

Hydrology and Water Use Data of the San Simon Valley Sub-Basin

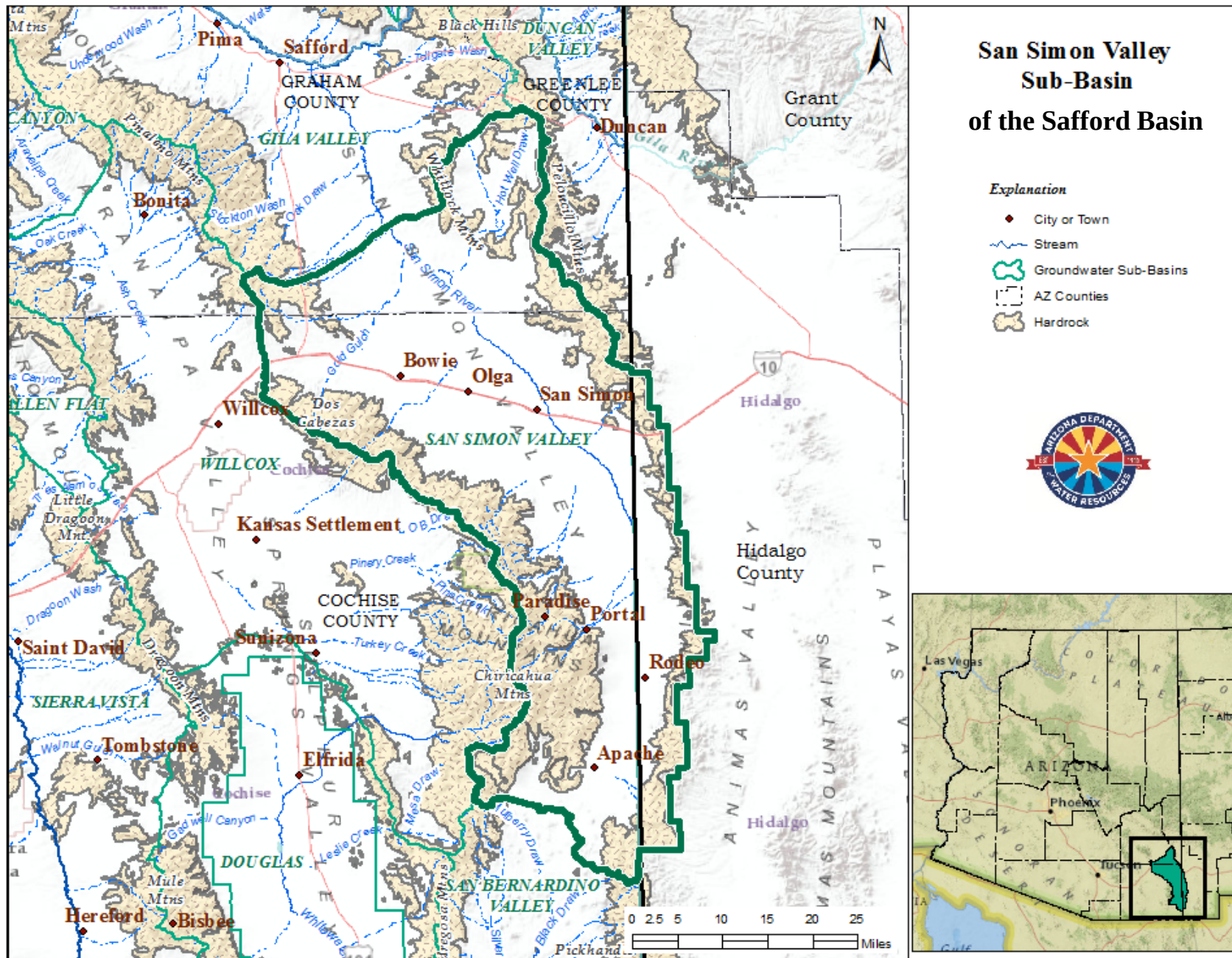
Presented by Frank Corkhill, Chief Hydrologist

**Arizona Department of Water Resources
Hydrology Division**

May 16, 2015

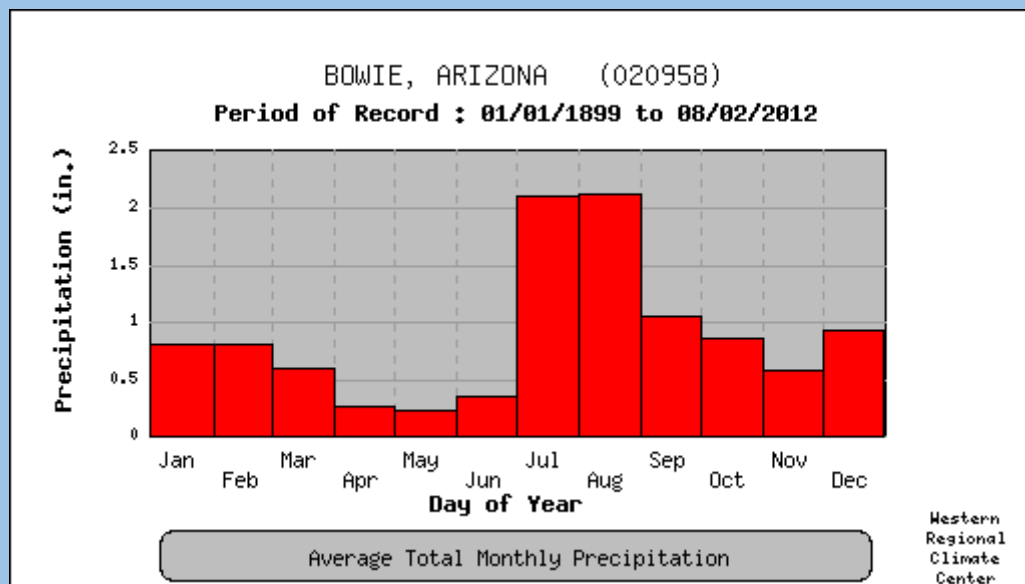
Bowie High School



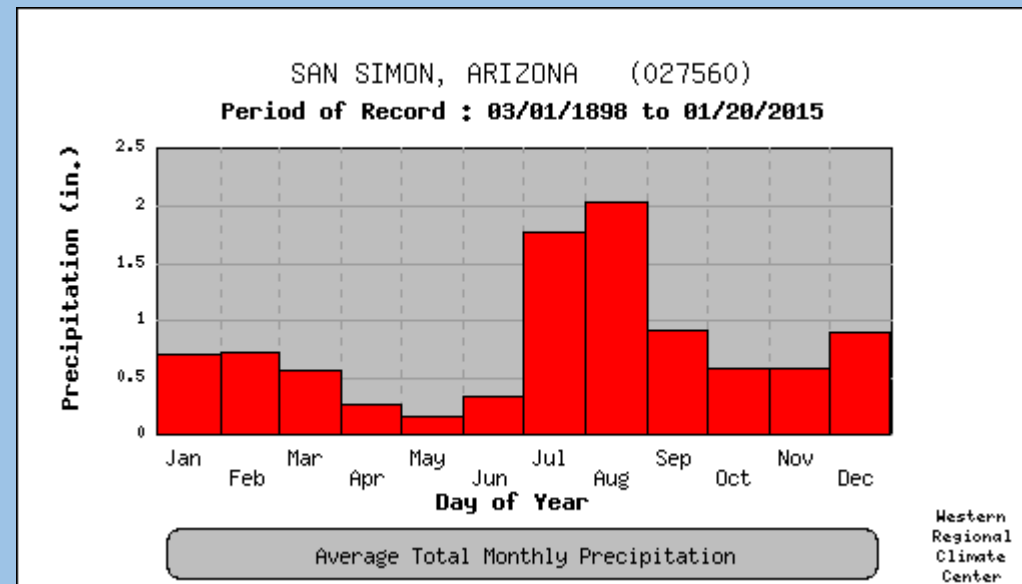


Supply

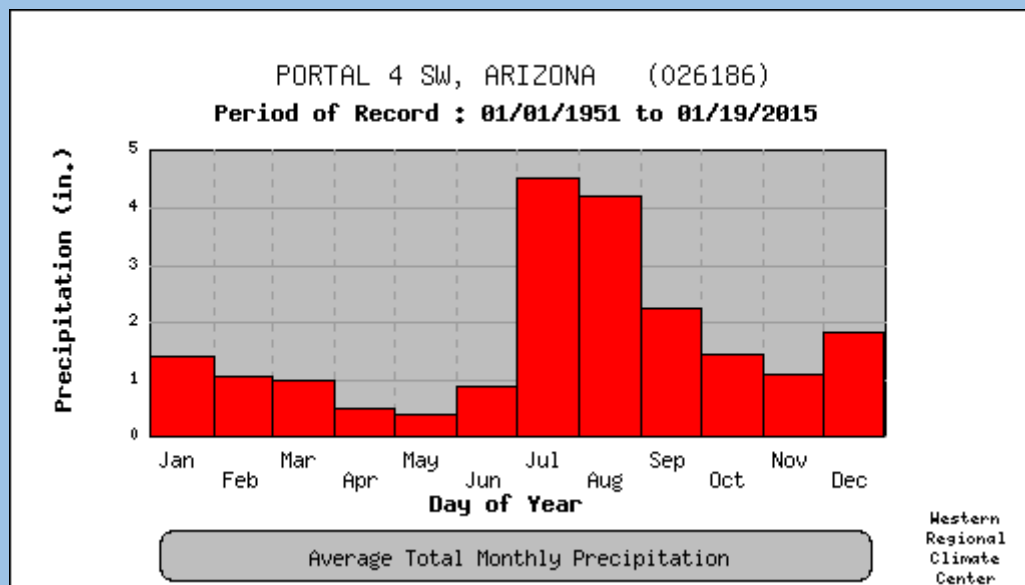
Annual Precipitation In the San Simon Valley Sub-Basin



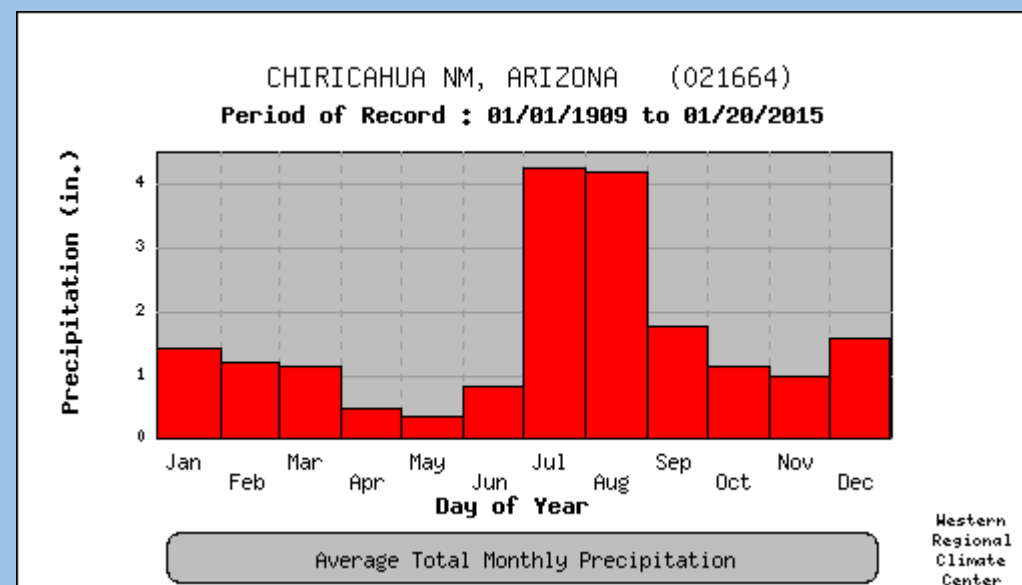
Average Annual Precipitation = 10.75 Inches



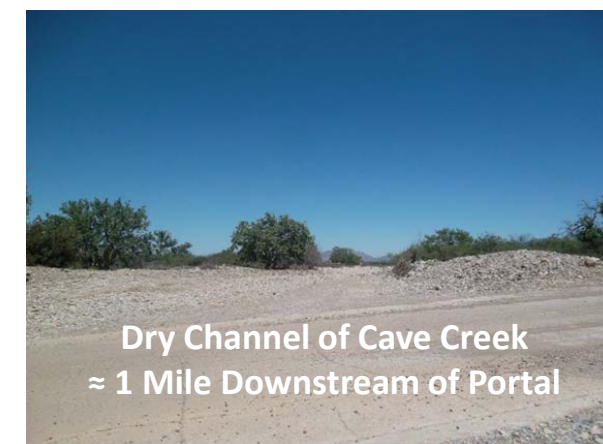
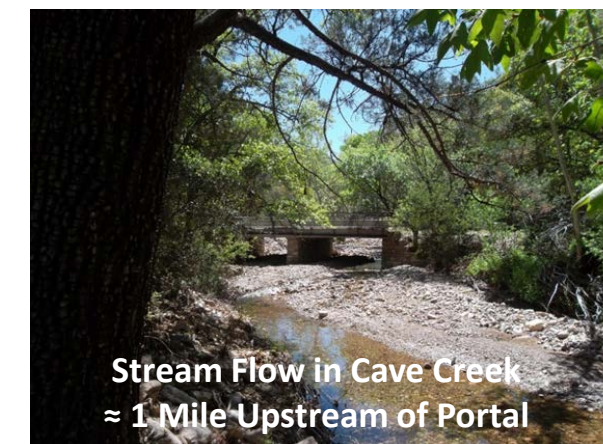
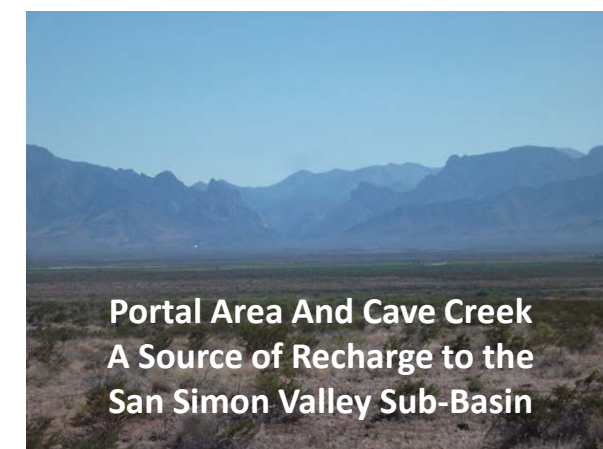
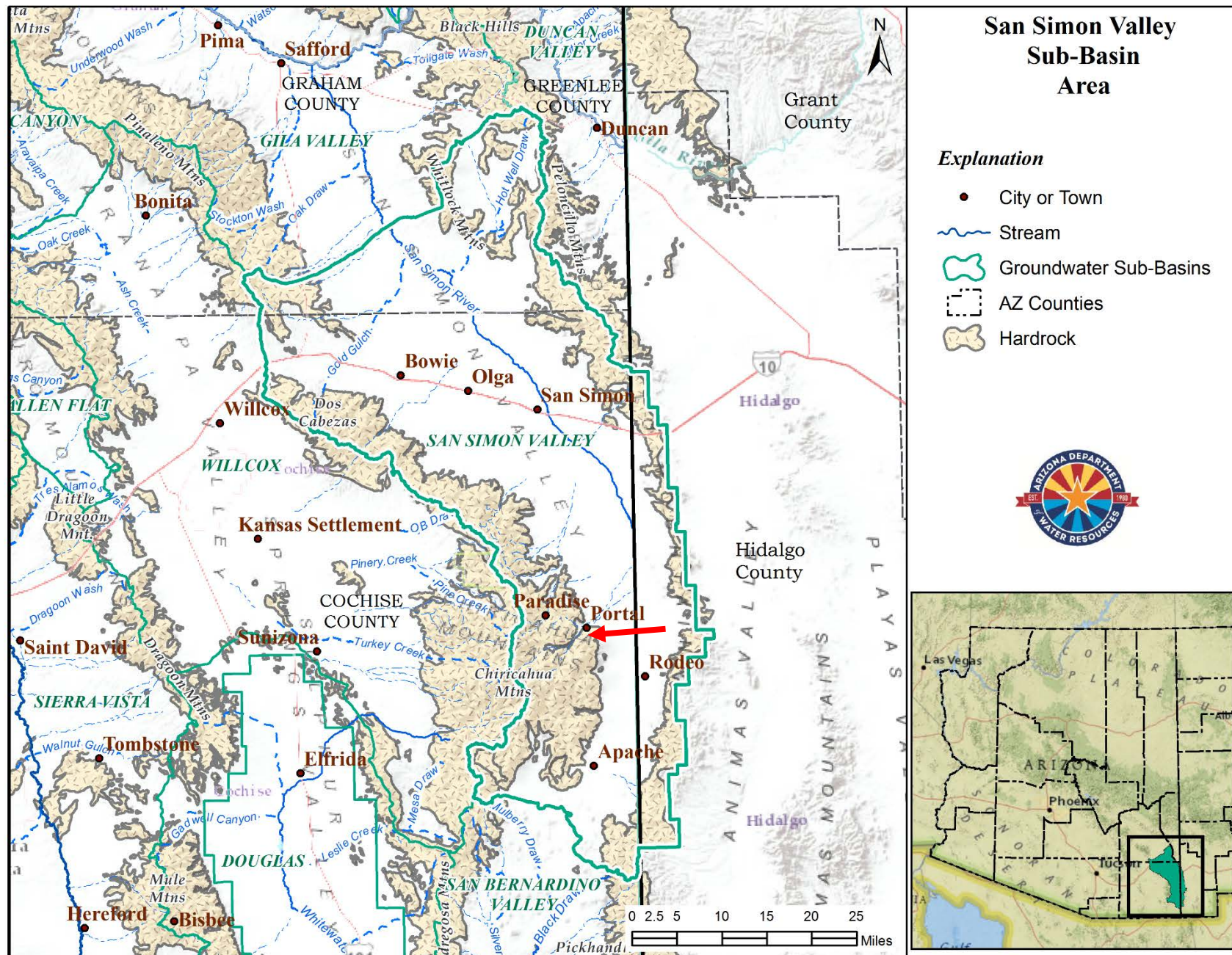
Average Annual Precipitation = 9.56 Inches



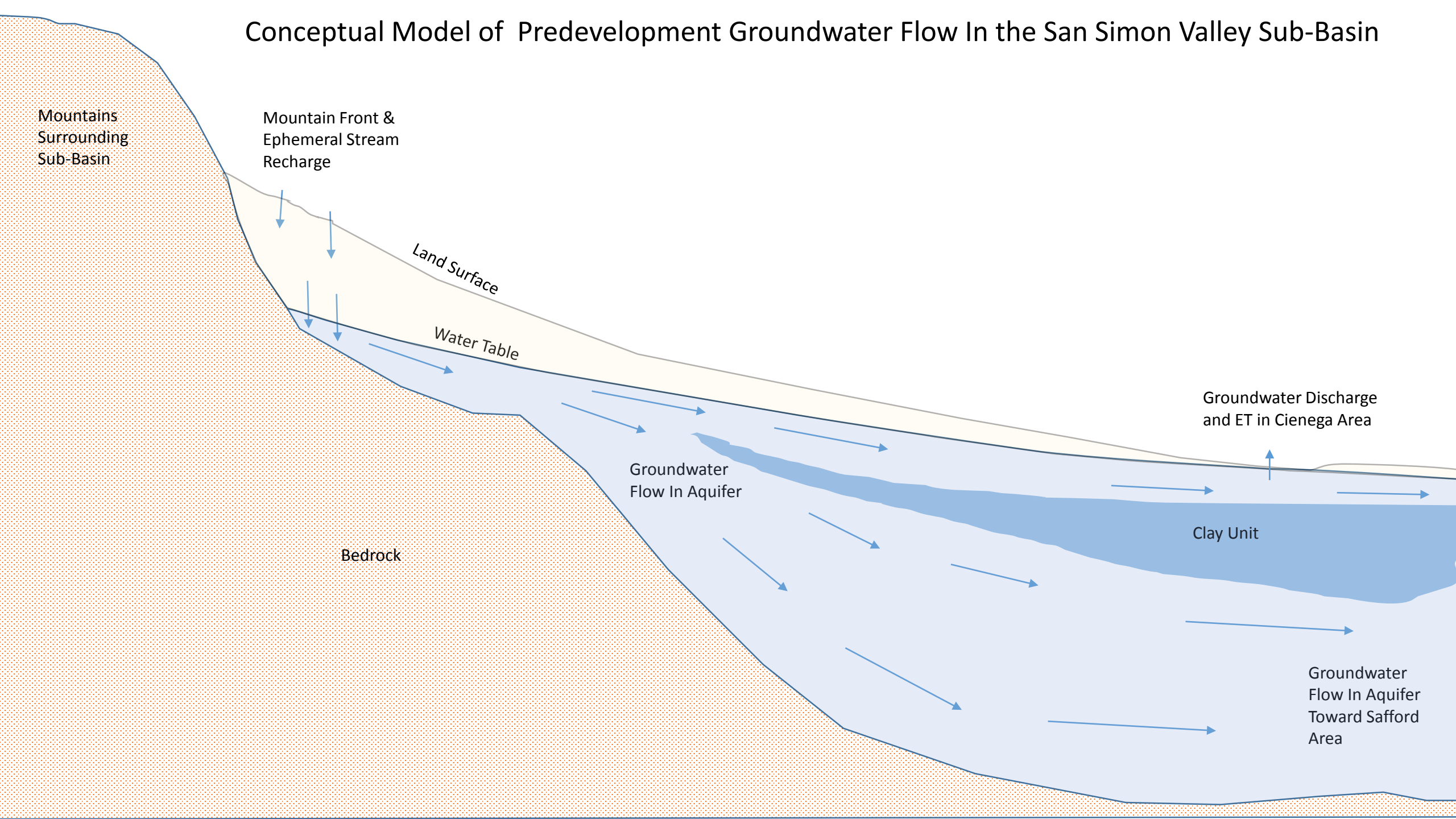
Average Annual Precipitation = 20.00 Inches

