2016 SCAP Biosolids Trends Survey

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Cover Photo: Tulare Lake Compost Facility
Courtesy of Sanitation Districts of Los Angeles County

SCAP 2016 Biosolids Trends Survey

Executive Summary

SCAP wishes to thank all of our agencies that took the time and effort to assist with the production of this survey. The response has been exceptional, as can be seen by the number of agencies contributing. It is our sincere hope that the information provided will be useful to our SCAP members for future planning and will provide the basis for a comprehensive statewide report.

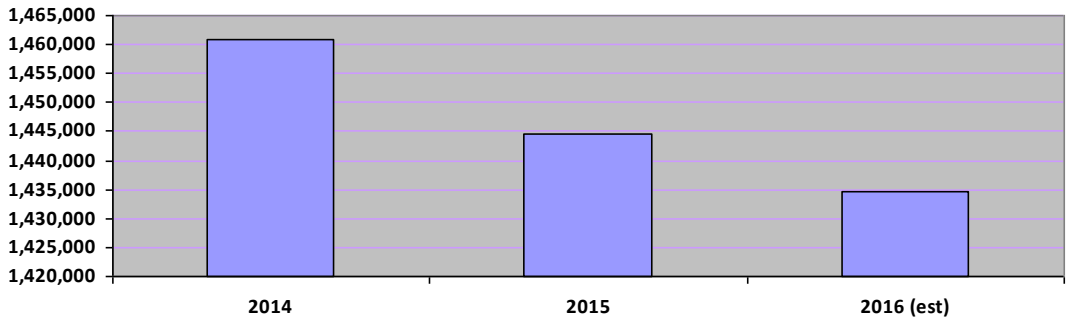
The intent of this survey was to update the previous 2014 survey information obtained from SCAP members in order to identify current industry trends for the following issues:

- *Biosolids Production*
- *Dewatering Technologies*
- *Biosolids Management Technologies and Destinations*
- *Biosolids Management Costs and Transportation Rates*
- *Agency Challenges*
- *Co-digestion and Food Waste Data*
- *Agencies Future Biosolids Management Plans*
- *Marketing and Media Practices*

1. Annual Biosolids Production

Although this study includes some agencies that were not included in previous studies making it impractical to accurately compare results from previous years a 9 year comparison is included as **Figure 5**. For accuracy, **Figure 1** has been modified to only compare the total volume of wet tons reported in the 3 year period from 2014 through 2016, with the 2016 volumes currently estimated. The annual biosolids production appears to be slightly decreasing over the last 3 years. Total volume in wet tons were reported as 1,460,989 for 2014 compared with an estimated total volume in 2016 of 1,434,502 wet tons resulting in a slight 2% decrease in biosolids production of 26,487 wet tons.

Figure 1



2. Management Options, Management Costs and Dewatering Statistics

Biosolids Management Options

Results of the survey pertaining to the types of technologies and disposal methods employed by agencies for biosolids management are reported in **Table 1** and the accompanying **Figure 2**. The various types of technologies and disposal methods reported include: composting, landfilling/daily cover (although *for purposes of this report these two methods are combined*), deep well injection, land application, mine reclamation, dryers/pellets/fertilizer, and community giveaway programs. As shown in **Table 1**, the most prevalent technology or disposal method utilized by reporting agencies in 2015/16 was: composting (33%); followed by landfills (30%); land application (26%); pellets/fertilizer (7%); mine reclamation (2%); and deep well injection (2%). Furthermore, **Table 1** shows that agencies use of these methods and technologies changed significantly from that reported in 2014. Landfilling usage remains the same as in 2014. In comparing 2014 results with 2015/16, the percentage of facilities composting significantly decreased while the percentage of facilities employing land application increased.

Table 1

Biosolids Management Options (by Agency)	2015/16	2014
Composting	33%	47%
Landfill	30%	30%
Land Application	26%	16%
Pellets/Fertilizer	7%	5%
Mine Reclamation	2%	0%
Deep Well Injection	2%	<0%
Biofuel	0%	0%

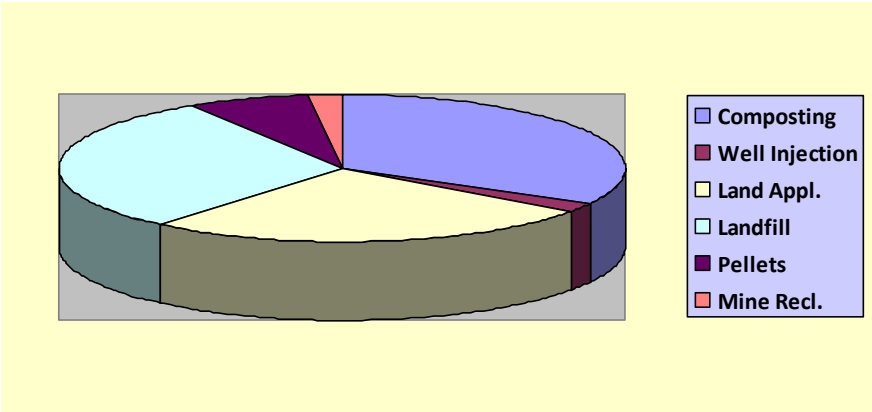


Figure 2

2015/16 Biosolids Technology by Usage

Ranking of these same biosolids management methods by estimated volume in wet tons rather than by usage for 2015/16 is shown below in **Table 2 and Figure 3**. **Table 2** confirms that composting, land application and landfilling remain the three available methods for disposal. Composting of biosolids, while only utilized by 33% (**Table 1)** of the responding agencies, accounts for 48% of the disposal options by volume, while Land Application is used by 26% of the agencies and represents 35% of the total options by volume. Landfilling remains the generally accepted method for the smaller agencies that have fewer options to consider.

