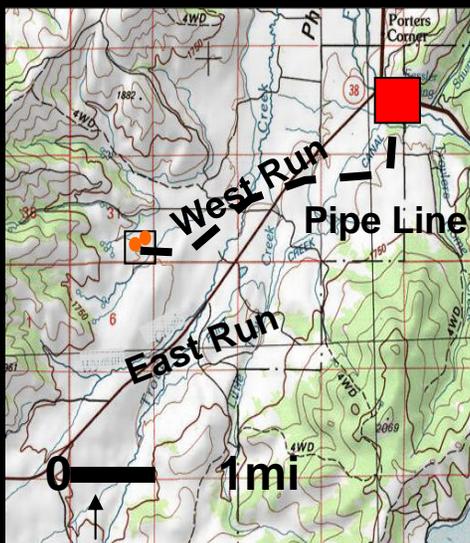
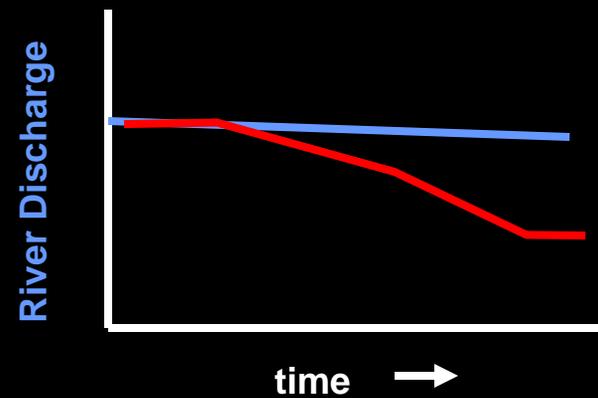
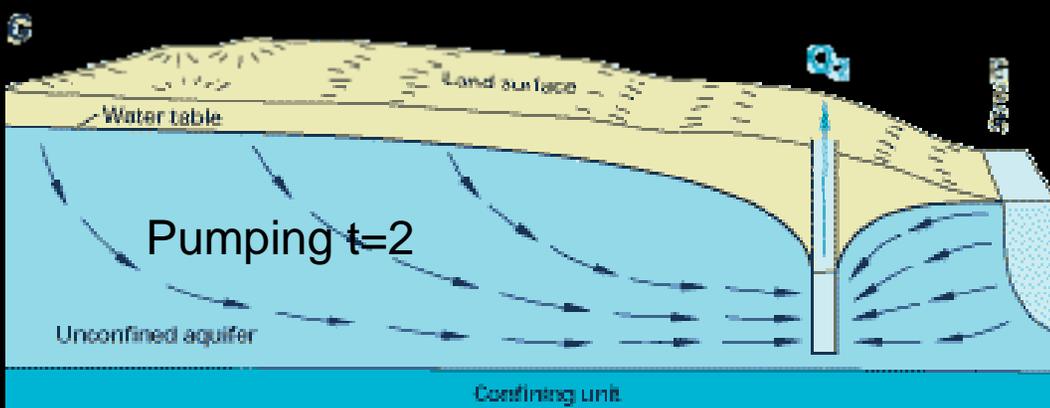
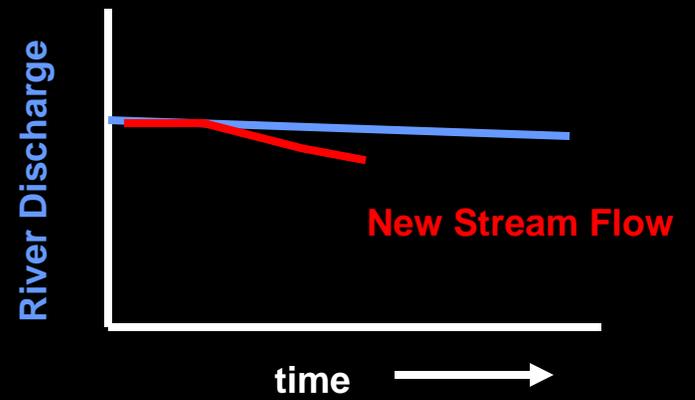
