COLLEGE OF AGRICULTURE & LIFE SCIENCES
Soil, Water and Environmental Science

Meeting Arizona Water Management Objectives with Long-Term Storage Credits

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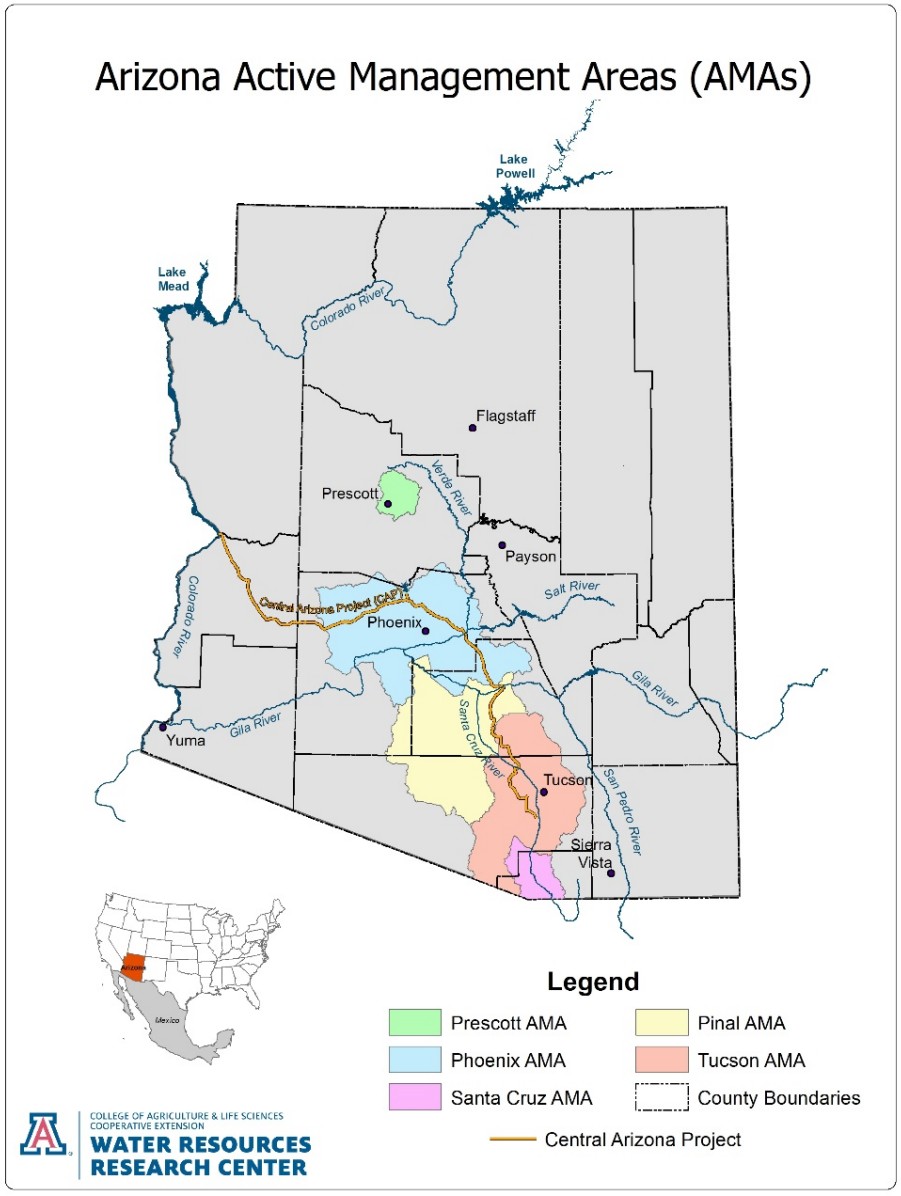
Outline

- 1980 Groundwater Management Act and objectives
- Underground Water Storage, Saving and Replenishment Act, and other added provisions to the Groundwater Management Act
- LTSC accounts
- Examples of LTSC transactions
    - Purchasers of LTSC
    - Sellers of LTSC
- Conclusion

