



## IOWA

### BIOSOLIDS MANAGEMENT 2018 - STATE SUMMARY

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

#### ***In Iowa...***

- *Iowa has abundant agriculture, and biosolids recycling to soils is prevalent, routine, economical, and encouraged. Landfill disposal of sewage sludge is discouraged and landfill disposal Class A or Class B biosolids is prohibited.*
- *Nutrient management is a growing concern statewide; effluent standards and non-point nutrient sources are a focus – and biosolids might be.*
- *Des Moines – the state’s largest WRRF – is a national leader in advanced anaerobic digestion and renewable natural gas (RNG) production, putting to use the abundant food processing and other liquid wastes available for co-digestion.*
- *IA DNR provides robust data on biosolids treatment technologies; see the state’s data spreadsheet.*

#### **Biosolids Management in Iowa**

Iowa’s economy and land use are largely focused on agriculture, making land application an efficient and economic destination for biosolids. In 2018, 72% of the state’s biosolids went to land application: over 44,400 dry metric tons (dmt), mostly Class B. In 2018, two facilities treated 6,370 dmt of biosolids to Class A EQ. One of those facilities is a separate preparer, a municipal composter in Davenport, that sells the compost to the general public. Iowa City is the second Class A producer (details below). Most of those Class A biosolids likely also go to land application on farms. An estimated 25% of IA’s biosolids are managed by private contractors. As with other states that have large swaths of cropland and pasture, nutrient management is an ongoing challenge in Iowa.

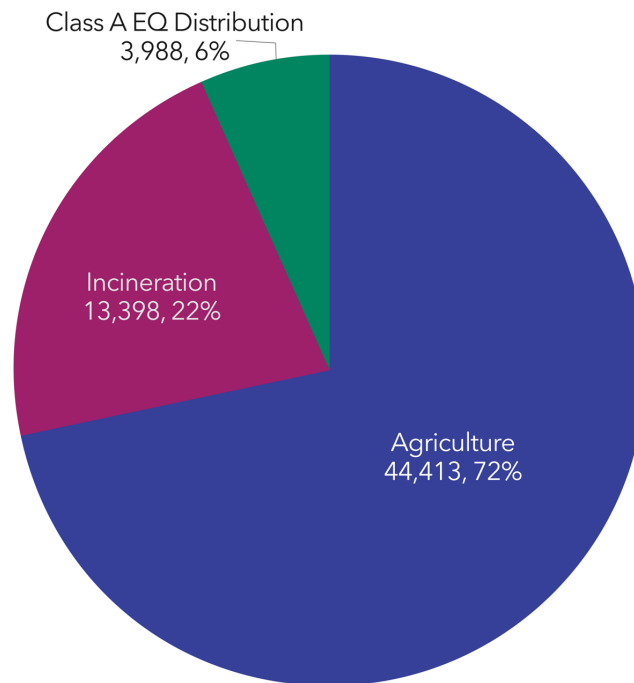
Biosolids not land applied are incinerated. The city of Cedar Rapids operates the only sludge incinerator in the state, and the ash from the incinerator goes to landfill alternative daily cover. Landfilling of Class B or Class A biosolids in Iowa is prohibited, and, according to the Solid Waste Division of the DNR, no landfilling of wastewater sludge happened in IA in 2018.

Iowa has 871 municipal WRRFs with NPDES discharge permits. Of those 871, 107 facilities are “majors,” with a design flow of >1 MGD. Those major facilities are required to submit an annual biosolids report to the state and the U.S. EPA if they land apply biosolids. Minor facilities also generate annual biosolids

reports, but keep them onsite. In 2018, 103 WRRFs sent biosolids annual reports to the state. The remaining WRRFs in Iowa have sludge lagoons and only submit reports to the state when they clean out their lagoons and land apply the biosolids.

The Iowa state biosolids coordinator provided detailed information about the design flow of facilities, both for wet and dry weather. (This focus on design of facilities and systems is likely due to her training and position as an engineer within the DNR, mostly focusing on construction designs and permitting.) IA's coordinator also provided notably robust numbers for stabilization, dewatering, and thickening technologies used at WRRFs around the state. As with other states, only Iowa's largest WRRFs have more expensive equipment like anaerobic digesters. Aerobic digestion is quite common, especially at smaller facilities.

