

# Restoration Plan

for Parcel ID: 4711-33-200-003



Community Presentation  
Genoa Charter Township  
January 7, 2025



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# Agenda

-  Introduction & Project Overview
-  Environmental Assessment
-  Historic Land Use
-  Restoration Plan
-  Questions & Discussion
-  Next Steps & Implementation



# Introduction



## Education

- 2010 B.S. Environmental Science
- 2013 M.S. Geographic Information Systems



## Experience

- Numerous nature-based planning and restoration projects
- COO of The Stewardship Network
- Environmental consultant in United Kingdom
- Formed K2 Environmental Consulting



## K2 Environmental Consulting



- Offer natural resource and conservation planning and advising services



## Project Types

- Landowner management plans
- Township natural resource planning
- Mapping & sustainable design
- Nature-based strategies

# Project Overview



## Environmental and ecological assessment

- Goal: Restore the land and habitat
- Goal: Develop parcel as nature-based asset



## Restoration Plan

- Access
- Target ecosystems – How to get there?
- Management techniques



## Implementation

- Funding
- Adaptive management & ecological oversight
- Volunteers



# Environmental Assessment



## Desk Research

- Reviewed historic files, maps, meeting minutes, and data
- Land use history – mine, dump, groundwater
- Well monitor data



## Field Work

- Walking/bushwacking throughout parcel
- Surveying trees, invasive species, ecosystems, topography, etc.
- Locating key property features



## Analysis & Planning

- Historic aerial image analysis
- Stand height analysis
- Site plan & management unit descriptions
- Restoration action plan



# Environmental Assessment



# Field Work



## Flora & Fauna

- Turkey, deer, squirrels, birds
- Grasses & flowers
- Shrubs & trees



## Invasive Plants

- Oriental bittersweet
- Multiflora rose
- Autumn olive
- Common buckthorn



## Landscape

- Historic image analysis
- Surface topography
- Groundwater contamination



# Main Habitat Types

## Mixed Shrubland

- Black locust dominate
- Mixed hardwood regeneration and isolated remaining trees
- High load of invasive shrubs and vines

## Buffer Deciduous Forest

- Mature forest ecosystem with several large diameter trees
- Mixed deciduous forest buffer around edge of parcel

## Mixed Conifer Forest

- Exposed sand/gravel soils
- Medium age conifer trees
- High load of invasive shrubs and vines



### Management Areas

Legend

- Parcel Boundary
- Imagery
- Roads
- Bing VirtualEarth
- Access Trails

Name	Acres	Ecosystem
Northeast Buffer Deciduous Forest	2.42	Mature deciduous
Northwest Buffer Deciduous Forest	1.37	Mature deciduous
East Buffer Deciduous Forest	4.67	Mature deciduous
South Buffer Lowland Deciduous Forest	4.27	Mixed deciduous
Mixed Conifer Savannah	3.88	Conifer dominant
South Deciduous Savannah	16.41	Mixed shrubland
Mixed Conifer Forest	5.99	Conifer dominant
Mixed Conifer Forest	8.52	Conifer dominant
West Deciduous Savannah	7.29	Mixed shrubland
Central Deciduous Savannah	6.11	Mixed shrubland
North Deciduous Savannah E	4.71	Mixed shrubland
East Deciduous Savannah	5.67	Mixed shrubland
North Access Area	2.71	Former dump
North Deciduous Savannah W	2.58	Mixed shrubland



