

Town of Prescott Valley Water Resources Update October 9, 2014



John Munderloh
Water Resources Manager

1980 Groundwater Management Act

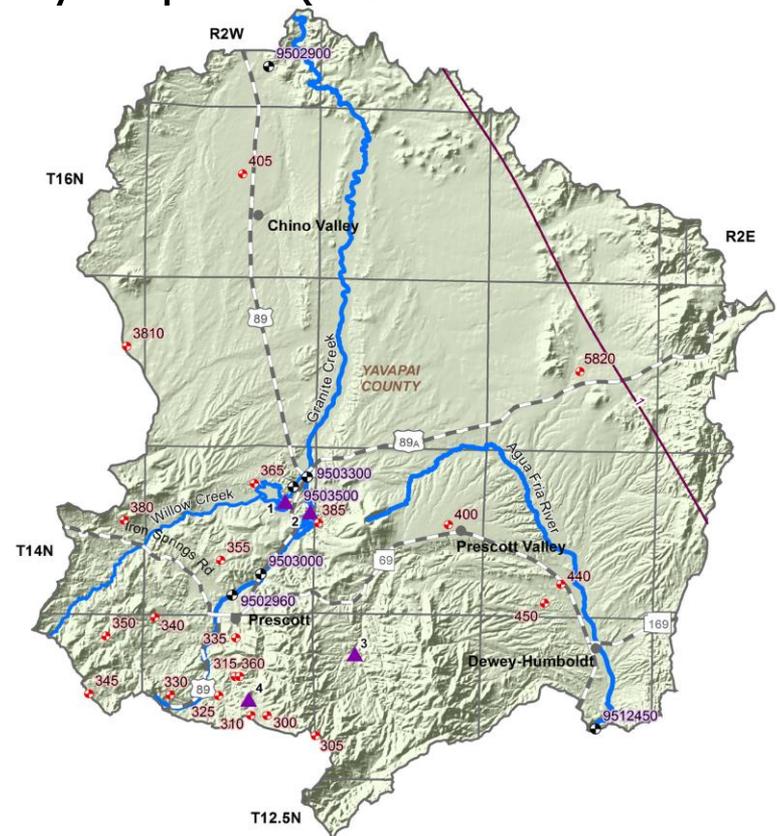
Active Management Areas (AMA) and Irrigation Non-expansion Areas (INA)



Prescott AMA	485 mile ² ~ 20,000 AF water use
Santa Cruz AMA	750 mile ² ~ 20,000 AF water use
Tucson AMA	3,800 mile ² ~ 300,000 AF water use
Pinal AMA	4,000 mile ² ~ 800,000 AF water use
Phoenix AMA	5,600 mile ² ~ 2.0 million AF water use

Prescott Active Management Area Groundwater

- Precipitation falling on the AMA accounts for *100%* of the *natural* aquifer recharge
- Precipitation = about 450,000 acre-feet per year
- Most groundwater is held in the “primary” aquifer (2.9 million acre-feet)
 - ▶ About 8,000 acre-feet per year is recharged (~2%)
 - ▶ About 16,000 acre-feet per year is pumped
 - ▶ We pump the same amount of water as in 1985
 - ▶ Safe Yield by 2025



Context

- ▶ Prescott AMA Communities are held to the highest standards (“do more with less”)

- Water Conservation
- Recharge Reclaimed Water
- Growth Restrictions
- Water Importation
- Water Groups
- Watershed Management

Safe Yield

1980
Groundwater
Management
Act



PV Conservation Program

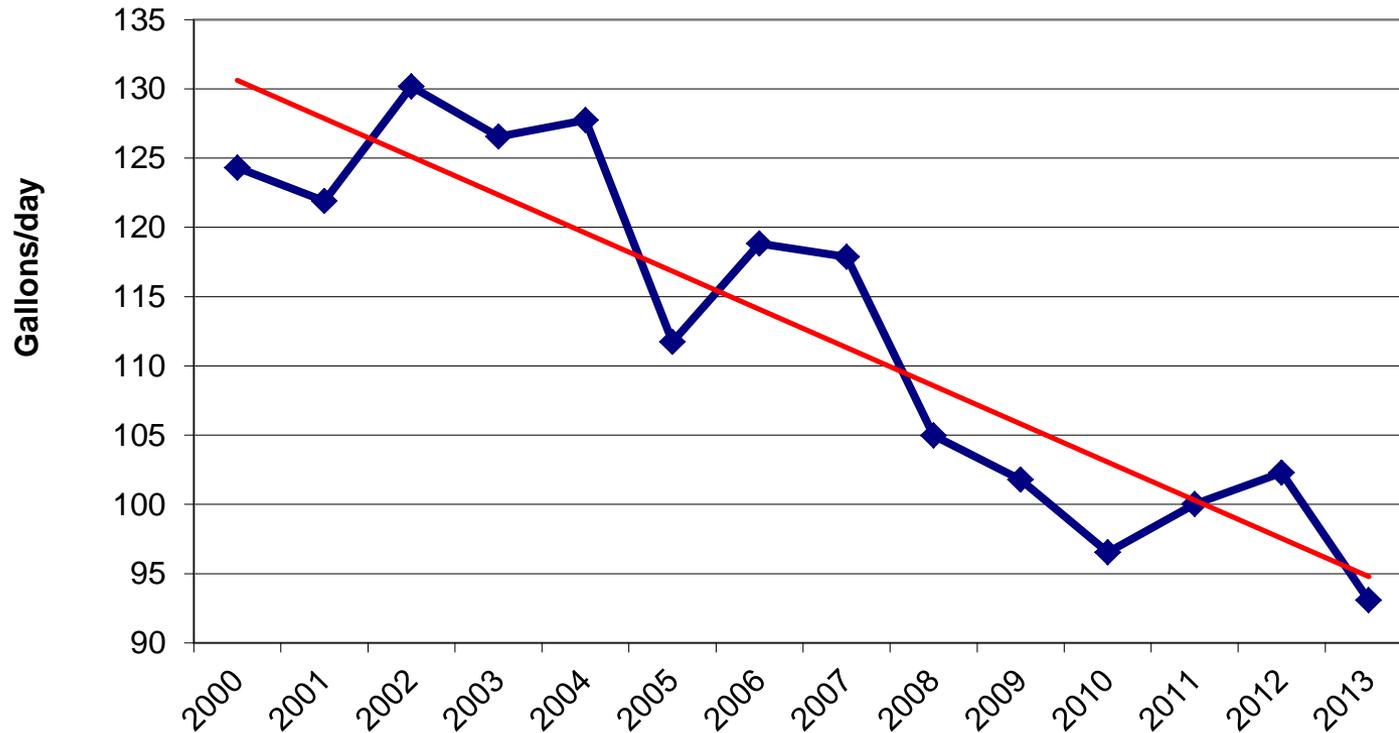
- ▶ Tiered Rates
- ▶ WaterSmart Outreach
- ▶ Xeriscape Demonstration Garden (Library)
- ▶ Customer High Water Use Resolution
- ▶ Customer High Water Use Notification
- ▶ Meter replacement (Flexnet)
- ▶ Smart Irrigation Technology at Parks
- ▶ Leak Detection (Public and Private)
- ▶ Turf for Public use
- ▶ No Water Conservation Ordinances (except during crisis)
- ▶ No Rebates or Buy Backs



PV Water Conservation

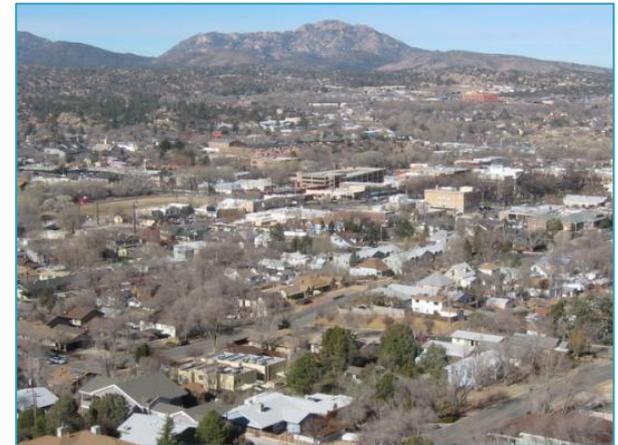


Town of Prescott Valley Per-capita Water Use



GPCD in Other Communities (2008)

