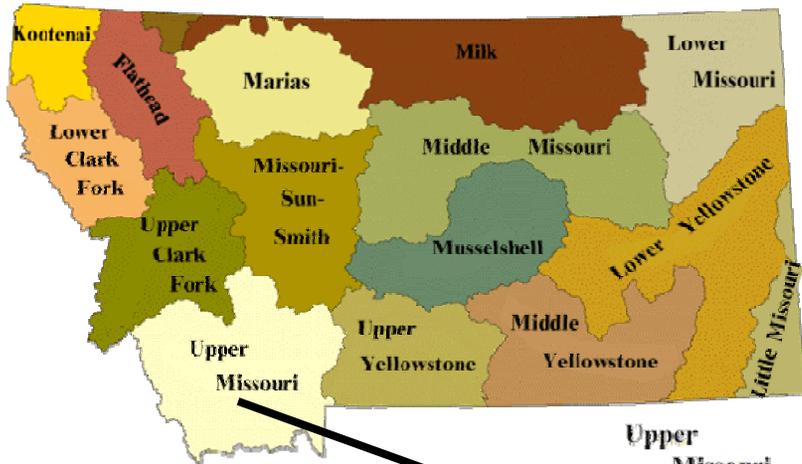


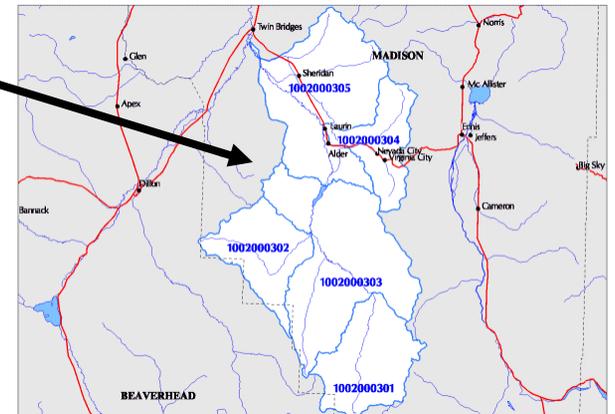
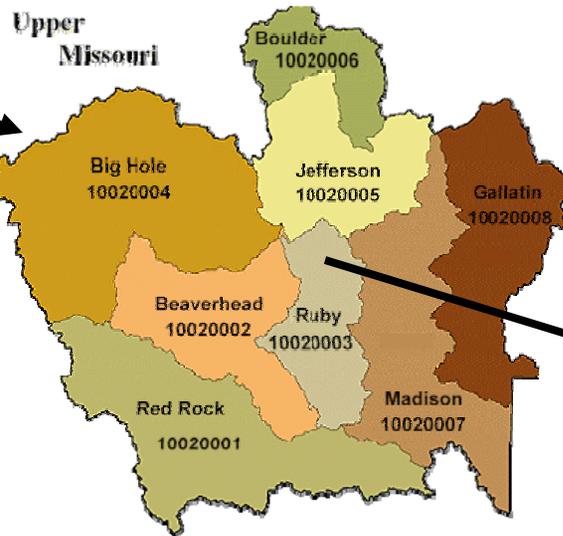
Concepts that may Support Policy

- Encouraging local entities to inventory their water resources
 - The Ruby presentation
- Scale and measurable impacts on water
 - Cumulative impacts and boundaries
- Facts about GW / SW exchange
- Montana Towns and Cities

