NATIONAL BIOSOLIDS DATA PROJECT

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TEXAS

BIOSOLIDS MANAGEMENT 2018 - STATE SUMMARY

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

NOTE: Correction regarding total tons made on page 5 in Sept. 2022. -nb

In Texas...

- *Texas is a huge state with large ranches and farms, multiple major cities, thousands of WRRFs that range from very large to very small, where both biosolids land application and landfilling are common.*
- *TCEQ developed a unique "Class AB" biosolids designation for Class A products that, when land applied in bulk, must be managed in accordance with certain Class B site restrictions, intended to reduce odor and other nuisance impacts and public upset.*
- *Texas is home to some nationally-renown biosolids recycling programs, including composting in Austin and San Antonio, energy recovery from outside wastes at Waco, Class AB land application from Fort Worth and Trinity River Authority(TRA)/Arlington, pelletized fertilizer from Houston and Waco, and a major anaerobic digestion and thermal hydrolysis and energy system to be running at TRA in the early 2020s.*

Biosolids Management in TX

Texas is a huge state, with some of the largest and fastest-growing urban centers in the country (Houston, San Antonio, Dallas, Austin, Fort Worth). Texas also has vast rural areas, especially in the western part of the state, and lots of open range and agricultural land. As of 2018, there were over 2800 wastewater resource recovery facilities (WRRFs) operating in the state, including hundreds of small package plants. The majority of the state's biosolids are produced by 30-35 WRRFs operating in the biggest cities; some of these biosolids programs are handled by private management companies. An estimated 85% of TX's biosolids are managed by private contractors.

Over half (56%) of Texas wastewater solids were disposed of in landfills or monofills in 2018. This percentage of landfilled treated or untreated wastewater solids is an estimate based on the reported wet tonnage of sludge received at municipal solid waste landfills. Of the 2800 WRRFs, 12 are permitted for monofill/trench disposal of wastewater solids in areas adjacent to WRRFs. There are also a few biosolids/sludge monofills permitted through Water Quality Districts (WQDs) that are not adjacent to a WRRF - El Paso, for example.

For the rest of Texas biosolids generated in 2018, 435 WRRFs sent at least some of their biosolids to beneficial use – over 209,800 dry metric tons in total. Beneficial use mostly includes application on rangeland, pasture, some cropland, and other agricultural use.

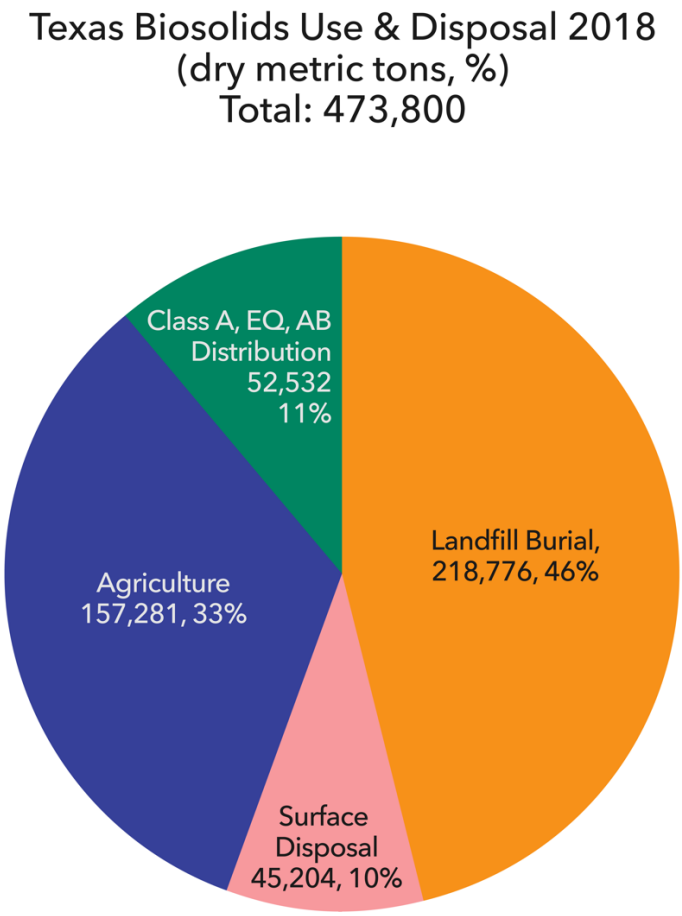
There is currently no incineration of biosolids in Texas; in contrast, in 2004, there were a handful of Texas facilities incinerating wastewater solids.

