And the Trees Will Last Forever

In northern Wisconsin, tribal foresters from the Menominee Nation are working to speed regeneration of forest areas that have been treated for invasive diseases. Their efforts are also creating forests that are better adapted to future conditions.

Lessons Learned

- Engage experts: Integrate scientific knowledge and diverse perspectives into resilience planning. Local or regional universities offer valuable assets, bringing relevant expertise and a vested interest to the planning process. Furthermore, establishing partnerships with these entities can build powerful relationships that can foster solidarity and significantly enhance climate resilience.
- Respect and embrace cultural heritage: Local communities are experts on their environments. Indigenous communities in particular possess profound expertise given deep, enduring connections to their homelands. Through generations, indigenous communities have safeguarded traditional knowledge, encompassing invaluable ecological wisdom. Respecting and recognizing this cultural heritage is essential. If given the opportunity, embracing this rich resource and allowing western science to be guided by indigenous wisdom can generate new understandings and novel approaches greatly enhancing climate resilience efforts.
- Biodiversity is resilience: With ecosystem restoration projects, recognize that bolstering biodiversity is your route to resilience. Biodiversity facilitates vital interactions and symbiosis among species, enhancing the health of the entire ecosystem. Moreover, with a multitude of species present, an ecosystem can remain functional even if one species is adversely affected by climate change, as other species continue to thrive and collaborate, reducing overall climate impacts. Therefore, in restoration efforts prioritize enhancing biodiversity to fortify resilience and preserve ecosystem services.

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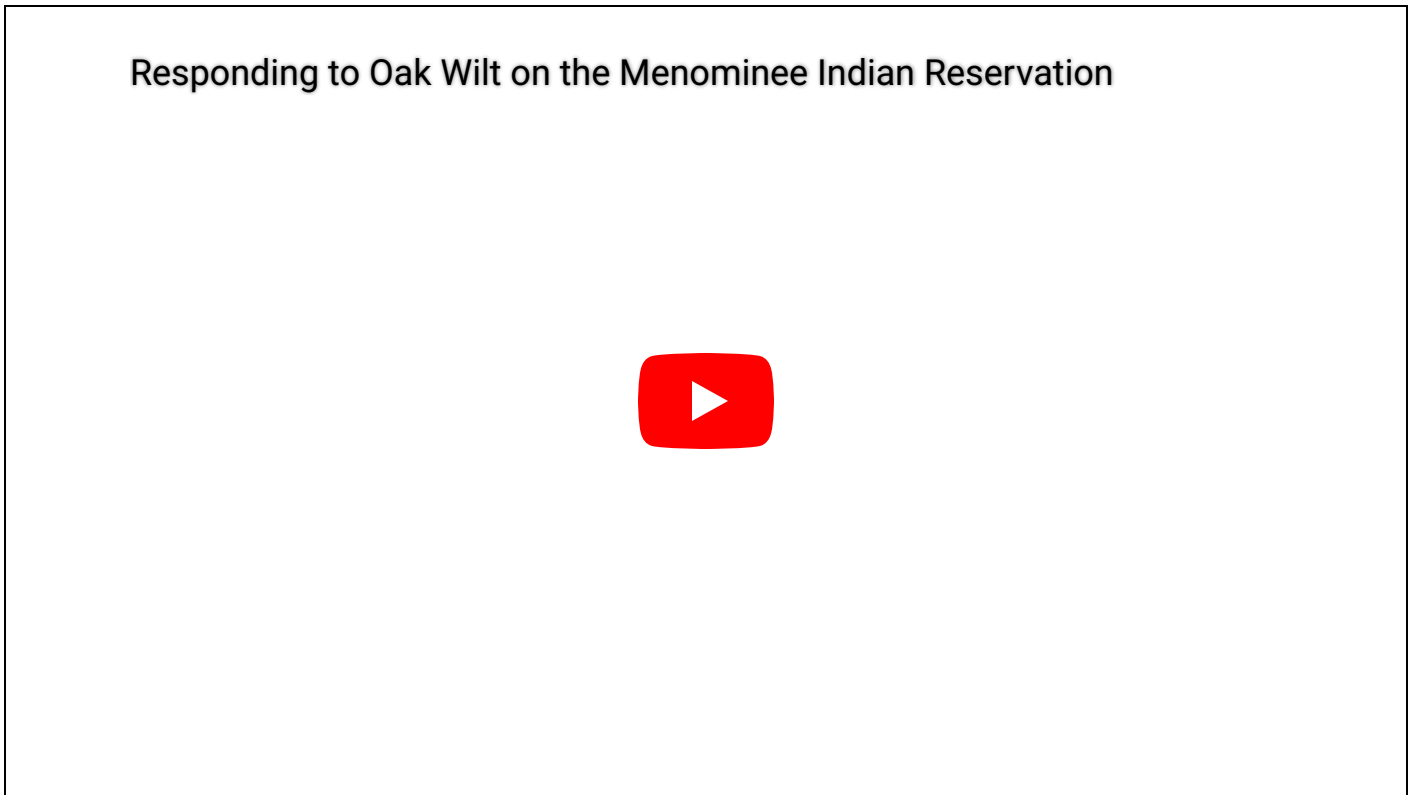
> "Start with the rising sun and work toward the setting sun, but take only the mature trees, the sick trees, and the trees that have fallen. When you reach the end of the reservation, turn and cut from the setting sun to the rising sun and the trees will last forever."
>
> —Attributed to Chief Oshkosh, Menominee Nation

