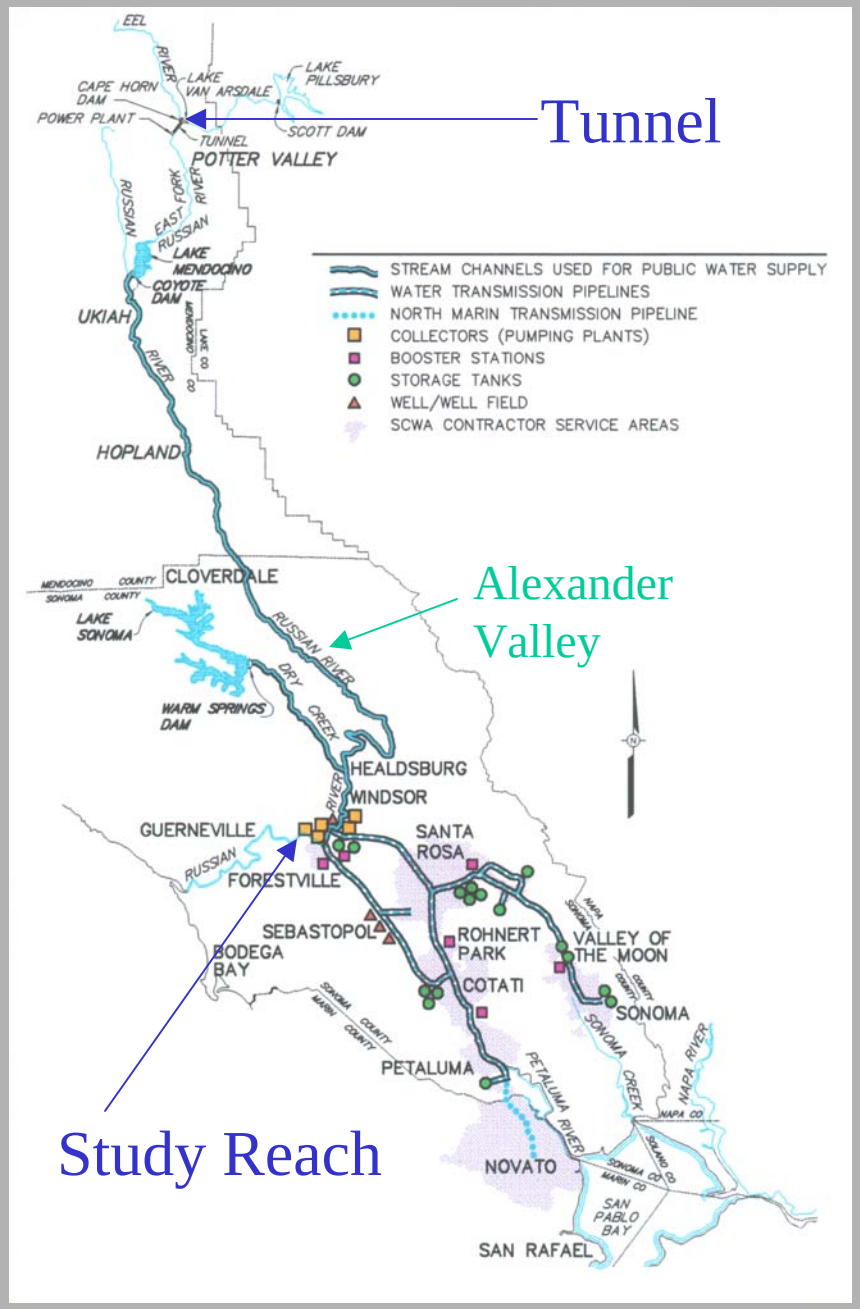
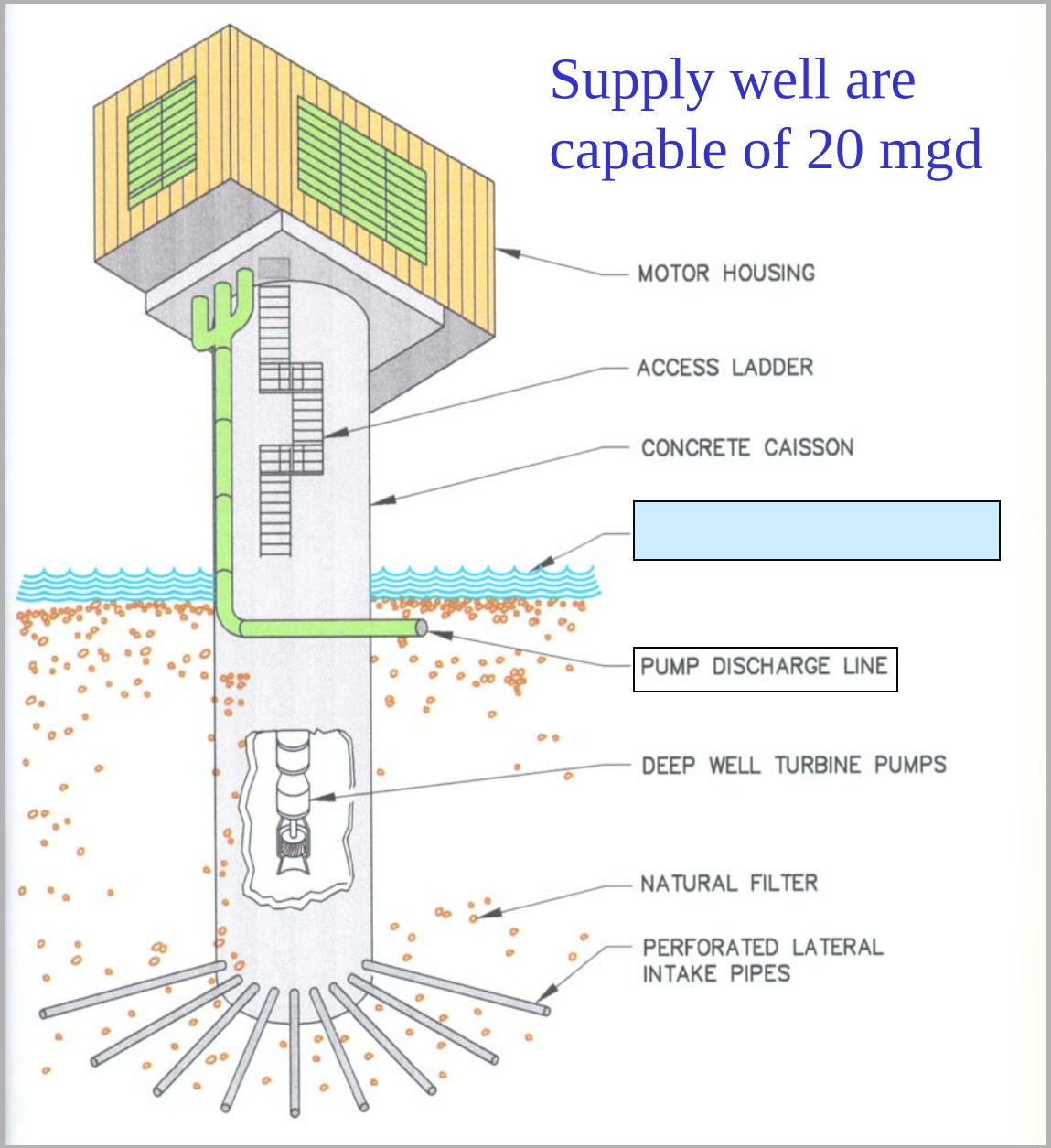
Characterization of the unsaturated zone beneath a bank filtration facility