Iowa Biosolids Use & Disposal 2018  
(dry metric tons, %)  
Total: 61,800



### Agency/Department Oversight

Iowa's biosolids program is overseen by the Department of Natural Resources (DNR). Iowa Solid Waste Rule 121 regulates and encourages the land application of wastewater solids.

## State Regulations and Permitting

Iowa's biosolids regulations are in Chapter 67 of State Administrative Code 567 (Environmental Protection) and concern land application only. (In Chapter 67, Class B biosolids are designated "Class II," and Class A, "Class I.") In 2018, a process began to remake the biosolids rules in Iowa. The state regulation has been revised and has undergone two public hearings (as of March 2021). Changes to the rule will make it more similar to Part 503 and will add new technologies for treatment, e.g. TPAD as a Class A stabilization technology. The new rule is expected to be completed in 2021.

Annual biosolids reports are required of all major WRRFs (>1 MGD flow). The annual report includes all data also required by the U.S. EPA, submitted electronically, plus a one-page form developed by IA DNR for reporting land application sites' locations and areas, the amount of biosolids applied that year, and whether the site is new or existing/long-term. This form is required to be turned in to the state at the same deadline as the annual report for EPA, also electronically. Field offices rely on these forms to perform field inspections.

Land application sites are not permitted. Self-compliance with state biosolids regulations and EPA Part 503 is expected, and compliance is checked during review of annual reports by state regulators. Field office wastewater staff periodically inspect biosolids land application sites.

New construction or expansion at wastewater treatment plants is required by law to be reviewed and permitted by the DNR's wastewater engineering section. Any construction permit review includes sludge treatment.

Iowa follows Part 503 for pollutant concentration limits and testing parameters. Additional management requirements are minimal, mostly concerning management practices that suit the state's agricultural conditions, e.g. the number of days between land application and harvest of specific crops. If a WRRF exceeds any limit in Part 503 Table 3, a CPLR must be developed. DNR requires inspections of land sites by field office staff, but no other monitoring. In 2018, there were 20 documented inspections by state regulators of biosolids facilities and field sites.

Nitrogen is the basis for Iowa's agronomic loading rate. There are currently no restrictions on phosphorus in biosolids land application. IA DNR is interested in how to manage P in biosolids, perhaps using the P Site Index developed for and currently in use at CAFOs.

## Pressures on Biosolids Management and Land Application

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

1. ENVIRONMENTAL ISSUES – nutrient management, phosphorus (P), nitrogen (N)
2. ENVIRONMENTAL ISSUES – impacts to soils, organisms, public health, contaminants (pathogens, metals, organic chemicals, etc.)
3. COST – rising costs generally
4. PUBLIC INVOLVEMENT – concerns of neighbors, environmental groups, and others

5. TRADITION – recycling biosolids is not a priority or part of WRRFs’ core mission

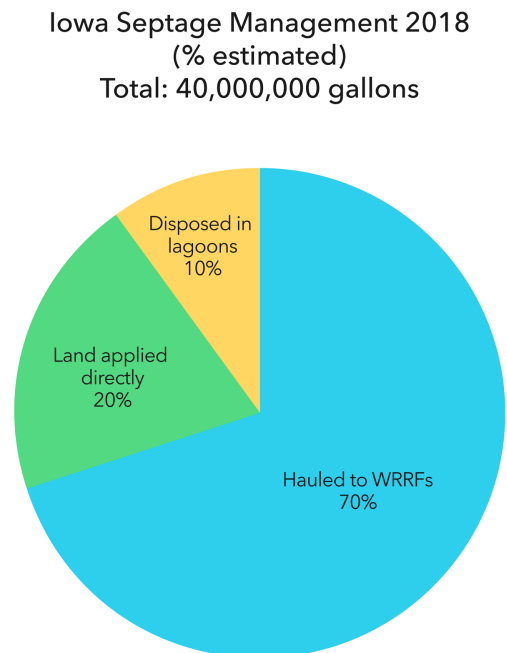
Overall, the beneficial use of biosolids is staying the same in Iowa.

