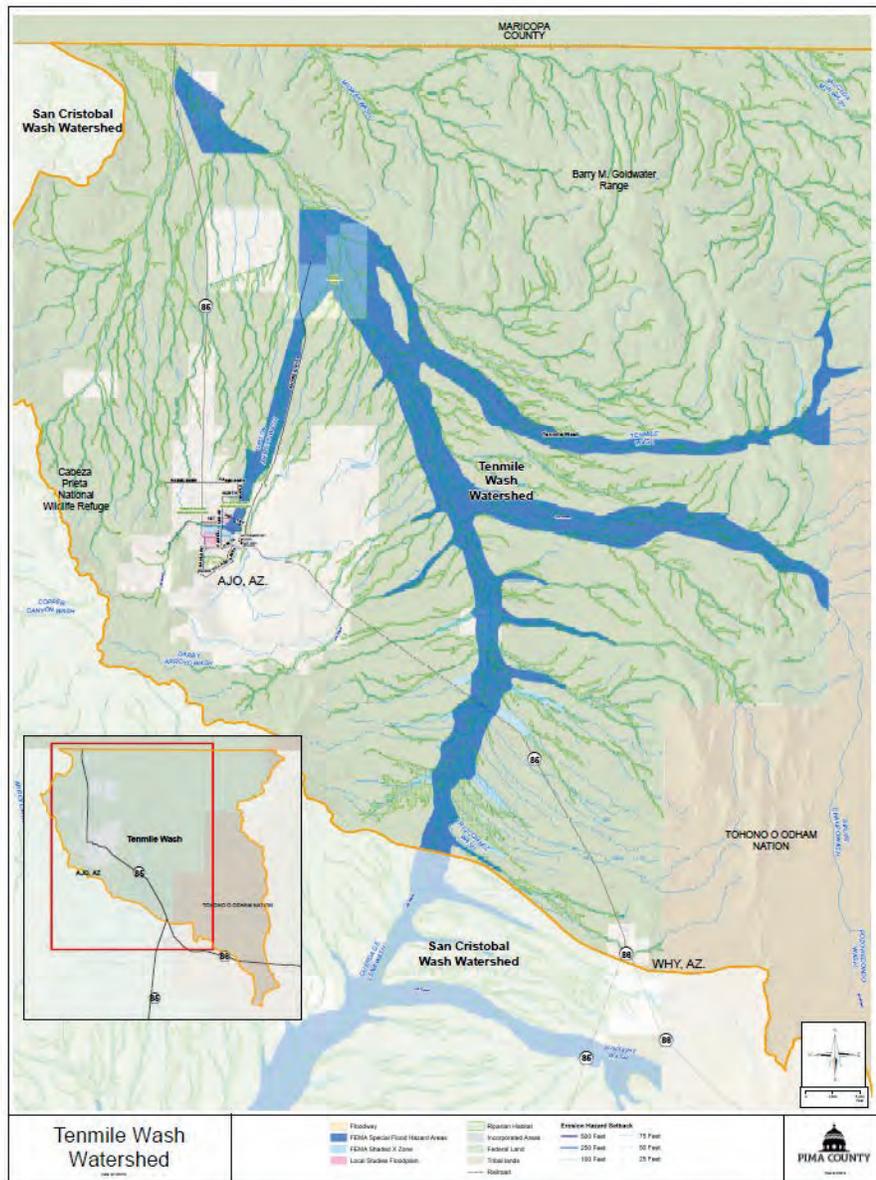


5.5.9 Tenmile Wash

This watershed includes Gibson Arroyo within the community of Ajo that is within Tenmile Wash watershed. While the watershed is mostly rural, the Town of Ajo, while remote, is urbanized. This watershed also includes roughly the northern half of the community of Why. The watershed extends from the Pozo Redondo and Batamote Mountains in the east across the basin floor to the Little Ajo and Childs Mountains in the west. From these headwaters, this watershed then drains northward into Maricopa County. It is tributary to the Gila River and the confluence is approximately 40 miles west of Gila Bend. The entire watershed is within unincorporated Pima County and is 207,096 acres (323.6 square miles).

