



# Data Science and Enterprise Data Management at the Arizona Department of Water Resources

2019 Water Information Management Systems  
Workshop

USGS National Water Use Data Collaboration

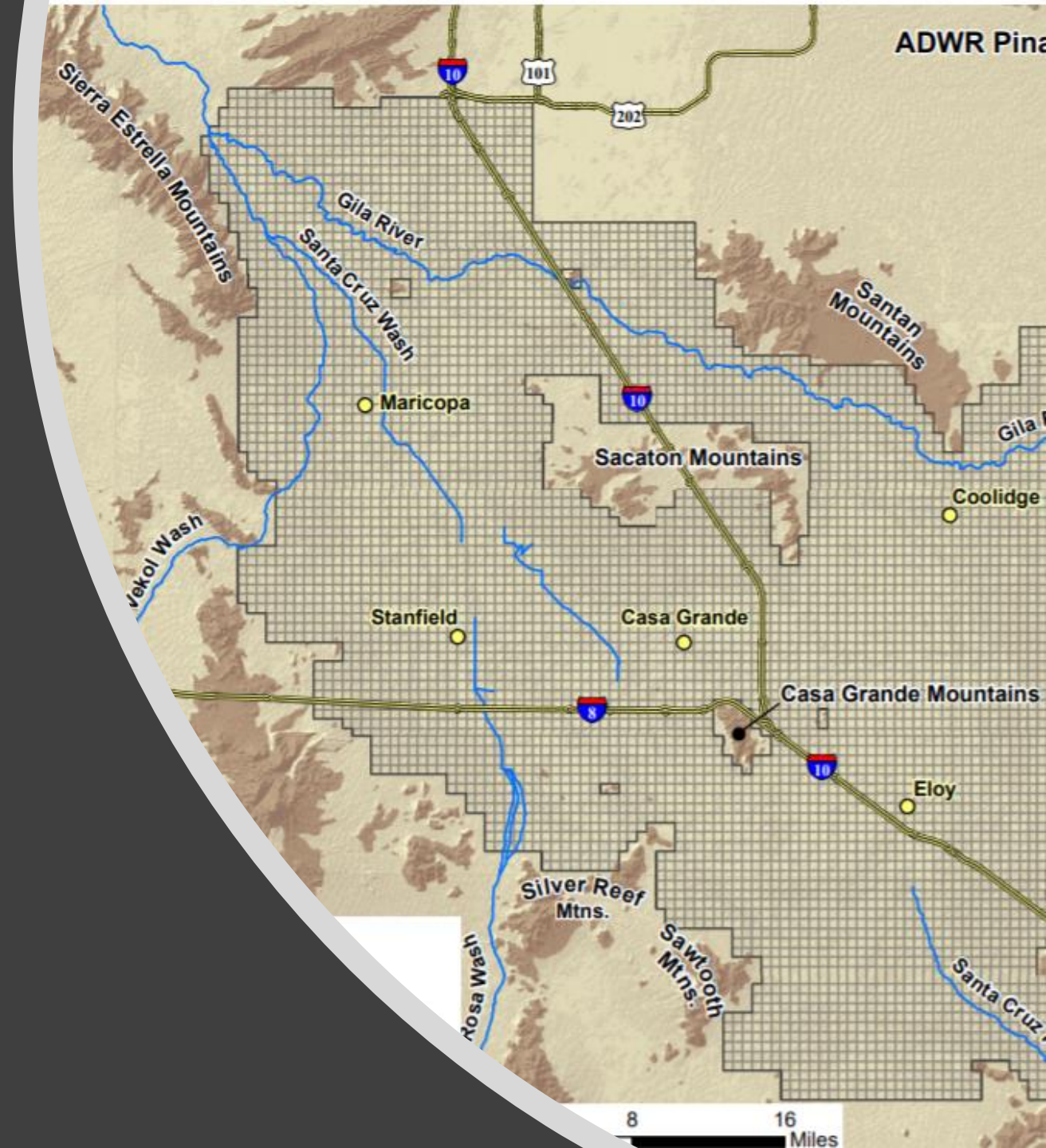
Fort Collins, CO

September 17, 2019

