



KENTUCKY

BIOSOLIDS MANAGEMENT 2018 - STATE SUMMARY

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

In Kentucky...

- *Louisville, the largest city, makes a notable Class A EQ heat-dried fertilizer product – Louisville Green. But that is one of only a few biosolids beneficial use programs in the Bluegrass State. Lexington, the second largest city, and a majority of other communities, dispose of wastewater solids in landfills, which have offered relatively low tipping fees for many years.*
- *The management – especially the land application – of Kentucky wastewater solids is overseen by the state Energy and Environment Cabinet (EEC), which relies on regulations established in 1992. Those antiquated regulations make beneficial use of Class B biosolids challenging.*
- *In 2021, as landfill tipping fees for “sludges” increase significantly, and with the regulatory pressure on Class B “landfarming” (as land application is called), several KY biosolids programs are looking at Class A EQ options. However, they find the costs involved to be daunting.*

Biosolids Management in Kentucky

Most of the wastewater solids produced in Kentucky (KY) are disposed of in landfills. For many years, landfill space has been abundant, and the tipping fees have been relatively low compared to other parts of the country. While agriculture is a significant industry in the Bluegrass State, there are regulatory and other challenges* with using biosolids and other residuals, compounded by the unusual karst geology, with sinkholes, creating additional concerns and regulations addressing possible impacts to groundwater. The result is relatively little bulk land application, by one quarter or fewer of the state’s water resource recovery facilities (WRRFs).

A few WRRFs have developed Class A EQ biosolids products – notably Louisville’s heat-dried fertilizer (details below). And composting was working for a few WRRFs, but, in the mid-2010s, a western KY compost facility serving Bowling Green and a few other communities was besieged by odor complaints after it expanded operations by taking in wastewater solids from Nashville, TN. Politics entered and a state law was passed that bans composting of wastewater solids in that county and imposes challenging requirements, including that compost facilities must be sited in industrial parks. Thus, in 2018, Paducah was the only KY WRRF (of which NBDP is aware) that still composted about 50% of its wastewater solids (the other ~50% went to landfill).

In the major construction period of the 1980s, when large amounts of federal funds were available, many KY WRRFs were built with anaerobic digestion (AD), which was a preference of one engineering

* For example, farms in the Lexington area that service the prize race horse industry are very picky about their fertilizer and soil management choices and have generally not used biosolids; however, further away from that urban/suburban area, other farms have embraced biosolids use when they are available.

firm that designed many facilities. But, over time, many AD systems were abandoned or converted to aerobic systems, because of perceived challenges in operating AD.

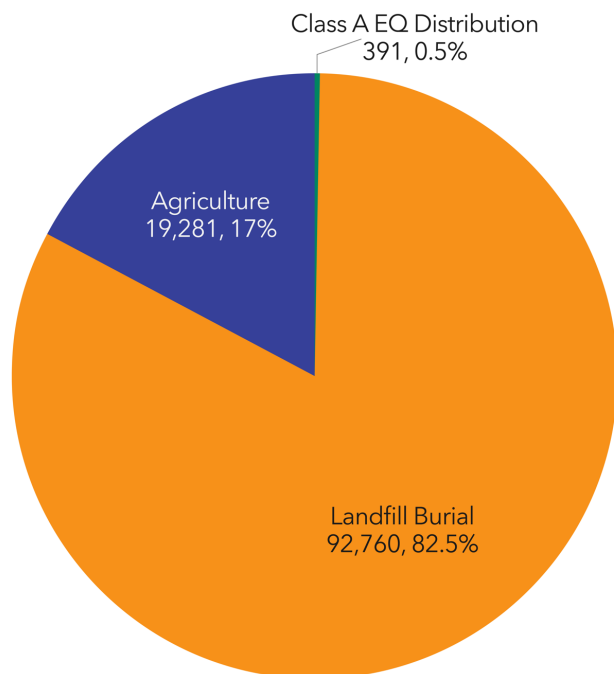
Alkaline stabilization was used by some WRRFs, including some Class A processes like NViro and RDP. But they proved challenging, sometimes creating odor issues and obstacles with land applying the final products. Both Nicholasville (near the Kentucky River and the Palisades, which neighbors are keenly sensitive about protecting from any perceived threat) and Winchester abandoned the RDP process in recent years and are now sending solids to landfills. Lexington tried the NViro alkaline stabilization process in the late 1980s, but gave it up and has been sending solids to landfill since at least as far back as ~2000.