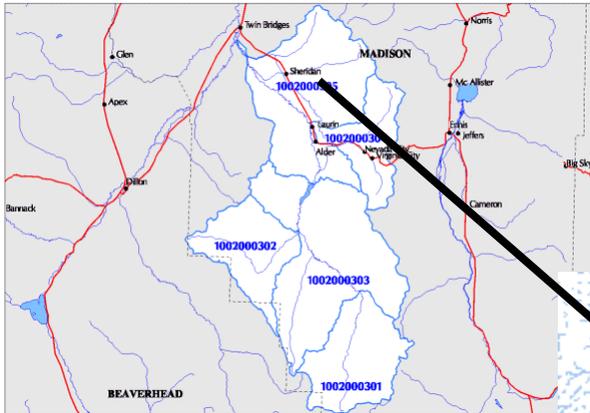
Scale – Tale of Different Outcomes



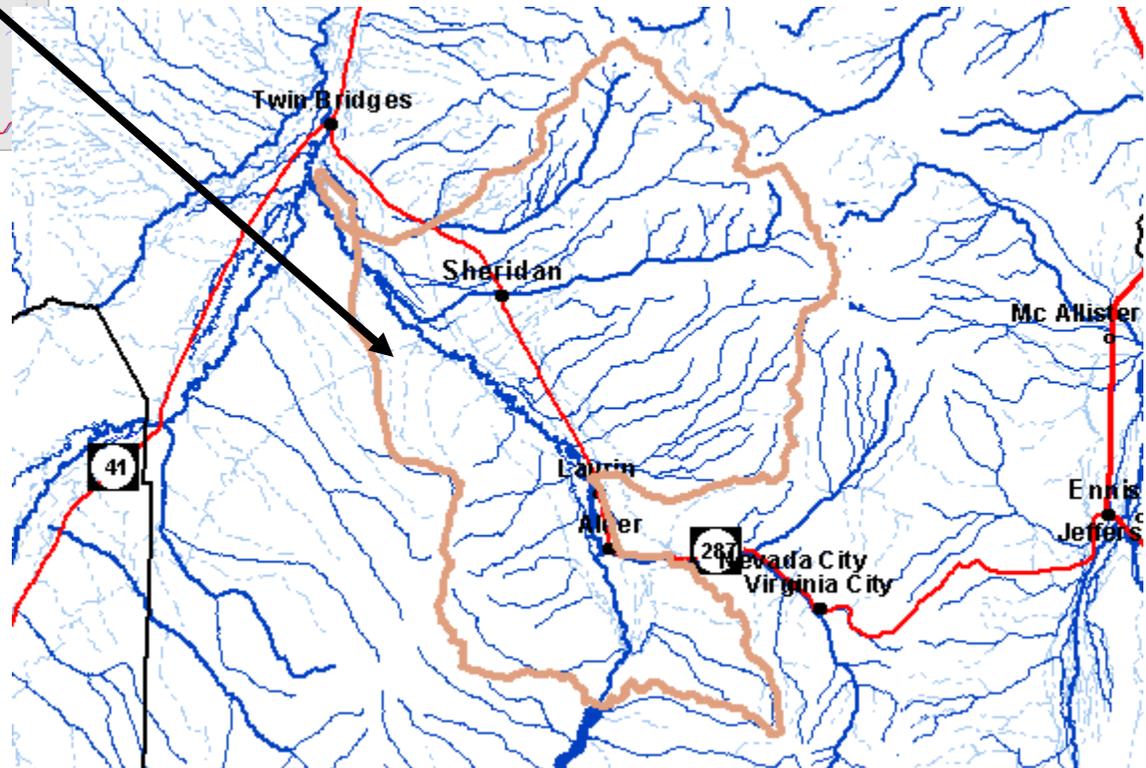
At this scale, the additional groundwater use for new home construction is not an issue. In most cases, you can't measure the impact in aquifers, streams or rivers.