(Water Resource Associates Study)



- ▶ Payson – 83
- ▶ Prescott – 126
- ▶ Sierra Vista – 131
- ▶ Buckeye – 136
- ▶ Mesa – 167*
- ▶ Phoenix – 173*
- ▶ Casa Grande – 203
- ▶ Lake Havasu City – 222
- ▶ Scottsdale – 302

*Surface water for irrigation not included

Reclaimed Water (Effluent) Recharge

- ▶ Becomes “Potable” water with recharge and recovery process
- ▶ Arizona Department of Water Resources “Credit” accounting system
 - Pump from existing wells to recover credits



Recharge Facilities



In-Channel Facility Since 2003

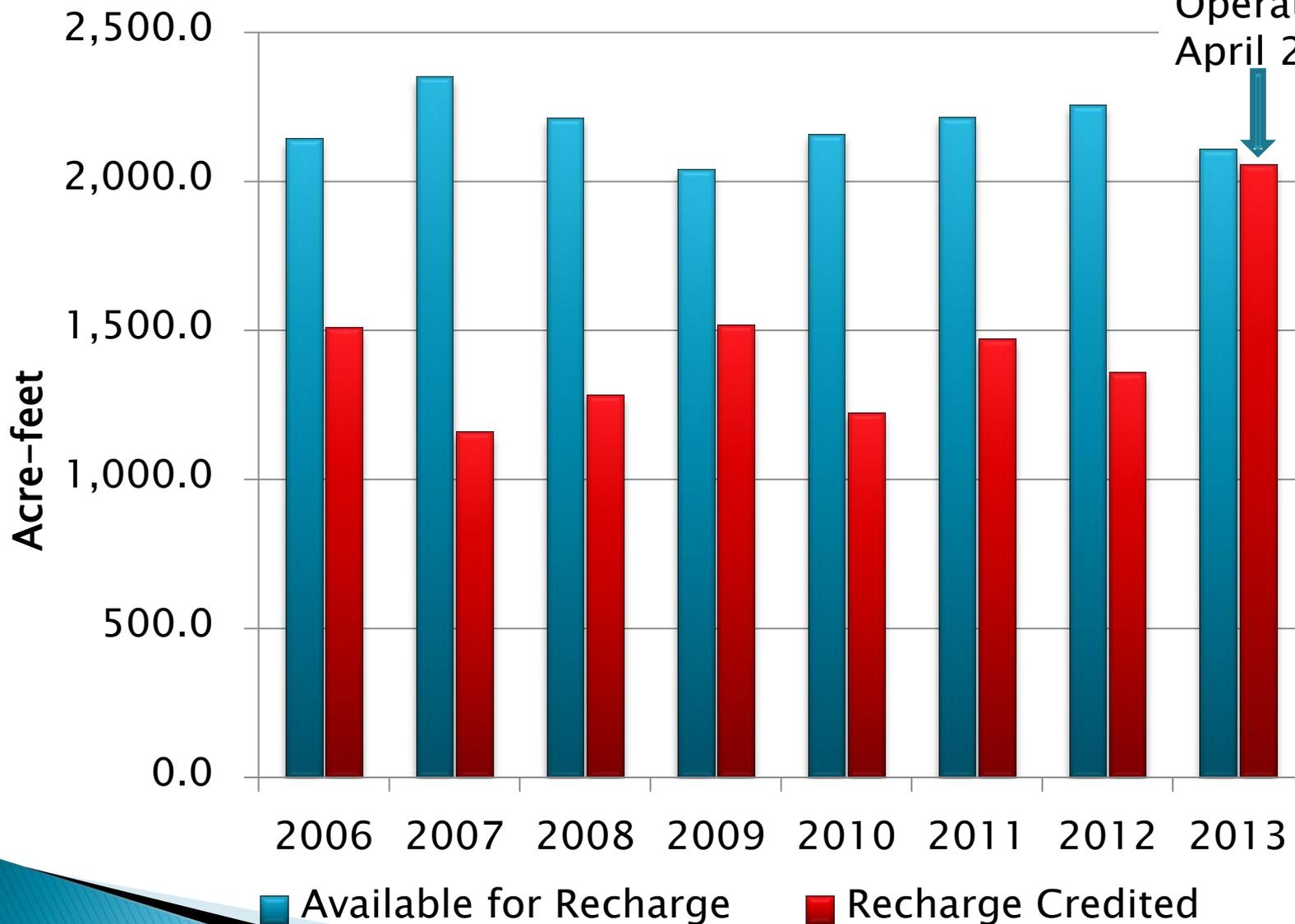


Recharge Basins (Constructed 2013)



Prescott Valley Recharge Credits

Basins
Operational
April 2013



Growth Restrictions (since 1999)

- ▶ State Assured Water Supply Rules:
 - Existing Homes have 100-year Assured Supply
 - 1999 – Declaration of Groundwater Mining (more pumping than recharge)
 - No new subdivisions based on new Groundwater
 - Extinguished groundwater rights can be used for growth (e.g. agriculture)
- Conserved groundwater cannot be used for new subdivisions



Big Chino Water Ranch Project

- ▶ Purchased Big Chino Water Ranch in 2004
- ▶ Prescott and Prescott Valley partners (54%/46% share water and costs)
- ▶ Significant opposition 2005–2010
- ▶ Settlement with Salt River Project 2010
- ▶ 8,067 acre–feet/year for Prescott & PV
- ▶ 1980 GW Rules apply to Big Chino Water Ranch



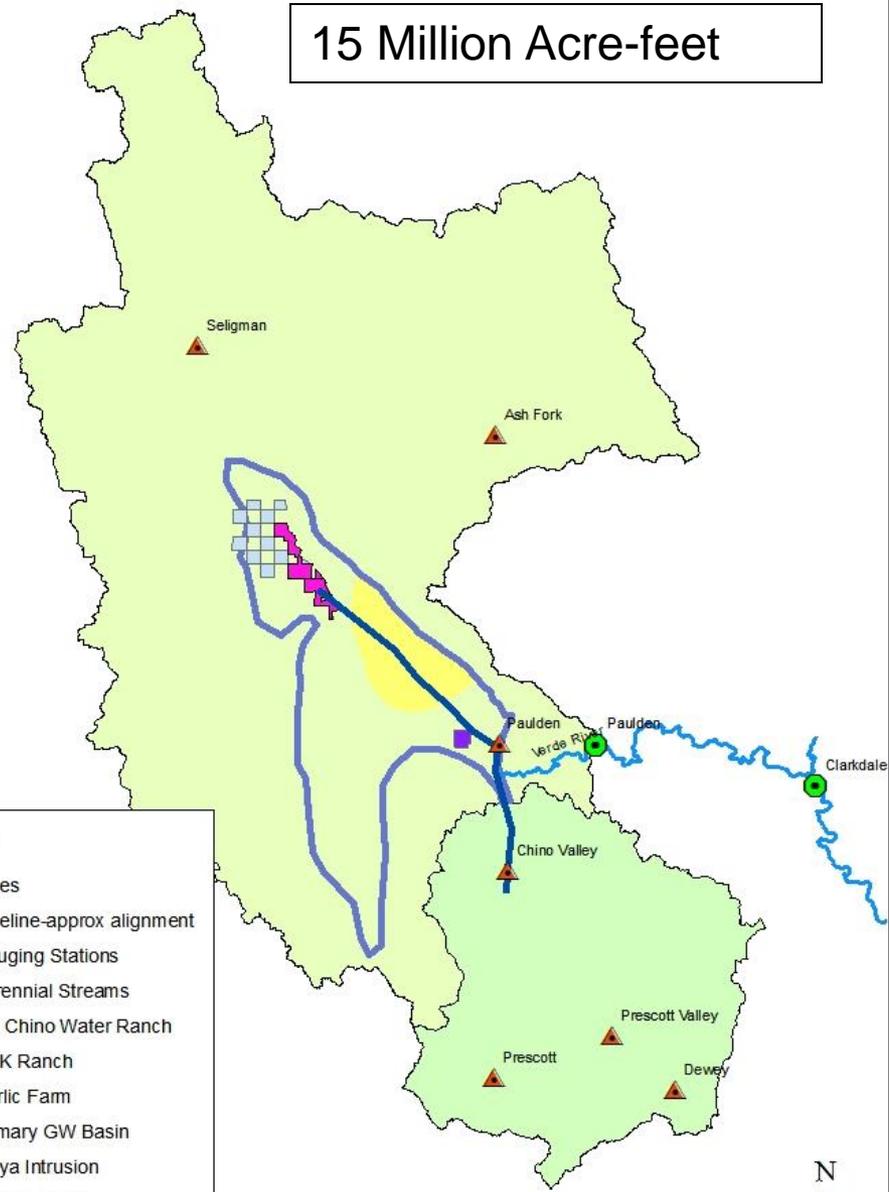
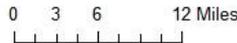
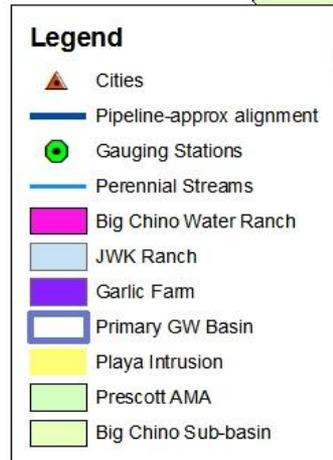
The Need for Importation

