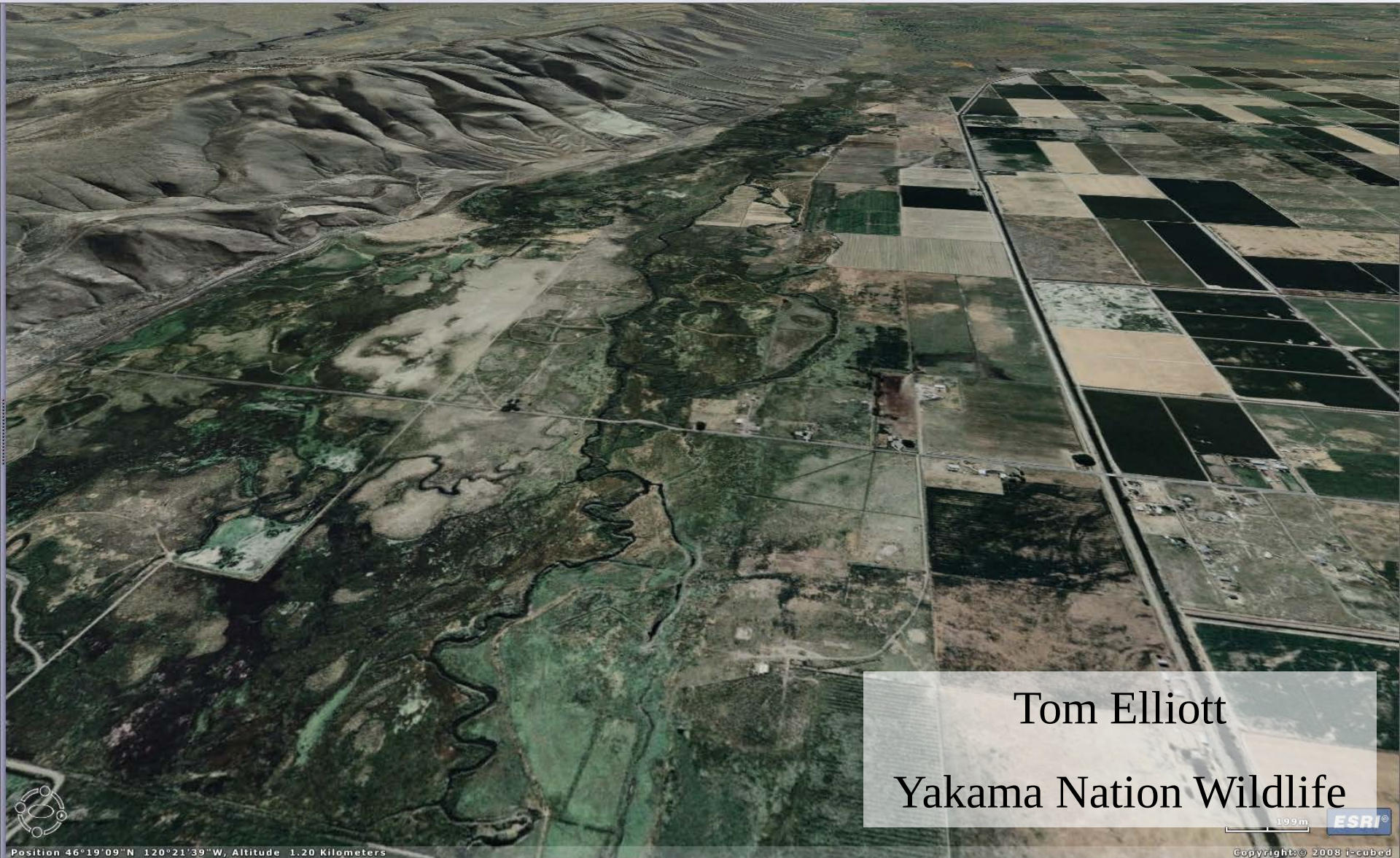
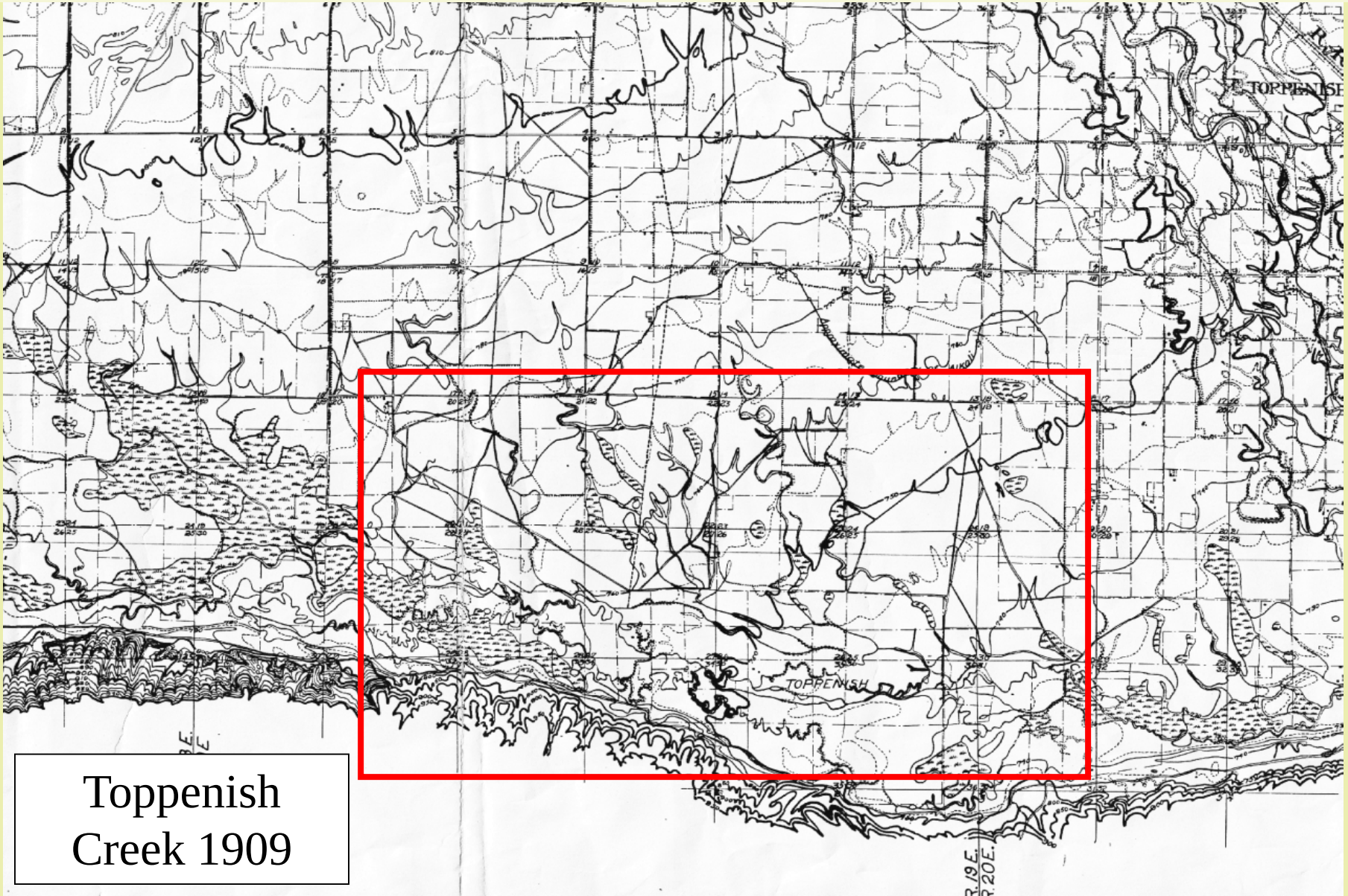
Ground Water Effects of Toppenish Creek Restoration