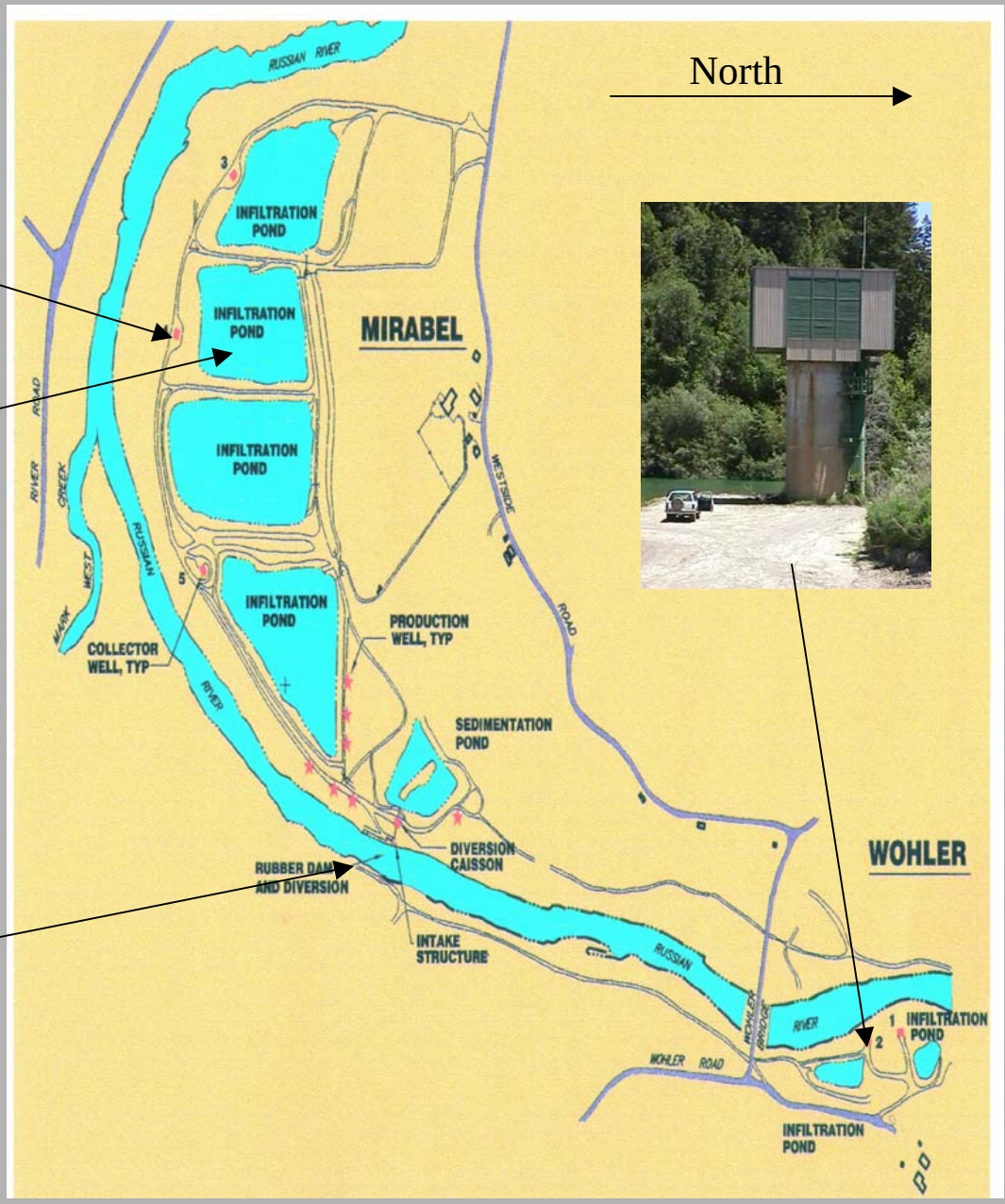
Jim Constantz
U.S. Geological Survey

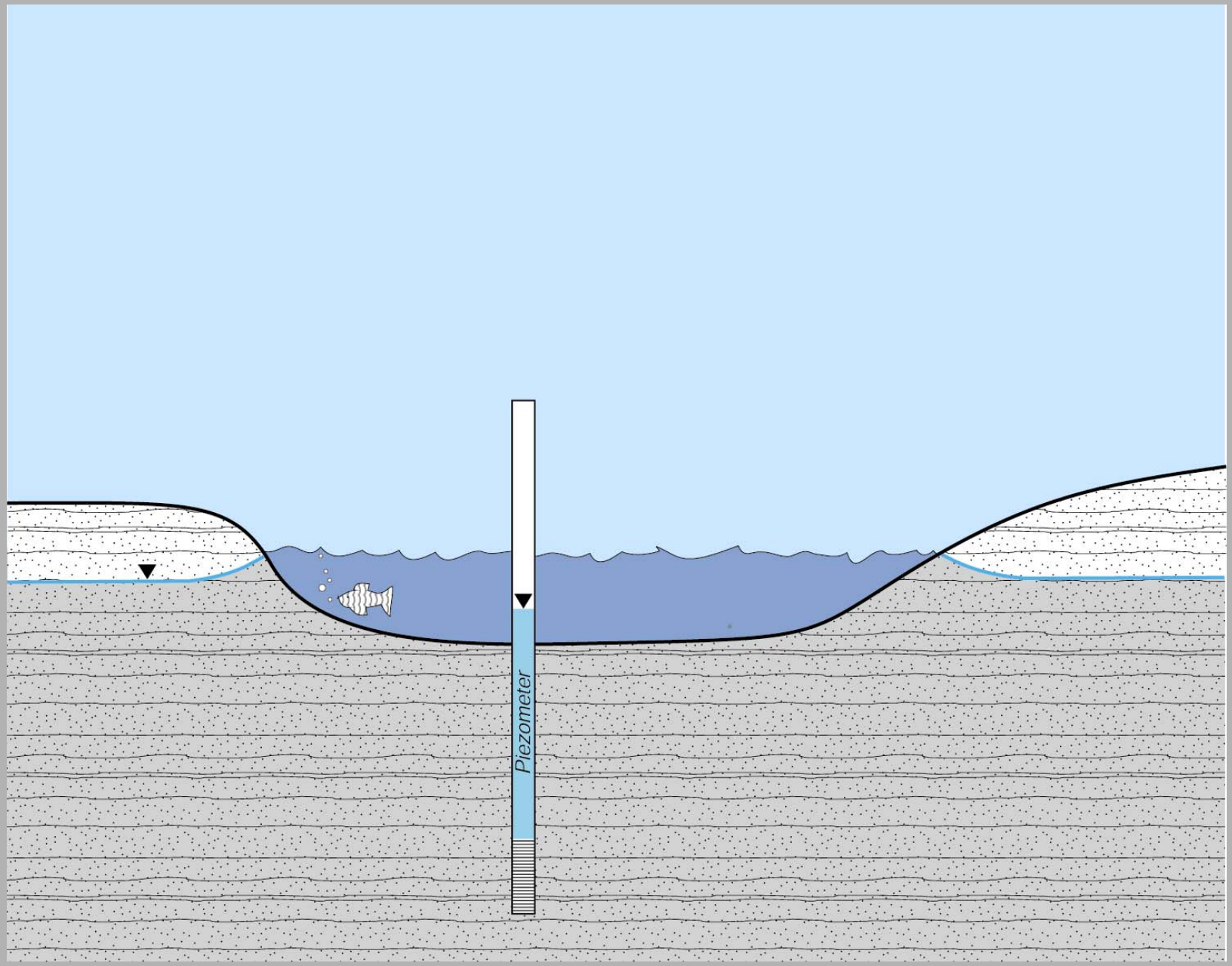


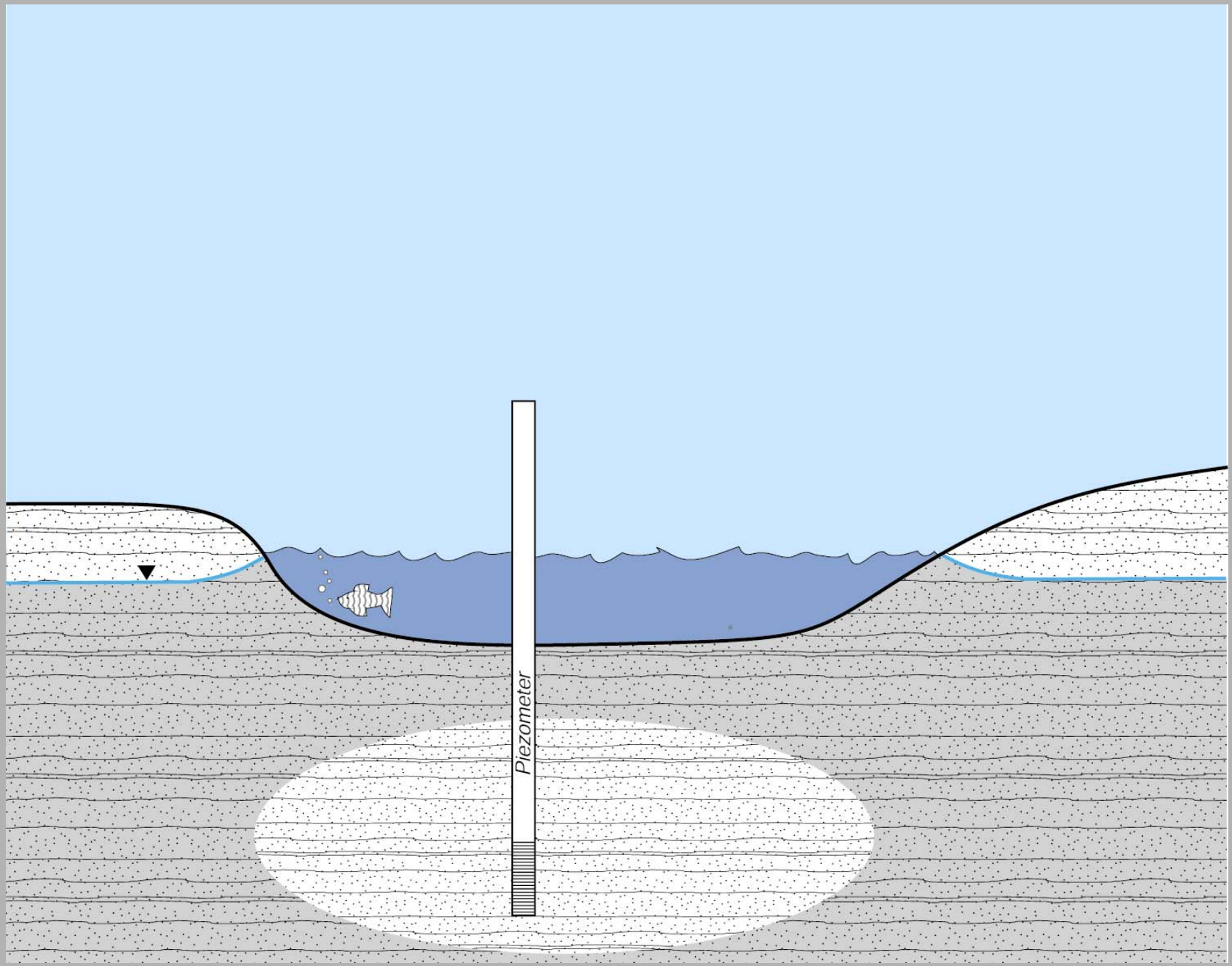
Sonoma County Water Agency operates the largest natural filtration system in the world. The streambed of the Russian River reduces the cost of water treatment by filtering out suspended sediment and colloidal materials.

