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Gladwin City Parks Management Plan

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[1] Gladwin Conservation District
[2] Central Michigan Invasive Species Management Area

Location of Parks:
North Park – NW ¼ S1, T18N, R2W
City Park & Campground – SE ¼ S1, T18N, R2W
River Road Trailhead – E ½ S12, T 18N, R2W and W ½ S7, T18N, R1W

Plan produced for: Gladwin City Park and Campground, City of Gladwin, Central Michigan Cooperative Invasive Species Management Area (referred to as CM-CISMA from here on), Gladwin County, and Gladwin Conservation District.

Plan Purpose: The purpose of the park management plan will be to combine all the stakeholder's values in one future management effort. The plan will be written with many goals in mind to make sure the goals are not lost with changes in leadership and management strategies over time.

Funding: Funding for this project has been made possible through grants obtained from The United States Forest Service (USFS) Great Lakes Restoration Initiative (GLRI) and Saginaw Bay Watershed Initiative (WIN).

GLADWIN CONSERVATION DISTRICT

CITY OF GLADWIN MICHIGAN

CENTRAL MICHIGAN CISMA Cooperative Invasive Species Management Area
Clare • Gladwin • Isabella
Midland • Gratiot

GLADWIN COUNTY MICHIGAN

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Objectives

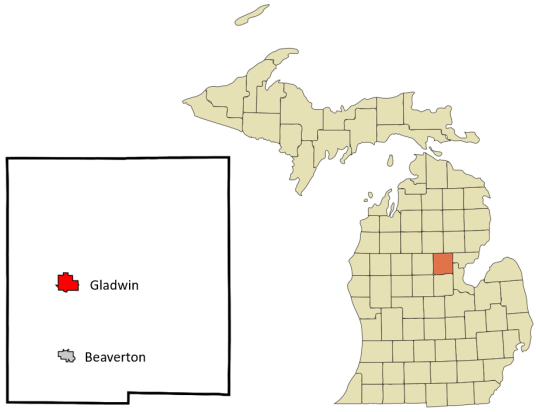
Gladwin Parks and Recreation has the following goals for their properties:

- Reduce the presence of invasive plant species down to long-term manageable levels
- Expand opportunity for public recreation and sports in Mid-Michigan
- Provide facilities, activities, and educational programs for citizens and visitors
- Serve public by increasing connectivity with nature, environment, and outdoors
- Provide biking, hiking, and viewing opportunities along the "Trail of Two Cities"

In addition, the City of Gladwin and partners have the following goals:

- Continue to provide high quality public natural areas
- Maintain functional habitat for local wildlife and recreation
- Reduce presence of invasive species to long-term manageable levels
- Prevent further non-native/invasive species presence
- Facilitate restoration of City owned property to native habitat in the Cedar River corridor
- Incorporate educational opportunities for stakeholders as well as the general public

General Information and Property Description



Gladwin County is in the middle/east portion of Michigan's Lower Peninsula (Figure 1). Gladwin County is bordered to the West by Clare County, to the North by Ogemaw County, to the East by Arenac County, and to the South by Midland County. The county includes the city of Beaverton in the southern portion, and the city of Gladwin toward the center of the County (Figure 1).

Figure 1. Gladwin County and the cities within: Beaverton and Gladwin.

The Gladwin city center is located at the junction of M-61 and M-18. The Cedar River runs North-South through the city of Gladwin and is of particular importance as a recreational site. The Gladwin City Park and Campground and North Park are both on the East side of the Cedar River (Figure 2).

