



## INDIANA

### BIOSOLIDS MANAGEMENT 2018 – SUMMARY

[biosolidsdata.org](http://biosolidsdata.org) This summary, a dashboard of statistics, & further data are at [www.biosolidsdata.org](http://www.biosolidsdata.org)

#### ***In Indiana...***

- *Indiana biosolids are managed by all three of the major options – about equally. Most of the state’s water resource recovery facilities (WRRFs) land apply biosolids, but many others landfill them. And Indianapolis – the largest city by far – incinerates the solids from its two wastewater facilities.*
- *Many Indiana WRRFs have staff who manage the solids, including making arrangements with farmers for land application, which mostly involves Class B biosolids. But outside contractors are also used for land application and transportation.*
- *There are seven regional biosolids centers (RBCs) that play a large role in recycling to soils the biosolids from many Indiana WRRFs. Merrell Bros. and Wealing Brothers are the largest companies operating RBCs; they recycle tens of thousands of tons of municipal Class B biosolids and industrial wastewater solids to soils every year.*
- *The solids from 12 WRRFs are treated to Class A standards.*

#### **Biosolids Management in Indiana**

In Indiana, the management of wastewater solids reflects the diversity of population and land use around the state. Indiana has the 17<sup>th</sup> largest state population in the U. S., and notably, that population is spread out amongst many smaller cities and towns with less than 100,000 residents. Only four cities – Indianapolis (~874,000), Fort Wayne (~266,000), Evansville (~119,000), and South Bend (~102,000) have greater populations. Although the northern tier is more densely populated and industrial – especially the northwest corner that is part of the Chicago megalopolis – most of the state is agricultural and open space dotted by small cities and towns, most of which have centralized water resource recovery facilities (WRRFs) that produce solids (sewage sludge).

Indianapolis dominates the center of the state; it is the one place in the state where wastewater solids are incinerated (details below). There, and at most other Indiana WRRFs, landfill disposal is used as a back-up option. For example, if a biosolids treatment has a hiccup and the resulting solids are not suitable for land application or if weather and/or timing disrupt land application schedules, the solids are sent to a landfill.

The Indiana Department of Environmental Management (IDEM) gets reports on all land applied biosolids and some of the landfilled biosolids. However, some biosolids that are landfilled are not required to be reported; this meant that, for this report, NBDP estimated that 34,000 dry U. S. tons of untracked Indiana municipal

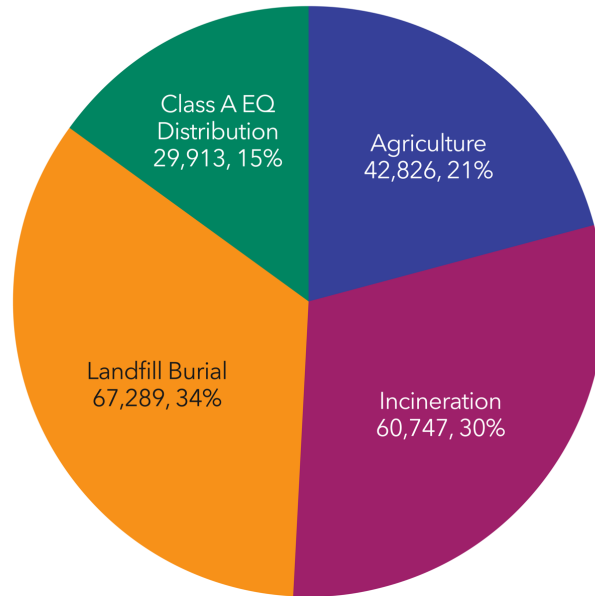
wastewater solids were put in landfills in 2018, resulting in an estimated total solids used or disposed that year of 200,000 dry U. S. tons. Overall, state experts say, the production and management of biosolids in Indiana has been stable and similar for the past 20 years or more.

Most Indiana biosolids are land applied – and were in 2018. Most smaller WRRFs (>90) treat biosolids with aerobic digestion (e.g. Richmond) and land apply them as Class B liquid or, after dewatering, semi-solid biosolids. Some (~37) of the mid-size WRRFs, such as South Bend and Mishawaka, use anaerobic digestion (AD) and put the resulting biogas and Class B biosolids to use. A fewer number of facilities (~10 or a few more) use alkaline stabilization to make Class A or Class B biosolids. The smallest facilities often store solids in lagoons, from which they are cleaned out every 5 – 20+ years, treated, and either land applied or landfilled. This mix of biosolids treatments is reflective of biosolids management nationwide.

