The connection between grazing and soil health: what do we know and what are we learning?

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Point Blue
Conservation science
for a healthy planet.

Central Coast Rangeland Coalition Meeting
Fall 2018

Objectives

- Discuss what we know about grazing and soil health, globally and in California
- Highlight what we're learning from Point Blue's Rangeland Monitoring Network
- What's next?

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What do we know about grazing and soil health?

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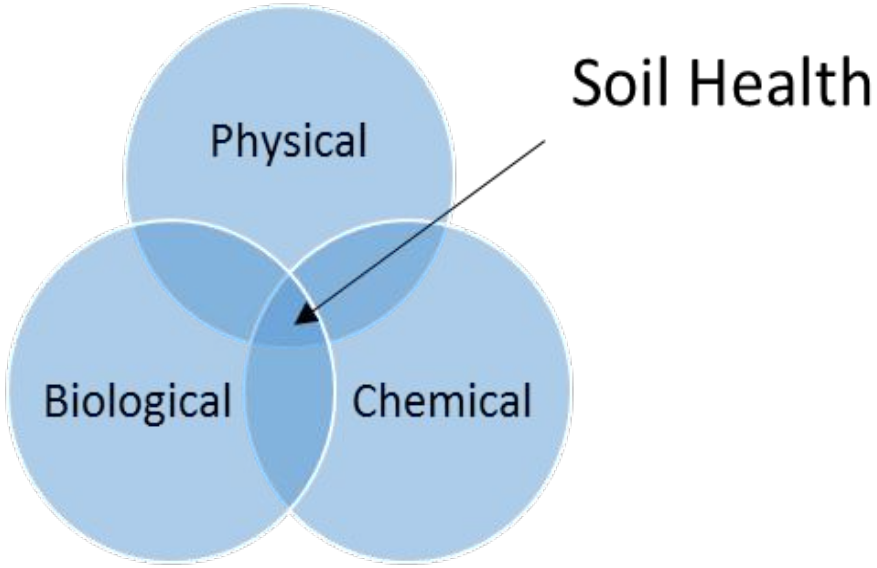
Soil health: The capacity of the soil to function as a vital living ecosystem that maintains biodiversity and maximizes provision of (multiple) ecosystem services in a sustainable way



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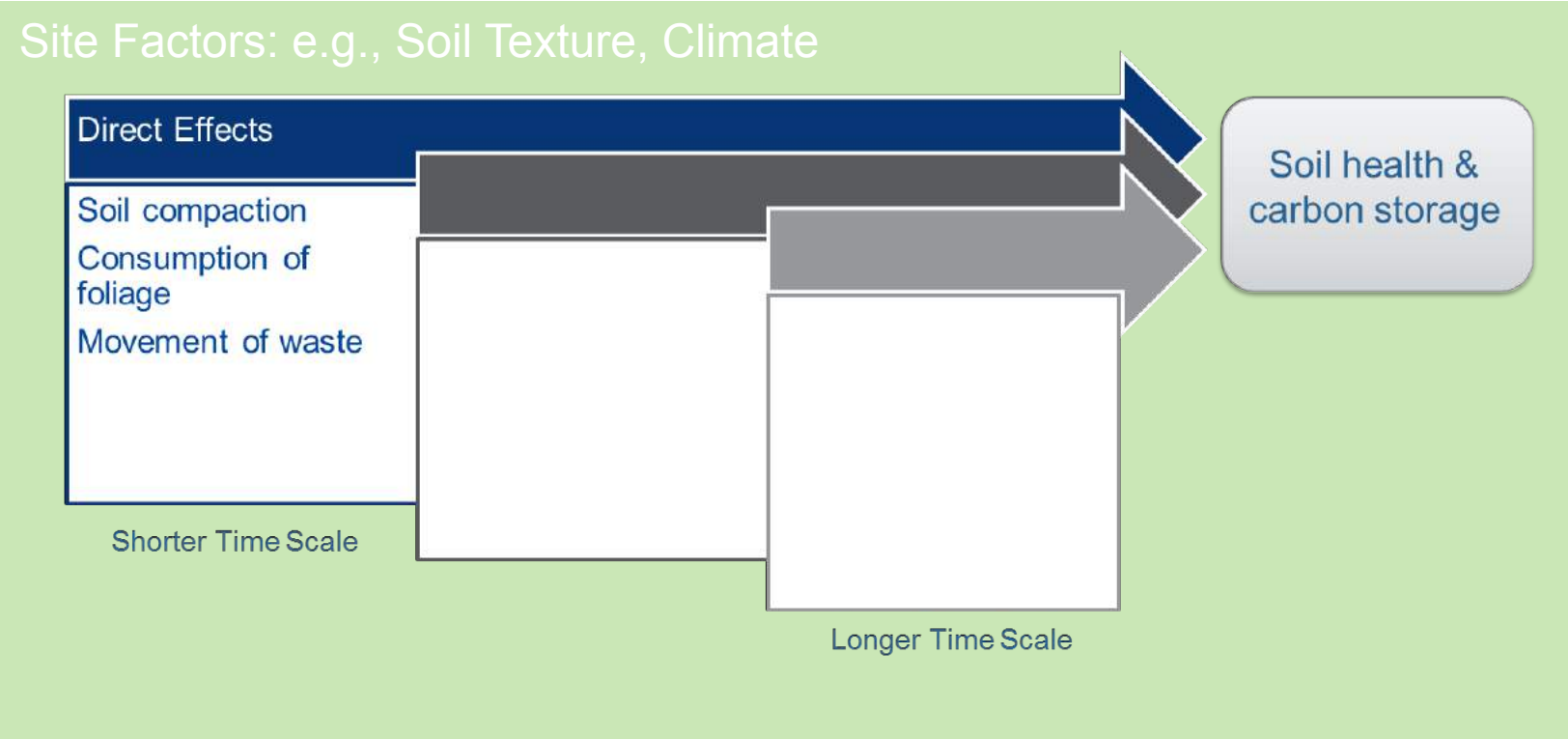
How can grazers influence the soil?



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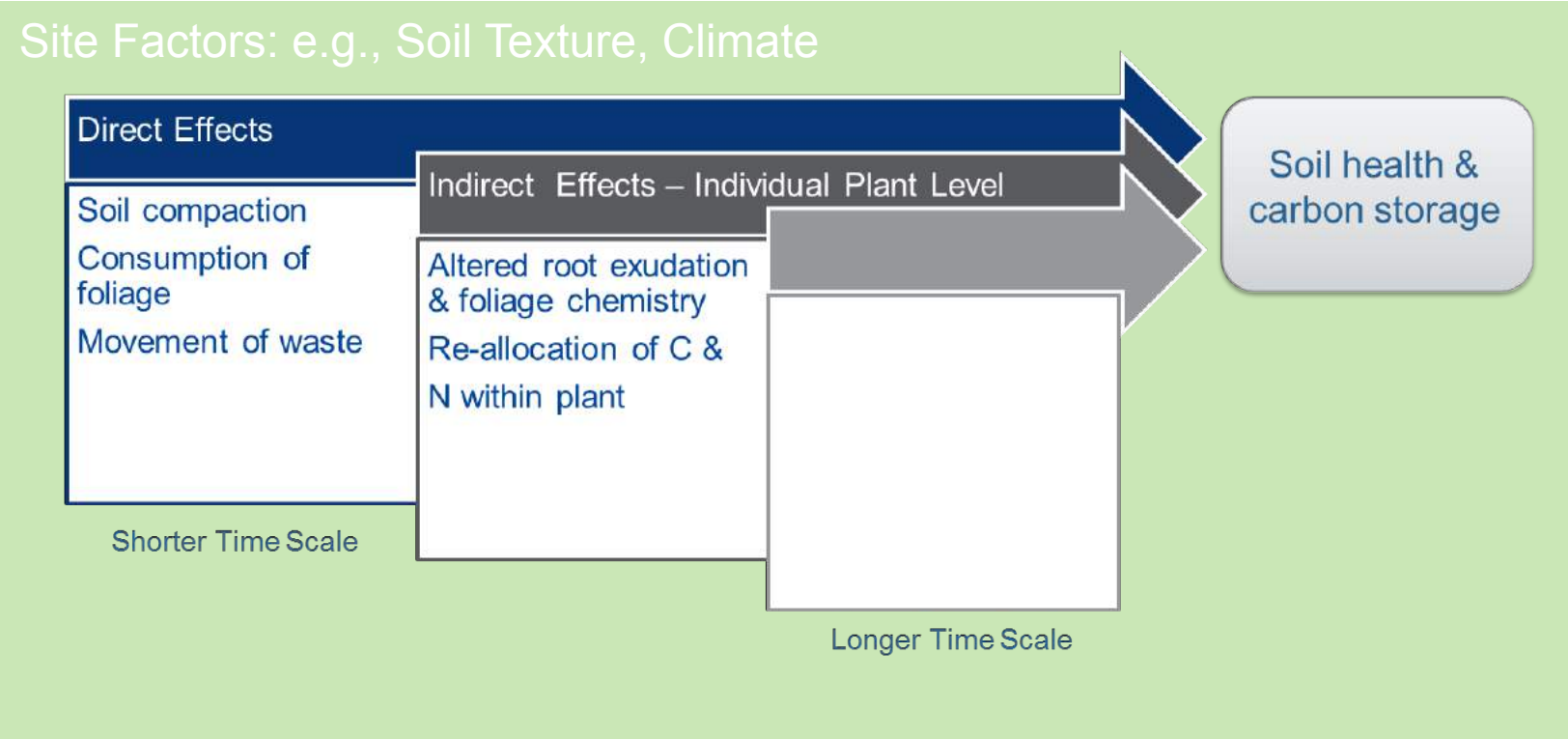

