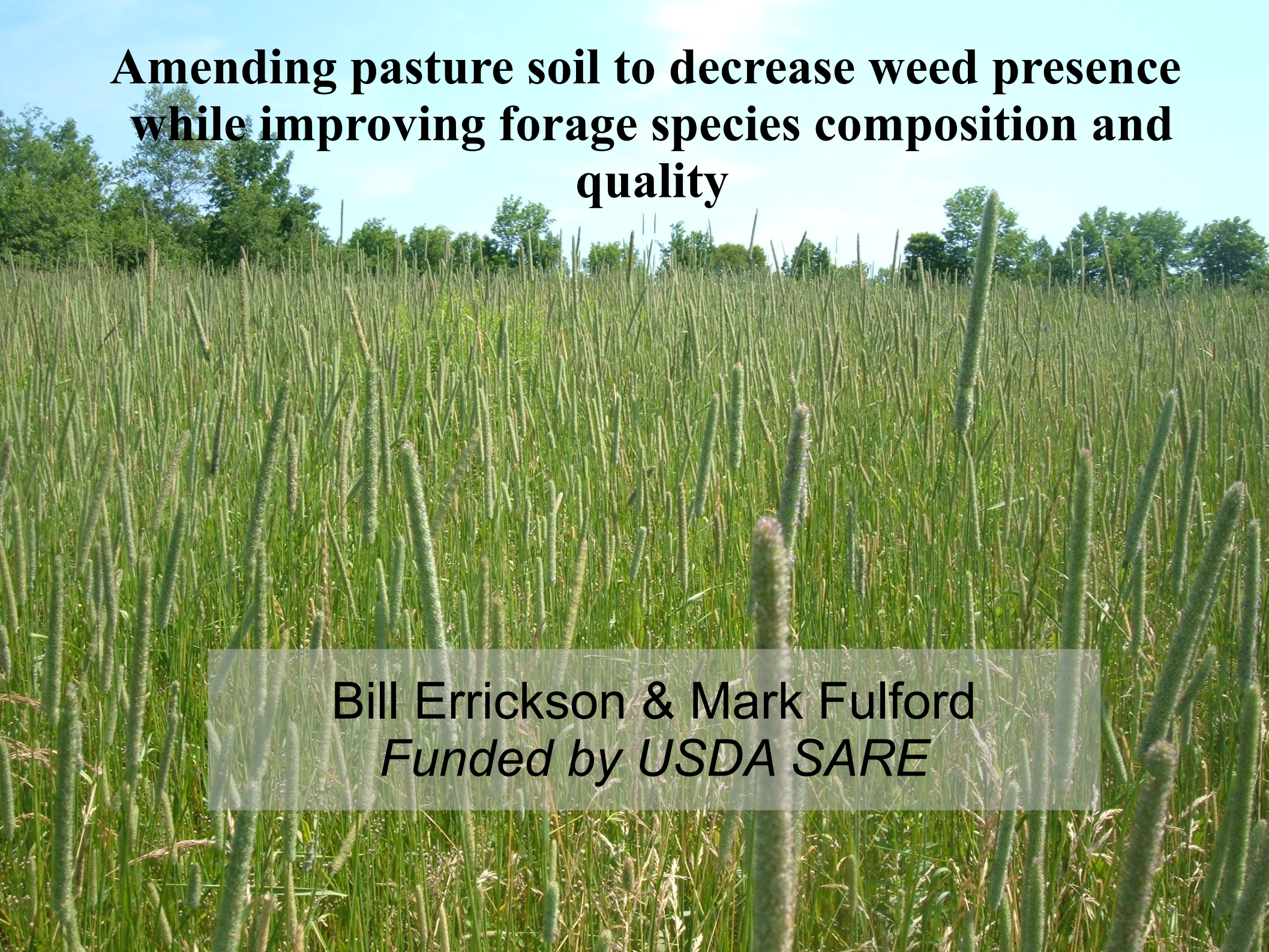
Amending pasture soil to decrease weed presence while improving forage species composition and quality



