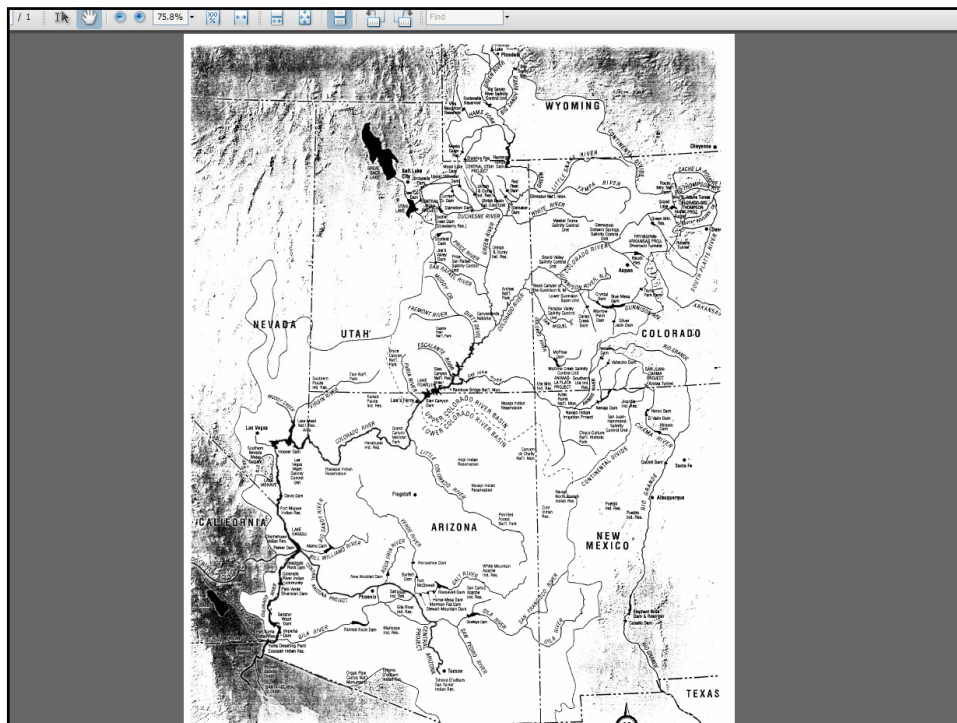


Getting To Know Your Local Watershed

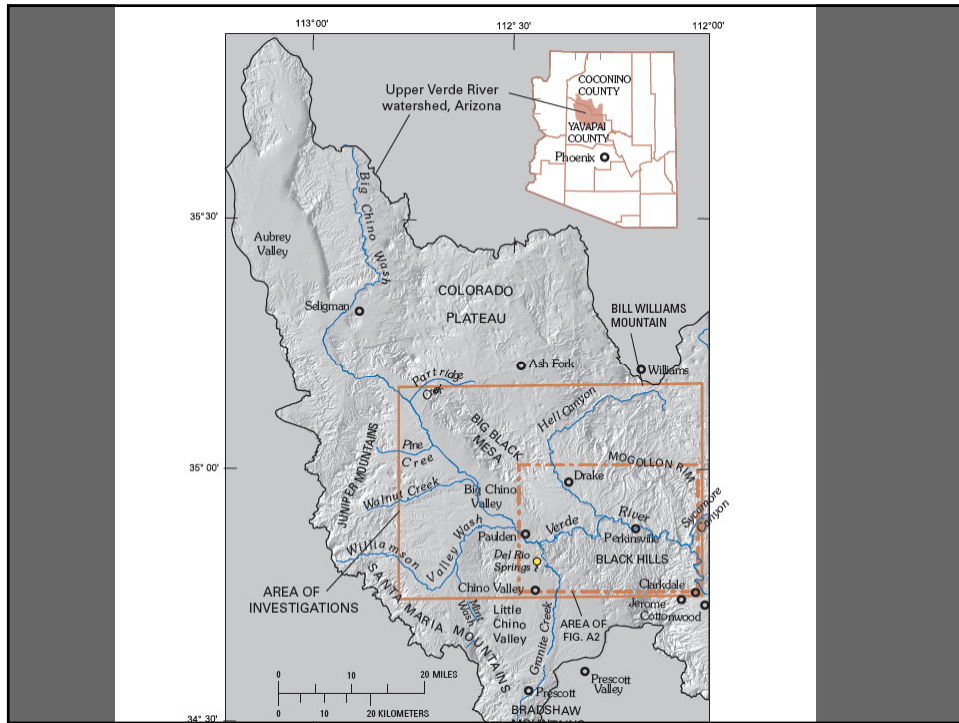
What is a watershed?
Where are the boundaries?
Importance of climate
Historical use of water/establishment of water rights
Modern use of water
Concerns: water availability, water quality



