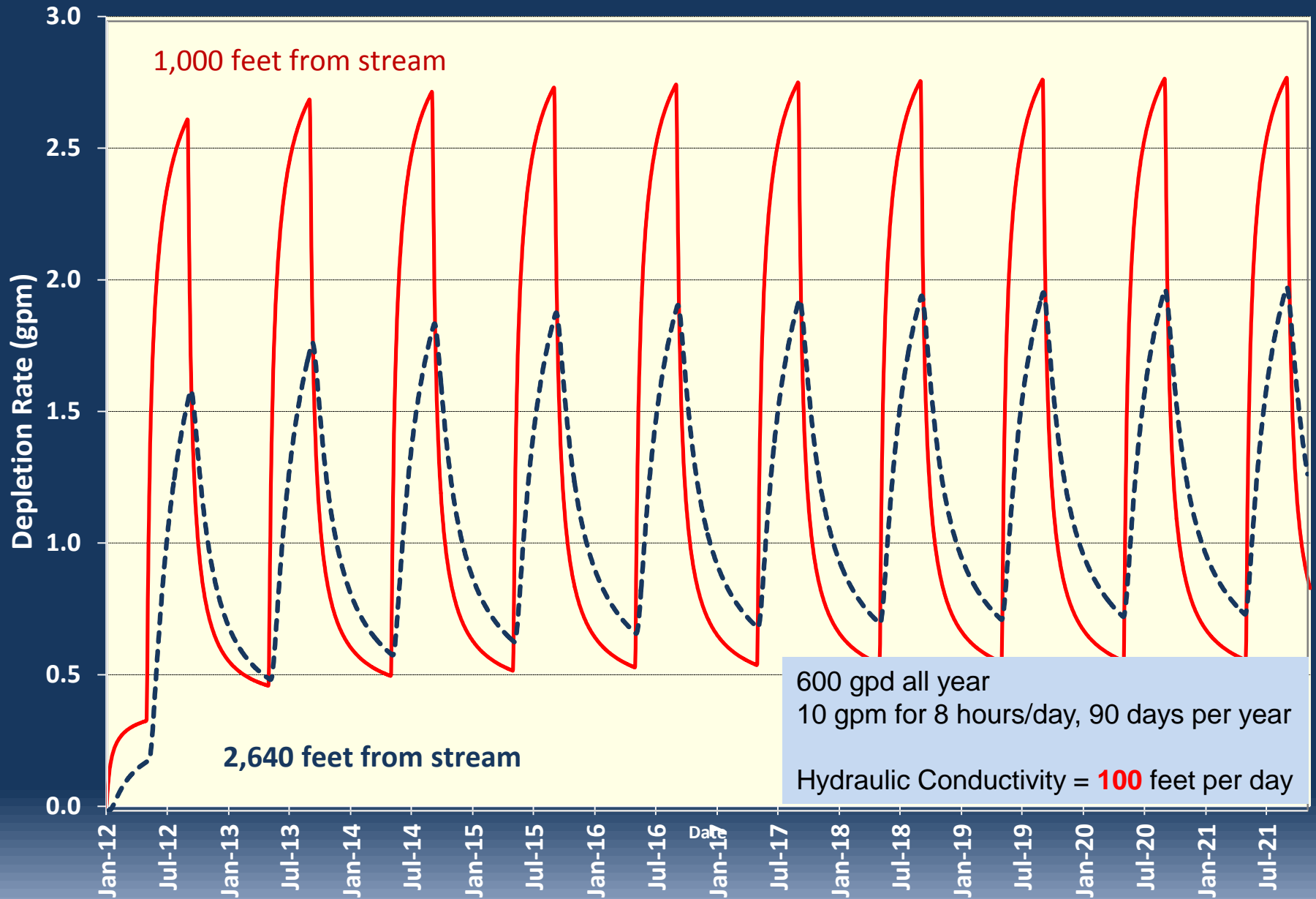


Eightmile Creek Depletion





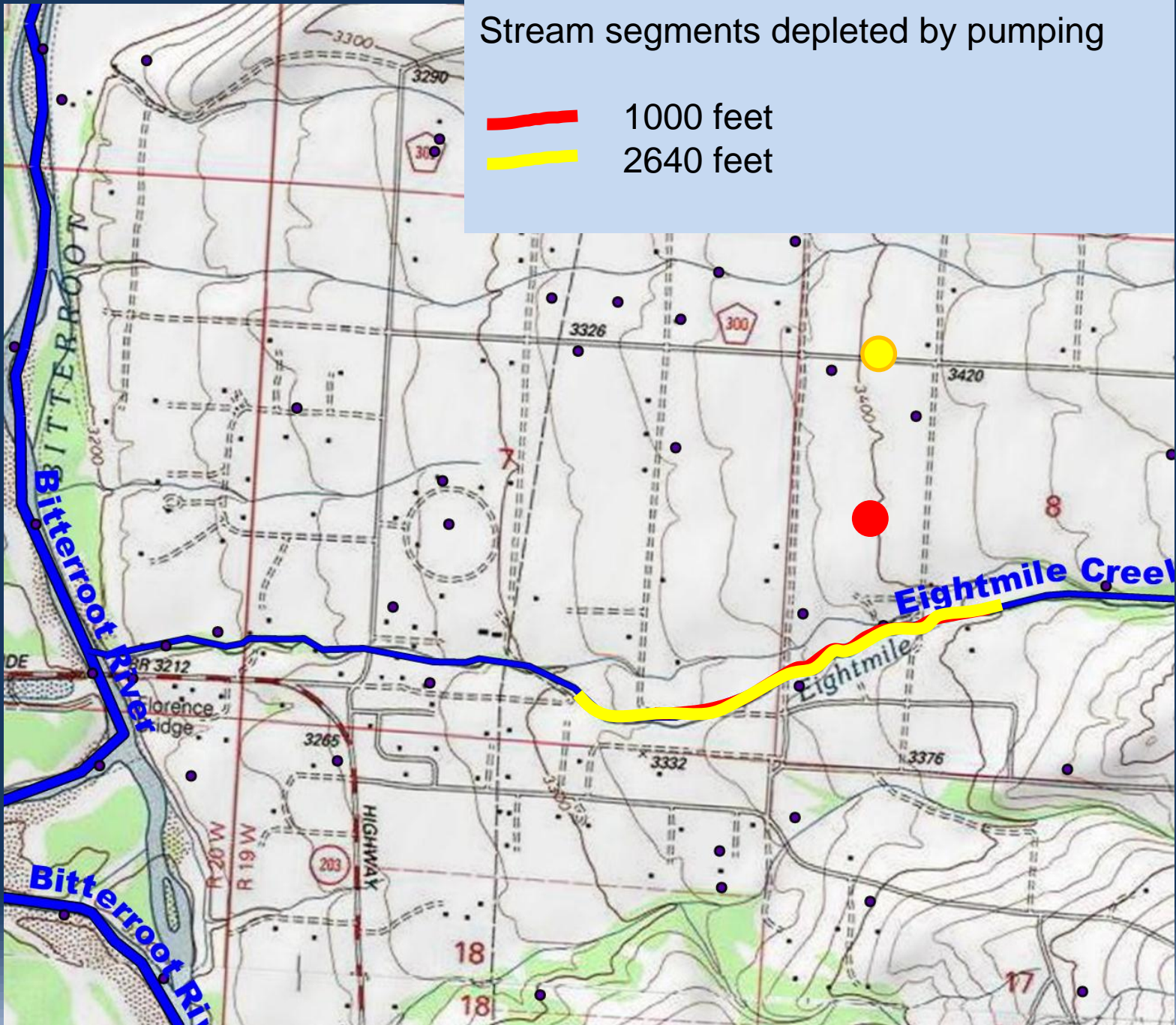
