Considering The Future of Petoskey's Urban Forest

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Key Ideas

Urban Forest - Urban forests are systems of trees, other vegetation, and water within any urban area. They can be understood as dynamic **green infrastructure** that provides cities and municipalities with environmental, economic, and social benefits.

– from *2011 report, Vibrant Cities & Urban Forests – A National Call to Action*

Sustainable – 1) healthy, long lasting, withstanding, diversity; 2) a system that achieves and maintains a healthy urban forest extent and structure; 3) ensuring the desired forest benefits persist over time.

Ecosystem Service – indirect or direct impact of a natural system that contributes to human well-being

– from *The Sustainable Urban Forest Guide, US Forest Service and Partners*

What is Petoskey's Urban Forest?

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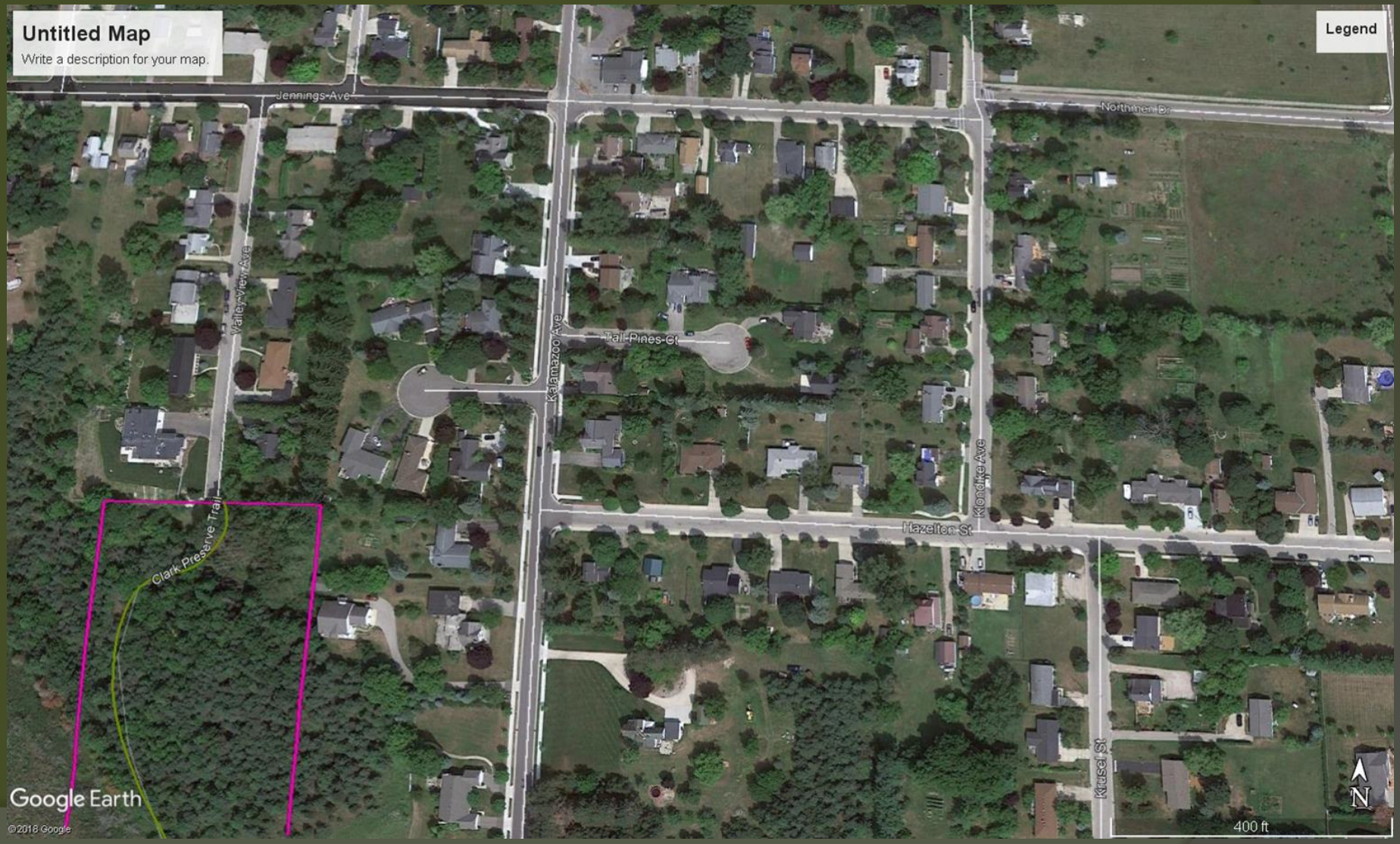

