PRE-EVENT SURVEY

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Please take a 3-minute survey before the workshop begins, to help us shape the future of this series:

GO TO:

https://10ktrees.a2gov.org/pre-event-survey

OR

SCAN ME!



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THREATS TO OUR URBAN TREE CANOPY

TREEducation Series

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Annika Moran, AmeriCorps Member

BACKGROUND

Trees and the A²ZERO Plan



WHAT IS THE "URBAN TREE CANOPY"?

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WHICH TREES ARE IN THE URBAN TREE CANOPY?



Along city streets



In public parks and nature areas



On private and institutional property

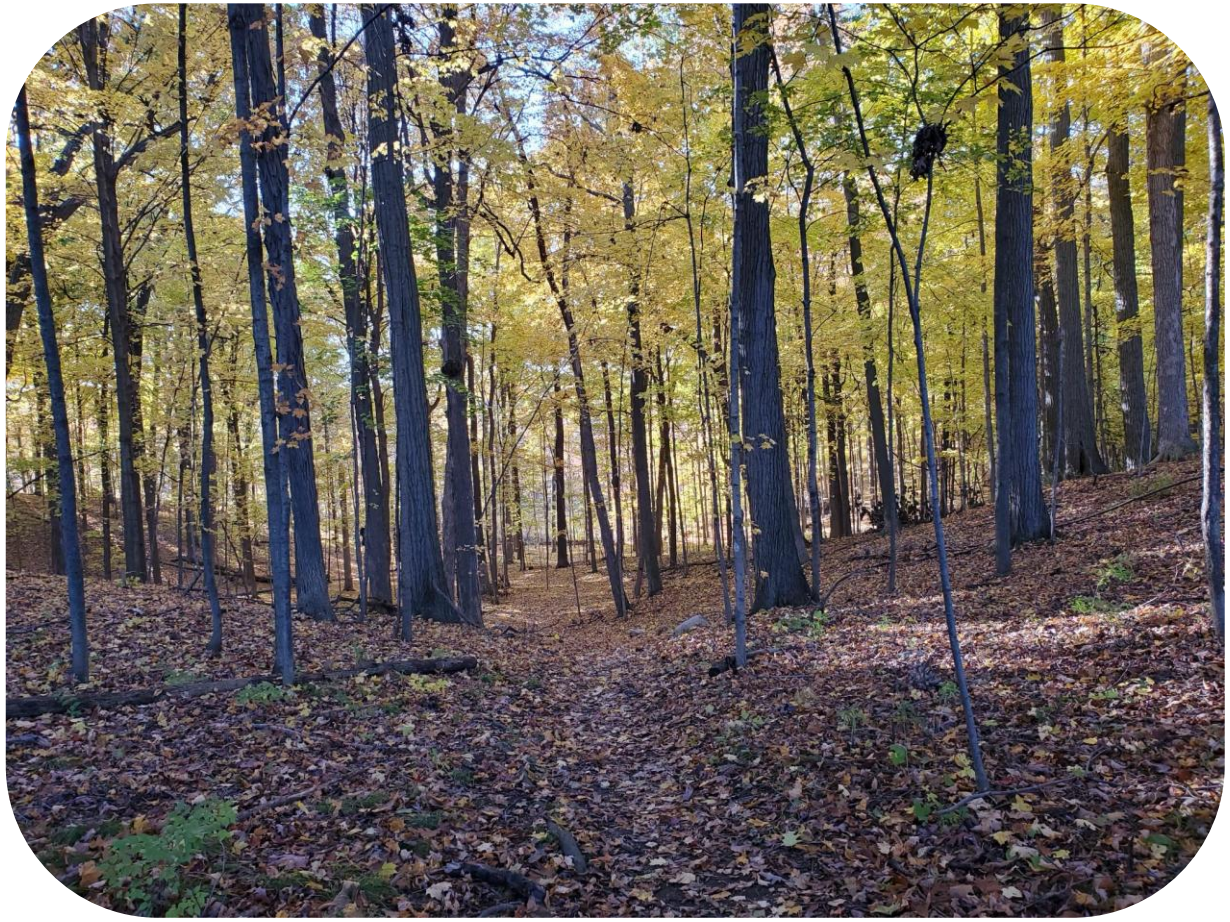
STREET TREES

- City property
- Managed by the Forestry Department
- Mix of native and non-native species chosen for survival in a highly developed environment
- Relatively high investment per tree— we need to put resources into planting and maintaining street trees



