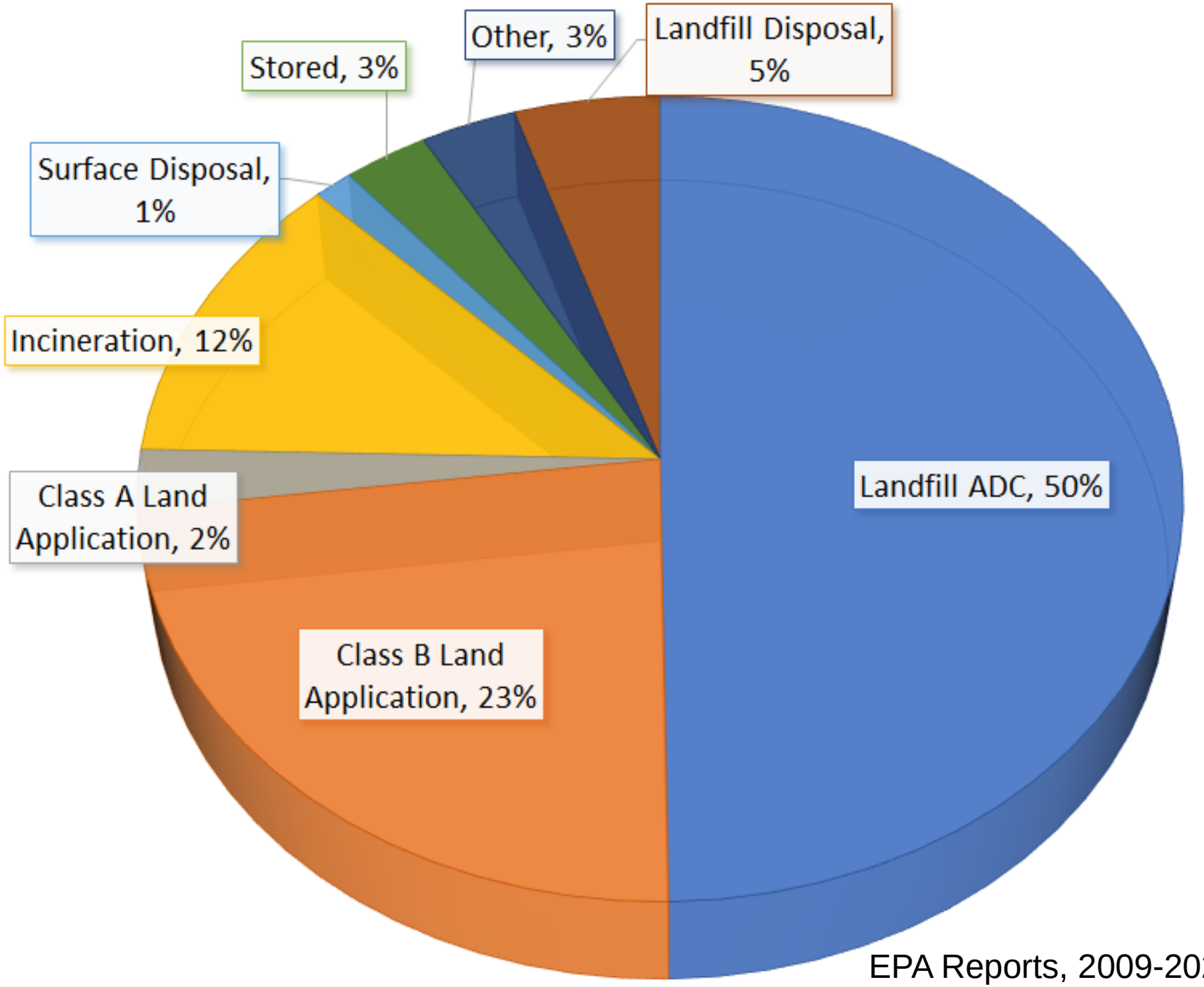
Biosolids – A Changing Landscape

Source: Mary Cousins, 2022

BACWA BAY AREA CLEAN WATER AGENCIES

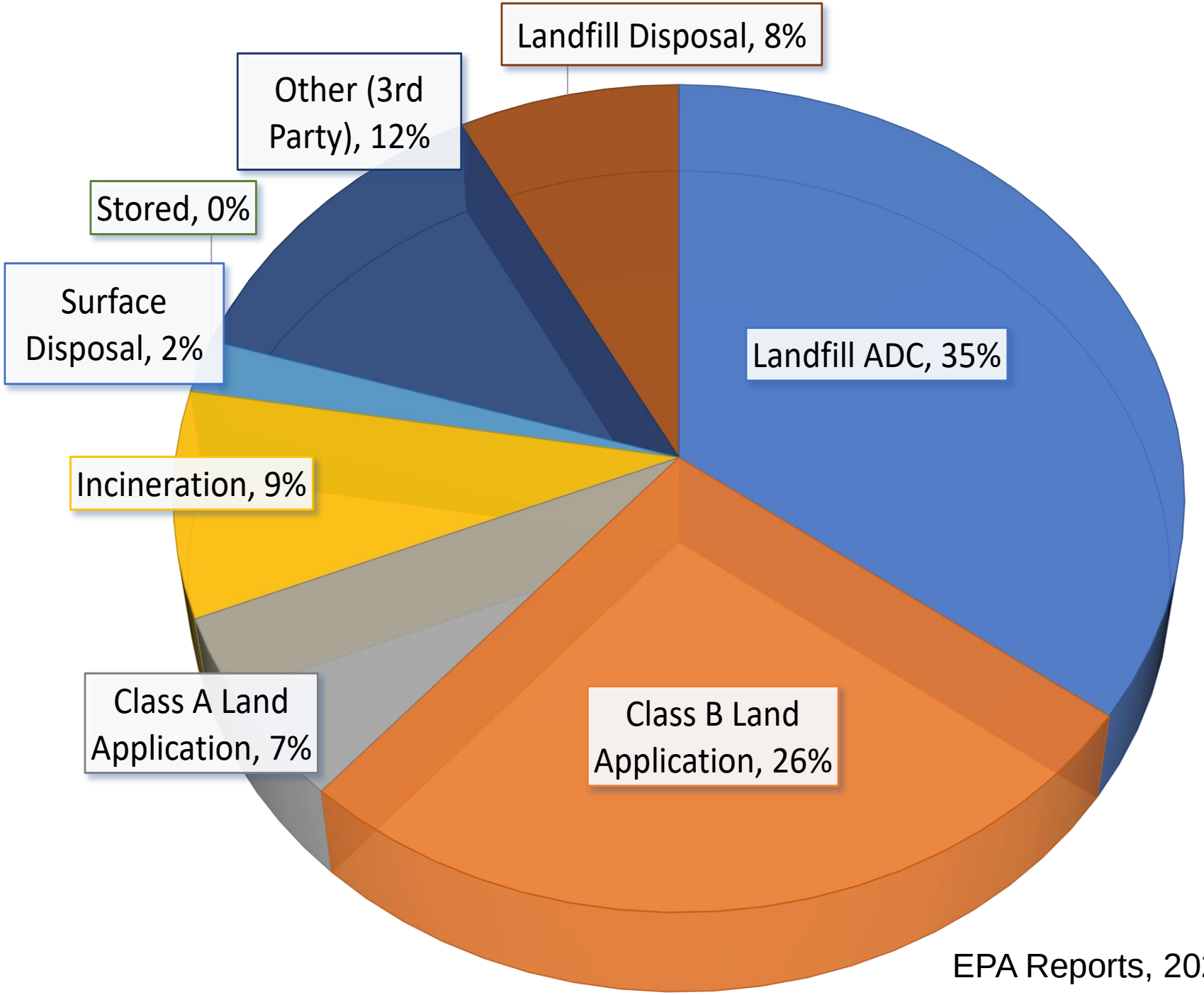
BAY AREA BIOSOLIDS COALITION

For the last decade, Bay Area biosolids have primarily been used as ADC at landfills or as a soil amendment land-applied to agricultural lands



EPA Reports, 2009-2020

In recent years, more Bay Area biosolids have been used as a soil amendment or sent to a third party for beneficial use



EPA Reports, 2020

Bay Area Biosolids Coalition Mission/Vision is to beneficially use all biosolids!

