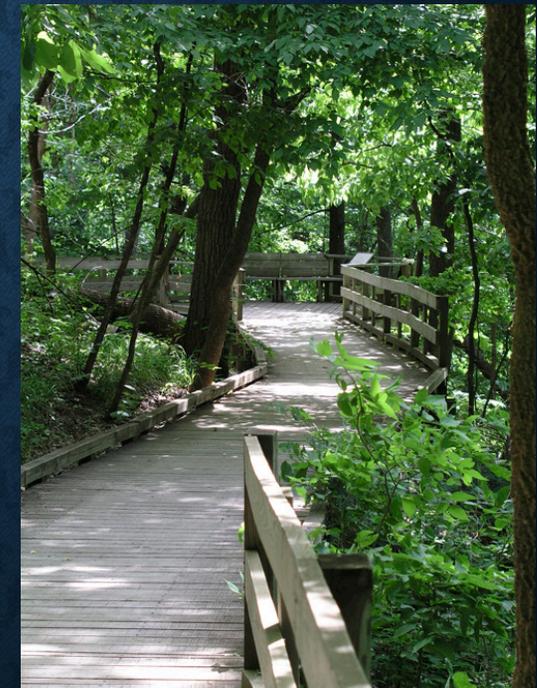


What Happens Without Fire in the Forest?

Mesophication and how it threatens our oaks...



Is Mesophication occurring at Fontenelle Forest?

- Until its recent re-introduction, Fontenelle Forest has been without fire for almost 150 years. It is expected that mesophication has already started deteriorating the Oak Savanna and Woodlands of Fontenelle Forest.
- A vegetative assessment was conducted by Fontenelle Forest in 2016 to help guide future management decisions regarding the forest. Data from that survey was then used to determine if mesophication is taking place at Fontenelle.

Indicators of mesophication in Fontenelle Forest are:

1) The presence of mesophytic woody species (shade-tolerant hardwoods)¹.

- The percent cover of undesirable woody species ranged from 10-47% with an average cover of 20%.
- At least one undesirable woody species was found in every single plot used in this survey.

2) A lack in oak tree recruitment¹.

- The number of bur and red oak seedling (>1 foot tall) counted in survey plots ranged from 0-15 seedlings per transect.
- There was an average of 2 bur oak seedlings/transect and 3 red oak seedlings/transect.

In summary, shade-tolerant, fire-sensitive species associated with mesophication have begun encroaching on Fontenelle Forest and oak regeneration is low.

Reintroduction of fire can help to halt mesophication and restore the Oak Savanna in Fontenelle Forest.

Managing Against Mesophication (And Saving Our Oaks)

- In order to save the oak trees of Fontenelle Forest, the management team at Fontenelle Forest aims to create a forest that is suitable for oak regeneration.
- This is done by clearing the forest of shade tolerant, fire sensitive, woody species that have created a “mesophytic” environment.
- Unfortunately, the forest has been without fire for many years and simply reintroducing fire is not enough to bring the forest back to its original state.
- That’s why Fontenelle Forest has created their “Save the Oaks” Management Plan, which involves:
 - Prescribed Burning
 - Hack and Squirt Tree Thinning
 - Mowing
- Eventually, prescribed burns may be all that is needed to keep the Oak Savanna in its historic state.

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Did You Know?

Oak forests are uniquely dependent on fire

- Oak trees are resistant to ground level fires due to thick bark and a stable root systems².
- Oak seeds (acorns) germinate below the soil surface (unlike other hardwoods) which protects oak seedlings from fire².
- Oak tree litter (leaves that have fallen on the ground) burn more readily than other types of hardwood leaves, promoting fires to occur more easily and frequently in oak dominated forests².
- Frequent fires makes it difficult for trees that are not adapted to fire to establish, reducing competition for oak trees and creating an ecosystem that is more conducive for new oak trees to grow².

Fire was removed from these ecosystems 150 years ago

- The exclusion of fire has started to transform Oak Savannas and Woodlands in Fontenelle Forest into habitats that cannot support oak tree regeneration.
- This process is known as **MESOPHICATION** and it is a problem in woodland ecosystems across the United States.

What is Mesophication?

Mesophication is the process that occurs when fire is removed from a fire-dependent forest such as an Oak Savanna.

Removing fire causes these forests to shift from open, sun-loving, fire tolerant forests to closed, shade-tolerant, fire sensitive forests¹.

This shift creates a “mesophytic” environment that is shady, cool, and damp, which further reduces the chances of frequent fire¹.

Fire-dependent plant species such as oaks, struggle to grow in this “mesophytic” environment causing the forest to be dominated by less desirable hardwoods.

What Happens to a Forest Overtime Without Fire

What Has Happened to Fontenelle Without Fire?

Historic Oak Savanna

- An Oak Savanna is a open canopy mixed grass-oak ecosystem.
- Frequent fires burn ground level vegetation ridding the savanna of other hardwoods while simultaneously promoting oak tree generation.
- This is what Fontenelle Forest would have looked like 3000-150 years ago.



Transitional State

- When fire is removed from Oak Savanna the system slowly starts to change.
- Fire-sensitive woody species start to invade the ground level of the forest.
- These woody species can inhibit new oak trees from growing by shading out oak seedlings and can help contribute to a “mesophytic” environment.



“Mesophytic” State

- Once the forest has been without fire for a long period of time it reaches what is known as a “mesophytic” state.
- Shade tolerant, fast growing woody species now dominate the forest.
- The amount of oak trees reaching maturity is close to zero.
- Fontenelle’s Oak Savanna most closely resembles this state.

