



Smithsonian
National Zoological Park
Conservation Biology Institute



Bee-Friendly Beef:

Case studies and preliminary
research findings from
Virginia Working Landscapes
Bee-Friendly Beef farms

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*Smithsonian's Virginia Working
Landscapes*



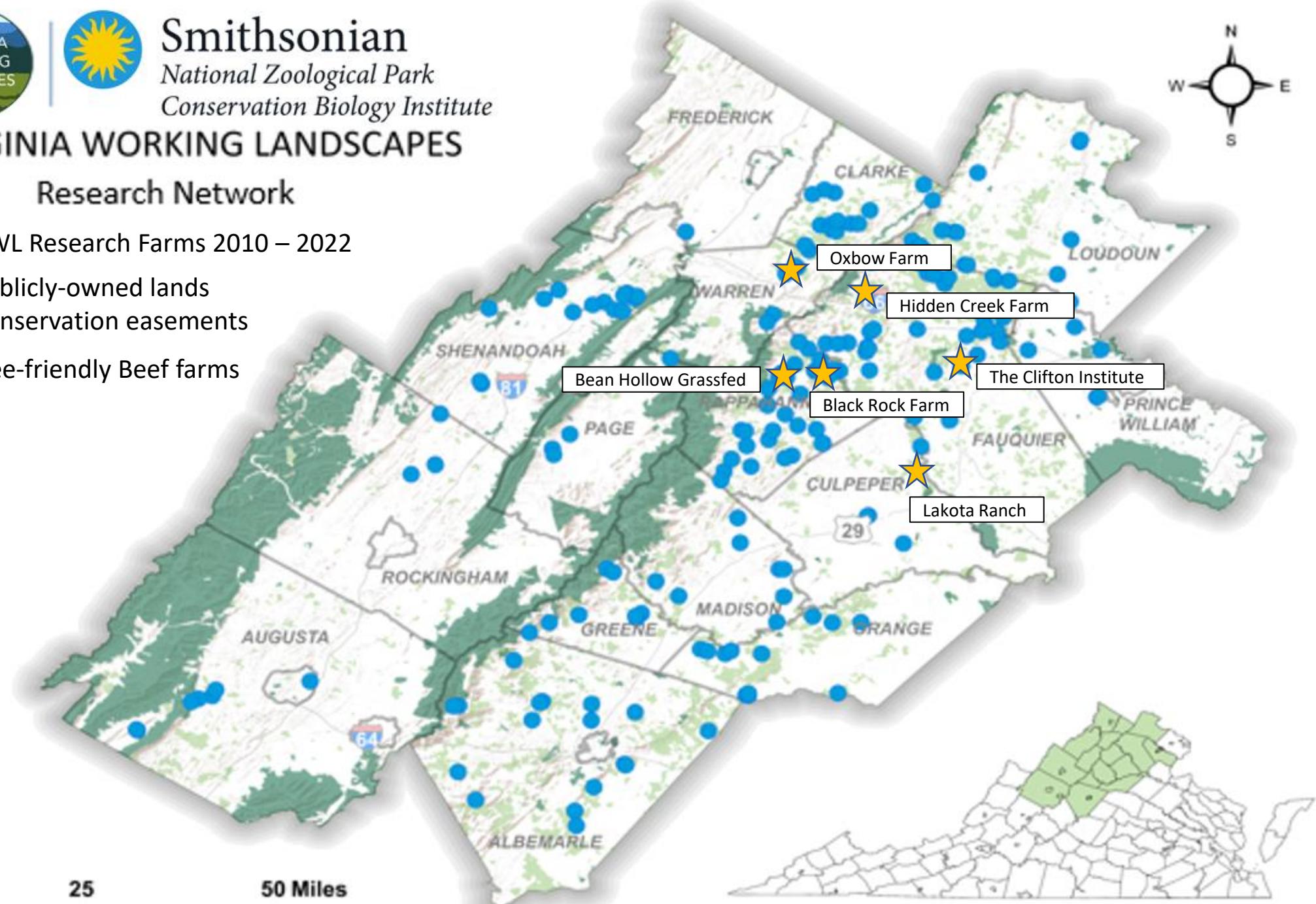


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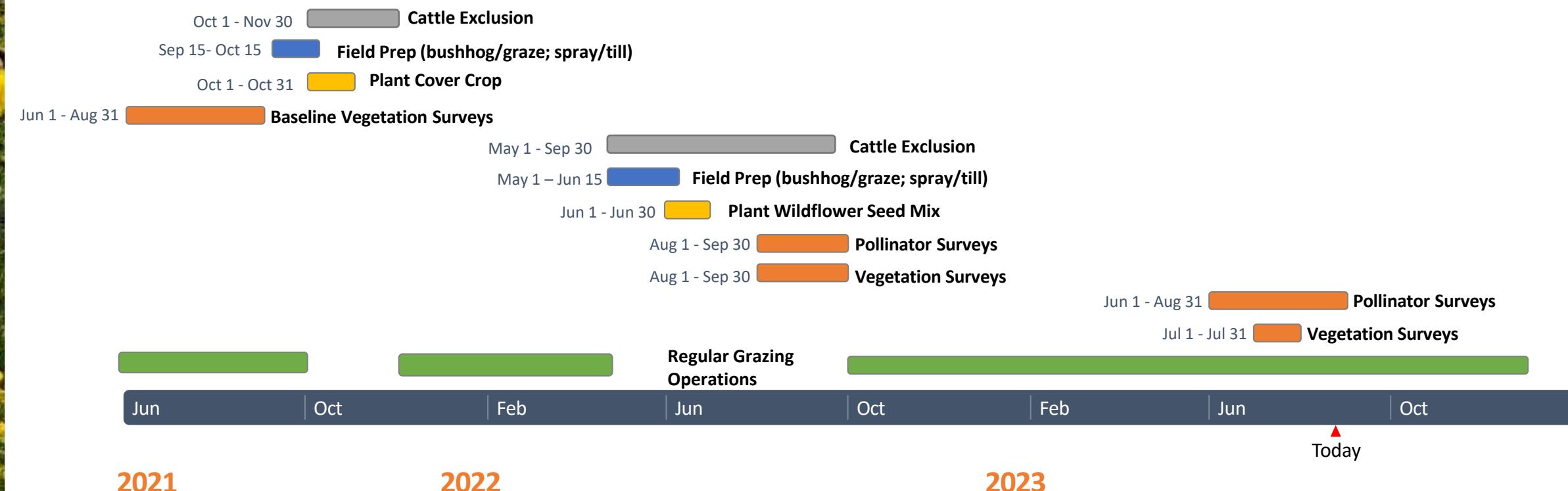
VIRGINIA WORKING LANDSCAPES

Research Network

- VWL Research Farms 2010 – 2022
- Publicly-owned lands
- Conservation easements
- ★ Bee-friendly Beef farms



Project Timeline



Experimental Treatments

- Each pasture (at least 10 acres) was divided into 2 treatments
- At least 25% of WE treatment planted with wildflowers
- Planting acreages ranged from 1.25 acres to 6 acres



Control (C)



Wildflower-enhanced (WE)