Groundwater Management Act



1980 Groundwater Management Act (GMA)

- Limited groundwater pumping in Active Management Areas (AMAs)
- Arizona Department of Water Resources regulates and enforces groundwater use
- Condition for federal funding for Central Arizona Project

Groundwater Management Objectives

Three objectives to Arizona 1980 Groundwater Management Act:

- **Control severe overdraft occurring in many parts of the state**
- Provide a means to allocate the state's limited groundwater resources to most effectively meet the changing needs of the state
- **Augment Arizona's groundwater through water supply development**

Added Provisions to 1980 GMA

- 1986: The Underground Water Storage and Recovery Act, updated in 1994 as the **Underground Water Storage, Saving and Replenishment Act**
  - Permitting program
  - Accounting system: recovery of stored water on an annual basis or long-term storage accounts

- 1993: The Central Arizona Groundwater Replenishment District
- 1995: The Assured Water Supply Rules

- 1996: The Arizona Water Banking Authority

Storage and Recovery in Arizona

- Stored water: renewable water
  - Surface water: **Colorado River water from the Central Arizona Project**, and others
  - **Effluent**

- Storage facility types
  - **Underground Storage Facilities**: “Direct” recharge (spreading basins, injection wells or natural channels)
  - **Groundwater Saving Facilities:** “In-lieu” recharge, water is delivered to agricultural user that would otherwise have pumped

- Recovery
  - The recovered water retains the legal characteristics of the water that was stored
  - Indirect utilization of **renewable supply**

Long-Term Storage Credits

- Water recharged is credited to long-term storage account
- "Cut" to the aquifer benefits the aquifer

Water remaining in the aquifer	Constructed Underground Storage Facility	"Managed" Underground Storage Facility	Groundwater Saving Facility
Surface water (Colorado River water from CAP, and others)	**5 %**	**5 %**	**5 %**
Effluent	**0 %**	**50 %**	**5 %**

Table 1: "Cut" to the aquifer of stored water before credit to long-term storage accounts (A.R.S)

- LTSC recovery in the same Active Management Area recharge occurred
- LTSC can be sold

→ GMA Objective 3 (augmenting groundwater): Part of water recharged cannot be recovered, therefore benefits the aquifer

Long-Term Storage Credits

Have CAP water entitlement through water settlements

LONG-TERM STORAGE CREDITS OWNED BY CATEGORY IN 2016 IN CENTRAL ARIZONA AMAS

Total LTSC: 11.2 MAF (13.8 BCM)