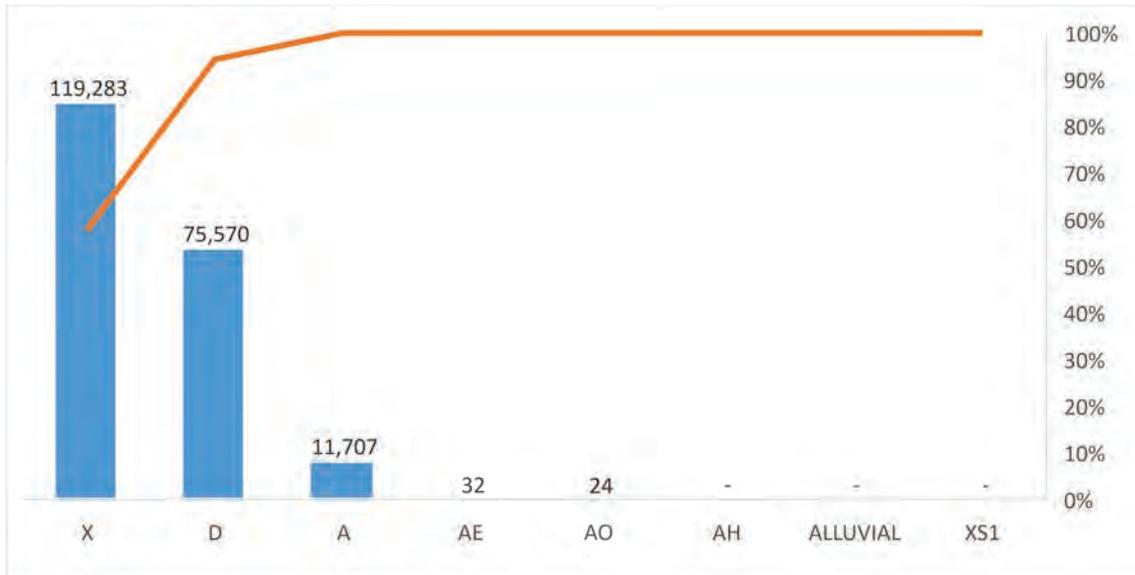
Figure 244 - Ajo Watershed Map



5.5.9.1 Flood Characteristics

While the majority of mapped regulatory floodplains in this watershed are SFHA Zone A (11,707 acres), the District has conducted Special Studies in the urbanized areas most impacted by flooding including Gibson Arroyo in downtown Ajo, where there are 54 acres of Special Studies Floodplains.

Figure 245 - Tenmile Watershed Federal floodplains

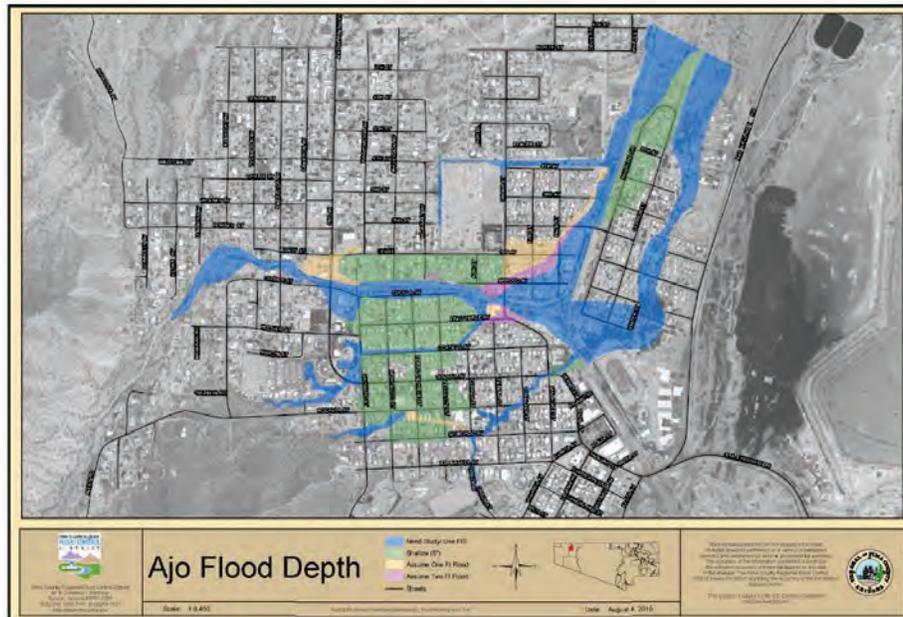


Tenmile Wash watershed upstream of the confluence with Gibson Arroyo is undeveloped desert valley. The main watercourses of Tenmile Wash are FEMA Zone A floodplain. Data along Tenmile Wash is limited due to its remote geographical location. Tenmile Wash's largest tributary is the Gibson Arroyo.

Gibson Arroyo originates southwest of the community of Ajo, to the west of the now inactive copper mine, in the Little Ajo Mountains. Upstream of Ajo, the watershed is undeveloped with steep slopes. Within Ajo, land use the watershed is predominately moderately dense single-family residences and small commercial buildings.

Flooding occurred in Ajo along the Gibson Arroyo on July 29, 2003, when a storm centered over the western portion of Ajo in the areas identified by the Special Study. Rainfall data associated with this storm is unofficial, due to lack of radar data and rainfall gauges. However, unofficial reports claim rainfall ranged from 2.7 to 4.0 inches of rain in approximately one hour. This high intensity event caused flooding throughout the community of Ajo, including many residences. The greatest flood depths occurred on the eastern end of Arroyo Avenue, west of the railroad. Tetra Tech analyzed peak flow rates from this storm event. They estimated a peak flood of 3,100 cfs for the Gibson Arroyo at Sartillion Ave. The flood-recurrence estimate was slightly greater than once every 500 years, on average. With the Special Study data available, the District has been able to inform property owners about the magnitude of flood risk to existing development and to provide flood depths when landowners propose new development within the Special Study floodplains.

