Arizona Strip Planning Area

Background

The Arizona Strip Planning Area is located in the far northwestern corner of the state, north of the Grand Canyon and the Colorado River. The Planning Area is portions of Coconino and Mohave Counties. The area is sparsely populated with the largest population center being Colorado City. Other population centers include: Fredonia, Centennial Park, Beaver Dam and Littlefield. The Planning Area also includes the Kaibab Indian Reservation near Fredonia along the northern border with Utah.

The majority of the land within the Planning Area is owned and managed by federal land management agencies, with over 90 percent controlled by the US Bureau of Land Management (BLM) and the National Park Service (*see Figure P.A. 2-1*). Less than five percent of the land is privately held. The balance of the Planning Area includes State Trust Lands managed by the Arizona State Land Department.

Water Supply Conditions

Groundwater

The Arizona Strip Planning Area is located within both the Colorado Plateau Physiographic Province, and the Basin and Range Physiographic Province. Water resources vary in each of these provinces. The Colorado Plateau Province is characterized by mostly level, horizontally stratified sedimentary rocks that have been eroded into canyons and plateaus, and by some high mountains. The Basin and Range Province is characterized by long broad alluvial valleys separated by mountain ranges, with thick productive regional alluvial aquifers. The province contains regional aquifers within sandstone and limestone layers and relatively thin deposits of alluvium that support unconfined aquifers along streams.

There are five groundwater basins within the Planning Area (*see Figure P.A. 2-2*). From east to west three basins, the Paria, Kanab Plateau, and Shivwits Plateau lie within the Colorado Plateau Province. The Virgin River and Grand Wash basins are adjacent to the western side of the Planning Area along the Nevada state border. This portion of the Planning Area is located within the Basin and Range Province.

Groundwater conditions in the Paria Basin generally declined at an average rate of 1.8 feet per year from 1989 to 2012 (*see Figure P.A. 2-2*). Groundwater levels in the Kanab Plateau Basin are generally stable to rising at approximately 0.3 feet per year from 1992 to 2012. Levels within the Virgin River Basin are generally increasing about 0.3 feet per year. Groundwater levels are also generally rising at approximately 1.2 feet per year in the Grand Wash Basin. Insufficient data is available for the Shivwits Plateau Basin.

Surface Water

Surface water features in the Planning Area include the Colorado River, which flows from northeast to the southwest and defines the southern border of the Planning Area (*see Figure P.A. 2-3*). The Colorado River is impounded in the northeast region of the Planning Area forming Lake Powell, and in the southwest region of the Planning Area forming Lake Mead. Other surface water features are the Paria

River in the northeast region of the Planning Area and the Virgin River and Beaver Dam Wash in the northwest region of the Planning Area.

Reclaimed Water

Reclaimed water generation is mostly limited to the population centers within the Kanab Plateau Basin and Virgin River Basin. Total reclaimed water production is estimated to be less than 500 acre-feet per year.

Ecological Resources

Large portions of the Arizona Strip Planning Area have been designated as critical habitat under the Endangered Species Act (*see Figure P.A. 2-3)*. These areas are largely limited to federal lands. Additionally, the Paiute and Beaver Dam Mountain Wilderness Areas are in the northwestern corner of the Planning Area. The Paria Canyon Wilderness Area is located in the far eastern portion of the Planning Area. The southern border of the Planning Area is defined by the Colorado River and, from east to west, abuts the Glen Canyon National Recreation Area, Grand Canyon National Park, and the Lake Mead National Recreation Area. The northern portion of the Kaibab National Forest lies in the eastern portion of the Planning Area.

Water Demands

Table P.A. 2-1 illustrates the baseline and projected water demands in the Arizona Strip Planning Area. Water demands within the Planning Area are served by a combination of surface water and groundwater. Agricultural demands are present within the Planning Area but are not expected to increase in the future. Municipal and domestic demands are scattered in small isolated population centers across the Planning Area and are expected to increase primarily in the existing population centers. Because of the large tracts of BLM lands, demands for energy production have been projected for this Planning Area.

Characteristics Affecting Future Demands and Water Supply Availability

Information regarding sustainable groundwater development is insufficient for this Planning Area. While demands are currently relatively small, some areas are drought sensitive and water level declines have been observed. However, it is unknown whether these declines will have long-term negative impacts.

Exportation

One item that may have an impact on future water supply availability is the interest for possible exportation of water to neighboring states from this Planning Area. Pursuant to Arizona Revised Statute (A.R.S.) §§ 45-291 et seq. – in compliance with federal commerce laws - it is permissible to transport water out of Arizona in limited circumstances. On March 15, 2005, ADWR received an application from Wind River Resources, LLC (Wind River), proposing to transport water via pipeline from the Mormon Wells area along the Beaver Dam Wash in northwestern Arizona to the Virgin Valley Water District in Mesquite, Nevada. After review of the application and a hearing conducted by the Arizona Office of Administrative Hearings, the application was denied because the applicant failed to demonstrate that the application met the statutory criteria. This application spurred significant controversy not only for the Beaver Dam and Littlefield, Arizona areas but also across Arizona.

Protected Species and Habitat

Large portions of the Arizona Strip Planning Area have been designated as critical habitat under the Endangered Species Act (*see Figure P.A. 2-3)*. These areas are largely limited to Federal lands. The presence of a listed species may be a critical consideration in water resource management and supply development in a particular area.