PUBLIC PARKS AND NATURE AREAS

- Public property (City, County, etc.)
- Usually managed by Forestry and/or Parks Departments
- Goal is mostly native, especially in nature areas
- Less investment per tree — we don't have to individually manage each and every tree in a nature area, because new trees can freely grow and replace dying ones



TREES ON OTHER PROPERTY

- Residential (single-family and multi-family), University of Michigan, AAPS, and other private properties
- Management varies widely, depending on priorities and resources of the property owner
- Mix of native, non-native, and invasive trees
- Investment per tree varies widely



WHY CARE ABOUT ALL OF THESE TREES?

- Trees can provide benefits to the entire community, regardless of who owns the property
- Reduced energy costs
- Erosion control
- Protection from flooding
- Habitat corridors
- Population resilience



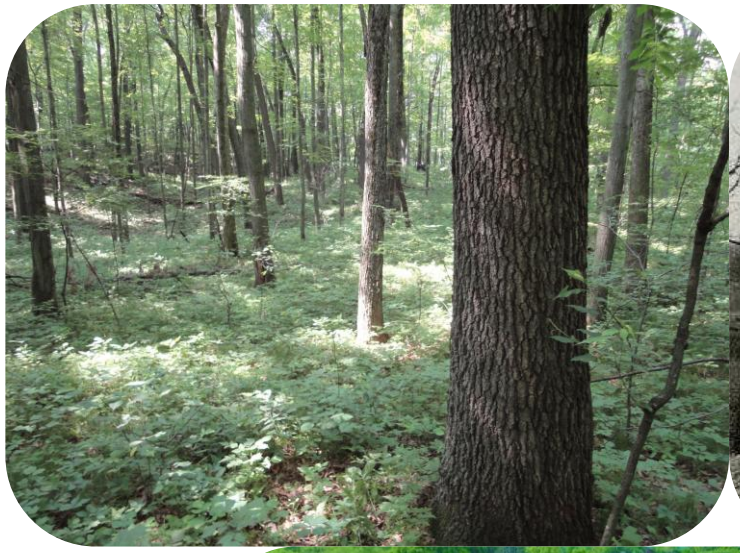
WHY LEARN ABOUT THREATS TO TREES?

- Trees have existed for over 300 million years, and species have always shifted and declined with time… why should we care now?
- Many modern tree threats are directly or indirectly caused by humans
- Knowing what threats exist helps you prepare for them - or even prevent them - and care for the trees on your property and in your community



WHY ARE TREES UNDER THREAT?

- The environment has changed drastically and rapidly in the last few hundred years—much faster than organisms are normally capable of adapting