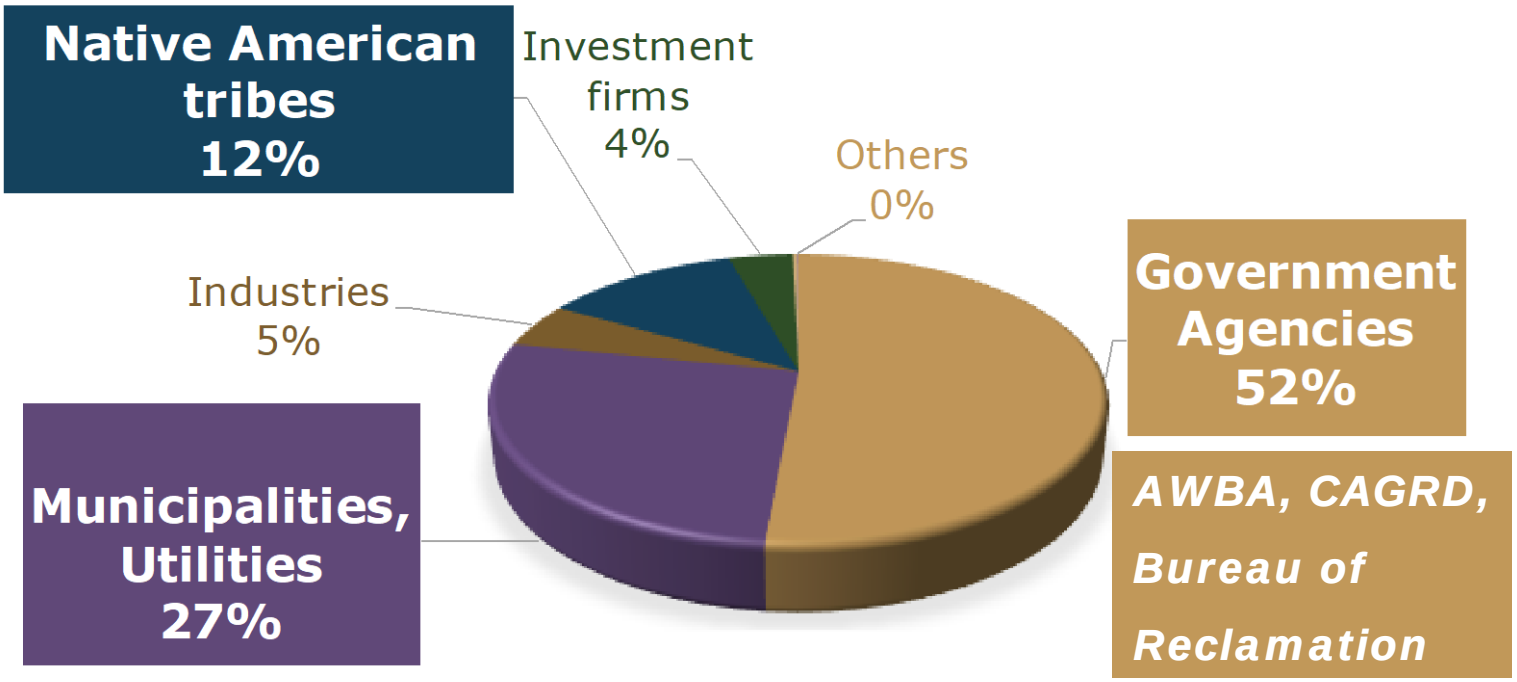


Figure 1: Percentage of LTSC owned in Central Arizona AMA in 2016 (ADWR LTSA Summaries)