Iowa is a great example of a nationwide challenge facing biosolids management: nutrient management. In Iowa, wastewater discharge accounts for a small portion of N and P in waterways (an estimated <10%), but wastewater effluent nutrient discharges are being regulated, as is happening in other states. In 2013, the state released a strategic plan for cutting nitrogen and phosphorus going into the Mississippi River by 45% as part of a federal initiative to shrink the hypoxia zone in the Gulf of Mexico. The plan requires Iowa’s 100 largest cities to start removing N and P during the wastewater treatment process. In 2017, IA DNR started point and nonpoint regulation of nutrients, and N and P are required to be removed from effluent at major WRRFs. Prior to 2017, only N was regulated in effluent. Roughly 10 WRRFs are designing and constructing biological P removal systems, and some chemical precipitation, working toward compliance with the new rule (as of spring 2021). Municipalities large and small are challenged to find funding for plant upgrades and new technology. As of the state’s 2017-2018 Nutrient Reduction Strategy annual report, 24 plants had met the goal N reduction goal, and 11 had met the P reduction goal (<https://www.thegazette.com/subject/news/government/iowa-towns-west-union-lone-tree-water-quality-upgrade-20190816>).

That focus on nutrient management is now beginning to include biosolids, and agronomic rates based on P, rather than just N, are beginning to be explored.

**Septage Management**

Septage regulation in Iowa is overseen by DNR. Septage can be land applied as long as it meets Part 503 requirements.



**Table 1. Iowa Septage Management**

Septage haulers based in the state	235
Separate preparers (not WRRFs) taking septage in the state	0
WRRFs required to take septage?	No
WRRFs accepting septage in the state	No data
Septage received in 2018 (gallons) - reported septage from septic tanks, chemical toilets, etc.	40,000,000
Other outside wastes accepted at WRRFs, type & gallons...	No data
Is FOG considered a significant issue? Is it regulated / how?	No data
Is there a proactive program to collect FOG?	
Can septage be land applied?	Yes
Most recent septage regulations update	2009
FTEs at state agency for septage	1

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

- Biosolids from the City of Davenport’s wastewater treatment facility go to the city’s Composting Department, which operates a facility that composts the solids into a Class A EQ product. The facility was built in the mid-1990s and features an aerated static pile composting system, completely enclosed to mitigate odor. Yard waste is the primary bulking agent for the compost. The compost is tested monthly for pathogens, trace metals, pH, nutrients, soluble salts, etc. in line with the US Composting Council’s quality assurance procedures. Davenport’s compost is sold in bulk or bags as Earth Cycle™ 100% Compost Soil Builder and priced according to volume purchased: 1-10 cubic yards cost \$12.00 per yard, 11-500 cubic yards cost \$8.00 per yard, and 500+ cubic yards cost \$6.00 per yard; the cost is \$2.00 for a 1-cubic foot bag. The compost facility also produces other soil amendments, including a Garden Soil that consists of compost mixed with sand and potting soil, sold by the facility and local retailers in bag or bulk. In the spring of 2020, during the beginning of the coronavirus pandemic and a nation-wide surge in home gardens, the Davenport Compost Facility temporarily ran out of their Garden Soil and other products.
- The City of Muscatine’s Water & Resource Recovery Facility (W&RRF) runs every step of its programs in-house. The facility takes in waste from industrial as well as residential and commercial sources. It has an industrial pretreatment program and an on-site lab that performs testing on industrial wastewater discharge, W&RRF samples, septage, biosolids, and more. Muscatine is in the process of implementing organic waste recovery and conversion to biofuel.

Using new and retrofitted anaerobic digesters, the W&RRF will receive high strength waste including food waste and FOG. Methane from co-digestion with solids from the W&RRF is compressed into natural gas to fuel their facility vehicles and equipment or sold on the market. Biosolids are then land applied through two different methods: a dragline operation, where solids are pumped into underground tanks that connect via hoses to a toolbar applicator that's dragged through the field; and subsurface injection, for solids hauled to fields farther away, for a fee of \$20 per acre. Land application sites total 550 acres throughout the county. Muscatine's beneficial use of biosolids has been ongoing since the 1970s.