Project Area-Toppenish Creek on Yakama Reservation



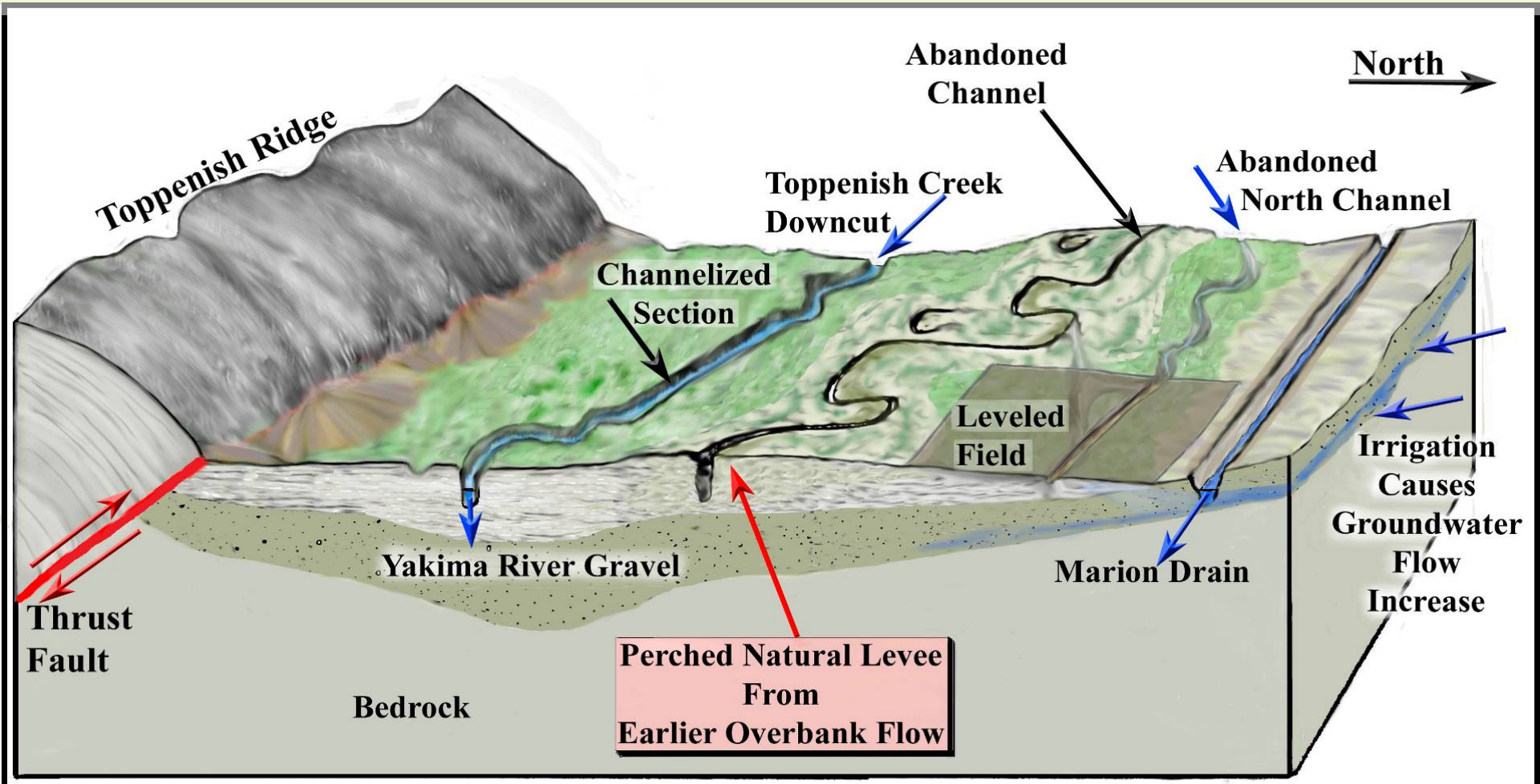
Toppenish Creek 1909

Historical Context

Drastic land use changes over last 200 years-

- Beaver trapping
- Cattle and sheep grazing
- Railroad and road development
- Irrigated Agriculture

Floodplain Disconnection

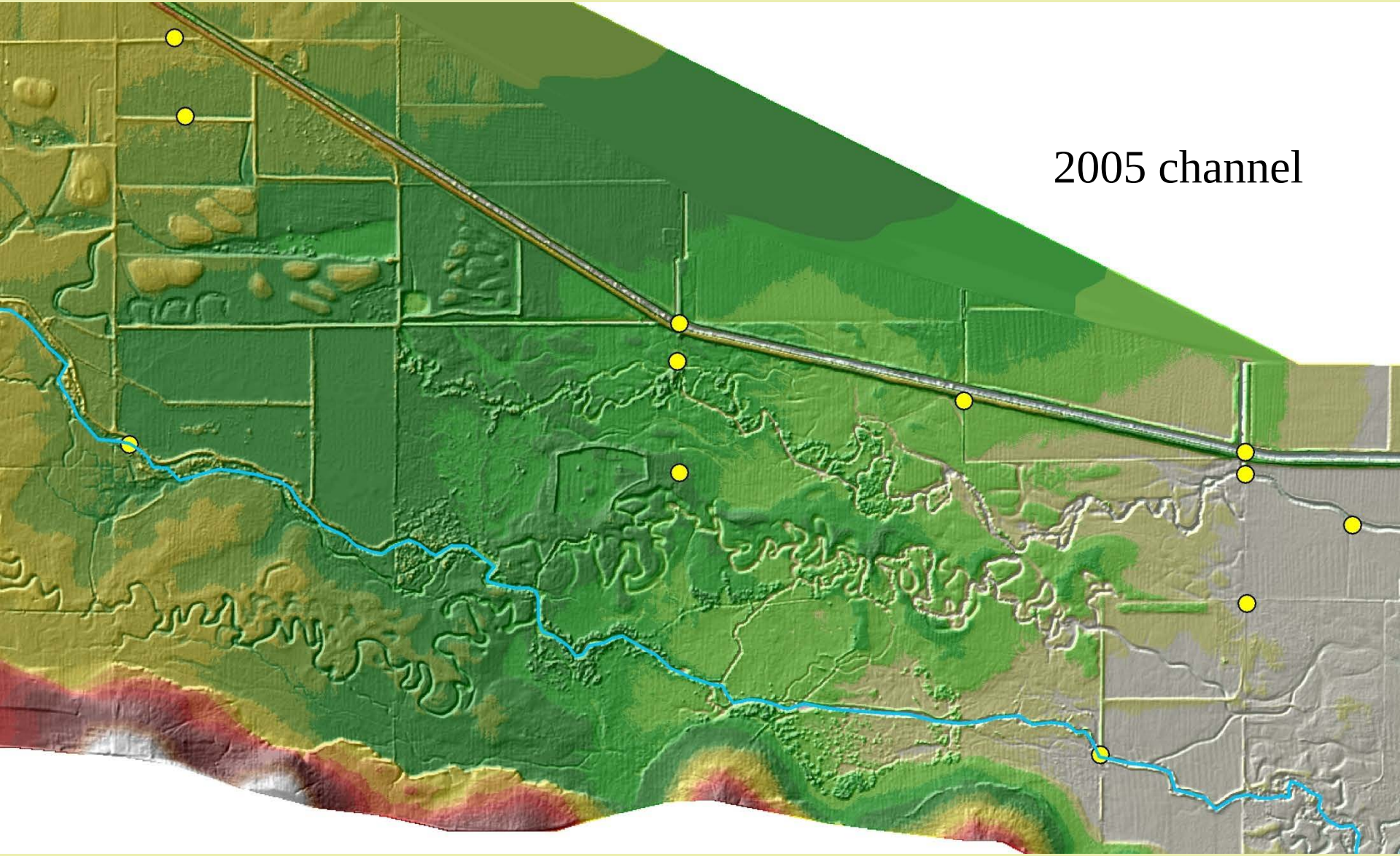


Lower Toppenish Creek
After Marion Drain Installed
1950 AD (55 Years Ago)

Valley Slope:
6.7Ft/Mile (0.13%)

Prepared By:
Geomax, P.C.

