Water Resources to Sustain Our Rivers, Wildlife, and Riparian Habitat

Joint City/County Water and Wastewater Infrastructure, Supply, and Planning

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The Nature Conservancy
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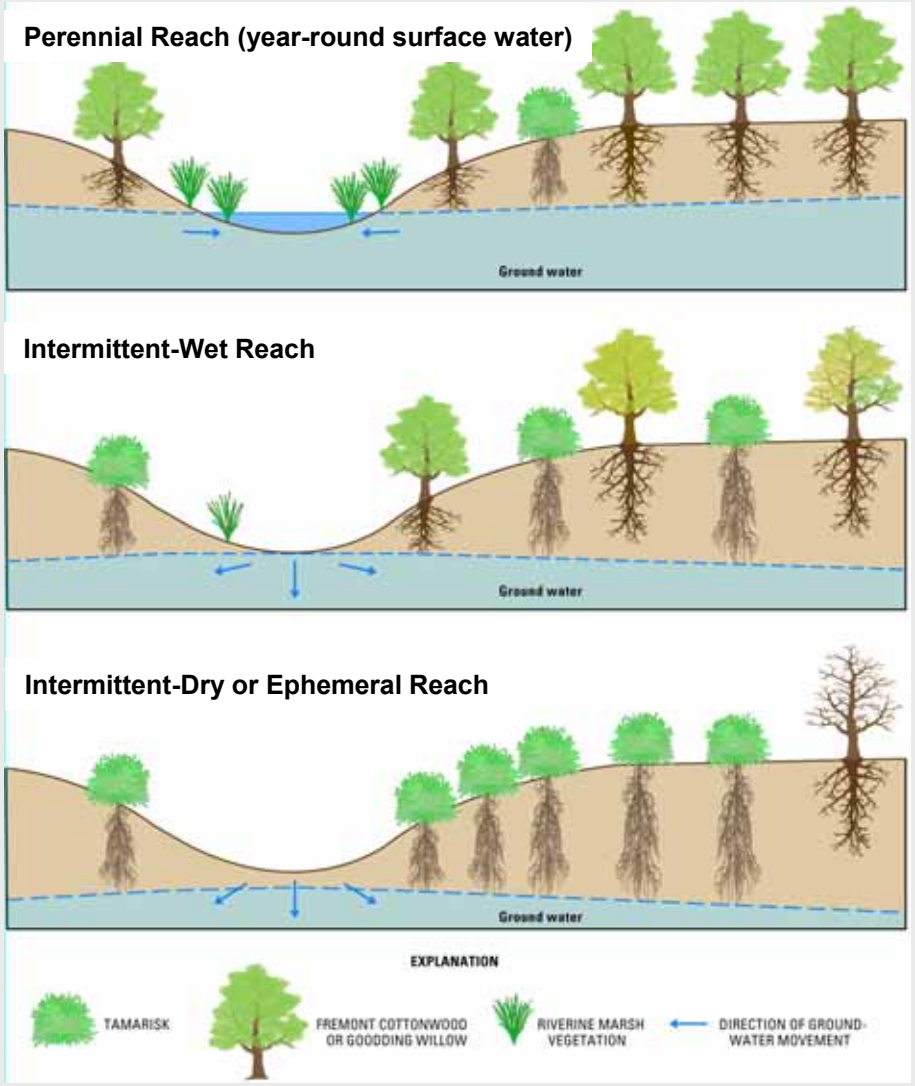
Topics Covered

- ✓ Environmental needs for rivers, wildlife, and riparian habitat
- ✓ Relationship between land use & water availability
- ✓ Priority mechanisms for land & water protection

Environmental Water Needs - Riparian Condition



Source: *Adapted from USGS & J. Stromberg*

Riparian vegetation conditions respond to short & long-term changes in surface & groundwater levels