1



2

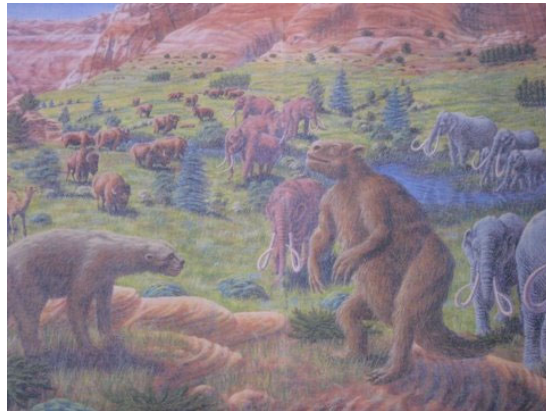
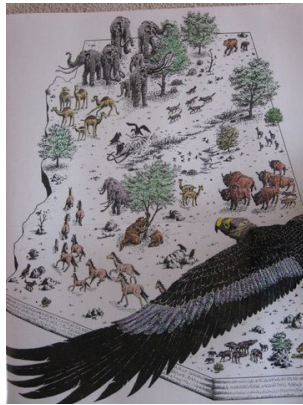


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4

Holocene Epoch begins 10,000 years ago marking the beginning of an interglacial cycle resulting in drier conditions. (20,000 years ago maximum of last ice age.)



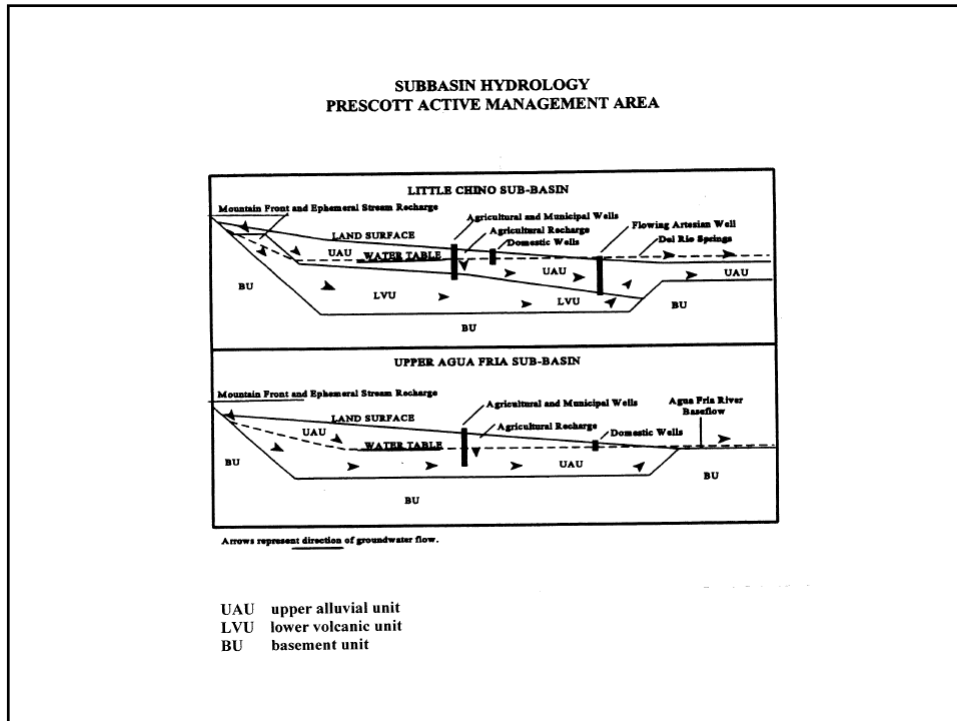
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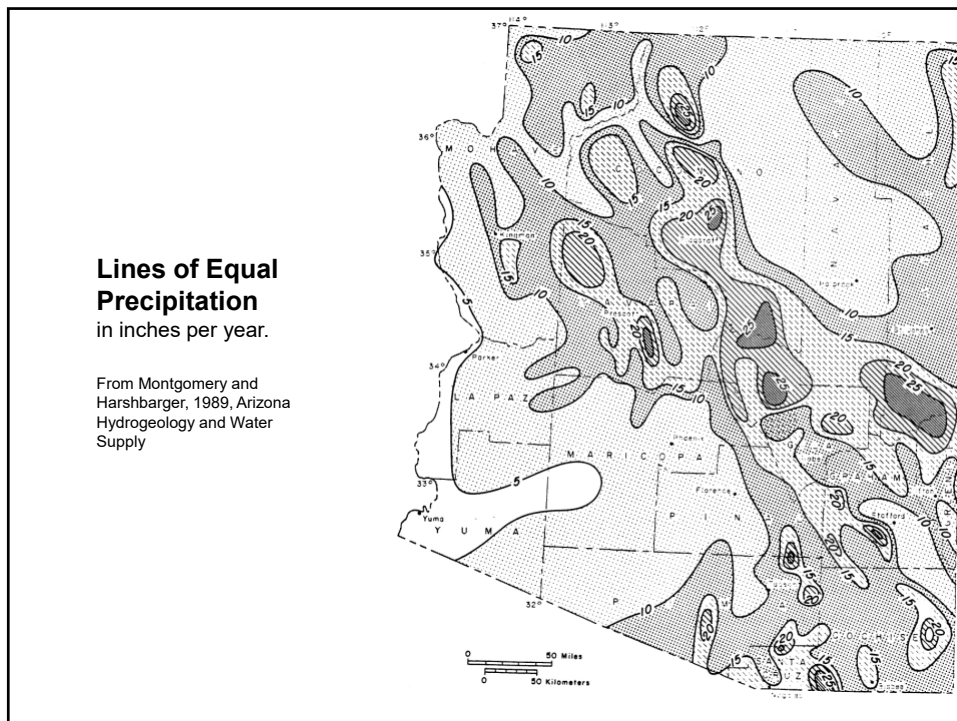
Pronghorn: can maintain speed of 45 mph for over 4 miles.



