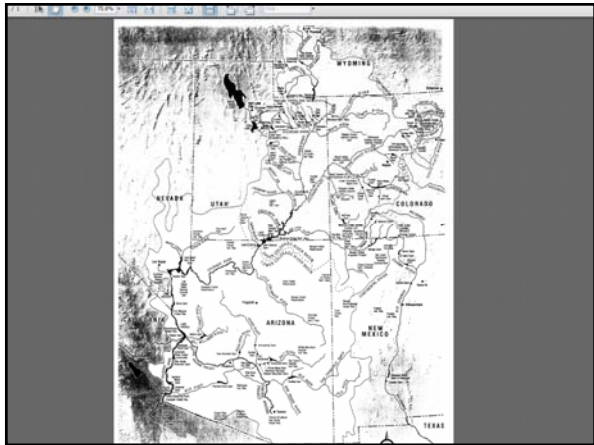
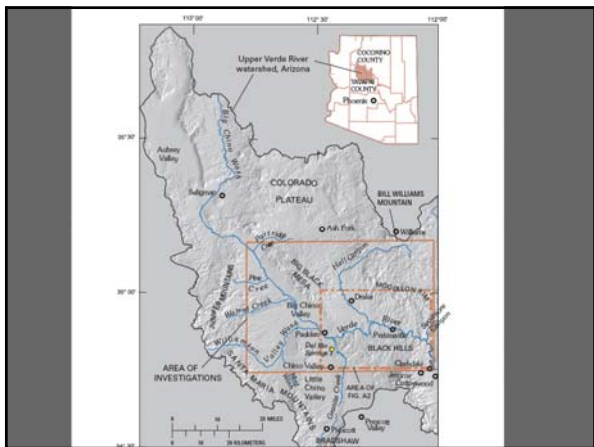


Getting To Know Your Local Watershed

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







Little Chino Valley Basin



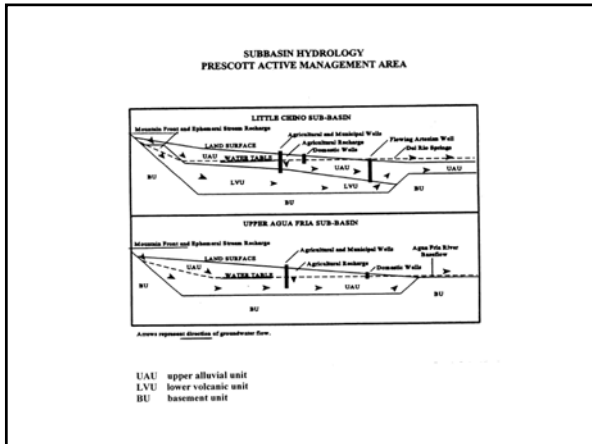
Holocene Epoch begins 10,000 years ago marking the beginning of an interglacial cycle resulting in drier conditions. (20,000 years ago maximum of last ice age.)