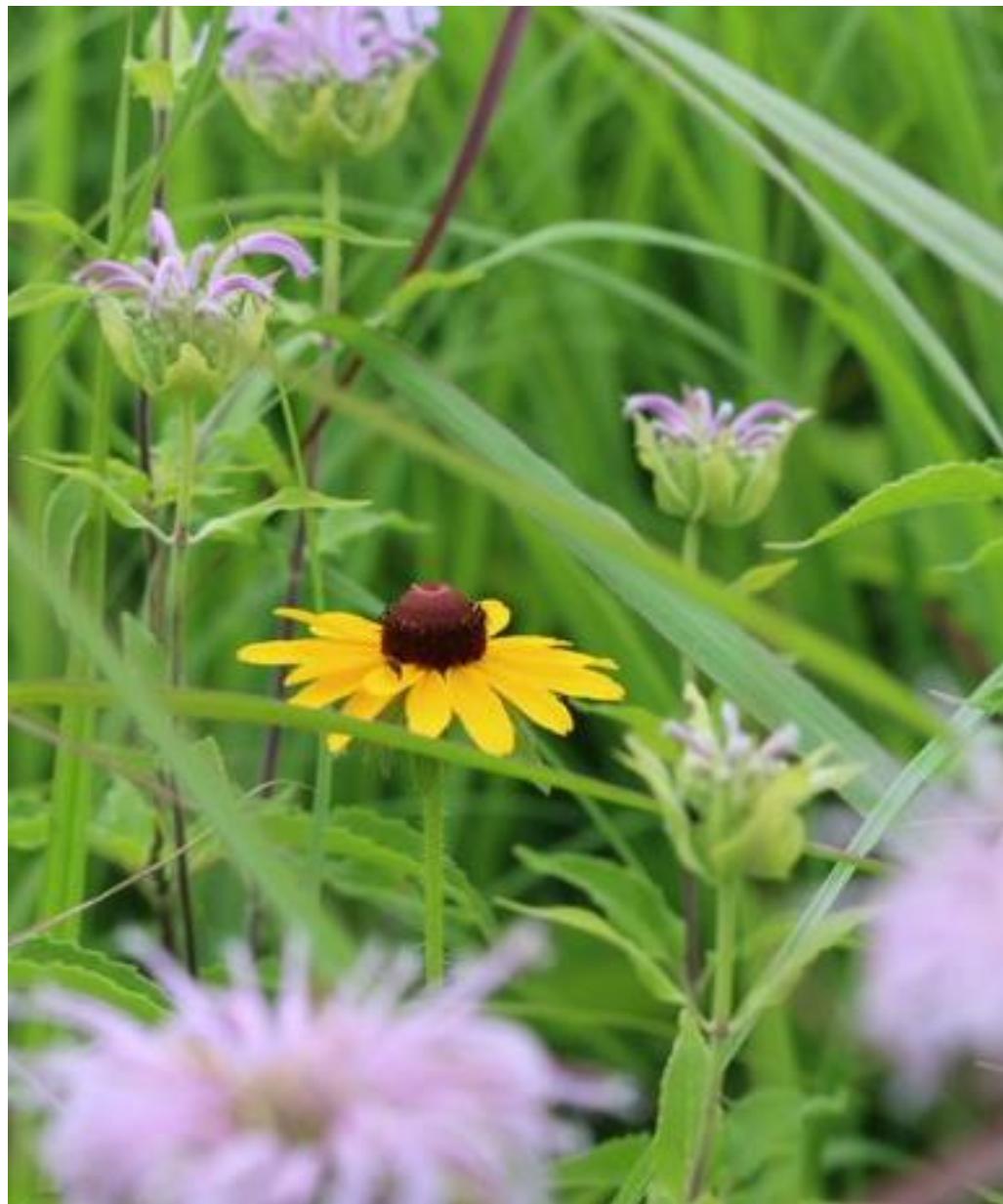
Field Preparation

- Fall 2021
 - Grazed and/or bushhogged
 - Field prep: producers chose between herbicide or tilling
 - Cover crop: Nomini barley or annual rye (winter grazing, soil retention)
- Spring 2022
 - 2nd round of herbicide or tilling
 - 1 month later - planted wildflower seed with no-til drill



Eastern U.S. Wildflower Mix

Common Name	Scientific Name	#seeds/lbs	target lbs/ac
Anise Hyssop	<i>Agastache foeniculum</i>	1,500,000	0.09
Black-eyed Susan	<i>Rudbeckia hirta</i>	1,576,000	0.08
Grey-headed Coneflower	<i>Ratibida pinnata</i>	430,000	0.3
Lanceleaf Coreopsis	<i>Coreopsis lanceolata</i>	221,000	0.59
Maximilian Sunflower	<i>Helianthus maximiliani</i>	196,360	0.67
Narrow-leaf Mountainmint	<i>Pycnanthemum tenuifolium</i>	5,336,000	0.02
Partridge Pea	<i>Chamaecrista fasciculata</i>	65,000	2.01
Purple Coneflower	<i>Echinacea purpurea</i>	115,650	1.13
Showy Ticktrefoil	<i>Desmodium canadense</i>	72,500	1.8
Wild Bergamot	<i>Monarda fistulosa</i>	1,272,000	0.1



Virginia Wildflower Mix

Common Name	Scientific Name	#seeds/lbs	target lbs/ac
Black-eyed Susan	<i>Rudbeckia hirta</i>	1,576,000	0.08
Calico Aster	<i>Sympphyotrichum lateriflorum</i>	800,000	0.16
Common Milkweed	<i>Asclepias syriaca</i>	70,000	1.87
Early Goldenrod	<i>Solidago juncea</i>	2,538,000	0.05
Flat-top Goldentop	<i>Euthamia graminifolia</i>	5,600,000	0.02
Narrow-leaf Mountainmint	<i>Pycnanthemum tenuifolium</i>	5,336,000	0.02
Ox Eye Sunflower	<i>Heliopsis helianthoides</i>	105,000	1.24
Panicleleaf Ticktrefoil	<i>Desmodium paniculatum</i>	200,000	0.65
Partridge Pea	<i>Chamaecrista fasciculata</i>	65,000	2.01
Wild Bergamot	<i>Monarda fistulosa</i>	1,272,000	0.1

Vegetation Surveys

- 10 sampling quadrats per treatment
 - Percent vegetation and ground cover
 - Bloom counts
 - Stem counts (density)
 - Livestock browse
 - Vegetation structure
 - Soil sampling