- The City of Dubuque's Water & Resource Recovery Center (WRRC) uses anaerobic digestion to treat biosolids. Methane is captured and used to produce electricity, providing 70% of the facility's required energy. Biosolids from the WRRC are spread on local farm fields.
- The Metropolitan Water Reclamation Authority (WRA) in Des Moines serves 17 communities surrounding the capital city. Its main facility is the largest wastewater treatment plant in Iowa, and, in 2020, they completed a multi-year project to install biofuel infrastructure. The WRA now cleans and compresses the methane produced in the anaerobic digestion of wastewater solids and outside waste (e.g. food processing wastes) and injects the natural gas into a nearby pipeline. Biosolids are dewatered through a belt filter press, then stored until they can be land applied on nearby farm fields.
- Cedar Rapids Water Pollution Control Facility operates the only sewage sludge incinerator in Iowa. In 2018, the facility used low pressure oxidation to stabilize the sludge. Methane from anaerobic digestion produced in the treatment of industrial waste helps to fuel the incinerator. The ash from incineration is used as ADC at the local landfill. Cedar Rapids also land applies some of its biosolids, after lime stabilization.
- Iowa City's WRRF utilizes thermophilic aerobic digestion to meet Class A standards, and anaerobic digestion to meet Class B. In 2014, the plant was expanded to increase capacity and install technology for biological removal of nitrogen and phosphorus, to comply with Iowa's Nutrient Reduction Strategy. Iowa City is home to Iowa State University, known for excellence in science and technology. Perhaps because of this, Iowa City's sewage treatment has been the topic of academic inquiry dating back at least to 1938. In an issue of *Sewage Works Journal* from January of 1938, a professor of sanitary engineering described the city plant's sludge treatment process. It included primary and secondary sludge digestion tanks, followed by air drying "on sludge beds" (Waterman, 1938). Gas from the digester tanks was used to heat "the primary digester, the control house, and the laboratory." The plant was built in 1935, but stable operation of the facility began in September 1936. It treated an average of 1.87 MGD during the first year, though daily flow fluctuated with the student population in residence, as it still does today, nearly a century later.

## References

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

Cedar Rapids:

[https://www.cedar-rapids.org/residents/utilities/land\\_application.php](https://www.cedar-rapids.org/residents/utilities/land_application.php)  
[https://www.cedar-rapids.org/residents/utilities/our\\_process.php](https://www.cedar-rapids.org/residents/utilities/our_process.php)

Davenport:

[https://cityofdavenportiowa.com/services/public\\_works/compost\\_facility](https://cityofdavenportiowa.com/services/public_works/compost_facility)  
<https://cityofdavenportiowa.com/cms/One.aspx?portalId=6481456&pageId=12942984>

Des Moines Metropolitan Water Reclamation Authority:

<http://www.dmmwra.org/162/Solids-Processing>  
<http://www.dmmwra.org/CivicAlerts.aspx?AID=39>

Dubuque:

<https://www.cityofdubuque.org/2731/WRRRC-Tour>

*The Gazette:*

<https://www.thegazette.com/subject/news/government/iowa-towns-west-union-lone-tree-water-quality-upgrade-20190816>  
<https://www.thegazette.com/subject/news/government-treading-water-dead-zone-hypoxia-agricultural-runoff-fish-kill-nonpoint-source-pollution-surface-runoff-iowa-farmers-dnr-cover-crops-improve-water-quality-12022018>

Iowa City:

<https://www.icgov.org/city-government/departments-and-divisions/wastewater>  
[https://www.icgov.org/sites/default/files/purchasing\\_bid/files/2018\\_epa\\_annual\\_biosolids\\_report.pdf](https://www.icgov.org/sites/default/files/purchasing_bid/files/2018_epa_annual_biosolids_report.pdf)

MSN:

<https://www.msn.com/en-us/news/us/davenports-compost-facility-is-out-of-soil-and-shredded-mulch-due-to-high-demand/ar-BB142mvM>

Muscatine:

<https://www.muscatineiowa.gov/DocumentCenter/View/21377/Resource-Recovery-Hand-out18-PDF>  
<https://www.muscatineiowa.gov/257/Biosolids>

*Muscatine Journal:*

[https://muscatinejournal.com/news/local/biosolids-program-wins-award-for-plant/article\\_c0c2ebe0-7ae3-11e1-b899-001a4bcf887a.html](https://muscatinejournal.com/news/local/biosolids-program-wins-award-for-plant/article_c0c2ebe0-7ae3-11e1-b899-001a4bcf887a.html)

Waterman, Earle L., and Royal E. Rostenbach. "Sewage Treatment at Iowa City, Iowa." *Sewage Works Journal* 10, no. 1 (1938): 106-14. Accessed February 3, 2021. <http://www.jstor.org/stable/25030714>.

*WaterWorld:*

<https://www.waterworld.com/water-utility-management/energy-management/article/16222612/des-moines-wra-plant-turns-sewage-into-energy>