NATIONAL BIOSOLIDS DATA PROJECT

STATE BIOSOLIDS SURVEY

2018 data
conducted 2020-2021
biosolidsdata.org

North Carolina

Infrastructure & Wastewater

	2004 Data	2018 Data	
Total Number of WWTPs:	**55 (survey), 457 CWNS**	**115**	
Number of Separate Preparers (in- or out-of-state, receiving solids from your state):	1	2	----------
Total number of your state's WWTPs sending to those Separate Preparers:	0	9+	----------
Number of operating sludge incinerators in your state (total):	4	4	----------
Fluidized bed:	no data	3	----------
Multiple hearth:	no data	1	----------
Number of Part 258 landfills in your state accepting sewage sludge:	data not requested for 2004	75 landfills, no data re accepting solid	----------
Number of WWTPs in your state with industrial pre-treatment programs:	data not requested for 2004	2+	----------
Number of WWTPs in your state with *sludge* lagoons:	data not requested for 2004	3+	----------
Wastewater Flow Totals			
Total statewide average daily wastewater flow (MGD):	data not requested for 2004	653	----------
Total statewide WWTP *design* capacity for wastewater flow (MGD):	data not requested for 2004	no data	----------
Total statewide average daily *dry weather* flow (MGD):	data not requested for 2004	no data	----------
Other Totals			
Number of documented odor & nuisance complaints received by state in 2018 related to biosolids transportation and use or disposal outside of the gates of the WWTP:	data not requested for 2004	no data	----------
Number of WWTPs involved in those complaints:	data not requested for 2004	no data	----------
Percent of population served by on-site systems (e.g. septic systems):	no data	40%	----------

Data presented here are from the U.S. EPA's ECHO database, with some additional data from the NBDP survey of WRRFs and from online sources; they account for 115 water resource recovery facilities (WRRFs) in North Carolina that reported managing solids in 2018. Together, these 115 WRRFs treat ~85% of the average daily wastewater flow in NC. The 2012 Clean Watershed Needs Survey counted 309 WRRFs in North Carolina. • Statewide average daily wastewater flow is from Seiple et al. 2020. • Sewage sludge incinerators (SSIs) are in Concord (MHI), Greensboro (FBI), Asheville (FBI), and High Point (FBI). • The largest separate preparer in NC is McGill Environmental Systems, which composts solids for use in soil blends. Of the 115 facilities for which NBDP acquired 2018 data, 7 reported sending some solids to McGill for further treatment and distribution. In 2021, McGill was permitted to take in "residuals" from ~30 facilities treating municipal wastewater. Eastern Compost, Inc., near Raleigh, is the second separate preparer listed here. There may be others. • Many WRRFs contract out land application, and some dewatering and lime stabilization. • Percent of NC population with septic tanks was estimated by an expert at North Carolina State University.

Biosolids Use and Disposal

UNITS:	**Dry metric tons**	**Dry metric tons**	
BIOSOLIDS USED OR DISPOSED, 2018 (adjusted total):		**129,200**	

Summary

	Number of Entities (WWTPs & Sep. Preparers) Going To…	Quantity of Biosolids	Number of Entities (WWTPs & Sep. Preparers) Going To…	Quantity of Biosolids
Beneficial Use (applied to soils, not including ADC)	34	60,787	112	90,236
Disposal & Alternative Dispositions	21	61,597	22	38,951
Other	0	0	0	0
TOTAL	**55**	**122,384**	**134**	**129,187**

NOTE: Quantity of sewage sludge or biosolids used or disposed means the quantity that goes out the gate of the WWTPs. Quantities are in the units (the form of measurement) indicated above.

Three WRRFs reported transferring solids to another WRRF for treatment; the transferred quantities are assumed to be counted in the receiving WRRF's totals. For instance, Raleigh's Neuse River Regional Recovery Facility (NRRRF) treats solids from other WRRFs in the capital area. Western Wake Regional Water Reclamation Facility also treats solids from other facilities. There are likely other smaller facilities not counted here that transfer solids to larger WRRFs for treatment or disposal (e.g. incineration).