Store water on their own to meet future AWS requirements

Storage Increase with LTSC

LTSC accounts in Phoenix AMA: 6.8 MAF (8.4 BCM) of LTSC as of 2016

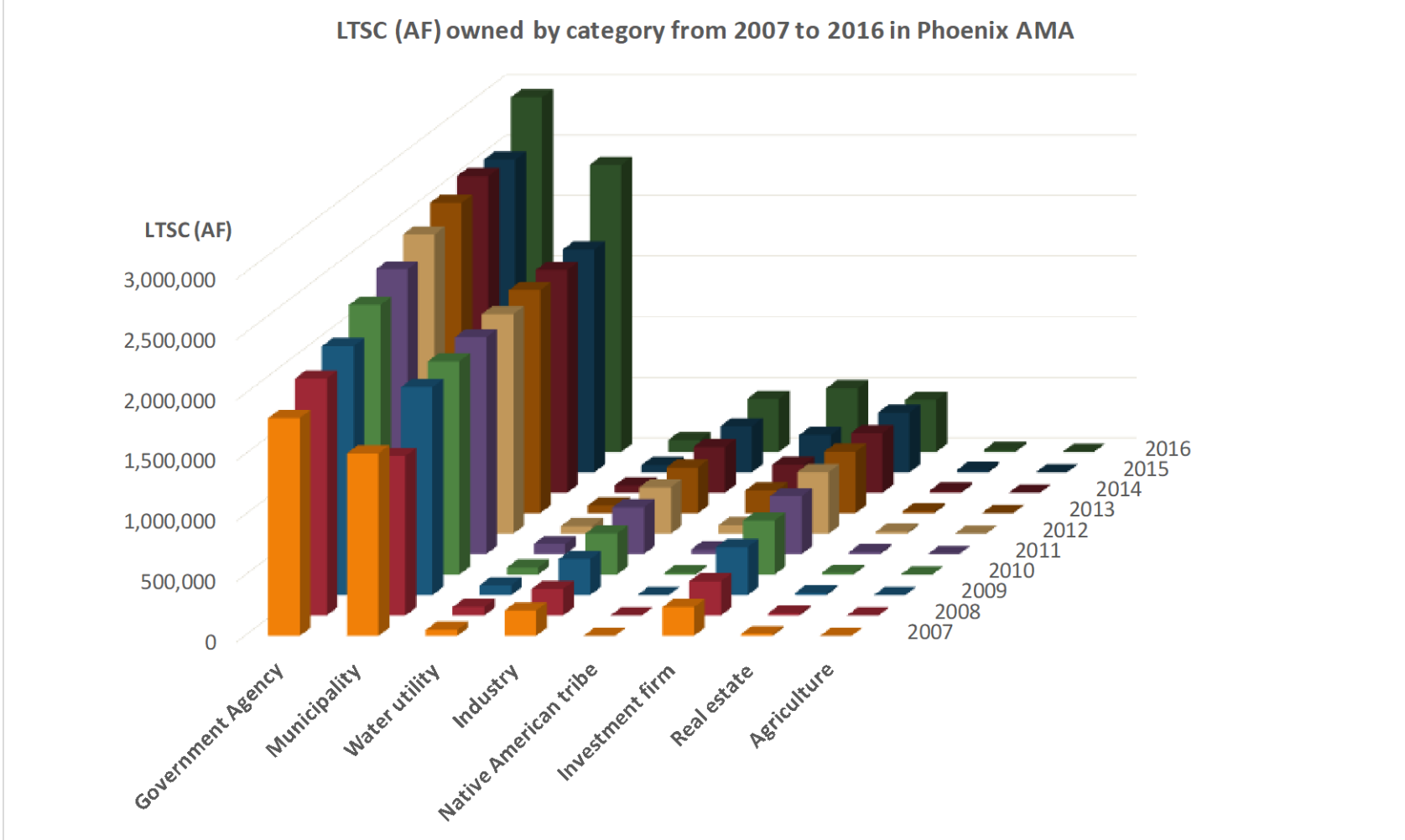


Figure 2: LTSC (AF) owned in Phoenix AMA from 2007 to 2016 (ADWR LTSA Summaries)