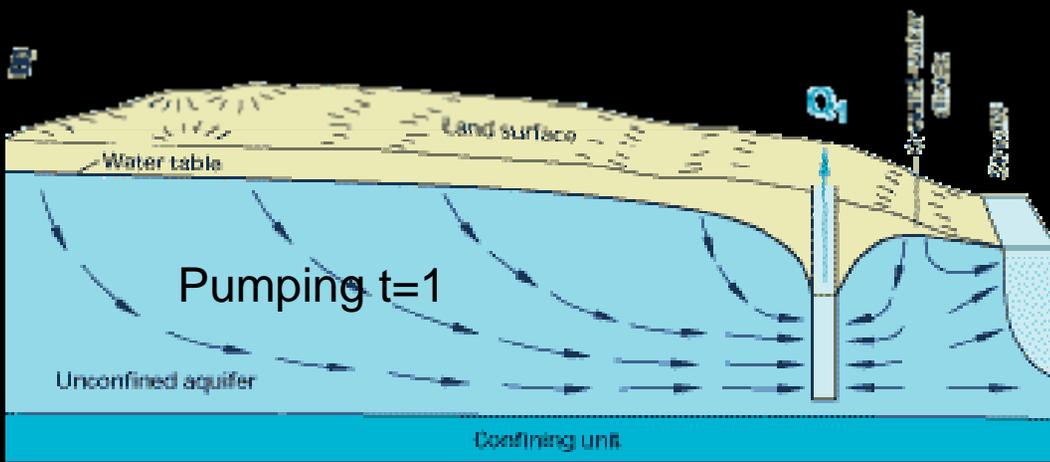
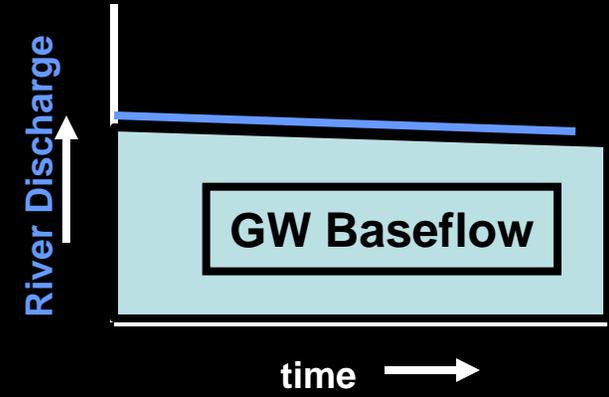
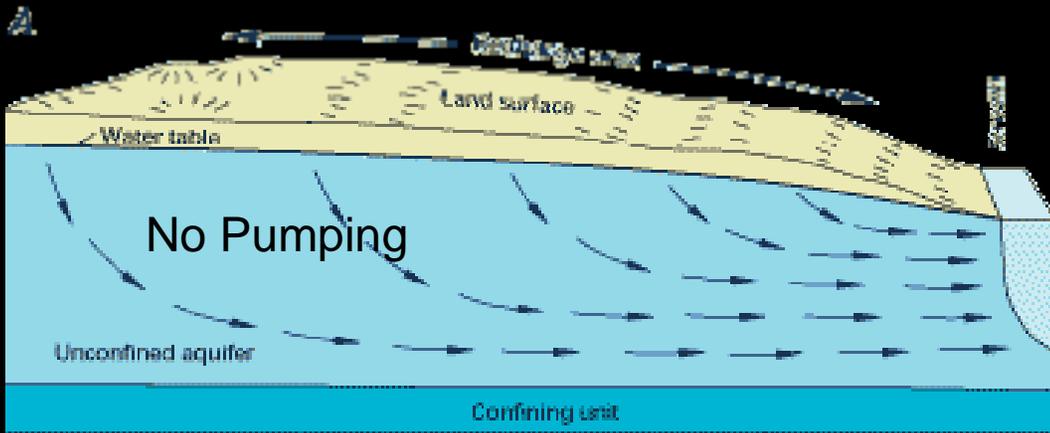


