


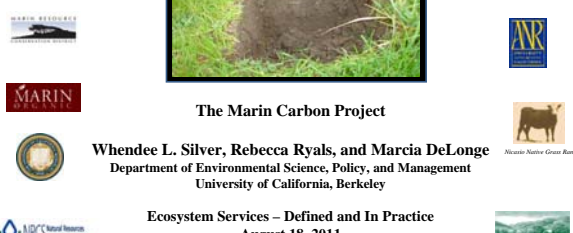
Ecosystem Services from Soils: The Role of Carbon Sequestration



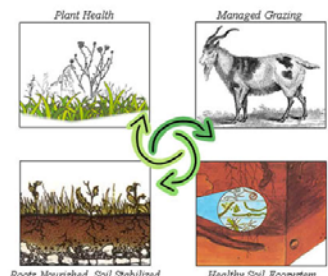
The Marin Carbon Project

Whendee L. Silver, Rebecca Ryals, and Marcia DeLonge
Department of Environmental Science, Policy, and Management
University of California, Berkeley

Ecosystem Services – Defined and In Practice
August 18, 2011



Soil provides nutrients and water for plant growth, which directly and indirectly support agriculture.




Plant Health *Managed Grazing*


Roots Nourished, Soil Stabilized *Healthy Soil Ecosystem*

Figure credit: Iowa State University Extension, Integrated Crop Management

Soils harbor tremendous biodiversity




Bacteria



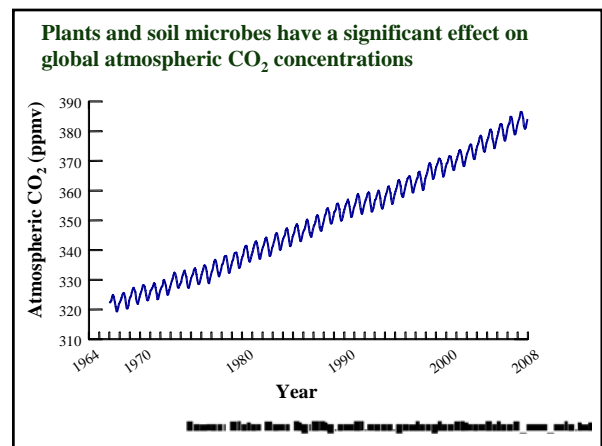
Bacillus species

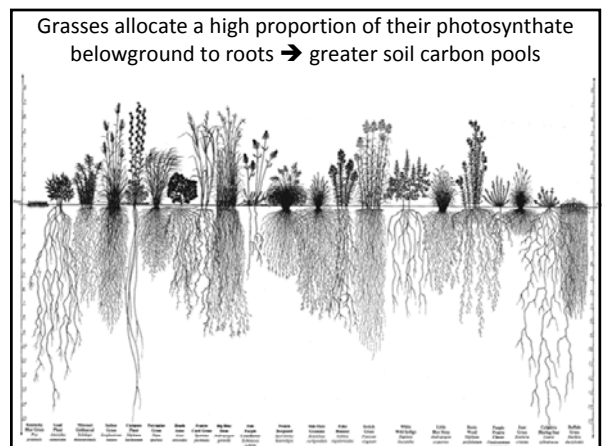
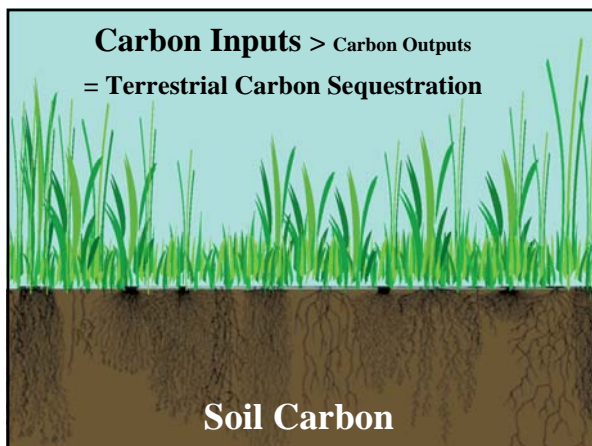
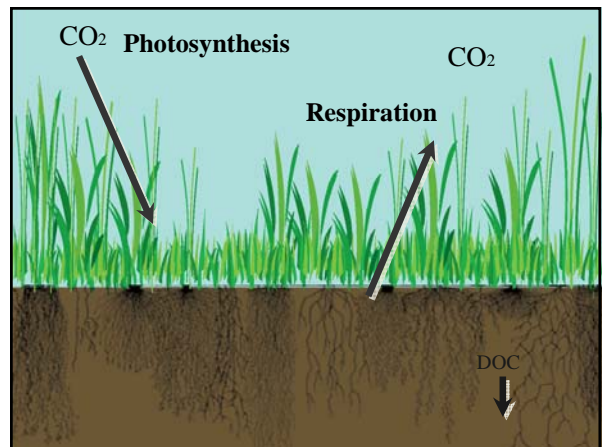
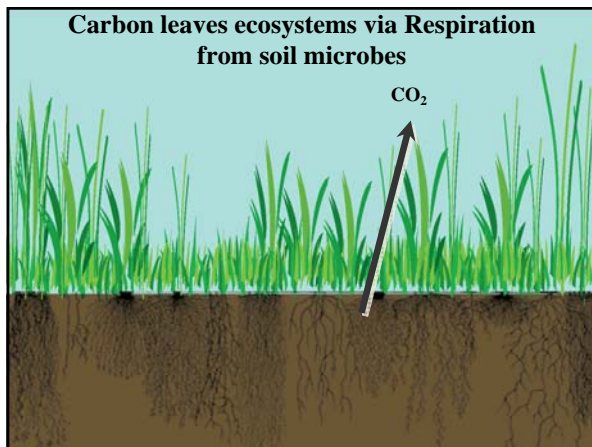
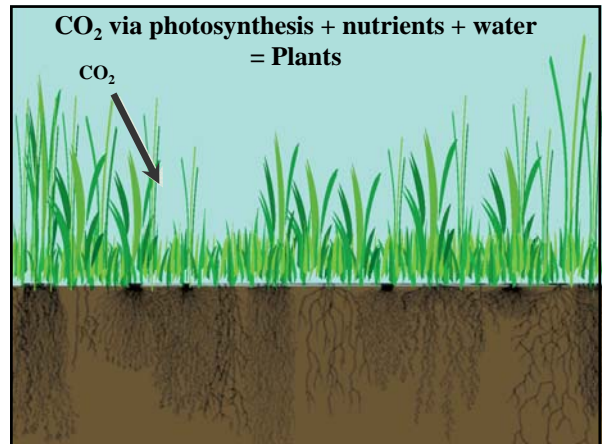
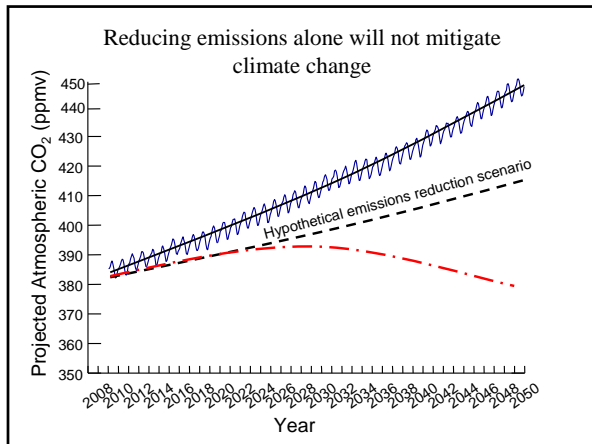
Fungi

