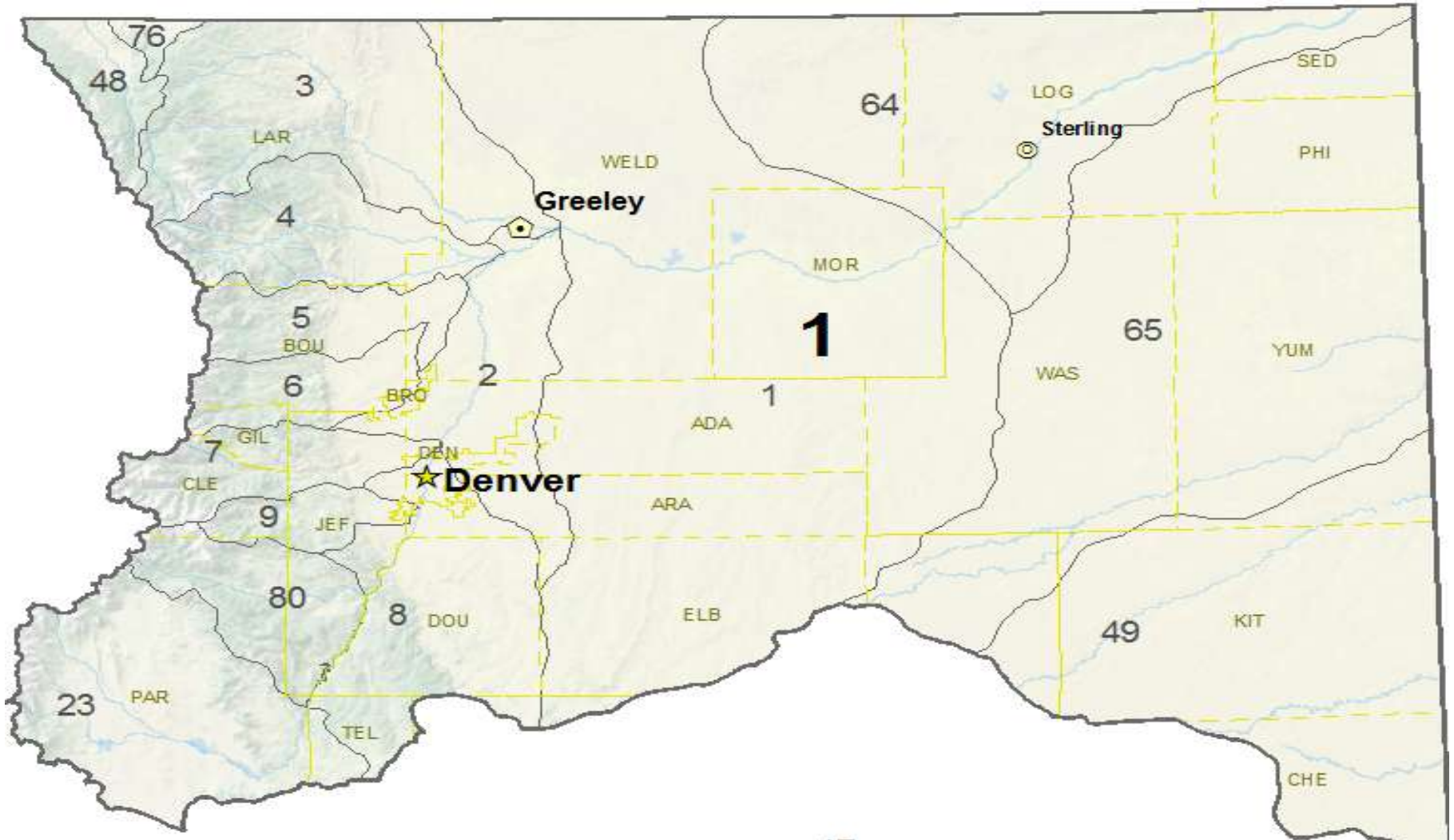


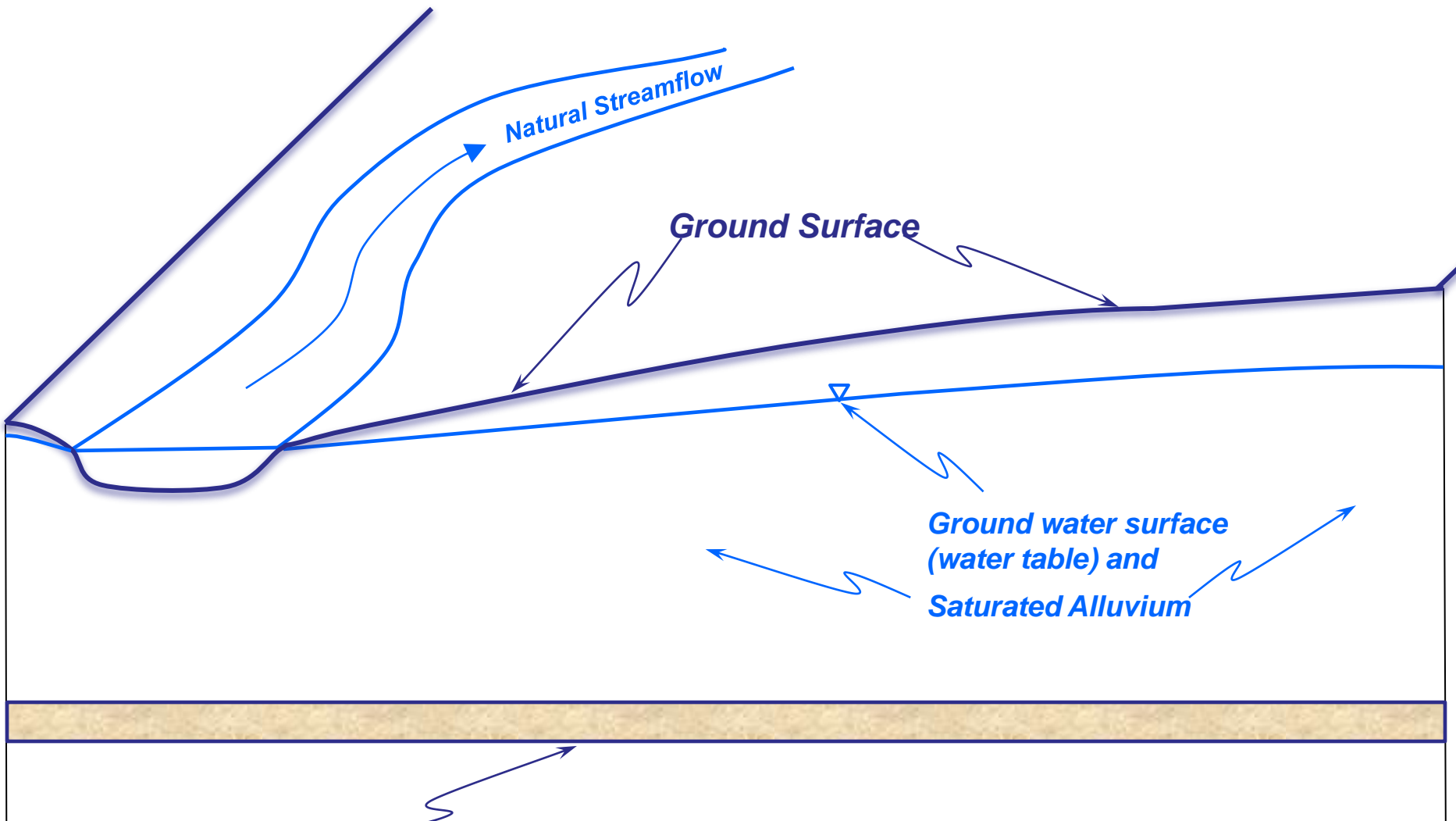
High Groundwater – No Magic Bullet

**South Platte Forum
October 19, 2011**

South Platte Near Sterling

Division 1 Water Districts Map





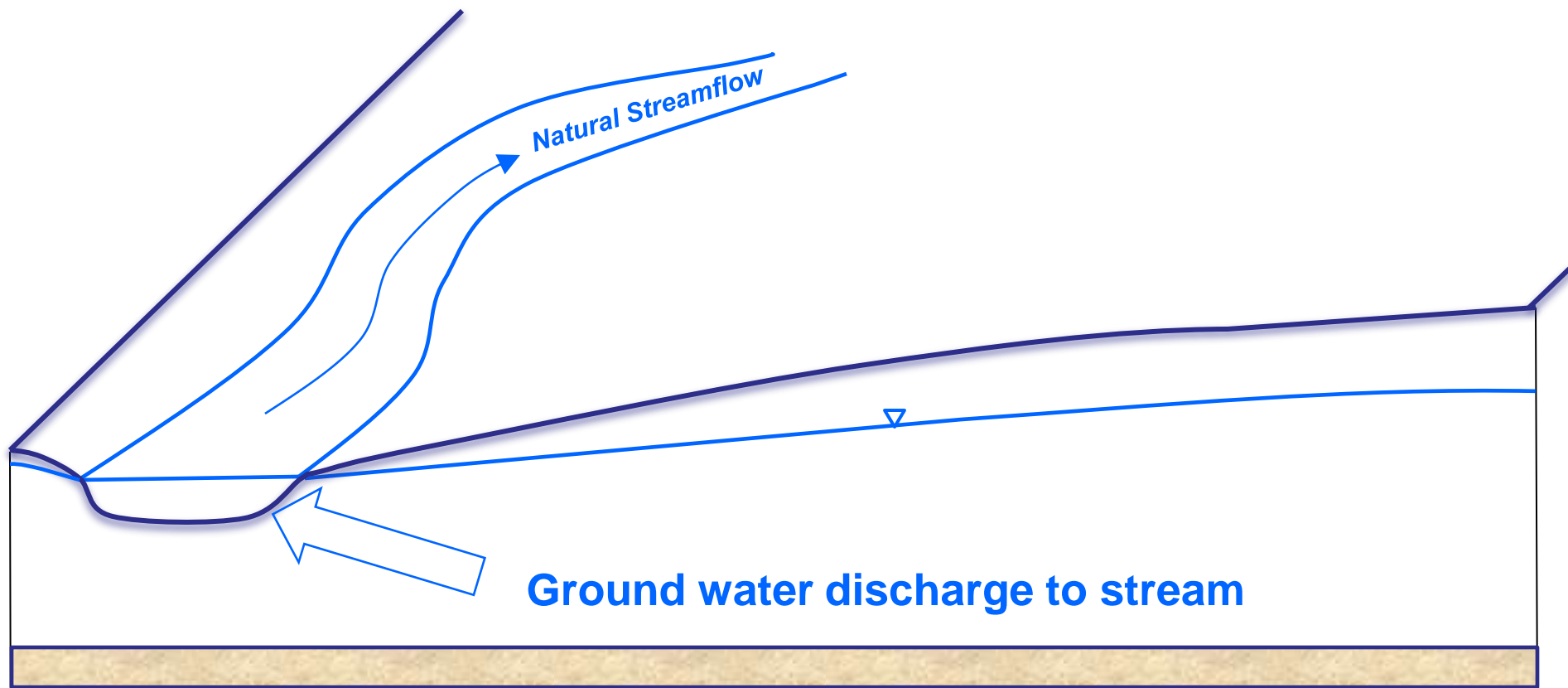