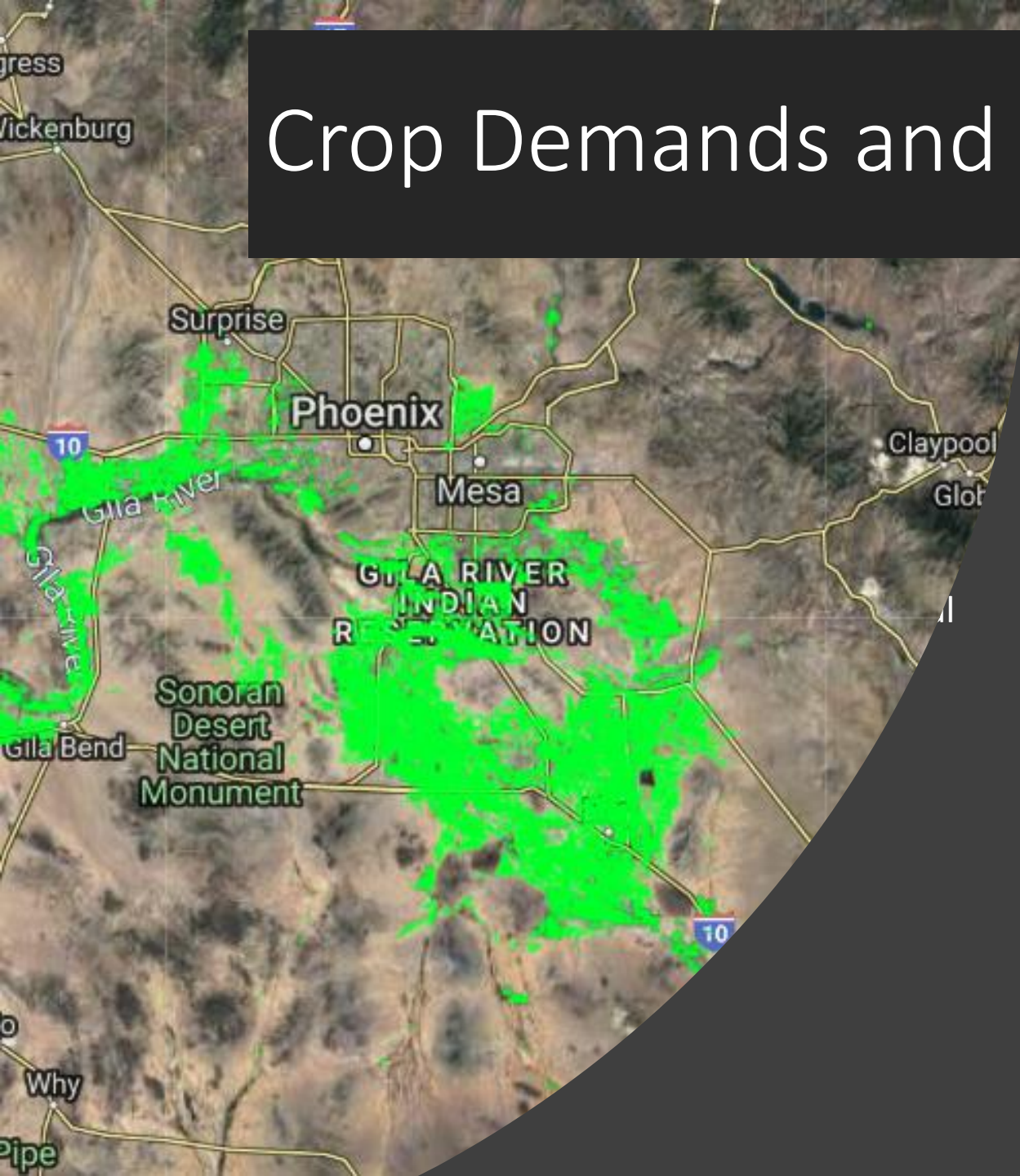
# Pinal AMA Groundwater Model

- Regional groundwater models project future conditions
- Evaluate AWS applications for Physical Availability
- Great deal of concern over conditions in this area
- Reports and datasets available at:

<https://new.azwater.gov/hydrology/e-library>



# Crop Demands and Reported Water Use



## Post 2010 Ag Recharge Estimates

- Prior estimates based on spatial location of crop fields and Az Ag Statistics
- Post 2010 used USGS crop surveys and Cropland data layers
- Recharge estimates based on total acres, crops, irrigation methods and assumed irrigation efficiencies

# Map the Use Upgrade

- Reported use, collected on-line or by hard copy, is prorated across pertinent polygons
- Any polygon or group of polygons can be joined to this to calculate water use, including model grids, HUCs and special study areas
- GIS data, maps and interactive tools are available at:

<https://new.azwater.gov/gis>



# Online Annual Reporting

## Complete Online May include FOBO

AGRICULTURE

**1497**

INDUSTRIAL

**1002**

IRRIGATION DISTRICT

**2**

MUNICIPAL

**21**

RECHARGE

**30**

**2552**

- Annually, 7,000 reports are due, requiring 58 different forms
- Online Filing Benefits for our Customers
  - 24/7 filing availability
  - Instant pdf receipt
  - Pay fees online
- Benefits for our staff
  - Frees up staff time
  - Staff is able to actually analyze and compile use sooner
  - Data entry largely done by June, rather than December, with fewer staff

Pumpage and Recharge data from Annual Reports available at:  
<https://infoshare.azwater.gov/docushare/dsweb/View/Collection-72>

- Single source of truth
- Used by staff and the public
- Also have live queries for surface water, adjudications, specific wells, etc.

Director Thomas Buschatzke  
 Arizona Department of Water Resources  
 Securing Arizona's Water Future

Revised Pumpage By AMA and Year  
 Drag a column header and drop it here to group by that column

Data from: 9/8/2019  
 Using parameters: ARYEAR=2018;AMA='D':

AMA	YEAR	Owner or BMP Operator	Right Number	Right Type	Sub-basin	Well Id	CADASTRAL
	2018	SILVERBELL IRRIGATION AND DRAINAGE DIST	56-001105.0000	SMALL MUNICIPAL PROVIDER	AGUIRRE VALLEY	217038	D-10
	2018	SILVERBELL IRRIGATION AND DRAINAGE DIST	56-001105.0000	SMALL MUNICIPAL PROVIDER	AGUIRRE VALLEY	599200	
		CITY OF ELOY	56-001203.0000	LARGE MUNICIPAL PROVIDER ACP	ELOY	605454	
		CITY OF ELOY	56-001203.0000	LARGE MUNICIPAL PROVIDER ACP	ELOY		
			56-001203.0000	LARGE MUNICIPAL PROVIDER ACP	ELOY		

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Revised Pumpage By AMA and Year  
 Parameters:

AMA:  Select All

Year:

# Remote Sensing Subsidence Data



*Photo 14 – Signs on the pole show approximate altitude of land surface in 1952 and 2018*

- Interferometric Synthetic Active Radar (InSAR) since 2002
- Picacho-Eloy feature: 1993 to 2018, .11 feet to .74 feet, 16 feet since 1952. 222 miles of fissures
- Maricopa-Stanfield feature: 12 feet by 1977, 23 miles of fissures
- More information is available at:

<https://new.azwater.gov/hydrology/e-library>

# Transducer Data

- We have 129 transducers sites, 79 of which have telemetry
- Water levels are measured four times daily (satellite telemetry) or
- Data downloaded quarterly
- Interactive GWSI map is available at:

<https://gisweb2.azwater.gov/gwsi>

Wells 55

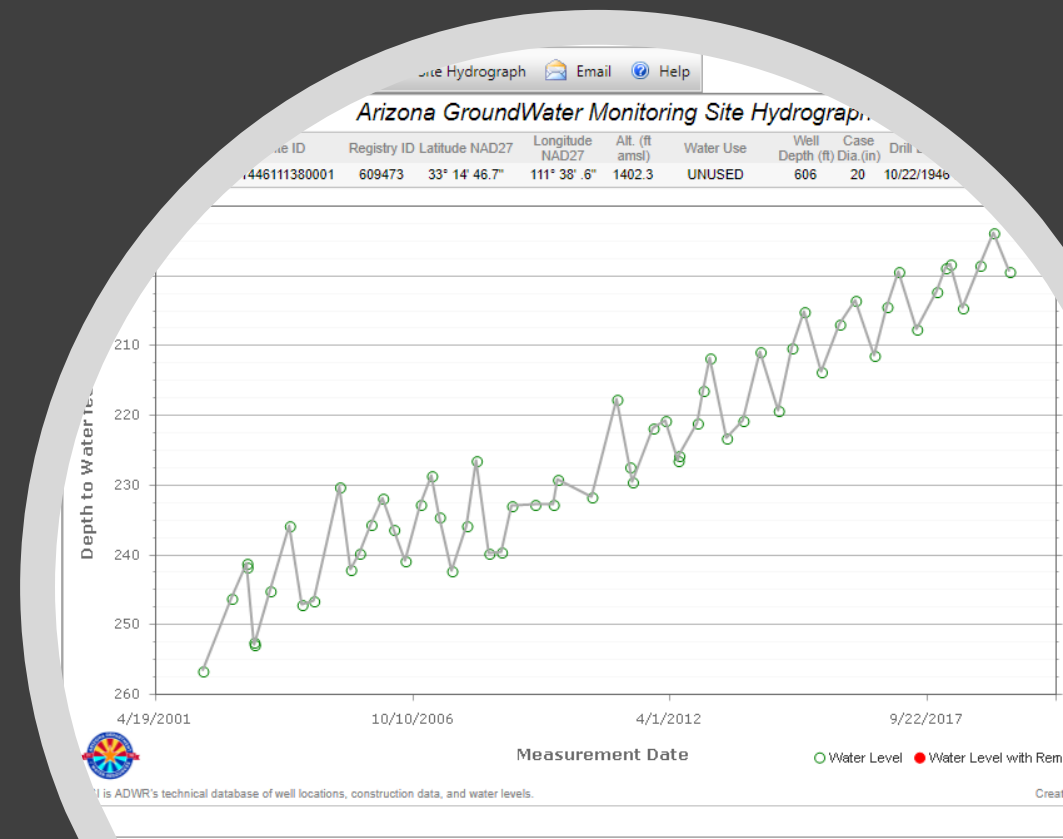
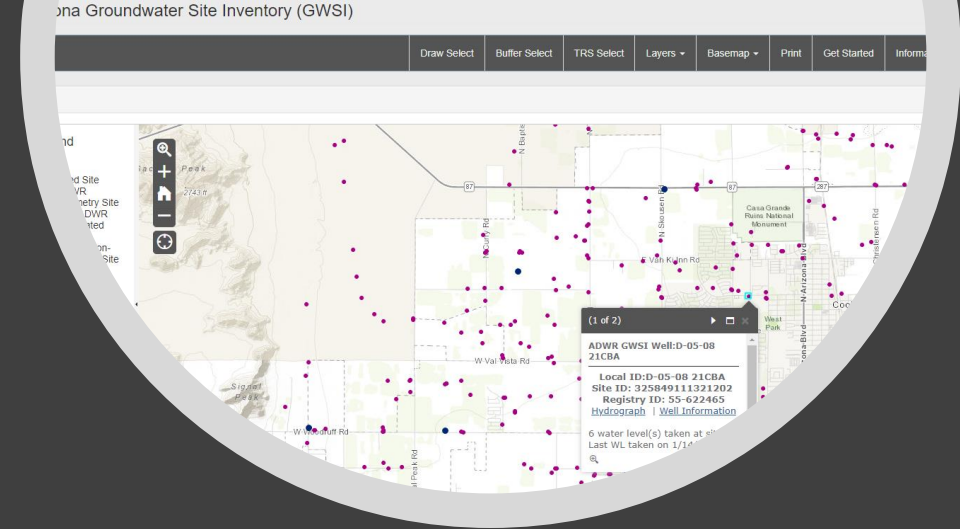
<https://gisweb2.azwater.gov/WellReg>