Are Impacts Measurable?

Science Perspective
Woessner 9/11/07

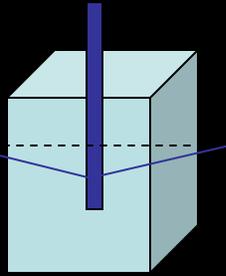
- Quantification of flows allows estimates of the degree of impact.
- Errors in measurement/uncertainty (5 to 20%+)
- 100 gpm = consumed 100 gpm of river impact?, when and where?



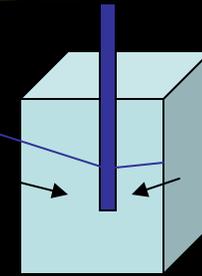


Pumped GW

100 %



100 %

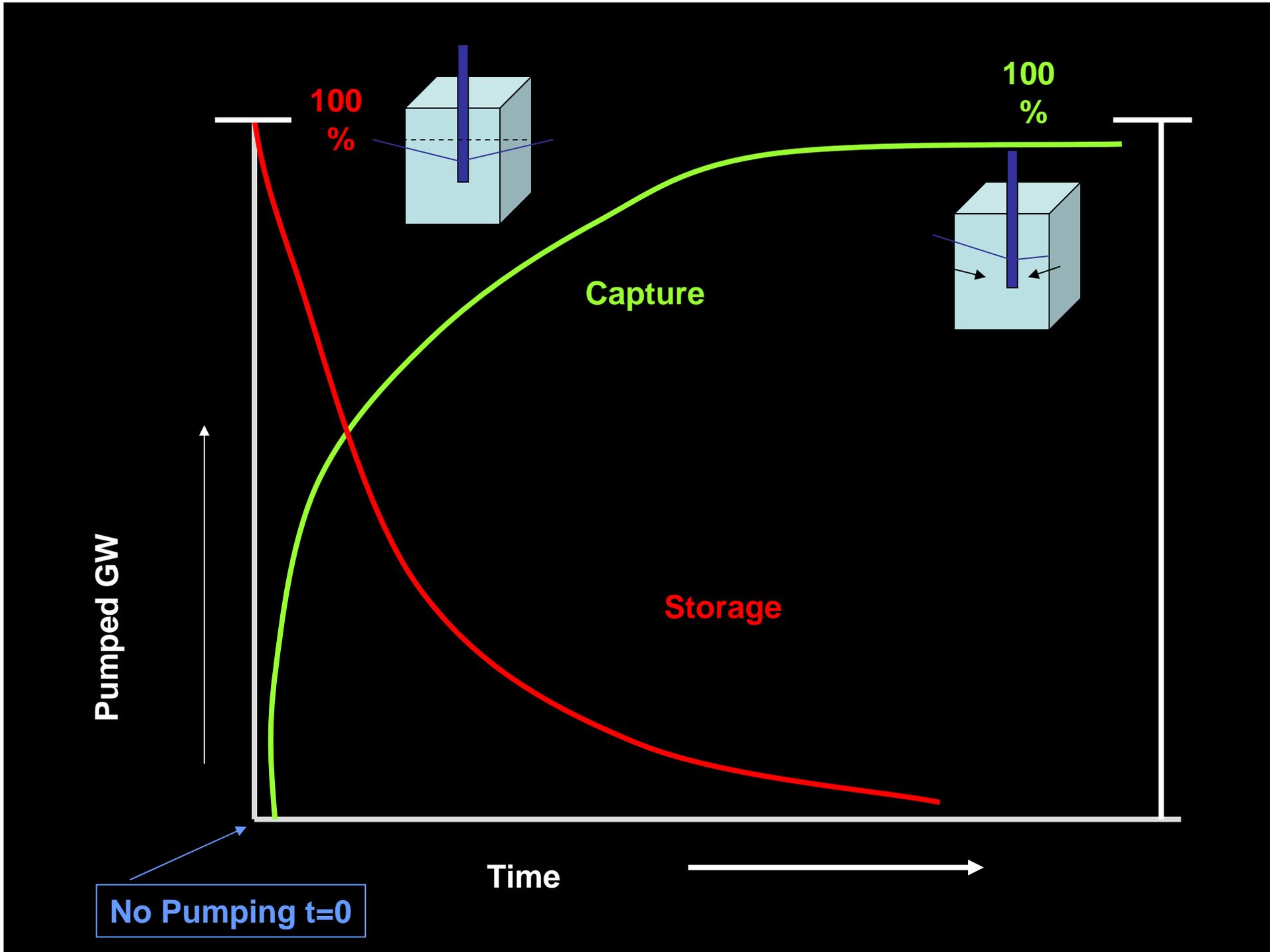


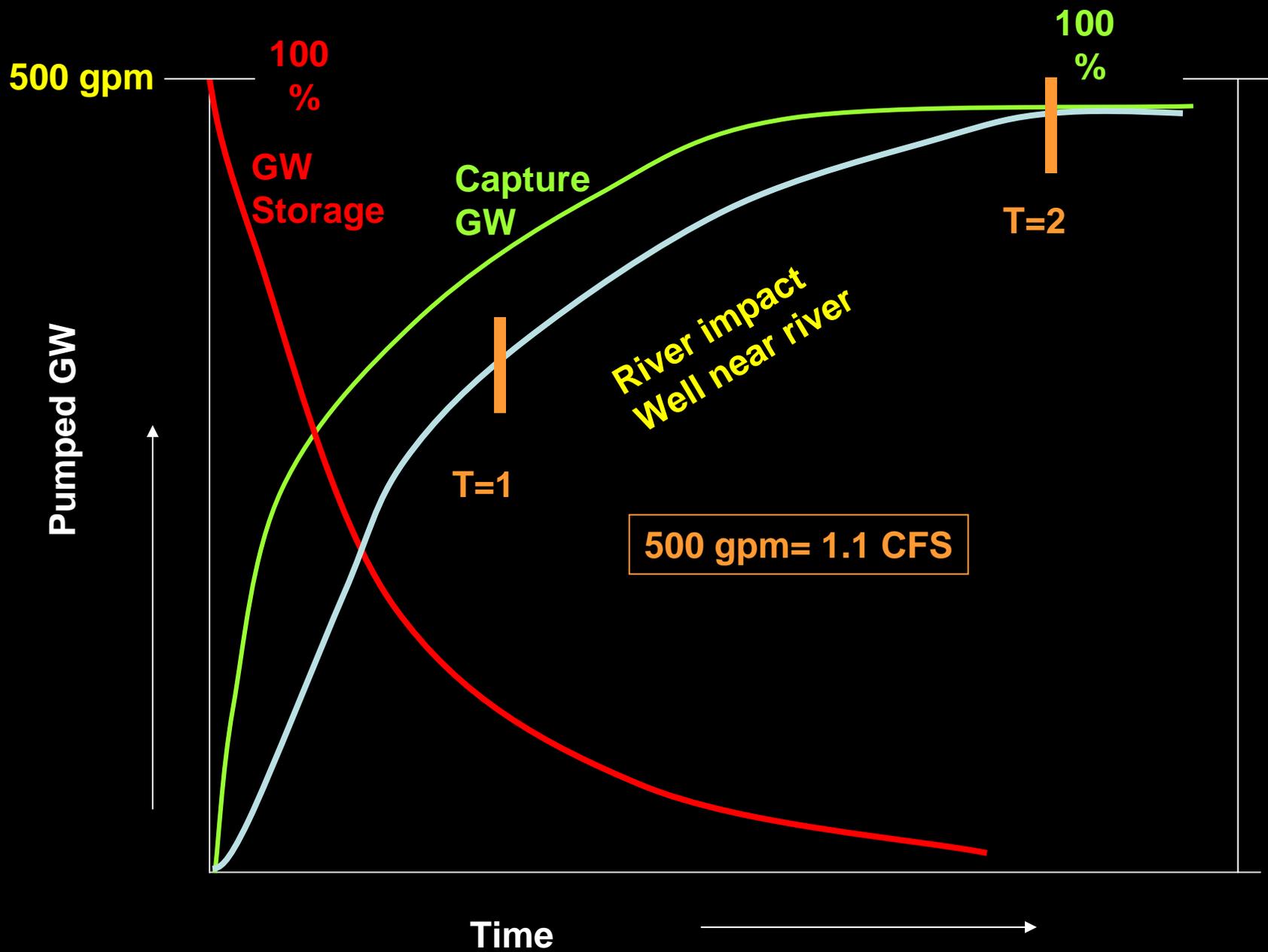