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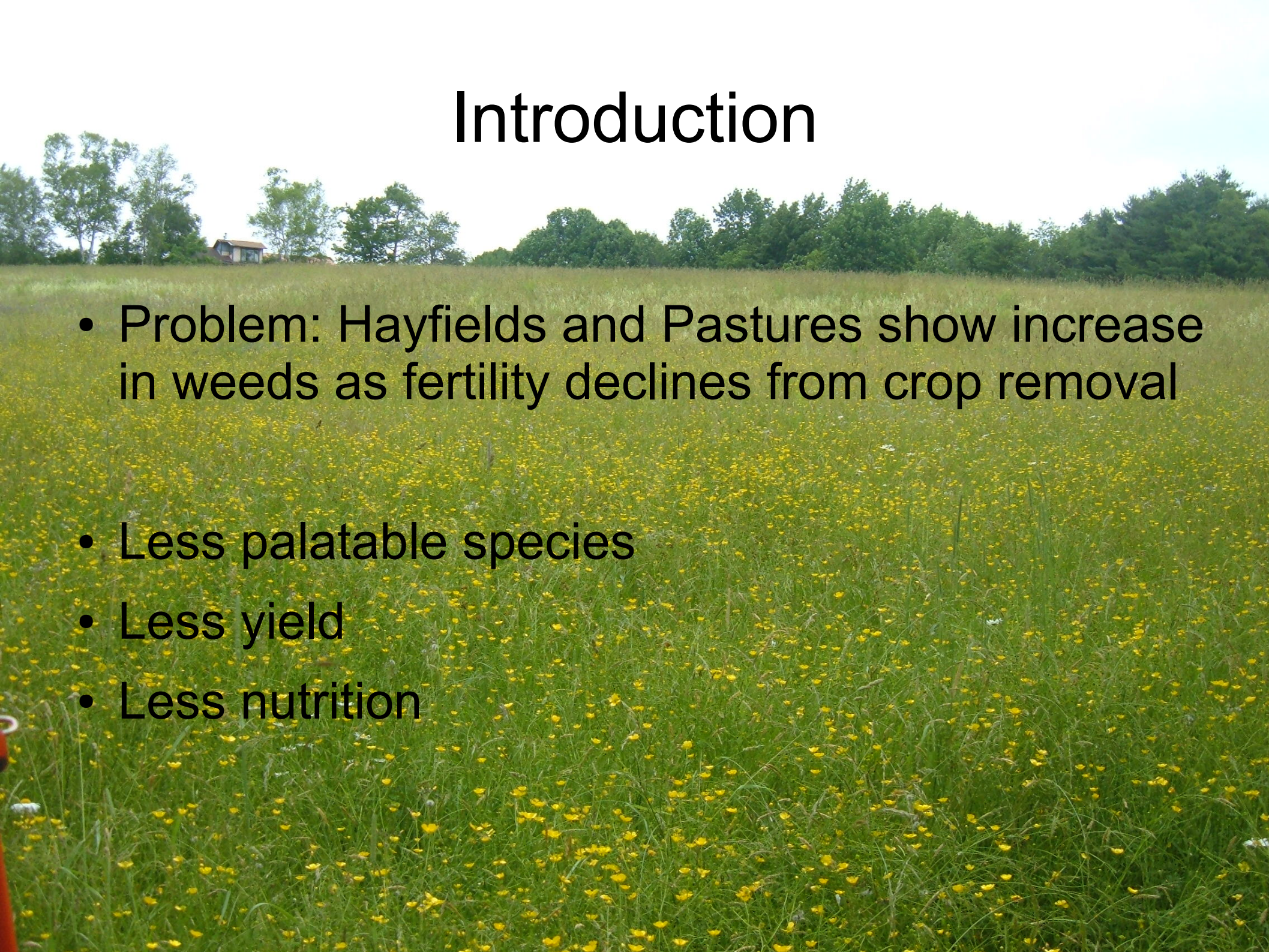
Funded by USDA SARE