# Historic Land Use

## Topics

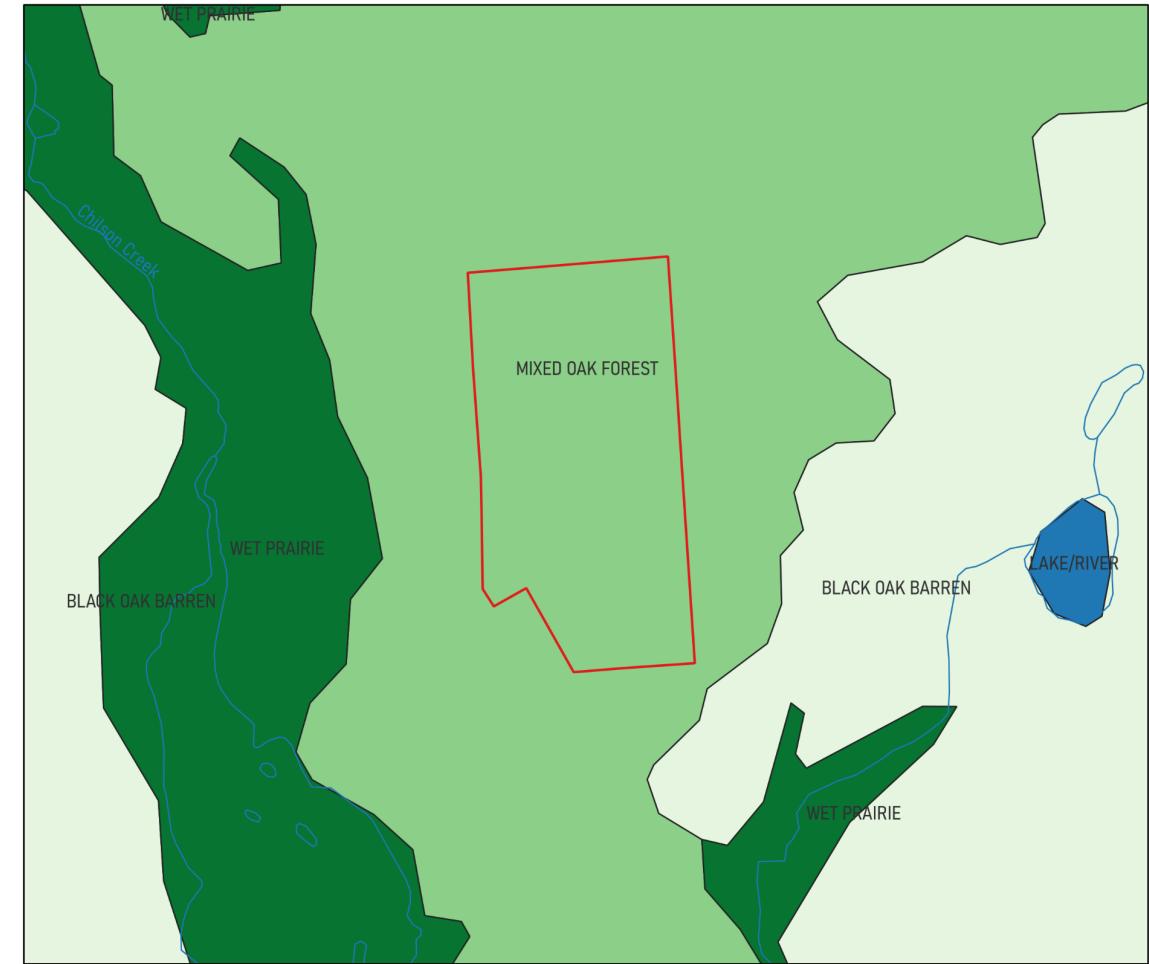
- Land Cover Circa 1800
- Sand & Gravel Mining
- Township Dump
- Wastewater Treatment Plant Contamination
- DNR Timber Sale
- Stand Height Analysis



# Historic Land Use

## Land Cover Circa 1800

- Original surveyors tree data and descriptions of the vegetation and land between 1816 and 1856
- Mixed Oak Forest
- Black Oak Barren
- Wet Prairie



Land Cover Circa 1800

### Legend

Imagery	
—	Rivers
OpenStreetMap	
Parcel Boundary	
Land Cover Circa 1800	
	BLACK OAK BARREN
	LAKE/RIVER
	MIXED OAK FOREST
	WET PRAIRIE