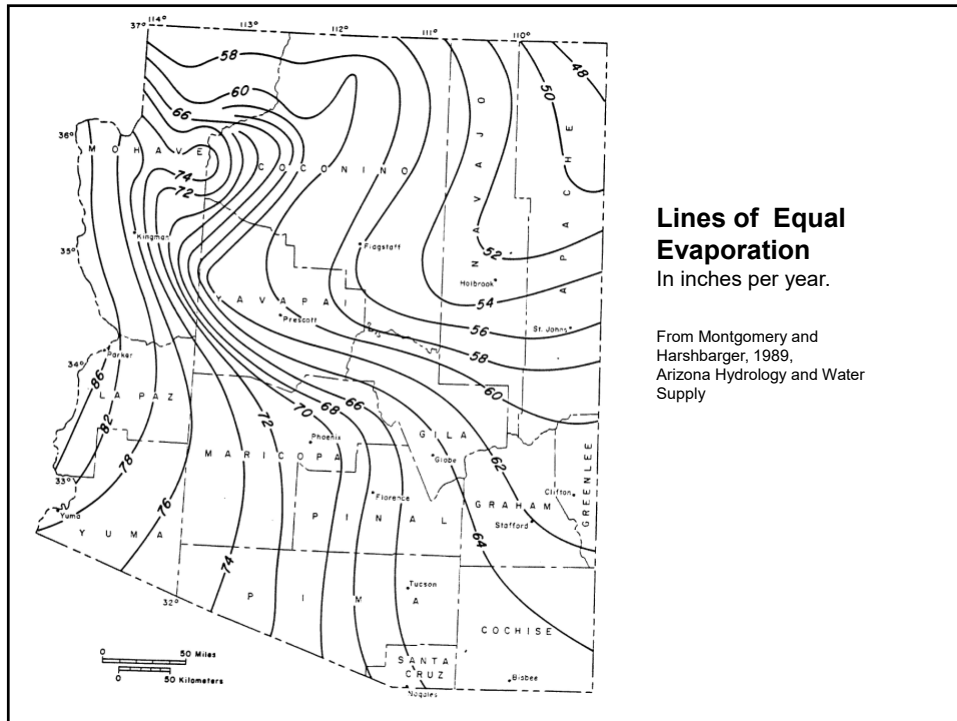
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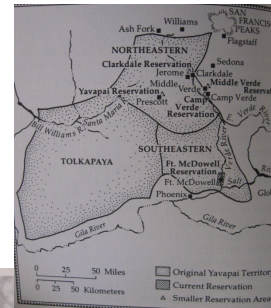


9



10

Native people present for several thousand years.
 Diversions for farming: Montezuma Well, Supai Village.
 Sacred Mountain: Waffle gardens.
 Hopi: Dryland farmers.



Havasupai Women with water baskets



11

Beavers: Important ecological role
 Create wetlands and increase bank storage and recharge to aquifers.
 Trapping began in 1826.



12

1848 Treaty of Guadalupe Hidalgo creates the New Mexico Territories (which include present day Arizona).

Gold Rush

Law of Prior Appropriation:

“First in time, first in right”

Senior rights holders.

Precious metals: gold and silver

Placer mines...hydraulic mining

Hardrock mining...

demand for charcoal, timber, firewood, mercury.

Farms needed to support mines:

Verde Valley and Chino Valley.

Ditch companies claiming rights to surface water for farms.

Grandfathered irrigation rights (GIR's) claims

to groundwater for farms



13

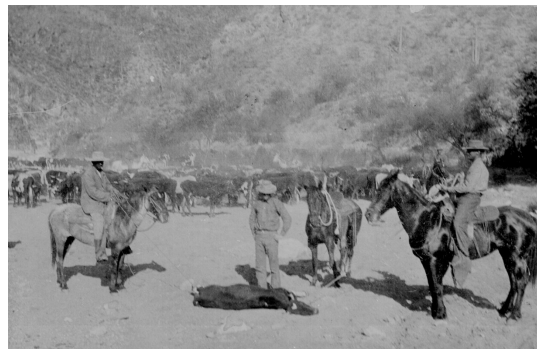
1880's Era of Extraction began with arrival of the Railroads.

Era of the “Three C's”

Cattle, Copper, and Cotton.

In 1870 there were 38,000 head of cattle in the Arizona Territory.