Table 2

Biosolids Management Options (by Volume)	2015/16	2014
Composting	48%	32%
Land Application	35%	51%
Landfill	16%	12%
Mine Reclamation	1%	0%
Biofuel	0%	0%
Pellets/Fertilizer	< 0%	2%
Deep Well Injection	< 0%	3%

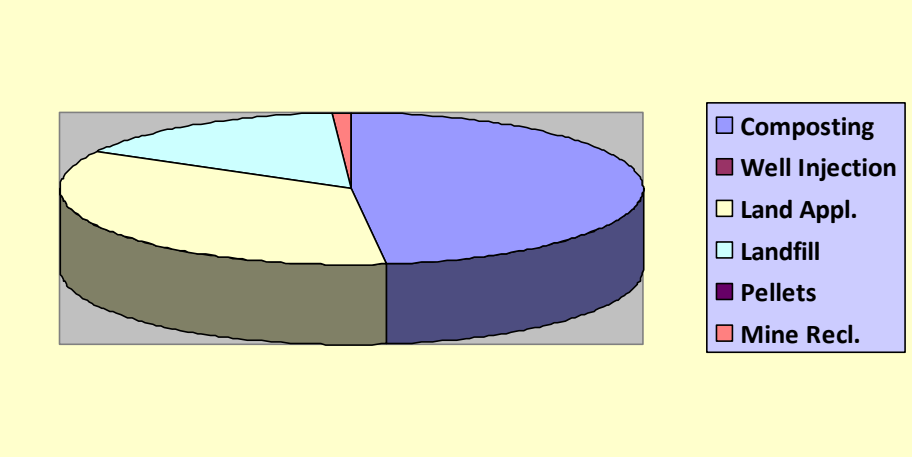


Figure 3
2015/16 Biosolids Technology by Volume

Management Costs

A breakdown of biosolids management costs is more difficult to interpret, as the so called "rate at the gate", includes many different factors for each agency. Similarly, the transportation costs reported vary widely due to the inclusion/exclusion of fuel charges and tipping fees, as well as travel distance. Details of the reported costs by agency are reported in **Table 4**. **Table 5** includes only a total cost that reflects both the gate fee and the transportation cost. The 2015/16 average of the total management rate/ton reported was calculated to be $49.94/ton, which is a decrease of $4.00/ton from the 2014 average rate.

Dewatering Statistics

The on-site methods employed by agencies to dewater biosolids prior to final use included: drying beds, centrifuges, presses and dryers. The percent solids for each technology are detailed in **Table 7** and reported to be in the following ranges: **Drying Beds (40% – 90%); Centrifuges (11% - 30%); Belt Filter Presses (14% - 32%); Screw Presses (16% - 23%); Dryers (90% - 96%).** Dewatering equipment employed by each agency is listed in **Table 6**.

Heat Dryers at Encina Wastewater Authority

Based on the total 2015 reported volume of 1,444,300 wet tons (**Table 7**) and the average solids reduction reported for each facility, the total estimated volume calculated for 2015 is 354,094 dry tons, compared with 336,181 dry tons reported for 2014.

Volumes and biosolids quality by agency are summarized in **Table 3.** Additionally, **Appendix A** on page 30 contains a list of abbreviations in **Table 11** that are used throughout various tables in the report.

3. Challenges, Future Planning, Digestion Enhancement and Public Outreach

Challenges

The question was "what challenges did each agency face with regards to biosolids recycling?" Responses were limited to 7 different categories of challenges with a total of 189 responses received from 29 agencies. The most frequently reported challenge was identified as "rising costs". This was followed closely by low cost local recycling options and securing long term disposal options. A comparison of answers received in 2010, 2012 and 2014 with 2016 responses are shown in **Table 8.**

Future Plans

The next question dealt with what each agency was planning to do with its biosolids, both in 2016 and 5 years in the future. By far the most prevalent answer was that the reporting agency planned to compost both now and in the future, followed by continuing to landfill now and in the future. Land application was a distant third both in the present and in the future years. The results of this question are summarized in **Tables 9 and 10**.

Digestion Enhancement

Another question asked for information from those agencies that co-digest high strength feedstock with solids to enhance their methane gas production. The city of Thousand Oaks, the Encina WA, the Victor Valley WRA and the Sanitation Districts of Los Angeles County responded that they currently perform co-digestion to enhance their methane gas production and provided process descriptions, volumes and cost information. Tipping fees were reported as both cost per gallon and cost per ton. Detailed information can be found on page 28 of this report.

Anaerobic Digesters at Hyperion WRP- City of Los Angeles

Marketing

Additionally, it was asked if agencies directly market their biosolids products. The city of Corona, the Encina WA, the Fallbrook PUD, the Inland Empire Utilities Agency, the Las Virgenes MWD, the Ojai Valley Sanitary District and the Sanitation Districts of Los Angeles County all reported both in 2014 and in 2016 that they actively market their biosolids products or participate in a community giveaway of their product. Further details are included on page 27 of this report.

Social Media

The final survey question asked if any agencies used social media outlets such as agency website, Facebook, Twitter, Youtube, Instagram, newspapers or other print media for public outreach or educational purposes to promote their biosolids program. Half of the responders answered that they did not use social media for disseminating biosolids related information.

