

Lower Gila Planning Area

Background

The Lower Gila Planning Area is located in the southwestern corner of Arizona and encompasses portions of Maricopa, Pima, Yuma, and La Paz counties. The Planning Area includes the entire Lower Gila Groundwater Basin comprised of three sub-basins: Childs Valley, Dendora Valley, and Wellton-Mohawk Valley. Communities include Why, Ajo, Sentinel, Hyder, Dateland, Tacna, Wellton, Dome and Fisher's Landing. A portion of the Tohono O'odam Indian Reservation is included in the far southeastern portion of the Planning Area.



The majority of the land (86 percent) within the Lower Gila Planning Area is owned and managed by the federal government (see Figure P.A. 12-1). The Tohono O'odam Indian Reservation includes just over two percent of these federal lands with larger holdings by the US Military at the Yuma Proving Grounds and the Barry M. Goldwater Air Force Range (approximately 38 percent). Other federal lands include national wildlife refuges and wilderness areas (approximately 23 percent) for resource conservation, wildlife protection and recreation; the US Bureau of Land Management (BLM) owns nearly 21 percent primarily used for livestock grazing, resource conservation and recreation; and the National Park Service (nearly four percent). State Trust Lands comprise just over four percent of the lands in the Planning Area and private lands (nearly 6 percent) are interspersed across the remainder of the Planning Area, primarily along the central corridor of the Basin between Interstate-8 to the south and Antelope Hill/Hyder Road to the north.

Water Supply Conditions

Groundwater

The Lower Gila Planning Area is located in the Basin and Range Physiographic Province. This Province is characterized by long broad alluvial valleys separated by mountain ranges, with thick productive regional alluvial aquifers. The groundwater within the Lower Gila Basin is usually found within productive basin-fill areas and in recent stream alluvium deposits. Prior to development, groundwater flow was from north and southeast toward the Gila River and then downstream to the southwest, generally paralleling the Gila River. Groundwater flow has been impacted by groundwater pumping at some locations in the Basin.

Groundwater levels in the Gila River floodplain in the western part of the basin historically ranged from 10 to 20 feet below land surface and the streambed alluvium served as the primary source of groundwater (see Figure P.A. 12-2). As irrigation activity increased in the 1930s, groundwater levels declined and salinity levels increased. To provide a dependable water supply for irrigation, Colorado River water was imported into the area in 1952 with completion of the Wellton-Mohawk canal system and groundwater pumping for irrigation ceased. Incidental recharge to the stream alluvium aquifer raised water levels, necessitating the need for a system of drainage wells to maintain groundwater levels below crop root zones and canals to transport the drainage water out of the Basin.

Estimates of natural groundwater recharge range from 9,000 to 88,000 acre-feet per year, primarily from infiltration of runoff in washes and the Gila River floodplain. Underflow from the Painted Rock

Dam on the Gila River at the eastern boundary of the Planning Area and releases from the dam during and immediately following flood events also contributes to groundwater recharge. By example, water releases from Painted Rock Dam (located upstream in the Gila Bend Planning Area) in 1975 resulted in an estimated 59,500 acre-feet of recharge along the Gila River floodplain. In the far western portions of the Basin, incidental recharge from agricultural activities is the largest source of groundwater recharge. Groundwater in storage is estimated to be nearly 144 MAF.

Groundwater quality varies in the eastern part of the Basin, with elevated fluoride concentrations measured in a number of wells. In the western part of the Basin, the quality of groundwater in the Gila River floodplain is characterized by elevated TDS concentrations as well as fluoride and arsenic.

Surface Water

The main surface drainage feature within the Planning Area is the Gila River which is intermittent, bisecting the central portion of the Planning Area from east to west (*see Figure P.A. 12-3*). Gila River flows in the Planning Area are highly variable, generally flowing now only in response to precipitation events, irrigation return flows, or releases from upstream dams. Near its confluence with the Colorado River, the Gila River near Dome, the stream gage recorded a maximum annual flow of over 4.7 MAF in 1993. Median annual flows at the Gila River near Dome are less than 4,800 acre-feet.

On the far western edge of the Planning Area, The Colorado River is perennial (*see Figure P.A. 12-3*). Imperial Dam is located on the Colorado River and is used primarily for diversion of Colorado River water for irrigation purposes in Arizona and California. The Gila Gravity Main canal delivers Colorado River water from Imperial Dam to the Wellton-Mohawk Irrigation and Drainage District (IDD) (water is also diverted through the Gila Gravity Main to irrigation districts in the Colorado Main Stem South Planning Area in the Yuma Basin). The majority of Colorado River water within the Wellton-Mohawk Irrigation and Drainage District is used for agricultural irrigation. A small portion is diverted for domestic and municipal uses in the Town of Wellton.

Reclaimed Water

There are several wastewater treatment facilities in the Lower Gila Basin. The total volume of reclaimed water generated, however, is minimal, less than 300 acre-feet per year. Most disposals are through evaporation and infiltration ponds, but one golf course, the Links at Coyote Wash in Wellton, is irrigated with reclaimed water.