Pumping Scenarios in Threemile Creek







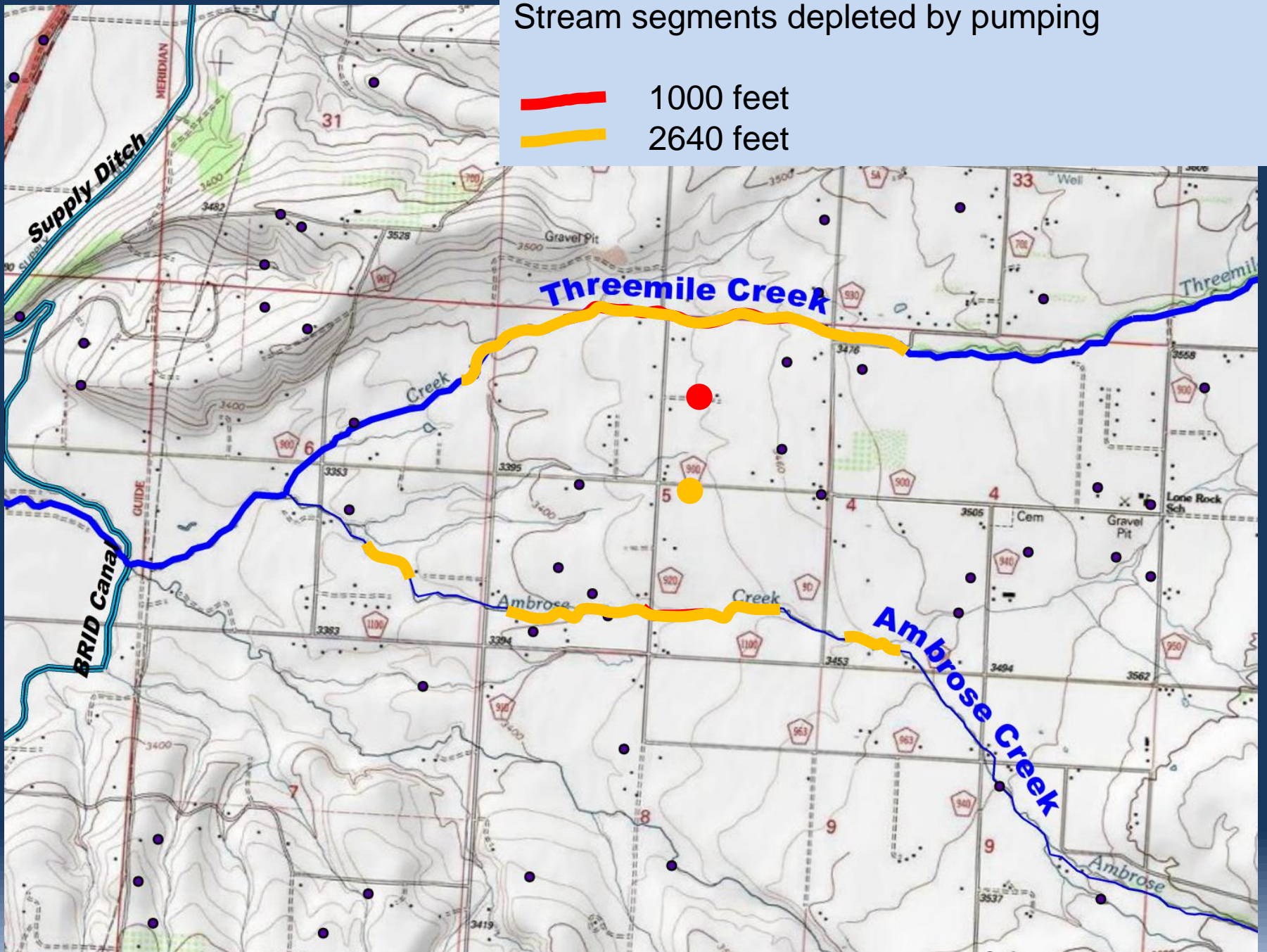
