The Arizona Water Highway

Water Supply Infrastructure Concepts for 2040

Guy Carpenter

Peter Newell

Tim Thomure

Status and Trends

Near Term

- Arizona's population will continue to grow – and spread
- Existing supplies will become fully utilized
- New water transfer projects will be implemented

Long-Term

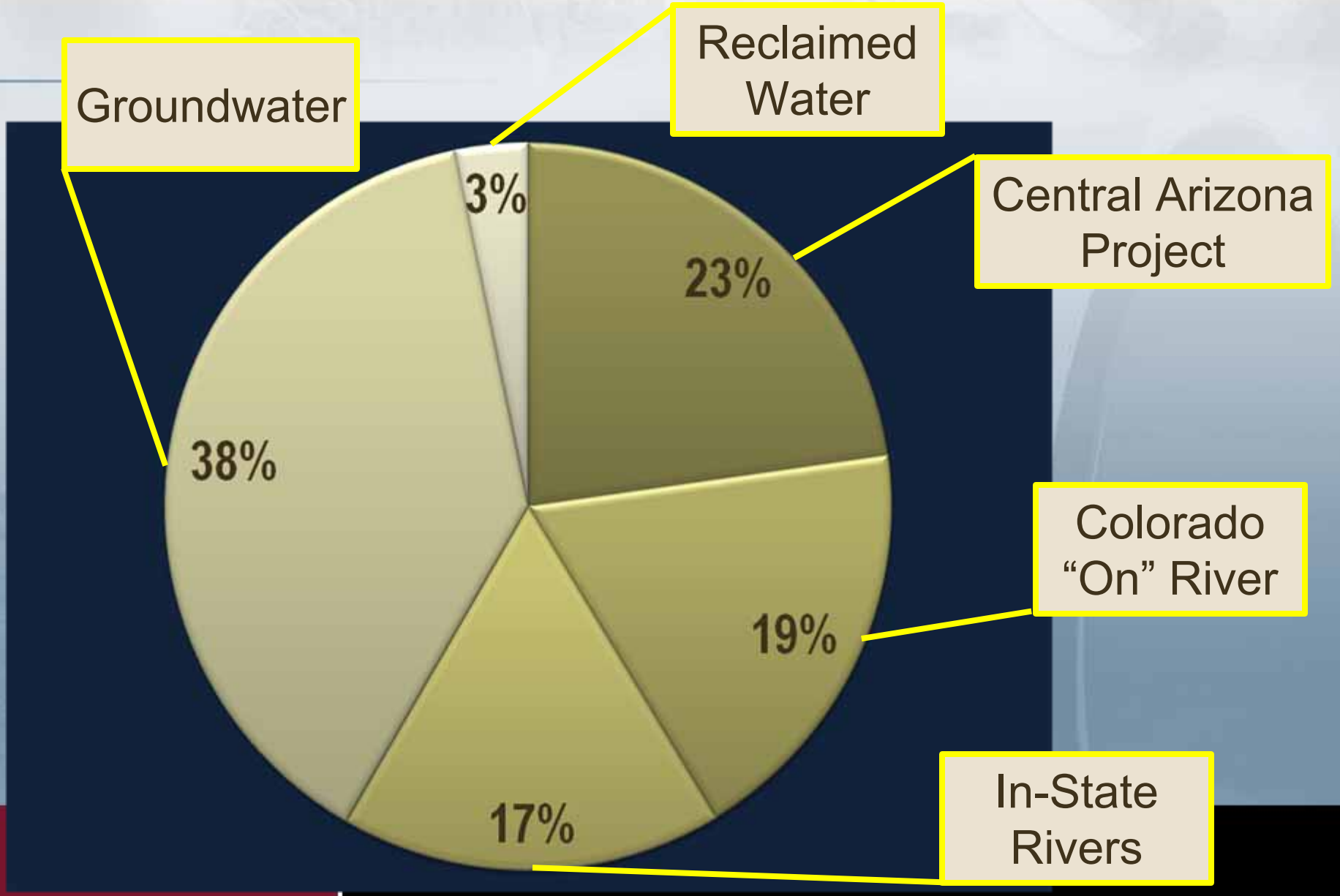
- "Next bucket" will take decades to plan/implement

Water Resource Planning Drivers

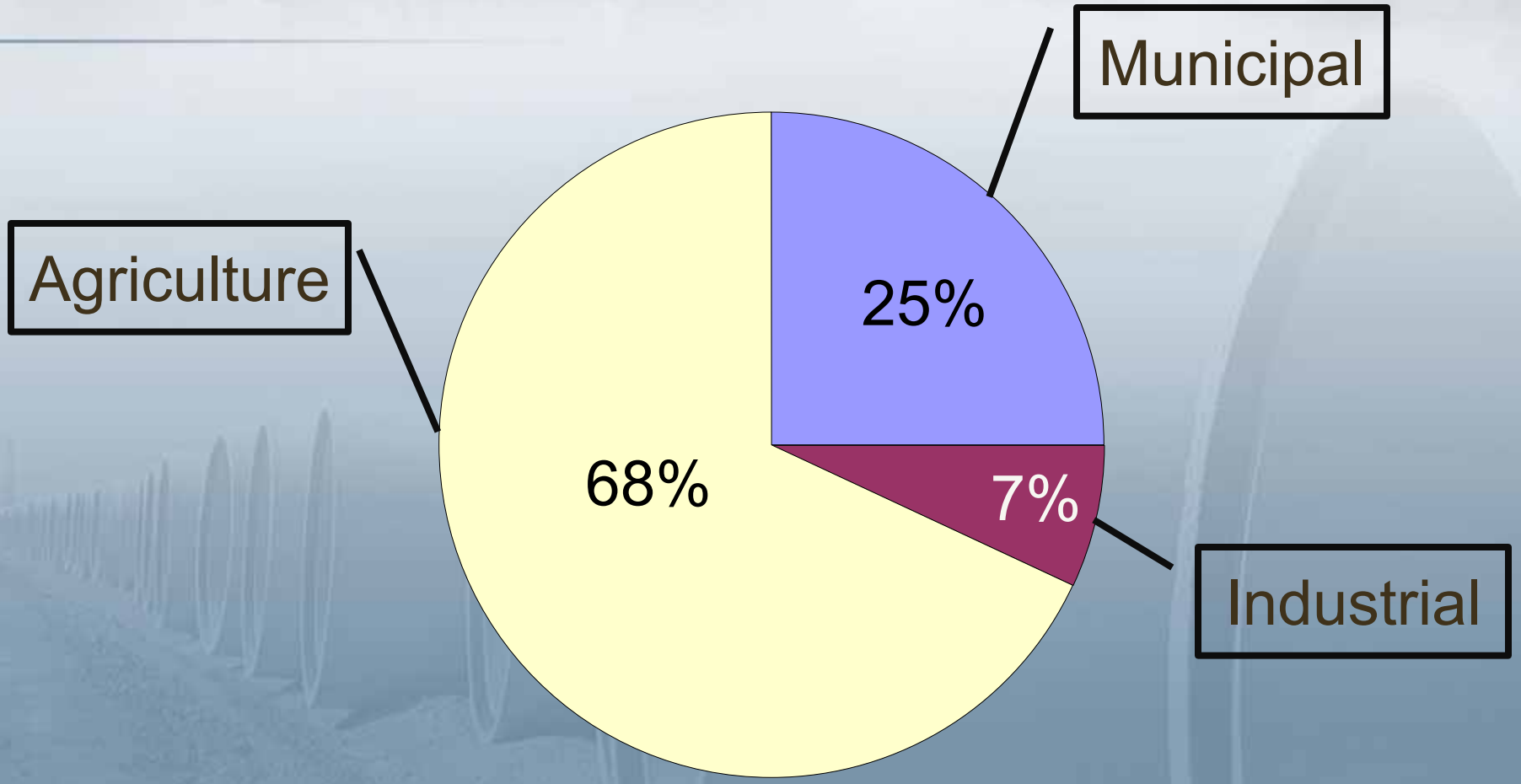
- Water Planning in the Western States:
  - Growing population
  - Drought and climate change
  - Overuse of groundwater supplies
  - Endangered species concerns
  - River ecosystem protection
  - Over-appropriation
  - Competing uses

Figure 1. Water planning efforts in western states

Arizona Water Use by Source (2006)