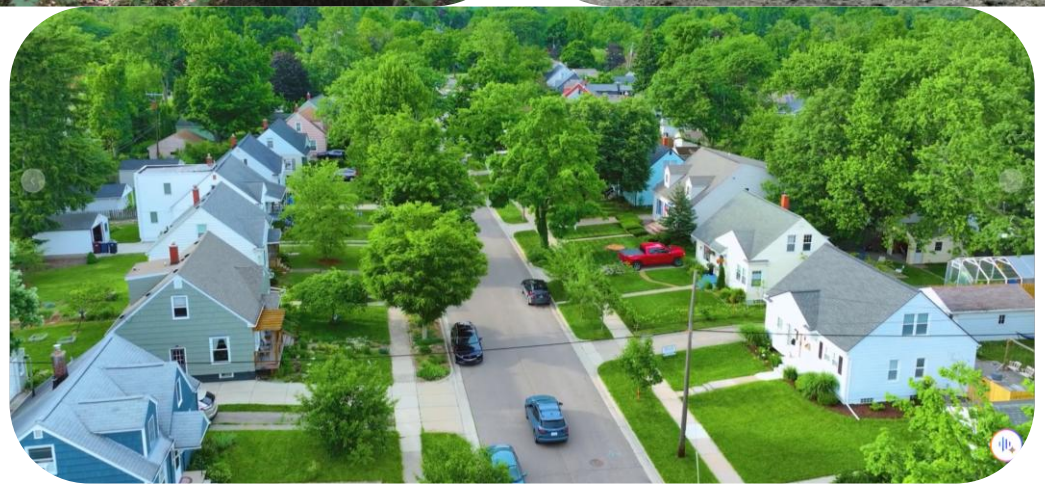


Image credits: Joshua P. Cohen, National Park Service, Frederick Law Olmsted National Historic Site and Homes.com







MURDER MYSTERTREE







CASE # 1: THE CASE

- Mrs. Oakley calls your office in a panic. Her husband, Rufus Oakley (who happens to be a northern red oak tree), has turned up dead this morning, and, with no compelling leads, the police suspect that she is responsible. Mrs. Oakley swears she is innocent and begs you to investigate the case and clear her name.

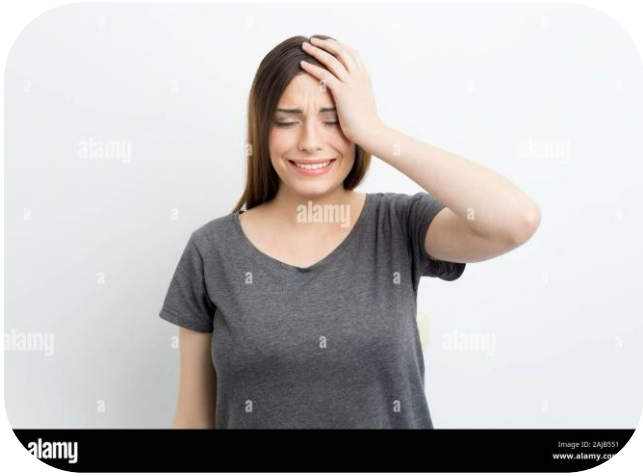




Photo credit: Joseph O'Brien, USDA Forest Service, Bugwood.org

CASE #1: THE EVIDENCE

- **HISTORY: Mr. Oakley had been feeling unwell all month. His leaves even began withering and yellowing well before the fall season—especially in his upper canopy.**
- **Many of Mr. Oakley's close oak friends have also been suffering similarly—especially those who had been pruned or cut during the summer.**

CASE #1: THE AUTOPSY



Leaves fell while partially green, dull bronze color



Bark cracked open with strange formation inside

Image credit: Wisconsin Department of Natural Resources

CASE #1: THE CULPRIT

- Oak wilt is a fungus of unknown origin that is highly contagious and lethal to American oak trees, especially red oaks.
- Two pathways to spread:
  - Underground through shared root systems
  - Overland through insects that carry spores from infected trees to sappy wounds in healthy trees



Image credit: Emily Jones

PREVENTING OAK WILT

- There is no cure or treatment for oak wilt. Trees exhibiting symptoms must be removed as soon as possible to prevent further spread.
- Never prune oaks during the growing season (roughly April-November)
- Infected trees must be trenched at least 5’ below ground all around them to sever the connections between the infected roots and other trees
- Never transport firewood more than 10 miles from its source



Image source: Legacy Land Conservancy

TREE DISEASES

- Over the years, several diseases and pests afflicting trees have emerged in the U.S.
  - Emerald ash borer
  - Dutch elm disease
  - Hemlock wooly adelgid
  - Beech leaf disease
- Often, these diseases are introduced from elsewhere in the world and devastate native tree species that have not evolved to tolerate them



