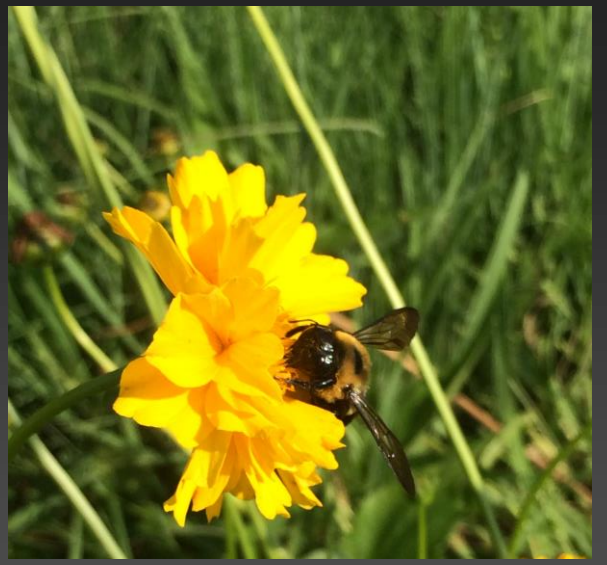

# Creating Higher Diversity Native Grass Pastures

Bee-Friendly Beef Producer Workshop ~ Smithsonian Conservation Biology Institute

P. Keyser, J. Prigge, J. Richwine, E. Bisangwa, K. Swilling

August 3, 2023

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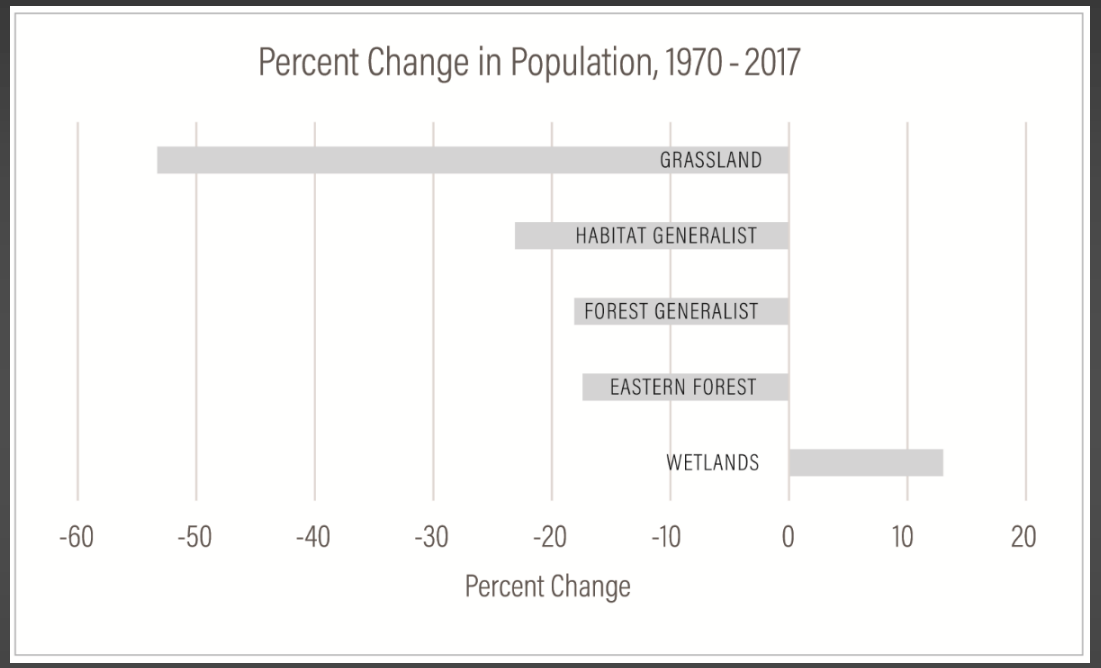
# Why More Diverse Native Grass Pastures?

