

Arkansas Wildlife Federation



2025 Private Lands
Leadership Academy

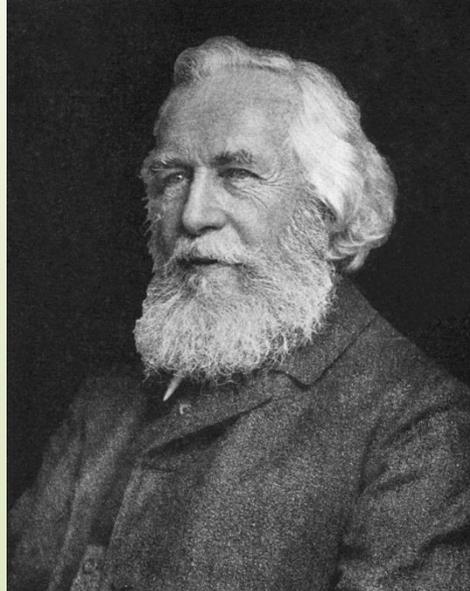


The two foundational scientific disciplines that support your work with land management are **ecology** and **genetics**

Both are new sciences in the overall scheme of things.

A Brief Timeline: Ecology, Genetics and Biodiversity

- ▶ German scientist Ernst Haeckel coins the word, “**oekologie**” in **1866**

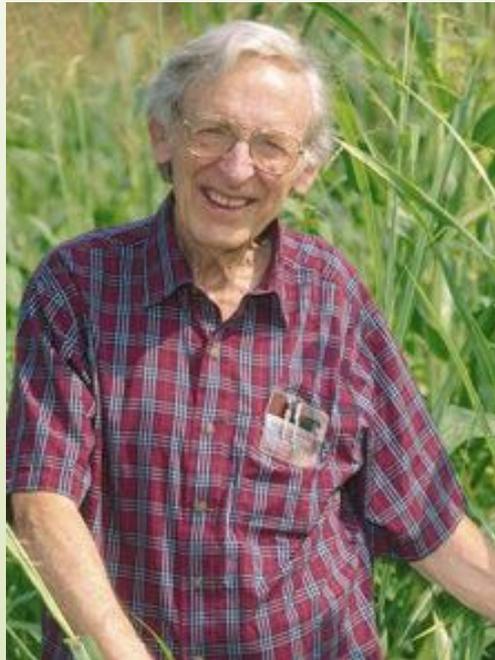


- ▶ Gregor Mendel published his work and established the **fundamentals of genetics** in **1866**.

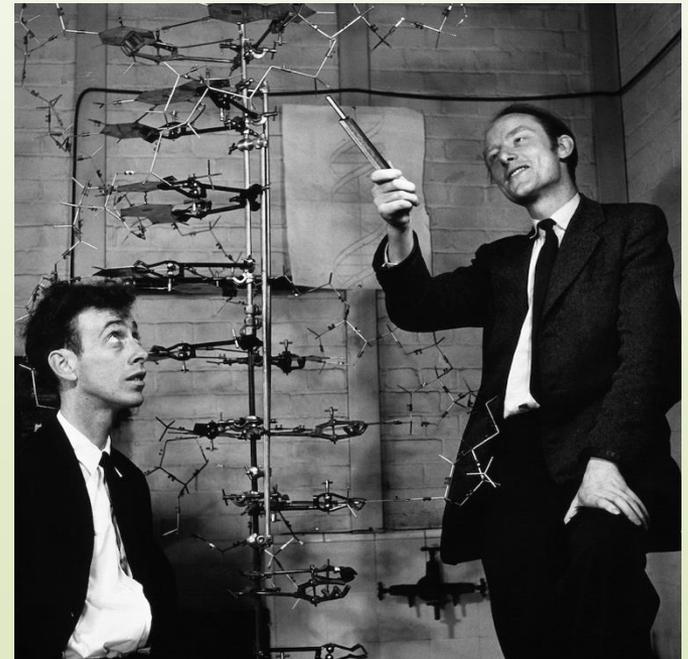


Ecology, Genetics, Biodiversity

- ▶ Eugene and Howard Odum wrote the first textbook widely used to teach ecology in **1953**: **Fundamentals of Ecology**.



- ▶ James Watson and Francis Crick first described the **DNA molecule** in **1953**.



Ecology, Genetics, Biodiversity

- **Ecology** transformed from a “soft science” to a hard science when the “Father of Ecology” G.E Hutchinson combined math with ecology in the **1960’s**.



