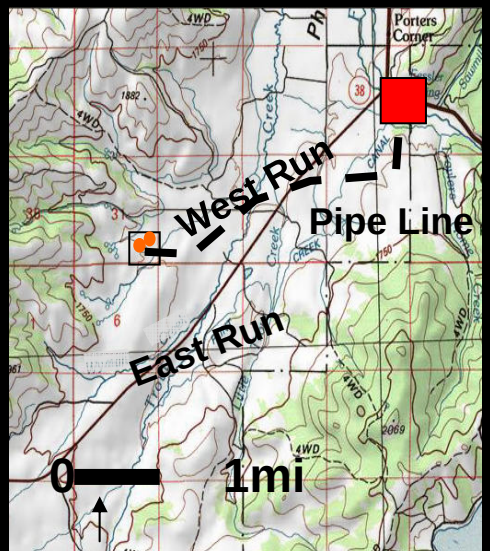
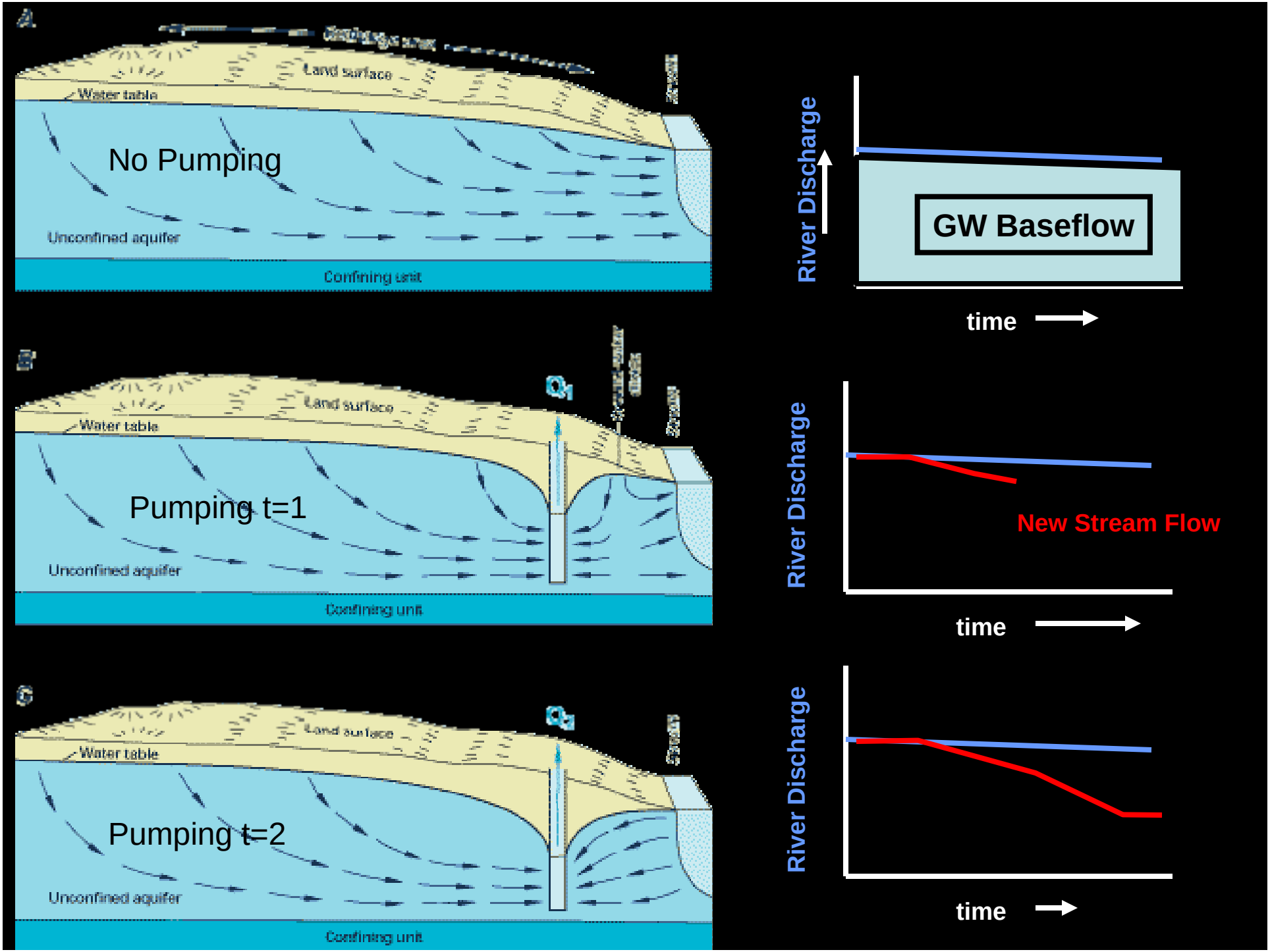