Introduction



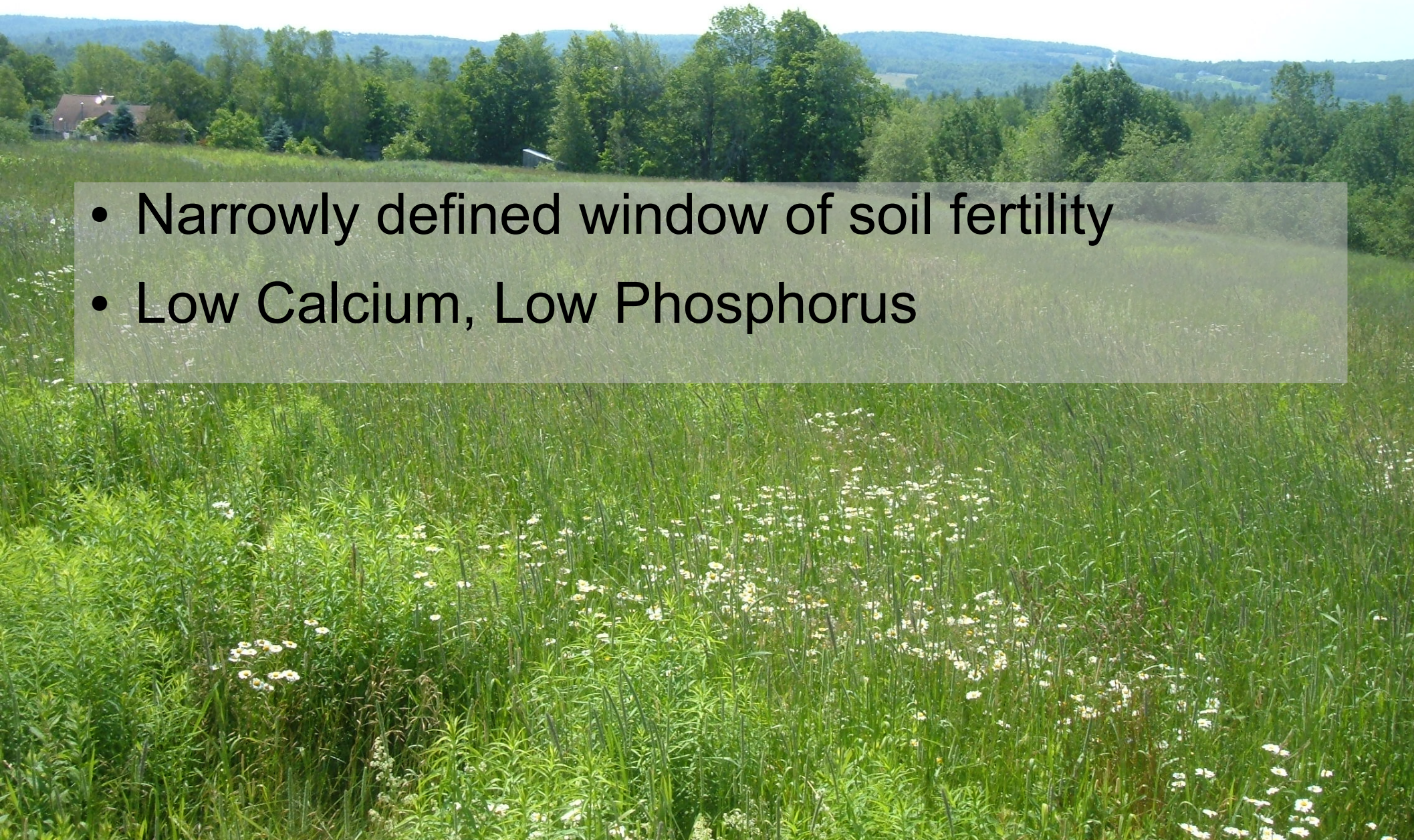
- Problem: Hayfields and Pastures show increase in weeds as fertility declines from crop removal

- Less palatable species
- Less yield
- Less nutrition

Common Recommendations

- Plow & Reseed
- Herbicides
- Spread Manure
- Lime

Weeds & Why They Grow



- Narrowly defined window of soil fertility
- Low Calcium, Low Phosphorus

A Fertile Approach

- Correct soil nutrition deficiencies
- Allow forage species to outcompete less desirable species
- Put labor and financial resources into soil fertility
- Animal nutrition will benefit

Methods

- Amended 1 acre experimental plots
- Unamended 1 acre control plots
- Three replications
- Two Years

Soil Tests

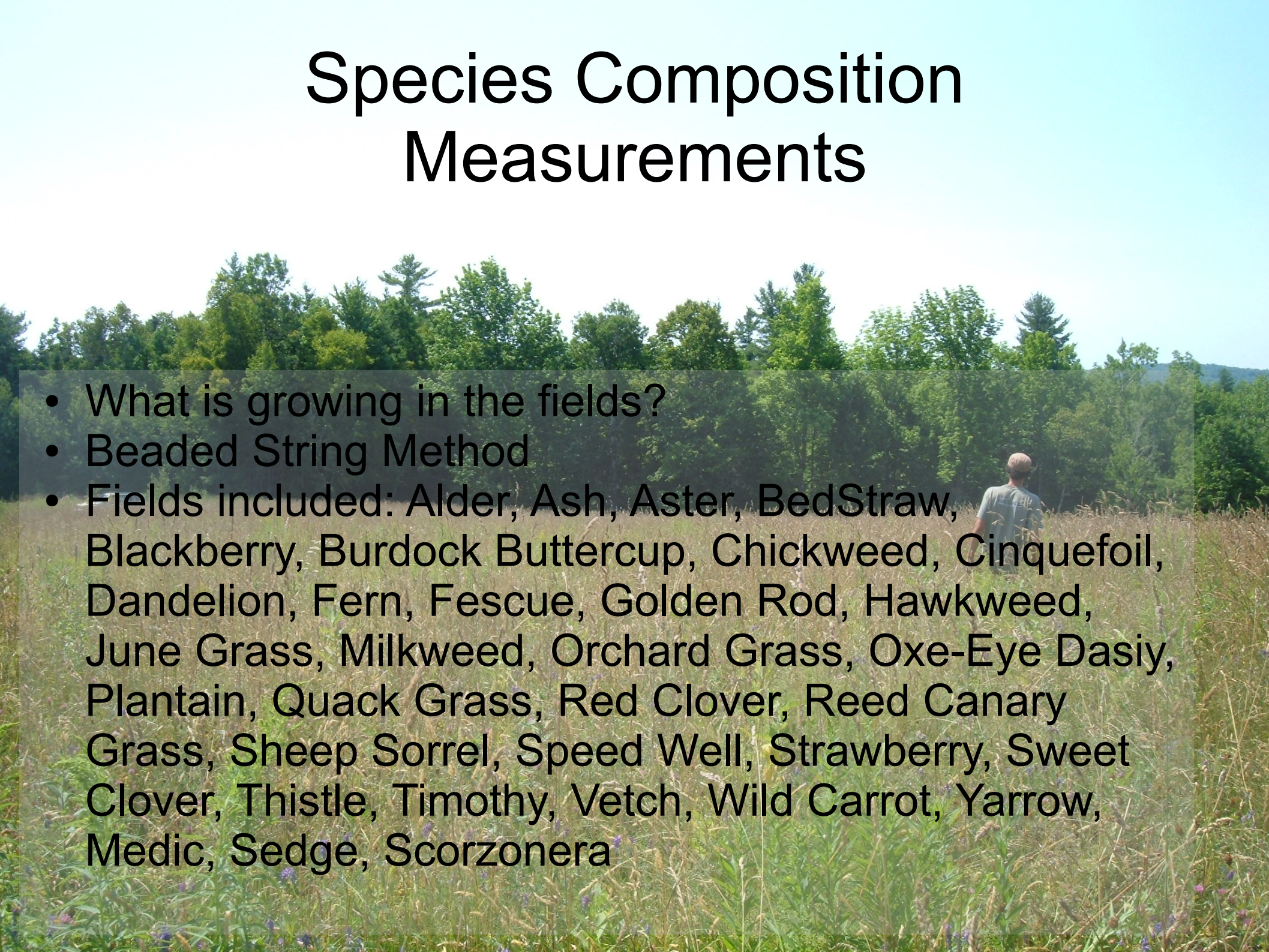
- Defficient in calcium, magnesium, phosphorus, potassium, nitrogen, sulfur, boron, zinc, copper, and manganese