Of the 33 agencies surveyed, 17 agencies responded indicating they used social media to promote their biosolids programs as follows: 16 utilized their websites, 8 used Facebook, 3 used Twitter, 2 used Youtube, 4 utilized newspapers, 2 employed newsletters and 1 used annual community outreach events. 17 agencies reported that they do not publicize their biosolids programs. Results are depicted in **Figure 4** below.

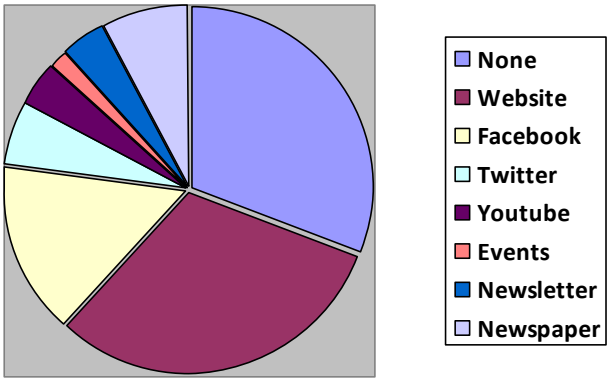


Figure 4

2016 Biosolids Multi Media

Summary of Survey Responses

Total Wet Tons of Biosolids Produced by Agency with Class Type

Table 3

Agency	Volume (Wet Tons)			Biosolids Quality		
	2014	2015	2016 (projected)	2014	2015	2016 (projected)
Carpinteria Sanitary District	1,807	1,296	1,224	Sub-Class B	Sub-Class B	Sub-Class B
City of Corona	3,924	4,609	4,444	Sub-Class B	Sub-Class B	Sub-Class B
City of Colton		5,111	17,572	Class B	Class B	Class B
City of Escondido	11,728	11,338	11,500	Class B	Class B	Class B
City of Los Angeles	258,000	247,000	240,000	Class A-EQ	Class A-EQ	Class A-EQ
City of Oceanside	13,163	13,608	13,750	Class B	Class B	Class B
City of Riverside	40,613	39,137	40,957	Class B/SubB	Class B/SubB	Class B/SubB
City of San Diego	128,248	131,208	133,000	Class B	Class B	Class B
City of Santa Maria	3,652	2,108	2,500	Class B	Class B	Class B
City of Thousand Oaks	7,880	12,487	9,000	Class B	Class B	Class B
City of San Bernardino MWD	23,110	21,494	21,647.28a	Class B	Class B	Class B
Crestline San. District	600	622	728	Class B	Class B	Class B
Eastern MWD	50,291	44,961	45,000	Class B	Class B	Class B
Encina Wastewater Authority	5,924	5,608	5,800	Class A-EQ	Class A-EQ	Class A-EQ
Elsinore Valley MWD	15,530	15,089	15,500	Sub-Class B	Sub-Class B	Sub-Class B
Fairbanks Ranch CSD	220	151	130	Sub-Class B	Sub-Class B	Sub-Class B
Fallbrook Public Utilities Agency	365	195	160	Class A-EQ	Class A-EQ	Class A-EQ
Goleta Sanitary District	6,852	6,620	8,212	Class B	Class B	Class B
Inland Empire Utilities Agency	62,366	58,924	58,000	Class B	Class B	Class B
Julian Sanitation District	130	126	150	Class B	Class B	Class B
LVMWD RLV Composting Facility	4,640	4,821	5,000	Class A-EQ	Class A-EQ	Class A-EQ
Los Angeles County Sanitation Districts	489,851	484,525	487,750	Class B	Class B	Sub-Class B
Olivenhain MWD	1,197	1,432	1,450	Class B	Class B	Class B

Orange County Sanitation District	283,142	285,519	285,500	Class B	Class B	Class B
Ojai Valley Sanitary District	5,596	5,265	5,431	Class A-EQ	Class A-EQ	Class A-EQ
Otay Water District				Sub-Class B	Sub-Class B	Sub-Class B
Ramona MWD	1,254	1,150	1,200	Class A	Class A	Class A
Rancho Santa Fe CSD	432	421	575	Sub-Class B	Sub-Class B	Sub-Class B
San Elijo JPA	3,341	3,599	3,500	Class B	Class B	Class B
Santa Margarita Water District	8,053	8,084	8,200	Class B	Class B	Class B
South Orange County Water Authority	22,771	22,251	22,200	Sub-Class B	Sub-Class B	Sub-Class B
Valley Center MWD	253	290	200	Class B	Class B	Class B
Victor Valley WRA	5,706	5,547	5,500	Class A	Class A	Class A
Whispering Palm CSD	350	312	369	Sub-Class B	Sub-Class B	Sub-Class B
Total Volume	**1,460,989**	**1,444,513**	**1,434,502**			
Totals						
Class A				**2**	**2**	**2**
Class A-EQ				**5**	**5**	**5**
Class B				**18**	**19**	**18**
Sub-Class B				**9**	**9**	**10**