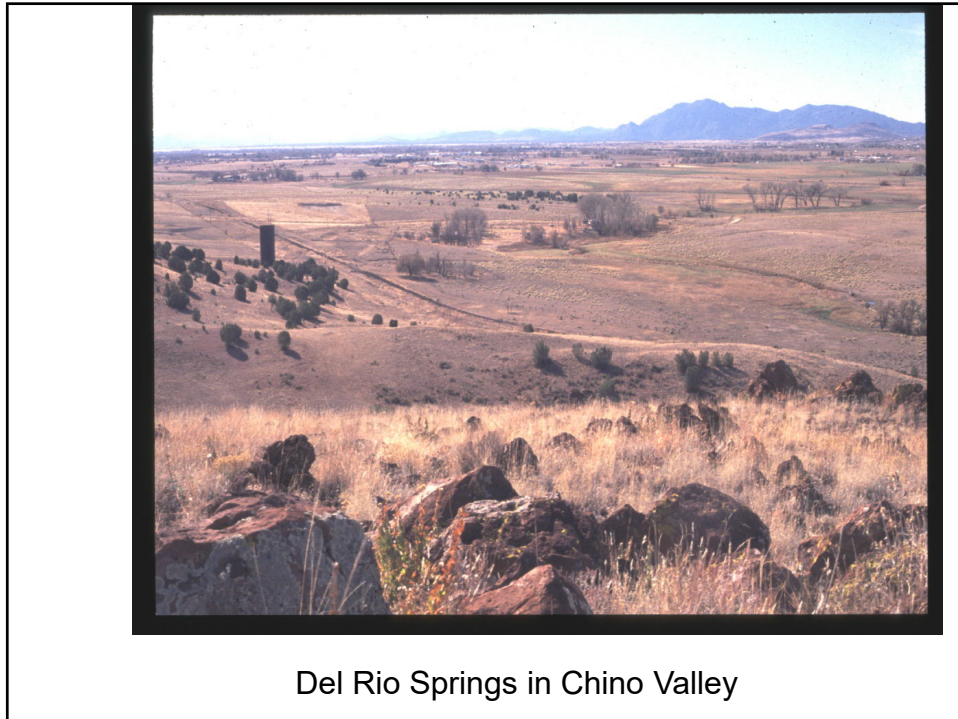
By the early 1890's there were 1.5 million head of cattle and over 1 million head of sheep.



Windmills, stock tanks.

Overgrazing, channel downcutting resulting in dropping water tables.

