SOLANO COUNTY

2018 ANNUAL BIOSOLIDS LAND APPLICATION REPORT

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2018 Annual Biosolids Land Application Report

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2018 Annual Biosolids Land Application Report

EXECUTIVE SUMMARY

The Solano County Department of Resource Management provides this annual summary report for the 2018 biosolids land application season (April 15 through October 15, 2018), as required by Chapter 25 of the Solano County Code.

Work performed by Solano County staff related to the land application of biosolids included: conducting stakeholder meetings, performing field inspections, sampling of biosolids material for pollutant (heavy metal) analysis, tracking volumes of land applied material, and responding to inquiries and concerns from the public. Staff reviewed notifications and required reporting information prior to and during the land application work.

Attachment A includes the 2018 Bay Area Clean Water Agency (BACWA) Report summarizing the biosolids generators' operations for the year.

Recommendations:

The Department of Resource Management recommends no changes to the Solano County Code, Chapter 25 as the code is protective of public health and the environment.

Acres, Tonnages, and Sources:

During the 2018 biosolids land application season, 1,319 acres of pasture and rangelands in Solano County received 7,665 calculated dry tons of Class B biosolids as a soil amendment. Land application initiated on April 17, 2018 and concluded on October 12, 2018.

Exhibit II provides maps which illustrate the location of registered land application fields which received biosolids in 2018.

Exhibit III summarizes historical tonnages and land applied acreage from 2002 through 2018.

Exhibit IV illustrates the percentage of biosolids supplied by the 12 regional generators that contributed biosolids material for the 2018 season.

Prior to bulk application of biosolids compost, Chapter 25 requires the applicators to notify the Environmental Health Division. During the 2018 season, no notices of bulk application of biosolid compost were received by the Environmental Health Division.

Staffing:

During the 2018 biosolids land application season, staff conducted 12 field inspections at the land application sites and collected 12 samples for lab analysis. Staff spent 201 hours overseeing the biosolids program which included; reviewing applications, performing inspections, reviewing reports, responding to public comments, requests for information, preparing and facilitating the biosolids stakeholder meetings, reviewing current industry trends, and preparing this annual biosolids summary report.

Monitoring and Reporting:

Prior to approving the receipt of biosolids from a generator source, biosolids samples must be analyzed for pollutant (heavy metal) concentrations and compared to the US EPA Part 503 acceptance criteria. Additionally, through the 2018 land application season Solano County staff collected 12 field samples of the biosolids material for pollutant analysis. All sample data received prior to and during the 2018 season were within the Class B pollutant thresholds for land application. Summary of the sample results, description of the cumulative pollutant loading

and available plant nitrogen uptake on each registered field that received biosolids in 2018 is presented in Exhibit V.

During field application, a weather station was used to measure wind speed and duration. Precipitation was also monitored by visual inspection and through daily weather reports. Based on the data reviewed, wind speed did not exceed 25 mph for a period of 60 minutes during land spreading activity.

Protests and Complaint Investigations:

Solano County Code Chapter 25 allows County residents adjacent to fields proposed for biosolids land application to submit a protest and bring forward concerns about land application in proximity to their properties. No protests were filed prior to the 2018 biosolids land application season. No complaints regarding biosolids were received during the 2018 season.

Exhibit VI provides additional details of previous years complaints and the number of complaints received.

Biosolids Stakeholder Group Meetings:

The Biosolids Stakeholder Group met on December 13, 2018. A summary of the meeting discussions is presented in Exhibit VII.

Solano County Research Study:

County staff are researching and attempting to identify areas that potential research can provide the most benefit and impact including utilizing a portion of the research funds towards a collaborative project sponsored by the California Association of Sanitation Agencies.

Projects identified for possible collaboration include; assessing and quantifying post-fire rehabilitation of lands through land-applied biosolids; evaluating how biosolids contribute to soil health and microbial populations, and the regrowth of pathogens in biosolids during transport and field application.

An independent research project is also being considered. A Request for Proposal shall be prepared once the research project is identified.

Exhibit VIII further describes the areas of research being considered.

Regulatory and Industry Update:

Updates are provided for the proposed California rule changes as described for SB 1383, an audit report dated November 15, 2018 from the Office of Inspector General on the US EPA Biosolids program controls, and operations of Lystek International Inc., a Canadian based company which currently land applies a biosolids derived injectable fertilizer product within the County.

Bay Area Clean Water Agency Report:

Generators that provide biosolids for land application in Solano County are required to present a summary of material supplied and an update on each agency's efforts toward developing alternative energy sources and uses of biosolids. The Bay Area Clean Water Agency Report (BACWA) for 2018 is included in Attachment A.

Based on the December 2018 annual BACWA report, all generators that provided biosolids to Solano County for land applications have either participated in biosolids-to-energy programs to develop alternative biosolids/energy options or are diverting a portion of their generated biosolids to Class A material. A summary of the report is provided in Exhibit X.

Exhibit I: A Brief Overview of Solano County's Biosolids Program

Biosolids are a solid fraction of sewage sludge that is treated in order to control disease-causing organisms and odors and to meet specific regulatory standards for use as a soil amendment. The regulation of biosolids is through various federal, state, and county requirements, each providing a regulatory framework and oversight for the generation, sampling, management, and land application of biosolids in Solano County.

Under the federal regulations 40 CFR Part 503, the U.S. Environmental Protection Agency (US EPA) regulates biosolids generation and establishes ceiling and lifetime pollution (heavy metal) accumulation concentrations in soils receiving biosolids as well as pathogen and vector attraction reduction standards for the biosolids material. These regulations also specify the sampling frequency and methodology and provide methods for calculating plant available nitrogen application and lifetime pollutant loading and reporting requirements.