Regional Biosolids Centers, private enterprises, take in and manage together biosolids from many, mostly smaller, WRRFs, providing a valuable service for a fee. The small WRRFs don't need to go through the requirements and hassles of land application site permitting, communications with farmers, and proper applications – that is all done by the RBC. Likewise, farmers can get enough biosolids from one source, rather than having to deal with multiple WRRFs. The RBCs have long played an important role in the recycling of biosolids to land in Indiana.

A biosolids management technology that is more common in Indiana than other states is drying beds or drying basins. Fort Wayne, the state's second-largest city, dries solids in 105 acres of basins before providing them to farmers and other end users (details below). There are a couple of facilities that use solar drying (Carmel and Noblesville; details below).

Indiana Biosolids Use & Disposal 2018  
(dry US tons, %)  
Total: 200,000



### Agency/Department Oversight

As in other states, NPDES permits for WRRFs, which are overseen by the Office of Water Quality at Indiana Department of Environmental Management (IDEM), include language related to solids management. However, biosolids are considered “solid waste,” and land application in Indiana is overseen by the Office of Land Quality, Solid Waste Permits Section of IDEM. The staffing consists of 2.5 full-time equivalents (FTEs), including the lead biosolids coordinator who works on the land application program 100%. There are also four regional permit managers who spend ¼ time on biosolids land application and one staff person dedicated to overseeing the RBCs (spending about ¼ to ½ of their time). Together, they track land application closely and compile data annually from annual and monthly land application reports submitted by WRRFs and RBCs. These land application data, in addition to the tonnages of solids incinerated at Indianapolis, account for much of municipal wastewater solids produced in the state. Uncertain, however, is the amount of solids disposed in landfills by WRRFs that do not have land application permits. They are not required to report tonnages sent to landfills. For this report, the National Biosolids Data Project team used independent data to estimate another 34,000 dry U. S. tons of Indiana biosolids were generated and went to landfill.

The IDEM land application permitting staff also oversee the Regional Biosolids Centers (RBCs), which are separate preparers of biosolids that mix two or more different biosolids together for land application; they are

considered generators/preparers and treated similarly to WRRFs with regards to requirements for their biosolids programs.

IDEM's biosolids staff also permit and track Class A EQ biosolids products marketed and distributed from out of state. These include Milorganite from Milwaukee, WI; similar heat-dried biosolids from Louisville, KY; and air-dried Chicago biosolids. These out-of-state biosolids totaled ~22,600 dry U. S. tons in 2018 – but they are not counted in this report as part of Indiana's total solids. (They are tracked in their states of origin.)

## **State Regulations and Permitting**

IDEM biosolids regulations follow the U. S. EPA 40 CFR Part 503 regulations fairly closely. The state regulations and regulatory program have been stable for at least 25 years.

The IDEM biosolids land application program has an efficient way of permitting land application sites for Class B biosolids that meet the higher quality U. S. EPA Table 3 metals standards (and including the Table 1 limit for molybdenum): a site permit is formally reviewed and approved only after the site is first applied to. The WRRF or private contractor has a non-site-specific permit for land application anywhere in a county. They can then review a potential land application site, ensure it meets state and federal requirements, make arrangements with the farmer or other landowner, complete the first land application to the site, and then submit a report to IDEM, which reviews it and considers it an approved site.

IDEM also provides permits for marketing and distribution of Class A biosolids.

The RBCs are treated like WRRF biosolids generators. Many of them take in not only municipal solids, but also non-hazardous industrial solids. These are all mixed and land applied at agronomic rates. RBCs are generally required to submit monthly reports to IDEM, listing the WRRFs and how much solids they took in from each one.

Specific requirements for biosolids in Indiana include:

- Biosolids sent from a WRRF or RBC to a field for land application can only be applied under the WRRF or RBC permit.
- Biosolids from more than one generator can be applied to the same site; in fact, RBCs often blend biosolids from different WRRFs and land apply them.
- All Class B biosolids land applicators must track cumulative loading on every site used.
- Testing of pH of soil to which biosolids are applied is required.
- EQ biosolids products require labeling for proper biosolids use, and out-of-state biosolids must hold an Indiana marketing and distribution permit and submit reports.

Biosolids regulation and land application continued to be active in 2018, as in previous years, as indicated by permitting approvals of 74 new sites comprising 5,736 acres that year. Biosolids land application programs are reviewed through reports and occasional informal field visits; no formal field inspections occurred in 2018 and there were no violations issued.

### **Pressures on Biosolids Management and Land Application**

Pressures on biosolids in Indiana as of 2018, as identified by the state biosolids coordinator, include...