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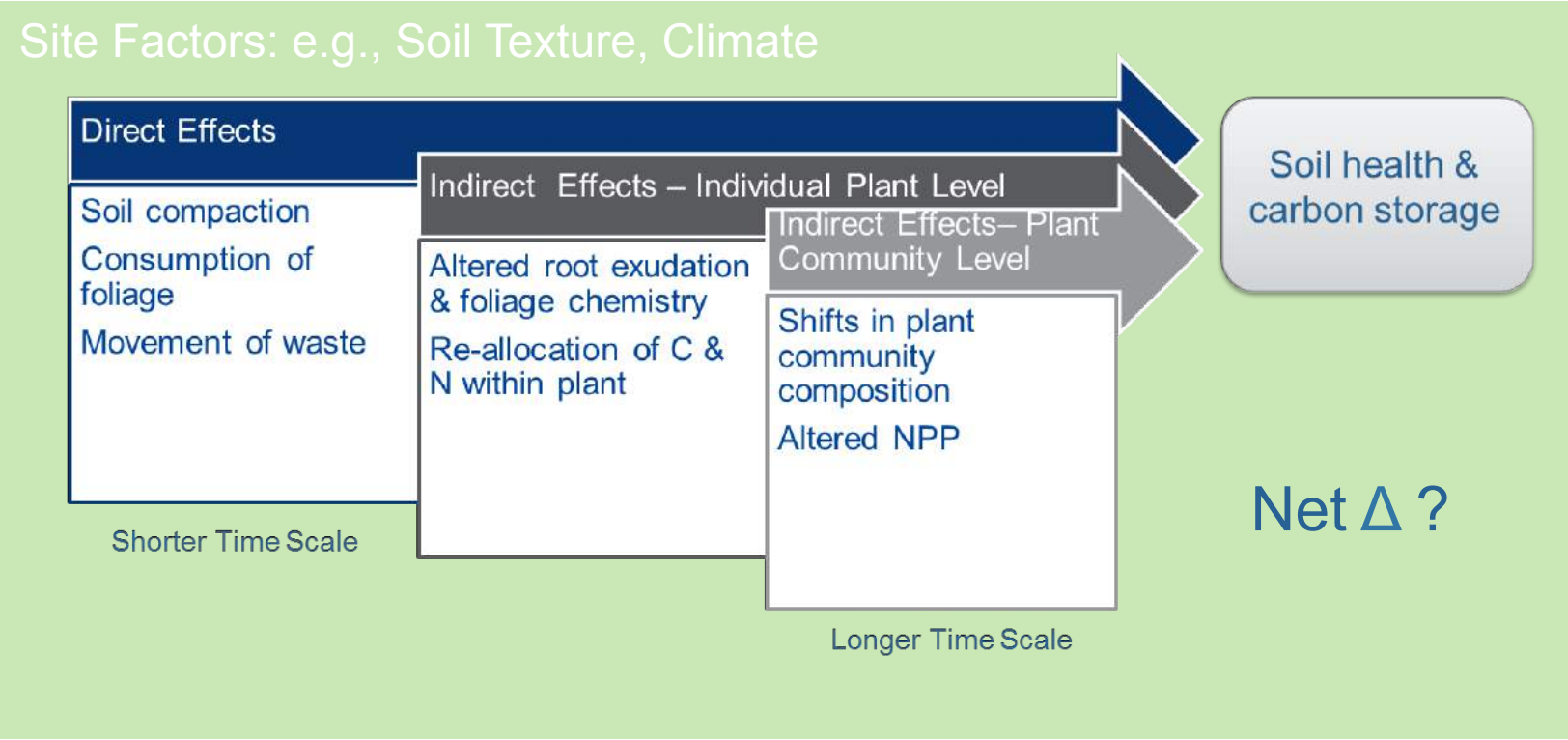
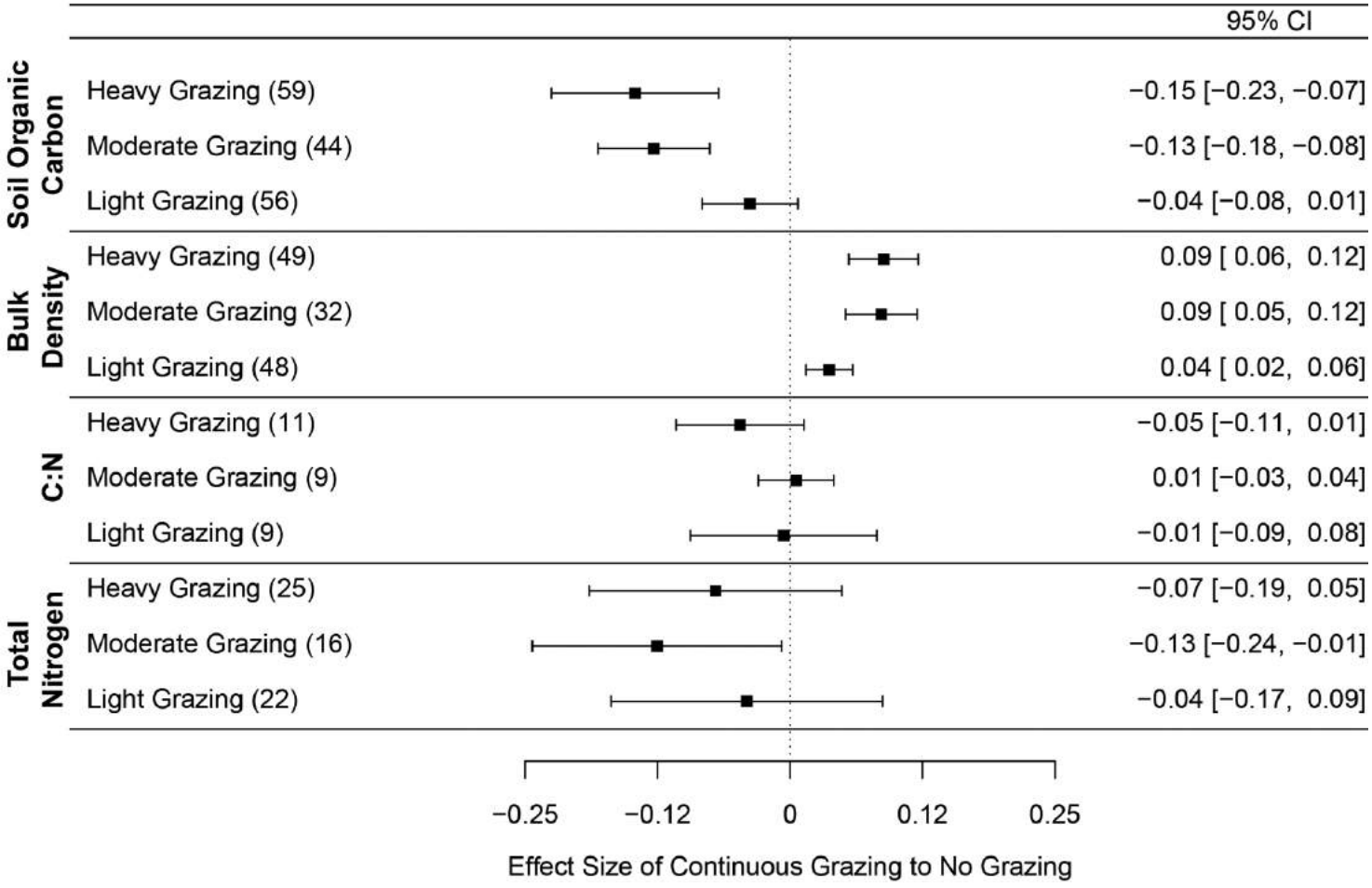


Grazing intensity influences soil organic carbon (SOC) and bulk density



Byrnes et al. (2018)