How Water Is Used in Arizona



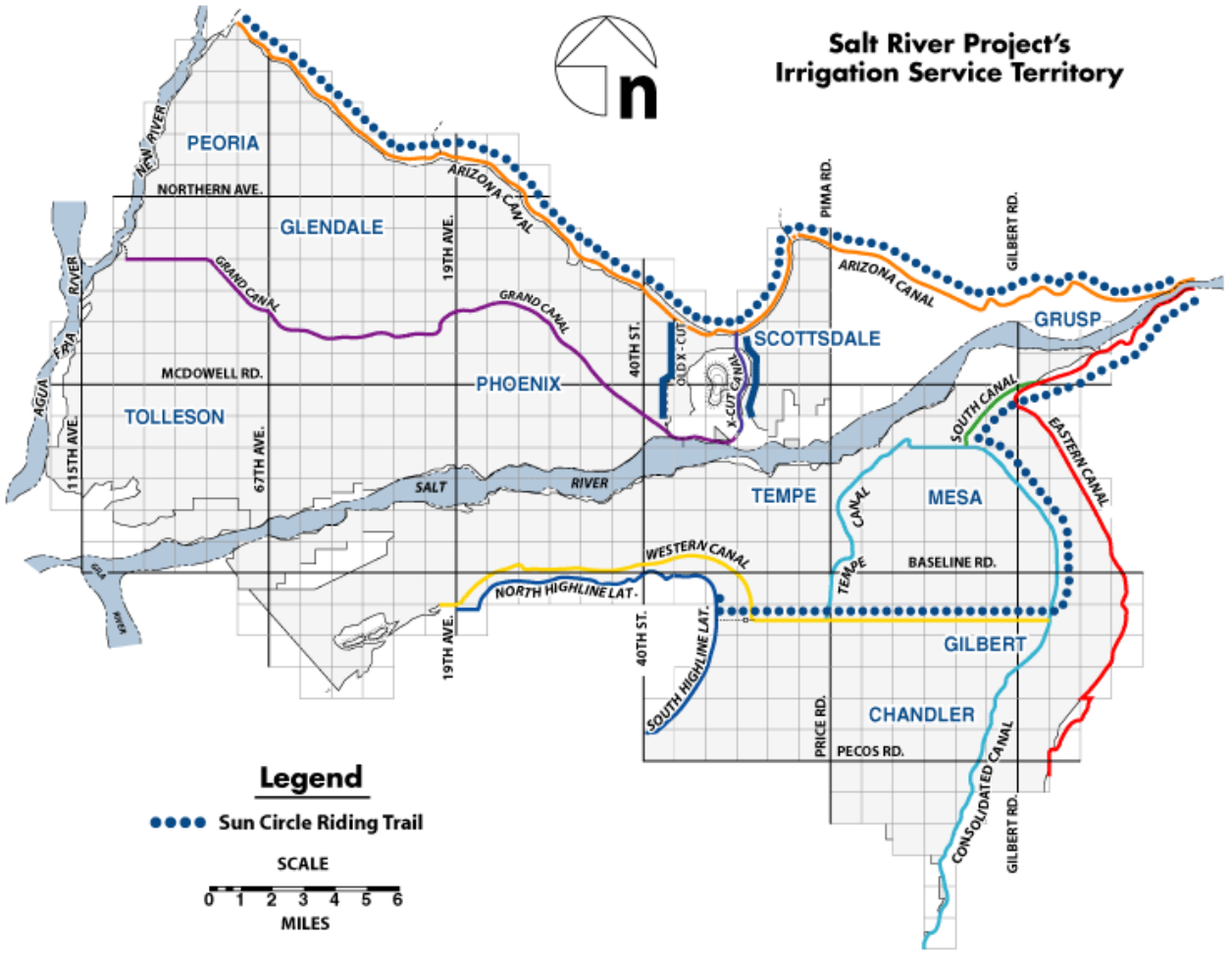
UA WRRC (2002)

Where's the Surface Water?

- Salt/Verde System & SRP

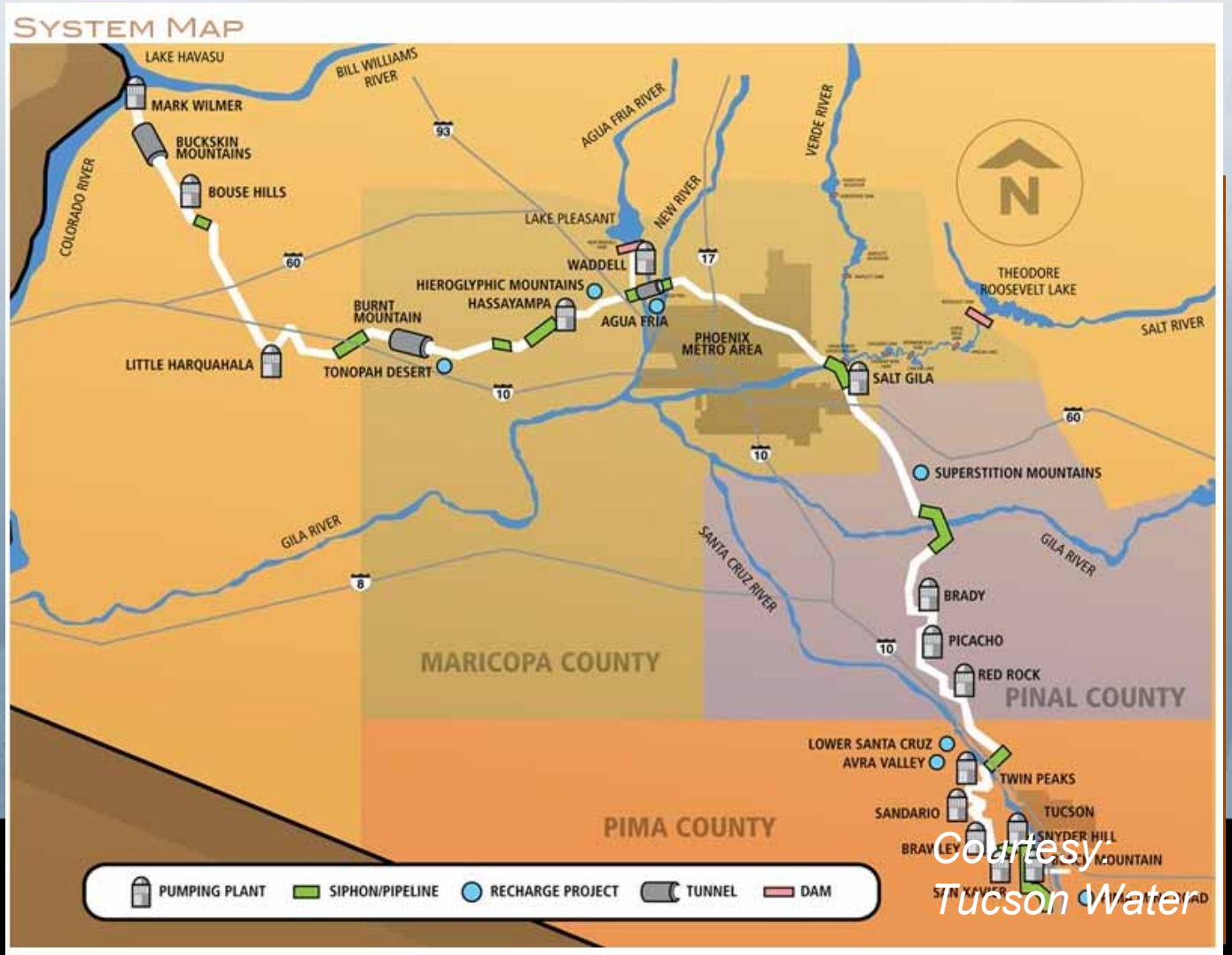
Irrigation service territory and canal distances

Below is a map of SRP's irrigation service territory, with each canal highlighted in a different color. Many people use the canal banks for recreation, such as running and biking.



Where's the Surface Water?

