

# ARIZONA WATER ATLAS & WATER USE DATA

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# Overview

- Arizona Water Atlas Summary
- Water Supply and Demand Data Sources and Definitions
- Supply and Demand Data
- Effluent Use
- Issues



# Arizona Water Atlas

- Assist local and regional planning efforts by providing water resource data and information
- Provide compiled information and data at one location
  - Many data sources: USGS, EPA, DEQ, NOAA, etc.
  - Data compiled by:
    - Planning areas → GW Basins → Community
- Identify data gaps
- Initiate development and maintenance of a statewide water resource database

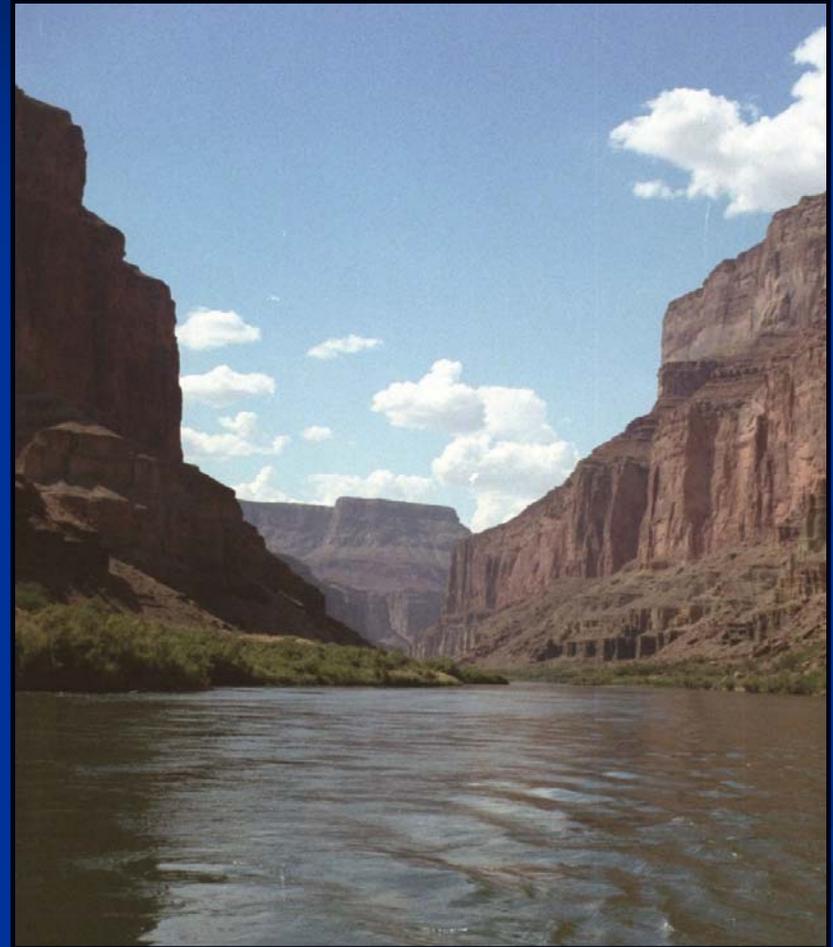




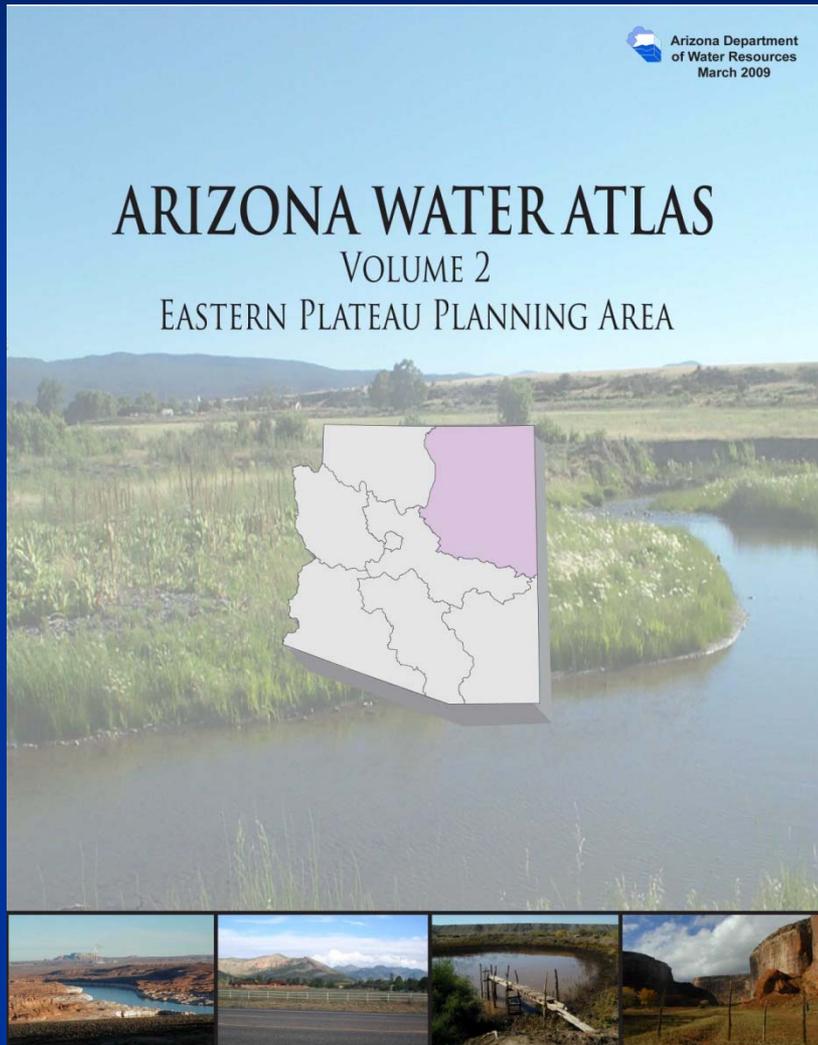
# Atlas Organization & Status

- Volumes 2-7 (non-AMA) final and posted on web (web-format)
- Volume 8 AMA draft; final 2/2010
- Volume 1 Executive Summary
  - Statewide overview, background, data sources and methods
  - Draft will be substantially reorganized: 4/2010
- Volume 9: Resource Sustainability Assessment
  - Focus on statewide supply, demand and issues: 12/2010

*Ultimate goal: interactive website with access to Atlas database & links to others - timeframe?*



# PLANNING AREA VOLUMES CONTENT



- Overview of entire planning area
  - Geography