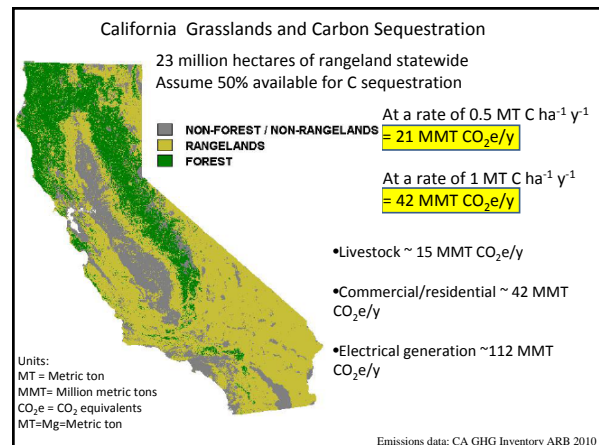
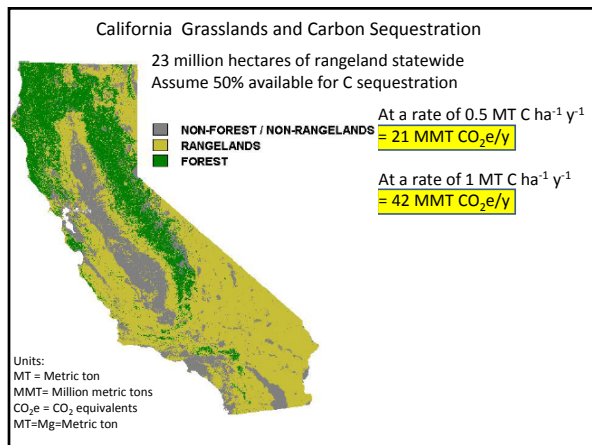
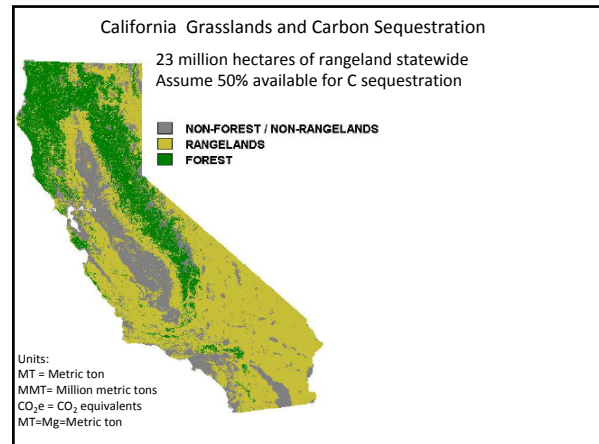
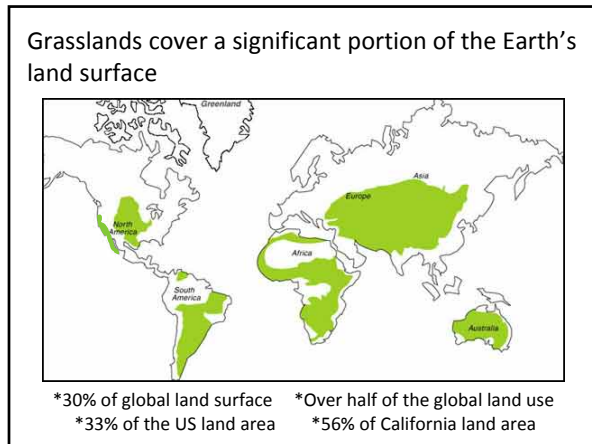


Spongiforma squarepantsii

Soil organisms are nature's waste disposal system





Managing grasslands for increased carbon content has many co-benefits

Carbon sequestration in pastures and rangelands increases:

- Fertility
- Water holding capacity
- Soil stability
- Sustainability
- Productivity