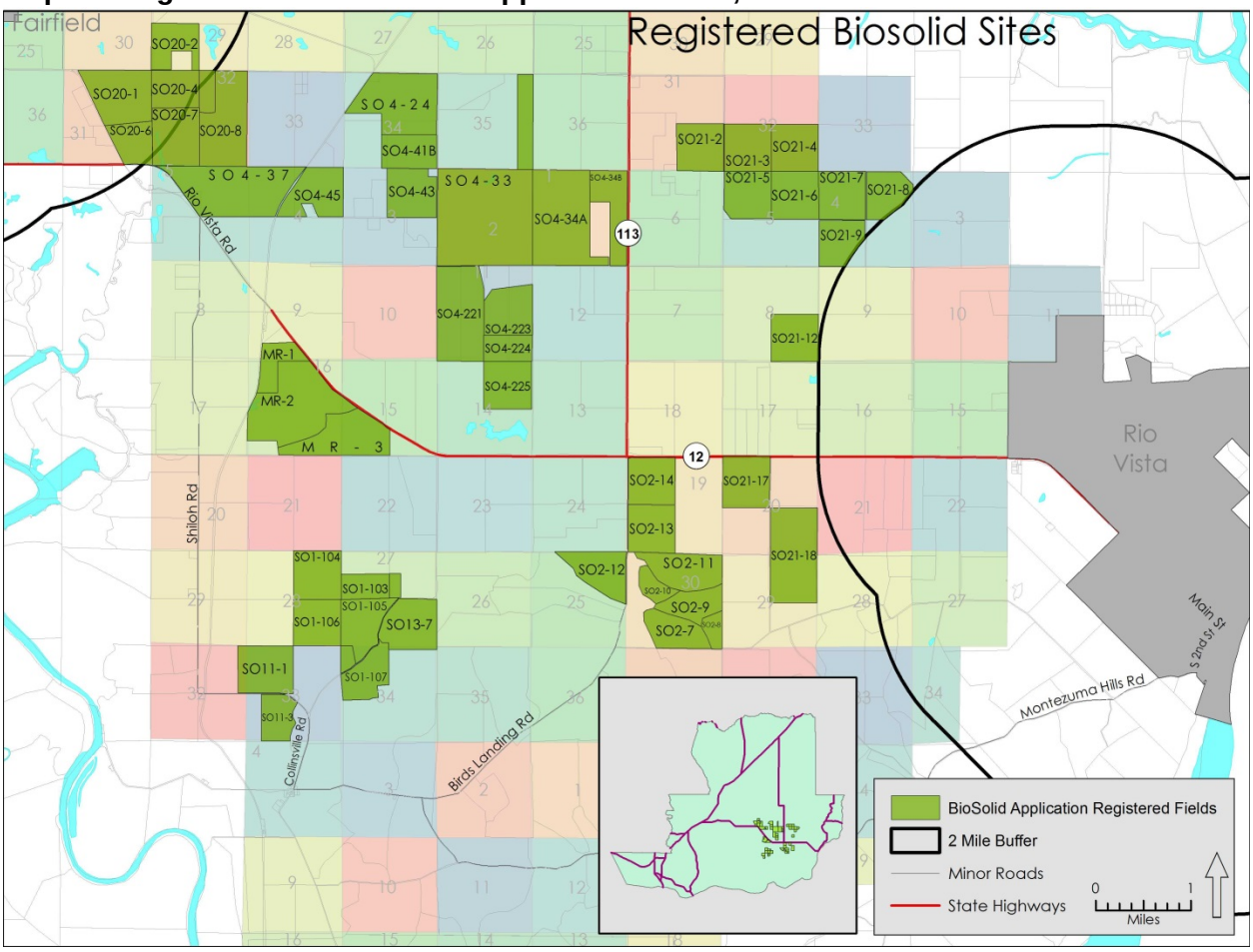
California State Water Resources Control Board (SWRCB) under Water Quality Order No. 2004–0012 – DWQ: *General Waste Discharge Requirements For The Discharge Of Biosolids To Land For Use As A Soil Amendment In Agricultural, Silvicultural, Horticultural, And Land Reclamation Activities*, regulates the land application processes of applying biosolids in sensitive habitats, including the Suisun Marsh. The state regulations also identify restrictions between biosolids land application and various crop harvest activities, minimum setback distances between staging and land application sites and sensitive receptors including water bodies, water wells, and public roads and establishes a field registration process.

Solano County began overseeing the land application of biosolids in 1995 and currently regulates the land application of biosolids through Solano County Code Chapter 25, Article IV: *Domestic Septage Land Application and Biosolids Land Application*. Chapter 25 builds upon both federal and State requirements through a County-specific inspection and oversight program. Chapter 25 restricts when and where biosolids may be applied in order to minimize offsite impacts by allowing applications only during dry season (April 15th through October 15th), and prohibition of land applying biosolids during wet weather and during high wind events. The County's program also encourages public participation through notifications and stakeholders meetings processes and establishes research fund to further understand and develop the County's program.

During the 2018 application season, the only permitted applicator of biosolids land was Synagro West LLC. Synagro has applied biosolids within Solano County since 2000 when they purchased Pima Gro and Bio Gro and assumed operations of their registered biosolids land application sites in Solano County. Synagro applied biosolids to registered fields. Exhibit II presents more information about current field registrations and registered fields that received biosolids in the 2018 land application season.

EXHIBIT II – Registered Biosolids Land Application Sites in Solano County

Map 1 – Registered Biosolid Land Application Fields, 2018



The above map illustrates all biosolids registered fields in Solano County for the 2018 season. To be considered for registration, all fields must be a minimum of two miles from City urban limits. This above map illustrates the 2-mile buffer outside of the City of Rio Vista city limits. There are a total of 7,738 net acres registered to the below seven ranches.

Ranch Name and ID	Corresponding Fields	Total Net Acreage
Emigh Ltd Ranch (S0-4)	SO-4-24,33,34,37,41,42,43,45,221,223,224,225	2,255 acres
Mayhood Ranch (MR)	MR-1,2,3	614 acres
Hamilton Ranch (S0-2)	SO-2-7,8,9,10,11,12,13,14	628 acres
McCormack Ranch (S0-21)	SO-21-2,3,4,5,6,7,8,9,12,17,18	1,439 acres
Anderson Ranch (S0-1)*	SO-1-101,102,103,104,105,106,107	1,506 acres**
Zadwick Ranch (S0-11)*	SO-11-1,3	212 acres**
Peterson Ranch (S0-20)**	SO-20-1,2,3,4,5,6,7,8	1,084 acres*
Total Net Acres Registered for Biosolids Applications		**7,738**

**Registered fields planned for non-renewal*

***Field registration was not renewed at the end of 2018*

On December 20, 2017 the Central Valley Regional Water Quality Control Board (CV-RWQCB) approved the addition of five registered fields, totaling 558 net acres, to the McCormack Ranch site. All five of the newly registered fields received land application in the 2018 season. Synagro is currently working with the CV-RWQCB to register additional fields to the Emigh Ranch (SO-4).

Registration of the approximately 1,084 acre Peterson Ranch was not renewed after the 2018 biosolids season, therefore, these field are no longer approved to receive biosolids land application.

The registrations for the Anderson (SO-1) and Zadwick (SO-20) ranches expired in 2017 and at this time are not planned for renewal by Synagro as there are no current plans to perform any further biosolids land application to these fields.

Map of All Active Biosolid Land Application Sites in Solano County, 2018

The below map (Map 2) illustrates the location of the fields where biosolids were land applied during the 2018 season. These fields are registered under Emigh Limited Ranch (SO-4) and McCormack Ranch (SO-21).