Storage Increase with LTSC

LTSC accounts in Pinal AMA: 2.7 MAF (3.3 BCM) of LTSC as of 2016

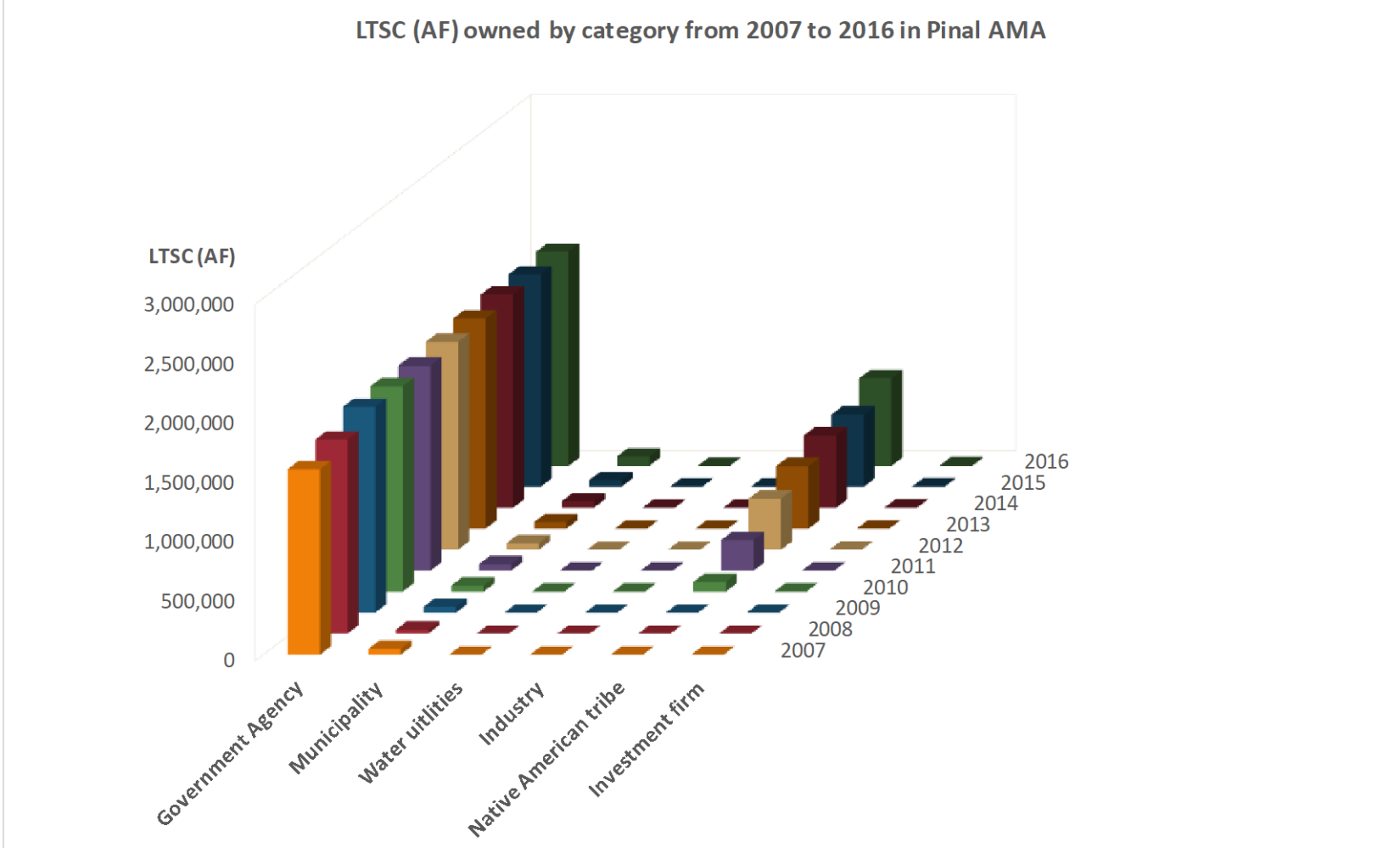


Figure 4: LTSC (AF) owned in Pinal AMA from 2007 to 2016 (ADWR LTSA Summaries)

