

Biosolids Capacity Challenges from a Potential Land Application Ban in California

Clean Water SoCal Biosolids Committee Meeting



**NORTHWEST
BIOSOLIDS**



October 2026

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**Brown AND
Caldwell**



Why This Study Was Conducted?



Growing national and state-level scrutiny of biosolids management and **PFAS**



Increasing discussion of **potential restrictions on land application**



Risks for WRRFs from restrictions on land application which is California's primary biosolids management pathway



Need to understand actual **landfill capacity and impacts to cost and greenhouse gas emissions**



Identify **broadier implications** for utilities, ratepayers, farmers, and statewide policy objectives

Study Goal: Assess potential capacity, cost, and environmental impacts in the event of a future restriction/ban on biosolids land application (including compost) in California.

Project Approach and Key Assumptions



Data Collection



Statewide Biosolids Management Inventory



Landfill Capacity Analysis



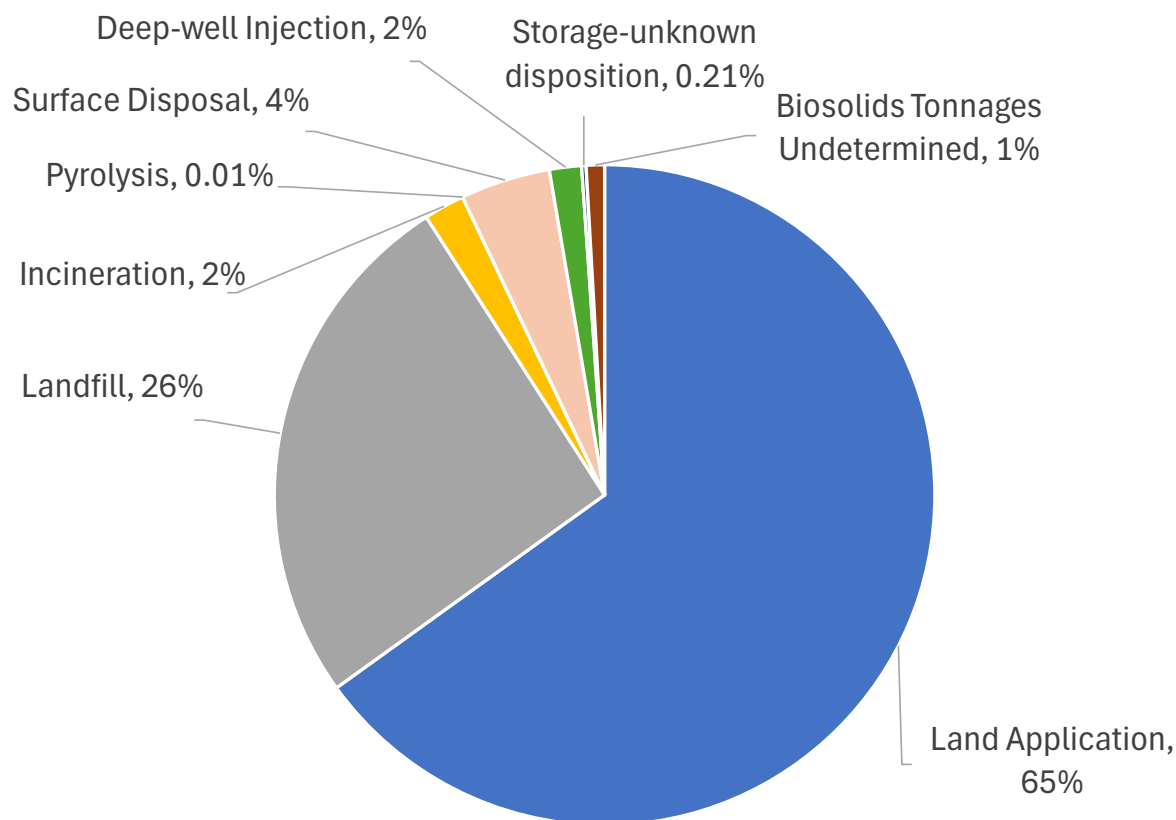
Cost Impacts



Environmental Analysis

- Primary Data Sources:
 - 2024 EPA ECHO data
 - BACWA and Clean Water SoCal reports/surveys
 - CalRecycle SWIS data (landfill info)
- Spot checking/double checking with older data from Lauren Fondahl and information from Synagro and Lystek
- Arizona land app restrictions or ban would precede California based on repeated legislative attempts
- SB 1383 would need to change to allow landfill disposal