Map 2 – Active Biosolid Land Application Sites, 2018

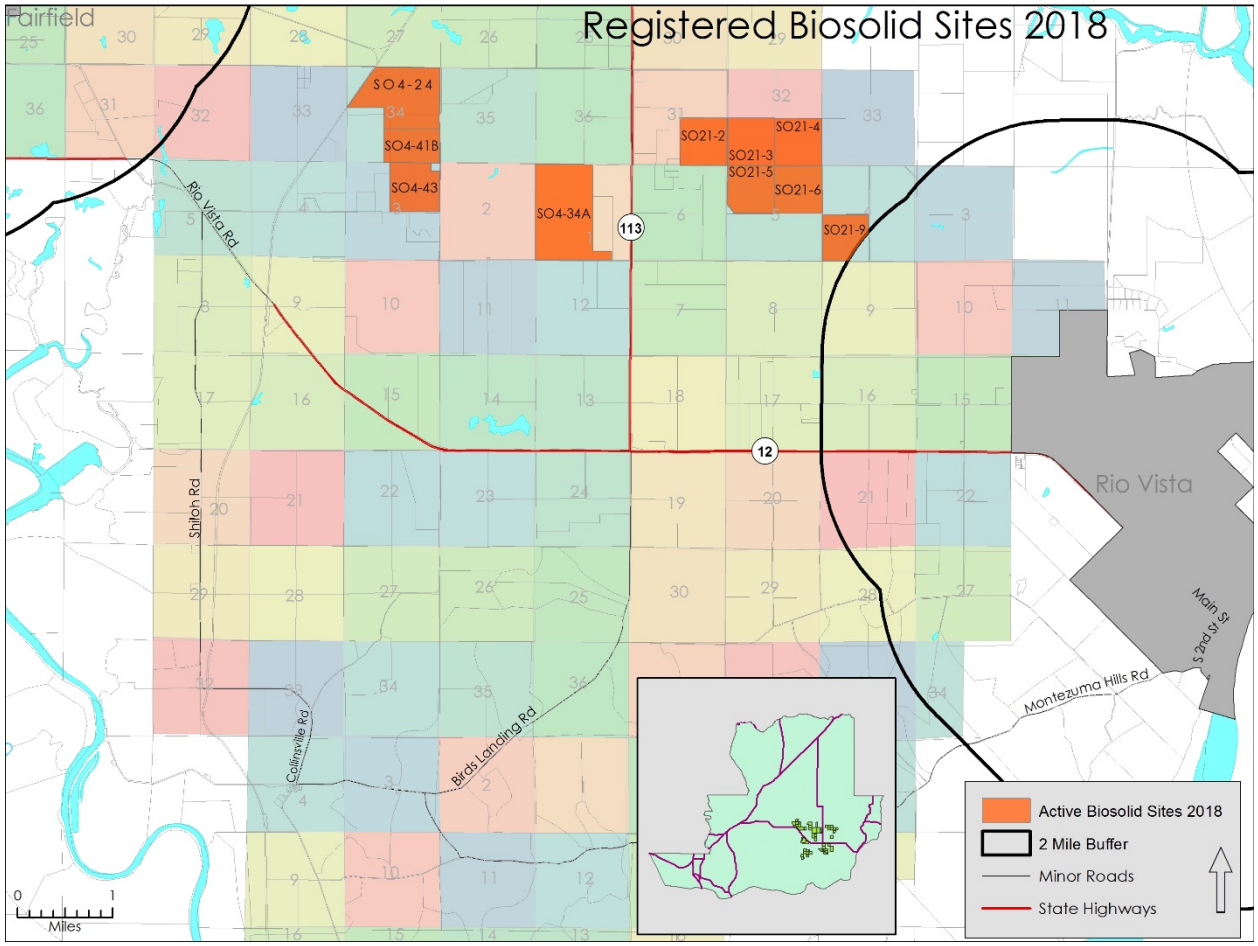


EXHIBIT III – Tonnages and Acreages of Land Application, 2018

In 2018, a total of 1,319 acres of farmland received 7,665 calculated dry tons of Class B biosolids as soil amendments. This is a 23% increase in tonnages when compared to 2017. The total acreage that biosolids were land applied increased 22% compared to 2017. The previous five years of land application averaged 6,835 dry tons per year.

The below graph illustrates the historical and current annual tonnages of biosolids land applied from 2002-2018. The most biosolids applied in a single year was in 2002 (18,697 dry tons) compared to 4,965 dry tons received in 2013 when the least amount of material was land applied.

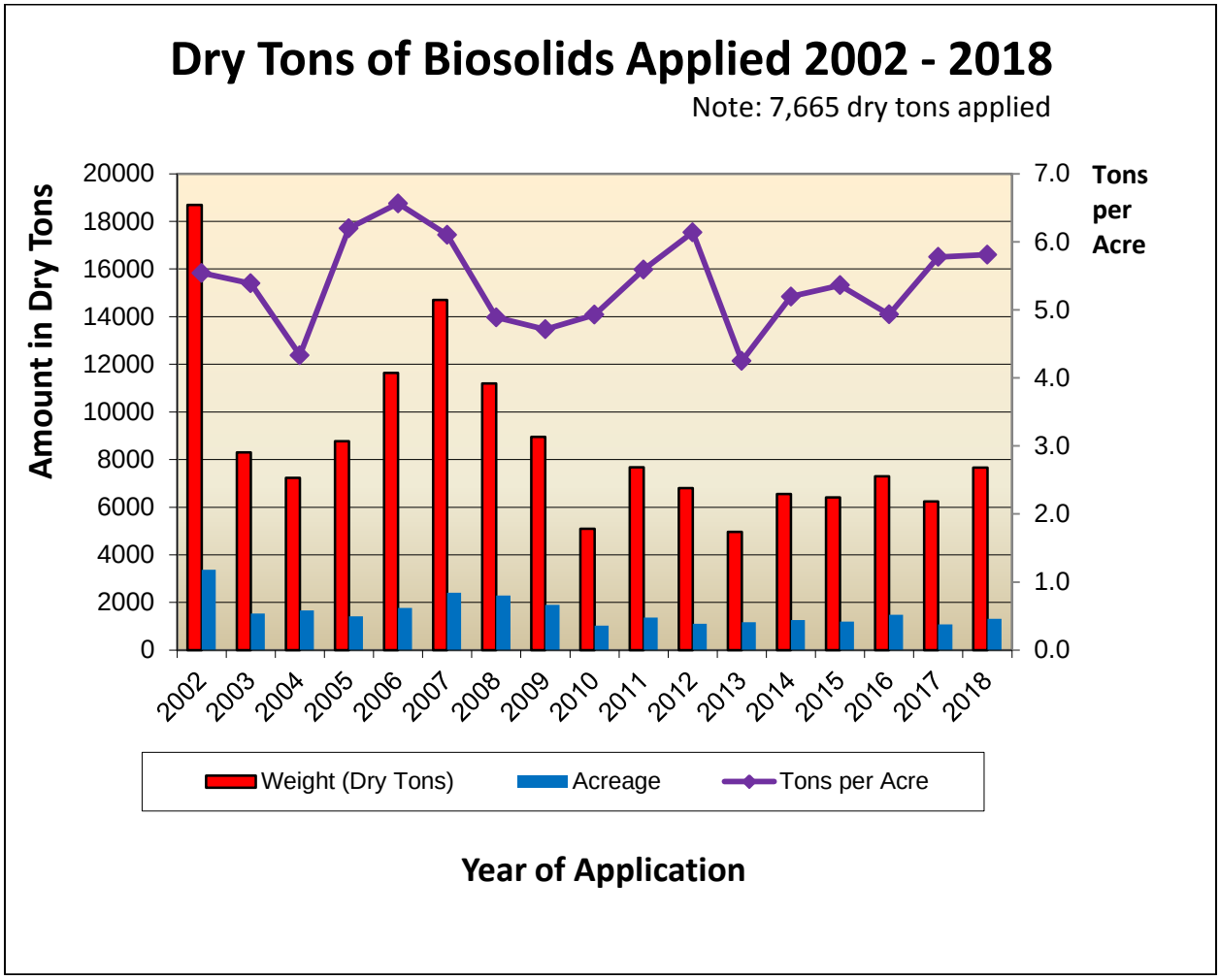
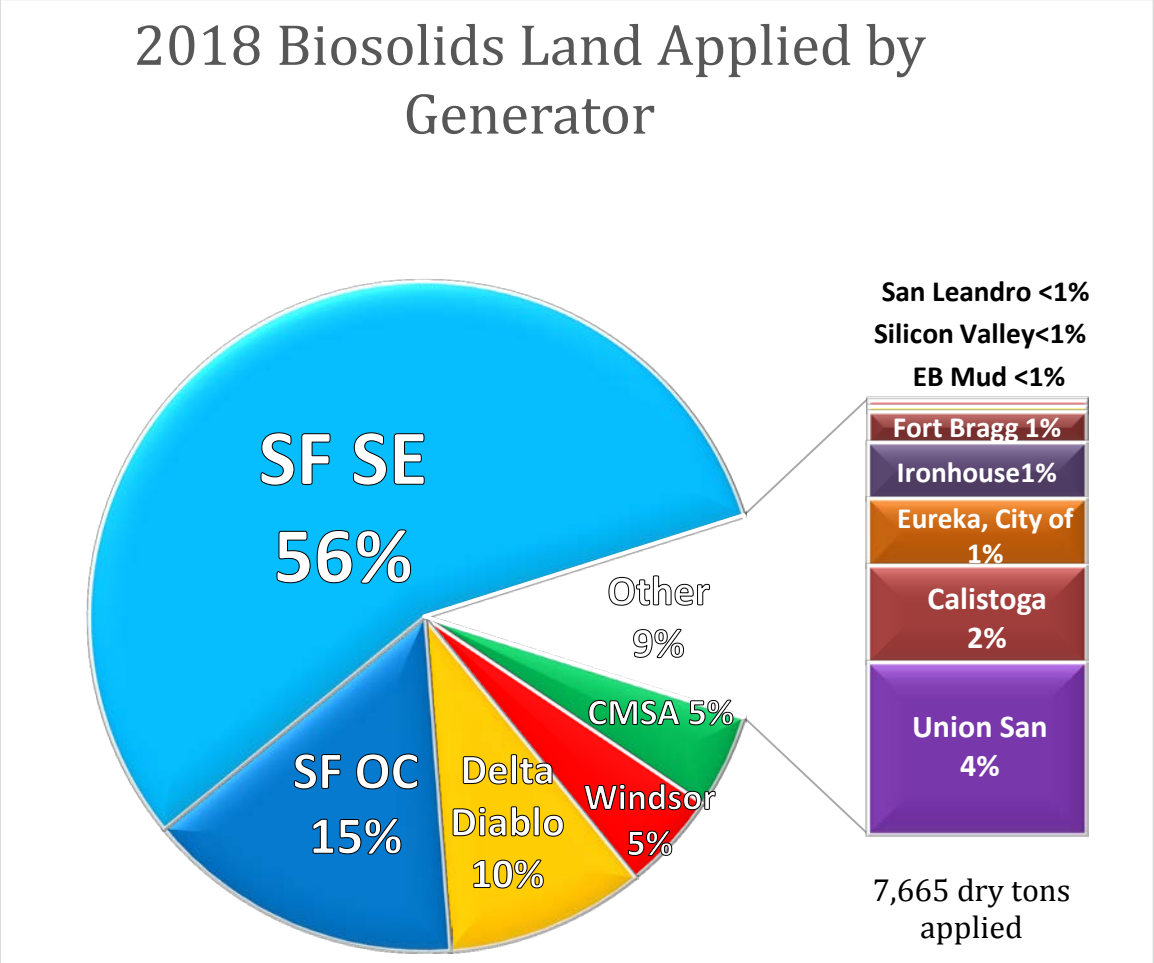