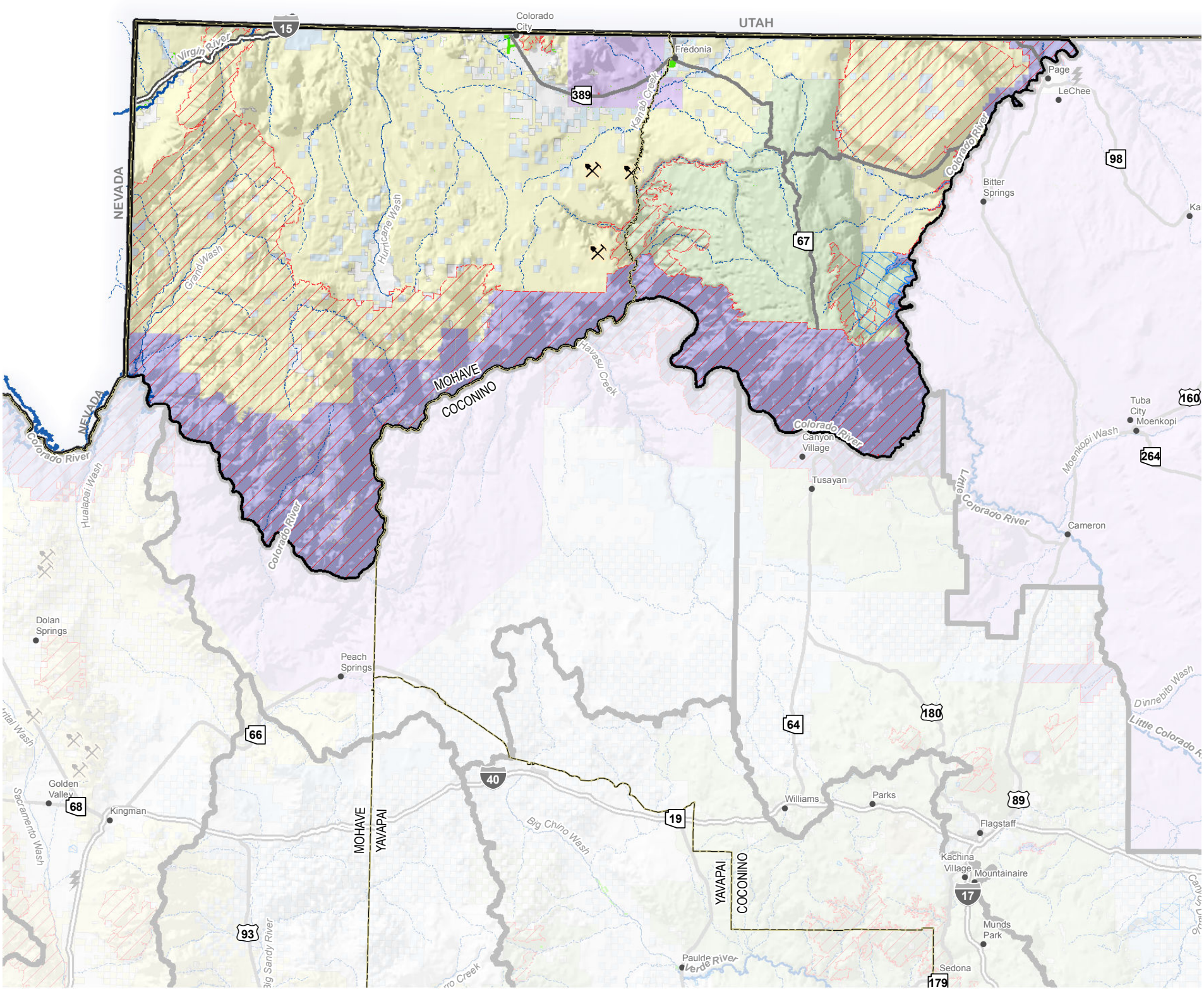
Table P.A. 2-1 Projected Water Demands (in acre feet) – Arizona Strip Planning Area

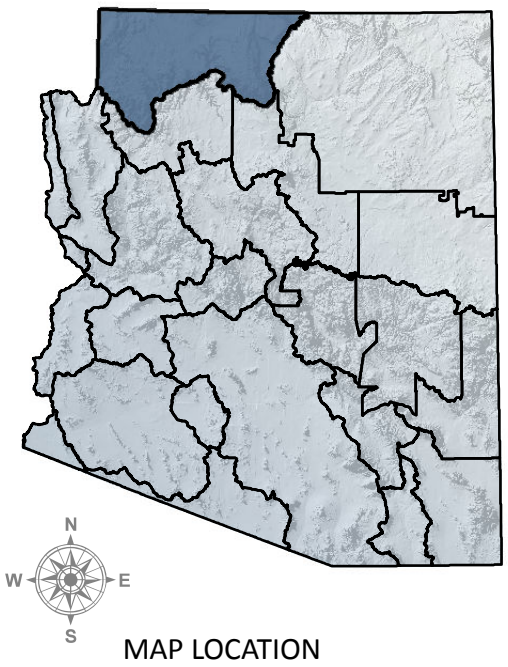
Sector	2010	2035	2060
Agriculture	2,100	2,100	2,100
Dairy	27	27	27
Feedlot	0	0	0
Municipal	3,315	4,833	6,061
Other Industrial	0	0	0
Mining	0		
High		0	0
Low		0	0
Power Plants	0		
High		12,832	16,091
Low		9,332	11,171
Rock Production	0		
High		217	274
Low		91	114
Turf	882		
High		882	882
Low		882	882
Total (High)	**6,324**	**20,891**	**25,435**
Total (Low)	**6,324**	**17,265**	**20,355**

Strategies for Meeting Future Water Demands

Because projected water demand increases are still small for the Arizona Strip Planning Area, no strategies are being developed at this time. However, interests in Nevada have requested a joint comprehensive hydrologic model be developed and exploration of interstate water management governance in the region including the Arizona Strip Planning Area. Arizona has not yet agreed to participate in either model preparation or governance discussions due to the lack of available information and concerns regarding exportation of water supplies from the State. ADWR believes that Arizona should develop a comprehensive hydrologic model that would assist the evaluation of long-term sustainability of the water supplies in this Planning Area and the availability of water supplies for possible energy development.