Scale – Tale of Different Outcomes

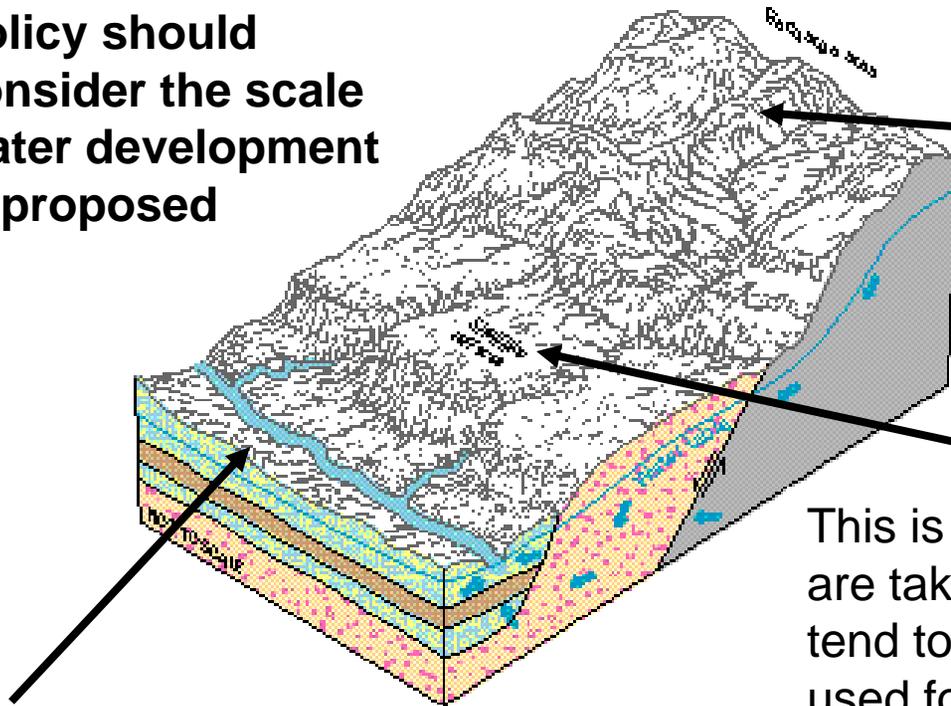


Even at this scale, small changes in water supplies are often not noticeable.



Policy should consider the scale water development is proposed

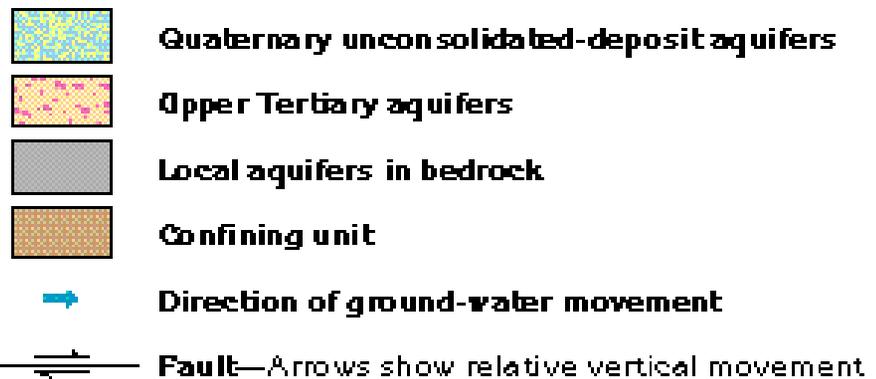
This area, the Mountains, can't be easily developed.



This is where the new developments are taking place. The upland areas that tend to be fairly dry, open, and was mostly used for agriculture. Often it more challenging to find water here.

This is where people started developing Montana towns and cities.

In areas where there was lots of water.