Environmental Water Needs - Riparian Condition

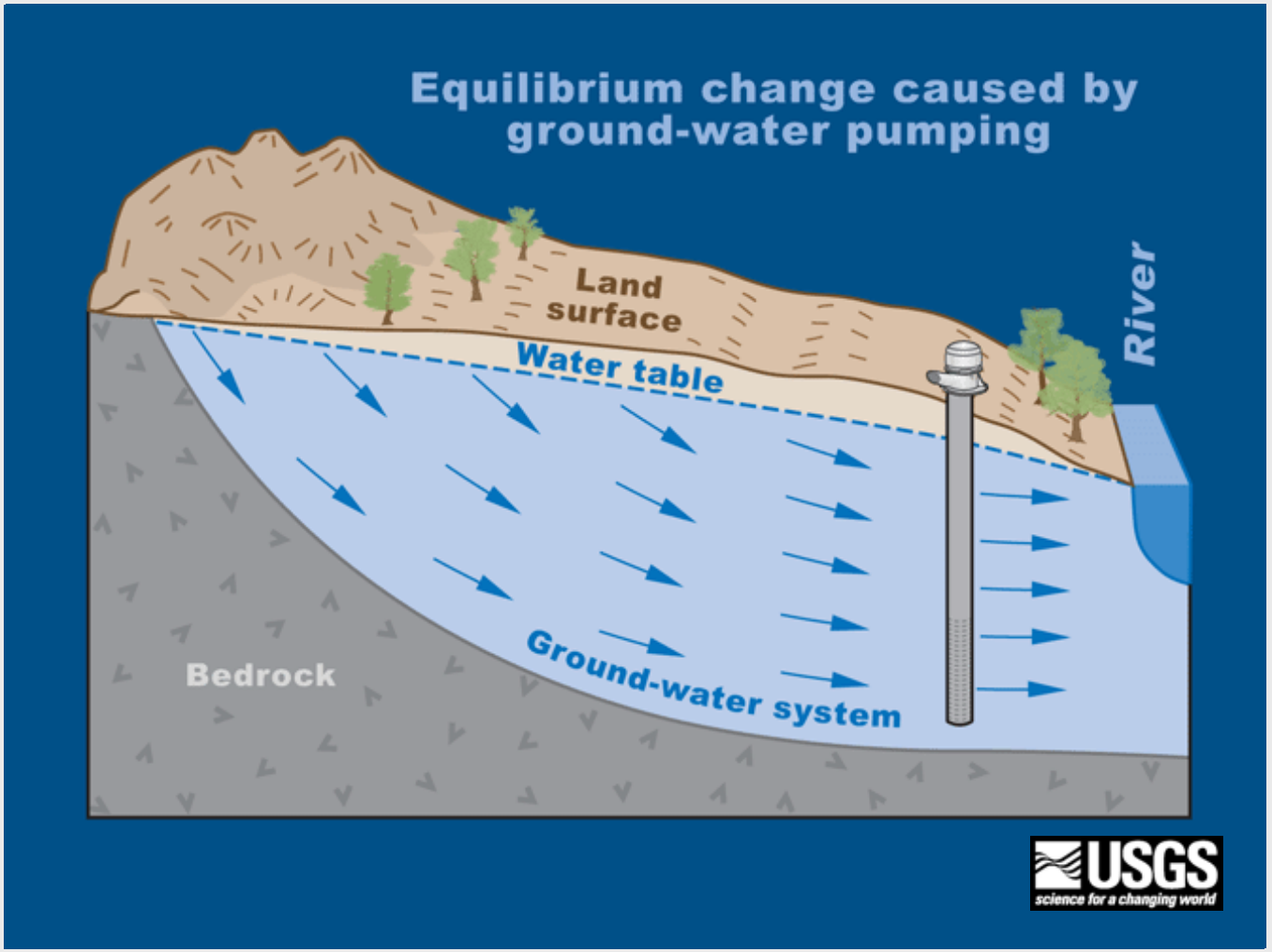
Perennial Reach - San Pedro River

Ephemeral Reach - Rillito River

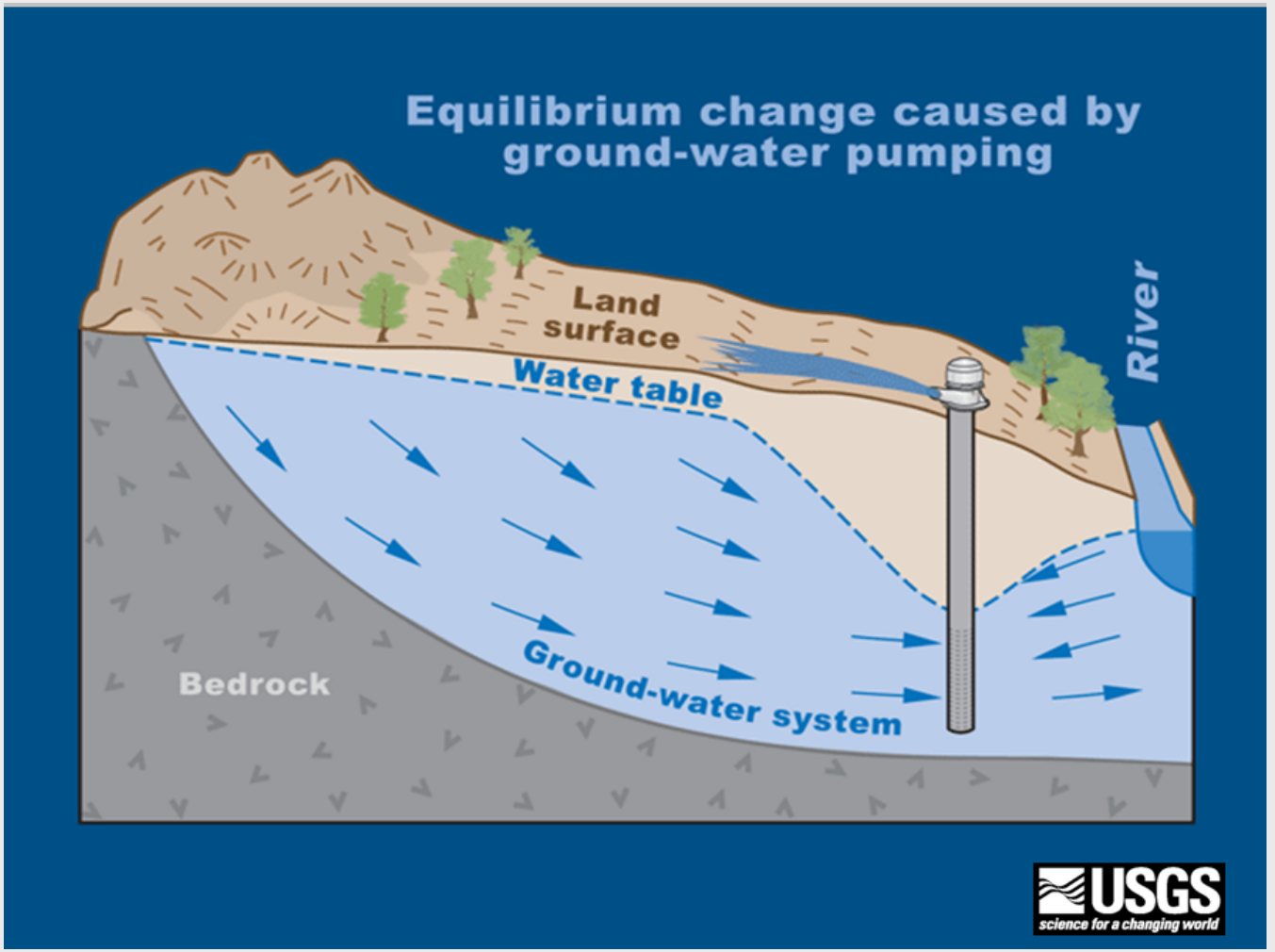
gallery forest with cottonwood, willow, and boxelder ⟷ **single species - desert broom**

As water levels decline riparian zones shrink and plant communities change from trees needing saturated/wet soil to deeper-rooted or drought tolerant species