As in many states, many of Kentucky's smaller communities rely on lagoon systems, where the wastewater treatment process collects solids in lagoons for many years, with solids cleaned out only every 10 – 30 years. One notable facility was at Bardstown, KY, where deep wastewater lagoons (~26 feet deep) became known for not seeming to generate any solids, which meant little, if any, cost for solids management. A lot of small KY municipalities put in lagoons, expecting similar results. But solids do accumulate, no matter what, and subsequent phosphorus (P) removal requirements increased solids accumulation. So now there are around 50 full lagoons that need cleaning out in communities that don't have the necessary budgets for solids clean out and management. Similar situations exist in other states.

In the early 2020s, landfills in Kentucky, like landfills elsewhere (e.g. see NBDP Georgia report), have begun to limit the amounts of wet wastes they will accept due to concerns about possible slope instability (slumping) and fires. In the early 2010s, Kentucky landfills generally charged less than \$25/wet U.S. ton (wt) for wastewater solids disposal. By 2021, the fees had gone up to \$30 to \$70 / wt. This has renewed interest in land application. But state regulatory requirements for site permits are challenging and costly. Because of these pressures, KY WRRF managers are increasingly anxious about solids management, and some are looking at producing Class A EQ biosolids, because Class A EQ biosolids don't have as many restrictions when they are used.

There are no Kentucky WRRFs with sewage sludge incinerators (SSIs).

Kentucky Biosolids Use & Disposal 2018
(dry US tons, %)
Total: 112,000



Agency/Department Oversight, Regulations, and Permitting

In Kentucky, the solid waste branch of the state’s Energy and Environment Cabinet (EEC) regulates the use and disposal of wastewater solids (sludge) and biosolids. The state regulations in effect were adopted in 1992, before the promulgation of the federal 40 CFR Part 503 biosolids rule.

“Landfarming” is the term used in KY rules for bulk land application, and, back at that time, the landfarming regulations for biosolids were built on those used for other “special wastes” such as coal ash, making for some requirements that are unusual for biosolids (e.g. the minimum depth to bedrock for application of Class B biosolids is 4 feet, which is more than in other states where there is a separation distance specified). Over the years, some of the provisions of the KY regulations have become outdated and have been tweaked through guidance and variances (e.g. the regulatory state limit for copper in biosolids is 450 mg/kg; but that is now commonly adjusted to be the same as the federal standard of 1500 mg/kg). The net impact of the antiquated and stringent state regulations, coupled with the low costs of landfill disposal, has resulted in only a small percentage of water resource recovery facilities (WRRFs) applying biosolids to land.

According to the EEC website, “sewage sludge is defined as a special waste.... In addition..., the special waste category includes water treatment plant sludge, utility coal ash, gas and oil drilling muds and other wastes of ‘high volume, low hazard.’ Chapter 45 of Title 401 applies to all types of special waste. Standards for land application are found in [401 KAR 45:100](#).

“There are four types of permits for managing sewage sludge by means other than disposal at a landfill. The four permit types are:

1. Landfarming
2. Composting
3. Storage and Treatment, and
4. Sludge Giveaway

“Incineration of sewage sludge is not addressed in the special waste regulations. For questions concerning incineration, contact the [KY Division for Air Quality](https://eec.ky.gov/Environmental-Protection/Waste/solid-waste/i-need-information/Pages/sludge.aspx)” (<https://eec.ky.gov/Environmental-Protection/Waste/solid-waste/i-need-information/Pages/sludge.aspx>). In 2018, there was no operating sewage sludge incineration in Kentucky.

“All landfarm facilities must have at least one certified operator who must be available to the facility during landfarming operations. The [Division of Compliance Assistance](https://eec.ky.gov/Environmental-Protection/Waste/solid-waste/i-need-information/Pages/landfarms.aspx) is responsible for certification of operators.... Landfarm facilities are required to report on their activities on an annual basis” (<https://eec.ky.gov/Environmental-Protection/Waste/solid-waste/i-need-information/Pages/landfarms.aspx>).

Regulation of biosolids also occurs in some counties. In addition to the composting ban in western KY, some of the counties around Louisville restrict wastes from outside the county.