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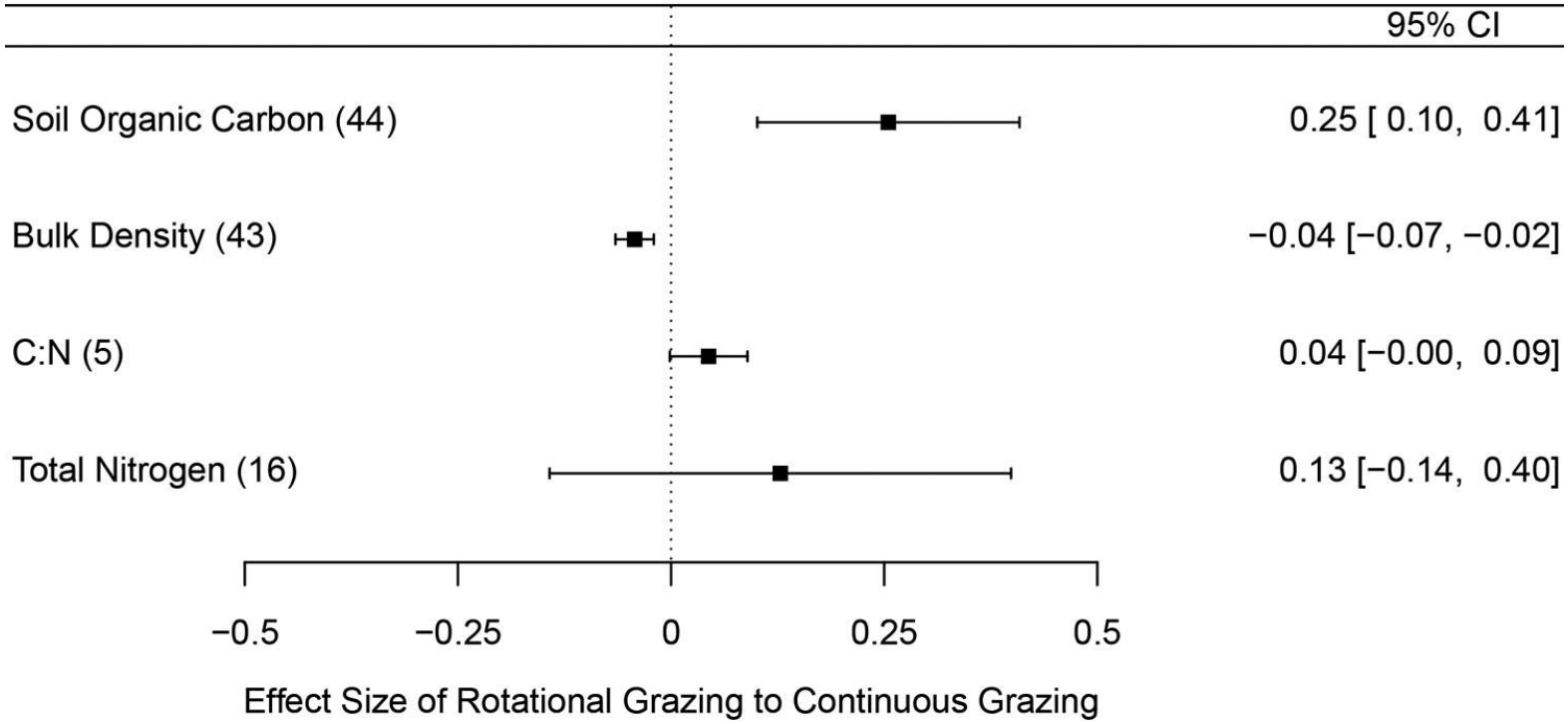
Rotational grazing strategies improve SOC and bulk density over continuous grazing



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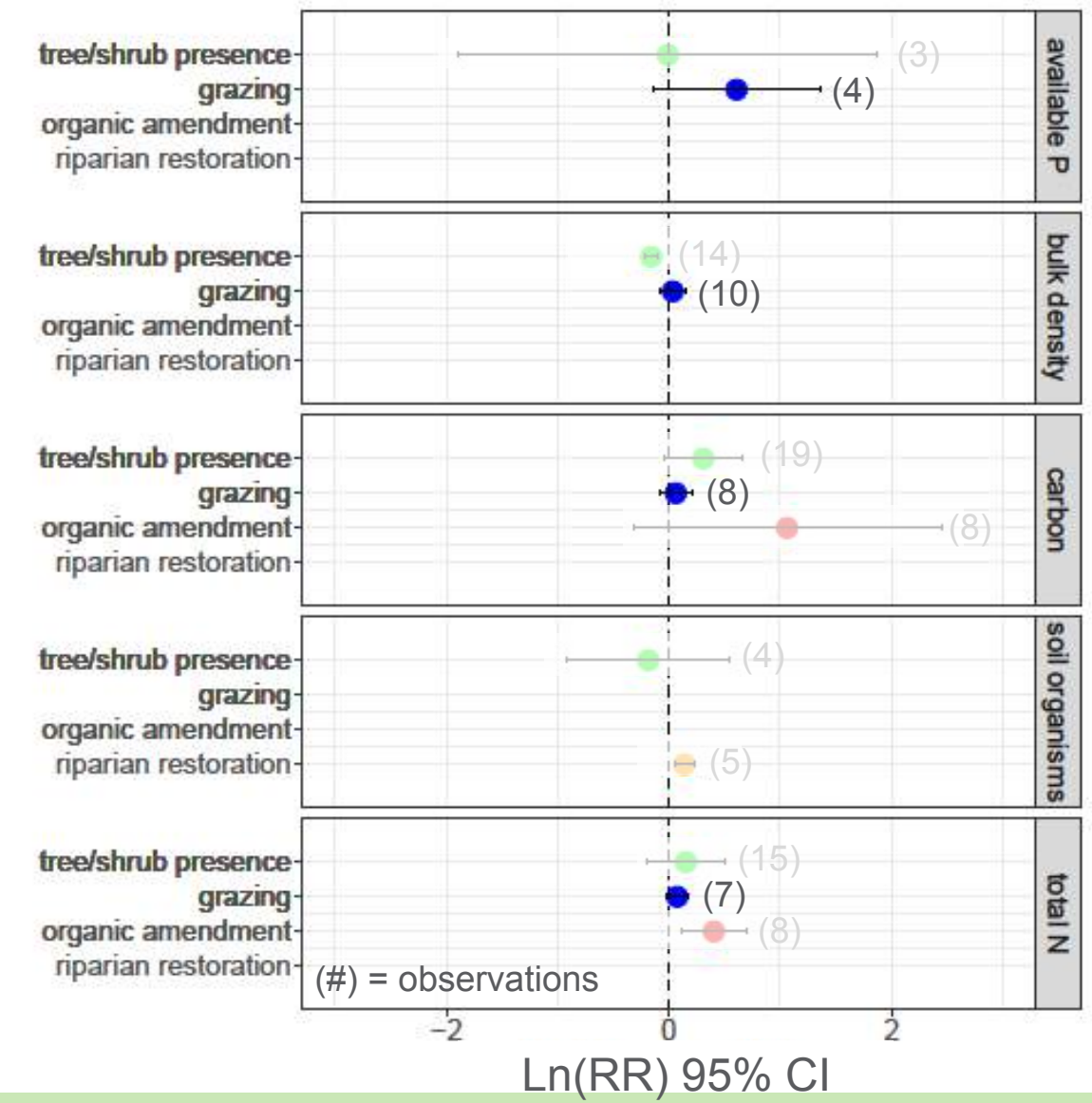
Byrnes et al. (2018)

What do we know from California?

Site Factors:
e.g., Soil Texture, Climate



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Carey et al. (in prep)

Point Blue's Rangeland Monitoring Network

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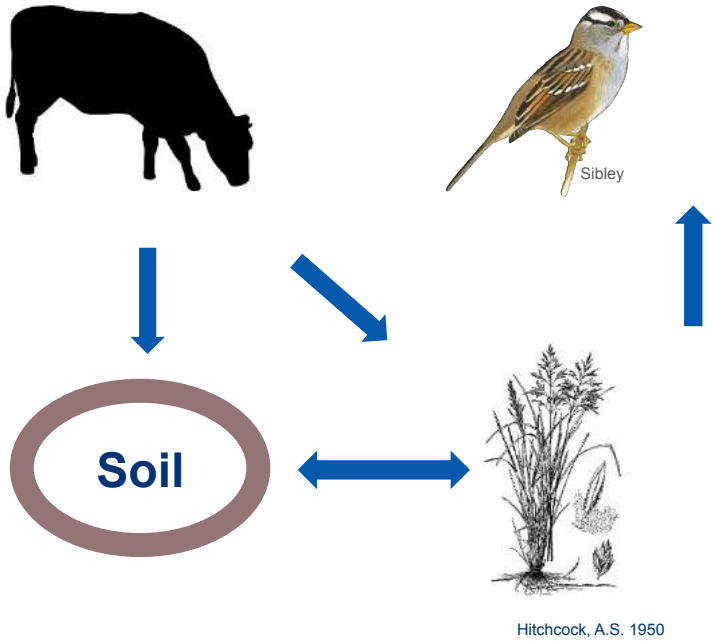
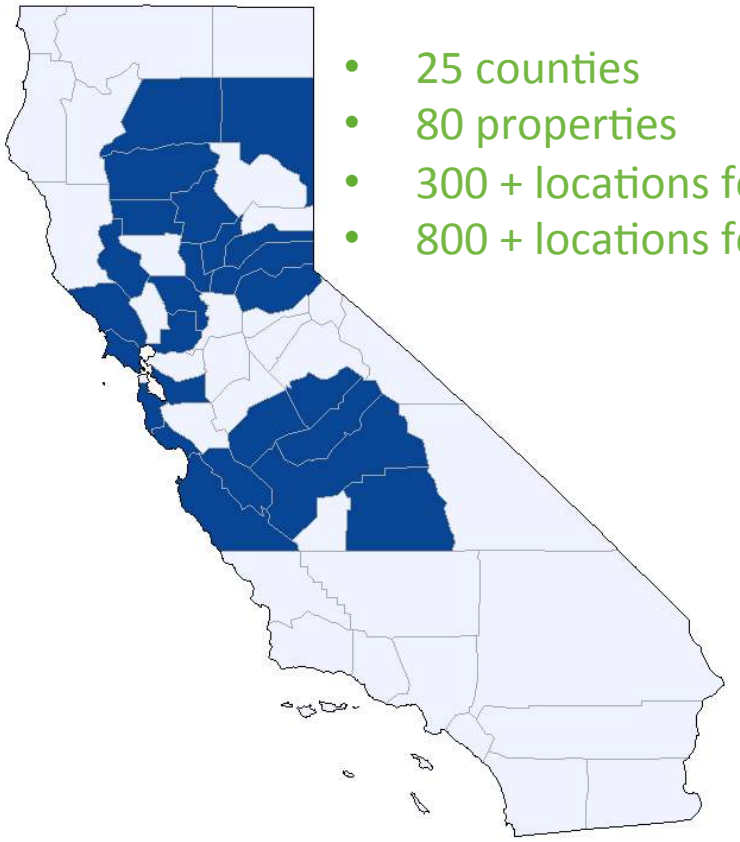
Rangeland Monitoring Network:

We measure **ecological function** of rangelands with **standardized protocols** across California.