  - Hydrology
  - Climate
  - Environmental Conditions
    - instream flow claims, ESA, WPF, protected areas
  - Population, Growth and Water Use
  - Water Supply
  - Cultural Water Demand
    - Sector/Community/Site
  - Water Resource Issues

# Planning Area Volume Content

- **Detailed Basin** water resource characteristics: maps, tables (see Fact Sheet)
  - Geography
  - Land Ownership
  - Climate
  - **Surface Water Conditions**
    - Streamflow, reservoir data, etc.
  - **Perennial/Intermittent Streams and Springs**
    - location, spring discharge  $> 1$  gpm
  - **Groundwater Conditions**
    - Major aquifers, recharge, flow direction, well yields, water levels and water level changes, selected hydrographs



# Planning Area Volume Content

## Basins (cont.)

### ■ Water Quality

- Sites with Drinking Water Standards exceedences
- Impaired lakes and streams and effluent dependent reaches
- Contamination sites (WQARF, VRP, Superfund, RCRA, DOD)

### ■ Cultural Water Demands

- Population
- Groundwater and non-groundwater demand by municipal, industrial and agricultural sector (1971-2005 as 5-year average)
- Effluent generation and disposal

### ■ Water Adequacy/Assured Water Supply Determinations

- Subdivisions, # of lots, water provider, etc.