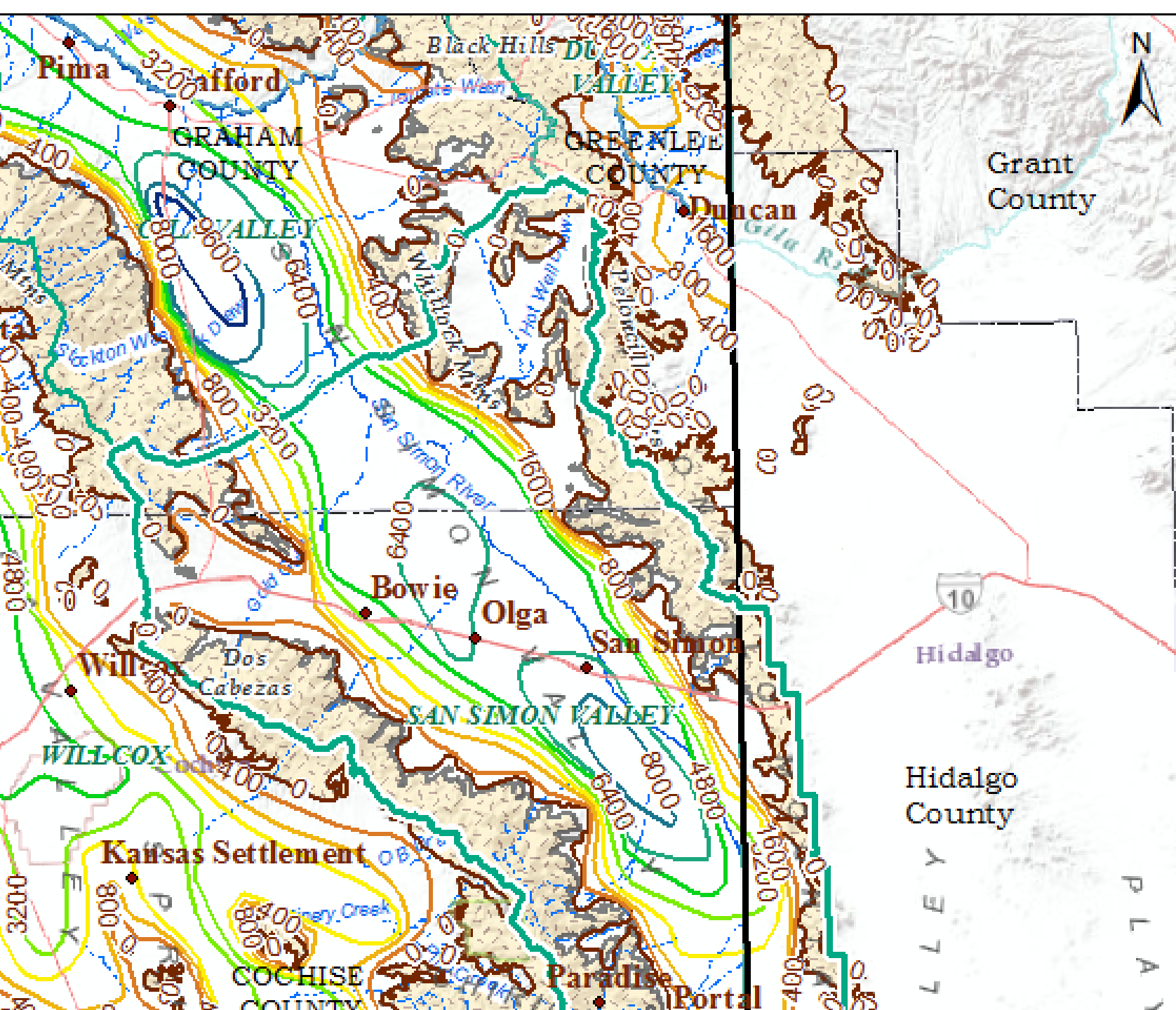


Average Annual Precipitation = 19.03 Inches



Conceptual Model of Predevelopment Groundwater Flow In the San Simon Valley Sub-Basin





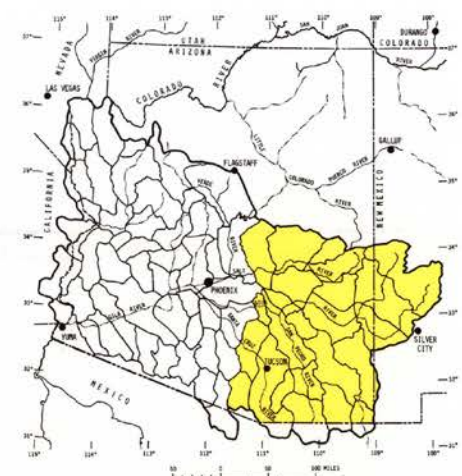
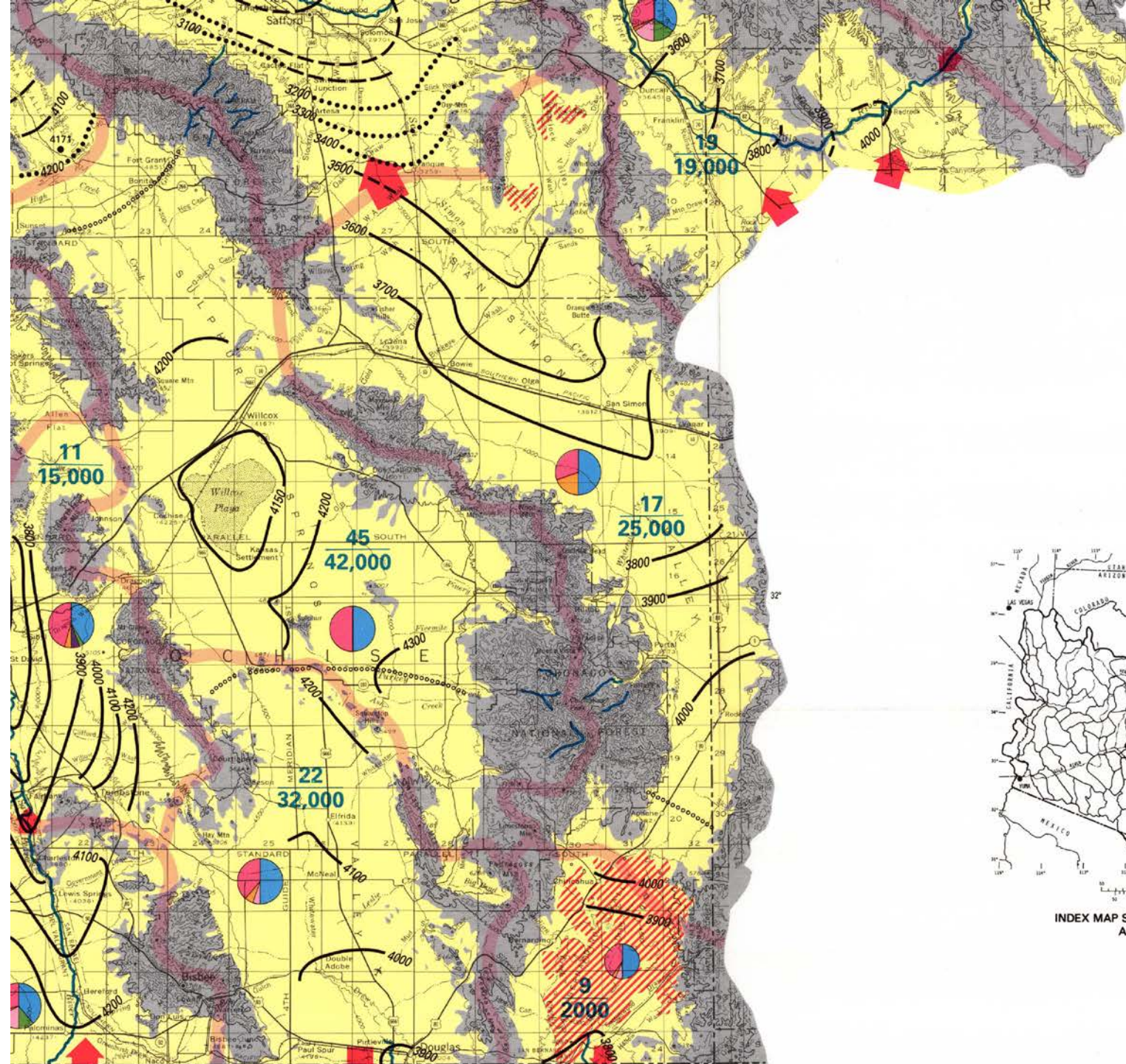
San Simon Valley Sub-Basin Depth-to-Bedrock (Ft)

Explanation

- 0
- 400
- 800
- 1,600
- 3,200
- 4,800
- 6,400
- 8,000
- 9,600
- City or Town
- Stream
- Groundwater Sub-Basins
- AZ Counties
- Hardrock



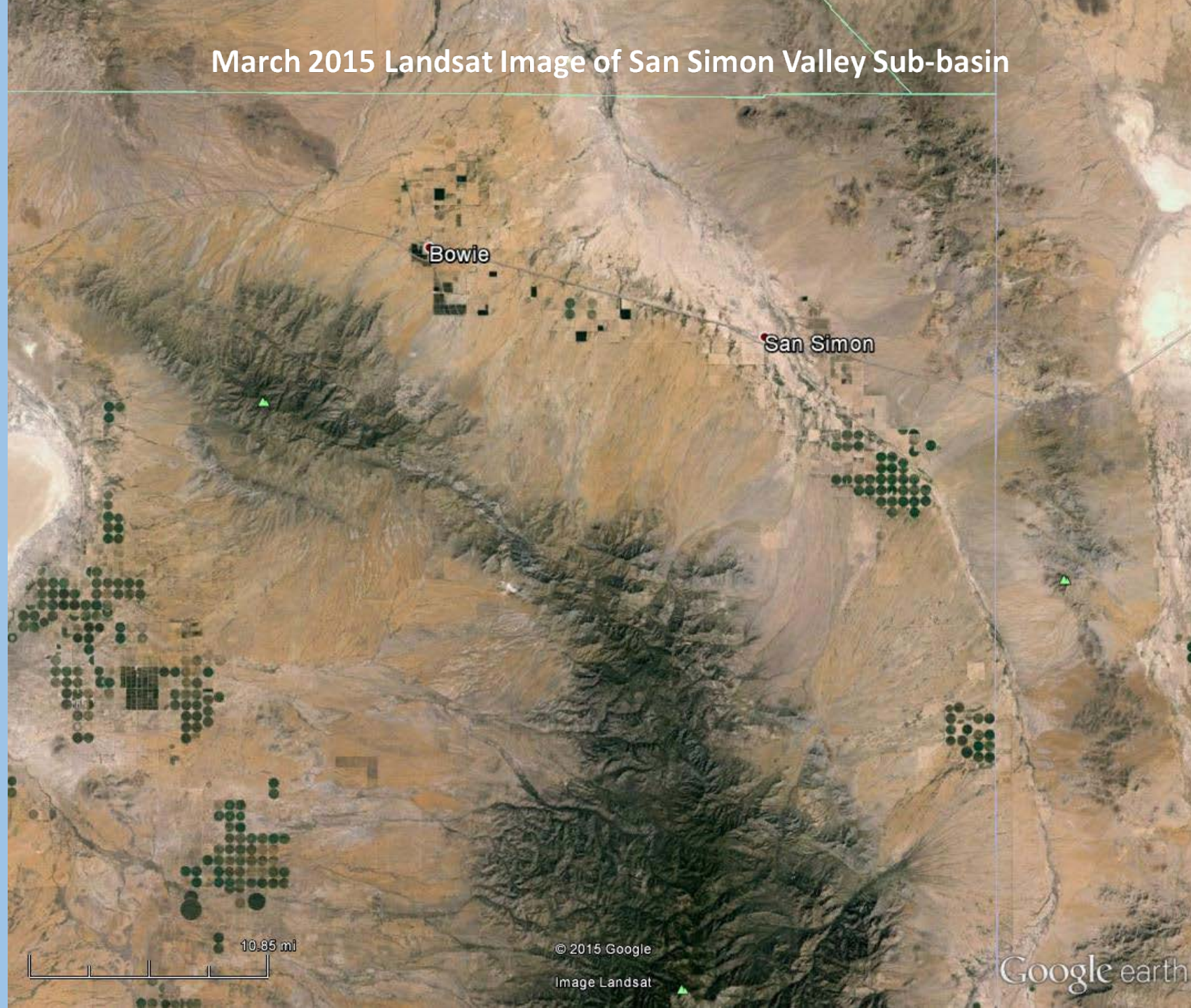
**Estimated
Predevelopment
Groundwater
Conditions In The
San Simon Valley
Sub-Basin Area
(USGS HA-664)**



**INDEX MAP SHOWING STUDY AREA
AND BASINS**

Demand

March 2015 Landsat Image of San Simon Valley Sub-basin



Bowie

San Simon

10.85 mi

© 2015 Google
Image Landsat

Google earth

Pistachios South of Bowie



Pecans North of Bowie



Grapes in Bowie Area



Young Pecans (Foreground) and
Older Pecans (Background) North of Bowie



New Orchard South of San Simon
(Drip Irrigation)



Alfalfa South of San Simon
(Center Pivot Irrigation)

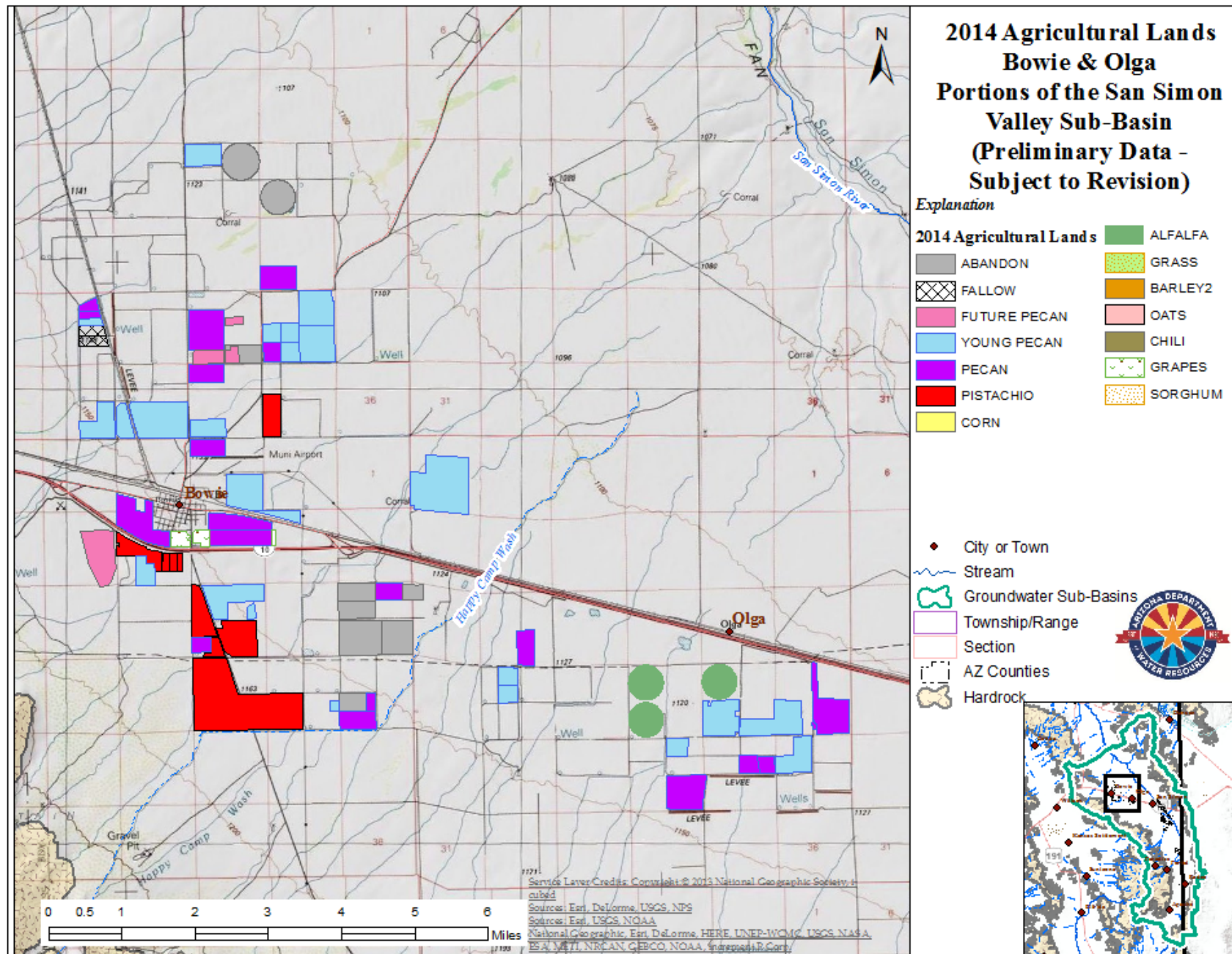


Older Pecans North of Bowie
(Drip Irrigation)