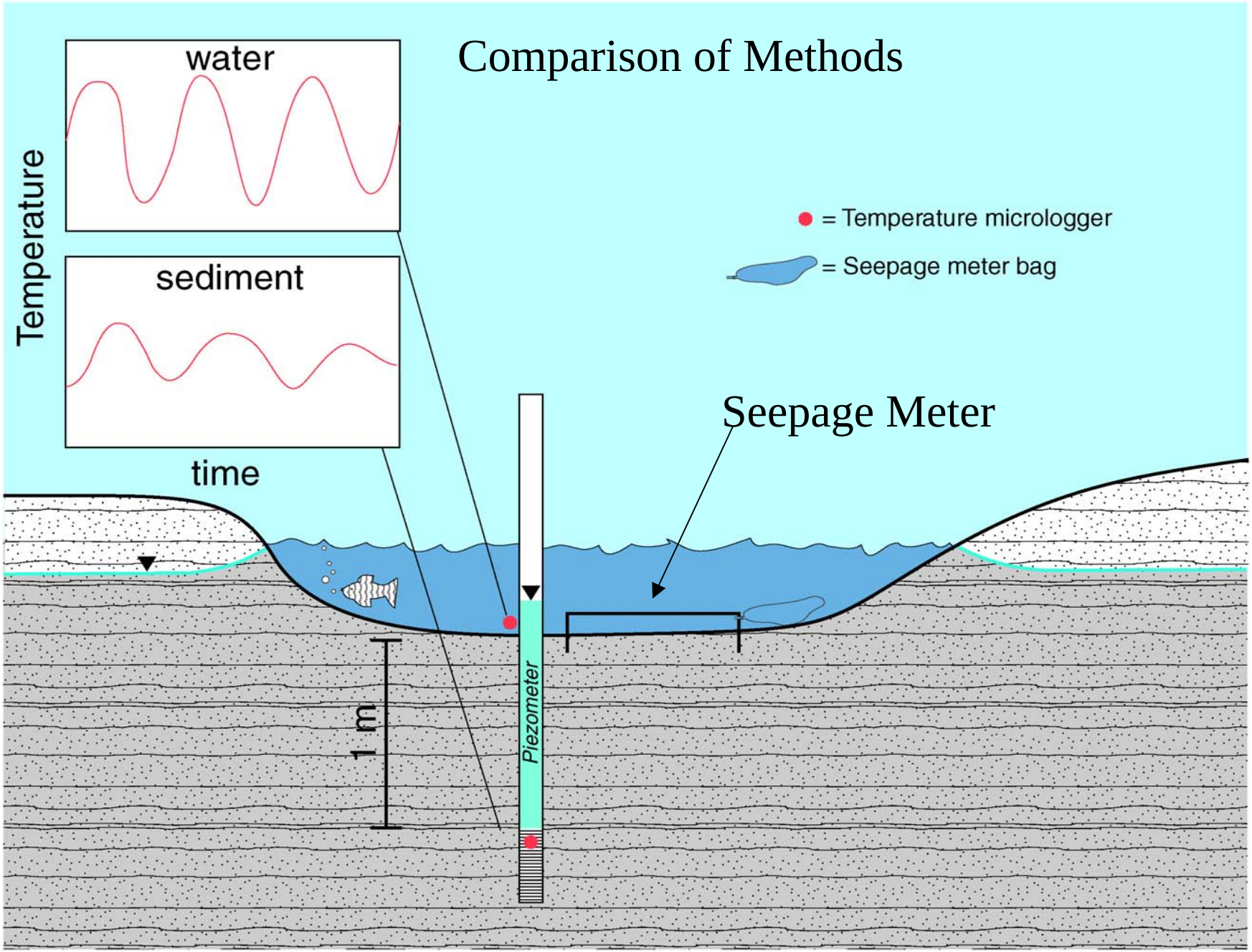


The inflatable dam is erected, May – Nov.