Figure 246 - Ajo Flood Map



The Gibson Arroyo travels through Ajo in what looks to be a natural flow path until the arroyo intersects the railroad. Once intersecting the railroad the wash makes almost a 90 degree bend to then parallel the railroad tracks and flow northward. In the July 2003 flood, this location was subject to the greatest flow depths, and the railroad tracks were overtopped. Sediment transport is a concern within the Gibson Arroyo. In the July 2003 flood, sediment and debris blocked the bridge at E. 2nd Avenue. Tetra Tech estimated that the storm event yielded 4.61 acre-feet of sediment at Sartillion Ave. In 2007, the County replaced the bridge with a new con arch bridge designed to contain the channel's capacity, but not the 1% annual chance discharge. It was determined that the new bridge decreased the downstream water surface elevation by about 1.5 feet. The removal of the piers should decrease blockage from debris.



The table below provides a summary of historic USGS gaging station records.

Table 68 - Tenmile wash Watershed USGS Gages

USGS Gaging Station	Hot Shot Arroyo near Ajo, AZ 09520110	Darby Arroyo near Ajo, AZ 09520130	Gibson Arroyo at Ajo, AZ 09520160	Rio Cornez near Ajo, AZ 09520170
Period of Record	1966-09-13 to 1981-01-12	1966-09-13 to 1981-08-23	1967-07-22 to 1981-08-23	1967-07-09 to 1980
Watershed Area (sq. m)	0.44	4.72	2.18	243
Flood Peak of Record (cfs)	240	1,670	1,800	8,030
Date	09-05-1976	09-06-1967	08-02-1970	09-04-1976
FIS Discharge (cfs)	NA	NA	2,400	NA

The table below summarizes regulatory discharge locations within the watershed. The locations are from the District's Table of Regulatory Discharges (Revised October 28, 2014). *There are currently no Pima County ALERT gages in this. UPDATE*

Table 69 - Tenmile Wash Watershed Regulatory Discharges

Watercourse	Regulatory Discharge, cfs 1% Return Frequency	Drainage Area, sq. miles	Source of Discharge Information
Gibson Arroyo @ West 2 nd Ave, Ajo, AZ @ State Hwy 85, Ajo, AZ	2,400 3,990	2.20 1.70	FEMA Flood Insurance Study FEMA Flood Insurance Study

5.5.9.2 Existing Development & Infrastructure Trends

The population of this watershed is 2,523. There are 620 people living within mapped floodplains. It is entirely within unincorporated Pima County. The chart below shows the distribution of residents within known floodplains, and distribution between incorporated and unincorporated areas.

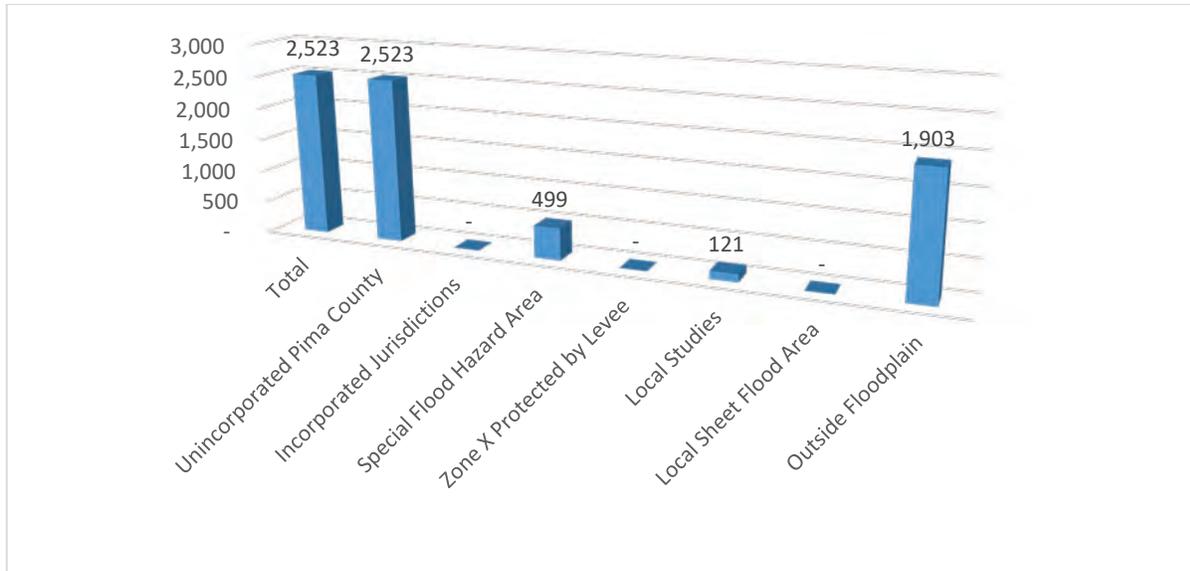


Figure 247 - Tenmile Wash Watershed Population Distribution

This watershed contains the communities of Why and Ajo. The latter is an architecturally unique rural community with its planned town center built by the mine operators.

With recent growth in Rocky Point, the Town is becoming much less of a shopping destination. The mine, which has been unproductive for years, continues only maintenance level operations.