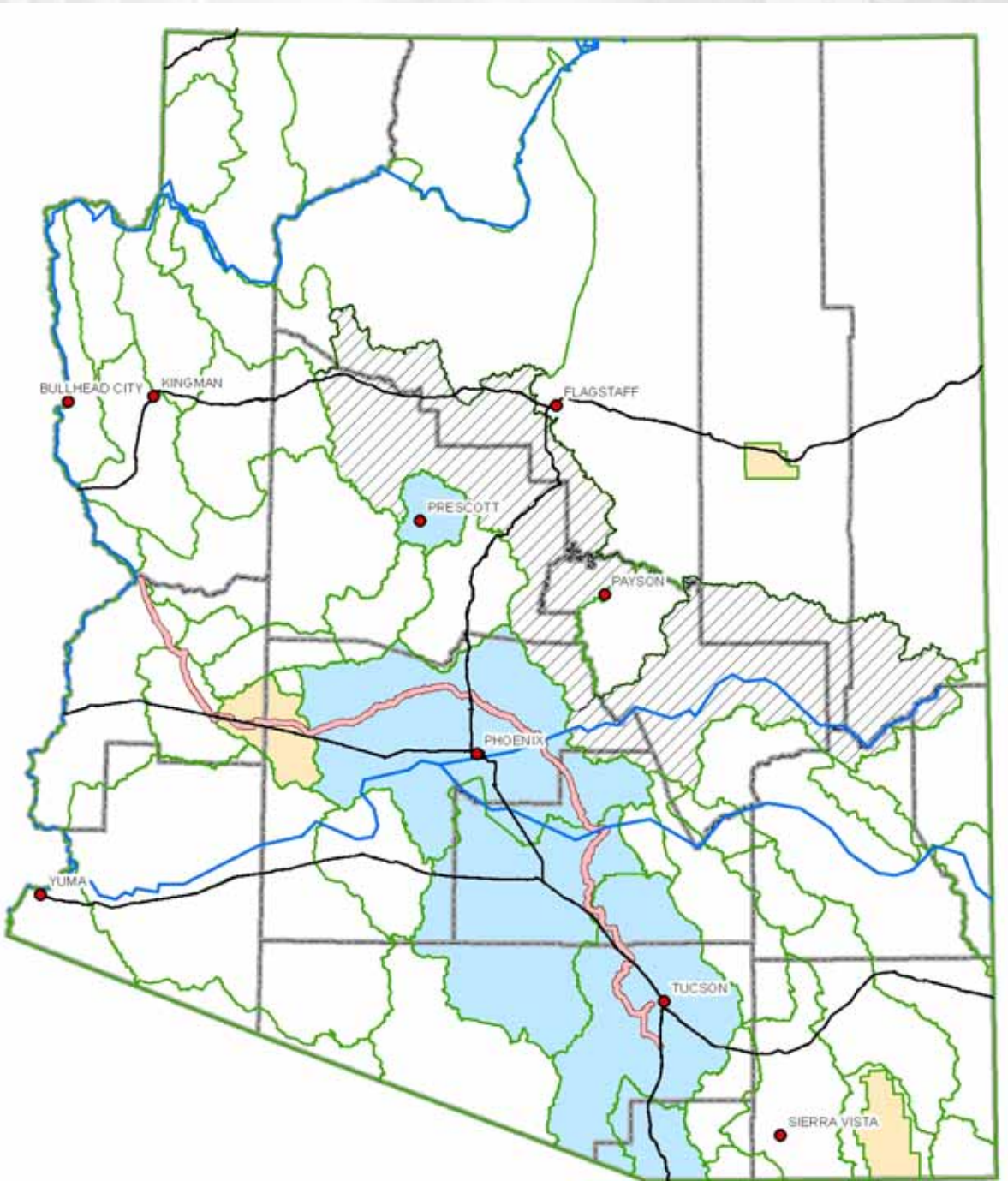
- Colorado River & CAP



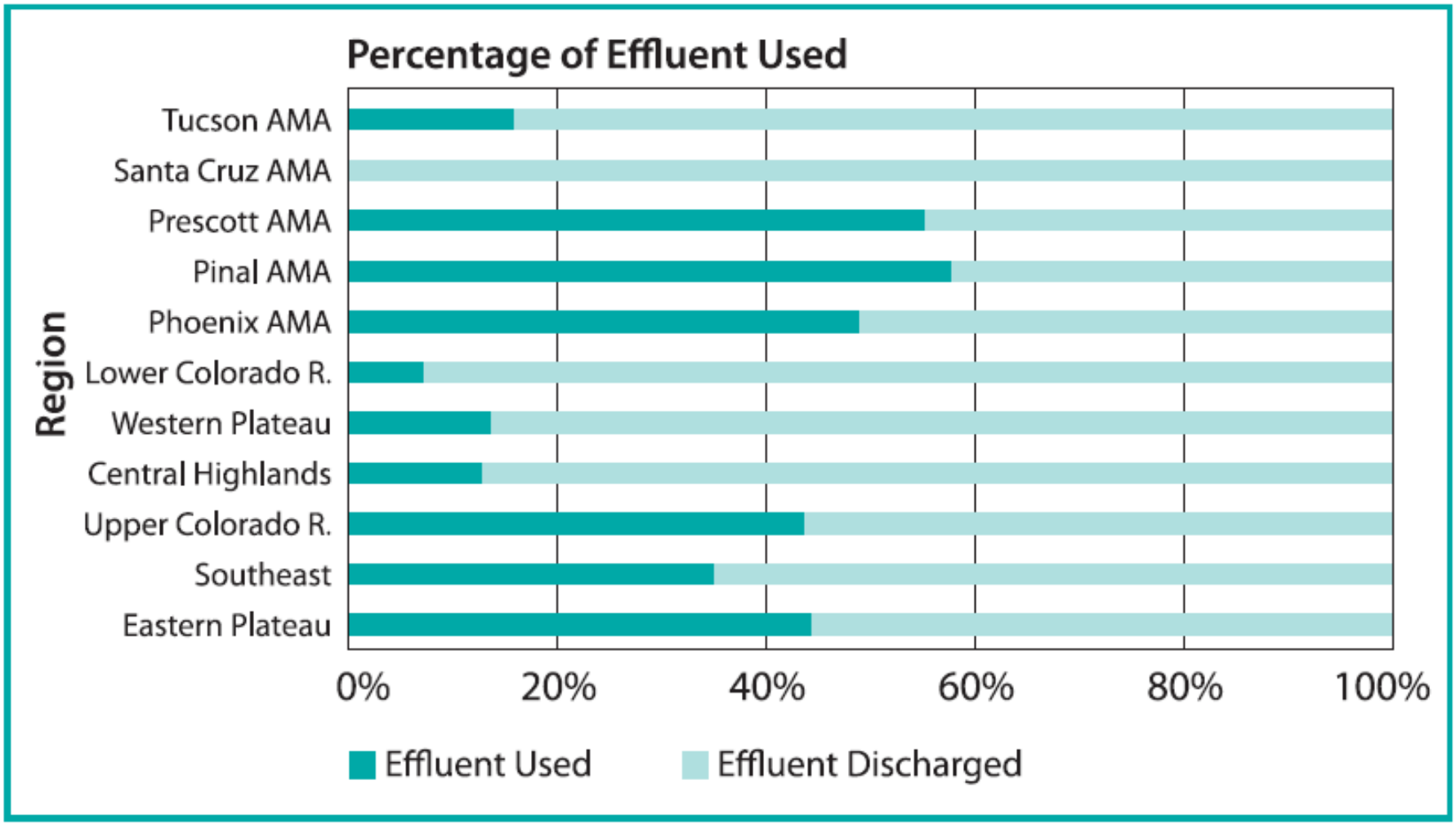
Courtesy Tucson Water

Where's the Groundwater?