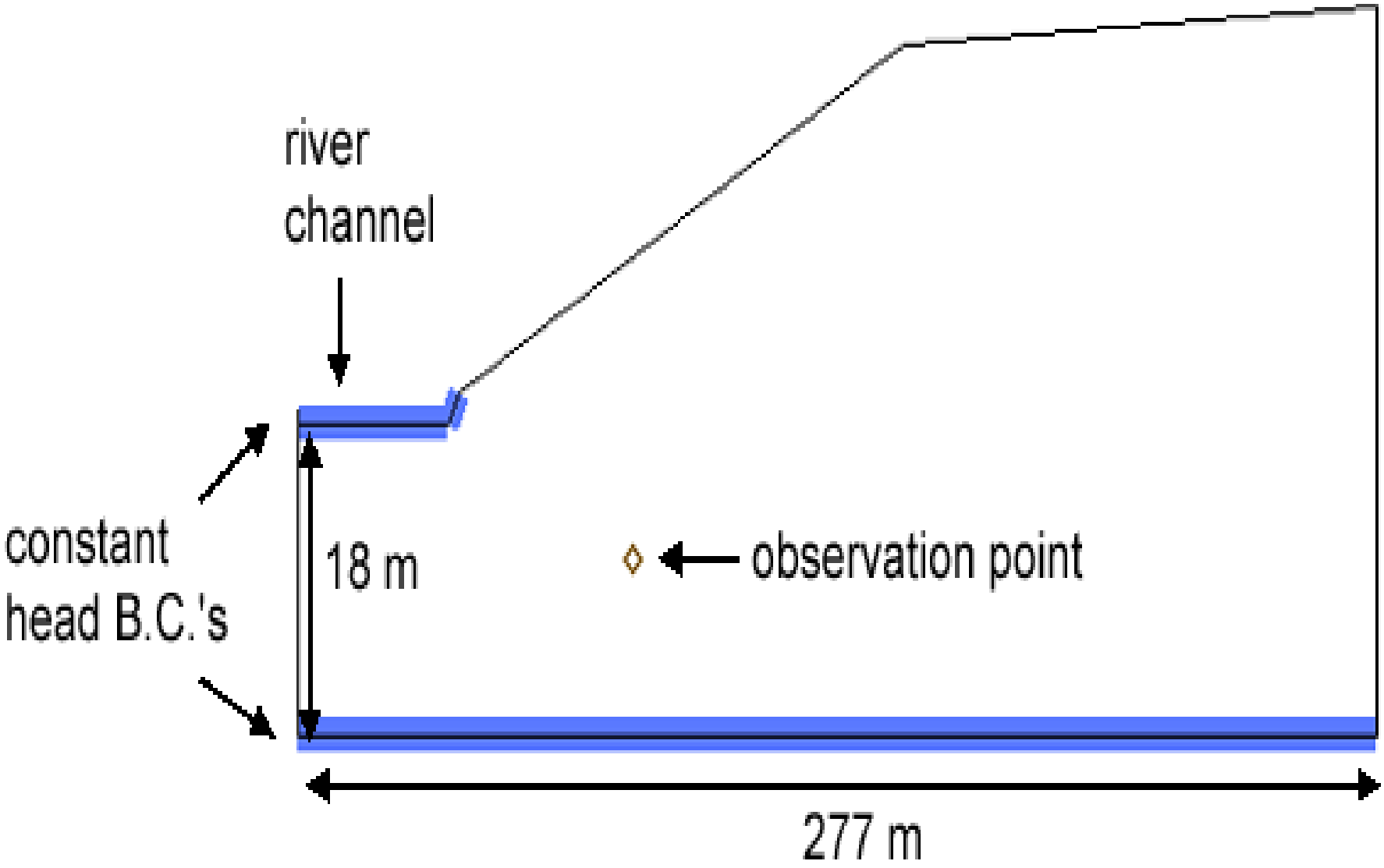


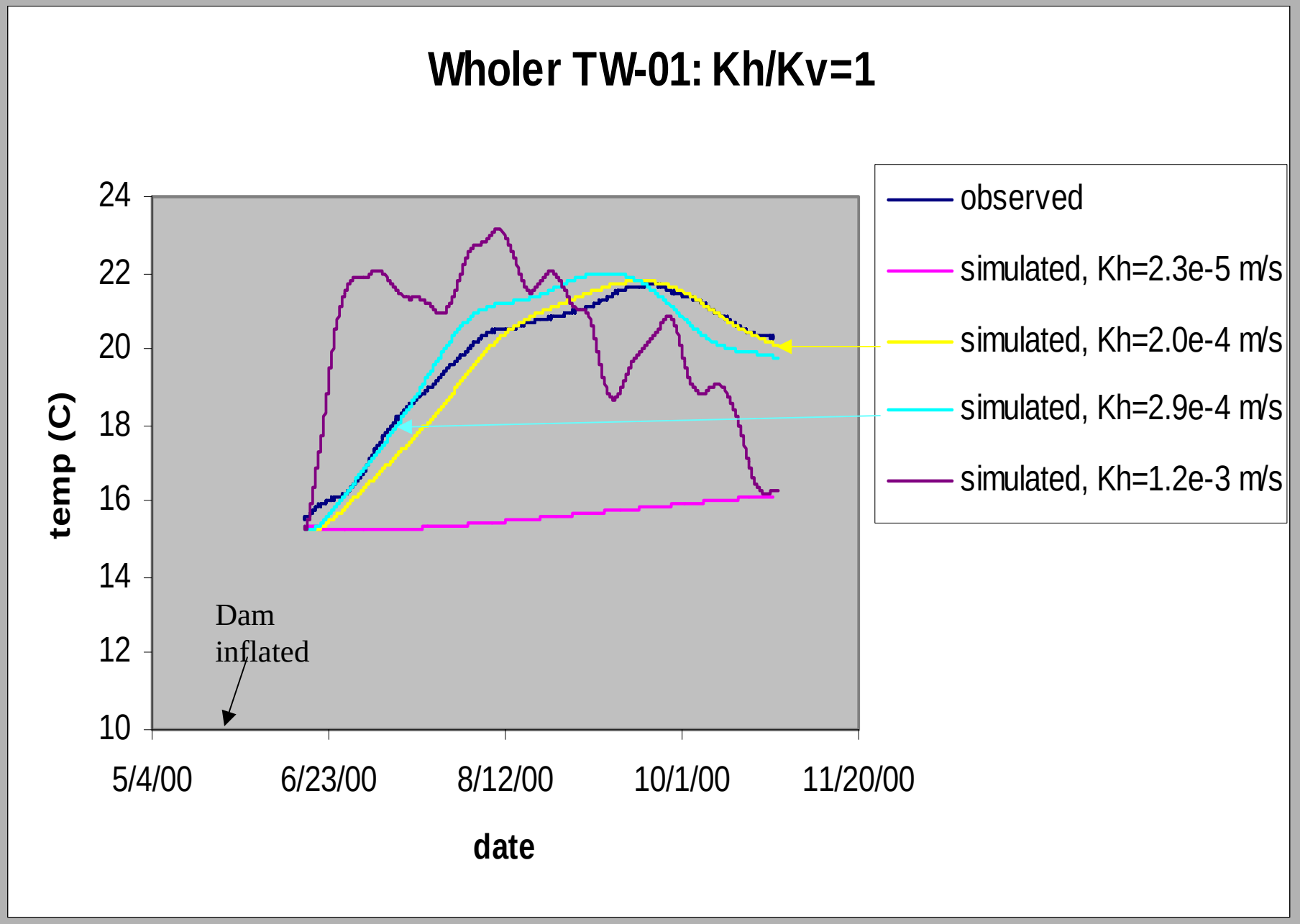

Piezometer


Piezometer



Deeper ground-water monitoring



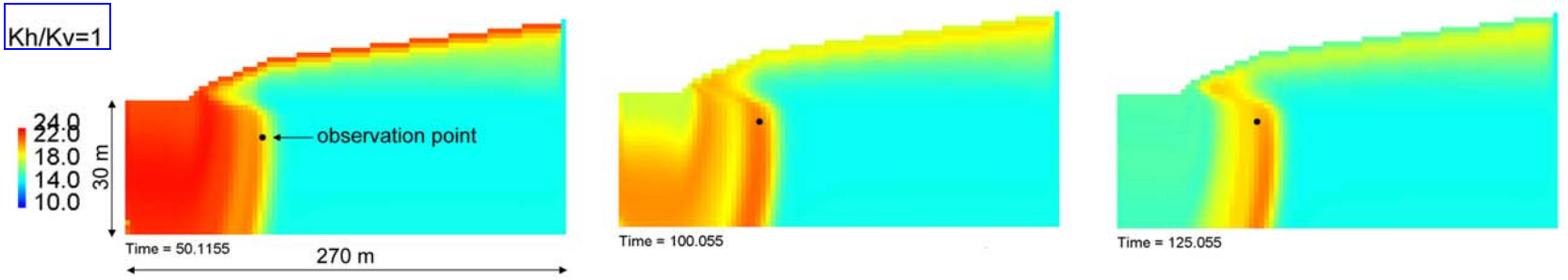