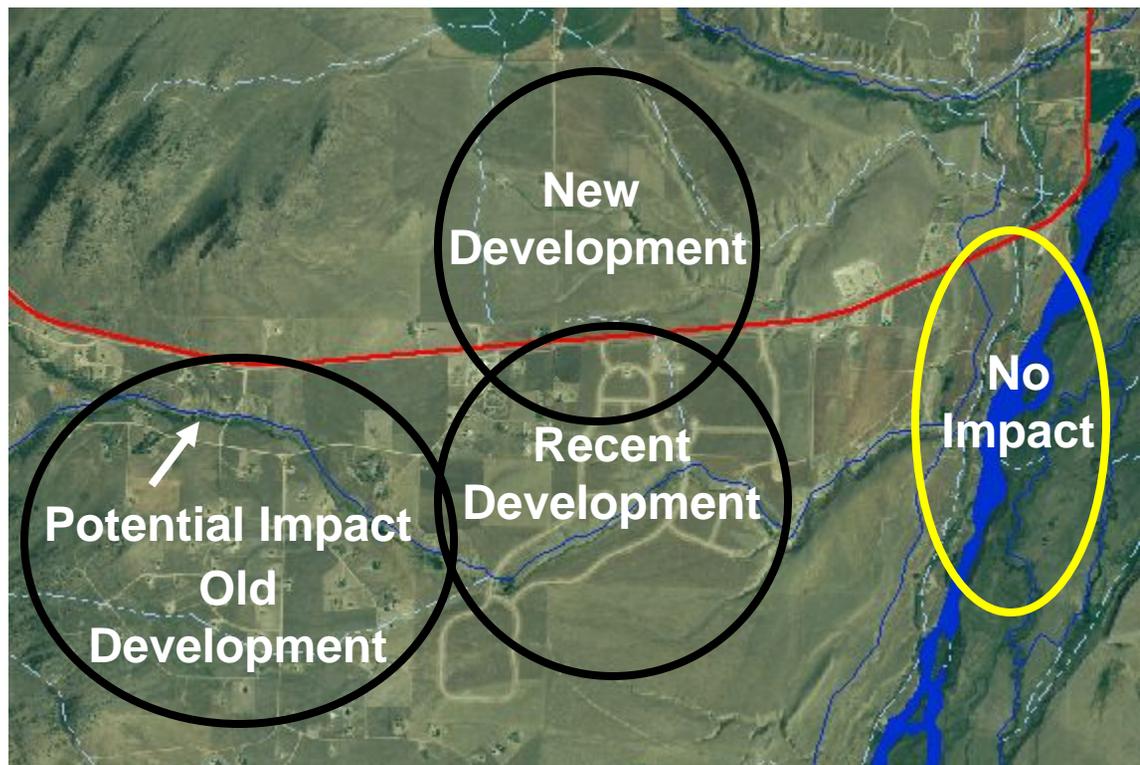
Scale – Tale of Different Outcomes

No Name Development Area And Cumulative Impacts

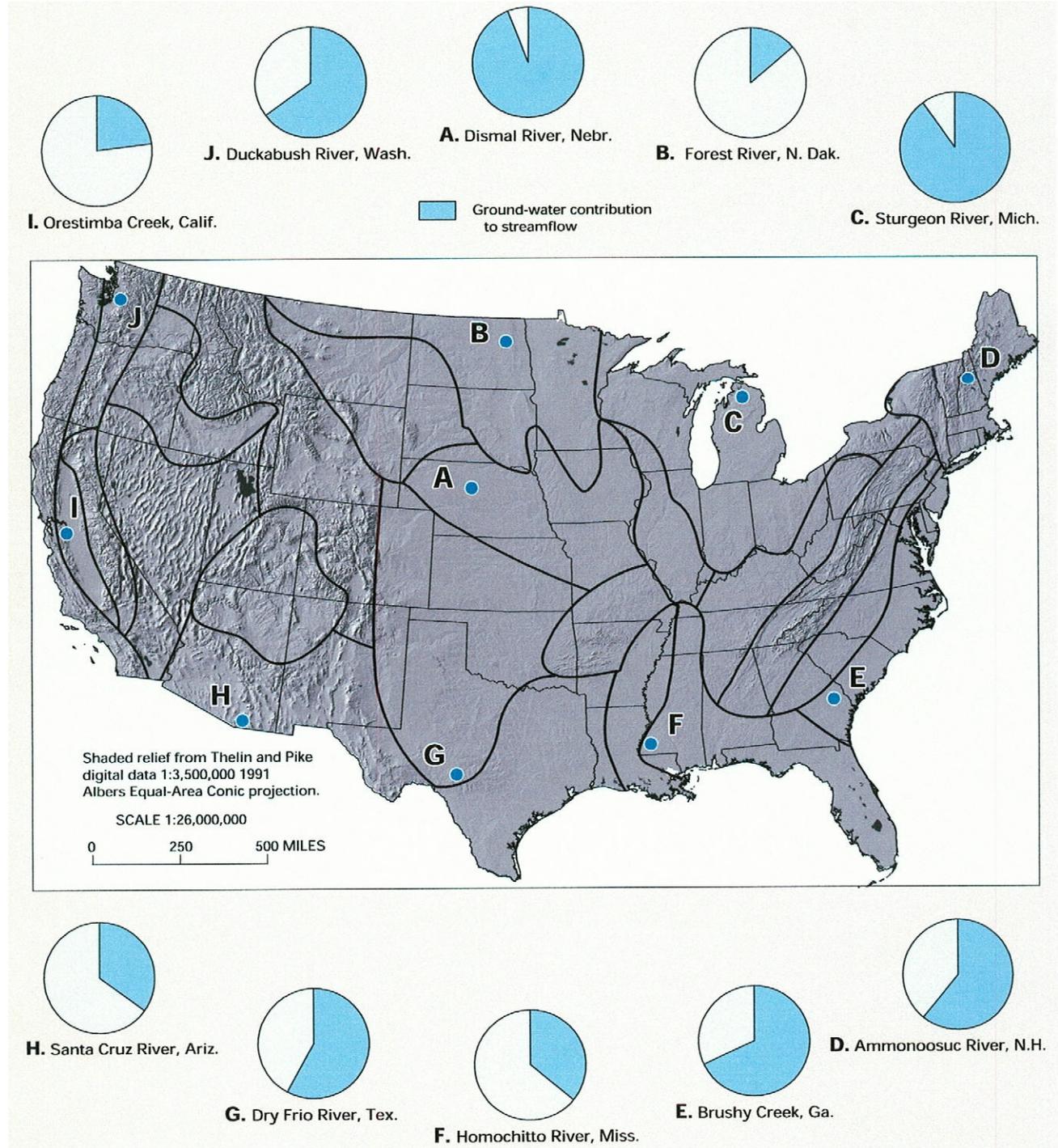
At this scale individual wells may
be an issue – it all depends on
where the new use is planned

Junior and senior water
right holders may be
impacted

Who should be
burdened with the cost
of mitigation if this
happens?

