SOLANO COUNTY

2023 ANNUAL BIOSOLIDS LAND APPLICATION REPORT

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EXECUTIVE SUMMARY

The Solano County Department of Resource Management provides this annual summary report for the 2023 Biosolids Land Application season (April 17th through October 13th 2023), as required by Chapter 25 of the Solano County Code.

Attachment A includes the 2023 Bay Area Clean Water Agency (BACWA) Report summarizing the biosolids generators' operations for the year.

Recommendations:

The Department of Resource Management recommends the Board of Supervisors accept the 2023 Annual Biosolids Land Application Report. Solano County Code (SCC) Chapter 25 continues to be protective of public health and the environment by regulating land application of Class A and Class B biosolids.

Acres, Tonnages, and Sources:

During the 2023 biosolids land application season, 495 acres of pasture and rangelands in Solano County received 2,613 calculated dry tons of Class B biosolids as a soil amendment. Land application commenced on June 6 and concluded on September 18, 2023.

The permitted land applicator, Synagro West LLC, encountered two issues which reduced the tonnages and applied acres for this season. The rain that uncharacteristically occurred in late March and early April, which was then followed by a period of temperate temperatures and no precipitation, promoted the growth of forage within several Registered Fields which were scheduled for biosolids land application. The farm and ranch owners were able to take advantage of the abundant forage and run their livestock through the new growth. The presence of livestock on the Registered Fields prevented biosolids land application, per State and County regulations, which pushed back the first land application from the approved opening day of April 17 to June 6, 2023. The land applicator also was informed during the season that several of the Registered Fields had been purchased by Flannery Associates. While Flannery Associates had previously allowed for the continued land application of biosolids at one set of Registered Fields, they did not grant consent to continue land application on these newly acquired properties. This greatly reduced the land application acreage available in 2023, and Environmental Health staff have been informed by Synagro West LLC that they do not intend to land-apply biosolids in Solano County in 2024.

Exhibit II and III describe the location, timeline, and tonnages of biosolids land applied in 2023. Exhibit IV illustrates the percentage of biosolids supplied by the 10 regional generators that contributed biosolids material for the 2023 season.

Prior to bulk application of biosolids compost, Chapter 25 requires applicators notify the Environmental Health Division. During the 2023 season, no notices of bulk application of biosolid compost were received by the Environmental Health Division.

Staffing:

During the 2023 biosolids land application season, staff conducted field inspections at the land application sites and collected four samples for lab analysis. Staff oversight actions 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. Staff reviewed notifications and required reporting prior to and during the land application work.

Monitoring and Reporting:

Prior to approving the receipt of biosolids from a generator source, biosolids samples must be analyzed for pollutant concentrations and compared to the US EPA Part 503 acceptance criteria. Through the 2023 land application season, Solano County staff collected four field samples for pollutant analysis. All sample data received prior to and during the 2023 season were within the Class B pollutant thresholds for biosolids 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 2023 is presented in Exhibit V.

During field application, weather station data from the applicator is reviewed by staff. Precipitation is 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 any 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 2023 biosolids land application season.

Two complaints were received during the land application season regarding odors. Both complaints were determined to stem from Lystek fertilizer applications. No received odor complaint was attributed to the permitted Synagro land application operations within the 2023 season. Once notified, Lystek has stated it will investigate odor complaints within 24 hours.

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

Biosolids Stakeholder Group Meetings:

The Biosolids Stakeholder Group met on February 15, 2024. The meeting was held in a hybrid format – the in-person meeting was also broadcast virtually via the Microsoft Teams application. A summary of the meeting discussions is presented in Exhibit VIII.

Solano County Research Study:

County staff put out a Request for Proposal (RFP) on July 13, 2023, soliciting bids to perform a research project to study the fate and transport of per- and polyfluoroalkyl (“PFAS”) chemicals associated with biosolids land applications. Four proposals from qualified research teams were evaluated during July and August, and the winning research team was selected in October. A contract with the Trihydro Corporation for an amount not to exceed $99,948 was approved on the October 24, 2023 Consent Calendar by the Board of Supervisors. Staff anticipate beginning site evaluation and biosolids sample collection in 2024.

Regulatory and Industry Update:

Exhibit X provides an update for regulatory and industry changes that may impact the science, oversight, technology, and/or business of biosolids.

Information is provided on some of the US EPA website and technology updates, research into emerging contaminants of concern, and continued investigation into potentially new pollutants and emerging constituents of concern.

A narrative is provided on SB 1383 – the California's Short-Lived Climate Pollutant Reduction Strategy, which was signed into law in 2016. Among many other things, SB 1383 requires a reduction in the landfilling of biosolids material, even as alternative daily cover. This has forced many wastewater treatment plants to explore options for beneficial reuse of biosolids and created opportunities for companies that can divert biosolids from landfill.

Short descriptions and updates are also provided for companies operating within the biosolids management industry in Solano County.

The Department is currently studying the level of oversight that should be applied for new companies that take biosolids material and perform additional processes on the material to either extract energy or use the biosolids feedstock as part of a fertilizer soil amendment. Aries Clean Technologies is no longer pursuing a processing facility within the boundaries of Fairfield-Suisun Sewer District Publicly Owned Treatment Works. The Department anticipates additional inquiries into the use of biosolids within Solano County as California moves forward in implementing SB 1383 as part of its Short-Lived Climate Pollutant Reduction Strategy.

Bay Area Clean Water Agencies 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 2023 is included in Attachment B.

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

Biosolids are the solid fraction of sewage sludge that undergoes treatment to reduce pathogens and reduce vector attraction factors. Various treatment methods are utilized by the Publicly Owned Treatment Works (POTW) to ensure the treated biosolids meet specifications for category and use. The pathogen reduction and vector attraction reduction methods must meet regulatory standards to beneficially reuse biosolids as a soil amendment. Biosolids are regulated by federal, State, and county agencies, each providing requirements and oversight for the generation, sampling, management, and land application of biosolids.

Biosolids are typically between 15-25% solids by weight, with the remaining weight being comprised of water. The tracking and reporting of land applied biosolids, nitrogen content, and pollutants is performed on a "dry weight" basis with the water content calculated out.

In 1993, the US EPA promulgated "Standards for the Use or Disposal of Sewage Sludge" (Code of Federal Regulations Title 40, Part 503 – "Part 503") which regulates biosolids generation and establishes ceiling and lifetime pollutant accumulation concentrations in soils receiving biosolids, as well as pathogen and vector attraction reduction standards for the biosolids material. Part 503 also specifies the sampling frequency, methodology, and provides methods for calculating plant available nitrogen application (PAN), lifetime pollutant loading, and reporting requirements.

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.[1] Chapter 25 builds upon both federal and State requirements through a County-specific inspection and oversight program. The need to implement the program was established with concerns over application rates of the biosolids material in conjunction with rain events and the potential for stormwater runoff and potential for pollution to waters of the State. Chapter 25 restricts when and where biosolids may be applied to minimize offsite impacts by allowing applications only during the dry season (April 15th through October 15th), and prohibiting the land application of biosolids during wet weather and during high wind events. The County's program also encourages public participation through notifications and the holding of stakeholder's meetings and establishes a funding mechanism to perform research on the composition and effects of land applied biosolids. In July of 2004, the California State Water Resources Control Board (SWRCB) began to regulate the land application of biosolids under Water Quality General Order No. 2004-0012-DWQ[2]. The General Order places restrictions on land application in sensitive habitats, including the Suisun Marsh, specifies time restrictions between biosolids land application and various crop harvest or livestock grazing activities, minimum setback distances between staging and land application sites and sensitive receptors including water bodies, water wells, and public roads, and established a field registration process.

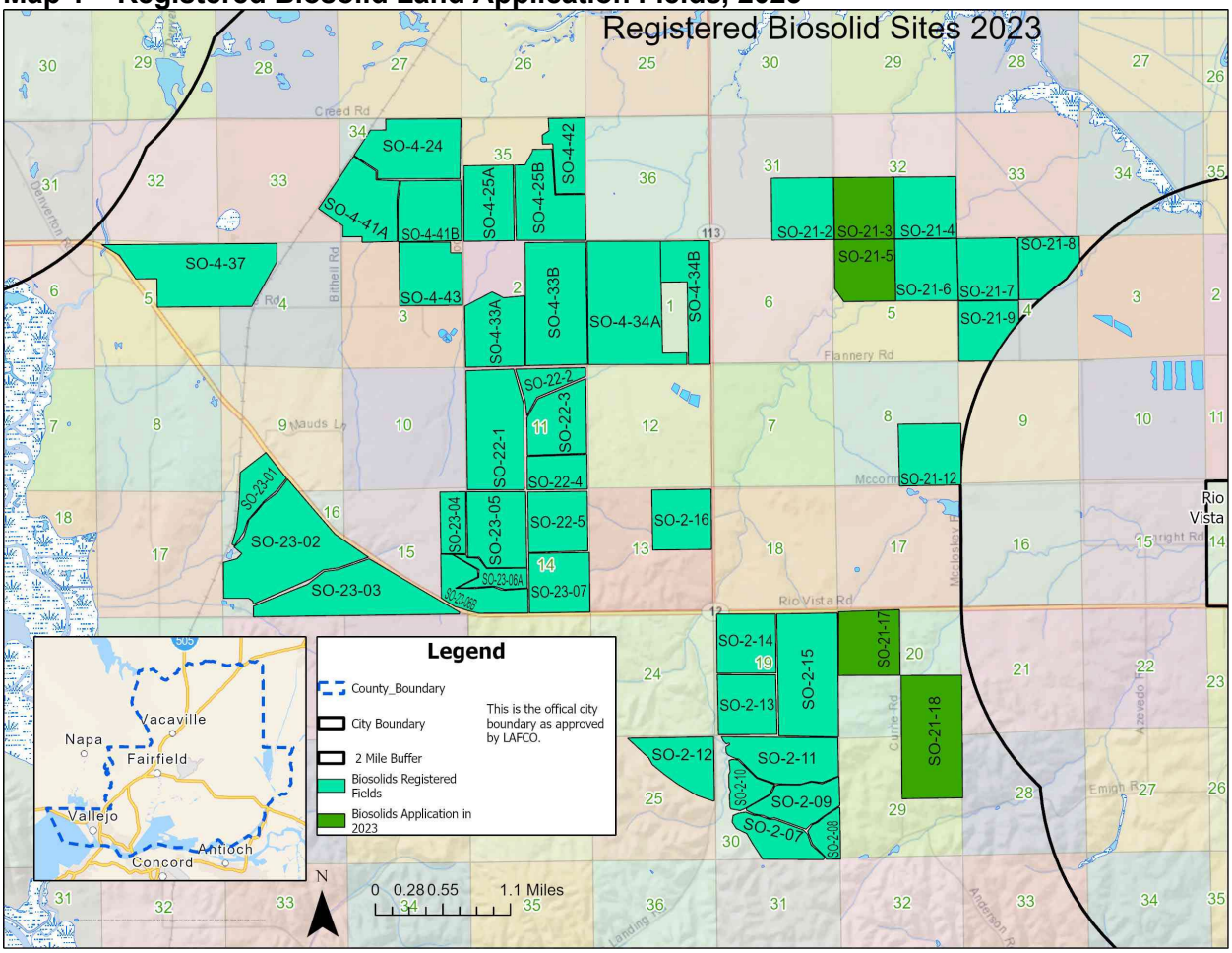
While oversight began in 1995, Solano County Code Ch. 25 has undergone numerous revisions and amendments in response to community and resident concerns, as well as evolving federal and State requirements. The ordinance was last amended in 2012 and currently incorporates the restrictions found in the State General Order.