Mission

(What is the Coalition doing?)

Work collaboratively with Bay Area Utilities to enhance environmental quality by developing cost effective and socially conscious solutions for biosolids management.

Vision

(Why is the Coalition doing it?)

Create a Bay Area region where all biosolids are beneficially used and recognized as an environmental asset.

Benefits of biosolids

- Offset inorganic fertilizer use
- Increase soil carbon content/stability
- Increase water holding capacity
- Increase nutrient use efficiency
- Increase crop yield
- Sequester carbon in the soil



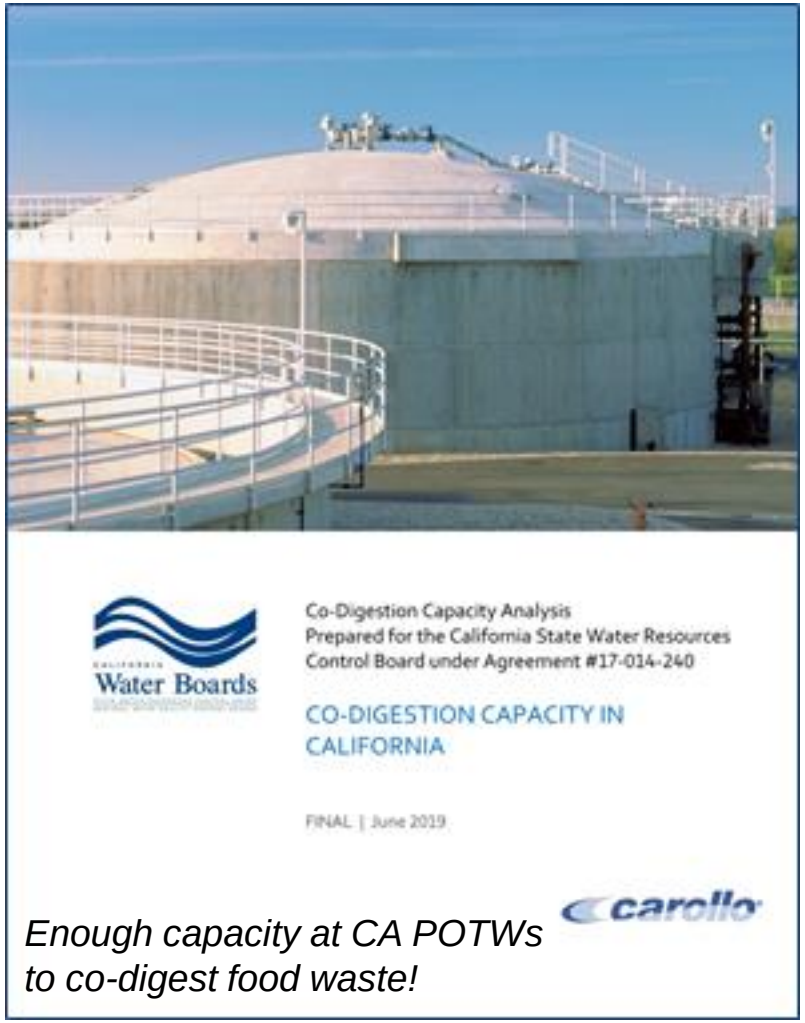



...the 2022 Scoping Plan Update, new legislation, as well as SB 1383 regulations, target beneficial use of recycled organics, in turn, a shift in biosolids management away from ADC.