Wholer Well TW-01

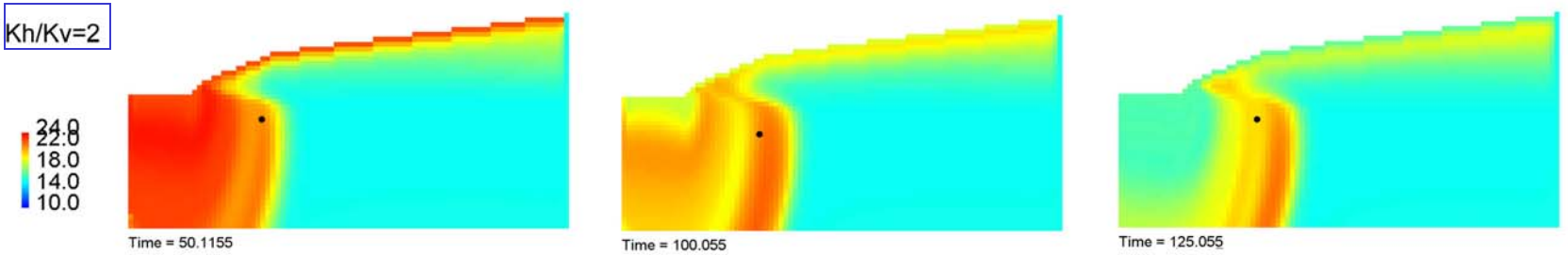
Kh=2.0E-4 m/s

50 days → 100 days → 125 days

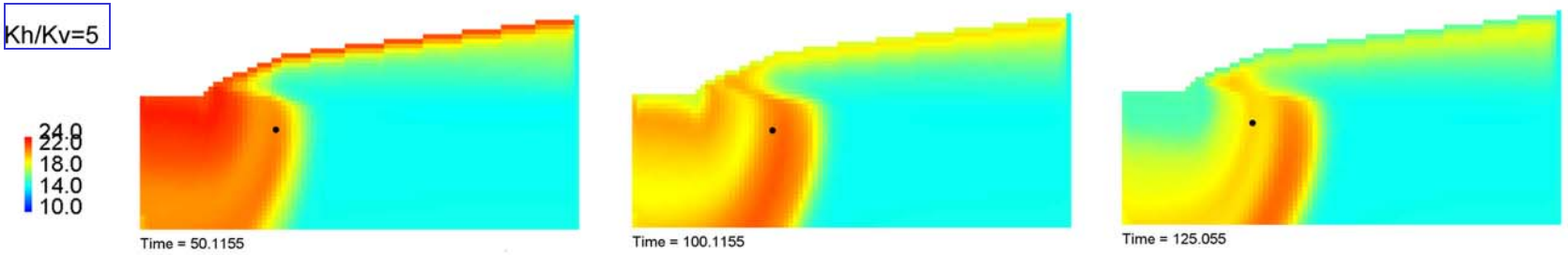
Kh/Kv=1



Kh/Kv=2



Kh/Kv=5