[1] Solano County Code Chapter 25, Article IV: *Domestic Septage Land Application and Biosolids Land Application*.

[2] State Water Resources Control Board (SWRCB) 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*

EXHIBIT II – Registered Biosolids Land Application Sites in Solano County

Map 1 – Registered Biosolid Land Application Fields, 2023



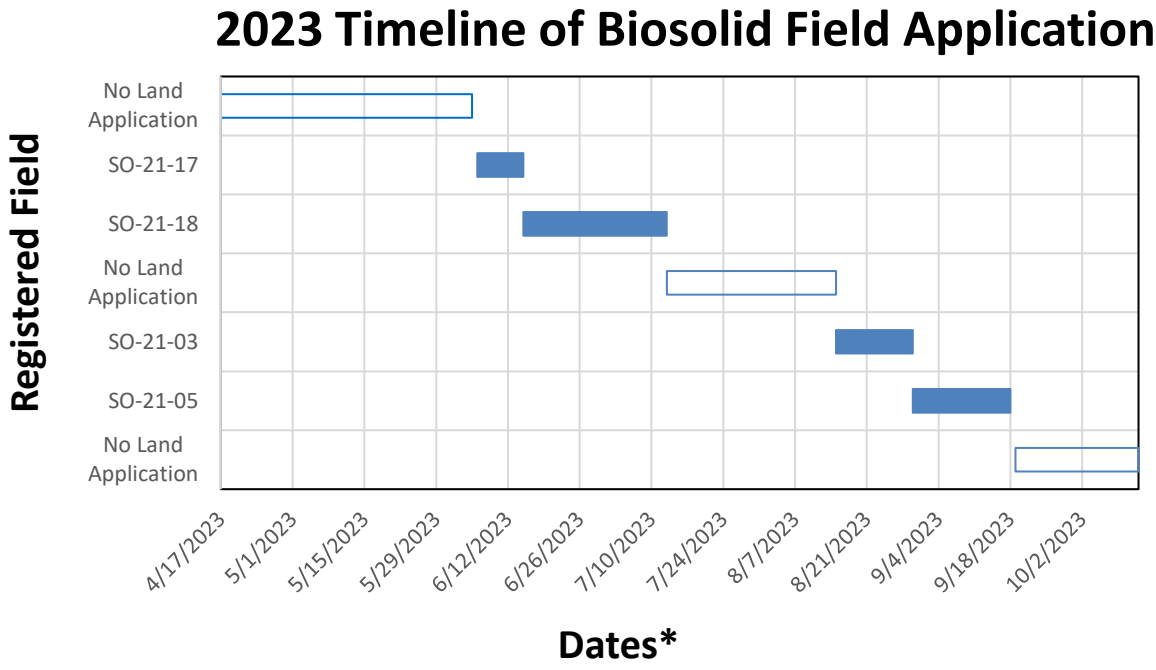
Ranch Name and ID	Corresponding Registered Fields	Total Net Acreage
Hamilton Farms (SO-2)	SO-2-7, -8, -9, -10, -11, -12, -13, -14, -15, -16	1,213
Emigh Ltd Ranch (SO-4)	SO-4-24, -25A+B, -33A+B, -34A+B, -37, -41A+B, -42, -43	1,951.19
McCormack Ranch (SO-21)	SO-21-2, -3, -4, -5, -6, -7, -8, -9, -12, -17, -18	1,439
Emigh Souza Ranch (SO-22)	SO-22-1, -2, -3, -4, -5	685
Mayhood Ranch (SO-23)	SO-23-1, -2, -3, -4, -5, -6A+B, -7	949.6
Total Net Acres Registered for Biosolids Applications		**6,237.79**

The above map illustrates the 6,237.79 net acres of biosolids registered fields in Solano County for the 2023 season. Property line, water well, creek, residence and other setbacks reduce the gross acreage to the net acreage values presented. The required 2-mile setback distance from City limits is also shown. Not all registered fields are land applied in any one year.

Fields which received biosolids land application in 2023 are in a darker green, fields which are Registered, but that did not receive land application this year, are in a lighter aqua color.

While still considered Registered Fields, Solano County was informed by the land applicator that Flannery and Associates did not grant consent for biosolids land application in the 2023 season

on several properties that they recently acquired.



**The chart has been simplified to present continuous dates of biosolids land application, however, land application is not permitted during weekends, County holidays, or during precipitation events.*

While the 2023 Land Application season ran from 4/17/2023 to 10/13/2023, land application only occurred during the specified time periods. Operational issues restricted land application during the 2023 season.

Registered Fields that received biosolids land application in 2023 included:

SO-21-03, -05, -17, and -18.

The timeline of applied field locations is presented in the above chart. As noted in the chart, the dates are presented in a continuous fashion to allow for easier presentation, however biosolids land application is not permitted during weekends, County holidays, or during precipitation events, per Solano County Code Ch. 25.

The applicator is required to provide a 24-hour advanced notification when changing fields.

While the 2023 Land Application season ran from 4/17/2023 to 10/13/2023, land application only occurred during the specified time periods. Previously mentioned operational issues restricted land application during the 2023 season.

EXHIBIT III – Tonnages and Acreages of Land Application, 2023

In 2023, a total of 495 acres of farmland received 2,613 calculated dry tons of Class B biosolids as soil amendments.

Compared to the 2022 season, there were decreases in tonnages and applied acres:

- -67% (5,261 tons) decrease in tonnages when compared to 2022.
- -66% (961 acres) decrease in applied acres when compared to 2022.

The last five years of land application averaged 7,109 calculated dry tons per year.

The below graph illustrates the historical and current annual tonnages of biosolids land applied from 2002-2023. The most biosolids applied in a single year was in 2002 (18,697 dry tons).

The recorded tonnages and acres applied in 2023 are the lowest values since the tracking of the land application material was started in 2002.

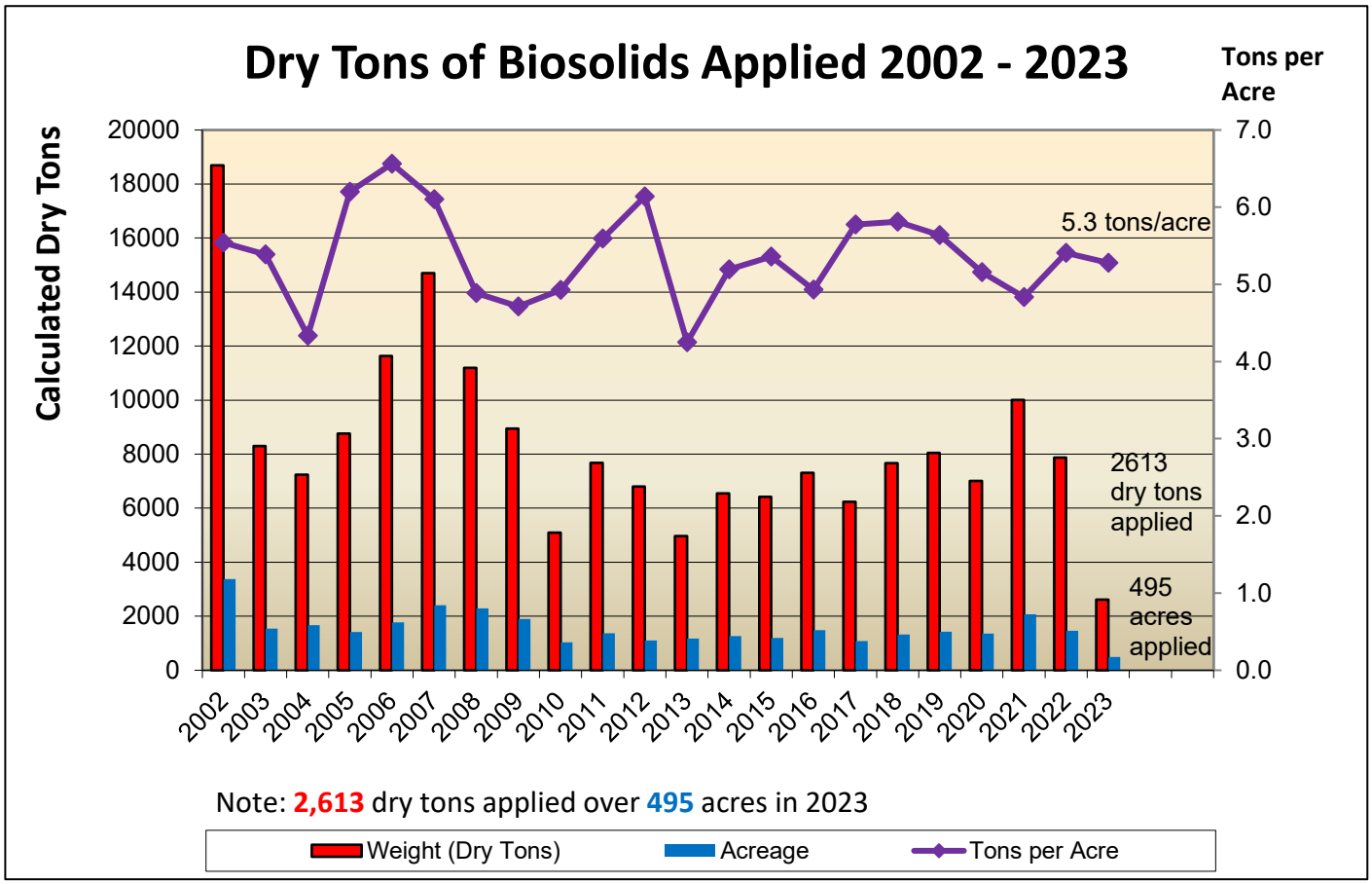


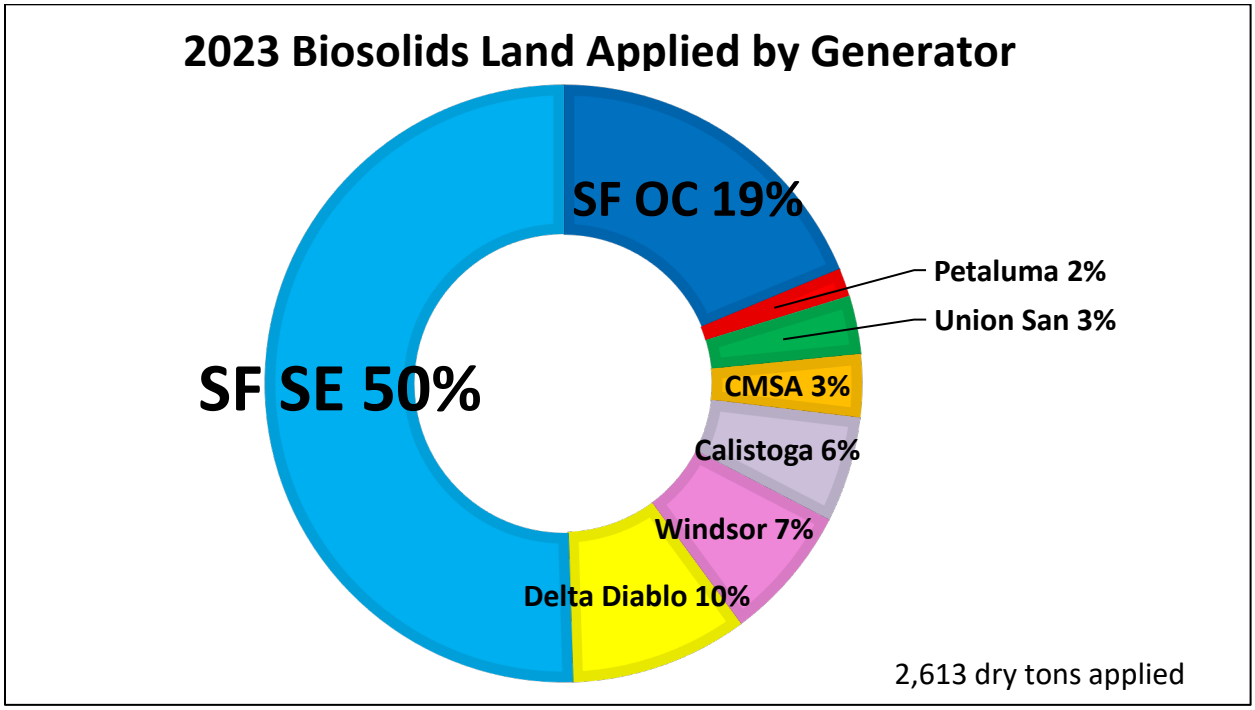
EXHIBIT IV – Generators and Percent of Biosolids Land Applied in 2023

In 2023, eight generators provided 2,613 calculated dry tons of biosolids for land application in Solano County.