Wildflower Establishment

2022

Partridge Pea

Showy Ticktrefoil

Black-eyed Susan

2023

Wild Bergamot

Sunflowers

Black-eyed Susan





Photo Credits (right): Hugh Kenny for Kinloch Farm

Pollinator Surveys

- 15 volunteers conduct walking transects to monitor pollinator presence and field composition
- Identify and categorize pollinators into 8 categories

Preliminary Pollinator Data (2022)

		Honey bees	Bumble bees	Small native bees	Large native bees	Flies	Butterflies/moths		Wasps	Beetles	Total
Blackrock Farm	Control	28	5	2	0	5	9		3	6	58
	Wildflower-Enhanced	22	35	16	0	7	11		7	6	104
Hidden Creek Farm	Control	1	0	0	0	50	18		1	0	70
	Wildflower-Enhanced	4	0	34	1	70	52		26	12	199
Lakota Ranch	Control	0	3	13	0	6	4		0	1	27
	Wildflower-Enhanced	0	1	21	0	10	7		4	12	55
Over Jordan Farm	Control	0	1	2	0	1	7		0	10	21
	Wildflower-Enhanced	24	9	28	1	5	23		1	9	100
Oxbow Farm	Control	0	0	9	0	4	11		5	1	30
	Wildflower-Enhanced	1	1	53	1	5	55		10	34	160
The Clifton Institute	Control	1	27	12	0	11	65		10	2	128
	Wildflower-Enhanced	1	4	13	0	14	84		15	5	136



A wide-angle photograph of a lush, green field filled with a variety of wildflowers, including yellow and purple blossoms. In the background, a line of trees borders a farm building, with a utility pole standing prominently on the left side.

VWL Farm Case Studies

Oxbow Farm

- Acres converted: 2.5
- Grazing Longhorn Cattle
- Seed mix: Virginia natives
- Establishment method: Herbicide
- Continuously grazed



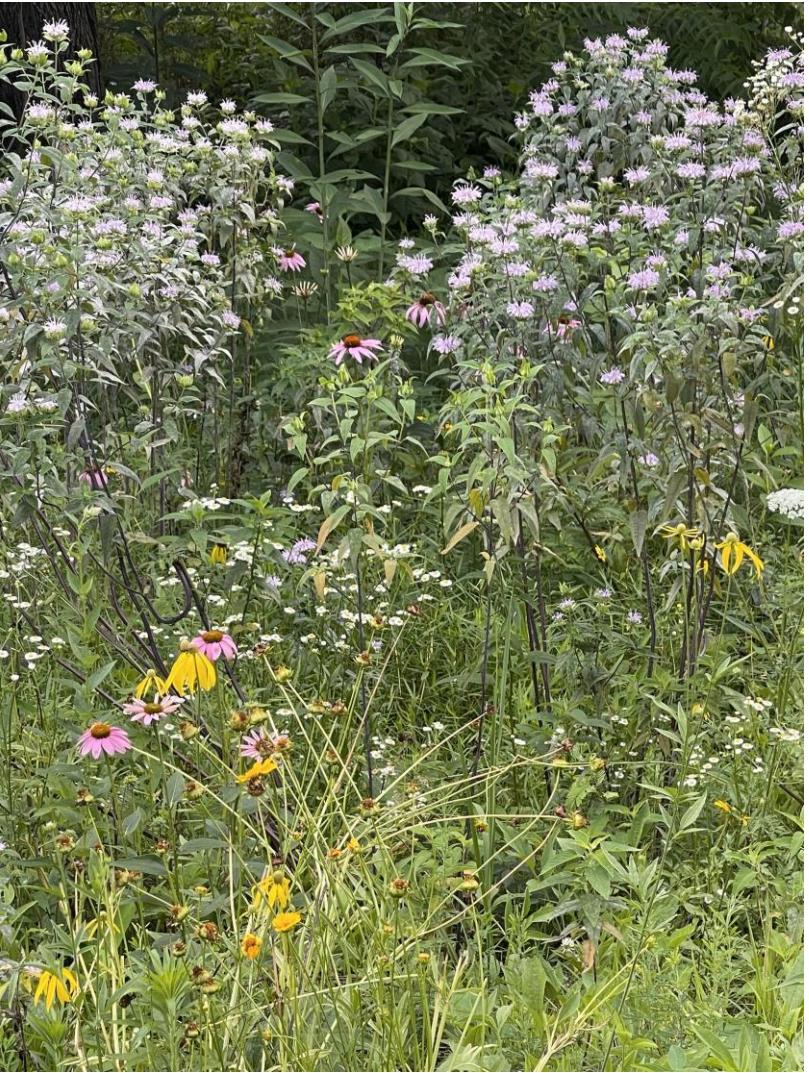
A wide-angle photograph of a rural landscape. In the foreground, there's a field of tall, golden-brown grass. Beyond it, a green pasture where a herd of sheep with white wool and dark faces is grazing. A line of trees marks the horizon on a slight incline. The sky above is a vibrant blue, filled with large, white, puffy clouds.