Beneficial Use

	Number of Entities (WWTPs & Sep. Preparers) Going To…	Quantity of Biosolids	Number of Entities (WWTPs & Sep. Preparers) Going To…	Quantity of Biosolids
Agricultural (EQ, Class A, & Class B)	33	60,567	94	69,222
Forestland (EQ, Class A, & Class B)	0	0	1	264
Reclamation (EQ, Class A, & Class B)	0	0	0	0
Class A EQ Distribution (bagged or bulk, public distribution, or unsure where it went)	1	220	17	20,750
Beneficial Use Subtotal	**34**	**60,787**	**112**	**90,236**
Long-term storage	0	0		0
Number of *acres* to which biosolids were applied:		no data		no data

Agricultural land application of biosolids dominates solids management in North Carolina, led by Raleigh, Charlotte, and Winston-Salem, with lesser significant amounts land appled from Cape Fear, Shelby, Fayetteville, Cary, Burlington, and Durham. • McGill Environmental is a large regional soil amendments producer and distributor. All biosolids composted by McGill become available for public sale in bag or bulk (Class A EQ distribution); some go to agricultural lands, while some are used in gardens, lawns, landscaping, parks, etc. Of the 19,133 dry metric tons (dmt) of Class A EQ biosolids publicly marketed and distributed in 2018, 10,590 dmt were composted by McGill Environmental Systems. • For solids composted by Eastern Compost, a smaller separate preparer, NBDP assumed 80% was land applied on company farm fields and 20% was sold to the public. The same split was assumed for the cities of Shelby and Wilson, where biosolids were reported as composted in 2018, but final product destination was unable to be determined by NBDP. • Camp Lejeune, a Marine Corps base, applies their Class A EQ biosolids to their training fields and forests. • The NC DEQ annual report on solid waste management indicates there were 47 composting and 16 mulch facilities in the state, and they composted 480,000 wet (U.S.) tons of materials, of which 13% was "sludge and biosolids;" using the NBDP default % solids of 22%, that comes to 12,451 dmt of composted solids. This state estimate is about 1/2 of the NBDP compiled data for biosolids composting presented here.

Disposal & Alternative Dispositions

	Number of Entities (WWTPs & Sep. Preparers) Going To…	Quantity of Biosolids	Number of Entities (WWTPs & Sep. Preparers) Going To…	Quantity of Biosolids
Landfill (total)	17	29,952	16	11,891
Burial	data not requested for 2004	data not requested for 2004	15	11,829
Alternative daily (ADC), intermediate, or final cover	data not requested for 2004	data not requested for 2004	1	62
Surface Disposal	0	0	2	169
Incineration	4	31,645	4	26,891
Cement kiln or industrial furnace	data not requested for 2004	data not requested for 2004	0	0
Deep well injection	data not requested for 2004	data not requested for 2004	0	0
Gasification	data not requested for 2004	data not requested for 2004	0	0
Pyrolysis	data not requested for 2004	data not requested for 2004	0	0
Disposal & Alternative Dispositions Subtotal	**21**	**61,597**	**22**	**38,951**
TOTAL	**55**	**122,384**	**134**	**129,187**

Sewage sludge incinerators (SSIs) are in Concord (MHI, Water and Sewer Authority of Cabarrus Co.), Greensboro (FBI), Asheville (FBI, Metropolitan Sewerage District of Buncombe Co.), and High Point (FBI). The incineration totals presented here differ from totals reported to ECHO, which seemed low for Concord, Asheville, and High Point. NBDP, in consultation with state experts, assumed the tonnages incinerated by these three WRRFs were close or equal to the total solids generated by the facilities in 2018. ECHO data for years surrounding 2018, plus lack of reporting of other management or disposal practices, corroborate this assumption.