Counties with RMN sampling, through 2017



- 25 counties
- 80 properties
- 300 + locations for soils
- 800 + locations for birds

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What makes a good indicator?

According to The Soil Health Institute, good indicators are:

- Sensitive to changes in management systems
- Representative of soil processes relevant to agricultural production and environmental outcomes
- Indicative of agriculturally significant changes within 5 years
- Available for use in commercial production laboratories (reproducible, economical, directionally interpretable)

**and informed by your objectives!

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What makes a good indicator?

It helps if they are also:

- Defined regionally by soil groupings/type
- Characterized such that thresholds are known to indicate “poor”, “adequate”, “good” conditions based on outcomes
- Characterized such that relationships to management practices are known

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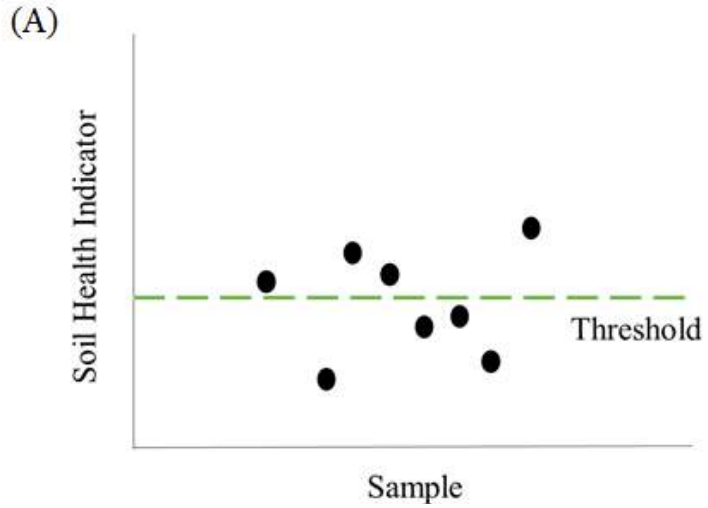
Interpretability is key



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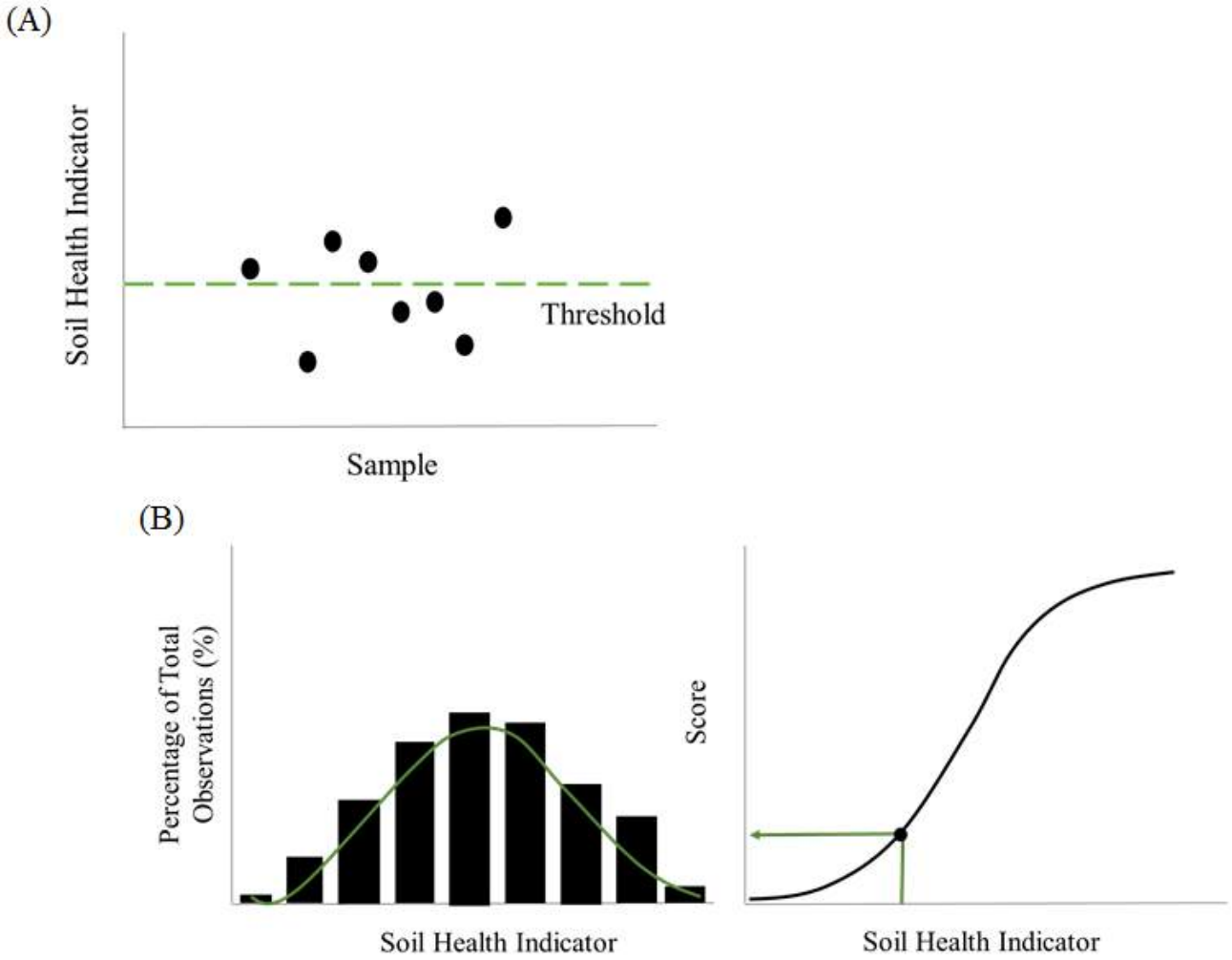

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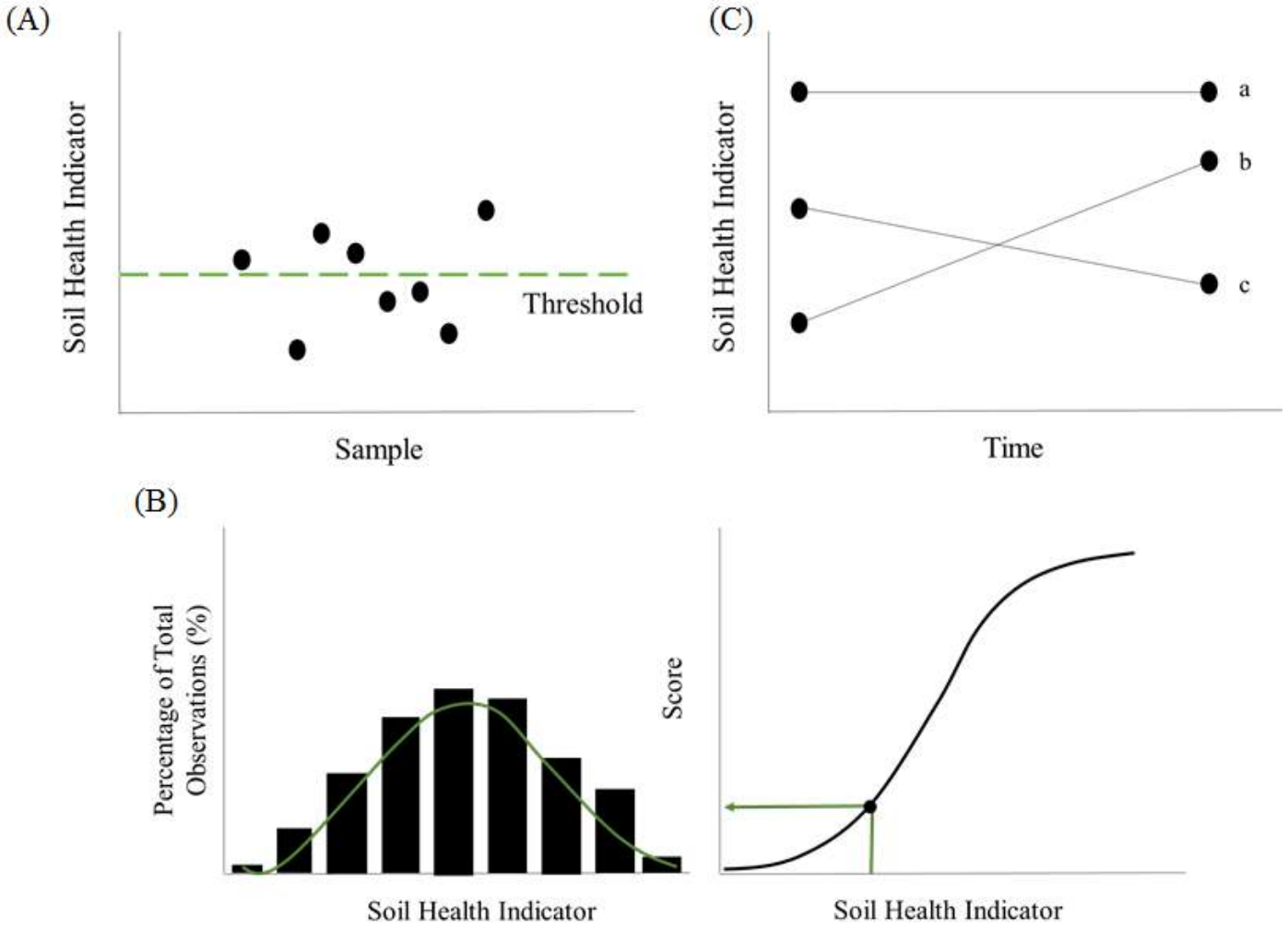