Custom Amendment Blend

- Year 1: hi-cal lime, gypsum, soft rock phosphate, magnesium sulfate, sulfate of potash, manganese sulfate, dolomitic lime, sul-po-mag, humates, zinc sulfate, sodium nitrate, myco-seed treat, and copper sulfate

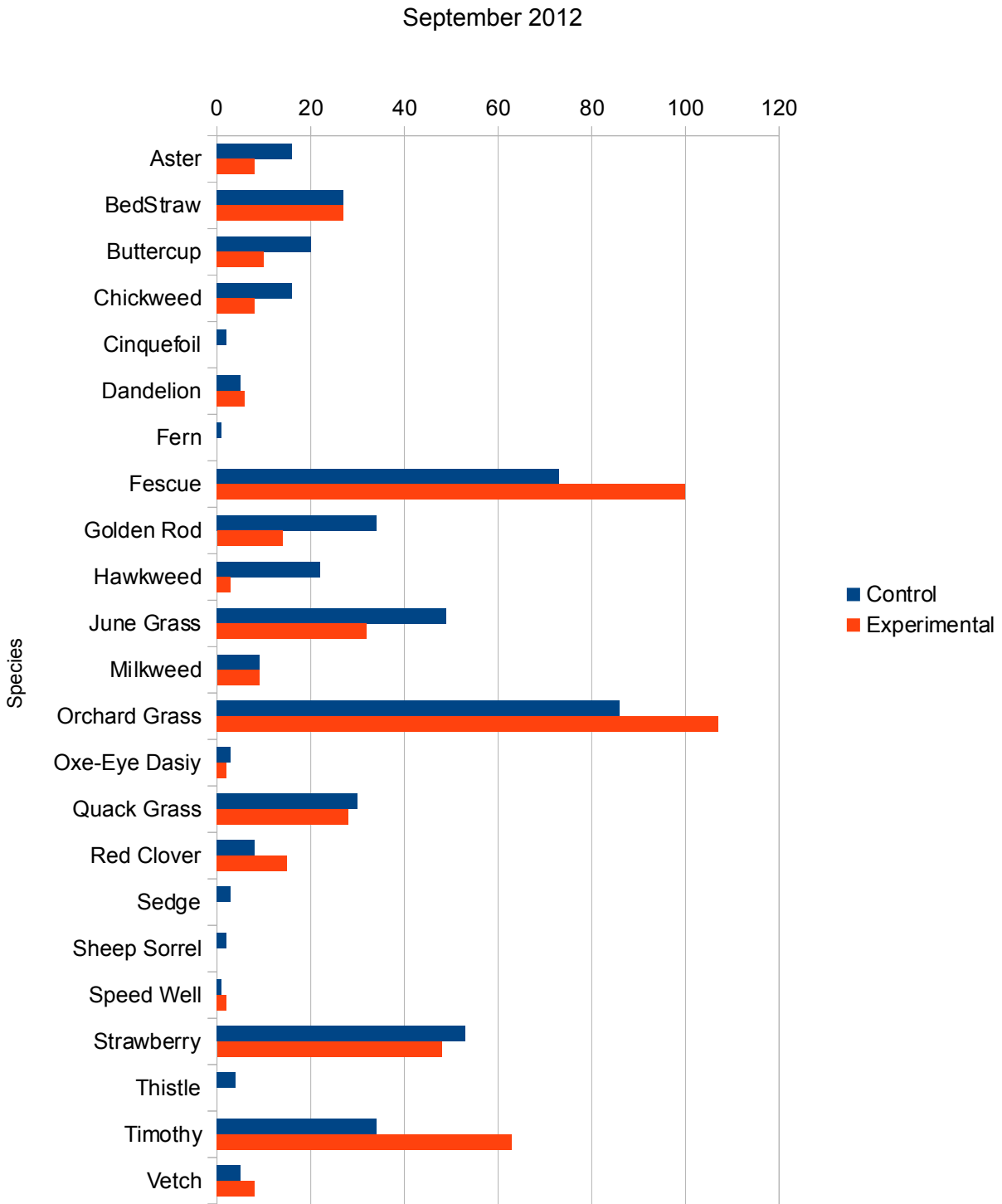
- Year 2: limestone, marl, sulfate of potash-magnesia, humus, soft rock phosphate, gypsum, brown phosphate rock, calcium borate, copper sulfate, zinc sulfate, and humates