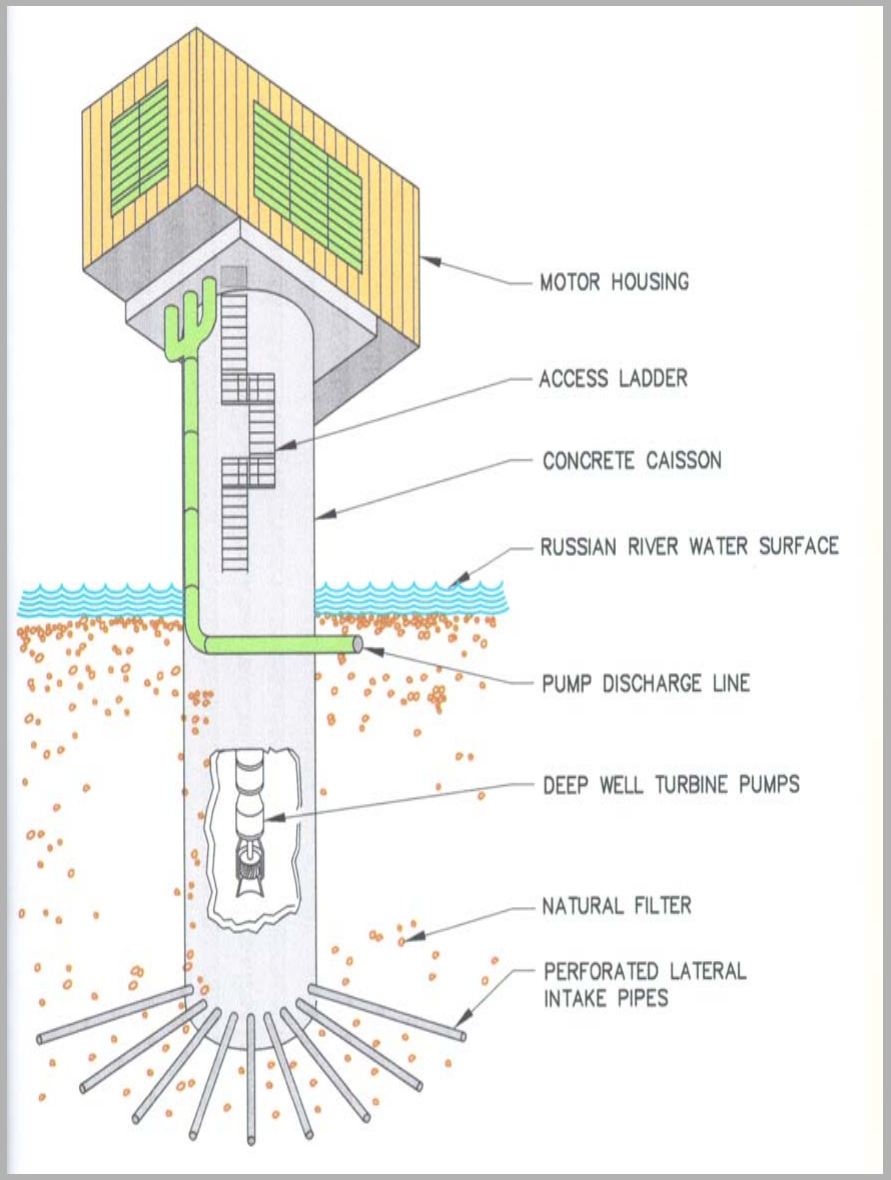


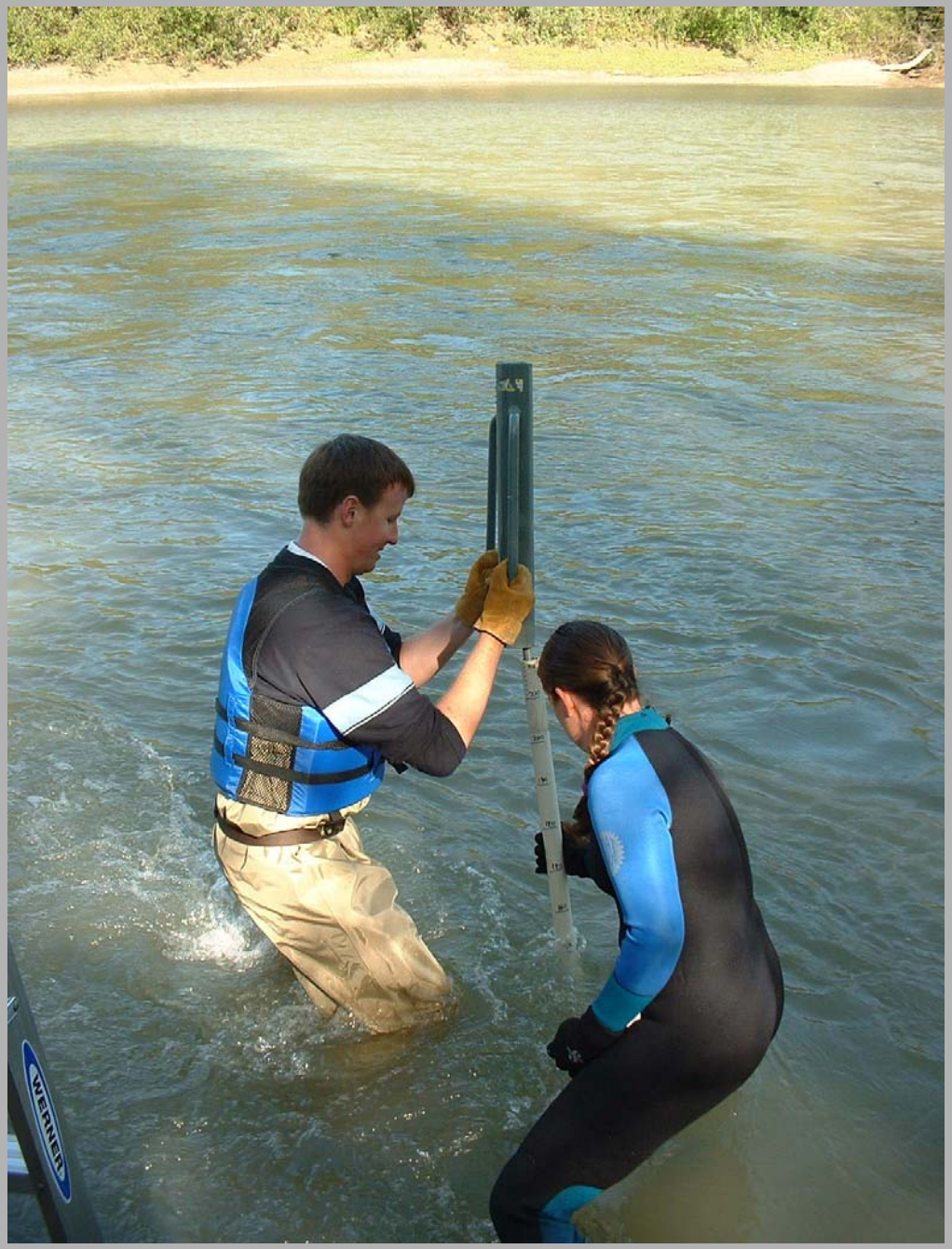
The use of temperature measurements to calibrate 3-D heat, solute, and water transport models