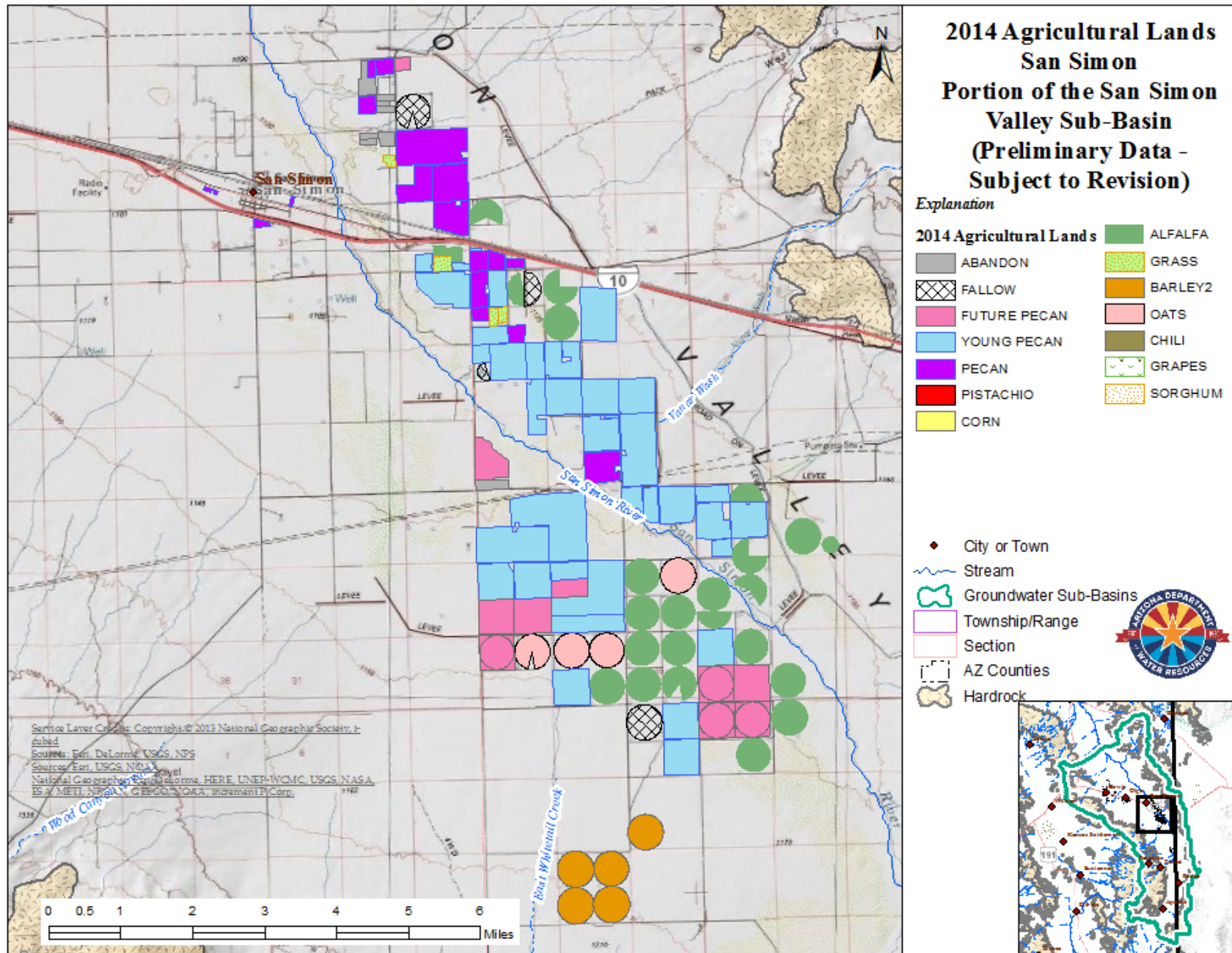


Older Pecans North of Bowie
(Drip Irrigation In Progress)

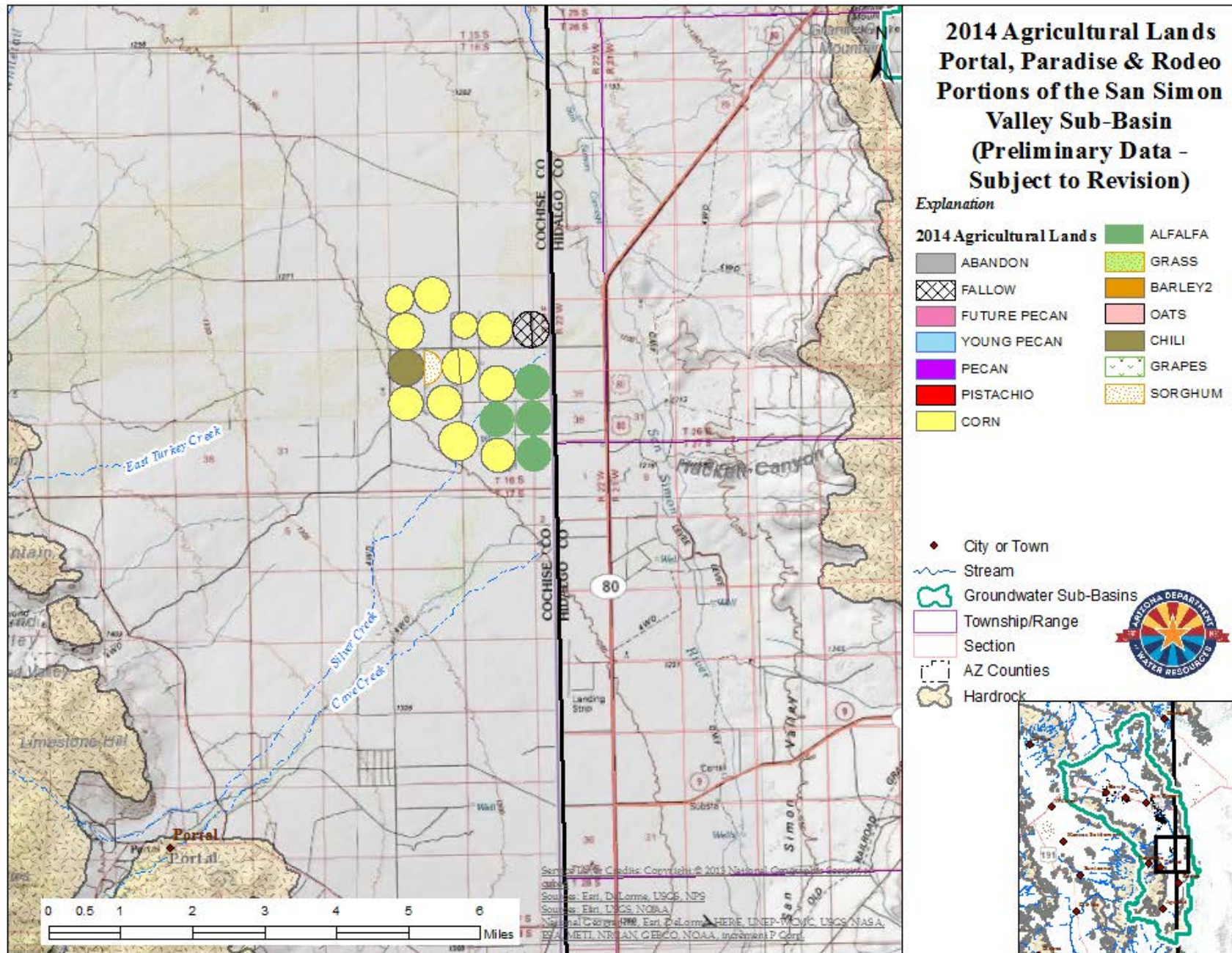




Source:
USGS

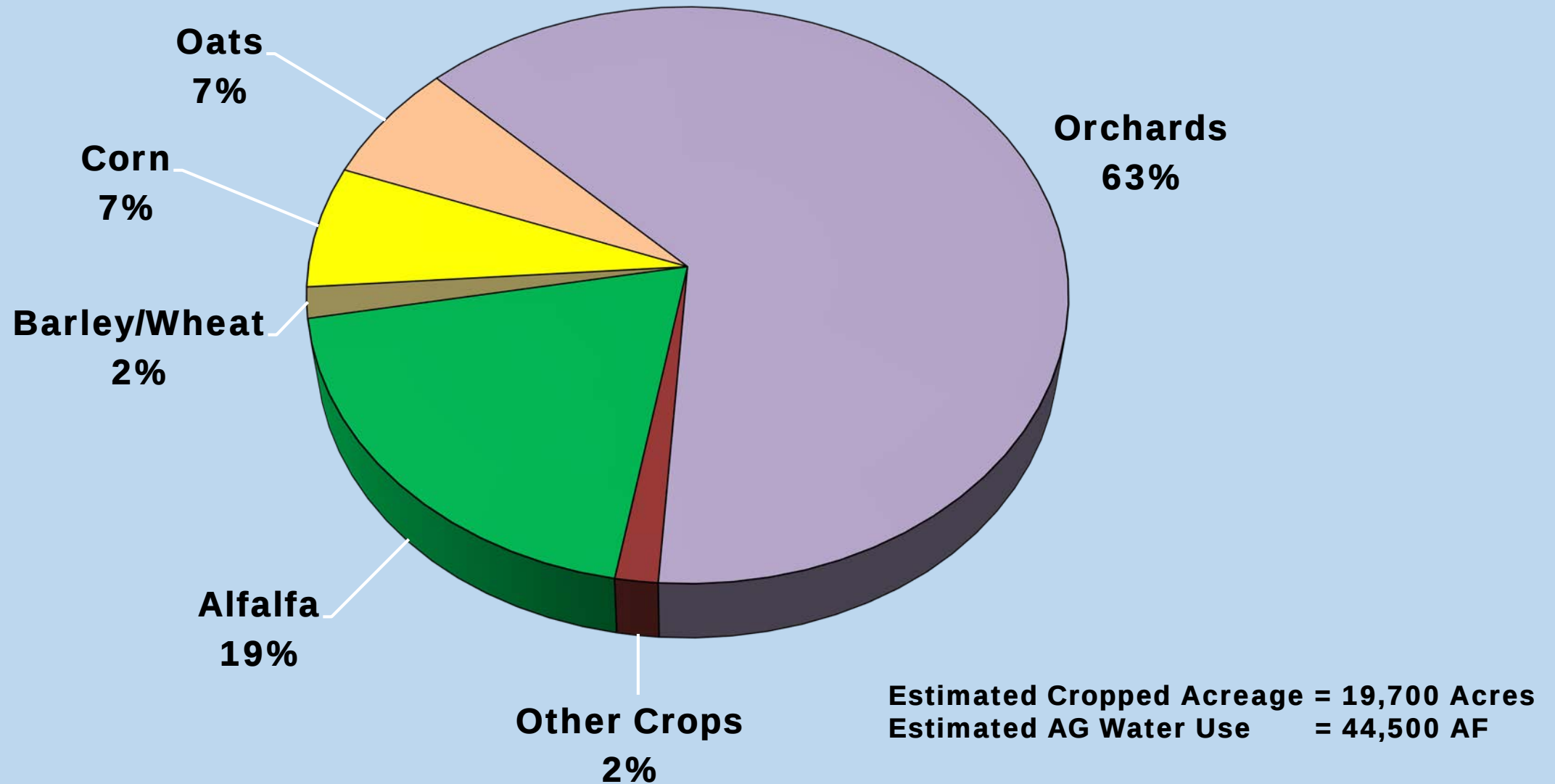


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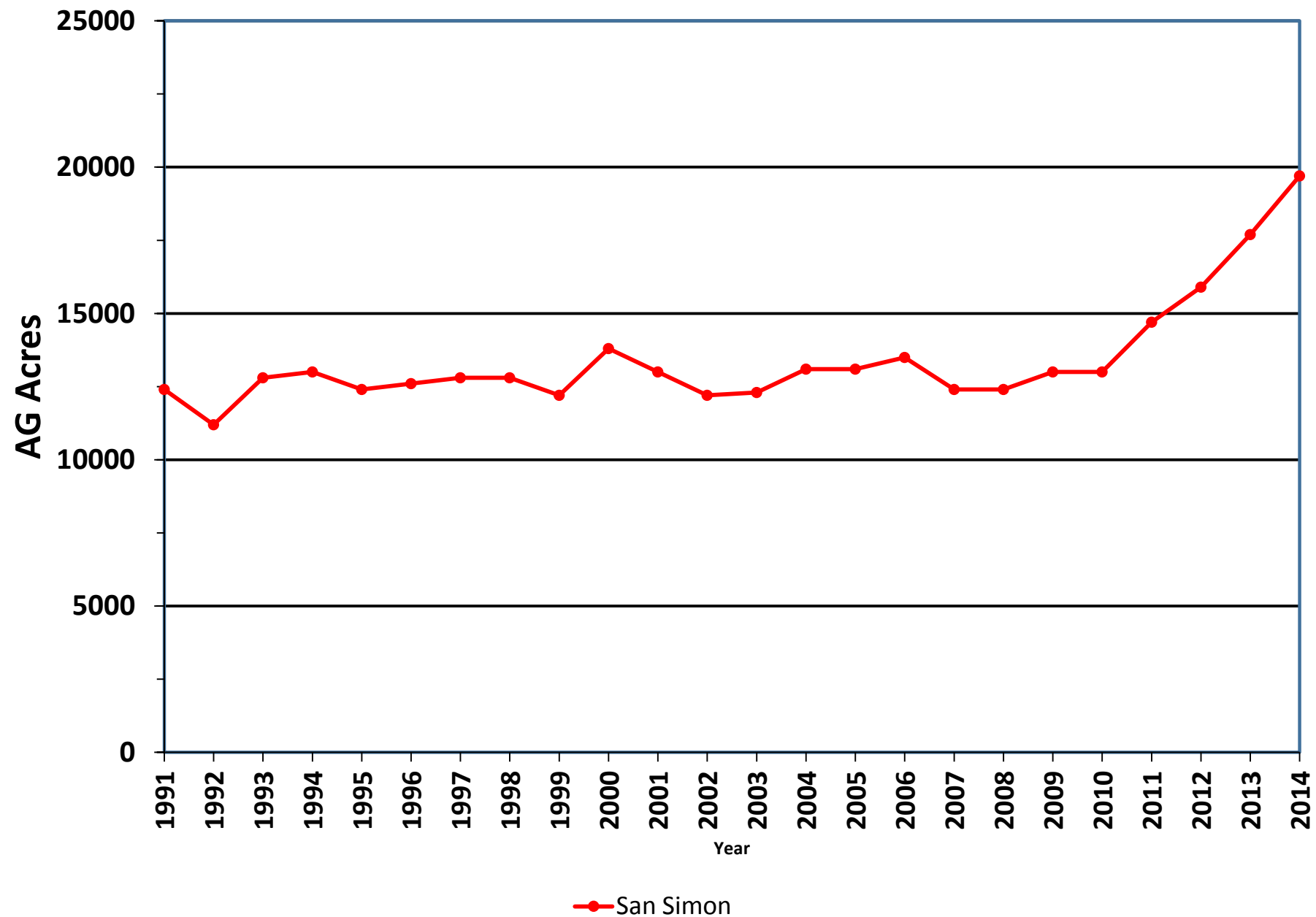


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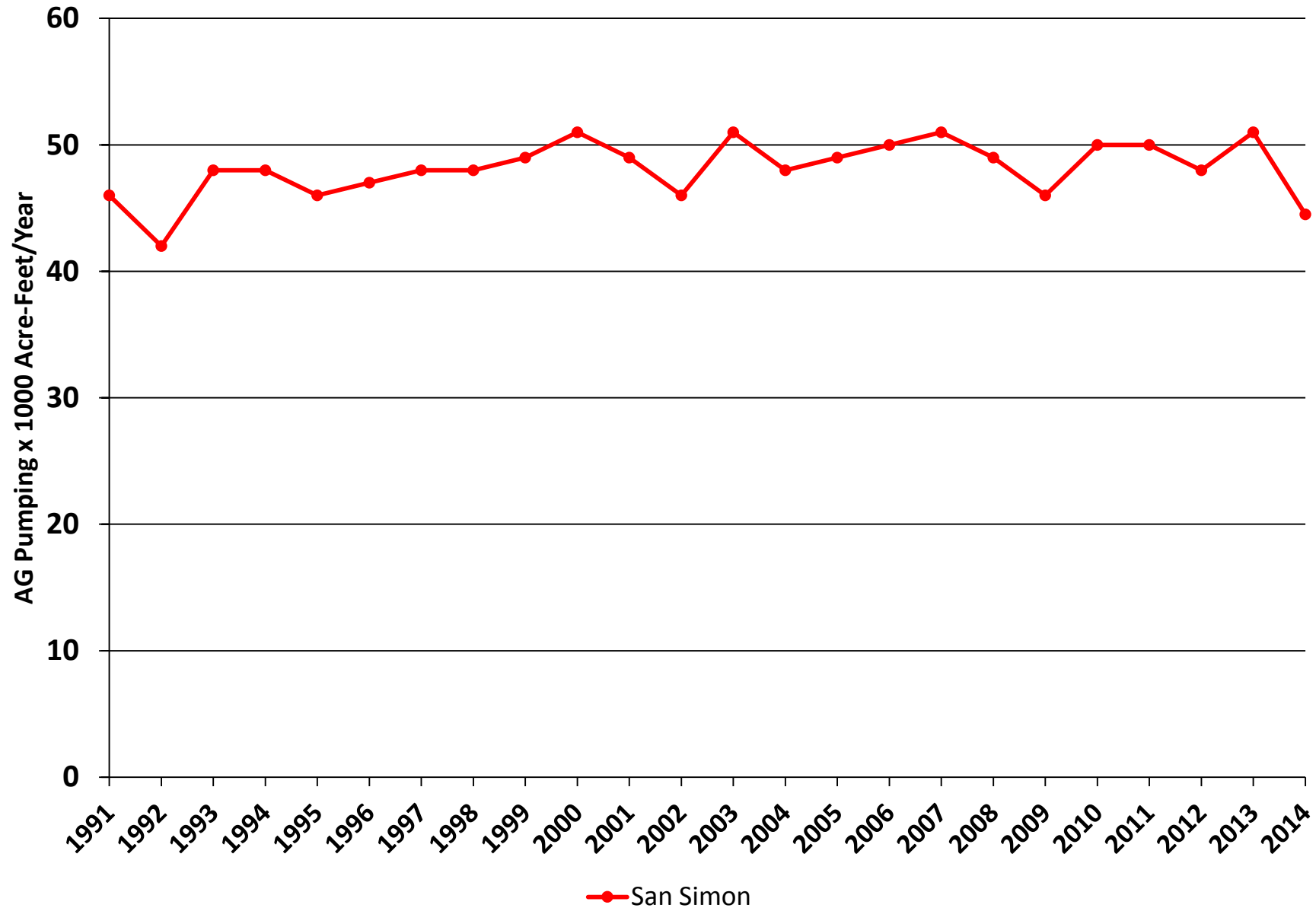
USGS Crop Survey Summary for San Simon Valley Sub-Basin, 2014



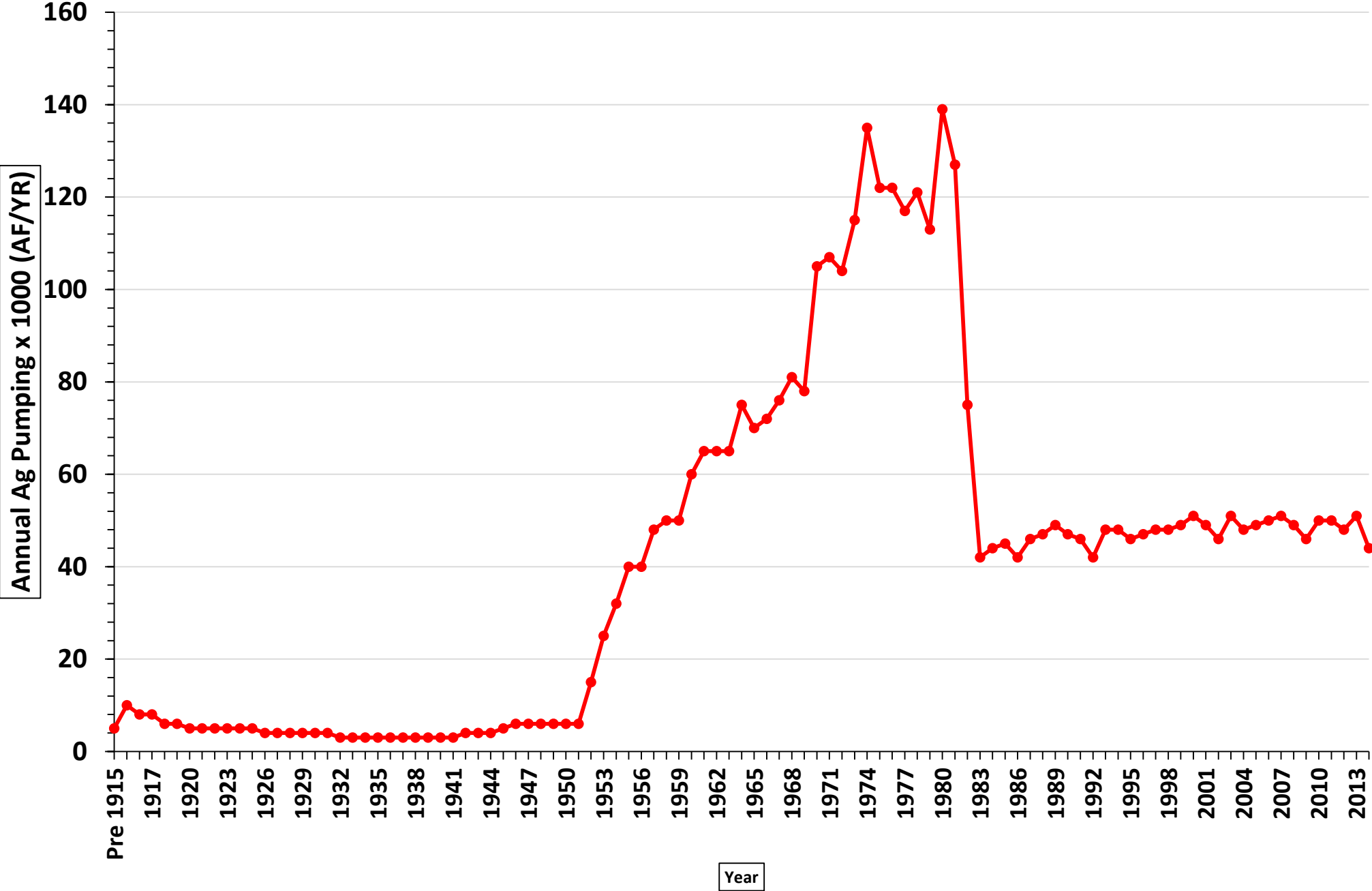
USGS Estimated AG Acres In the San Simon Valley Sub-Basin 1991 - 2014
(Totals Included Double Cropped Acres)