EXHIBIT IV – Generators and Percent of Biosolids Land Applied in 2018

In 2018, 12 generators provided 7,665 calculated dry tons of biosolids for land application in Solano County.

The generators that provided biosolids for land application in 2018 included: City of Calistoga, Central Marin Sanitation District, Delta Diablo, East Bay Municipal Utility District, City of Eureka, Fort Bragg Municipal District #1, Ironhouse Sanitary District, San Francisco Public Utilities Commission (two generators; Southeast Water Pollution Control Plant and Oceanside Water Pollution Control Plant), Silicon Valley Clean Water, Union Sanitary District, and the Town of Windsor

The two San Francisco Public Utilities Districts (San Francisco Oceanside and San Francisco Southeast) together accounted for approximately 71% (5,467 calculated dry tons) of the total biosolids received during the 2018 season. The below graph illustrates the percentage of biosolids provided by each generator.



Notes:
SF SE = San Francisco Southside
SF OC = San Francisco Oceanside Treatment Works
CMSA = Central Marin Sanitation District

EXHIBIT V – Pollutant Analyses, Cumulative Pollutant Loading, and Nitrogen Loading

The United States Environmental Protection Agency (US EPA) published Title 40 of the Code of Federal Regulations (CFR) Part 503 in 1993, commonly referred to as Part 503. Part 503 provides a regulatory framework for the land application of biosolids, including concentration limits of eight heavy metals (pollutants). Solano County Code Chapter 25 adopted by reference Title 40 CFR, Part 503 as part of its biosolids regulations.

As specified under Part 503, prior to biosolids land application, the biosolids generator must provide documentation of Notice and Necessary Information (NANI) that demonstrates the Class B biosolid materials proposed for land application meet standards for pollutant concentrations, class and method of pathogen reduction, and method of vector attraction reduction.

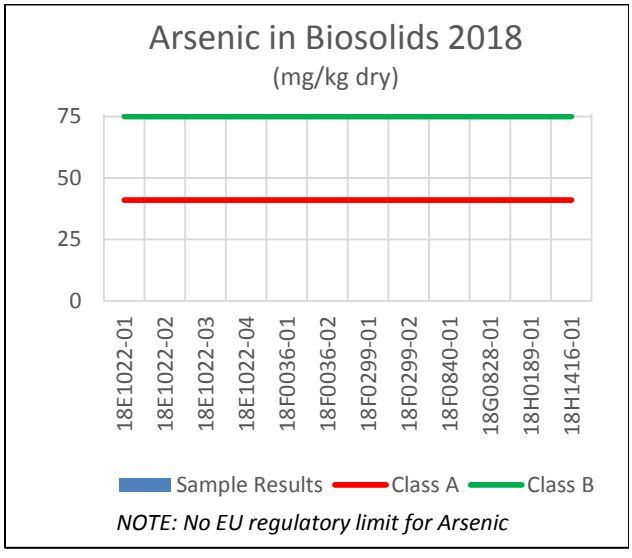
Pollutant concentration limits specified under Part 503 include: Arsenic, Cadmium, Copper, Lead, Mercury, Nickel, Selenium, and Zinc. The US EPA eliminated Chromium concentration limits for biosolids in 1995 as the risk of concentrated hexavalent chromium in biosolids (12,000 mg/kg) was found to be negligible.

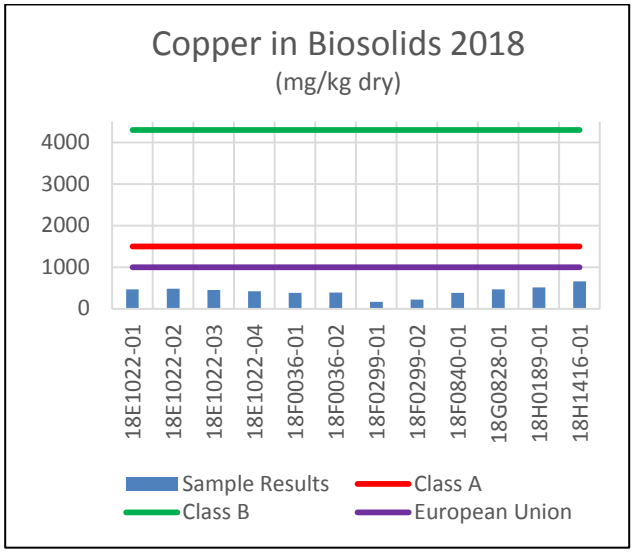
Solano County only permits the application of biosolids from generators that provide NANI reports confirming the pollutant concentrations are below the Part 503 Class B limits. Prior to land application, all generators for the 2018 biosolids season submitted NANI reports with pollutant concentrations within all Class B pollutant criteria.

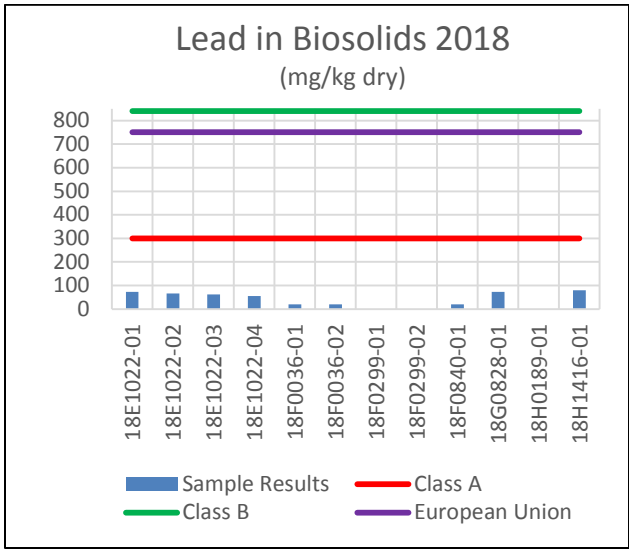
The European Union (EU) limits for biosolids are taken from the European Council Directive 86/278/EEC of 12 June 1986, Annex 1B. EU limits are not required for land application of biosolids in Solano County but are presented herein for reference. There are no EU limits for Arsenic, Chromium, or Selenium.