Storage Increase with LTSC

LTSC accounts in Tucson AMA: 1.7 MAF (2.1 BCM) of LTSC as of 2016

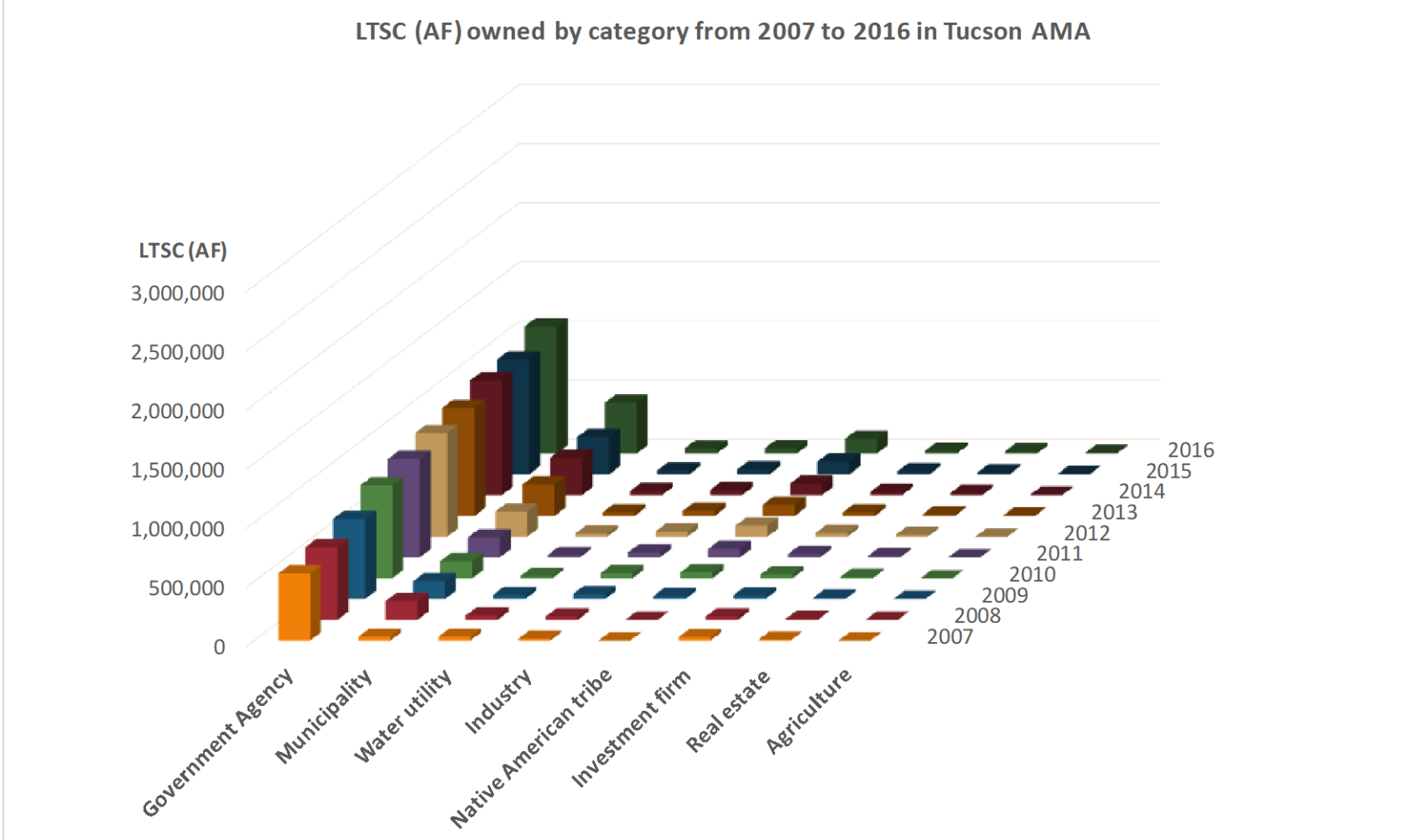


Figure 3: LTSC (AF) owned in Tucson AMA from 2007 to 2016 (ADWR LTSA Summaries)

LTSC Transactions: AWBA

- Goals of the Arizona Water Banking Authority
  - Mitigating impact of Colorado River shortages
  - Supporting management goals of AMAs
  - Supporting settlement of Native American claims
  - Providing for interstate water banking

- Arizona Water Banking Authority will rely on LTSC:
  - In 2014, statutes amended and allowed the purchase of LTSC
  - In 2016, AWBA bought 50,000 LTSC to Active Resource Management in Phoenix AMA
  - AWBA intends to purchase 87,770 LTSC in Central Arizona AMAs

LTSC Purchases: CAGRD Portfolio

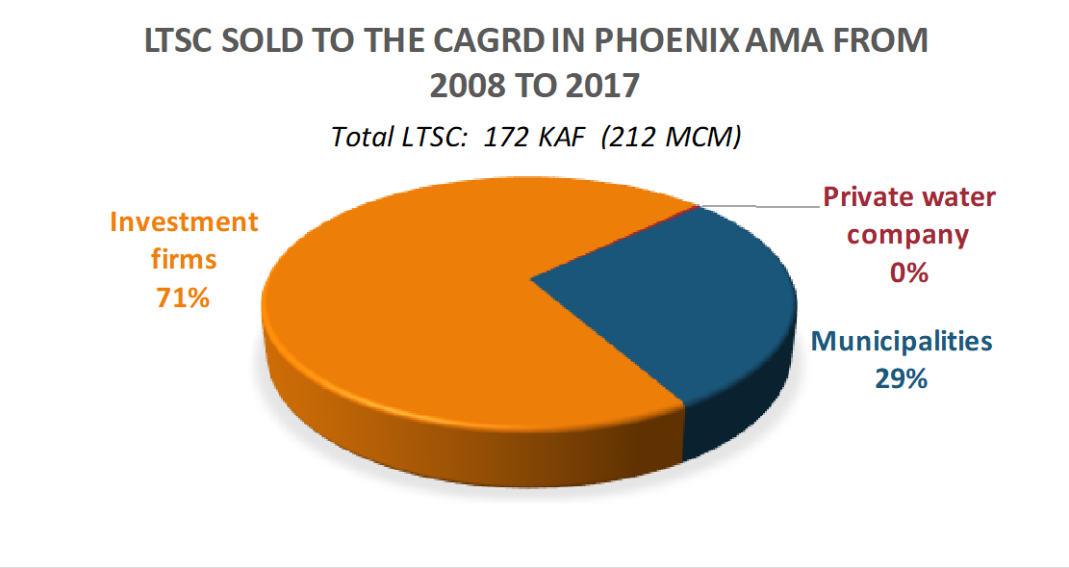
- LTSC are essential to the CAGRD to meet its near term obligations
- Purchase represents 12% of the CAGRD's total LTSC in Phoenix AMA and 43% in Tucson AMA as of 2016