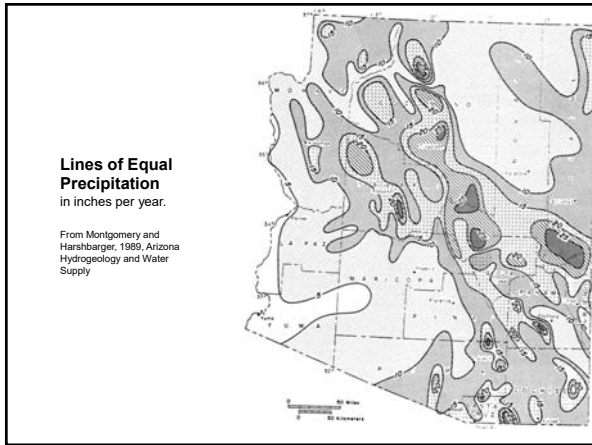


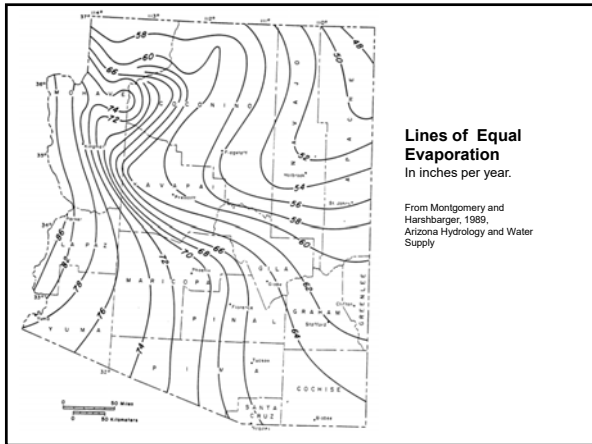


Pronghorn: can maintain speed of 45 mph for over 4 miles.





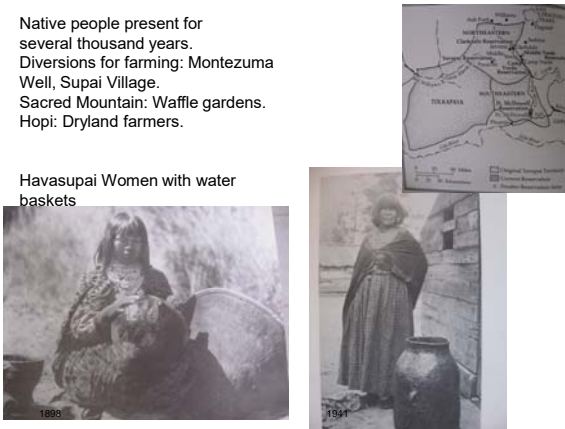







Native people present for several thousand years.
Diversion for farming: Montezuma Well, Supai Village.
Sacred Mountain: Waffle gardens.
Hopi: Dryland farmers.

Havasupai Women with water baskets



The composite image includes a map of the region in the upper right, showing various locations like Montezuma Well and Supai Village. Below the map are two historical photographs: one from 1893 showing a woman with large water baskets, and another from 1941 showing a woman with a large water jar.

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



A photograph of a beaver dam in a stream. The dam is constructed from sticks and branches, creating a small pond. The surrounding area is grassy with some trees in the background under a clear blue sky.

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.



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.



Del Rio Springs in Chino Valley

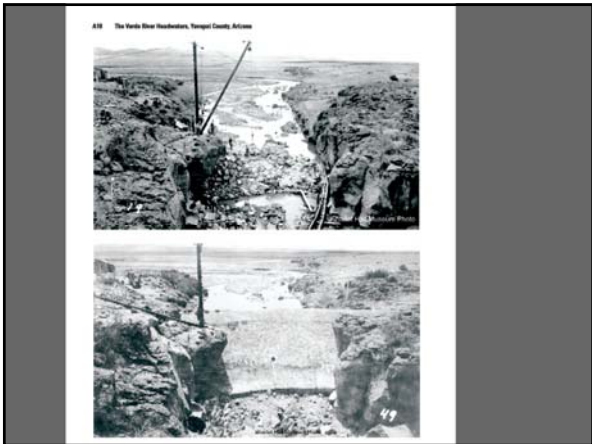


**Table 5. Statistical Summary of Water Level Change Data
in the Precinct AMA and Vicinity (1995 to 2003)**
(Figures rounded to nearest 0.1 foot)