Trees Have Many Benefits

- Clean Air
- Clean Water
- Carbon Sequestration
- Reduced Crime
- Increased Property Values
- Support Mental Health
- Temperature Control
- Bolster Wildlife
- Positive Economic Impact

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Trees Reduce the Load of Waste Water Treatment Plants

- Canopy – capture H_20, release to atmosphere
- Draw H_20 and increase capacity of soil H_20 storage
- Leaf litter increases infiltration and decreases erosion
- Slow down water and take up pollutants
- Not just trees…

Petoskey Street - St. Francis Credit Union

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How Does a Tree Grow So Large?

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"Across the United States, physicians are prescribing patients nature." – American Journal of Public Health

The case is strong that some children do seem to need psychotropic drugs to function well and have a better life. But other kids may well need an added or alternative therapy — and **nature time** may be just what the doctor ordered.
– Richard Louv (Nature-Deficit Disorder)

"Access to Nature - greenery - tied to long term health improvement outcomes."
– *Ming Kuo, U. of Illinois*

"Stronger immune systems - a boost of natural killer cells, 50% more than normal"
– Ming Kuo, Frontiers in Psychology

"Nearby Nature in the City: Preserving and Enhancing Livability"
– R. Kaplan, J. E. Ivancich & R. De Young at University of Michigan

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Trees Provide a Return on Investment

- Minneapolis - $1.59 in benefits for every $1 spent (i-Tree)
- Austin - Trees within the city limits of contribute nearly $34 million in ecosystem services (USFS).

Real. Aware. Respond.

The Current and Looming Threats?

Threats - Climate Change

- Tree Stressors!
  - Hotter and more heat events
  - Reduced soil moisture and more/longer droughts
- Shifting USDA hardiness zone – (5b)
  - Change to zone 6 in next 30 years *-National Climate Assessment*
- Stronger storms

White birch

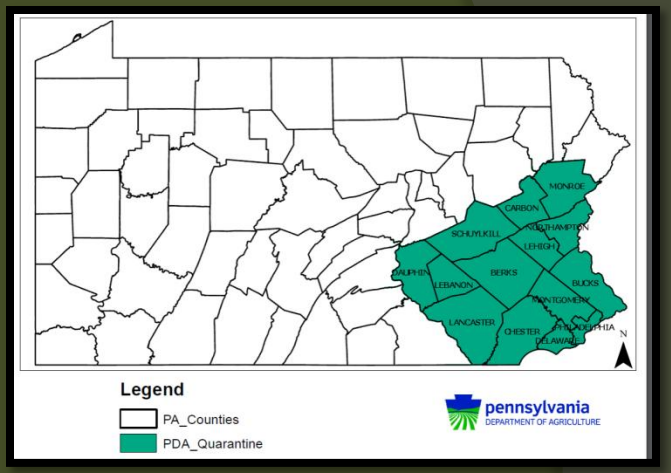
Threats - Invasive forest pests

- Ash species have nearly been wiped out in Emmet County (old trees)
- American beech trees are nearly all infected if not dead in Emmet County (old trees)
- Asian Longhorned Beetle and Maple Trees!

Map and photo from USDA

Threats - Invasive forest pests

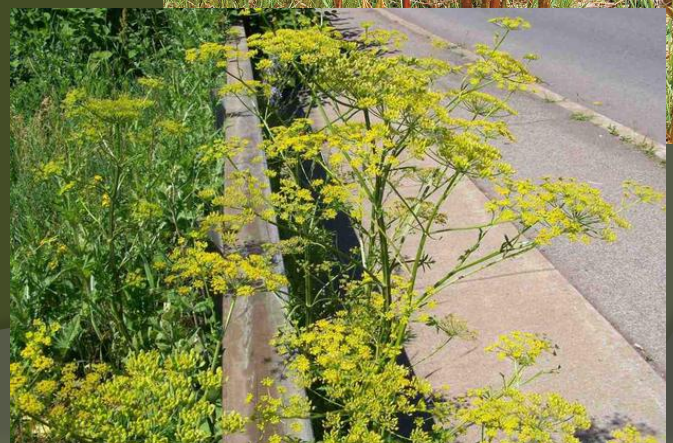
- Spotted Lanternfly and many woody trees!
- Hemlock Woolly Adelgid
- The Next One…



Map and photos from USDA

Threats - Invasive vegetation

- Swallowwort
  - Ecological impact
  - First northern MI infestation
- Japanese knotweed
  - Ecological and economic impact
  - Throughout northern MI
- Wild parsnip
  - Human health impact



Photos: Chris Evans, David Beaulieu, and NY Dept. of Transportation

Future. Opportunities. Choices.