1. TRADITION – recycling biosolids is not a priority or part of WWTP's core mission
2. MANAGEMENT ISSUES – hauling distances
3. AGRICULTURAL ISSUES – declining farmland due to less agriculture or due to development, sprawl, seasonal restrictions, or competition with manures, etc.
4. COST – rising costs generally
5. REGULATIONS ON DISPOSAL – strict regulations or fees on disposal

Addressing potential excess phosphorus (P) in biosolids and soils was a topic of discussion, research, and planning in Indiana in the 2010s. This led to development of a formula for estimating the leachability of biosolids-borne P. However, the formula and its application in biosolids regulation has not progressed. IDEM does receive results of soil tests that many biosolids programs routinely conduct at land application sites, and IDEM staff have considered the feasibility of analyzing those data to determine if there are sites that would advisedly no longer receive any high-P materials.

There are two Indiana counties that have ordinances that restrict biosolids land application. For example, in Wayne County, a land applier needs to obtain a land application permit from the county commissioners before going through the state permitting process. And some counties don't allow waste from out of the county, which can restrict some biosolids.

### **Septage Management**

IDEM does not track septage pumped and disposed of. Based on the number of households in Indiana and estimating that 20% of them rely on onsite septic systems for wastewater management, the NBDP estimates annual production of septage at 23 million gallons or more. Survey responses from three WRRFs with combined flow of 15.2 MGD showed they took in a combined total of 2.65 million gallons of septage in 2018. According to IDEM staff, not that many WRRFs take in septage, but, as of 2021, an estimated 93% of septage goes to WRRFs and only about 6% is directly land applied in accordance with the requirements of the federal Part 503 regulations. The amount of septage going to WRRFs has been increasing in recent years. IDEM records indicate 3,986,700 gallons of septage was land applied in 2018.

IDEM provided some examples of fees charged by WRRFs for septage disposal in 2020, ranging from 3 to 20 cents per gallon:

- Evansville charges \$30 per 1000 gallons for septage (domestic waste); but \$85 if it's grease trap waste.
- Gary charges one flat rate for septage.
- Lafayette charges 1 cent per pound for up to 20,000 lbs, plus an additional fee if over 20,000 lbs.
- Marion charges a flat rate of \$110 for any load under 2500 gallons and \$60 additional for each 1000 gallons over 2500.
- Vincennes charges \$125 for any load under 1500 gallons and \$140 for any load over 1500 gallons.
- Merrell Bros. charges a flat fee of 8 cents per gallon.
- South Bend charges a flat fee of 5 cents per gallon.
- Some facilities only take septage from within their county (example: Lafayette).
- Terra Haute will take septage from anywhere, but charges differently: 8 cents/gallon for out-of-county septage and 2 cents/gallon for in-county septage.

### Indiana Septage Management

Quality of state septage data	Moderate
Septage haulers based in state:	345
In-state separate preparers (not WRRFs) taking septage:	4
WRRFs required to take septage?	No
WRRFs that accept septage:	73
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?	--
Is it regulated?	Yes
How?	septage regulations
	Brown grease is considered septage by definition & must be handled/disposed according to state septage regulations.
Is there a proactive program to collect FOG?	No
Can septage be land applied in state?	Yes
If yes, what treatment is required?	Meet Part 503 and the following additional state requirements: IDEM rules prefer lime stabilization
Most recent septage regulations update:	2004

Full-time equivalent (FTE) at state agency for septage:	2
<b>Notes:</b>	
IDEM does not receive record of waste disposal from septage haulers or WWTPs	
NBDP estimates 23 million gallons of septage are generated in IN annually, assuming 20% of households on septic systems, 5% pumped each year @ 1000 gals.	

### Major WRRFs, Separate Preparers, and Notable Projects

- Indianapolis wastewater is managed and treated by Citizens Energy Group, “a broad-based utility service company, providing natural gas, thermal energy, water, and wastewater services to about 800,000 people and thousands of businesses in the Indianapolis area” (<https://www.citizensenergygroup.com/Our-Company/About-Citizens>). Citizens Energy Group incinerates centrifuge-dewatered solids from its two wastewater facilities, the Belmont and Southport Advanced Wastewater Treatment Plants (AWTPs), using four multiple hearth furnaces. Some smaller WRRFs in the Indianapolis region send their solids to the Belmont site for incineration, but data on the number doing so were not available for this report.