- The genetic code was finally cracked in **1966**

UUU Phenyl- alanine	UCU UCC Serine UCA UCG	UAU Tyrosine UAC UAA Terminator UAG	UGU Cysteine UGC UGA Terminator UGG Tryptophan
CUU CUC Leucine CUA CUG	CCU CCG Proline CCA CCG	CAU Histidine CAC CAA Glutamine CAG	CGU CGC Arginine CGA CGG
AUU Isoleucine AUC AUA Methionine AUG (Initiator)	ACU ACC Threonine ACA ACG	AAU Asparagine AAC AAA Lysine AAG	AGU Serine AGC AGA Arginine AGG
GUU GUC Valine GUA GUG	GCU GCC Alanine GCA GCG	GAU Aspartic acid GAC GAA Glutamic acid GAG	GGU GGC Glycine GGA GGG

Genetic Code Table

Ecology, Genetics, Biodiversity

- The term **biodiversity** (a contraction of biological diversity) was first used in a publication in **1985** written by Laura Tangley of the National Wildlife Federation. Walter Rosen is credited with coining the term in the late 1980's.



- The groundwork for the **Human Genome Mapping Project** was completed between 1984 and 1988.

Francis Collins





A Timeline of Public Natural Lands Designation

- First National Park was **Yellowstone National Park**, established in **1872**.
- First Wilderness Area was **Gila Wilderness**, established in New Mexico in **1924**. First wilderness area (**Upper Buffalo Wilderness**) established in Arkansas in **1975**.
- First state to establish a natural heritage agency was **Wisconsin**. The **State Natural Areas Program** was established in **1951**.
- **Arkansas** established the **Arkansas Natural Heritage Commission** in **1973** and is recognized as the first state to put together a comprehensive natural areas plan. **Singer Forest Natural Area** was donated to ANHC in 1973. (**Harold Alexander** was very involved in laying the groundwork for ANHC.)



Arkansas Natural Heritage Commission

The Arkansas Natural Heritage Commission (ANHC) focuses on science-based conservation to protect our state's biological diversity.

- Established in 1973
- Arkansas Natural Area Plan published in 1974
- System of Natural Areas now exceeds 77,000 protected acres.
- Maintains Arkansas Heritage Program biodiversity database.
- Small tracts – large; Cossatot River 1st; 1988
- Uses herbicides and prescribed burns as management tools. (Leopold 1924; Yosemite 1968)

Ecoregions of Arkansas





How were prairies formed and when did they appear in North America?

- The “**Great Plains**” were formed when tectonic plates shifted and pushed the Rocky Mountains upward, creating a rain shadow.
- Prairies appeared in North America at the end of the last period of glaciation, **8,000 - 10,000 years ago**.
- **Topographic features, soil type** and **rainfall amount** are 3 important ecological factors that affect prairies.



Long Island, New York, consists of glacial outwash from Connecticut. When the last glaciers retreated, 8,000 – 10,000 years ago, a large prairie formed. Estimated size was 60,000 acres.



Sandplain gerardia

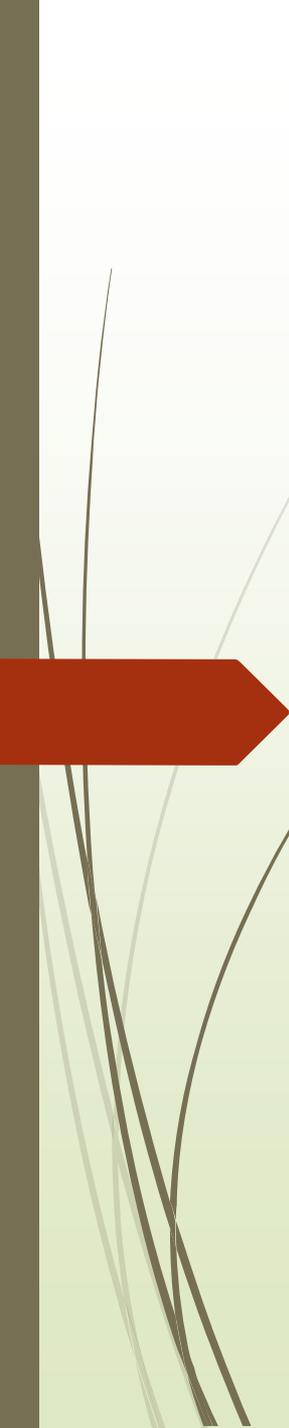
The last heath hen, a subspecies of the prairie chicken, died in 1934 on Martha's Vineyard. It was overhunted and the attempt to save the species was too little, too late.



Heath hens



Statute of "Booming Ben,"
the last heath hen on Martha's
Vineyard."



Man always kills the thing he loves, and so we the pioneers have killed our wilderness. Some say we had to. Be that as it may, I am glad I shall never be young without wild country to be young in. Of what avail are forty freedoms without a blank spot on the map?

