Metropolitan Water Reclamation District of Greater Chicago

Welcome to the June Edition of the 2022 M&R Seminar Series

NOTES FOR SEMINAR ATTENDEES

- All attendees' audio lines have been muted to minimize background noise.
- A question and answer session will follow the presentation.
- Please use the "Chat" feature to ask a question via text to "All Panelists."
- The presentation slides will be posted on the MWRD website after the seminar.
- This seminar has been approved by the ISPE for one PDH and has been approved by the IEPA for one TCH. Certificates will only be issued to participants who attend the entire presentation.

NED BEECHER
SPECIAL PROJECTS MANAGER
NORTH EAST BIOSOLIDS AND RESIDUALS ASSOCIATION (NEBRA)

From 1998 to 2019, Ned Beecher was Executive Director of NEBRA, tracking research, legislation, and regulations, and providing information to members and the public. He is now Special Projects Manager at NEBRA and since January 2017 has focused much of his work on PFAS. Other projects include compiling biosolids management data, advancing anaerobic digestion, and addressing policies on biosolids, energy, soils, and climate. He is honored to have received the New England Water Environment Association (NEWEA) Biosolids Management Award in 2015 and the Elizabeth A. Cutone Leadership Award in 2020. He has an MS in Resource Management from Antioch University and a BA in Geology from Amherst College. He has two adult children and lives and gardens (using biosolids) with his wife Chris in Tamworth, New Hampshire.




NATIONAL BIOSOLIDS DATA PROJECT

biosolidsdata.org

How Are Biosolids Used & Managed in the U. S.?

Results of the 2nd Comprehensive National Biosolids Survey

2018 Data

Ned Beecher, Special Projects Manager, NEBRA

Juliana Beecher, Special Projects, NEBRA

Nora Goldstein, *BioCycle* • Janine Burke-Wells, NEBRA

Bill Toffey, MABA • Maile Lono-Batura, WEF • Greg Kester, CASA

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A MWRDGC Seminar • June 24, 2022

nebra Recycled organics: Tools for sustainability.

North East Biosolids & Residuals Association

National Biosolids Data Project

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biosolidsdata.org

- 1st Survey: 2004 data - outdated
- 2nd Survey 2018 data
  - Lit. review & methods funded by EPA Region 5
  - Pre-PFAS impact?
- Comprehensive Biosolids Update
  - Regulation
  - Quality
  - End Use and Disposal Data

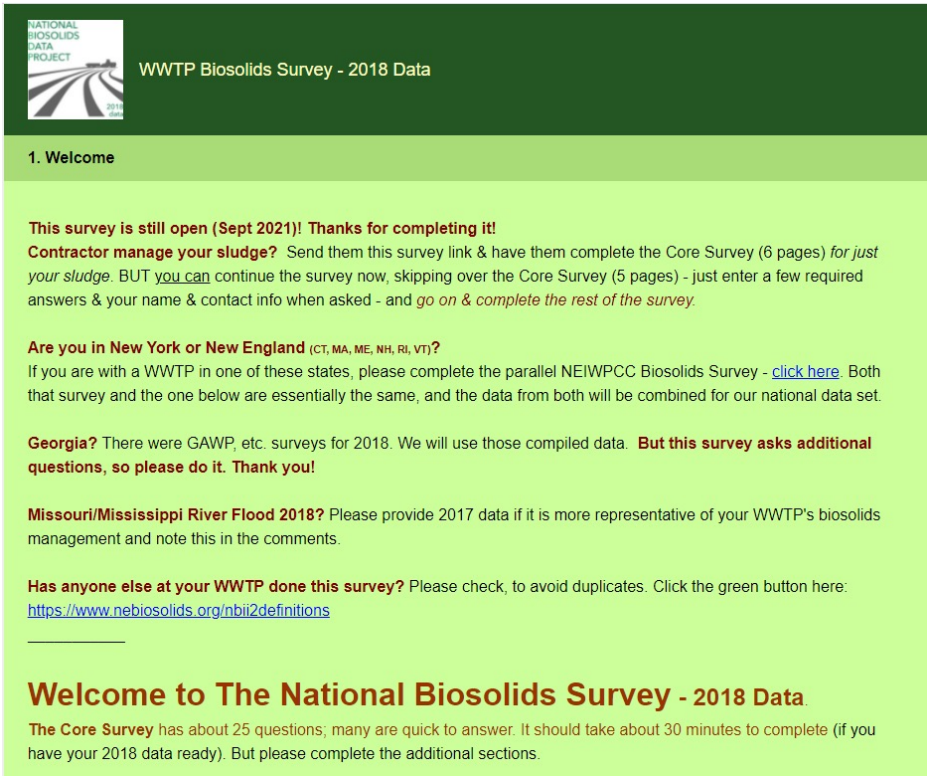
NBDP Survey Topics

- How much & where biosolids were used or disposed in 2018
- Quality: Class A, B; nutrient levels, meeting Part 503 Table 3
- Biosolids management details
- Energy – limited data, but useful insights
- Economic Data – limited data, but useful insights never compiled before
- Issues & Pressures on Biosolids Management Program
- Trends
- Septage & other outside wastes (limited data, from some states only)

National Biosolids Data Project –

2 separate but similar surveys to collect data:

- State Biosolids Coordinators' Survey – 2018 Data
  - Spreadsheet
  - Online Survey
- WRRF Survey – 2018 Data
  - Online Survey



WWTP Biosolids Survey - 2018 Data

1. Welcome

This survey is still open (Sept 2021)! Thanks for completing it!
Contractor manage your sludge? Send them this survey link & have them complete the Core Survey (6 pages) *for just your sludge*. BUT you can continue the survey now, skipping over the Core Survey (5 pages) - just enter a few required answers & your name & contact info when asked - and *go on & complete the rest of the survey.*

Are you in New York or New England (CT, MA, ME, NH, RI, VT)**?**
If you are with a WWTP in one of these states, please complete the parallel NEIWPCC Biosolids Survey - click here. Both that survey and the one below are essentially the same, and the data from both will be combined for our national data set.

Georgia? There were GAWP, etc. surveys for 2018. We will use those compiled data. **But this survey asks additional questions, so please do it. Thank you!**

Missouri/Mississippi River Flood 2018? Please provide 2017 data if it is more representative of your WWTP's biosolids management and note this in the comments.

Has anyone else at your WWTP done this survey? Please check, to avoid duplicates. Click the green button here: https://www.nebiosolids.org/nbii2definitions

Welcome to The National Biosolids Survey - 2018 Data.

The Core Survey has about 25 questions; many are quick to answer. It should take about 30 minutes to complete (if you have your 2018 data ready). But please complete the additional sections.

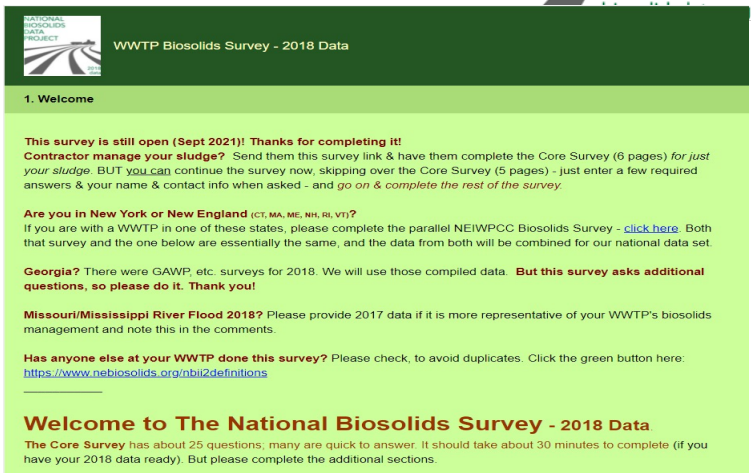
METADATA & QUALITY OF NBDP STATE-BY-STATE SURVEY

- Careful compilation of data for each state, DC, & larger territories
- Standard method & review process for each report
- Corroboration using EPA ECHO data where available & calculated estimates based on wastewater flows and population
- Almost all state reports were reviewed by state coordinator or other state expert
- Confidence in states' data quality:
  - 32 "High" or "Moderately High"
  - 17 "Moderate"
  - 4 "Low"

METADATA & QUALITY OF NBDP WRRF SURVEY RESPONSES

NATIONAL BIOSOLIDS DATA PROJECT

- 452 valid responses
- From 43 states & DC
- Representing ~12,000 mgd, or 34% of U. S. average wastewater flow
- Fairly good representation by geography & size of WRRF in U. S.



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Welcome to The National Biosolids Survey - 2018 Data

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Data From WRRF Surveys

- 452 valid responses
- Total solids reported: 2,113,875 dry metric tons
- Represents 34% of U. S. total wastewater flow
- Extrapolation: 6.1 million dry metric tons
  - Compared to more accurate state-by-state total of 5.823 million dmt
- Good representation of:
  - Geography
  - WRRF size
  - Types of end use & disposal

NBDP WRRF survey responses are...

- More from the largest WRRFs;
- More from New England especially, as well as from Missouri (plain states) & the Northwest; and
- Less from smaller facilities (<10 mgd); and
- Less from the southeast & south central states.

But, overall, pretty good representation,

THANKS to all those who did the survey!

thermal hydrolysis & AD tour, Blue Plains, Washington, DC

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Results

biosolids composting, Topeka, KS

biosolids demonstration corn row, MI

How much biosolids?

Total solids ***used or disposed*** in the U. S., 2018:

5,823,000 dry metric tons (dmt)

from state-by-state data compilation (5.823 million dmt)

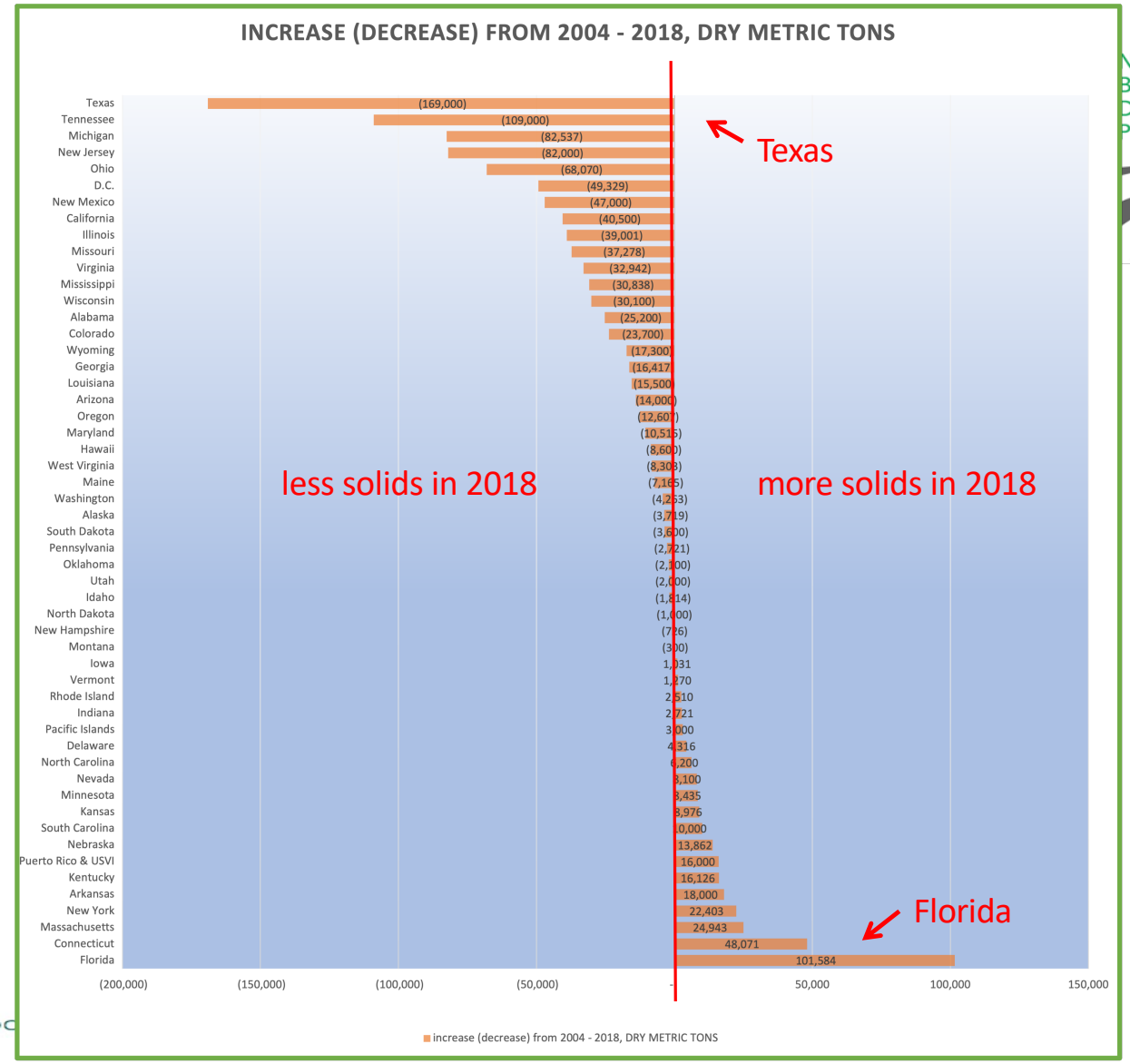
Compare this to **6,132,000 dmt in 2004** (NEBRA et al., 2007, which does not include 382,000 dmt identified as "stored" in 2004 data).