Species Composition Measurements



- What is growing in the fields?
- Beaded String Method
- Fields included: Alder, Ash, Aster, BedStraw, Blackberry, Burdock Buttercup, Chickweed, Cinquefoil, Dandelion, Fern, Fescue, Golden Rod, Hawkweed, June Grass, Milkweed, Orchard Grass, Oxe-Eye Dasiy, Plantain, Quack Grass, Red Clover, Reed Canary Grass, Sheep Sorrel, Speed Well, Strawberry, Sweet Clover, Thistle, Timothy, Vetch, Wild Carrot, Yarrow, Medic, Sedge, Scorzonera

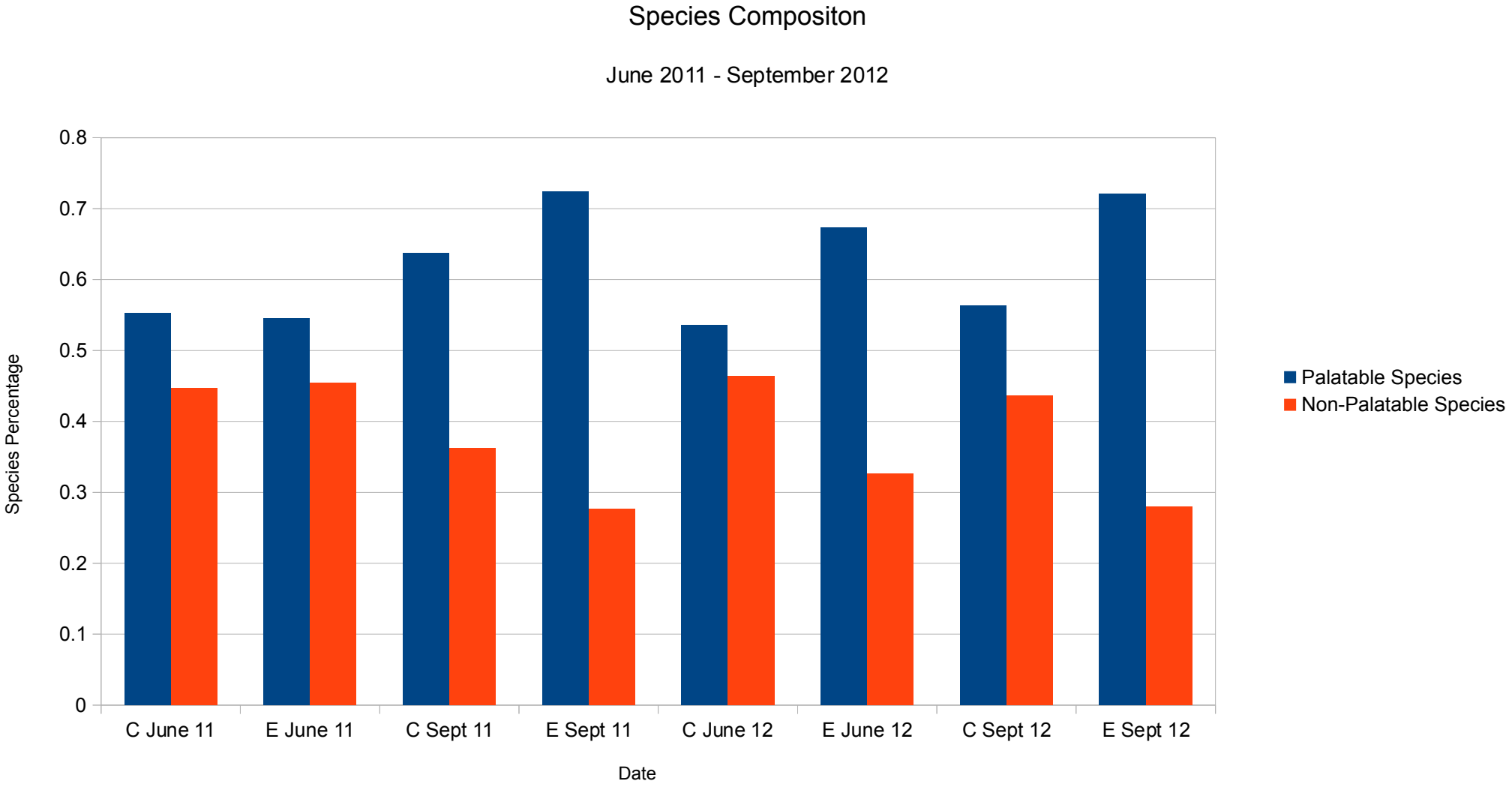
Pasture Species Composition



Results

Increase in fescue, orchard grass, quackgrass, timothy, red clover, and vetch

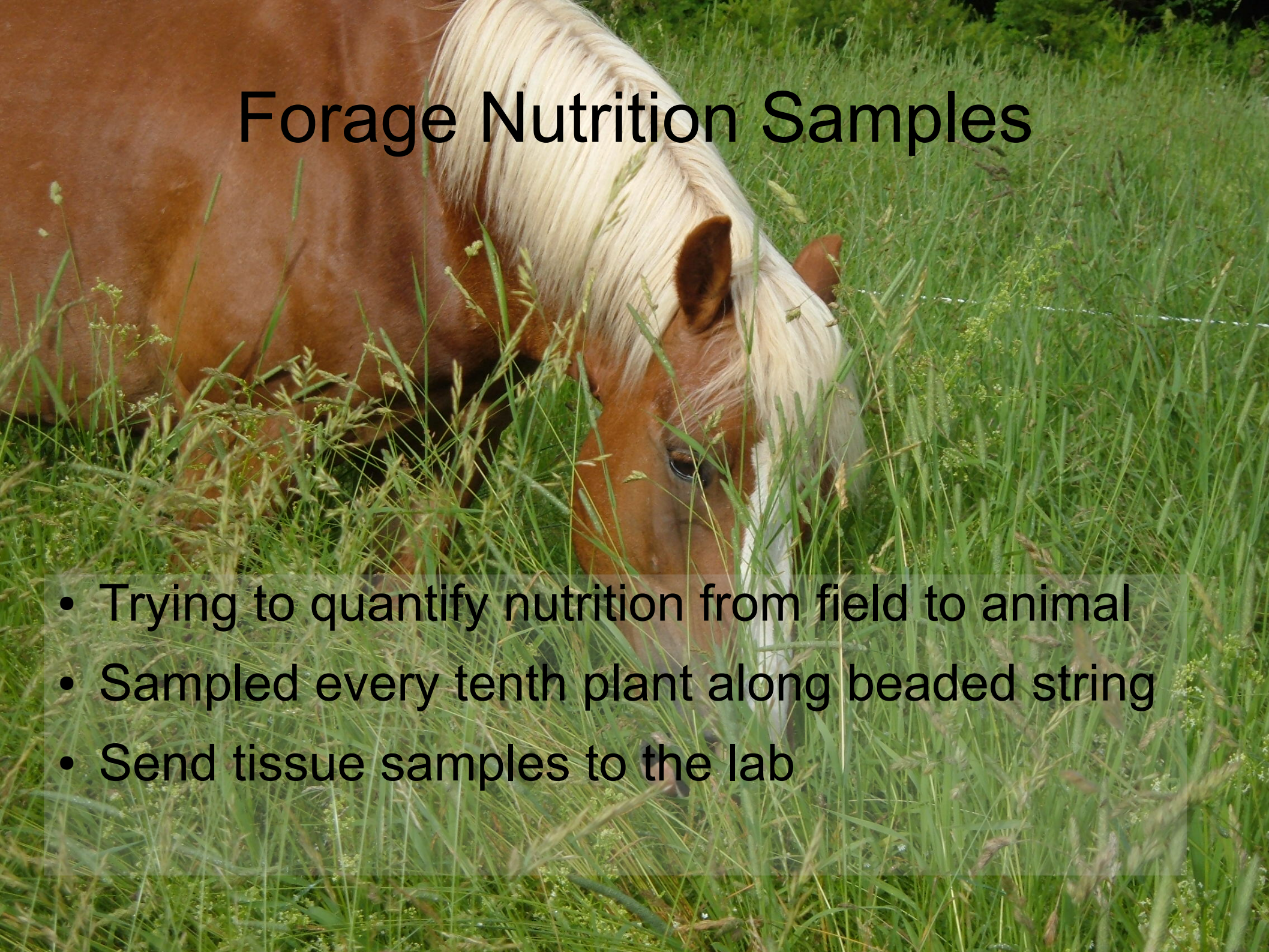
Decrease in aster, buttercup, chickweed, cinquefoil, goldenrod, hawkweed, daisy, strawberry, and yarrow.