The generators that provided biosolids for land application in 2023 included:

> City of Calistoga, Central Marin Sanitation District, Delta Diablo, San Francisco Public Utilities Commission (Southeast Water Pollution Control Plant and Oceanside Water Pollution Control Plant), City of Petaluma, 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 69% (1,809 calculated dry tons) of the total biosolids land applied during the 2023 season. The below graph illustrates the percentage of biosolids provided by each generator.



Key:

SF SE	= San Francisco Public Utilities Commission – Southeast Treatment Plant
SF OC	= San Francisco Public Utilities Commission – Oceanside Water Pollution Control Plant
Petaluma	= City of Petaluma – Ellis Creek Water Recycling Facility
Union San	= Union City – Union Sanitary District
CMSA	= Central Marin Sanitation District
Calistoga	= City of Calistoga – Dunaweal Wastewater Treatment Plant
Windsor	= Town of Windsor Water Reclamation Plant
Delta Diablo	= Delta Diablo Wastewater Treatment Plant

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. Part 503 provides a regulatory framework for the land application of biosolids, including concentration limits of nine heavy metals ("pollutants"). Solano County Code Chapter 25 adopted by reference Title 40 CFR, Part 503 as part of its biosolids regulations.

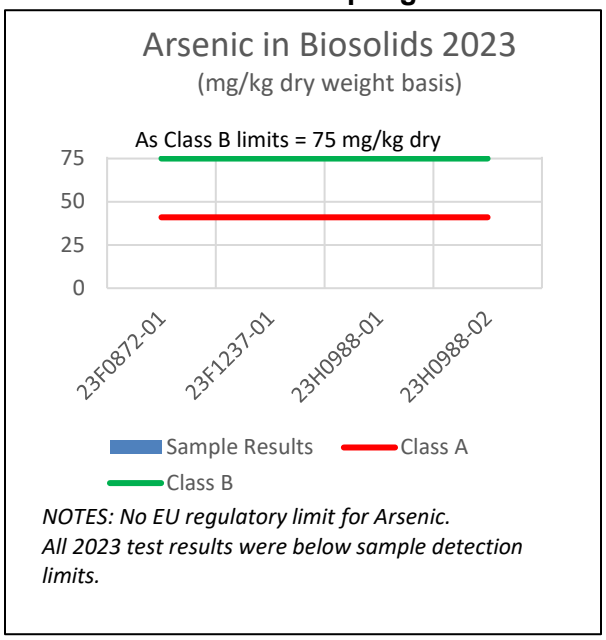
As specified under Part 503, prior to biosolids land application, the biosolids generator must provide documentation of Notice and Necessary Information (NANI) that demonstrates the Class B biosolid materials proposed for land application meet standards for pollutant concentrations, class and method 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 Part 503 rule was amended in 1994 – pollutant limits for molybdenum in biosolids applied to land were deleted, but the molybdenum ceiling limit was retained. The US EPA eliminated Chromium concentration limits for biosolids in 1995 as the risk of concentrated hexavalent chromium in biosolids was found to be negligible.

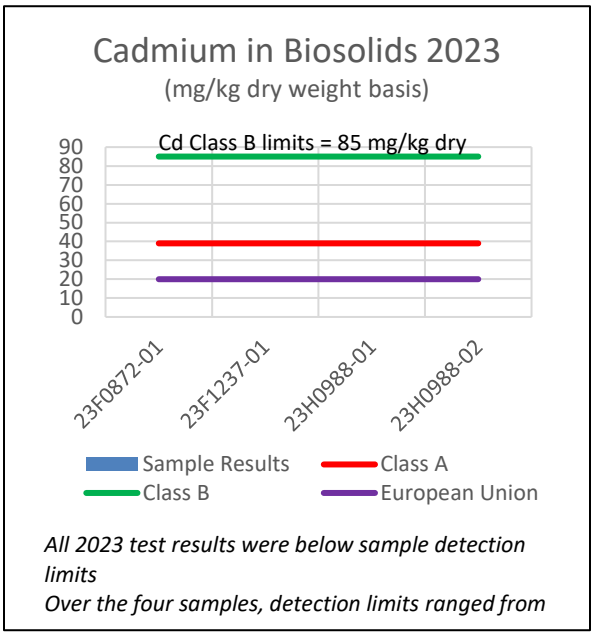
Solano County only permits the application of biosolids from generators that provide NANI reports confirming the pollutant concentrations are below the Part 503 Class B limits. Prior to land application, all generators for the 2023 season submitted NANI reports that showed pollutant concentrations under all Class B 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, or Selenium. While European Council Directive 86/278/EEC was passed in 1986, many EU member states have since passed stricter and more encompassing pollutant threshold restrictions.
In addition to the sampling performed by the generators as part of the application process, County staff collected eight field samples during the 2022 season. All samples were reported below Part 503 Class A and Class B biosolids threshold limits for pollutants.

2023 Biosolids Field Sampling Pollutant Analyses:

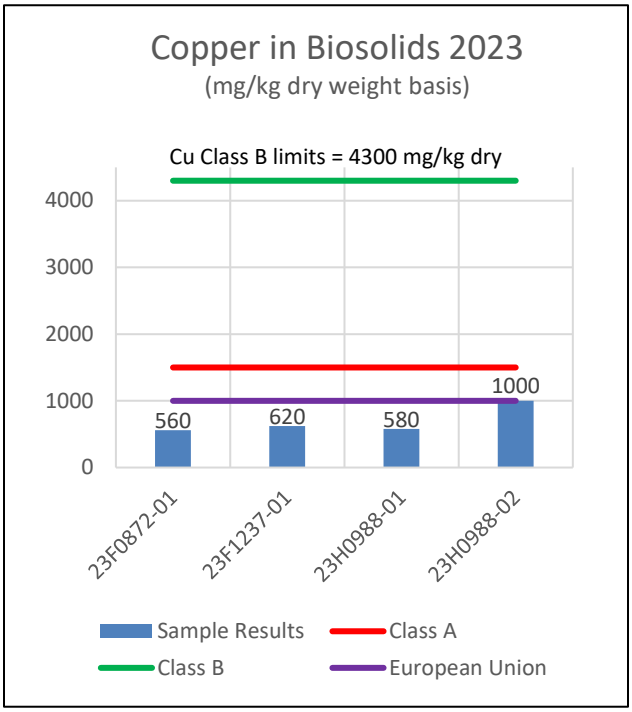


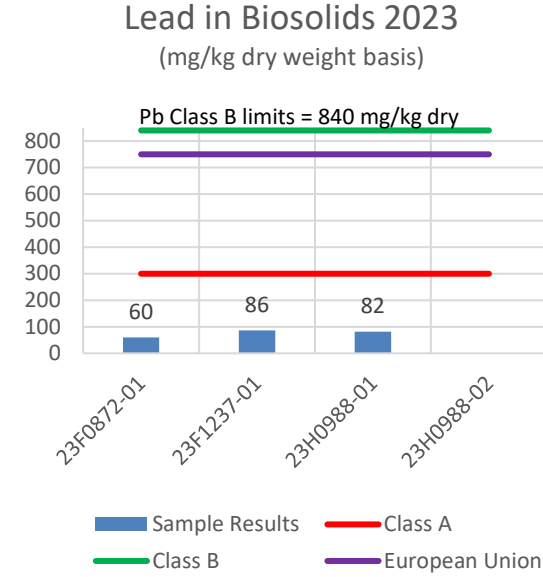
NOTES: No EU regulatory limit for Arsenic.
All 2023 test results were below sample detection limits.



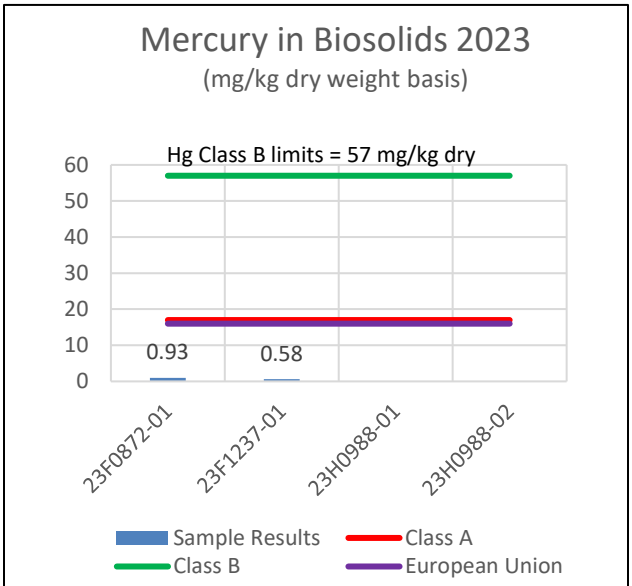
All 2023 test results were below sample detection limits
Over the four samples, detection limits ranged from

2023 Pollutant Analyses, continued:

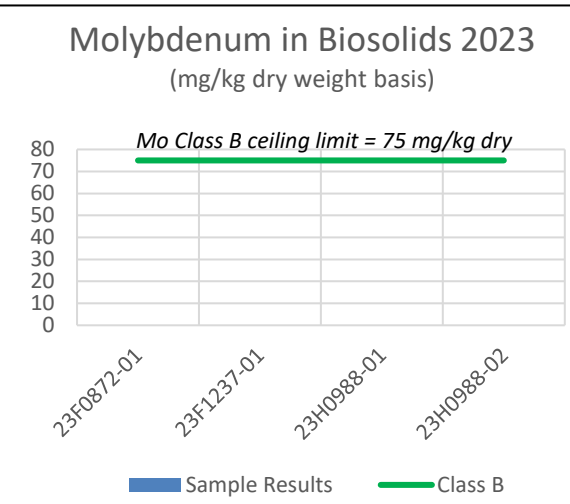




One 2023 test result was below the sample detection limit of 29 mg/kg.