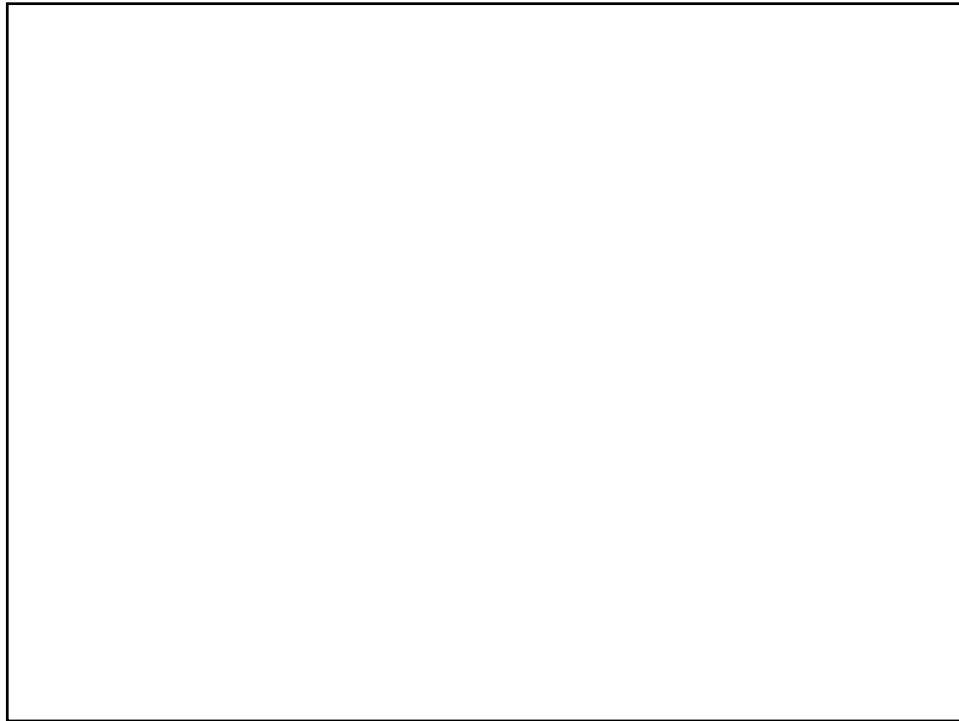
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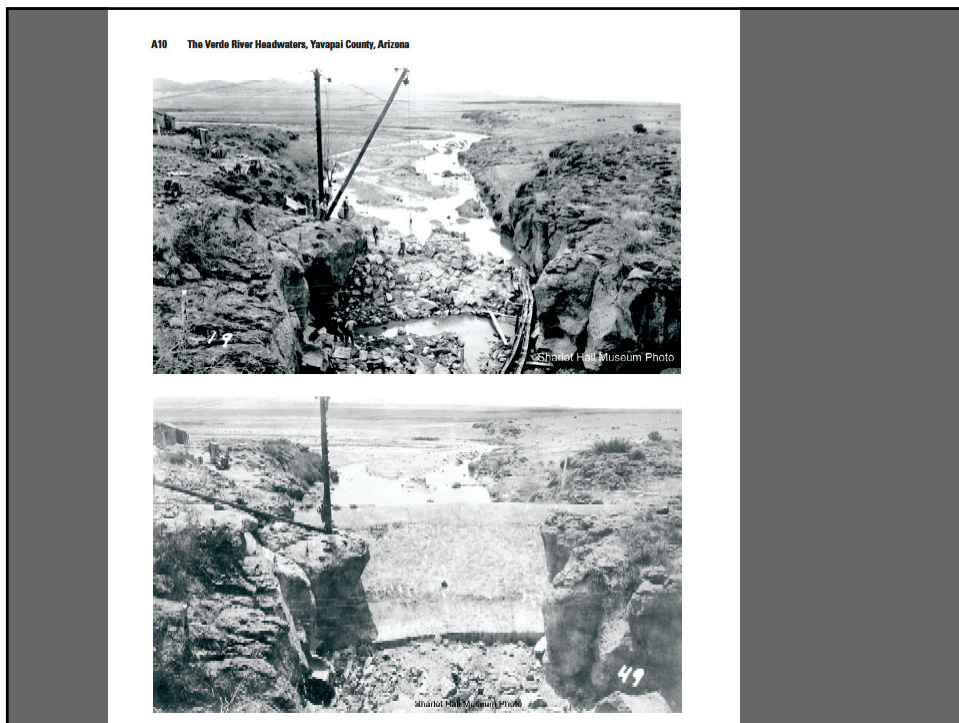
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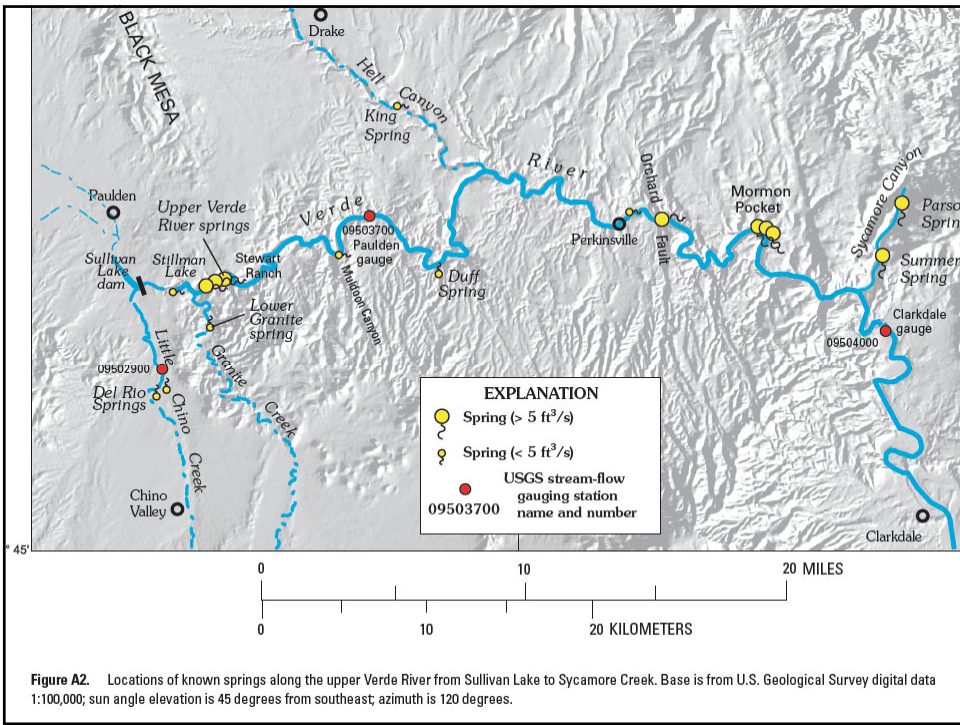


18

Sullivan Dam considered mile 0 of the Verde River
 U.S.G.S.'s Paulden Gauge is 10 miles downstream
 measures streamflow.
 Base flow averages 25 cfs (cubic feet per second).

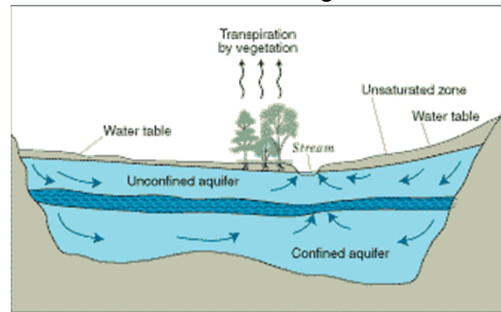
Sullivan Dam built in 1935
 Civil Works Administration Project
 built by Chino Valley and Prescott relief clients
 whose crops had suffered in drought.
 Worked their relief time in exchange for irrigation pumps.

19



20

Cross-sectional view of idealized aquifer and movement of groundwater.