- ▶ Central Arizona Project envisioned in early 1900's, completed in 1993
- ▶ Purpose - to provide for Arizona's growth
- ▶ City of Prescott and YPIT given a CAP allocation ~8,000 af in 1983
- ▶ CAP allocation traded for Big Chino water rights early 1990's
- ▶ ARS §45-555



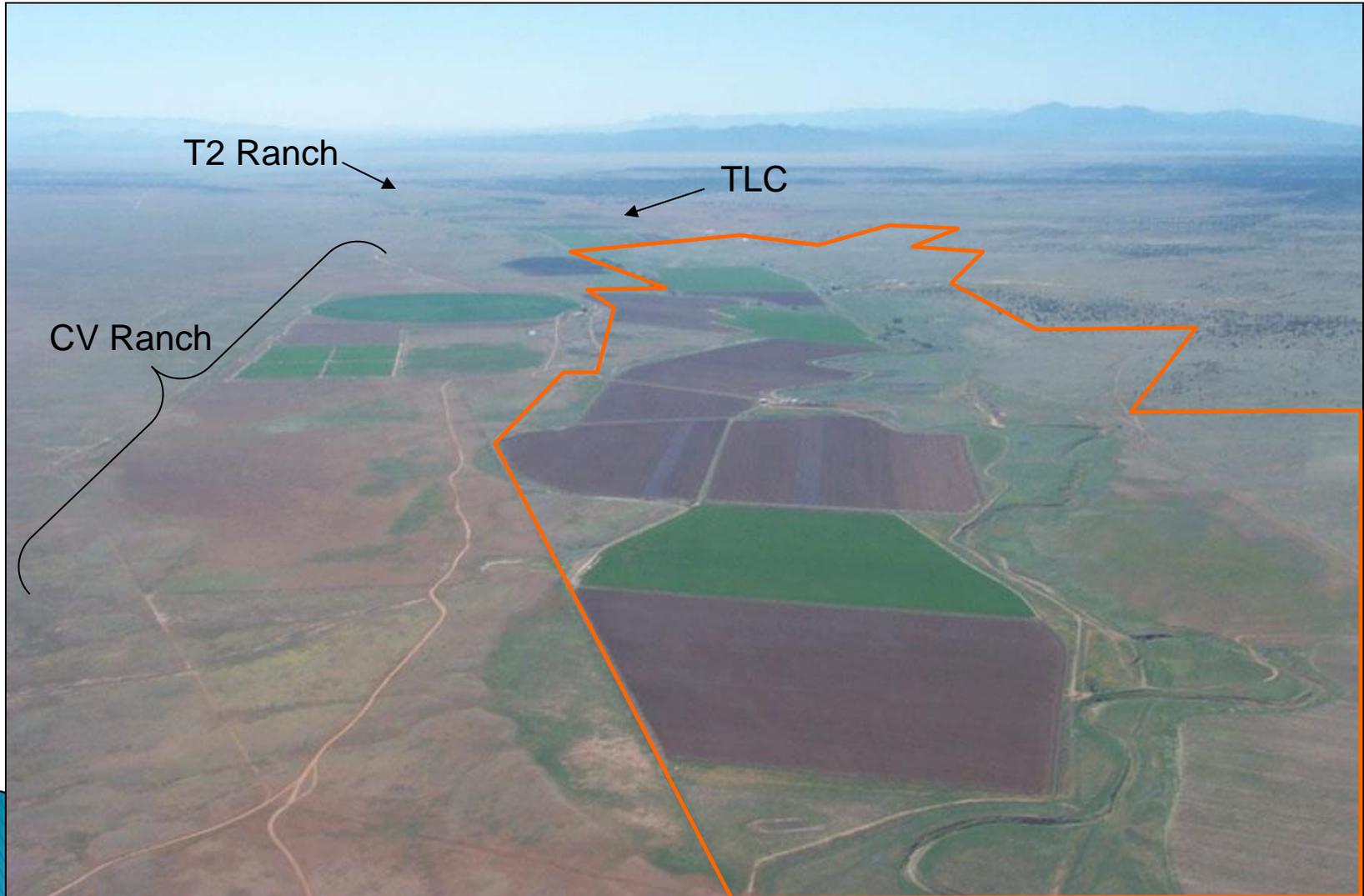
Big Chino and Prescott AMA Groundwater Basins

15 Million Acre-feet



Big Chino Water Ranch

(View looking to SE, Mingus Mtn in background)