Image credit: University of New Hampshire

COMBATING TREE DISEASES

- Be extremely vigilant and cautious when moving biological materials, including wood, over large distances—many pests and diseases were transported from their native range by ‘hitchhiking’ on products like wood
- Plant a variety of native tree species so that one disease doesn’t take out an entire canopy
- Monitor trees for signs of disease and failing health
- Report suspected cases of invasive tree diseases to the Midwest Invasive Species Information Network so that authorities can track these threats



CASE #2: THE CASE

- The Cherry family are worried about their kid, Little Susie Cherry (who is a young black cherry tree). No matter how much sunlight and water they give her, she keeps turning up with missing leaves and broken branches, and her health has taken a turn for the worse as a result. The Cherry parents' marriage is on the brink of collapse over this and they need you to figure out what is going on.





CASE #2: THE EVIDENCE

- The forest where the Cherry family lives has very little herbaceous vegetation…it's all bare dirt
- There are very few young trees around. They all seem to succumb to Little Susie's fate.
- The adult trees have no low branches or leaves. In fact, it's almost as if there's a hard cutoff around 6' off the ground below which no leaves can survive…



Image credit: Washtenaw Citizens for Ecology Balance

CASE #2: THE CULPRIT

- Deer!
- Historically, deer populations in Michigan were limited by predators like wolves and human hunters; now they are overpopulated in many areas
- “Landscape of fear” - predators may reduce deer herbivory not only by reducing deer populations, but also by making deer more anxious and less likely to remain in one place for long
- The deer overpopulation problem has worsened significantly in the last 50 years, with some estimates putting the population increase at over 300%



Image credit: Laura Herberg/Bridge Michigan

DEER HERBIVORY AND TREES

- Increased deer populations combined with fewer native landscapes puts excess herbivory pressure on the native trees and herbaceous plants that we do have—in other words, the ratio of deer to native plants has tipped
- Deer threaten young native trees and decrease the chances that native seedlings will survive. The result may be a forest that appears to be thriving with full-sized native trees, but almost completely lacking in the young trees that will be needed to replace them



COMBATING DEER THREATS

- **Population management is an ongoing challenge**
- **Young trees can be caged to protect from herbivory**





Image credit: MLive

CASE #3: THE CASE

- **Ripley Birch thought that mob life was behind him. That is, until a package arrived on his doorstep one day from an unknown sender. Foolishly, he opened it - and didn't think much of the innocuous-seeming decorative wreath inside. Over the next few years, Mr. Birch's health began to fail. Being an old birch tree, he was used to some vines making their home among his branches, but lately something had changed and he found himself downright strangled. Eventually, Mr. Birch perished in an ice storm that broke off most of his weak, vine-burdened branches. The police wrote this off as a tragic accident, but you aren't so sure.**





Image credit: Seth Nagy

CASE #3: THE EVIDENCE

- In the months leading up to his death, Mr. Birch reported increasing weakness and alarming rates of branch die-off, as if his ability to deliver water and nutrients throughout his tree body had been disrupted.
- Unlike the vines Mr. Birch was used to, these new vines never seemed to struggle with herbivory or pests keeping them subdued.

CASE #3: THE AUTOPSY





Image credit: Joe Johnson and Roaring Brook Lake Property Owners Association

CASE #3: THE CULPRIT

- Invasive species—like the Asian bittersweet vine that strangled Mr. Birch—are species that evolved in a different geographic location and currently pose an ecological, economic, and/or health threat after being introduced to a new region
- Southeast Michigan forests suffer from dozens of invasive species—most of which originate from Eurasia and arrived here sometime in the last 200 years, often through human actions
- Invasive species outcompete natives for resources and change the environment, making it difficult for natives to survive



INVASIVE SPECIES CHANGE THE ENVIRONMENT





Image credit: Indiana University

COMBATING INVASIVES

- Choose native plants whenever possible in landscaping and gardening
  - If non-native plants are necessary, research thoroughly to ensure that the plant you are choosing is not invasive and does not harbor invasive pests
- Participate in workdays and programs to eliminate invasive species from public areas
- Clean clothing and equipment before entering a new natural area (e.g. a body of water like a lake, or a nature area) to ensure invasive species can't hitchhike