LiDAR Elevation Model

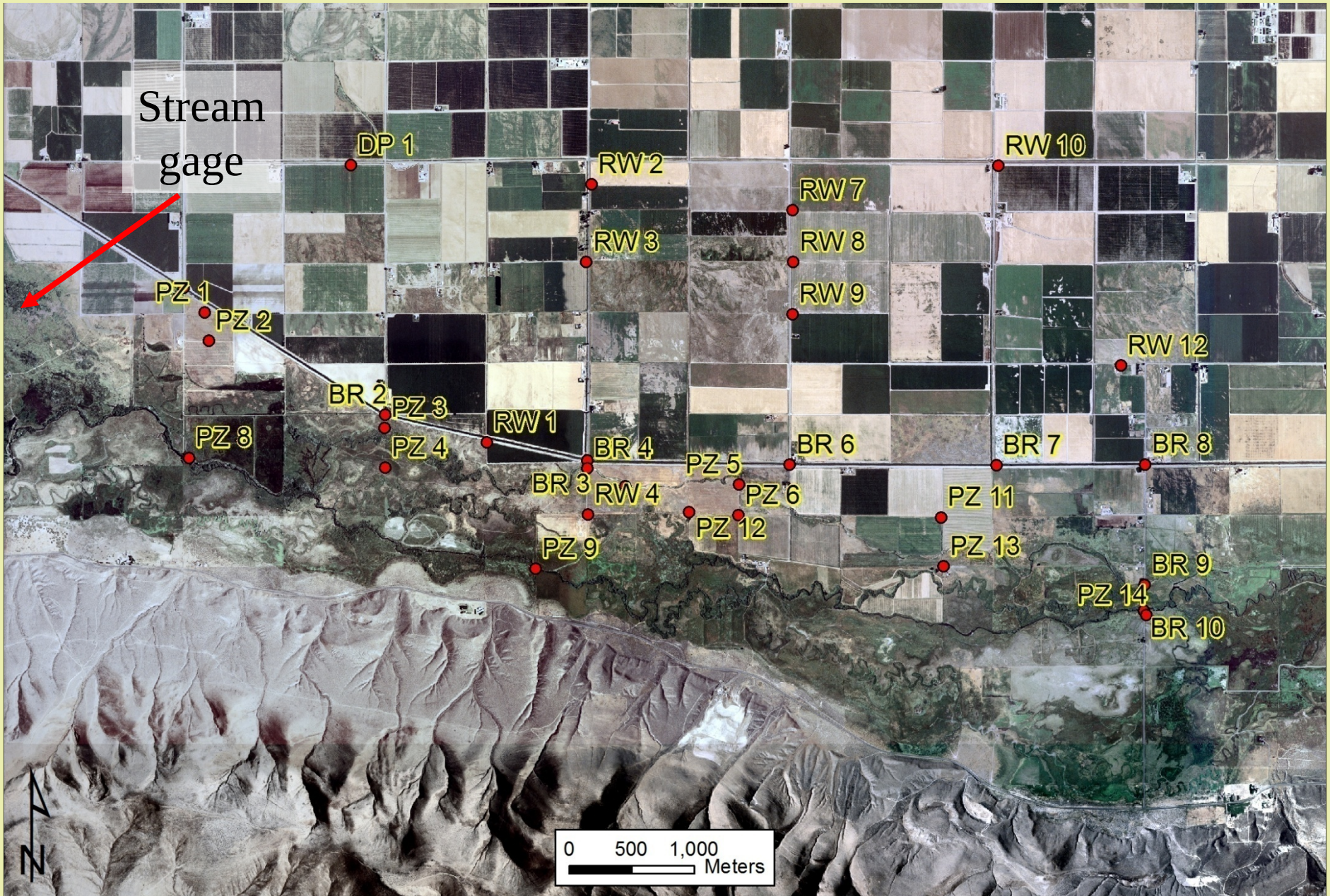


Floodplain Restoration Using Grade Control

Goals:

- Reconnect previously active channels and floodplain
- Spread flood waters
- Raise water table for riparian habitat improvement

Monitoring Network

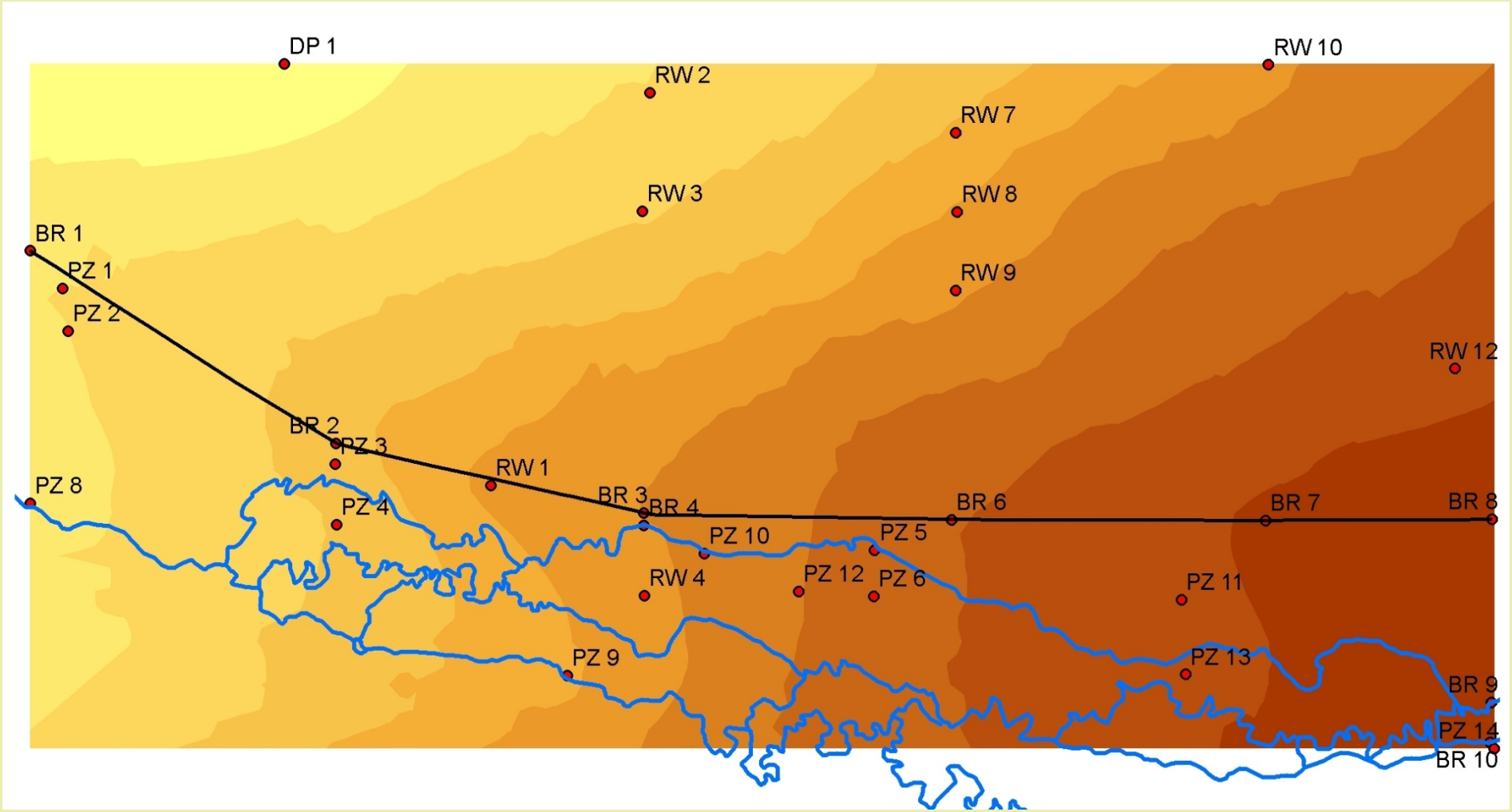


Study Approach

Did the project raise the floodplain water table relative to creek flows?