California's Biosolids Management in 2024 (in DMT)

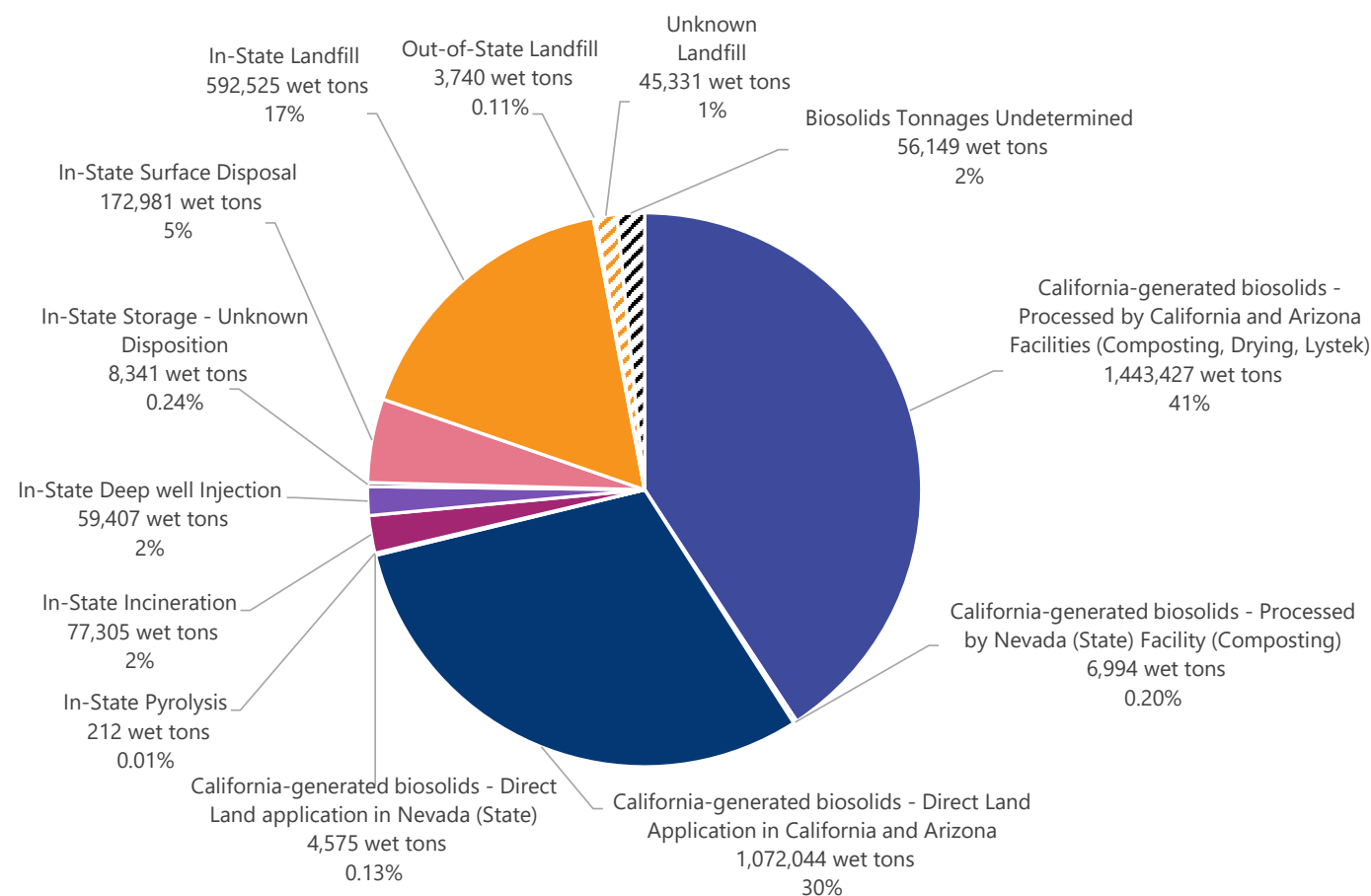


Total used or disposed in 2024: 708,000 dry metric tons (DMT)