Natural Streamflow

Ground Surface

*Ground water surface
(water table) and
Saturated Alluvium*

Confining Bedrock Layer

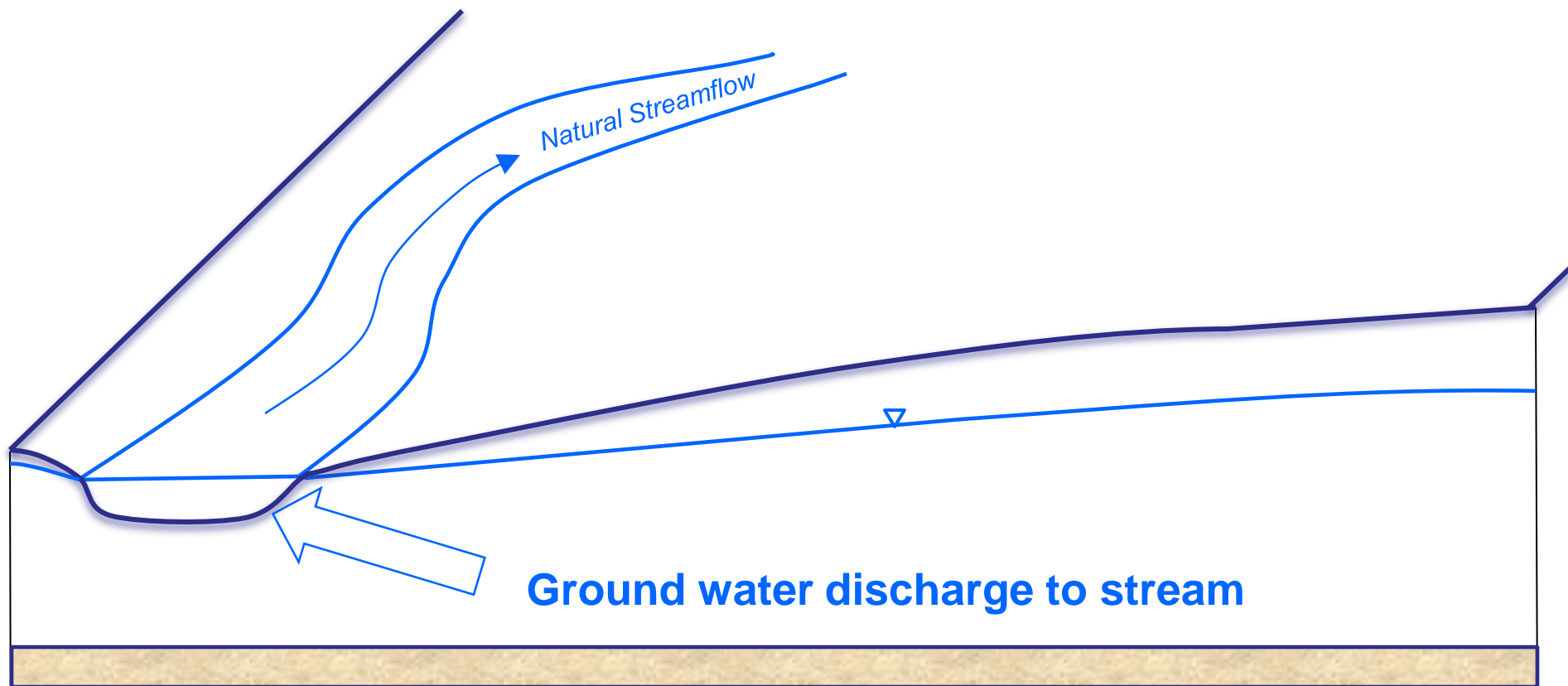
Cross section of alluvial ground water system



General South Platte Condition

Discharge of ground water to the stream because the ground water surface is at a higher level than the stream surface.

Flow occurs due to this hydraulic gradient, and increases or decreases with the magnitude of the hydraulic gradient.



Mass Balance Still Controls

$$\text{Change in Storage} = \text{Inflow} - \text{Outflow}$$

INFLOWS

- **Natural**
 - **Precipitation**
 - **High Streamflow**
- **Artificial**
 - **Un-intentional**
 - **Ditch and Reservoir Seepage**
 - **Irrigation Deep Percolation**
 - **Intentional**
 - **Non-historic Ditch Recharge**
 - **Recharge Basins**