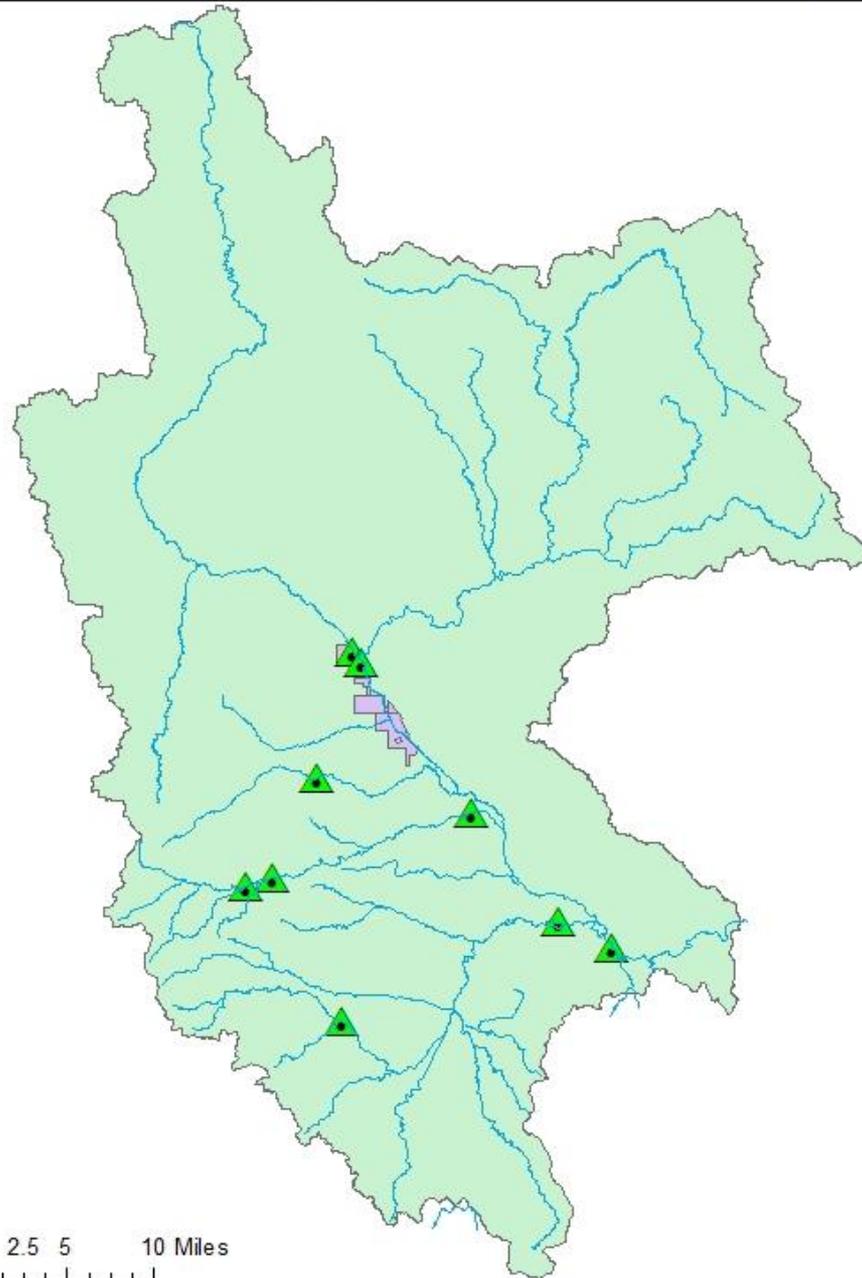


Prescott, Prescott Valley & SRP Agreements

- ▶ First agreement February 11, 2010
 - Step-by-step approach to very complex issues
 - Unwound litigation while work on more specific items moved forward
- ▶ Second agreement September 20, 2012
 - Monitoring and Modeling
 - Recognizes existing water rights
 - Just Completed 1st Annual Report



Big Chino Monitoring Project - Stream Gages



Legend

- BC_Maj_Streams
- Stream Gages - New
- Big Chino Water Ranch
- Big_Chino_Basin_Bndy



0 2.5 5 10 Miles



“Flowtography” Stream Gage



Big Chino Wash above and below Partridge Creek



Stealth Cam

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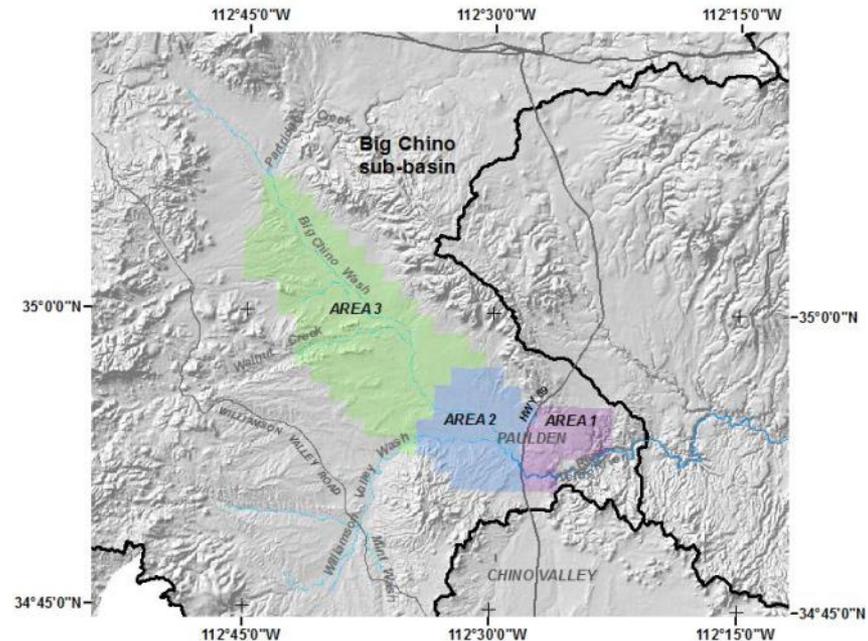
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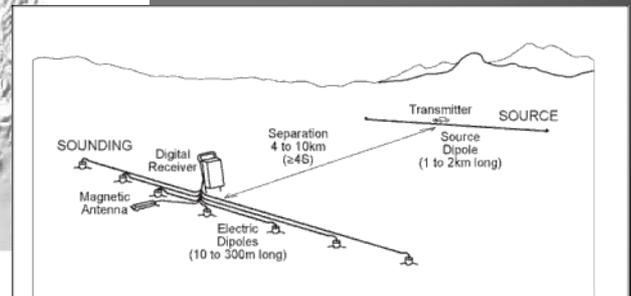
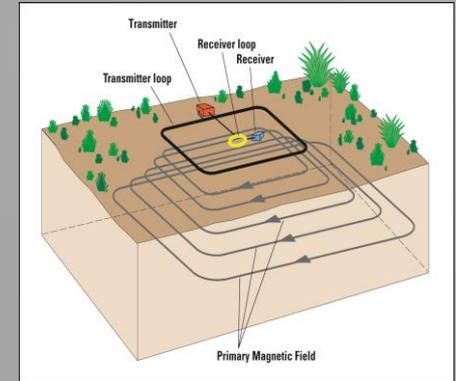
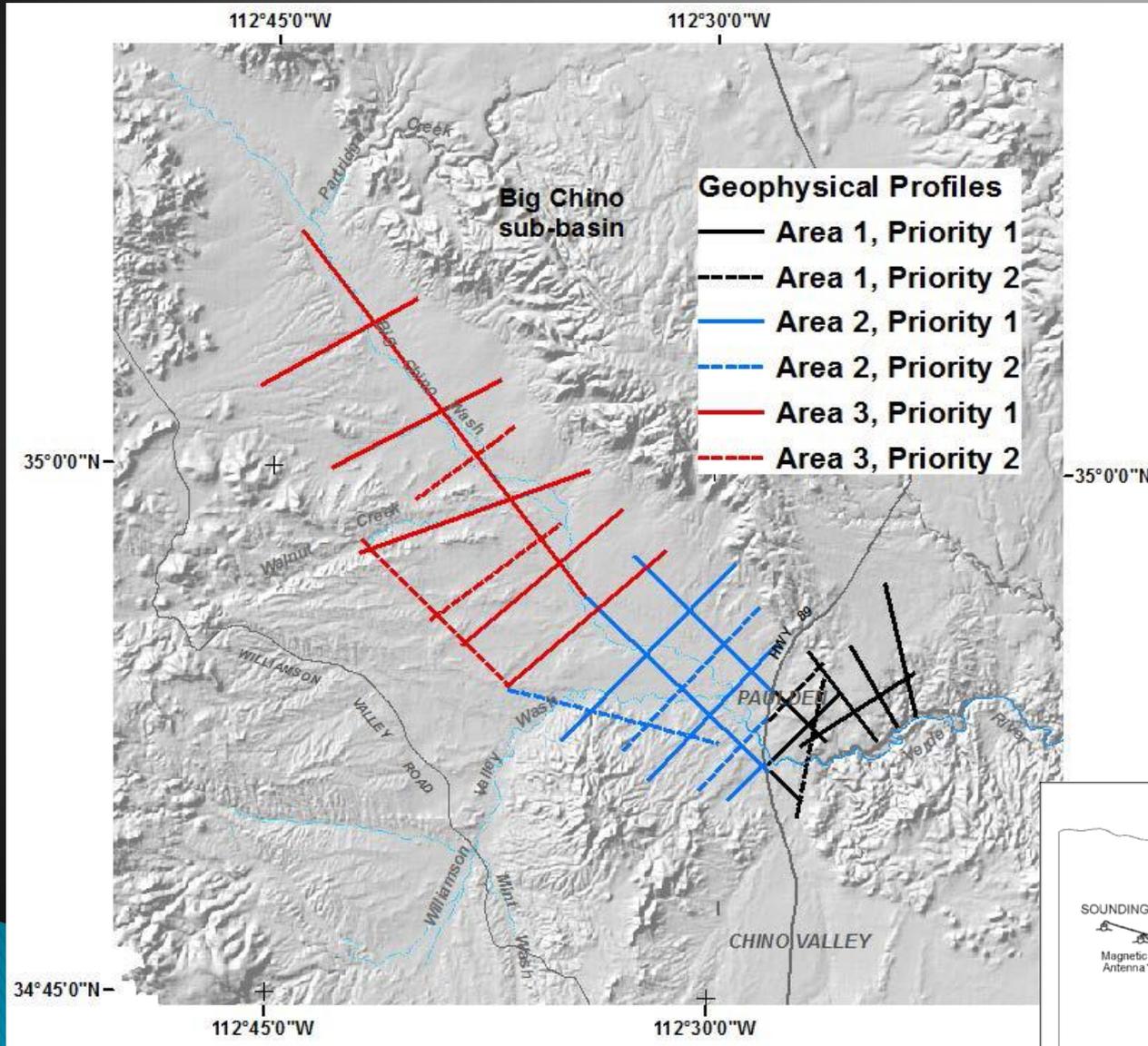
Current Monitoring Activities