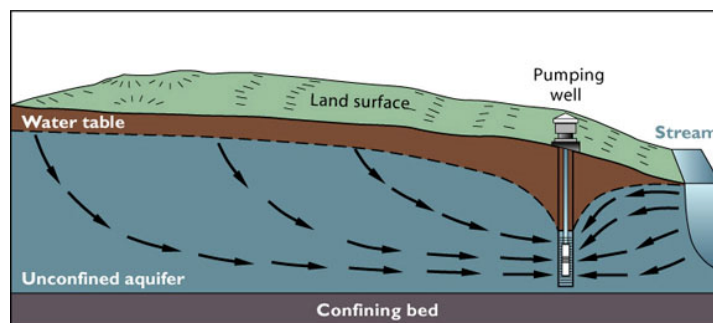


EXPLANATION

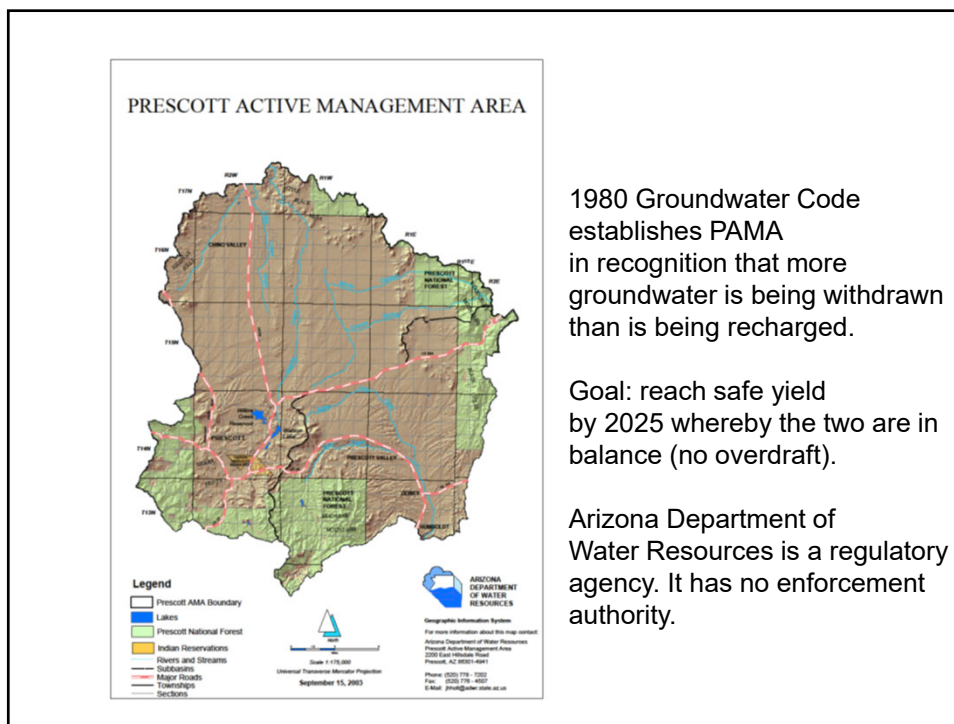
- High hydraulic-conductivity aquifer
- Low hydraulic-conductivity confining unit
- Very low hydraulic-conductivity bedrock
- Direction of ground-water flow

21

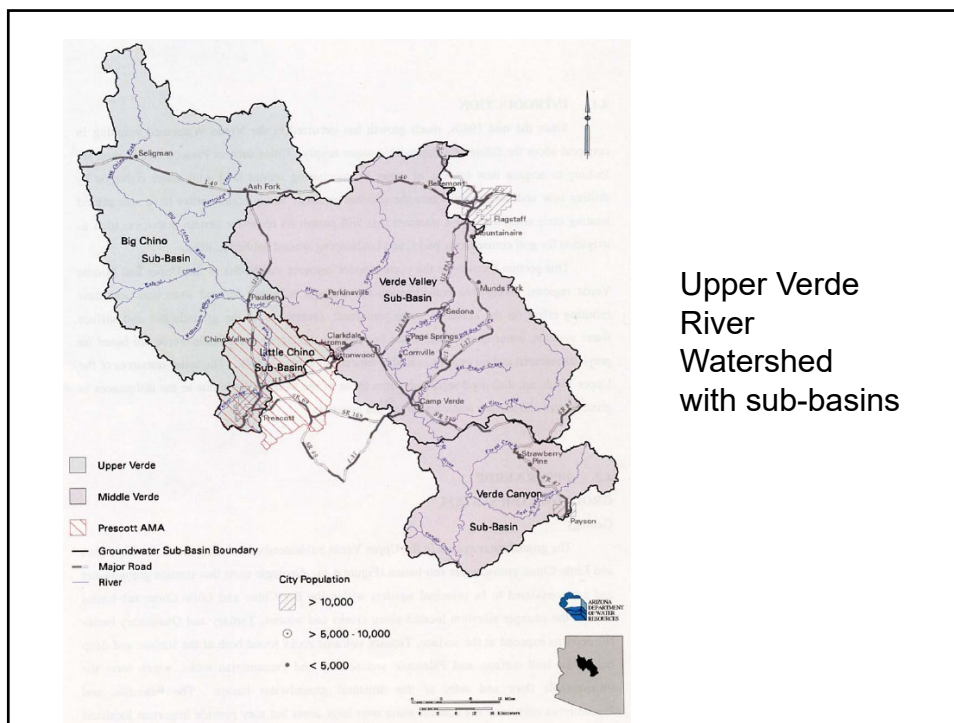
A well creates a cone of depression as it draws water from an aquifer. The direction of groundwater flow can actually reverse and capture water from a stream, thereby impacting stream flow.