Dr. Gabby Black
UC Davis, 2021

SB 1383 - Short-Lived Climate Pollutant Reduction: Organic Waste/Methane Reduction Regulations

- **40% methane reduction** by 2030 (relative to 2013 levels)
- Organic waste diversion from landfills (includes biosolids, digestate, and sludges)
  - **75% by 2025** (relative to 2014 levels)
- Regulations effective: January 1, 2022
- CARB acknowledged the importance of SB 1383 mandates for achieving methane reductions and the sector's role in achieving them



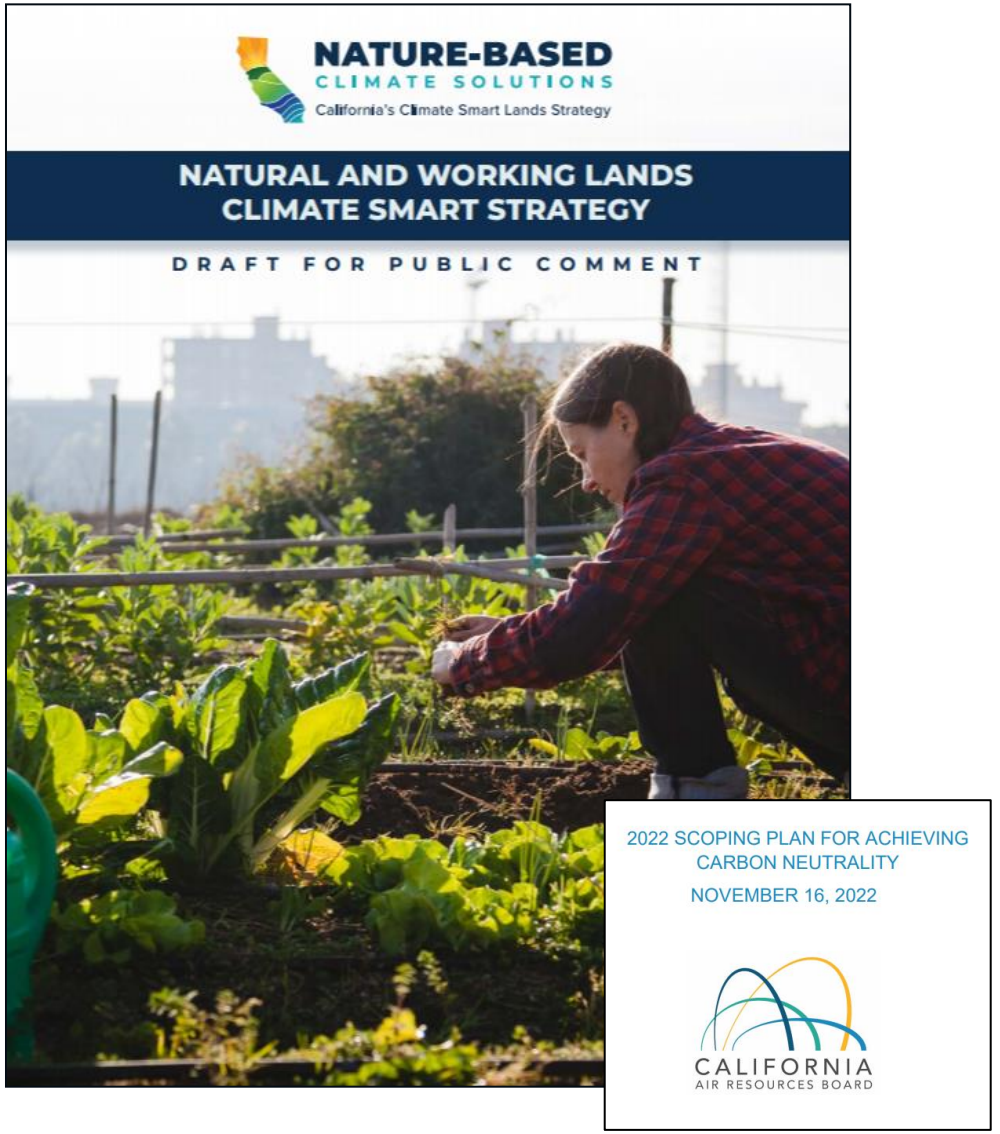
Enough capacity at CA POTWs to co-digest food waste!