•The 2018 total is 309,000 dmt lower due to:

- The 2018 data were compiled with greater precision, assisted by increased consulting with state experts and use of EPA ECHO data for corroboration. There may have been more double-counting in 2004 data; this was avoided more in 2018. There were improvements in methods for estimating solids use & disposal for some states (e.g. MO). And, for 2018, NBDP did not extrapolate extra tonnage for small facilities with no data; it was assumed that most of those solids were stored and that capturing >75% of each state's flow accounted for nearly all solids used & disposed. For 2004, some states' data were rounded up.
- In 2018, there is more anaerobic digestion (which reduces tonnage) and less alkaline stabilization (which increases tonnage); for example DC Water produced 49,000 less dmt in 2018 than in 2004.

State-by-state

increase (decrease) in biosolids used & disposed, 2004 - 2018



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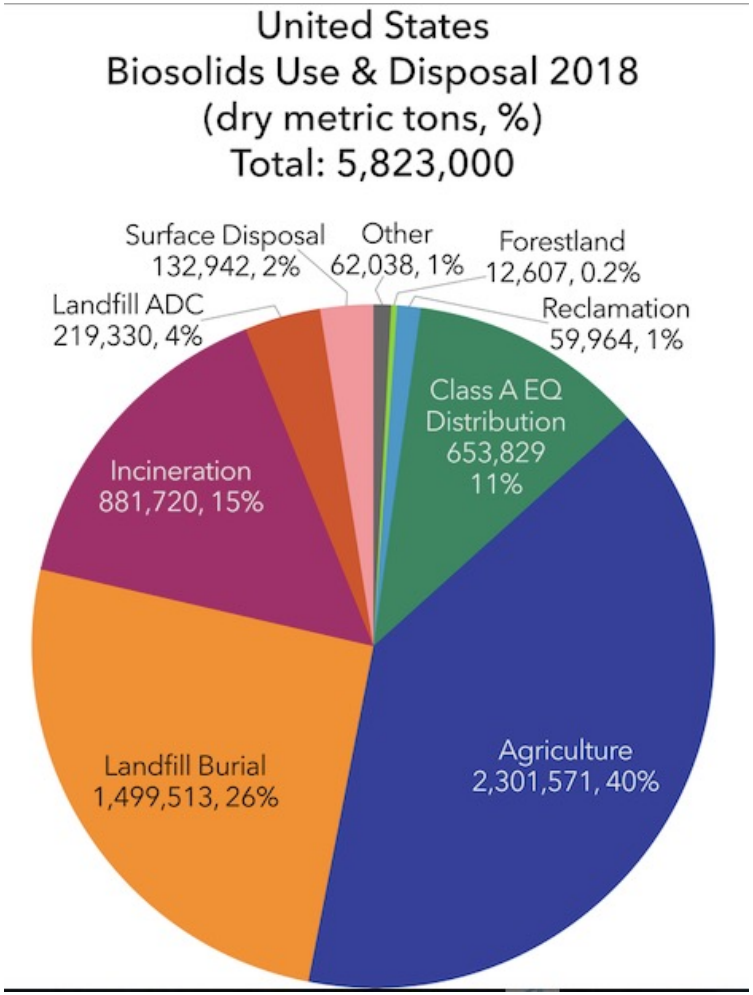
North East Biosolids & Residuals Association
Recycled organics: Too

How much biosolids?

Use & disposal

Biosolids Use & Disposal	%	dry metric tons
% Beneficial Use	53%	3,027,971
% Disposal	47%	2,733,505
% Agricultural	40%	2,301,571
% Forestland	0.2%	12,607
% Reclamation	1%	59,964
% Class A EQ Distribution	11%	653,829
% Landfill Burial	26%	1,499,513
% Landfill ADC	4%	219,330
% Surface Disposal	2%	132,942
% Incineration	15%	881,720
% Other	1%	62,038
Total (dry metric tons)		5,823,000



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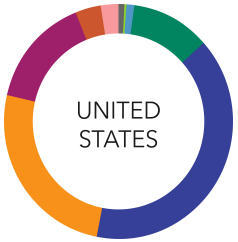

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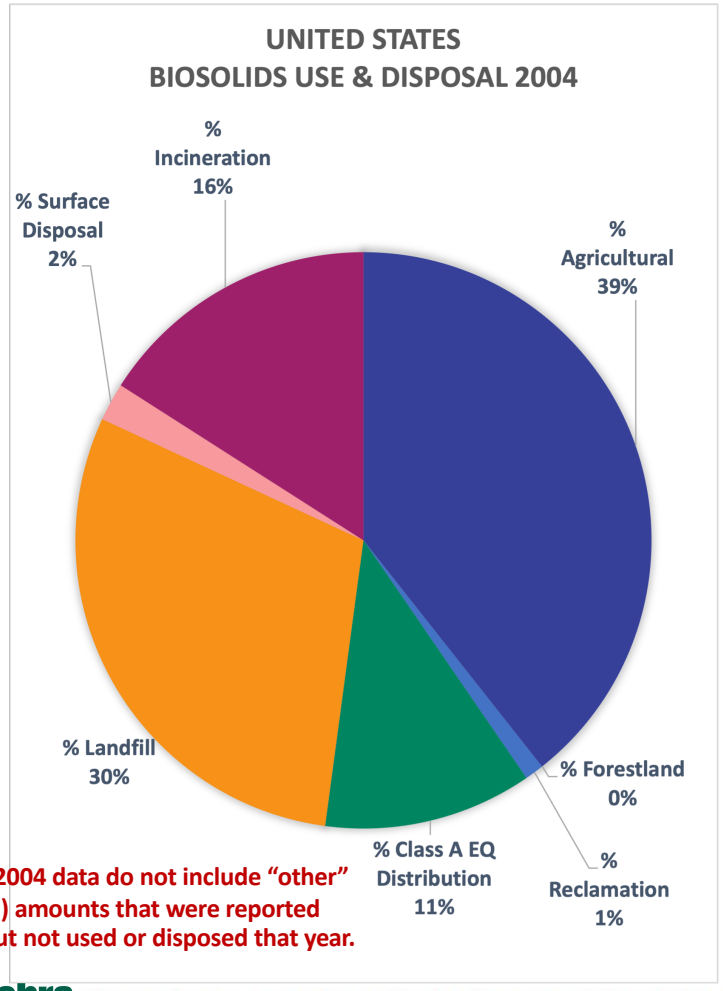
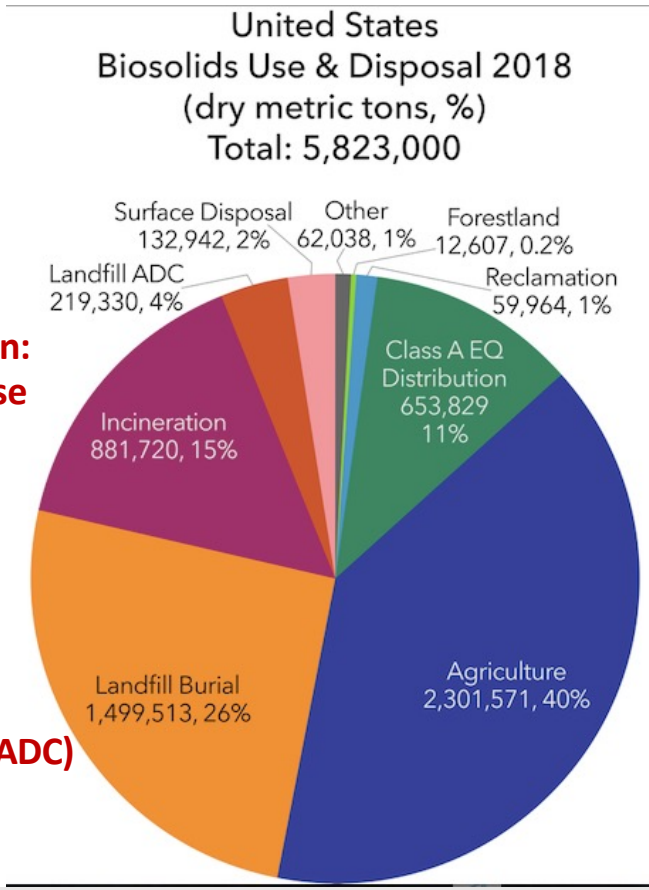
Comparing 2004 to 2018 Use & Disposal (%)



These 2004 data do not include "other" (stored) amounts that were reported then but not used or disposed that year.



Incineration: 1% decrease

EQ distribution:: no change

Landfill (including ADC) no change

Agricultural Use: >1% increase

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Comparing 2004 to 2018 Uses: Small % increase in agricultural use

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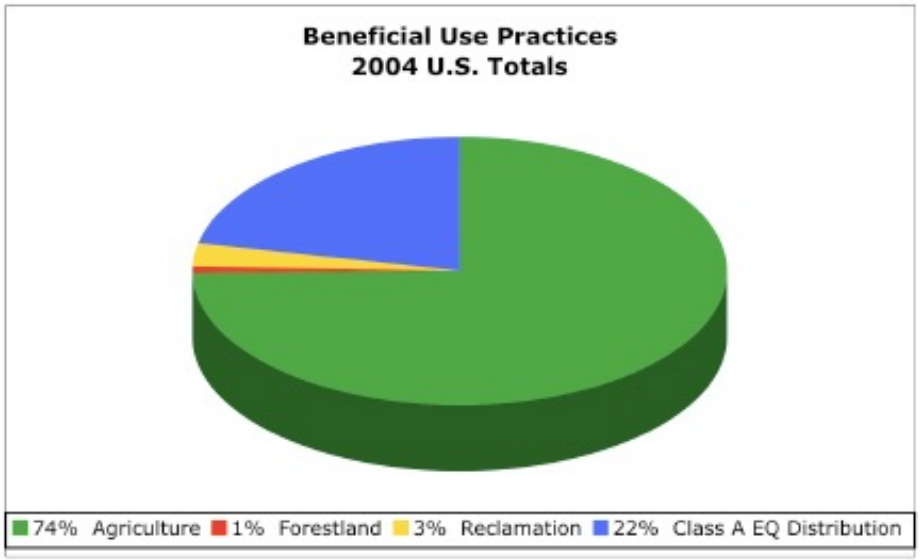