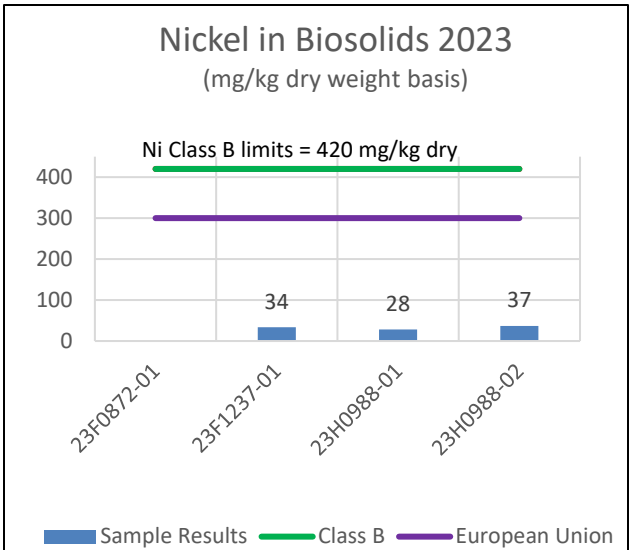


Two 2023 sample result were below sample detection limits. Over the two samples, detection limits ranged from 5.0 to 5.7 mg/kg, with an average of 5.3 mg/kg

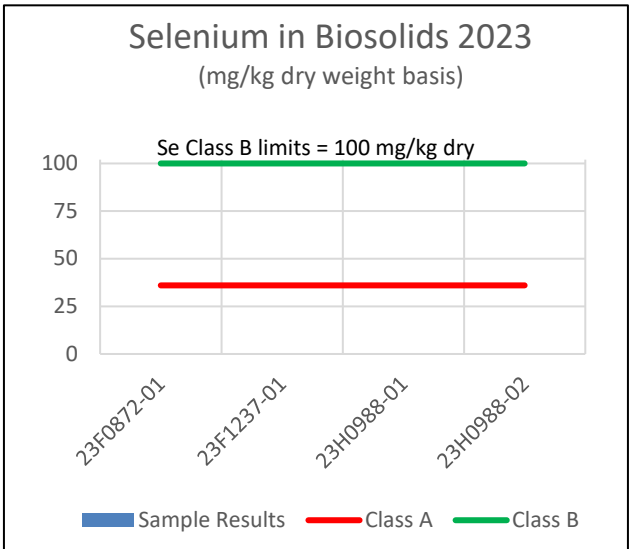


NOTES: No EU regulatory limit for Molybdenum. Under Part 503, Mo has a ceiling concentration only. All 2023 sample results were below detection limits.
Over the four samples, detection limits ranged from 25 to 29 mg/kg, with an average of 28 mg/kg

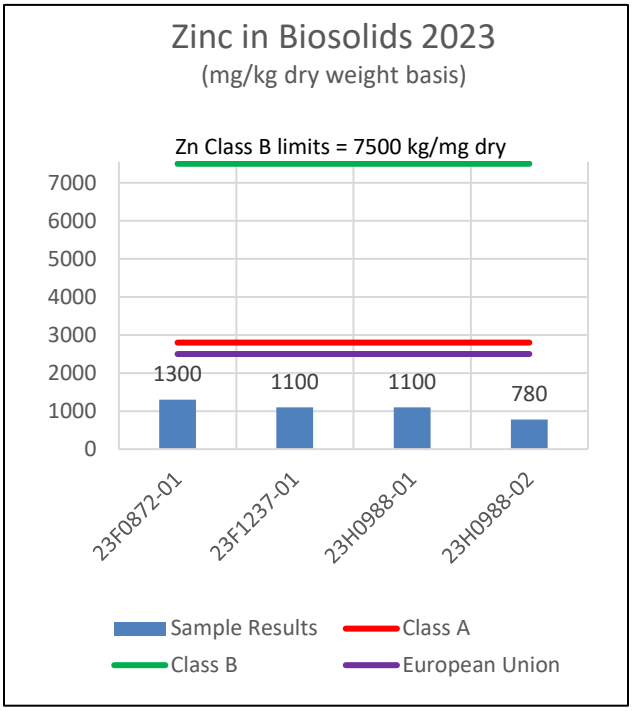
2023 Pollutant Analyses, continued:



NOTE: Class A and B limits are the same for Nickel. One sample result was below detection limits. The detection limit for that sample was 28 mg/kg.



NOTE: No EU regulatory limit for Selenium
All 2023 test results were below sample detection limits. Over the four samples, detection limits ranged from 13 to 14 mg/kg, with an average of 14 mg/kg



Calculated Field Life and Cumulative Pollutant Loading Rates (CPLR)

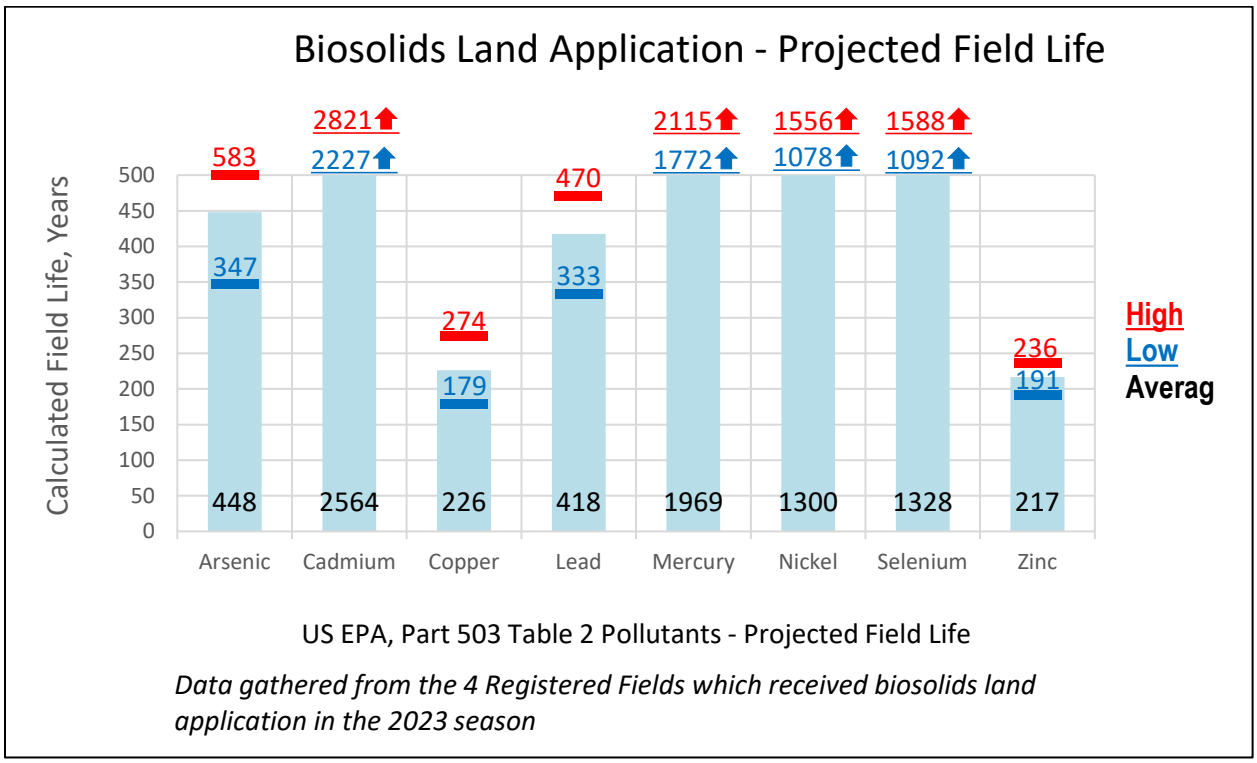
The EPA Biosolids Management Handbook provides a method for calculating the number of years that a location may receive biosolids land application without exceeding the federal limits for pollutants (40 CFR Part 503.13, Table 2: Cumulative Pollutant Loading Rates). The process involves determining the current pollutant loadings, pollutant loading rates, and projecting those calculations forward against the federal limits.

The calculation provides the "Site Life", in 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 fallowed and not land applied every year.

An average value for the eight Table 2 pollutants was calculated for the four registered fields that received biosolids in the 2023 land application season and is shown in the graph below. Also included are the lowest and highest values out of the four registered fields. The graph only illustrates values up to 500 years, values exceeding 500 years are labeled.

Based on current pollutant loads, the 2023 biosolids land application rates, and looking at all of the pollutant loading over the four fields, field SO-21-03 has the shortest projected site life, at 179 years ("application periods"), at which point it may reach the pollutant loading threshold for copper.

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 PAN that can be applied. In 2023, as in years past, the Central Valley Waterboard has approved a maximum PAN application rate of 200 pounds/acre.



2023 Projected Field Site Life: Estimated number of years that each registered field may continue to receive biosolid land applications without exceeding federal (Part 503) Cumulative Pollutant Loading Rates (CPLR). The graph summarizes the average values of all four fields which received biosolids in 2023.

The pollutant loading projections are averages for all fields applied and indicate projected number of years that the fields can continue to be used. High and low value calculations are labeled.

Field SO-21-03 has the shortest projected site life at 179 years and is limited by copper.

Nitrogen Loading – Plant Available Nitrogen (PAN) application rates

One of the primary nutrients supplied by biosolids is nitrogen. Nitrogen is also one of the limiting factors in determining land application rates, as Solano County Code Chapter 25 requires that biosolid land application rates adhere to the SWRCB agronomic rate requirements. Agronomic rate generally refers to the nitrogen requirements of a plant 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.

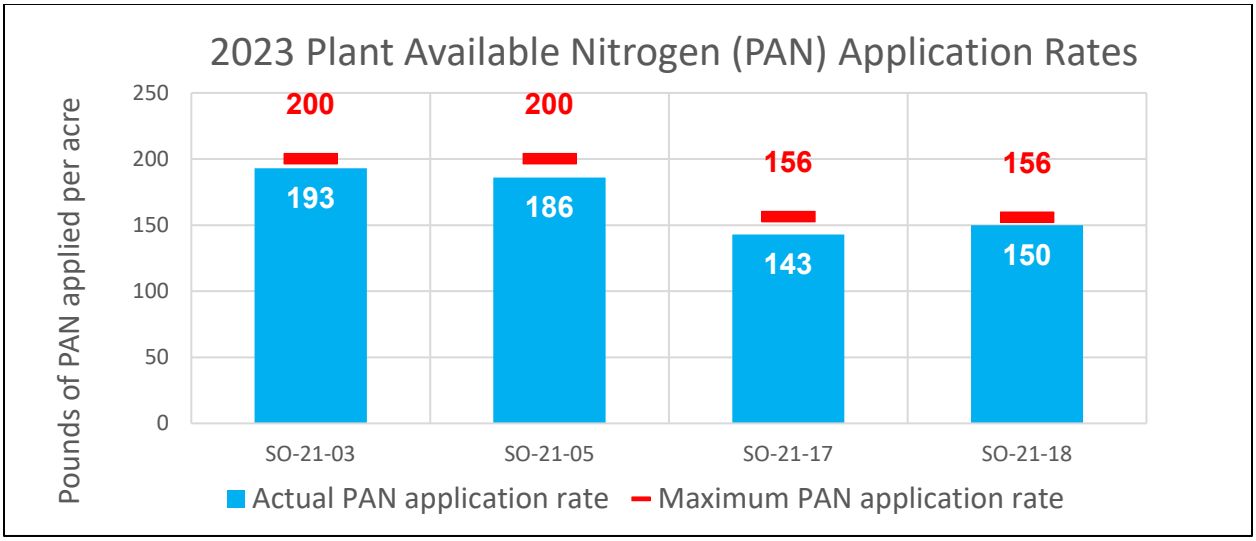
Overapplication of nitrogen may lead to excess nitrogen run-off and explosive algae growth in lakes and streams, impacting surface and/or ground water. Ingestion of nitrate in drinking water may also lead to methemoglobinemia, also known as “blue baby syndrome”, where the excess nitrate decreases the ability of blood to carry oxygen – a potentially serious condition for pregnant or nursing women and 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 by soil microbes of organic nitrogen, amino acids, and other carbon-based compounds 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 PAN value in terms of dry pounds of PAN/acre, or dry kilograms 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 2023.