-Aldo Leopold

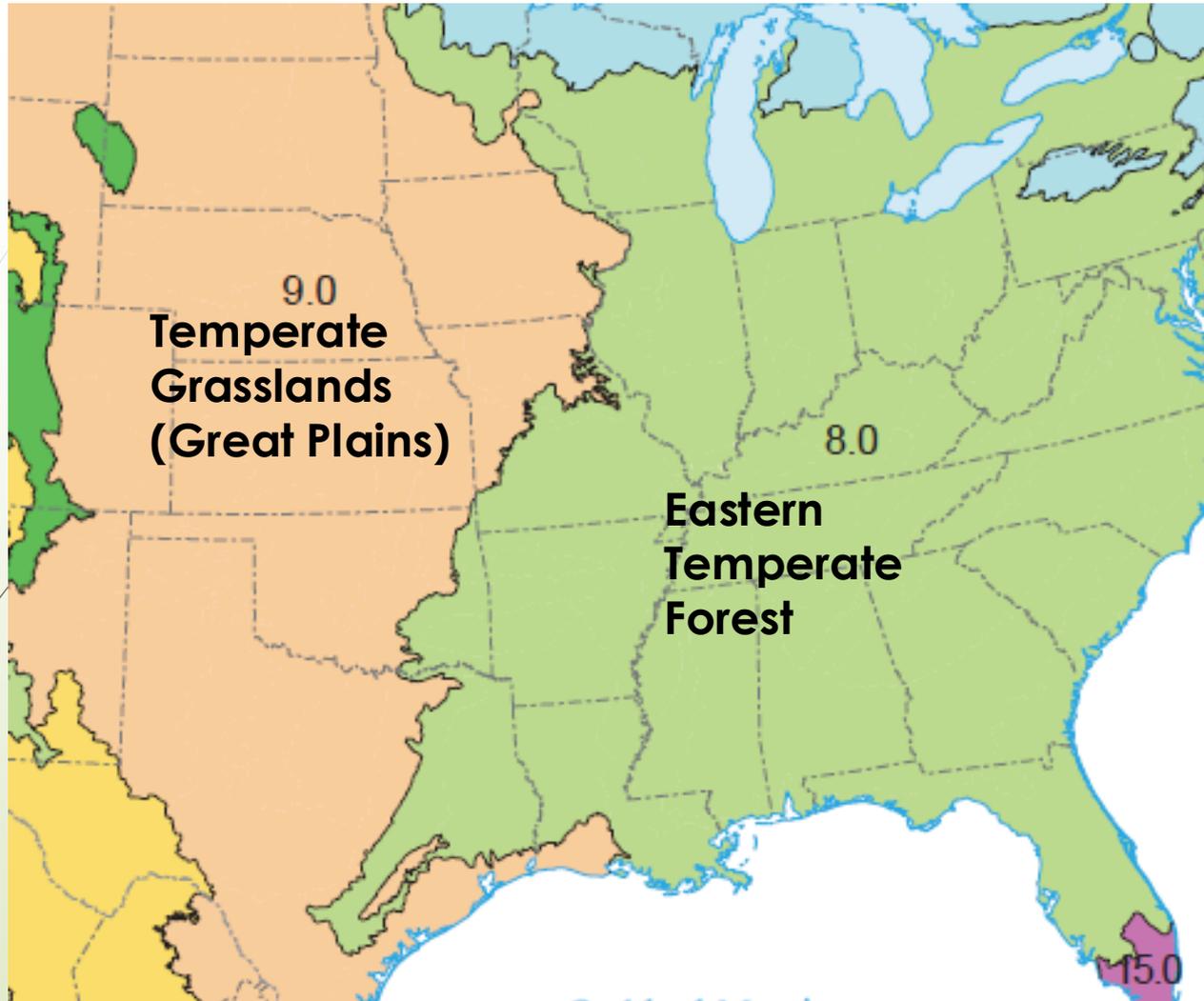


What is a prairie?

- **Prairies** are enormous stretches of flat to gently rolling grassland with **moderate temperatures, moderate rainfall, and few trees.**
- **Prairie** is the French word for **meadow**; the root is the Latin ***pratium***.
- **Prairies** are typically **80% grasses** and **20% forbs.**