- ▶ Geophysics (Electromagnetic)
- ▶ Gravity Measurements
- ▶ Water Level Measurements
- ▶ Crop Surveys
- ▶ Stream gaging

- ▶ Next:
 - Monitoring Wells
 - GW Model



Geophysical Surveys



Water Groups

- ▶ **Groundwater Users Advisory Committee (GUAC)**
 - Implement the 1980 GMA in Prescott AMA
- ▶ **Yavapai County Water Advisory Committee (WAC)**
 - Water Resource/Hydrologic Studies/Planning
 - Now disassembling
- ▶ **Northern Arizona Municipal Water Users Association (NAMWUA)**
 - Public Policy for Municipal Water Providers
- ▶ **Upper Verde River Watershed Protection Coalition (Coalition)**
 - On-ground projects based on science
 - Regional water conservation outreach

Groundwater Users Advisory Committee (GUAC)

- ▶ GUAC – guide implementation of the 1980 Groundwater Management Act
- ▶ Established by Statute (ARS §45–420)
- ▶ Fourth Management Plan
 - Defines path to reach Safe Yield in the Prescott AMA
- ▶ Prescott AMA Groundwater model
 - Helps to guide Fourth MP, water use decisions



Fourth Management Plan

Chapter 11: BUDGETS

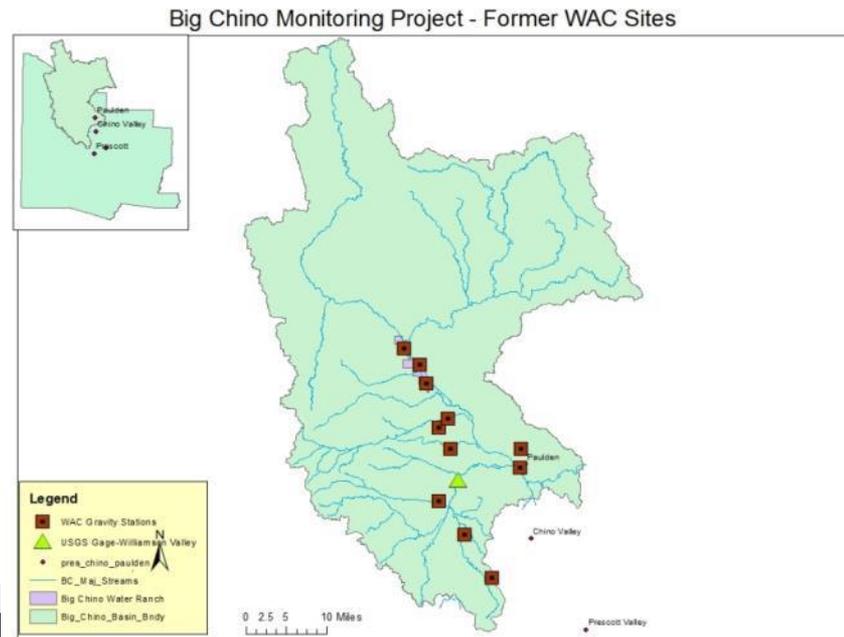
- In 2025, rather than pumping more groundwater, municipal groundwater is capped at 3,000 acre-feet/year
- Remainder of municipal demand is direct use reclaimed water, recovered surface water, Big Chino, and recovered reclaimed water;
 - First assumes annual recovery within the area of impact (AOI) of storage for reclaimed
 - If additional reclaimed is needed to meet the remainder of demand it is LTS reclaimed credits;
 - Growth in small providers and exempt wells is either offset with extinguished reclaimed credits (non-recoverable) or directly served (small providers) with reclaimed credits recovered (as much within the AOI as possible)
- These assumptions can get the PRAMA to Safe-Yield in 2025 and depending on the scenario can maintain until 2040, 2055, or 2070

Yavapai County Water Advisory Committee (WAC)

- ▶ Water Resource/Hydrologic Studies/Planning
- ▶ Central Yavapai Highlands Water Resource Management Study (CYHWRMS)
 - Bureau of Reclamation, ADWR and WAC
 - 32,000 AF of Additional Water needed by 2050 (in Prescott AMA and Big Chino sub-basin)
 - Future Supply Sources include reclaimed water, conservation, and importing water from Colorado River

WAC – Long-term Monitoring

- ▶ Former WAC long-term monitoring in the Big Chino being combined with the Big Chino agreement
 - Includes 1 stream gage, water level measurements, aquifer storage monitoring, stable isotopes, noble gas
 - About \$20,000 commitment for PV