# Arizona Water Atlas Data Sources

- See Fact Sheet
- Over 60 data sources
- Cultural demand data sources include:
  - USGS Water Use Contract
    - Annual municipal, industrial and agricultural use by basin
  - Hydrologic and Planning Studies
    - USGS, USBOR, ADWR, consultants
  - Arizona Drought Preparedness Plan (2004)
  - CWS annual water use reports and water supply plans, conservation plans and drought plans (2007)

# Arizona Water Atlas Data Sources (cont.)

## ■ AMA Assessments

- Fourth Management Plan Precursor; Annual Reports and AWS Designations data

## ■ Wastewater Data

- Clean Water Needs Survey – WIFA
- ADEQ files
- EPA
- Reports, surveys, personal communication, web search, etc.



# Supply Definitions

- Groundwater = generally, water withdrawn from a well
- Surface Water = water diverted from a watercourse
  - Colorado River Water
  - Salt, Verde and Gila primarily
- Central Arizona Project
  - direct use
  - recharge and recovery
- Effluent
  - Municipal wastewater
  - Industrial wastewater



# Demand Sector Definitions

*“Cultural demand” = municipal, industrial and agricultural uses*

## ■ Municipal

- Residential and commercial demand served by a city, town, private water company or DWID
- Exempt well demand (domestic wells)

## ■ Industrial

- Power plants, golf courses, sand and gravel, metal mining, dairies, feedlots, other industrial type facilities served by a facility well

## ■ Agricultural

- Actively irrigated farmland

*Riparian/ecosystem demand unable to quantify statewide*



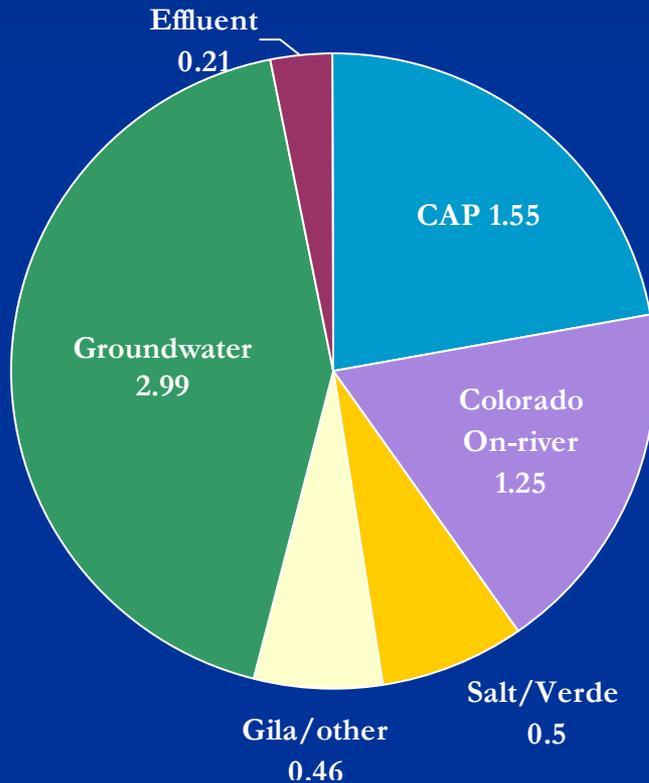
# Arizona Water Supply & Demand

Colorado River on-river diversions are 2.046 Maf of which 0.75 Maf is returned to the system for other use.