**USGS Estimated AG Pumping In the San Simon Valley Sub-basin 1991 -
2014**
(Totals Include Double Cropping)

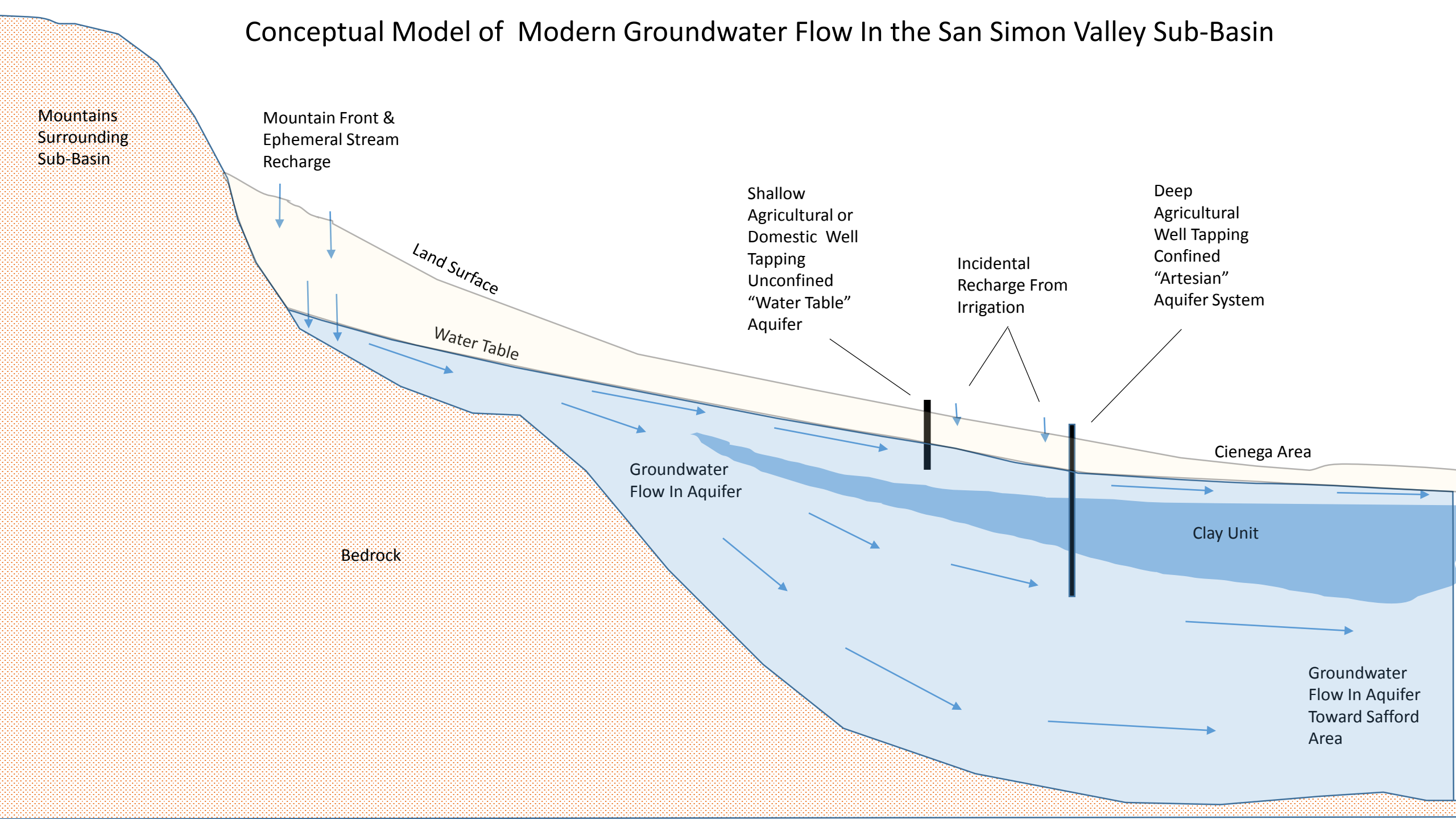


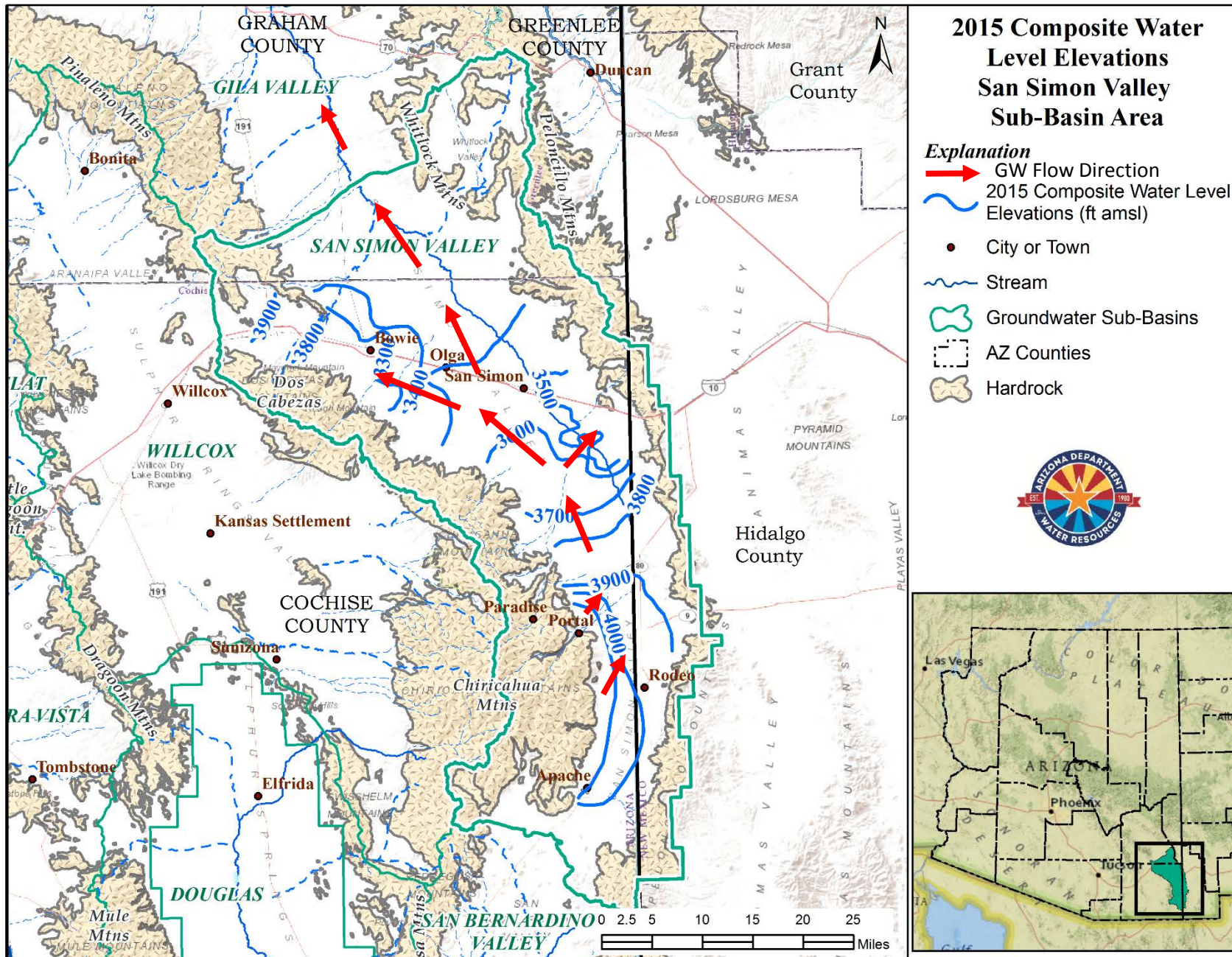
USGS Estimated San Simon Sub-Basin Ag Pumping 1915 - 2014

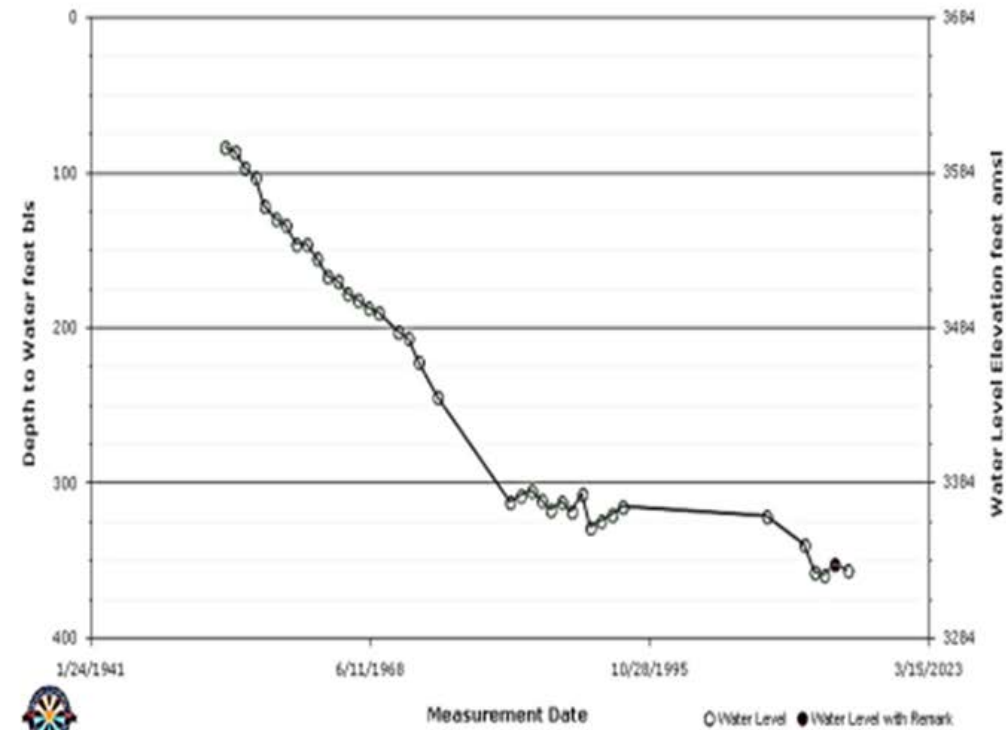
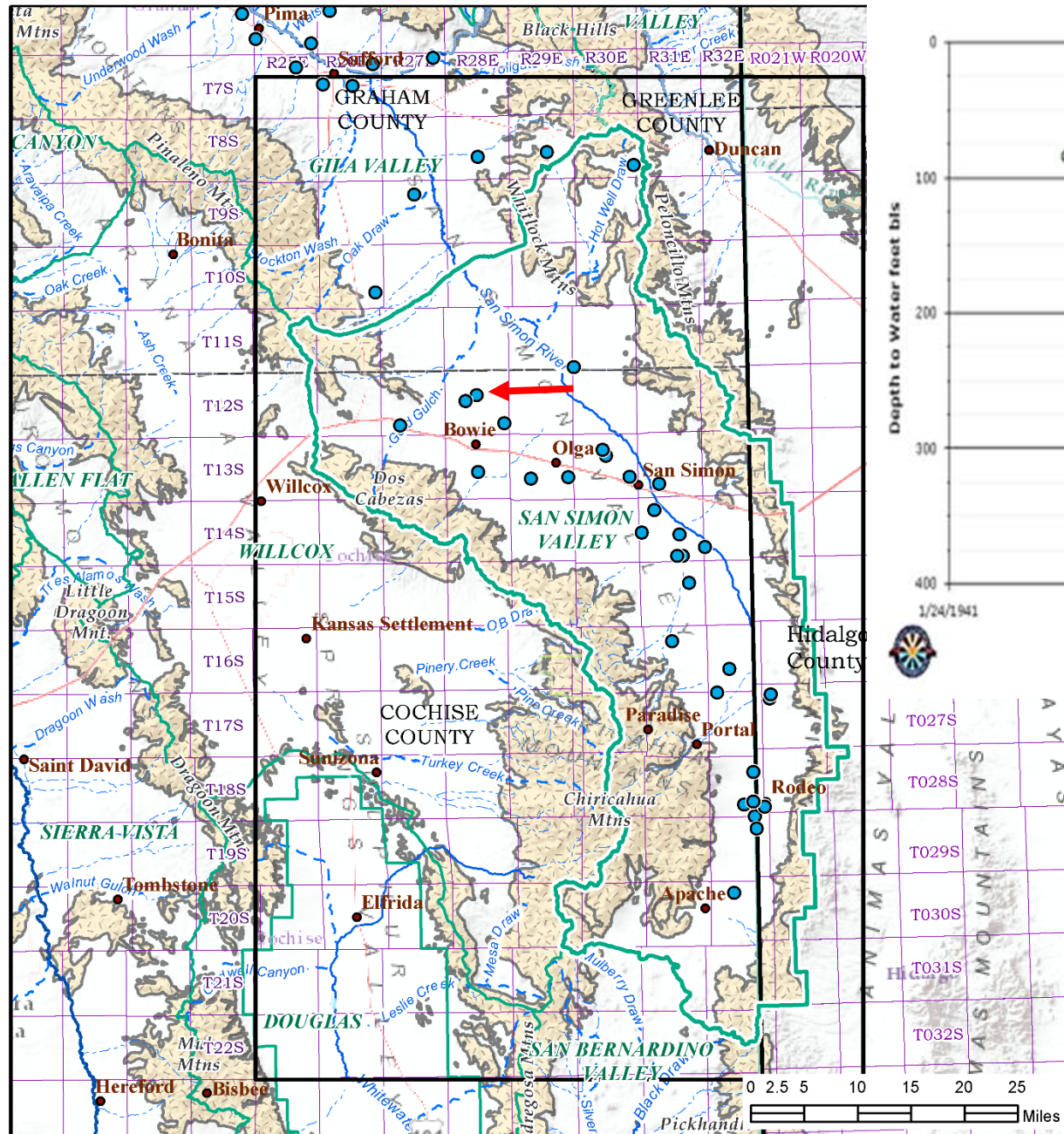


Effects

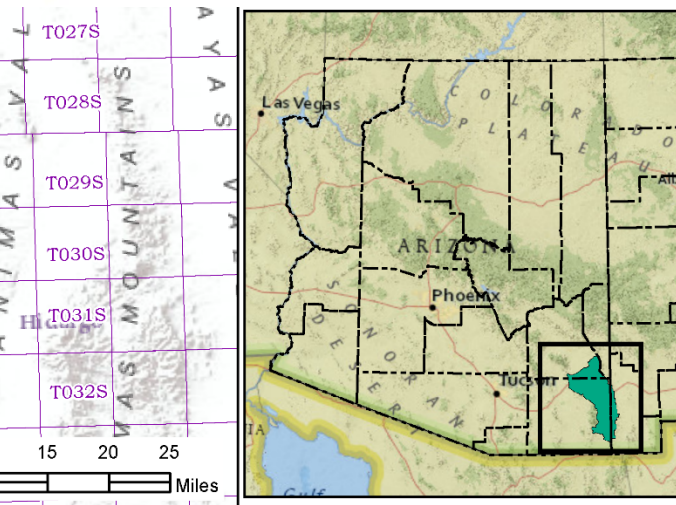
Conceptual Model of Modern Groundwater Flow In the San Simon Valley Sub-Basin





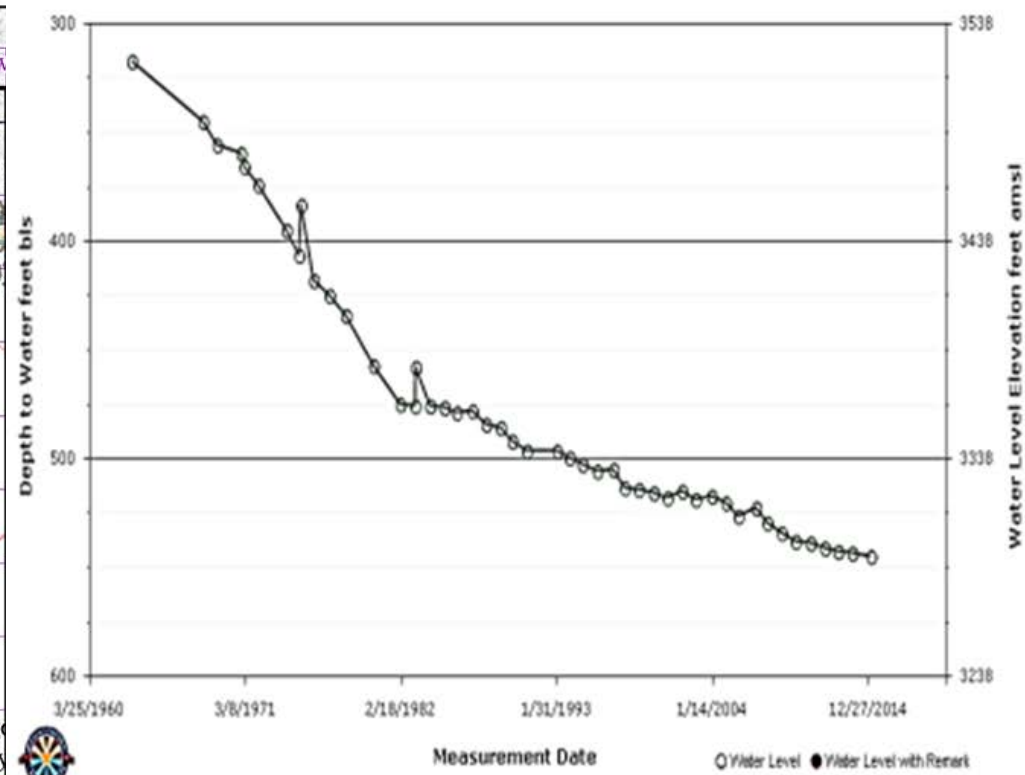
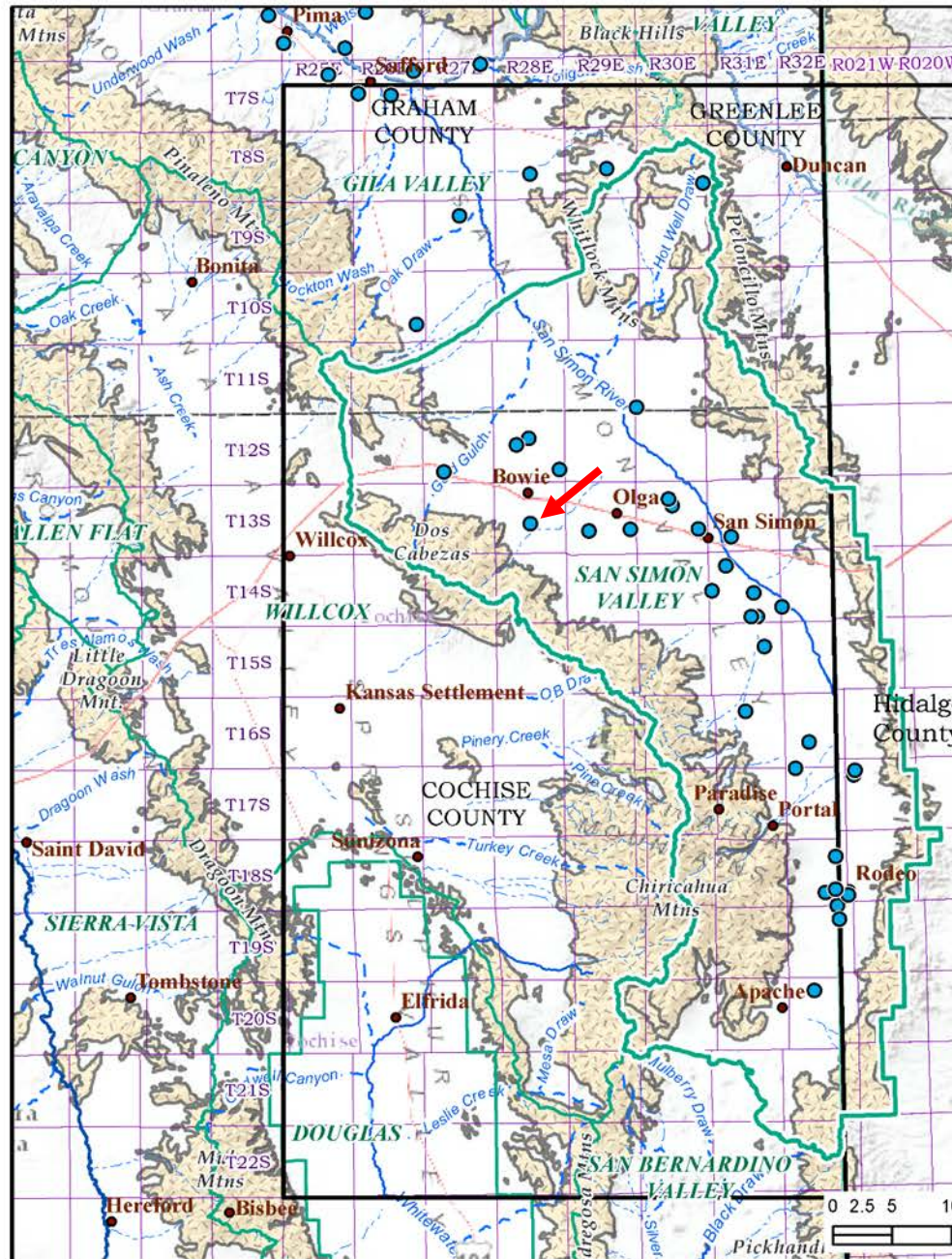