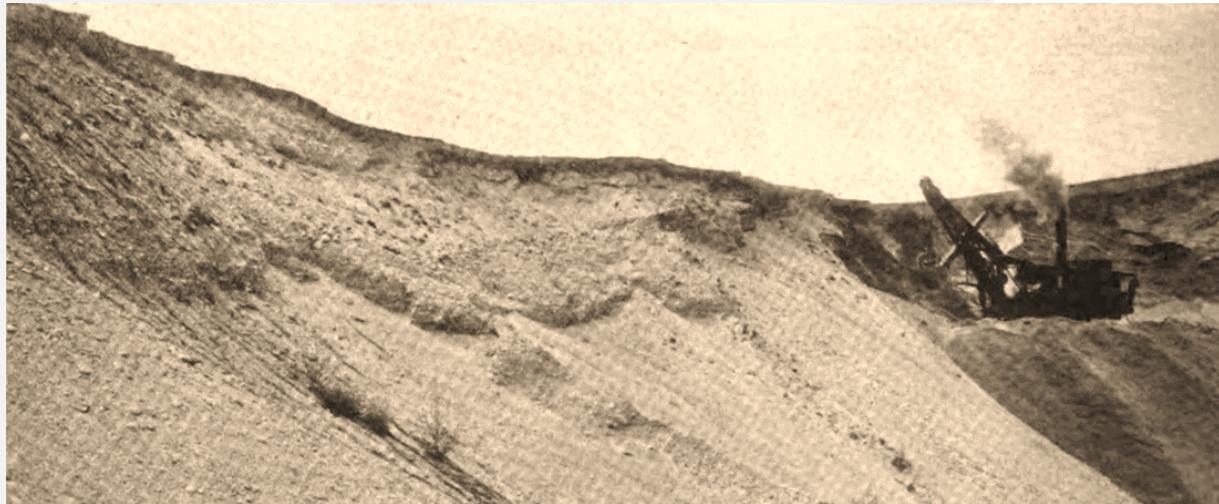


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# Historic Land Use

## Sand & Gravel Mine

- 1905 – 1937 Ohio & Michigan Sand and Gravel
- W.F. Bradley, first commercial gravel mine in Michigan
- 35,000 tons per month
- Increased to 75,000 tons with electric powered wash plant
- Railroad-type shovels and tracks on site
- 1951 – Sold to State of Michigan for \$1.00



Source Credit: Ryan Groat



1950 Aerial Image  
Mining completed and property sold to DNR in 1951

Legend	
General Info	Imagery
■ Township Parcel Boundary	1950



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# Historic Land Use

## Township Dump

- Area residents used north area as dump
- 1970 approximate close date
- 1984 – Unable to obtain state files on dump

## Groundwater

- 1982 Genoa Township Policy Plan for Groundwater Protection
- 1984 Water quality samples taken near abandoned dump. All negative for volatile organics and metals



