



# Healthy Soils

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Sustainable Organics Recycling

## SOIL SMART STRATEGY TO CARBON NEUTRALITY

Governor Gavin Newsom issued [Executive Order N-82-20](#) on October 7, 2020, enlisting California's vast network of natural and working lands – forests, rangelands, farms, wetlands, coast, deserts, and urban greenspaces – in the fight against climate change. Within one year of this Order, state agencies must develop a Natural Working Lands Climate Smart Strategy that serves as a framework to advance the states' carbon neutrality goal and builds climate resilience. California then celebrated [Healthy Soils Week November 30 – December 5, 2020](#) where California Department of Food and Agriculture and their partners, including the California Compost Coalition, hosted a series of virtual events around the state. In December 2020, [Project Drawdown](#) released the Study [Farming Our Way Out of the Climate Crisis](#), where it was concluded that our land use and agricultural practices can be changed — using “regenerative” style techniques, and others — to create temporary carbon sinks on land. After years of neglect and being treated like dirt, compost use on soils is being recognized as one of the most cost-effective solutions to mitigate climate change.

We are learning how to mitigate, adapt and be resilient, while needing to regenerate. Regardless of what causes climate change, mitigation measures are needed, forcing California to change common practices and be more resource efficient. California farmers are adapting to new weather patterns and drought with some instituting regenerative agricultural practices. Some of these practices have negative carbon emissions; they sequester carbon by using compost and biochar while building healthy soils. We are producing more energy from our waste and displacing fossil fuels. Electricity delivery now has community choice aggregation and could be transformed into independent power plants with micro-grids. We are trying to build resiliency into our systems so that we are not overly reliant on big utilities, huge imports of high carbon diesel and fertilizers, and instead are developing low carbon,

community-scale systems from our wasted biomass, instituting a localized circular economy.

“[Regenerative Agriculture](#)” describes farming and grazing practices that, among other benefits, reverse climate change by rebuilding soil organic matter with compost and biochar, restoring degraded soil biodiversity, resulting in both carbon drawdown and improving the water cycle. Lawrence Livermore Lab released a January 2020 report, “[Getting to Neutral – Options for Negative Carbon Emissions in California](#)”, which featured natural solutions where compost and biochar are sequestered into the soils, leading to carbon neutrality by 2045; these programs are noted as the most cost-effective solutions.

Compost production and use is now being viewed as contributing to carbon neutrality at CARB's Natural and Working Lands Workshops and in policy documents. The [January 2019 Draft California 2030 Natural and Working Lands Climate Change Implementation Plan](#) looks to double down on compost and mulch use, where this document will be rolled into the upcoming update of the AB 32 Scoping Plan. With new CARB members, healthy soils will be prioritized within its climate change and environmental policy leadership to provide long-term resiliency and position California for economic recovery. California's recycling and composting industry can drive significant investment and job growth, creating 125,000 new green jobs on the pathway to stabilizing the falling statewide recycling rate, while concurrently reducing between 20 and 30 million metric tons of greenhouse gases.

According to new research, soil can act as a huge carbon sink to help balance out greenhouse gases, withholding up to three times as much carbon as is found in the atmosphere. If we can tap into its potential to suck even more carbon pollution out of the air, dirt could save the Earth, making us more resilient with healthy soils.

## Executive Order

Harnessing the innovative spirit of California, Governor Gavin Newsom issued [Executive Order N-82-20](#) on October 7, 2020, enlisting California's vast network of natural and working lands – forests, rangelands, farms, wetlands, coast, deserts and urban greenspaces – in the fight against climate change. A core pillar of Governor Newsom's climate agenda, these novel approaches will help clean the air and water for communities throughout the state and support California's unique biodiversity.

The order directs state agencies to deploy a number of strategies to store carbon in the state's natural and working lands and remove it from the atmosphere. Specifically, state agencies are directed to pursue innovative actions, strategies and partnerships to maximize the full climate benefits of natural and working lands, through:

- Healthy soils management, including planting cover crops, hedgerows and compost applications;
- Wetlands restoration to protect the coast;
- Active forest management to reduce catastrophic risk and restore forest health; and
- Boosting green infrastructure in urban areas with trees and parks.