Stream segments depleted by pumping

-  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

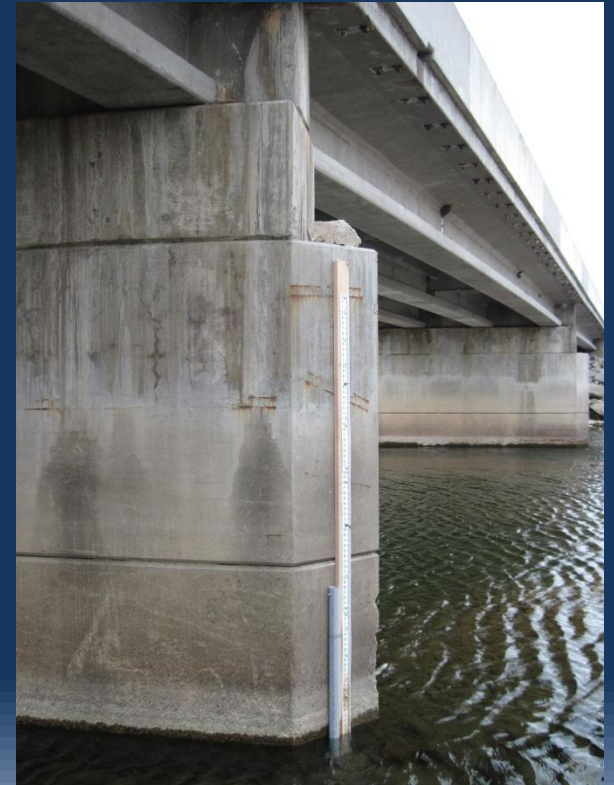
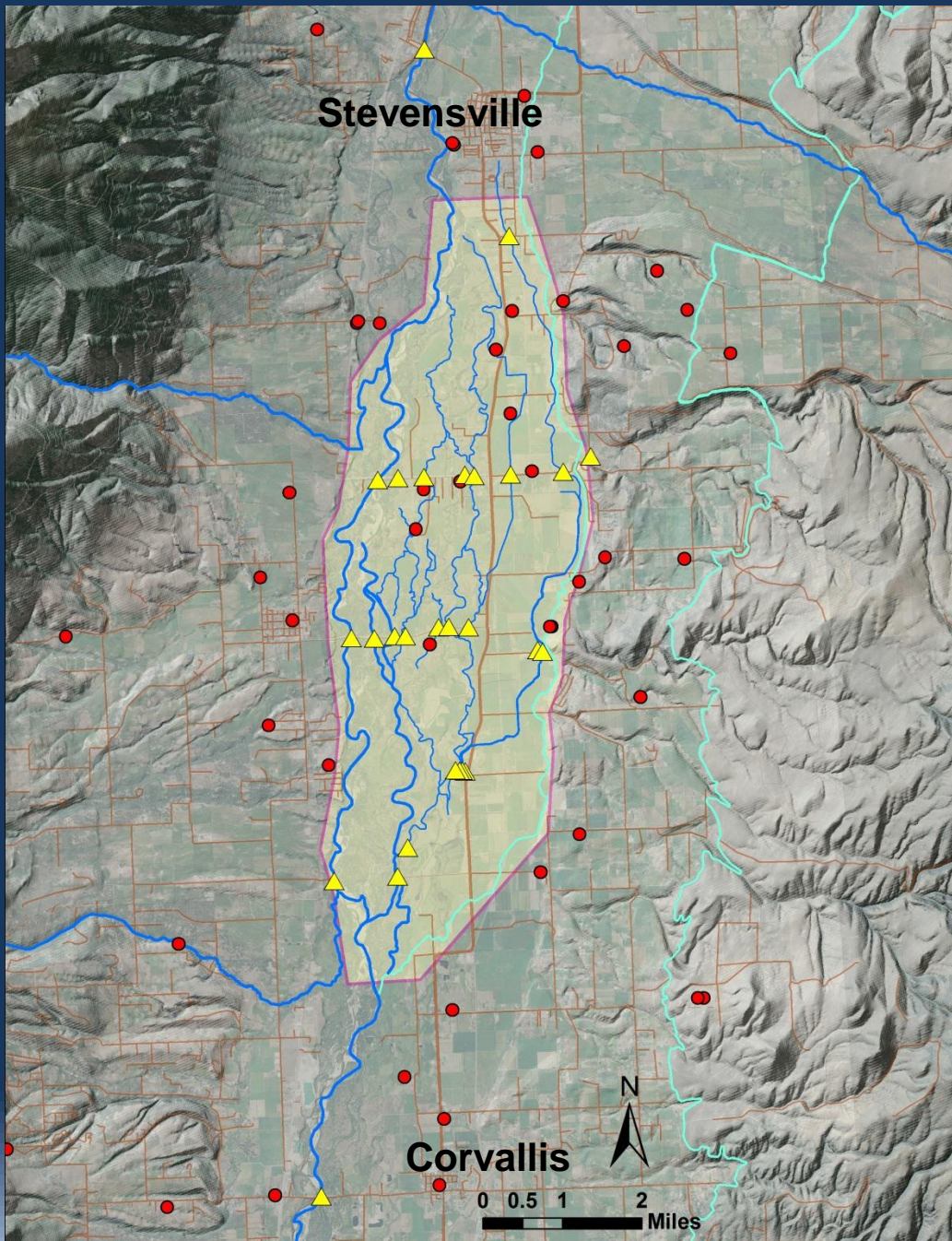