NOTE: Because GIS data for this project were acquired from multiple sources employing different land base grids and varying accuracy standards, some inconsistencies were encountered.
The user is responsible for understanding the accuracy limitations of GIS data layers and is responsible for the results of any application of the data for other than their intended purpose.





MAP LOCATION
(Planning Area Boundaries)

- Planning Area (ADWR)
- State (ALRIS)
- County (ALRIS)
- River or Stream (ASLD)
- Interstate (ADOT)
- Population Center (GNIS)
- Mine (ADMMR, ADWR)
- Hydroelectric Power Plant (ADEQ, ADWR)
- Thermoelectric Power Plant (ADEQ, ADWR)
- Agriculture (SWReGAP, 2004)
- Federal Conservation Land (USFS, BLM, NPS)
- State Managed Conservation Land (AZGFD, AZSP)
- BLM Land
- National Forest
- National Park
- Military Reserve
- Private and Other Land
- State Trust Land
- Tribal Land

Figure P.A.2-1

Arizona Strip Land Ownership

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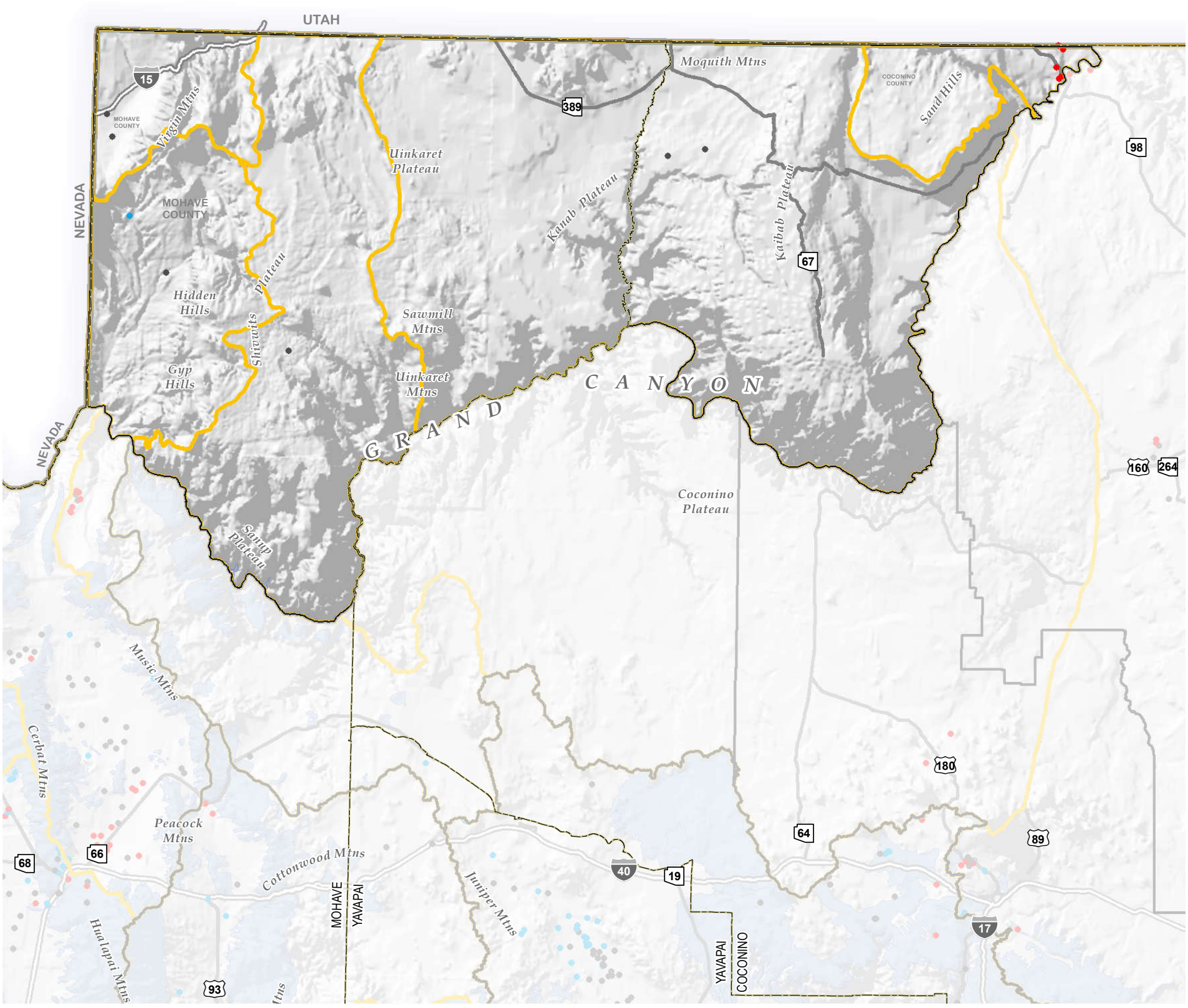

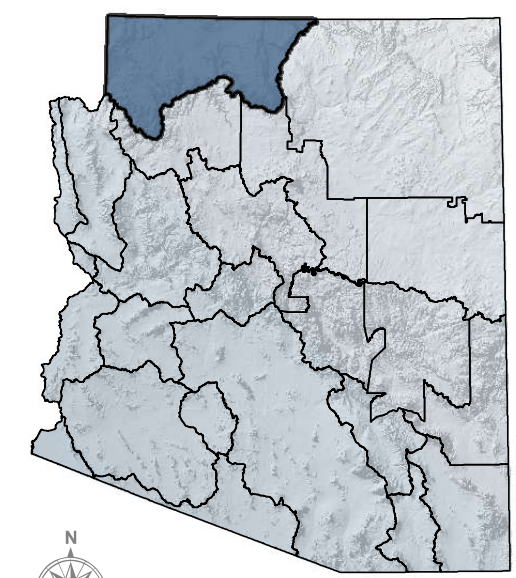

MAP LOCATION
(Planning Area Boundaries)