Final Compost Product at the Tulare Lake Compost Facility

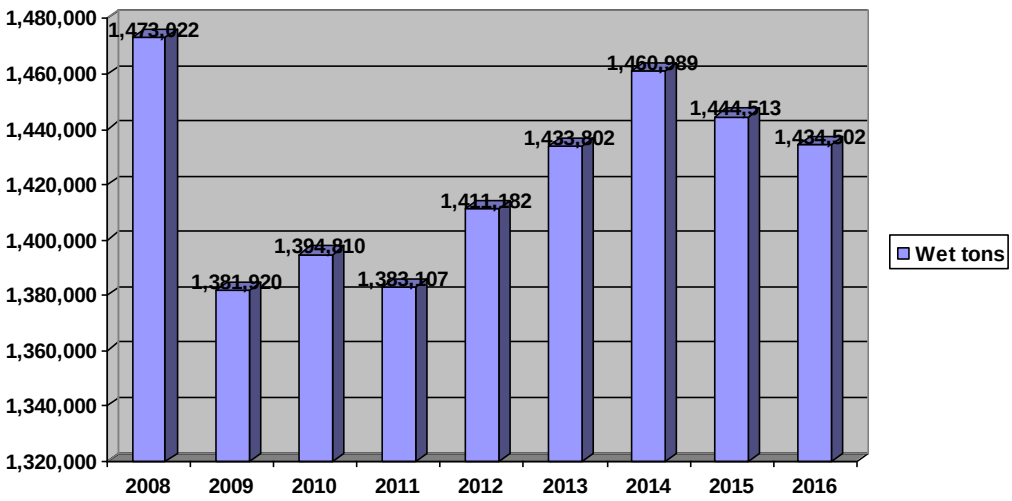


Figure 5

Composting at Ojai Valley Sanitary District

2015/16 Biosolids Management Options with Cost Data

Table 4

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
Carpinteria Sanitary District-CSDWRP 1,296 WTs	Sub-Class B	C	Engel & Gray - Santa Barbara County, CA	87		$56.00		
Carpinteria Sanitary District-CSDWRP 612 WTs	Sub-Class B	C	Engel & Gray - Santa Barbara County, CA	87		$56.00		
City of Corona-WRF No.1	Class B	C	Denali - Yuma, AZ	248			$47.56	
City of Corona-WRF No.1	Class B	C	Nursery Products - Helendale, CA	75			$49.80	
City of Corona-WRF No.1	Class A-EQ	F	Solid Green - Pico Rivera, CA	40				
City of Colton (2015) 5,111 WTs	Class B	LA/C	Denali Water - Yuma, AZ & Barstow, CA					
City of Escondido-HARRF 11,338 WTs	Class B	LA	Tule Ranch - Yuma, AZ	200	LA		$36.00	per ton cost
City of LA-GPCF 1,613 WTs	Class A-EQ	C	City - Los Angeles, CA	56				
City of LA-RBM/HTP 196,827 WTs	Class A-EQ	LA	Resp. Biosolids Mgmt - Bakersfield, CA	236			$38.68	
City of LA-SS/HTPSK Compost 2,716 WTs	Class A-EQ	C	Solid Solutions - Taft, CA	248			$73.00	
City of LA-SS/HTP Land Ap Yuma 22,100 WTs	Class A-EQ	LA	Solid Solutions - Yuma, AZ	578			$51.16	

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
City of LA-SS/HTP Land Ap Merced - 0 WTs	Class A-EQ	LA	Solid Solutions Merced, CA	560				
City of LA-SS/HTP NP Compost - 22,136 WTs	Class A-EQ	C	Solid Solutions Helendale, CA	256			$58.82	
City of LA-SS TIRE HTP 1,679 WTs	Class A-EQ	DWI	Solid Solutions San Pedro, CA	44		$76.00		
City of LA-TR/Merced TIWRP -0- WTs	Class A-EQ	LA	TerraRenewal-Merced, CA	594				
City of LA-TR/TI Yuma 7,007 WTs	Class A-EQ	LA	TerraRenewal - Yuma, AZ	560				
City of LA-TR/NP TIWRP	Class A-EQ	C	TerraRenewal	242				
City of LA-TR/SK TIWRP -0- WTs	Class A-EQ	C	TerraRenewal-Taft, CA	284				
City of LA-TI/TIRE -0- WTs	Class A-EQ	DWI	City of Los Angeles - San Pedro, CA	0			$7.37	
City of Oceanside-Cullison Farms – 19,151 WTs	Class B	LA	Denali - Wellton, AZ					
City of Oceanside-Desert Ridge Farms -8,207 WTS	Class B	LA	Denali Yuma, AZ -					
City of Riverside 12,345 WTs	Class B	LA	Denali Yuma, AZ	225			$40.00	
City of Riverside 16,302 WTs	Class B	C	Denali/Nur Pr. Helendale, CA	80			$40.00	
City of Riverside 12,345 WTs	Sub-Class B	C	Denali/Nur Pr. Helendale, CA	80			$45.00	
City of San Diego-Different Farms 7,383 WTs	Class B	LA	Denali Water - Yuma, AZ	220		$46.65	I	Jan 15 - May 16
City of San Diego-Otay Landfill 170,783 WTs	Class B	ADF	Denali Water - San Diego, CA	30		$47.60	I	Jan 15 - May 16
City of Santa Maria-City Landfill – 1,544 WTs	Class B	ADF	City Santa Barbara	8	MAD		$8.00	
City of Santa Maria 4,215 WTs	Class B	C	Engel & Gray - Santa Barbara, CA	0	MAD	$29.41	$2.85	

