



STATE BIOSOLIDS SURVEY

2018 data
conducted 2020-2021
biosolidsdata.org

California

Infrastructure & Wastewater

	2004 Data	2018 Data	
Total Number of WWTPs:	87 (survey), 633 CWNS	237	
WWTP & Biosolids Infrastructure Totals			
Number of Separate Preparers (in- or out-of-state, receiving solids from your state):	15	13	-----
Total number of your state's WWTPs sending to those Separate Preparers:	69	70	-----
Number of operating sludge incinerators in your state (total):	2	2	-----
Fluidized bed:	0	0	-----
Multiple hearth:	2	2	-----
Number of Part 258 landfills in your state accepting sewage sludge:	data not requested for 2004	25	-----
Number of WWTPs in your state with industrial pre-treatment programs:	data not requested for 2004	120	-----
Number of WWTPs in your state with <i>sludge</i> lagoons:	data not requested for 2004	25	-----
Wastewater Flow Totals			
Total statewide average daily wastewater flow (MGD):	data not requested for 2004	2,480	-----
Total statewide WWTP <i>design</i> capacity for wastewater flow (MGD):	data not requested for 2004		-----
Total statewide average daily <i>dry weather</i> flow (MGD):	data not requested for 2004		-----
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	1	-----
Number of WWTPs involved in those complaints:	data not requested for 2004	12	-----
Percent of population served by on-site systems (e.g. septic systems):	10%	10%	-----

237 is the number of majors that prepare sewage sludge. This figure does not include WWTPs that pipe their solids to the influent line of another WWTP within their agency for treatment. • 70 WWTPs sent some or all to separate preparers. Number of separate preparers includes 2 out-of-state taking CA biosolids. • The average daily flow is extrapolated from NBDP surveys by WWTPs that represent ~68% of the solids produced by major facilities and have a total combined flow of 1,686 MGD (1,686/.68 = 2,480 MGD). In comparison, Seiple et al. estimate a total statewide average daily flow from major facilities of 3,310 MGD (for all facilities: 3,381 MGD) • The 2 incinerators were at Contra Costa and Palo Alto; the latter was closed in 2019. • The 1 documented odor/nuisance complaint was the # received by U. S. EPA, involving approximately 12 WWTPs. • California has 92 approved pre-treatment programs. Several agencies have multiple WWTPs covered under their pretreatment programs. • There may be additional municipal landfills taking biosolids from minor WWTPs. Many minor WWTPs have sludge lagoons - the numbers here are for majors only, which account for ~98% of the annual wastewater flow in California. • Regarding septic systems, the state biosolids coordinator states: "An estimated 10% of California residents may rely on onsite wastewater systems (septic systems) for wastewater treatment."

Biosolids Use and Disposal

UNITS:	Dry metric tons	Dry metric tons	
BIOSOLIDS USED OR DISPOSED, 2018 (adjusted total): 675,000			
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)	178	499,000	112
Disposal & Alternative Dispositions	73	206,500	80
Other	14	10,000	many
TOTAL	265	715,500	192
			675,000
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)	98	499,000	90
Forestland (EQ, Class A, & Class B)	0	0	0
Reclamation (EQ, Class A, & Class B)	0	0	2
Class A EQ Distribution (bagged or bulk, public distribution, or unsure where it went)	11	part of above	20
Beneficial Use Subtotal	109	499,000	112
Long-term storage	14	10,000	10
Number of acres to which biosolids were applied:		70,000-80,000	no data
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

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.

Total biosolids used or disposed - 675,000 - is the best estimate by the U. S. EPA regional coordinator and is for major facilities (>1 MGD). This figure is corroborated by CASA data from 2015, which showed 665,000 dmt. Many minor and smaller major POTWs only remove biosolids from treatment lagoons every several years. • The 480,000 dry metric tons to beneficial use does not include alternative daily cover (ADC). ADC is shown here under landfill disposal. • The numbers of entities (WRRFs) going to each use or disposal (column D) may include double counting, as some facilities send solids to more than one use or disposal option.

NBDP survey responses from WRRFs representing 68% of estimated total solids production indicate 302,000 dmt go to Class A & Class B land application for agriculture (this extrapolates to ~447,000 dmt). The remainder of the ~447,000 dmt was Class B. An additional ~35,500 dmt go to Class A EQ general use, which is assumed to be used in agriculture also (so also part of the 447,000 dmt above), and ~22,000 dmt (~33,000 dmt) go to land reclamation. The 316,000 dmt shown for Class A / EQ is the U. S. EPA coordinator estimate; ~288,000 dmt of it goes to agriculture and is thus part of the 447,000 dmt in that category. The U. S. EPA coordinator estimated 480,000 dmt of Class A & Class B went to agriculture in 2018 *from majors only*, which aligns well with the extrapolations from the NBDP data, although that estimate does not include POTWs sending biosolids to separate preparers. CASA's 2015 data showed 412,000 dmt land applied, with 280,000 dmt being Class A.

Landfill (total)	65	163,000	70	113,000
Burial	data not requested for 2004	data not requested for 2004	30	28,000
Alternative daily (ADC), intermediate, or final cover	data not requested for 2004	data not requested for 2004	40	85,000
Surface Disposal	6	18,400	5	17,000
Incineration	2	25,100	2	24,000
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	2	11,000
Gasification	data not requested for 2004	data not requested for 2004	1	pilot scale only
Pyrolysis	data not requested for 2004	data not requested for 2004		
Disposal & Alternative Dispositions Subtotal	73	206,500	80	165,000
TOTAL	196	715,500	202	675,000

The numbers in this section are from the U. S. EPA coordinator; NBDP survey data representing 69% of solids production corroborate these data. She notes "Line 47 includes majors sending all or some to landfills. Not all majors reported how much went to ADC." Analysis of EPA data indicate ADC is likely about 85,000 dmt in 2018, so NBDP included this, rather than 27,000 suggested by EPA, essentially reversing the ADC and burial data provided by the EPA coordinator. CASA estimated 134,000 dmt went to landfills as ADC or final cover in 2015 and 58,000 dmt went to burial / disposal in landfills. Line 58 surface disposal is majors only; Sunnyside did not use their surface disposal site in 2018.