Assured Water Supply

<https://gisweb2.azwater.gov/AAWS>

Community Water Systems

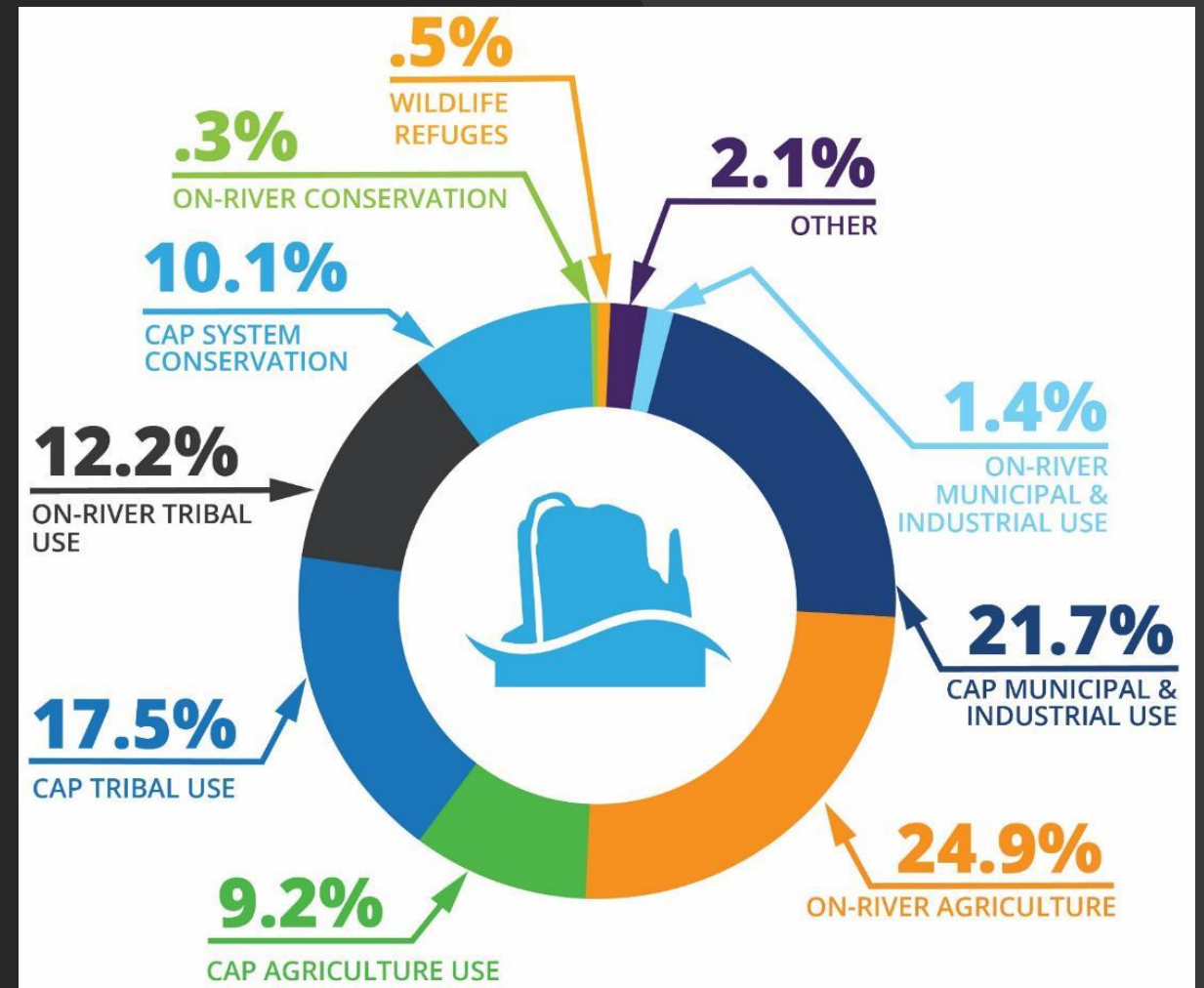
<https://gisweb2.azwater.gov/cws>





# Colorado River Data

- The Secretary of Interior is required to account for and report Colorado River water use pursuant to applicable Federal Law.
- Colorado River Accounting and Water use Report
  - Report published each year since 1964
  - Available on the web at <https://www.usbr.gov/lc/region/g4000/wtracct.html>
- Central Arizona Project – Water Delivery Reports
  - Published since 1985
  - Available on the web at <https://www.cap-az.com/departments/water-operations/deliveries>