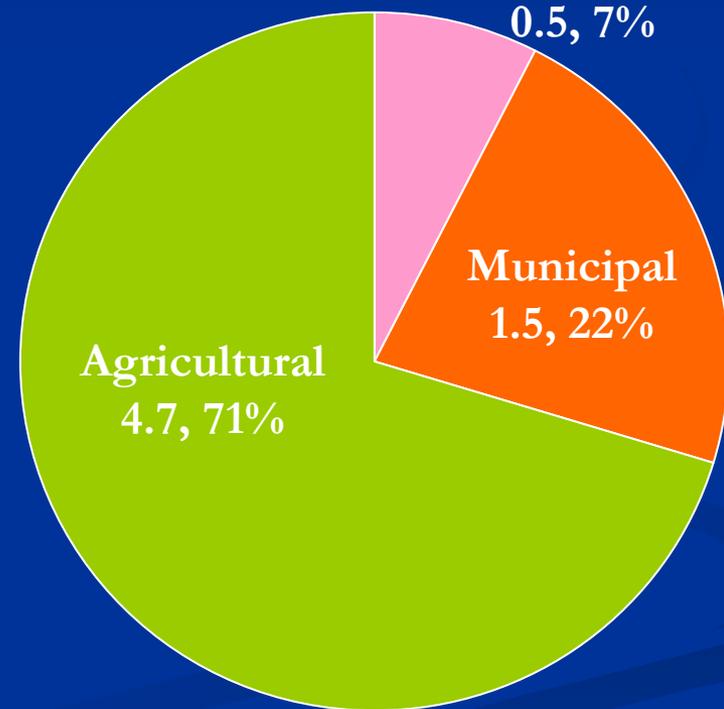
Assumes all well pumpage is groundwater, except for accounting surface wells along the Colorado River.

Demand does not include CAP long-term storage and system losses (approximately 0.3 Maf) or environmental demands on the Colorado River (approximately 0.02 Maf)

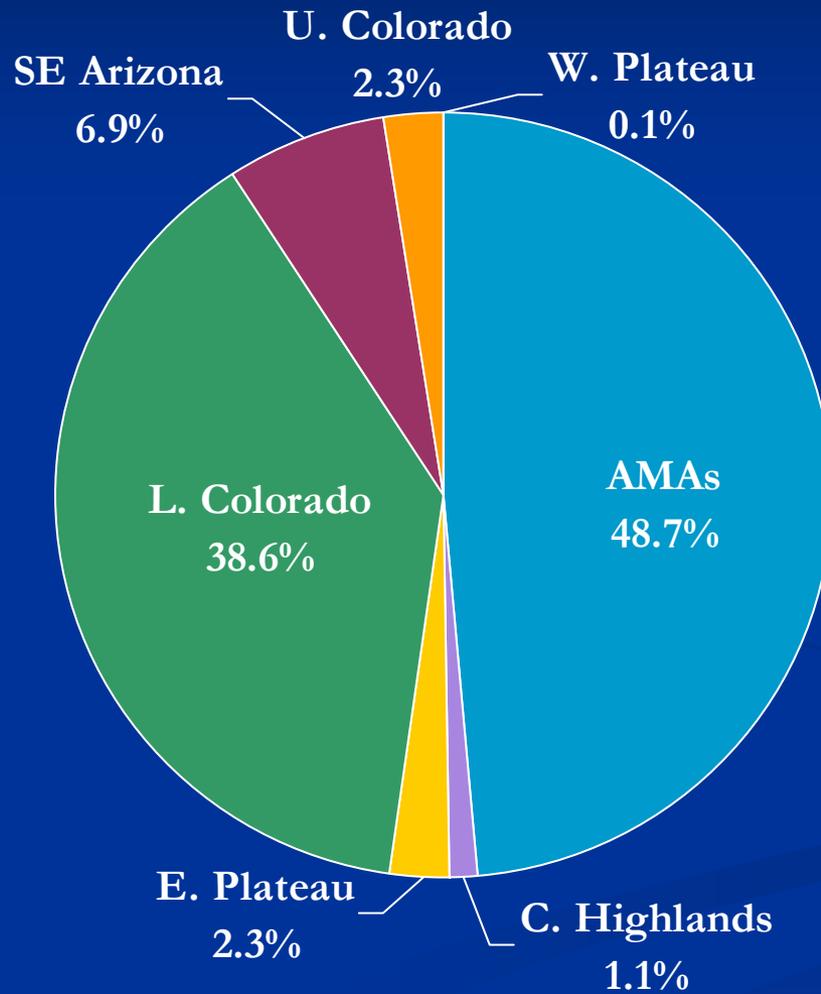
## WATER SUPPLIES 2001-2005 (Maf)