Ecological Resources

Below Painted Rock Dam, the Gila River is mostly dry until irrigation return flows within the Wellton-Mohawk Irrigation District add some flow to the river. In the area near Dome, return flows support riparian vegetation consisting of a narrow band of cottonwood trees and dense tamarisk along the channel (*see Figure P.A. 12-3*). Protected areas in this Planning Area include portions of the following:

- Organ Pipe Cactus National Monument;
- Cabeza Prieta National Wildlife Refuge, the third largest refuge in the contiguous United States with an area of over 860,000 acres primarily designated as wilderness (including lands in the Western Borderlands Planning Area);
- Kofa National Wildlife Refuge, at 665,400 acres, also primarily designated as wilderness (including lands within the West Basins and Colorado Main stem South Planning Areas); and

- Imperial National Wildlife, at almost 25,800 acres, of which 15,000 acres is designated wilderness Refuge (including lands within the Colorado Main Stem South Planning Area).

Additional BLM wilderness areas include the Eagletail Mountains Wilderness, Muggins Mountains Wilderness, Woolsey Peak Wilderness and Signal Mountain Wilderness.

Water Demands

Table P.A. 12-1 below illustrates baseline and projected water demands in the Lower Gila Planning Area. Agriculture is the dominant use sector in the Lower Gila Planning Area. In the eastern portion of the Planning Area, groundwater makes up the majority of the agricultural supply, predominantly around Hyder. In the western portion of the Planning Area, Colorado River water is the predominant agricultural water supply. The Wellton-Mohawk IDD irrigates approximately 63,000 acres and currently has a Priority 3 Colorado River entitlement for consumptive use of approximately 278,000 acre-feet per year. In the western portion of the Planning Area, shallow groundwater, a consequence of incidental recharge from agricultural irrigation, has required dewatering pumping for removal via drainage canals. Agricultural demands were projected by the WRDC to decline through 2060, although district officials have stated that this assumption may be overstated, as such for purposes of this document it is projected that agricultural uses will remain stable through the planning period.

Industrial demands in the Planning Area are primarily dependent on groundwater and includes approximately 3,600 acre-feet per year for dairies and feed lots. The largest industrial demand is a feed lot operation east of Wellton, the McElhaney Cattle Company, which custom feeds up to 100,000 head at one time. Water use for dairies and feedlots are projected to increase significantly through the planning period.

Municipal uses primarily rely upon groundwater, although a small portion uses surface water within the Wellton-Mohawk IDD as noted above. Municipal groundwater demand is about 2,000 acre-feet per year, and is projected to increase slightly through the planning period.

Characteristics Affecting Projected Water Demands and Supply Availability

General Stream Adjudication

The general stream adjudications are judicial proceedings to determine or establish the extent and priority of water rights in the Gila and Little Colorado River systems. Over 84,000 claimants and water users are joined in the Gila River Adjudication that will result in the Superior Court issuing a comprehensive final decree of water rights. Until that process is complete, uncertainty regarding the extent and priority of water rights, particularly in the eastern portion of this Planning Area, will make it difficult to identify strategies for meeting the projected water demands.

Land Ownership

Because of the large areas of land in federal ownership, it is not anticipated that significant development will occur outside of the current population centers. Much of the federally-owned lands include portions of several Wilderness Areas. Wilderness areas are designated under the 1964 Wilderness Act to preserve and protect the designated area in its natural condition. These designations have the potential to significantly limit water supply development and growth in this Planning Area.

Table P.A. 12-1. Projected Demands (in acre feet) – Lower Gila Planning Area

Sector	2010	2035	2060
Agriculture	393,000	393,000	393,000
Dairy	246	5,281	13,814
Feedlot	3,421	6,781	6,781
Municipal	2,028	2,676	3,184
Other Industrial	0	0	0
Mining	0		
High		18,000	18,000
Low		0	0
Power Plants	0		
High		1,642	2,955
Low		1,313	2,364
Rock Production	0		
High		200	238
Low		83	99
Turf	0		
High		0	0
Low		0	0
Total (High)	398,695	427,580	437,972
Total (Low)	398,695	409,134	419,242

Colorado River Entitlement Priority

Rights to Colorado River water in Arizona are based on the following priority levels:

- a. 1st Priority: Satisfaction of Present Perfected Rights as defined in the Arizona v. California decree (pre-1928);
- b. 2nd Priority: Satisfaction of Secretarial Reservations and Perfected Rights established prior to September 30, 1968;
- c. 3rd Priority: Satisfaction of entitlements pursuant to contracts between the United States and water users in Arizona executed on or before September 30, 1968 (2nd and 3rd priority are coequal);
- d. 4th Priority: i) Contracts, Secretarial Reservations and other arrangements between the U.S. and water users in Arizona entered into after September 30, 1968, for a total quantity not to exceed 164,652 acre-feet of diversions annually and ii) contract No. 14-06-W-245, dated December 15, 1972, as amended, between the United States and the Central Arizona Project (CAP). Entitlements having a 4th priority as described in (i) and (ii) are coequal;
- e. 5th Priority: Unused Arizona entitlement; and
- f. 6th Priority: Surplus water

Within the Planning Area, there are no entitlement holders with a 1st Priority or Present Perfected Rights. Second (2nd) and 3rd priority entitlement holders (which are coequal), include the Imperial and Cibola National Wildlife Refuges, Yuma Proving Grounds, and the Wellton-Mohawk IDD.

