NATIONAL BIOSOLIDS DATA PROJECT

STATE BIOSOLIDS SURVEY

2018 data conducted 2020-2021
biosolidsdata.org

Massachusetts

Sheet 1 of 2 - Biosolids Infrastructure & Quantities

Infrastructure & Wastewater

	2004 Data	2018 Data	
Total Number of WWTPs:	**22 (survey), 20 CWNS**	**122**	
WWTP & Biosolids Infrastructure Totals			
Number of Separate Preparers (in- or out-of-state, receiving solids from your state):	7	4	----------
Total number of your state's WWTPs sending to those Separate Preparers:	21	~10	----------
Number of operating sludge incinerators in your state (total):	5	3	----------
Fluidized bed:	1	1	----------
Multiple hearth:	4	2	----------
Number of Part 258 landfills in your state accepting sewage sludge:	data not requested for 2004	~6	----------
Number of WWTPs in your state with industrial pre-treatment programs:	data not requested for 2004	47	----------
Number of WWTPs in your state with *sludge* lagoons:	data not requested for 2004	several	----------
Wastewater Flow Totals			
Total statewide average daily wastewater flow (MGD):	data not requested for 2004	823	----------
Total statewide WWTP *design* capacity for wastewater flow (MGD):	data not requested for 2004	1,012	----------
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):	40%	28%	----------

All 2018 data in this spreadsheet are from NEBRA, 2020, Mass Sludge Survey 2018, conducted for the MA Clean Energy Center (available free at https://files-cdn.masscec.com/NEBRA-MassCEC-MassSludgeSurvey2018-v.1.1-FINAL-30Dec2019.pdf). • Separate preparers included are compost facilities at Ipswich (Agresource), Williamstown (Hoosac), and Marlborough (WeCare), MA, and Hawk Ridge, Unity, ME (Casella Organics). • As of 2018, operating sewage sludge incinerators (SSIs) were at Brockton, Lynn, and Upper Blackstone (Worcester area); only the Upper Blackstone SSI routinely takes in solids from other WRRFs. SSIs at Fall River and Fitchburg closed several years earlier. • There are several sludge lagoons in the state; Salisbury has one, but they removed no solids from it in 2018. • The number of industrial pretreatment programs and flow data shown here were provided in 2019 data by the Mass DEP biosolids coordinator; NBDP assumes these data are representative of 2018 as well. • The state biosolids coordinator notes that "Total average daily flow is sum of 2020 average daily flows in ECHO." The total design flow is from 2016/2017 data, but "none of the facilities have been terminated or gotten a flow increase since then." • Regional Massachusetts Department of Environmental Protection offices and local health boards may receive odor and nuisance complaints, but any documentation of these is not compiled centrally. One private, stand-alone septage and grease treatment facility in Wareham, MA experienced odor issues and was closed in or around 2018. • The % of septic systems is based on a best estimate from Mass DEP.

Biosolids Use and Disposal

UNITS:	**Dry U. S. tons**	**Dry U.S. tons**	
BIOSOLIDS USED OR DISPOSED, 2018 (adjusted total):			**180,800**

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)	17	53,513	32	68,651
Disposal & Alternative Dispositions	110	99,146	108	110,138
Other	0	0	12	1,986
TOTAL	**127**	**152,659**	**152**	**180,775**

All 2018 data in this spreadsheet are from NEBRA, 2020, Mass Sludge Survey 2018, conducted for the MA Clean Energy Center.

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)	2	587	15	60,772
Forestland (EQ, Class A, & Class B)	0	0	0	0
Reclamation (EQ, Class A, & Class B)	0	0	2	630
Class A EQ Distribution (bagged or bulk, public distribution, or unsure where it went)	15	52,926	15	7,249
Beneficial Use Subtotal	**17**	**53,513**	**32**	**68,651**
Long-term storage	1	576		
Number of *acres* to which biosolids were applied:		no data		no data

The tons applied to agricultural land is estimated by assuming that composted biosolids and 10% of MWRA (Boston area) heat-dried pellets and 30% of Greater Lawrence Sanitary District (GLSD) heat-dried pellets did not go to agricultural land but were generally distributed and used in landscaping, turf management, parks, gardens, etc.

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)	21	41,588	29	31,072
Burial	data not requested for 2004	data not requested for 2004	no data	no data
Alternative daily (ADC), intermediate, or final cover	data not requested for 2004	data not requested for 2004	no data	no data
Surface Disposal (i.e., beneficial reuse)	0	0	2	713
Incineration	89	57,558	77	78,353
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	**110**	**99,146**	**108**	**110,138**
TOTAL	**128**	**153,235**	**140**	**180,775**

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	15	52,926	17	45,147
Other Class A	0	0	2	513
Class B	2	587	5	33,205
Other (no data, etc.)	110	99,722	36	101,910
TOTAL	**127**	**153,235**	**60**	**180,775**

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

Class A EQ products are compost and two heat-dried products (MWRA Boston and Greater Lawrence SD). • Class A, non-EQ biosolids are 100% of Hoosac compost and 25% of Somerset compost. • Class B biosolids (and where they ended up in 2018) are from Devens (92% incinerated, 8% landfilled), Erving (with large paper mill input, 98% land applied, 2% landfilled), Holyoke (1/3 landfilled, 2/3 incinerated), Pittsfield (100% landfilled), and Springfield (50% incinerated, 50% landfilled).