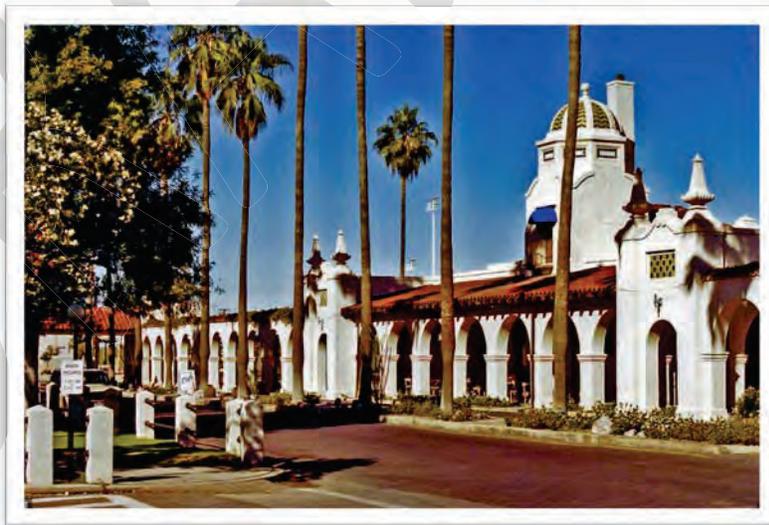
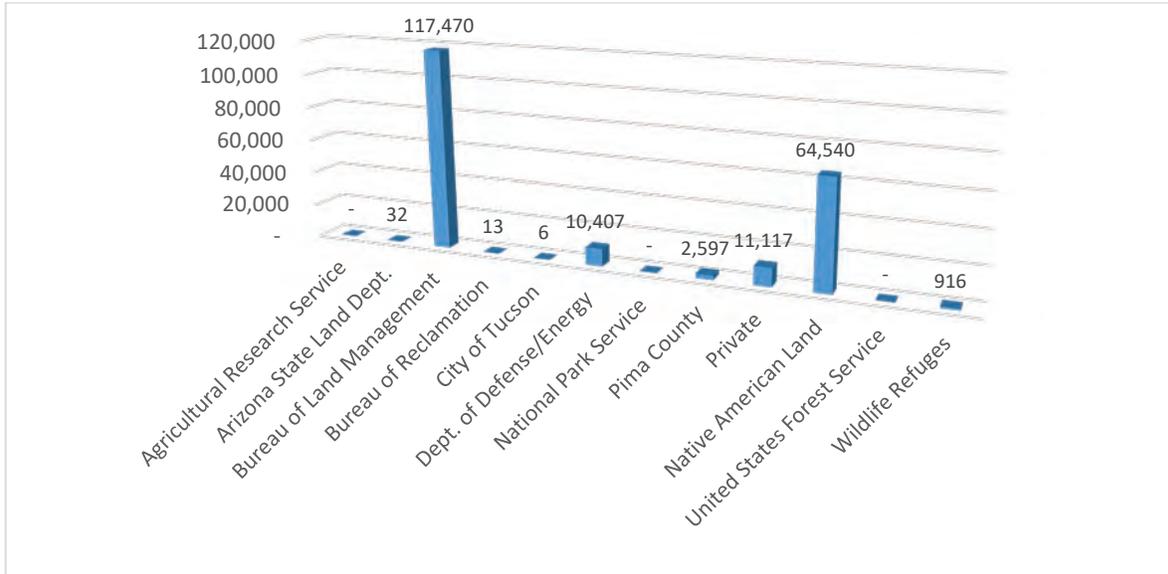


Figure 248 - Ajo including Gibson Arroyo & Tenmile Wash Ownership in Acres



As shown in the figure above the Bureau of Land Management or the Tohono O’odham Nation, manage most of the public land. Although neither entity manages lands solely for open space, they are currently predominately natural. Still significant private land remains available for development.