Purpose

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

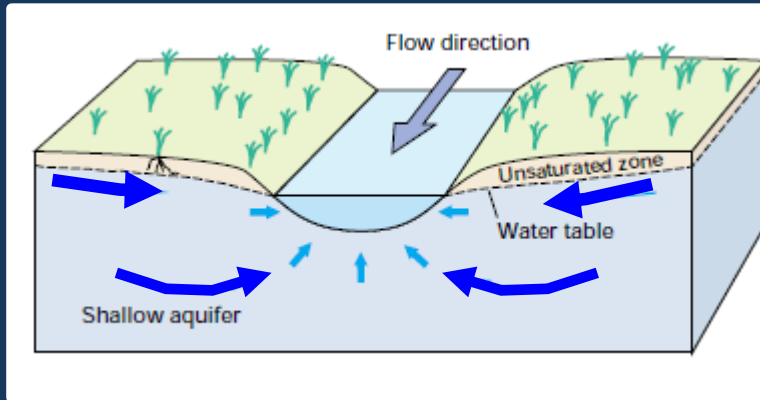
Monitoring Network



Groundwater / Surface Water Interaction

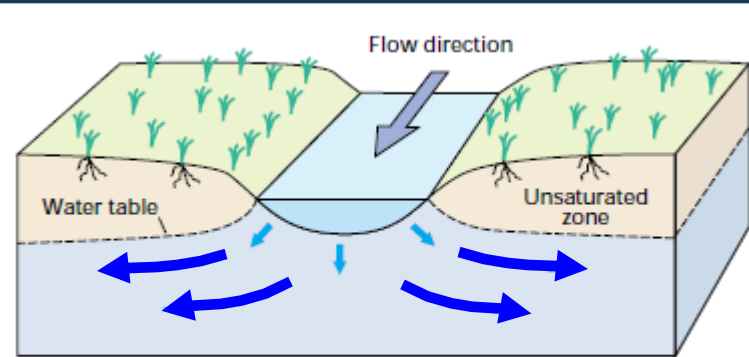
Gaining stream/ditch