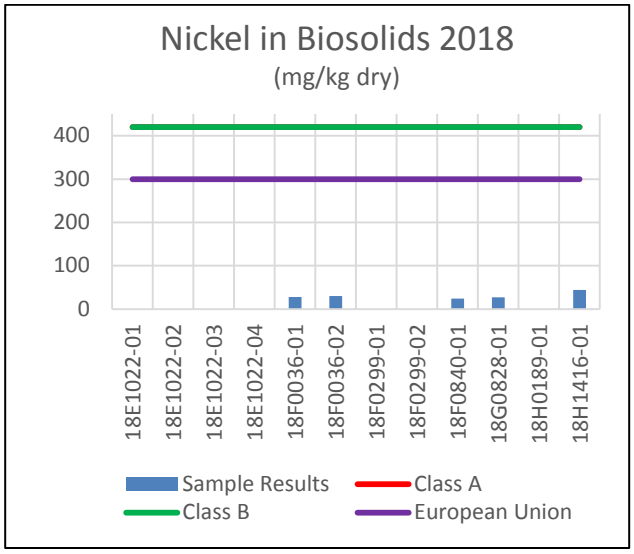
In addition to the sampling performed by the generators as part of the application process, County staff conducted seven sampling events and collected 12 field samples during the 2018 season. All samples were reported below Part 503 Class A and Class B biosolids threshold limits for pollutants.

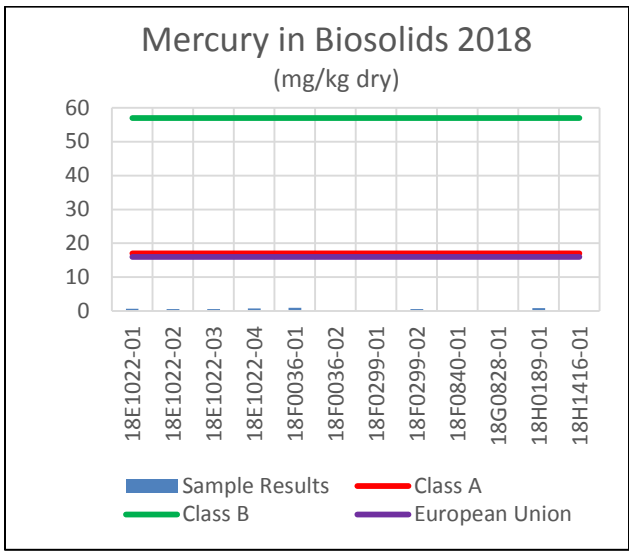
2018 Biosolids Field Sampling Heavy Metal Analyses

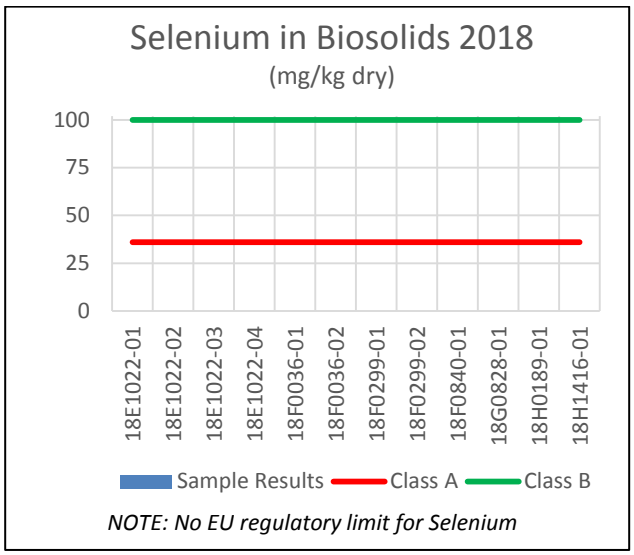


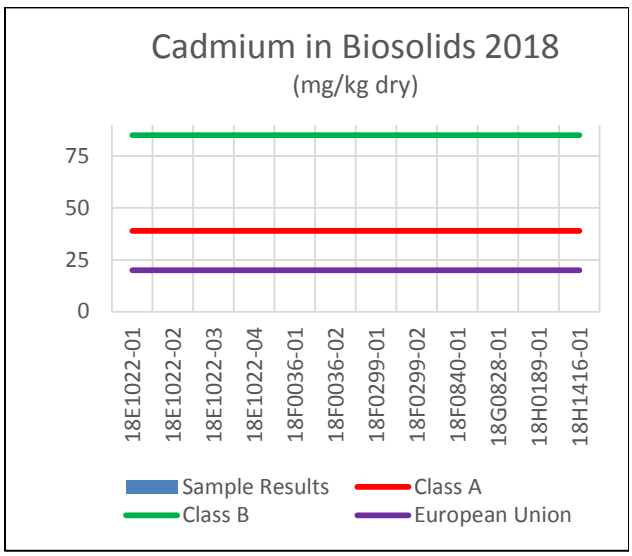


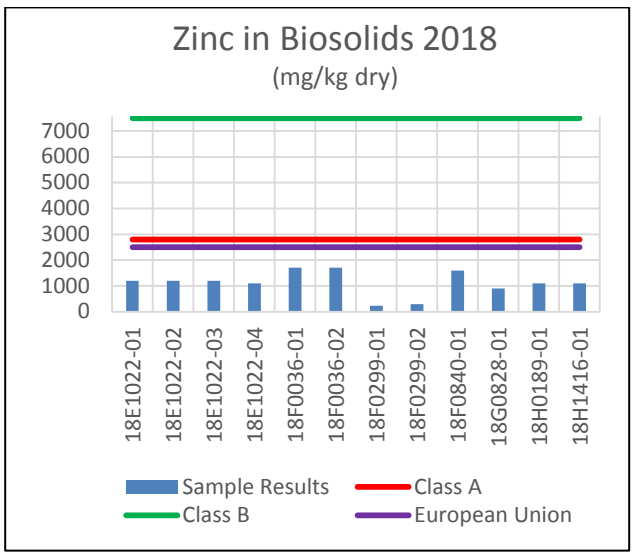

Lead in Biosolids 2018
(mg/kg dry)
800
700
600
500
400
300
200
100
0
18E1022-01
18E1022-02
18E1022-03
18E1022-04
18F0036-01
18F0036-02
18F0299-01
18F0299-02
18F0840-01
18G0828-01
18H0189-01
18H1416-01
Sample Results
Class A
Class B
European Union


Nickel in Biosolids 2018
(mg/kg dry)
400
300
200
100
0
18E1022-01
18E1022-02
18E1022-03
18E1022-04
18F0036-01
18F0036-02
18F0299-01
18F0299-02
18F0840-01
18G0828-01
18H0189-01
18H1416-01
Sample Results
Class A
Class B
European Union


Mercury in Biosolids 2018
(mg/kg dry)
60
50
40
30
20
10
0
18E1022-01
18E1022-02
18E1022-03
18E1022-04
18F0036-01
18F0036-02
18F0299-01
18F0299-02
18F0840-01
18G0828-01
18H0189-01
18H1416-01
Sample Results
Class A
Class B
European Union


Selenium in Biosolids 2018
(mg/kg dry)
100
75
50
25
0
18E1022-01
18E1022-02
18E1022-03
18E1022-04
18F0036-01
18F0036-02
18F0299-01
18F0299-02
18F0840-01
18G0828-01
18H0189-01
18H1416-01
Sample Results
Class A
Class B
NOTE: No EU regulatory limit for Selenium


Cadmium in Biosolids 2018
(mg/kg dry)
75
50
25
0
18E1022-01
18E1022-02
18E1022-03
18E1022-04
18F0036-01
18F0036-02
18F0299-01
18F0299-02
18F0840-01
18G0828-01
18H0189-01
18H1416-01
Sample Results
Class A
Class B
European Union


