Learning from the Land: A Partnership for Native American Education in Natural Resource Science Across the Great Lakes Forest

“Tree Regeneration Response to Oak Wilt Disease Control”

By: Brenda Miller, Briana Levsen, Mario Kaquatosh and Keith Kinepoway
Mentors: Rebecca Edler, CMNSDI Sustainability Coordinator, David Mausel, MTE Forest Health Forester, Leon Fowler, MTE Invasive Species Technician.
PROJECT OVERVIEW

• Learning from the Land: A Partnership for Native American Education in Natural Resource Science Across the Great Lakes Forest

• Partnerships: State University of New York (SUNY) College of Environmental Science & Forestry (ESF), Menominee Tribal Enterprises (MTE), and College of Menominee Nation (CMN) Sustainable Development Institute (SDI).

• Funded by USDA NIFA's Higher Education Challenge (HEC) grant program.

• Primary objective of the grant was to increase Native American participation and achievement in the environment disciplines.
  • Develop Forest Ecology Summer Institute
  • Student Research Experience
  • Masters

• This specific practical application was the result of earlier work completed by CMNSDI students to inventory the extent of oak wilt impacts on northern red oak forests of the Menominee Nation.
What is Oak Wilt?
• In one oak wilt location, the perimeter of the pocket was traced using a GPS

• We looked at five separate areas inside the pocket (center, North, East, South and West).

• Took record of the amount and species of seedlings in a 3.7ft radius.
  • Tree saplings of at least 3ft tall within 11.77ft radius were recorded along with their species, diameter of the sapling and the amount present in the area.
Oak Trees
Prevention

- Oak cutting ban (April - October)
- Mark “high risk” trees for harvest
- Favor greater diversity in young oak stands to reduce root grafting

Early Detection Rapid Response

- Scouting (July-September)
  - Low level aerial observation
  - ATV and foot scouting
  - Confirm oak wilt or monitor
- Rapid response
  - Cut down damaged and recently infected
• A Biltmore stick was used to find trees in the 5 smaller areas to measure.

• The diameter of the tree and the species was recorded for each tree that fell into that range using the gauge at the end of the stick.

• We took record of the approximate percentage of herbaceous cover and mineral soil.
• Estimated and recorded the average shrub height
• Looked for the presence of invasive plants, such as honeysuckle and garlic mustard, and the presence of any dead oaks
• Calculated and recorded the slope percent using a hypsometer along with the degree aspect which was calculated using a compass.
• The Nitidulid beetle is known to transfer the oak wilt disease from one oak tree to another.

• Traps were made to catch these specific insects to track the growing degree days and their peak flying days.

• There are three parts of PVC pipe that make up the trap with each section serving a purpose A thermometer is located close by to calculate the average daily temperature.

• According to data from 2014 and as of July 2015, higher temperatures brings more growing degree days for the Nitidulids.
  • With climate change occurring and higher temperatures arriving, it is possible that there will be longer growing degree days and increasing oak wilt sightings.
Controlling root graft spread of oak wilt using herbicide

K. Kinepoway, L. Fowler, D. White and D. Mausel
Menominee Tribal Enterprises, Forestry Center, N1035 Hwy. 47 N, 47 N. Keshena WI

Introduction
- Red oak (Maeqtekomih) forests cover 13,461 acres on the Menominee Indian Reservation.
- Oak wilt is a vector and root-graft transmitted systemic fungal disease.
- Aerial photo and ground surveys have detected 674 disease pockets (168 acres).
- Diseased trees and a buffer of healthy trees are harvested using the Bruhn distance model. Stumps are extracted with an excavator but despite being effective at disease control, it is expensive, time consuming, and disturbs the soil.

Methods
- To halt the spread of oak wilt spores through root grafts, we tested an herbicide to kill roots instead of mechanically removing them.
- Live trees marked for harvest were double girdled with a chainsaw at stump height and the cuts were sprayed with Garlon 4 Ultra herbicide at 20% concentration mixed with bark oil or water.
- Pockets are evaluated in August for 4 yr post-treatment to evaluate effectiveness at stopping oak tree mortality.
- Trees were harvested in fall/winter.

Results and Discussion
- Two years of post-release monitoring data are currently available.
- A total of 166 pockets were treated with the girdle and herbicide method (52 in 2013, 14 in 2014, 100 in 2015).
- Preliminary results of post-treatment monitoring indicate a 95% success rate (only 3 treated pockets failed to control the disease out of 66 sites treated in 2013 + 2014). The 100 sites treated in 2015 will be monitored in 2016 for the first time.
- If the herbicide method ultimately proves successful, benefits include:
  1. No excavator use or expenses
  2. Salvage logging doesn’t have to be rushed in order to excavate stumps
  3. Less site disturbance and potential for invasive plant spread + establishment.

Acknowledgments: We are indebted to MTE foresters and loggers; and Marathon Co. Wi, Wi-DNR, Linda Haugen (USFS) and the Stockbridge Mohican Tribe for advice. Funding was provided in part by a USDA-NIFA “Learning from the Land” grant to R. Kimmerer (SUNY-ESF), C. Caldwell (CMN-SDI), and D. Mausel (MTE).
Any questions?