Streams/ditches gain water from inflow of groundwater



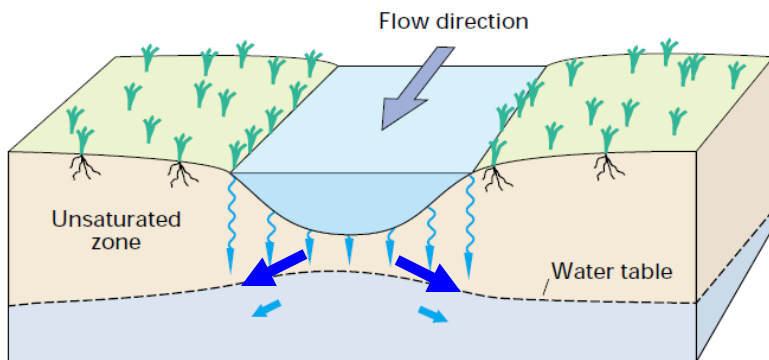
Loosing stream/ditch

Streams/ditches lose water to groundwater
Connected system



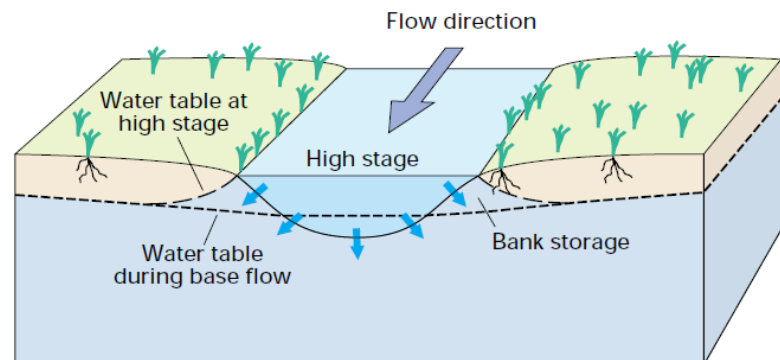
Loosing stream/ditch

Streams/ditches lose water to groundwater