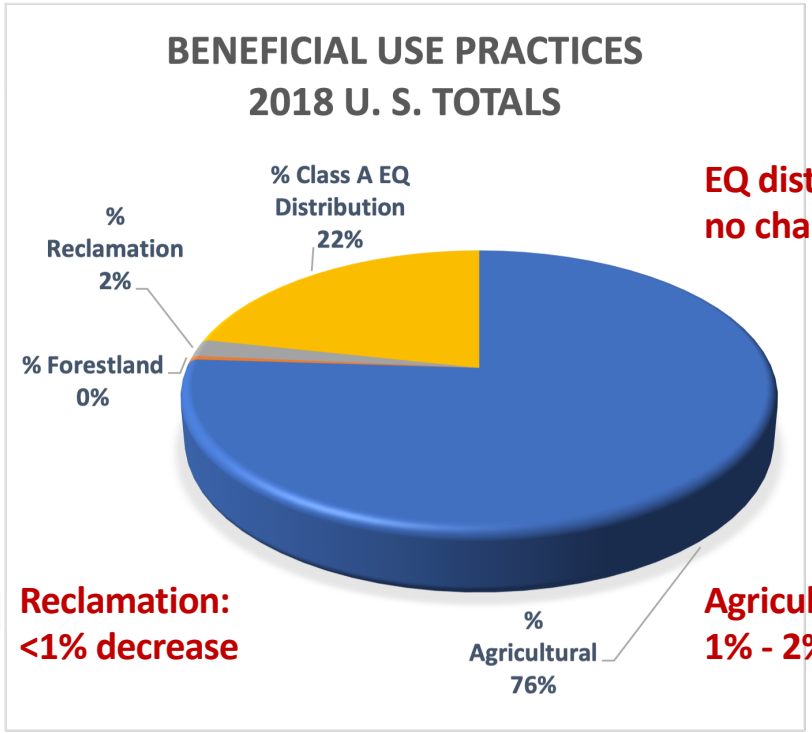

EQ distribution: no change

Reclamation: <1% decrease

Agricultural Use: 1% - 2% increase

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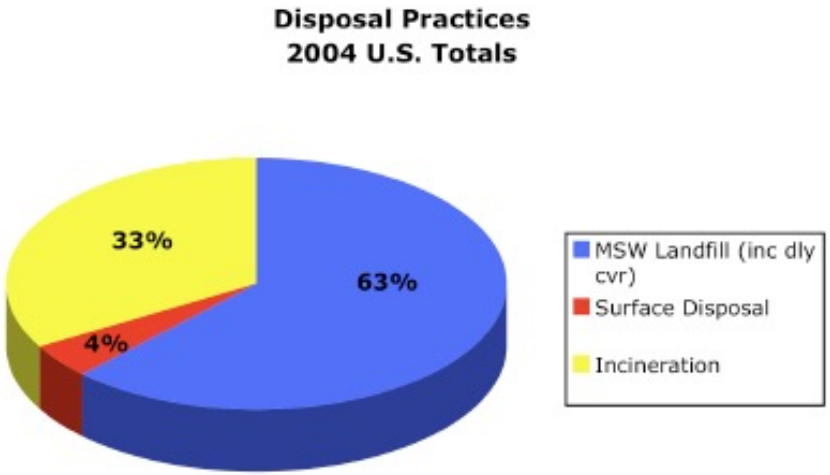
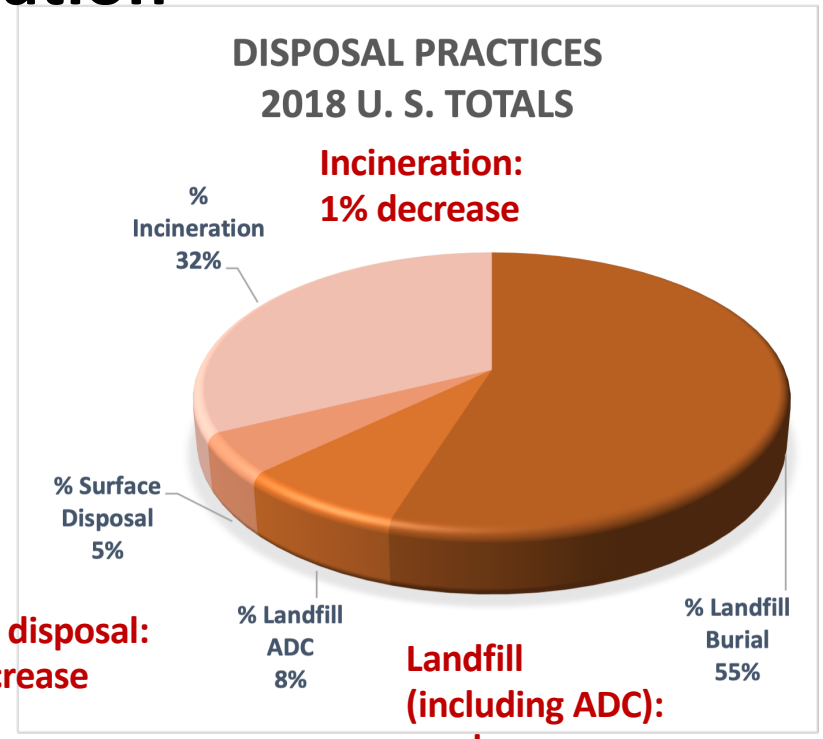
How much biosolids?

Comparing 2004 to 2018 Disposal: Small % decrease in incineration





Incineration: 1% decrease

Surface disposal: <1% increase

Landfill (including ADC): no change

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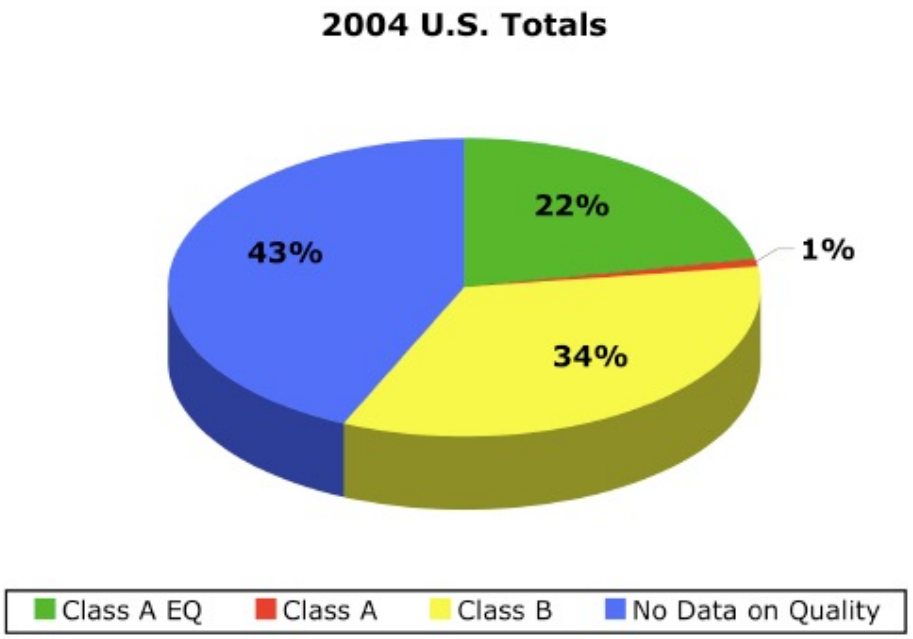
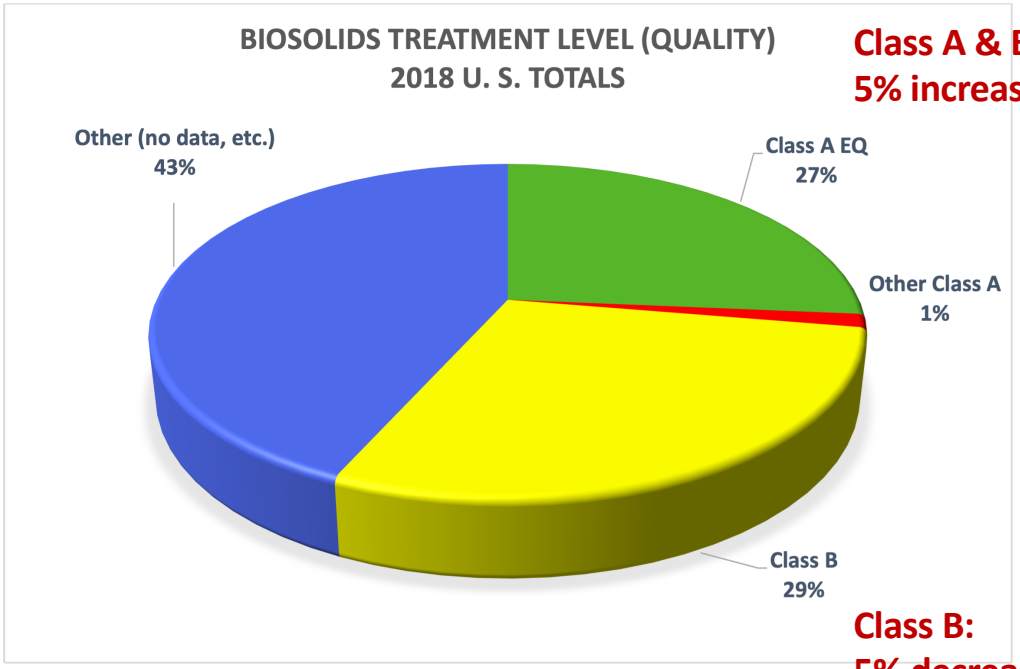
Biosolids Treatment Level (Quality): 2004 vs. 2018





Class A & EQ: 5% increase

Class B: 5% decrease

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Biosolids Quality (data from WRRF survey)

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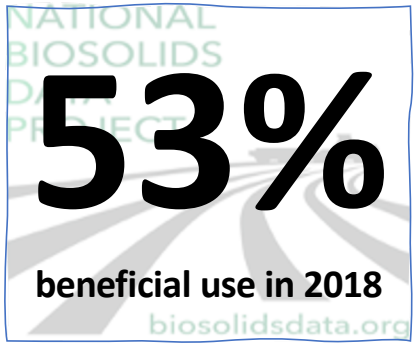
- In 2018, did all of your biosolids meet Part 503 Table 3 (high quality) standards? (n = 416)
  - 330 Yes
  - 13 No
  - 73 Don't know or Not applicable (no treatment going to landfill or incineration)
- Average % solids of biosolids (n=80): 22%

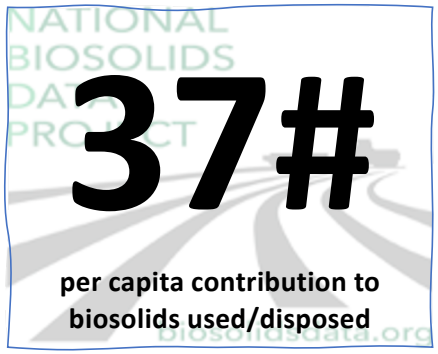



U. S. Biosolids Use & Disposal, 2018



- 53% of biosolids were beneficially used in 2018

- ~37 pounds = the average per capita contribution to biosolids used or disposed in the U.S.



RESULTS: Trends from 2004 to 2018

- More Class A & EQ biosolids being produced
- Same % of landfilled solids, despite more pressures & incentives to divert from landfills
- Less incineration (fewer SSIs & less tonnage)
- Decrease in state full-time employees (FTEs)
- Always: less than 1% of U.S. cropland needed for land application of all biosolids

A local hardware store in western Maine enthusiastically advertises Milorganite every year.

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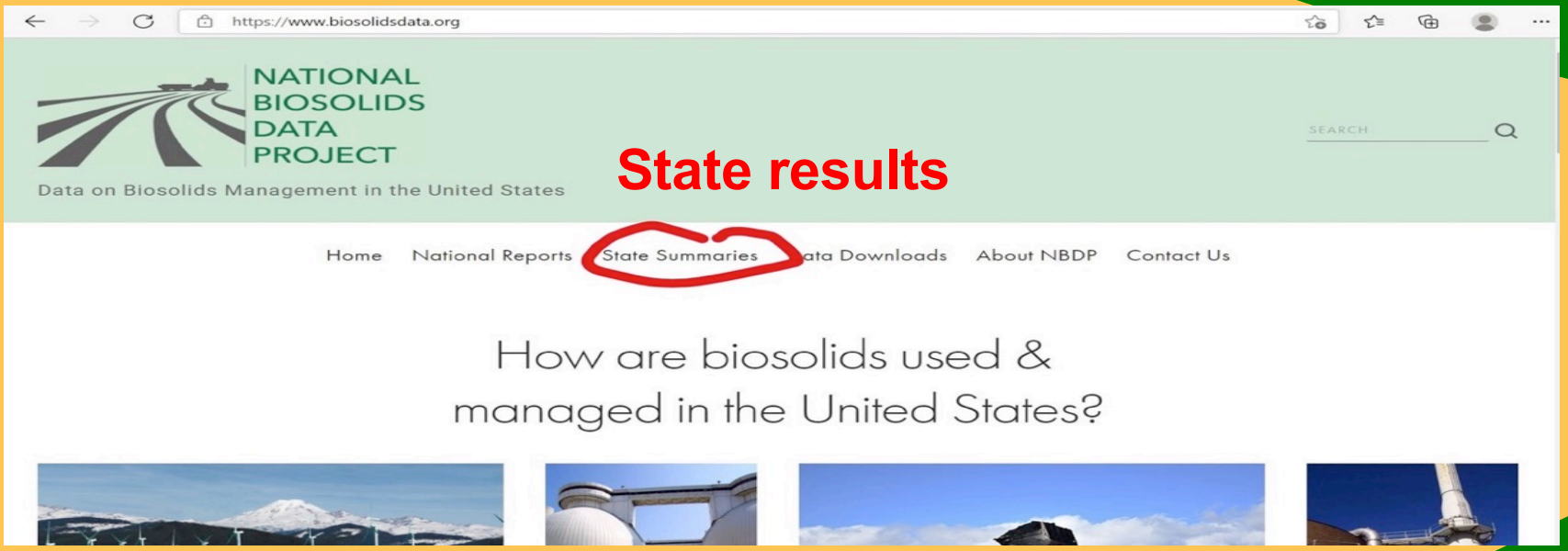
Navigating

