NATIONAL BIOSOLIDS DATA PROJECT

STATE BIOSOLIDS SURVEY

2018 data
conducted 2020-2021
biosolidsdata.org

Virginia

Infrastructure & Wastewater

	2004 Data	2018 Data	
Total Number of WRRFs:	**261 (survey), 225 CWNS**	**228**	
WWTP & Biosolids Infrastructure Totals			
Number of Separate Preparers (in- or out-of-state, receiving solids from your state):	0	1	----------
Total number of your state's WWTPs sending to those Separate Preparers:	614	8	----------
Number of operating sludge incinerators in your state (total):	6	10	----------
Fluidized bed:	0	no data	----------
Multiple hearth:	6	no data	----------
Number of Part 258 landfills in your state accepting sewage sludge:	data not requested for 2004	~50	----------
Number of WWTPs in your state with industrial pre-treatment programs:	data not requested for 2004	many	----------
Number of WWTPs in your state with *sludge* lagoons:	data not requested for 2004	a few	----------
Wastewater Flow Totals			
Total statewide average daily wastewater flow (MGD):	data not requested for 2004	742	----------
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	27	----------
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	34%	----------

The number of WRRFs is from Seiple et al., 2020. • McGill Composting is the large separate preparer in Virginia. (There may be some other small ones.) Eight WRRFs, including 3 of the Hampton Roads facilities and Rivanna, sent some solids to the McGill site for composting. • The 10 incinerators are detailed below; five are at Hampton Roads WRRFs, and one of those ceased operations as of 2021 (and 2 more will by 2030). • According to the VA DEQ report on solid waste disposal in 2018, there were about 50 landfills operating in the state who reported future capacity. (VA Places puts the number at 60.) • Total statewide average daily flow is from Seiple et al., 2020. • Complaints have been tracked and addressed by VA DEQ since 2008 when there were 203; there are far fewer in recent years. In 2018, VA DEQ documented 27 complaints and issued 4 warning letters and 1 notice of violation. • The percentage of onsite septic systems is from a 2010 State plan for the Chesapeake Bay TMDL.

Biosolids Use and Disposal

UNITS:	**Dry metric tons**	**Dry U.S. tons**	
BIOSOLIDS USED OR DISPOSED, 2018 (adjusted total):		**140,000**	

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)	69	49,085	33	72,661
Disposal & Alternative Dispositions	137	96,140	114	66,905
Other	55	14,770		
TOTAL	**261**	**159,995**	**147**	**139,566**

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

VA DEQ and the JLARC legislative report of 2017 indicate 146,000 dry U.S. tons (dt) of biosolids were land applied in 2016; this included out-of-state biosolids. For 2018, 51 in-state WRRFs reported to the U.S. EPA ECHO database a total of 144,550 dt *produced* (which can be a different number from what was used or disposed of). The 2020 VAMWA/MAMWA Biosolids Survey by Aqualaw, with MWCOG analysis, found a 5-year average of ~580,000 wet tons/year of total biosolids production, which included 26,520 wet tons of DC Water flow that came from Virginia. Subtracting that DC Water portion (since, for NBDP purposes, it is reported in the DC total) and using the NBDP default solids percentage of 22% for the rest of the VA solids, the VAMWA/MAMWA 5-year average total is 121,700 dry U.S. tons. For best accuracy for 2018 specifically, NBDP chose to use VA DEQ data for land applied biosolids, the VAMWA/MAMWA survey estimate for landfill disposal, and U.S. EPA ECHO data for tonnages for surface disposal and incineration, as further detailed in notes below.

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	63	44,250	33	53,499
Forestland	0	0	7	1,489
Reclamation	0	0	0	0
Class A EQ Distribution	6	4,835	14	17,673
Beneficial Use Subtotal	**69**	**49,085**	**54**	**72,661**
Long-term storage	55	14,770	no data	no data
Number of *acres* to which biosolids were applied:		50,488		22,397

The 53,499 dry U.S. tons (dt) of biosolids sent to agriculture and the 1,499 dt to silviculture are from VA DEQ data. Some entities sent solids to both agriculture and silviculture. • Data on Class A EQ production are from WRRFs' and preparers' annual reports to VA DEQ. Composting of biosolids occurs at the large commercial McGill facility (a separate preparer), as well as at the following local public utilities: Spotsylvania County (~2,500 dt went into compost), Leesburg Town (818 dt), Rappahanock (~10 dt to composting), and Wolf Creek WRF (8 dt to compost). In 2018, Upper Occoquan Service Authority produced 6,295 dry U.S. tons of heat-dried EQ fertilizer. In 2018, McGill received 8,048 dt wastewater solids from 9 WRRFs, including Hampton Roads and Rivanna, and distributed 24,840 bags of compost weighing a total of 298 dt and distributed in bulk 19,858 dt of compost. The finished compost was made not just from wastewater solids, but also other organic residuals (food processing waste, agricultural waste, etc.). • The number of acres applied to is for bulk EQ, Class A, and Class B biosolids applied from VA WRRFs to farm and forest lands and does not include areas receiving EQ biosolids products marketed for general distribution in bulk or in bags.

