



ARIZONA

BIOSOLIDS MANAGEMENT 2018 - STATE SUMMARY

This summary, a dashboard of state statistics, & further data are at www.biosolidsdata.org

Arizona (AZ) is an arid state, and both wastewater effluent and biosolids are widely utilized for moisture and soil amendments on farms and in horticulture and landscaping. The Arizona Department of Environmental Quality (AZ DEQ) was unable to provide data on biosolids management, but input was kindly provided by Lauren Fondahl, renowned biosolids expert, EPA Region 9.

Based on limited data from U.S. EPA's ECHO database, the NBDP national survey, internet-based sources, and EPA Region 9, it is clear that almost all AZ wastewater solids were recycled to soils in 2018, as has been the case and is the case for many years. Typically, ~90% of AZ wastewater solids goes to Class B land application, led by the following WRRFs:

- Phoenix, the capitol and largest city in AZ (pop. ~1.75 million), hosts the state's largest water resource recovery facility (WRRF) – the 91st Avenue Wastewater Treatment Plant, which treats 145 MGD on average. [According to TPO](#), for many years, 100% of its effluent and biosolids have been beneficially used, the effluent “for irrigation, supplying the Tres Rios Wetland, and for cooling the nuclear reactors at the Palo Verde Generating Station,” the largest nuclear power facility in the U.S. “Anaerobically digested and dried biosolids are land-applied to crops such as hay and cotton.” Phoenix also manages the solids from some nearby communities, such as Scottsdale. In 2018, resource recovery was increasing with the addition of improved biogas utilization – a “renewable natural gas plant” owned and operated by Ameresco. Previously, the WRRF had been flaring copious amounts of biogas. Ameresco now converts the Phoenix biogas to 693,500 dekatherms of renewable natural gas annually that is sold into the local natural gas pipeline, with use as vehicle fuel providing credits under the U.S. EPA Renewable Fuel Standards.
- [Pima County](#), which includes Tucson (AZ's 2nd largest city, pop. ~539,000, with Pima County totaling almost 1 million), treats ~62 MGD of wastewater at two major Tucson WRRFs and five smaller facilities in other parts of the County. All of the solids from all of the County WRRFs are anaerobically digested at the Tres Rios WRRF. All the resulting Class B biosolids are land applied, some in thickened form injected into farm soils, and some dewatered and land applied as semi-solid “cake.”
- Mesa (3rd largest city, pop. ~546,000), close to Phoenix, land applies Class B biosolids, mostly in Pinal County. The utility is proud of its long record of use of 100% of its effluent and biosolids. Notably, about 17 MGD of the flow that Phoenix treats originates in the city of Mesa (that flow and the resulting solids are included in the Phoenix data).

- Scottsdale (5th largest city, ~265,000), just east of Phoenix, has a “water campus” with wastewater treatment that, as of 2019, is “only the third in the nation” to be approved for direct potable reuse. Designed to treat up to 30 MGD, the WRRF takes tertiary-treated effluent and further treats it with membrane ultrafiltration, reverse osmosis, and ultraviolet photolysis. Its wastewater solids are managed by Phoenix and land applied as Class B biosolids.
- Yuma, in the southwest corner of the state (pop. ~96,000 in 2018), land applies Class B biosolids, including some from southern California cities, such as San Diego.

As in other states, there are several private biosolids management companies that contract with WRRFs to transport and land apply biosolids. Synagro land applies biosolids from Phoenix and surrounding communities. Avra-Gro applies biosolids from the Tucson area to sites in Pima and Pinal Counties. Denali Water Solutions applies Mesa biosolids to sites in Pinal County. AZ is a destination for about 15% of California’s biosolids, typically close to 100,000 dmt per year, most of it applied directly to AZ agricultural land as Class B biosolids, managed by Ag-Tech and Denali.

AZ has one very small compost operation at the Pinetop-Lakeside WWTP. The one large composting operation in AZ is used exclusively for California solids: Synagro’s Arizona Soils Composting Facility in Vicksburg, which processes about 2% of CA solids (~13,000 dmt/year). All of the resulting compost is beneficially used. (In this report and data, CA solids managed in AZ are not included in AZ data; they are counted in CA data.)