Biosolids Quality Summary

	Number of Entities (WWTPs & Sep. Preparers) Producing…	Quantity of Biosolids	Number of Entities (WWTPs & Sep. Preparers) Producing…	Quantity of Biosolids
Class A EQ	7	21,114	24	37,775
Other Class A	0	0	0	0
Class B	23	47,604	85	55,014
Other (no data, etc.)	26	53,667	13	36,398
TOTAL	**56**	**122,385**	**122**	**129,187**

NOTE: For "number of entities," the total may not match because some entities go to more than one use or disposal.

In NC, there is no difference between Class A and Class A EQ biosolids; all Class A biosolids are likely EQ, and categorized as such here. • Roughly 2/3 of the Class A EQ biosolids represented here were compost. The rest were treated with advanced alkaline stabilization, ATAD, heat dryers. • "Other" includes solids that were incinerated or landfilled without having been treated to Class A or B standards or without quality being tracked.

Biosolids Treatment Practices

	Estimated Number of WWTPs or Separate Preparers Using…	Estimated Quantity of Biosolids Produced Using…	Estimated Number of WWTPs or Separate Preparers Using…	Estimated Quantity of Biosolids Produced Using…
Stabilization				
Aerobic Digestion (total)	some	no data	67	no data
Class A (ATAD/Other)	data not requested for 2004	data not requested for 2004	3	no data
Class B	data not requested for 2004	data not requested for 2004	64	no data
Anaerobic digestion (AD) (total)	many	no data	12+	no data
Class A (e.g. thermophilic)	data not requested for 2004	data not requested for 2004	no data	no data
Class B (mesophilic)	data not requested for 2004	data not requested for 2004	likely all mesophilic	no data
WWTPs co-digesting (FOG, food, glycol, etc.)	data not requested for 2004	data not requested for 2004	maybe a few	N/A
Biogas used (heating, electicity, fuel, etc.;scf/year)	data not requested for 2004	data not requested for 2004	yes, by most AD WRRFs	N/A
Lime/Alkaline (total)	many	no data	17	no data
Class A lime/alkaline	data not requested for 2004	data not requested for 2004	2	no data
Class B lime/alkaline	data not requested for 2004	data not requested for 2004	15	no data
Composting	several	no data	14	24,395
Thermal (e.g. heat drying, not incineration/gasificatn/pyrol)	a few	no data	7	
Gasification	data not requested for 2004	data not requested for 2004	0	0
Pyrolysis	data not requested for 2004	data not requested for 2004	0	0
Hydrolysis (thermal, chemical, etc.)	data not requested for 2004	data not requested for 2004	0	N/A
Long-term (lagoons, reed beds, etc.)	no data	no data	many	N/A
Oxidation ditch / extended aeration	data not requested for 2004	data not requested for 2004	no data	N/A
Other stabilization technology	no data	no data	no data	no data
Dewatering				
Belt Filter Press	most	no data	no data	no data
Plate & Frame Press	a few	no data	no data	no data
Screw Press	no data	no data	no data	no data
Centrifuge	several	no data	no data	no data
Vaccuum Filter	no longer many	no data	no data	no data
Drying beds (open-air)	a few	no data	no data	no data
Solar drying (e.g. in greenhouse)	data not requested for 2004	data not requested for 2004	no data	no data
Other dewatering technology	no data	no data	no data	no data
Thickening				
Gravity thickener	data not requested for 2004	data not requested for 2004	no data	no data
Gravity belt thickener (GBT)	data not requested for 2004	data not requested for 2004	no data	no data
Centrifuge	data not requested for 2004	data not requested for 2004	no data	no data
Dissolved air flotation (DAF)	data not requested for 2004	data not requested for 2004	no data	no data
Other thickening technology	data not requested for 2004	data not requested for 2004	no data	no data
Other				
Biosolids sold in bags (explain at right what size bags)	data not requested for 2004	data not requested for 2004	1	no data

Data presented here are from the NC WRRFs that reported to ECHO for 2018; data are incomplete. • Charlotte Water is considering installing thermal hydrolysis in the 2020s. • Some McGill compost is sold in bags.