OUTFLOWS

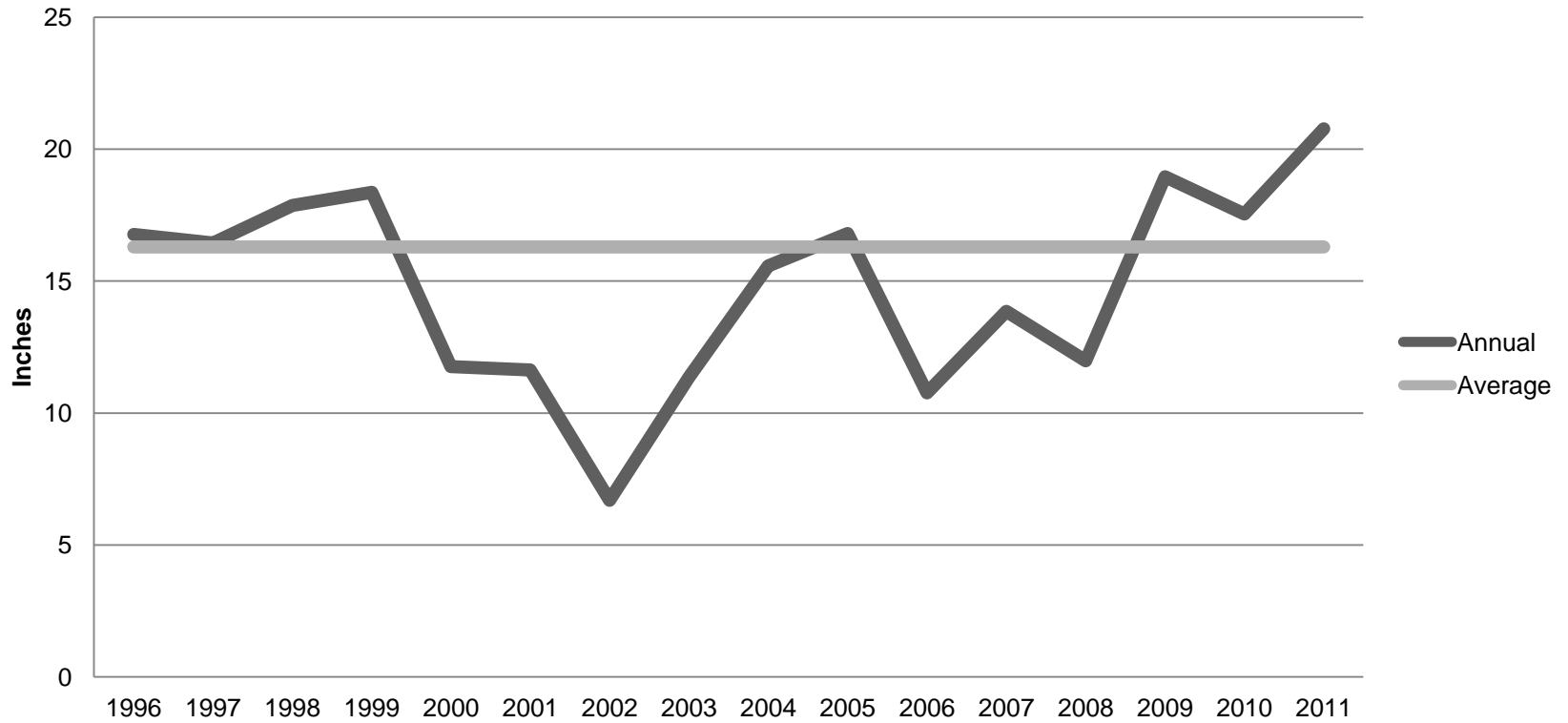
- **Natural**
 - **Stream Discharge**
 - **Phreatophyte Consumption**
 - **Natural Groundwater Pond Evaporation**
- **Artificial**
 - **Groundwater Drainage System Discharge**
 - **Consumptive Well Pumping**
 - **Planted Phreatophyte Consumption**
 - **Artificial Groundwater Pond Evaporation**

WHO GETS THE BLAME?

- **1st Increased Artificial Intentional Inflows**
- **2nd Reduced Artificial Outflows**
- **3rd Increased Artificial Un-intentional Inflows**
- **4TH Increased Natural Inflows**

**REALITY IS SOME COMBINATION
OF FACTORS IS RESPONSIBLE**

Sterling Precipitation



*2011 Precipitation through September 30

REGULATORY AUTHORITY

- **Division Engineer shall order diversions discontinued:**
 - **To the extent the water is not necessary for application to a beneficial use;**
 - **To the extent the water is needed by a senior water right for beneficial use;**
 - **If a well causing out-of-priority depletions is not in an augmentation plan or substitute water supply plan.**

LOCAL COOPERATIVE SOLUTIONS?

- **Dewatering wells**
- **Local sub-surface and surface drainage systems**
- **Lining sections of ditches**
- **Ditch agreements to accept water**
- **Ditch agreements to modify operations**

QUESTIONS?

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