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 Diameter = 16"
 Irrigation
 DTW = 355.6' 2/25/2015

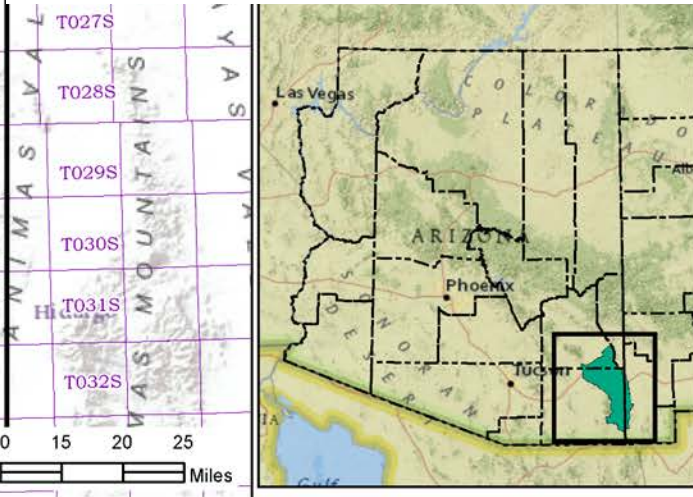


Preliminary Data Subject to Revision (4/1/2015)

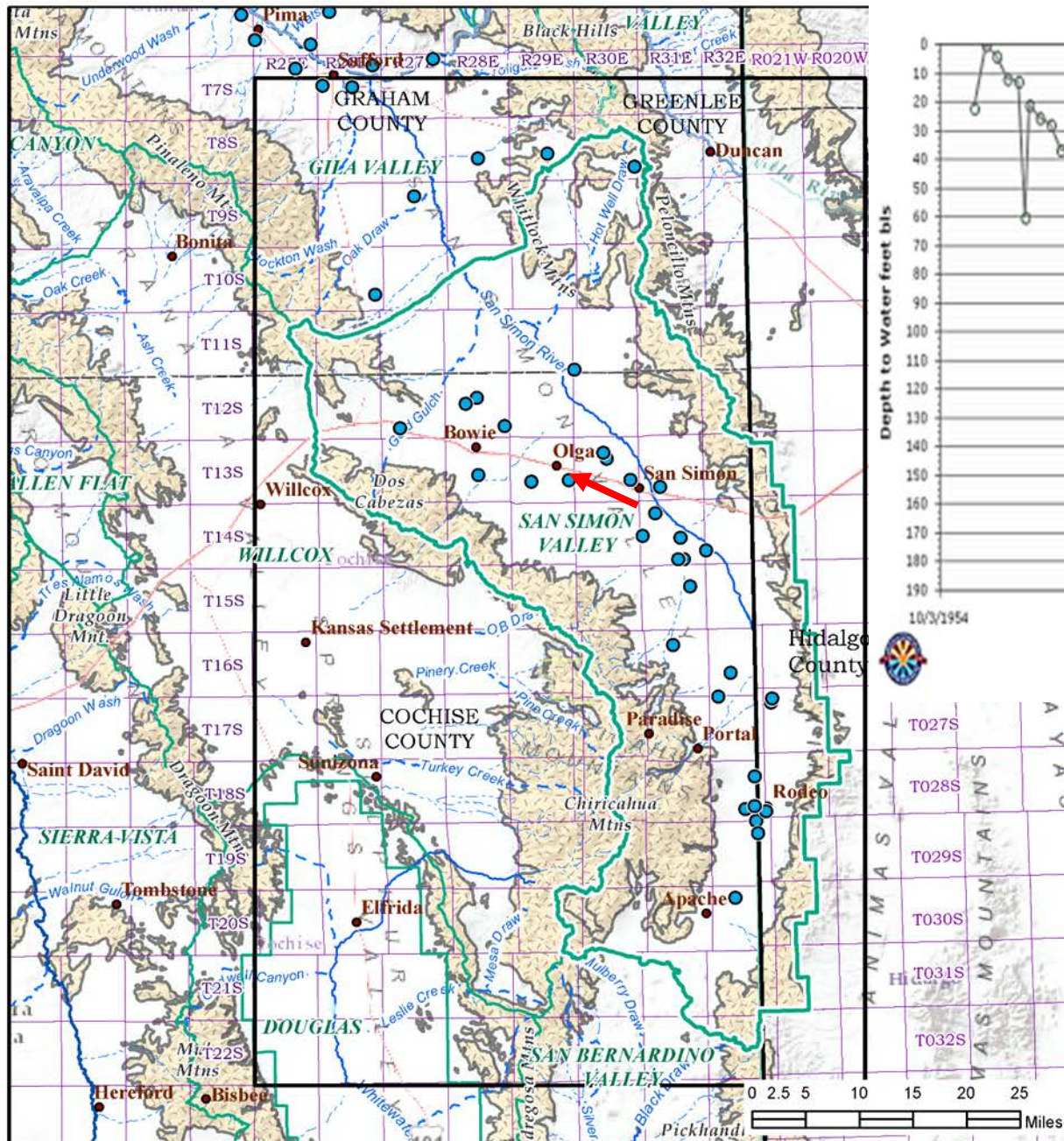
D-13-28 22BCC



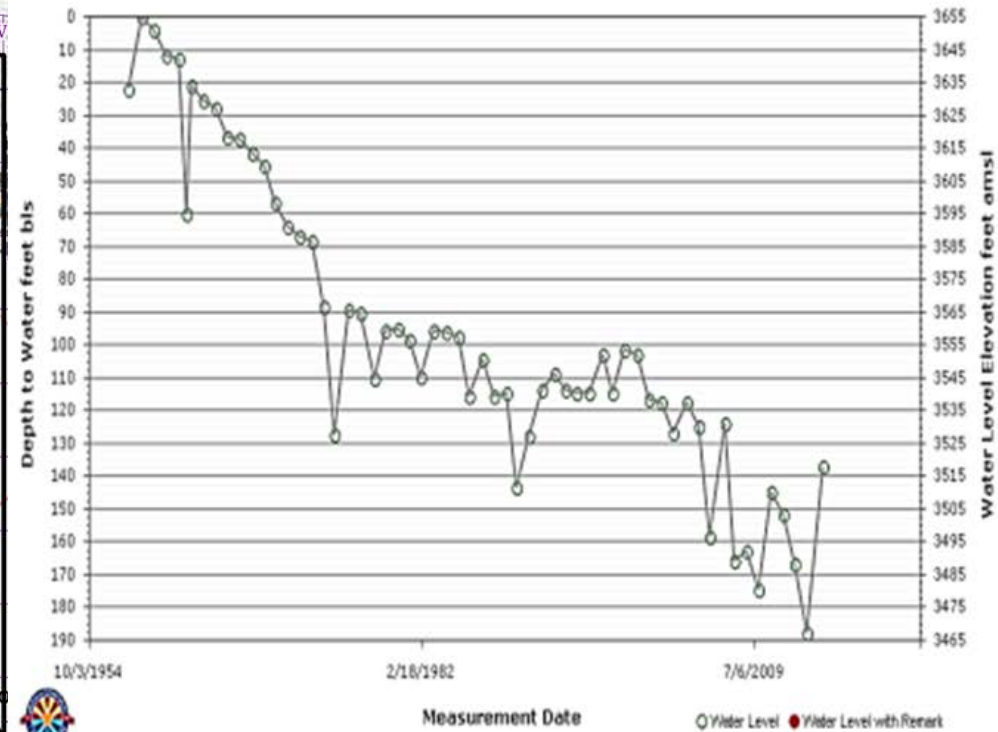
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 Regno = 55-618342
 Well Depth = 892'
 Irrigation
 DTW = 544.6 2/26/2015



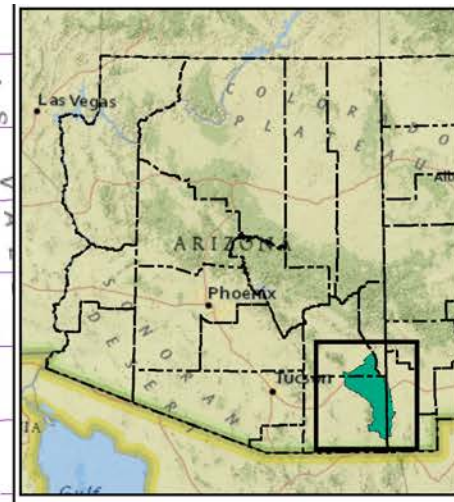
Preliminary Data Subject to
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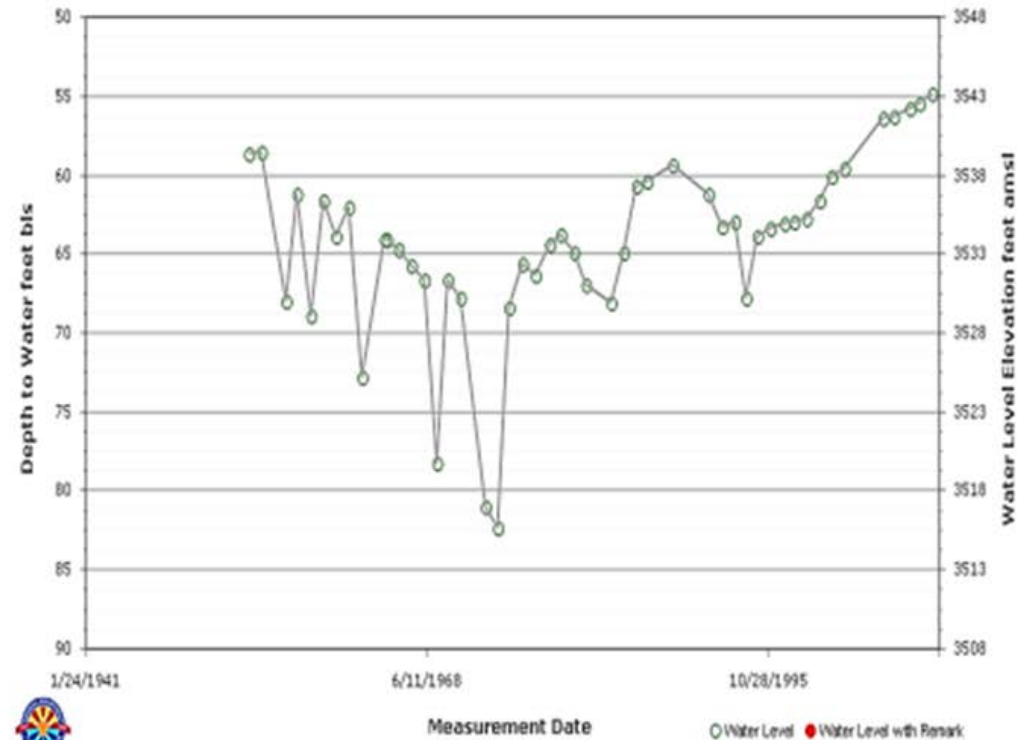
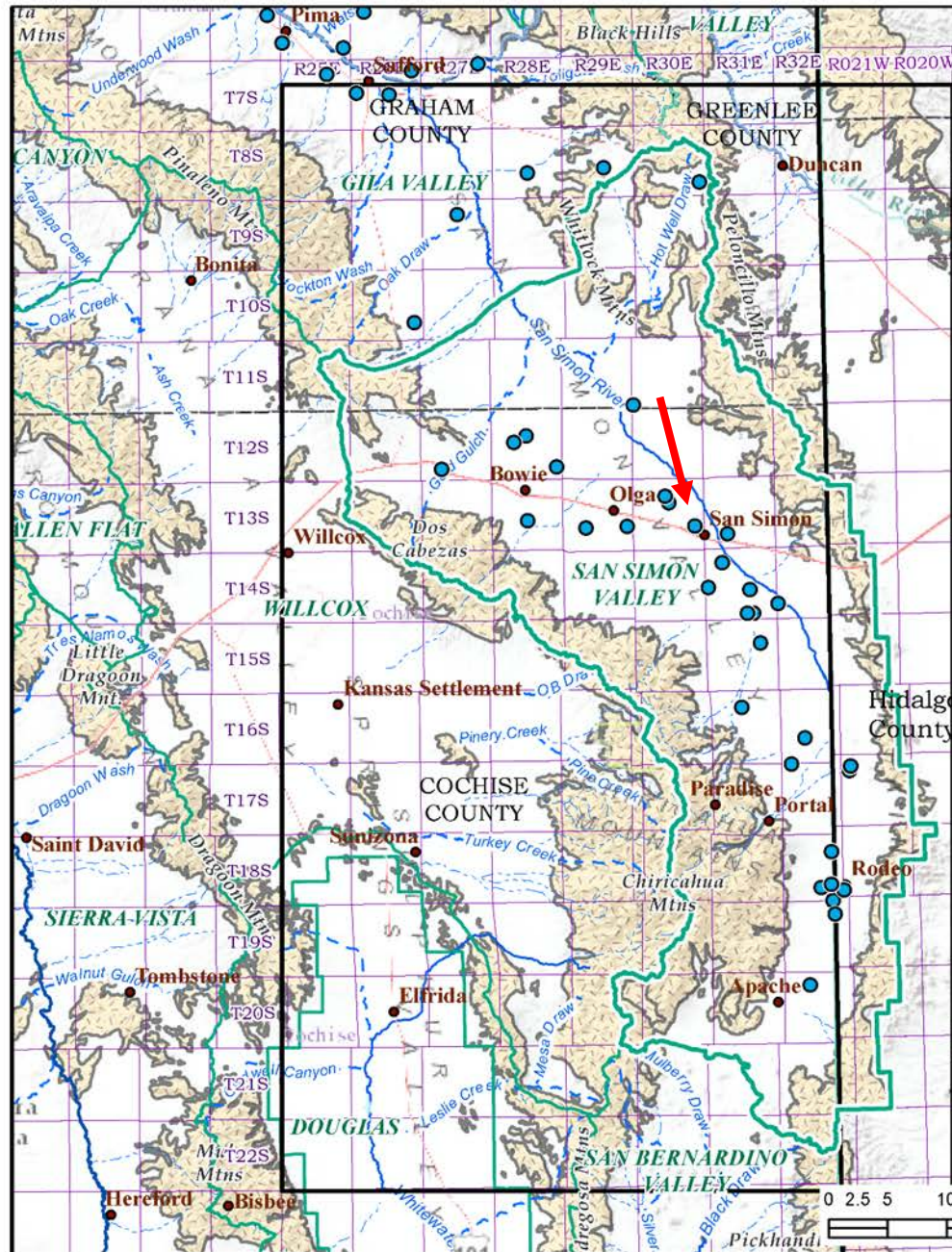


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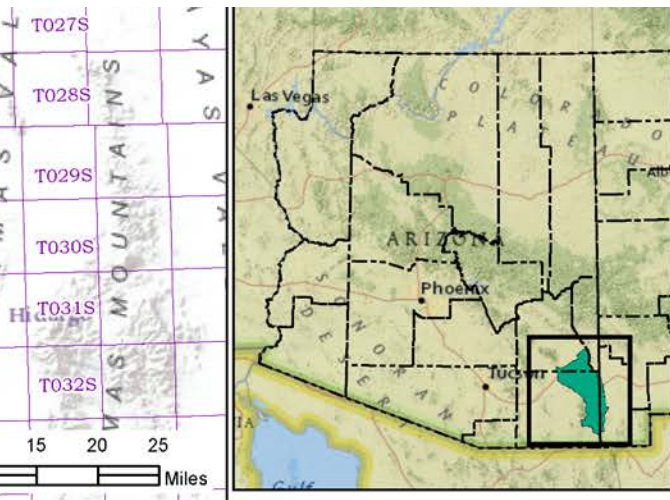


Preliminary Data Subject to
 Revision (4/1/2015)