Groundwater Pumping and Stream Flow



Groundwater Pumping and Stream Flow



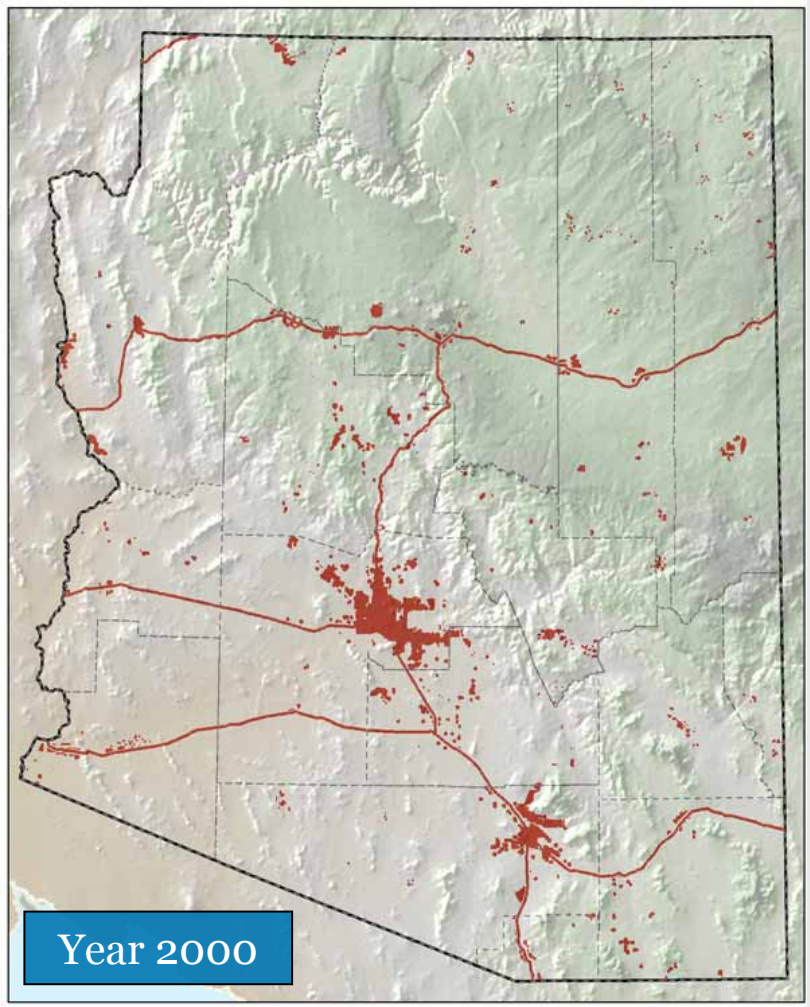
Cone of depression around well & reversal of flow from river to well