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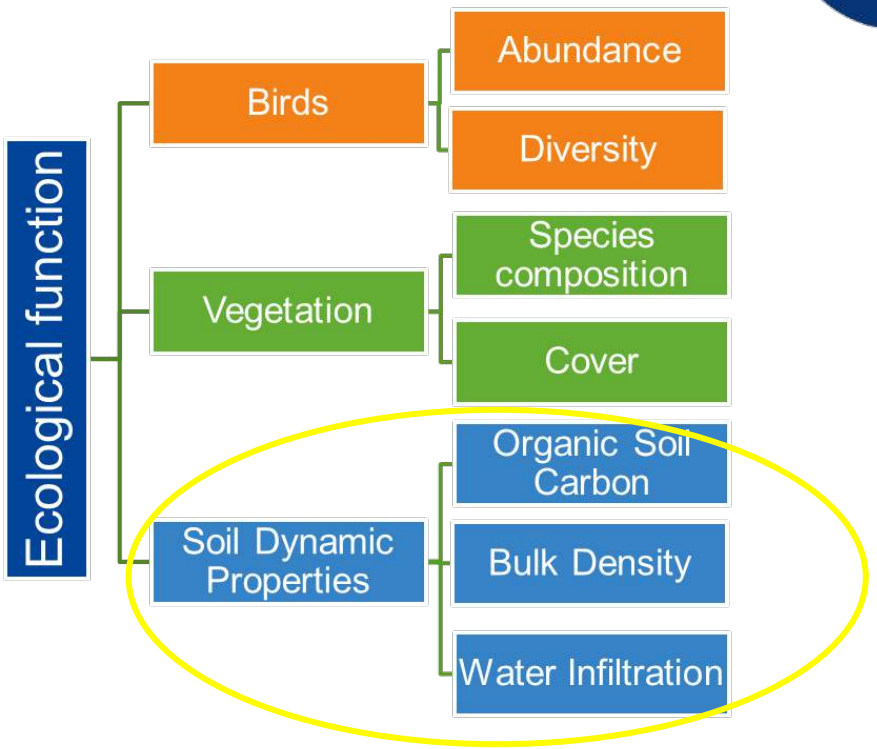
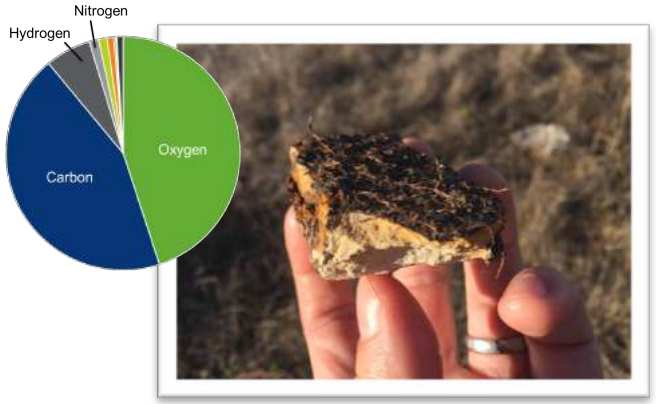
What soil health indicators does RMN measure?





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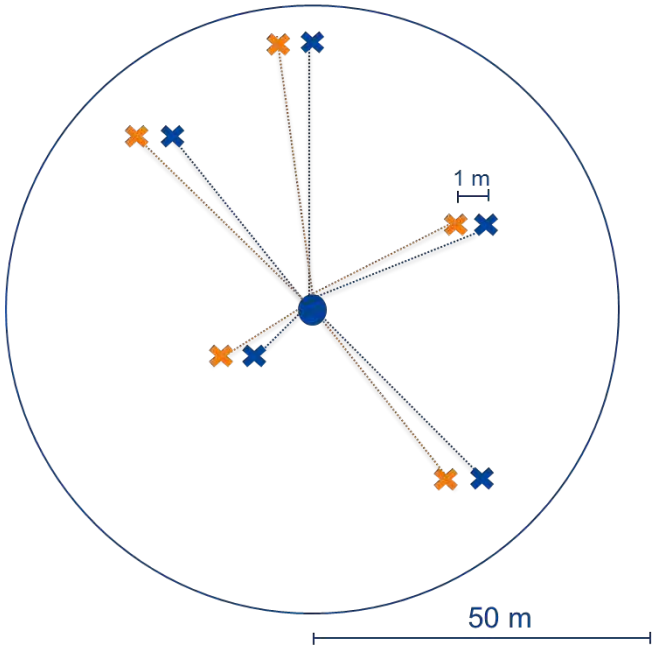
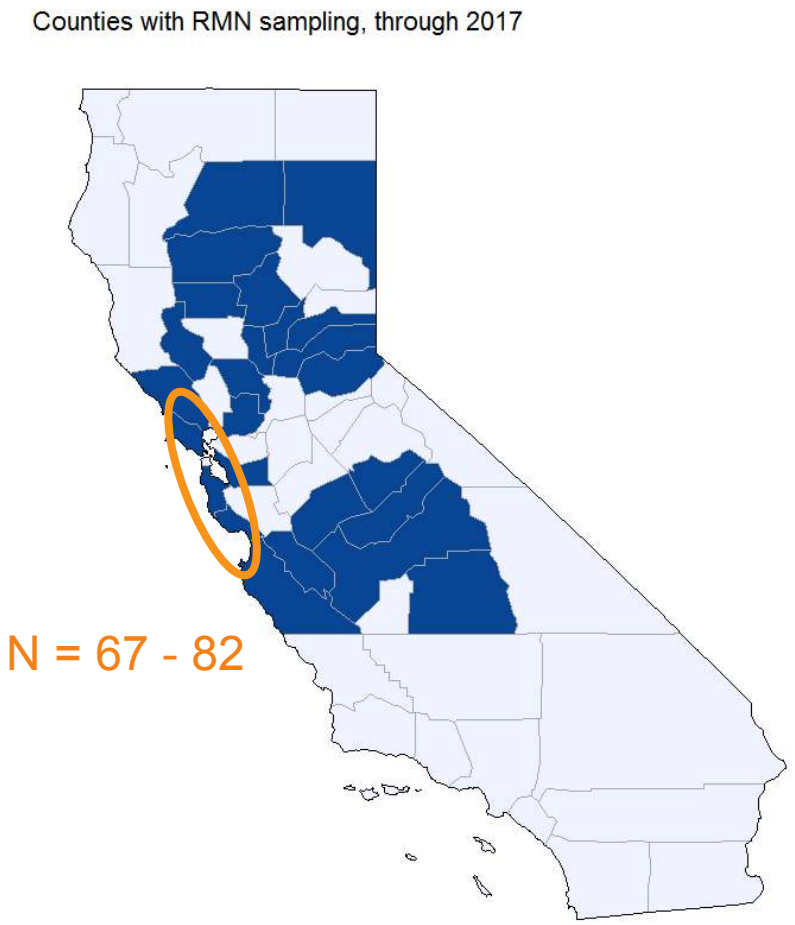
What soil health indicators does RMN measure?

We measure ecological function on rangelands across California to:

- Establish baselines for monitoring change
- Evaluate the ecological effects of grazing and other management practices
- Provide information to landowners to help guide decision-making

What are we learning?





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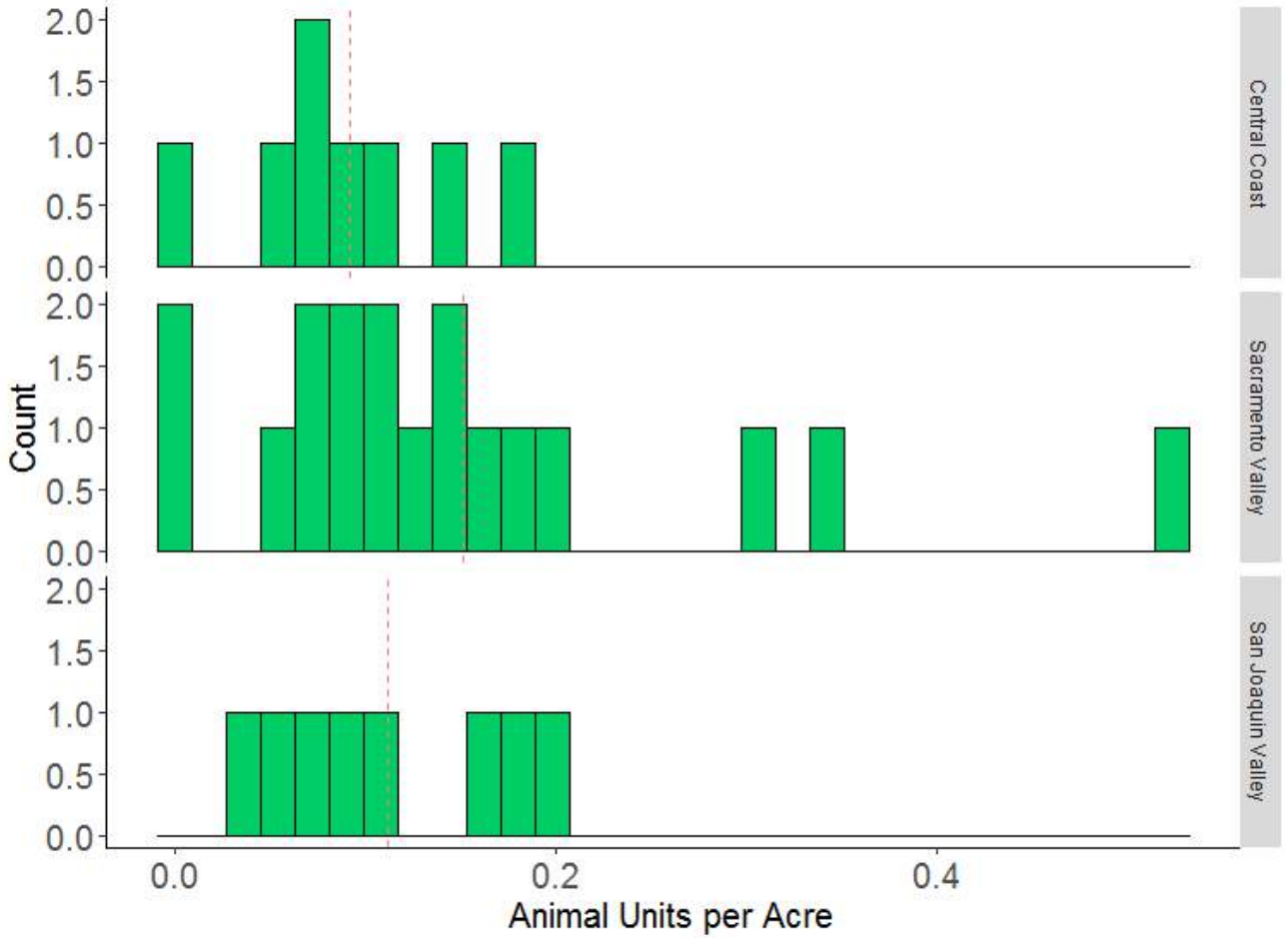
Grazing Information

Property-level summary, intended to characterize grazing management on the entire ranch.