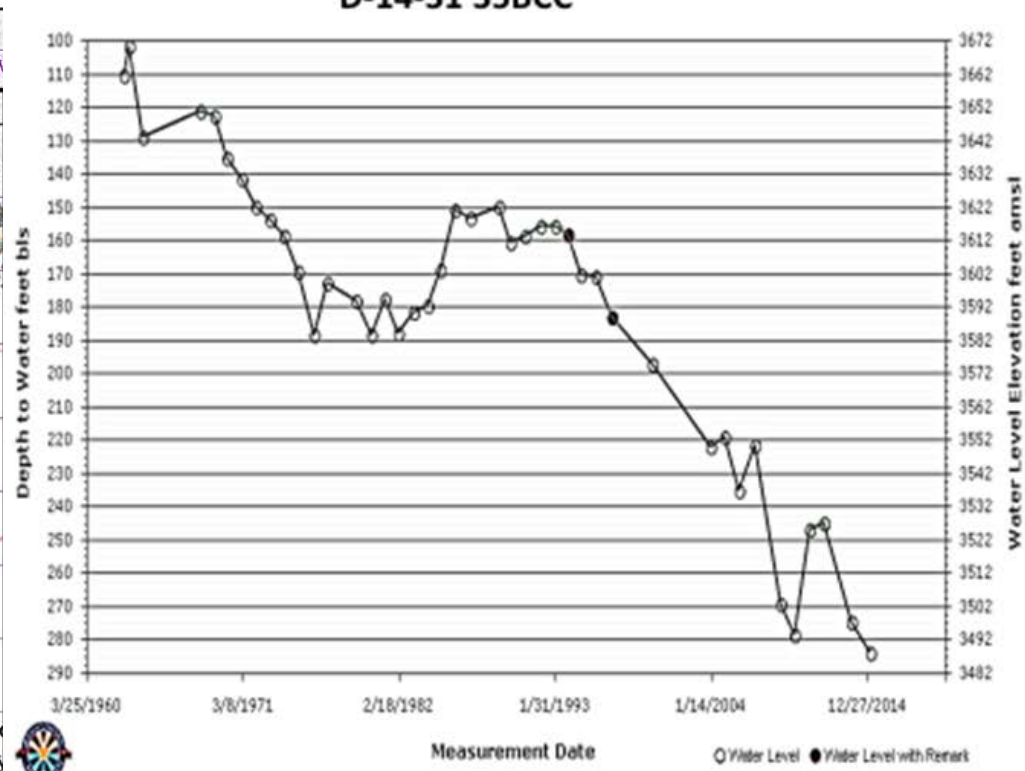
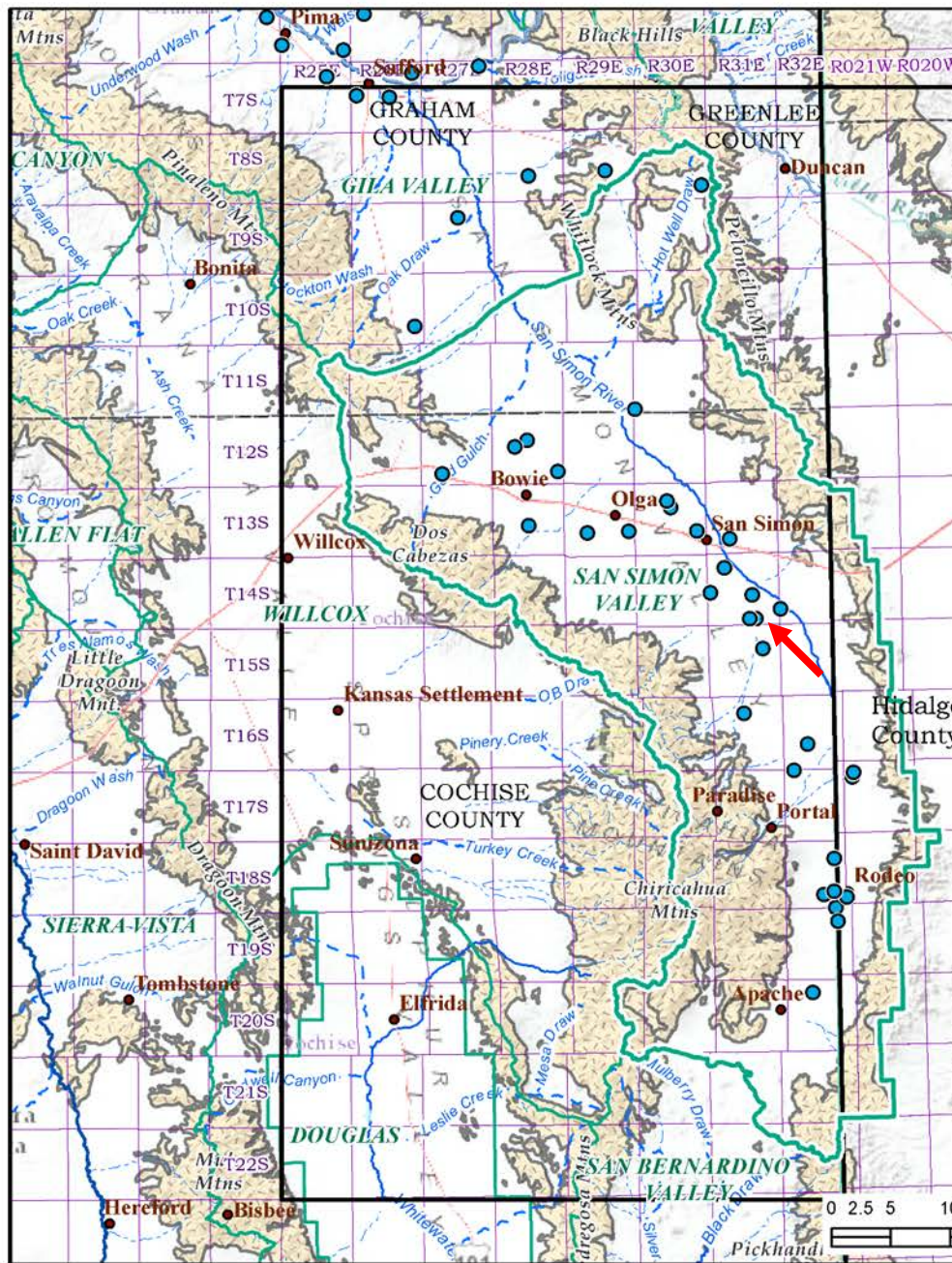
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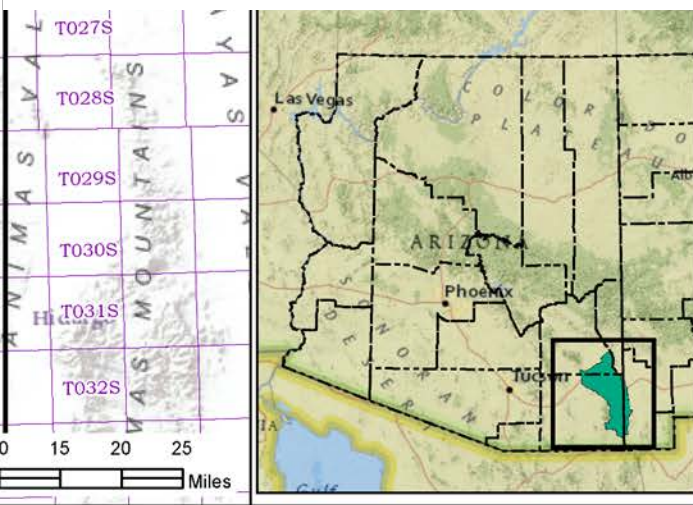
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 Diameter = 16"
 Unused
 DTW = 54.8' 11/18/08



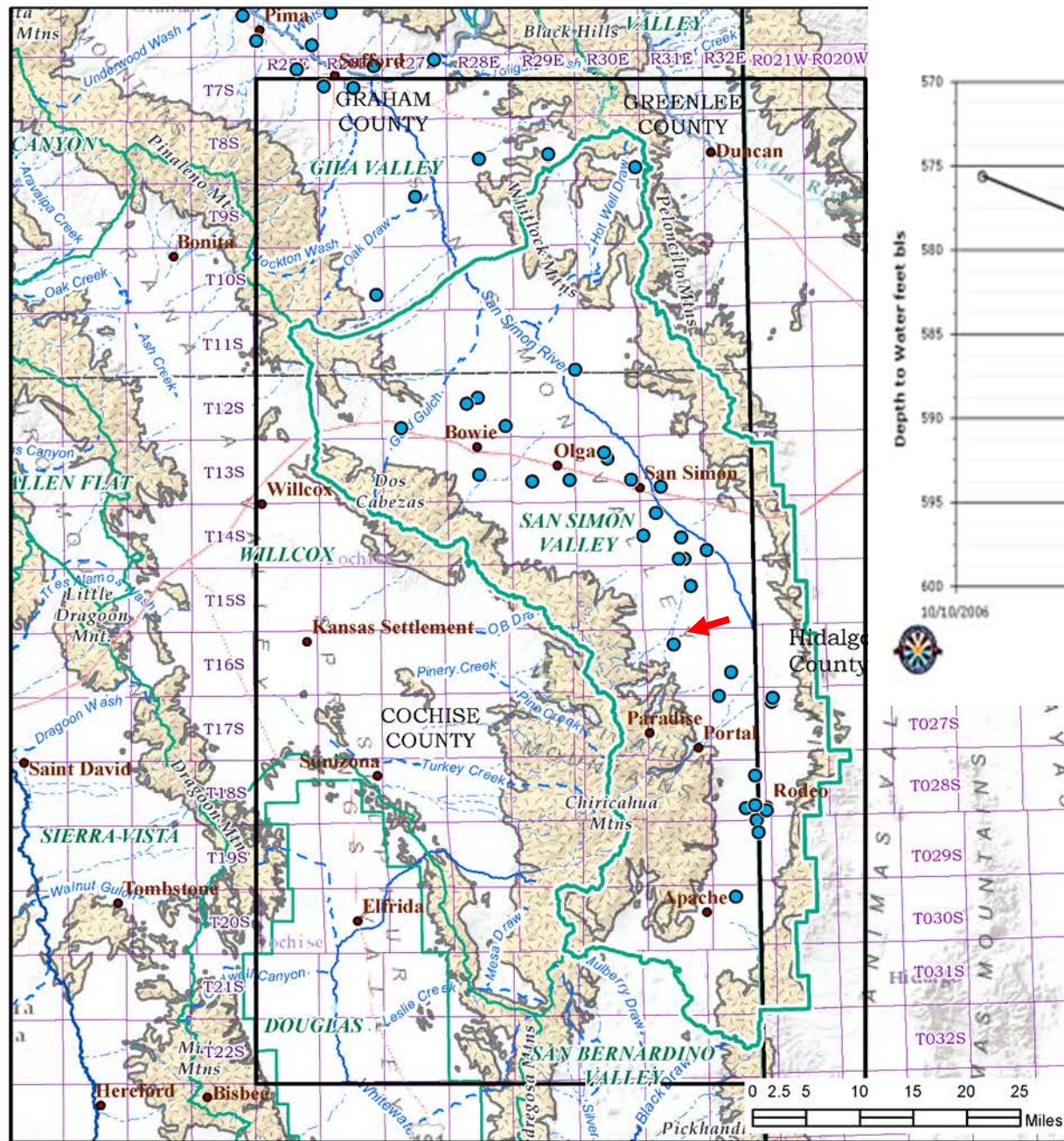
Preliminary Data Subject to
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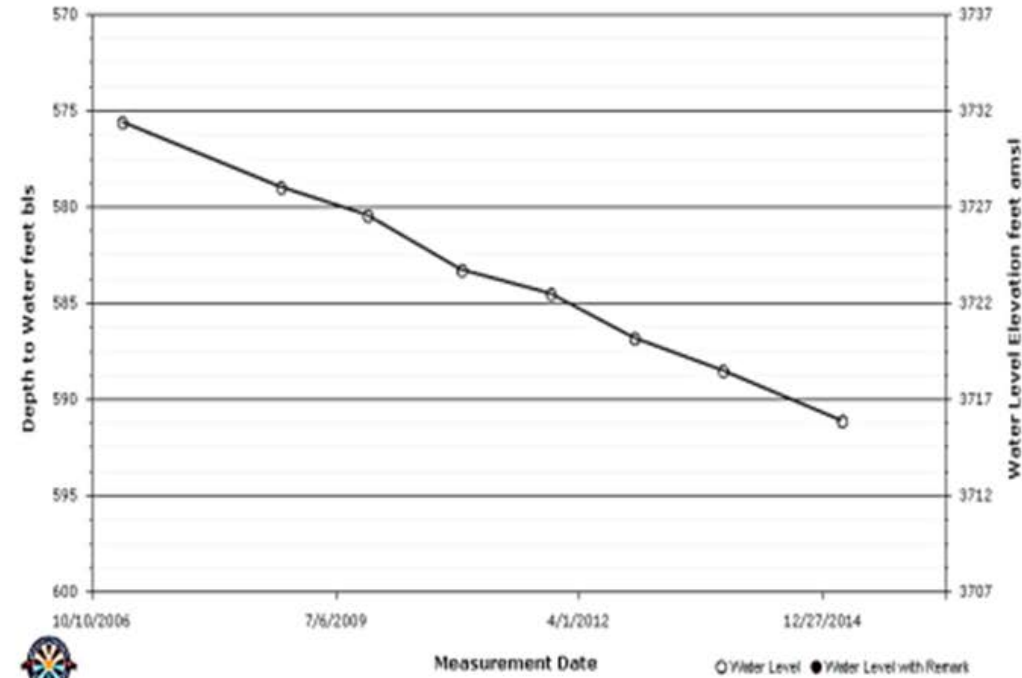
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 Irrigation
 DTW = 283.9' 3/3/2015



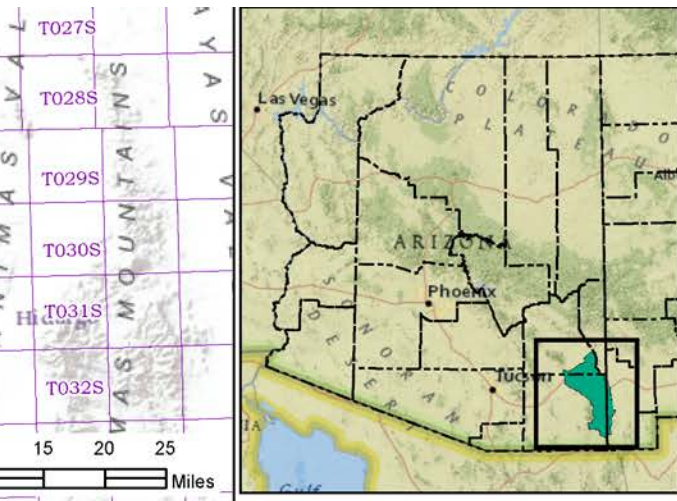
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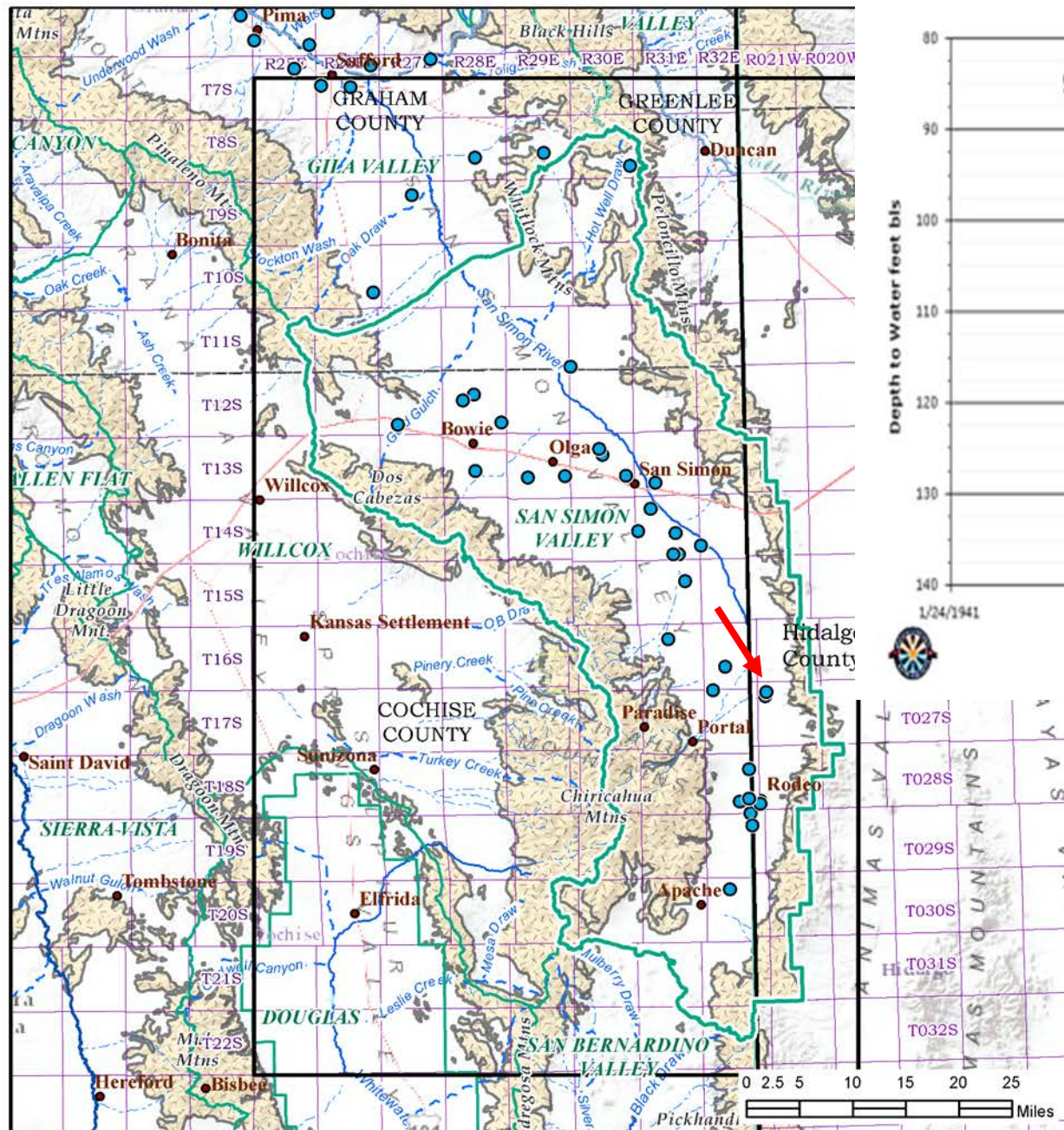
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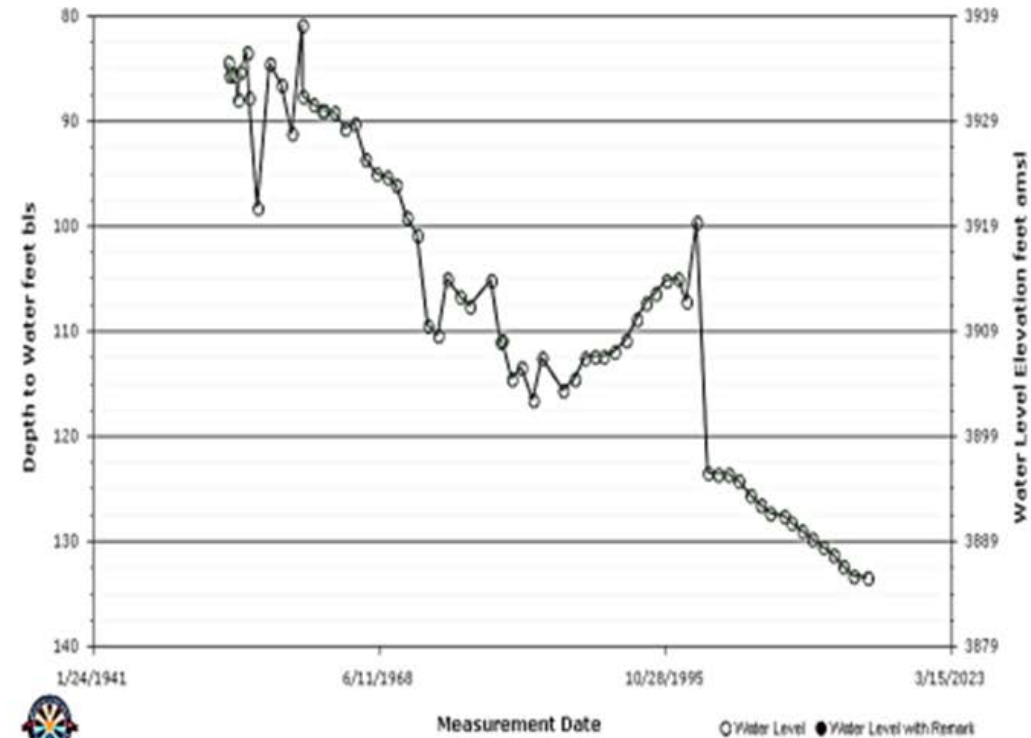
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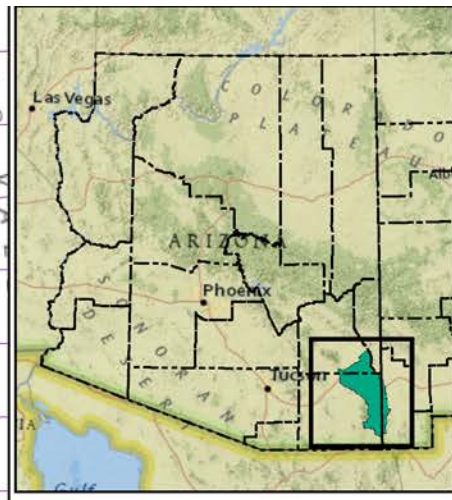
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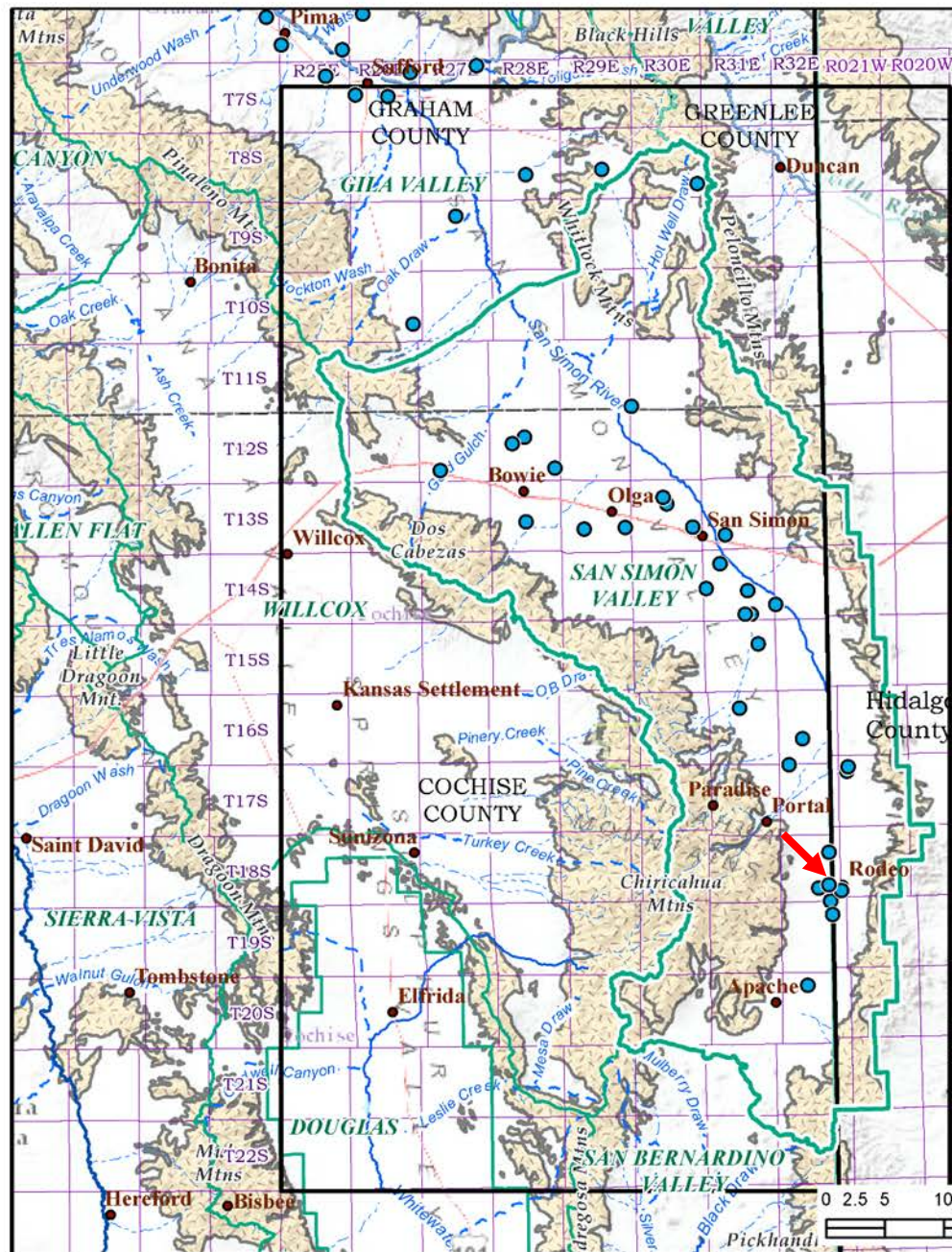
27S 21W 07 232A