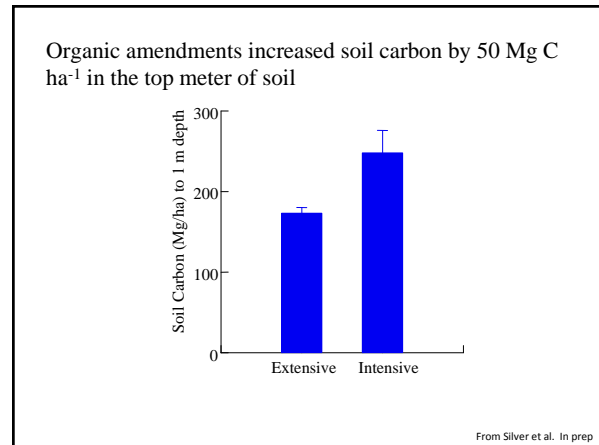
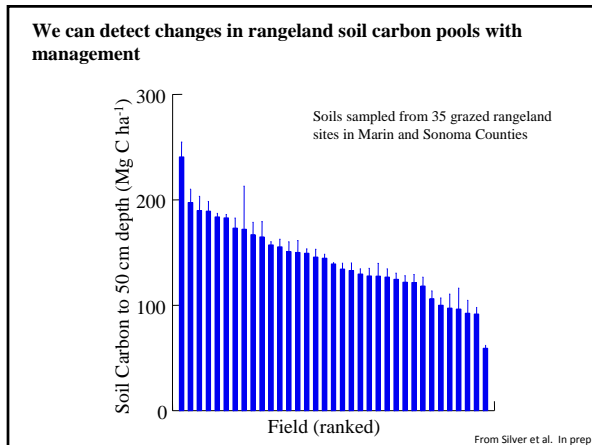
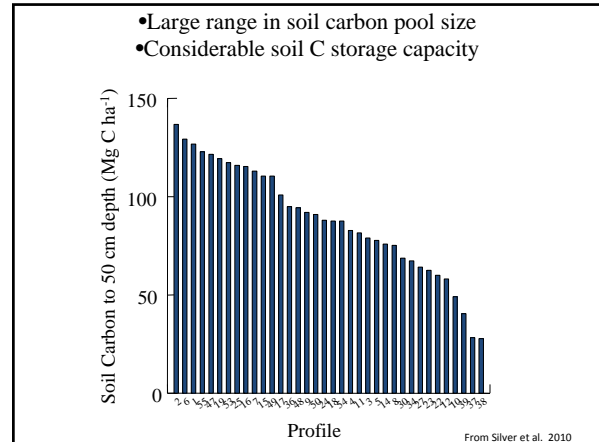
Marin Carbon Project
(UC Berkeley and Davis, Stakeholders, Resource Conservation District, UC Extension, Marin Agricultural Land Trust, Marin Organic, County Agricultural Commissioner, USDA-NRCS)

Can we manage rangelands to increase carbon storage, while maintaining other ecosystem services?

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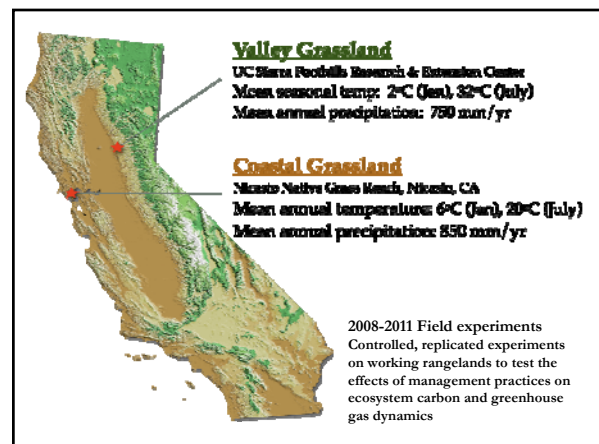
- **Forage production**
- **Soil stability**
- **Plant community/biodiversity**