Figure 249 - Tenmile Wash Watershed Land Use in Acres

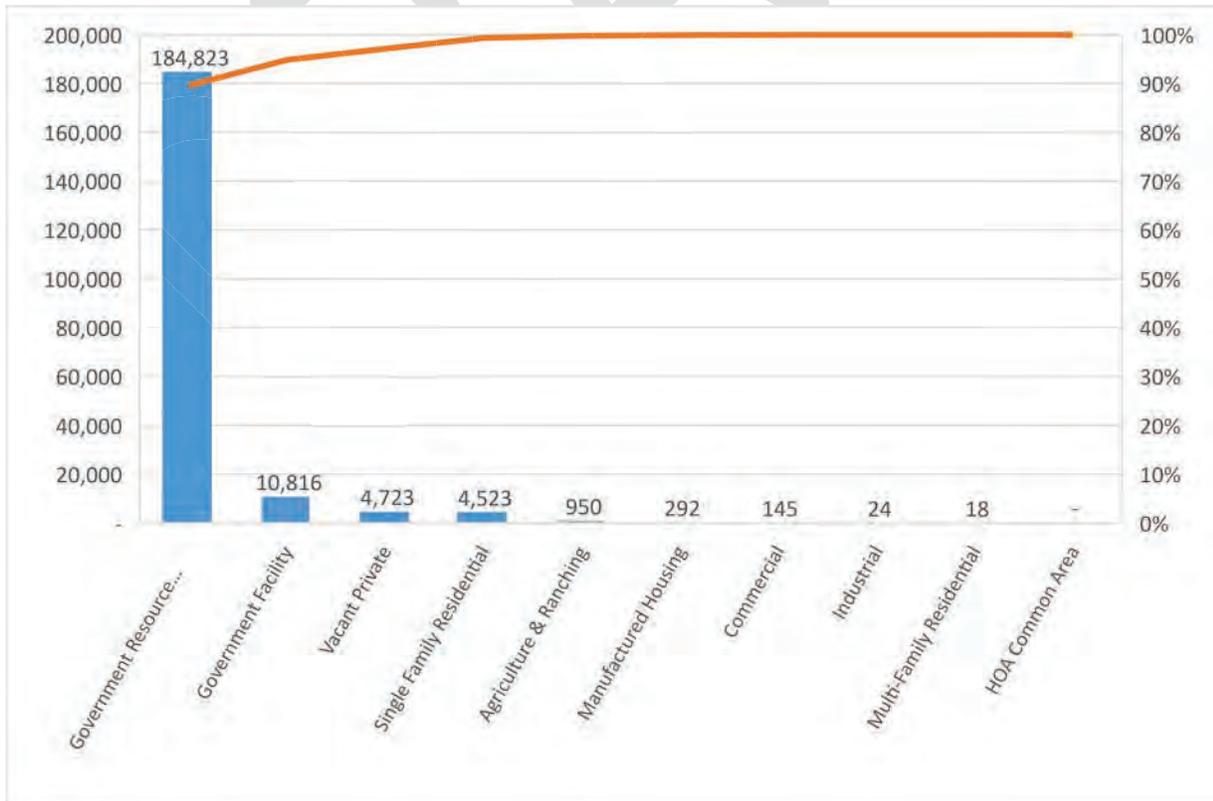