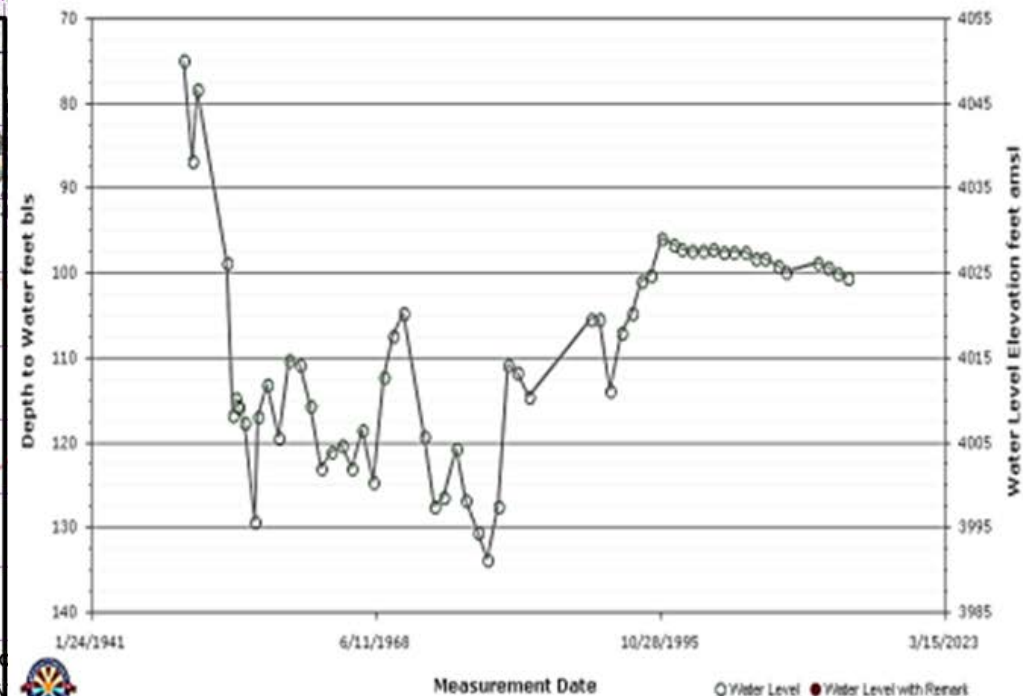
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Irrigation
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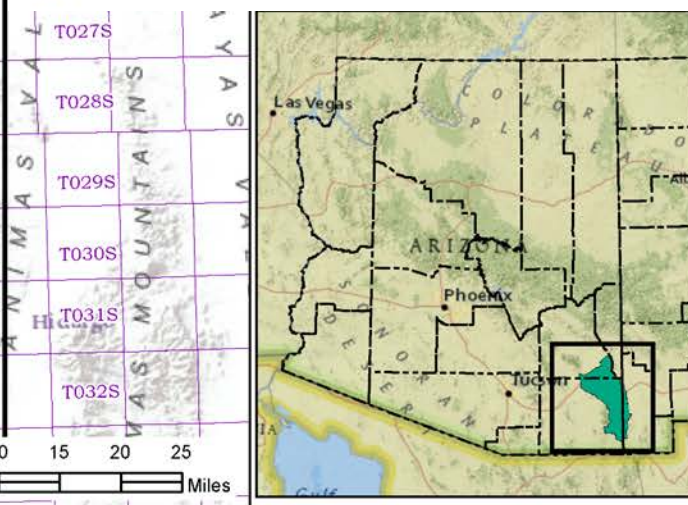
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D-18-32 26BBC



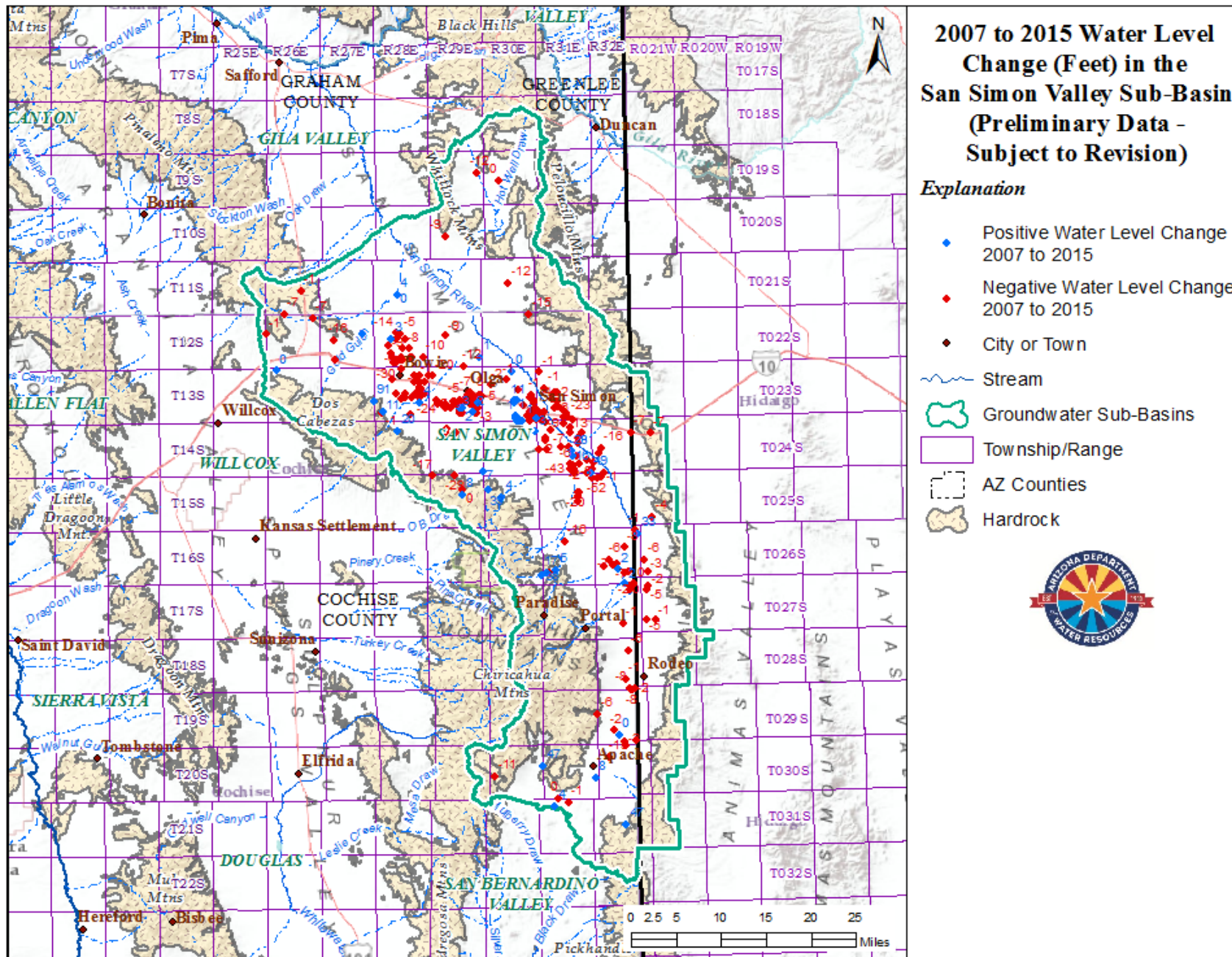
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 DTW = 100.5' 11/15/2013

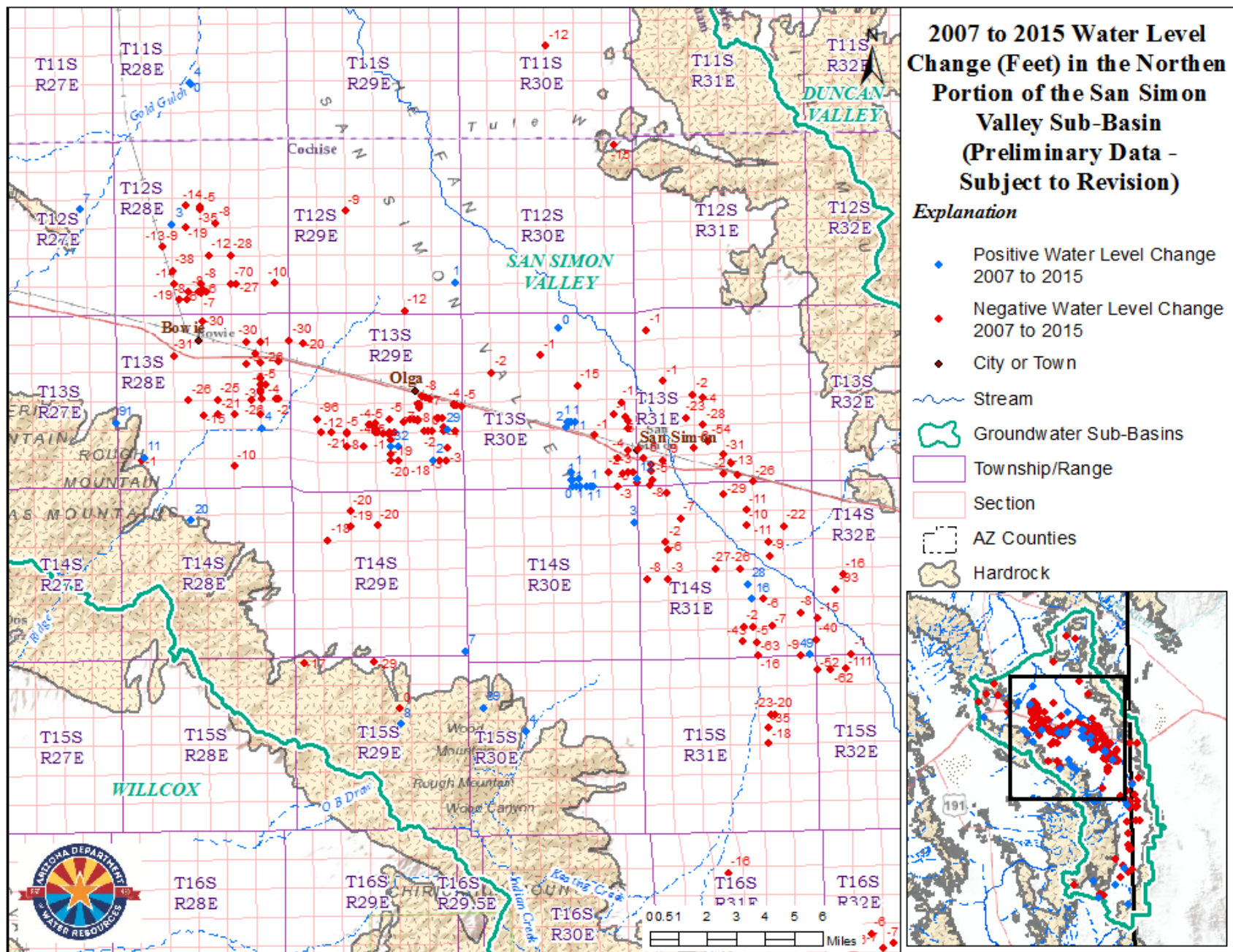


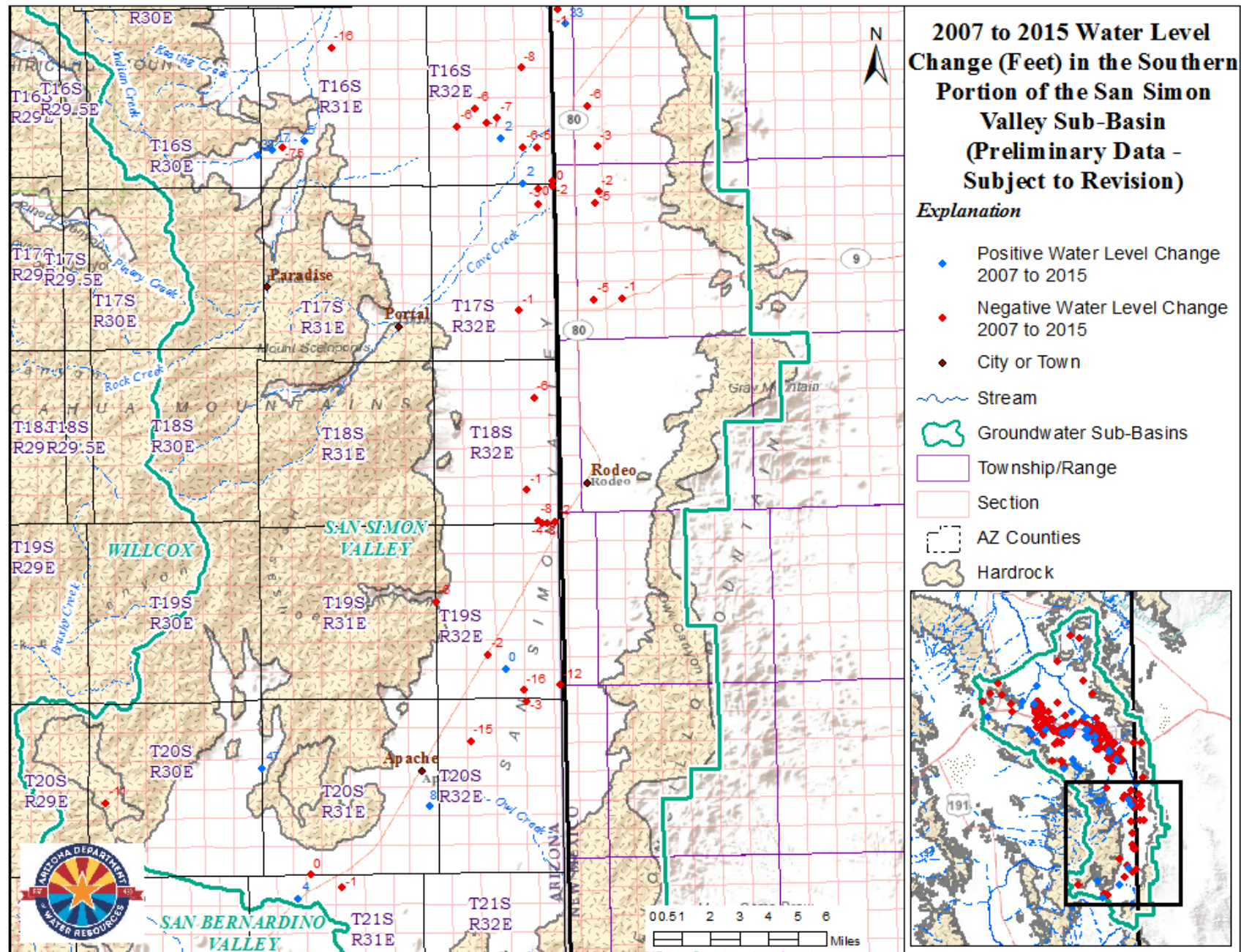
Preliminary Data Subject to
 Revision (4/1/2015)

San Simon Valley Sub-Basin GWSI Index Well Water Level Change Statistics									
	1940/50 to 1984/85 WL Change (Feet)	1940/50 to 1984/85 WL Change Rate (FT/Yr)	1984/85 to 2007 WL Change (Feet)	1984/85 to 2007 WL Change Rate (FT/Yr)	2007 to 2015 WL Change (Feet)	2007 to 2015 WL Change Rate (FT/Yr)	POR WL Change (feet)	POR WL Change Rate (FT/Yr)	POR (Years)
count	18		31		32		31		
Average	-59.9	-2.2	-12.9	-0.6	-13.7	-1.7	-60.5	-1.2	48.9
Median	-40.3	-1.3	-15.1	-0.7	-7.9	-0.9	-28.7	-0.8	53.0
Max	8.8	0.3	32.8	1.4	9.2	0.4	28.6	0.5	75.0
Min	-221.3	-7.6	-76.8	-3.8	-62.6	-7.8	-272.2	-4.5	25.0

Preliminary Data Subject to Revision
(4/1/2015)