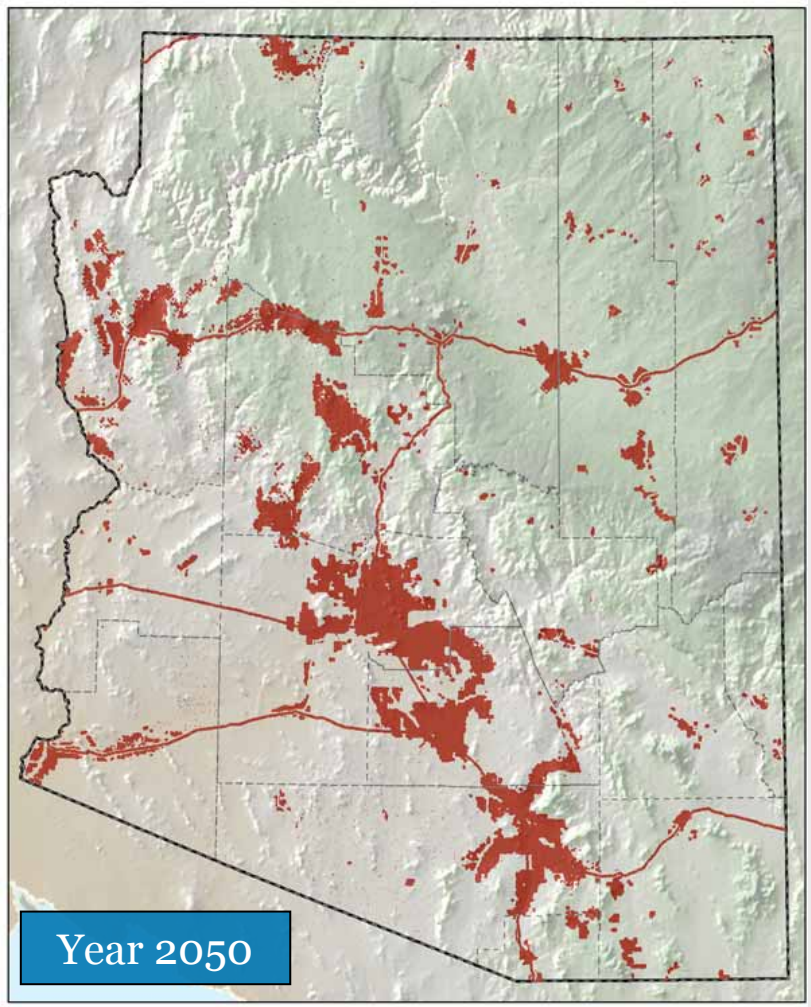
Environmental Water Needs

Summary

- ✓ river ecosystems provide benefits to humans & wildlife
- ✓ riparian condition influenced by surface flow/groundwater levels
- ✓ groundwater basins can contain large volumes of water but increment of change that results in impacts to rivers is small

Growth of Our Urban Footprint





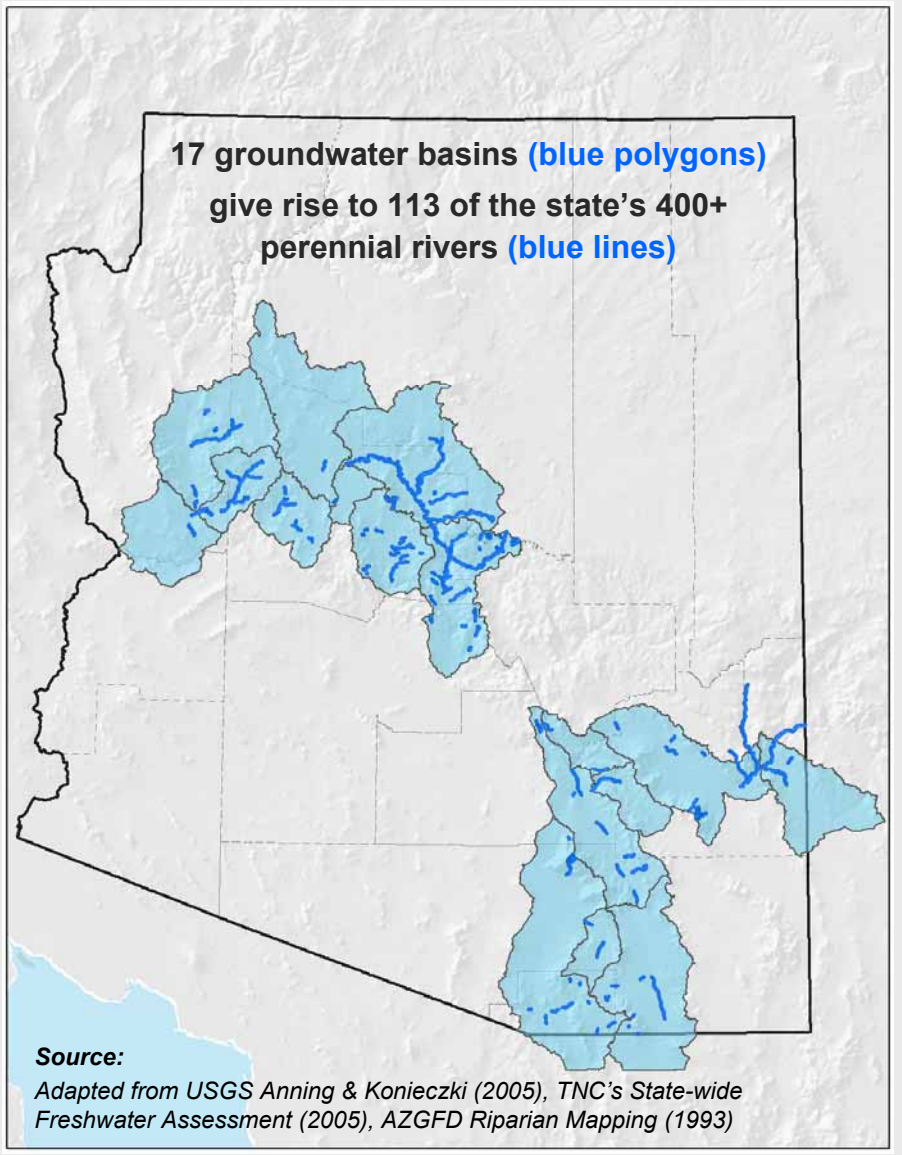
Source: *Maricopa Association of Governments 2005*