- Planning Area (ADWR)
- State (ALRIS)
- County (ALRIS)
- Groundwater Basin (ADWR)
- Area of Active Land Subsidence (ADWR)
- Hard Rock Geology (AZ Bureau of Mines, UofA)
- Interstate (ADOT)

Recent Water Level Change * (1990's through 2000's)
- Minor WL Change +5' to -5'
- Negative
- Positive

* Data provided by ADWR

Figure P.A.2-2

Arizona Strip Groundwater Hydrology

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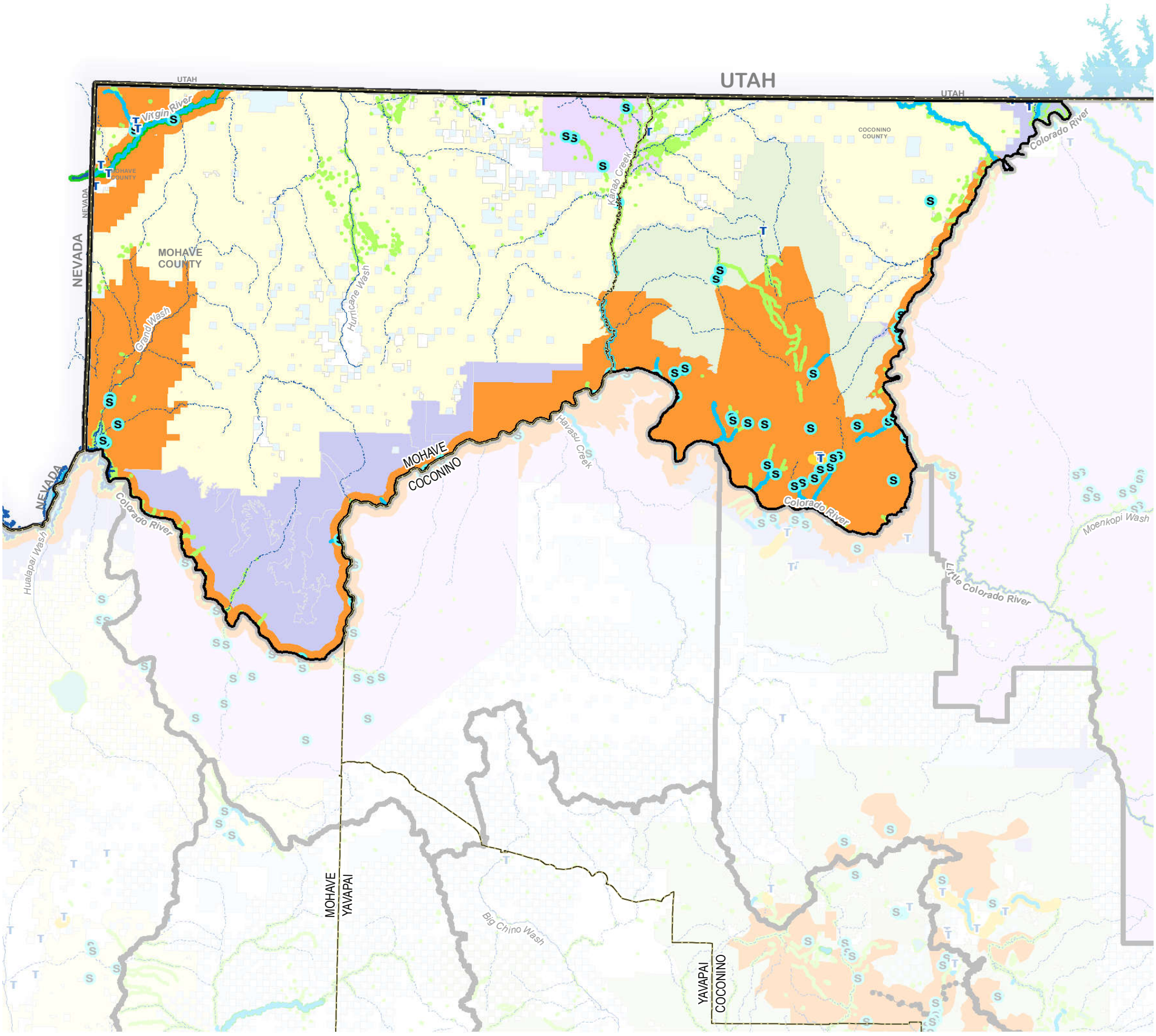
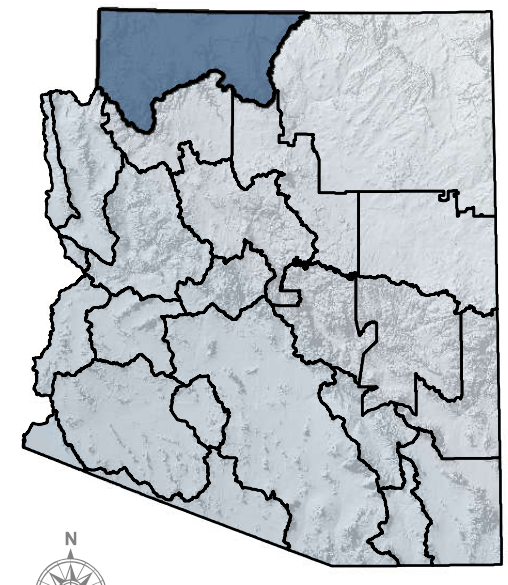