“The sludge from the Southport AWTP is pumped approximately 6 miles to Belmont to be treated in conjunction with Belmont’s sludge. Belmont has also recently undergone projects to improve their sludge dewatering and incineration. A portion of the plant’s belt filter presses were removed and replaced with centrifuges that are capable of dewatering the sludge to a greater extent before being conveyed to [the] multi-hearth incinerators. Five new centrifuges were installed to replace the 12 existing belt filter presses. Additionally, the incinerators were recently upgraded to be able to meet more stringent, clean air requirements” (<https://info.wesslerengineering.com/blog/field-trip-belmont-advanced-wastewater-treatment-plant>). Incinerator ash is stored in an ash lagoon on-site. When the lagoon is filled, the ash is dewatered and sent to landfills. If and when incinerators are out of service, untreated wastewater solids are sent directly to landfill.

- Fort Wayne, the second largest city in Indiana, creates a Class A EQ biosolids product at its “Biosolids Handling Facility... The facility has 105 acres of drying basins where the material is turned regularly and air-dried for more than two years before it is mixed with composted leaves from the City’s annual leaf collection program. This biosolids material [– 30,000 wet tons a year (19,445 dry U. S. tons in 2018) –] is then sold to farmers and made available at little or no cost to residents. Biosolids are regularly tested for safety and to determine the amount of nutrients in the material”

(<https://www.cityoffortwayne.org/utilities/3958-biosolids.html>). Because of the long-term processing and dilution with leaves, the percent of nitrogen content of these biosolids is relatively low – .8% – with phosphorus at just 1%.

- Evansville, the 3<sup>rd</sup> largest city in Indiana, operates eight anaerobic digesters at its two WRRFs (East and West Wastewater Treatment Plants). Until the mid-2010s, solids were dewatered with a belt filter press, alkaline stabilized with an RDP process, and solar dried. That system could not keep up with solids production, so it was replaced with two centrifuges and ancillary systems. The Class B biosolids are usually land applied by a third party.
- Carmel, IN, the 4<sup>th</sup> largest municipality and a suburb of Indianapolis, received the Indiana Water Environment Association’s biosolids award in 2016. Back in 2005, it was the first facility in the U. S. to install the Kruger “BioPasteur” process. The pasteurized solids are then anaerobically digested and dried in a solar dryer greenhouse that includes an automated “mole” that mixes and stirs the solids. The resulting Class A EQ biosolids are picked up by businesses and residents for garden and landscaping uses.
- South Bend, the 5<sup>th</sup> largest city in Indiana (population ~102,000), treated an average of 48 MGD of wastewater in 2018 and produced about 2,500 dry U. S. tons of Class B biosolids that was land applied on 322 acres (out of 500 acres permitted), supporting the growth of corn for ethanol and soy beans. The land application work is done by city staff from the “Organic Resources” facility, which stores the biosolids and land applies them in spring and fall on area farms that are typically just five miles away.

South Bend biosolids are treated by anaerobic digestion, and in 2018, they produced 67,399,000 standard cubic feet of biogas, 2/3 of which was flared and the rest used to heat the digesters and power plant machinery. Some biogas is now treated to renewable natural gas quality and used as a fuel. South Bend staff note that, in recent years, they spent \$12 million: “Upgraded primary digester, added external draft tube mixers, new boiler, gas cleaning equipment (Guild) and pipe lines to power natural gas powered engines and also to send to slow-fill CNG station that's on site for solid waste department trash trucks” (<https://southbendin.gov/department/public-works/utilities-division/organic-resources/>).

- The City of Mishawaka Wastewater Treatment Plant (WWTP) biosolids program is representative of small- to mid-size biosolids programs in Indiana. This WWTP cleans about 14 million gallons per day (MGD) of wastewater from 55,000 residents, producing 1,028 dry U. S. tons of anaerobically-digested, belt-filter-pressed, Class B biosolids in 2018 that were hauled by a private contractor – typically just ten miles one way – and land applied on 271 acres (out of 1,369 acres permitted for land application), supporting the growth of corn for animal feed. Mishawaka biosolids have typical nutrient values: 4%



nitrogen (N) and 3% phosphorus (P), on average. The Mishawaka WWTP uses the biogas produced in its AD system to heat the digesters and for building heating.

Like most U. S. biosolids – the quality of which are protected by industrial pretreatment programs that reduce metals and other industrial contaminants by keeping them out of wastewater to begin with – Mishawaka biosolids meet the more stringent “Table 3” limits in the U. S. EPA Part 503 regulations – most of the time. But in 2018, one test showed copper – an important plant and animal nutrient – exceeding the Table 3 limit, resulting in the need to track cumulative loading as the biosolids are applied.