- Active Management Areas (AMA)
- Irrigation Non-Expansion Areas
- Basins

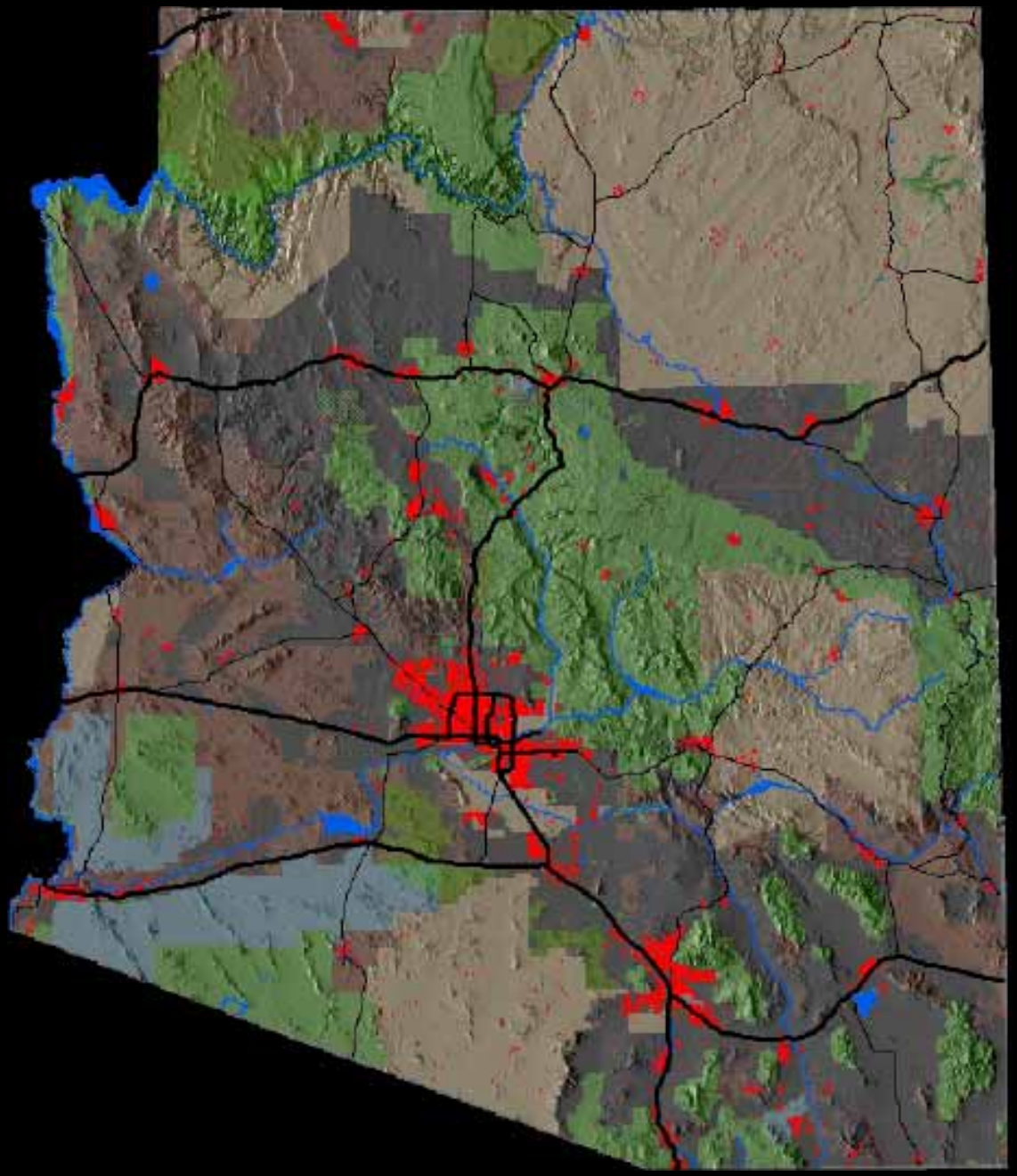


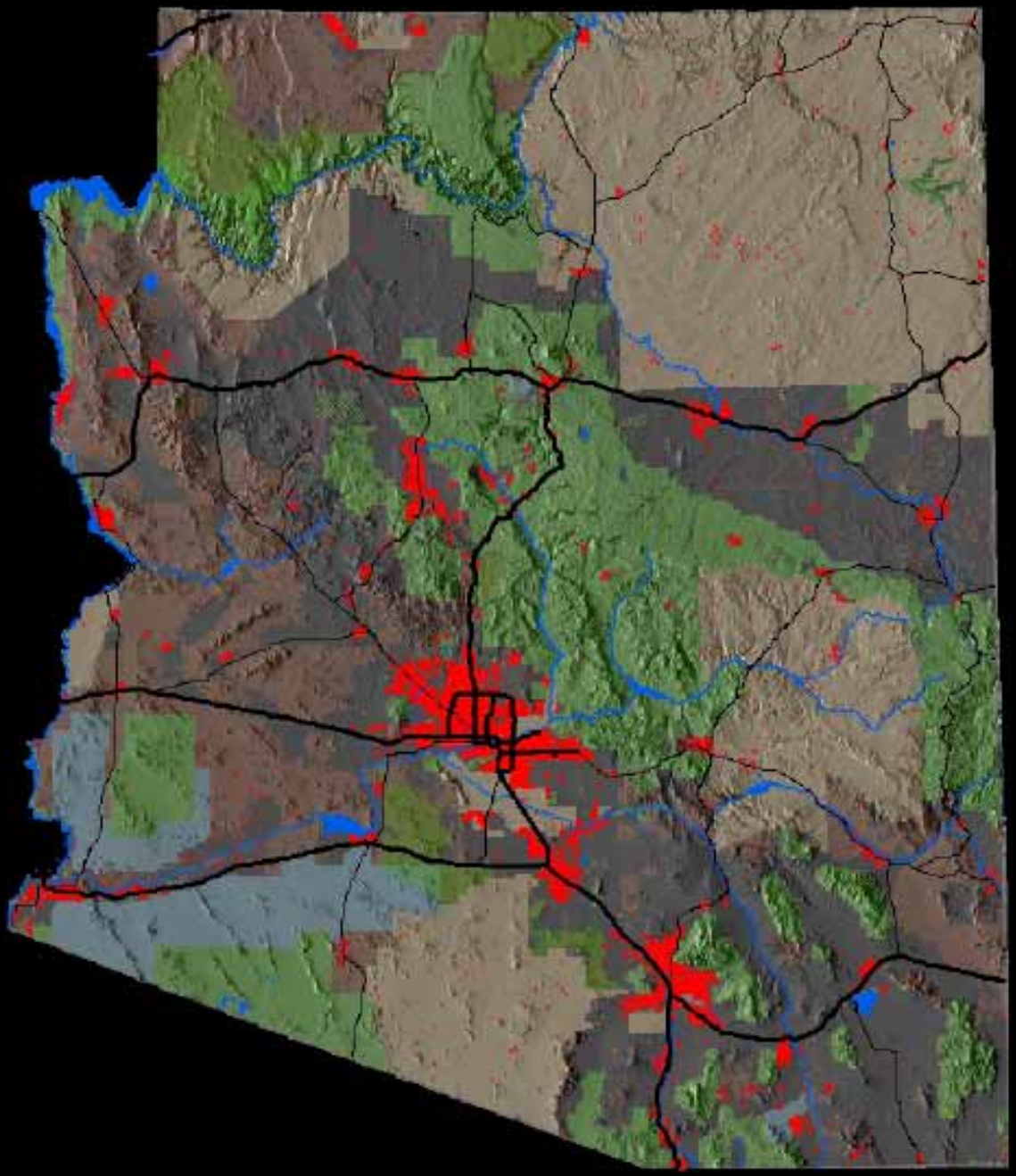
What About Reclaimed?