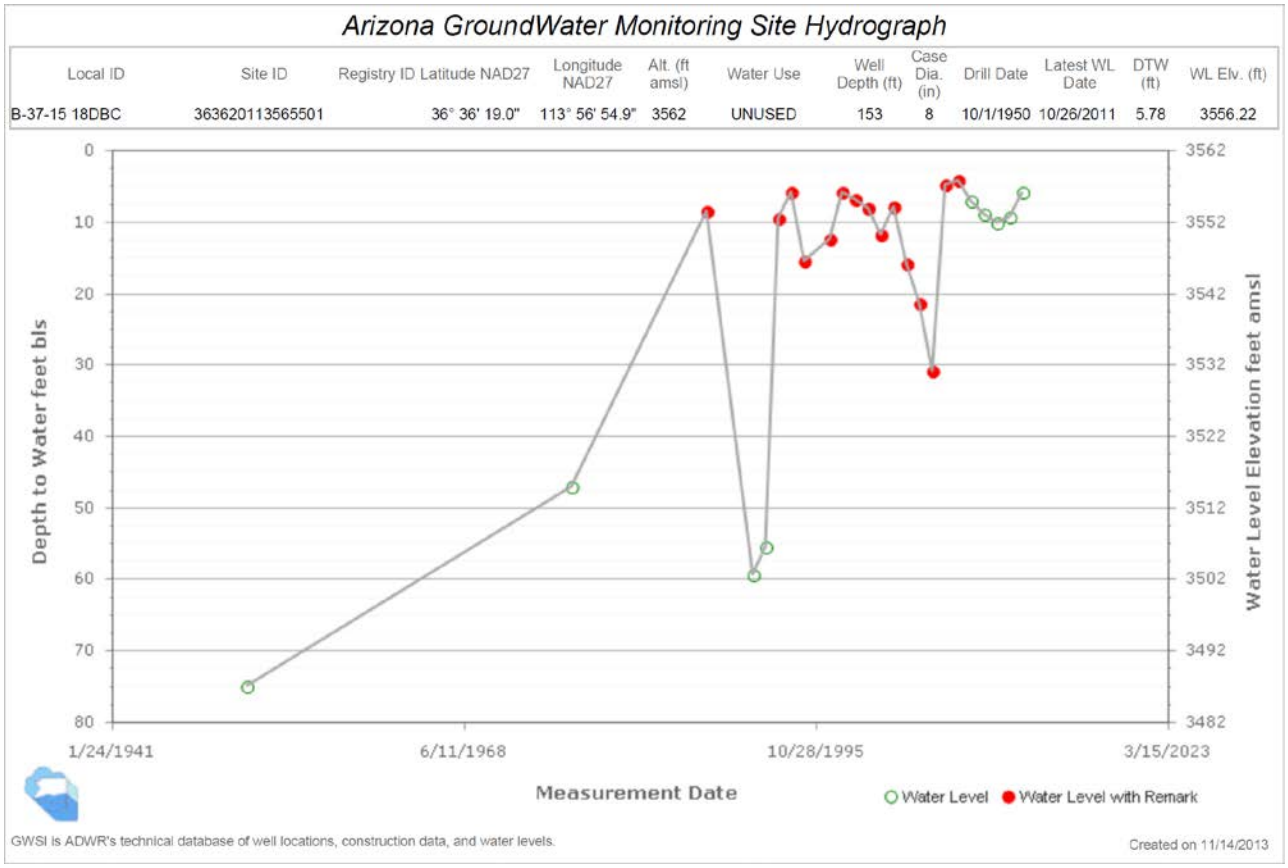
MAP LOCATION
(Planning Area Boundaries)