The Superstition Mountains Community Facilities District is an example of a small WRRF that stores solids for up to 20 years in basins and drying beds. This 1.4 MGD average flow facility in Apache Junction reports storing 171 dmt of aerobically treated biosolids in 2018. (Stored solids are not counted in the data totals in this report, because they were not used or disposed in the NBDP data year 2018.) This WRRF also provides an important community service by taking in septage; in 2018, they took in more than 6 million gallons.

No wastewater solids are incinerated in Arizona; it is not allowed. Almost all of the state’s solids *not* land applied are disposed of in landfills, which have abundant capacity. The City of Flagstaff operates a surface disposal site, disposing of ~1,000 dmt per year. For smaller WRRFs with smaller staff, landfill disposal is simpler than land application and the treatment, testing, permitting, and reporting required. Landfills are relied on by the following and many other small WRRFs:

- Chandler, the 4th largest city in AZ (~270,000 people), located just south of Phoenix, was [expanding its Ocatillo Water Reclamation Facility](#) from a capacity of 10 MGD to 18 MGD in 2018. The city’s 3 WRRFs treat ~26 MGD, putting all of the effluent to use, but its solids go to landfill.
- U.S. EPA and AZ DEQ have ordered the City of Nogales to landfill their biosolids after they exceeded regulatory ceiling concentrations for cadmium and nickel, precluding their application to soils. Nogales receives 3/4 of its wastewater from the city of Nogales in Sonora, Mexico, which does not have industrial source control, which is why those metals are high in the Nogales, AZ, wastewater solids.

- Gilbert (6th largest city, pop. ~260,000) is another southern suburb of Phoenix and has two WRRFs. One, the Neely facility, is operated by a private contractor, Severn. The utility has the goal of 100% water reuse. Its wastewater solids are sent to a landfill.
- Peoria (9th largest city with ~185,000 pop.) extends into the hills northwest of Phoenix, with four WRRFs with a total capacity of 16.25 MGD. One WRRF is shared with a neighboring town, a kind of arrangement found in several communities around the state.
- Surprise WRRF treats ~7 MGD of wastewater and recycles its effluent to irrigate agricultural fields and landscaping, as well as for dust control and groundwater recharge. It sent its solids to landfill in 2018. To cut solids management costs, it is installing a solar drying process that will reduce the tonnage of material to be transported and disposed of.

AZ DEQ is delegated by U.S. EPA for the federal 40 CFR Part 503 biosolids program, which means AZ DEQ has full responsibility, including record-keeping. AZ WRRFs are not required to submit annual reports for the U.S. EPA ECHO database. For details on AZ DEQ biosolids regulatory program, see: <https://azdeq.gov/why-do-i-need-biosolids-land-application-registration>. Artiola, 2006 provides an overview of biosolids land application in AZ, but that report may now be somewhat outdated: <https://extension.arizona.edu/pubs/biosolids-land-use-arizona>.

Arizona's two major universities have long contributed to biosolids research. Microbiologists Charles Gerba and Ian Pepper at the University of Arizona (Tucson) have published important research on biosolids pathogens, bioaerosols, and other contaminants. At Arizona State, Rolf Halden and Paul Westerhoff have focused on contaminants and resources in biosolids; they house a U.S. national sewage sludge repository – historic samples from around the country that are available for research.

References:

Phoenix:

<https://www.tpomag.com/editorial/2019/09/an-arizona-plant-can-now-claim-full-capture-and-reuse-of-clean-water-plant-resources>

Pima County:

https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Wastewater%20Reclamation/Biosolids/2018_AnnualReport.pdf

Chandler:

<https://www.chandleraz.gov/residents/water/water-conservation/reclaimed-water>

AZ biosolids regulations:

<https://azdeq.gov/why-do-i-need-biosolids-land-application-registration>

AZ Extension biosolids land application overview:

<https://extension.arizona.edu/pubs/biosolids-land-use-arizona>