https://www.biosolidsdata.org

Liquid land application by injection, Kentucky

PRELIMINARY RESULTS

Results at www.biosolidsdata.org



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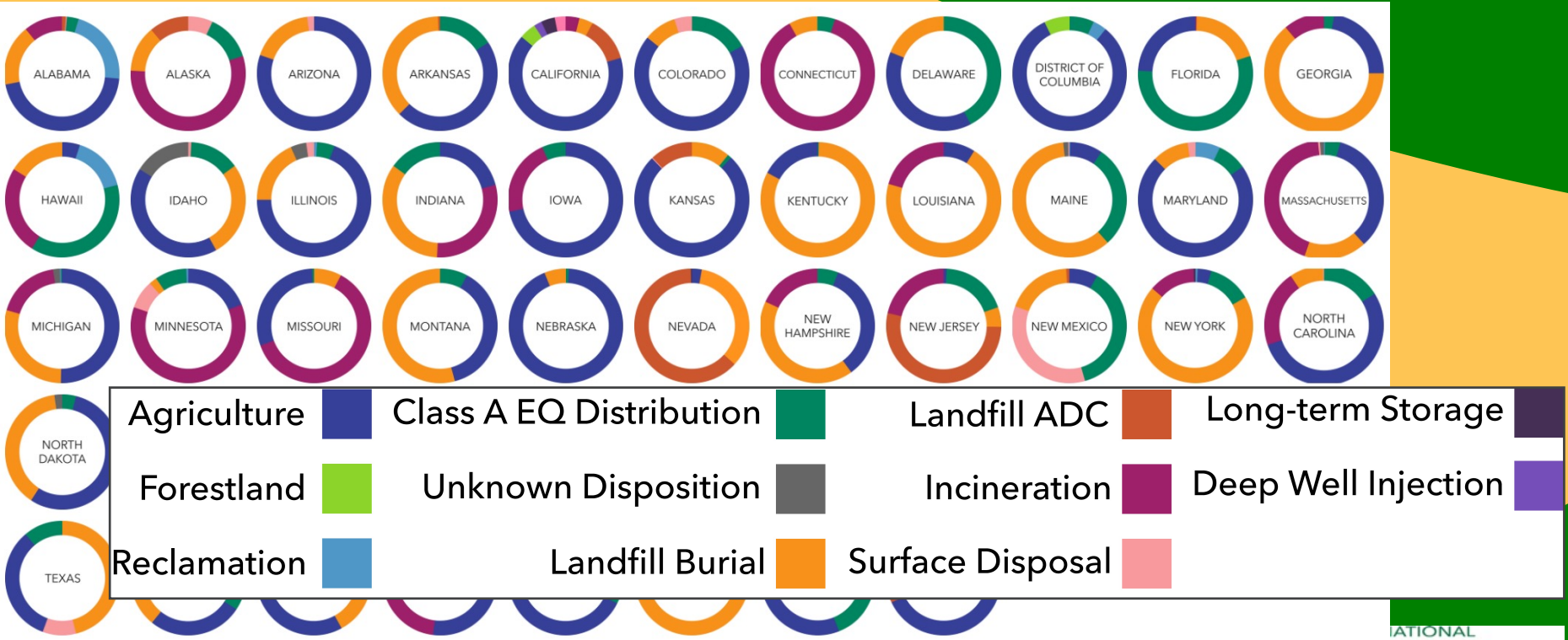
Navigating state data

Project Website: www.biosolidsdata.org - STATE DATA



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Navigating state data

Iowa Biosolids

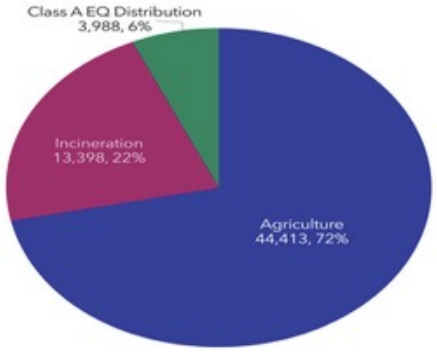
State Data

Confidence in data for this state:

HIGH

2018 data unless noted.

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



Iowa Septage Management 2018
(% estimated)
Total: 40,000,000 gallons

Biosolids dry cake land application near Dubuque, IA. *Photo courtesy of Nutri-Ject Systems, Inc.*

State Statistics Dashboard

Demographics & Wastewater

Avg population served per WRRF	[illegible]
Avg wastewater flow statewide (MGD)	[illegible]
WRRFs treating >75% WW flow	[illegible]
% of population served by on-site (septic) syste..	[illegible]
Biosolids used or disposed / person in 2018 (lbs)	[illegible]

Biosolids Application

% of state area in cropland	[illegible]
% cropland to which biosolids were applied	[illegible]
application rate if all state biosolids were applied to cropland (dt/acre)	[illegible]
% cropland needed if all biosolids were applied at typical rate of ~3dt/acre	[illegible]

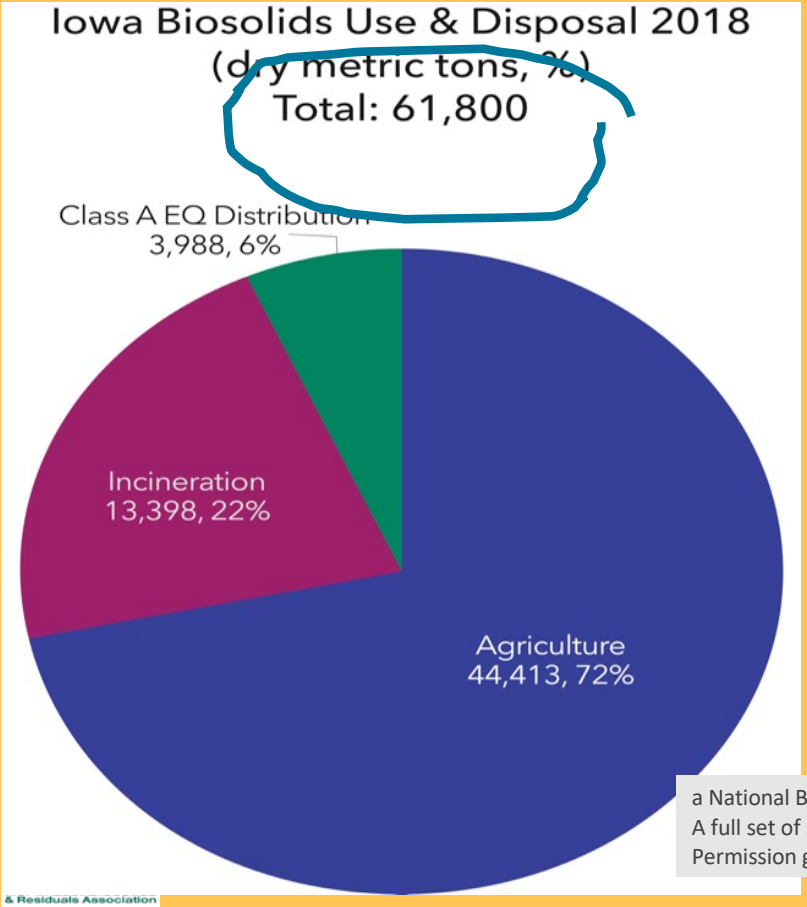
State Summary

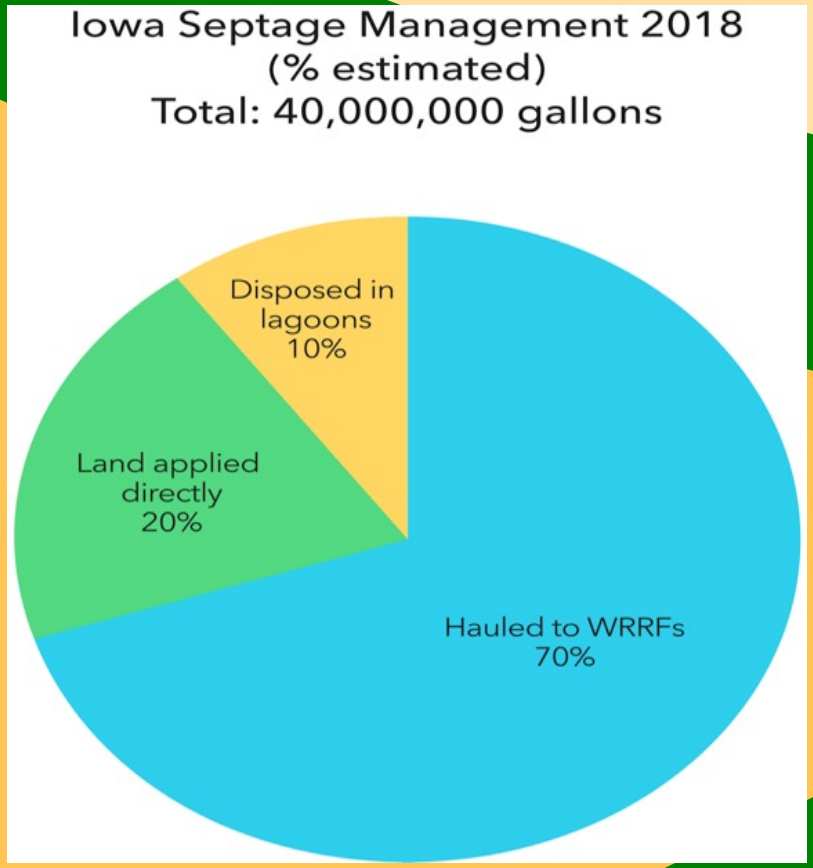
- Iowa has abundant agriculture, and biosolids recycling to soils is prevalent, routine, economical, and encouraged. Landfill disposal of sewage sludge is discouraged and landfill disposal Class A or Class B biosolids is prohibited.
- Nutrient management is a growing concern statewide; effluent standards 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.

STATE NARRATIVE SUMMARY REPORT (PDF)

Navigating state data

Example: IOWA





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State Statistics Dashboard

Demographics & Wastewater

Avg population served per WRRF	2,718
Avg wastewater flow statewide (MGD)	507
WRRFs treating >75% WW flow	70
% of population served by on-site (septic) syste..	25
Biosolids used or disposed / person in 2018 (lbs)	39

Biosolids Application

% of state area in cropland	74.000
% cropland to which biosolids were applied	0.070
application rate if all state biosolids were applied to cropland (dt/acre)	0.002
% cropland needed if all biosolids were applied at typical rate of ~3dt/acre	0.100
If all state's biosolids applied, what % of state's applied N would come from biosolids?	0.200
If all state's biosolids applied, what % of state's applied P would come from biosolids?	0.400

25th Anniversary 1997–2022
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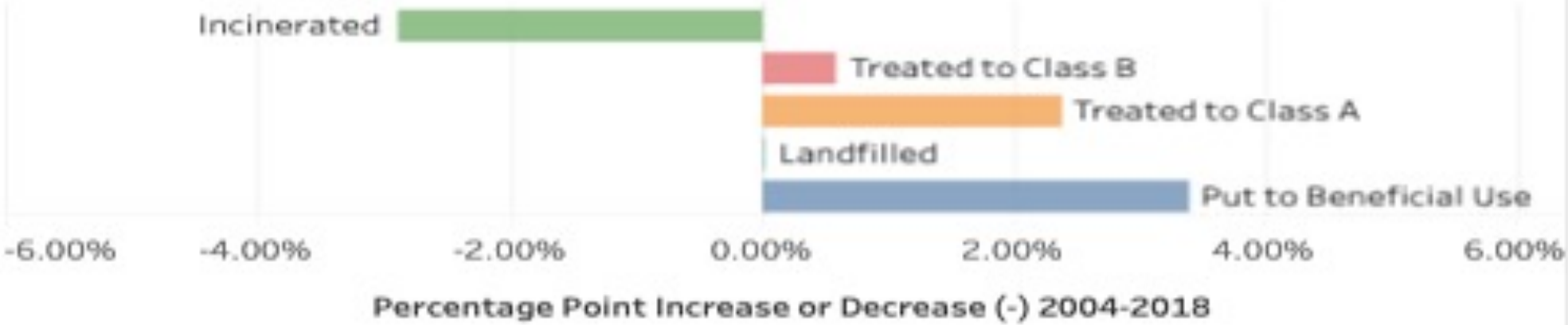
Changes in Biosolids Use & Disposal

Change* in solids reported used or disposed from 2004 to 2018: **-5,201** dry metric tons

*change may be due to changes in population or solids treatment, and/or different systems of data tracking and reporting.