Capture

Storage

Time

No Pumping t=0





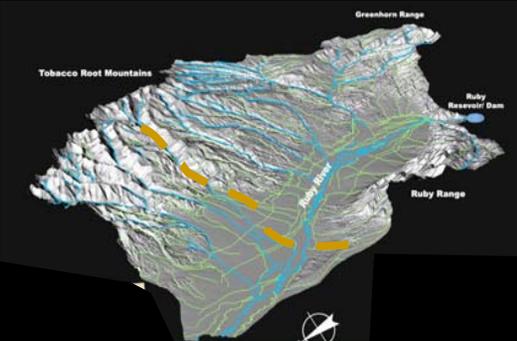
Valley Cross Section

Well-not Pumping

Land Surface

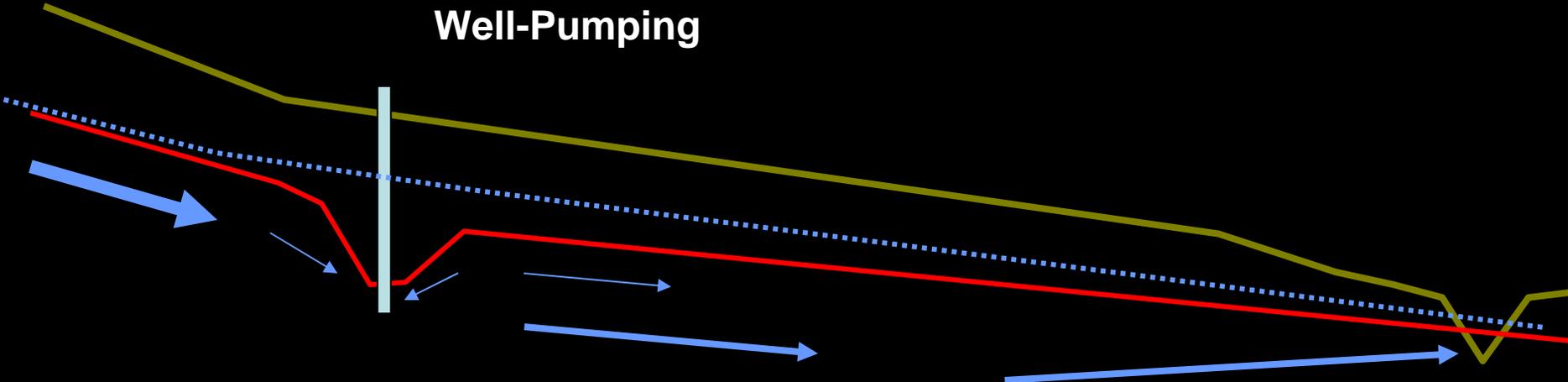
Stream
GW Discharge

