



The Mass Sludge Survey 2018

Wastewater Solids Generation and Management in Massachusetts

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Thank you to...



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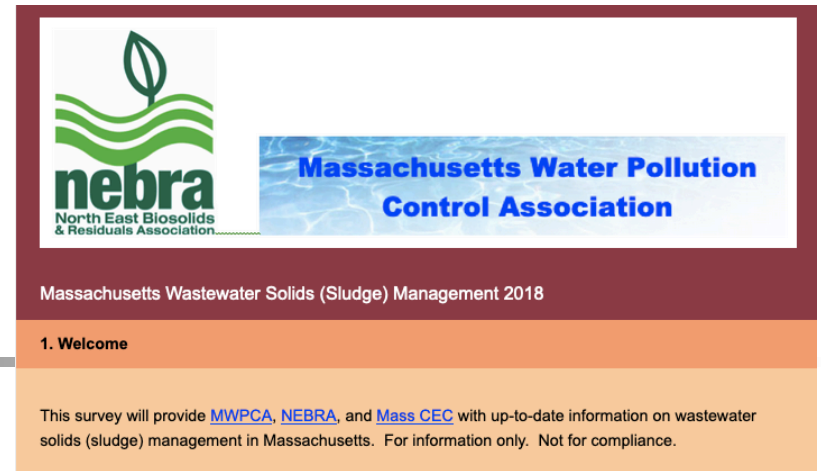
... and all the WRRF operators & managers who took the
time to provide data, answers, & understanding!

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Methods

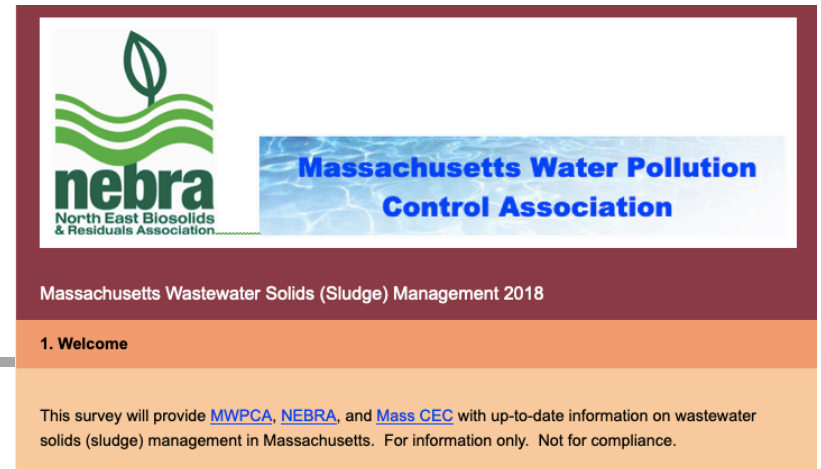
- WRRF lists from EPA Region 1 (2011), MA DEP, & MWPCA
- Online survey, March – July 2019, collecting 2018 data
- Achieved participation goals:
 - All 28 largest WRRFs (> 5 MGD)
 - 70% (actual: 69%) of WRRFs 1 – 5 MGD
 - Data from 30% of smallest WRRFs (< 1 MGD)
 - Representing > 90% of the state's solids





Data Quality

- Data from survey compared to Mass DEP 2005 - 06 data, EPA ECHO data 2016 & 2017, & estimates based on wastewater flows
- Conversion to consistent units: e.g. dry U. S. tons
- 85 WRRFs participated
- 122 WRRFs are represented, with estimates updated from prior surveys

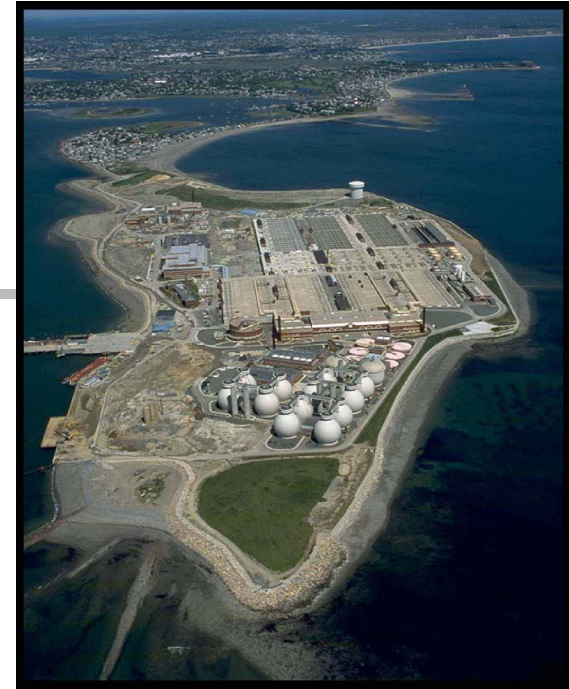




Results:

Sewered population & flow

MWRA photo



Average daily flow statewide:
666 MGD

2018 best estimate	5,000,000
Adjusted total represented by the 85 survey responses	4,800,000
Historic data	4,365,705

Facility	Septage received in 2018 (gallons)
Greater Lawrence Sanitary Treatment District	24,667,750
Plymouth	19,563,768
Fitchburg (East)	11,355,645
Lowell Regional Wastewater Utility	10,903,551
Haverhill	9,052,850
Barnstable	9,048,000
Spencer	8,000,000
Charles River	6,650,000
Ipswich	6,622,000
Devens	5,589,425
MWRA sewer system	5,000,000
Bridgewater	5,000,000
Kingston	4,982,633
Palmer	4,154,675
North Brookfield	3,870,200
Westfield	3,500,000
Uxbridge	3,338,200
Erving Center	3,044,400
Springfield	3,003,738
Total of all reporting WRRFs (53)	173,600,000



Delivering septage to a WRRF

And 15 MA WRRFs take in other outside wastes.

Results:

Solids (sludge) generated, & use / disposal

Mass Sludge Survey 2018 Results	Year of data	# of WRRFs/WWTPs	# of facilities with total dt sludge data	Total sludge (from # of facilities in prior column) (dt)	Land applied Biosolids	Sludge disposed in landfill or monofill	Sludge incinerated	Sludge other disposal
85 WRRFs that provided survey responses	2018	85	83	167,150 (includes 19,644 dt Erving paper fiber)				
All 122 WRRFs	2018	122	122	180,800 ¹ (includes 19,644 dt Erving paper fiber)	68,651 (from 19 WRRFs) (includes 34,345 dt from MWRA Deer Island, 19,186 dt Erving paper fiber, and 6,299 dt from Greater Lawrence)	31,784 (from 31 WRRFs) 18%	78,353 (from 77 WRRFs) 43%	2,012 ² (from 12 WRRFs) 1%

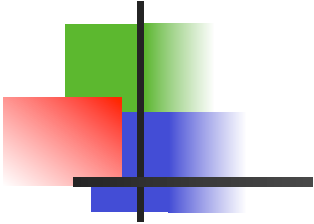
Results:

Beneficial use options



	# of facilities ¹	Solids (U. S. dry tons)
Composting	11	4,127
Heat drying (making fertilizer pellets) ²	2	40,644
Land applied paper fiber (Erving)	1	19,186
Other	5	4,694

Results:



Dewatering technologies

belt filter press	plate and frame press	screw press	centrifuge	vacuum filter	drying beds	gravity belt thickener
24	0	1	14	0	0	14

gravity thickener tanks	dissolved air flotation (DAF) units	none or N/A	Other ¹
19	3	12	16



Results: Highest & lowest totals spent in 2018

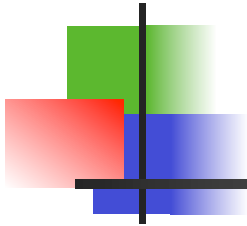
Facility	Wastewater solids produced in 2018 (dry U. S. tons)	Total paid for solids use/disposal in 2018	Total calculated annual cost per dry U. S. ton
MWRA Deer Island Treatment Plant	34,345	\$15 million	\$437
Springfield	10,604	\$4,138,284	\$390
South Essex	6,968	\$3,510,294	\$504
Fall River	3,263	\$2,300,000	\$705
Lowell	6,530	\$2,079,605	\$318
Haverhill	3,978	\$1,217,459	\$306
Charles River	2,303	\$1,023,000	\$444
Hardwick	16	\$20,000	\$1,250
Huntington	4	\$9,650	\$2,350
Otis	2.5	\$6,000	\$2,400
Russell Village	9	\$3,435	\$380
Northfield	1.5	\$2,000	\$1,330



Results:

per-wet-ton cost, transportation & end use / disposal

Solids end use or disposal option	Mean cost per wet U. S. ton¹	Range of costs per wet U. S. ton
Incineration (n = 28) ²	\$144	\$21 - \$432
Landfill disposal (n = 15)	\$176	\$35 - \$608
Class A and Class B land application (n = 3)	\$180	\$74 - \$365
Off-site preparer (n = 5)	\$270	\$83 - \$569