Disconnected system



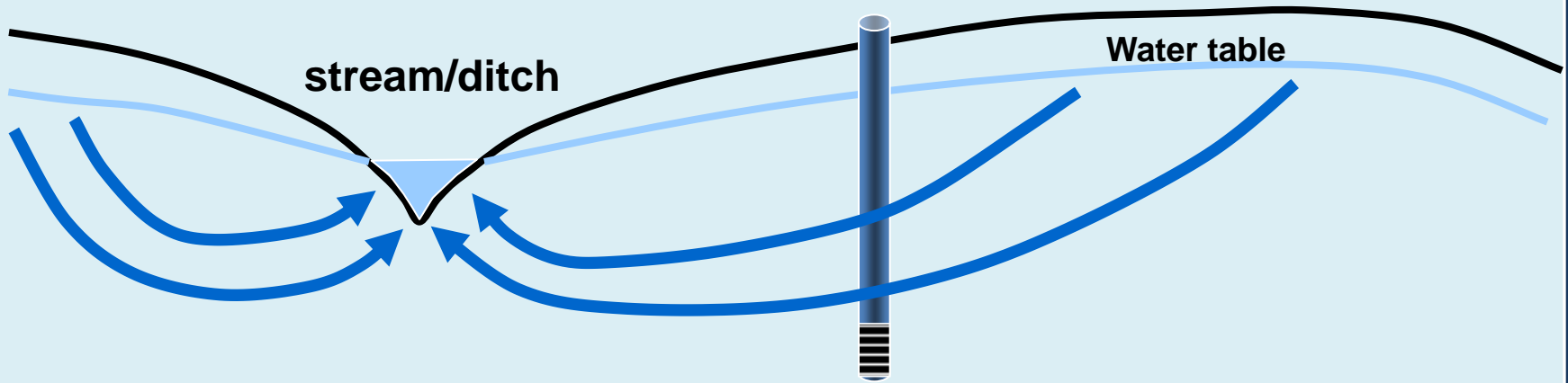
Bank Storage

Stream levels higher than groundwater
Varies seasonally

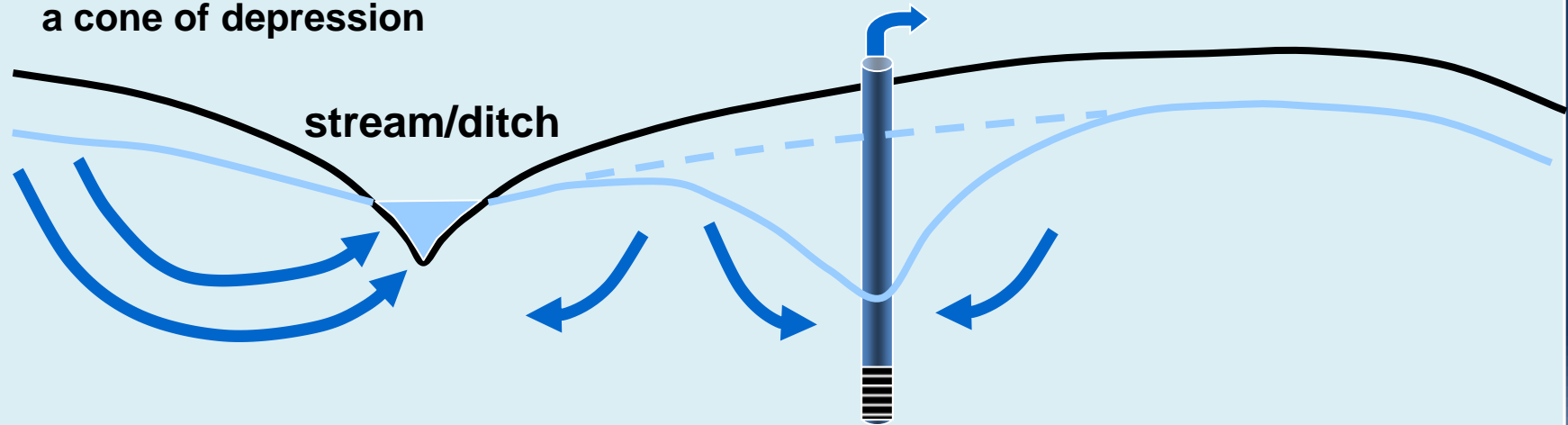


Groundwater flow and pumping near a stream

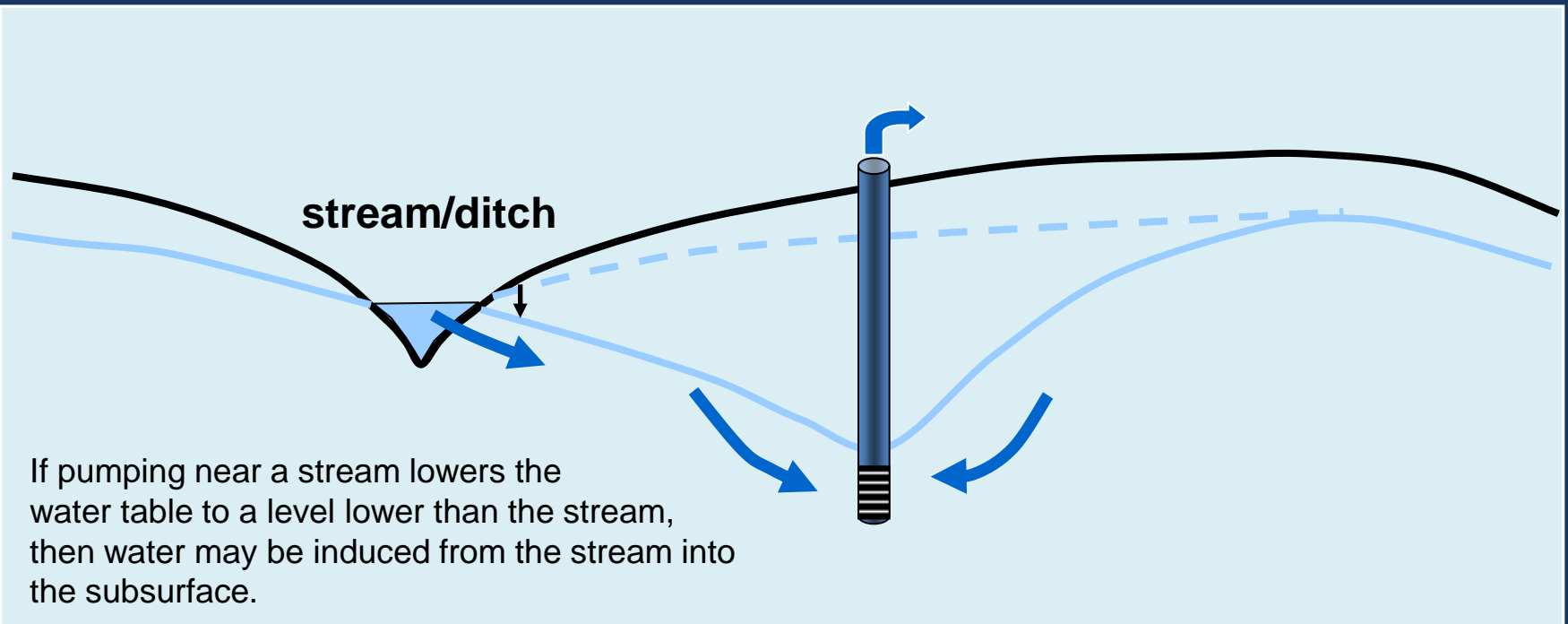