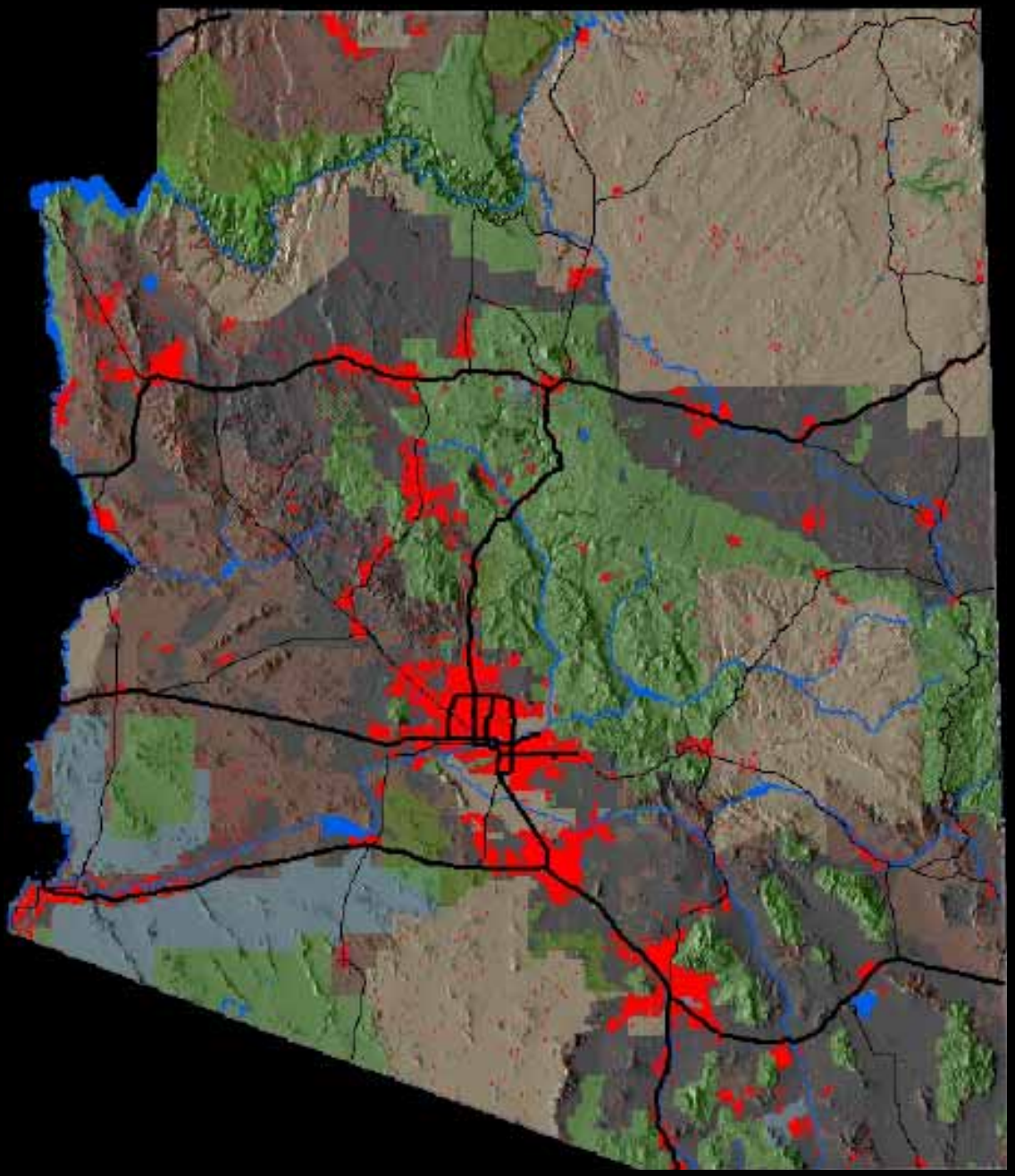
Where's the Demand?

- "Red Dot" maps
  - (source: Maricopa Association of Governments)
- 2010 through 2040
- Population projections vs. water availability

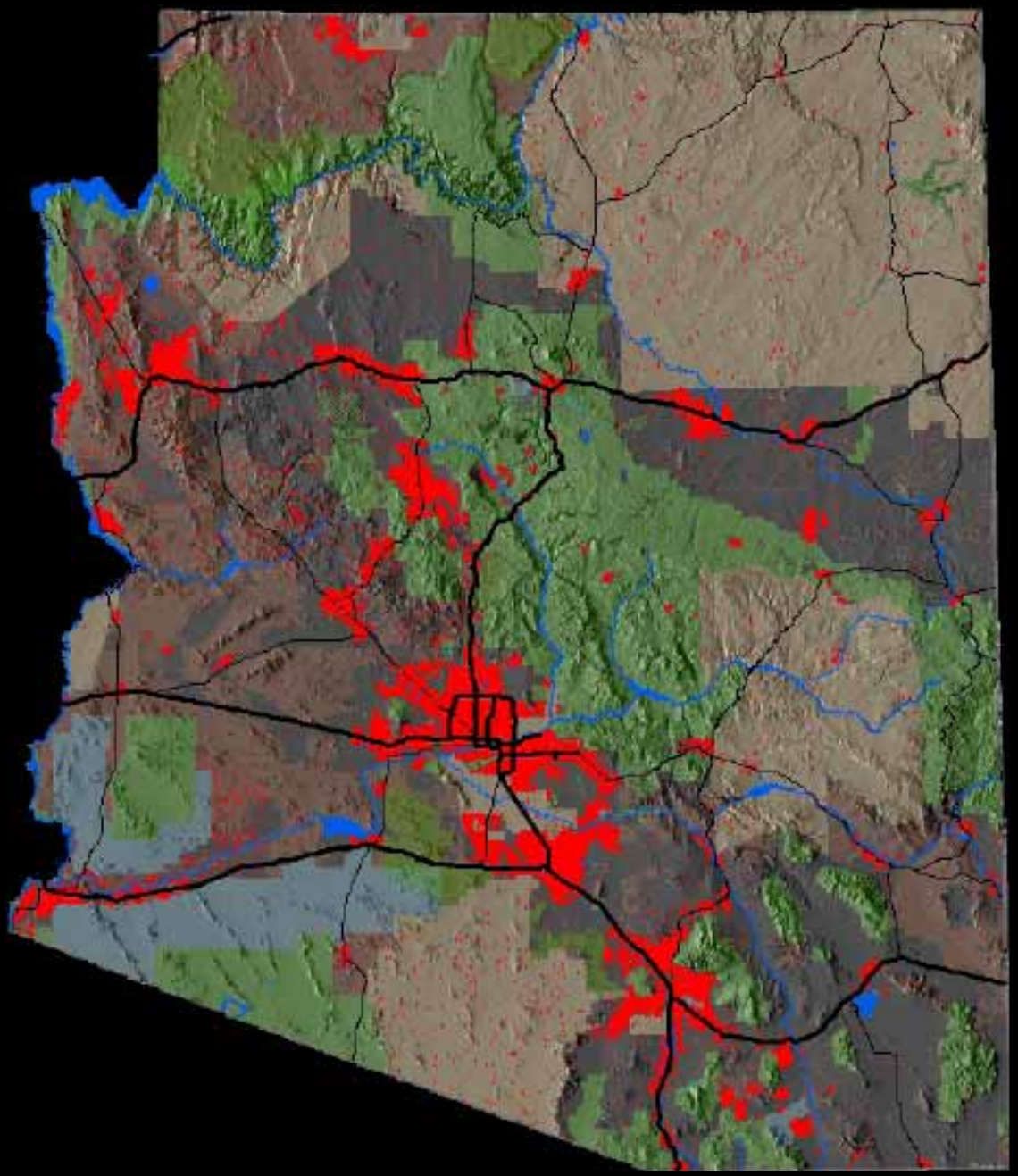

2010


2020

2030



2040



Population & Municipal Demand Trends

- Total State population projected to grow from 6 million to 12.8 million by 2050
- Municipal water demand to increase by 110% - to a total of almost 3 MAF

Regional Notes

- Pinal County projected to grow by 400%
- State-wide municipal water use still dominated by three-county CAP service area in future years: 85% of Arizona total