Pressures on Biosolids Management and Land Application

Pressures on biosolids in KY as of 2018 include the following, which were selections by the state coordinator from a preset list in the NBDP state survey:

1. AGRICULTURAL ISSUES – declining farmland due to less agriculture or due to development, sprawl, seasonal restrictions, or competition with manures, etc.
2. ENVIRONMENTAL ISSUES – impacts to soils, organisms, public health, contaminants (pathogens, metals, organic chemicals, etc.)
3. ENVIRONMENTAL ISSUES – nutrient management, phosphorus (P), nitrogen (N)
4. MANAGEMENT ISSUES – hauling distances
5. COST – rising costs generally

As of 2018, the beneficial use of biosolids was staying about the same in Kentucky – at a low level as biosolids are mostly landfilled. In 2021, there is growing interest in beneficial use of biosolids on soils, because landfill tipping fees have increased dramatically in the last couple of years.

Septage Management

Septage is managed at the local level, with some oversight by county health departments in conjunction with the KY Department for Public Health. Data on septage management are not readily available. However, septage can be – and is – land applied in the state. A good portion is also trucked to WRRFs for disposal. Fats, oils, and grease (FOG) can also be land applied, if mixed with septage. Land application of septage requires use of sites that are permitted. Testing of septage and other requirements are spelled out in several regulations that were updated in 2021. See Table 1.

Table 1. Kentucky Septage Management

Quality of state septage data	Moderately low
Septage haulers based in state:	263
In-state separate preparers (not WRRFs) taking septage:	no data
WRRFs required to take septage?	No
WRRFs that accept septage:	many
Septage received at WRRFs in 2018 (gallons):	no data
Other outside wastes accepted at WRRFs:	no data
Is fats/oil/grease (FOG) a significant issue?	Somewhat
Is it regulated?	Yes
How?	septage regulations
	Land Application of FOG is applied at 3:1 ratio (septage to grease)
Is there a proactive program to collect FOG?	no data
Can septage be land applied in state?	Yes
If yes, what treatment is required?	The regulations 902KAR10:150 define Disposal Site Approval Procedures. 902 KAR 10:160 discusses Disposal Site Operation. 902 KAR 10:170 details Septic Tank Servicing/Pumpers. All of the regulations address Land Disposal Sites in KY, from siting a new location to owner operation to pumper use. Land Disposal Sites are permitted through the KY Department of Public Health Environmental Management Branch. Land application sites are permitted through the Department for Public Health Env. Mgmt Branch (state office). Local Health Departments perform inspections on the facilities to ensure compliance. The permit holder of the Land Application sites has to abide by the 902 KAR 10:150, 902 KAR 10:160 regulation requirements. Sampling & testing requirements are listed in 902 KAR 10:150 and 902 KAR 10:160.
	WWTPs are governed under Energy and Environmental Cabinet's Division of Water section (separate agency)
Most recent septage regulations update:	2021
Full-time equivalent (FTE) at state agency for septage:	no data
Notes: NBDP estimates that KY households generated at least 35 million gallons of septage in 2018, assuming about 5% of systems are pumped out each year and septic tanks are 1000 gallons each.	

Major WWTPs, Separate Preparers, and Notable Projects

The following provide a representation of biosolids management in Kentucky:

Louisville is by far the largest city (~617,000 in 2018) and producer of wastewater solids in Kentucky. The Louisville/Jefferson County Metropolitan Sewer District (MSD) treats about 153 million gallons per day (MGD) at five different WRRFs. The Morris Forman Water Quality Treatment Center is the state's largest and oldest WRRF, treating an average of 100 MGD. It is also where the solids from all five Louisville WRRFs have been processed into as much as 70 – 80 U.S. tons per day (30,000 dry U.S. tons per year) of heat-dried fertilizer. This process was started in 2004. These biosolids have been sold and distributed to farmers and fertilizer blenders as "Louisville Green." 2013 was the record year for sales of Louisville Green, with income of about \$460,000. In 2018, most of the city's biosolids – that Louisville Green product – went to beneficial use on soils. The rest – off-spec material – was landfilled. The biosolids heat-drying system was beginning to need upgrading, which resulted in 2018 biosolids production being significantly lower than in prior recent years, with more solids being landfilled. In April 2021, MSD announced receipt of a \$97 million WIFIA low-cost loan from U.S. EPA that was used to improve biosolids processing and expand capacity to 40,000 dry tons of fertilizer production per year. The upgraded system begins operations in mid-2022. The quality and pride in Louisville's biosolids management program is highlighted through its many years of participation in the National Biosolids Partnership's Environmental Management System (EMS) program.