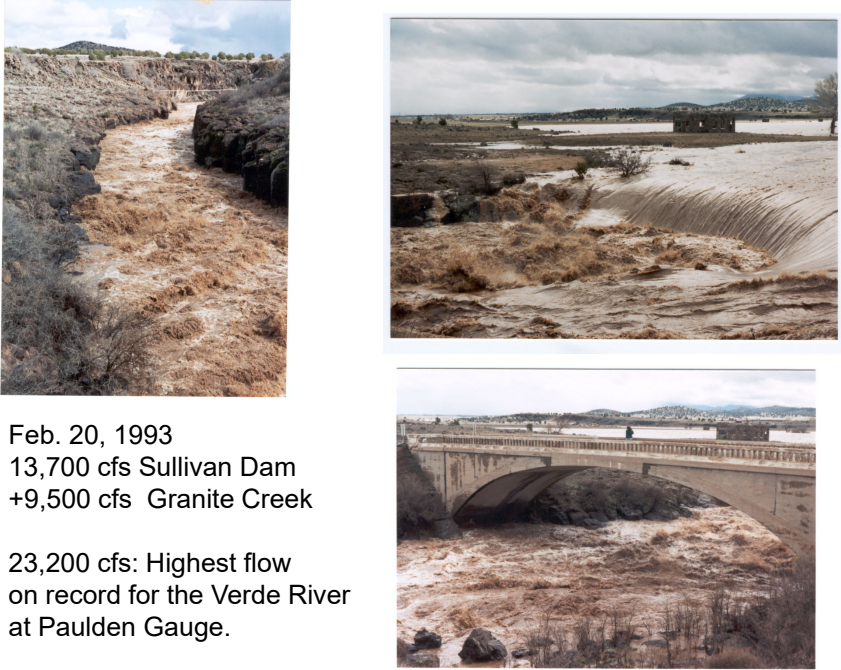
22



23



24




Feb. 20, 1993
13,700 cfs Sullivan Dam
+9,500 cfs Granite Creek

23,200 cfs: Highest flow
on record for the Verde River
at Paulden Gauge.

25

Upper Verde River
Base flow averages 25 cfs



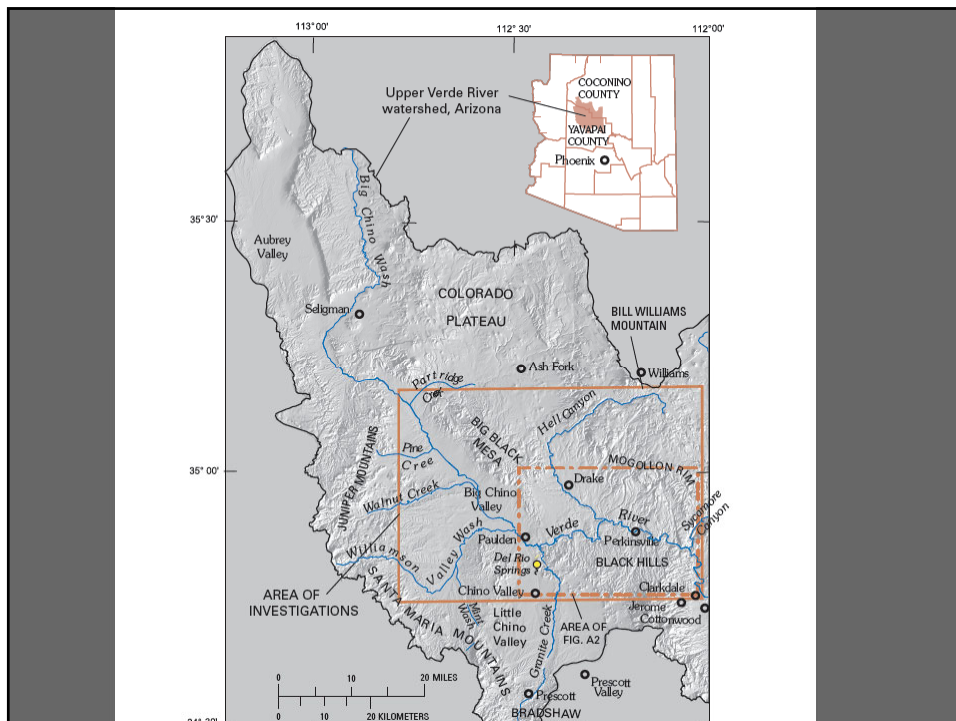
26

Upstream from the Verde Headwaters is the Big Chino Basin. 1991 Groundwater Transportation Act allows for importation of water into the Prescott Active Management Area.

Arizona has different laws for groundwater and surface water. Gila River Stream Adjudication is trying to address this disconnect.

A well pumping in the saturated Holocene alluvium may be determined to be pumping surface water.

27



28



29

Looking up Granite Creek
at confluence with the Verde River.
Stillman Lake is on the right.