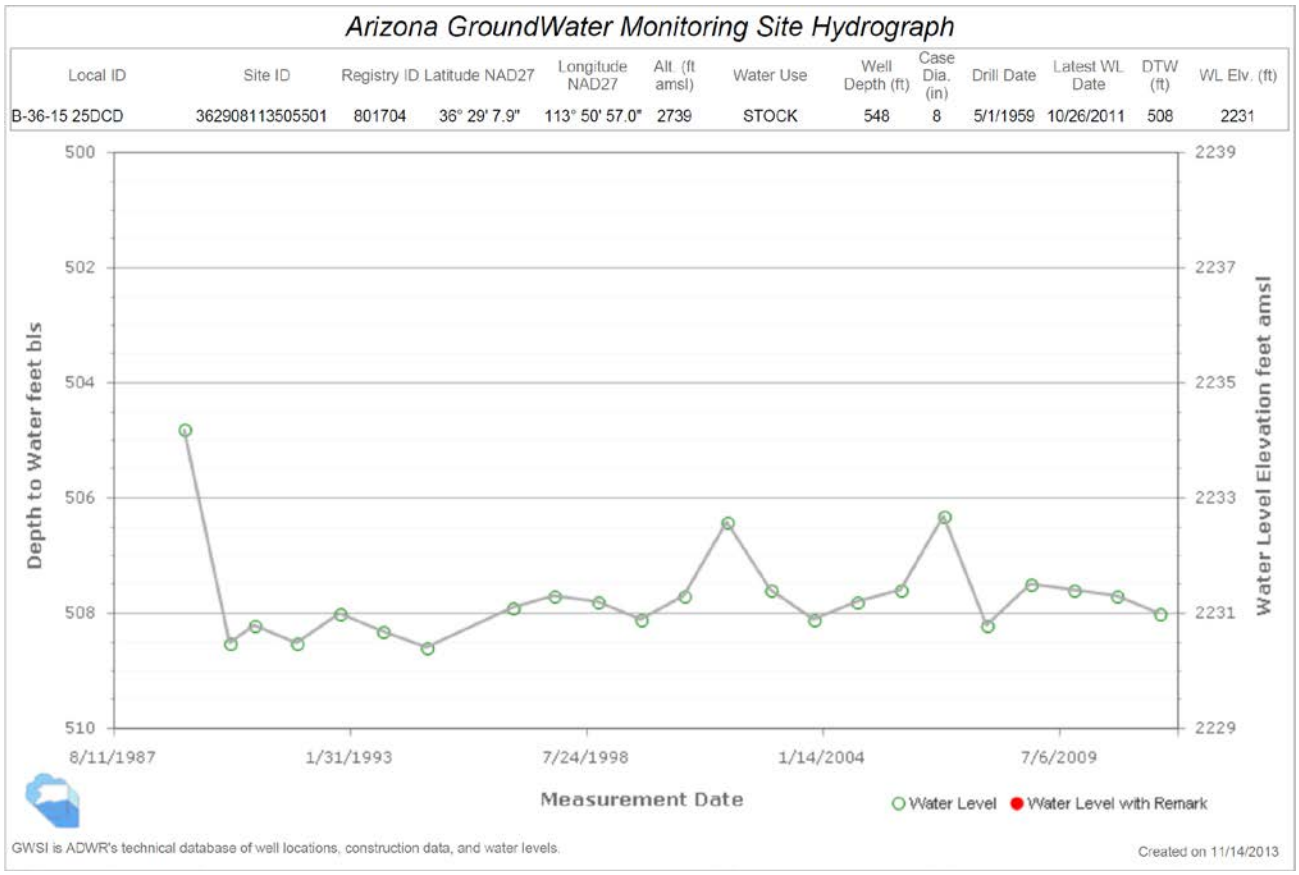
- Planning Area (ADWR)
- State (ALRIS)
- County (ALRIS)
- Reservoir or Lake (NHD)
- Waste Water Treatment Plant (ADEQ)
- Major Spring (ADWR, Pima County)
- Perennial Flow (ADEQ, USGS)
- River or Stream (ASLD)
- Outstanding Arizona Water (ADEQ)
- Effluent Dependent Stream (ADWR, NEMO)
- Instream Flow Certificate (ADWR)
- 1993 Riparian Inventory (AZGFD)
- Modeled Riparian Habitat (AZGFD)
- Designated ESA Critical Habitat (USFWS)
- Proposed ESA Critical Habitat (USFWS)
- Federally Designated Wild and Scenic River (USFS)
- BLM Land
- National Forest
- National Park
- Military Reserve
- Private and Other Land
- State Trust Land
- Tribal Land

Figure P.A.2-3

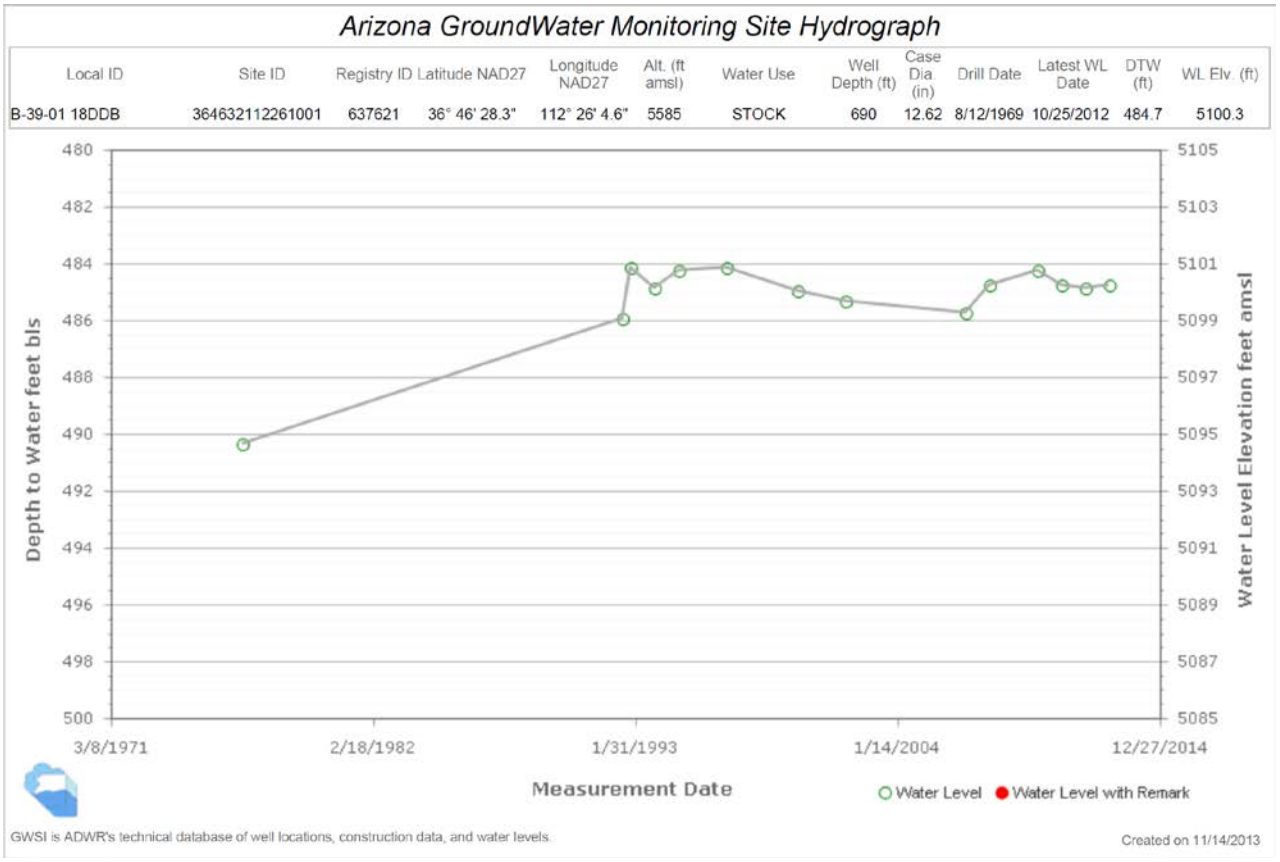
Arizona Strip
Surface Water and Natural Features