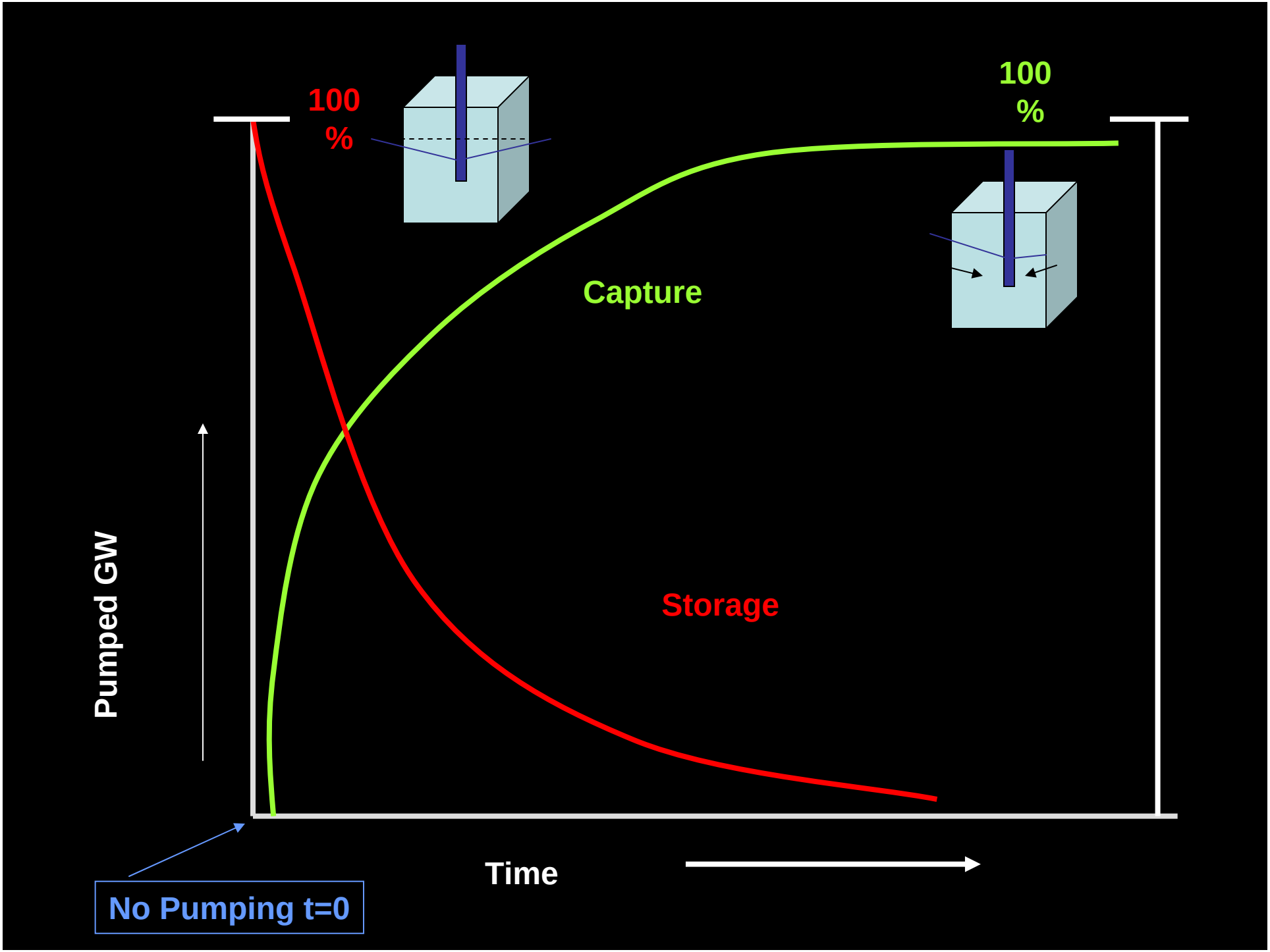
Are Impacts Measurable?