30

Native Fish of the Verde River
Spikedace
Gila chub
Roundtail chub
Longfin dace
Speckled dace
Sonora sucker
Desert sucker

Reintroduced extirpated natives
Colorado squawfish
Razorback sucker
Gila topminnow



31



Flagstone quarries along the edge of the Colorado Plateau.



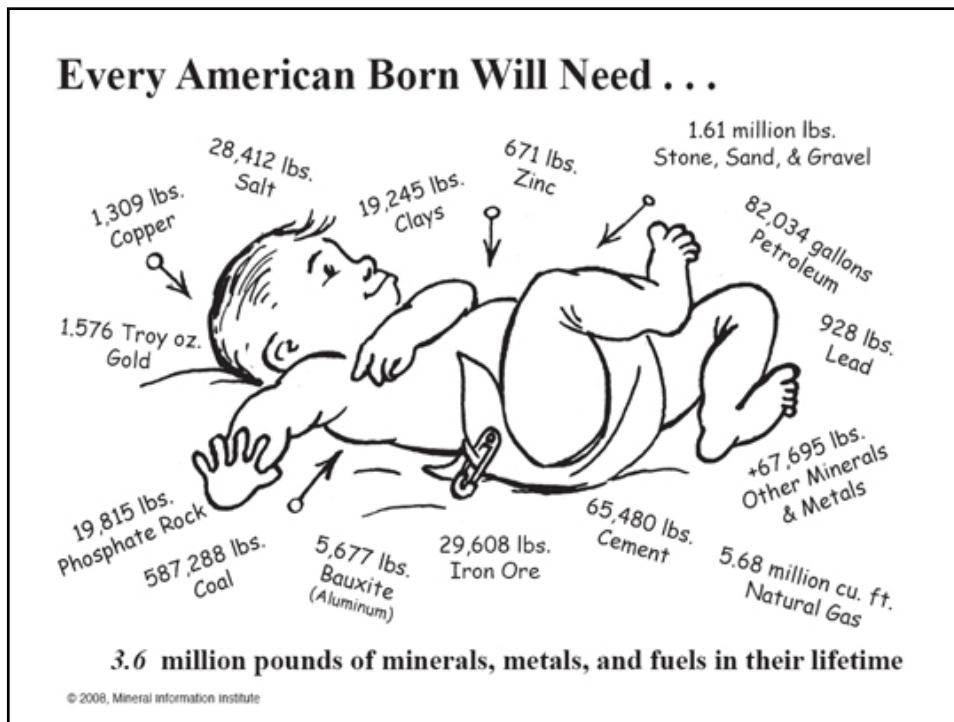
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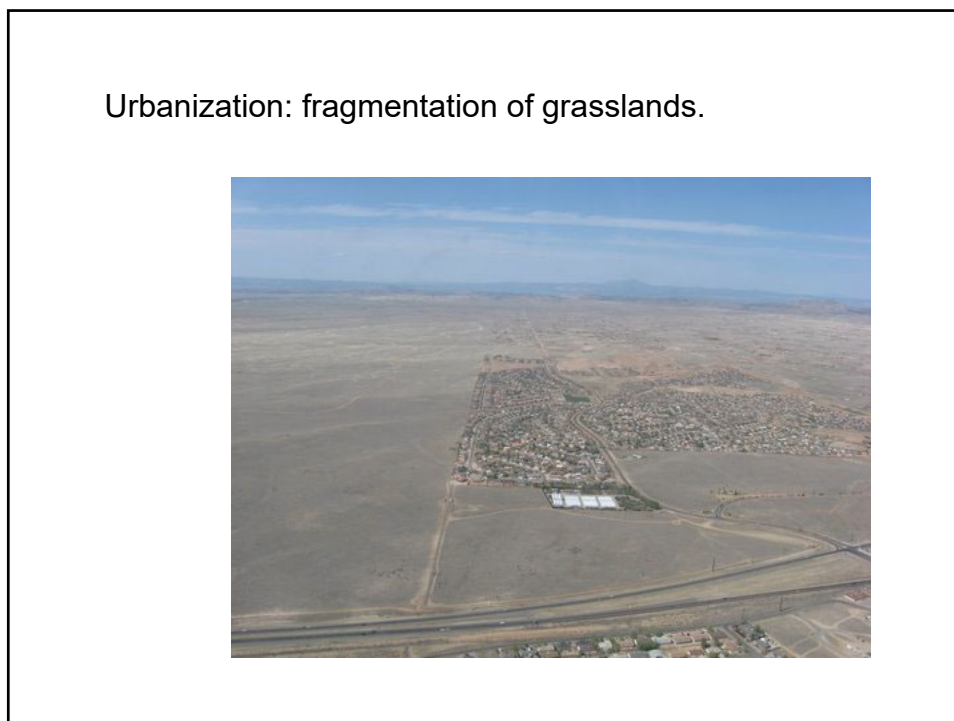
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34



35



36

Additional issues:
Difficulty of building consensus
Population pressures
Water quality issues
Power demand equals greater water demand
Paving permeable surfaces= less recharge to aquifers
Warming temperatures =more evaporation, less infiltration

37



38