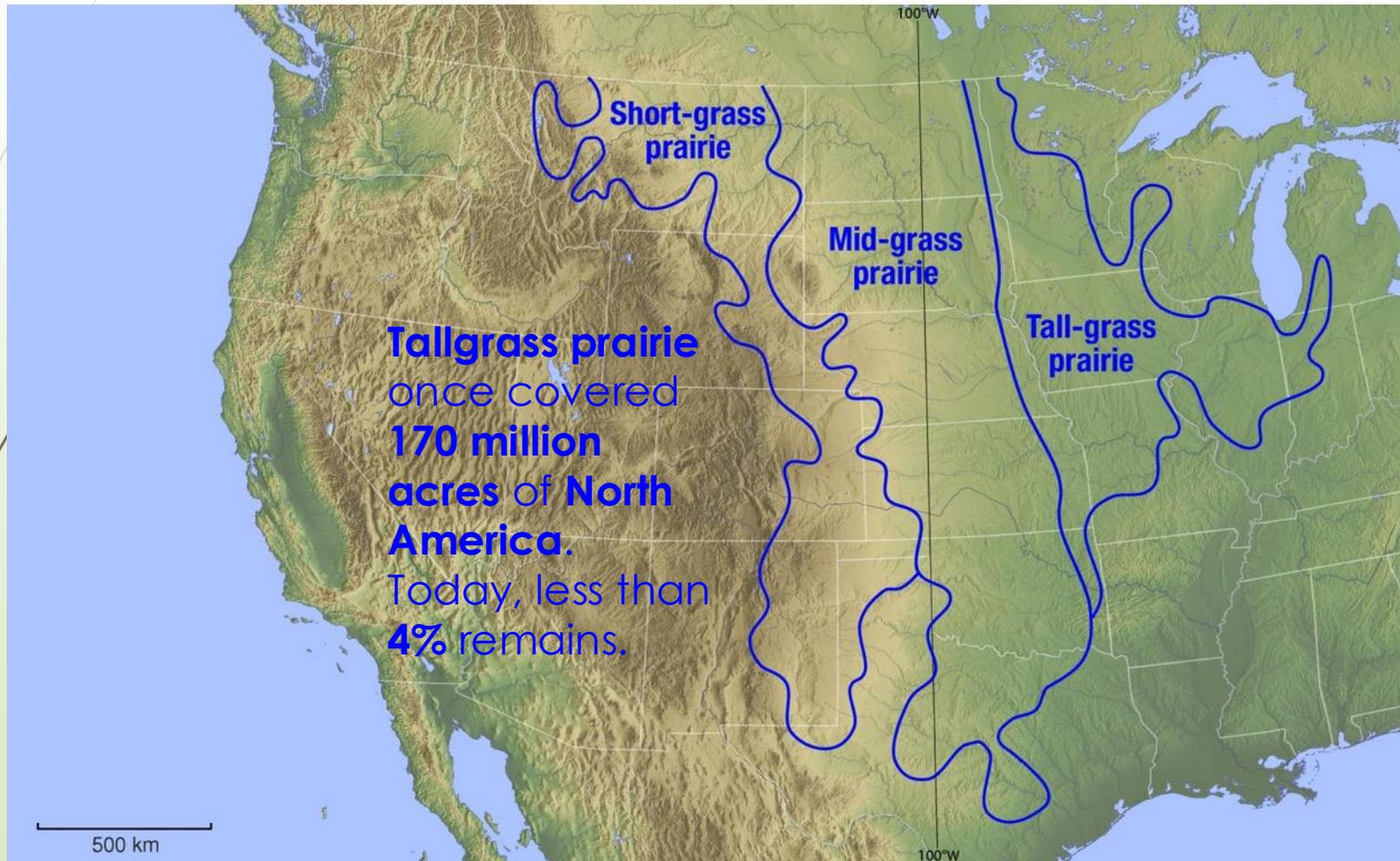
Prairies were developed and are maintained by 3 stresses – climate, grazing and fire.





Arkansas is at the edge of the Eastern Temperate (Deciduous) Forest Biome and the Temperate Grasslands (Great Plains) Biome.

Are temperate grasslands uniform?



Tallgrass prairie grasses may grow up to 10 feet tall.



**Big
Bluestem**

Tallgrass prairies must be grazed or burned to prevent the growth of woody plants.



What ecosystem services do prairies provide?



The deep roots of native prairie plants hold soil in place and retain water.

**Native plants
provide nectaries
and nurseries for
native insects**



Obedient Plant



Swamp milkweed



Monarch cat on
milkweed



“The last word of ignorance is the man who says of an animal or plant, ‘What good is it?’ If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something that we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.”