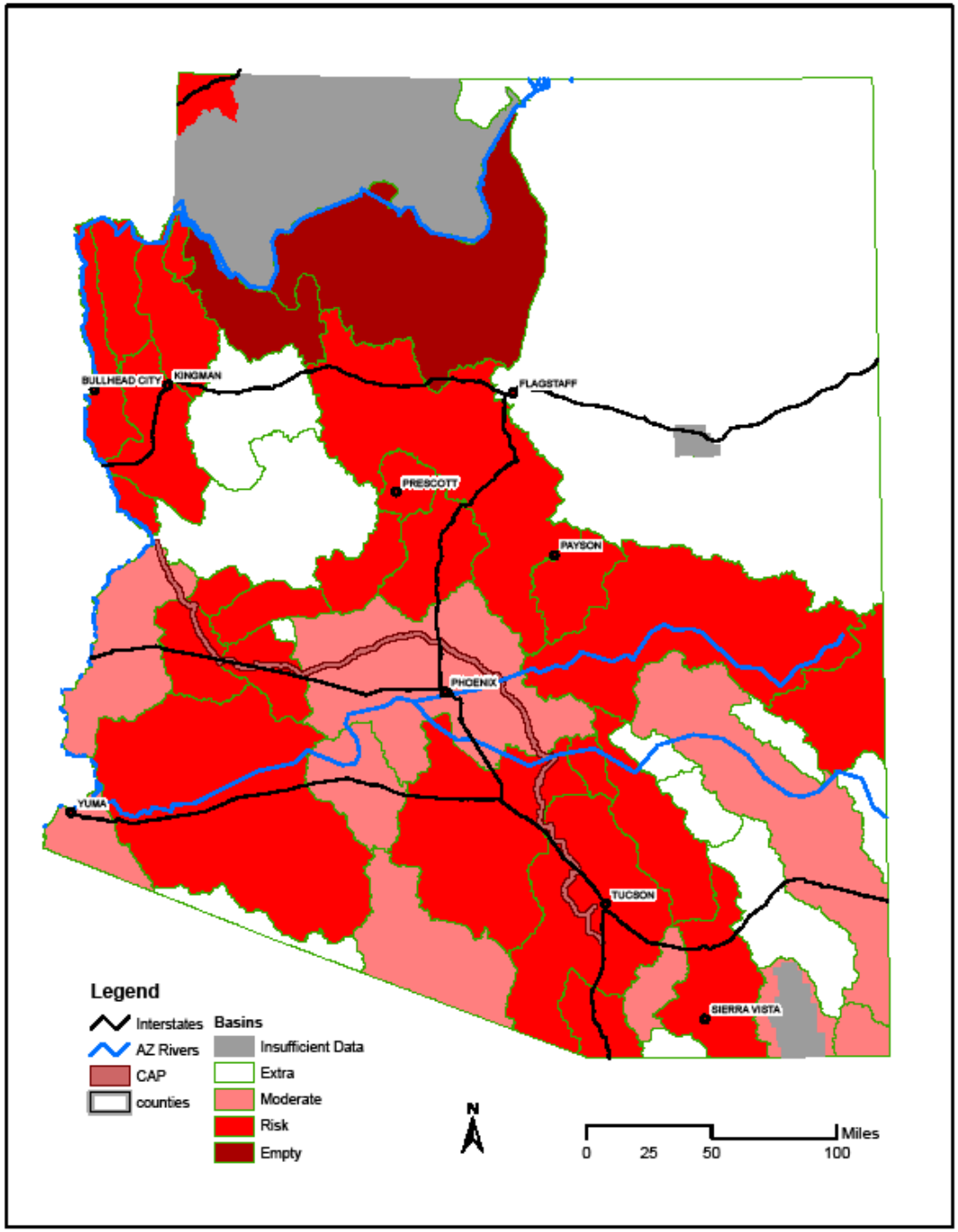
Groundwater Basin Evaluations
(Using ADWR New Water Atlas)

- Looked at three scenarios
  - -Assumed GW availability to 1,000 or 1,200 feet below surface
  - -Assumed 200 years of pumping
  - -Evaluated against Department of Economic Security population projections for 2040

- Scenario A
  - -No incidental recharge
  - -Projected lower gpcd for future M&I
- Scenario B
  - -Included incidental recharge
  - -Projected lower gpcd for future M&I
- Scenario C
  - -Included incidental recharge
  - -Used existing gpcd for future M&I

Groundwater Availability

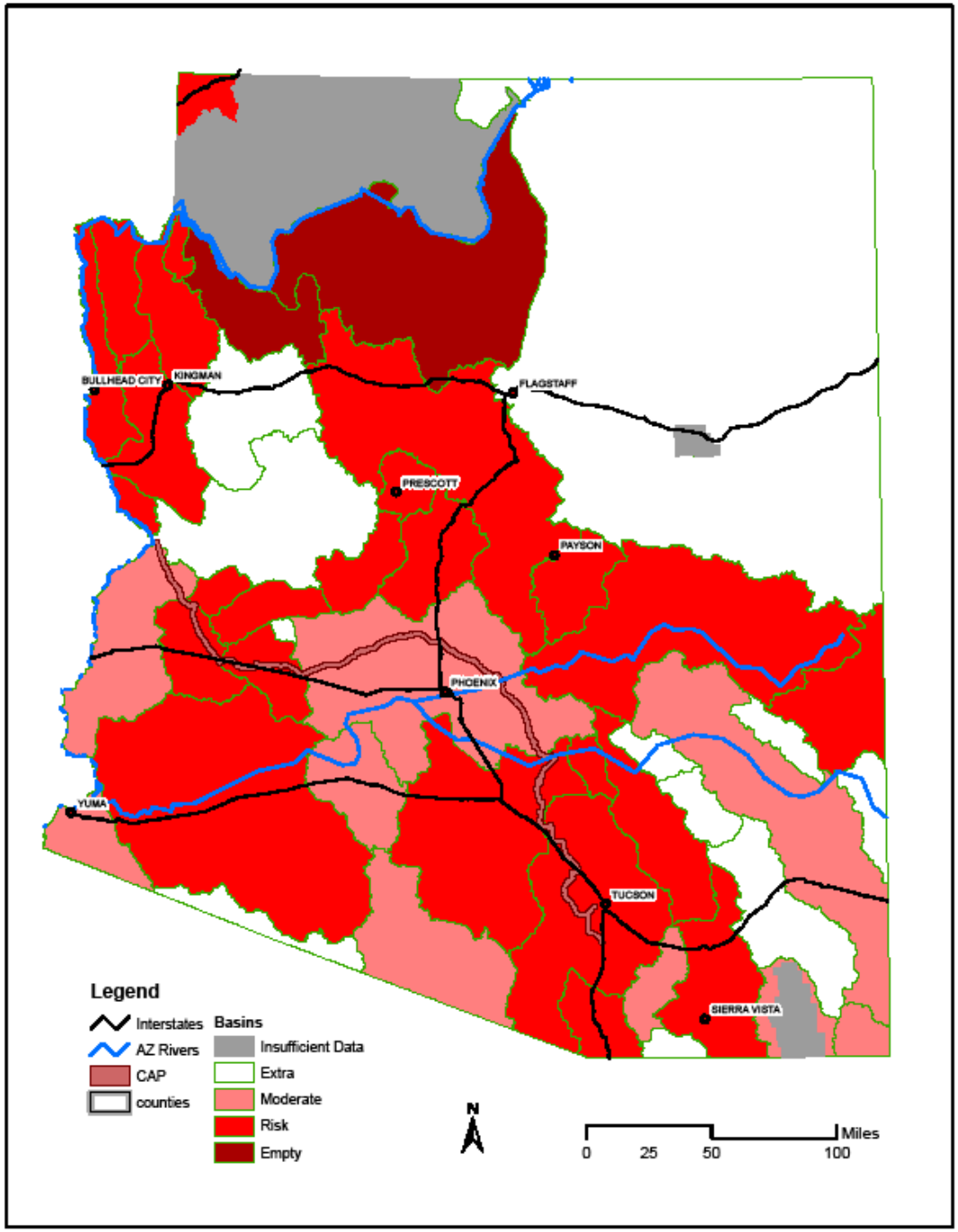
- **Extra:** more water available after 200 years
- **Moderate:** some water, but not a lot
- **Risk:** about to run out
- **Empty:** overdraft will occur if not carefully managed