Lexington, "horse capital of the world," is Kentucky's second largest city (~323,000 population). The Lexington-Fayette Urban County Government owns and operates two WRRFs. The Town Branch facility is one of the oldest in the central U.S., dating back to 1919. It treats about 30 MGD, as does the other Lexington-Fayette WRRF, West Hickman. Solids from both facilities are dewatered and sent to landfill.

Bowling Green, population ~70,500, in western Kentucky, treats about 8.5 MGD. Bowling Green Municipal Utilities (BGMU) has tried a variety of solids management options in recent decades, including alkaline stabilization (NViro) and off-site composting (see compost discussion above), but has mostly relied on landfill disposal. In 2012, an indirect-heat-drying system began operation, with the resulting pellet fertilizer sold to area farms for \$23/U.S. ton – a positive financial impact when compared to the former landfill fees of up to \$35/wet U.S. ton (Schnell et al., 2013). However, that system failed a few years later, and Bowling Green biosolids now go to landfill – as they did in 2018.

Frankfort's WRRF, which serves the state capitol (population ~27,700), is an example of a WRRF that, back in the 1980s, was built with anaerobic digestion. In 1994, the tank covers were removed and digestion became aerobic. Frankfort has land applied some of the resulting Class B solids on area farms in recent years, including 188 dry U.S. tons in 2018. That same year, the WRRF sent 845 dry U.S. tons of solids to landfill. The land application program is managed by a contracted private company.

Paducah composts wastewater solids with local yard waste and woody debris.

Morehead's Utility Plant Board WRRF treats ~3.5 MGD of wastewater. Its wastewater solids go through rotary drum thickening and autothermal thermophilic aerobic digestion (ATAD) to create a

Class A EQ biosolids product that is dewatered with belt filter presses and land applied at the utility-owned and -operated land farm. The ATAD process, which is not widely used, is sometimes described as composting of liquid waste.

References

Most of the data and information contained herein were kindly provided by Todd Stephens, President of H&A Resource Management, KY EEC biosolids coordinator Robin Green, and other EEC staff. Additional data were compiled from the U.S. EPA ECHO biosolids electronic reporting database for 2018. And additional information was obtained from the following sources:

KY Energy & Environment Cabinet:

State land application regulations: <https://eec.ky.gov/Environmental-Protection/Waste/solid-waste/i-need-information/Pages/sludge.aspx>
<https://eec.ky.gov/Environmental-Protection/Waste/solid-waste/i-need-information/Pages/landfarms.aspx>
<https://eec.ky.gov/Environmental-Protection/Compliance-Assistance/operator-certification-program/Test%20Preparation%20Documents/KYLandfarmOperatorCertificationManualRevMarch2018.pdf>

Louisville:

<https://louisvillemsd.org/what-we-do/wastewater-treatment>
<https://louisvillemsd.org/programs/louisvillegreen>
<https://www.epa.gov/wifia/louisville-morris-forman-biosolids-processing-solution>
<https://louisvillemsd.org/news/wifia-loan-morris-forman-project-marks-msd-commitment-community>
<https://louisvillemsd.org/programs/programs-and-projects/louisville-green-management-system>

Bowling Green:

<https://www.bgohio.org/325/Wastewater-Treatment-Plant>
https://www.bgdailynews.com/news/bgmu-sludge-drying-delayed/article_6663acec-dbf6-11e1-a6d9-0019bb2963f4.html
<https://www.greshamsmith.com/project/bowling-green-wastewater-treatment-plant-expansion-and-renovation/>

Schnell, K., K. Baker, and S. Neighbors. 2013. From surplus sludge to savings. *Water Env. & Tech.* Dec. 2013. <http://www.themahercorp.com/files/89608102.pdf>

Paducah:

<http://paducahky.gov/compost-facility>

Morehead:

<https://mupb.com/wwtp2.html>

Other:

<https://haresource.net>