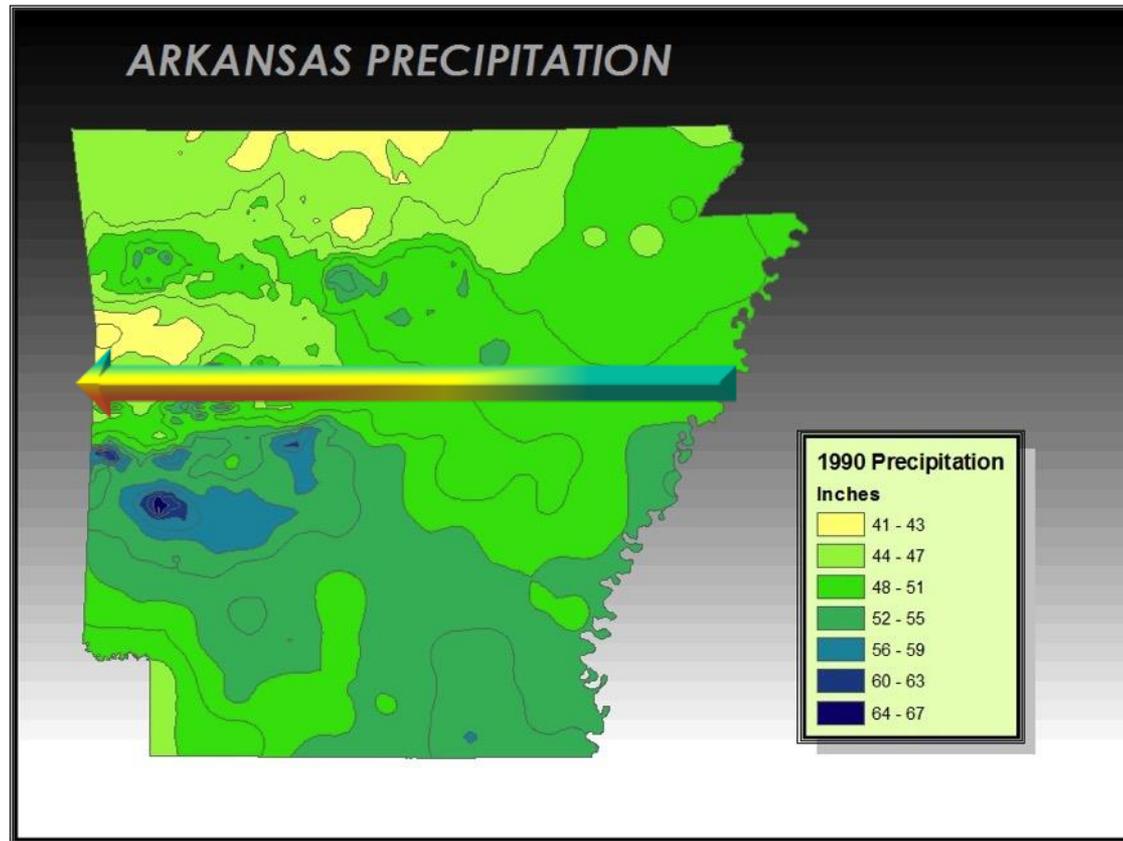
-Aldo Leopold

Prairies are rich in biodiversity. There are over 250 species of plants documented on 10 acres at Searles Prairie Natural Area.

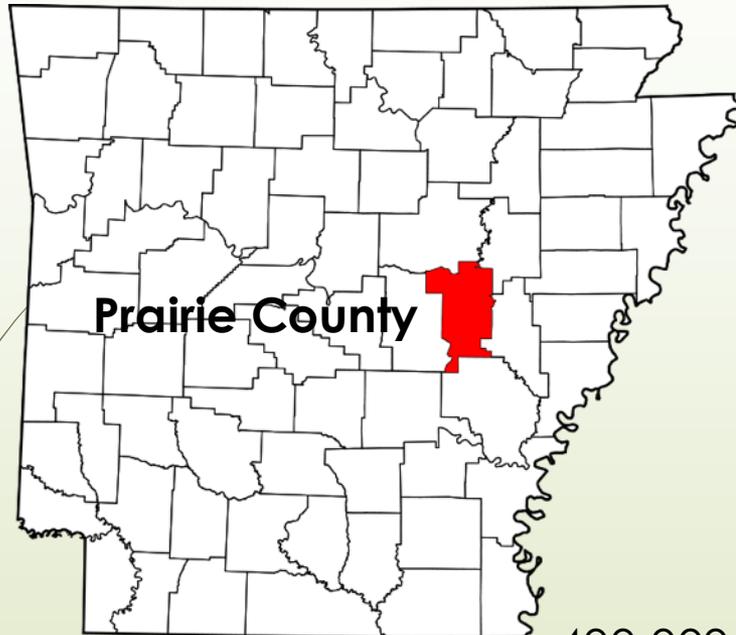


Ladies' tresses orchids

Where are prairies in Arkansas?



How can a prairie exist on the Mississippi Alluvial Plain?



400,000
acres of
prairie at
time of
settlement;
600 acres
remaining

Grand Prairie

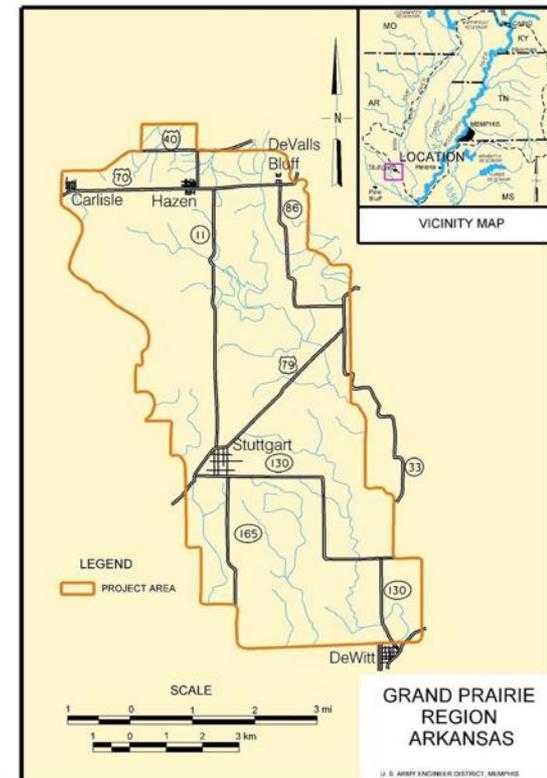


Figure 1. Project Area Map

Arkansas Valley Prairies are our most extensive tracts.