Oxbow Farm



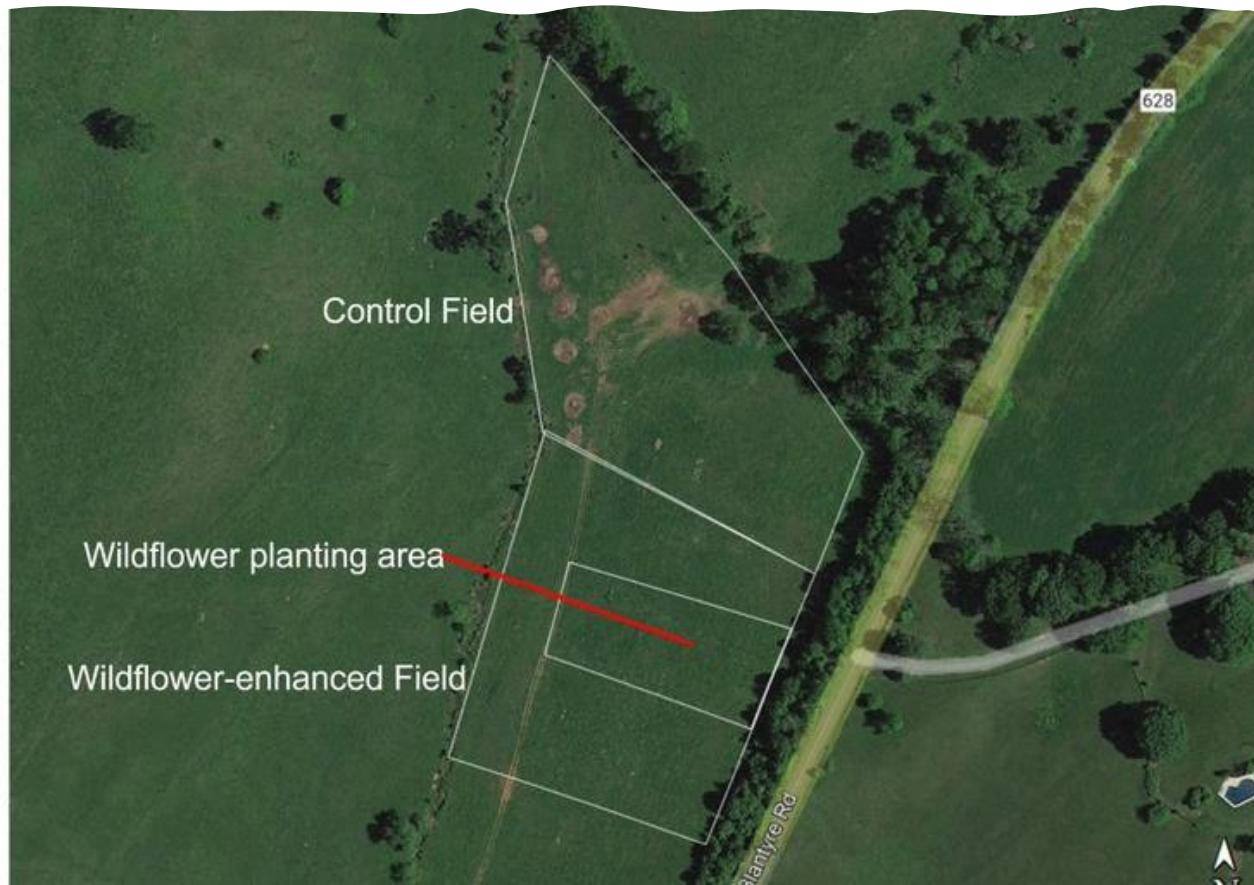
- Acres converted: 2
- Grazing: Red Poll Cattle
- Seed mix: Eastern U.S. natives
- Establishment method: Tilling
- Rotationally grazed