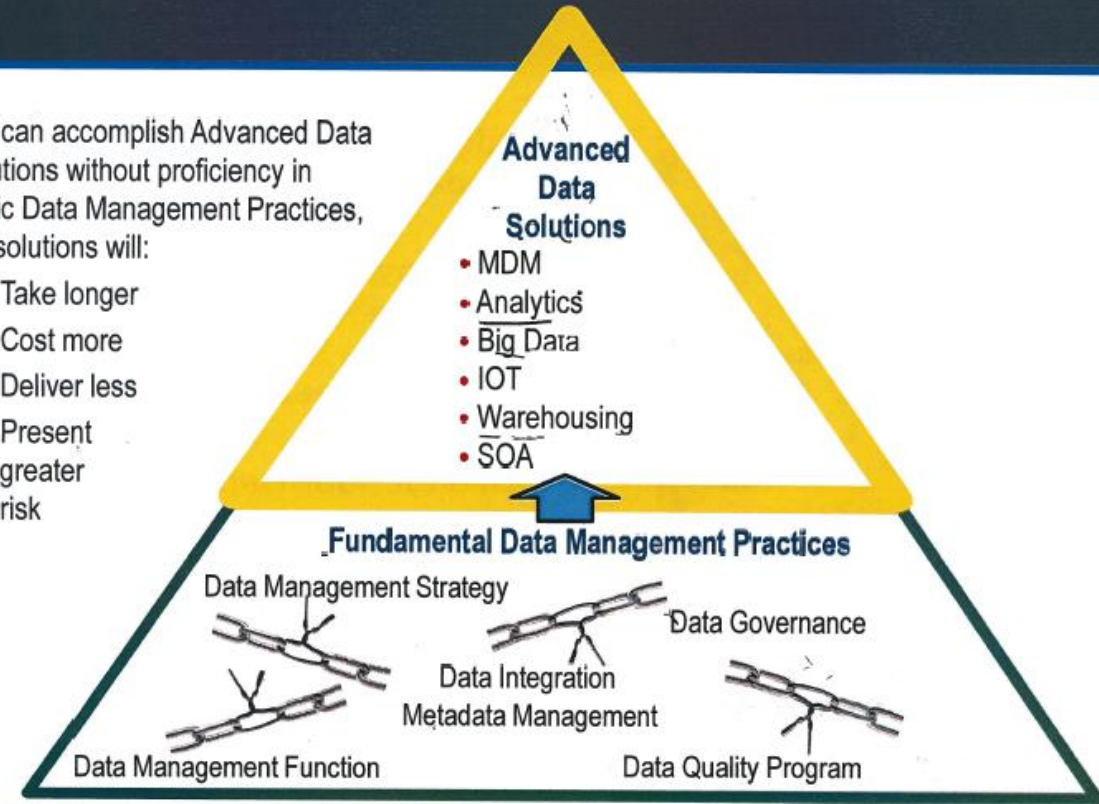
# Enterprise Data Management

- Strategic Plan objective: Make data more accurate and accessible
- Data is an Asset
- Data Maturity Assessment done June 2017
- Office of Data Management established September 2017

