CALIFORNIA
NATIVE PLANT SOCIETY

The need to research potential adverse effects to native grassland species composition and structure resulting from the application of compost onto grazed grasslands

In the FY 2015-16 State Budget, Governor Brown has proposed appropriating $20M funding to implement projects and research related to the Healthy Soils Initiative (HSI). California state agencies involved in the development, certification, and eventual implementation and monitoring of HSI programs have convened informational workshops and requested public input on the Initiative, in part to help identify research gaps related to proposed HSI projects. CNPS has been tracking the development of HSI proposals related to the statewide application of compost to urban softscapes, agricultural row-crops and orchards, and grazed grasslands, and we recognize multiple benefits possible through the Healthy Soils Initiative. At the same time, we have identified a fundamental research need related to compost-onto-grasslands projects that must be addressed as these projects move forward to prevent unintended consequences to native grassland plants and animals over the long-term.

To date, research related to the compost-onto-grasslands concept has been focused on carbon sequestration dynamics associated with the practice. While both research and on-going pilot projects have demonstrated that adding compost does enhance CO2 uptake in grazed grassland systems, critical questions must still be answered before Californians can be assured that the addition of compost will not adversely alter native species composition and structure of grassland habitats where the practice is applied. Unintentionally altering grassland species composition could negatively affect already competition-stressed native annual forb and grass species and pollinators. Altered grassland structure could adversely impact wildlife species dependent on short-structure landscapes (e.g., kit fox, salamanders, and burrowing owls).

Research to address this question will require the monitoring of treated vs. untreated plots, across a spectrum of grassland types (e.g., coastal, moist, perennial species-dominated grasslands to central valley, arid, annual forb/grass-dominated grasslands) and at sufficient time intervals to document and analyze species composition and structure both before and after compost addition. Data collection could be integrated into the existing draft treatment protocol[1], developed by the Marin Carbon Project (MCP), and conducted as part of a beta-testing process for the draft protocol.

Concurrent with research that assesses habitat dynamics of compost onto grasslands, it is essential that future carbon credits awarded to compost-on-grassland projects be distributed according to a prioritized credit structure favoring the practice on lands that provide the greatest beneficial change in carbon sequestration for the least impact on native habitat, e.g., lands being converted from other agricultural use back to rangelands, or lands without a native grassland component.

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[1] Methodology for Compost Additions to Grazed Grasslands v1.0, October 2014. The American Carbon Registry.

[2] Ryals, R., M. Kaiser, M.S. Torn, A.A. Berhe, and W.L. Silver. 2014. "Impacts of Organic Matter Amendments on

Conversely, carbon credit incentives should not extend to lands already designated for conservation. These include lands acquired as compensatory mitigation or otherwise currently managed as mitigation lands, lands identified for conservation in existing or in-process NCCPs or HCPs, lands designated or modeled as critical habitat for sensitive species, and rare grassland types including but not limited to serpentine grasslands, lands hosting vernal pool complexes, alkali grasslands, and desert grasslands.

Methodology-Specific Comments

Adding compost to grazed grasslands can enhance CO2 uptake in treated areas, and recent field studies conducted through the Marin Carbon Project (MCP) have quantified such benefits measured at two annual grassland sites in California (Nicasio, CA and Browns Valley, CA in (Ryals et al. 2014[2]; Ryals and Silver 2013[3])). MCP has demonstrated that by applying 0.5 inch of aerobically-generated compost with no tilling onto grazed grasslands in Year 1, a rancher can increase both above ground and subsurface CO2-sequestration in treated areas for several years after initial application. This creates a potential win-win scenario by reducing landfill burden and increasing CO2-sequestration of treated lands. To incentivize the expanded application of this practice in California, a formal methodology has been drafted and submitted to the American Carbon Registry with the ultimate goal of having the protocol qualify for California's carbon credit funding. We propose that this draft protocol provide the framework within which essential research can be integrated into pilot projects to test whether the practice results in adverse effects to grassland biodiversity and/or structure.

To our knowledge, no studies are available that inform questions regarding compost application's effects on grassland biodiversity or structure. Therefore, the information that a Qualified Expert (QE) (i.e., a Certified Rangeland Manager, NRCS Soil Conservationist or Qualified Extension Agent) has available to determine project location suitability, timing of compost application, and/or site eligibility (e.g., baseline species composition), is insufficient. Standard NRCS ecological site descriptions (ESD's)[4] are not fully developed for the state and are especially lacking in grassland habitats, thus are not able to adequately describe the variation within California rangeland communities, let alone assess a compost treatment's impacts to grassland biodiversity.

Below we identify points along the compost-onto-grassland methodology timeline where field studies would be most applicable and informative at addressing current research gaps related to the practice.

• Pre-project Land Assessment
This occurs before compost application and during development of a rancher's GHG Project Plan. The Land Assessment is used for the following project requirements;

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[2] Ryals, R., M. Kaiser, M.S. Torn, A.A. Berhe, and W.L. Silver. 2014. "Impacts of Organic Matter Amendments on Carbon and Nitrogen Dynamics in Grassland Soils." *Soil Biology and Biochem*istry. 68: 52–61.

[3] Ryals, R. and W.L. Silver. 2013. "Effects of organic matter amendments on net primary productivity and greenhouse gas emissions in annual grasslands." *Ecological Applications.* 23:49-59.

[4] http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/desc/

- to determine if the land represents intact native grasslands, in which case the area becomes ineligible as a project site; (at Box 2, p. 11-12)
- to determine if the land is a heterogeneous grassland type that requires *stratification* of the project site. Stratification means each strata of the project is treated as its own individual project under the GHG Project Plan (i.e., each strata would get its own model development, etc.). (at pp. 13-14)

• Model verification

Land Assessment data provides attributes used during Model development and verification (at p. 33 and p. 48). This requires a Land Assessment developed by a QE using NRCS's Ecological Site Description (ESD) framework for rangelands.

While we recognize that much thought and care has gone into developing the eligibility and on-going monitoring requirements of the current protocol, additional research is needed to determine what effect, if any, compost application will have on grassland nativity and biodiversity and structure. This research can be integrated into regional pilot projects that conform to and can serve as beta-test sites for Methodology v1.0 protocols.