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
MSW landfill (total)	125	32,024	100	5,500

According to the 2017 JLARC report for the Legislature, "Approximately half of the sewage sludge generated in Virginia is treated to

Burial	data not requested for 2004	data not requested for 2004	100	5,500	meet biosolids standards and land applied, while the remainder is sent to landfills or incinerated." The VA DEQ solid waste report on landfill disposal tracks "sludge" disposal and indicates that 200,544 wet tons of VA sludge was landfilled in 2018 (VA DEQ, 2019, p. 5). It is assumed that most of this "sludge" is not from municipal WRRFs, but the percentage is uncertain. The VAMWA/MAMWA Bisolids Survey (2020), which included responses from WRRFs representing more than 90% of VA wastewater flow, reported only 4% of municipal wastewater solids were landfilled. It is a common practice for small WRRFs to use landfills for solids disposal, and most of these small WRRFs were not captured in the VAMWA/MAMWA survey. Therefore, NBDP added a few hundred dry tons to the VAMWA/MAMWA estimate of 5,100 dry U.S. tons going to landfill, resulting in the 5,500 dt included here. NBDP guesstimated that 100 WRRFs sent solids to landfills in 2018. While all of those solids are shown here as being buried in the landfills, it is possible that some was used as alternative daily cover (ADC). • The surface disposal data are from ECHO; surface disposal was done in 2018 with some of the solids from Alexandria Renew, Richmond, Opequon, and Bluefield. • The JLARC report (2017) says there were 6 sewage sludge incinerators operatng in the state in 2018. ECHO data, which NBDP relied on here, show the following WRRFs sent solids to incineration in 2018: Prince William County Service Authority, Lower Potomac WRRF, Hopewell WRRF, and these Hampton Roads WRRFs: Army Base, Atlantic, Boat Harbor, Chesapeake/Elizabeth, VA Initiative, Nansemond, and Williambsurg. In total, Hampton Roads Sanitation District (HRSD) incinerated 26,900 dry U.S. tons. In contrast, Henrico Regional WRRF sent 162 dt of its solids to another facility for incineration, likely the Hopewell incinerator, not far away.
Alternative daily (ADC), intermediate, or final cover	data not requested for 2004	data not requested for 2004	some	some	
Surface Disposal	0	0	4	1,250	
Incineration	12	64,116	10	60,155	
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	**137**	**96,140**	**114**	**66,905**	
TOTAL	**261**	**159,995**	**168**	**139,566**	

Biosolids Quality Summary

	Number of Entities (WWTPs & Sep. Preparers) Producing…	Quantity of Biosolids	Number of Entities (WWTPs & Sep. Preparers) Producing…	Quantity of Biosolids	**NOTE:** For "number of entities," the total may not match because some entities go to more than one use or disposal.
Class A EQ	6	4,835	14	17,673	Biosolids quality data shown here for EQ and Class A are from the ECHO reports provided by 51 VA WRRFs for 2018. The Class A EQ tonnage is supplemented with VA DEQ and VAMWA/MAMWA data so that it matches the total Class A EQ distribution number above. The VAMWA/MAMWA survey found 76,526 dry U.S. tons of Class B biosolids were land appied and landfilled, and this number is used here, since that survey included a higher percentage of reporting WRRFs. Data were not available regarding the quality of the remaining solids. This is common; many wastewater solids that go to incineration, landfilling, and surface disposal are often not treated and/or classified.
Other Class A	0	0	4	7,063	
Class B	64	44,411	32	76,526	
Other (no data, etc.)	147	110,748	178	38,303	
TOTAL	**217**	**159,994**	**228**	**139,566**	

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)	no data	no data	17	4,273	
Class A (ATAD/Other)	data not requested for 2004	data not requested for 2004			
Class B	data not requested for 2004	data not requested for 2004	17	4,273	
Anaerobic digestion (AD) (total)	no data	no data	13	34,293	
Class A (e.g. thermophilic)	data not requested for 2004	data not requested for 2004	1	5,927	
Class B (mesophilic)	data not requested for 2004	data not requested for 2004	12	28,366	
WWTPs co-digesting (FOG, food, glycol, etc.)	data not requested for 2004	data not requested for 2004	no data	N/A	
Biogas used (heating, electricity, fuel, etc.;scf/year)	data not requested for 2004	data not requested for 2004	13	N/A	
Lime/Alkaline (total)	no data	no data	5	16,422	
Class A lime/alkaline	data not requested for 2004	data not requested for 2004			
Class B lime/alkaline	data not requested for 2004	data not requested for 2004	5	16,422	
Composting	.	no data	14	17,673	
Thermal (e.g. heat drying, not incineration/gasificatn/pyrol)	no data	no data	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	
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	some	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	McGill compost and maybe a few other Class A EQ producers sell biosolids in bags. • Hampton Roads SD is installing thermal hydrolysis in the 2020s.
Dewatering					
Belt Filter Press	no data	no data	no data	no data	
Plate & Frame Press	no data	no data	no data	no data	
Screw Press	no data	no data	no data	no data	
Centrifuge	no data	no data	no data	no data	
Vaccuum Filter	no data	no data	no data	no data	
Drying beds (open-air)	no data	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	some	some	