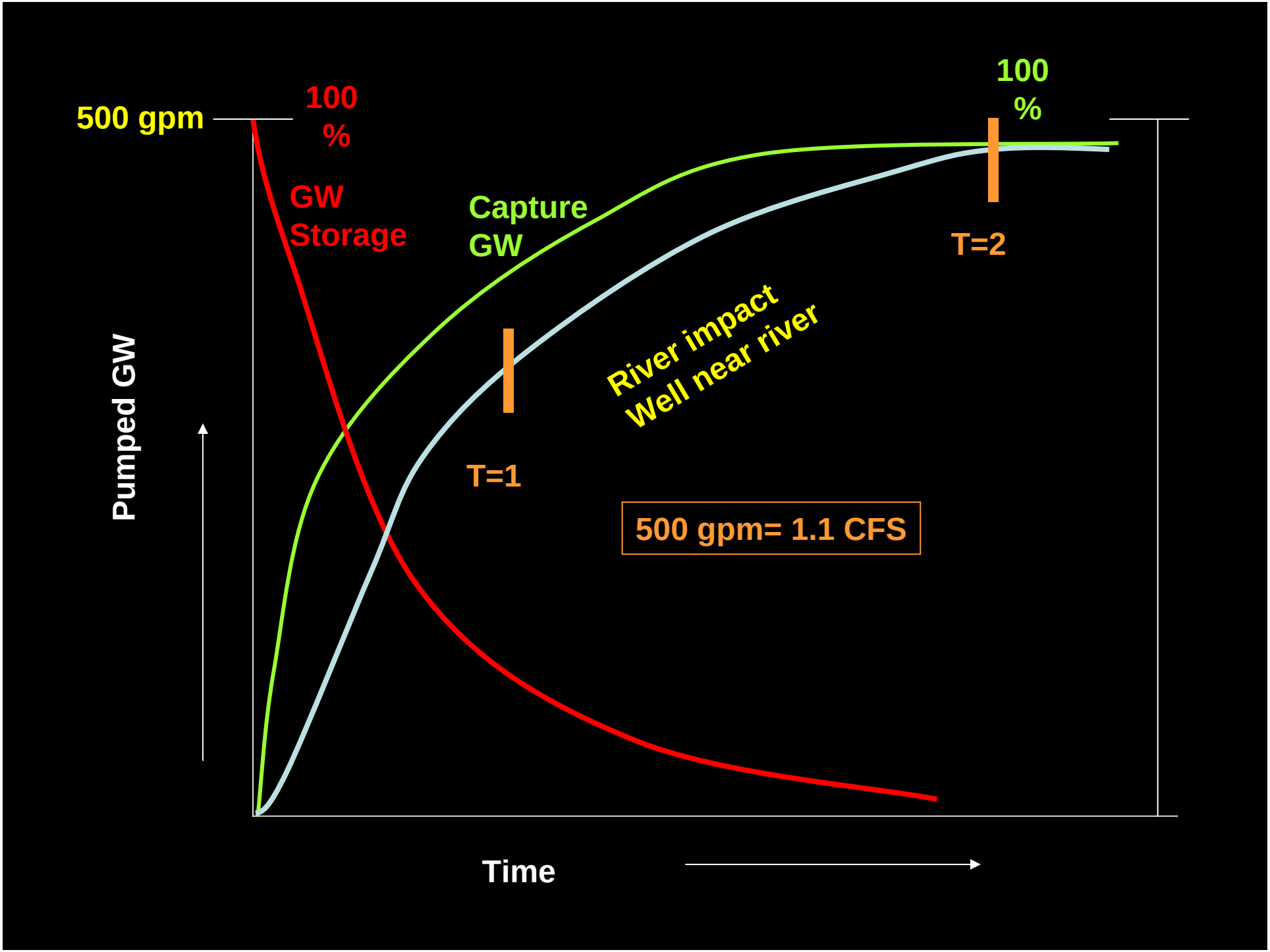
Science Perspective
Woessner 9/11/07

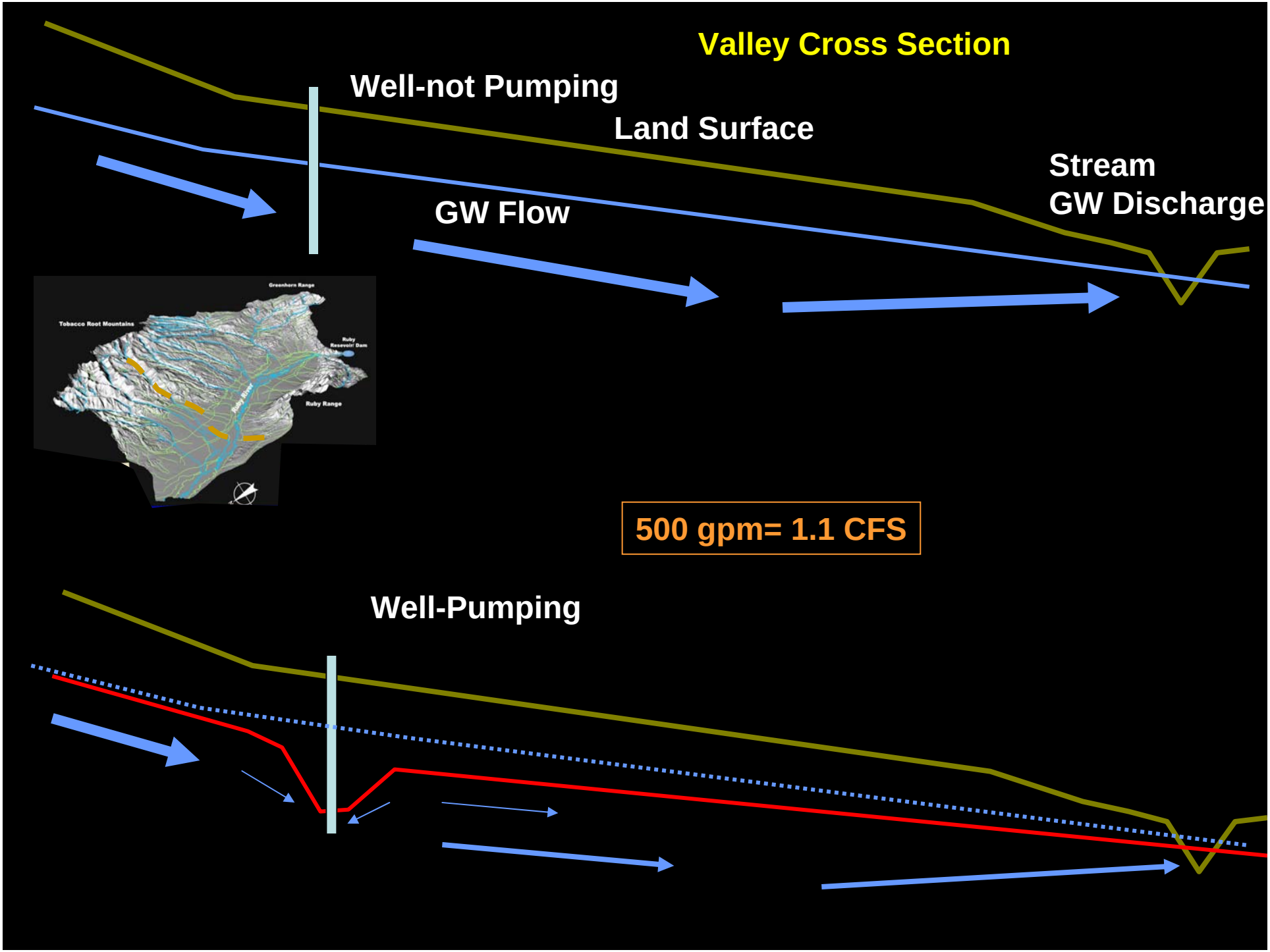
- Quantification of flows allows estimates of the degree of impact.
- Errors in measurement/uncertainty (5 to 20%+)
- 100 gpm = consumed 100 gpm of river impact?, when and where?