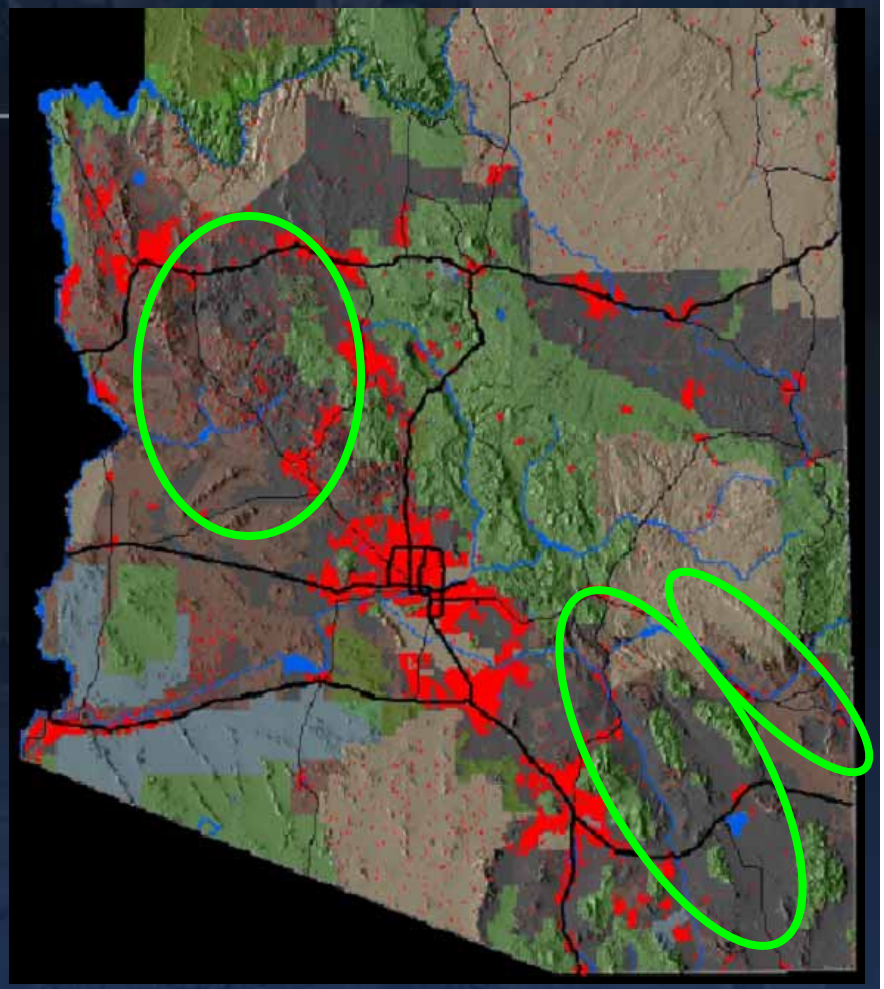


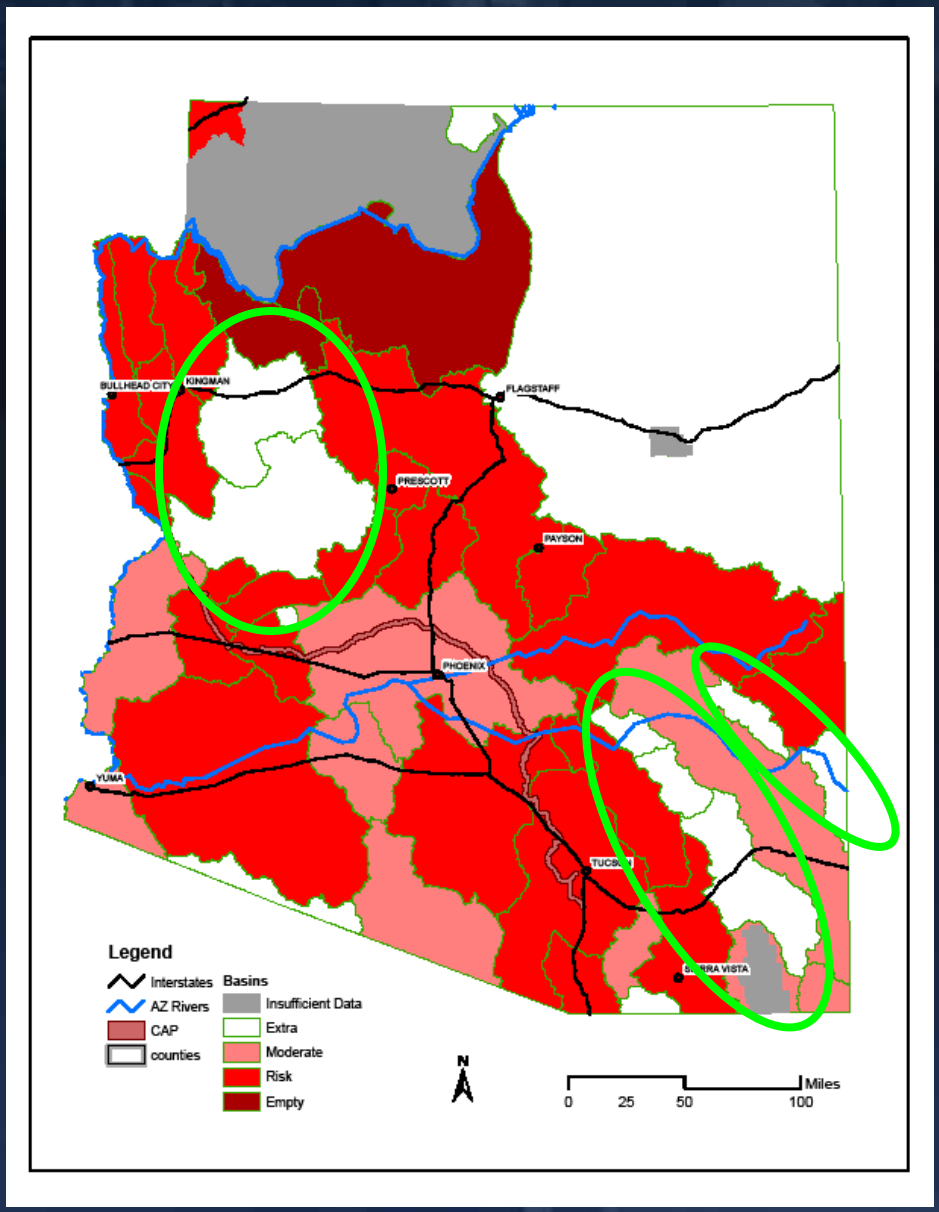
Groundwater Availability

Dark Red:
Overdraft conditions
White Areas:
Not under stress

- Opportunities for inter-basin transfers & new pipelines?
- Opportunities for shifting projected populations based upon water availability?