A rich history of sustainability

For more than 150 years, the Menominee Tribe of northern Wisconsin has pioneered practices that preserve more than 200,000 acres of diverse forested land. The tribe's long history of sustainable land management has enabled the Menominee to maintain a healthy forest, even as they have harvested half a billion feet of lumber from the lands since the mid-1800s.



Responding to Oak Wilt on the Menominee Indian Reservation

"Throughout history, Menominees have been a woodland people," says Tony Waupochick, a Menominee silviculturist and forester. "As the early Menominee leaders started to make their decisions about harvesting the timber on the reservation, they always maintained the concept that they never wanted to harvest more than what the forest can provide. Basically, that was an early concept of sustainability."

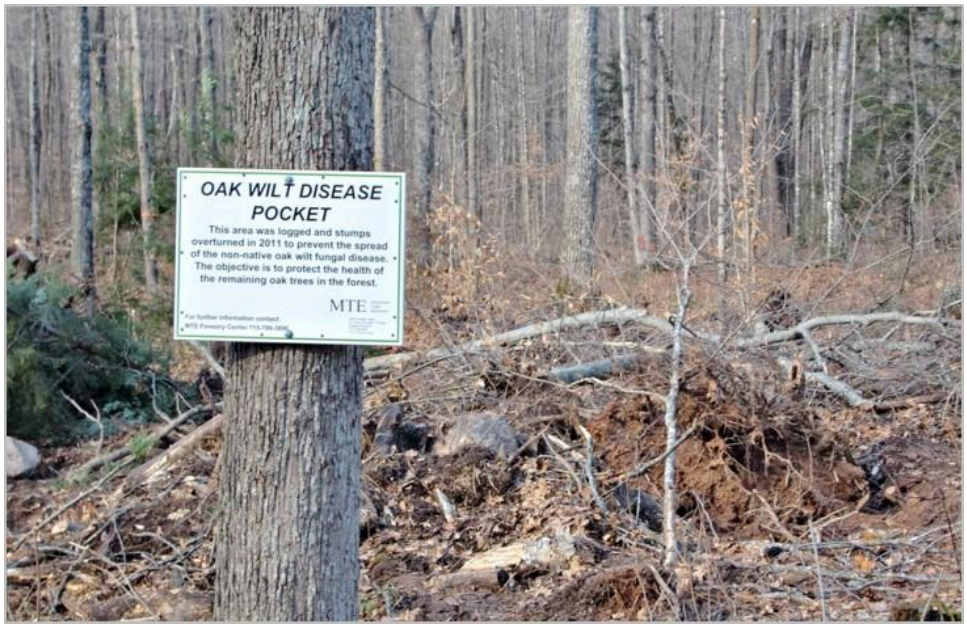
Menominee lands feature expansive forests of maple, oak, and birch trees, prized for their beauty, diversity, and valuable wood. Despite their productivity, the forest is vulnerable to pests, disease, and invasive species. These threats are likely to worsen when combined with the effects of a changing climate. For example, warmer temperatures may promote the viability of insects that interfere with tree growth, and increased frequency and intensity of drought can make trees more susceptible to insects and diseases. This increases their risk of being out-competed by invasive plants.