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DASHBOARD

Iowa State Biosolids Statistics

Data Quality & Methods

	2018	explanations & sources
Quality & Confidence in this state's data:	**HIGH**	ranking by survey team based on information provided in survey (options: High, Moderate, Low, None)
Data sources & methods:	*State biosolids coordinator, who was very thorough in completing this survey, tracks land application closely & compiles data from annual reports from WRRFs, which are now submitted electronically.*	
State biosolids included in 2018 EPA ECHO data	103% % in ECHO vs. the total presented here	[illegible]

Demographics & Wastewater

	2018	explanations & sources
State population:	3,156,145	U. S. Census estimate for July 1, 2018
Total land area in state (acres):	35,748,480	[illegible]
Population density (persons/square mile):	56.5	calculated
Total number of WRRFs reported in state survey:	871	survey response by state expert
total number of WRRFs permitted/reported elsewhere:	763	Seiple et al., 2020; state experts, etc.
number of WRRFs in EPA ECHO reports for 2018:	81	[illegible]
Average population served per WRRF:	**2,718**	calculated
Average wastewater flow statewide (MGD, NBDP):	**507**	survey response by state expert
avg.wastewater flow statewide (MGD, Seiple):	371	Seiple et al., 2020 https://doi.org/10.1016/j.jenvman.2020.110852
Number of WRRFs that treat >75% of state flow:	**70**	Seiple et al., 2020 https://doi.org/10.1016/j.jenvman.2020.110853
% of population served by on-site (septic) systems:	**25%**	survey response by state expert
Biosolids used or disposed / person in 2018 (lbs):	**39**	calculated

Biosolids Application

	2018	explanations & sources
Agricultural land cropland (acres):	26,545,960	[illegible]
% of state area in cropland:	**74%**	calculated
Number of farms with that cropland:	77,943	[illegible]
% cropland to which biosolids were applied:	**0.07%**	calculated
Application rate if all state biosolids were applied to cropland (dry metric tons/ac.):	**0.2%**	calculated
% cropland needed if all state biosolids were applied at typical rate (~3 dt/ac):	**0.1%**	calculated

Nutrient Sources - Comparison

	2018	explanations & sources
Nitrogen (N) in all this state's biosolids (metric tonnes, 2018):	2,966	calculated assuming avg. 4.8% biosolids N
N in this state's animal manures (metric tonnes):	398,551	[illegible]
N in this state's purchased fertilizer (metric tonnes, 2011):	1,214,110	[illegible]
If all state's biosolids applied, what % of state's applied N would come from biosolids?	**0.2%**	calculated
Phosphorus (P) in this state's biosolids (metric tonnes, 2018):	1,236	calculated assuming avg. 2% biosolids P
P in this state's animal manures (metric tonnes):	144,981	[illegible]
P in this state's purchased fertilizer (metric tonnes, 2011):	200,085	[illegible]

If all state's biosolids applied, what % of state's applied P would come from biosolids?	**0.4%**		calculated
State Regulatory Involvement			
Biosolids oversight agency / division:		**Environment agency - water / wastewater program**	
Permitting.... of biosolids programs:			
...of land application sites:			
FTEs: state biosolids regulatory program:	0.3	Iowa sewage sludge land application regulation IAC 567-67 is currently being revised. The draft revision is complete. Public hearing has been done. It is in the rulemaking process. The anticipation rule change will possibly be in 2021.	survey response by state expert
Biosolids program FTEs per million population:	**0.10**		calculated
Enforcement: Inspections of biosolids facilities & field sites in 2018:	**20**		survey response by state expert
Formal violations issued:	**0**		survey response by state expert
Amount of state regulations beyond Part 503:		**Low**	
Amount of state regulation of nutrient management & phosphorus:		**None (Part 503 requirements only)**	rankings by survey team based on information provided in survey (options: High, Moderate, Low, None)
Accessibility of biosolids data to public:		**Moderate**	
State encouragement of biosolids recycling to soils:		**High**	
Voluntary additional protections by land appliers known & reported by state coordinator:		None	
Trends			
New land application activity, 2018 - new permits & acreage, acres applied:		**No data**	
acres applied in 2018:	18,889		rankings by survey team based on information provided in survey (options: High, Moderate, Low, None)... With quotes of survey responses by state expert(s)
Local regulations & their impacts?:		**None**	
details...			0
Legislative & state regulatory actions in 2018 & their impacts?:		**Some**	
details...			0
Biosolids beneficial use increasing... ...in 2018?:		**It's staying the same.**	survey response by state expert
....in 2020?:		**It's staying the same.**	survey response by state expert
details...			0
Changes in Biosolids Use & Disposal			
Change* in solids reported used or disposed (in units used by state):	(5,201)		*Change may be due to population increase/decrease, change in treatment at a large WWTP, and/or different systems of data tracking and reporting.
Beneficial Use - percentage point increase or decrease (-):	3%		
Landfill & surface disposal - % point increase or decrease (-):	0%		
Incineration - percentage point increase or decrease (-):	-3%		calculated comparing these 2018 data to 2004 data compiled by the same survey team (NEBRA, 2007)
Class A - percentage point increase or decrease (-):	2%		
Class B - percentage point increase or decrease (-):	1%		
No class or not known - percentage point increase or decrease (-):	-3%		

Pressures on biosolids, 2018

survey response by state expert

1 PUBLIC INVOLVEMENT- concerns of neighbors, environmental groups, and others
2 MANAGEMENT ISSUES - the hassle of biosolids recycling/land application
3 COST – disposal options are least expensive
4 AGRICULTURAL ISSUES - declining farmland due to less agriculture or due to development, sprawl, seasonal restrictions, or competition with manures, etc.
5 REGULATIONS ON BENEFICIAL USE– strict EPA and/or state regulation and enforcement

NATIONAL BIOSOLIDS DATA PROJECT

STATE BIOSOLIDS SURVEY

2018 data
conducted 2020-2021
biosolidsdata.org

Iowa

Infrastructure & Wastewater

	2004 Data	2018 Data	
Total Number of WWTPs:	**78 (survey), 730 CWNS**	**871**	
WWTP & Biosolids Infrastructure Totals			
Number of Separate Preparers (in- or out-of-state, receiving solids from your state):	no data	1	----------
Total number of your state's WWTPs sending to those Separate Preparers:	0	1	----------
Number of operating sludge incinerators in your state (total):	2	1	----------
Fluidized bed:	1	0	----------
Multiple hearth:	1	1	----------
Number of Part 258 landfills in your state accepting sewage sludge:	data not requested for 2004	0	----------
Number of WWTPs in your state with industrial pre-treatment programs:	data not requested for 2004	20	----------
Number of WWTPs in your state with *sludge* lagoons:	data not requested for 2004		----------
Wastewater Flow Totals			
Total statewide average daily wastewater flow (MGD):	data not requested for 2004	507	----------
Total statewide WWTP *design* capacity for wastewater flow (MGD):	data not requested for 2004	667	----------
Total statewide average daily *dry weather* flow (MGD):	data not requested for 2004	348	----------
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	0	----------
Number of WWTPs involved in those complaints:	data not requested for 2004	0	----------
Percent of population served by on-site systems (e.g. septic systems):	no data	25%	----------

The 871 WWTPs are all municipal WWTPs. • Davenport City is the 1 separate preparer, composting Davenport biosolids. • Iowa has 871 municipal WWTPs that have NPDES discharge permits. Our major POTWs are 107 facilities (in 2020) based on the design average wet weather flow equal to or greater than 1 MGD. The design AWW flow for the 107 facilities ranges from 1 mgd to 134 mgd. • Major POTW facilities have biosolids annual reporting requirements to EPA and state. Minor facilities keep their biosolids report at their site. • Design flow definitions are in the Iowa Wastewater Facilities Design Standards Chapter 14. • The average dry weather flow in this survey is based on the average of the facility's design average dry weather flow, which is 3.248 MGD. The average statewide wastewater design capacity is based on the average of the facility's design average wet weather flow, (the same number that designates a "major" facility), and is 6.236 mgd. The statewide average daily wastewater flow is the average of the ADW and AWW, in design. We did not run the DMR flow data for the actual average daily wastewater flow. All the flow numbers reported here are based on the wastewater treatment plant design flow in the construction permits that are approved by Iowa DNR. • Two dozen or more wastewater facilities are lagoon facilities that do not dedudge every year. The survey data reported here are based on those POTWs that sent annual reports for biosolids land application.

Biosolids Use and Disposal

UNITS:	Dry U.S. tons	**Dry metric tons**	
BIOSOLIDS USED OR DISPOSED, 2018 (adjusted total):			**61,800**

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)	78	50,200	81	46,401
Disposal & Alternative Dispositions	2	16,480	1	13,398
Other	0	0	0	0
TOTAL	**78**	**66,680**	**82**	**61,799**

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

The beneficial use numbers include some composted biosolids. The disposal numbers include incinerated biosolids. There is no Iowa wastewater sludge going to landfill. State law prohibits Class A and Class B biosolids going to landfill. Solid Waste Rule 121 on land application of waste, discourages sewage sludge going to landfill.

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)	65	48,200	80	44,413
Forestland (EQ, Class A, & Class B)	0	0	0	0
Reclamation (EQ, Class A, & Class B)	0	0	0	0
Class A EQ Distribution (bagged or bulk, public distribution, or unsure where it went)	11	2,000	1	3,988
Beneficial Use Subtotal	**78**	**50,200**	**81**	**48,401**
Long-term storage	0	0	0	0
Number of acres to which biosolids were applied:		data not provided		18,889

The Class A EQ material is composted biosolids sold to the market. This program is a separate preparer in Davenport, IA; the city's Composting Facility.

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)	0	0	1	3,055

Burial	data not requested for 2004	data not requested for 2004	0	0	
Alternative daily (ADC), intermediate, or final cover	data not requested for 2004	data not requested for 2004	1	3,055	
Surface Disposal	0	0	0	0	
Incineration	2	16,460	1	13,398	
Cement kiln or industrial furnace	data not requested for 2004	data not requested for 2004	0	0	The material included as ADC (row 49) is the ash from Cedar Rapids' incinerator that went to landfill ADC. The mass of this landfilled ash is not included in the disposal total, so as not to be double-counted.
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	2	16,460	1	13,398	
TOTAL	76	66,660	82	61,799	

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	11	5,200	2	6,374	
Other Class A	0	0	0	0	
Class B	65	45,000	79	42,027	The two facilities producing EQ biosolids are Davenport's composting facility and Iowa City's WWTP.
Other (no data, etc.)	0	16,460	1	13,398	
TOTAL	76	66,660	82	61,799	

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)	25	no data	35	8,206	
Class A (ATAD/Other)	data not requested for 2004	data not requested for 2004	0	0	
Class B	data not requested for 2004	data not requested for 2004	35	8,206	
Anaerobic digestion (AD) (total)	44	no data	46	33,435	
Class A (e.g. thermophilic)	data not requested for 2004	data not requested for 2004	3	2,406	
Class B (mesophilic)	data not requested for 2004	data not requested for 2004	45	31,029	
WWTPs co-digesting (FOG, food, glycol, etc.)	data not requested for 2004	data not requested for 2004	at least Des Moines	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)	8	no data	3	880	
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	3	880	
Composting	1	no data	1	3,998	
Thermal (e.g. heat drying, not incineration/gasificatn/pyrol)	0	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.)	0	no data		N/A	
Oxidation ditch / extended aeration	data not requested for 2004	data not requested for 2004	0	N/A	
Other stabilization technology	0	no data	1	13,398	Cedar Rapids WWTP sends sewage sludge to incineration. It used low pressure oxidation (LPO) on secondary sludge to stabilize sludge. They produced 13,398 dry tons of sludge in 2018. The "Other" stabilization technology (row 88) is this LPO. • "Other" dewatering technologies include reed beds, rotary press, Fourrier Press, and more. • "Other" thickening technology includes rotary drum thickener.
Dewatering					
Belt Filter Press	4	no data	11	65,676	
Plate & Frame Press	0	no data	2	4,614	
Screw Press	0	no data	1	119	
Centrifuge	3	no data	5	27,242	
Vacuum Filter	5	no data	0	0	
Drying beds (open-air)	25	no data	9	12,548	
Solar drying (e.g. in greenhouse)	data not requested for 2004	data not requested for 2004	0	0	
Other dewatering technology	0	no data	8	1,435	
Thickening					
Gravity thickener	data not requested for 2004	data not requested for 2004	9	19,579	
Gravity belt thickener (GBT)	data not requested for 2004	data not requested for 2004	6	2,013	
Centrifuge	data not requested for 2004	data not requested for 2004	1	968	
Dissolved air flotation (DAF)	data not requested for 2004	data not requested for 2004	5	15,798	
Other thickening technology	data not requested for 2004	data not requested for 2004	12	5,002	
Other					
Biosolids sold in bags (explain at right what size bags)	data not requested for 2004	data not requested for 2004	0	0	

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)										
State high quality (lower number) limit (mg/kg)										
State CPLR (kg/ha)										
State APLR (kg/ha/365days)										

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			lowa biosolids testing parameters, limits, and testing frequency are identical to 40 CFR 503.
Other metals (boron, silver…)	no	no	no			
Dioxins/furans	no	no	no			
PCBs	no	no	no			
Priority pollutants (https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf)	no	no	no			
Other organic compounds (e.g. PDBEs, pharmaceuticals)	no	no	no			
Radioactive isotopes (alpha, beta, Ra 226, etc.)	no	no	no			
Nutrients (NPK)	no	yes	yes			
Pathogen reduction (Class A or B)	no	yes	yes			
Vector attraction reduction (VAR)	no	yes	yes			
PFAS (as of 2018)	no	no	no			
Microplastics (as of 2018)	no	no	no			
TCLP (toxicity characteristic leaching procedure)	no	no	no			
Paint Filter Liquids Test	no	no	no			

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		electronic	yes	lowa biosolids regulation only has a land application rule. Iowa does not have surface disposal and incineration rules. Landfilling is discouraged. - Iowa's biosolids land application rule mirrors federal 40 CFR 503 in most areas, but includes a few best management practices that suit the state's agricultural and land use conditions. - In 2018, Iowa changed the biosolids annual reports submittal requirement from paper reporting to electronic reporting. For the items and data in the annual report that are required by EPA biosolids annual electronic reporting, Iowa asks the same of WWTPs. WWTPS can use EPA's report to satisfy state reporting needs. For the information that is not required by EPA, Iowa developed a supplemental form for WWTPs to submit. Information in IA's supplemental report covers the location of land application sites, total annual biosolids applied on each site, size of the parcel, etc. - CPLR needs to be developed if any limit in 40 CFR Part 503 Table 3 is exceeded by a WWTP.
Part 503 metals (As, Cu, Hg, etc.)	yes	yes		electronic	yes	
Other metals (boron, silver…)	no	not applicable (N/A)		not applicable (N/A)	no	
Dioxins/furans	no	not applicable (N/A)		not applicable (N/A)	no	
PCBs	no	not applicable (N/A)		not applicable (N/A)	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, pharmaceuticals)	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	yes		electronic	yes	
Cumulative Pollutant Loading Rates (CPLR)	yes	yes		electronic	yes	
How biosolids achieve Class A or Class B	yes	yes		electronic	yes	
How biosolids achieve vector attraction reduction (VAR)	yes	yes		electronic	yes	
Solids stabilization process(es) used	yes	yes		electronic	yes	
Other biosolids treatments	yes	yes		electronic	yes	
End use or disposal practice	yes	yes		electronic	yes	
PFAS (as of 2018)	no	not applicable (N/A)		not applicable (N/A)	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	