TREE INEQUITY

- Due to unequal distribution of resources and historical and present systemic discrimination, trees in some parts of the city have received poor investment
- This shows up as a struggling tree canopy in some neighborhoods, especially corresponding with historically lower-income and minority communities

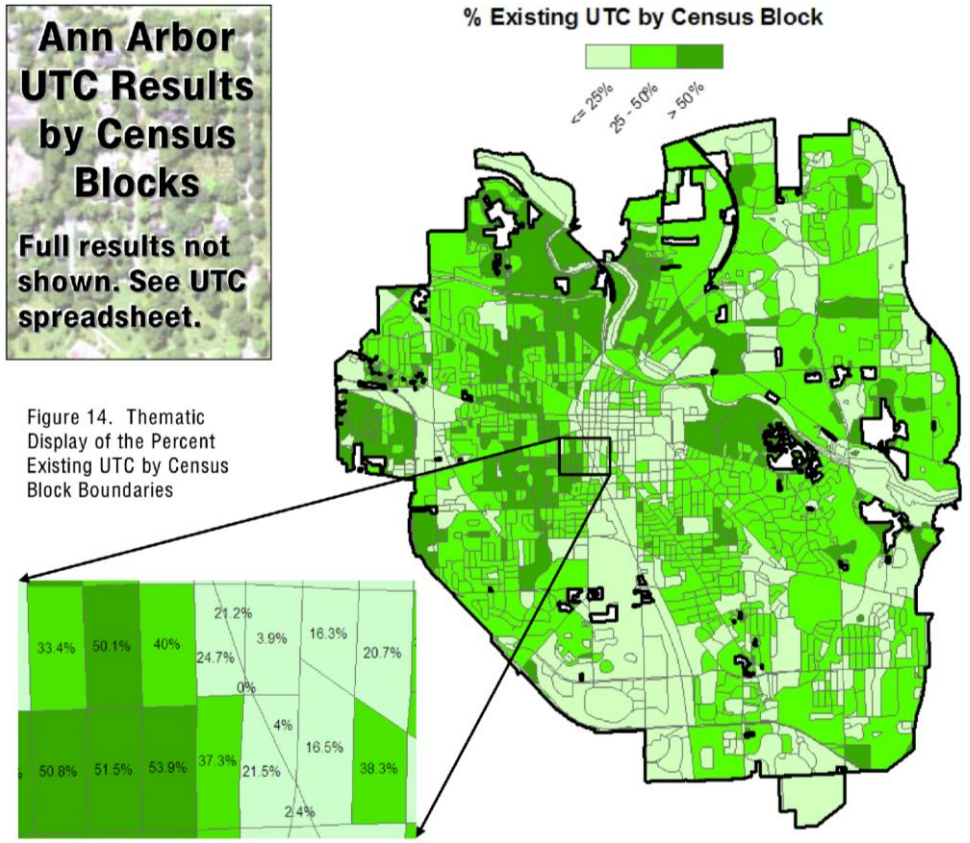


Figure 14. Thematic Display of the Percent Existing UTC by Census Block Boundaries

CLIMATE CHANGE: A THREAT MULTIPLIER

- As climates shift, diseases and invasive species find new ranges in which to survive
- Predators and pests that once kept tree threats in check are no longer as prevalent
- Increased intensity and frequency of storms, heat waves, droughts, and floods