Urban footprint projected to quadruple to 4.5 million acres

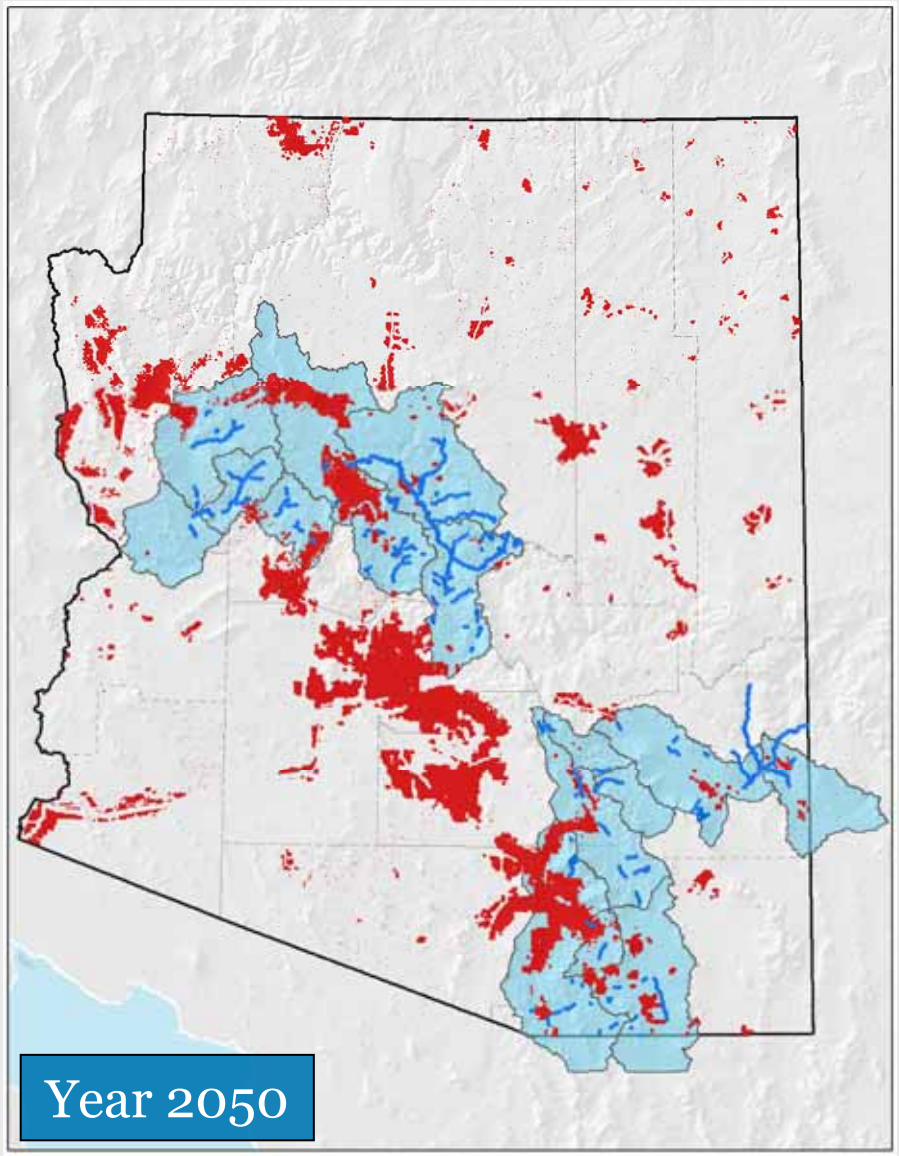
Groundwater-Dependent Rivers

State's major alluvial aquifers that give rise to our rivers

- ✓ 1,000 miles groundwater-dependent rivers & streams
- ✓ 32% of our perennial waters