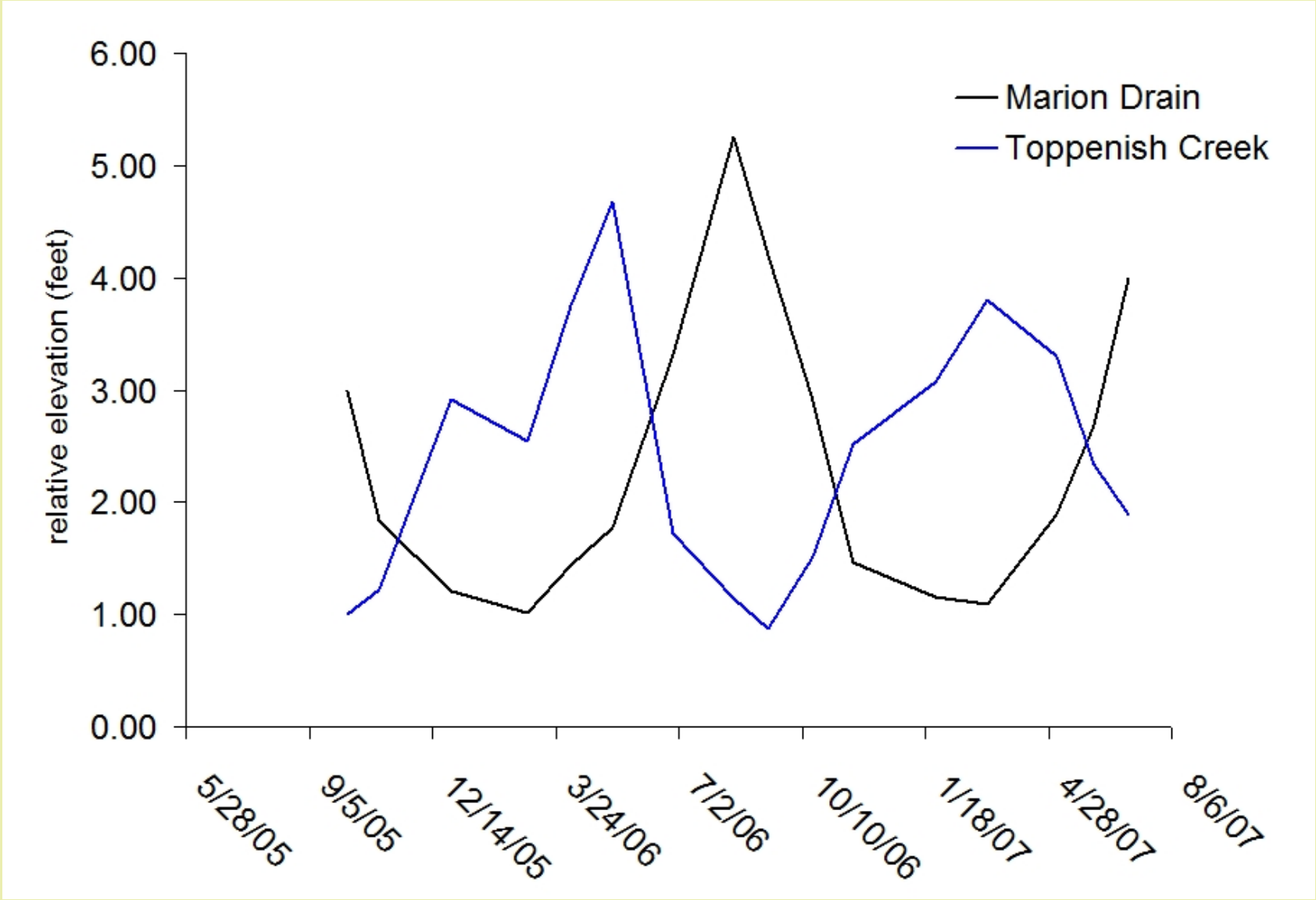
- Collect and reduce data
- Characterize groundwater interactions
- Select wells that show creek influence
- Compare water levels before and after project completion for selected wells
- Project was completed in fall of 2006