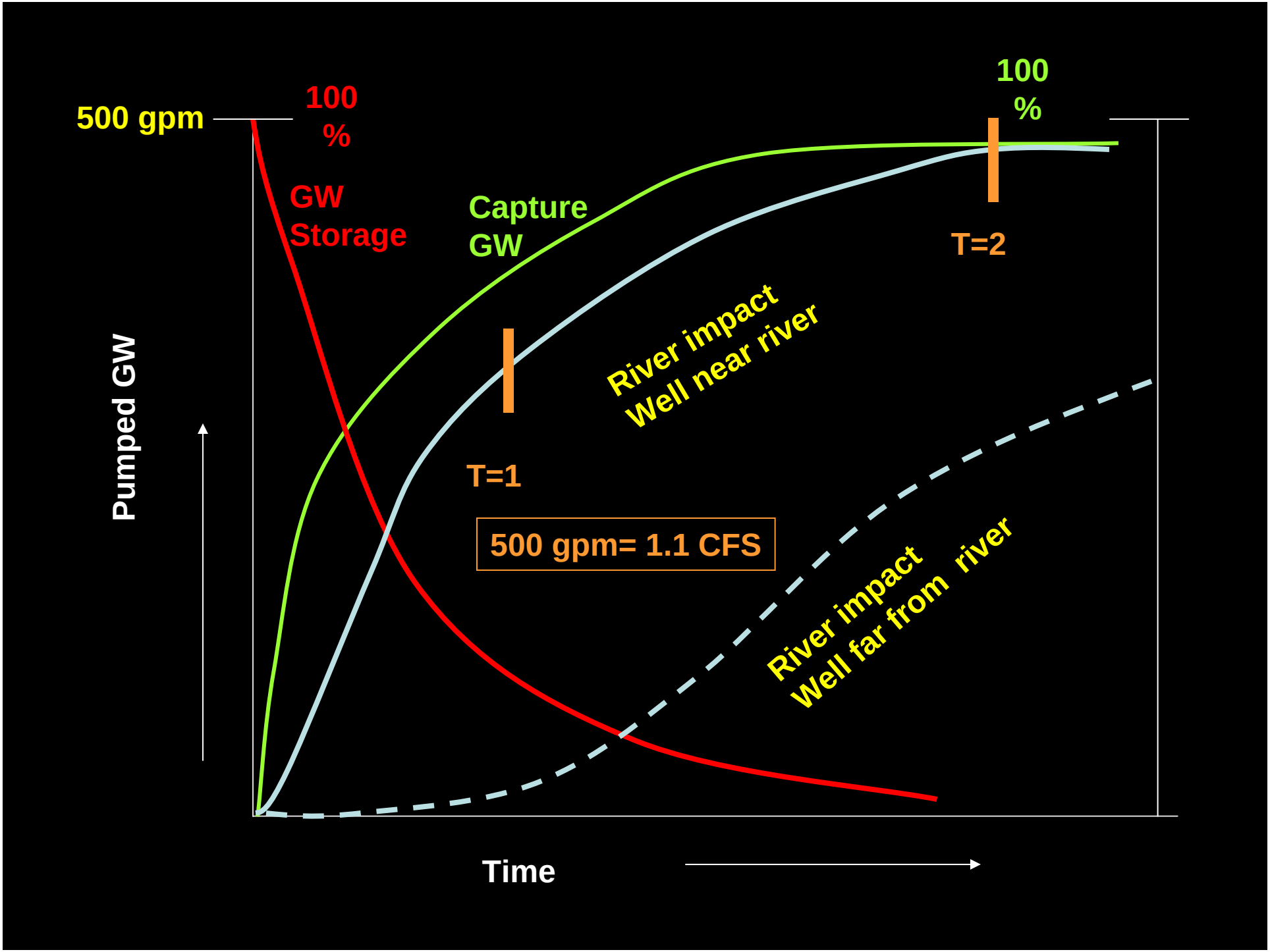



A
Land surface
Water table
No Pumping
Unconfined aquifer
Confining unit
River Discharge
GW Baseflow
time
B
Q1
Land surface
Water table
Pumping t=1
Unconfined aquifer
Confining unit
River Discharge
New Stream Flow
time
C
Q2
Land surface
Water table
Pumping t=2
Unconfined aquifer
Confining unit
River Discharge
time