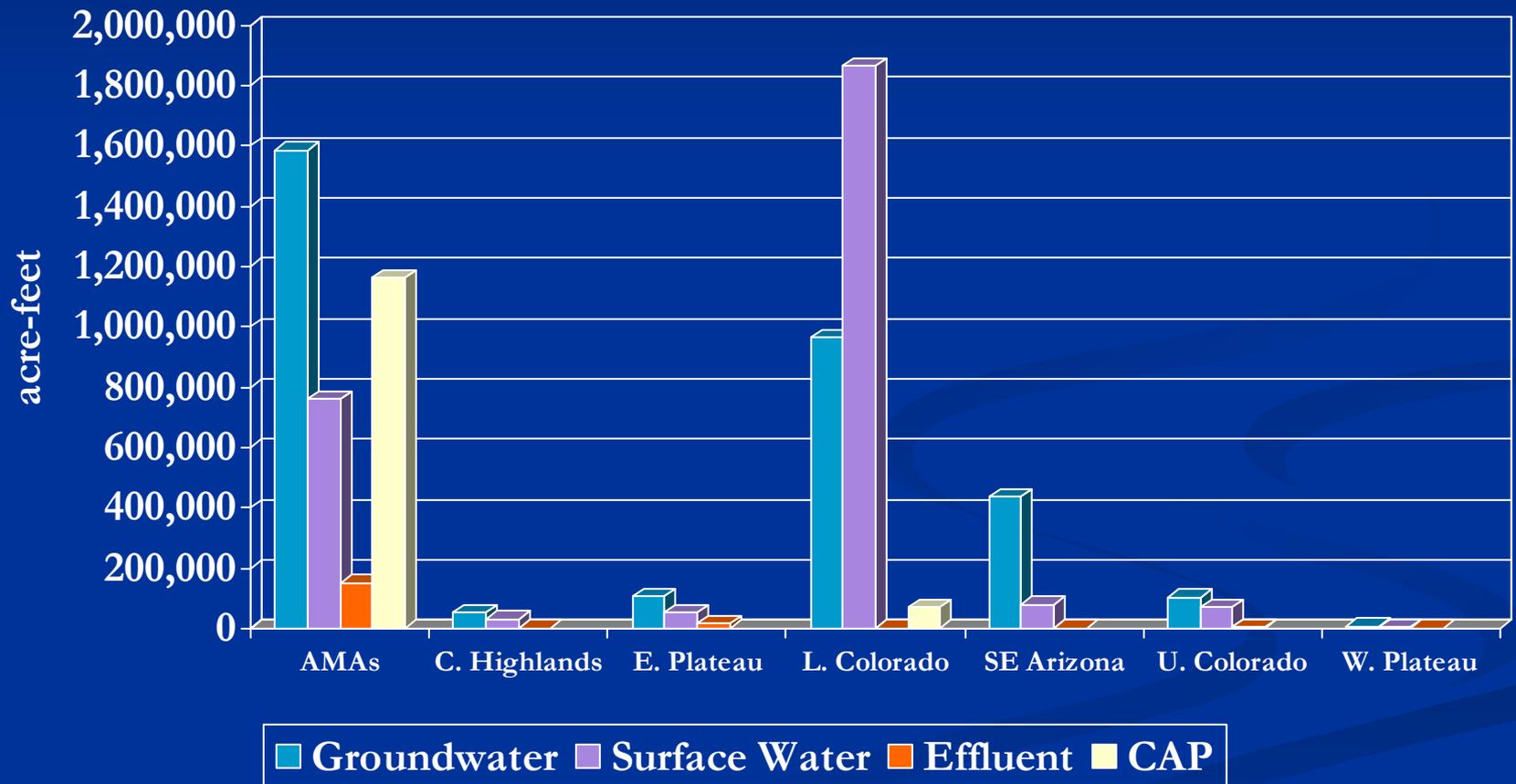
## SECTOR DEMAND 2001-2005 (Maf)