How Should We Respond?

Recommendation -1- Inventory

To plan where you want to go and how to get there, you must first know where you are.

Recommendation -1- Inventory

- Know the status of our urban forest
- Provide a clear picture, set goals and priorities
- Quantify benefits
- Monitor change
- i-Tree tools
- Community collaboration and volunteer labor

Mitchell Street

www.itreetools.org

Recommendation -2- Increase Tree Canopy

- Total amount of leaves and branches on the stems or trunk of all trees, thus the footprint or surface area of the land covered by the “shade” of all standing trees
- 22.8% (USFS 2010)
- i-Tree (current?)
- Maximize desired ecosystem services

Cover Class	Description	Abbr.	Points	% Cover
Tree	Tree, non-shrub	T	7	36.8 ±13.9
Non-Tree	All other surfaces	NT	12	63.2 ±11.1

Tree Benefit Estimates

Abbr.	Benefit Description	Value (USD)	±SE	Amount	±SE
CO	Carbon Monoxide removed annually	653.11 USD	±246.85	983.01 lb	±371.54
NO2	Nitrogen Dioxide removed annually	24.61 USD	±9.30	225.75 lb	±85.32
O3	Ozone removed annually	35,111.49 USD	±13,270.90	20.46 T	±7.73
PM2.5	Particulate Matter less than 2.5 microns removed annually	47,029.05 USD	±17,775.31	1,521.99 lb	±575.26
SO2	Sulfur Dioxide removed annually	66.19 USD	±25.02	1,666.03 lb	±629.70
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	26,176.04 USD	±9,893.61	4.19 T	±1.58
CO2seq	Carbon Dioxide squestered annually in trees	300,761.49 USD	±113,677.16	6,489.30 T	±2,452.73
CO2stor	Carbon Dioxide stored in trees (Note: this benefit is not an annual rate)	7,553,249.60 USD	±2,854,860.01	162,970.79 T	±61,597.17

i-Tree Canopy output

Recommendation -2- Increase Tree Canopy

- Don’t forget about canopy quality!

Norway Maple

Recommendation -3- Increase Tree Diversity

- Diversity is key!! (There's no single answer for responding to climate change, but if there was one…)
- 10/20/30 rule
- Age classes
  - Value in big trees
  - Save mature trees
- Plant only climate winners? I would probably not plant birch trees
- Native trees
  - Better likelihood of success
  - Habitat and nature value

Honey Locust - Mitchell St.

https://forestadaptation.org/

Recommendation -3- Increase Tree Diversity

- Insect and bird diversity - Doug Tallamy

- Silver maple
- Sugar maple
- Honey locust
- Hophornbeam
- Bur oak
- KY coffeetree
- Sour gum
- Tulip tree

More Norway Maple - Greenway

Recommendation -4- Develop a Full View of the Urban Forest

- Bioswales, rain gardens, flowers-beauty or habitat, etc. - features
- Street trees, private landowners, businesses, entities within, entities without, etc. -people
- CAKE CISMA – invasive species trainings
- Tip of the Mitt Watershed Council

Recommendation -5- Develop Effective Public Policy

- Effective urban forestry depends ultimately on the public policy supporting it – financially, administratively, and legally
- Integrating urban forestry concerns into community planning activities at all levels

– from *The Sustainable Urban Forest Guide, US Forest Service and Partners*

- Influence over control
  - Ex. Adopt street and park tree protection ordinance/policy
  - Ex. Regulations for trees at Development sites
- Tree City USA
  - A Tree Board
  - A Tree Care Ordinance
  - A Community Forestry Program
  - Arbor Day Observance

Trees are wealth

Spread it broadly

Trees are “a matter of life and death”

- Geoffrey Donovan (USFS) looked at mortality rates in areas which have lost millions of trees to emerald ash borer, and identified “a corresponding increase in human mortality”. (theguardian.com)

- *The Sustainable Urban Forest Guide, US Forest Service and Partners*
- *Found at itreetools.org*
- https://forestadaptation.org/
- Derek can be reached at derek@landtrust.org