Ahead of the Executive Order, there were numerous bill proposals in 2020 to implement the healthy soils program, as listed here. SB 1323 and AB 2832 were taking on the key points in the Lawrence Livermore Lab Report on "Getting to Neutral". SB 1323 was going to create a carbon off-set protocol and project registry to monetize carbon sequestration. AB 1567 was going to have an Organic Waste Scoping Plan for a comprehensive strategy. AB 3113 sought a water efficiency grant program.

### [SB 1323 \(Skinner\)](#)

TOPIC: Carbon sequestration on natural and working lands: Registry of projects. This bill would require, no later than July 1, 2021, that the Natural Resources Agency, in coordination with the California Environmental Protection Agency, CARB, and CDFA to establish carbon sequestration goals for natural and working lands. The bill would require CARB to include specified carbon dioxide removal targets as part of its AB 32 scoping plan.

This bill would require, beginning on January 1, 2021, that the office maintain a registry called the California Carbon Sequestration and Climate Resiliency Project Registry for the purposes of identifying and listing carbon sequestration projects in the State that are seeking funding from State agencies or private entities. The bill would require, no later than July 1, 2021, that the office, in collaboration with the Strategic Growth Council, create an application process for project applicants to have their carbon sequestration projects listed on the registry, with the office ensuring that these projects meet certain minimum criteria. The bill would require the office to establish a mechanism for removing these projects from the registry once funded and for tracking the outcomes of those projects.

STATUS: Introduced 2/21/20. Rescinded due to shortened 2020 Legislative calendar.

### [AB 2832 \(Cristina Garcia\)](#)

TOPIC: Greenhouse gases: Carbon neutrality. This bill would declare the policy of the State to achieve carbon neutrality as soon as possible, but no later than 2045, and to achieve and maintain net negative greenhouse gas emissions thereafter. The bill would require CARB to work with relevant State agencies to develop a framework for implementation and accounting that tracks progress toward achieving carbon neutrality, and to ensure that updates to the AB 32 scoping plan identify and recommend measures to achieve carbon neutrality.

STATUS: Introduced 2/20/20. Referred to Natural Resources Committee. Died in Committee.

### [AB 3113 \(Eggman\)](#)

TOPIC: Cannella Environmental Farming Act of 1995: Grant program update. The act requires the Secretary of Food and Agriculture to convene the Scientific Advisory Panel on Environmental Farming for the purpose of providing advice to the secretary on the implementation of the Healthy Soils Program (such practices include compost and mulch applications) and the State Water Efficiency and Enhancement Program. The act requires CDFA to provide an update to the panel on or before January 31, 2021, on aspects of the grant program, as specified. This bill would require, after January 31, 2021, that the department provide to the panel subsequent reports on aspects of the grant program every 2 years.

STATUS: Introduced 2/21/20. Hearing cancelled at the request of the Author.

### [AB 1567 \(Aguiar-Curry\)](#)

TOPIC: Organic Waste: Requires the Strategic Growth Council to develop a scoping plan for the State to meet its organic waste management mandates, goals, and targets. It would also require the scoping plan to include among other things, recommendations on policy and funding support for closing the loop on carbon-neutral or carbon-negative organic waste management practices.

STATUS: Jan. 27, 2020. Read third time. Passed. Ordered to the Senate. (Ayes 78. Noes 0. Page 3899.) June 23, 2020 – Referred to Committee and Died.

### [AB 2680 \(Aguiar-Curry\)](#)

TOPIC: Direct land application of green waste. This bill would require the department, on or before January 1, 2022, to adopt regulations establishing a local permitting and enforcement process for the land application of green material derived from the municipal solid waste stream. The bill would require the regulations to require an entity that engages in the land application of 250 or more tons of green material per year on a single parcel of land to notify the local enforcement agency and to prohibit the land application of 1,000 or more tons of green material /year without an SWFP.

STATUS: Died in Committee.

## Working Lands

Lawrence Livermore Lab (LLL) released a January 2020 report, [“Getting to Neutral – Options for Negative Carbon Emissions in California”](#), which featured natural solutions, where compost and biochar are sequestered in the soils, and the conversion of biomass into transportation fuels. These programs are noted as the most cost-effective solutions using current technologies to convert food waste, green waste, and wood waste into carbon negative products such as renewable natural gas and biochar from biomass gasification. SB 1323 (Skinner) attempted to utilize this study as the basis of a bill to establish the California Carbon Sequestration and Climate Resilience Project Registry for the purposes of identifying and listing carbon sequestration projects in the State that are seeking funding from State agencies and private entities.