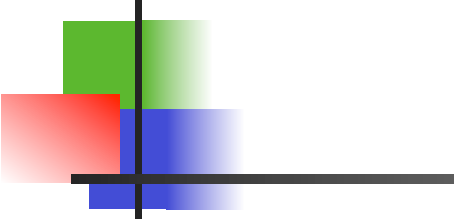
Results:

Comparing 2004 to 2018 end use & disposal

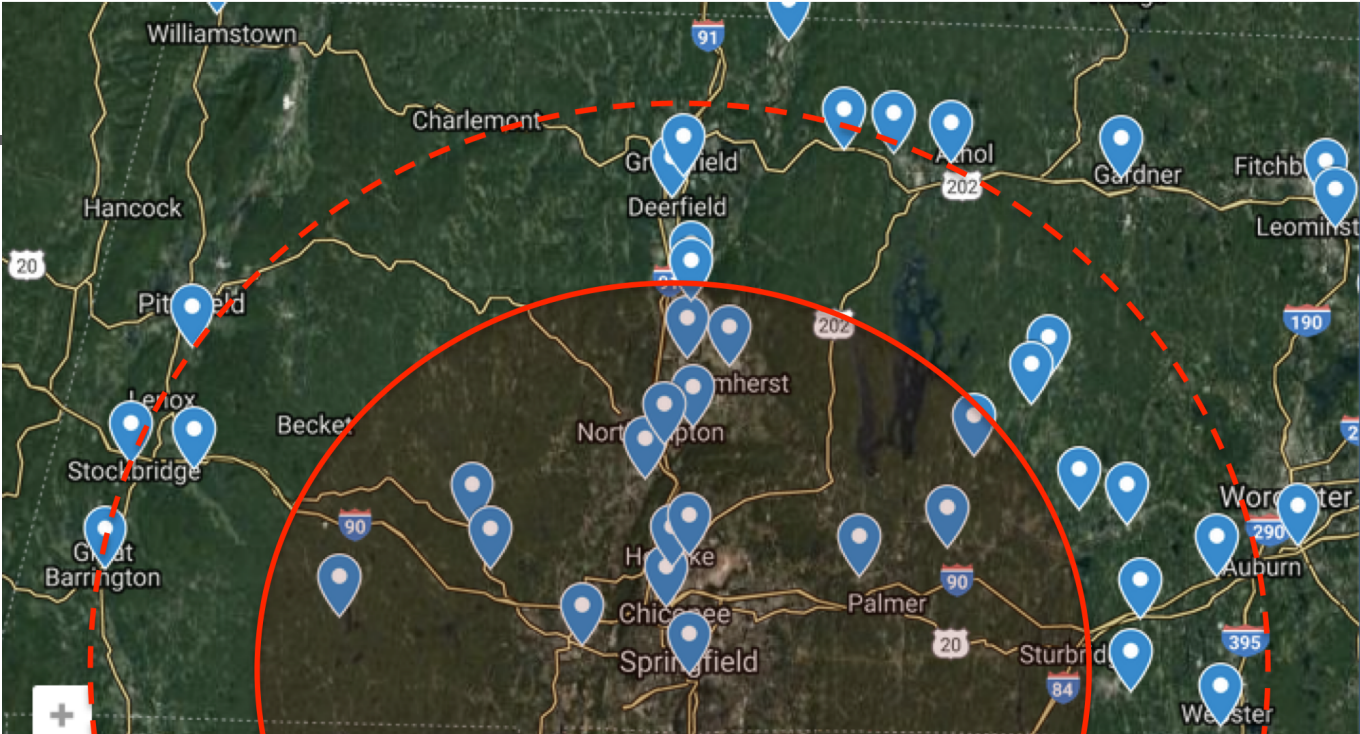
	2004 (NEBRA et al., 2007)			2018 (current survey)		
	# of WRRFs	Dry U.S. tons	% of tons	# of WRRFs	Dry U.S. tons	% of tons
Beneficial use (application to soil)	17	53,513	35%	19	68,651	38%
Landfill disposal	21	41,588	27%	31	31,784	18%
Incineration	89	57,558	38%	77	78,353	44%
Totals	127	153,235		122 ¹	180,800	



Massachusetts wastewater solids for a Springfield or Greenfield Regional Facility:
Within ~30 miles: 18,760 dry U. S. tons / year or 245,000 gallons / day @ 5% solids
Within ~50 miles: 22,670 dry U. S. tons / year or 295,000 gallons / day @ 5% solids
18 WRRFs “very likely” or “likely” to host or send solids to a regional facility: 17,760 U. S. tons/yr



MA CEC
wants to
know if
regional
(AD)
facilities
are viable.



Springfield 30 mi.

Springfield 50 mi.





Thanks for... your invitation,
your attention, & your
comments.

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