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
City of Thousand Oaks-Toland Landfill - 6,195 WTs	Class B	ADF	Ventura County, CA	30		$61.76		Thru 6/30/15
City of Thousand Oaks-Lost Hills Mine - 11,782 WTs	Class B	MR	Holloway,/GIC Transports - Kern County, CA	152		$48.00		7/1/15 - present
City of San Bernardino MWD (2015) - 21,494 WTs	Class B	C	Nursery Prod./ Terra Renewal - San Bernardino County, CA	69	WC	$42.00	I	
City of San Bernardino MWD (2016) 21,647 Wts	Class B	C	Nursery Prod./ Terra Renewal - San Bernardino County, CA	69	WC	$42.00 b	I	
Crestline Sanitation District-One Stop 500 WTs	Class B	C	Larry Curti - San Bernardino, CA	29	WC	$55.00	$20.00	
Eastern MWD-Moreno Valley RWRF 11,082 WTs	Class B	LA	Tule Ranch/Magan Farms - Yuma, AZ	225	LA	I	A	
Eastern MWD-San Jacinto RWRF 6,007 WTs	Class B	LA	Tule Ranch/Magan Farms - Yuma, AZ	225	LA	I	A	
Eastern MWD-Temecula Valley RWRF 14,854 WTs	Class B	LA	Tule Rch/Magan Farms - Yuma, AZ	225	LA	I	A	
Eastern MWD-Perris Valley RWRF 41,329 WTs	Class B	LA	Tule Ranch/Magan Farms - Yuma, AZ	225	LA	I	A	

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
Elsinore Valley MWD (2015) 15,089 WTs	Sub-Class B	C	Synagro - Kern County, CA	200		$83.00		
Elsinore Valley MWD (2016) 15,500 WTs	Sub-Class B	C	Synagro - Kern County, CA	200		$83.00		
Encina Wastewater Authority-EWPCF 3,240 WTs	Class A-EQ	LA	Denali - Yuma, AZ		HD	I	$52.01	
Encina Wastewater Authority-EWPCF 1,986 WTs	Class A-EQ	F	Various - CA, AZ, ID, OR		HD	I	varies	
Encina Wastewater Authority-EWPCF - 371 WTs	Class B	LA	Denali - Yuma, AZ		Cent.	I	$52.01	
Encina Wastewater Authority-EWPCF - 10 WTs	Class B	ADF	Denali - Chula Vista, CA		Cent.	I	$65.26	
Fairbanks Ranch CSD-Otay Landfill - 281 WTs	Sub-Class B	ADF	Denali - Otay, CA	30	L	$45.41	$269.18	
Fallbrook PUD-Desert Ridge Farms - 296 WTs	Class B	LA	Solid Solutions LLC/Denali - AZ	243			$53.00	
Goleta Sanitary District - 6,620 WTs	Class B	C	Liberty Compost - Kern County, CA	164		$30.00	$25.00	
Goleta Sanitary District 4,106 WTs	Class B	C	Liberty Compost - Kern County, CA	164		$30.00	$25.00	Thru June 2016
Inland Empire Utilities Agency 116,044 WTs	Class B	C	IERCA - Riverside, CA	9	ASP	$52.00	$5.80	
Inland Enpire Utilities Agency 880 WTs	Class B	C	Nursery Products - San Bern., CA		WC	$35.00	$15.00	
Julian Sanitation District-WWTP 22 WTs	Class B	ADF	Otay Landfill - Otay, CA	34	DB	$61.00		

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
Las Virgenes MWD-RLVCF	Class A-EQ	C	LVMWD RLV Facility - Los Angeles, CA					
LACSD-JWPCP 110,732 WTs	Class B	C	Liberty Composting - Kern County, CA	172	AW	$53.34	I	
LACSD-JWPCP 50,552 WTs	Class B	C	Synagro-WWT - Kern County, CA	144	AW	$68.84	I	
LACSD-JWPCP 83,000 WTs	Class B	C	IERCF - Rancho Cucamonga, CA	61	W	$54.00	$12.83	
LACSD-JWPCP 87,065 WTs	Class B	C	Nursery Products - San Bern., CA	144	W	$49.63	I	
LACSD-JWPCP 66,870 WTs	Class B	SB/DB	Holloway - Kern County, CA	168	L	$48.32	I	
LACSD-JWPCP 44,482 WTs	Class B	LA	Denali - Yuma, AZ	310	LA	$47.99	I	
LACSD-JWPCP -0- WTs	Class B	C	Tulare Lake Compost - San Bernd,, CA	190	AW		$35.60	
LACSD-Lancaster WRP 9,703 WTs	Class B	C	Nursery Products - San Bern., CA	71	W	$44.34	I	
LACSD-Palmdalw WRP 4,881 WTs	Class B	C	Nursery Products - San Bern., CA	88	W	$44.34	I	
LACSD-Valencia WRP 27,233 WTs	Class B	C	Liberty Compost - Kern County, CA	118	AW	$45.29	I	