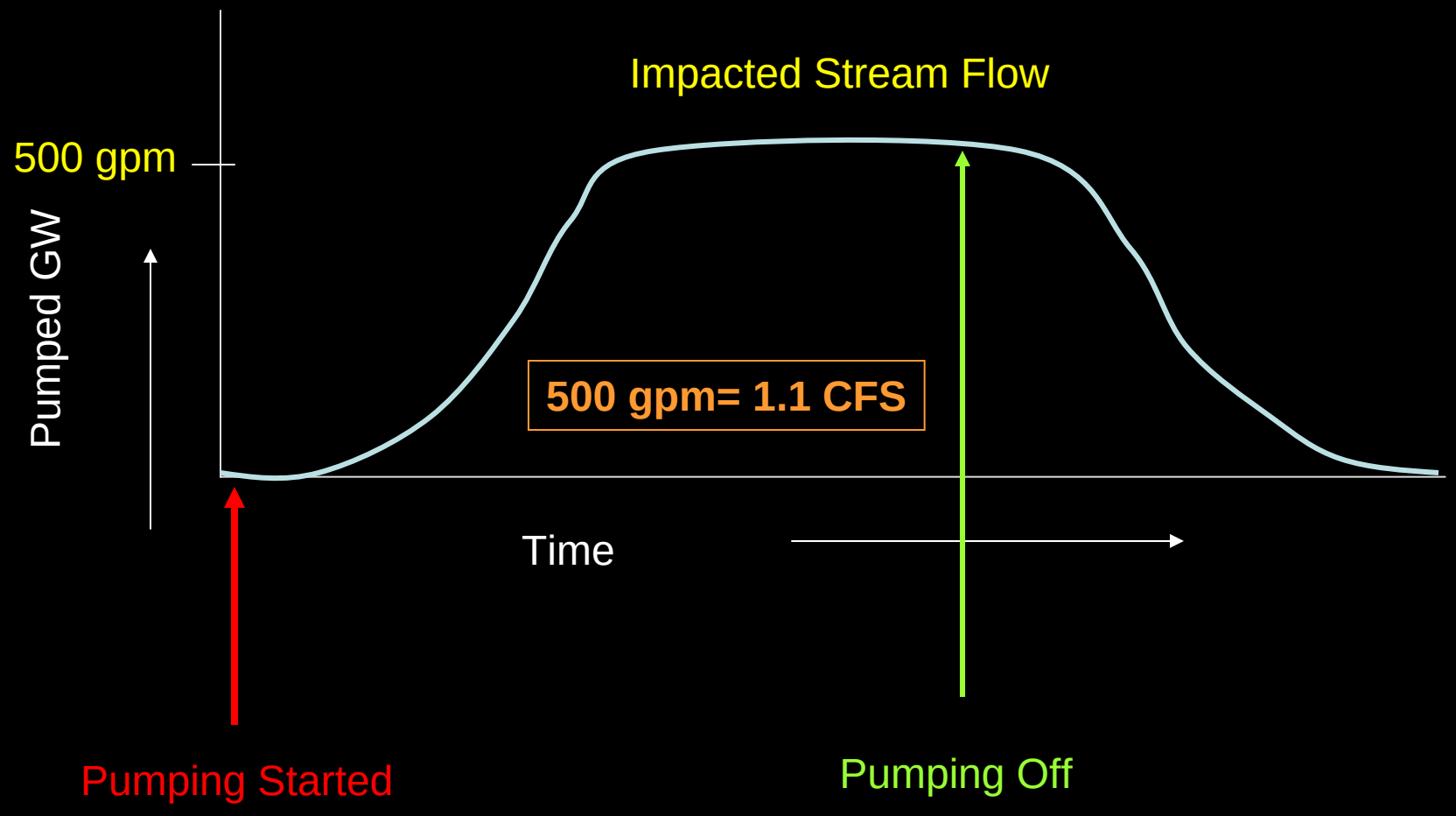

100
%
100
%
Capture
Storage
Pumped GW
Time
No Pumping t=0


500 gpm
100 %
GW Storage
Capture GW
100 %
T=2
River impact
Well near river
T=1
500 gpm= 1.1 CFS
Pumped GW
Time