**Cherokee Prairie
Natural Area
586 Acres**



**Flanagan Prairie
Natural Area
539 Acres**

Coastal Plain Blackland Prairies

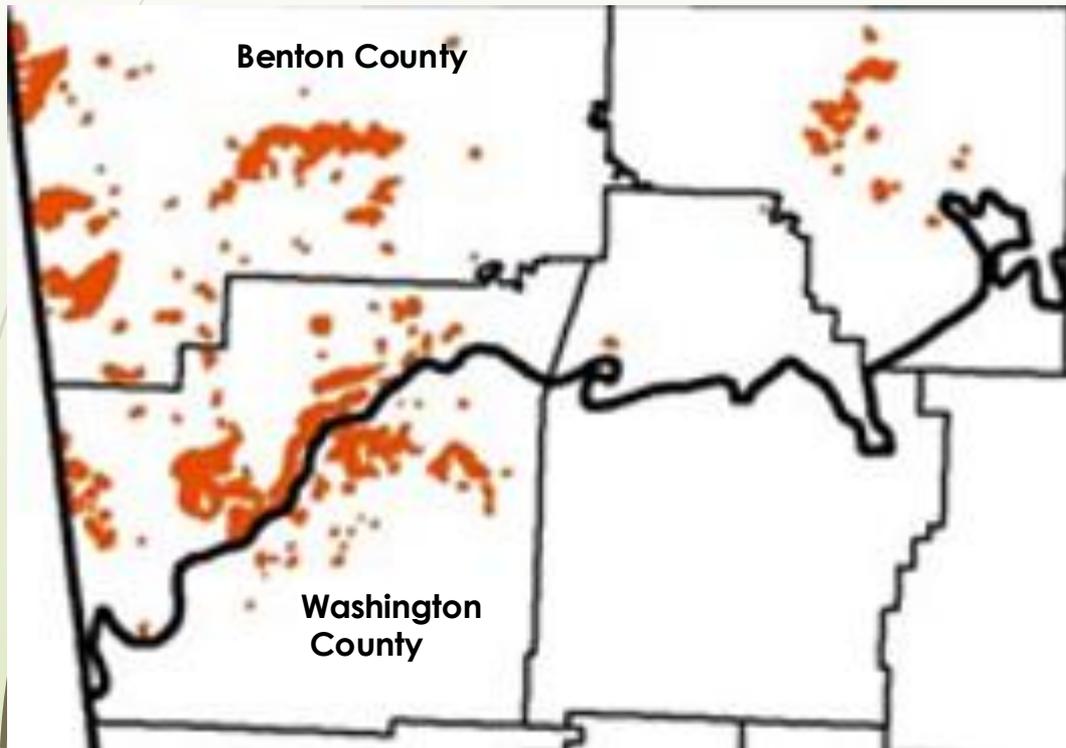


Terre Noire



Grandview Prairie

Where were prairies historically located in Benton and Washington Counties?