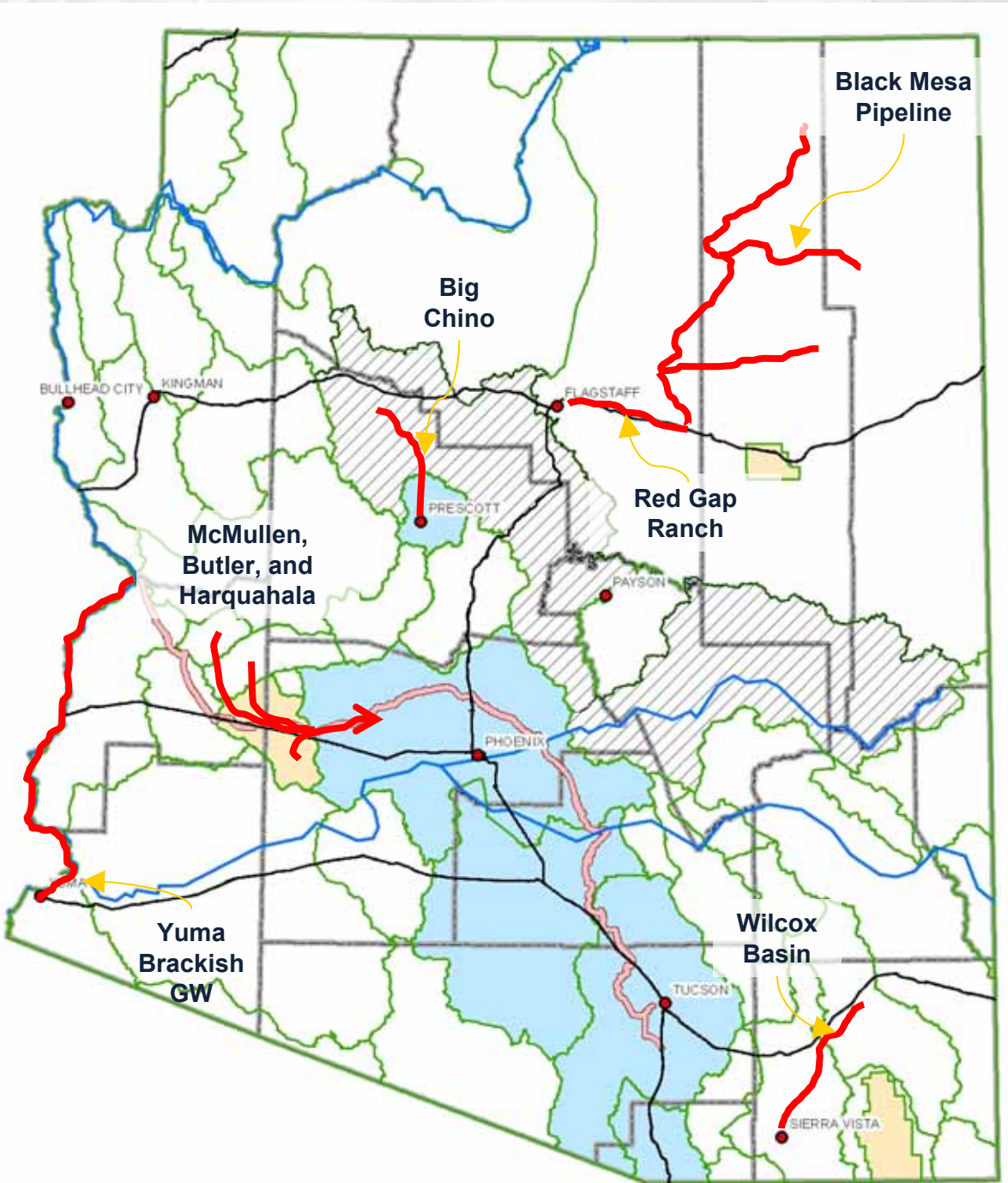



BULLHEAD CITY
KINGMAN
FLAGSTAFF
PRESCOTT
PAYSON
PHOENIX
YUMA
TUCSON
SIERRA VISTA
Legend
Interstates
AZ Rivers
CAP
counties
Basins
Insufficient Data
Extra
Moderate
Risk
Empty
N
Miles
0
25
50
100

So, What are Some of the Current Plans and Possibilities to Meet Demands?

Proposed Groundwater Transfers

- Red Gap Ranch
- Big Chino
- McMullen, Butler, and Harquahala
- Black Mesa
- Brackish Supplies



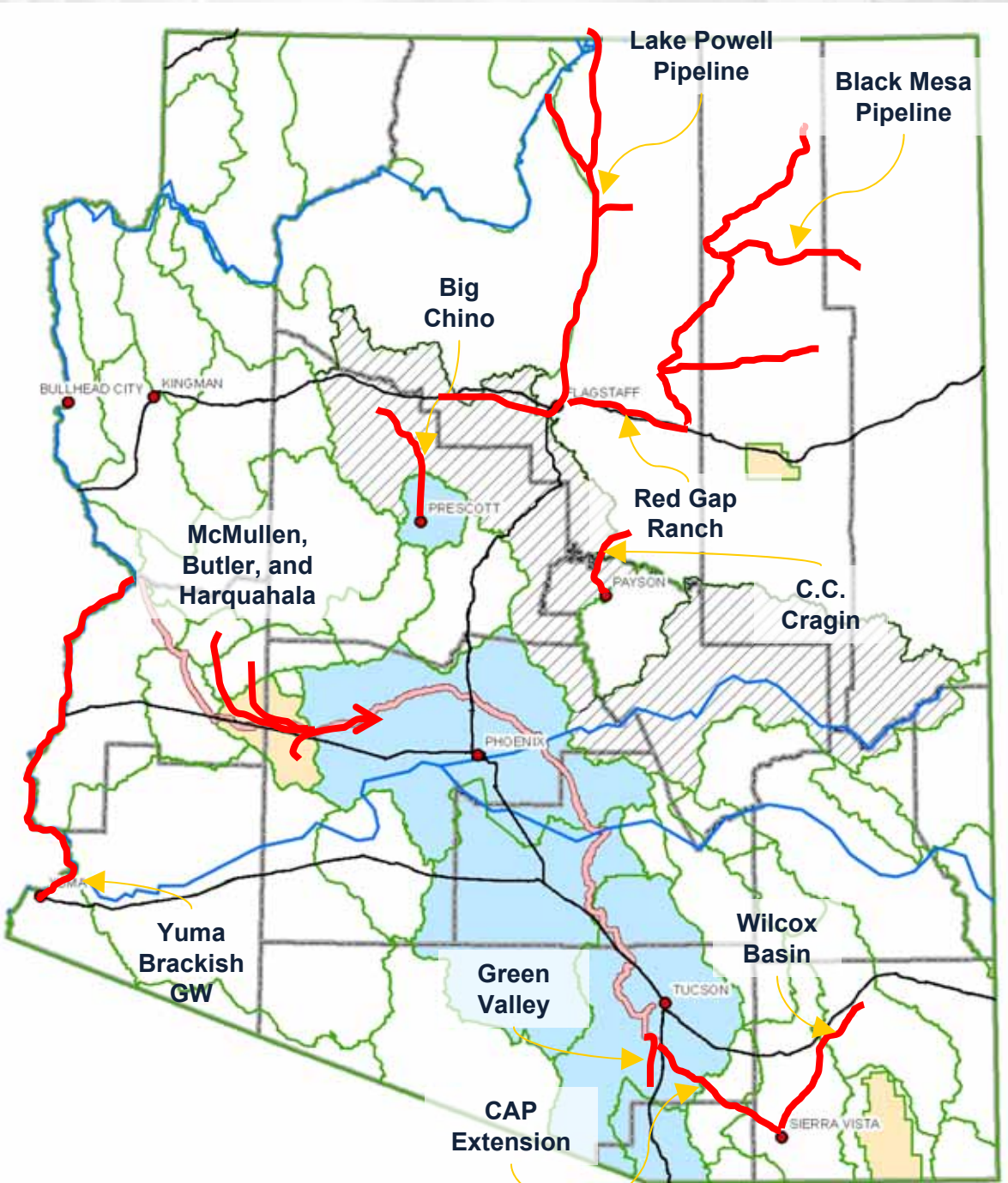
Surface Water Concepts

- C.C. Cragin in Payson (Verde River Agreement)
- Metro Water District, Marana, Oro Valley, and Flowing Wells Irrigation District (Allocated CAP)
- Green Valley, Sahuarita, and Surrounding Interests (Allocated and Unidentified CAP)
- Sierra Vista CAP Extension (Unidentified CAP)
- Lake Powell Pipeline in Northern Arizona (Unidentified Colorado River Water)

Colorado River/CAP are Fully Allocated

2040 Water Highways…

- Many of these projects are under development
- Some will fade away as other options are developed
- Large water transfers will continue to be a part of Arizona's water management



Reclaimed Water

Beyond Arizona Highways…

International?
(Binational Desalination Project)

Implications of Not Moving Forward

- Regional economic stifling
- Decrease in investor confidence
- Severe vulnerability to drought / climate change
- Increased pressure to move water from the “haves” to the “have nots”.

What's Next?

- Allow/encourage water availability to influence where development occurs?
- Conservation by design (increase the way infrastructure shapes water use)?
- Changes to rules/regulations to increase Arizona's flexibility to meet water demands?
- Move water from where it is, to where it needs to be – develop the highways

The Arizona Water Highway

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Guy.Carpenter@hdrinc.com

Peter.Newell@hdrinc.com

Timothy.Thomure@hdrinc.com

520-584-3640

Population & Demand Projections by Region & Time Frame

Arizona Population Projections 2006 - 2050 Summary Table	2005	2050	GPCD	AFY 2005	AFY 2050
Apache	73,775	104,248	150	12,396	17,516
Cochise	131,790	212,822	175	25,834	41,718
Coconino	130,530	198,149	150	21,932	33,293
Gila	54,445	78,274	150	9,148	13,152
Graham	35,455	49,929	175	6,950	9,787
Greenlee	8,300	9,067	150	1,395	1,523
La Paz	21,190	30,909	220	5,222	7,617
Maricopa	3,648,545	7,661,423	220	899,117	1,888,017
Mohave	188,035	400,695	220	46,338	98,744
Navajo	109,985	192,360	150	18,480	32,321
Pima	957,635	1,709,026	175	187,721	335,012
Pinal	246,660	1,302,950	200	55,259	291,898
Santa Cruz	44,055	84,708	175	8,636	16,605
Yavapai	205,105	418,671	175	40,206	82,070
Yuma	189,480	377,598	250	53,061	105,741
Arizona	6,044,985	12,830,829		1,391,693	2,975,015

Source: Arizona Department of Economic Security, Research Administration, Population Statistics Unit.
Population projected by Demographic Cohort-Component Population Model.
Approved by Arizona Department of Economic Security Director, March 31, 2006.
Population Statistics Unit, Arizona Department of Economic Security (602) 542-5984
GPCD numbers from Kohloff and Roberts (2007). Beyond the Colorado River: Is an International Water Augmentation Consortium in Arizona's Future?. Arizona Law Review. Vol 49. No 2.