Water table March 23 2009

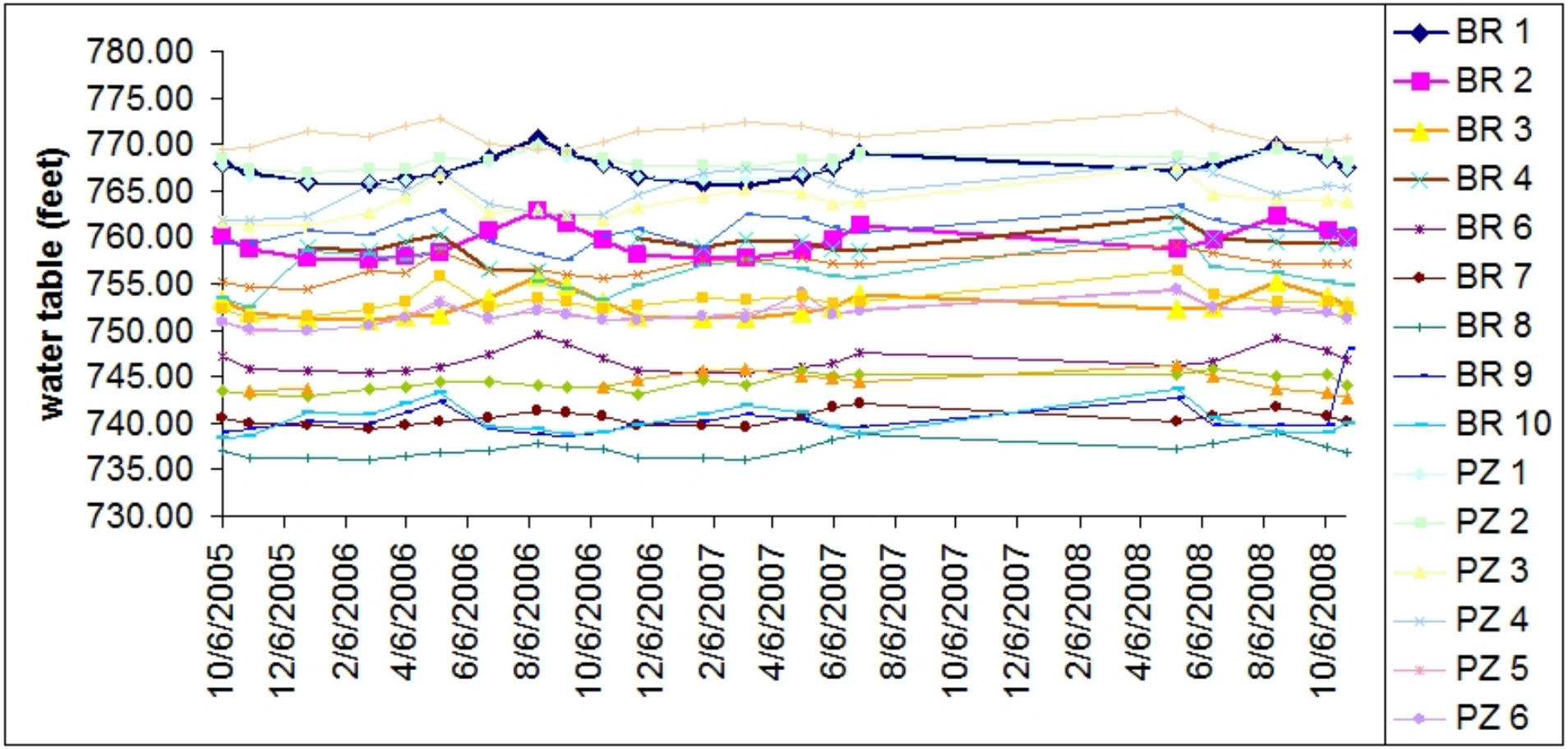


Kriged using ArcMap Geostatistical Analyst

Toppenish Creek vs. Marion Drain

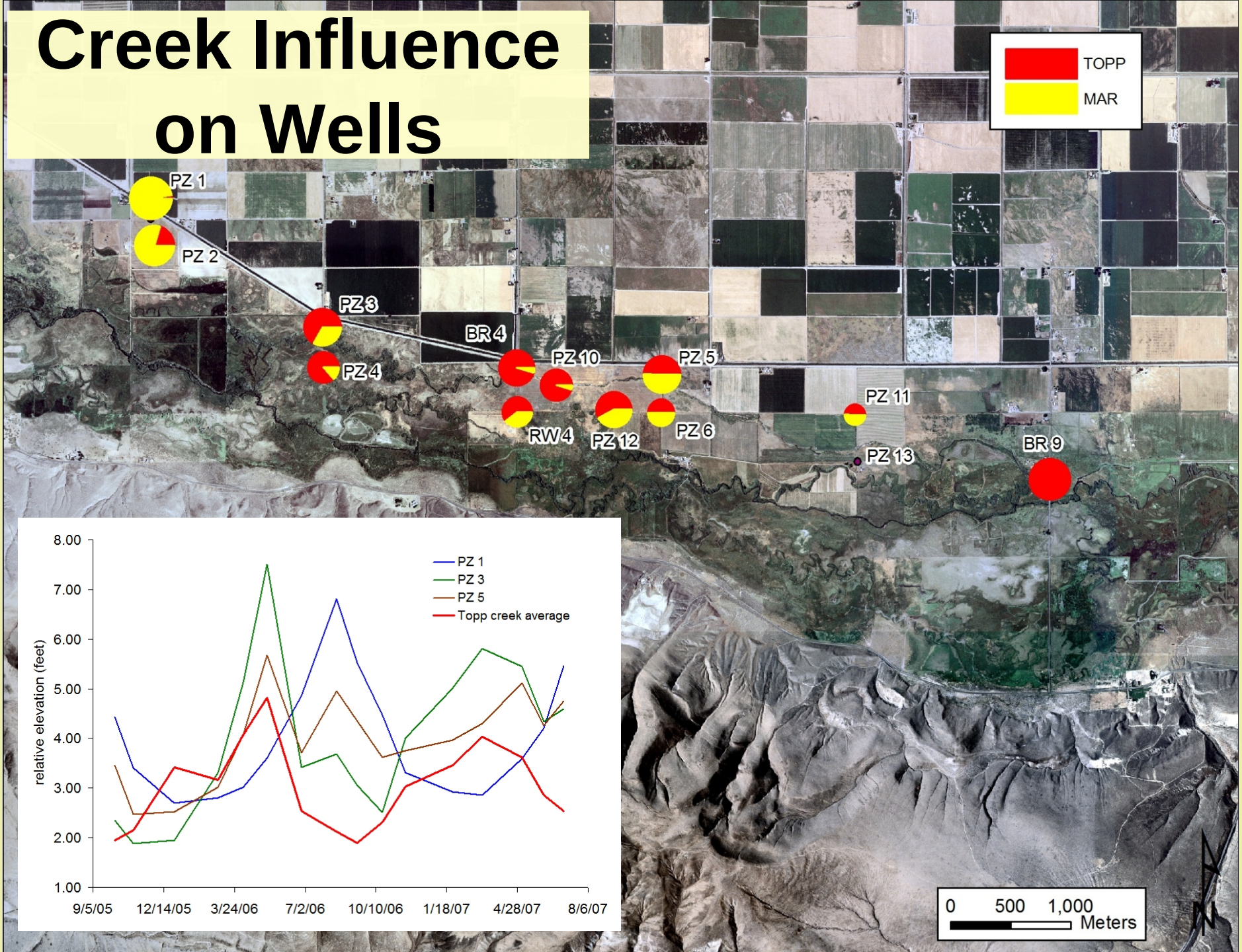


Well Data

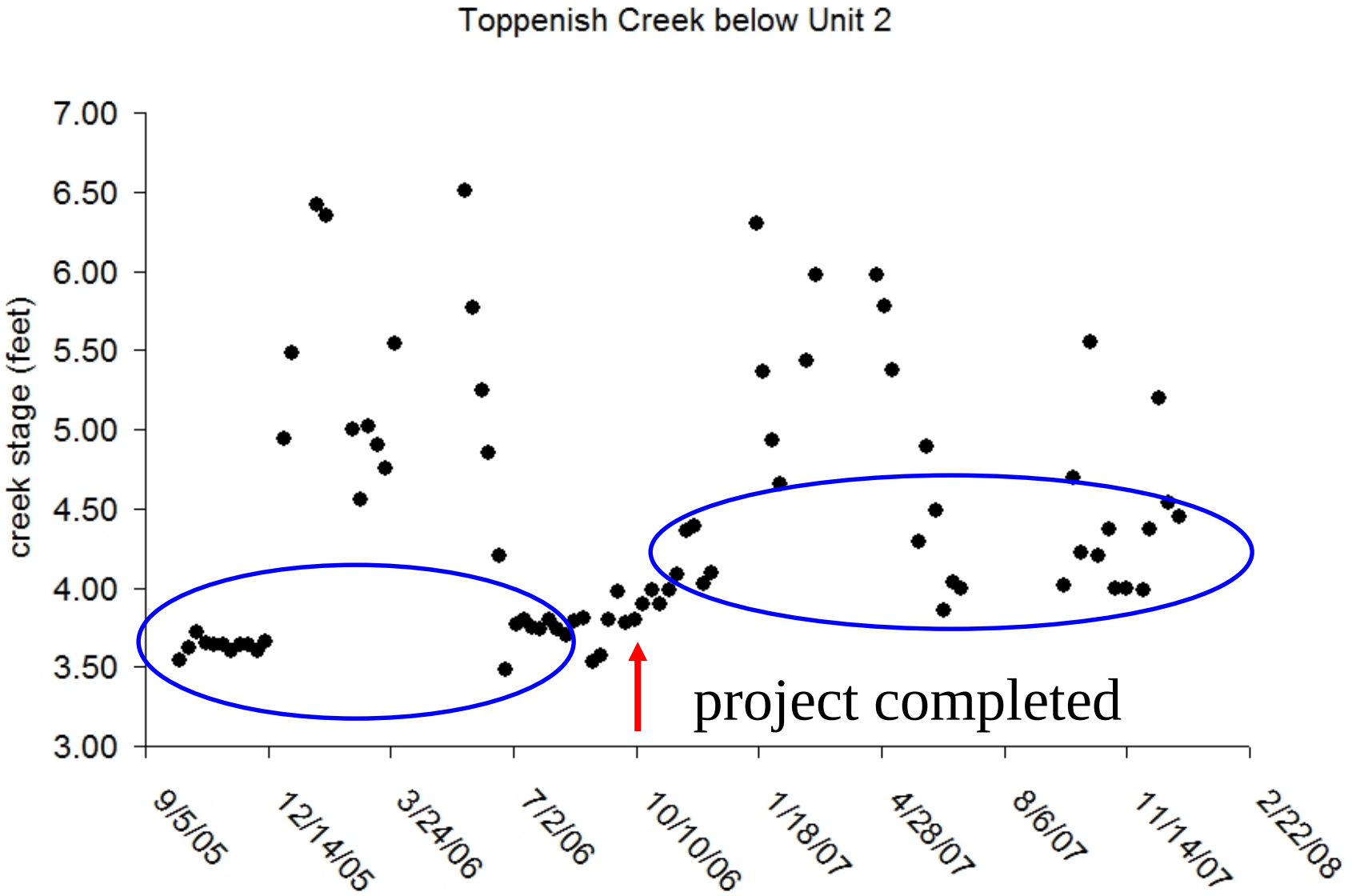


need to reduce!