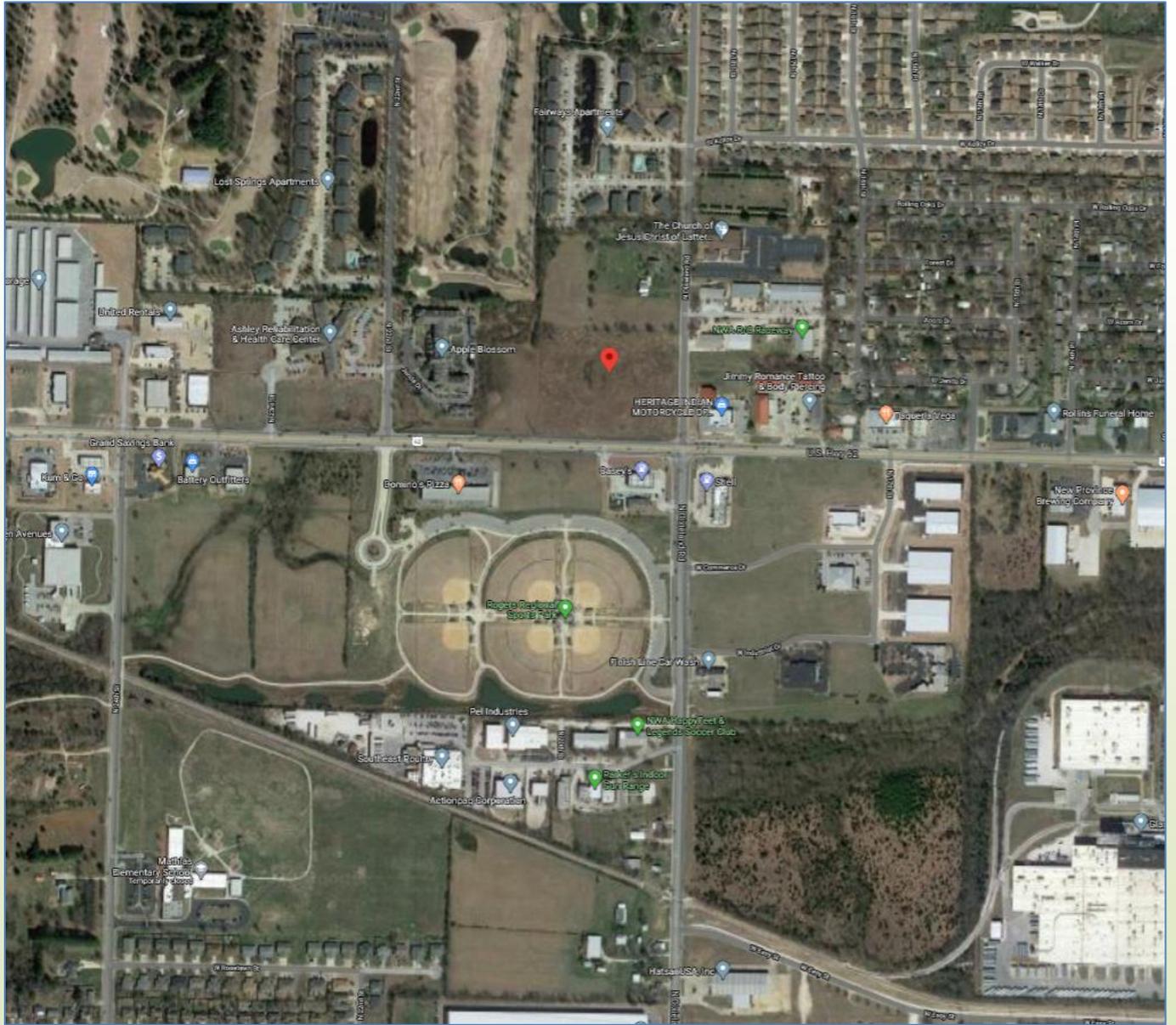
A general land survey conducted in the 1800s documented that there were 106 square miles, or 68,000 acres, of treeless prairies mapped in Benton and Washington counties. Today there are less than 150 acres, or less than 1%, remaining.

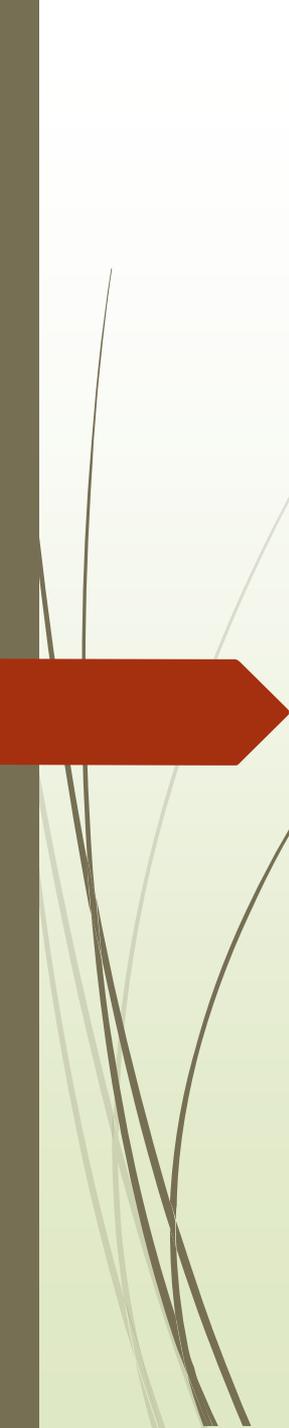
Searles Prairie Natural Area

A richly diverse natural area in an urban landscape



- **10.5 acres**
- **Original 8 acres dedicated in 1988**
- **Conservation easement donated by Anna Mae Searles**
- **Searles Prairie Addition (2.5 acres) added in 2019;**
- **250 plant species documented at the site**





**To those devoid of
imagination a blank place on
the map is a useless waste; to
others, the most valuable
part.**

-Aldo Leopold

False Indigo Bush – *Amorpha fruticosa*



The Searles farmed most of their land, leaving the land that is now Searles Prairie Natural Area as a hay meadow. They valued the meadow for its beauty, and for its importance to monarch butterflies.