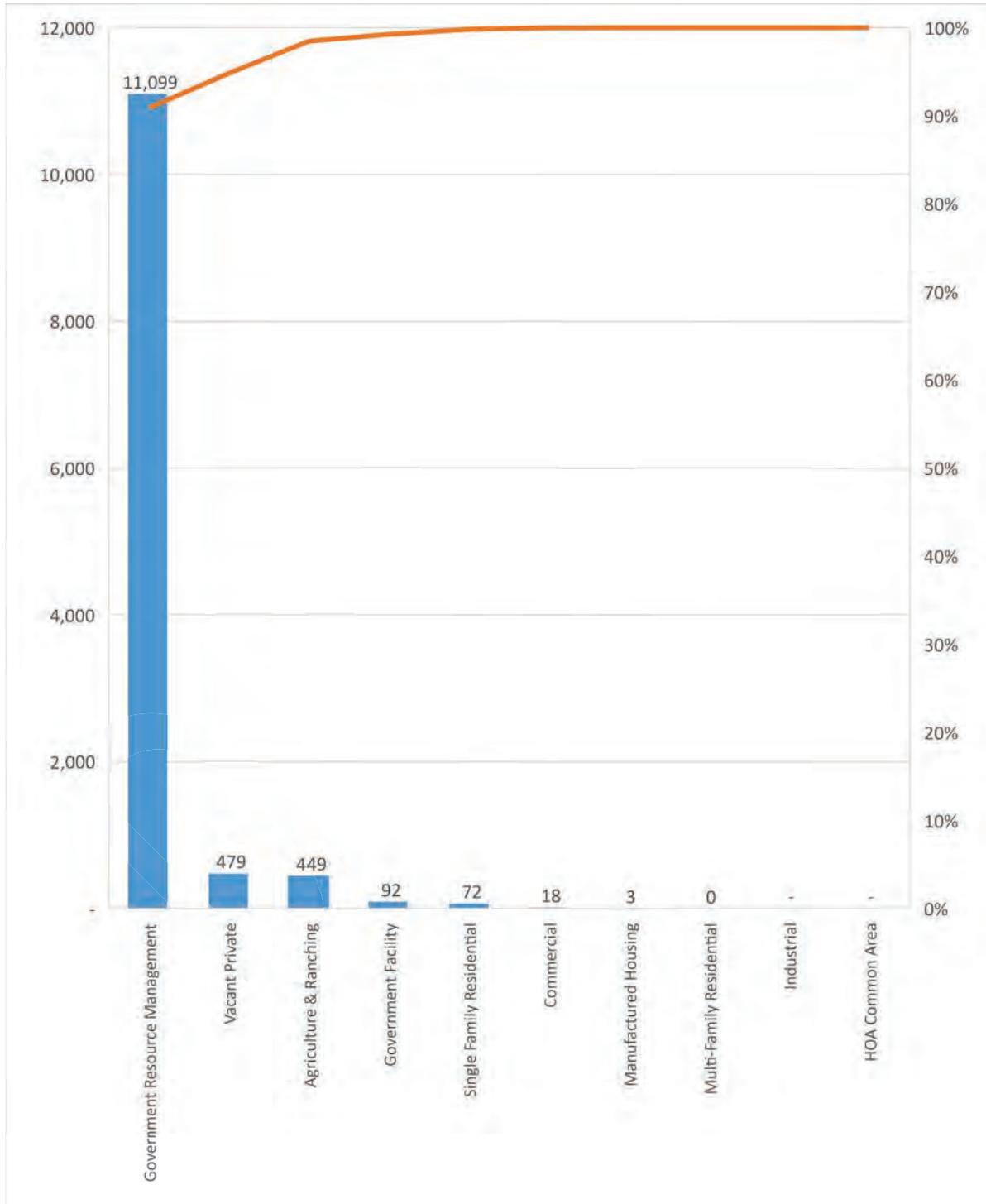
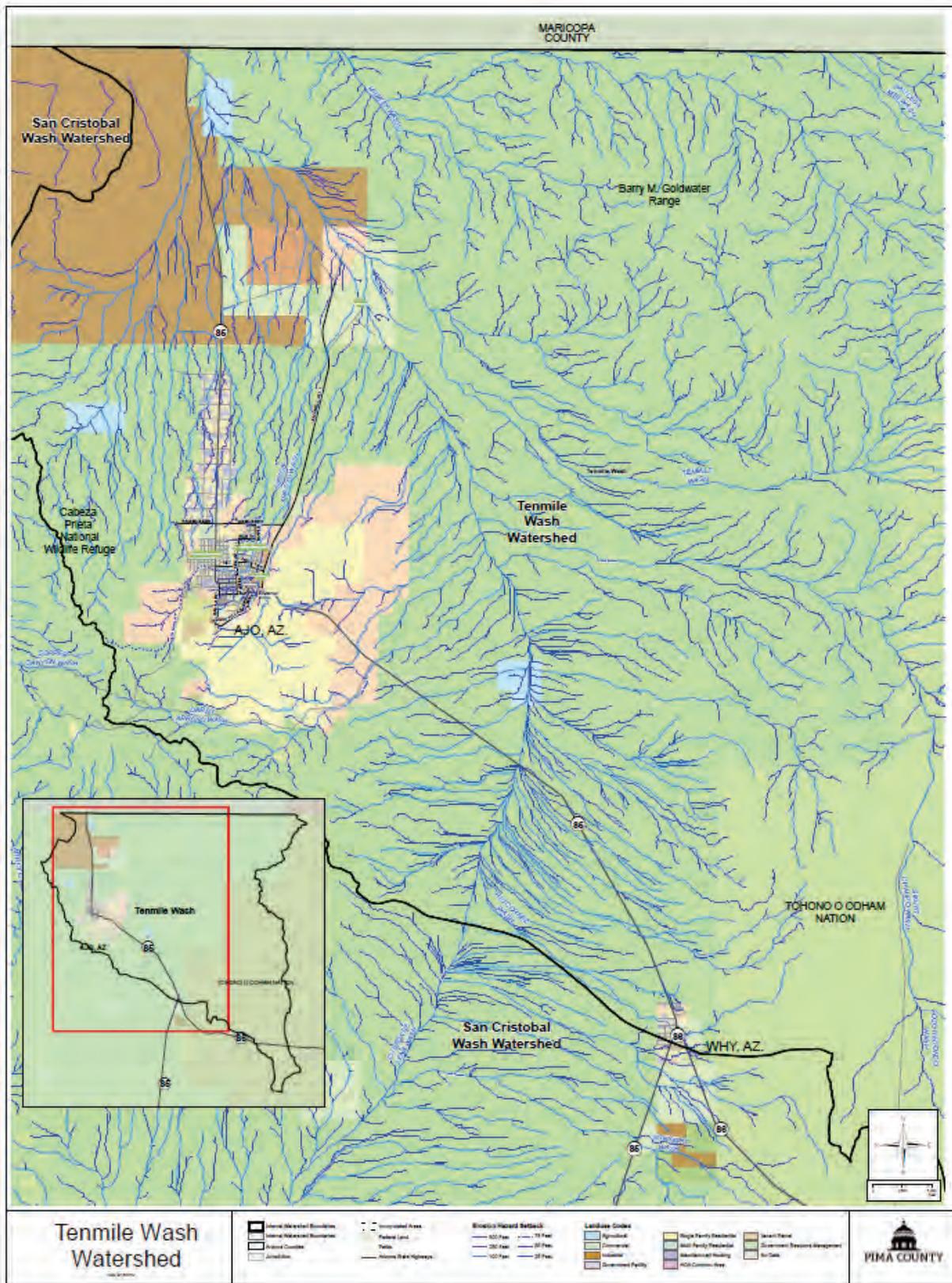