- Land application*: 458,000
- Landfill: 182,000
- Incineration: 14,000
- Pyrolysis: 40
- Surface Disposal: 31,000
- Deep-well Injection: 11,000
- Storage-unknown disposition: 1,500
- Biosolids Tonnages Undetermined: 10,200

**Land application includes compost and other beneficial use products*

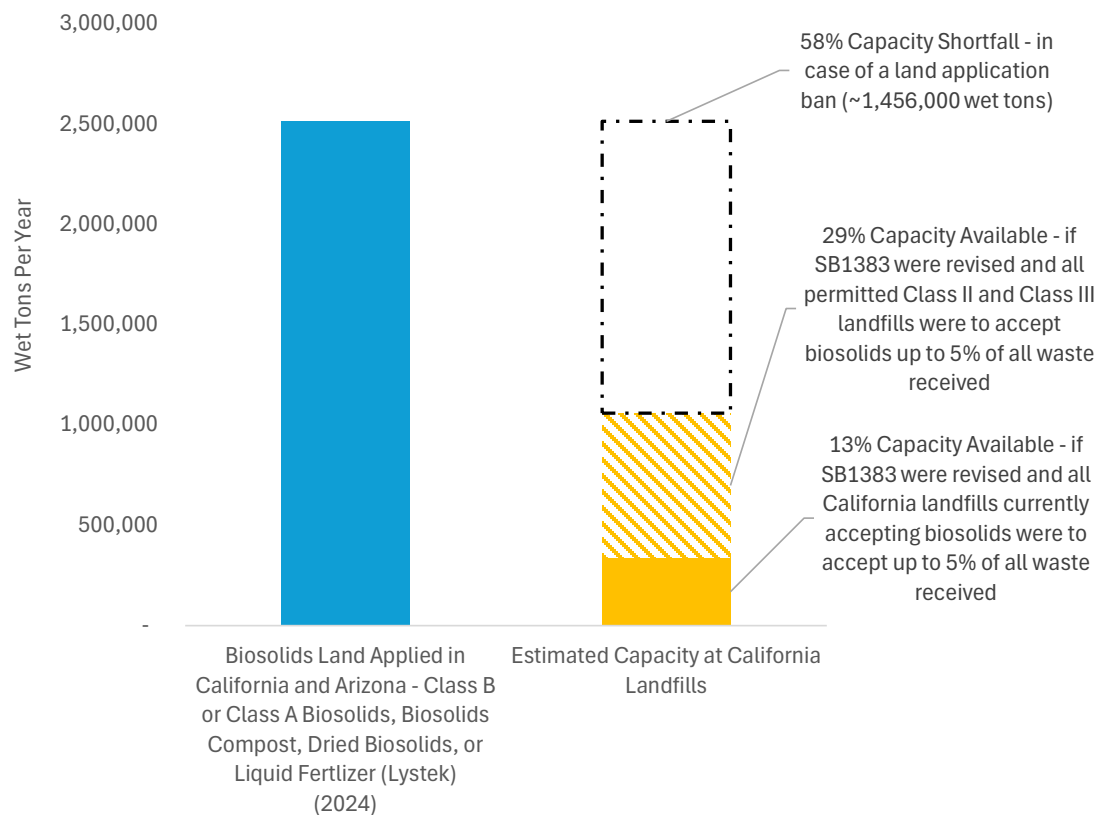
California's Biosolids Management in 2024 (in WT)



- CA generates ~3.5M wet tons (WT) per year
- ~2.5M WT (71%) beneficially used through land application/ compost in CA/AZ
- Approximately 15% of CA biosolids are currently managed in AZ

Note: WT and DMT percentages differ due to variable moisture content reported for air-dried biosolids disposed at landfill by one utility, resulting in a lower landfill percentage on a WT basis than on a DMT basis. Conversely, wetter pathways such as composting and land application represent a larger share on a WT basis. Therefore, equivalent dry mass does not necessarily correspond to equivalent wet mass.

Estimated Capacity Shortfall under Potential Land App Ban



- **Landfills Are Not a Long-Term Solution**

- Existing landfill capacity is insufficient to replace current land application volumes.
- Even under optimistic assumptions, a significant statewide capacity shortfall remains.