Period of Change ^a	1995	1996	1997	1998	1999	2000	2001	2002	2003
	32	37	34	30	30	31	31	32	32
Number of wells showing									
Decreases in water level	1	4	10	7	23	9	10	10	10
Increases in water level	28	28	24	23	7	22	22	22	22
Sum of increases (feet)	-0.6	-21.0	-10.0	-20.0	-21.0	-25.0	-20.0	-21.0	-21.0
Maximum increase (feet)	-0.6	-7.0	-3.0	-5.0	-6.0	-6.0	-6.0	-6.0	-6.0
Minimum increase (feet)	-0.6	-7.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Mean of increases (feet)^b	-0.6	-2.8	-1.8	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4
Number of wells showing									
Decreases in water level	17	10	24	20	40	32	32	32	32
Increases in water level	15	27	10	10	10	10	10	10	10
Sum of decreases (feet)	22.0	22.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Maximum decrease (feet)	2.0	2.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum decrease (feet)	-1.0	-0.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Mean of decreases (feet)^b	2.0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Mean of declines (feet)^c	2.0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Number of wells showing no Change in water level	0	0	0	1	2	1	1	1	1

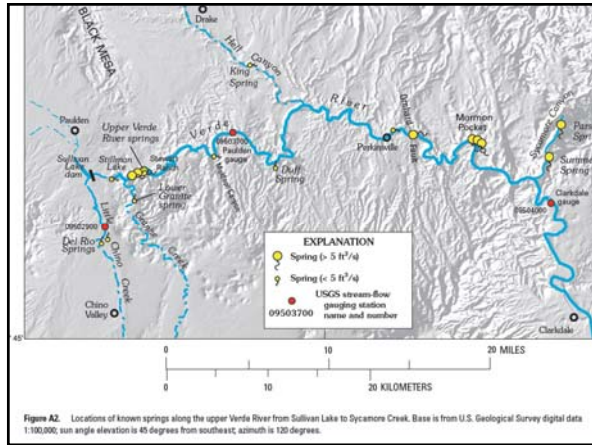
^a The sums of increases or declines is the arithmetic average of each group of measurements (that is, the average change in water level for wells with measured increases in water level or the average change in water level for wells with measured decreases in water level). For example, the sum of all measured water level decreases in the 10 wells that showed decreases between 2002 and 2003 was -21.0 feet. The mean decrease in water level, -2.1 feet, was calculated by dividing the sum of decreases (-21.0 feet) by the number of measurements that showed decreases (10).

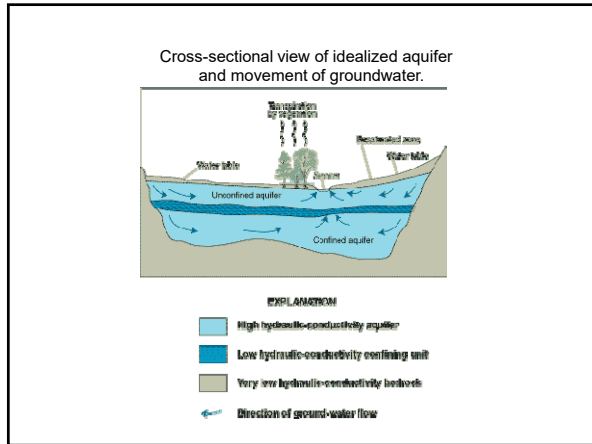
^b The median of increases or declines is a statistical measure of the central value of each group of measurements. 50% of the measurements in each group are less than the median, and half of the measurements in each group are greater than the median. For example, the median decline in water level, -1.7 feet, equals the 10th ranked level of the 31 wells with that showed declines between 2002 and 2003.



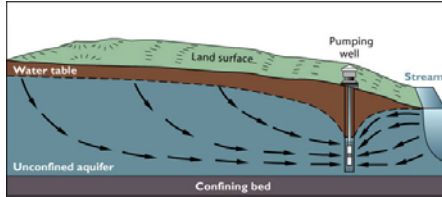
Sullivan Dam considered mile 0 of the Verde River
U.S.G.S.'s Paulden Gauge is 10 miles downstream
measures streamflow.
Base flow averages 25 cfs (cubic feet per second).

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.





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.