LTSC	LTSC (AF) owned by CAGRD	LTSC (AF) bought by CAGRD	CAGRD LTSC accrued by purchase
Phoenix AMA	**952,973**	**117,821**	**12%**
Tucson AMA	**221,856**	**95,213**	**43%**

Table 2: LTSC owned and purchased by the CAGRD as of 2016 (CAGRD Agreements and Acquisitions as of 04/11/2017, Journal of Water, Stratecon INC, 01/31/2017)

→ GMA Objective 1 (limiting groundwater overdraft): CAGRD will be able to meet its obligations thanks to its LTSC portfolio.

Sellers of LTSC



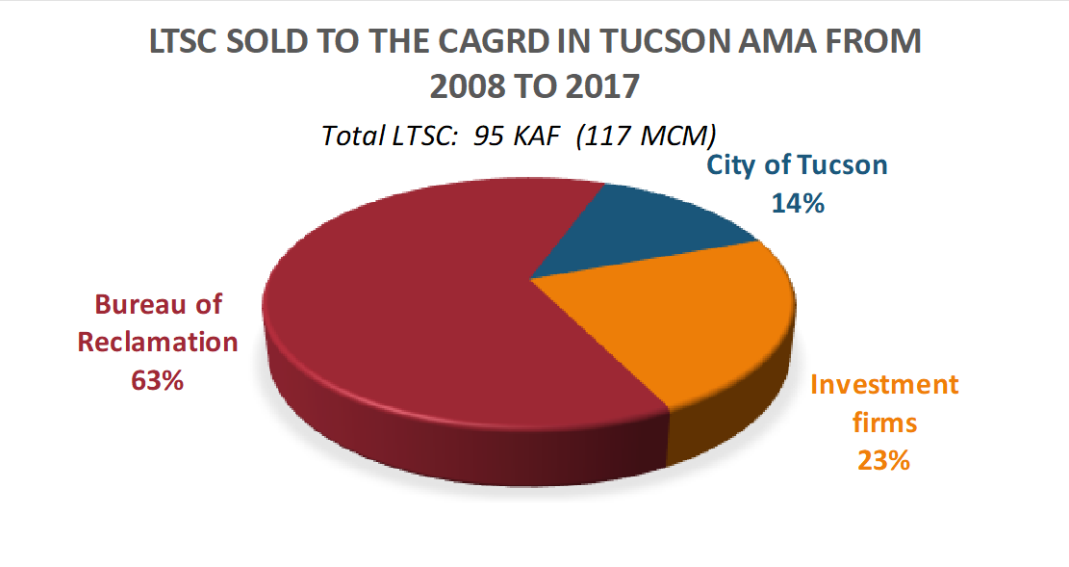


Figure 5: Entities who sold LTSC to the CAGRD (CAGRD Agreements and Acquisitions as of 04/11/2017, Journal of Water, Stratecon INC, 01/31/2017)

- **Active Resource Management** sold 50,000 LTSC to the CAGRD in 2017 (and 50,000 LTSC to the AWBA)
- **City of Goodyear** sold 34,000 LTSC to the CAGRD in 2010
- **City of Tucson** sold around 13,000 LTSC to the CAGRD from 2014 to 2016
- **The Bureau of Reclamation** sold 60,000 LTSC to CAGRD in 2015

Conclusion

GMA Objectives	LTSC Contribution
Control the severe overdraft occurring in many parts of the state	- CAGRD water supply portfolio - Meeting AWS requirement with purchase of LTSC by AWBA and municipalities - Facilitating the use of renewable supplies
Augment Arizona groundwater through water supply development	"Cut" to the aquifer

Thank you