1966 Aerial Image  
Dump closed in approximately 1970

Legend  
Imagery  
1966



1966 Aerial Image  
Dump closed in approximately 1970



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Legend  
Imagery  
1966



1980 Aerial Image



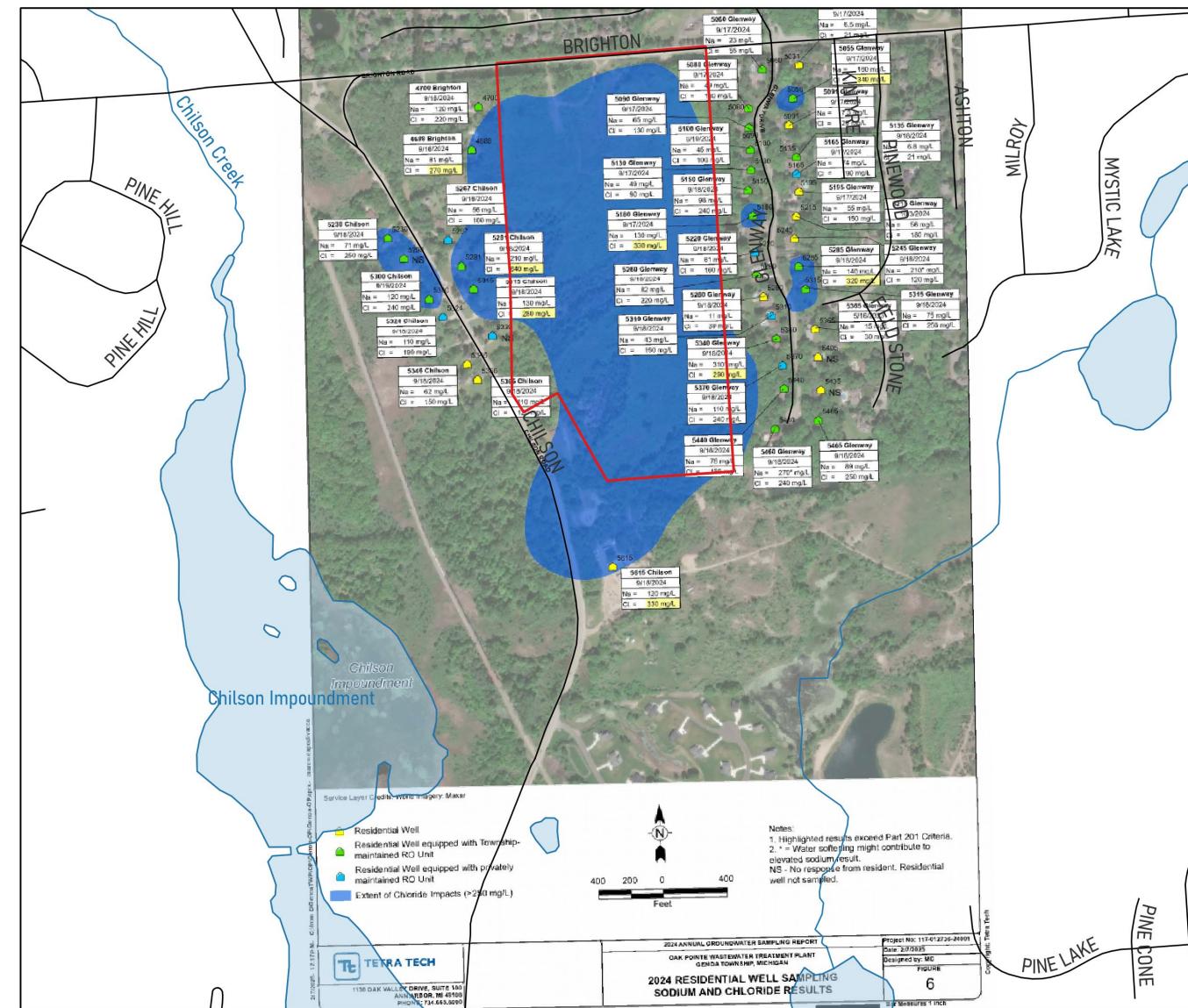
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Legend  
Imagery  
1980