To reach its ambitious goal of economy-wide carbon-neutrality by 2045, LLL determined that California will likely have to remove on the order of 125 million tons per year of CO<sub>2</sub> from the atmosphere. California can achieve this level of negative emissions at modest cost, using resources and jobs within the State, and with technology that is already demonstrated or mature. LLL concluded this after a comprehensive, first-of-its-kind, quantitative analysis of natural carbon removal strategies, negative emissions technologies, and biomass resources in the State. When LLL staff presented this report at Legislative hearings and conferences, they compared the costs to be \$8 billion per year, or as they said – the cost of garbage in the state – or just 0.34% of the current gross domestic product.

### Double Down on Compost Use

The [January 2019 Draft California 2030 Natural and Working Lands Climate Change Implementation Plan](#) (Plan) has been under review for one year, after two years of workshops. The State finally included [CCC metrics](#) to double down on compost and mulch use by 2030 and made compost application a priority. Where the preliminary draft Plan did not include compost use on irrigated cropland at all, now compost application is being targeted, adding 31,000 to 62,000 acres each year to 2030, with mulching over cropland also increasing at 10,400 to 20,800 acres per year.

The analysis to support this Plan used a sampling method to combine COMET Planner outputs from twelve agricultural counties into a statewide average. While specific levels of activity for each practice were required to generate the estimated climate benefits, CDFA will target implementation acres for healthy soils practices generally, rather than on practice-specific acreages. Additionally, because a statewide average was used, the acreage target is statewide rather than regional. Considering historic funding levels, it is assessed that implementation at the scale would cost approximately \$18 – \$36 million per year, reducing GHG by 5.3 to 10.7 million metric tons.

This Plan aims to integrate management objectives wherever possible, coordinating all natural and working lands programs under a united approach. The implementation will significantly increase and improve conservation, restoration, and management of California’s natural and working lands through State programs and other means, to enhance their resilience to worsening climate change impacts, sequester carbon, reduce GHGs, and create healthy soils.

The last CARB Workshop was on May 17, 2019, where we heard from academic experts, practitioners, and the public to explore how policy, practices, and innovative financing mechanisms can help California’s natural and working lands contribute to carbon neutrality by mid-century while supporting healthy and resilient ecosystems. CARB plans to roll this information into the upcoming AB 32 Scoping Plan starting in Spring, 2021.

### SB 1383 Regs – Compost Use

**Procurement of Recovered Organic Waste Products, adopted within Article 12**, is authorized in SB 1383, where local government is mandated to procure organic waste products. CalRecycle will be providing the annual recovered organic waste product procurement for each jurisdiction on or before January 1, 2022 and every five years thereafter, which shall be calculated by multiplying the per capita procurement target of 0.08 tons per resident, and which may be achieved directly or via a contractor. Jurisdictions have the flexibility to purchase one of the four products to implement the circular economy locally, which on a statewide basis would create huge markets (for a population of 44 million people) by 2025. A balanced procurement portfolio could fuel 2,000 CNG trucks, produce 87 MW, amend 100,000 acres of parklands and 10,000 acres of mulch for erosion control. If all jurisdictions choose to provide compost, up to 1.85 million tons would need to be purchased and could be used on 185,000 acres of farmland.

CalRecycle prepared the [Model Procurement Policy](#) to assist jurisdictions with their requirements related to the procurement of recovered organic waste products. Diversion Strategies is hosting a free [6-session program series](#), December through January, on Innovative Solutions for SB 1383 Compliance with a procurement session slated for January 21, 2021.

### AB 32 Scoping Plan

At the November 19, 2020 CARB meeting, staff presented an update on [California’s Greenhouse Gas Goals and Deep Decarbonization](#) and set the tone for the next year, as CARB pivots to carbon neutrality by 2045. Compost use on working lands and RNG will be showcased during the AB 32 Scoping Plan Update, which will be adopted in the late summer of 2022. CARB will need to set targets for the natural and working lands, both as a source and sink, to support overall carbon neutrality. The update must include cost per ton, social cost of carbon, and the economic benefit, where compost use on working lands is the most cost-effective to date.

## Project Drawdown

Founded in 2014, Project Drawdown is a nonprofit organization that seeks to help the world reach “Drawdown”— the future point in time when levels of greenhouse gases in the atmosphere stop climbing and start to steadily decline. Since the 2017 publication of the New York Times bestseller, *Drawdown*, the organization has emerged as a leading resource for information and insight about climate solutions.