Zinc in Biosolids 2018
(mg/kg dry)
7000
6000
5000
4000
3000
2000
1000
0
18E1022-01
18E1022-02
18E1022-03
18E1022-04
18F0036-01
18F0036-02
18F0299-01
18F0299-02
18F0840-01
18G0828-01
18H0189-01
18H1416-01
Sample Results
Class A
Class B
European Union

Calculated Field Life and Cumulative Pollutant Loading Rates (CPLR)

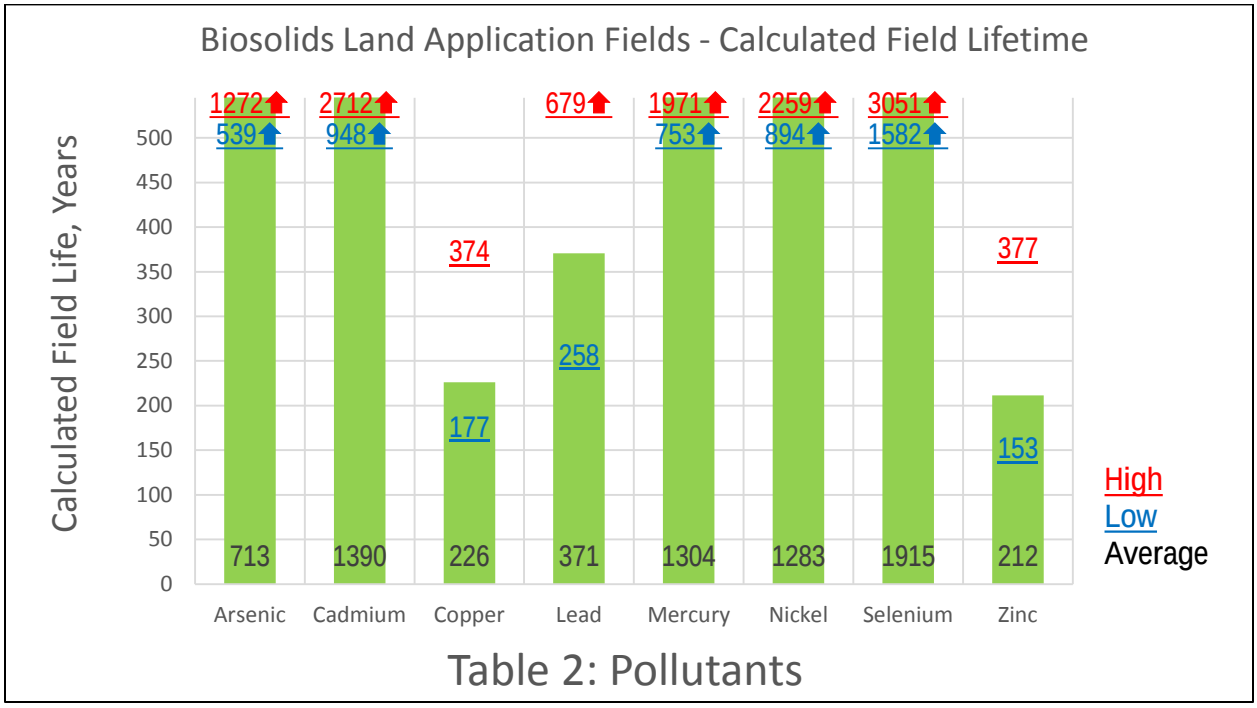
The EPA Biosolids Management Handbook provides a method for calculating the number of years that a location may receive biosolids land application without exceeding the 40 CFR Part 503.13, Table 2: Cumulative Pollutant Loading Rates. The process involves determining the current pollutant loading rates and comparing the projected pollutant loading to the Table 2 limits.

The calculation provides the "Site Life Years" that the field can continue to receive biosolids land applications. It should be noted that "years" refers to application seasons, and often sites will be rested and not land applied every year.

An average value for the eight Table 2 pollutants was calculated for the 10 registered fields that received biosolids in the 2018 land application season and is shown in the graph below. Also included are the lowest and highest values out of the 10 registered fields. The graph only illustrates values up to 500 years, values exceeding 500 years are labeled.

Based on current biosolids land application rates and looking at all of the pollutants over the 10 fields, field SO-4-34A has the shortest projected site life, at 153 years/application seasons, at which point it may reach the threshold for zinc pollutant loading.

It should be noted that the amount of biosolids land applied to any field in any year is also constrained by the agronomic rate of plant available nitrogen (PAN) that can be applied. In 2018, as in years past, the State Water Resources Control Board (SWRCB) has approved a maximum PAN application rate of 200 pounds/acre.



Calculated Field Lifetime: Estimated number of years that each registered field may continue to receive biosolids land applications without exceeding 40 CFR Part 503 Cumulative Pollutant Loading Rates (CPLR). The graph summarizes the average values of all 10 fields which received biosolids in 2018. The pollutant loading projections are averages for all fields applied and indicate the most conservative loading rate to determine number of years of potential field use. High and low value calculations are labeled. By the averages of the pollutants, field SO-4-34A has the shortest projected site life at 153 years and is limited by zinc.

Nitrogen Loading – Plant Available Nitrogen (PAN) Calculation

One of the primary nutrients supplied by biosolids is nitrogen. Nitrogen is also one of the limiting factors in determining application rates, as Solano County Code Chapter 25 requires that biosolid land application rates adhere to the SWRCB agronomic rate requirements of 200 pounds per acre. Agronomic rate generally refers to the nitrogen requirements of a plant needed for optimal growth and production. The agronomic rate provides an upper boundary of biosolids that can be land applied based on location, soil, and crop type.

Over application of nitrogen may lead to excess nitrogen run-off or impacts to surface water or groundwater as nitrate that may cause explosive algae growth in lakes and streams. Ingestion of nitrate in drinking water may also lead to methemoglobinemia, also known as “blue baby syndrome”, where the excess nitrate decreases the ability of blood to carry oxygen – a potentially lethal condition for infants.

Not all the nitrogen within land applied biosolids are available for vegetative uptake. Volatilization is the escape of some of the nitrogen into the air as ammonia. Mineralization is the breakdown of organic nitrogen and carbon-based compounds, like amino acids, by soil microbes into inorganic nitrogen, which is available for vegetative uptake. The US EPA provides a formula which utilizes volatilization and mineralization correction factors to calculate a Plant Available Nitrogen (PAN) value in terms of dry pounds of PAN/acre, or dry tons of PAN/hectare.

For the combination of pasture grasses that are grown on the biosolids land application fields, the SWRCB has historically approved a maximum PAN application rate of 200 lbs./acre, which was similarly approved for 2018. No fields received biosolids more than 200 lbs. PAN/acre during the 2018 season.

Several fields which received biosolids during the 2016 season have residual nitrogen in the ground that is accounted for in the US EPA calculation. These fields have a reduced target PAN application rate to accommodate the prior nitrogen loading.

It should be noted that the Regional Water Quality Control Board (RWQCB) has required quarterly groundwater monitoring on the SO-21 fields since 2005 to assess potential excess nitrogen as nitrate into ground water. The nitrate concentrations in the groundwater have reported consistent levels with no exceedances of the primary Maximum Contaminant Level of 10 parts per million reported. For other fields with no groundwater monitoring, the RWQCB has restricted land application to only those portions of the fields that show at least a 25-foot vertical separation to groundwater.