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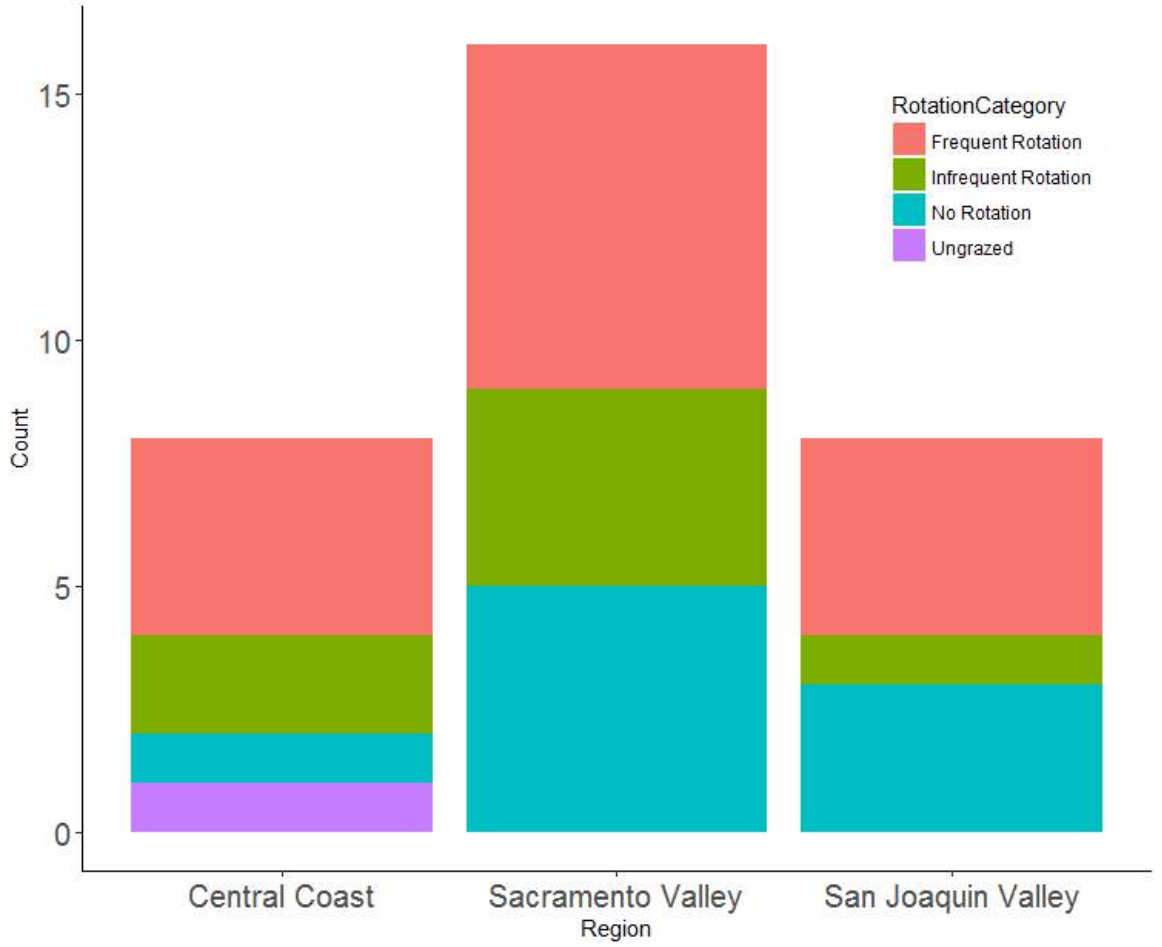
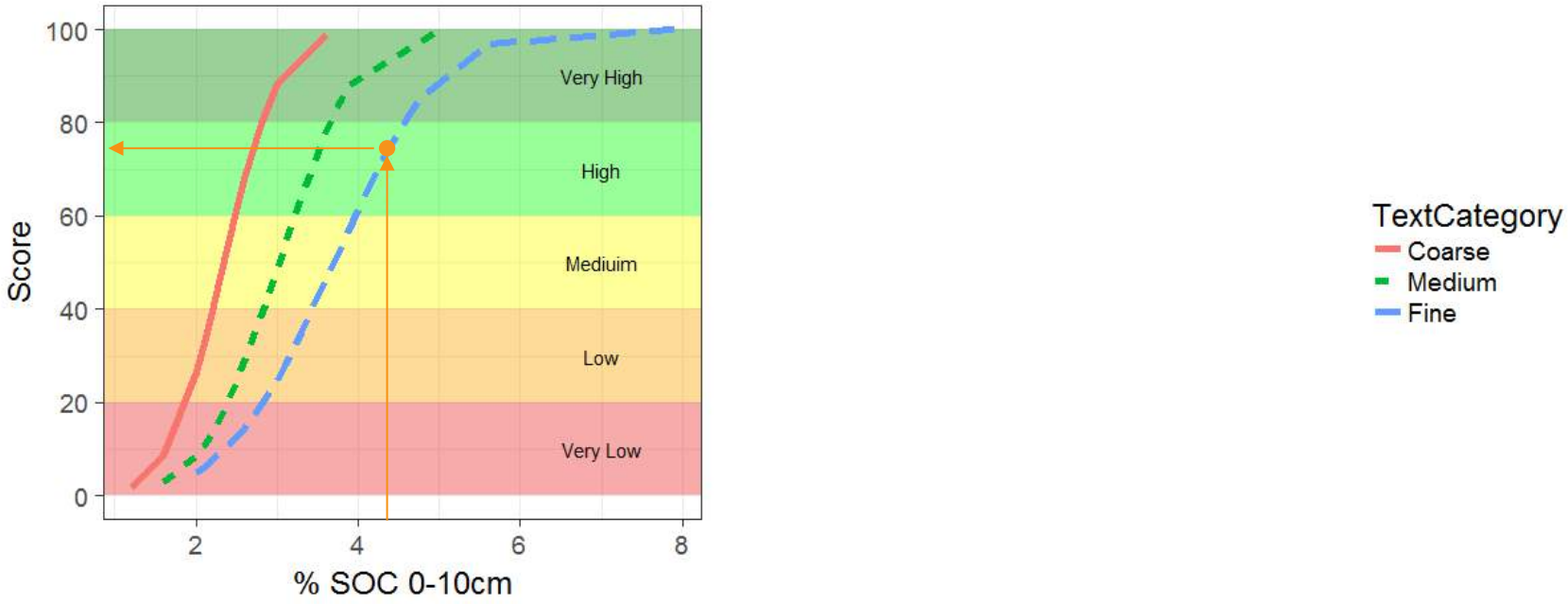


Scoring Functions for Central Coast Rangeland Soils



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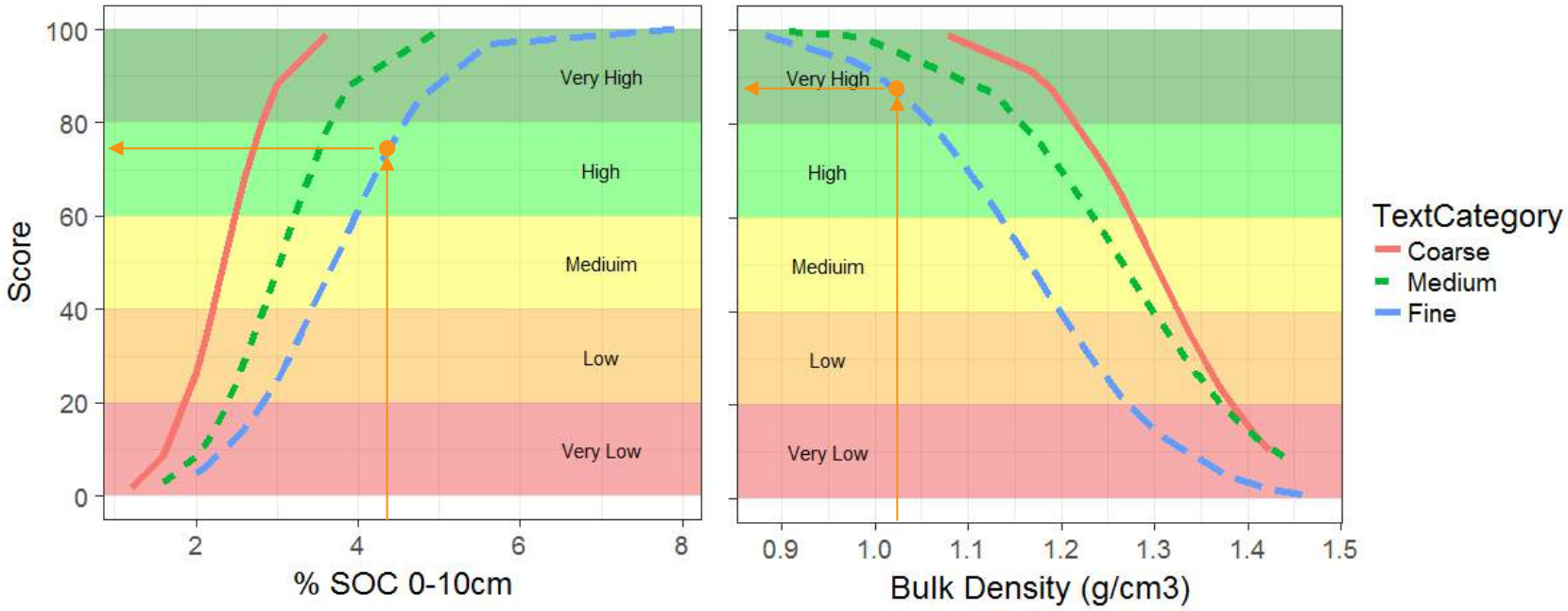