Pollinator declines, bird declines, soil health, align with historical ecological norms

Interest from conservation groups, farm bill programs, but…

Lack of empirical evidence – where's the data? What works, what doesn't work? And what does it even mean to "work"?




Rosenberg, K.V. et al., 2019. *Science 336:120-124*

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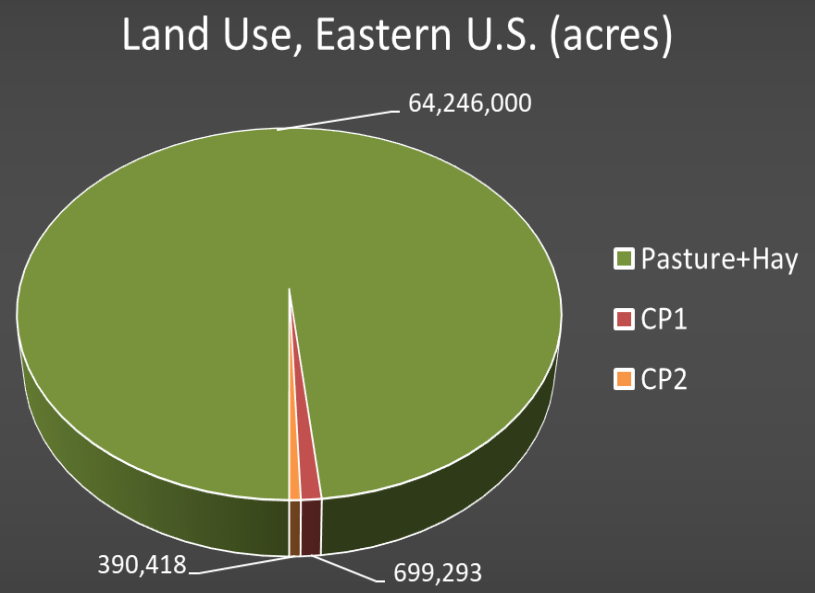
# Why More Diverse Native Grass Pastures?

Why in pastures – why not just smaller “gardens” of these forbs and leave the pastures to the cattle?

<u>Working Lands Concept</u>

- scale: 64 MM acres working grasslands in eastern U.S.
- cost: Grazing *<u>pays</u>* landowner
- disturbance: essential for a healthy grassland ecosystem




Keyser et al., 2019, Wildlife Society Bulletin 43:382–390.

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# How Do We Get More Diverse Native Grass Pastures?

- What species will *establish* in pastures?
- What species will *persist* in pastures?
- And won't become a *pest*?
- Does *grazing management* matter for all of this?
- Are any of these species *good forages*?
- Do they produce appreciable *yields* of forage?
- Do they contribute to improved *pasture productivity and/or cattle performance*?
- What are the *economics* of incorporating these into pastures?
- Do *pollinators* use these – are we providing improved habitat?

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# How Do We Get More Diverse Native Grass Pastures?

To answer key questions, we implemented a series of research projects over the past 7 years, some still ongoing:

- *Interseeding Native Forbs into Native Grass Pastures*
- *Improved Establishment of Native Forages*
- *Blooming and Forage Characteristics of Twelve Native Forbs and Legumes*
- *Bee-friendly Beef: Integrating Native Wildflowers into Southeastern Grazing Systems*
- *Herbicide Tolerance of Native Forbs and Legumes*

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# How Do We Get More Diverse Native Grass Pastures?

Partners:

- University of Tennessee Foundation
- USDA-NRCS – Conservation Innovation Grant
- USDA-AFRI
- University of Tennessee AgResearch
- University of Tennessee School of Natural Resources
- Ernst Conservation Seeds

ERNST SEEDS

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# What Works, What Persists, and Does Rest Have Anything to Do with it?