Salinity and Mexican Treaty Compliance

Portions of the irrigated lands in the Planning Area must have either natural or artificial drainage to remove excess water that would otherwise “waterlog” the land, and also to dispose of the salts which accumulate through evapotranspiration. Long-term irrigation with Colorado River water, combined with naturally elevated salt concentrations in groundwater and soil, require salts to be leached from the soil through irrigating in excess of the crop consumptive use and removal of the leached water to prevent waterlogging. In addition, occasional flooding on the Gila River raises groundwater levels to depths within crop root zones. The Wellton-Mohawk IDD operates 90 drainage wells spaced about a mile apart with an average depth of 100 feet to control rising groundwater levels below the root zone of crops. About 120,000 acre-feet of brackish groundwater is pumped annually. Three-hundred observation wells monitor groundwater levels¹. If this water was directly returned to the river it would increase salinity levels above the international treaty standard and could not be counted towards Mexico’s Colorado River apportionment of 1.5 MAF.

Because the high salinity of the Wellton-Mohawk IDD return flows increased the salinity of the Colorado River, a number of actions were undertaken to achieve the salinity standards for delivery to Mexico specified in Minute 242 of the 1944 Mexican Water Treaty. The drainage water is pumped into a dedicated concrete-lined channel (Main Outlet Drain and Extension, “MODE”), which allows it to be either diverted to the main channel of the Colorado River above Morelos Dam, or bypass the dam through a canal to the Cienega de Santa Clara in Mexico. The US also built a \$250 million dollar desalination plant in Yuma to treat Wellton-Mohawk IDD drain water, so that it could be returned to the mainstem of the Colorado River for delivery to Mexico. The facility was completed in 1992, operated briefly in 1993, and then placed in standby status. The Wellton-Mohawk IDD has also taken steps within the District to reduce return flows including: acreage reduction; improved irrigation scheduling; land-leveling; and improvements to ditches and turnouts².

The reestablishment of a wetland in the Mexican Delta was a consequence of the annual bypass of the saline irrigation return flow to the Cienega de Santa Clara. Currently, there is significant interest on both sides of the border to maintain this wetland. However, delivering this water to Mexico via the bypass each year without crediting it against the Treaty obligation requires the U.S. to release an equal volume of water from storage in Lake Mead to meet the required 1.5 MAF entitlement to Mexico. These releases for delivery to Mexico increase the risk of shortage, particularly to the CAP and other 4th priority water users in Arizona. After more than a decade of drought in the Colorado River Basin, the potential for shortage has been further amplified.

Water Management

The Lower Gila Planning Area is not within any AMA, or INA that requires additional water management or reporting. However, because of the relatively high priority Colorado River entitlement in the Wellton-Mohawk Irrigation and Drainage District, some entities may be exploring the potential for water

¹ <http://www.wmidd.org/irrigation.html>

² <http://www.wmidd.org/irrigation.html>

transfers from Wellton-Mohawk IDD for use within other parts of the state. While it is legal to transfer Colorado River water within Arizona, it does require consultation with ADWR, a recommendation from ADWR to the Secretary of the Interior, and approval of the transfer by the Secretary. Consultation and recommendations by ADWR are required by A.R.S. §45-107(D) and are executed through its *Policy and Procedures for Transferring an Entitlement of Colorado River Water*³. Generally, the policy requires the following: irrigation district approval for proposed transfers of water associated with lands located within the district; consideration of city and/or county economic impacts; and possible environmental compliance.