Species Compositon
June 2011 - September 2012
Species Percentage
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
C June 11
E June 11
C Sept 11
E Sept 11
C June 12
E June 12
C Sept 12
E Sept 12
Date
Palatable Species
Non-Palatable Species

Results

- Species showing increase thrive in high Ca, Mg, S, P, and pH
- Species showing decrease thrive in low Ca and P
- 2012 Soil test revealed higher Ca, Mg, S, pH, conductivity, and P levels, with a slight increase in N and K

Forage Nutrition Samples

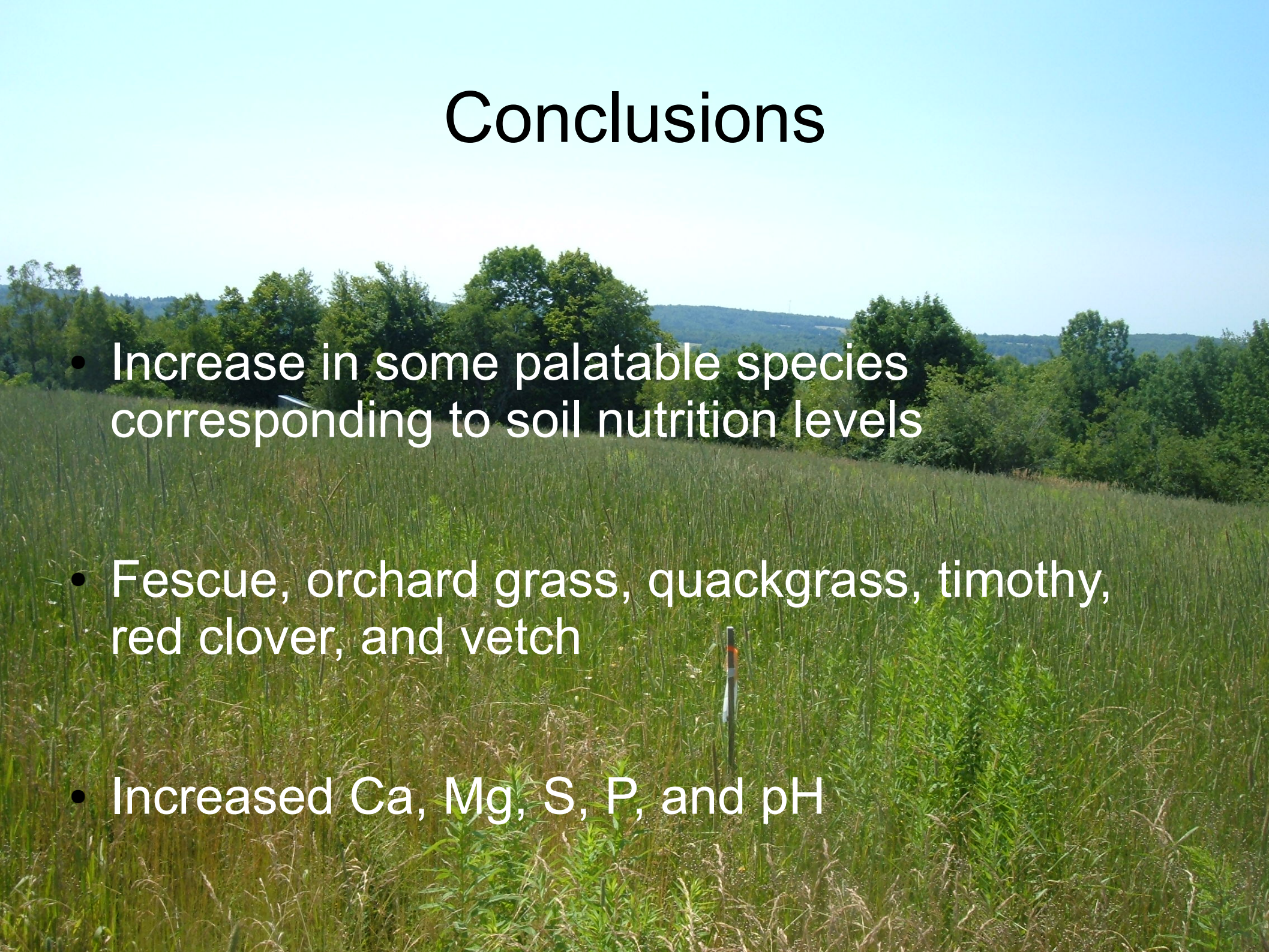


- Trying to quantify nutrition from field to animal
- Sampled every tenth plant along beaded string
- Send tissue samples to the lab