In Texas, Class B land application sites require permits and more thorough record-keeping than for Class A biosolids use sites. Class B sites can have biosolids applied from multiple WRRFs, and these sources change year by year, as documented in site permit applications or as additional biosolids sources are added to an already-issued permit. In 2018, over 34,700 dry metric tons of Class B biosolids were applied to agricultural lands.

But the majority of biosolids land applied in Texas are Class AB. In the mid-2010s, Texas developed the category "Class AB" to supplement the U.S. EPA's EQ, Class A, and Class B designations. Class AB biosolids are treated to Class A standards but are land applied following requirements similar to those used for Class B. This was in response to odor complaints and concerns about potential viable pathogens in bulk land-applied alkaline-stabilized EQ biosolids. The Class AB designation is tied to specific U.S. EPA pathogen and vector attraction reduction (VAR) standards. Texas's old rules did not require any permitting or specified practices for land application of Class A products, but the "Class AB" rules require specific management practices to control odors, mitigate nuisances, etc. – similar to the requirements that have long been in place for the management of Class B biosolids. A large portion of the Class AB biosolids (most of which are EQ) are applied in bulk to agricultural lands. That number includes, for example, "Houactinite," a pelletized biosolids fertilizer produced in Houston, of which 29,100 dry tons went to bulk land application in 2018. Other EQ products include biosolids compost, such as Austin's "Dillo Dirt" and San Antonio's compost, which are used in landscaping and horticulture as well as in agriculture.

Although there are approximately 35 facilities permitted to market and distribute Class A and Class AB biosolids in Texas, some do not consistently produce biosolids. For example, some may produce biosolids only when they clean out drying beds, every ten years or so.

Data on long-term storage of biosolids were not available for 2018, but it is expected that about 200 WRRFs relying on this option for solids management (a similar number to 2004 data).



Agency/Department Oversight

The biosolids program in Texas is overseen by the Texas Commission on Environmental Quality (TCEQ). Within TCEQ, the Water Quality Division (WQD) oversees solids at WRRFs, land application, and some surface disposal. The Municipal Solid Waste Division (MSWD) oversees landfilling and composting of biosolids (including composting of biosolids mixed with other organic matter, bulking agents, etc.). TCEQ has three FTEs working in biosolids and septage, and regional office employees spend, on average, 30% of their time on biosolids and septage.

While MSWD manages most composting permits, WQD issues permits for composting and surface disposal that is done on-site at WRRFs and for a few off-site biosolids monofills (e.g. in El Paso).

State Regulations and Permitting

Biosolids regulations in Texas are robust and active. As noted above, they were thoroughly scrutinized and updated with the Class AB designation in the mid-2010s, because of public concerns and political pressure. Most recently, a rule change that took effect in April 2020 officially designated wastewater treatment solids as "biosolids" when they meet Class A, AB, or B standards.

Biosolids are regulated through NPDES-type and state-only permits, solid waste permits, and Land Application and Processing Authorizations. Third party land appliers and/or private contractors can be authorized to land apply, process, and dispose of biosolids.

WRRFs in Texas are permitted to send their sludge/biosolids for specific types of end use or disposal (e.g. landfilling, processing by separate preparer, Class B land application), but WRRF permits do not specify to which *specific destination* plants send their solids (e.g. *x* landfill, John Doe's Compost, Big Star Farm). If a WRRF is permitted to send their sludge/biosolids for Class A or Class AB EQ processing at a nearby composting facility, *and* Class B land application by a contracted land applier, *and* landfilling, the WRRF could choose any of those disposal/end use options on any given day. Smaller plants sending solids to larger plants further complicates the flow of solids from production to end use. In some areas, for example, independently-operated dewatering units, sometimes located at WRRFs, remove excess water from package plants' liquid sludge before it can go to landfill, land application, or further processing at another facility. As in other states, this makes accurate numbers of WRRFs sending biosolids to specific end uses and disposals, and the exact quantities of biosolids sent, virtually unattainable. WRRFs that land apply biosolids are easier to track because they are required to hold specific land application permits and, in many instances, activity reports.

When compared to the U.S. EPA Part 503 regulations, Texas has additional requirements for biosolids management, pathogen and/or vector attraction reduction, and pollutant limits. Setbacks are greater (e.g. for Class AB, compared to Class A), and reporting requirements are more stringent. When U.S. EPA changed Table 3 metals limits in the mid-1990s, TX kept the old limits, requiring testing for chromium and a ceiling concentration for selenium of 36 mg/kg (ppm).