PRESCOTT ACTIVE MANAGEMENT AREA



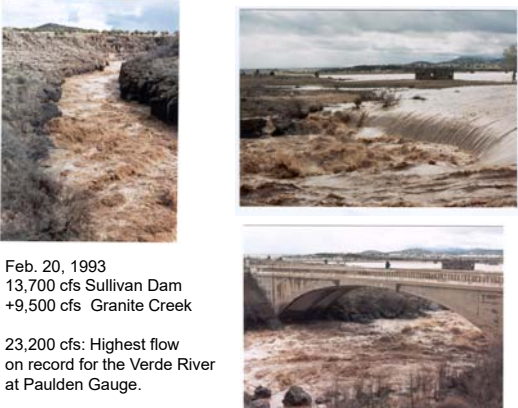
1980 Groundwater Code establishes PAMA in recognition that more groundwater is being withdrawn than is being recharged.

Goal: reach safe yield by 2025 whereby the two are in balance (no overdraft).

Arizona Department of Water Resources is a regulatory agency. It has no enforcement authority.




Upper Verde River Watershed with sub-basins



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.

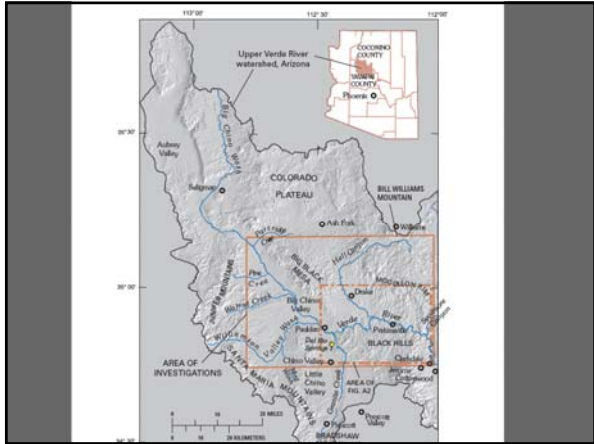
Upper Verde River
Base flow averages 25 cfs



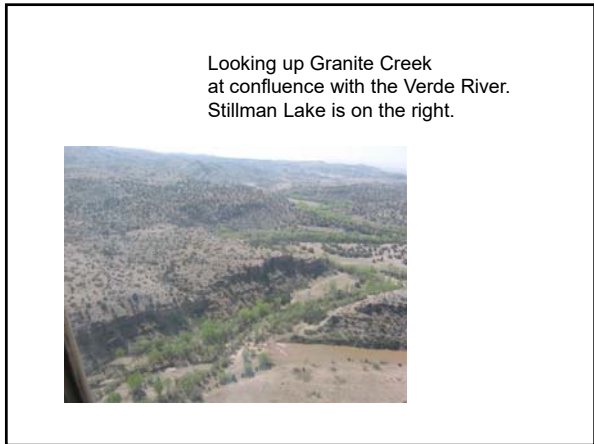
Upstream from the Verde Headwaters is the Big Chino Basin. 1991 Groundwater Transportation Act allows for importation of water into the Prescott Active Management Area.

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.








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



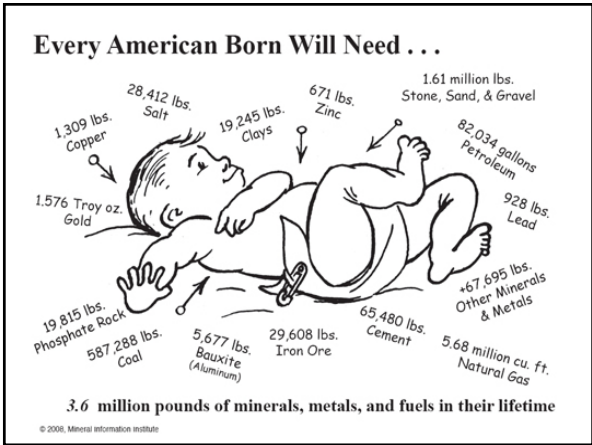


Flagstone quarries along the edge of the Colorado Plateau.











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