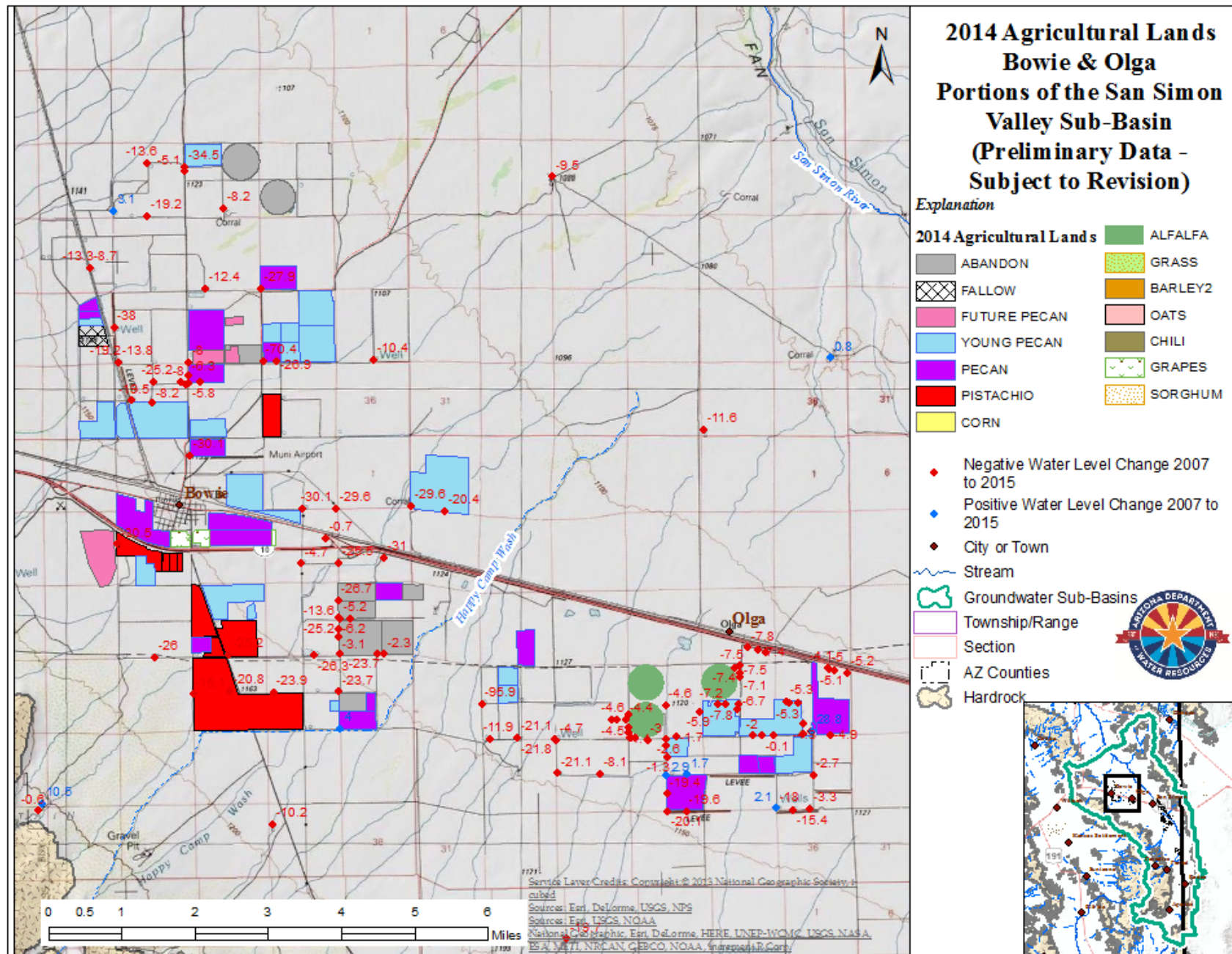


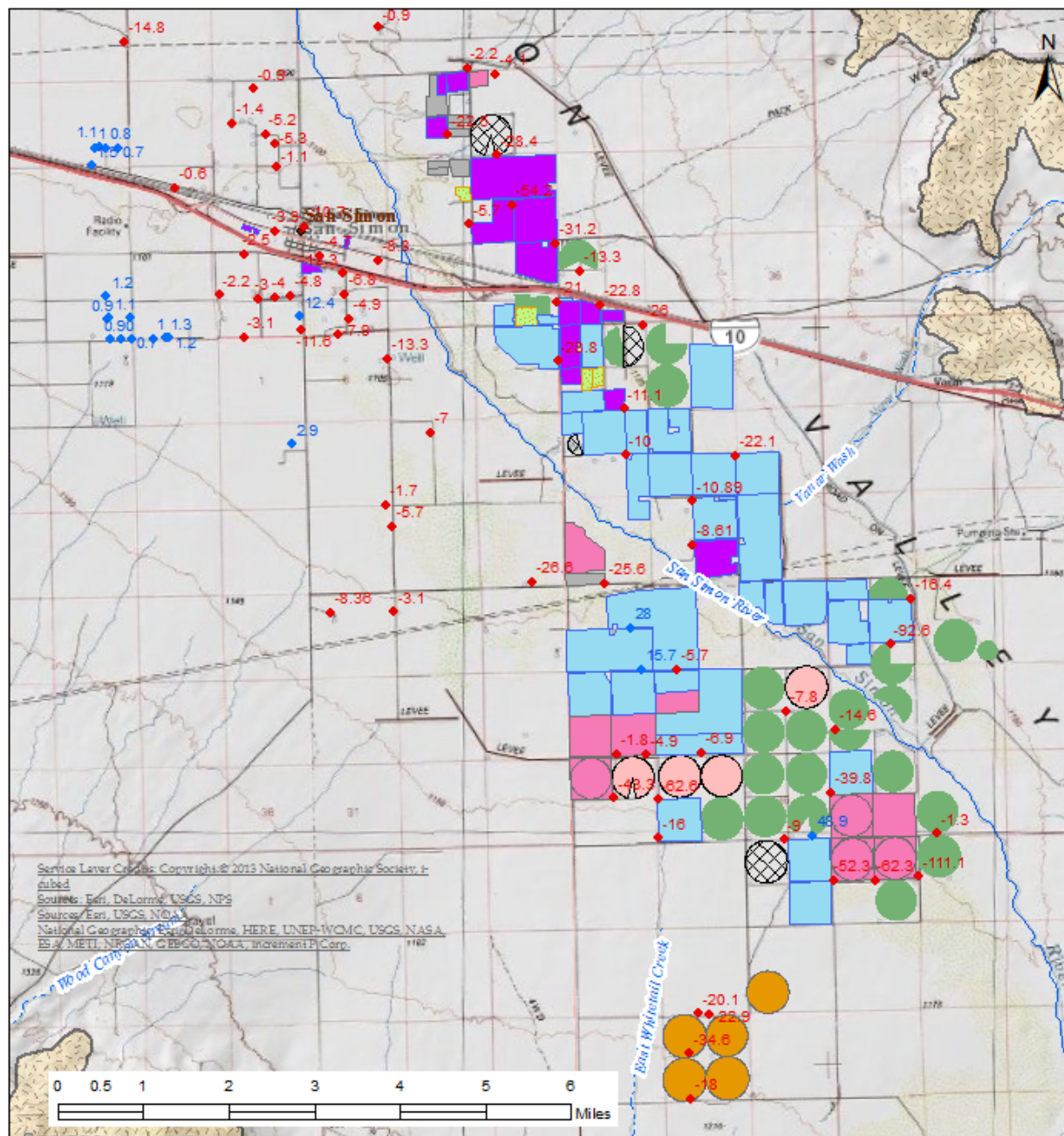




San Simon Valley Sub-Basin 2007-2015 All GWSI Water Level Changes						
	All WL Changes (Feet)	WL Change Rate (Ft/Yr)	WL Declines (Feet)	WL Change Rate (Ft/Yr)	WL Rises (Feet)	WL Change Rate (Ft/Yr)
Count	288		238		50	
Average	-9.0	-1.1	-13.2	-1.7	11.2	1.4
Median	-5.9	-0.7	-7.5	-0.9	2.9	0.4
Maximum	90.8		-0.1		90.8	
Minimum	-111.1		-111.1		0.0	
Std Dev	18.6		15.8		17.9	

Preliminary Data Subject to
Revision (4/1/2015)



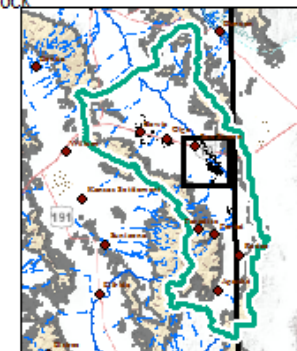


2014 Agricultural Lands San Simon Portion of the San Simon Valley Sub-Basin (Preliminary Data - Subject to Revision)

Explanation

2014 Agricultural Lands	
ABANDON	ALFALFA
FALLOW	GRASS
FUTURE PECAN	BARLEY2
YOUNG PECAN	OATS
PECAN	CHILI
PISTACHIO	GRAPES
CORN	SORGHUM

- Negative Water Level Change 2007 to 2015
- Positive Water Level Change 2007 to 2015
- City or Town
- Stream
- Groundwater Sub-Basins
- Township/Range
- Section
- AZ Counties
- Hardrock

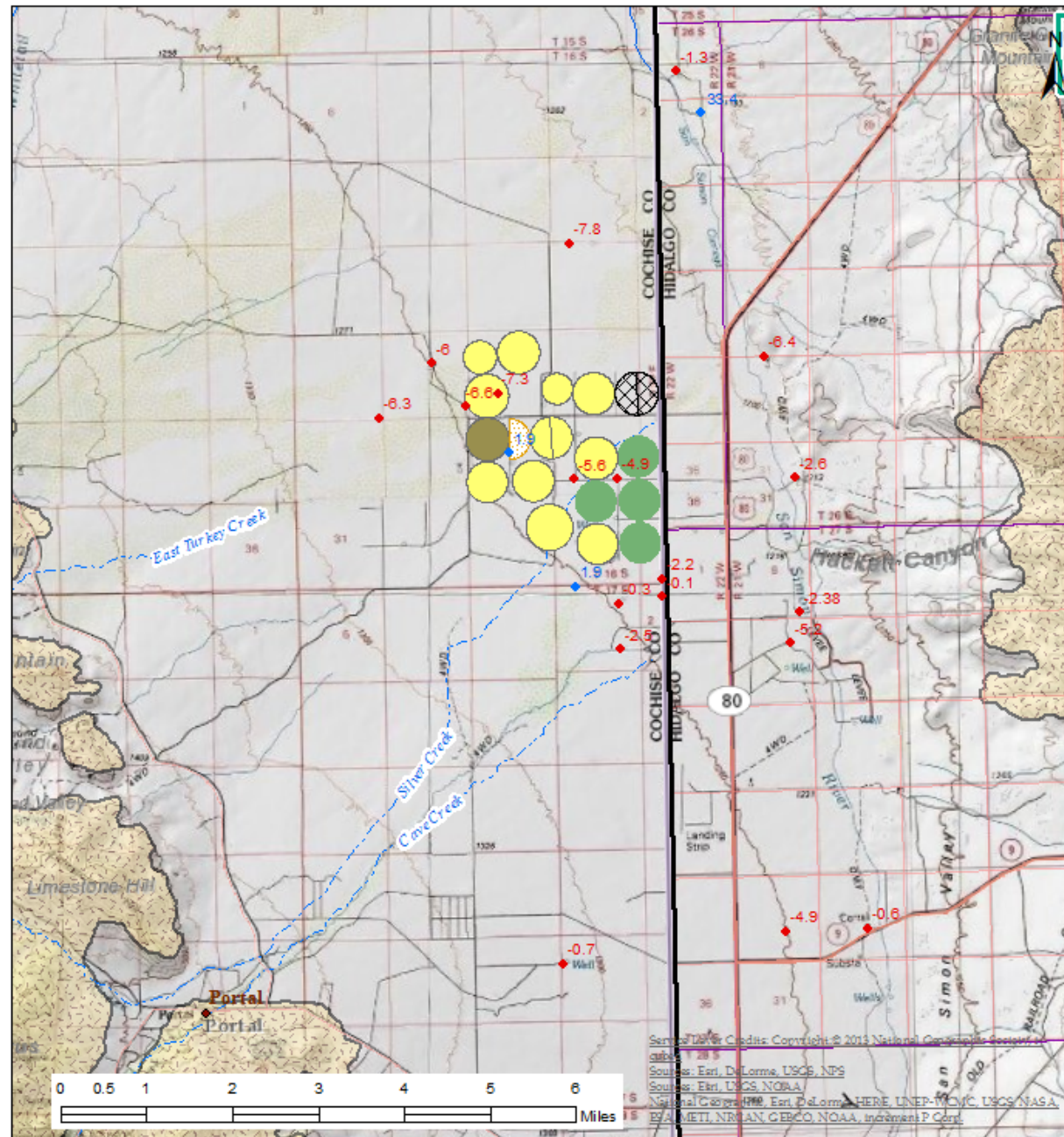
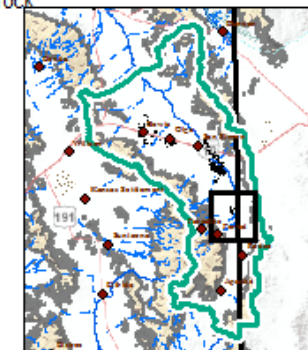


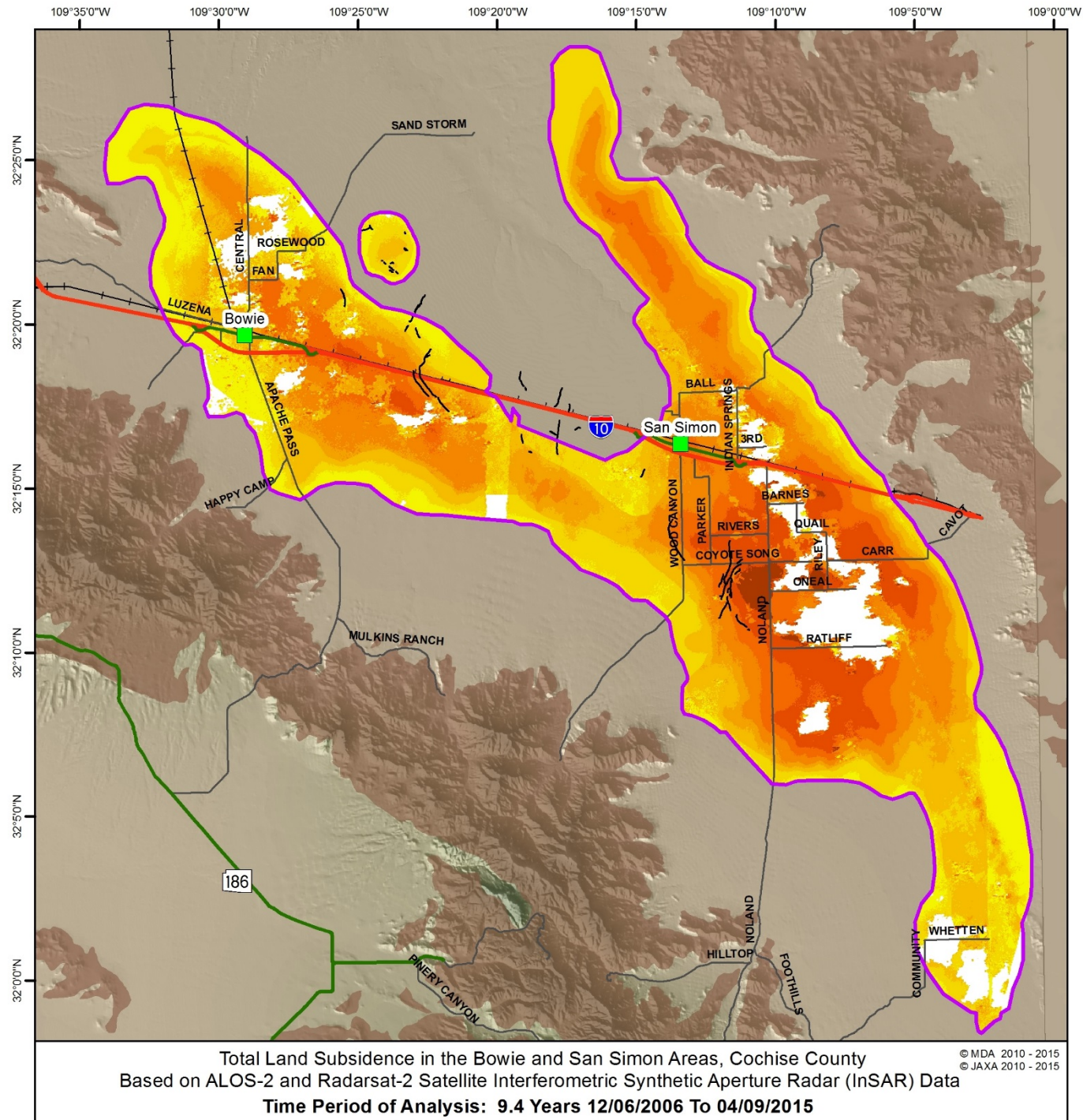
2014 Agricultural Lands Portal, Paradise & Rodeo Portions of the San Simon Valley Sub-Basin (Preliminary Data - Subject to Revision)

Explanation

2014 Agricultural Lands	
	ALFALFA
	GRASS
	BARLEY2
	OATS
	CHILI
	GRAPES
	SORGHUM
	PECAN
	YOUNG PECAN
	FUTURE PECAN
	ABANDON
	FALLOW
	PISTACHIO
	CORN

- Negative Water Level Change 2007 to 2015
- Positive Water Level Change 2007 to 2015
- City or Town
- Stream
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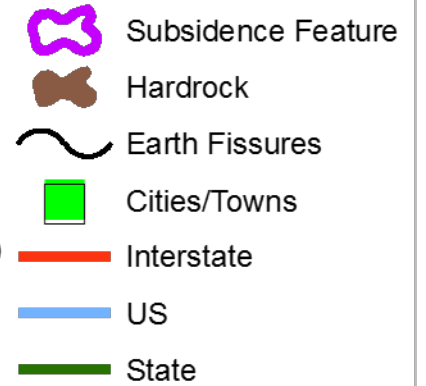
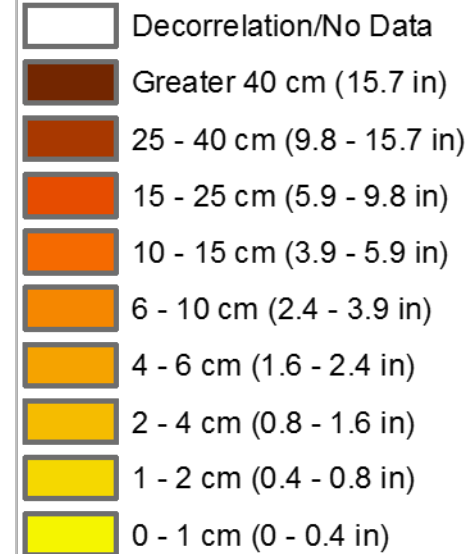




Explanation

12/06/2006 To 04/09/2015

Total Land Subsidence



Water Quality

Summary of San Simon Valley Water Quality Data (ADEQ, 2004)

- Groundwater in the San Simon Valley Sub-basin is Generally Suitable for Domestic and Municipal Use With 67 Percent of Sample Sites Meeting All Health-Based Water Quality Standards**
- Wells That Did Not Meet Health-Based Standards Are Most Clustered Around the Town of San Simon and Northwest Along the San Simon River Groundwater In These Areas Often Appears Unsuitable For Domestic and/or Municipal Without Additional Water Treatment**

ADEQ, 2004. Ambient Water Quality of the San Simon Sub-Basin: A 2002 Baseline Study (Open-File Report 04-02)

Summary of San Simon Valley Water Quality Data (ADEQ, 2004)

- **Suitability of Groundwater For Irrigation In The San Simon Valley Sub-Basin Displays A Wide Range of Irrigation Water Classifications With Salinity Hazards Generally Greater Than Sodium**
- **Selected Anthropogenic Water Quality Effects Noted:**
 - **High Calcium and Sulfate Levels In Agricultural Areas Due to Dissolution of Calcite and Gypsum Concentrated by Evaporation During Irrigation**
 - **Elevated Levels of Nitrate At A Few Sites Around San Simon Probably Due to Application of Nitrogen Fertilizer to Irrigated Farmland**
 - **Elevated Nitrate at A Windmill near Bowie Probably Due To Nearby Cattle Corrals**
 - **Two Sites With TDS Exceedances in Chiricahuas Were Likely Impacted By Historic Mining Operations**

ADEQ, 2004. Ambient Water Quality of the San Simon Sub-Basin: A 2002 Baseline Study (Open-File Report 04-02)

Thank You

This Presentation Is Available At:
www.azwater.gov