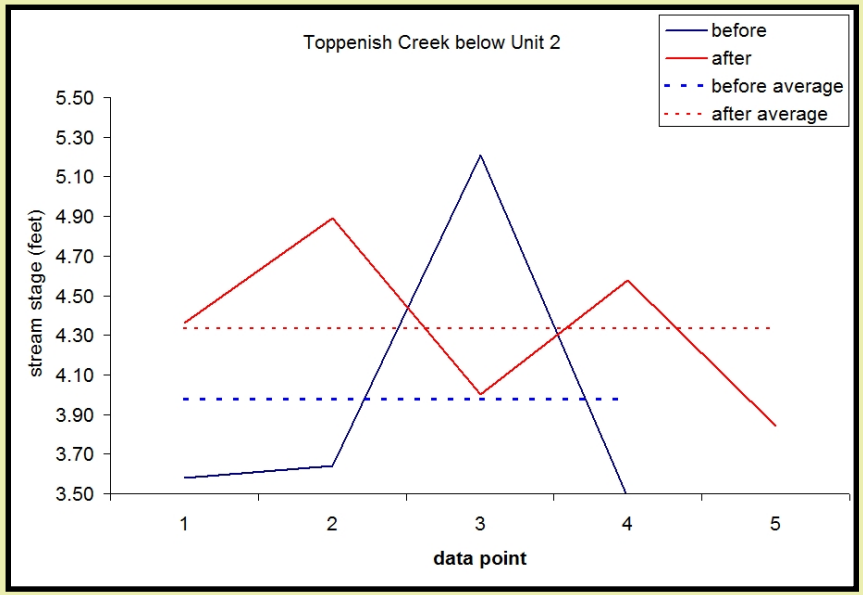
Creek Influence on Wells

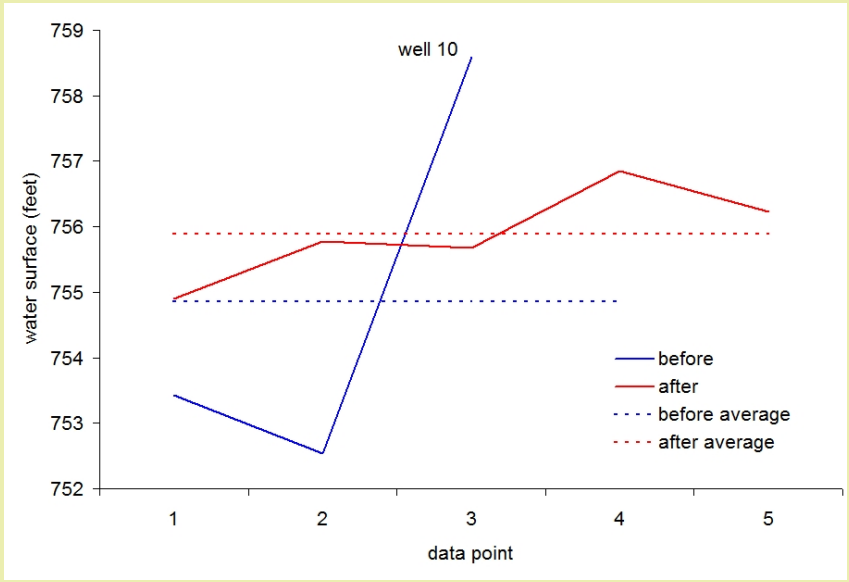


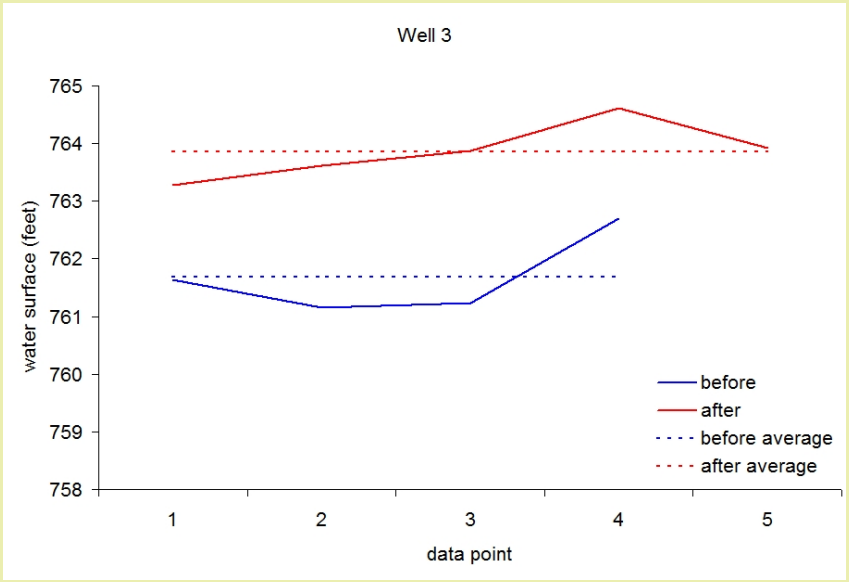
Stream Stage Data

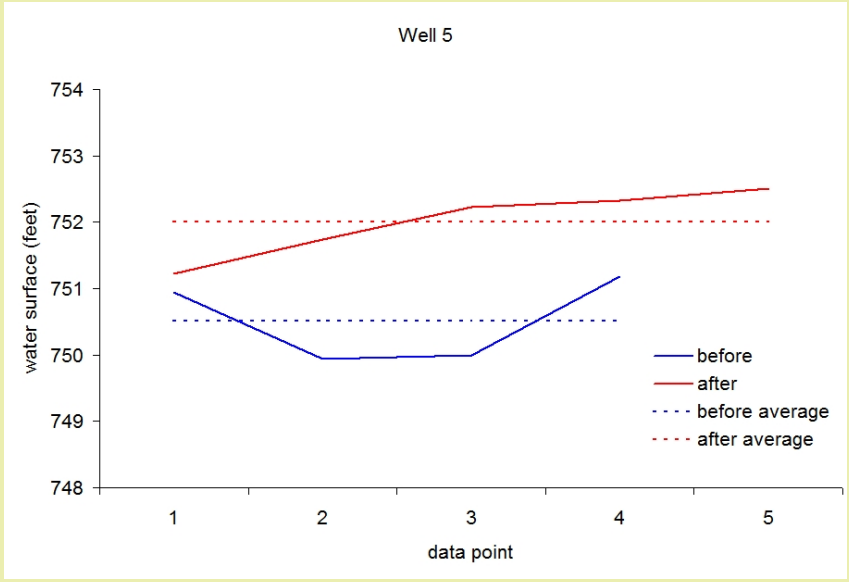


Graphical analysis



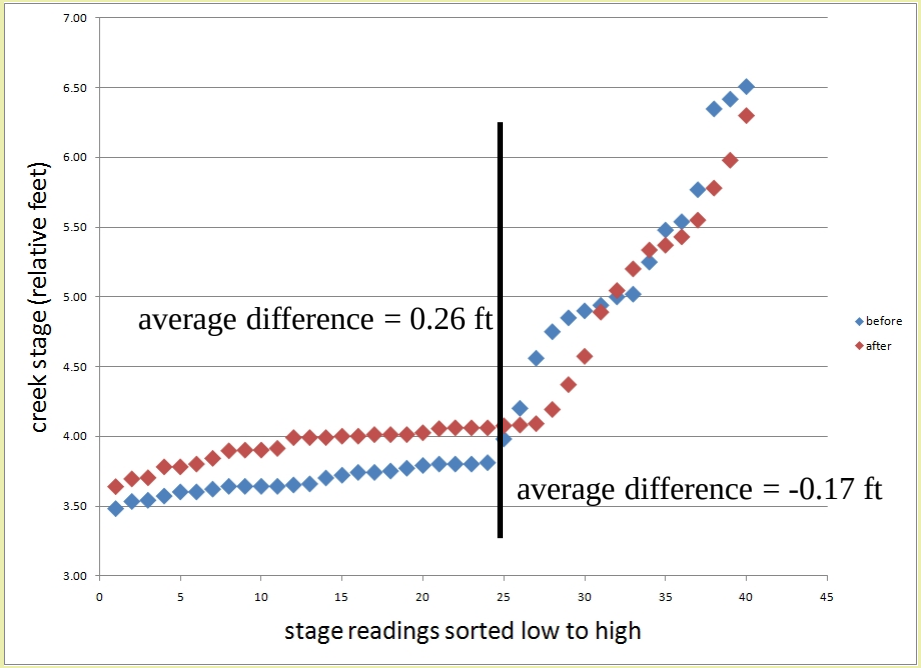




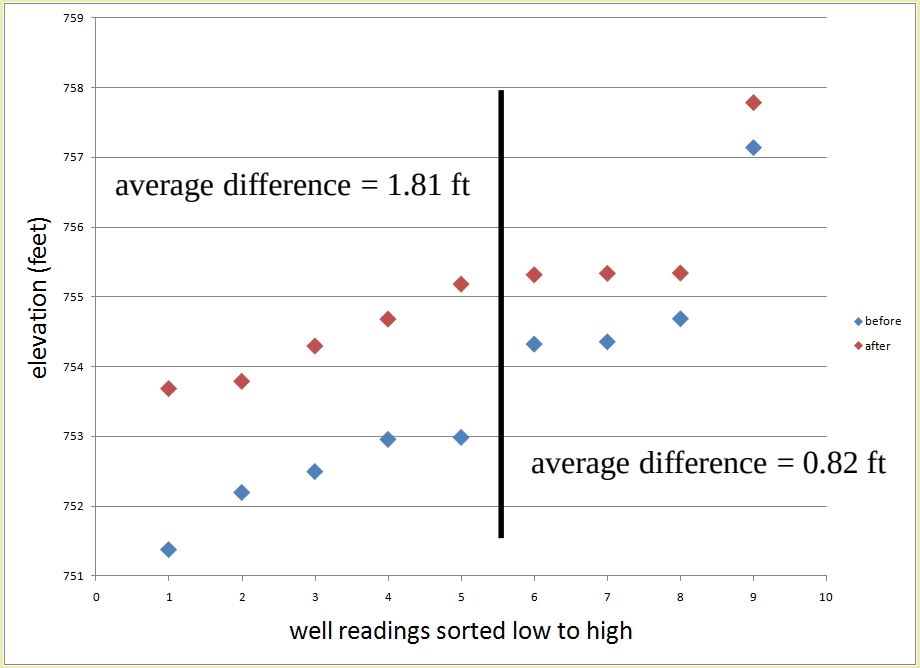


Water levels before and after

Toppenish Creek at Unit 2

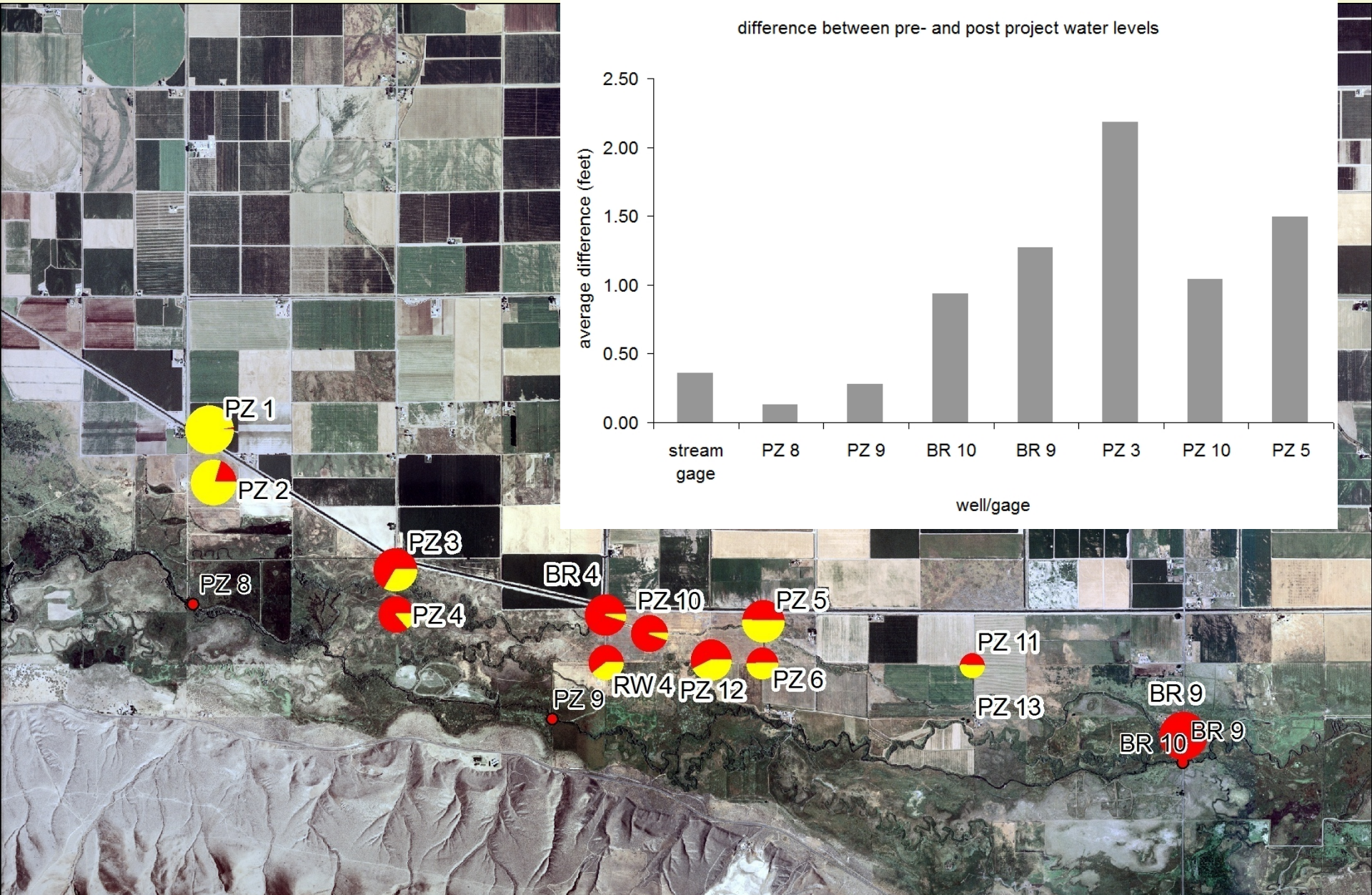


Average water levels in selected wells