Several fields which received biosolids during prior seasons have residual nitrogen in the ground that is accounted for in methodology set forth by the US EPA. These fields have a reduced target PAN application rate to factor in the residual nitrogen loading still present.

Note 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.



The maximum Plant Available Nitrogen (PAN) values for each Registered Field are shown in red, in pounds of PAN/acre. The actual calculated amount of PAN applied is shown in the blue.

EXHIBIT VI – 2023 Application Period Operational Summary

This is a brief summary of operational and reporting issues encountered during the 2023 application period. Complaints are described in Exhibit VII.

April 2023: Prior to the beginning of the land application season, Synagro informed the County that due to the uncharacteristic late rains in March and early April, several of the Registered Fields that were planned for biosolids land application had forage growth on them. The area farmers wanted to take advantage of this late forage for their livestock and did not want to have land application begin on these fields until later in the year.

Synagro also relayed to County staff that several of the Registered Fields had been purchased by Flannery Associates and that these fields would no longer be available as Flannery and Associates were unwilling to provide authorization for continued biosolids land applications.
Due to the anticipated later start to the season, the notices to area residents informing them of the commencement of biosolids land application operations were sent later than in previous years to ensure that they were delivered within the appropriate time frame.

June 5, 2023: Biosolids land application operations begin.

July 13, 2023: Biosolids land applications paused.

August 2023: A series of complaints were received from the Walnut Grove area of the County, on the eastern bank of the Sacramento River. Due to the relative locations of the Lystek and Synagro application sites, this was identified as a Lystek operation. Lystek was contacted to investigate the matter, and the complainant was provided contact information to the Sacramento Metro Air Quality Management District (SM-AQMD) and Lystek International.

August 15, 2023: Biosolids land application operations resume.

September 18, 2023: Biosolids land application operations conclude for the season.

January 2024: Synagro informed the County that further biosolids land application operations were not planned for the 2024 season due to Flannery Associates decision to not allow further biosolids land application on any of its newly acquired properties and farmers desire to not encounter operational or legal issues with Flannery Associates.

Flannery Associates was unveiled to be a subsidiary of California Forever on their website on August 22, 2023. California Forever's website indicates that it has purchased around 55,000 acres of land within Solano County, with the intent of building a new community in proximity of the Highway 113 and 12 intersection. They have submitted a ballot measure for the 2024 election seeking Solano County voter approval of their plan, with the anticipation that future biosollids contracts in these areas will cease during this process.

EXHIBIT VII – 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 31, 2023 in the Fairfield Daily Republic and on March 30, 2023 the Vacaville Reporter.

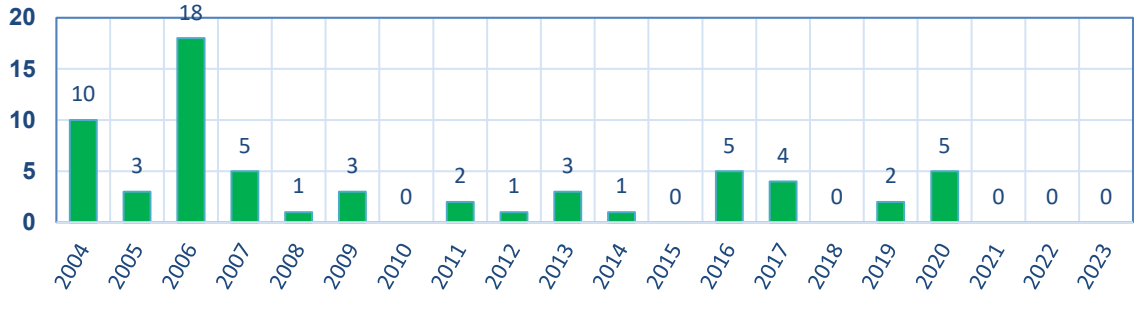
No protests were received for the 2023 land spreading season.

Complaint Investigations:

Note: The below complaints were determined to originate from Lystek subsurface injection activities of their biosolids derived fertilizer product. No odor complaints received were determined to originate from permitted biosolids land application operations.

8/17/2022 – 8/23/2022:
A series of complaints were received from the Walnut Grove area of Solano County, east of the Sacramento River. Due to the relative locations of the Lystek and Synagro application sites, this was identified as a Lystek operation. Lystek was contacted to investigate the matter, and the complainant was provided contact information to the Sacramento Metro Air Quality Management District (SM-AQMD) and Lystek International.

The below graph summarized the number of annual complaints regarding biosolids land application received since 2004. The complaints received during the 2023 season which were determined to not originate from permitted biosolids land application operations are not included in this chart.



Note: For the 2023 Season, the odor complaints received were determined to not have originated from permitted biosolids land application operations and were not included in this data set.

EXHIBIT VIII – Biosolids Stakeholder Group Meetings Summary

The Biosolids Stakeholder's Group meeting was held in a hybrid format – in person and virtually – on February 15, 2024. Participants in the Stakeholder Group Meeting included representatives from:

> Central Valley Regional Water Quality Control Board, San Francisco Public Utilities Commission, Synagro West, Lystek International, US EPA Region 9, Engeo representing California Forever, Trihydro, Solano County Environmental Health, and Solano County Supervisor Mashburn's office.

Environmental Health presented an overview of the 2023 land application season, including a summary of the calculated dry tonnages applied, the timeline of application, breakdown of the material received by generator, and a brief description of the timeline on the County Research Project.

The Trihydro Corporation presented a brief introduction to their research team, an overview of the project design, and a timeline for the project. Some discussion was had over the design of the project and the sampling techniques that will be employed.

Synagro thanked the County for the 20+ year relationship that they and the County have enjoyed and pointed out the valuable contribution that the land application of biosolids has provided to the local farming community. They also mentioned that Flannery Associates has purchased many of the Registered Fields and are not allowing land application on those properties. It was relayed that the single ranch still able to allow land application has elected not to participate in biosolids land application in 2024. Consequently, Synagro does not anticipate performing land application in Solano County in 2024 and will shift their land application operations to other counties to make up for this. In responding to an inquiry about the potentially longer haul routes, the San Francisco Public Utilities Commission speculated that the additional distance may add millions of dollars in costs to their biosolids hauling operations.

Lystek stated they have been expanding their operations and have begun, or will begin in very short order, LystGro fertilizer application operations in Yolo, Colusa, and Sutter counties.

EXHIBIT IX – Biosolids Research Fund Summary

In 2004, the Board of Supervisors established a biosolids scientific research and education fee of $15 per applied acre, which is charged to all biosolids land application permit holders. 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 County opened up a Request for Proposal (RFP) on the OpenGov Procurement website July 13, 2023, soliciting bids and proposals to study the fate and transport of per- and poly-fluoroalkyl ("PFAS") chemicals potentially present in biosolids.

Four proposals from qualified research teams were evaluated during July and August, and the winning research team selected in October. A contract with the Trihydro Corporation for an amount not to exceed $99,948 was approved by the Board of Supervisors on the October 24, 2023 Consent Calendar.

Staff are working with Trihydro to revise the research project design as direct field applied biosolids are not scheduled through Synagro for Solano County land application in 2024. Research will focus on previous years biosolids application sites for data collection with areas defined as controls contained within the registered fields where no historic biosolids land applications have taken place adjacent to existing residences. The Research and Education Fund will be impacted as the amount of money contributed to the fund is associated with the total number of acres utilized for land application of biosolids.

Exhibit X – 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). CalRecycle has published the Final Regulations Text, Final Statement of Reasons and Final Statement of Purpose and Necessity.

SB 1383 establishes statewide targets to reduce the amount of organic waste disposed of in landfills (50% reduction by 2020 and 75% by 2025). It also sets a goal to rescue at least 20% of currently disposed edible food by 2025 and redirect that food to people in need.

In addition, SB 1383 requires organic material diverted from landfills must also be diverted to activities that reduce greenhouse gas emissions. Recovery activities are defined as actions that keep organic waste out of the landfills and reduce greenhouse gas emissions.

Within SB 1383, biosolids was newly defined as an "organic waste" and thus subject to many of the landfill disposal reduction requirements. Credits previously given to biosolids as beneficial reuse when used as alternative daily cover (ADC) were also removed.

The continued implementation of SB 1383 is anticipated to spur additional activity within the biosolids industry as wastewater treatment plants are forced to find beneficial reuses for their biosolids material and companies find innovative beneficial end uses.

Further information can be found at the CalRecycle website: calrecycle.ca.gov/Organics/

US EPA – Program Updates

Clean Water Act Analytical Methods for Per- and Polyfluorinated Alkyl Substances (PFAS)

Growing concern over the widespread use and potential for human health impacts of PFAS chemicals has prompted the US EPA to place more focus on identifying and quantifying the amount of PFAS chemicals that are present in the environment. As a part of this effort, an analytical procedure ("Method") is being developed to test for PFAS compounds in eight different matrices, including biosolids.

First synthesized in the 1940's, PFAS compounds are present in paint, cleaning products, food packaging, nonstick pans, stain-resistant fabric, waterproof clothing, and firefighting foam among other products. PFAS compounds have been identified in tissue samples of polar bears, blue whales, and human breast milk as their organic structure and presence everywhere within the environment allow their inadvertent uptake by almost all organisms.

Per- and Polyfluoroalkyl Substances (PFAS) are organic chemicals that contain a carbon-fluorine (C-F) bond – this bond is very strong and allows these substances to persist in the environment for hundreds to years. In multiple studies, PFAS compounds have been found to act as endocrine disruptors, carcinogens, cause impacts to our reproductive and immune systems, and impact fetal development.

To better study PFAS compounds in the environment, and in biosolids, the US EPA introduced analytical Method 1633 in August 2021 – the Method has undergone several drafts in which the procedure has been slightly revised and more thoroughly documented, with the Fourth/latest draft of Method 1633 being released in July 2023. Finalization of Method 1633 was anticipated at the end of 2023, but no updates have yet been provided on the US EPA website.

Method 1633 is meant to provide a standardized procedure to test for 40 different PFAS in eight different matrices – wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue.

The currently approved Methods 533, 537, and 537.1 can detect up to 29 PFAS compounds in potable water and groundwater.

For reference, the US EPA currently identifies just under 15,000 different PFAS chemicals on its CompTox Chemicals Dashboard v2.3.0.

(https://comptox.epa.gov/dashboard/chemical-lists/PFASSTRUCT)

Pathogen and Vector Attraction Reduction options in Sewage Sludge

The US EPA provided a revised guidance document describing the various pathogen and vector attraction reduction pathways that may be used in the treatment of biosolids. Originally published in 2003, the Office of the Inspector General (OIG) stated that the document was in need of an update during its 2018 audit of the US EPA.

Published on January 10, 2023, document EPA/600/R-22/194: “Pathogens and Vector Attraction in Sewage Sludge” the revised guidance document organized and presented the Pathogen and Vector Attraction Reduction options in a manner meant to reduce redundancies and to allow the document to be read easier, as compared to the original document. Additional analytical testing methods were also included, as well as clarifications to Alternatives 3 and 4 of the pathogen reduction options for Class A biosolids.

The clarification to Alternatives 3 and 4 for pathogen reduction of Class A biosolids is a part of the US EPA push to evaluate new pathogen reduction techniques – processes which may not have existed when Part 503 was originally formulated – and potentially approve them as adequate and equivalent pathogen reduction options.

Industry Update: Lystek International Inc.

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. Lystek has a current on-site lease agreement with the Fairfield-Suisun Sewer District expiring in 2041.