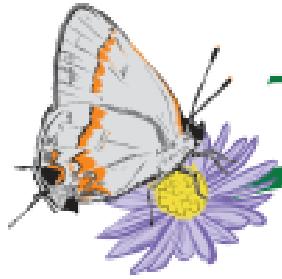




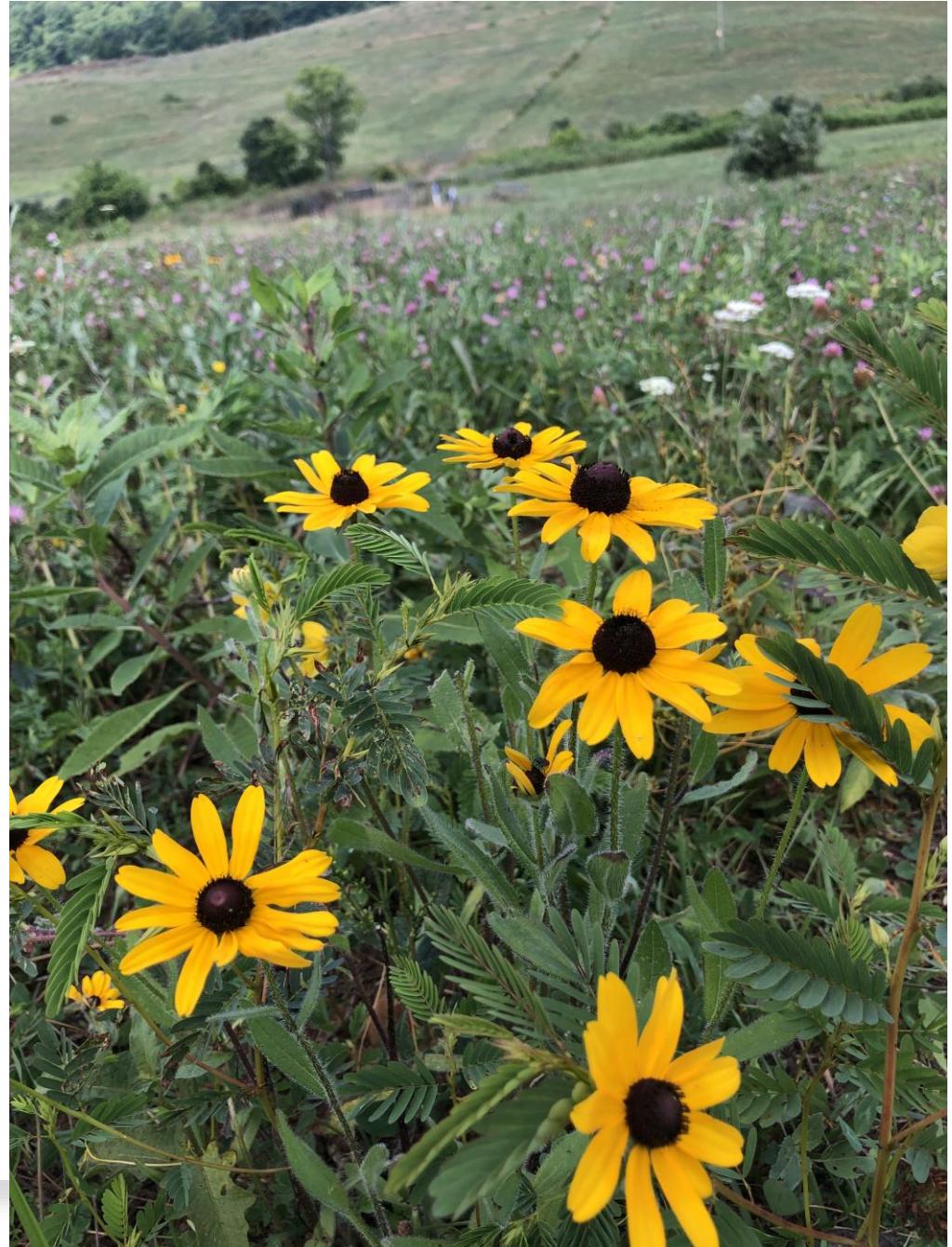


- Acres converted: 1.25
- Grazing: Red Poll Cattle
- Seed mix: Virginia natives
- Establishment method: Tilling
- Rotationally graze – 3.5 day graze, 35 day rest