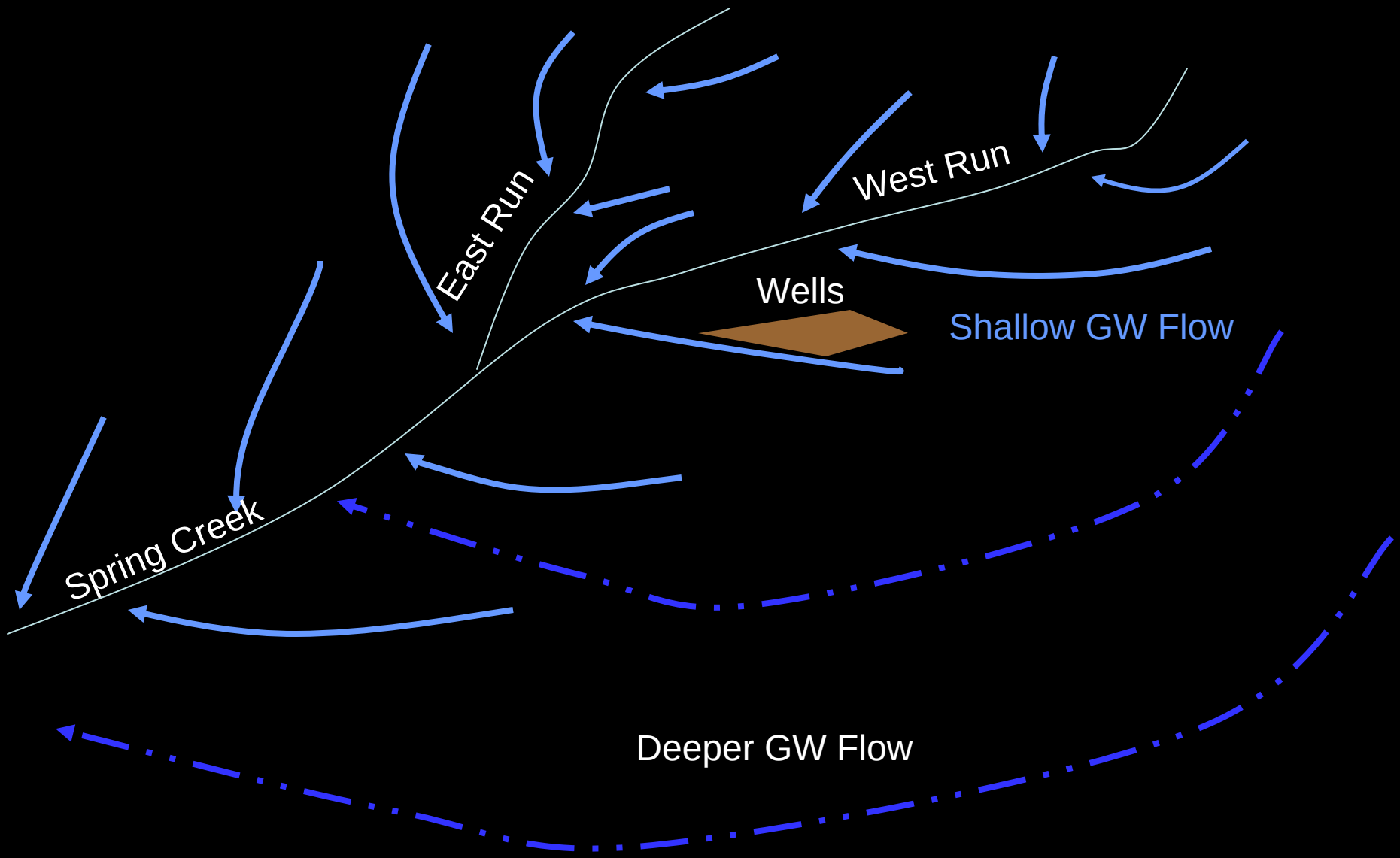

Valley Cross Section
Well-not Pumping
Land Surface
Stream
GW Discharge
GW Flow
Greenhorn Range
Tobacco Root Mountains
Ruby Reservoir Dam
Ruby River
Ruby Range