2022 Scoping Plan Update prioritizes SB 1383 & land managmenet to achieve carbon neutrality by 2045

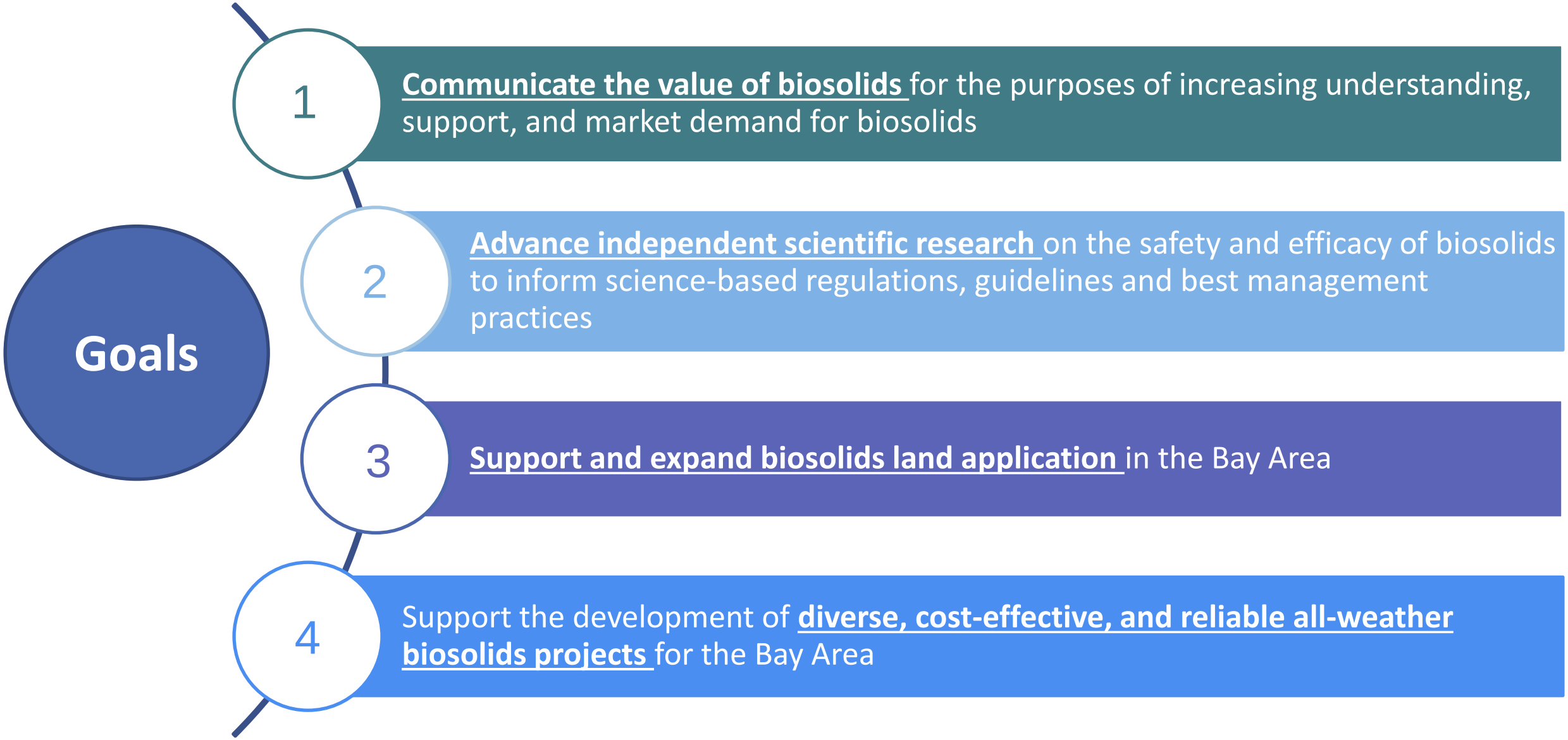
- CNRA is modeling “natural and working land” landscapes:
  Forests, Shrublands and Chaparral, Developed Lands, Wetlands, Seagrasses and Seaweeds, Croplands, Grasslands, Sparsely Vegetated Lands

- AB 284/SB 27 seek to improve and set goals for increased carbon sequestration on natural and working lands through application of soil amendments and improving soil health

- More to come this year!