The Mishawaka program illuminates typical costs for solids management:

- land application cost, per wet ton of biosolids in 2018: \$78
  - total biosolids management cost in 2018 (estimated) (including digestion, dewatering, transportation, and land application) : \$450,000
  - total WWTP budget in 2018: \$15,844,874
  - biosolids management cost, proportion of total budget: 3%
  - biosolids staff cost: \$132,000 for 2 full-time equivalents (FTEs)
  - expected new investments in biosolids in the next 5 years: \$200,000
- 
- Richmond, IN is home of the 11 MGD William Edwin Ross Treatment Plant, which serves 38,000 residents and produced 1,930 dry U. S. tons of biosolids in 2018. The solids are anaerobically digested in 2 stages (heated, then unheated), with biogas used to heat the primary digesters. Like many other IN WRRFs – especially smaller ones – land application of the facility’s Class B biosolids is the goal, but other options are used when needed. In 2018, 90% of Richmond’s biosolids were land applied at area farms on 320 acres (out of 6000 permitted in 3 counties), supporting the growth of hay and corn for animal feed, as well as wheat and soy crops. Solids are stored for up to four months before being applied. A small amount went to a Merrell Bros. regional biosolids center (RBC), and the rest was sent to a landfill. The Richmond facility provides a critical regional service by taking in 12 million gallons of other WRRF solids, 1.6 million gallons of septage, 7.5 million gallons of landfill leachate, and 100,000 gallons of fats, oil, and grease (FOG) in 2018.
  - The 7.5 MGD Noblesville Treatment Plant uses active solar drying, with a greenhouse and cute automated “moles” that routinely mix and turn the solids, supplemented with heat from biogas from the digesters. After all that work, the solids are then landfilled. But discussions began there in 2019 regarding additional uses of the biogas and whether other end uses of the biosolids might be better than landfilling.

- Brownsburg’s ~3 MGD WRRF is a typical smaller Indiana facility that relies on aerobic digestion, which is common at many smaller facilities, followed by gravity belt thickening and belt filter press dewatering. In 2018, the facility’s 474 dry U. S. tons of dewatered Class B biosolids went to the Wealing Bros. RBC, where it was combined with other solids and land applied.
- Merrell Bros. provides biosolids management to scores of Indiana communities and has expanded services throughout the central and southeastern U. S., with centers in Florida and Texas. It operates three regional biosolids centers (RBCs) in Indiana, at Indianapolis, Warsaw, and its headquarters in Kokomo, taking in wastewater solids, septage, greywater, leachate, and non-hazardous industrial solids.
- Other RBCs and providers of related biosolids services in Indiana include Wealing Brothers, Karle Enviro Organic Recycling, Smith Creek Inc., and small local RBCs such as Ag Spread Inc., Hohl Family Farms Inc., RCS Cannelburg, and Hauswald Corydon.

## References

Much of the information herein was provided by the helpful biosolids coordinator at the IDEM. Additional information was gleaned from the following:

Regional Biosolids Centers:

<https://www.wealingbrothers.com/>

<https://merrellbros.com/>

<https://karleenviro.com/indiana/>

Fort Wayne:

<https://www.wane.com/news/compost-and-mulch-available-at-biosolids-facility/>

<https://www.cityoffortwayne.org/utilities/3958-biosolids.html>

Evansville:

<https://www.wesslerengineering.com/project/biosolids-master-plan-centrifuge-dewatering-improvements/>

Carmel:

<https://www.tpomag.com/editorial/2009/05/working-toward-a-goal>

<https://www.carmel.in.gov/department-services/utilities/department-divisions/wastewater-treatment/carmel-included-in-national-league-of-cities-best-practices>

South Bend:

<https://southbendin.gov/department/public-works/utilities-division/organic-resources/>

Brownsburg:

[https://www.tpomag.com/editorial/2015/11/award\\_winning\\_indiana\\_plant\\_maintains\\_tough\\_standards](https://www.tpomag.com/editorial/2015/11/award_winning_indiana_plant_maintains_tough_standards)

Richmond:

<https://www.richmondindiana.gov/resources/wastewater-treatment>

Terre Haute:

[https://www.tribstar.com/news/local\\_news/fbi-raids-terre-haute-wastewater-treatment-plant/article\\_1dc0d956-3fb7-5e4b-98ac-6b6dcef5f386.html](https://www.tribstar.com/news/local_news/fbi-raids-terre-haute-wastewater-treatment-plant/article_1dc0d956-3fb7-5e4b-98ac-6b6dcef5f386.html)

Noblesville:

<https://www.cityofnoblesville.org/topic/subtopic.php?topicid=268>