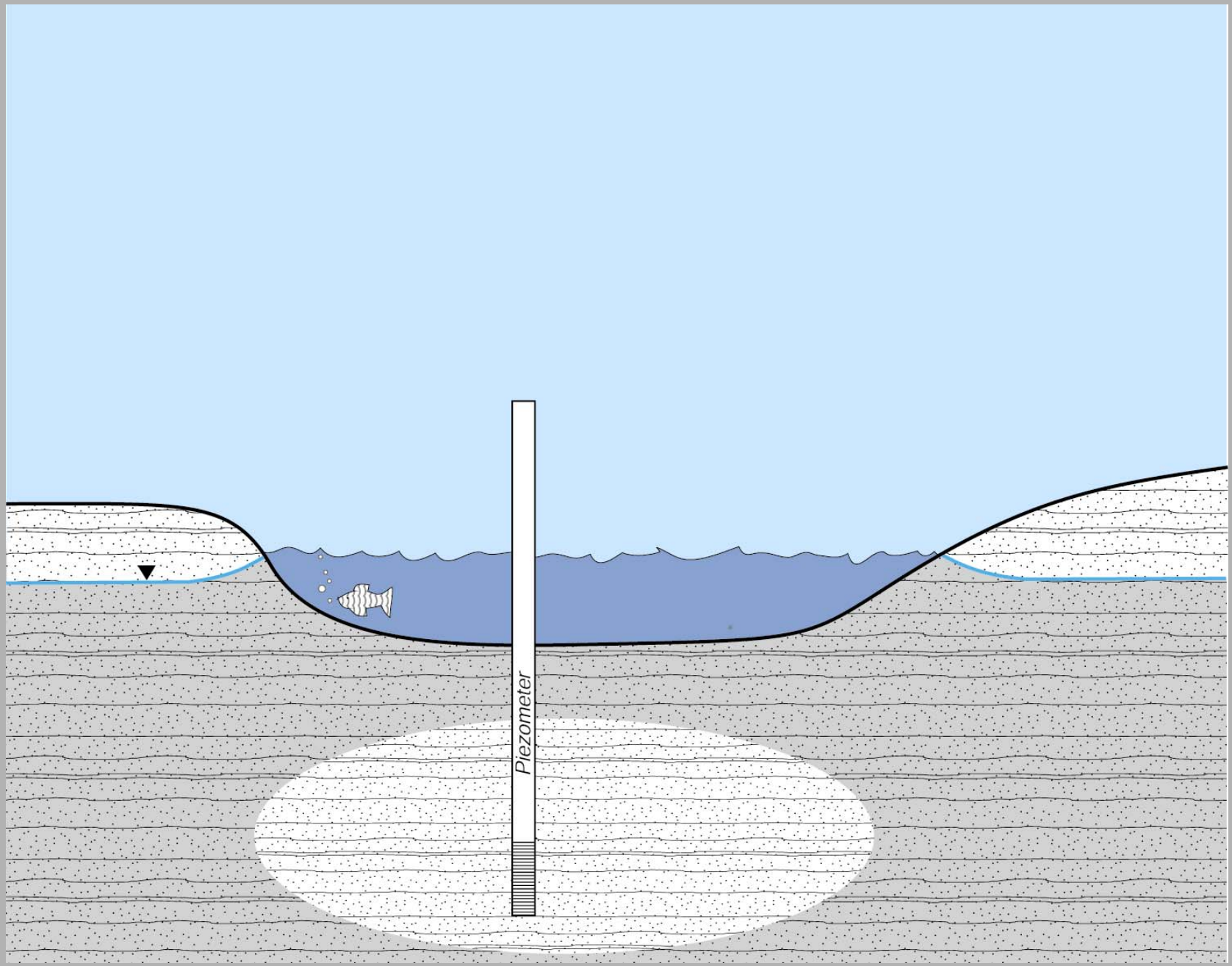
SUTRA

TOUGH2

Supply wells cause the streambed to desaturate in the summer

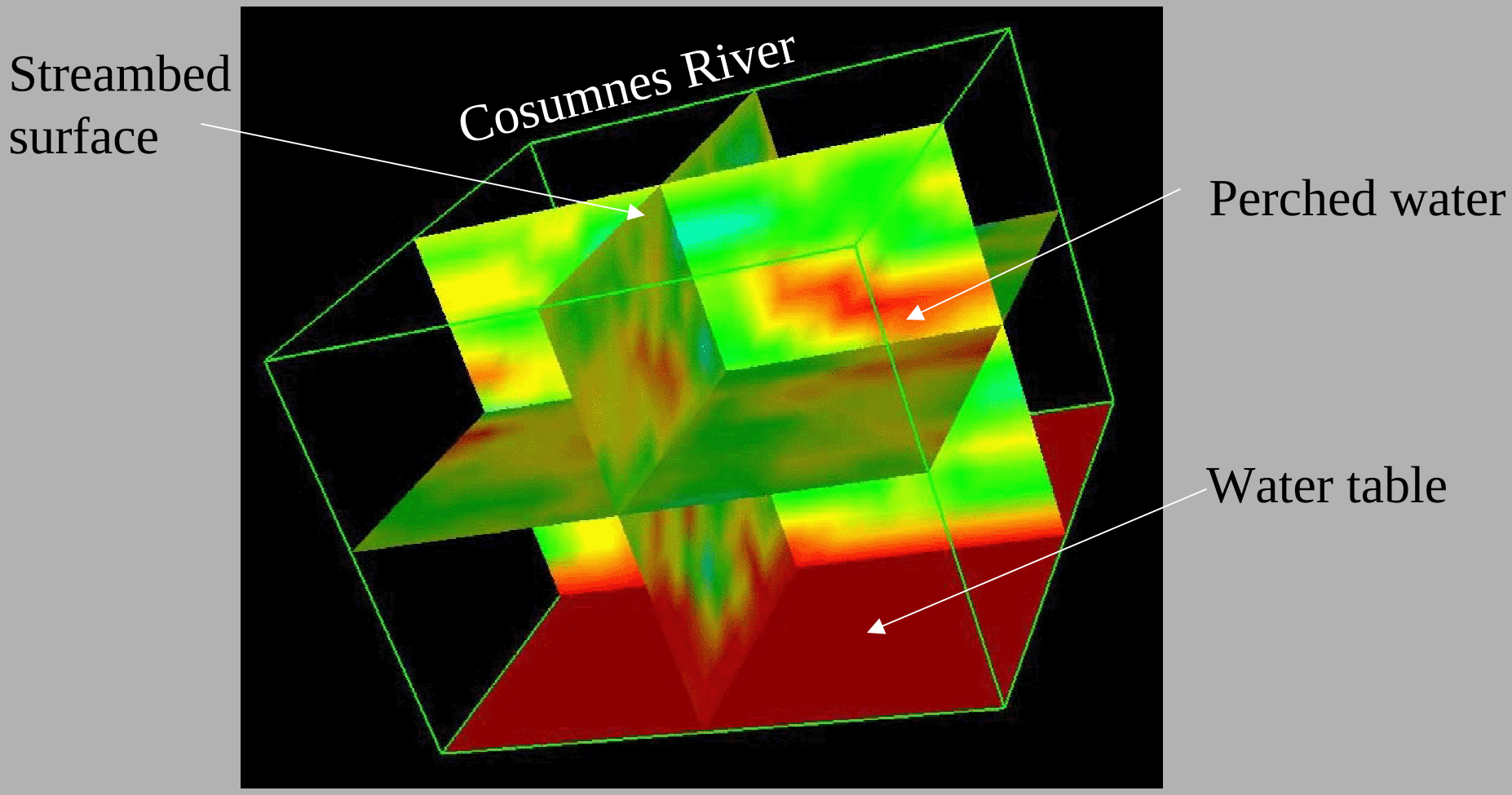





Piezometer

3-D GW modeling using TOUGH2 and SUTRA

Observed sediment temperature used to calibrate the model



TOUGH2 contour plot of sediment water content below the river three months after flow ceased. Red color represents saturated sediments and blue is driest sediments. Horizontal plane spans 100 m in both directions.