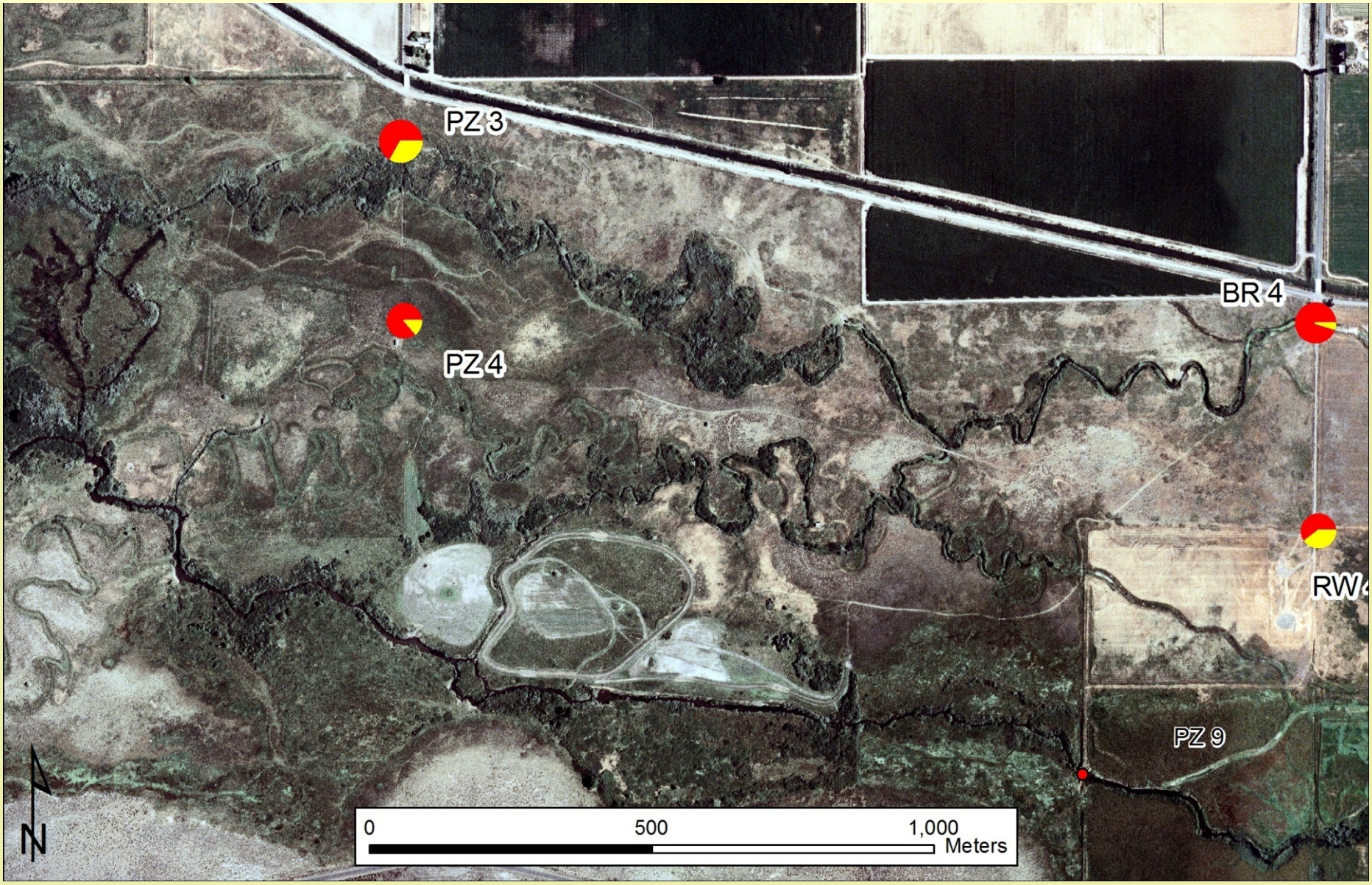


1.81 ft – 0.26 ft = 1.5 ft

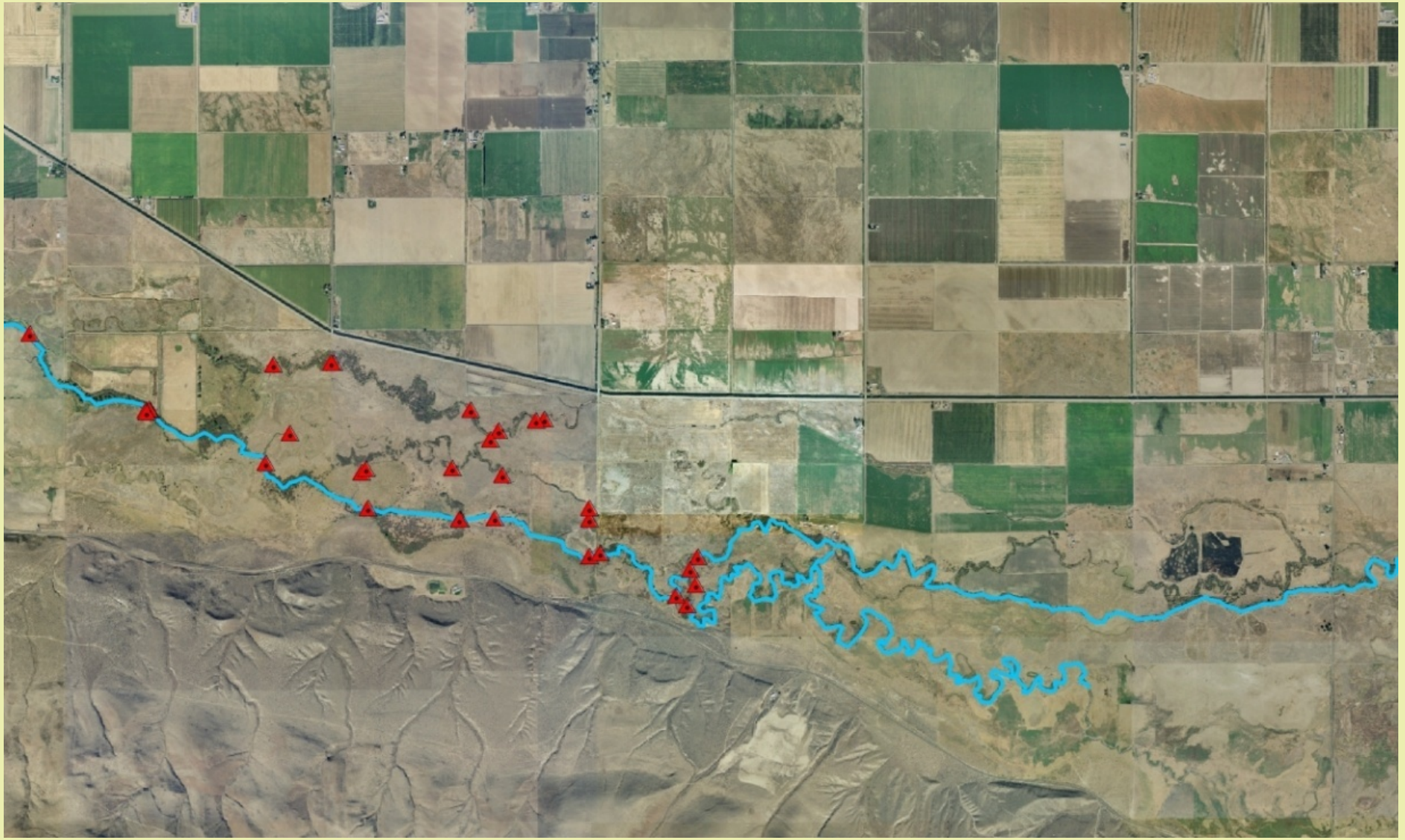
Data Summary



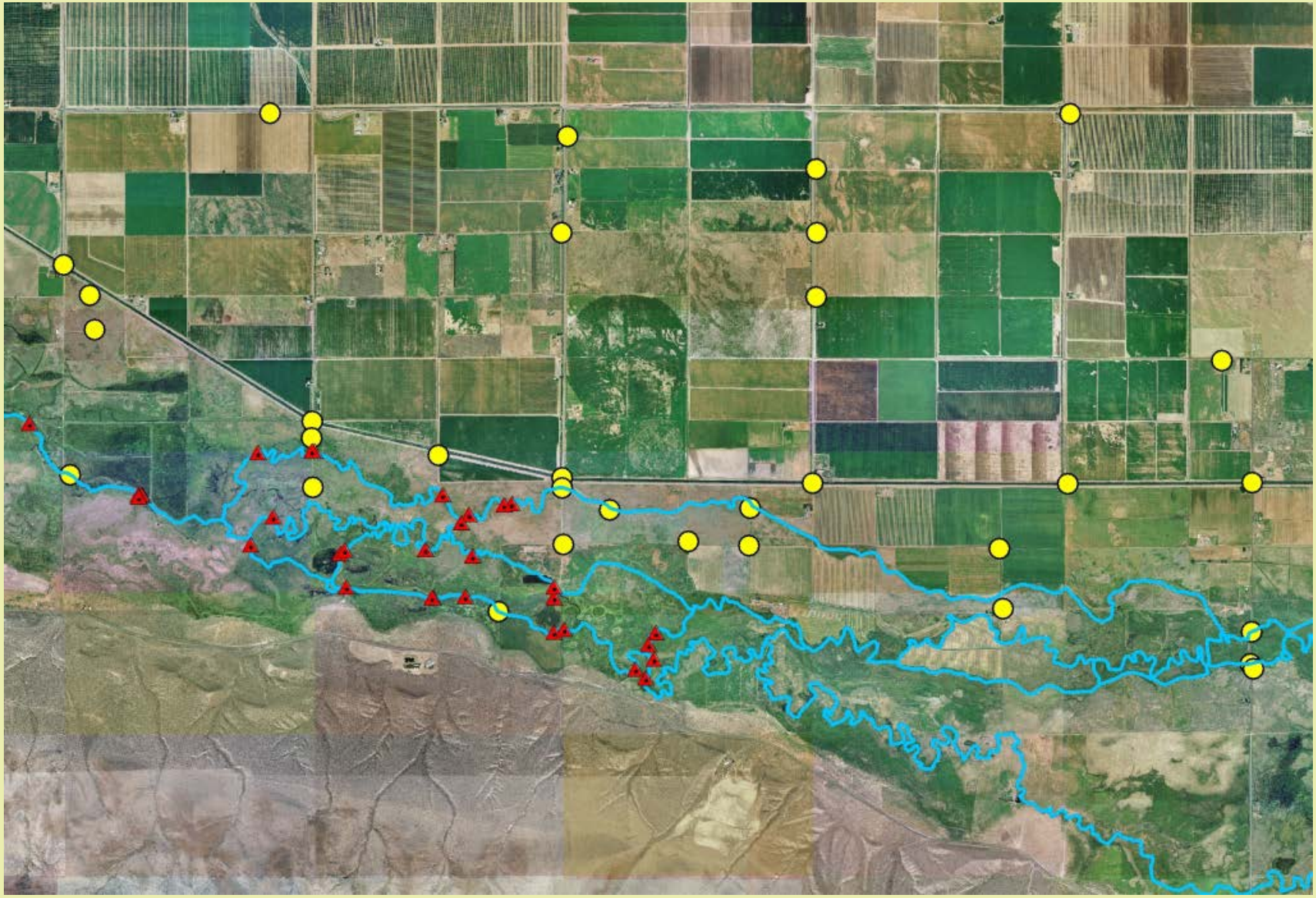
Channel effects?



September 2005



July 2008



Conclusions

- Grade control structures appear to have raised water table relative to upstream flow by at least 1 foot at low flow
- Project effects vary by well location
- The biological significance is likely to be positive
- Better data collection is necessary for future monitoring efforts

Questions?


137m
ESRI
ion 46°19'48"N 120°26'10"W, Altitude 963 Meters
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Works cited

- Reichmuth, D.R., Potter, A.S., and Reichmuth, M.G., 2007, Toppenish Basin Geomorphology, Geomax, P.C.
- Zar, J.H., 1999, Biostatistical Analysis, Fourth Edition: Upper Saddle River, New Jersey, Prentice-Hall, Inc., 798 p.