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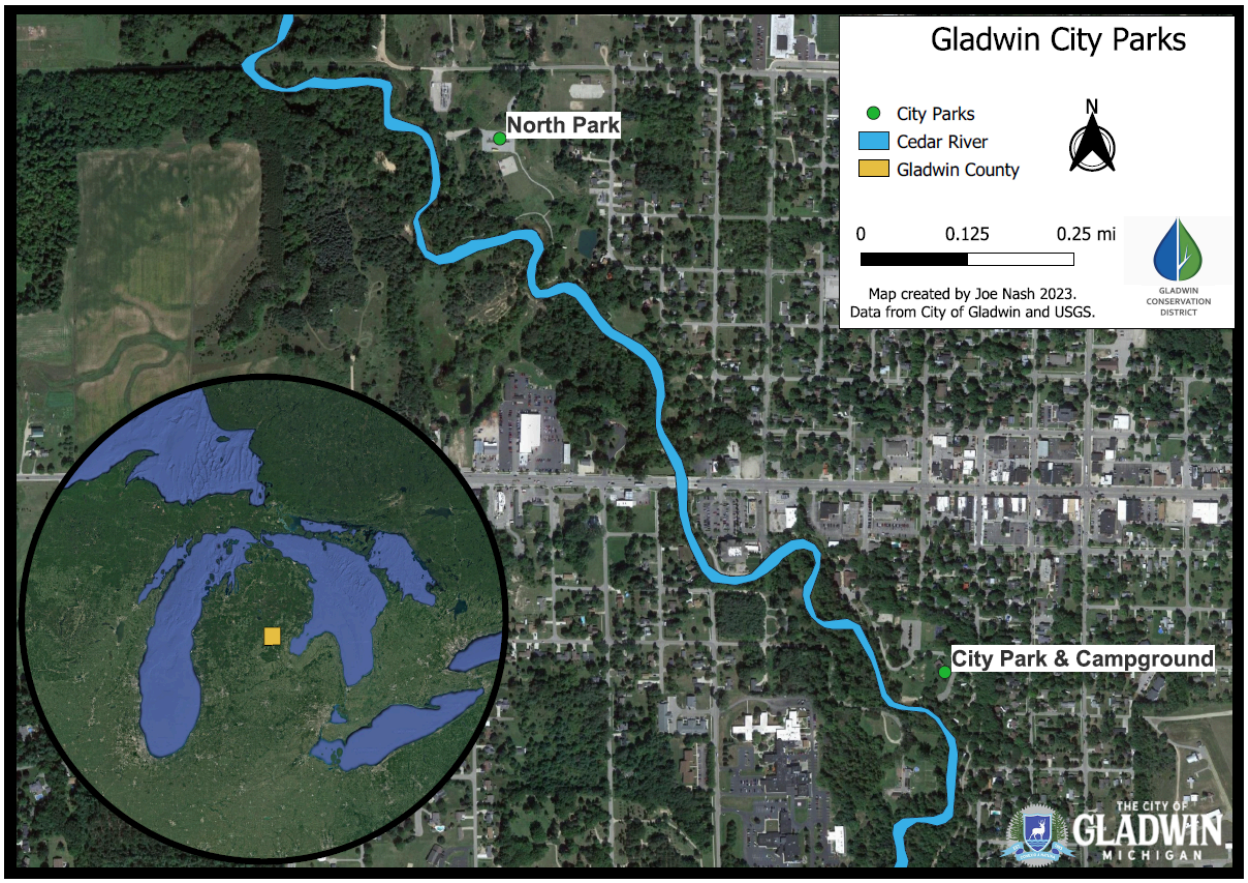

Figure 2. City of Gladwin's City Park and Campground and North Park.

North Park is approximately 26 acres located on W 1st Street in the City of Gladwin (Section 1, T18N R2W). The Cedar River serves as a western park boundary while most of the eastern boundary borders private property. North Park has recreational opportunities that attract community members and visitors: A skate park, a disc golf course, walking trails, group pavilions, a skating rink, river access, and wildlife viewing opportunities (Figure 3). The walking trails that start at the park continue along the Cedar River through Gladwin to the City Park and Campground becoming the in-progress "Trail of Two Cities." This is a paved walking and biking trail that is meant to connect Gladwin to Beaverton. The trail utilizes city owned property and provides recreational access to the property including both city parks.

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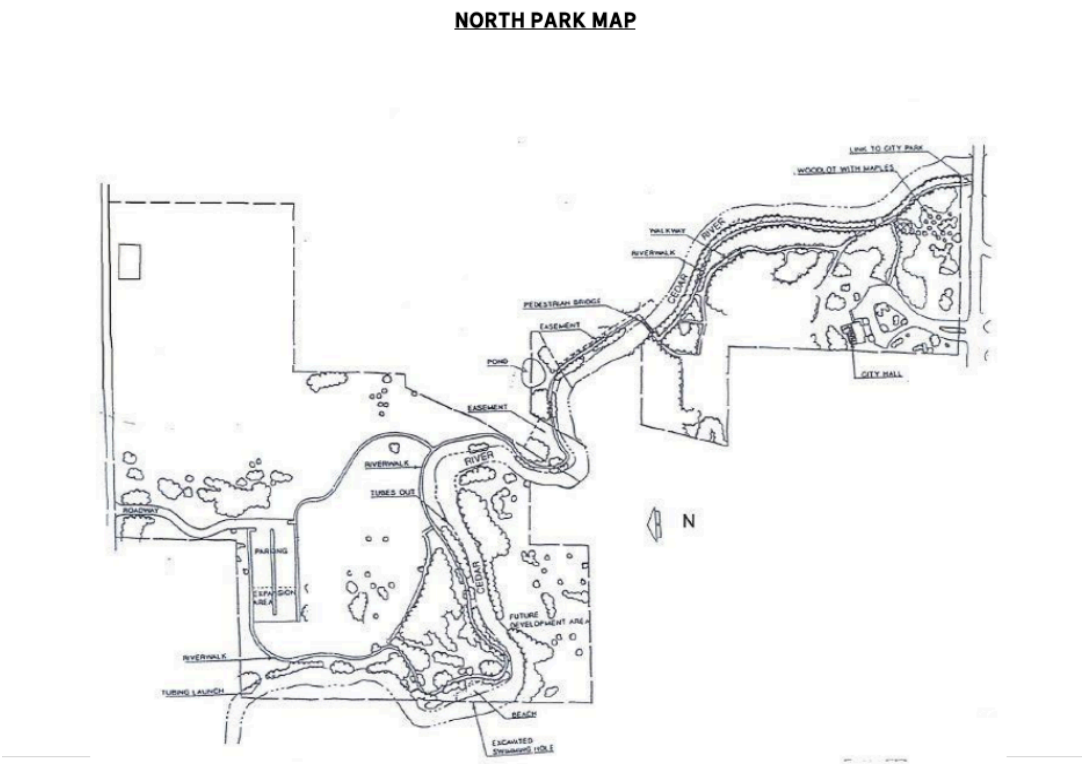

Figure 3. City of Gladwin's North Park.