Texas has 60-65 Class B land application sites, and hundreds of bulk Class AB land application sites. There are overlaps in requirements for Class B and AB, and Class AB and A, but some requirements that are specific to individual Classes as well. Site permits are not required for Class AB land application, but appliers are bound by strict management practices, as noted above. For land application of both Class B and AB biosolids, the state requires independent inspectors or monitors at sites and certification of biosolids land appliers (WRRF operators and

contractors). Sampling and testing are required for Class A and Class AB biosolids for pathogens if ≥3 weeks have passed since processing. For Class B land application, the state additionally requires nutrient management plans (NMPs) managed and submitted by a certified specialist, and groundwater monitoring on a case-by-case basis depending on the groundwater characteristics of a land application site. Nitrogen (N) is the basis for the state's agronomic loading rate. Land application sites in sole-source impairment zones (e.g. CAFOs) can also be limited by phosphorus (P) using a P Index.

TCEQ provides a unique option for rural WRRFs (mostly in west Texas) where solids have been baking in drying beds for many years. TCEQ's WQD tests the solids, and if they meet Class AB standards, the WRRF can spread the solids around their facility one time without having to get a land application permit.

TCEQ requires reporting from major and minor WRRFs and separate preparers. Any biosolids entering the state must be permitted – Milorganite (a Class A EQ bagged product from Wisconsin) is the main biosolids product entering Texas from out of state.

Pressures on Biosolids Management and Land Application

Pressures on biosolids in Texas as of 2018, as identified by the state's biosolids coordinator, include...

1. PUBLIC INVOLVEMENT – concerns of neighbors, environmental groups, and others
2. AGRICULTURAL ISSUES – declining farmland due to less agriculture or due to development, sprawl, seasonal restrictions, or competition with manures, etc.
3. MANAGEMENT ISSUES – the hassle of biosolids recycling/land application
4. MANAGEMENT ISSUES – hauling distances
5. REGULATIONS ON BENEFICIAL USE – strict EPA and/or state regulation and enforcement

Between 2004 and 2018, there was an ~~increase~~ apparent decrease in tonnage of biosolids generated,* ~~mainly because of population growth.~~ There was ~~also an increase in tonnage of biosolids land applied, but~~ a decrease in land area applied to: 18,257 acres, down from 23,112 in 2004. This is because new legislation resulted in a more stringent and pricey permitting process, which led to the cessation of smaller land application operations and sites. At the same time, larger biosolids management companies were able to benefit by consolidating regional operations and serving multiple WRRFs. For example, Denali Water ran a successful outreach campaign with smaller WRRFs in the Rio Grande area, and contracted to handle and land apply solids from 32 different sources. A similar situation emerged in the Houston area, with larger biosolids management

*For 2004, there were tons of "other" solids reported, leading to a larger total then. The current 2018 data are more accurate and do not include stored or other solids. See the data spreadsheet & dashboard for further details. This correction here was made Sept. 7, 2022. -nb

companies land applying solids from small package plants and other sources that likely were not counted in 2004 data.

The Dallas-Fort Worth area struggled with public concerns in the early 2010s. Malodors affecting neighbors of land application sites resulted in complaints and political pressures on TCEQ. There was considerable media coverage, and some dedicated opposition to biosolids developed. This led to revisions in TCEQ's biosolids regulations – including the new designation of Class AB – which has significantly reduced conflicts and complaints. As of 2020, an estimated 10-15 complaints per year are received by the regional TCEQ office in the Dallas-Fort Worth (DFW) area, far fewer than previously. Biosolids management is also the subject of odor complaints in the Houston area, though fewer (maybe 4-6 each per year). There remains public sensitivity about biosolids odors; this is one of the drivers for ongoing projects to upgrade biosolids treatment and management practices at both Fort Worth and Trinity River Authority (more details below).

Dallas-Fort Worth is one of the fastest-growing urban areas in the U.S. As rural areas surrounding the metro area (where most of the cities' biosolids go for land application) see increased development, a proportional increase in odor and other nuisance complaints is not surprising. Fort Worth is an example of a challenge for biosolids management in cities across the country: as urban areas expand outward, the space available for biosolids land application and other practices moves farther from the city center and from the facilities where biosolids are generated, increasing hauling distances and costs. Large cities produce the vast majority of the country's sewage sludge/biosolids, making urban expansion a pressing issue for biosolids management nationwide.

Septage Management

There are over 1,000 septage haulers based in Texas. The population served by on-site systems was approximated based on population data for rural vs. urban areas in Texas. In 2010, nearly 85% of Texas's population lived in urban areas. Looking at previous rural/urban population trends and factoring in the recent growth rate of the state's largest cities, we estimate that in 2018 only 15 - 20% of Texans were served by on-site septic systems.