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Tour at Boulder Park, King County WA biosolids program

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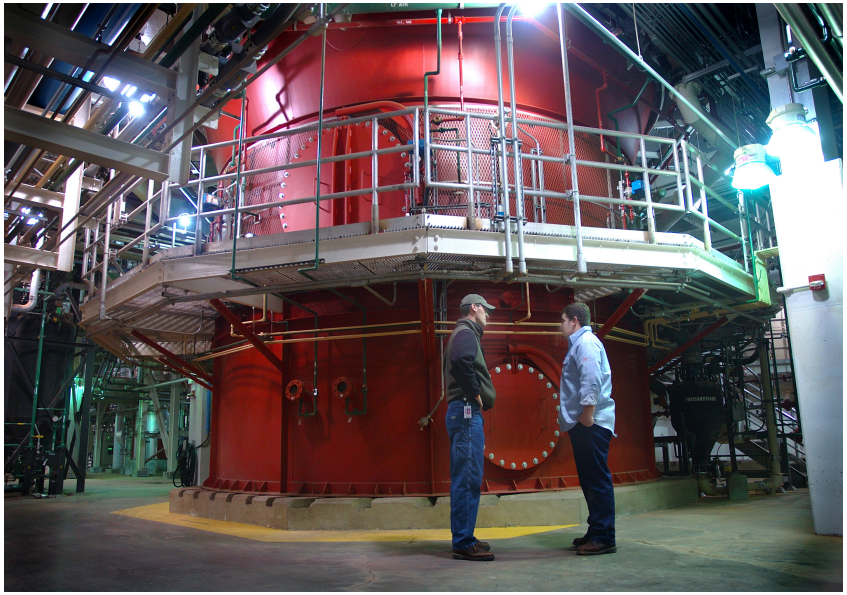
More Results

Rotary drum dryer, South Cary, NC

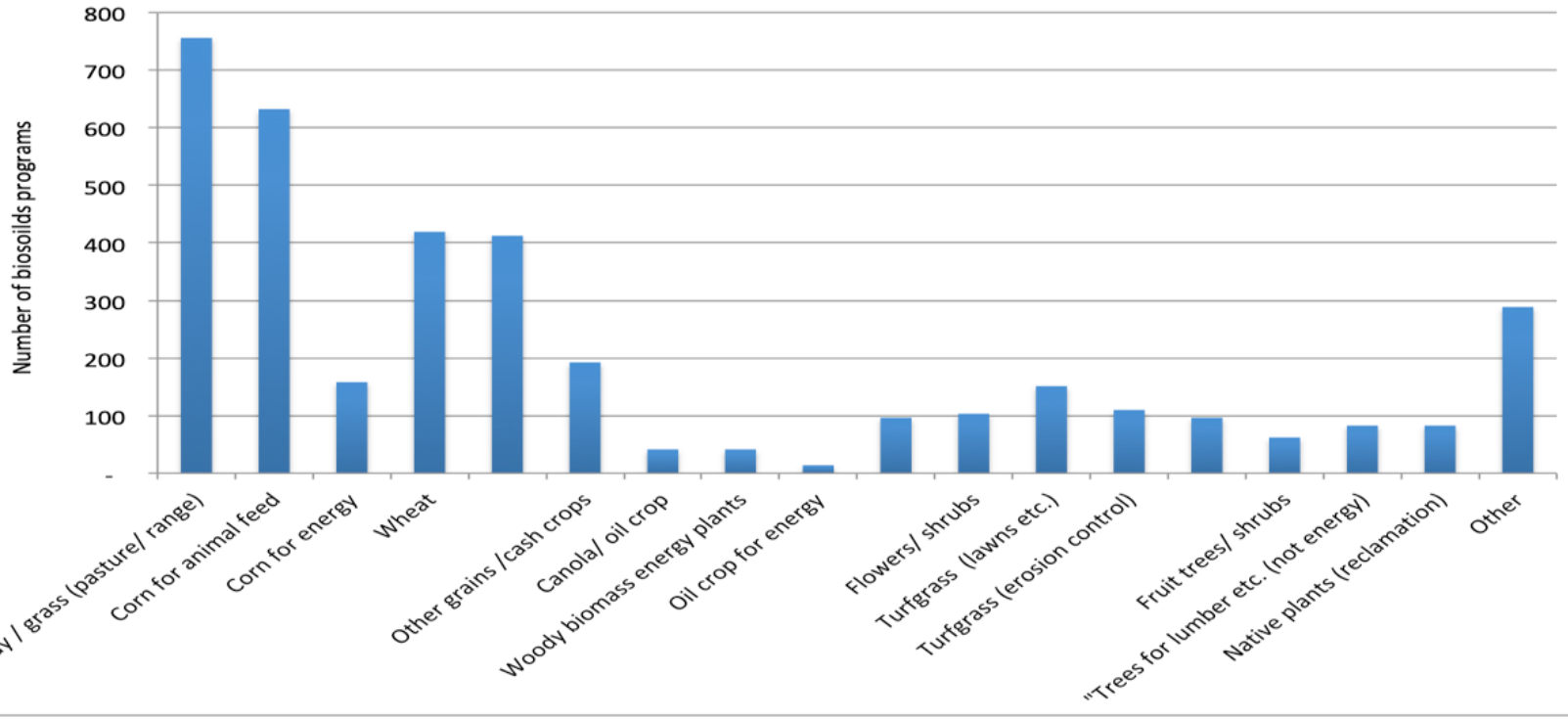


Wastewater solids (SSI) incinerator, St. Paul, MN

nebra Recycled organics: Tools for sustainability.
North East Biosolids & Residuals Association

WHAT CROPS ARE GROWN WITH BIOSOLIDS?

Number of U. S. biosolids programs growing each crop
(extrapolated to a nationwide estimate for the 3,740 major (>1 MGD) WRRFs and based on % of each option chosen by 197 respondents from accross the U. S.)
These numbers are estimates; what counts are the relative amounts.



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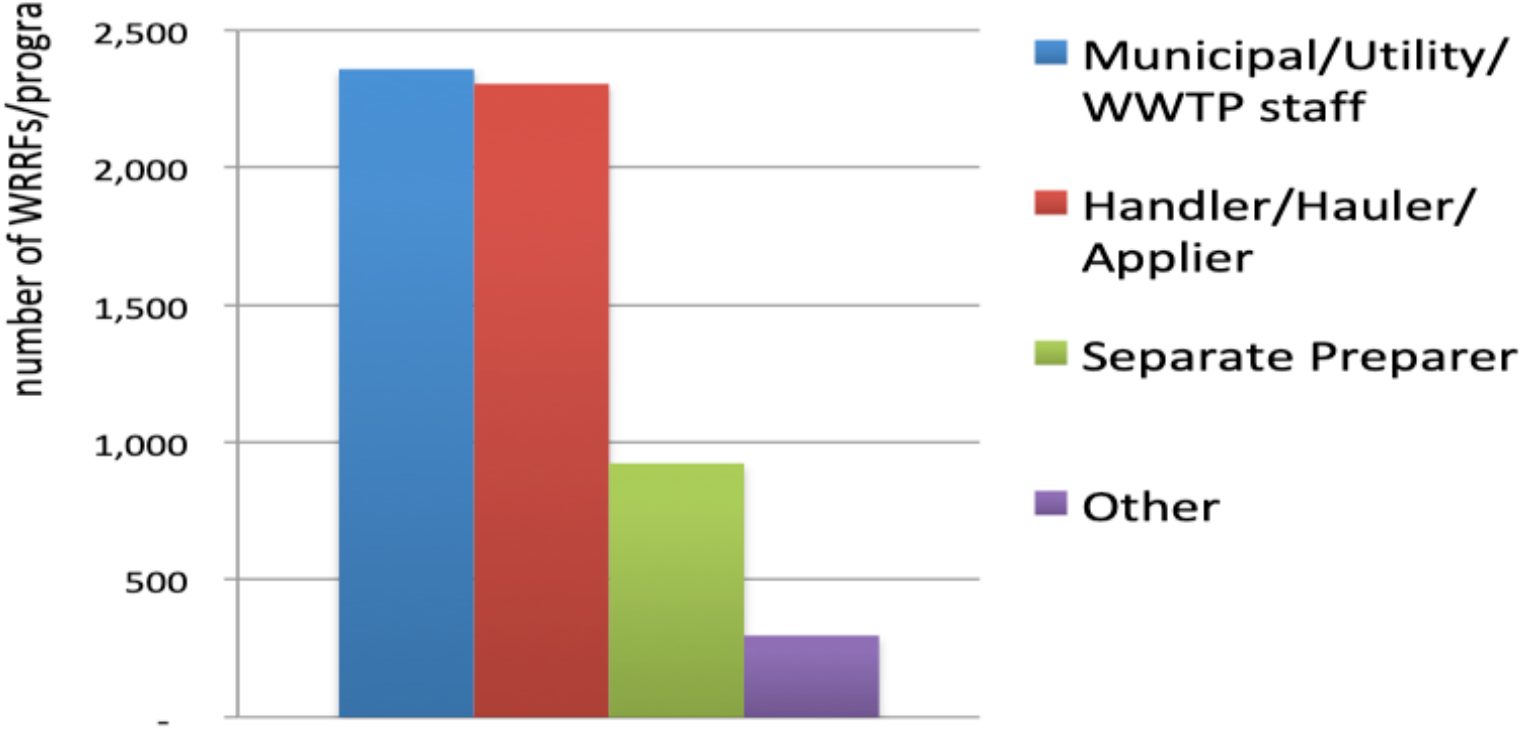
WHO MANAGES THE BIOSOLIDS?

Relative numbers of WRRFs programs, extrapolated from NBDP WRRF survey responses (n = 452)
Some programs use more than one option.



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Facts & Figures: Energy

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- AD tank capacity of 88 WRRF respondents:

1.285 billion gallons

- Do they have excess capacity?

% of AD Capacity In Use Already	Number of WRRF respondents
WRRFs at 100%:	35
WRRFs at 80-99%:	18
WRRFs at >50-79%:	39
WRRFs at <50%:	2

  - On average, these WRRFs use 86% of AD capacity.
  - Excess capacity for co-digestion?
    - YES: 26 WRRFs NO: 34 WRRFs MAYBE: 36 WRRFs

About Outside Wastes

- **Septage** received in 2018 (n = 128 respondents):

  594,588,942 gallons

- **Active industrial pretreatment**? (n = 266)