Lystek has a patented[1] process to convert biosolids to fertilizer – this fertilizer product is called LysteGro. It is an injectable biosolids derived fertilizer product with known minimum nitrogen, phosphorus, and potassium (N-P-K) values. Derived from biosolids feedstock, LysteGro is registered with the California Department of Food and Agriculture–Fertilizer Materials Inspection Program[2] (CDFA-FMIP). Industry reports indicate that Lystek has increased its agreements with biosolids generators and the volume of land applied biosolids derived fertilizer material.

Odor nuisance complaints received in 2021 resulted in an exploration of potential mitigation measures to address the odor complaints received. Staff collected samples of the LysteGro product for analysis. The sample results confirmed no bacteriological activity and were within compliance limits for heavy metals.

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

[1] US Patent 6,808,636 B2 www.uspto.gov - "Treatment of Sewage Sludge". Patent issued October 26, 2004, to Lystek International Inc. Abstract of the patent reads:

> *"A method for reducing sludge viscosity of a sewage sludge having a solids concentration of at least 10% (w/w). The method comprises the steps of increasing the pH of the sludge to 9.5-12.5%, at least one step selected from subjecting the sludge to a holding step of at least one day and adding inorganic or organic chemicals to facilitate viscosity reduction, followed by incubating the sludge at temperature up to 100° C., and subjecting the sludge to a shearing or disintegration step. The method provides sludge, especially concentrated sludge, that is more readily pumped or transported."*

[2] California Department of Food and Agriculture, Fertilizer Materials Inspection Program (CDFA-FMIP) lists Lystek International LTD under license #447783. Lystek's registered fertilizer product is LysteGro®, which has the CDFA-FMIP approved registration ID# 486200. Further information can be found at the CDFA website: https://www.cdfa.ca.gov/is/ffldrs/fertilizer.html

Industry Update: Aries Clean Technologies

Aries Clean Technologies ("Aries") was started in 2010 as PHG Energy and currently has their headquarters in Tennessee. Solano County has held preliminary meetings with Aries, who is proposing to co-locate a biomass processing center at the Fairfield Suisun Sewer District facility on Chadbourne Road.

The biomass processing center would utilize the Aries patented[1] Fluidized Bed Gasifier and Downdraft Gasifier processes to daily gasify roughly 165 wet tons of biosolids and 65 tons of wood chips or other wood or yard waste. The gasification process is a thermochemical decomposition process which heats the feedstock material to temperatures between 900-1,700 degrees Fahrenheit in an oxygen starved environment. Once initiated, the process is self-sustaining, and Aries states the process is able to destroy harmful chemicals, including per- and polyfluoroalkyl substances (PFAS).

Areis Clean Tech has recently informed the County that it is currently focusing resources on one of its existing facilities and is not currently looking to move forward with its FSSD location. Further information on Aries can be found at: www.ariescleantech.com

[1] For this 2021 report, Solano County Environmental Health was only able to identify four of the eight patents that the Aries Clean Technologies website references. US Patent Nos. 9,242,219; 9,809,769; 10,611,973; and 10,696,913. Only one is described below.

US Patent 9,242,219 – "Fluidized Bed Gasifier and Method for Gasifying Biosolids". Patent issued on January 26, 2016 to PHG Energy LLC. Abstract of the patent reads:

> *"A fluidized bed biogasifier is provided for gasifying biosolids. The biogasifier includes a reactor vessel and a feeder for feeding biosolids into the reactor vessel at a desired feed rate during steady-state operation of the biogasifier. A fluidized bed in the base of the reactor vessel has a cross-sectional area that is proportional to at least the fuel feed rate such that the superficial velocity of gas is in the range of 0.1 m/s (0.33 ft/s) to 3 m/s (9.84 ft/s). In a method for gasifying biosolids, biosolids are fed into a fluidized bed reactor. Oxidant gases are applied to the fluidized bed reactor to produce a superficial velocity of producer gas in the range of 0.1 m/s (0.33 ft/s) to 3 m/s (9.84 ft/s). The biosolids are heated inside the fluidized bed reactor to a temperature range between 900° F. (482.2° C.) and 1700° F. (926.7° C.) in an oxygen-starved environment having a sub-stoichiometric oxygen level, whereby the biosolids are gasified."*

Additional information can be found at www.uspto.gov

EXHIBIT XI – Summary of the 2023 Annual Bay Area Clean Water Agencies (BACWA) Report to the Solano County Board of Supervisors

The Bay Area Clean Water Agencies, BACWA, is a joint powers agency providing technical expertise and financial support from a Public Utilities perspective. Collectively, the member agencies operate throughout nine Bay Area Counties and provide sanitary services to over 7.1 million people.

The BACWA principal agencies are the five largest wastewater treatment agencies in the San Francisco Bay Area: East Bay Municipal Utilities District, East Bay Dischargers Authority, San Francisco Public Utilities Commission, Central Contra Costa Sanitary District, and the City of San Jose. The BACWA Executive Board is comprised of one member from each of the five founding Public Utilities.

BACWA 2023 Annual Report to the Solano County Board of Supervisors

The BACWA Annual Report to the Solano County Board of Supervisors Land Application of Biosolids in Solano County report, dated December 2023, summarizes the land application of biosolids conducted in Solano County in 2023.

The report also summarizes the land application of biosolids throughout Northern California thru 2022 – the Northern California reporting typically lags behind by one year. Per the BACWA report, three Northern California counties received roughly 89% of the land applied biosolids in 2022, with Sacramento County receiving 41%, Merced receiving 26%, and Solano County receiving 22%. Four other counties received the remaining 11% of land applied biosolids.

The BACWA report indicates that the Lystek Organic Materials Recovery Center (OMRC) co-located at the Fairfield Suisun Sewer District facility on Chadbourne Road represented 6% of the total end use of biosolids material in the Bay Area.

The report also states that in 2022 landfill disposal of biosolids accounted for roughly 2% of all biosolids uses. From 2017 to 2020 the landfill disposal percentage ranged from 4-10%, and in 2022 it was reported at 1%. Some of these decreases may be attributed to the implementation and restrictions of SB 1383.

ATTACHMENT A

ANNUAL REPORT to the SOLANO COUNTY BOARD OF SUPERVISORS

LAND APPLICATION of BIOSOLIDS in SOLANO COUNTY

Photo Credit: Bay Area Biosolids Coalition, Robin Scheswohl

BACWA BAY AREA CLEAN WATER AGENCIES

Prepared by the BACWA Biosolids Committee
December 2023

Table of Contents

Introduction

With the 2023 application season recently completed, the Bay Area Clean Water Agencies (BACWA) Biosolids Committee is pleased to present its annual summary report on land application of biosolids in Solano County. BACWA wishes to express its sincere appreciation to the staff of the Environmental Health Services Division of the Department of Resource Management for the continuing support of the biosolids land application program. This program allows for the effective use of biosolids as an agricultural soil amendment in the County. We believe this partnership provides a valuable resource to Solano County agriculture and provides many Bay Area agencies with an opportunity to ensure their biosolids are put to their highest and best use by making a positive impact on the environment.

This report provides information on trends in the use of biosolids resources in California and the Bay Area, an update on regional biosolids programs, and specific information on projects from individual agencies currently applying biosolids in the County. It highlights each agency's compliance with the requirement in Solano County Code, Sec. 25-400[1] that "Class B biosolids may only be land applied provided that the generator of the Class B biosolids is individually or as part of a consortium having a portion of their biosolids produced as Class A Exceptional Quality biosolids, converting biosolids to energy, or otherwise diverting Class B biosolids away from land spreading or landfilling (as waste or as alternative daily cover)."

This report is intended as supplemental information to the report submitted by the County Department of Resource Management staff and by Synagro, a contract hauler and applier of biosolids. It has been prepared for the Solano County Board of Supervisors in response to the Board's request for an annual update on agency activities and progress towards compliance with the goals set forth in County Code, Chapter 25. The affected agencies have coordinated the required reporting through BACWA to produce a single report for the Board.

[1] Source: *Solano County Code.* Available online at https://www.codepublishing.com/CA/SolanoCounty/#!/SolanoCounty2500.html#25-400. Accessed November 28, 2023.

We would like to acknowledge the assistance of your staff in working with BACWA member agencies throughout the year, including Edmond "Trey" Strickland (Program Manager), Jeffrey Bell (Supervisor), Anthony Endow (Senior Inspector), Robert Liu (Civil Engineer), Ashley Feigel (Inspector), and Nailah Souder (Inspector).

Municipal Agencies Applying Biosolids in Solano County

The use of biosolids as an amendment supplies valuable plant nutrients, organic matter, and carbon to soils, enhancing the productivity and financial resilience of local farms. Each agency that applies biosolids must meet strict standards and provides a report annually to the United States Environmental Protection Agency (USEPA) to demonstrate compliance. In 2023, seven Northern California agencies transported biosolids to agricultural land in Solano County through a contract with Synagro:

- City of Calistoga
- Central Marin Sanitation Agency (San Rafael, Ross Valley, Larkspur, Corte Madera)
- Delta Diablo (Antioch, Pittsburg, Bay Point)
- City of Petaluma
- San Francisco Public Utilities Commission, Southeast and Oceanside Water Pollution Control Plants
- Union Sanitary District (Union City, Newark, Fremont)
- Town of Windsor

A total of 2,613 dry tons were land applied on agricultural sites in Solano County in 2023. The portion from each agency is shown below in **Figure 1**.

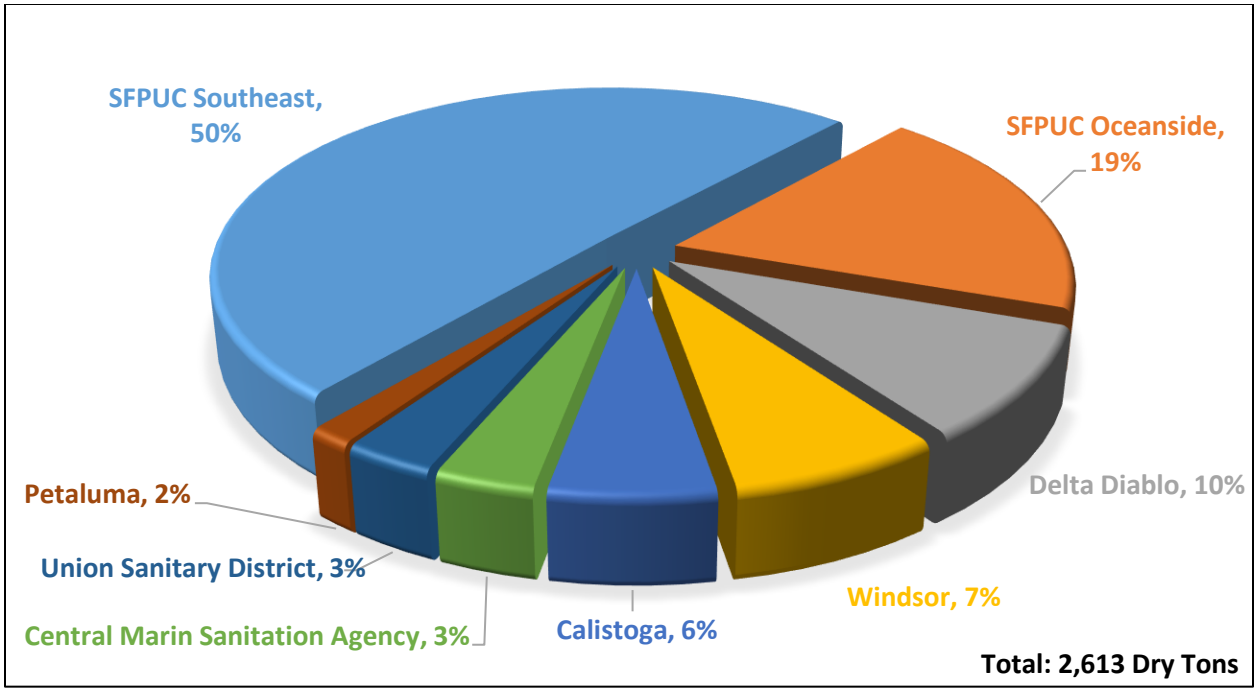


Figure 1. Biosolids (Dry Tons) Land Applied in Solano County by Each Agency, 2023
Data provided by Synagro

The annual quantities of biosolids applied to agricultural land in Solano County since 2011 is shown in **Figure 2**. The quantity of biosolids land applied in Solano County in 2023 was significantly lower than historic levels (about 1/3 of the previous year), in part because some property owners elected against allowing land application on newly acquired properties.