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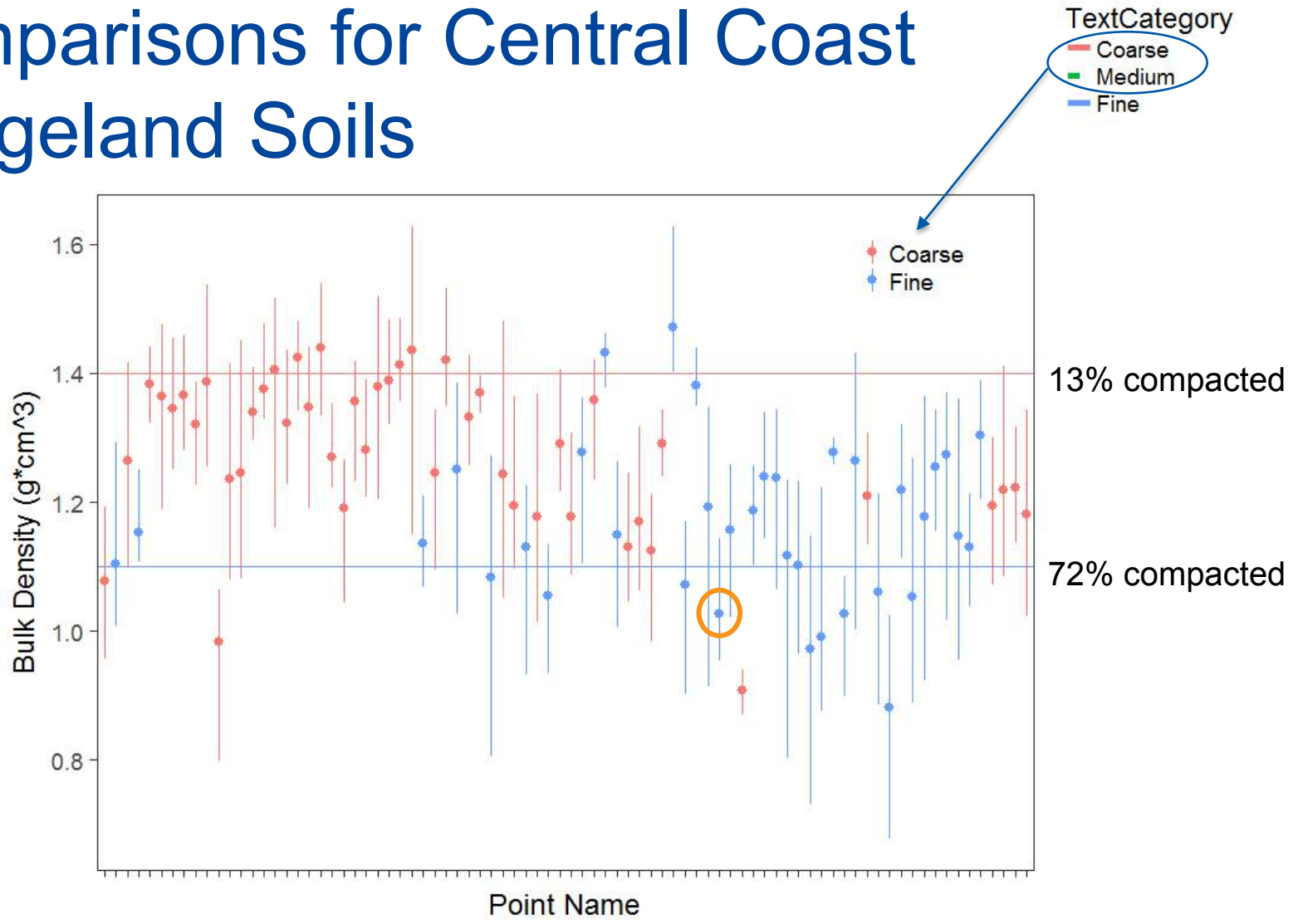
Bulk Density Threshold Comparisons for Central Coast Rangeland Soils



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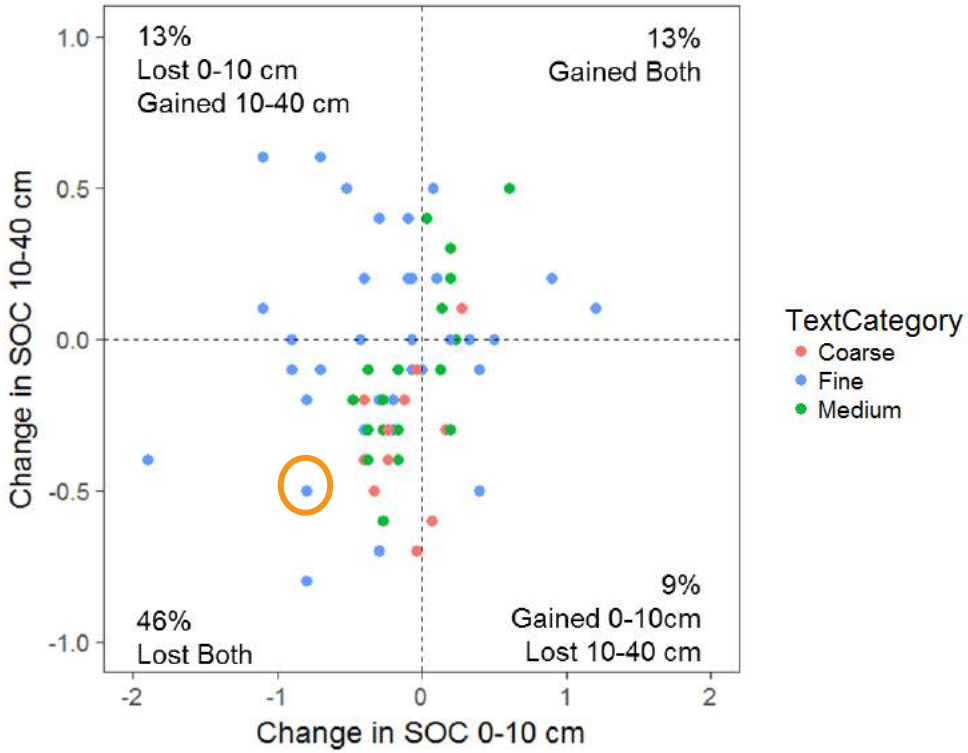
Change over Time for Central Coast Rangeland Soils



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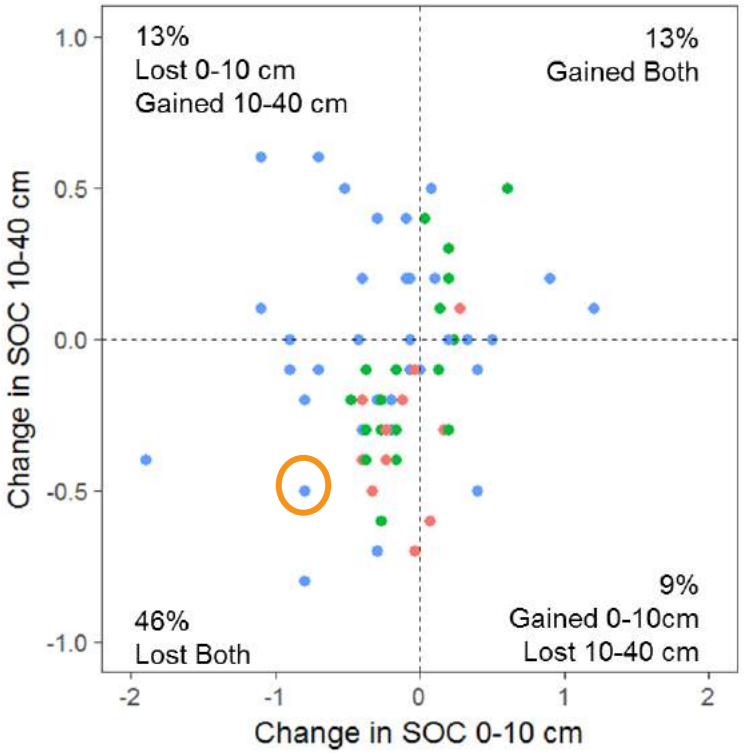