Septage can be land applied if it meets Part 503 requirements, and there are 52 land application sites permitted for septage in Texas. WRRFs are not required to accept septage. Texas regulates brown grease under Solid Waste Regulations and actively collects fats, oils, and grease (FOG) under Municipal Solid Waste Processing Authorizations.

Major WRRFs, Separate Preparers, and Notable Projects

- The City of Austin has an award-winning, long-term, biosolids recycling program at the Hornsby Bend Biosolids Management Plant. Austin wastewater residuals are sent through anaerobic digesters and belt filter presses before being mixed with curbside-collected yard waste and composted. The compost has been sold under the label "Dillo Dirt" since 1989. In 2018, Synagro took on contracted operation of compost production at Hornsby Bend from Austin Water, continuing to produce compost that is sold as "Dillo Dirt" or as the Synagro brand "AllGro."

- Waco's Metropolitan Area Regional Sewerage System (WMARSS) plant takes in wastewater from surrounding communities, anaerobically digests solids, and heat-dries and pelletizes its biosolids. The EQ product is available for sale in bulk. Tractor trailer loads head to agricultural sites, and residents can drive up to the facility and have their pickup truck beds filled. Waco has a long-standing program of increasing its renewable energy production from mesophilic anaerobic digestion and combined heat and power (CHP) by taking in outside wastes - food waste, slaughterhouse waste, and FOG. Waco is a Platinum Certified member of the National Biosolids Partnership.

- Houston is Texas's largest city, with a variety of biosolids processing programs and infrastructures. The Houston metro area has over 750 wastewater treatment plants – the majority small package plants that send solids and effluent to a few larger, central plants for processing. Most of Houston's solids are either alkaline stabilized and land applied on area ranches and farms as Class AB or are heat-dried and pelletized to make "Houactinite" fertilizer that is used in agriculture locally and farther away, including in fertilizer blends. In 2018, 29,100 dry tons of Houactinite were produced and sold. As is typical for many biosolids programs in Texas, any biosolids that are not land applied – for example, because they are not dry enough – go to landfill. About 1% of Houston's biosolids were off-spec and went to landfill in 2018.

- Located just outside Houston, K-3 Resources, L.P. (formerly K-3BMI), a regional biosolids management and oilfield logistics company, collects, transports, and treats much of the solids produced by small WRRFs in the area. K-3 operates two mobile belt presses for dewatering sludge, as well as a Class A biosolids processing facility. They send these biosolids to land application, mostly in Waller County.

- The Trinity River Authority operates five WRRFs in the Dallas-Fort Worth (DFW) metro area. TRA contracts with Renda Environmental to land apply the alkaline-stabilized Class

AB biosolids produced by their Central Regional Wastewater System. A project is currently underway at TRA to install thermal hydrolysis (pretreatment) and anaerobic digestion to produce a Class A biosolids that will have less odor, be easier to dewater, and will not require alkaline stabilization.

- All of Fort Worth's wastewater solids are treated to Class AB standards and land applied on the region's agricultural lands. As noted above, Fort Worth is planning a switch from alkaline stabilization to heat-drying and pelletization in the early 2020s. In 2018, Renda conducted the biosolids treatment and land application program for Fort Worth; it had done so successfully for many years. In 2020, Synagro took it over under a new contract. Fort Worth is a Platinum Certified member of the National Biosolids Partnership.

- San Antonio has a highly successful water resource recovery program. San Antonio Water System (SAWS) operates three "water recycling centers" in the metro area and contracts with the locally-founded company New Earth to compost ~80% of its biosolids. New Earth (which was acquired by Denali Water Solutions in January 2021) mixes biosolids with wood chips and markets and distributes the final product in bags or bulk as their "Landscapers Compost." SAWS was one of the first public utilities in the U.S. to capture and sell refined biogas from anaerobic digestion as renewable natural gas (RNG). Through a public-private partnership with national energy company Ameresco, Inc., the RNG is injected into a nearby gas pipeline and sold on the open market.

- El Paso is in one of the most arid regions of the U.S., and over the past several decades, it has been a leader in reducing water consumption. Water reuse is becoming critical and is continually advancing. From many years of water reuse for irrigation, the city's potable reuse program is expanding beyond aquifer recharge to some possible future treatment for direct potable reuse. The city's wastewater solids have long been disposed in a dedicated local landfill, but, as of 2019, concerns about landfill space and interest in resource recovery are driving evaluation and testing of composting as a biosolids management option. In addition, El Paso is following the trend in Texas of increasing biogas and renewable energy by taking in FOG and other liquid wastes for anaerobic digestion.

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The state biosolids coordinator and other state biosolids experts provided most of the information in this summary report. Additional information was obtained from:

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