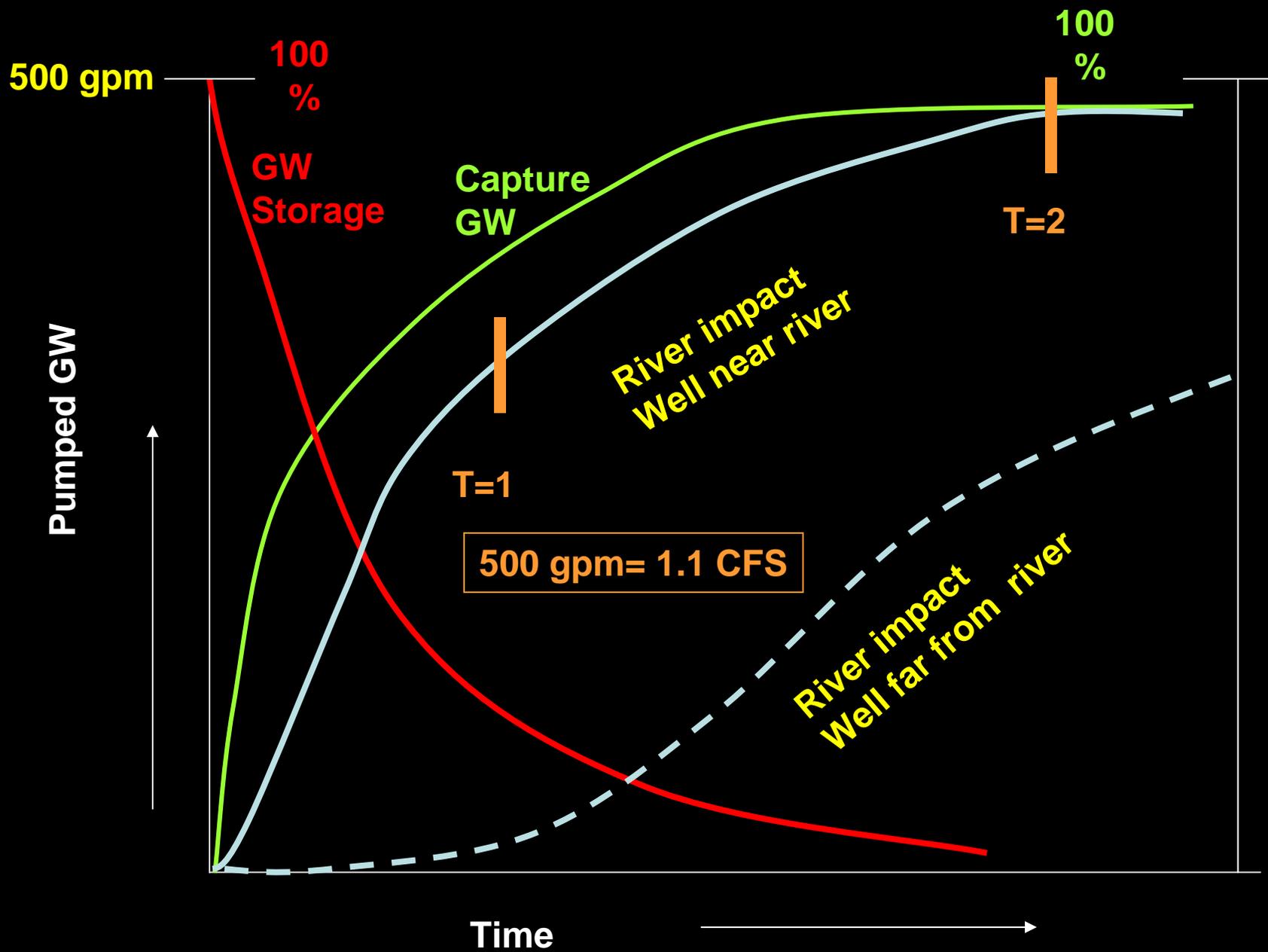
GW Flow



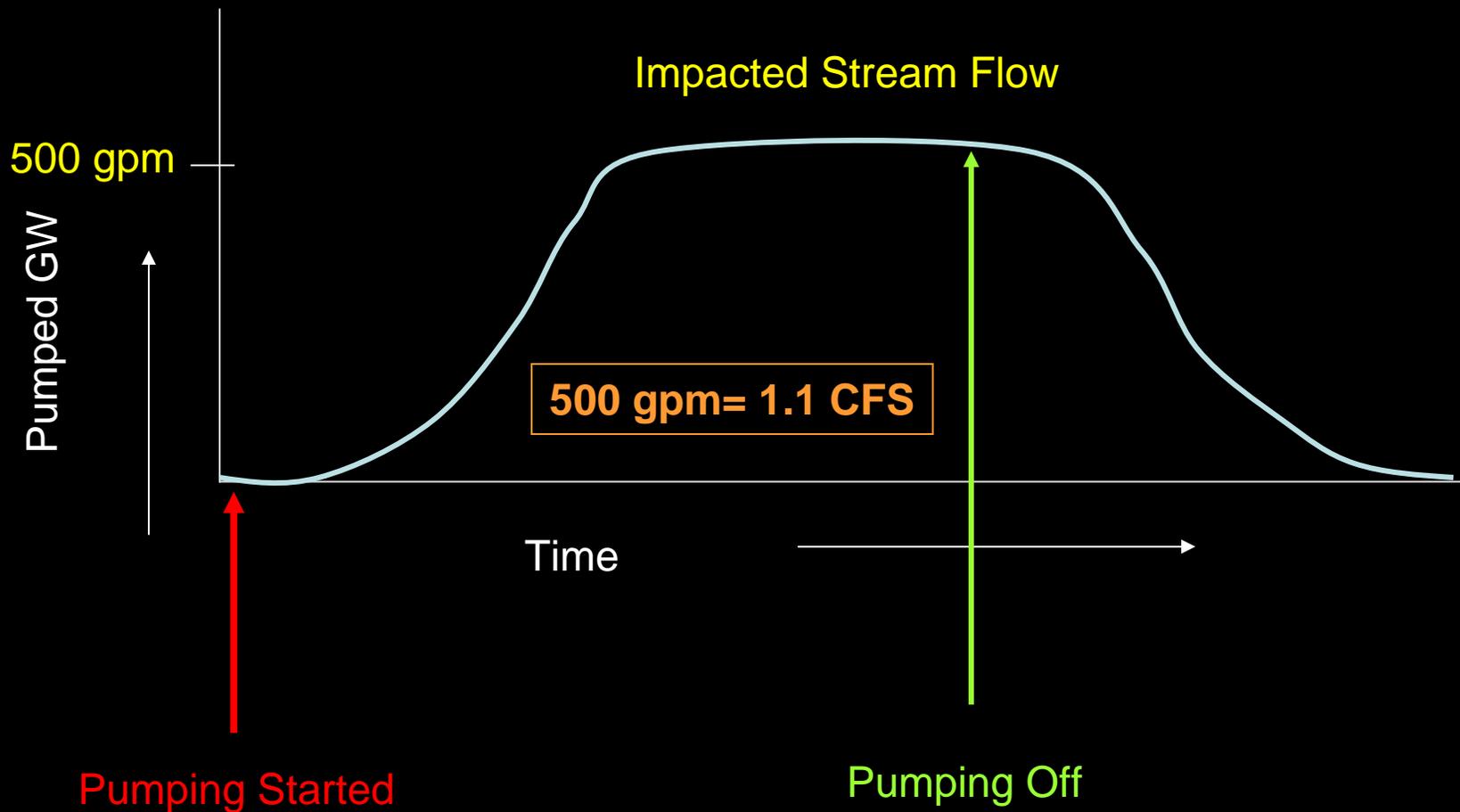
500 gpm = 1.1 CFS

Well-Pumping

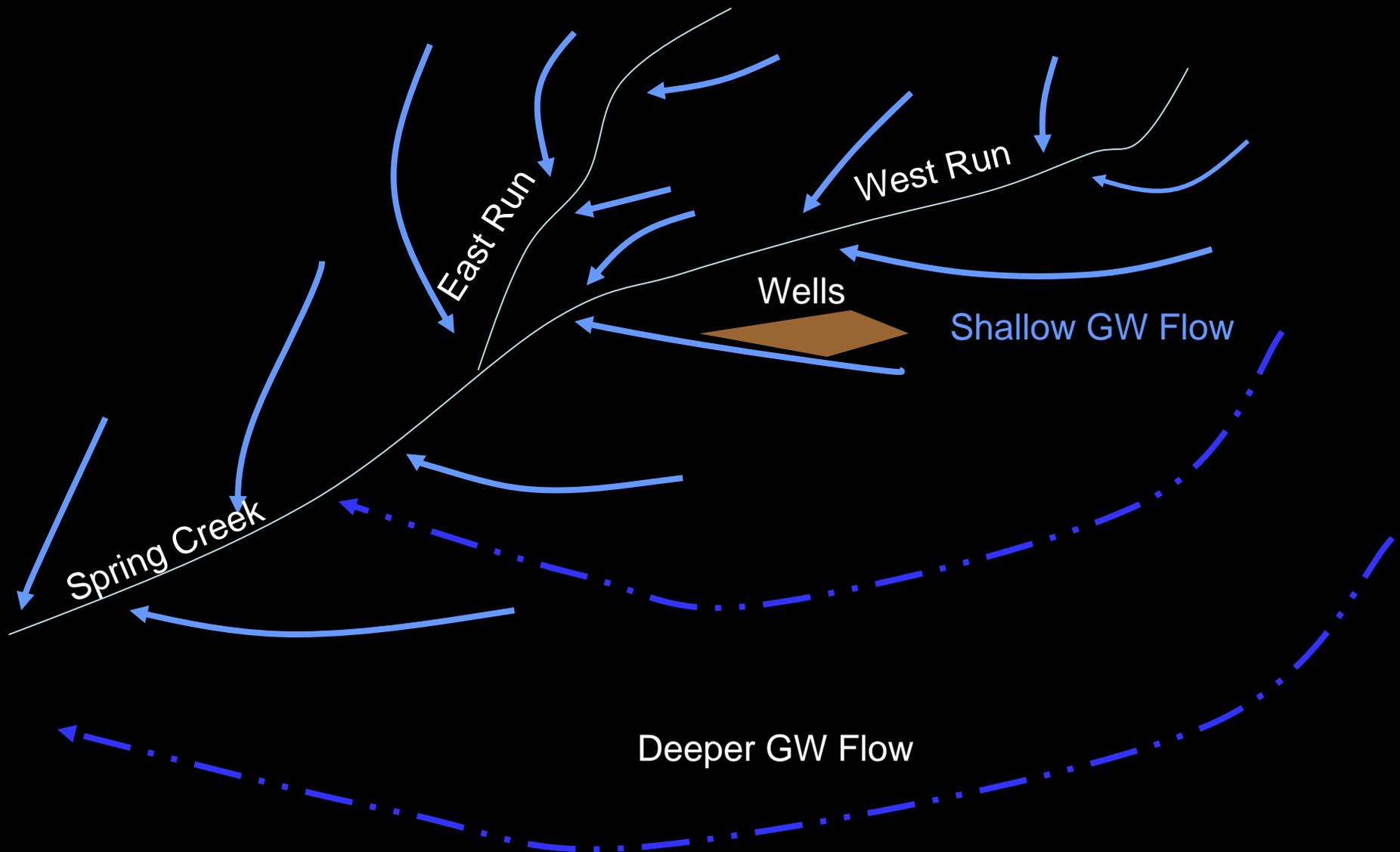


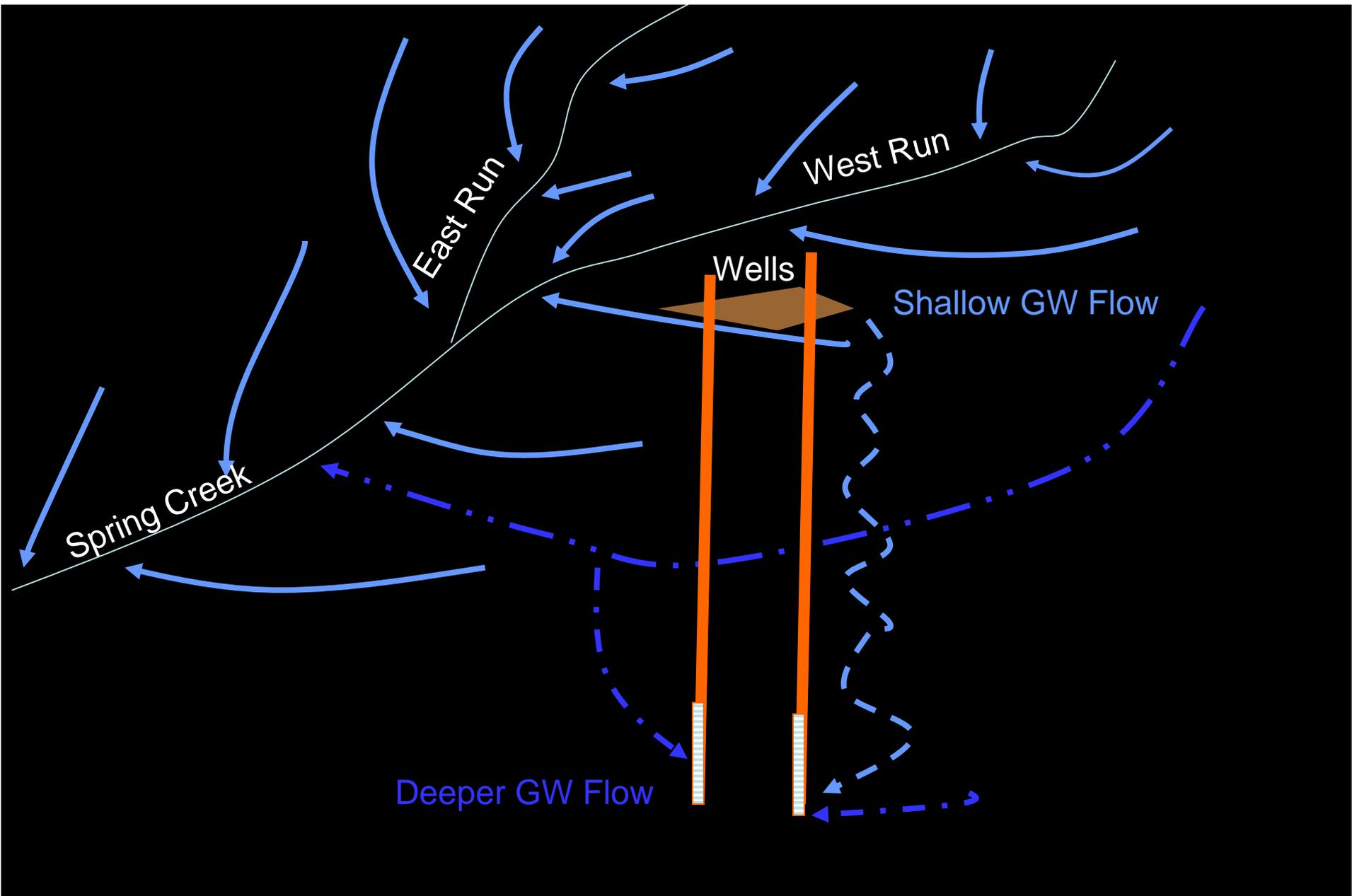