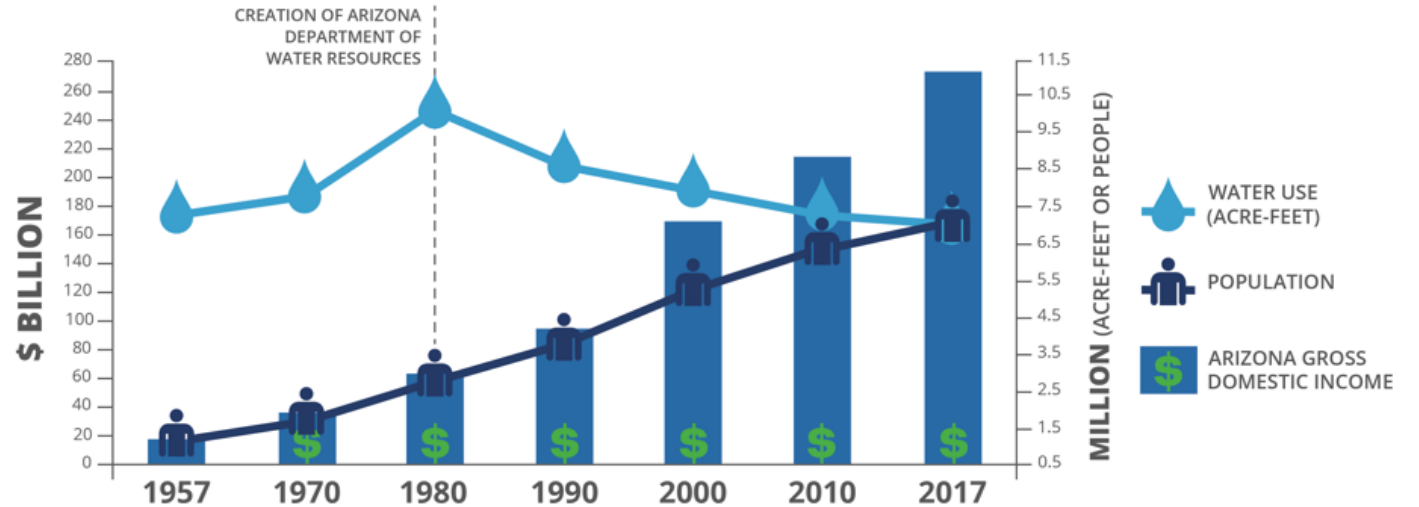
## Foundation for advanced solutions

You can accomplish Advanced Data Solutions without proficiency in Basic Data Management Practices, but solutions will:

- Take longer
- Cost more
- Deliver less
- Present greater risk



## ARIZONA WATER USE, POPULATION, AND ECONOMIC GROWTH (1957 - 2017)



### TOTAL WATER USE (IN MILLIONS ACRE/FEET)

1957 7.1 MAF  
 2017 7 MAF

**-1%** CHANGE FROM 1957-2017

### POPULATION (IN MILLIONS)

1957 1.1  
 2017 7

**536%** CHANGE FROM 1957-2017

### GROSS DOMESTIC INCOME (IN BILLIONS)

1957 \$ 13.4  
 2017 274.8

**1,951%** CHANGE FROM 1957-2017

Director's  
 Favorite  
 Chart

# Data Governance & Quality

## Data Governance

- Executive Data Council & Data Management Council
- Policies to improve quality of data
  - Business Glossary
  - Data Quality Strategy
  - Mandatory Power BI training
- Statewide online Data Stewardship course

## Data Quality

- Data Quality Strategy
- Data Profiling
- Will develop re-usable processes
- Developing dashboards to do live profiling of Wells data based on live queries

# AMA Water Use from the Data Warehouse

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- AMA Data
  - 1985-2017 use by source and sector
  - Online Dashboard
- <https://new.azwater.gov/ama/ama-data>
  - Entire Dataset
- <http://www.azwater.gov/querycenter/query.aspx?qrysessionid=8CF17C8B1CB88E14E0534C64850A39FA>
  - Business Glossary
- <http://www.azwater.gov/querycenter/query.aspx?qrysessionid=8CF17C8B1CB98E14E0534C64850A39FA>

# What's next?

## Data Warehouse Datasets

- Wells drilled by basin, sub-basin, county, watershed, type, water use and year
- Percentage of state by drought category over time
- Natural recharge components

## Agency-wide Projects

- Reconstruct SharePoint site
- Business Glossary “Hover Over” capabilities in live ARM queries
- Online Data Catalog
- Increase internal communications efforts



Questions?  
Want More  
Information?

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