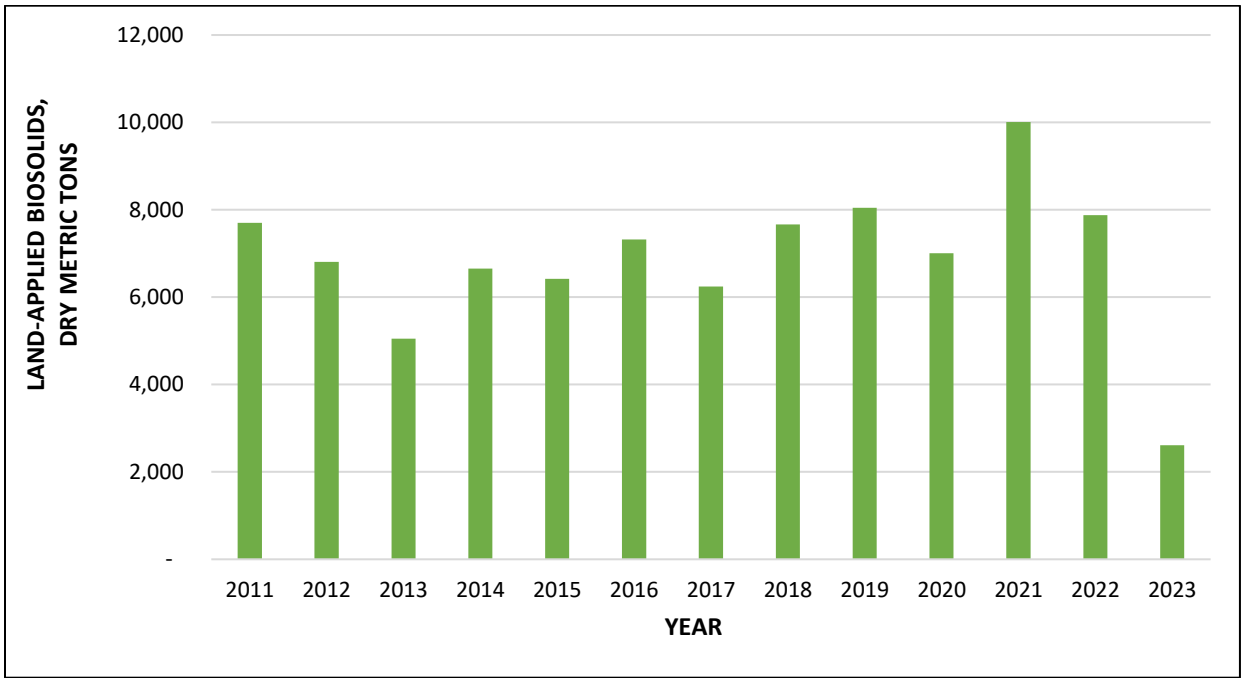


Figure 2. Total Annual Biosolids (Dry Tons) Land Applied in Solano County, 2011-2023
Data provided by Synagro

Trends in Biosolids Usage in California

Wastewater agencies in California are continuing to identify and evaluate new options for biosolids beneficial use and recycling, including emerging technologies as well as established practices such as composting and heat drying.

Overall California Use Summary. The use of biosolids in California for calendar years 2009 through 2022 is summarized in **Figure 3**. Statewide data for 2023 are not yet available and will be included in the 2024 report. The number one use statewide continues to be land application for agriculture in the form of compost, Class B biosolids and Class A biosolids, which together accounted for 59% of biosolids uses in 2022. Biosolids have proven to be a safe, reliable, and nutrient-rich soil amendment that offers a more cost-effective alternative to chemical fertilizers, which are energy intensive and increasingly expensive to produce.

Landfill disposal and the beneficial use of biosolids at landfills (primarily for use as alternative daily cover) are also common management practices for biosolids in California, together accounting for 33% of statewide biosolids use. In recent years, biosolids have also been used for backfilling of the H.M. Holloway gypsum mine in Kern County. In 2022, about 1% of all biosolids generated in California went to this purpose. This use is tracked as "landfill beneficial use" in Figure 3.

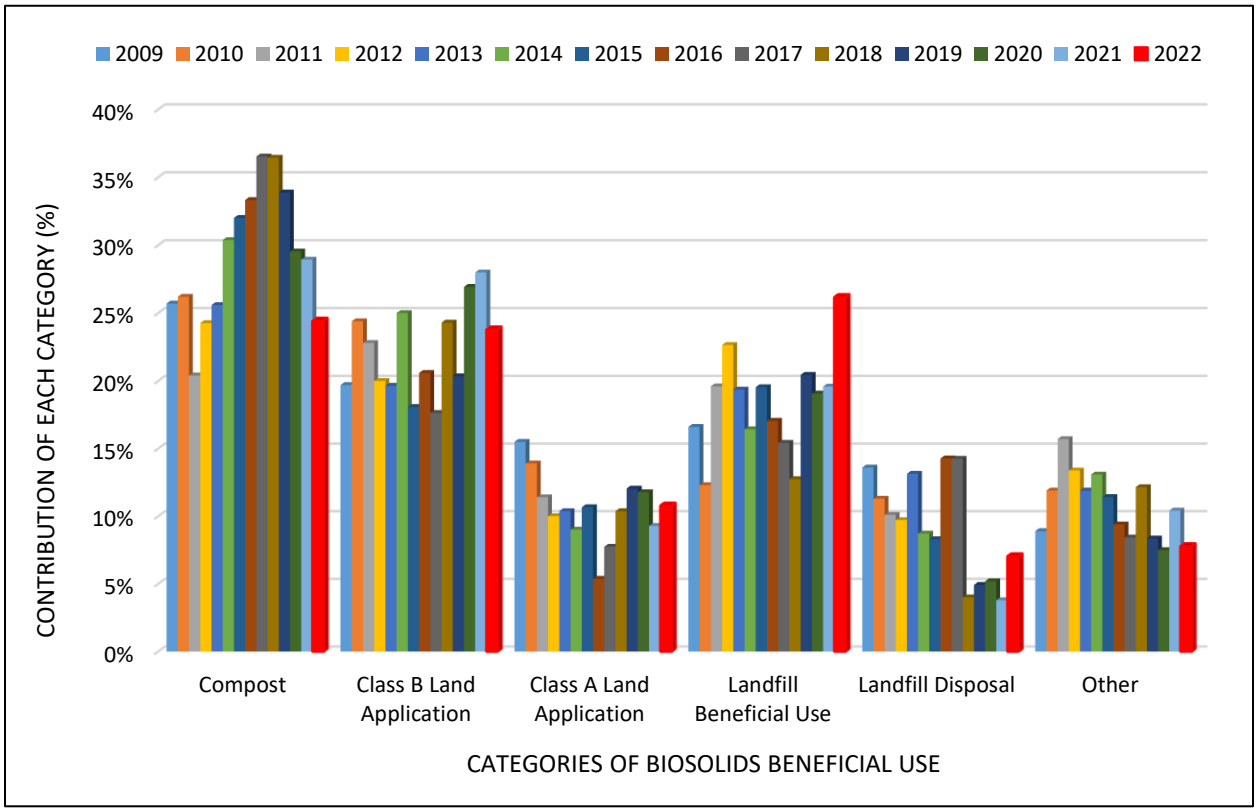


Figure 3. California Trends in Biosolids Uses, 2009-2022

Data provided by USEPA Region 9

Bay Area Trends. Looking solely at the nine-county Bay Area, **Figure 4** illustrates end uses of biosolids in 2022. The primary uses continue to be landfill beneficial use (as alternative daily cover), land application, and incineration, which together account for 84% of biosolids end uses in the Bay Area. Compost (5%) and surface disposal levels (2%) also remained similar to past years.

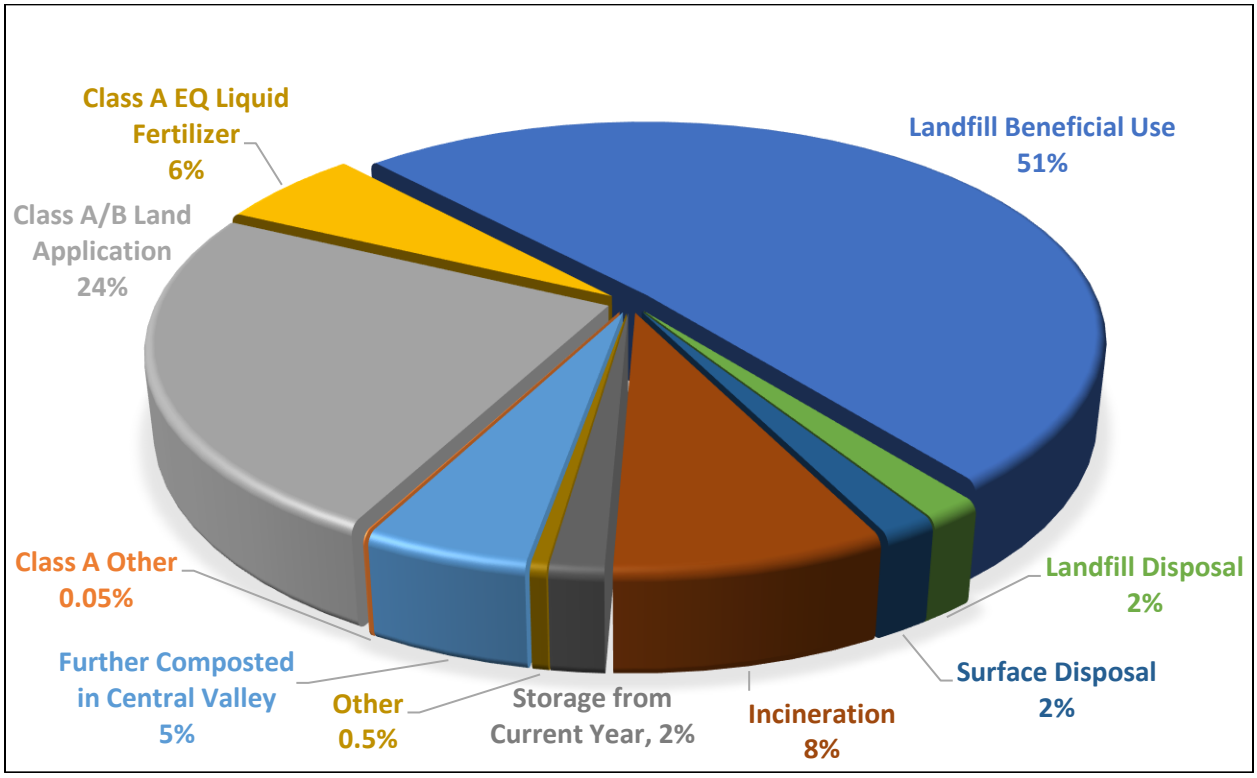


Figure 4. Bay Area Usage of Biosolids, 2022
Data from USEPA Region 9

Tonnage for biosolids conveyed to the Lystek Organic Materials Recovery Center (OMRC) in Fairfield is categorized as Class A liquid fertilizer and represented 6% of biosolids end uses in 2022. The OMRC conducts further biosolids processing by utilizing LysteGro technology to create a Class A product. Lystek's hydrolysis process uses high speed shearing, low pressure steam and alkali addition in an enclosed reactor to transform organic residuals and biosolids into a liquid fertilizer. Lystek's fertilizer program in Solano County began in spring 2017. Thirteen Bay Area agencies and one industrial generator sent material to Lystek in 2023:

- Benicia, City of
- Budweiser Brewery of Fairfield
- Central Marin Sanitation Agency
- Central Contra Costa Sanitary District
- Delta Diablo
- East Bay Municipal Utility District
- Fairfield-Suisun Sewer District

- Mt. View Sanitary District
- Palo Alto Regional Water Quality Control Plant
- Petaluma, City of
- San Francisco Public Utilities Commission
- Sanitary District No. 5 of Marin County
- Santa Rosa, City of
- Vallejo Flood & Wastewater District

LysteGro is used primarily in Solano County, and the product is registered as a fertilizer with the California Department of Food and Agriculture. As a Class A product, LysteGro can be used with no restrictions, and is not subject to the Solano County biosolids ordinance (Solano County Code, Sec. 25-400). Use of LysteGro is classified as "Class A Land Application" in **Figure 3.** LysteGro is also an approved commercial fertilizer for use in Colusa, Contra Costa, and Yolo Counties.

Counties where biosolids are land applied. Biosolids were predominantly applied to agricultural land in three Northern California counties in 2022 – Sacramento, Merced, and Solano – with Solano County ranking third. **Figure 5** illustrates the distribution of land-applied biosolids among counties in Northern California. Smaller amounts were also land applied in Sonoma, San Joaquin, Stanislaus, and Napa counties, typically by agencies that operate their own land application programs.

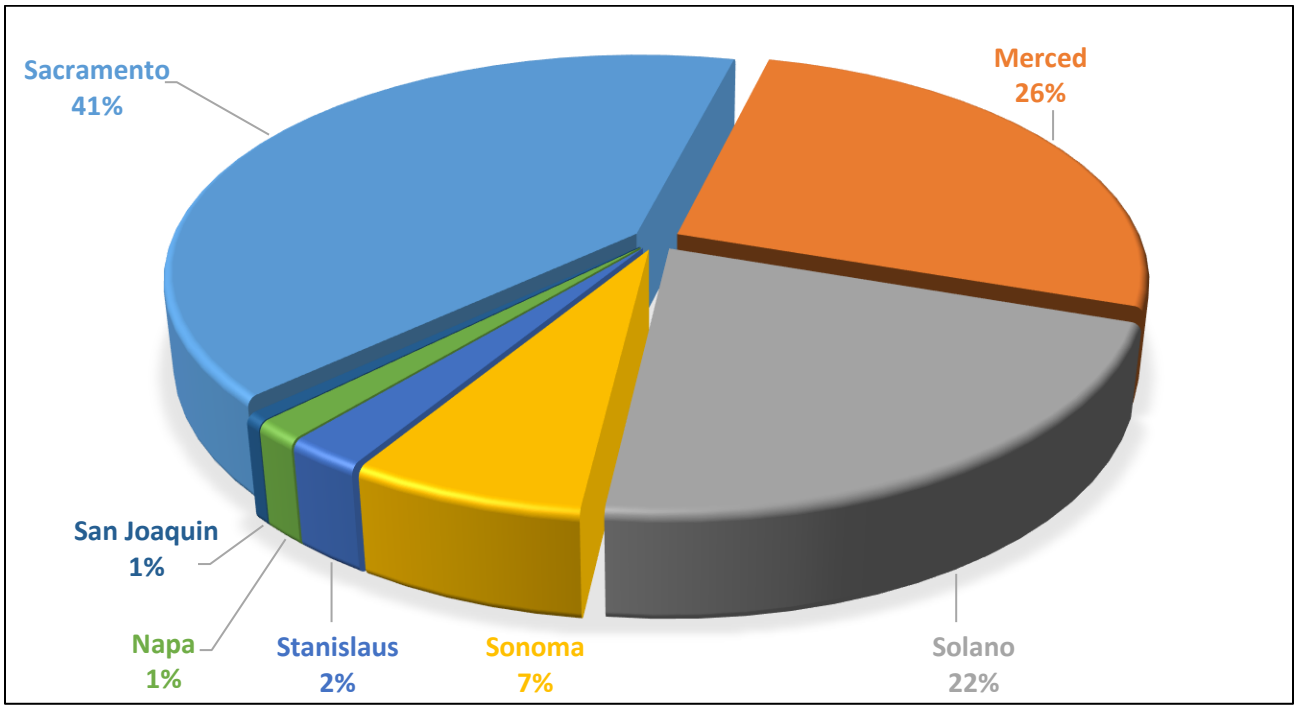


Figure 5. Distribution of Biosolids Land Application among Northern California Counties, 2022

Data provided by USEPA Region 9 and ECHO Database

Bay Area Regional Efforts

BACWA Biosolids Committee. The mission of the BACWA Biosolids Committee (The Committee) is to support the development and maintenance of cost-effective, sustainable biosolids management options for the approximately 150,000 dry metric tons of biosolids produced in the Bay Area annually. The Committee was formed to provide proactive support and information sharing to member agencies on regional biosolids issues, projects, and proposed regulations and legislation.

In 2021, the Committee completed the 2020 Biosolids Trends Survey Report, which is available at https://bacwa.org/wp-content/uploads/2021/12/BACWA-2021-Biosolids-Trends-Survey-Report.pdf. The survey will be updated in 2024.

Because of member agencies' level of engagement in the Bay Area Biosolids Coalition at the current time (see below), the Biosolids Committee was placed on hiatus in 2019. The email distribution list continues to be maintained so that the Committee can meet again when there is interest. For example, committee members convened in November 2023 to discuss biosolids-related projects at their respective agencies. While regular meetings are on hiatus, the Committee will continue to produce this Annual BACWA Report to Solano County, as well as the BACWA Biosolids Trends Survey.

Bay Area Biosolids Coalition. The members of the Bay Area Biosolids Coalition, originally formed in 2004, work together to advance research, expand land application and share new opportunities and information on biosolids. The Coalition is pursuing a multi-pronged approach that includes:

- Educating the public on biosolids management issues in California through public outreach efforts, including the creation of a public website and securing media coverage.
- Advancing the industry and legislative state of knowledge on biosolids as a valuable resource.
- Investigating viable, year-long (weather resilient) alternatives to land application that look beyond "biosolids to energy" and seek to responsibly recycle back value-added products of biosolids to the environment.
- Serving as a technology incubator - particularly for pre-commercial technologies.
- Supporting land application in the Bay Area by seeking to create more capacity for biosolids in the Bay Area marketplace.

The Coalition has established the following goals in support of achieving the above-mentioned objectives, for which associated strategies and key outcomes have been defined that will be pursued over the next one to two years:

- Communicate the value of biosolids for the purposes of increasing understanding, support, and market demand for biosolids.
- Advance independent scientific research on the safety and efficacy of biosolids to inform science-based regulations, guidelines and best management practices.
- Support and expand biosolids land application in the Bay Area.
- Support the development of diverse, cost-effective, and reliable all-weather biosolids projects for the San Francisco Bay Area.

Current Coalition members include the following public agencies:

Central Marin Sanitation Agency	East Bay Municipal Utility District
City of Millbrae	Ironhouse Sanitary District
City of Petaluma	North San Mateo County Sanitation District
City of San José	San Francisco Public Utilities Commission
City of Santa Rosa	Union Sanitary District
Delta Diablo	Vallejo Flood & Wastewater District
Dublin San Ramon Services District	West County Wastewater District

Individual Agency Programs. Individual BACWA agencies are responsible for their own biosolids management programs, and each develops its own plan in addition to participating in regional programs. Below are program descriptions from all agencies which sent biosolids to Solano County for agricultural use via land application. All agencies described below produce biosolids according to 40 CFR regulations.

All seven agencies that land applied Class B biosolids in Solano County in 2023 converted a portion of their biosolids to Class A, either through their own means or at a 3rd party conversion facility (e.g., compost facility or Lystek OMRC).

City of Calistoga. At the City's Dunaweal Wastewater Treatment Facility, solids are processed by the treatment methods of thickening and application to drying beds. The material is picked up and land applied to various fields in Solano County by Synagro, and a portion of this material is diverted to produce Class A Biosolids at Synagro's Central Valley Compost site.

Central Marin Sanitation Agency. The Central Marin Sanitation Agency (CMSA) has a contract with Synagro for land application of its biosolids during the dry weather season in Solano County. CMSA also has contracts in place for sending the biosolids to Redwood Landfill for landfill beneficial use and to Lystek International for further processing to produce Class A (EQ) liquid fertilizer. CMSA is a member of the Bay Area Biosolids Coalition.

Delta Diablo. Diablo produces Class B biosolids and contracts with Synagro for biosolids management. In 2022, 92% of the biosolids were land applied in Solano, Sacramento, or Merced Counties. The remaining biosolids are either sent to Synagro's Central Valley Compost facility or to the Lystek facility at Fairfield Suisun Sewer District for further processing to Class A standards (2 truckloads per month for the first half of 2023 and 4 truckloads per month for the

second half of 2023). Delta Diablo is a member of the Bay Area Biosolids Coalition and continues to explore additional and alternative biosolids management options.

City of Petaluma. The City of Petaluma's Ellis Creek Water Recycling Facility produces Class B biosolids. Biosolids produced at Ellis Creek are applied to agricultural land in Solano and Sacramento Counties, or transferred to the Lystek OMRC for production of and subsequent reuse as Class A biosolids. The City of Petaluma is a member of the Bay Area Biosolids Coalition.

San Francisco Public Utilities Commission (Southeast and Oceanside Facilities). The San Francisco Public Utilities Commission (SFPUC) produces Class B biosolids at its two facilities. In addition to sending biosolids to Solano County for use as a fertilizer, the SFPUC also contracts with Synagro to use Class B biosolids as a fertilizer in Sacramento County and to produce compost in Merced County and contracts with Lystek to produce a Class A EQ liquid fertilizer. The SFPUC's biosolids are now used as either a fertilizer or compost and are no longer used for alternative daily cover in landfills. The SFPUC is an active participant in the Bay Area Biosolids Coalition.

Town of Windsor. The Town of Windsor Water Reclamation Facility contracts with Synagro to land apply biosolids to farmland in Solano and Sacramento Counties. As part of the Synagro contract, Synagro diverts a portion of its biosolids to its Merced County facility for composting. The Town of Windsor continues to investigate feasible and cost-effective Class A biosolids treatment and process options. The Town is currently at 30% design for a biosolids handling facility, including biodrying and pyrolysis.

Union Sanitary District. Union Sanitary District (USD) beneficially used most of its biosolids in 2023 and met all USEPA regulations for the 30th consecutive year. USD continues to contract with Synagro for its biosolids management. The majority of USD's biosolids are land applied to farmland in Sacramento, Merced and Solano Counties. The remainder are delivered to Synagro for producing Class A compost. USD is a member of the Bay Area Biosolids Coalition.