As Menominee Tribal Enterprises (MTE) became aware of these risks, they chose to take action to build the forest's resilience.

Oak wilt disease

Oak wilt, an invasive fungus in northern Wisconsin, spreads through tree roots or by sap-feeding beetles. The disease can kill red oak trees by plugging up the cells that move water from their roots to their leaves.

"Trees typically wilt and lose their leaves very fast," says David Mausel, a forest entomologist/pathologist with MTE. "They'll turn brown or mottled green. All the leaves fall down very fast, like in a week or two, and cover the ground in a halo right beneath the trees."



Oak wilt notification displayed at a treatment site.

So far, MTE has identified and treated over 300 pockets of forest affected by oak wilt on Menominee lands. Treatment typically involves removing affected and potentially affected oak trees, including their stumps, to avoid transmission of the fungus through roots. MTE managers must, as Mausel says, "amputate the disease...you have to nip the disease off like gangrene." Following treatment, the oak wilt sites have few trees remaining.

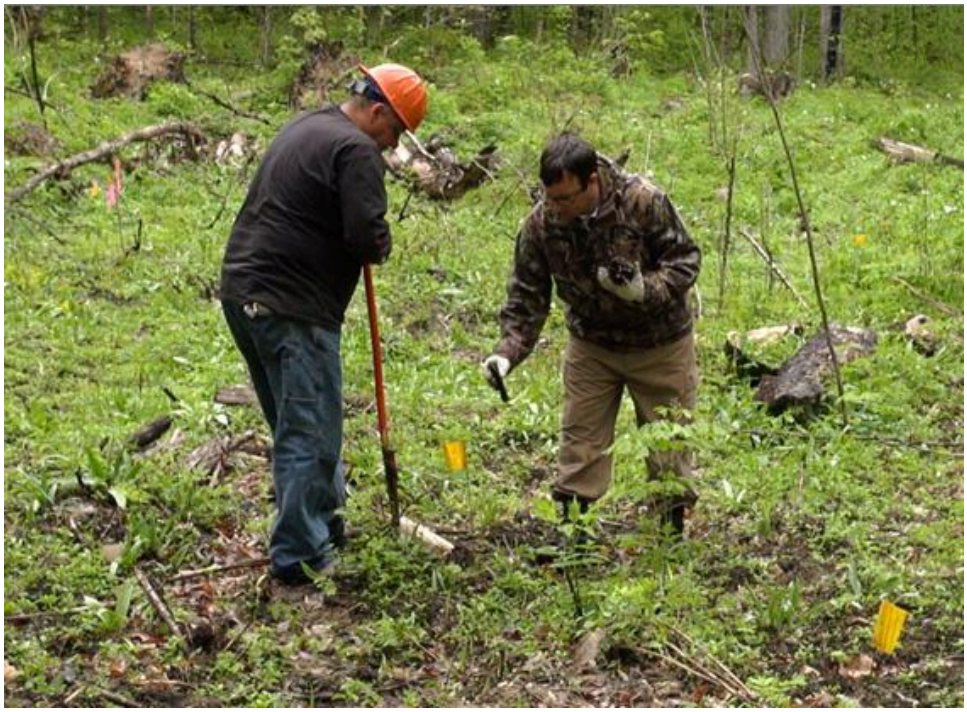
The typical management approach allows natural growth of red oak, white pine, and other species to restore these pockets over time.