Groundwater Availability

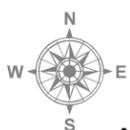
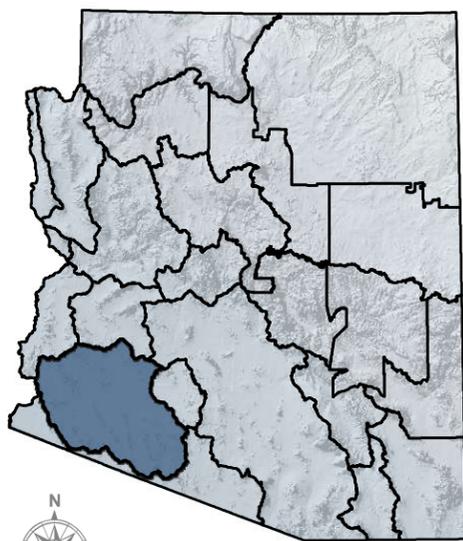
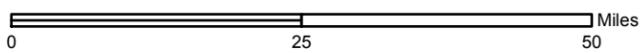
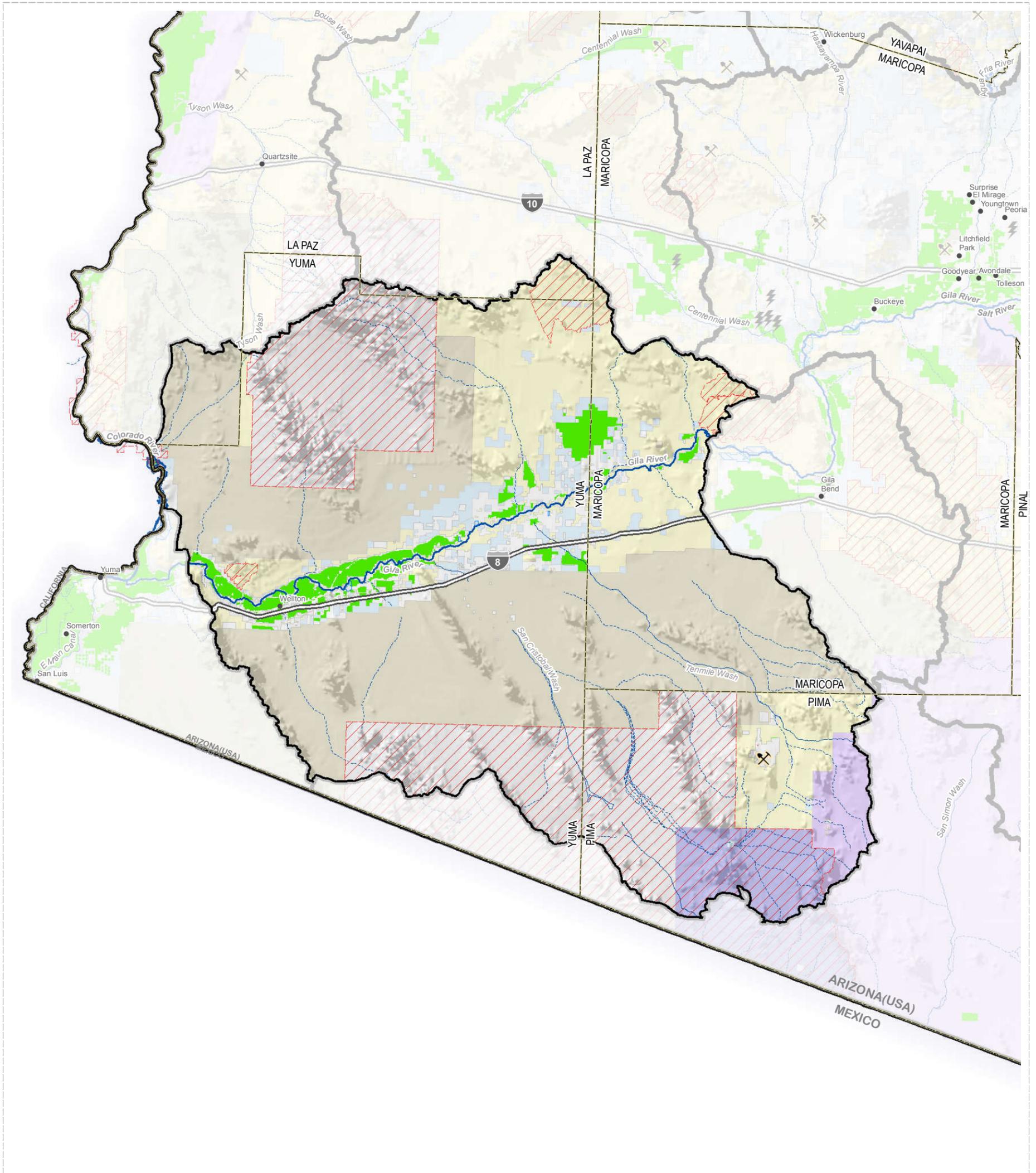
While waterlogging conditions exist in the western portion of the Planning Area, water levels in the eastern portion of the Planning Area do not benefit from connection to, and use of, Colorado River water. As stated earlier, groundwater flow was from north and southeast toward the Gila River and then downstream to the southwest prior to development. Groundwater flow has been altered by the development of cones of depression formed by groundwater pumping at some locations in the Basin. Historically, cones of depression occurred in irrigated areas north of Hyder, east of Dateland and in the Palomas Plain west of Hyder. Historic groundwater level declines up to 15 feet per year were recorded in irrigated areas north and west of Hyder and east of Dateland. ADWR continues to monitor wells in these areas.