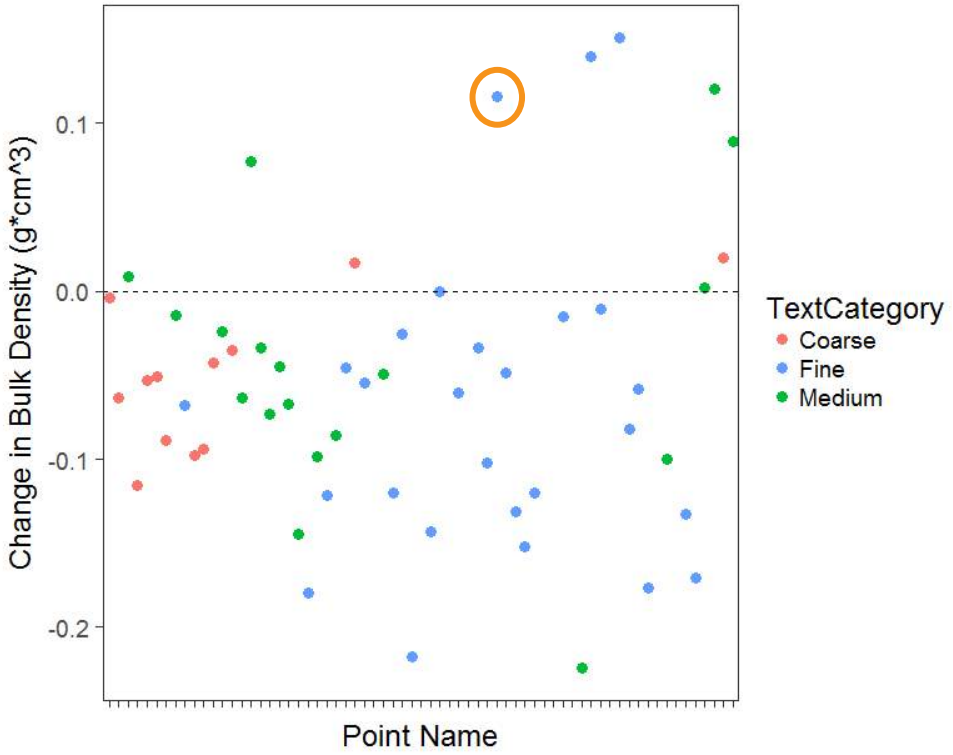

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What's next?

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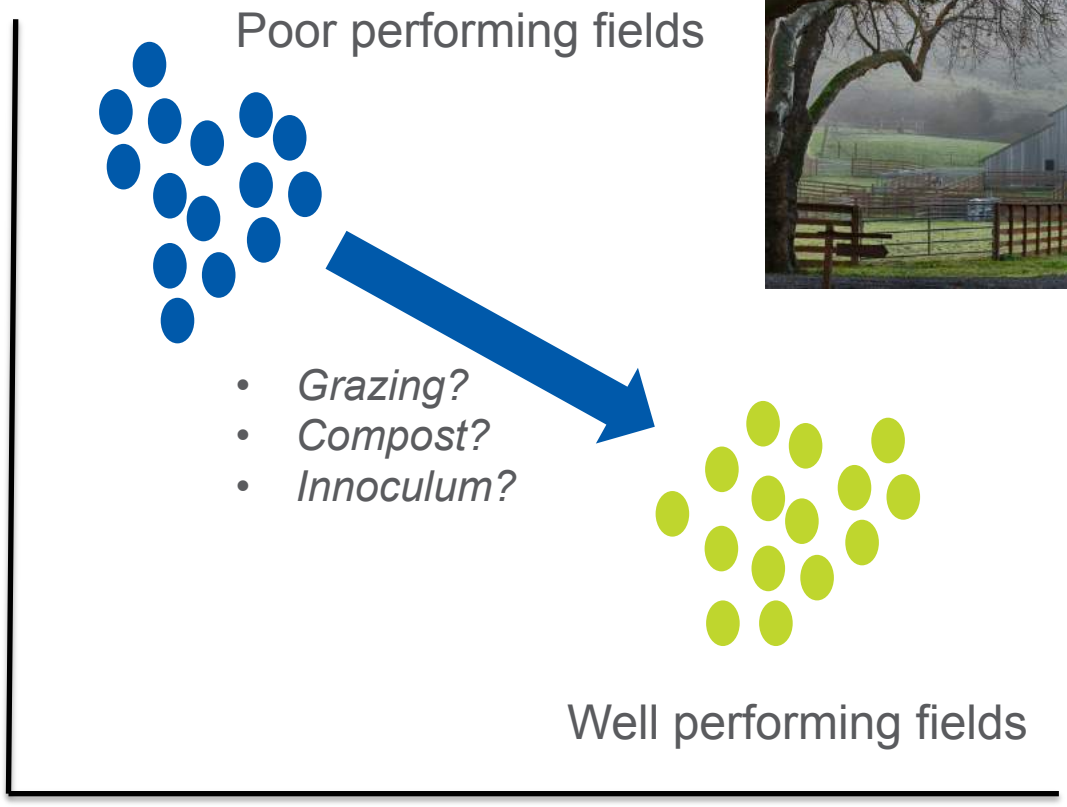
Assess management interventions



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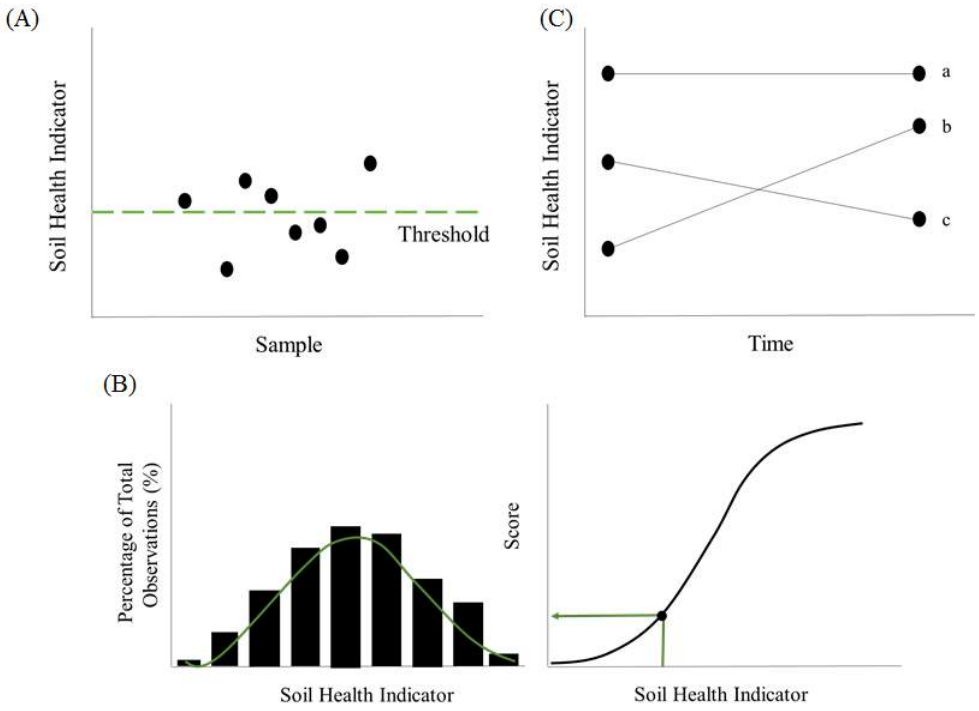
Adequately characterize three soil health indicators across California's rangelands



May be the indicators we already have, may be new ones.

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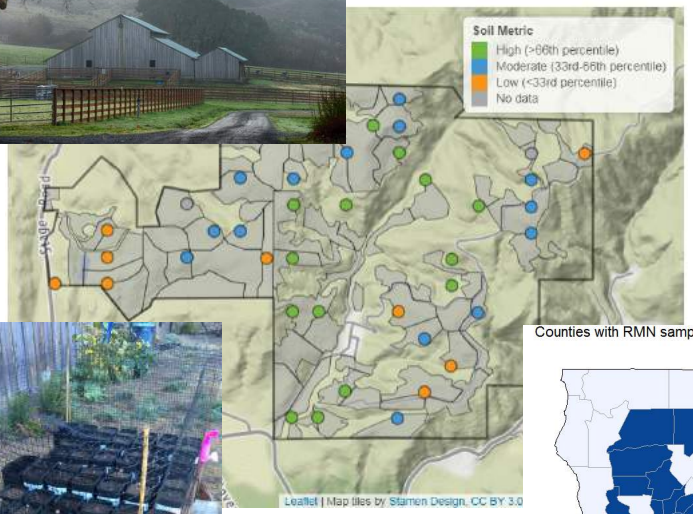
Test Hypotheses & Validate Assumptions



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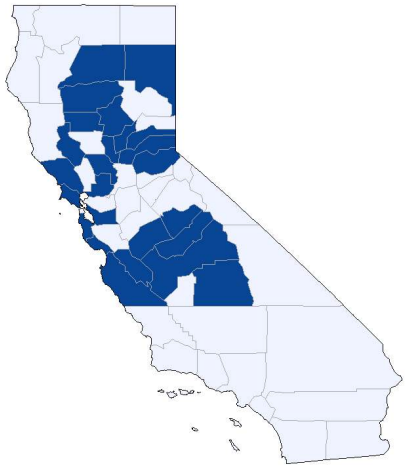

e.g.,

- Relationship between aboveground & belowground diversity
- Relationship between plant/microbial diversity and soil carbon
- How much management can “move the needle”

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Thank you!

And many . . .

ranchers, land trusts, RCDs, agencies, NGOs, and private donors

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