Effects on SW continue after Pump is shut off



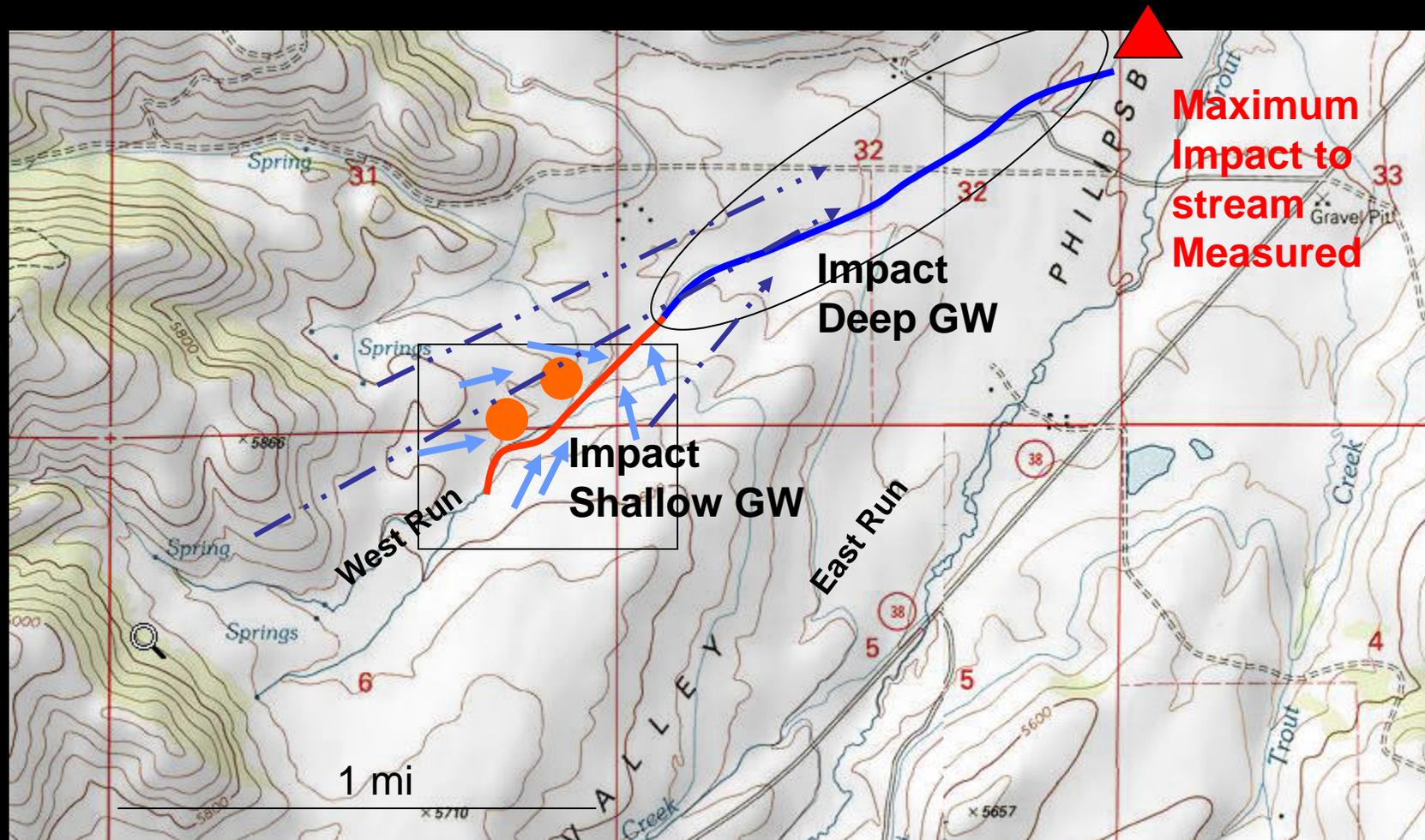
Source of Groundwater to Streams





Source of Groundwater to Wells

Where Might Impacts Occur?



Are Impacts Significant?

- Criteria for Significance...related to what?

Degree of Unfavorable Impact

1. Senior Water Rights-SW and GW
2. Fish Habitat- River water Depths and temperature
3. Water levels in riparian areas- invasive species.
4. Others.....