The Coalition tracks and supports development of a diverse set of local, sustainable solutions



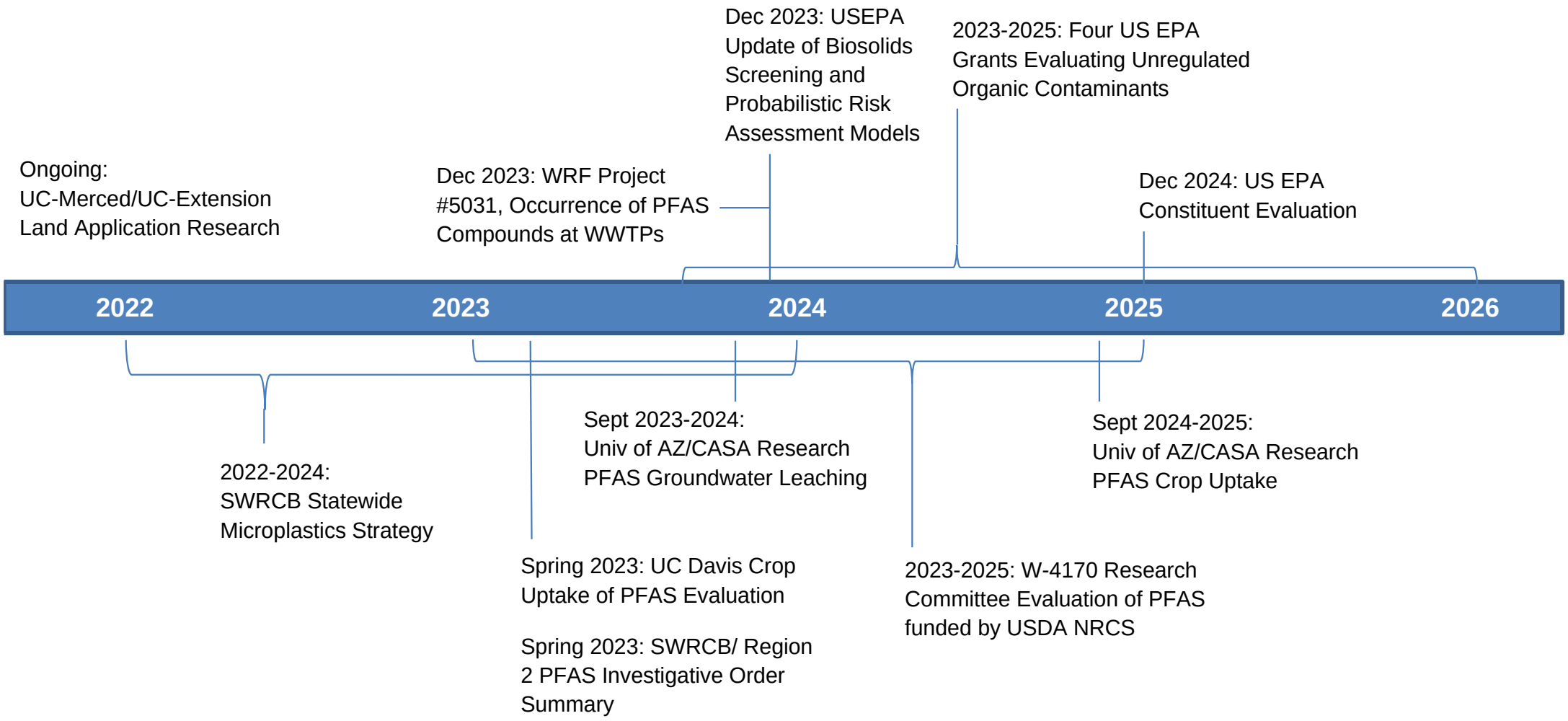
Goal 2: Advance Scientific Research

- Three-year Research Plan priorities:
  - Benefits of biosolids as a soil amendment
  - Demonstrating biosolids safety
  - Expanding biosolids use/markets
- Maintain and expand partnerships with stakeholders
  - *Regulators*
  - *Academics*
  - *Customers (e.g., farmers)*
  - *Landowners*
  - *Etc.*

- **UC-Merced**/UC-Extension C-sequestration
- **Biosolids Emissions Assessment Model (BEAM)**
- Virginia Tech C-Sequestration Meta-Analysis