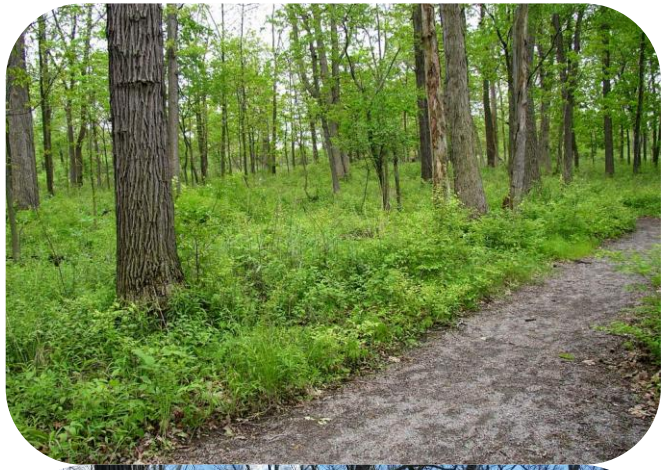
TREES AND CLIMATE CHANGE IN A2

- 10K Trees Initiative
  - Fall Coupon Codes
  - FreeTree Giveaway
- Providing free tree maintenance and planting in eligible communities to combat tree inequity
- Online tree walks and educational programming to raise awareness about our trees



PROTECTING OUR CANOPY FROM THREATS

- **Planting new trees and** choosing native species when possible
- Choosing a variety of native species improves resilience to climate change and disease
- Urban trees: prune and manage for health and safety
- Trees in natural areas: protect native organisms by managing invasive species, conducting prescribed burns, collecting biological data, and monitoring for & responding to disease threats





HOW CAN YOU GET INVOLVED?

- Volunteer at our annual FreeTree Giveaway and at public tree plantings
- Talk to friends and neighbors about tree threats, so that our community is more ready to identify and mitigate problems like diseases and invasive species
- Become an A²ZERO Ambassador and gain tools to advocate for sustainability in your community
- Volunteer in our Parks and Nature Areas to remove invasive species, plant native trees, and contribute to scientific data to help our local ecosystems







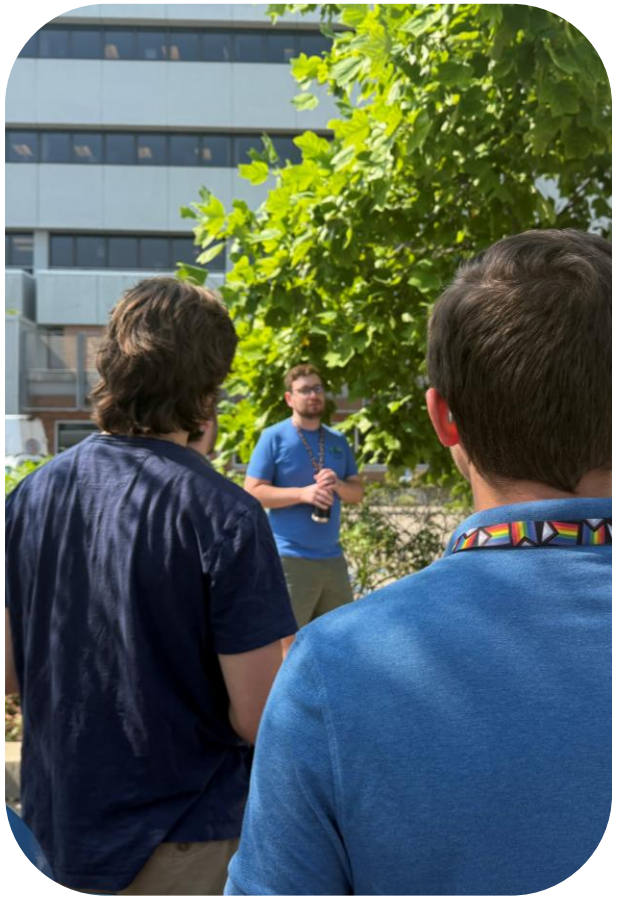
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THANK YOU!

Sean Reynolds, Senior Analyst
Annika Moran, AmeriCorps Member

UPCOMING EVENTS

- **November | Trees & Art**
  - **11/20, 6-7:30pm, LSNC**
- **A plan for a 2027 series is in the works!**



POST-EVENT SURVEY

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