Working out of the book

MTE foresters consulted the team at the Northern Institute of Applied Climate Science (NIACS), a research institute of the U.S. Forest Service's Northern Research Station. “At NIACS we developed an adaptation workbook for helping managers integrate climate change into their management decisions,” says Maria Janowiak, Climate Change Specialist with NIACS. The NIACS and MTE teams worked together to determine objectives for long-term sustainability of the forest and the cultural and economic resources it provides, integrating climate change as an additional layer of focus. They decided to adopt a strategy described in the Adaptation Workbook—enhancing regeneration of the forest in disturbed oak wilt treatment areas.

"My role is to regenerate the forest, maintain the forest, create diversity, and look towards the future," says Jeff Grignon, head of the Forest Development Department with MTE. "My ultimate goal in the oak wilt areas is to recreate the elder plant communities using science as a tool guided by indigenous wisdom."

To start, they identified ten of the largest and most visible oak wilt sites to serve as adaptation demonstration areas. In 2013, foresters prepared the soil and planted white oak and bur oak seedlings from locally collected seed in the ten areas and initiated a monitoring program. On a regular basis, foresters document the growth and survival of planted seedlings, costs associated with the treatments, and forest composition in the sites over time.



MTE staff planting tree seedlings in an oak wilt pocket.

From 2014 through 2018, foresters also planted black cherry, black walnut, chinkapin oak, hackberry, and disease-resistant American elm trees in the demonstration sites. They also planted understory grasses, herbs, and shrubs to establish entire plant communities.

Responding to climate change

The tree species selected for reforestation efforts are expected to be better adapted to future conditions. The plantings also help to increase forest diversity, reduce the risks of any one species being negatively impacted by climate or forest health issues, and provide for high-quality forest products in the future.

“And that is a response to climate change,” says Tony Waupochick. “To have your forest growing in such a way that it’s maximizing its strength and health so that it can withstand any problems or pressures that come up."

Continued monitoring of the demonstration sites will help determine how this "climate-informed" reforestation strategy compares to normal natural regeneration in sites treated for oak wilt.

Relevant Options

This selection of resilience actions from our Options Database is specifically tailored to address the hazards and assets identified in this case study. To explore other resilience actions that may be applicable to your community, visit the complete Options Database.

References

- Janowiak, Maria K., Christopher W. Swanston, Linda M. Nagel, Leslie A. Brandt, Patricia R. Butler, Stephen D. Handler, P. Danielle Shannon, Louis R. Iverson, Stephen N. Matthews, Anantha Prasad, and Matthew P. Peters. "A Practical Approach for Translating Climate Change Adaptation Principles into Forest Management Actions." *Journal of Forestry* 112, no. 5 (2014): 424-33. Accessed July 29, 2019.
- *Responding to Oak Wilt on the Menominee Indian Reservation*. Directed by NIACS. Performed by Tony Waupochick, David Mausel, Jeff Grignon, and Maria Janowiak. August 3, 2015. Accessed July 29, 2019.

Story Credit

Adapted with permission by Benjamin Chappelow, narrative writing intern with UNC Asheville's NEMAC, from "Case Study: Adaptation in Forestry" in the Fourth National Climate Assessment, Chapter 21: Midwest, originally published November 23, 2018, from "Menominee Tribal Enterprises: Responding to Oak Wilt on the Menominee Forest" from the Climate Change Response Framework, last updated June 24, 2018, and the video "Responding to Oak Wilt on the Menominee Indian Reservation" from the Northern Institute of Applied Climate Science, published August 3, 2015. See links at right, under Additional Resources, and the embedded video above.

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Tony Waupochick, Menominee Tribal Enterprises, surveys an oak wilt site after treatment. Image credit: Climate Change Response Framework (https://forestadaptation.org/adapt/demonstration-projects/menominee-trib...). Used with permission

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This content supports the highlighted step.

- tarted
- rstand Exposure
- s Vulnerability & Risk
- tigate Options
- ize & Plan
- Action

Hazards

Vector-Borne Disease ›

Assets

Forestry ›

Tools

Adaptation Workbook ›

Climate Change Response Framework ›

Additional Resources

Fourth National Climate Assessment | Chapter 21: Midwest | Case Study: Adaptation in Forestry ›

Climate Change Response Framework | Menominee Tribal Enterprises: Responding to Oak Wilt on the Menominee Forest ›

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