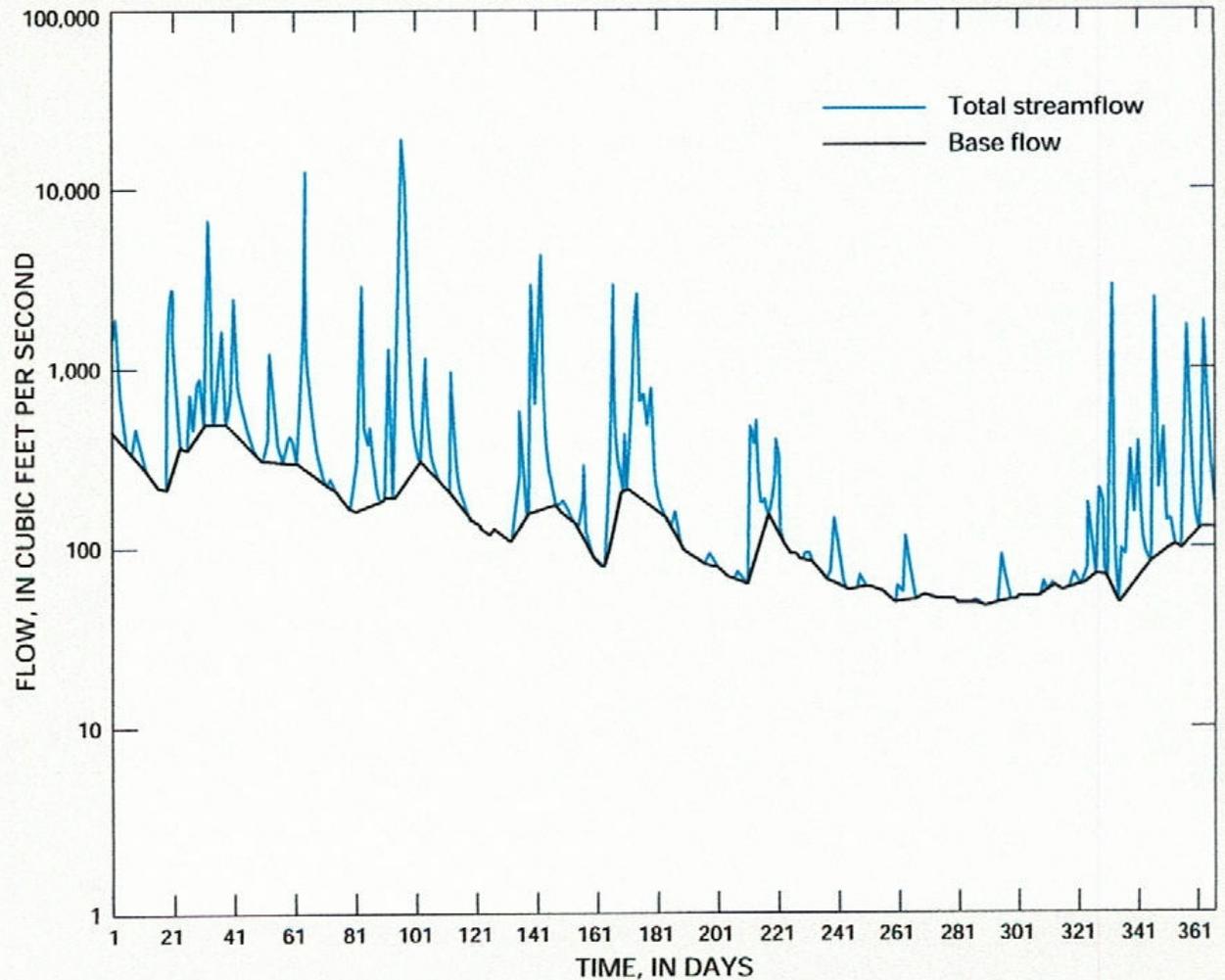


Groundwater / Surface Water Exchange



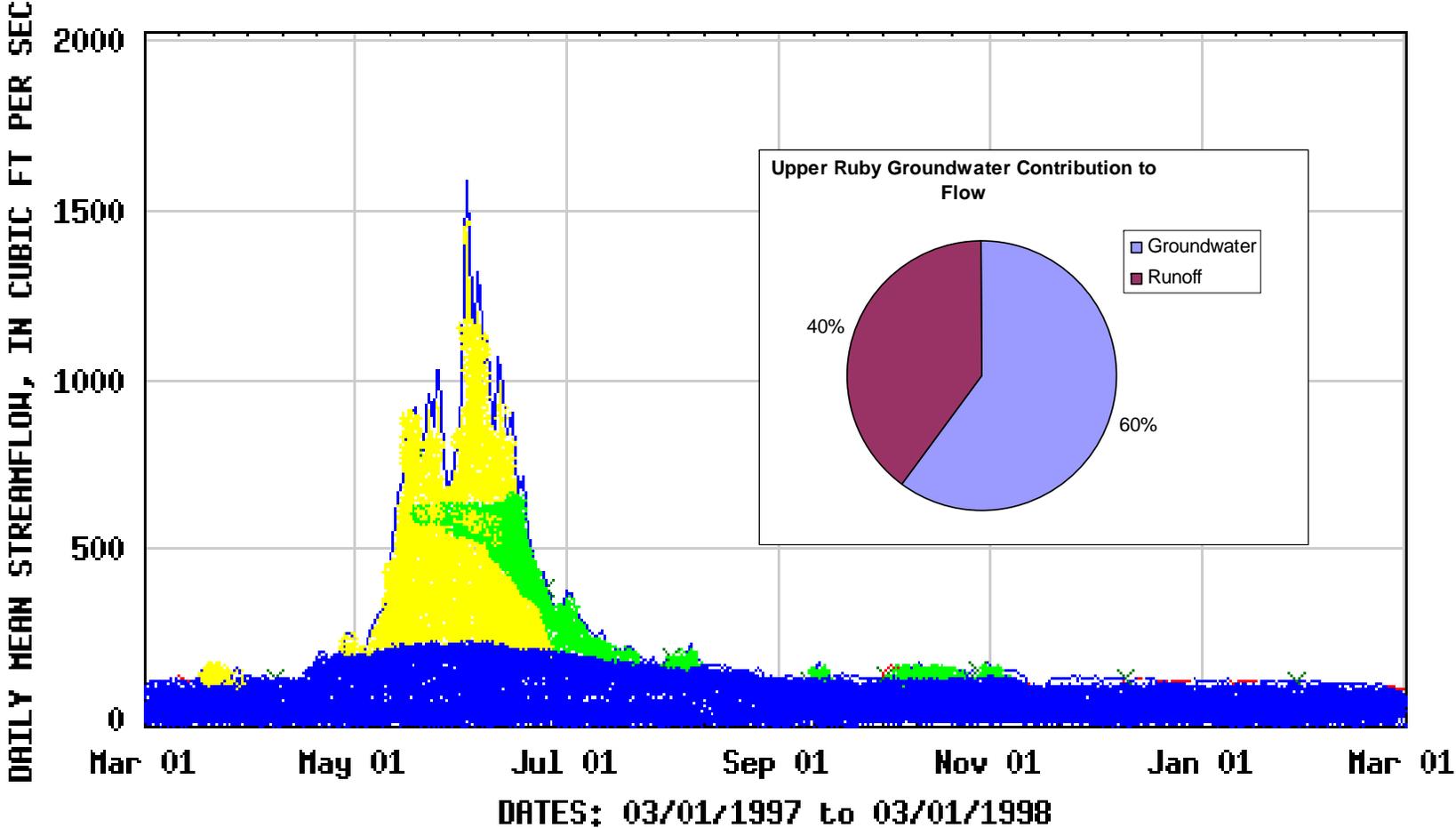
Example GW / SW Analysis for a Major River System

Figure B-1. The ground-water component of streamflow was estimated from a streamflow hydrograph for the Homochitto River in Mississippi, using a method developed by the institute of Hydrology, United Kingdom. (Institute of Hydrology, 1980, Low flow studies: Wallingford, Oxon, United Kingdom, Research Report No. 1.)