In December 2020, Drawdown released the Study, [Farming Our Way Out of the Climate Crisis](#), where it was concluded that our land use and agricultural practices can be changed — using “regenerative” style techniques, and others — to create temporary carbon sinks on land. These carbon sinks work by sequestering carbon within biomass and soils, significantly raising the level of these carbon stocks above their present-day values. And we must recognize the need to manage carbon sinks well into the future to avoid releasing the carbon back into the atmosphere if the practices that sequestered it are discontinued or if natural disasters like droughts or fires create a disturbance.

Pursuing these solutions found in the study will require substantial changes in policy, business practice, capital, and behavior, of course. But most of these would generate incredible economic and social co-benefits and would be very smart things to do. Reducing food waste, reducing the overuse of fertilizers and manure on farm fields, and promoting regenerative agricultural practices could significantly contribute to improving the health, economic, and local environmental benefits of the food system — and help address climate change at the same time.

On land, carbon dioxide is absorbed through photosynthesis, and is later stored in living biomass or as organic matter in the soil. Depending on the form of biomass or soil organic matter, this carbon can be stored on land, away from the atmosphere, for a season, several years, multiple decades, or several centuries. Ultimately, the carbon that is locked up in biomass or soil organic matter is returned to the atmosphere, through decomposition and microbial respiration.

## CARB and CAR Programs

The Cap-and-Trade Program is a key element of California’s climate plan. It sets a statewide limit on sources responsible for 85 percent of California’s greenhouse gas emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest cost options to reduce emissions. At last auction in February 2020, 57 million allowances sold with the current auction reserve fund at \$16.86 per ton. The revenues raised are \$12.5 billion so far and fund an array of programs, including compost and anaerobic digestion facility development at CalRecycle.

CARB adopted the six project types of Regulatory Compliance Offset Protocols that may be used to generate GHG offset credits which include forest, livestock, ozone depleting substances, mine methane capture, and rice cultivation. Forest offsets account for 80% of the market with 136 million credits, where soil has a greater potential to sequester carbon.

These Regulatory Compliance Offset Protocols were first developed as voluntary offset markets, typically through the [Climate Action Reserve](#) (CAR), and were modified by CARB to be clear and enforceable. There is a dearth of compliance offsets that are needed as the GHG reduction targets ratchet down to 40% by 2030. AB 398 (Garcia) was adopted in 2017 to extend the Cap-and-Trade Program to 2030 and requires CARB to establish a Compliance Offsets Protocol Task Force. The Task Force will provide guidance to CARB in establishing new offset protocols for the Cap-and-Trade Program with direct environmental benefits in the State while prioritizing disadvantaged communities, rural and agricultural regions. The Task Force met on March 2, 2020, and CCC

will provide comments to initiate the development of compost and biochar use protocols.

A draft Report is due soon and will be presented to CARB in early 2021. The general offset criteria is that reductions must be real, additional, permanent, verifiable and enforceable – beyond business as usual. It will be a multi-year process, will involve all stakeholders and could be ready in a few years as SB 1383 kicks into gear.

With the [Lawrence Livermore Lab](#) recognizing compost and biochar use as carbon negative practices and with the [Natural and Working Lands Climate Change Implementation Plan](#) calling for the doubling of compost use to achieve up to 10.7 million metric tons of GHG reduction, now is the time to develop these protocols. CARB adopted conservative GHG emissions reduction factors for compost use that should be expanded to be more encompassing of all of the co-benefits, and can be used as a starting point to develop the protocol. AB 293 (Garcia, 2019) calls for consideration of offsets on agricultural lands where up to 7.5 million more tons of compost use per year is targeted by 2030.

The [Climate Action Reserve](#) develops voluntary GHG offsets, including a [Soil Enrichment Protocol](#), which will provide a strong basis for the CARB’s regulatory protocol. CAR adopted version 1.0 on September 30, 2020 for soil organic carbon accrual on non-forest lands as a policy paper that outlines the challenges with and opportunities. Validating these carbon negative emissions and monetizing them is needed to provide incentives to transport the material to agricultural sites. SB 1323 (Skinner) could have established the California Carbon Sequestration and Climate Resilience Project Registry for the purposes of identifying and listing carbon sequestration projects.