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
Olivenhain MWD-4S Ranch WRF 1,432 WTs	Class B	LA	Ag Tech - Yuma, AZ	185		$12.00	$53.00	
OCSD-South Kern Compost Manuf. Facility - 146,761 WTs	Class A-EQ	C	Synagro - Kern County, CA	155	ASP	$75.00	I	
OCSD-Arizona Soils 60,080 WTs	Class A-EQ	C	Synagro - La Paz County, AZ	272	WC	$58.13	I	
OCSD-Tule Ranch/Ag Tech 216,394 WTs	Class B	LA	Tule Ranch - Yuma, AZ	253	LA	$54.50	I	
OCSD-Prima Descheca 20,490 WTs	Class B	ADF	Orange County Waste Recycling - Orange, CA	25	L	$41.50	$12.50	
OCSD-IERFCF 2,920 WTs	Class A-EQ	C	IERCA - Riverside, CA	47	ASP	$56.50	$13.50	
Ojai Valley WD-Liberty Composting (2015) – 1,888 WTs	Sub-Class B	C	Liberty Comp. - Kern Cty, CA			$47.94	I	
Ojai Valley WD-Liberty Composting (2016)- 1,322 WTs	Sub-Class B	C	Liberty Comp. - Kern Cty, CA			$47.94	I	Projected
Ramona MWD-Santa Maria WWRP - 843 WTs	Class A	ADF	Otay Landfill - Otay, CA	44	T			
Ramona MWD-San Vicente WWRP - 310 WTs	Class A	ADF	Otay Landfill - Otay, CA	48	T			
Rancho Santa Fe CSD-Otay Landfill - 996 WTs	Sub-Class B	ADF	Denali - Otay, CA	30	L	$45.41	$269.18	Projected
San Elijo JPA-Ag Tech 5,426 WTs			Ag Tech - Yuma, AZ		LA			
Santa Margarita WD-Chiquita (2015) 2,322 WTs	Class B	C	Synagro - Kern County, CA	500	C	$86.00		RT miles
Santa Margarita WD-Chiquita (2015) 2,446 WTs	Class B	C	Nursery LLC - San Bernardino, CA	400	C	$67.00		RT miles/$85 trlr fee

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
Santa Margarita WD-Chiquita (2015) 3,315 WTs	Class B	ADF	Prima Desheca - Orange County, CA	14	L	$37.96	$5.00	RT miles
Santa Margarita WD-Chiquita (2016) 1,470 WTs	Class B	C	Synagro - Kern County, CA	500	C	$86.00		RT miles
Santa Margarita WD-Chiquita (2016) 1,820 WTS	Class B	C	Nursery LLC - San Bernardino, CA	400	C	$67.00		RT miles/$85 trlr fee
Santa Margarita WD-Chiquita (2016) 2,022 WTs	Class B	ADF	Prima Desheca - Orange County, CA	14	L	$37.96	$5.00	RT miles
SOCWA-JBL 5,653 WTs	Sub-Class B	C	Nursery Products - San Bern., CA	134				
SOCWA-JBL 2,897 WTs	Sub-Class B	SB/DB	Prima Deshecha Landfill - San Juan Capistr., CA	18				
SOCWA-RTP 1,887 WTs	Class B	C	Nursery Products - San Bern., CA	131				
SOCWA-RTP 2,629 WTs	Class B	SB/DB	Prima Deshecha Landfill - San Juan Capistr., CA	22				
SOCWA-RTP 9,185 WTs	Class B	C	Synagro - South Kern Industrial Complex, Kern County, CA	174				
Valley Center MWD-Otay Landfill 390 WTs	Class B	ADF	Otay Landfill/Atlas - Otay, CA	60		$45.00	$305.00	

Table 4 (cont)

Agency/Facility	Quality	Mgt	Contractor(s)	Miles	Tech.	Tip. Fee	Trans Cost	Notes
Victor Valley WRA 5,706 WTs	Class A	LA	American Organics - Lucerne, CA	30				1,029 Dry Tons
Victor Valley WRA 6,000 WTs	Class A	LA	American Organics - Bakersfield, CA	125				Pred.for 2016
Whispering Palms CSD-Otay Landfill 681 WTs	Sub-Class B	ADF	Denali - Otay, CA	30	L	$45.41	$269.18	per trip fee

Washing Out Trailer at City of Los Angeles' Green Acres Farm

SCAP 2016 Biosolids Trends Survey

Biosolids Management Technology and Cost Summary

Table 5

Management Option	Agencies Reporting	Number of Facilities Reported	Wet Tons Reported 2015/16	Total Mgmt Cost/Ton Range	Avg.Total Mgmt Cost/Ton	Percent of Total By Vol.
Bio-fuel	0	0	0	NA	NA	NA
Composting	16	40	848,292	$32.26 to $86.00	$54.59	48%
Landfill	14	16	279,887	$8.00 to $72.00	$55.66	16%
Deep Well Injection	1	2	1,679	$7.37 to $76.00	$41.69	0%
Incineration	0	0	0	NA	NA	0%
Land Application	13	22	627,909	$36.00 To $65.00	$49.79	35%
Mine Reclamation	1	1	11,782	$48.00	$48.00	1%
Heat Drying/ Pellet/Fertilizer	3	2	1,986	NA	NA	0%
Community Giveaway Program	3* *Included above	3	23,397*	NA	NA	NA

Dewatering Equipment Utilized

Table 6

Filter/Screw Press	Dryer	Centrifuge
Andritz	Andritz	Alfa Laval
Ashbrook Corporation	Fenton	Andritz
Bellmer Winkler	Siemens	Centrisys
Envirex	ThermaFlite	Humbolt
FKC		Sharples
Huber		
Ritterhaus & Belcher		