Upper Ruby River

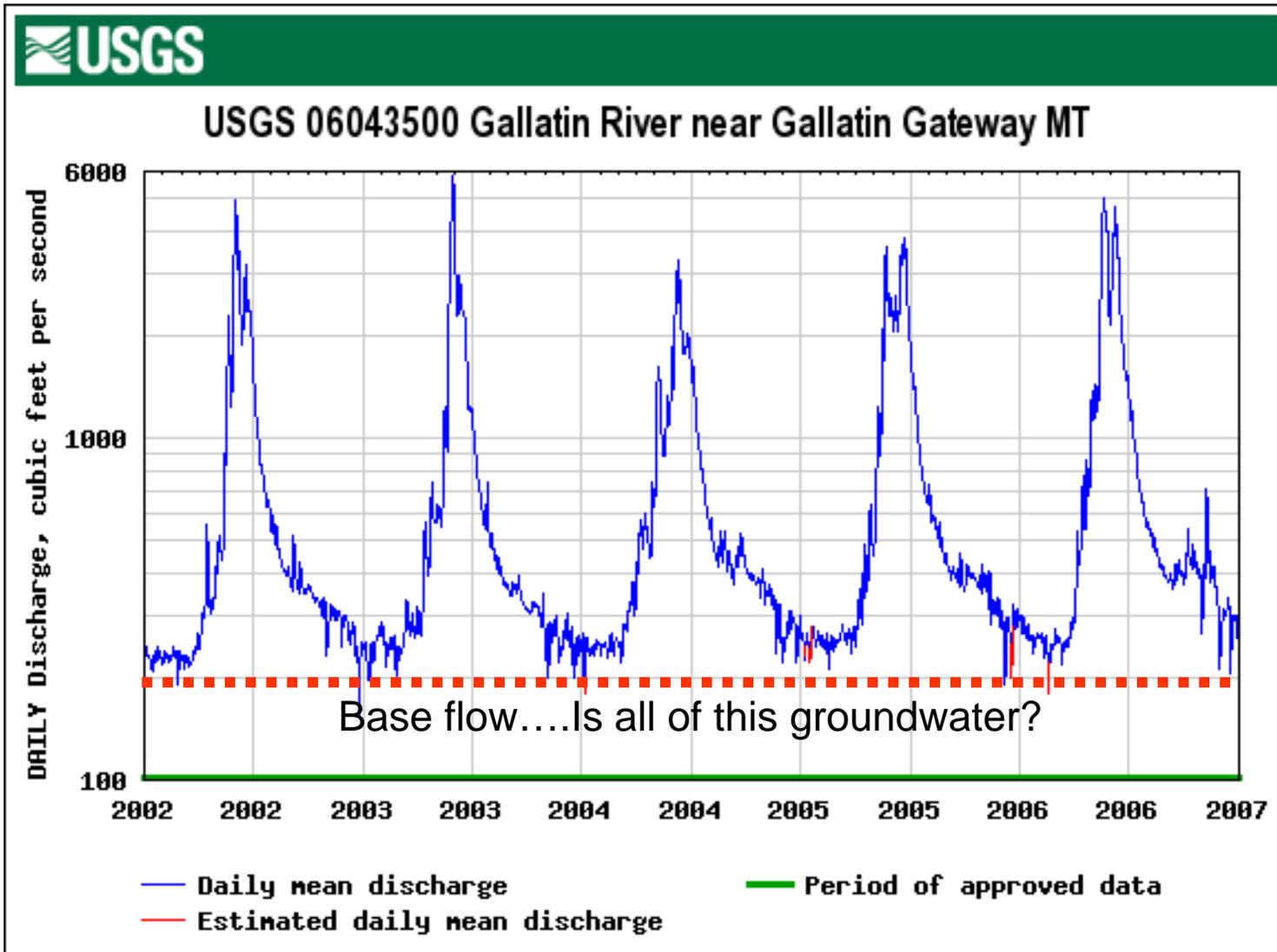
USGS 06019500 Ruby River ab Reservoir nr Alder MT



EXPLANATION

— DAILY MEAN STREAMFLOW × MEASURED STREAMFLOW — ESTIMATED STREAMFLOW

Other Rivers?



SW/GW Exchange and Back to Scale

- Groundwater and Surface Water Exchange is often variable spatially.
- Some reaches of streams and rivers are not connected in Montana. Groundwater goes and surface water goes....depending on site specific conditions
- The concept that major river systems have “no” connection to surface water is not supported.

Montana Towns & Cities

- Strict public water supply rules – Why?
 - Well head protection
 - Well design approval
 - Water disinfection
 - Comprehensive supply analysis (1.5 times the total flow needed)
- Many new developments are as big or bigger than Montana towns.....should they follow the same or similar rules?
 - Perhaps there needs to be balance? Treat big developments like towns?