Results

- Only slight differences detected in nutritional sampling
- Increased Boron in amended plots

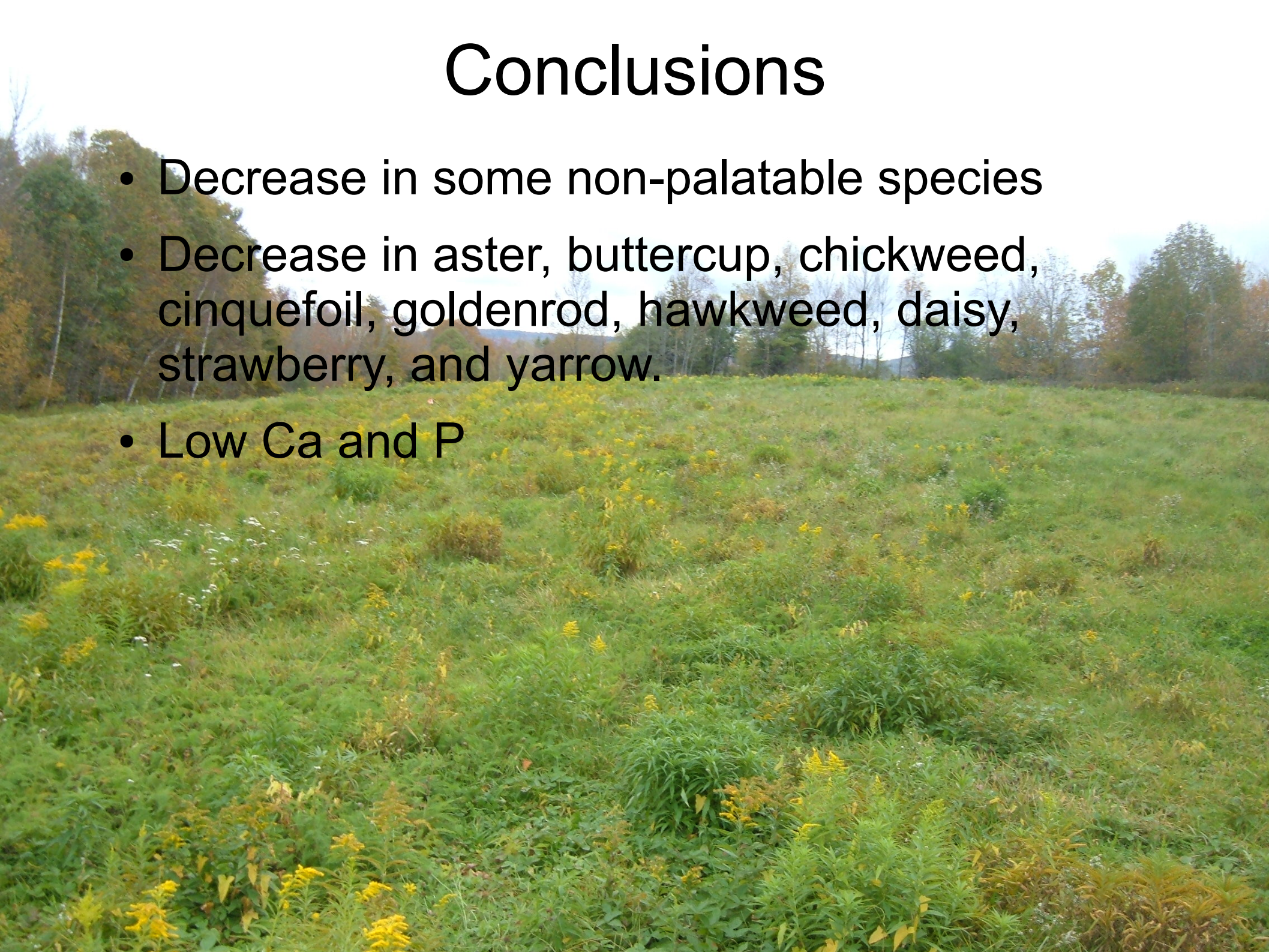
Conclusions



- Increase in some palatable species corresponding to soil nutrition levels
- Fescue, orchard grass, quackgrass, timothy, red clover, and vetch
- Increased Ca, Mg, S, P, and pH

Conclusions

- Decrease in some non-palatable species
- Decrease in aster, buttercup, chickweed, cinquefoil, goldenrod, hawkweed, daisy, strawberry, and yarrow.
- Low Ca and P



Conclusions

- Only slight changes in forage nutrition detected
- Increased Boron
- Field applied dry blends may need more time to become active in the soil

Future Research

- Need nutrition that is fast acting, financially viable, and effective
- Liquid Amendments: sea salt, seaweed, liquid calcium, MPM
- Yield Data

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