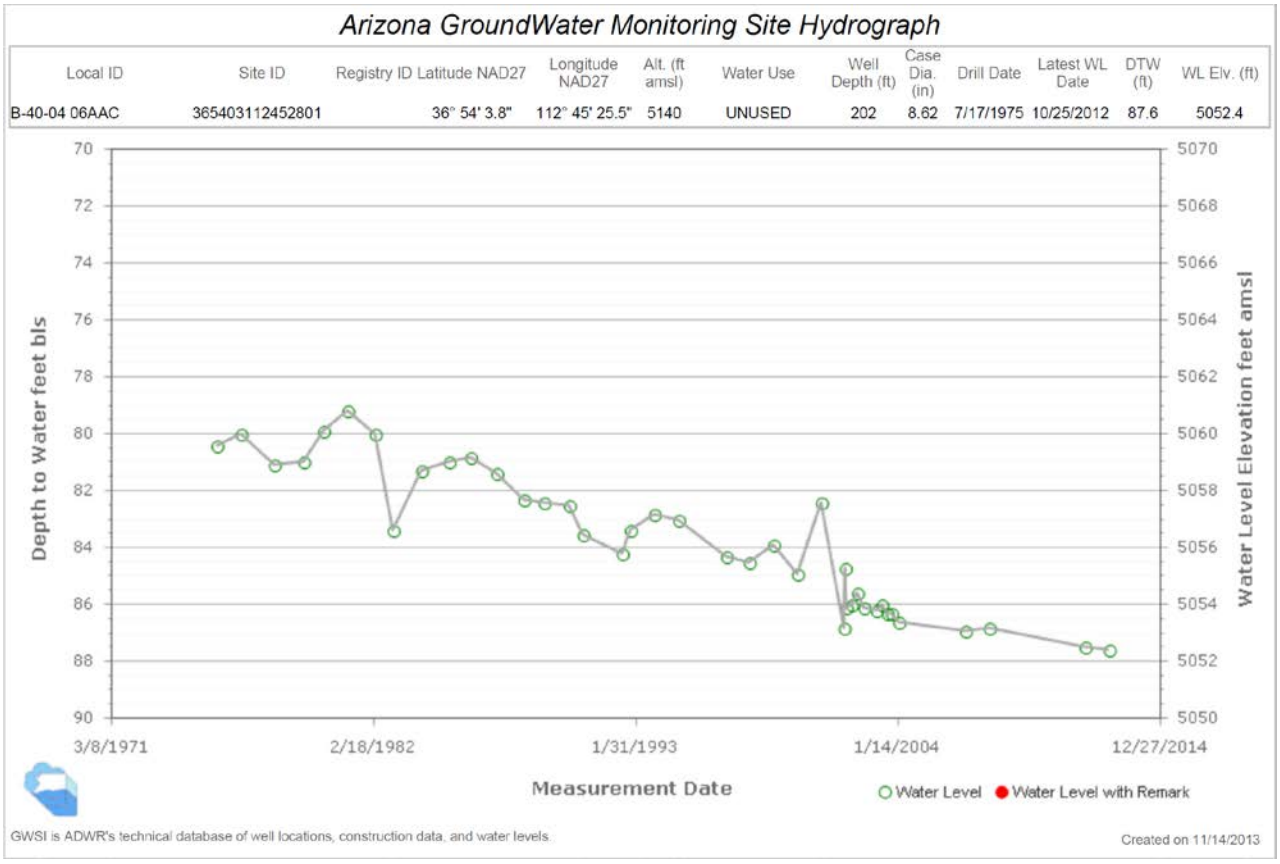
Grand Wash Basin – Arizona Strip Planning Area