Figure 250 - Tenmile Wash Floodplain Land Use in Acres



While there are residential and commercial areas this watershed is predominately rural. Less than 10% is urban as shown on the land use chart above and map below.

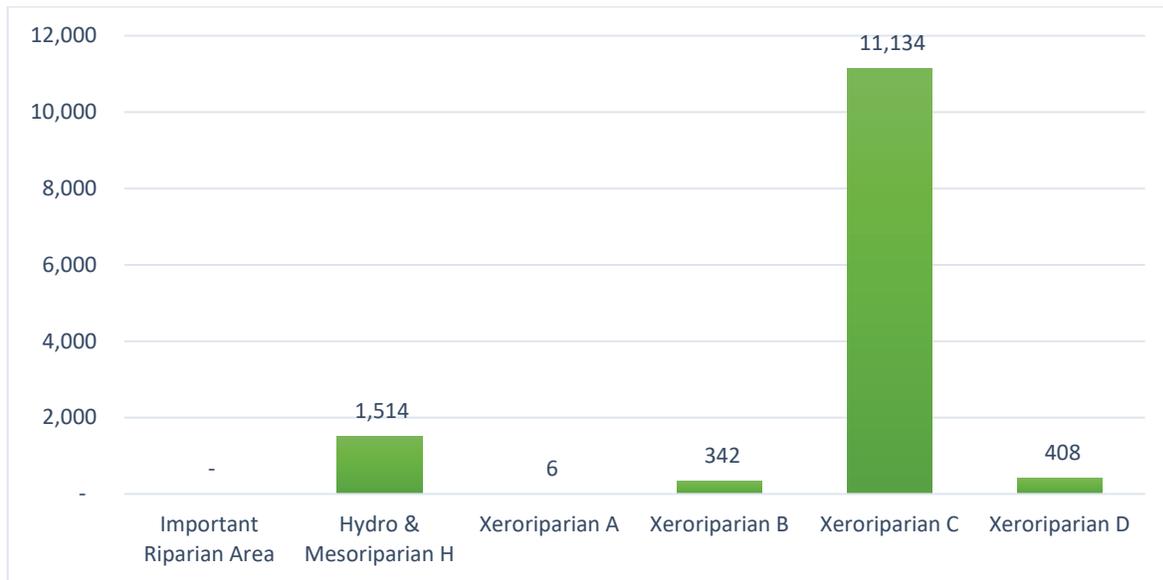
Figure 251 - Tenmile Wash Land Use Map



5.5.9.3 Riparian Habitat and Natural Areas

As shown on the figure below, there are 13,405 acres of Pima County Regulated Riparian Habitat in this watershed. Much more exists in a natural condition outside the unincorporated area where the District has not completed mapping. There are also 12,110 preserved acres in this watershed, including 157 in regulatory floodplain.

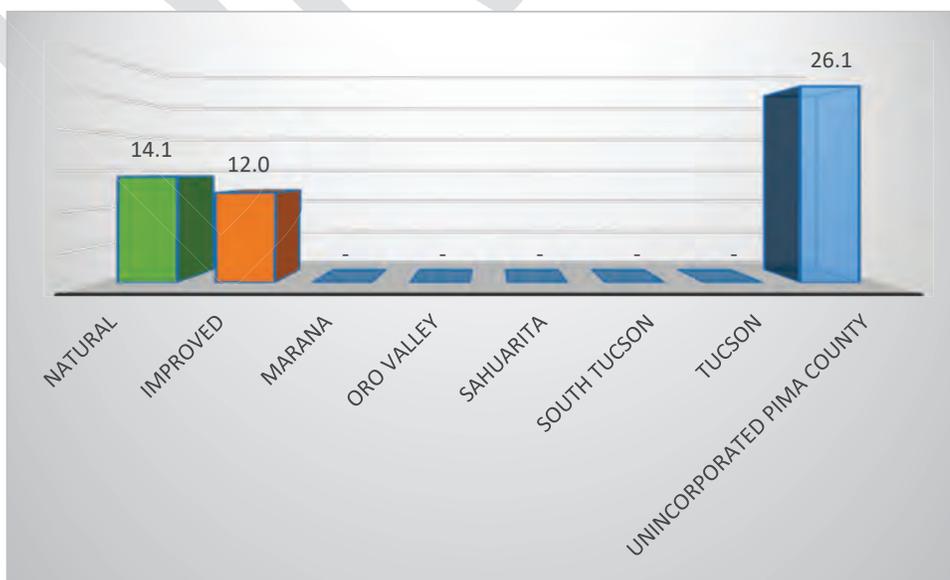
Figure 252 - Gibson Arroyo & Tenmile Wash Riparian Habitat in Acres



5.5.9.4 Historic Floodplain Management Approach

The figure below shows the split between natural and improved drainageways, and how many acres the District is responsible for in each jurisdiction.

Figure 253 - Tenmile Wash Drainageway Acreage



As shown on the chart above, 100% of the drainage system managed by the District in this watershed is natural. In addition, there are 11,593 acres of preserved open space managed by multiple entities. In reality, as shown on the map almost the entire watershed is natural with the exception of the mine and towns of Ajo and Why, however much of the land is either part of the Tohono O’odham Nation, is managed by the Bureau of Land Management, or is a part of military reserves used largely for flight training. Each of these lands are in a largely natural condition but are not preserves.

During 2003, a significant flood event in the Town of Ajo led to completion of a regional detention basin, channel and bridge improvements to reduce risks for community residents and visitors within the urbanized area.

In July 2014, floods affected those living in the community of Why.