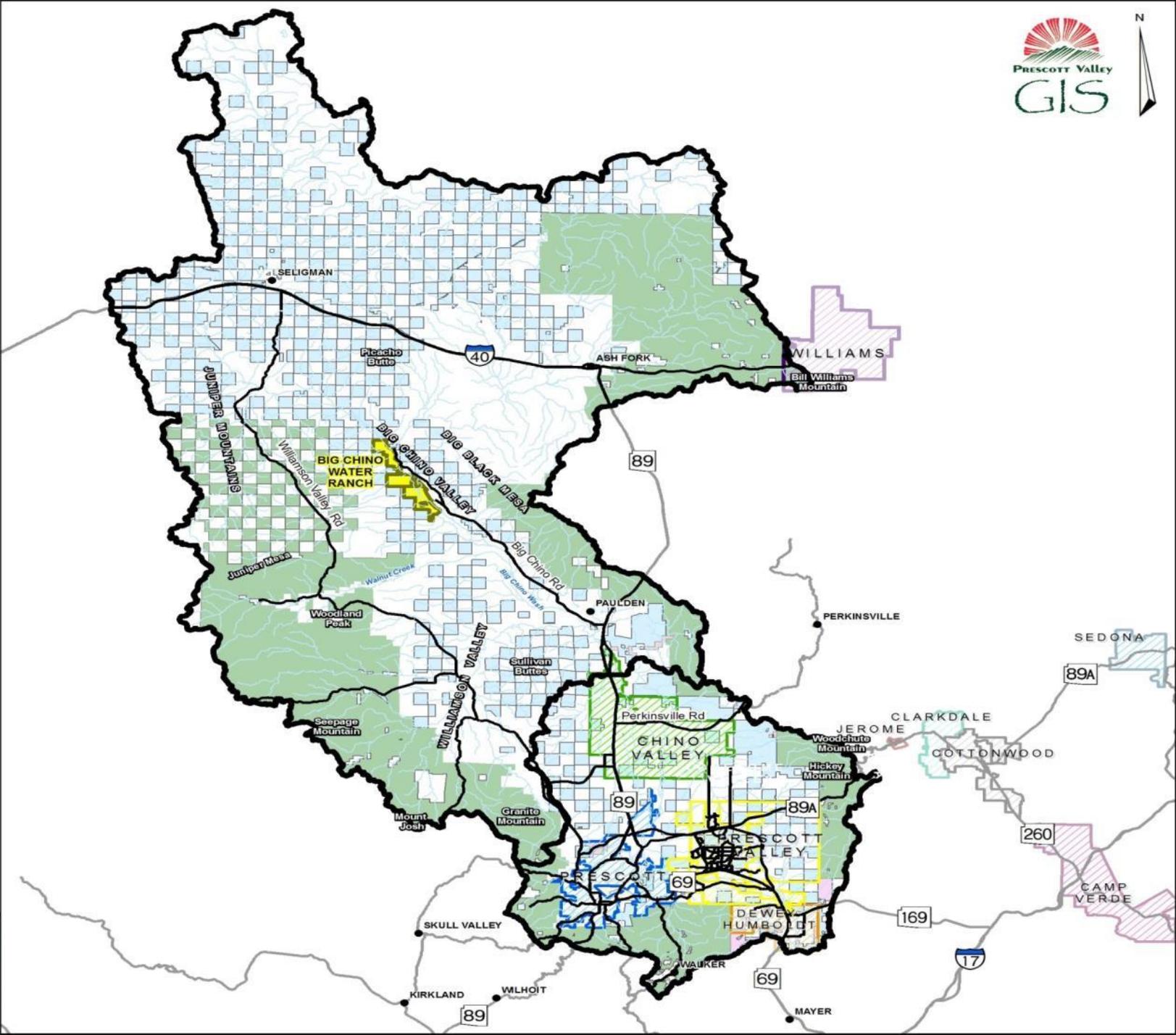
Northern Arizona Municipal Water Users Association (NAMWUA)

- ▶ Good public policy for water providers
- ▶ Chino Valley, Clarkdale, Cottonwood, Flagstaff, Payson, Prescott, PV, Sedona
- ▶ Currently Tracking and Acting:
 - Possible Action to limit Municipal Rate Setting
 - Water Development Fund
 - US EPA Rules “Waters of the US”
 - ADWR Enhanced Aquifer Management Program
 - US Forest Service proposed directive on Groundwater Management

Upper Verde River Watershed Protection Coalition (UVRWPC or “Coalition”)

- ▶ Established 2006
- ▶ Yavapai County, Prescott, Prescott Valley, Yavapai–Prescott Indian Tribe, Chino Valley
- ▶ Purpose: Protect the flow of the Upper Verde River and achieve Safe Yield in the Prescott AMA
- ▶ Watershed Initiative in 2012, USBR Grant



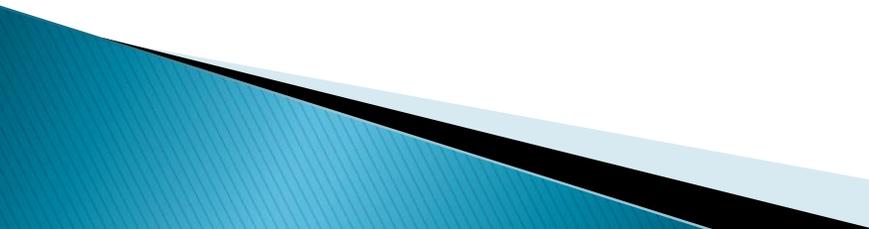


Coalition Reports / Projects

▶ Reports

- Larson & Associates Water Conservation
- SW Ground-water – Recharge Mapping
- Safe Yield Workgroup
- M & A – Mountain Front Recharge Literature Review
- Watershed Management Plan

▶ Projects

- Water Smart – Regional Water Conservation Outreach
 - Technical Assistance for Small Water Companies
 - Macro-Rainwater Harvesting
 - Watershed Restoration Initiative
- 

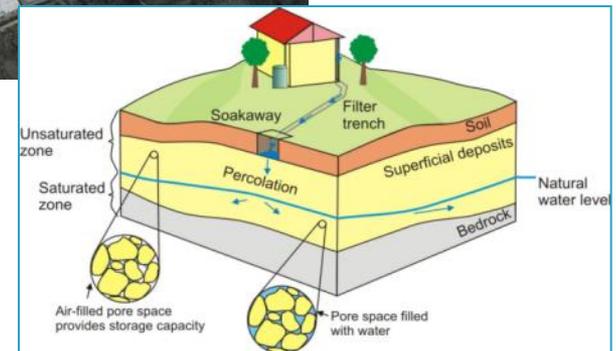
Coalition – Watershed Restoration Initiative

- ▶ Avg. Precipitation in Big Chino and Prescott AMA = 2,200,000 acre-feet/yr
- ▶ Avg. Recharge = 40,000 acre-feet/yr
- ▶ Less than 2% of total Precipitation is Recharge
- ▶ Coalition Board initiative to improve recharge and restore watershed functions.
- ▶ \$88,000 USBR Grant