Strategies for Meeting Future Water Demands

Sufficient groundwater and Colorado River supplies are expected to be available to meet the projected demands in the Lower Gila Planning Area. Resolution of the Gila River General Stream Adjudication will support long-term certainty of water supply availability in this Planning Area.

³ <http://www.azwater.gov/AzDWR/StateWidePlanning/CRM/documents/CR7new.pdf>

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



Lower Gila Land Ownership

Figure P.A.12-1

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.

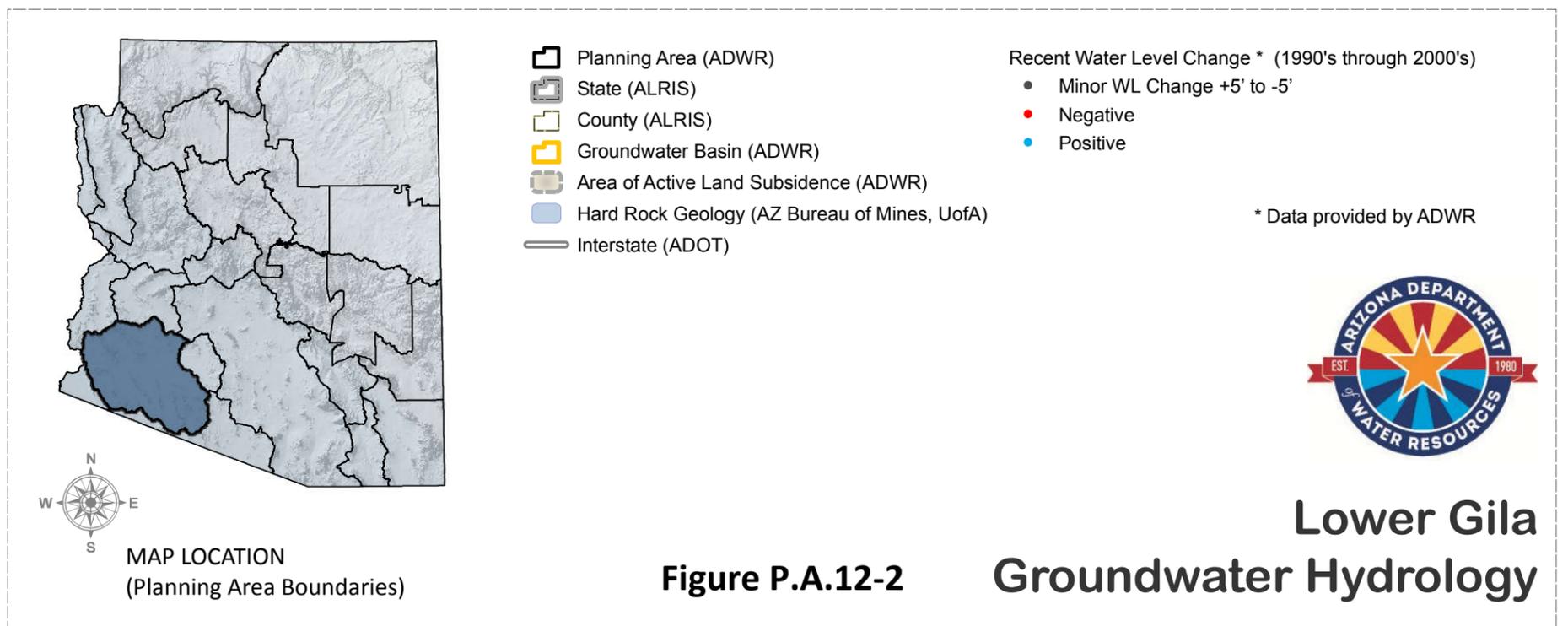
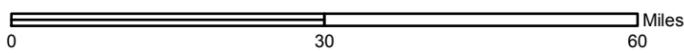
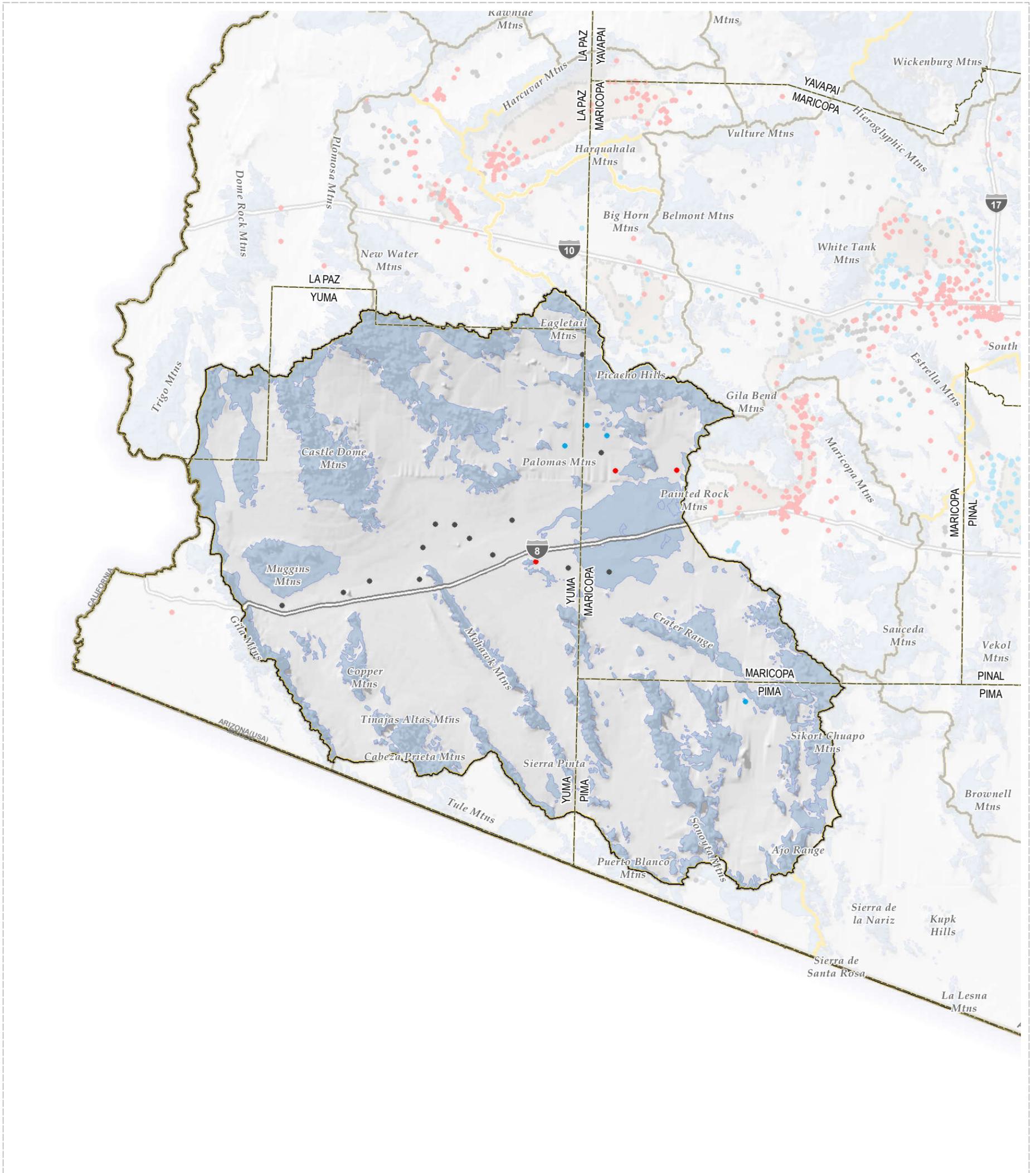
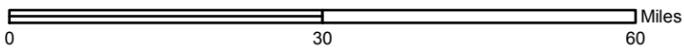
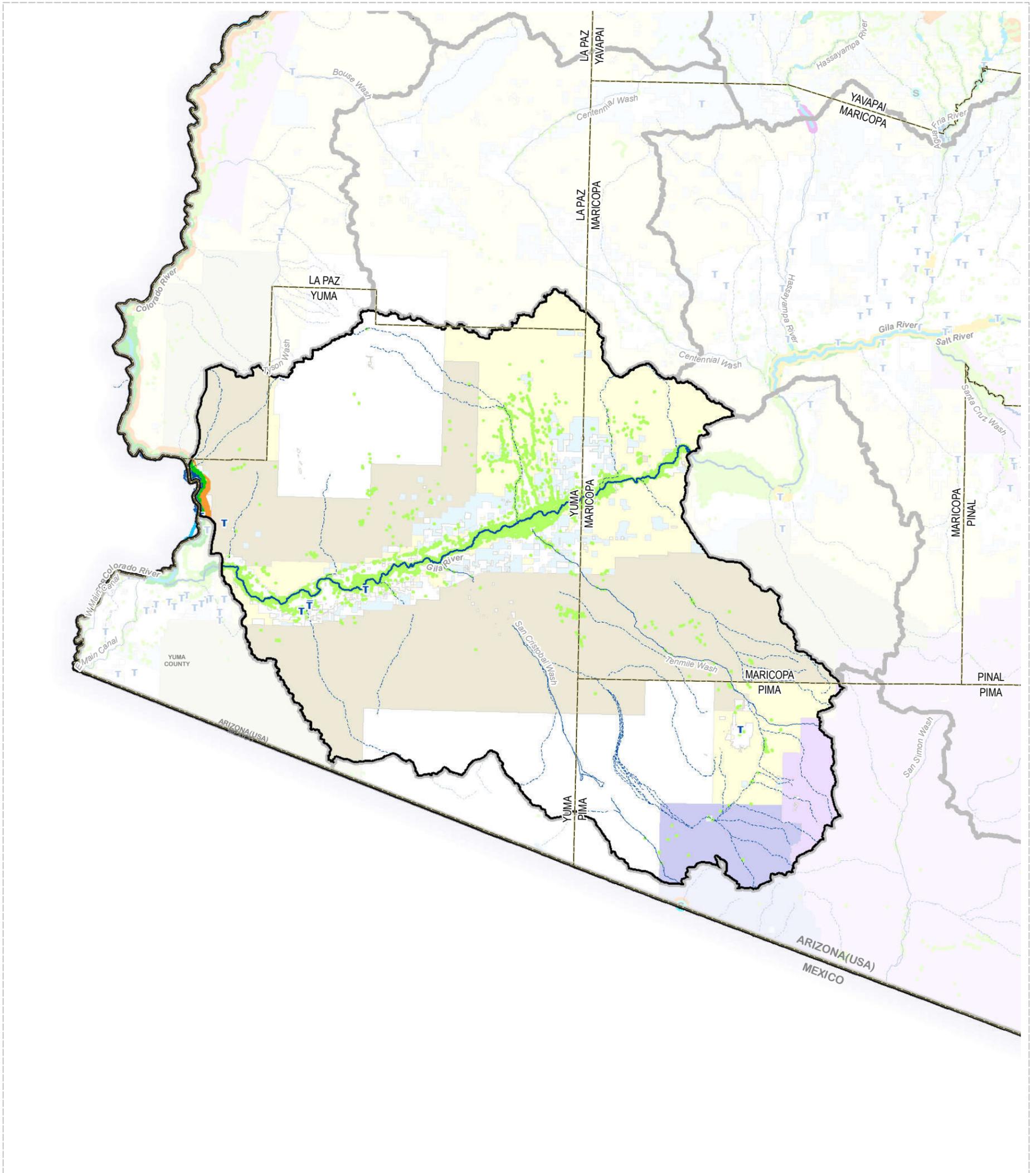