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	no data	433,800	22	316,000	The numbers in this section are from the U. S. EPA coordinator. Many POTWs achieve Class B but don't report it if going to a separate preparer, landfill, or other disposal.
Other Class A	no data	0	0	0	
Class B	no data	198,200	69	164,000	
Other (no data, etc.)	no data	83,500	176	195,000	
TOTAL	-	715,500	267	675,000	

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					Regarding treatment processes, with EPA's current electronic reporting system, they no longer get a full description of which processes were used for pathogen reduction, i.e. for how much biosolids were drying beds used and for how much was anaerobic digestion and dewatering used to demonstrate Class B. Data previously obtained on dewatering equipment, i.e. types of presses, switch from presses to centrifuges, etc. may be outdated. Many POTWs used to demonstrate Class B if their biosolids went to a landfill for ADC or to a compost for further treatment, in order to meet state requirements, but no longer do so using the current electronic reporting system.
Aerobic Digestion (total)	25	4,000			
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			
Anaerobic digestion (AD) (total)	160	650,000			
Class A (e.g. thermophilic)	data not requested for 2004	data not requested for 2004			
Class B (mesophilic)	data not requested for 2004	data not requested for 2004			
WWTPs co-digesting (FOG, food, glycol, etc.)	data not requested for 2004	data not requested for 2004		N/A	
Biogas used (heating, electricity, fuel, etc.;scf/year)	data not requested for 2004	data not requested for 2004		N/A	
Lime/Alkaline (total)	4	44,000			
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			
Composting	0	226,400			
Thermal (e.g. heat drying, not incineration/gasification/pyrolysis)	0	0			
Gasification	data not requested for 2004	data not requested for 2004	1	pilot scale only	
Pyrolysis	data not requested for 2004	data not requested for 2004			
Hydrolysis (thermal, chemical, etc.)	data not requested for 2004	data not requested for 2004		N/A	
Long-term (lagoons, reed beds, etc.)	6	no data		N/A	
Oxidation ditch / extended aeration	data not requested for 2004	data not requested for 2004		N/A	
Other stabilization technology	0	0			
Dewatering					
Belt Filter Press	205	160,000			
Plate & Frame Press	4	12,000			
Screw Press	2	3,000			
Centrifuge	35	344,000			
Vacuum Filter	0	0			
Drying beds (open-air)	80	305,038			
Solar drying (e.g. in greenhouse)	data not requested for 2004	data not requested for 2004			
Other dewatering technology	0	0			
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			

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

Data provided show 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.)	yes	yes	yes		
Other metals (boron, silver...)	no	no	not applicable (N/A)		
Dioxins/furans	no	no	not applicable (N/A)		
PCBs	no	yes	yes		
Priority pollutants (https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf)	no	no	not applicable (N/A)		
Other organic compounds (e.g. PDBEs, pharmaceutical)	no	no	not applicable (N/A)		
Radioactive isotopes (alpha, beta, Ra 226, etc.)	no	no	not applicable (N/A)		
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)	(please select)	(please select)	(please select)		
Paint Filter Liquids Test	(please select)	(please select)	(please select)		

Regarding pollutant testing requirements in California for pollutants not regulated under 503, it varies by Regional Water Quality Control Board, and by staff within each Board. Not sure if any boards now have standard monitoring requirements in place. Testing requirements for dioxins/dibenzofurans seems to be on a case-by-case basis. Many POTWs have a scan done for several hundred volatiles and semi-volatiles in response to pretreatment monitoring requirements.

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? Is 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
Part 503 metals (As, Cu, Hg, etc.)	yes	yes		electronic	yes
Other metals (boron, silver...)	no	not applicable (N/A)		paper	no
Dioxins/furans	no	not applicable (N/A)		paper	no
PCBs	no	yes		paper	no
Priority pollutants (https://www.epa.gov/sites/production/files/2015-09/documents/priority-pollutant-list-epa.pdf)	no	not applicable (N/A)		paper	no
Other organic compounds (e.g. PDBEs, pharmaceutical)	no	not applicable (N/A)		paper	no
Radioactive isotopes (alpha, beta, Ra 226, etc.)	no	not applicable (N/A)		paper	no
Nutrients (NPK)	no	not applicable (N/A)		paper	no
Cumulative Pollutant Loading Rates (CPLR)	no	not applicable (N/A)		paper	no
How biosolids achieve Class A or Class B	no	yes		paper	no
How biosolids achieve vector attraction reduction (VAR)	no	yes		paper	no
Solids stabilization process(es) used	no	yes		paper	no
Other biosolids treatments	no	not applicable (N/A)		paper	no
End use or disposal practice	no	yes		paper	no
PFAS (as of 2018)	(please select)	(please select)		(please select)	(please select)
Microplastics (as of 2018)	(please select)	(please select)		(please select)	(please select)
TCLP (toxicity characteristic leaching procedure)	(please select)	(please select)		(please select)	(please select)
Paint Filter Liquids Test	(please select)	(please select)		(please select)	(please select)