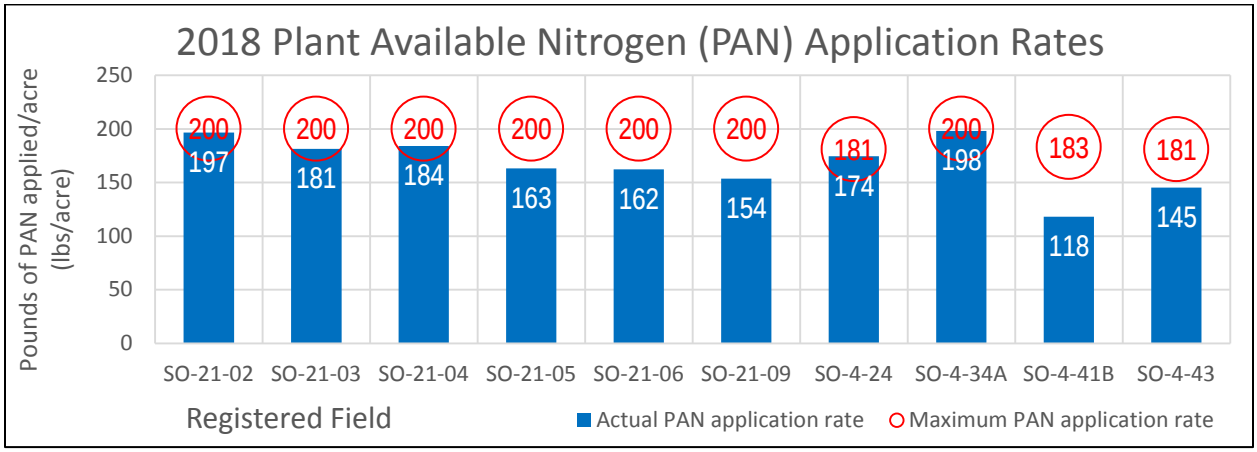


EXHIBIT VI – Protests Received and Complaint Investigations

Protest Process:

Solano County Code Chapter 25 allows residents adjacent to a field proposed for biosolids land spreading the opportunity to protest the land application of biosolids prior to the commencement of land spreading activities. As required by Chapter 25, the biosolids applicator, Synagro, provided notices of biosolids land application to residents adjacent to proposed land application sites at least 14 to a maximum of 45 days prior to beginning land spreading operations.

Public notices stating the intent to land apply biosolids were also published on March 1, 2018 in the Fairfield Daily Republic and in the Vacaville Reporter.

No protests were received for the 2018 land spreading season.

Complaint Investigations:

No complaints were received during the 2018 season regarding the land application of biosolids.

One violation was cited when County staff observed biosolids material on a County road during inspection on July 16, 2018. Upon notice, the material was removed by Synagro on July 17, 2018. No further action was needed and the citation was closed.

The below graph summarized the number of annual complaints regarding the biosolids land application received since 2004.

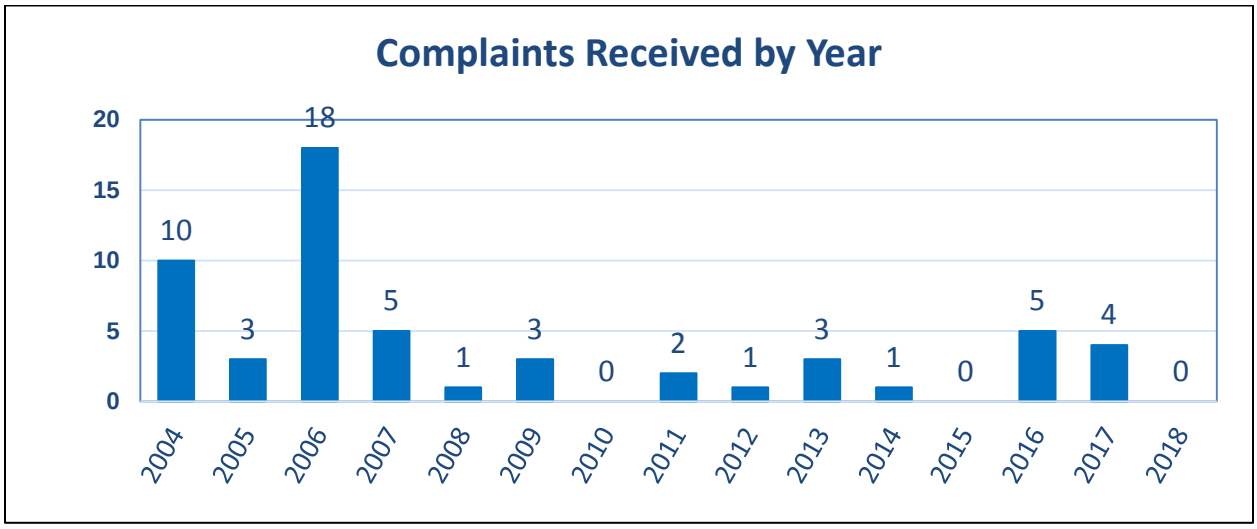


EXHIBIT VII – Biosolids Stakeholder Group Meetings Summary

The Biosolids Stakeholder's Group meeting was held on December 13, 2018. A summary of this meeting is presented below.

Participants in the Stakeholder Group Meeting included: Solano County Environmental Health staff, US EPA Region 9, Synagro, San Francisco PUC, Fairfield-Suisun Sewer District, Lystek, and a County resident.

Staff provided a summary of the 2018 application season including the total tonnages, land applied acres, and percentage breakdown by generator. Staff noted that, as in years past, the San Francisco PUC facilities contributed the majority of biosolids material for land application.

The stakeholders briefly discussed potential impacts of SB 1383: Short Lived Climate Pollutant (SLCP) Reduction Strategy. The request to begin the formal rulemaking process was made by CalRecycle staff on December 12, 2018. County staff expressed concern that the proposed regulation reduces the ability of jurisdictions to enforce ordinances and requirements which are more stringent than the State Waterboard General Order. Staff are preparing official comments regarding the proposed regulatory language of SB 1383, which will be submitted to Calrecycle as part of the formal rule making process.

Several ideas for the next County research project were discussed, including having the County contribute to a research project from the California Association of Sanitation Agencies (CASA) that would evaluate how biosolids can reduced erosion, improved water quality, carbon sequestration, and improved soil health on fire damaged areas. The project is currently searching for a suitable control and remediation area to commence the fire reclamation project, as well as secure additional funding.

Collaboration with UC Merced on a carbon sequestration and soil health research project which is currently in its first phase was also briefly discussed.

The US EPA welcomed feedback from the stakeholders on the electronic reporting system, Central Data Exchange (https://cdx.epa.gov/). Electronic annual reporting via the online system has been required since 2016 for all California facilities generating more than 1 million gallons of wastewater per day or that serve more than 10,000 people.

Synagro stated it has applied to the Central Valley Regional Water Quality Control Board (CV-RWQCB) to add additional registered fields and acreage for land application.

Lystek stated it has experienced growth of requests for its biosolids derived fertilizer product LysteGro.

A resident requested information regarding possible restrictions on organic labeling for animals pastured on biosolids-applied fields. After the meeting, County staff followed up on an inquiry brought forward by the resident in attendance: Per the US National Organic Program guidelines, which have been adopted by the State and the County, animals which are pastured on fields which have received biosolids soil amendments are unable to be labeled as "organic". The resident was referred to the Solano County Ag Department for further discussion of organic labeling requirements for packaged lamb.

EXHIBIT VIII – Biosolids Research Fund Summary

In 2004, the Board of Supervisors established a biosolids scientific research and education fee as of $15 per-acre surcharge charged to biosolids land application permit holder. This provides funding for the Biosolids Education and Research Trust Fund (Research Trust Fund). The Research Trust Fund allows Solano County to fund research studies on the potential effects of biosolids land application in Solano County. The current Biosolids Research Trust Fund allocation available for research is $90,000.

Previous County-funded biosolids research projects include:

- *Evaluation of the Potential Regrowth of Fecal Coliform Bacteria in biosolids between Sewage Treatment Plants and Land Application sites in Solano County* (Department of Resource Management, 2005),

- *Occurrence and Fate of Selected Pharmaceutical and Personal Care Products in Biosolids-Applied Soils in Solano County, California,* (Mississippi State University, 2006),

- *Assessment of the Impacts of Biosolid Application on Water and Soil Quality and Bioavailability of Constituents of Concern*, (University of California, Davis, 2012).