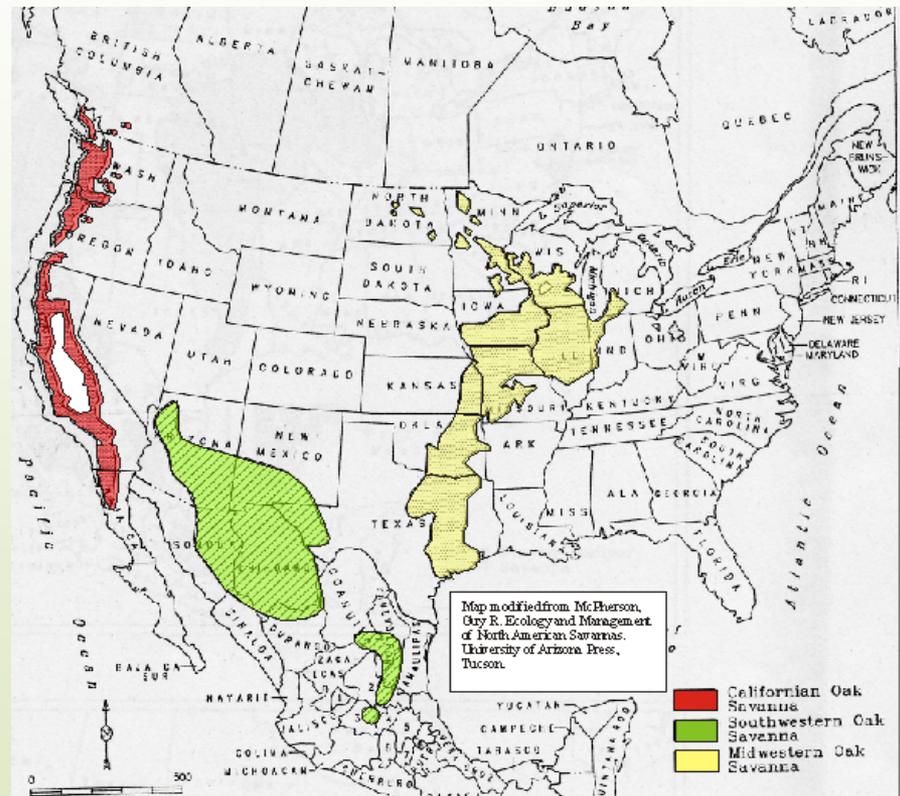
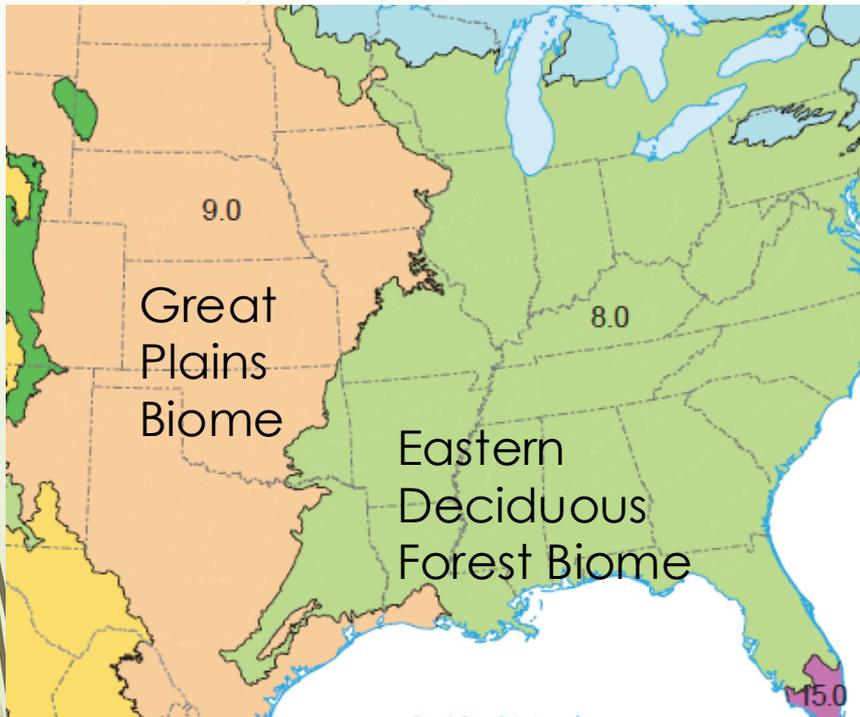
“We abuse land because we see it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”

-Aldo Leopold



Anna Mae and Ike Searles took good care of their prairie over The years. Dr. Neil Compton (who took this picture) was a family friend who loved the prairie almost as much as the Searles.

Original location of post oak savannas



Northwest Arkansas Community College Living Laboratory



Searles Prairie provided seeds for NWACC ecosystem restoration.



**Both prairies and savannas
are maintained
by prescribed fire.**



**2017 NWACC
Prescribed
Burn**



**2019 Searles Prairie
Prescribed Burn**



“Today remnant prairies and savannas with native ground flora are among the rarest plant communities in the Ozarks and are considered a high priority for conservation.”

–Theo Witsell, ANHC Chief of Research



**Land management is not
rocket science. It is harder
than that.**

-Tom Foti, Director of Research, Arkansas Natural
Heritage Commission. Arkansas' Ecologist Emeritus



“We must recognize.....that the products of technology are not enough to satisfy all of man’s needs, and that appreciation of esthetic values and moral truths are essential to the perpetuation of a world in which man can live out a wholesome and beneficial life.”

-Harold Alexander

Arkansas’ “Arkansas’ Father of Conservation”