- **UC-Davis Plant PFAS research**
- **UA National Collaborative PFAS Study**
- USDA NRCS PFAS in land applied biosolids
- **SWRCB PFAS Investigative Order/Region 2**
- **SWRCB Microplastics Strategy**
- **EPA Evaluation of Pollutants in Biosolids**

Goal 2: Advance Scientific Research timing relative to regulatory discussions

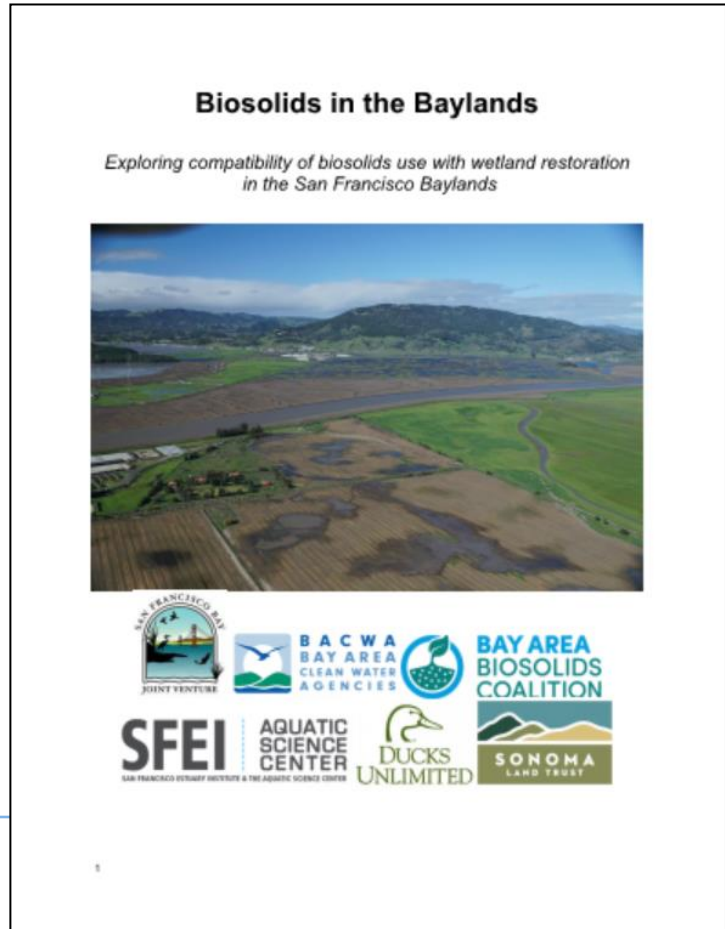


Collaborating with the Regional Water Board and research efforts to answer questions regarding biosolids in Baylands:

~4.5% of the Bay Area biosolids are land applied to agricultural lands in Baylands.

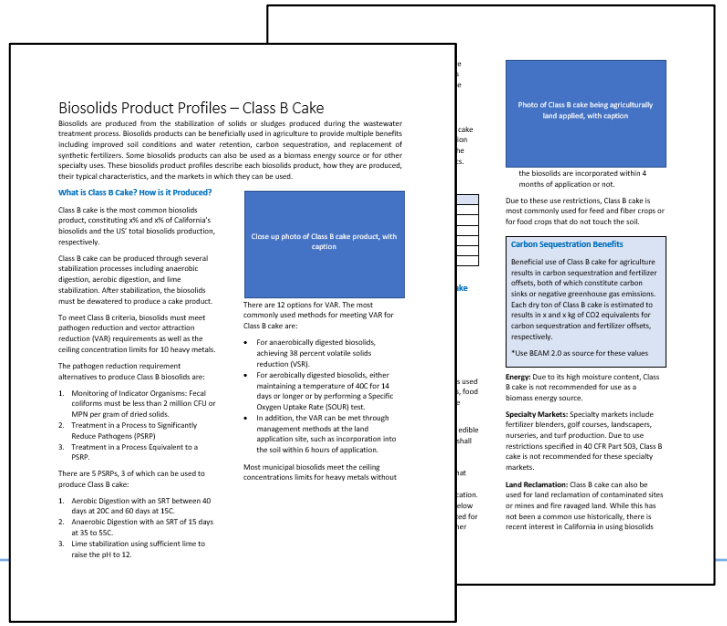
(1) Is biosolids land application in the Baylands compatible with future wetland restoration if needed for sea level rise mitigation?