Figure P.A.12-2

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)

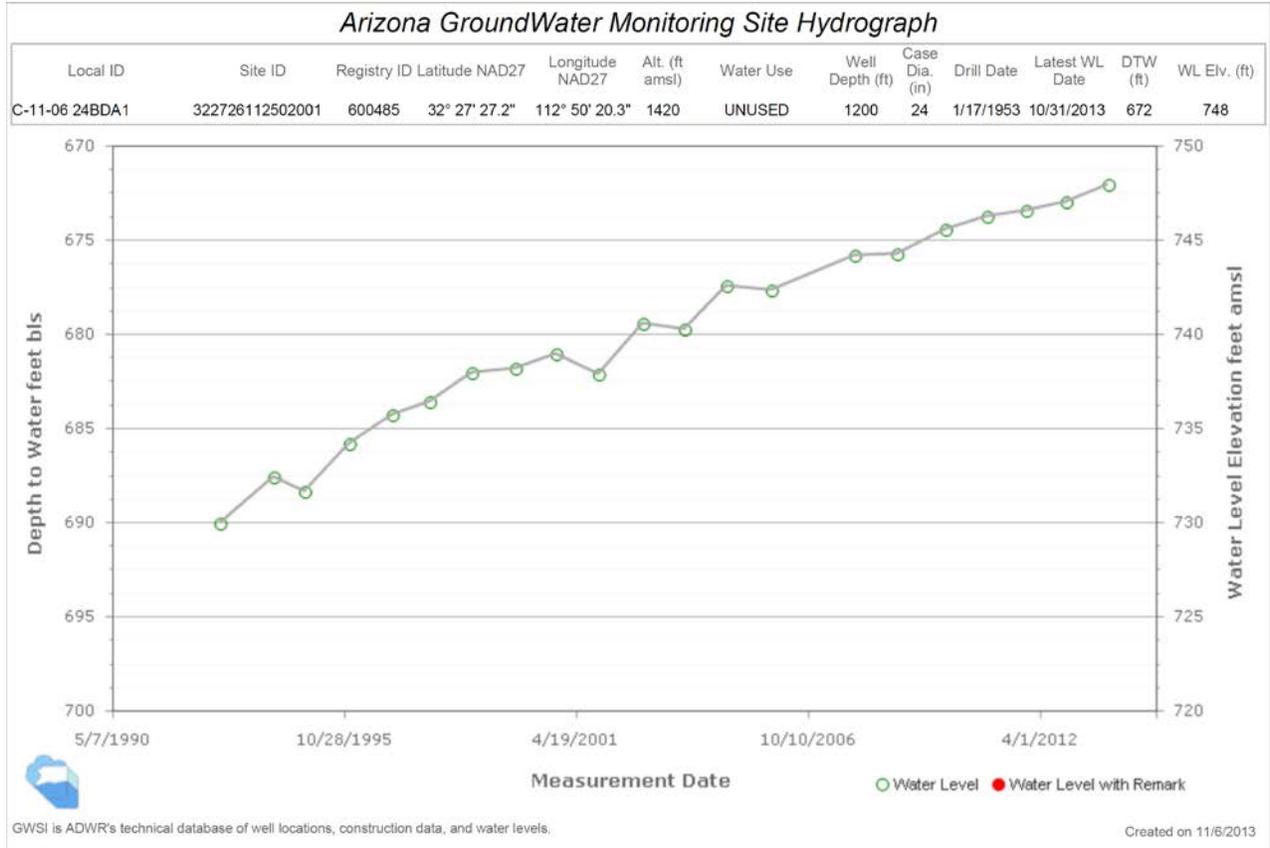
- | | |
|--|---|
| Planning Area (ADWR) | 1993 Riparian Inventory (AZGFD) |
| State (ALRIS) | Modeled Riparian Habitat (AZGFD) |
| County (ALRIS) | Designated ESA Critical Habitat (USFWS) |
| Reservoir or Lake (NHD) | Proposed ESA Critical Habitat (USFWS) |
| Waste Water Treatment Plant (ADEQ) | Federally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