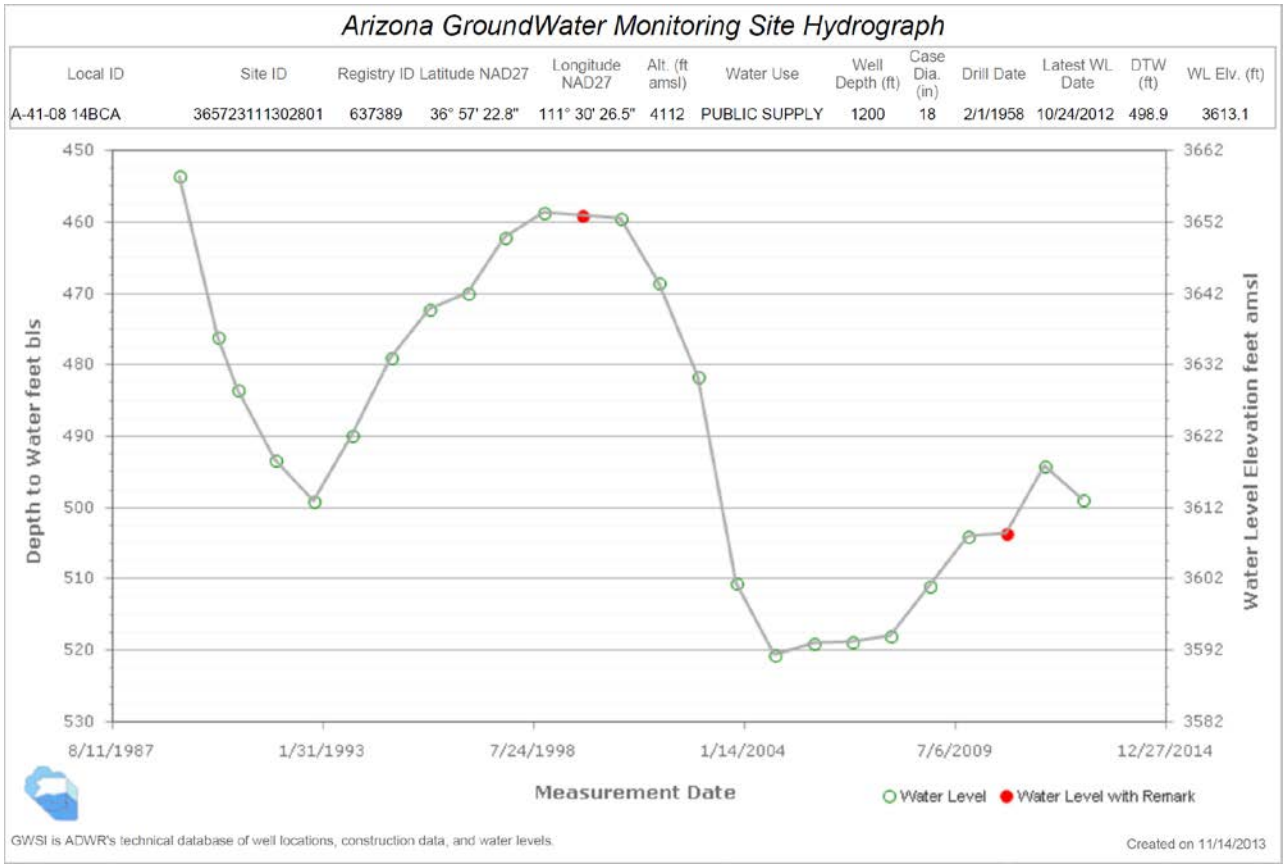


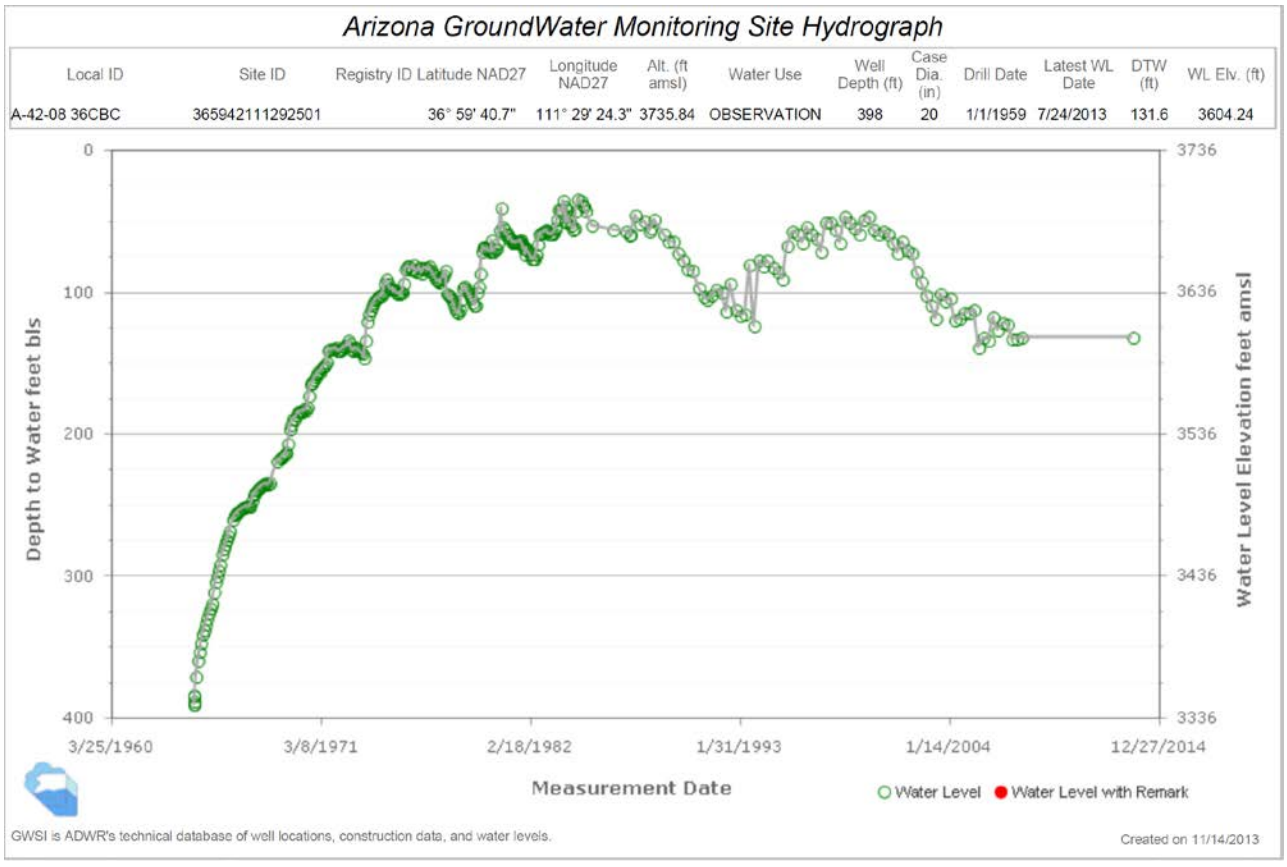
Kanab Basin – Arizona Strip Planning Area





Paria Basin – Arizona Strip Planning Area





Virgin River Basin – Arizona Strip Planning Area