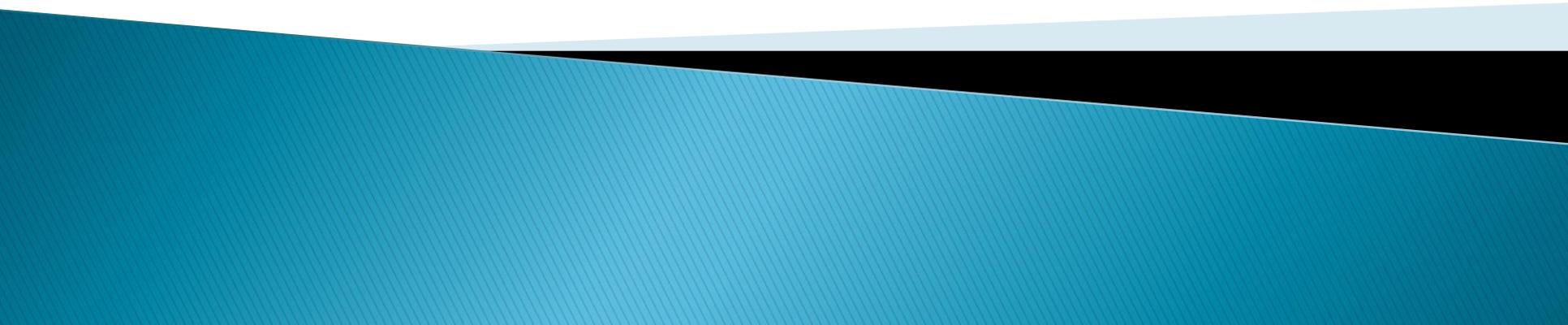


UVRWPC Watershed Restoration Initiative

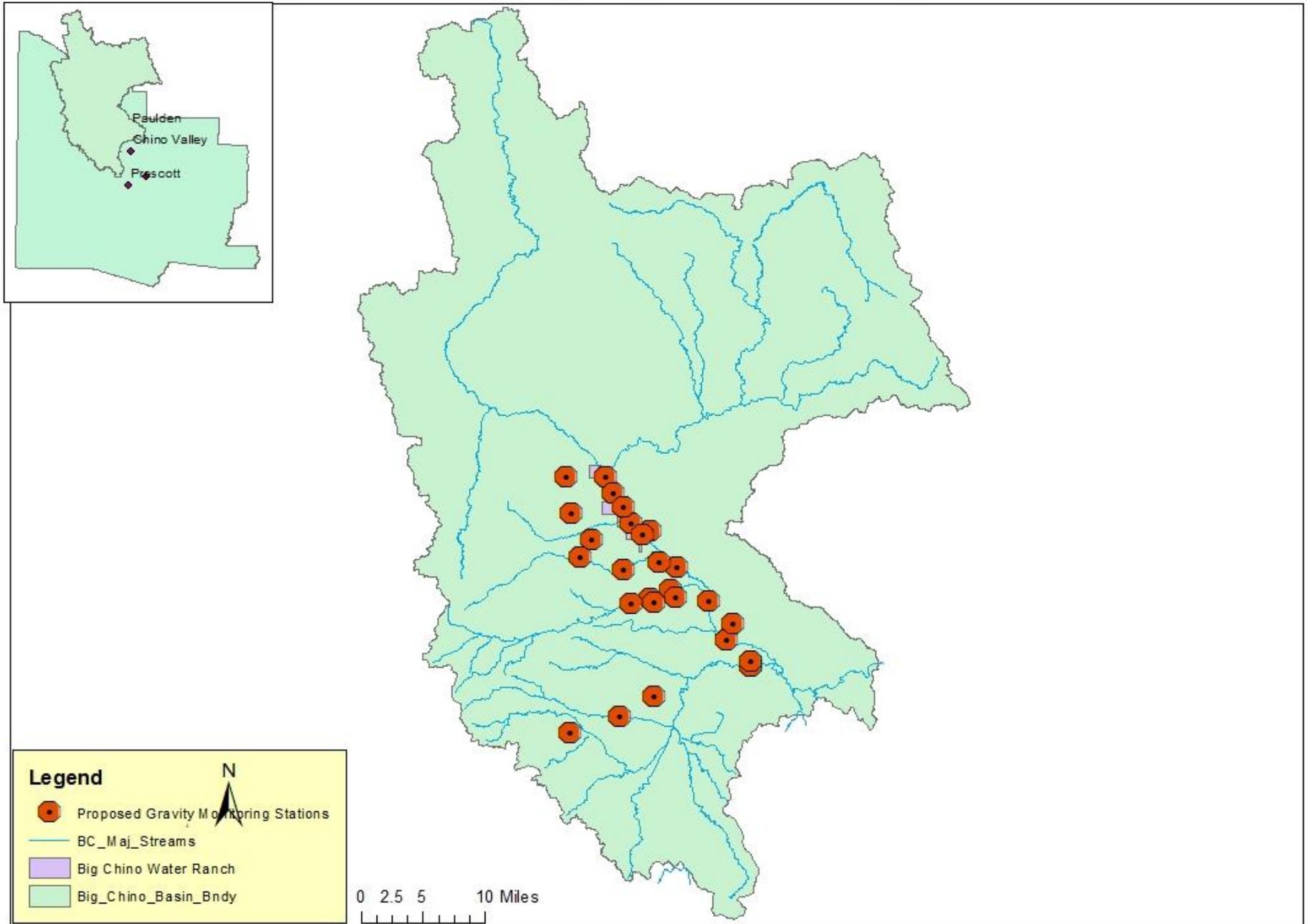
- ▶ Four proposed project types:
 - Restore Watershed Vegetation Density and Type
 - Increase Infiltration
 - Capitalize on urbanized area
 - Land use management and conservation



Questions?



Big Chino Monitoring Project - New Gravity Sites





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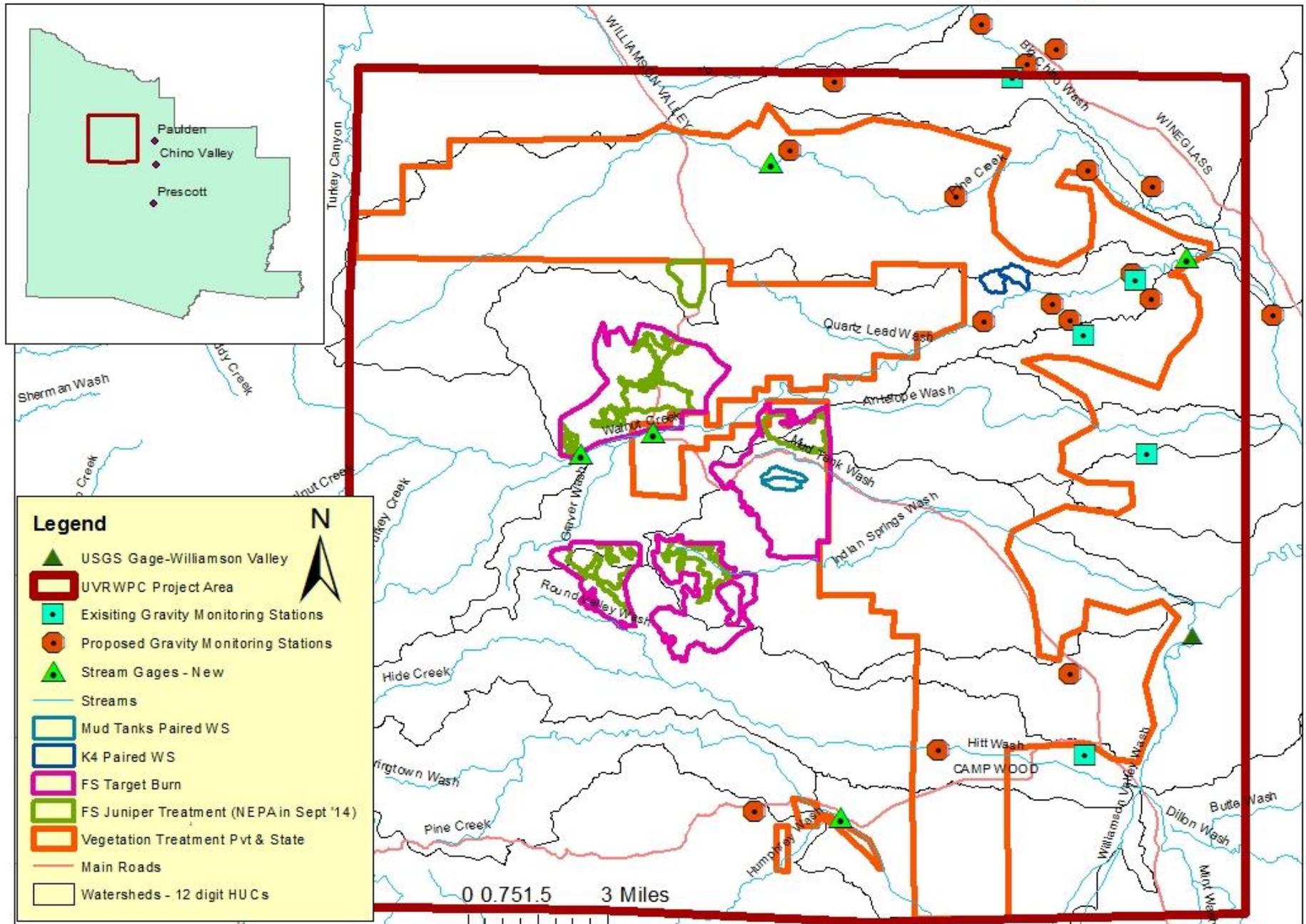
1995

Vegetation restoration

- ▶ Pinyon/juniper encroachment
- ▶ Chaparral encroachment
- ▶ Prescribed burns
- ▶ Removal of exotic species