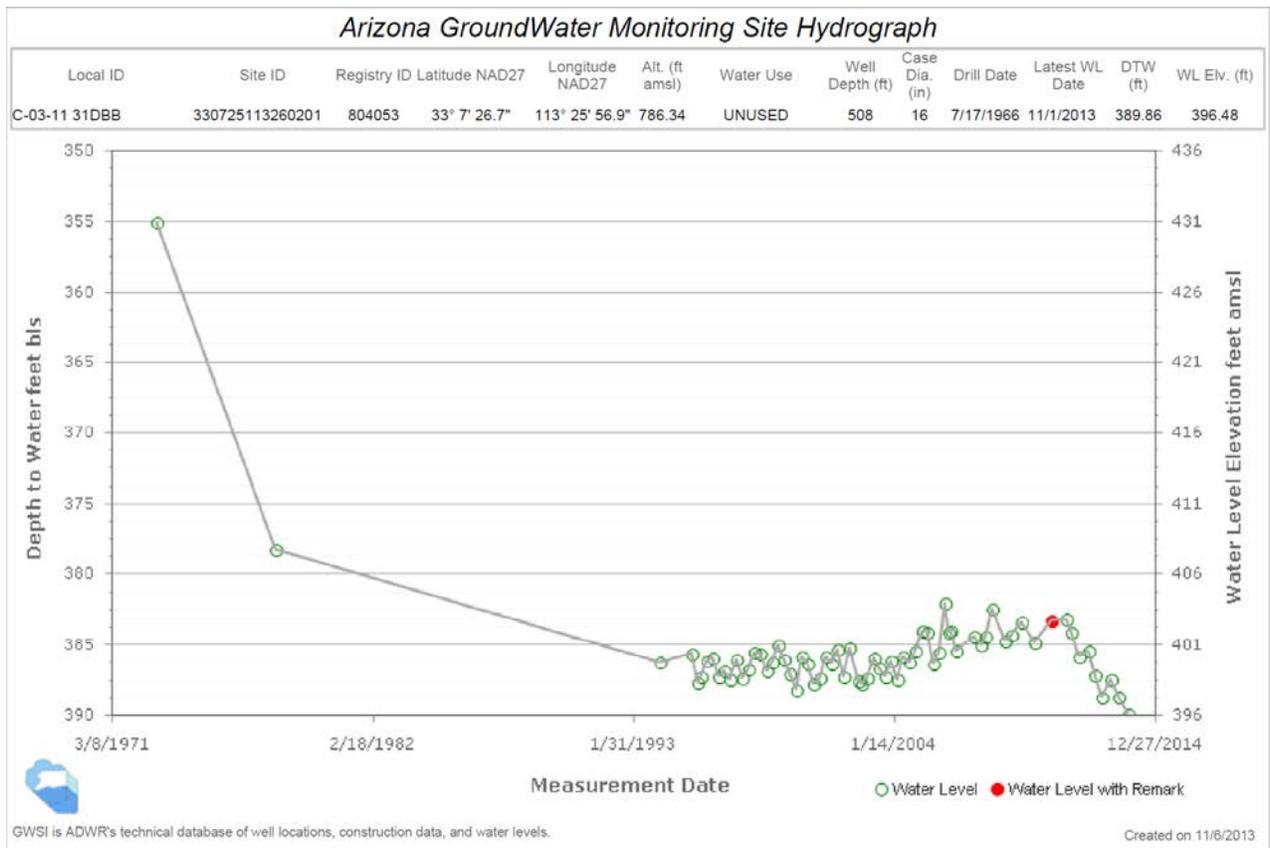
Figure P.A.12-3

Lower Gila Surface Water and Natural Features

Lower Gila Basin – Lower Gila Planning Area



C-11-06 24BDA1 – Lower Gila basin – Childs Valley sub-basin 5 miles North of Ajo.



C-03-11 31DBB -- Lower Gila basin – Wellton – Mohawk sub-basin about 8 miles NW of Hyder.