2014 Why Flood Damages

5.5.9.5 Needs – Capital Improvement

For each watershed; monitoring, frequently flooded structures and properties subject to damage, exposed infrastructure, and safety concerns have been described in full detail in the District’s Flood Response Field Manual (April 2019). Each of the areas so identified have addresses and geodetic coordinates associated with them and District personnel have them mapped in the Geographic Information System used. For planning purposes, specific items of concern follow; the complete report is in Appendix D.

Frequently Flooded Structures and Properties Subject to Damage

- 701 W. Rocalla (401-24-0880) There is a culvert that goes under the house and outlets right next to the house. Flooding source is Gibson Arroyo (T12S R06W Sec. 22) <GIS Point ID: AJO-FSP-001>
- 530 W. Morondo Ave. (401-24-0150) Flooding source is a tributary to the Gibson Arroyo (T12S R06W Sec. 22) <GIS Point ID: AJO-FSP-002>
- 400 W. Morondo Ave. (401-23-2520) Water backs up behind bridge and floods property. Flooding source is a tributary to the Gibson Arroyo (T12S R06W Sec. 22) <GIS Point ID: AJO-FSP-003>
- 401 W. Rocalla Ave. (401-23-2610) Water backs up behind bridge and floods property. Flooding source is a tributary to the Gibson Arroyo Sewer pipe broke in July 2003 event and flooded basement. (T12S R06W Sec. 22) <GIS Point ID: AJO-FSP-004>
- 201 W. Solana Ave. (401-23-1410) A fully lined channel goes underneath the home. Flooding source is a tributary to the Gibson Arroyo (T12S R06W Sec. 22) <GIS Point ID: AJO-FSP-005>
- 341 W. Arroyo Ave. (401-55-2440) Flooding source is the Gibson Arroyo (T12S R06W Sec. 15) <GIS Point ID: AJO-FSP-006>
- 140 W. Arroyo Ave. (401-55-2420) Flooding source is the Gibson Arroyo (T12S R06W Sec. 14) <GIS Point ID: AJO-FSP-007>
- 130 W. Arroyo Ave. (401-55-2430) Flooding source is the Gibson Arroyo (T12S R06W Sec. 14) <GIS Point ID: AJO-FSP-008>
- 131 W. First Ave. (401-55-2210) Flooding source is the Gibson Arroyo (T12S R06W Sec. 14) <GIS Point ID: AJO-FSP-009>
- 120 W. First Ave. (401-55-1960) Flooding source is the Gibson Arroyo (T12S R06W Sec. 14) <GIS Point ID: AJO-FSP-010>
- 111 W. Second Ave. (401-55-1830) Flooding source is the Gibson Arroyo (T12S R06W Sec. 14) <GIS Point ID: AJO-FSP-011>
- 100 W. Second Ave. (401-55-1690) Flooding

Infrastructure

- Water may come up out of the storm drain on the south side of Esperanza Avenue, east of Montecito Street, due to head created by water backing up behind the headwall located

at the southwest corner of Esperanza and Montecito. (T12S R06W Sec. 22) <GIS Point ID: AJO- INF-001>

- The Curly School Detention Basin near Esperanza Ave. and Orilla Ave. The old high school football field has been transformed into a storm detention basin. Inspect the conditions of the inlet spillways and note if slope erosion has occurred along the basin walls. The culvert outlet should also be inspected for debris blockage. (T12S R06W Sec. 22) <GIS Point ID: AJO- INF-002>



- The drainage ditch along the south side of the Ajo Community Health Center. Inspect for damage to or blockage of the drainage ditch south of the Community Health Center. County maintenance responsibilities stop at the north side of Solana Avenue. The culvert at Solana Ave. belongs to the Arizona Department of Transportation and the drainage upstream (south) of Solana is private. (T12S R06W Sec. 14) <GIS Point ID: AJO- INF-003>



- The County maintains the Gibson Arroyo upstream of 2nd Avenue to Cedar Street via a maintenance easement granted by Phelps Dodge. This area is subject to deposition. Bank erosion can occur in upstream and downstream of Cedar Street



Upstream of Cedar street there are no construction plans for the channel. Utilities crossing to the channel are shallow and in

some locations exposed. The channel lacks capacity for moderate to strong storm events and widespread flooding is likely. Flood damage reports should address channel conditions. (T12S R06W Sec. 15) <GIS Point ID: AJO-INF-004>

- The County maintains that portion of the drainage ditch north of Ocatillo Avenue that lies within the road right-of-way from Sahuaro Street east to a point approximately 170 feet east of Tecolote Street, at which point the channel leaves the road right-of-way. It is unknown if we maintain the footbridges across the channel. Flood damage reports should address the condition of the channel. (T12S R06W Sec. 15) <GIS Point ID: AJO-INF-005>



Safety Concerns

- No site-specific issues identified.

There were no CIP completed by the District in this watershed during the previous five years. Needed minor projects are dependent upon funding levels.

5.5.9.6 Floodplain Management

Issues identified include:

- Old and undersized infrastructure especially roadway culverts
- Presence/Program for Public Information
- Lack of residential permit requirement