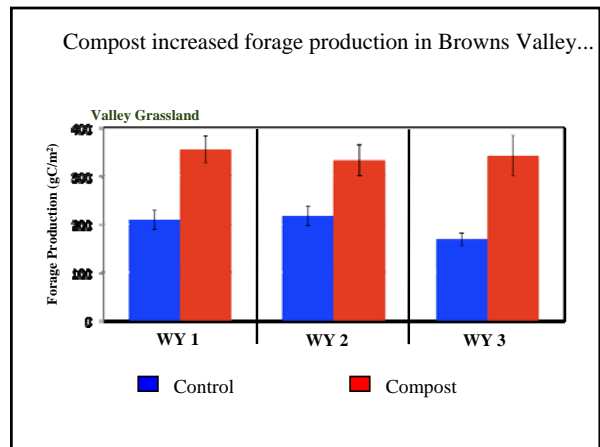
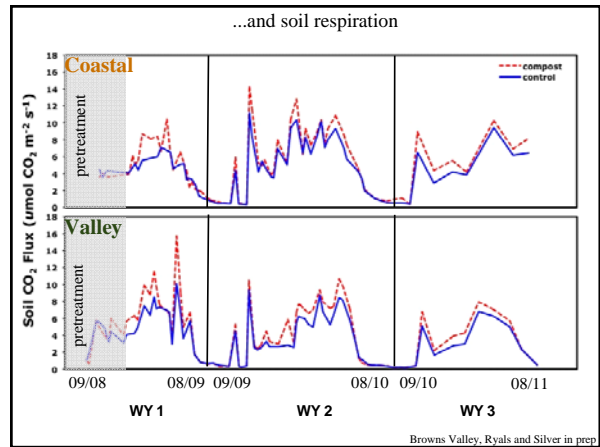
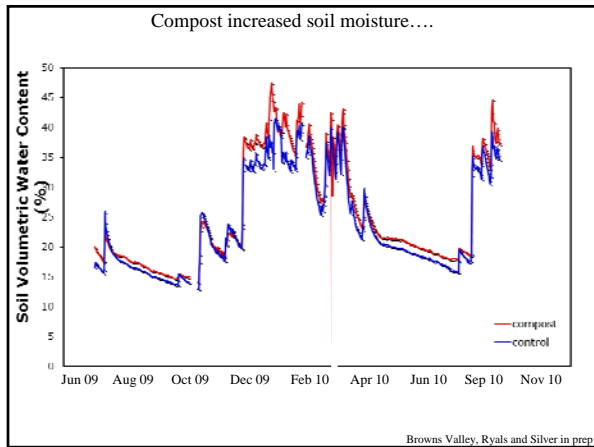