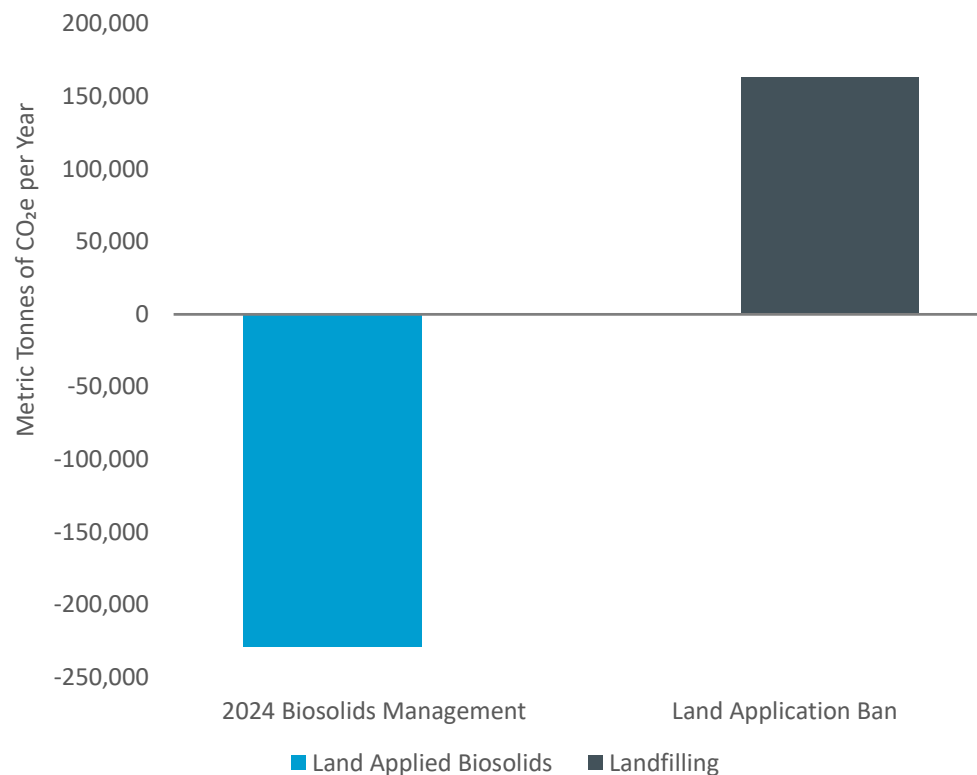
- **Alternative Technologies Are Capacity-Constrained**

- California currently has only one operating biosolids incinerator.
- Pyrolysis and other advanced thermal technologies have limited deployment and face stringent permitting, cost, and scalability challenges.

- **Additional Risks**

- Reliance on out-of-state management options (AZ and NV)
- Restrictions in Arizona could further reduce available management capacity

Greenhouse Gas Impacts of a Potential Land Application Ban



- Landfilling biosolids increases lifecycle GHG emissions
- Estimated **174%** increase in net GHG impacts under a land application ban
- Loss of carbon sequestration and soil health benefits currently provided through beneficial reuse
- Additional emissions equivalent to approximately 86,770 passenger vehicles annually

Potential Annual Cost Increases for Utilities and Ratepayers

Current Beneficial Use

Current beneficial use baseline ~**\$95/WT**
based on 2018-2023 regional survey data

Current Landfilling

Average current landfill cost ~ **\$130/WT**
based on 2018-2023 regional survey data

Future Landfilling

Future costs could range from **\$150/WT to \$260/WT**

- Reduced landfill acceptance as ADC (SB1383)
- Reduction in landfill capacity
- Concerns about biosolids impacts
- Market-based increases

Shifting beneficially used biosolids to landfill disposal **could increase annual costs by approximately \$140M to \$420M**

Conflicts with California State Policies



Source: [CalRecycle](https://calrecycle.org/)

Cal Recycle SB 1383: Short-Lived Climate Pollutant Reduction Strategy

- » Increased landfill disposal conflicts with California's goal of methane emissions reduction by reducing organics (including biosolids) disposal by 75% by 2025

Other California Policy Objectives

- » Increased landfill disposal would also conflict with broader California initiatives that promote beneficial reuse, greenhouse gas reductions, carbon sequestration, and soil health, including:
 - CalRecycle's Zero Waste Goals, CDFA Healthy Soils Initiative, etc.