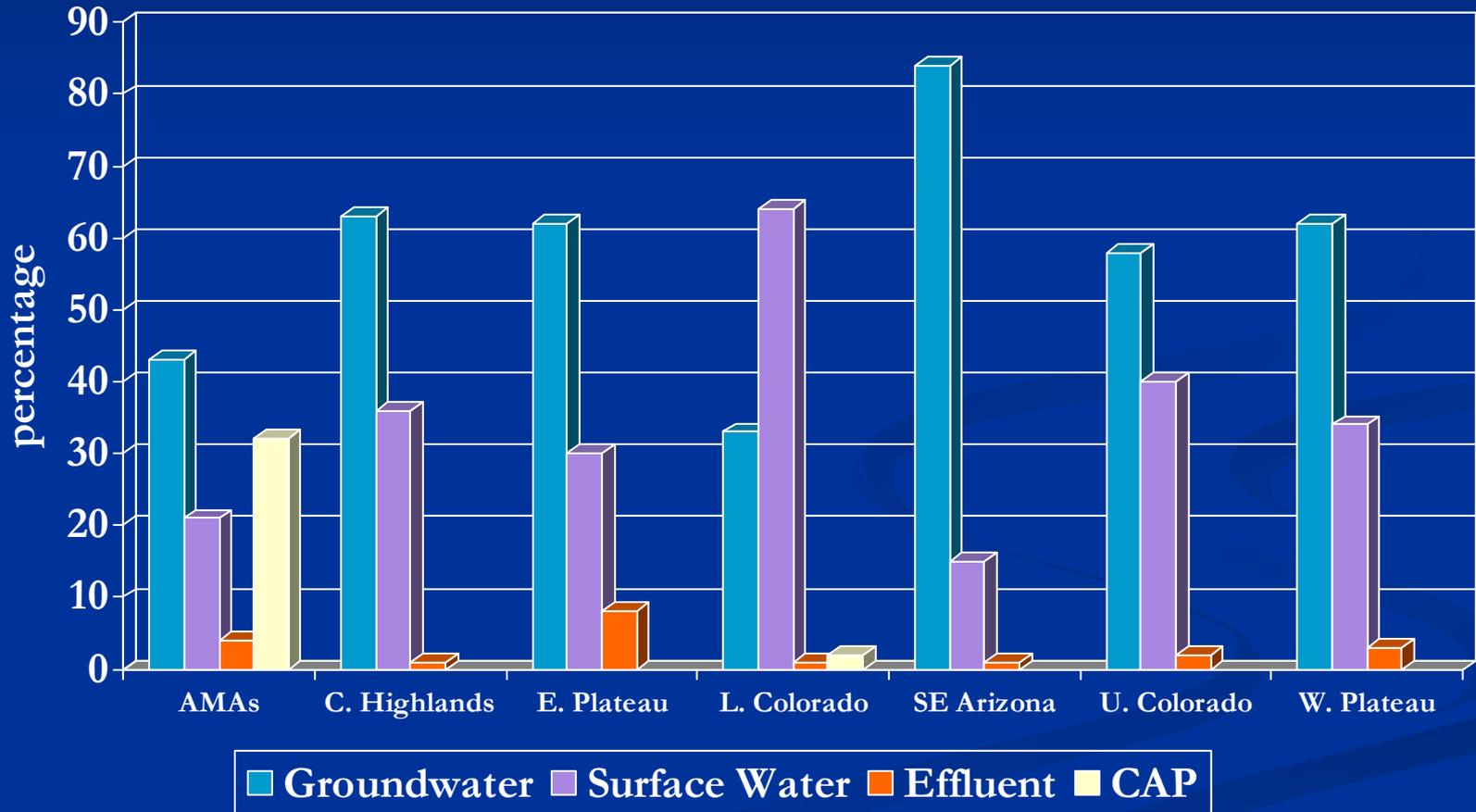
# Planning Area Water Demand (2001-2005)