Inland Empire Regional Compost Facility

Percent Solids Data for Agency's Biosolids

Table 7

Agency	Digestion Technology	Percent Solids	2015 Wet Tons (Metric)	2015 Dry Tons (Metric)
Carpinteria San. Dist.	Aerobic	16	1,296	194
City of Corona	Mesophilic anaerobic digestion (staged)	Filter Press 14 Dryer 90	4,609	645
City of Escondido	Mesophilic anaerobic digestion (single stage)	Centrifuge 25	11,338	2,834
City of Los Angeles	Thermophilic anaerobic digestion	Centrifuge 26.6 Centrifuge 1.7		
City of Oceanside	Mesophilic anaerobic digestion (staged)	Centrifuge 25		
City of Riverside	Mesophilic anaerobic digestion (staged)	Cent/Screw Press 19.5	39,137	7,632
City of San Diego	Thermophilic anaerobic digestion (temperature phased)	Centrifuge 28	178,166	49,886
City of Santa Maria	Mesophilic anaerobic digestion (single stage)	Drying Beds 60-80	5,759	4,031
City of Thousand Oaks	Mesophilic anaerobic digestion (single stage)	Screw Press 16.7	17,977	3,002
City of San Bernardino	Mesophilic anaerobic digestion (single stage)	Cent/Screw Press 22.1		
Crestline Sanitation District	No digestion, primary only	Filter Press 32	500	160
Eastern Municipal Water District	Mesophilic anaerobic digestion (acid/gas phased)	Centrifuge 20-25	73,272	16,486
Elsinore Valley MWD	Secondary only	Filter Press 16-18	30,589	5,200
Encina Wastewater Authority	Mesophilic anaerobic digestion (single stage)	Direct Dryer 94	5,607	5,270

Table 7 (cont)

Agency	Digestion Technology	Percent Solids	2015 Wet Tons (Metric)	2015 Dry Tons (Metric)
Fairbanks Ranch CSD	Aerobic Digestion	Centrifuge 11-20	281	43
Fallbrook Public Utilities District	Aerobic Digestion	Direct Dryer 96	296	278
Goleta Sanitary District	Mesophilic anaerobic digestion (single stage)	Screw Press 16	10,726	1,716
Inland Empire Utilities Agency	Thermophilic anaerobic digestion (temperature phased)	Centrifuge 24.5 Filter Press 14.4	116,924	40,397
Julian Sanitation District	Aerobic Digestion	Drying Beds 40-90	22	14
Las Virgrenes Municipal Water District	Mesophilic anaerobic digestion (single stage)	Centrifuge 23		
Los Angeles County Sanitation Districts	Mesophilic anaerobic digestion (single stage)	JWPCP -Cent (29) Valencia- FP (19) Lancaster- Cent (24) Palmdale- Cent (21) JWPCP- Dryer (92)	442,701 27,233 9,703 4,881 0	97,934 5,174 2,329 1,025 0
Olivenhain Municipal Water District	Aerobic Digestion	Filter Press	3,210	449
Orange County Sanitation District	Mesophilic anaerobic digestion (single stage)	Filter Press 18-22	447,644	89,529
Ojai Valley Sanitary District	Extended Aeration (OD w/BNR)	Filter Press 14	3,210	449
Ramona Municipal Water District	Mesophilic anaerobic digestion (acid/gas phased)	Centrifuge 16.5 Drying Beds 66	1,153	
Rancho Santa Fe CSD	Aerobic Digestion	Centrifuge 21-30	996	254
San Elijo JPA	Thermophilic anaerobic digestion	Filter Press 20	5,426	1,085

Table 7 (cont)

Agency	Digestion Technology	Percent Solids	2015 Wet Tons (Metric)	2015 Dry Tons (Metric)
Santa Margarita Water District	Mesophilic anaerobic digestion (single stage)	Filter Press 17 Screw Press 23	13,395	2,679
SOCWA	Mesophilic anaerobic digestion (single stage)	Centrifuge 20-30	22,250	5,562
Valley Center MWD	Aerobic Digestion	Centrifuge 30	390	117
Victor Valley WRA	Mesophilic anaerobic digestion (acid/gas phased)	Drying Beds 90	11,706	10,535
Whispering Palms CSD	Aerobic Digestion	Centrifuge 21-30	681	174
Total Wet Vol. (US Tons)			**1,444,300**	
Total Dry Vol. (Metric)				**354,094**

Corn Crop Growing at Green Acres Farm

Main Challenges Agencies Face with Biosolids Recycling

Table 8

Agencies Main Challenges	Reported in 2010	Reported in 2012	Reported in 2014 *	Reported in 2016
Rising Costs	13	10	17	10
Public Perception/Relations	3	5	12	2
Finding Low Cost Local Mgnt Options	3	4	16	8
Space for Drying Operations	3	1	12	2
Regulatory Restrictions	3	3	14	3
Securing Long Term Disposal Options	3	8	19	7
Wet Weather Drying Operations	3	3	12	2

***2014 includes all concerns reported whereas other years only includes number one concern.**

Additional Comments

City of Corona DWP – Seeking low cost, long term storage solutions.

City of Thousand Oaks – Contractors technology for drying biosolids to class A is unreliable, only 5-10% of eligible biosolids are being dried to class A for landfill cover.

Encina Wastewater Authority – a high quality fertilizer increases the market value.

Agencies Plans for Biosolids in 2016

Table 9

Management Option	Number Reporting
Composting	16
Landfill	10
Land Application	7
Heat Drying/Fertilizer	3
Update Management Plan	1
Deep Well Injection	1
Expand Market for Use of Pellets	1
Investigate Dewatering Options	1
Incineration	0
Evaluation of Class A or B Certification	0
Gasification/Energy Production	0
Bio-fuel Production	0

Agencies Plans for Biosolids in Next 5 Years

Table 10

Management Option	Reported in 2016	Reported in 2014	Reported in 2012
Composting	10	17	14
Landfill	6	12	12
Land Application	4	12	6
Evaluate Alternatives	4	1	4
Investigate Dewatering Options	4	3	2
Evaluation of Class A or B Certification	3	2	0
Utilize Food Waste	2	0	0
Heat Drying/Pelletizing	2	3	3
Expand Market for Use of Pellets	1	2	0
Deep Well Injection	1	1	1
Incineration	0	0	1
Bio-fuel Production	0	1	2
Gasification/Energy Production	0	1	1

Additional General Comments

City of Oceanside - We are just beginning to try to secure supply of FOG & food waste.