Future Growth & Water

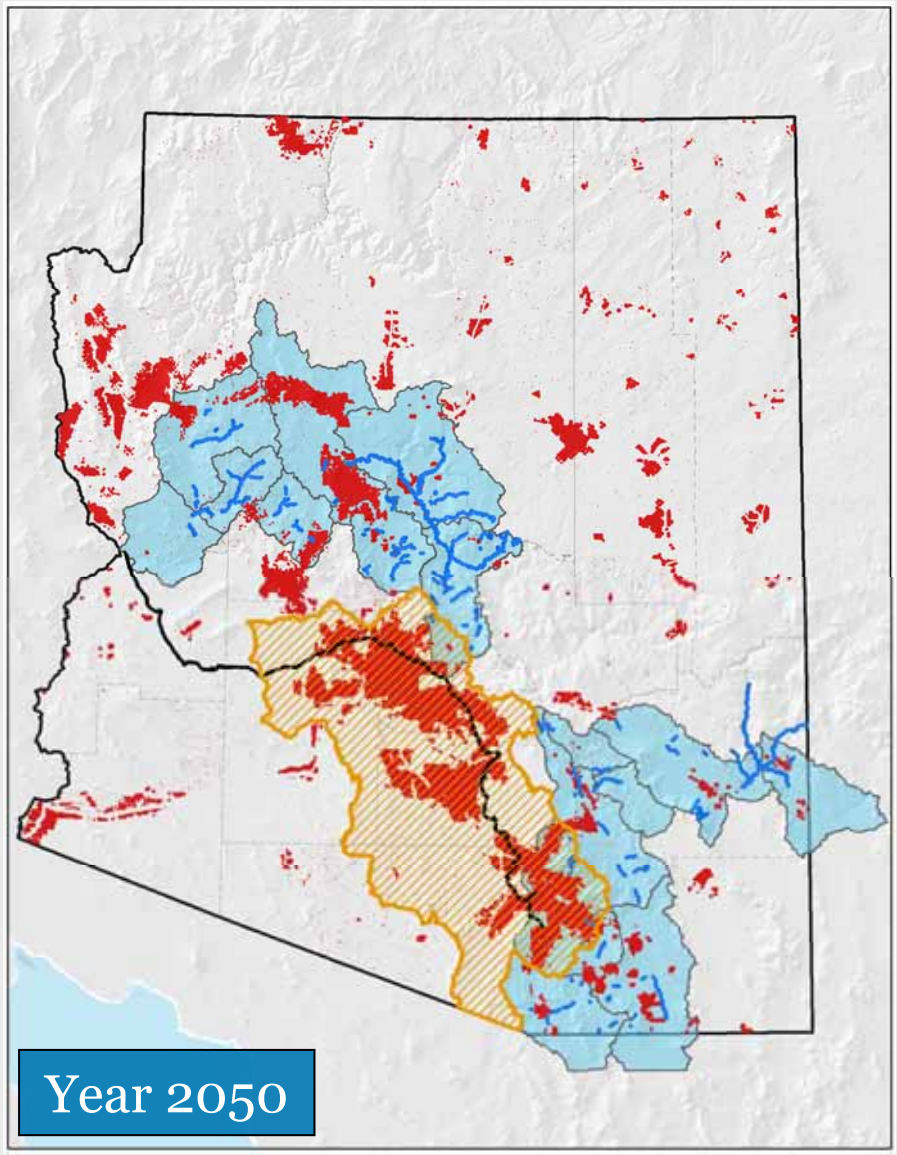


30% of projected growth footprint to occur within groundwater basins vulnerable to pumping