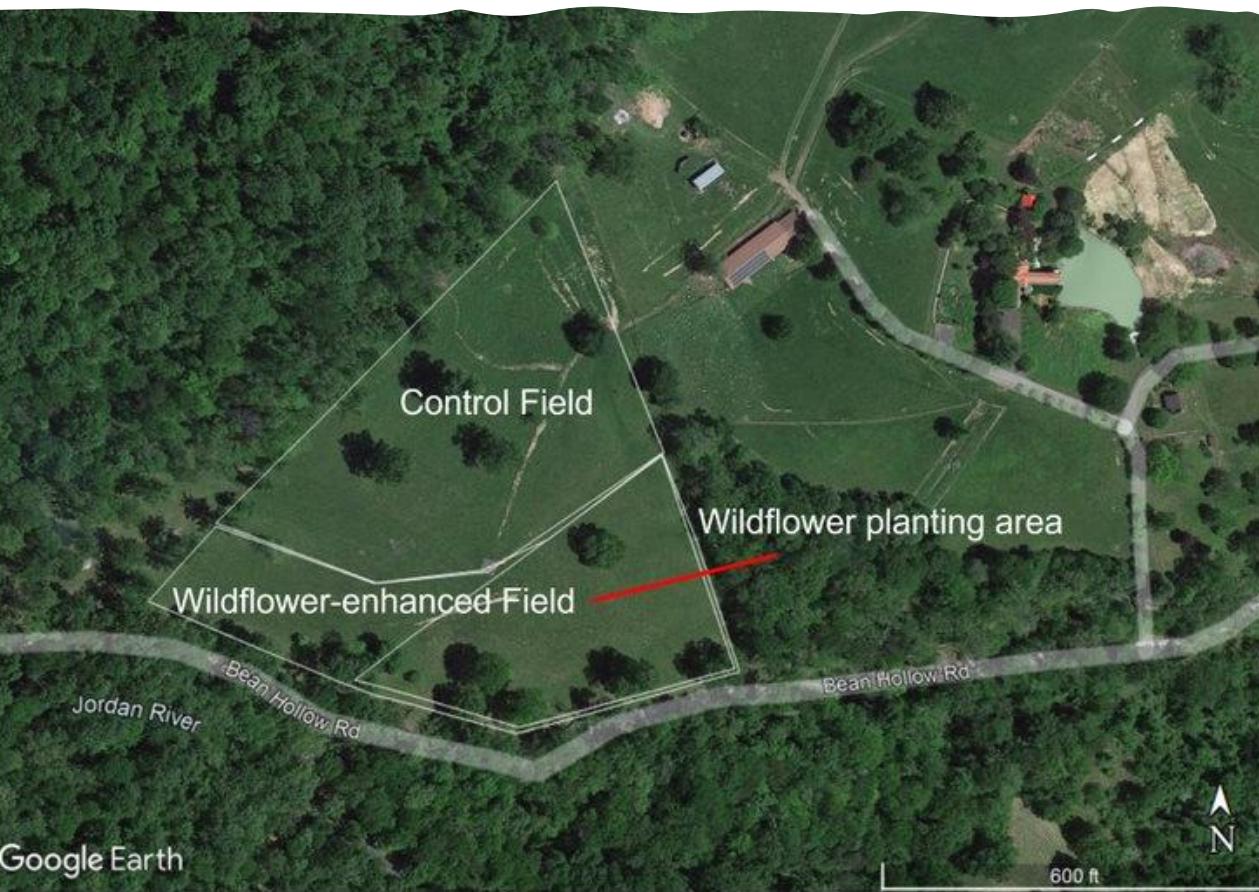
The Clifton Institute

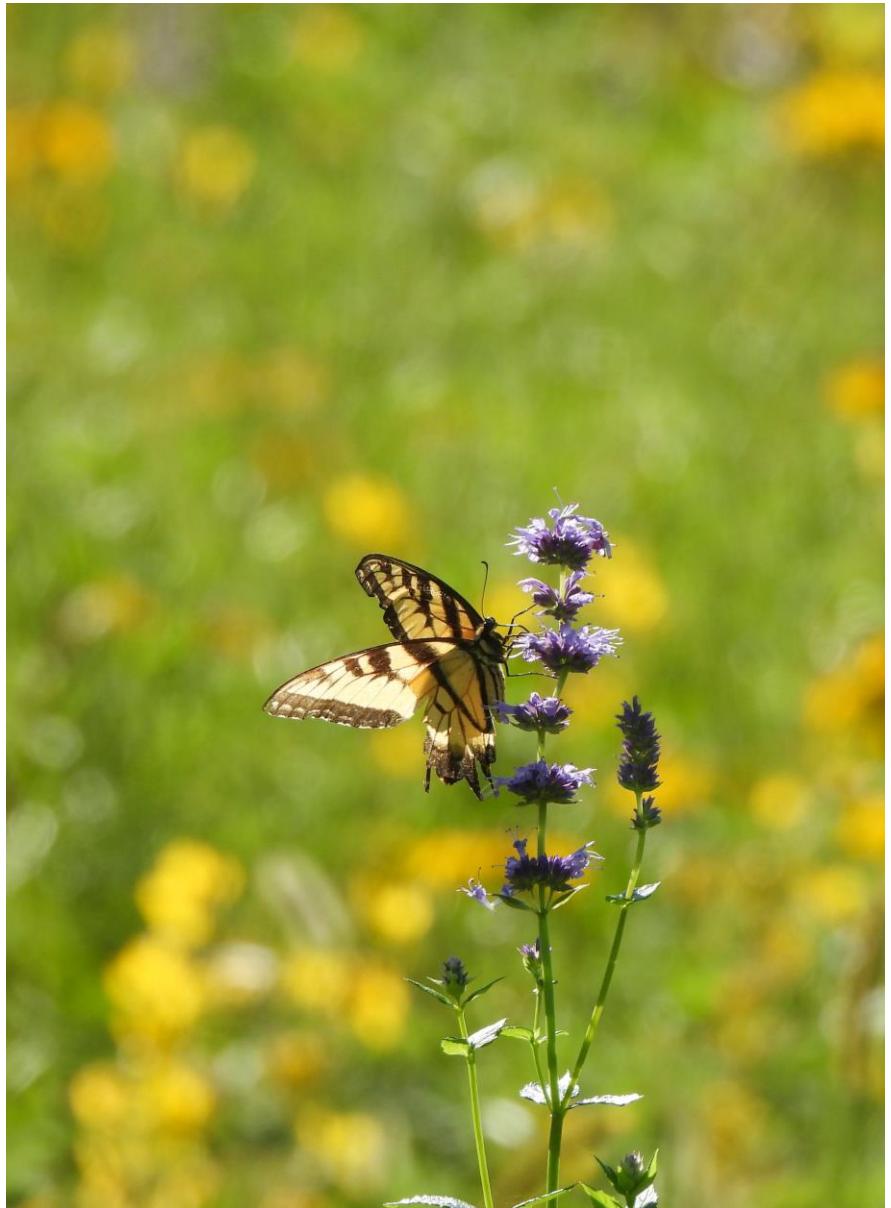




- Acres converted: 2.8
- Grazing: South Poll and Red Devon Cattle Crosses; Sheep
- Seed mix: Eastern U.S. natives
- Establishment method: Herbicide
- Rotationally graze a “flerd” – 1-3 day graze, 25 day rest (spring) or 55 day rest (summer)

Photo Credit: Mike Sands





Blackrock Farm



- Acres converted: 6
- Grazing: South Poll and Red Devon Cattle Crosses
- Seed mix: Eastern U.S. natives
- Establishment method: Herbicide
- Rotationally graze



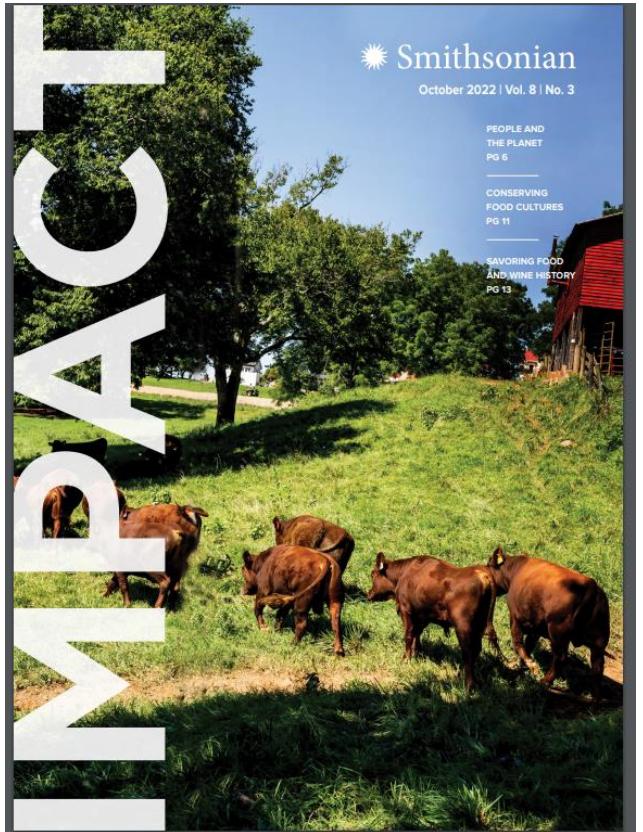


Blackrock Farm





- Acres converted: 5
- Grazing Red Devon Cattle
- Seed mix: Eastern U.S. natives
- Establishment method: CATTLE
- Rotational grazing



The background image shows a hillside covered in a mix of evergreen and deciduous trees displaying autumn colors. In the foreground, there is a field of tall, purple-flowered plants (Agastache) and several yellow flowers with dark centers (likely Rudbeckia). The sky is overcast with white and grey clouds.

Next Steps



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VIRGINIA TECH™

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TENNESSEE
KNOXVILLE

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- Natalie Izlar – Botany Technician
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