City of San Bernardino – To continue current practice of biosolids disposal.

City of San Diego – The city is currently looking into other methods of disposal.

City of Santa Maria – To continue current practice of biosolids disposal.

City of Thousand Oaks – The City of Thousand Oaks continues to seek out cost effective technology with emphasis on reducing quantity of biosolids hauled from facility, utilizing renewable resources for drying, and/or extracting energy or marketable products.

Eastern Municipal Water District- Wet Ton production dropped in 2015 from 2014 due to a successful dewatering optimization program that was implemented. Belt Presses are utilized as backups to the Centrifuge.

Elsinore Valley Municipal Water District – Planning for a plant expansion with the possibility of anaerobic digestion to get to Class B biosolids.

Goleta Sanitary District – We also occasionally produce a very small amount of Class A EQ biosolids and make it available to the local community for free as a component of the public education outreach program.

Sanitation Districts of Los Angeles County- Continue to manage biosolids from a economical and environmentally friendly perspective. We have begun start-up at Tulare Lake Compost and will continue to refine operations. We are experimenting with a pilot-scale indirect dryer. Continue to successfully operate our solids digestion process. We have implemented a food waste digestion process.

Ojai Valley Sanitary District – Compost onsite ~6 mo's, Haul to offsite compost facility rest of year.

Orange County Sanitation District – Note 1: We do not do "Landfill alt daily cover." We only do Landfill. The tipping fee includes the cost of transportation for contractors with "included" noted under transportation. The transportation cost provided as a range is an estimate over the two years.

Santa Margarita Water District – Hope to utilize alternative drying technologies to achieve almost complete drying.

South Orange County Wastewater Authority - The Quality of the Biosolids in Question 1 for TRP is Class B and JBL is sub-class B for JBL due to time not always being 15 days. The Biosolids data for question 2 is only for the calendar year 2015.

Agencies That Market Biosolids Products

City of Corona – Yes. Biofuel pellets with Cemex, Apple Valley, CA.

Encina JPA – Yes. Fertilizer pellets sold to golf courses/sod, wholesale nurseries and agricultural farms.

Fallbrook Public Utility District – Yes. Fertilizer pellets sold directly to customer.

Inland Empire Utilities Agency – Yes. The Agency operates a composting facility in partnership with LACSD. Products are sold locally into turf and landscape projects as a soil amendment or topdressing.

Las Virgenes Municipal Water District – Yes. Finished Class A-EQ Compost is given away to the community.

Los Angeles County Sanitation Districts – Yes. Compost in San Joaquin Valley.

Ojai Valley Sanitary District – Yes. We have a give-away program to the public.

Centrifuge Unit at Rancho Santa FE WRF

Co-Digestion with High Strength Feedstock to Enhance Methane Gas Production

City of Thousand Oaks – Yes. We process approximately 500,000 gallons per month of FOG at the Hill Canyon TP. We utilize 8 different haulers and charge a tipping fee of $0.065/gal. We also process approximately 50,000 gallons per month of food waste from our feedstock contractor, IWP at a tipping fee of $0.035/gal.

Encina WA JPA – Yes. We process approximately 78,000 gallons per week of FOG from our feedstock contractor, Liquid Environment at a tipping fee of $0.05 per gallon.

Los Angeles County Sanitation Districts – Yes. 84 tons per day of food waste. Contractor is Waste Management. Tipping fee is $10.38 per ton.

Victor Valley Wastewater Reclamation Authority –Yes, anaerobically digestible materials, i.e., expired ketchup, mustard, mayonnaise, chocolate, blends of food waste and FOG. Material comes in a a slurry. 407,293 gallons of slurry from CoWestand Alpha Omega. 4,083,316 gallons from CoWest, SMC, Nutro and Alpha Omega. Tipping fee is $0.04 per gallon.

Agencies That Utilize Social Media for Biosolids Outreach/Education

Carpinteria Sanitary District – Facebook, website and newspaper.

City of Los Angeles – Facebook, YouTube and website.

City of San Diego – Facebook and website.

City of Thousand Oaks – Website.

Elsinore Municipal Water District – Website and community outreach open house in March.

Inland Empire Utilities Agency – Website.

Encina Wastewater Authority – Facebook, website and quarterly newsletter.

Fallbrook Public Utility District – Newspaper and paper media.

Goleta Sanitary District- Website, newspaper and paper media.

Las Virgenes MWD – Facebook, Twitter, website, newspaper and paper media..

Los Angeles County Sanitation Districts – Website.

Olivenhain MWD – Facebook, Twitter and website.

Ojai Valley Sanitary District – Website and newsletter.

Orange County Sanitation District - Facebook, Twitter, YouTube, and website.

Santa Margarita Water District – Website.

South Orange County Wastewater Authority– Website.

Victor Valley Wastewater Authority – Facebook and website.

APPENDIX A

Abbreviations Used in Report

Table 11

A	Available Upon Request
ADF	Alternative Daily Cover
ASP	Aerated Static Pile
AW	Aerated Windrow
C	Compost
Cent	Centrifuge
DB	Direct Burial
DWI	Deep Well Injection
F	Fertilizer
HD	Heat Drying
I	Cost Includes Tipping Fee
L	Landfill
MAD	Mesophilic Anaerobic digestion
MR	Mine Reclamation
SB	Soil Blending
T	Trucked
W	Windrow
WC	Windrow Composting