500 gpm= 1.1 CFS
Well-Pumping

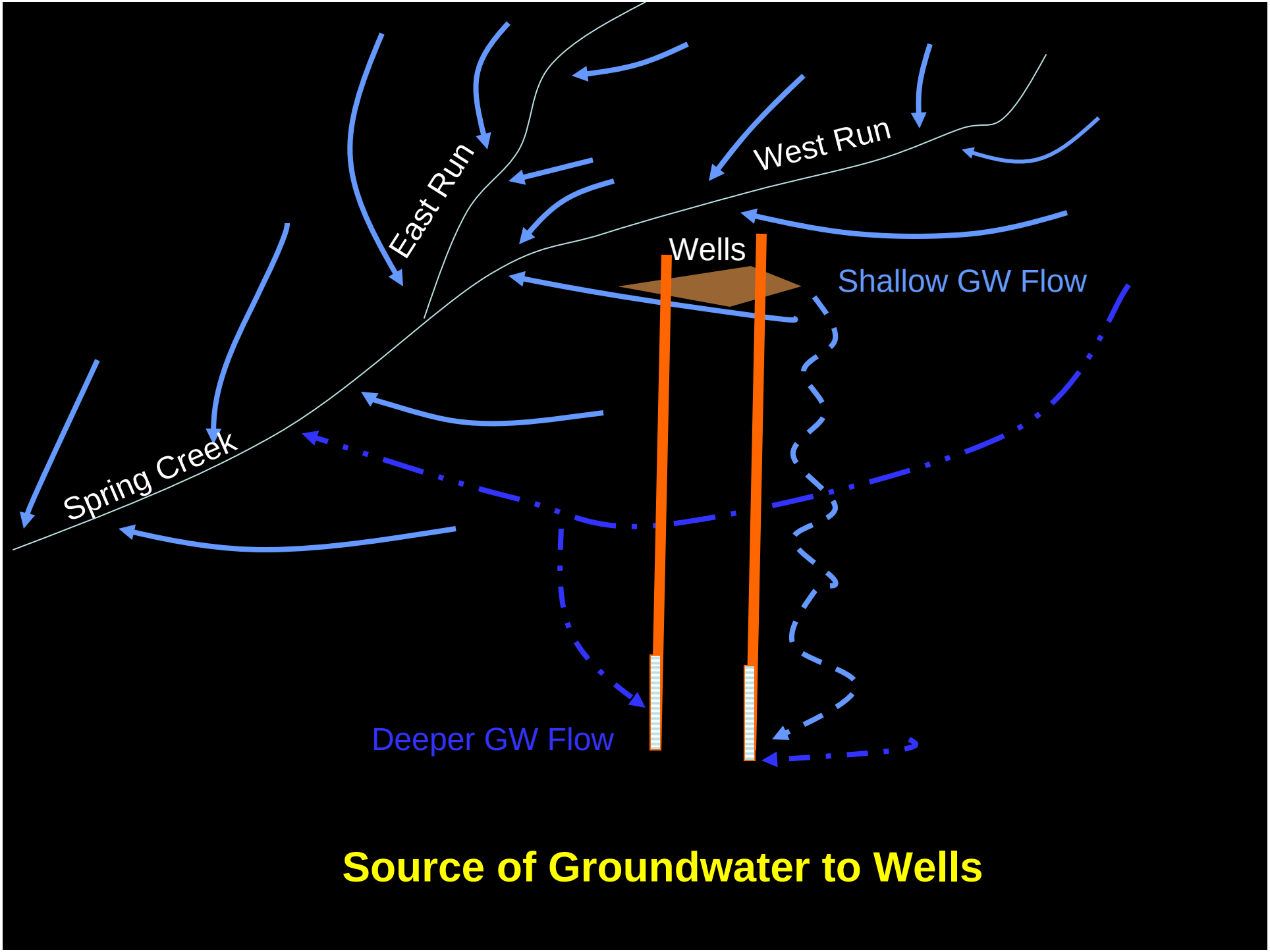

500 gpm
100 %
GW Storage
Capture GW
100 %
T=2
River impact
Well near river
T=1
500 gpm= 1.1 CFS
River impact
Well far from river
Pumped GW
Time