Documents Produced Through Study

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Final Report



August 5, 2026

Letter Report

Adam Link
California Association of Sanitation Agencies
925 L Street, Suite 200
Sacramento, CA 95814

204593

Subject: Biosolids Capacity Challenges from a Land Application Ban in California

Dear Mr. Link,

This report documents the current state of biosolids management in California and estimates the capacity and environmental implications in the event of a statewide ban or restrictions on land application. Based on an evaluation of data from the United States Environmental Protection Agency's (US EPA) Enforcement and Compliance History Online (ECHO) database, most of the state's wastewater utilities primarily manage biosolids through direct land application, composting, and landfill disposal with a few utilities utilizing drying, thermo-chemical hydrolysis (Lystek), pyrolysis, deep well injection, incineration, storage, and surface disposal.

Notably, approximately 15% of biosolids generated in California are transported to Arizona for beneficial use through direct land application or compost for agricultural production. Based on legislation that has been proposed in Arizona in recent years, this interstate biosolids management could be endangered in the immediate future through bans on land application of biosolids and biosolids-based products in that state. These legislative efforts have not yet been successful; however, our analysis conservatively assumes that biosolids currently managed in Arizona will ultimately need to be managed within California. Therefore, those biosolids would also be impacted by any future California-based restrictions or bans.

It is critical for legislators and policymakers to note that under California's Senate Bill 1383 (SB 1383, Short-Lived Climate Pollutants: Organic Waste Reduction) regulations, local jurisdictions are prohibited from enforcing ordinances or policies that ban or unreasonably restrict the lawful land application of biosolids. This is intended to ensure municipalities have the infrastructure needed to divert organic waste from landfills (to achieve SB 1383 mandates) and support beneficial soil amendments. As a result, implementation of a statewide ban or significant restriction on land application would likely require legislative or regulatory changes beyond the current framework.

Our analysis indicates that banning the land application of biosolids and biosolids-based products in California would impact approximately **2,527,000 wet tons** of material annually. This shift would present immediate and significant challenges:

- **Insufficient Alternative In-State Capacity:** It is estimated that the available additional landfill capacity in California for managing this displaced tonnage falls short by at

Biosolids Capacity Challenges from a Land Application Ban in California

AVOIDING AN AFFORDABILITY CRISIS

A Practical Guide for Biosolids Management in California



A PRACTICAL GUIDE TO BIOSOLIDS MANAGEMENT IN CALIFORNIA Avoiding an Affordability Crisis

Decades Supporting Farmers and a Sustainable Future

Biosolids are nutrient-rich materials produced during wastewater treatment. When returned to the soil, this valuable resource improves soil health, retains water, and replaces nutrients.

California generates around 2.5 million wet tons of biosolids annually, enough to fill 100,000 55-gallon drums. For decades, the state has partnered with farmers and landowners to recycle biosolids as a sustainable alternative to commercial fertilizers.

PFAS in Everyday Products and Biosolids
PFAS chemicals, including PFOA and PFOS, were used widely in manufacturing of products such as cosmetics, food packaging, pesticides, dental floss, and clothing. These substances persist in the environment and accumulate in our bodies. As a result, PFAS are measurable in wastewater and biosolids, though at levels much lower than many consumer products.

If the goal of a biosolids land application ban would be to reduce PFAS in the environment, forcing biosolids to landfill and incineration may not achieve that goal. According to the EPA, studies estimate that as much as 50% of mobile PFAS entering a landfill are emitted via leachate and landfill gas, while most landfills lack PFAS treatment.

Consequences of a Ban or Severe Restrictions on Land Application
Potential future restrictions on land application could result in significant unintended consequences. For example, Maine and Florida have documented that the biosolids management costs increased by 175% to 300% following the loss of land application options.

There are limited options for managing biosolids: (1) land application, (2) landfilling, and (3) incineration (drying).
Universal bans and severe restrictions on land application, without consideration for PFAS contamination or health risks, force local utilities to rely on costly and less sustainable disposal options.

Incineration Capacity Constraints
California currently has only one operational biosolids incineration facility, which is 43 years old. The state's stringent air-quality standards, siting constraints, and public opposition make the approval and construction of additional biosolids incineration capacity highly unlikely in the foreseeable future.