(2) Could land application benefit the restoration process?



In addition to research…

- Drafting biosolids product profiles
- Performing a RFI for the latest developments in emerging technologies
- Providing News & Events updates on the website
- To summarize funding sources



Biosolids Product Profiles – Class B Cake

Biosolids are produced from the stabilization of solids or sludges produced during the wastewater treatment process. Biosolids products can be beneficially used in agriculture to provide multiple benefits including improved soil conditions and water retention, carbon sequestration, and replacement of synthetic fertilizers. Some biosolids products can also be used as a biomass energy source or for other specialty uses. These biosolids product profiles describe each biosolids product, how they are produced, their typical characteristics, and the markets in which they can be used.

What is Class B Cake? How is it Produced?

Class B cake is the most common biosolids product, constituting x% and x% of California's biosolids and the US' total biosolids production, respectively.

Class B cake can be produced through several stabilization processes including anaerobic digestion, aerobic digestion, and lime stabilization. After stabilization, the biosolids must be dewatered to produce a cake product.

To meet Class B criteria, biosolids must meet pathogen reduction and vector attraction reduction (VAR) requirements as well as the ceiling concentration limits for 10 heavy metals.

The pathogen reduction requirement alternatives to produce Class B biosolids are:

1. Monitoring of Indicator Organisms: Fecal coliforms must be less than 2 million CFU or MPN per gram of dried solids.
2. Treatment in a Process to Significantly Reduce Pathogens (PSRP)
3. Treatment in a Process Equivalent to a PSRP.

There are 5 PSRPs, 3 of which can be used to produce Class B cake:

1. Aerobic Digestion with an SRT between 40 days at 20C and 60 days at 15C.
2. Anaerobic Digestion with an SRT of 15 days at 35 to 55C.
3. Lime stabilization using sufficient lime to raise the pH to 12.

Close up photo of Class B cake product, with caption

There are 12 options for VAR. The most commonly used methods for meeting VAR for Class B cake are:

- For anaerobically digested biosolids, achieving 38 percent volatile solids reduction (VSR).
- For aerobically digested biosolids, either maintaining a temperature of 40C for 14 days or longer or by performing a Specific Oxygen Uptake Rate (SOUR) test.
- In addition, the VAR can be met through management methods at the land application site, such as incorporation into the soil within 6 hours of application.

Most municipal biosolids meet the ceiling concentrations limits for heavy metals without

Photo of Class B cake being agriculturally land applied, with caption

the biosolids are incorporated within 4 months of application or not.

Due to these use restrictions, Class B cake is most commonly used for feed and fiber crops or for food crops that do not touch the soil.

Carbon Sequestration Benefits

Beneficial use of Class B cake for agriculture results in carbon sequestration and fertilizer offsets, both of which constitute carbon sinks or negative greenhouse gas emissions. Each dry ton of Class B cake is estimated to results in x and x kg of CO_2 equivalents for carbon sequestration and fertilizer offsets, respectively.

*Use BEAM 2.0 as source for these values

Energy: Due to its high moisture content, Class B cake is not recommended for use as a biomass energy source.

Specialty Markets: Specialty markets include fertilizer blenders, golf courses, landscapers, nurseries, and turf production. Due to use restrictions specified in 40 CFR Part 503, Class B cake is not recommended for these specialty markets.

Land Reclamation: Class B cake can also be used for land reclamation of contaminated sites or mines and fire ravaged land. While this has not been a common use historically, there is recent interest in California in using biosolids

Updating Matrix

Process Category
Other (e.g., super critical water oxidation)
Process Category
Pyrolysis (requires dryer)
Gasification (requires dryer)
Hydrothermal Liquefaction
Process Category
Land Application (w/ storage)
Compost (existing/future)
Thermal Hydrolysis
Dryers

BAY AREA BIOSOLIDS COALITION

THANK YOU!

Next Bay Area Biosolids Coalition Meeting:
May 8th, 10 am to Noon

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