Cross Section View



Pumping a well will create
a cone of depression



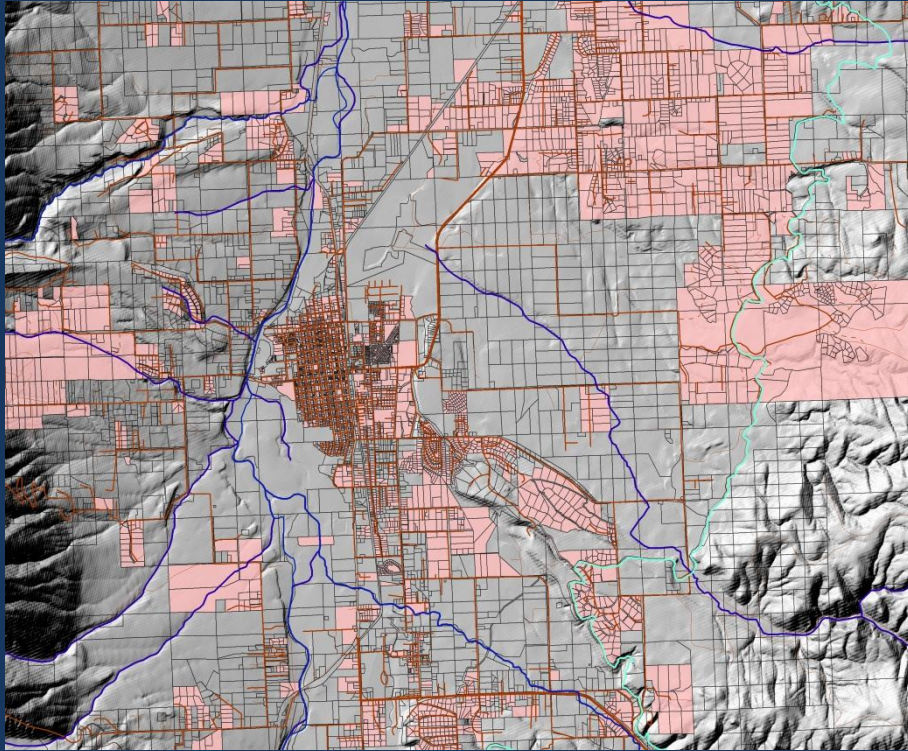
Continued pumping ...



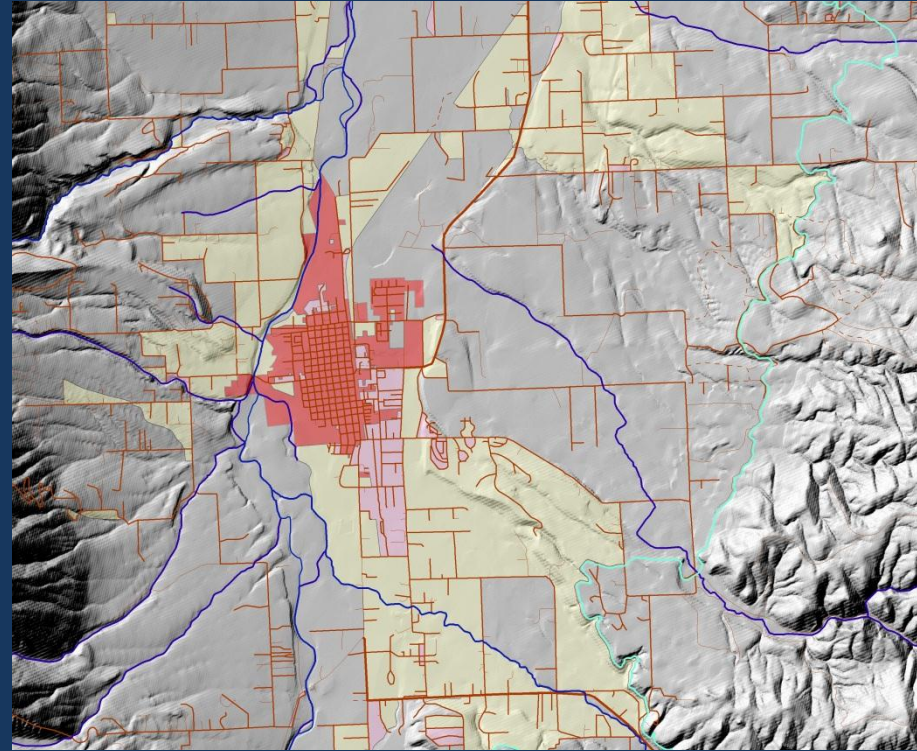
Project Status



Hamilton



Subdivisions



Septic System Density