Effects on SW continue after Pump is shut off



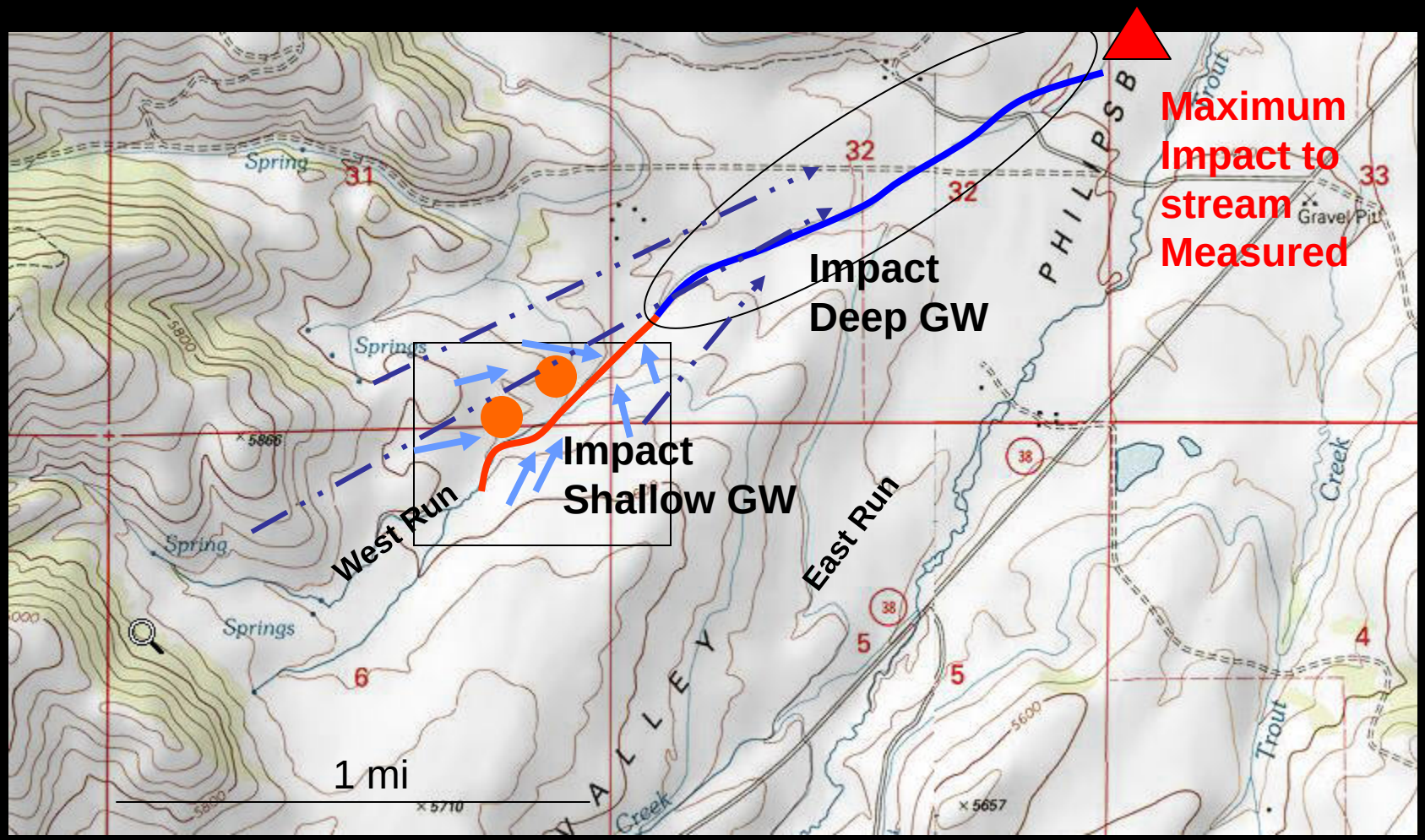
Source of Groundwater to Streams





Source of Groundwater to Wells

Where Might Impacts Occur?



Are Impacts Significant?

- Criteria for Significance…related to what?

<u>Degree of Unfavorable Impact</u>

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…..