Northeast Tennessee AgResearch and Education Center, 2017-2022

- No-till drilled, spring 2017 into existing SG and BB/IG pastures

- 11 Spp, rest treatments (no rest, early rest, middle rest, late rest, no grazing), 2018-2022

| Common Name | Latin Name | Total lbs/ac | A/B/P |
|---|---|---|---|
| Partridge pea | *Chamaecrista fasciculata* | 0.50 | A |
| Purple prairie clover | *Dalea purpurea* | 0.50 | P |
| Illinois bundleflower, Midwestern U.S. Eco | *Desmanthus illinoensis* | 1.125 | P |
| Dixie ticktrefoil, AL Eco | *Desmodium tortuosum* | 0.50 | P |
| Lanceleaf coreopsis | *Coreopsis lanceolata* | 1.00 | P |
| Plains coreopsis | *Coreopsis tinctoria* | 0.50 | A |
| Eastern purple coneflower | *Echinacea purpurea* | 0.625 | P |
| Maximilian sunflower | *Helianthus maximiliani* | 0.50 | P |
| Oxeye sunflower | *Heliopsis helianthoides* | 0.25 | P |
| Upright prairie coneflower | *Ratibida columnifera* | 0.25 | P |
| Black-eyed Susan, AL Eco | *Rudbeckia hirta* | 0.50 | A/B/P |
| | Total | 6.25 | |

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# Establish Forbs with or After the Grass?

Private farm, Buncombe County, NC, planted May 2019 and March 2021
Drill grass and forbs together – or grass then forbs?

- weed suppression prior to introducing forbs?
- forbs overwhelming grass seedlings in year one?
- grass too thick for the forbs where grass is already established?

And does this matter whether we do it conventional (2019 only) or no-till?

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# But Are Forbs Good Forage?

East TN AgResearch and Education Center

- established 12 species (6 x 25’ plots, 4 reps), July 2018
- harvested 2020-2022
- nutritive values, yields, persistence under repeated defoliations

| Common Name | Latin name | Seeding rate (PLS lbs/ac) |
|---|---|---|
| Maximilian sunflower | *Helianthus maximilianii* | 3.7 |
| Black-eyed Susan | *Rudbeckia hirta* | 2.0 |
| Oxeye sunflower | *Heliopsis helianthoides* | 7.9 |
| Lanceleaf coreopsis | *Coreopsis lanceolata* | 3.6 |
| Upright prairie coneflower | *Ratibida columnifera* | 1.6 |
| Purple coneflower | *Echinacea purpurea* | 6.9 |
| **Canada goldenrod** | *Solidago canadensis* | 0.5 |
| **Cup plant** | *Silphium perfoliatum* | 7.9 |
| Illinois bundleflower | *Desmanthus illinoensis* | 6.6 |
| Partridge pea | *Chamaecrista fasciculata* | 9.5 |
| Purple prairie clover | *Dalea purpurea* | 2.6 |
| Showy ticktrefoil | *Desmodium canadensis* | 4.7 |

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# And Does it Matter to Cattle?

East TN AgResearch and Education Center – Holston Unit

- interseeded 18 forbs into existing BB/IG/LB pasture, June 2020/April 2021
- four ~3 ac pastures interseeded, four left as controls (grass only)

How does animal performance and pasture productivity compare?

What about animal preference – will they graze this stuff, any preference?

Canada goldenrod

Prairie dock

Purple prairie clover

White prairie clover

Roundhead bushclover

Slender bushclover

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# Cleaning Up the Mess – Weed Control in Diverse Native Grass Pastures

Northeast Tennessee and East Tennessee AgResearch and Education Centers, 2023

Can we control undesirable weeds in native grass pastures forbs – without killing all the (expensive!) native forbs?

| Herbicide | Active Ingredient | Rate (product), per acre | |
|---|---|---|---|
| | | Low | High |
| DuraCor | aminopyralid, florpyrauxifen | 12 fl oz | 16 fl oz |
| 2-4DB | 2,4-D butyric | 32 fl oz | 64 fl oz |
| Plateau | imazapic | 6 fl oz | 10 fl oz |
| Cimarron Plus | metsulfuron methyl, chlorsulfuron | 0.5 oz | 1 oz |
| PastureGard | triclopyr, fluroxypyr | 24 fl oz | 48 fl oz |

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# Questions?

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