# Wastewater Treatment Plant Contamination

# Groundwater Testing

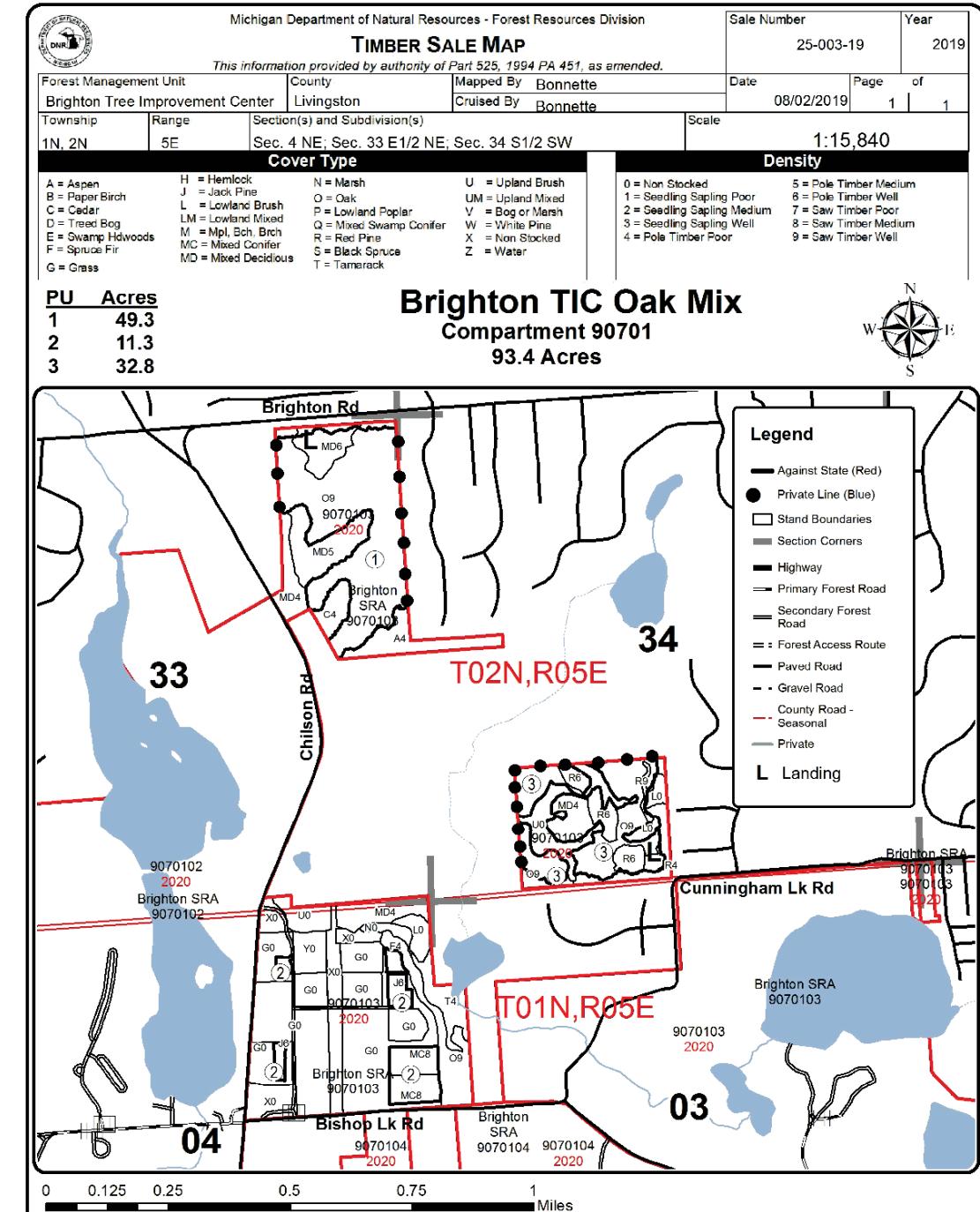
- 2005 – MW-A reporting lead above MDEQ Part 201 Generic Drinking Water Criteria
- 2/11 sampled homes downgradient had concentrations of lead above the reporting limit
- 2024 Residential Well Sampling for Na & Cl



# Historic Land Use

# DNR Timber Sale

- 2020/21 timber harvest occurred
- Brighton TIC Oak Mix (25-003-19) / T01N, R05E, SEC. 4 , NE.
- Livingston County, Advertised Price \$57,865.70, 93.4 Acres, Hardwood, Red Oak.



# Stand Height Analysis



## Aerial image analysis

- Aerial image
- Model trained on high-resolution (0.6m) data
- Each pixel given height value



## What can we learn?

- Determine historic forest form and heights
- Insights into forest age and structure
- Understand the scale of logging





## Stand Height Analysis

- 2013 Forest Image
- Shrubs lower than 4 meters;
- Forest from 4 to 10 meters high;
- Forest more than 10 meters high



Dark green = forest height greater than 10 meters  
Light green = forest height is between 4 -10 meters  
Brown = forest height less than 4 meters

2013 Forest Image  
Before 2021 timber harvest

### Legend

General Info	Mapflow
Orange Box = Township Parcel Boundary	2013 Forest Image



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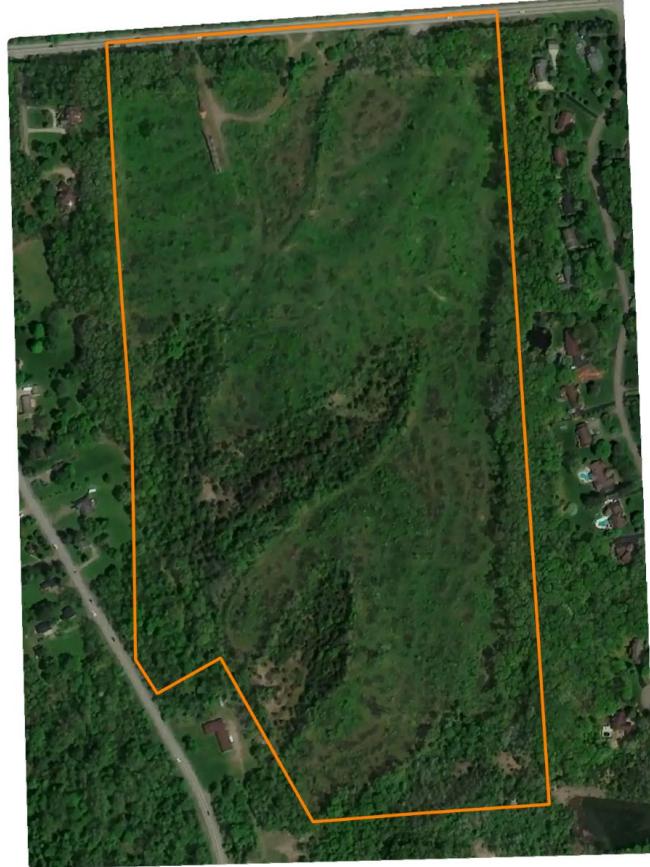
2013 Forest Image  
Before 2021 timber harvest