# Planning Area Water Supplies and Demand (2001-2005)



# Planning Area Water Supplies as a Percentage of Demand



# Basin Effluent Data

- Facility Name, Owner, City/location served
- Current population served/not served
- Volume Generated
- Treatment level
- Year of record
  - Varies depending on most recent reporting year
- Disposal method
  - Watercourse, evaporation pond, agricultural irrigation, golf course, wildlife area, discharged to another facility, industrial or municipal reuse, permitted recharge facility, infiltration basin

# Effluent use by reporting facilities (c. 2006)

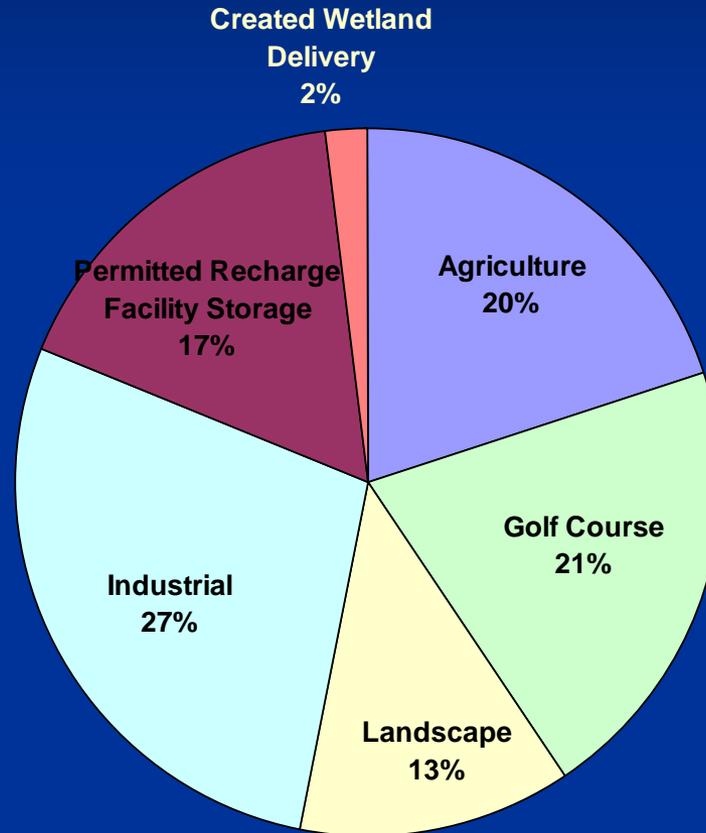
| Planning Area                      | % Reporting Facilities | Volume Generated (af) | Direct Use (af) | Permitted Recharge Storage (af) | Created Wetland Delivery (af) | Disposal (af)  | % Rep. Use |
|------------------------------------|------------------------|-----------------------|-----------------|---------------------------------|-------------------------------|----------------|------------|
| Eastern Plateau Planning Area      | 83%                    | 36,100                | 14,900          | 0                               | 2,700                         | 18,500         | 49%        |
| Southeastern Arizona Planning Area | 86%                    | 10,600                | 1,670           | 2,000                           | 0                             | 6,930          | 35%        |
| Upper Colorado River Planning Area | 53%                    | 8,700                 | 3,400           | 0                               | 0                             | 5,300          | 39%        |
| Central Highlands Planning Area    | 48%                    | 9,300                 | 1,200           | 300                             | 426                           | 7,374          | 21%        |
| Western Plateau Planning Area      | 71%                    | 2,200                 | 300             | 0                               | 0                             | 1,900          | 14%        |
| Lower Colorado River Planning Area | 58%                    | 16,700                | 1,600           | 0                               | 0                             | 15,100         | 10%        |
| Active Management Areas            | 43%                    | 419,346               | 200,700         | 34,000                          | 1,350                         | 183,296        | 56%        |
| <i>Phoenix AMA</i>                 | 42%                    | 315,000               | 177,200         | 13,100                          | 1,350                         | 123,350        | 61%        |
| <i>Pinal AMA</i>                   | 33%                    | 6,900                 | 4,800           | 600                             | 0                             | 1,500          | 78%        |
| <i>Prescott AMA</i>                | 67%                    | 6,900                 | 2,700           | 3,600                           | 0                             | 600            | 91%        |
| <i>Santa Cruz AMA</i>              | 50%                    | 16,311                | 0               | 0                               | 0                             | 16,311         | 0%         |
| <i>Tucson AMA</i>                  | 42%                    | 74,235                | 16,000          | 16,700                          | 0                             | 41,535         | 44%        |
| <b>Arizona Total</b>               | <b>53%</b>             | <b>502,946</b>        | <b>223,770</b>  | <b>36,300</b>                   | <b>4,476</b>                  | <b>238,400</b> | <b>53%</b> |