Groundwater basins

Projected growth footprint 2050

Future Growth & Water



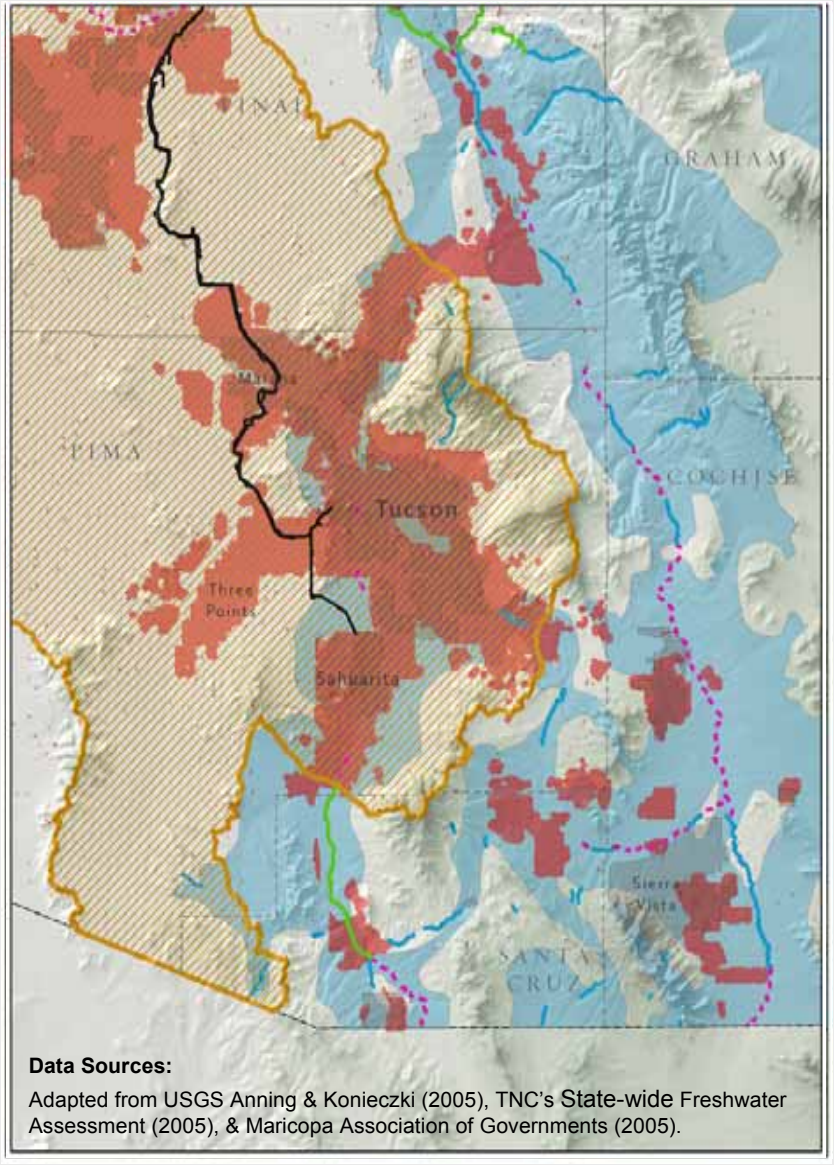
distribution of renewable supplies of water versus reliance on groundwater

Groundwater basins

Projected growth footprint 2050

Approximate distribution of renewable supplies

Groundwater and Projected Growth



Data Sources:

Adapted from USGS Anning & Konieczki (2005), TNC's State-wide Freshwater Assessment (2005), & Maricopa Association of Governments (2005).

Perennial streams

Formerly perennial

Regulated or effluent dominated

Groundwater basins

Projected growth footprint 2050

Approximate distribution of renewable supplies

Population Growth & Water Availability

Why does this matter?

- ✓ habitat for 73 imperiled species
- ✓ loss of recreational opportunities & nature-based tourism
- ✓ increased regulatory burden/project costs
- ✓ impacts to those with surface water rights
- ✓ water supplies may be exacerbated by climate change

Mechanisms for Protection

Protection of rivers limited by lack of legal authority

- ✓ No state jurisdiction over regulation of groundwater pumping to benefit rivers, springs, wetlands, riparian systems, or wildlife
- ✓ ‘Safe Yield’ provision under Groundwater Management Act allows for use of all annual recharge for human consumption
- ✓ ‘Assured Water Supply’ provision does not require evaluation of impacts to rivers, riparian systems, etc.

Mechanisms for Protection

Protection of surface water for the environment occurs through indirect measures or tools with limited certainty

- ✓ Stream adjudications & 'sub-flow' ruling
- ✓ Federal actions where Clean Water Act & ESA are invoked
- ✓ Land acquisition with water rights converted to instream flow for benefit of wildlife or 'sever & transfer'
- ✓ 2007 Pima Co. Plan Amendment requiring impact study?
- ✓ Shift from groundwater to CAP & re-use/recharge have potential but would require secure allocation to environment?

Summary Points

- ✓ large proportion of population growth projected to occur in areas currently without renewable water supplies
- ✓ no legal mechanisms to protect rivers & riparian systems with certainty
- ✓ characterize desired ecological conditions then allocate sufficient water to maintain conditions

For More Information...

visit www.azconservation.org

- ✓ download scientific studies & data
- ✓ example analyses
- ✓ links to data sources

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