  Yes: 189
  No: 77

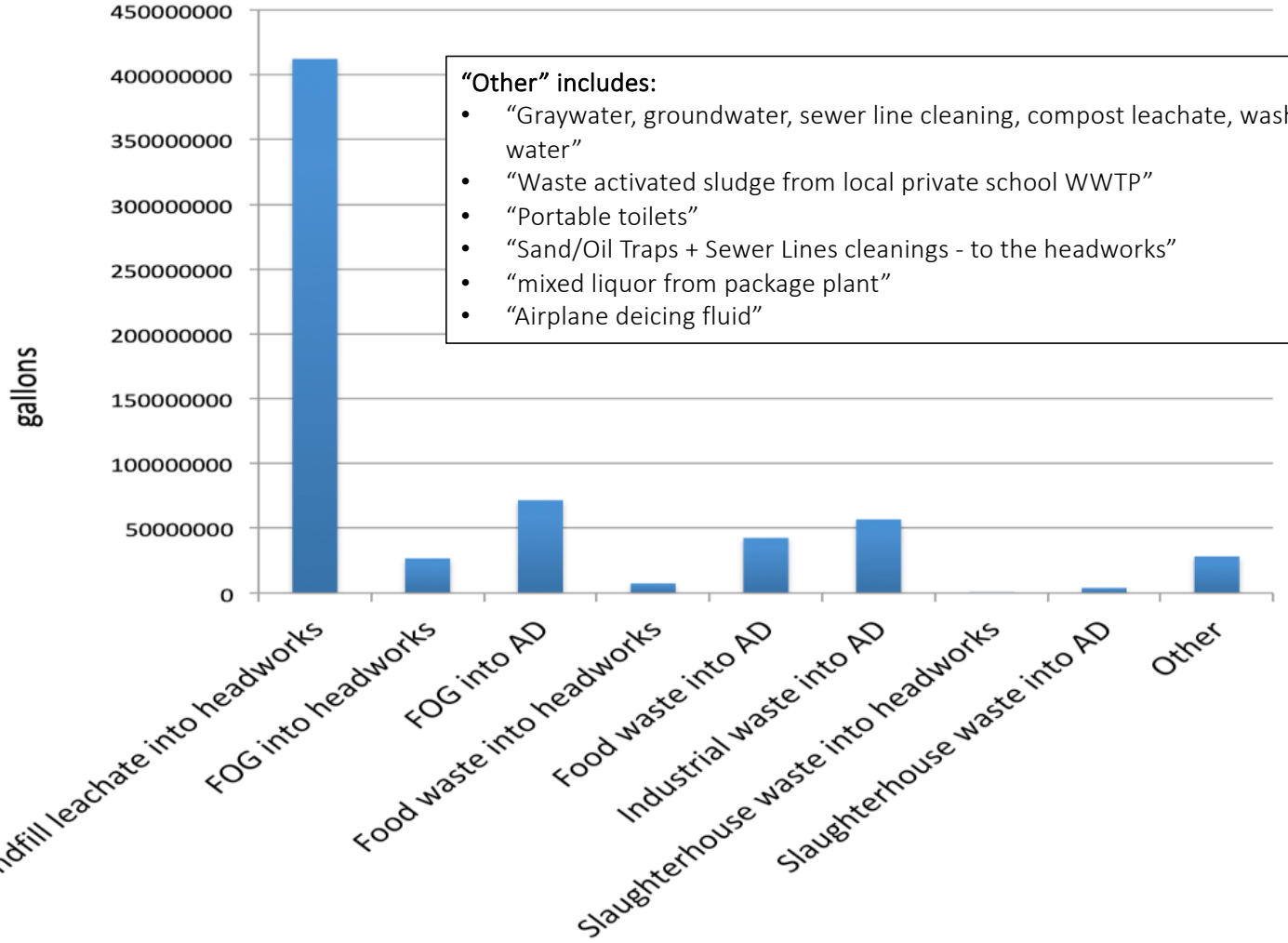
- **Industrial users** included in the 189 programs above:

  29,458

  ~17,000 of them at the Hyperion Water Reclamation Plant, Los Angeles, CA

  Average per WRRF (not including Hyperion): 66

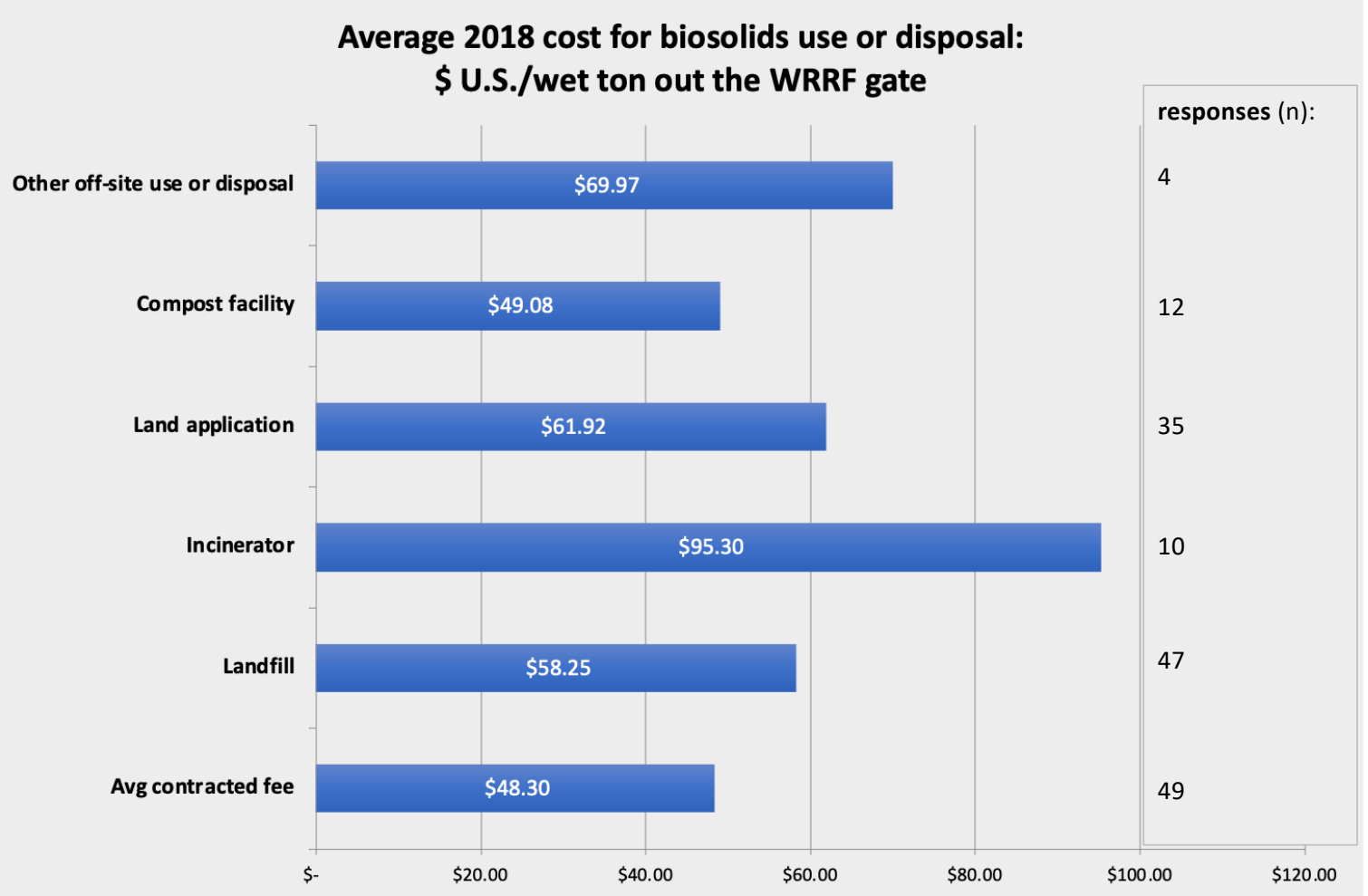
TRUCKED-IN WASTE RECEIVED (n = 80)



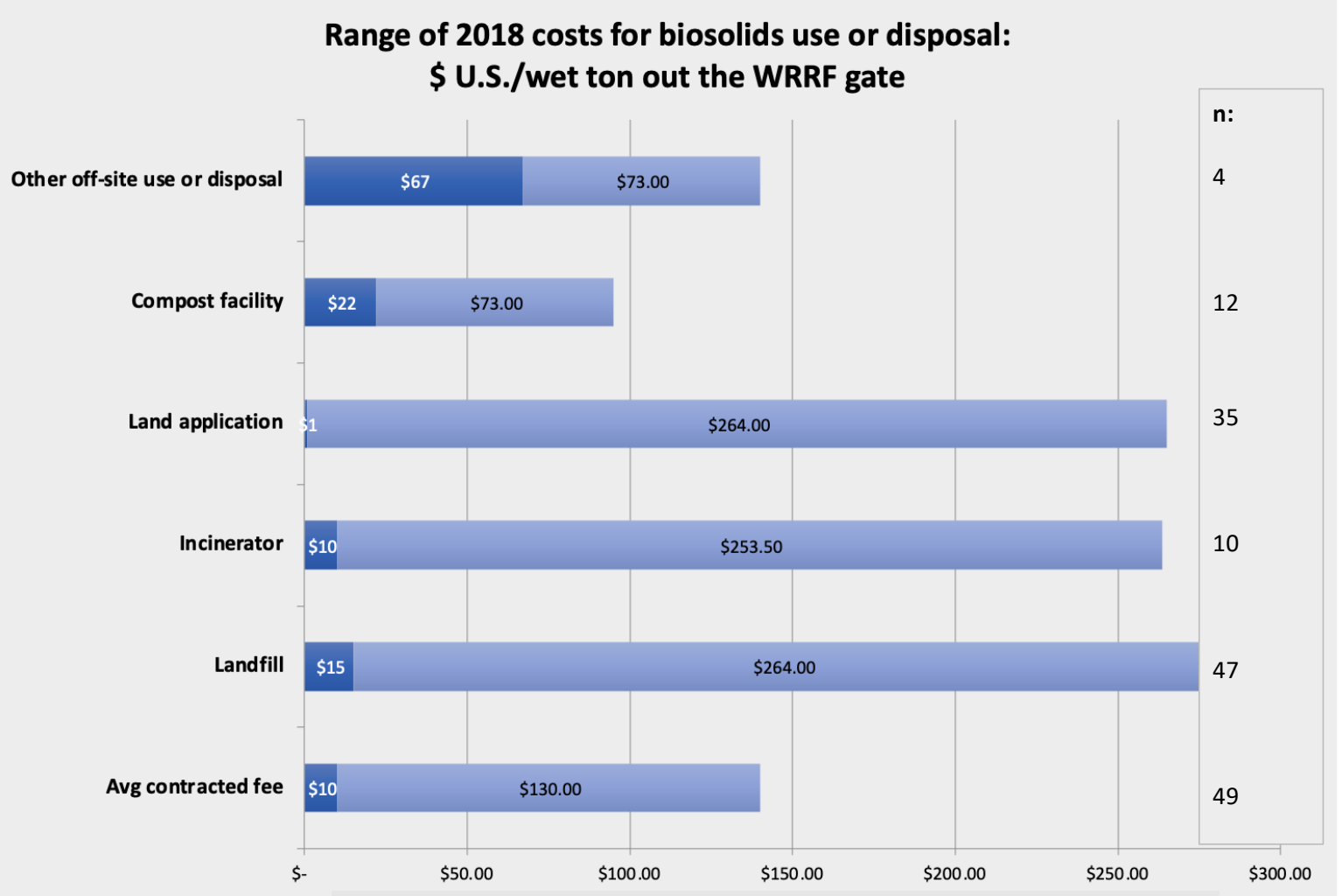
"Other" includes:

- "Graywater, groundwater, sewer line cleaning, compost leachate, wash/rinse water"
- "Waste activated sludge from local private school WWTP"
- "Portable toilets"
- "Sand/Oil Traps + Sewer Lines cleanings - to the headworks"
- "mixed liquor from package plant"
- "Airplane deicing fluid"

WRRF Average End-Use or Disposal Cost



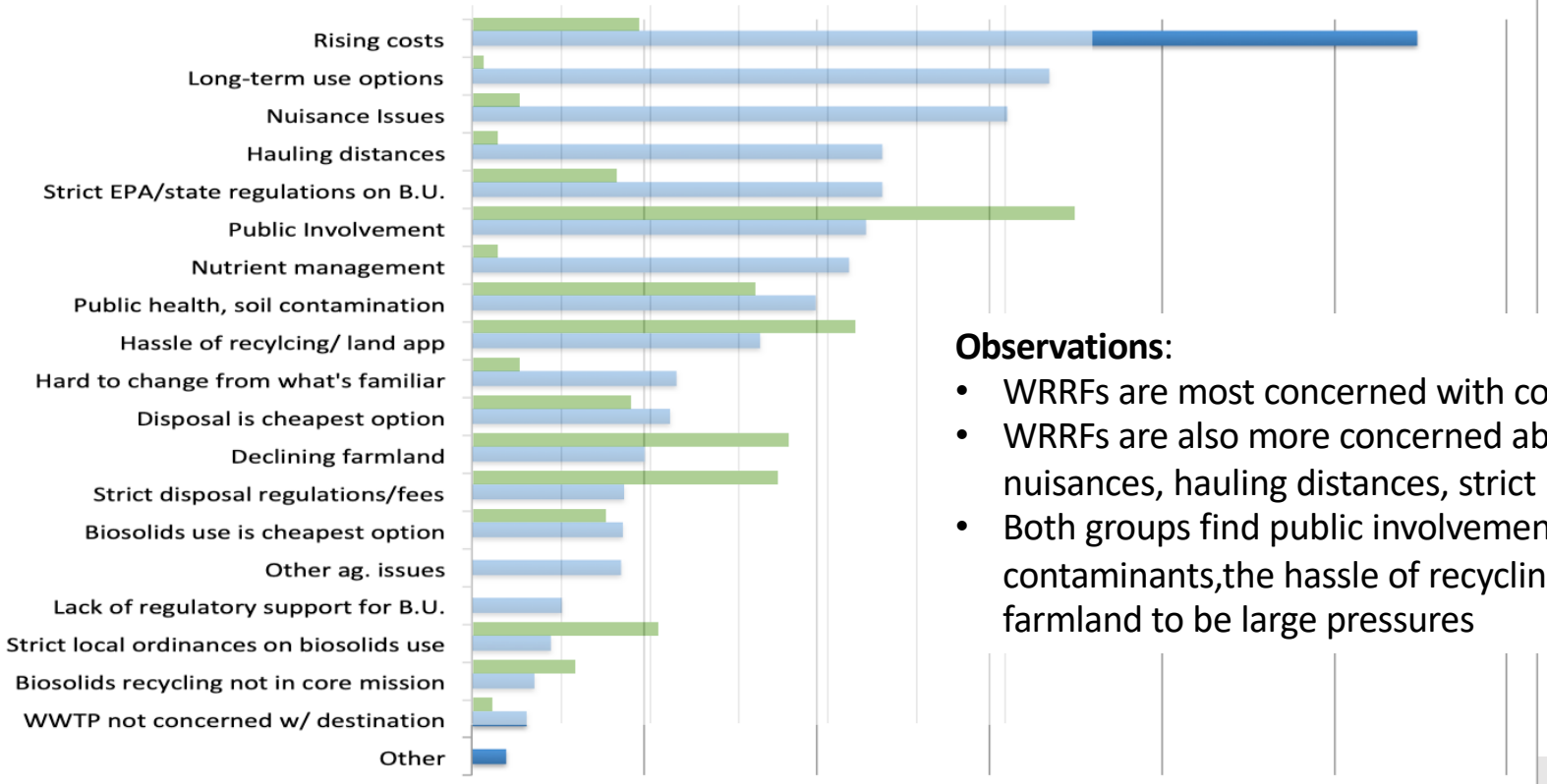
WRRF Range of End-Use or Disposal Costs



a National Biosolids Data Project presentation • June 24, 2022
A full set of slides (.ppt) is available for a fee at https://www.biosolidsdata.org/data-downloads.