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	13	no data
Class A (ATAD/Other)	data not requested for 2004	data not requested for 2004	no data	no data
Class B	data not requested for 2004	data not requested for 2004	no data	no data
Anaerobic digestion (AD) (total)	no data	no data	6	no data
Class A (e.g. thermophilic)	data not requested for 2004	data not requested for 2004	0	0
Class B (mesophilic)	data not requested for 2004	data not requested for 2004	6	no data
WWTPs co-digesting (FOG, food, glycol, etc.)	data not requested for 2004	data not requested for 2004	1	N/A
Biogas used (heating, electicity, fuel, etc.;scf/year)	data not requested for 2004	data not requested for 2004	6	N/A
Lime/Alkaline (total)	no data	no data	0	0
Class A lime/alkaline	data not requested for 2004	data not requested for 2004	0	0
Class B lime/alkaline	data not requested for 2004	data not requested for 2004	0	0
Composting	no data	no data	13	5,016
Thermal (e.g. heat drying, not incineration/gasificatn/pyrol)	no data	no data	2	40,644
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	a few	N/A
Other stabilization technology	no data	no data	no data	no data
Dewatering				
Belt Filter Press	no data	no data	≥24	see Mass Sludge Survey 2018 data
Plate & Frame Press	no data	no data	0	see Mass Sludge Survey 2018 data
Screw Press	no data	no data	≥2	see Mass Sludge Survey 2018 data
Centrifuge	no data	no data	≥14	see Mass Sludge Survey 2018 data
Vaccuum Filter	no data	no data	0	see Mass Sludge Survey 2018 data
Drying beds (open-air)	no data	no data	0	see Mass Sludge Survey 2018 data
Solar drying (e.g. in greenhouse)	data not requested for 2004	data not requested for 2004	0	see Mass Sludge Survey 2018 data
Other dewatering technology	no data	no data	≥3	see Mass Sludge Survey 2018 data
Thickening				
Gravity thickener	data not requested for 2004	data not requested for 2004	see Mass Sludge Survey 2018 data	
Gravity belt thickener (GBT)	data not requested for 2004	data not requested for 2004	see Mass Sludge Survey 2018 data	
Centrifuge	data not requested for 2004	data not requested for 2004	see Mass Sludge Survey 2018 data	
Dissolved air flotation (DAF)	data not requested for 2004	data not requested for 2004	see Mass Sludge Survey 2018 data	
Other thickening technology	data not requested for 2004	data not requested for 2004	see Mass Sludge Survey 2018 data	
Other				
Biosolids sold in bags (explain at right what size bags)	data not requested for 2004	data not requested for 2004	1	100

There are five biosolids composting operations that processed solids from 13 WRRFs in 2018. • The two thermal processes are heat-drying operations at MWRA Boston (operated by NEFCO) and at Greater Lawrence SD (operated by Synagro). • Some MWRA Boston / NEFCO biosolids heat-dried pellets are bagged each year and sold in area stores - about 100 dry U.S. tons in 2018. • Additional details can be found in the Mass Sludge Survey 2018, by NEBRA, 2020, for the Mass CEC, available free at https://files-cdn.masscec.com/NEBRA-MassCEC-MassSludgeSurvey2018-v.1.1-FINAL-30Dec2019.pdf.

State Pollutant (trace metal, etc.) Concentration Limits in Biosolids Applied to Land, 2018

Enter numbers only where state limits differed in 2018 from U.S. EPA limits.

	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Zinc (Zn)
EPA Table 1 (mg/kg)	75	85		4300	840	57	75	420	100	7500
EPA Table 3 (mg/kg) & CPLR (kg/ha)	41	39		1500	300	17		420	36 (CPLR = 100)	2800
State ceiling limit (higher limit) (mg/kg)		25	1000	1000	1000	10	40	200		200
State high quality (lower number) limit (mg/kg)		14	1000	1000	300	10	40	200		200
State CPLR (kg/ha)		5		140				56		200
State APLR (kg/ha/365days)					498					