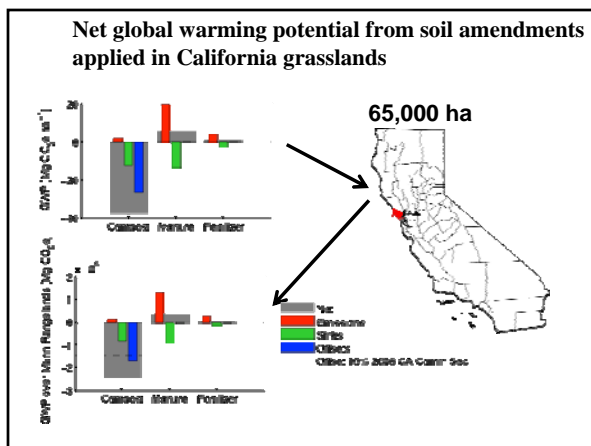
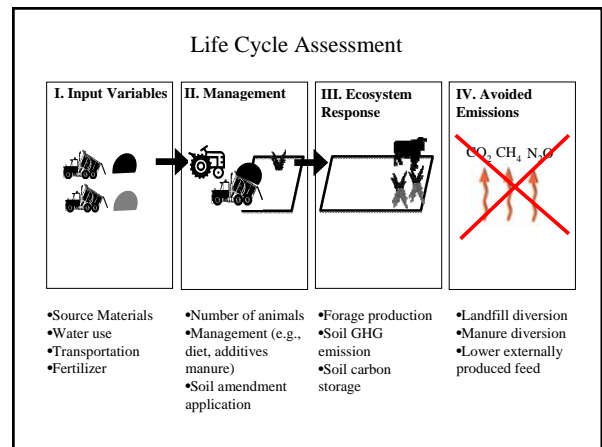
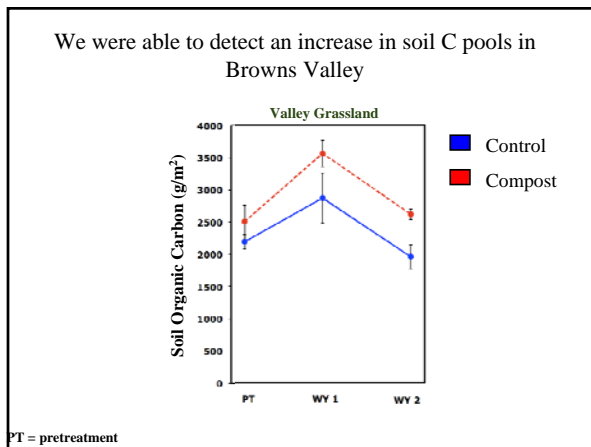
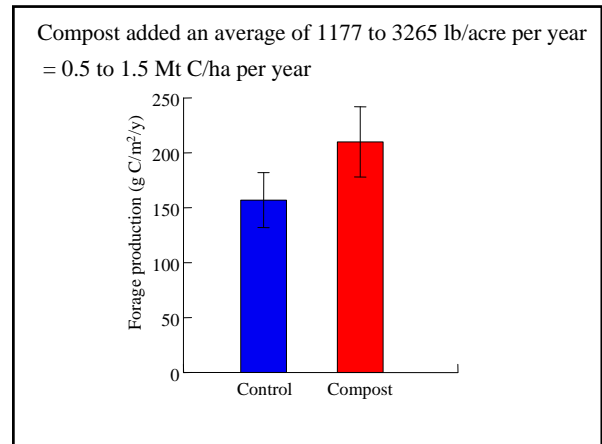
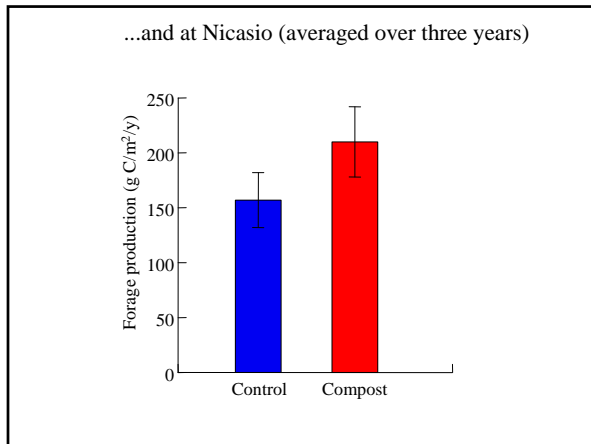
Redirecting the waste stream and reducing greenhouse gas emissions

Livermore Landfill

Jepson Prairie Organics







Summary

Rangeland soils and plants offer many ecosystem services.

One key ecosystem service is their potential to store carbon, and help mitigate climate change.

Our research suggests that compost amendments increase plant and soil carbon sequestration.

Life cycle and simulation modeling in progress will help us transfer the science into sound management practices.

Marin Carbon Project



Support provided by:
 The Marin Community Foundation
 The Rathmann Family Foundation
 The Lia Foundation
 The Kearney Foundation for Soil Science
 USDA