California recycles approximately 2.5 million wet tons of biosolids annually, benefiting farmers and the environment while avoiding greenhouse gas emissions equivalent to driving 60.7 million miles.

A ban on land application of biosolids would increase greenhouse gas emissions by an estimated 1,145, which is equivalent to California's SB 1383 goal of reducing organic impacts by 15% by 2025 (organic includes biosolids)—increasing methane-related climate impacts.

Landfills are not a Long-Term Solution

A ban on land application in California would leave roughly 2.5 million wet tons of biosolids currently land applied in California and Arizona with limited alternative management options. The volume exceeds the state's estimated additional landfill capacity for "wet" waste by 337%. Biosolids would be heavily taxed out of state, where capacity is similarly limited and costs are high. Furthermore, sending more organic material into landfills to landfills conflicts with California's SB 1383 goal to divert organic waste from landfills to reduce methane emissions in support of statewide climate objectives.

Restrictions Risk Affordability for Ratepayers and Farmers
A ban or severe restriction on land application of biosolids would further strain utilities struggling to maintain affordable services for their customers. According to a study conducted by Policy Navigation Group on behalf of Association of Metropolitan Water Agencies, water utilities and ratepayers across the country are already facing an estimated \$6.4 billion in compliance costs to meet emerging PFAS regulations. A ban on biosolids land application would dramatically add to these costs, further burdening ratepayers. Additionally, a ban would drive up costs for the agricultural community by removing access to a reliable, nutrient-rich soil amendment and requiring farmers to purchase costly manufactured fertilizers.

A Responsible Path Forward
California can continue to protect public health and the environment without sacrificing sustainability or affordability. Legislators and regulators can advance responsible management of PFAS in biosolids through the following:

1. **MANAGE PFAS AT THE SOURCE:** Continue and strengthen policies related to PFAS use in commercial products and industrial processes, and support pollution prevention programs.
2. **PROTECT FARMERS AND HOMEOWNERS:** Avoid policies that abruptly eliminate recycling and beneficial use and force utilities into high-cost landfill or out-of-state options. Help keep farmers in business and farmers in production through the higher yields and lower costs provided by biosolids.
3. **INVEST IN INNOVATION AND TREATMENT:** Fund research, pilot projects, source-control programs, and technologies that reduce PFAS before biosolids are generated or beneficially used.
4. **SUPPORT CLIMATE GOALS AND RESILIENCE, BIODIVERSITY MANAGEMENT:** Align biosolids policy with SB 1383 methane reduction and climate resilience goals by preserving beneficial biosolids reuse options. Regulations should consider the impacts to all stakeholders to avoid unintended consequences for California ratepayers and farmers.

A ban on land application of biosolids would leave 2.5 million wet tons of biosolids with nowhere to go in California



Alternatively, Michigan's data-driven policies successfully reduced PFAS emissions by 90% without creating unnecessary economic hardship for public utilities and ratepayers.

Maine's land application ban caused costs to increase by 175% in average.

According to the Maine Water Control Association.

For additional information on PFAS and Biosolids Management, visit the QR code shown to visit the California Association of Sanitation Agencies. <https://cassa.org>

Presentation

Legislative Handout (2-Page Brief)

A Responsible Path Forward

MAINTAIN PROTECTIVE POLICIES Continue emphasizing source control and monitoring to reduce PFAS impacts prior to biosolids land application.

MANAGE PFAS AT THE SOURCE Continue and strengthen policies related to PFAS use in commercial products and industrial processes, and support pollution prevention programs.

PROTECT FARMERS AND RATEPAYERS Avoid policies that abruptly eliminate recycling and beneficial use and force utilities into high-cost landfill or out-of-state options. Help keep farmers in business and farmland in production through the higher yields and lower costs provided by biosolids.

INVEST IN INNOVATION Fund research, pilot projects, source-control programs, and technologies that reduce PFAS before biosolids are generated or beneficially used.

SUPPORT CLIMATE GOALS AND REGIONAL BIOSOLIDS MANAGEMENT Align biosolids policy with SB 1383, methane reduction and climate resiliency goals by preserving biosolids beneficial reuse options. Regulations should consider the impact to all stakeholders to avoid unintended consequences for California ratepayers and farmers.



Open Discussion/ Questions

Thank you!

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*Point your camera at the QR
code for contact information.*