TESTING

For each of the following constituents, indicate if testing is required by your state, as of 2018.	Is testing required for *all* sewage sludge or biosolids?	Or is testing required only for biosolids being beneficially used as fertilizers and soil amendments?	Frequency of testing (indicate how often testing must be done for each parameter):		If frequency depends on wastewater flow or amount of biosolids used or disposed of, please explain:
			In accordance with Part 503 requirements	In accordance with other frequency required by state (if applicable, please specify)	
Part 503 metals (As, Cu, Hg, etc.)	no	yes	yes	see details	
Other metals (boron, silver…)	no	yes	not applicable (N/A)	see details	
Dioxins/furans	no	no	not applicable (N/A)	no	
PCBs	no	yes	not applicable (N/A)	see details	
Priority pollutants (https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf))	no	no	not applicable (N/A)	no	
Other organic compounds (e.g. PDBEs, pharmaceutical)	no	no	not applicable (N/A)	no	
Radioactive isotopes (alpha, beta, Ra 226, etc.)	no	no	not applicable (N/A)	no	
Nutrients (NPK)	no	yes	not applicable (N/A)	see details	
Pathogen reduction (Class A or B)	no	yes	yes	Only to meet 503 regulations.	
Vector attraction reduction (VAR)	no	yes	yes	Only to meet 503 regulations.	
PFAS (as of 2018)	no	yes	not applicable (N/A)	None in 2018. Only a few were required to begin PFAS testing in 2019,	
Microplastics (as of 2018)	no	no	not applicable (N/A)	no	
TCLP (toxicity characteristic leaching procedure)	no	no	not applicable (N/A)	no	
Paint Filter Liquids Test	no	no	not applicable (N/A)	no	

State residuals testing requirements only:

Wastewater sampling frequency:
<1 MGD and no industrial discharge into the water or wastewater treatment system= One sampling period every six months
<1 MGD and any industrial discharge into
the water or wastewater treatment system= One sampling period every three months
1-5 MGD= One sampling period every three months
>5 MGD= One sampling period every month
Reduction potentials:
Every 6 months can be reduced to annual
Every 3 months can be reduced to every 6 months
Monthly can be reduced to every 3 months

All required testing parameters: pH; cation exchange capacity (CEC), expressed in milliequivalents per 100 grams of soil, Total Nitrogen (N); Ammonium Nitrogen (NH -N); Nitrate Nitrogen (N0 -N); Phosphorus (P); Potassium (K); Cadmium (Cd); Total Chromium (Cr); Copper (Cu); Lead (Pb); Mercury (Hg); Nickel (Ni); Zinc (Zn); Molybdenum (Mo); PCBs, if sludge or septage contains concentrations of PCBs equal to or greater than two parts per million; and any additional substance for which sampling and analysis is required by the Department at the request of the board of health of a city or town in which Type II or Type III sludge or septage is or is intended to be land applied or on the Department's own initiative upon review of information submitted in compliance with 310 CMR 32.00 or of any other information which the Department has

REPORTING

For each of the following, indicate what WWTPs and/or biosolids preparers must report to the state:	Is reporting to the state required for these parameters?	Frequency of reporting (indicate how often testing must be done for each parameter):		How are these data stored by the state?	Are data compiled by the state in reports or summaries? If so, please attach.
		In accordance with Part 503 requirements	In accordance with other frequency required (if applicable, please specify)		
The amounts of biosolids/ sewage sludge used or disposed	yes	yes	Monthly	paper	no
Part 503 metals (As, Cu, Hg, etc.)	yes	yes		paper	no

Other metals (boron, silver…)	yes	not applicable (N/A)		paper	no
Dioxins/furans	no	not applicable (N/A)		not applicable (N/A)	no
PCBs	yes	not applicable (N/A)		paper	no
Priority pollutants (https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf)	no	not applicable (N/A)		not applicable (N/A)	no
Other organic compounds (e.g. PDBEs, pharmaceutical)	no	not applicable (N/A)		not applicable (N/A)	no
Radioactive isotopes (alpha, beta, Ra 226, etc.)	no	not applicable (N/A)		not applicable (N/A)	no
Nutrients (NPK)	yes	not applicable (N/A)		paper	no
Cumulative Pollutant Loading Rates (CPLR)	no	yes		paper	no
How biosolids achieve Class A or Class B	yes	yes		paper	no
How biosolids achieve vector attraction reduction (VAR)	no	yes		paper	no
Solids stabilization process(es) used	yes	yes		paper	no
Other biosolids treatments	yes	yes		paper	no
End use or disposal practice	yes	no		paper	no
PFAS (as of 2018)	yes	not applicable (N/A)		paper	no
Microplastics (as of 2018)	no	not applicable (N/A)		not applicable (N/A)	no
TCLP (toxicity characteristic leaching procedure)	no	not applicable (N/A)		not applicable (N/A)	no
Paint Filter Liquids Test	no	not applicable (N/A)		not applicable (N/A)	no

See previous section "Testing" notes regarding testing frequency. Reporting is due after testing. All facilities are also required to report annual report of data to MassDEP.