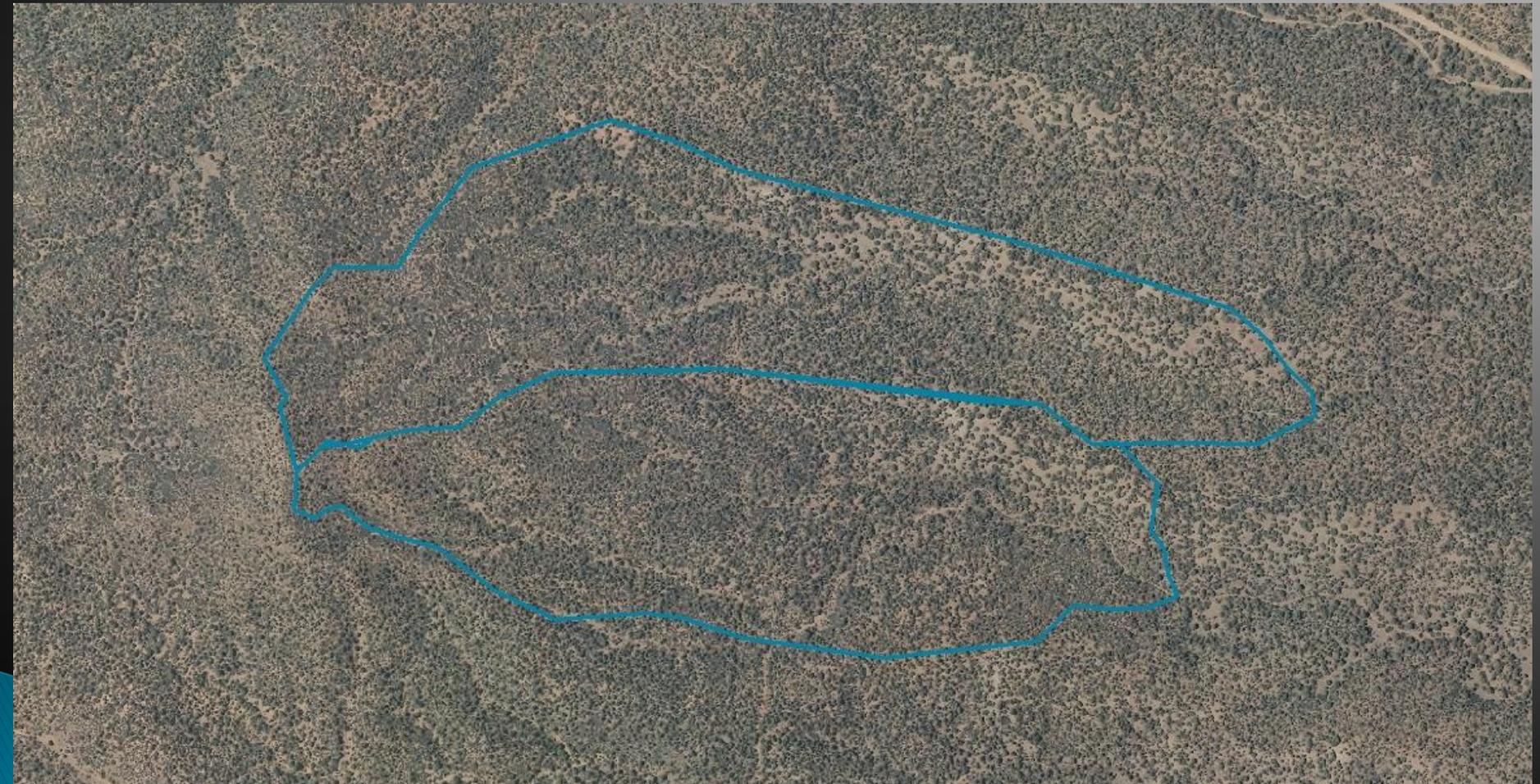


UVRWPC Grassland Restoration and Groundwater Recharge Project Area

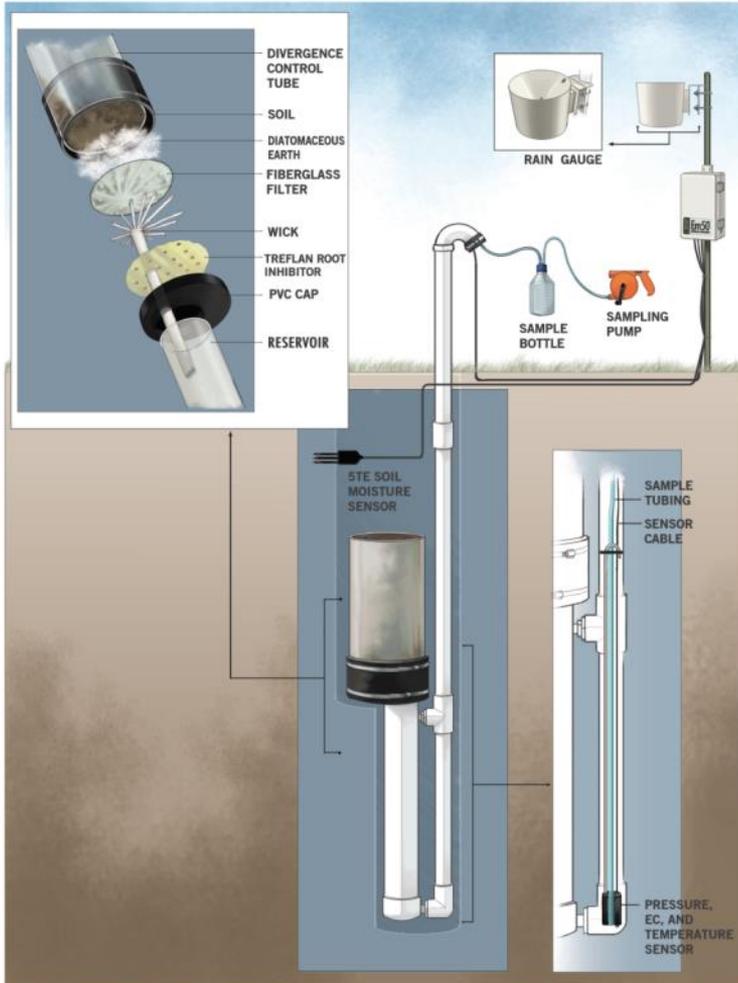




Small Paired Watershed



Lysimeters to Measure Deep Percolation (recharge)

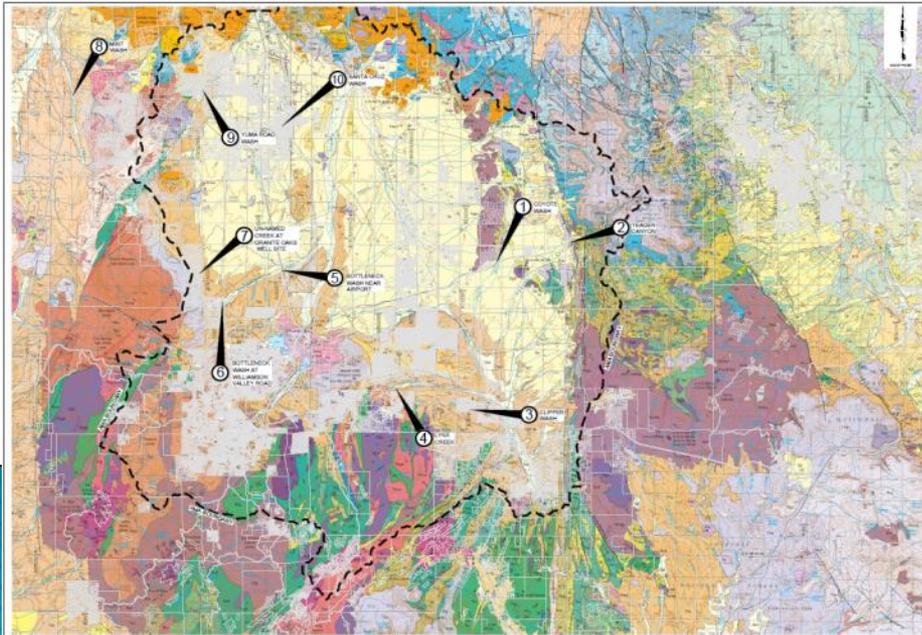


Decagon G3 Passive Wick Lysimeter

- Actual water passing below root zone collected in a tube with a sample port
- Rate of infiltration can be determined
- Water samples can be chemically analyzed

Increase Infiltration

- ▶ Rock structure for design storm – fails for larger storm events
 - Filter Fabric beneath
 - Space according to channel slope



Capitalize on urbanized areas

- ▶ Rainwater harvesting from impermeable surfaces
- ▶ Subsurface treatment



Land use management and conservation

- ▶ Aquifer Protection
- ▶ Range management
- ▶ Reduce consumer water use