# Effluent Use by Created Wetlands

(not permitted recharge facilities)

| Name  | Facility Name         | Basin | Created Wetland Delivery (af) |
|---|-----------------------|-------|-------------------------------|
| Rio Wetlands Project  | Rio De Flag WWTP      | LCR   | 28                            |
| Show Low Wetlands (Pintail Lake, Telephone Lake, Redhead Marsh etc) | Show Low WWTF         | LCR   | 898                           |
| Jacques Marsh (7 marshes total)                                     | Pinetop Lakeside WWTF | LCR   | 1,792                         |
| Kachina Village Wetlands  | Kachina Village WWTP  | VRB   | 426                           |
| Tres Rios   | 91st Ave WWTP         | PHX   | 1,050                         |
| Rio Salado  | NA                    | PHX   | 300                           |

# Percentage of Effluent Use by Type



## % Golf Course Supply (2006)

- Phoenix AMA – 23%
- Pinal AMA – 21%
- Prescott AMA – 70%
- Santa Cruz AMA – 3% (remediated water)
- Tucson AMA – 48%

# LCR Effluent utilization

- 8.5% of water supply
- Catalyst Paper – 11,300 af
  - Pasture irrigation with paper mill wastewater
- Flagstaff area – 2,300 af
  - Schools, parks, golf courses
  - SCA tissues
  - Reclaimed water hauling
- Holbrook, Page golf course irrigation – 950 af



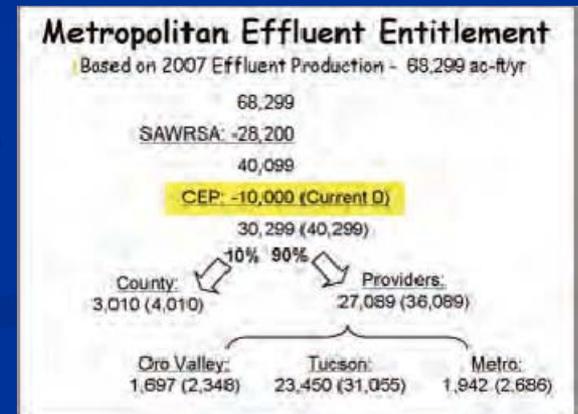
# Phoenix AMA Effluent Utilization

- 6% of water supply; variety of uses
- Palo Verde NGS - 59,800 af
- Golf course, other turf, landscape - 45,100 af
- Agriculture (RID) - 28,200
- Recharge - 13,100 af stored (not recovered)
- Wetland - 1,350



# Issues

- Data uncertainties
  - opportunities to improve data e.g. University research
- Ownership/legal considerations
- Matching quality with use
- Infrastructure and financing
- Cost
- Opportunities for “simple” approaches?
- Centralized reclaimed systems vs. on site reuse



# Questions?



*Aravaipa Canyon Wilderness*