### Legend

General Info	Mapflow
Orange Box = Township Parcel Boundary	2013 Forest Image



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2022 Forest Image  
After 2021 timber harvest



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Legend

General Info	Mapflow
Orange Box: Township Parcel Boundary	2022 Forest Image

## Stand Height Analysis

- 2022 Forest Image
- Shrubs lower than 4 meters;
- Forest from 4 to 10 meters high;
- Forest more than 10 meters high



2022 Forest Image  
After 2021 timber harvest



Legend

General Info	Mapflow
Orange Box: Township Parcel Boundary	2022 Forest Image

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## Stand Height Analysis

- Areas with height greater than 10 meter were clear cut
- Marketable hardwoods: Red oak, White oak, Shagbark hickory, Black cherry
- Others: Black locust (IS), Sweet cherry, Aspen, Cottonwood, Sassafras, White pine, Red pine, Scotch pine (IS),



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2013 Forest Image  
 Before 2021 timber harvest

### Legend

General Info	Mapflow
Township Parcel Boundary	2013 Forest Image

### Legend

General Info	Mapflow
Township Parcel Boundary	2022 Forest Image



2020 Aerial Image  
Prior to timber harvest in 2021

Legend  
Imagery  
2020\_modified



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Present Aerial Image  
After timber harvest in 2021

Legend  
General Info  
Imagery  
Township Parcel Boundary  
Bing VirtualEarth



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Source Credit: Genoa Charter Township



# Restoration Planning

## Access

- Vehicle access off Brighton Road
- Trail system
- Foot & machine traffic

## Existing Habitat Types

- Characterize existing vegetation
- Shrubland, Mixed deciduous, Mixed conifer
- Invasive species

## Target Ecosystems

- What ecosystem are we managing toward?



### Management Areas

#### Legend

- Parcel Boundary
- Management Units
- Roads
- Access Trails
- Imagery
- Bing VirtualEarth

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# Restoration Planning

## Access

- Vehicle access off Brighton Road
- Trail system
- Foot & machine traffic



Topography & Proposed Access

### Legend

- Roads
- - - Access Trails
- 5 ft. Contours
- 5 ft. interval
- Parcel Boundary
- Imagery
- OpenStreetMap



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# Mixed Shrubland

## Deciduous Savannah

- A prairie interspersed with open grown trees



## Existing Conditions

- Dominated by invasive shrubs and vines
- Mixed hardwood regeneration and isolated remaining trees



## Restoration Priorities

- Prioritize health of existing/regenerating native trees
- Use mulching mower to control/thin invasive shrubs and vines
- Foliar spray, cut-stump, or basal application of herbicide
- Native grass and flower planting/seeding



# Buffer Deciduous Forest



## Mixed Deciduous Forest



- Mixed deciduous forest buffer around edge of parcel
- Mature forest ecosystem with several large diameter trees
- Invasive shrubs and vines present: Common buckthorn, Multiflora rose, Autumn olive, Oriental bittersweet

## Restoration Priorities

- Control/thin invasive shrubs and vines using chainsaws, loppers, and herbicide treatment
- Prioritize maintaining large healthy trees and closed-canopy forest structure