- *Assessment of the Agronomic Effects and Potential Carbon Sequestration Associated with Biosolid Applications on Rangelands in Solano County,* (Blankinship & Associates, Inc., 2017)

County staff are assessing potential collaboration with research projects currently under way. Some of the projects being considered include:

Evaluation of the fire ravaged areas and the use of biosolids soil amendments; through the California Association of Sanitation Agencies (CASA).

Carbon sequestration and soil health project by UC Merced to include an analysis of biosolids applied soil health and microbial communities using targeted quantitative PCR (polymerase chain reaction) techniques.

A County led independent research project on the potential of pathogenic re-growth during biosolids transport is also under consideration.

A Request for Proposal shall be prepared if determined that a collaborative effort on undergoing research is not possible. Initiating and completing an independent research project is projected to encumber most of the funds currently held within the Research Trust Fund.

Exhibit IX: Biosolids Regulatory and Industry Update

Regulatory Update:

California: Senate Bill 1383 – Short-Lived Climate Pollutants

In September 2016, Governor Brown signed into law SB 1383 establishing methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants (SLCP) in various sectors of California's economy. CalRecycle published the proposed SLCP regulations for the formal 45-day comment period on January 18, 2019.

SB 1383 aims to reduce emissions of methane by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030. These reductions are proposed by several mechanisms including reduction of dairy and livestock manure emissions, recovery of edible food from landfill waste stream, and the reduction of organic waste in landfills. Biosolids are included in the definition of organic waste.

US EPA, Office of Inspector General: EPA Audit Controls Over the Land Application of Sewage Sludge

The US EPA Office of Inspector General published audit OPE-FY17-0019, Report No. 19-P-0002, dated November 15, 2018:, addressing if the US EPA has, and has implemented, controls over the land application of sewage sludge that protect human health and the environment.

The report Conclusions include the following statements:

> *"We found that the EPA, depending on the control area, is either not fully implementing its processes, the Clean Water Act and the EPA's Biosolids Rule, or it has control weaknesses. The EPA, through its biennial review of the biosolids regulations, is working to assess the safety of several hundred pollutants found in biosolids but, for the most part, it has not done so. The EPA says it lacks the data and tools necessary to assess the health and environmental risks of many of these pollutants, resulting in the EPA being unable to state whether and at what level the pollutants found in biosolids pose a risk"*
>
> *"Congress directed the EPA to develop and administer the regulations for biosolids. Over time the EPA has reduced the control activities over the biosolids program, including reductions in inspections and training intended to check for regulatory compliance and protect public health and the environment."*

The report contains additional information on the state of the US EPA's controls over biosolids. Summarized takeaways from the audit report include:

> The US EPA has identified 352 pollutants grouped into pharmaceuticals, steroids and hormones, flame retardants, and PFOA/PFAS compounds which require additional data and/or risk assessment analysis to determine if they pose adverse human health or environmental degradation concerns. Although the EPA requires additional information to complete these risk assessments, existing regulations are silent on how the EPA will obtain the additional data.
>
> In 2013 the EPA consolidated oversight of biosolids compliance monitoring and enforcement into the Biosolids Center of Excellence. Approximately 2,700 major wastewater treatment facilities submit online annual biosolids reports which are reviewed at the Center of Excellence for compliance with the federal biosolids program and potential enforcement. At the time of the audit, there were two US EPA staff assigned to the biosolids program.

The US EPA response to the audit report states that some of the methodology of the audit

process was disappointing and that the science behind some of the conclusions was biased and taken out of context. Additionally, the US EPA states that the report does not make clear that pollution in biosolids does not necessarily mean those pollutants pose a risk to public health and the environment.

The report notes that the US EPA has provided acceptable corrective actions and recommendations for eight of the 13 recommendations, with five of the recommendations remain unresolved.

Industry Update:

Canadian based Lystek International Inc. ("Lystek") continues to operate its Organic Material Recovery Center at the Fairfield Suisun Sewer District location on Chadbourne Road. The Public-Private Partnership began operations onsite in 2016.

In 2018, Lystek used 100% of the biosolids output of the FSSD wastewater treatment plant, approximately 18,300 wet tons and imported an additional 14,900 wet tons from other agencies as feed stock for their patented biosolids-to-fertilizer process. Lystek produces LysteGro, which is an injectable biosolids derived fertilizer product with 5-12% solids content and known minimum nitrogen, phosphorus, and potassium (N-P-K) values.

Although derived from biosolids feedstock, LysteGro is registered with the California Department of Food and Agriculture–Fertilizer Materials Inspection Program (CDFA-FMIP) and considered a fertilizer product. Like other land applied fertilizer products within the County, LysteGro is under jurisdiction of the Solano County Agriculture Department. The Agricultural Department reported that it did not receive any complaints regarding Lystek operations in 2018.

Lystek stated that they experienced a 22% increase of applied acreage and an approximately 3.5% increase of fertilizer product land applied within the County, which corresponds to roughly 4,625 calculated dry tons of LysteGro fertilizer land applied in 2018.

Note: These are self-reported numbers which were provided by Lystek and FSSD as a courtesy for this annual report. Resource Management has no mechanism to track the provided data.

Further information on Lystek can be found at: www.lystek.com

EXHIBIT X: Summary of the Annual Bay Area Clean Water Agencies (BACWA) Report to the Solano County Board of Supervisors – Land Application of Biosolids in Solano County

BACWA is a joint powers agency providing technical expertise and financial support from a Public Utilities perspective. The BACWA Principal agencies are East Bay Municipal Utilities District, East Bay Dischargers Association, San Francisco Public Utilities Commission, Central Contra Costa Sanitary District and the City of San Jose. BACWA's charter members are the five largest wastewater treatment agencies in the San Francisco Bay Area. The BACWA Executive Board is comprised of one member from each of the five founding Public Utilities.

The BACWA Annual Report to the Solano County Board of Supervisors Land Application of Biosolids in Solano County report, dated December 2018 summarizes the land application of biosolids conducted in 2018. The Report also provided an update on agency efforts toward other options for beneficial reuse of biosolids including exploring technologies for extracting energy and nutrients from the biosolids material. BACWA has prepared a separate report, 2016 Biosolids Trends Survey that includes detailed cost analysis comparing landfill disposal, landfill alternative daily cover and land application. Land application and the beneficial use as alternative daily cover are predominant use of Biosolid material in California. BACWA indicates that in the Bay Area Region biosolids primary uses include; landfill, beneficial use, land application, and incineration.

BACWA continues to explore emerging issues including climate change mitigation. For example, Senate Bill 1383, adopted September 2016 reduces the amount of organics going to landfill. Production of Class A biosolids and the use of energy driven technologies such as biogas production are continually being explored. Alternatives for the use of biosolids are becoming more critical as the ability to dispose of the product as a waste in landfills is not deemed a long-term environmentally effective solution due to air emission standards and residual organics.

The Bay Area Biosolids Coalition, formerly known as The Bay Area Biosolids to Energy Coalition is focusing on Green House Gas Reductions and the impact for biosolids disposal at Sanitary Landfills in California. The Bay Area Biosolids Coalition consists of fifteen member agencies: City of Millbrae, City of Palo Alto, City of Santa Rosa, Central Marin Sanitation Agency, Delta Diablo, Dublin San Ramon Services District, East Bay Municipal Utility District, Fairfield-Suisun Sewer District, Ironhouse Sanitary District, North San Mateo County Sanitation District, San Francisco Public Utilities Commission, Sausalito-Marin City Sanitary District, Union Sanitary District, Vallejo Food and Wastewater District, and West County Wastewater District. Individual agency reporting is included as part of the 2018 BACWA report. Additional information is available at www.bayareabiosolids.com; www.bacwa.org