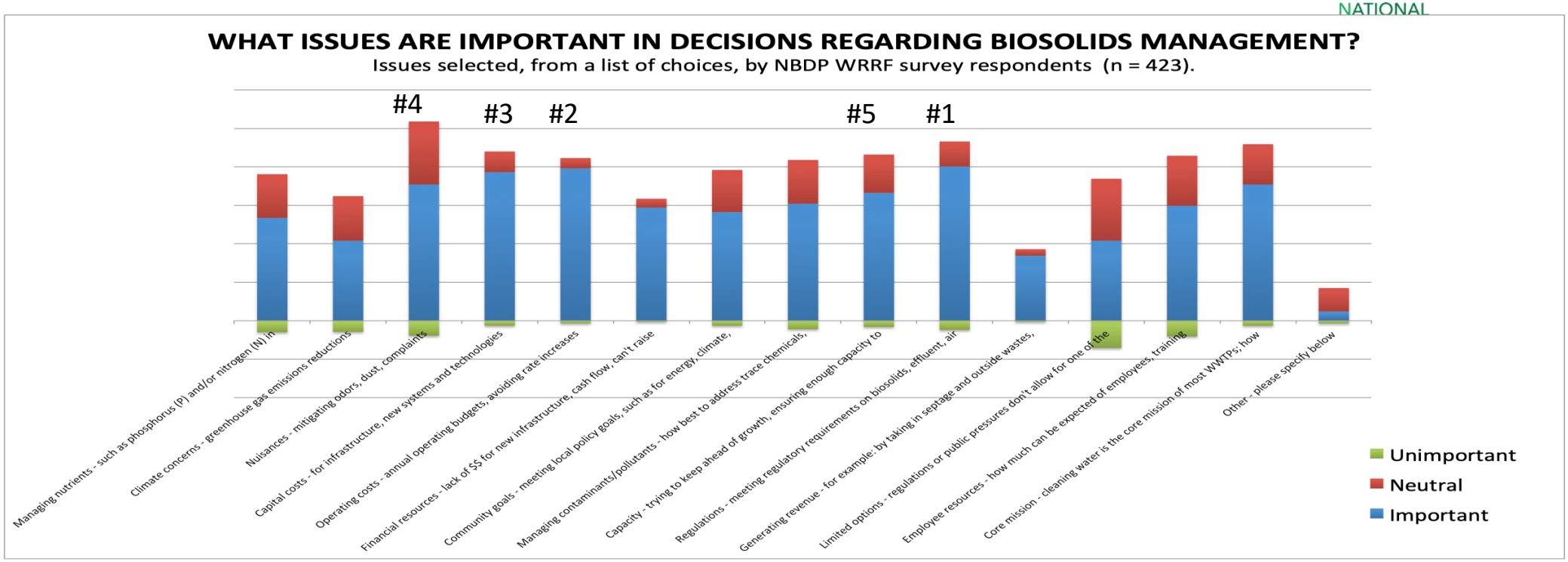
TOP 5 PRESSURES ON BIOSOLIDS PROGRAMS

WRRF survey respondents (blue, n = 155 respondents) and state biosolids coordinators (green, n = 51 respondents) selected the following top pressures on biosolids programs from a list provided in the NBDP surveys.



Observations:

- WRRFs are most concerned with costs & future outlets.
- WRRFs are also more concerned about practical issues: nuisances, hauling distances, strict regulations, nutrients
- Both groups find public involvement, public health / contaminants,the hassle of recycling, and declining farmland to be large pressures



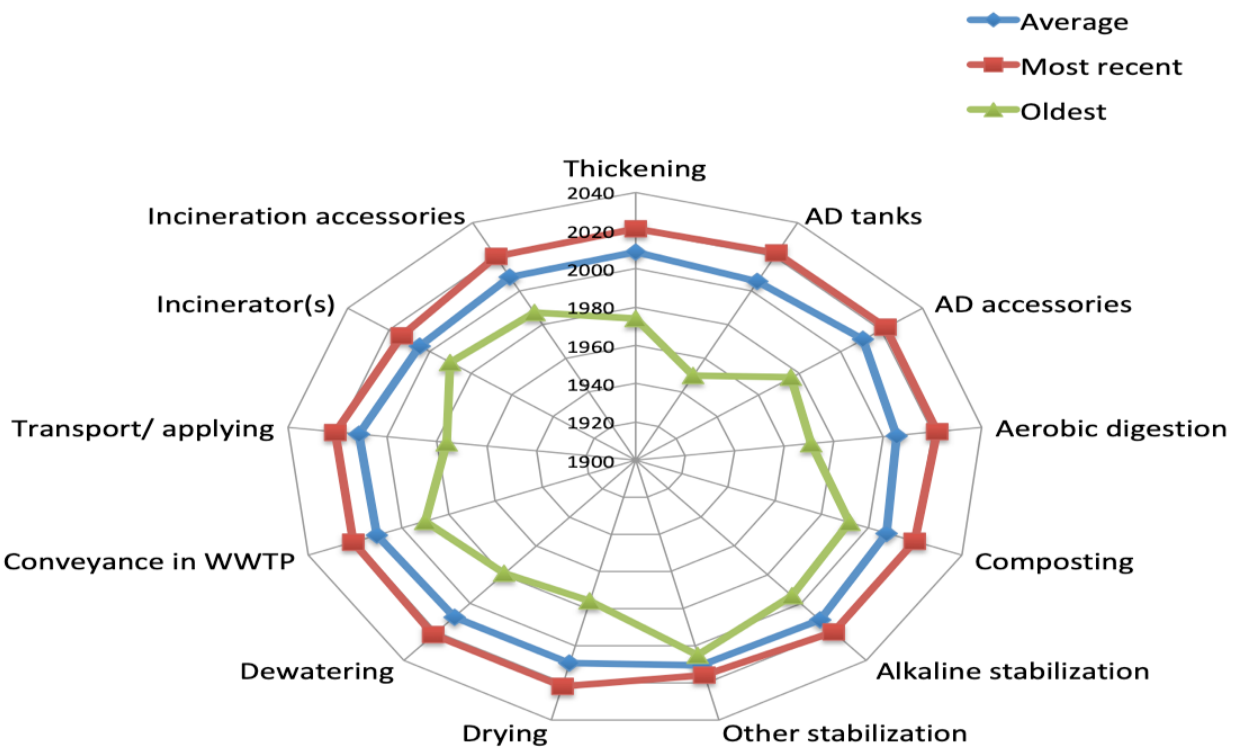
Most important:

1. Meeting regulatory requirements
2. Operating costs
3. Capital costs
4. Nuisances
5. Ensuring enough capacity

Most unimportant:

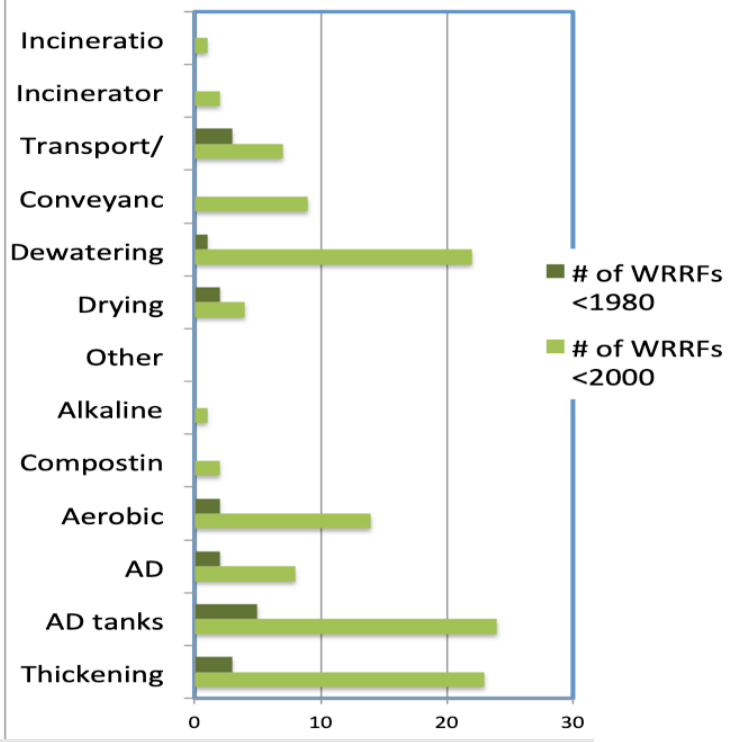
1. Limited options - regulations or public pressures don't allow for one of the 3 options
2. Employee resources - how much can be expected of employees, training
3. Nuisances

MOST RECENT UPGRADES / AGE OF INFRASTRUCTURE (n = 137)



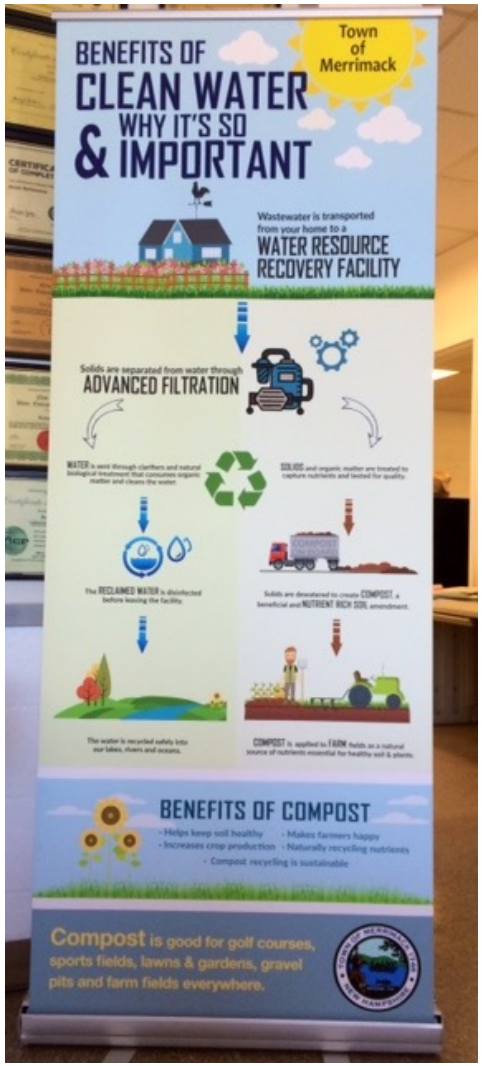
NATIONAL BIOSOLIDS DATA

NUMBER OF WRRFS WITH SYSTEMS PRE-2000 & PRE-1980



Applying the Data

- Assess Capacity Issues
- Understand Local and Regional Markets
- Regional Planning
  - Support policy development
- Develop recommendations for short-term and long-term actions



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nebra
North East Biosolids & Residuals Association
Recycled organics: Tools for sustainability.

Dedication to beneficial use

"While it would be cheaper to go to a landfill, we have prided ourselves to have 100% of the biosolids to go to beneficial reuse. No biosolids have gone to the landfill."

–City of Cookeville WWTP, Tennessee

"Beneficial use of biosolids as fertilizer and soil amendment product is a priority to our facility. It helps that is also the most cost effective and environmentally friendly option.

–WRRF in north central Utah

"Our farm partner and their property are considered a community asset that our governing body supports in many ways. Biosolids land application is a priority for the farm and the community in working to keep this farm financially viable and based in our community."

–Village of Essex Junction, Vermont

Thanks to these partners for funding support!

NATIONAL BIOSOLIDS DATA PROJECT

biosolidsdata.org

NACWA

Water Environment Federation®

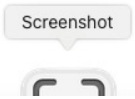
the water quality people®

nebra

North East Biosolids & Residuals Association

Recycled organics: Tools for sustainability.

Thanks to these partners for funding support!



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Questions?

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