# Mixed Conifer Woodland



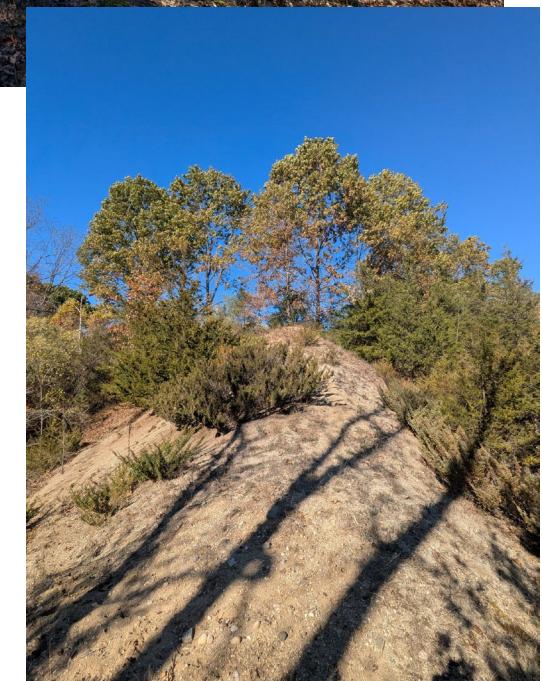
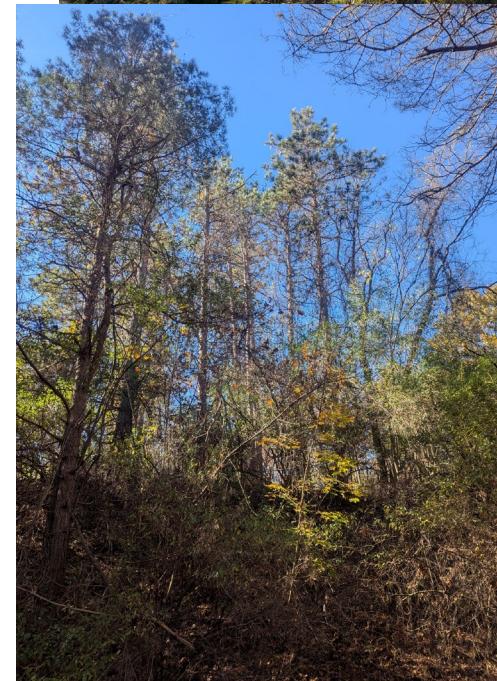
## Mixed Conifer



- Larger conifer overstory present
- Main sand/gravel pit areas
- Invasive shrubs and vines present:  
Common buckthorn, Multiflora rose,  
Autumn olive, Asian bittersweet

## Restoration Priorities

- Control/thin invasive shrubs and vines
- Prioritize deciduous trees and large healthy conifers



# Restoration Plan

## Adaptive Management

- Structured process to learn from management actions & adjust strategy accordingly
- Monitoring results and iterative decision-making

## Management Areas

- Consider each unit as a whole
- Seasonality & growth management
- Manage toward Target Ecosystem



# Management Areas

## Adaptive Management

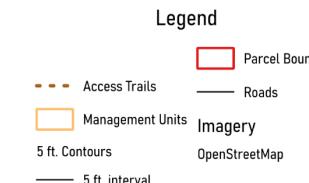
- Each area has defined Target Ecosystem
- Structured, adaptive management to implement restoration plan

## Management Techniques

- Mulching mower – Trail access & clearing dense shrubs & vines
- Mechanical – Chainsaws, Loppers, Handsaws, Brush cutters
- Herbicide application – Foliar spray, Cut-stump, Hack and squirt, Basal bark
- Prescribed fire
- Native species – Protect existing & new planting



### Management Areas



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# Questions & Discussion

## Environmental

- Target ecosystems
- Management techniques
- Contractors

## Amenities

- Parking lot (proposed off Brighton Rd)
- Hiking trails (proposed Access Trails)
- Biking trails (additional planning needed)
- Disc golf (additional planning needed)

## Fundraising

- Name
- Grants / Donations
- Long-term stewardship



# Next Steps



## Finalize Restoration Plan

- Incorporate feedback
- Management areas work plan
- Final report write-up



## Fundraising Support

- Grant writing
- Application support



## Implementation Support

- Implementing Restoration Plan
- Adaptive management



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