The City Park and Campground is located approximately half a mile downstream of North Park (Section 1, T18N R2W). The City Park and Campground can be accessed via a walking trail from North Park, or from highway M-61 between the County Sheriff's office and the County Courthouse. City Park has an entry fee during the summer season (May - November) ($3 day/$15 annual) and offers overnight options for campsites and cabin stays. In addition to the campground, the City Park offers beach space, public bathroom/shower facilities, pavilions, tennis and basketball courts, river access, and an amphitheater (Figure 4).

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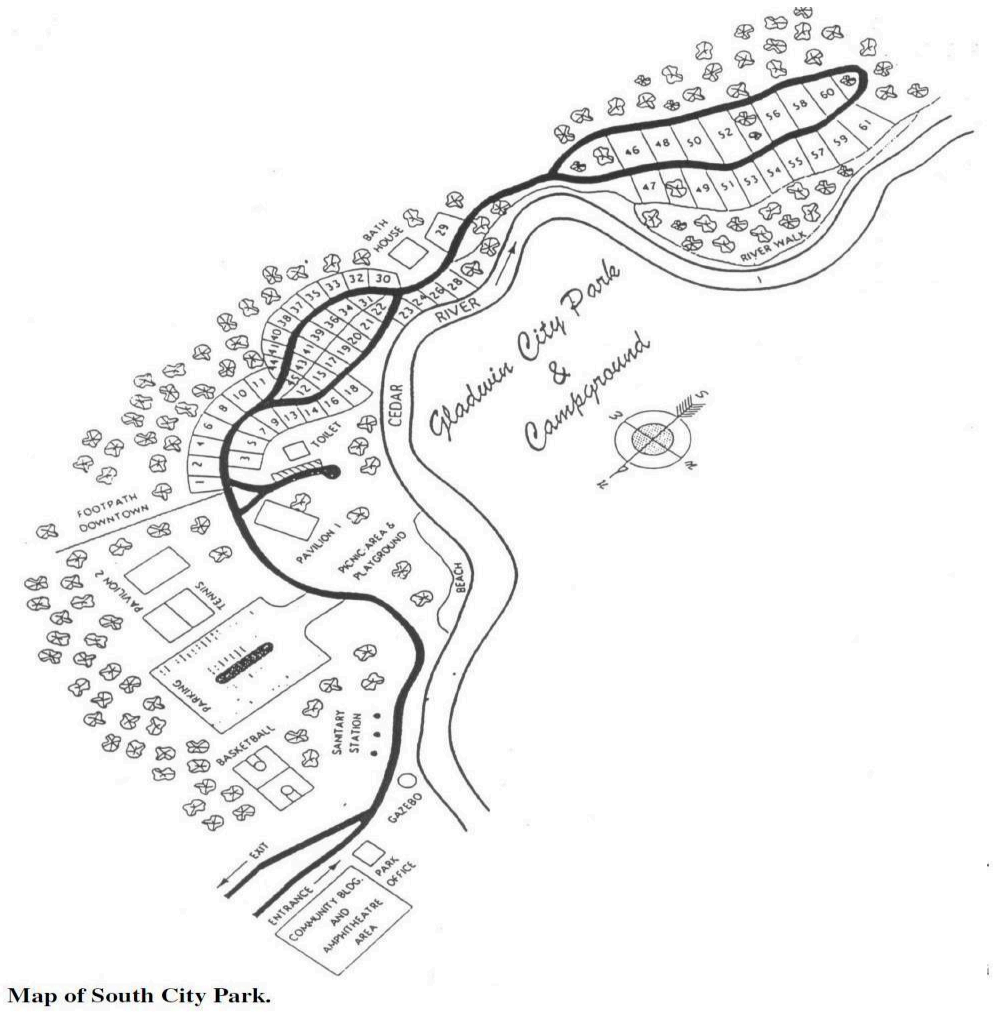

Figure 4. Gladwin City Park and Campground.

The city owns additional acreage beyond the park boundaries that is of importance to the management plan. Some of this acreage was acquired from the Gladwin Department of Natural Resources (DNR) for the purpose of the Trail of Two Cities development (Figure 5). The DNR maintained the property as a State Game Area. Now the city owns and maintains the property providing public access for the primary purpose of recreation that does not include hunting. It is worth noting the DNR has maintained rights to access and manage a parcel of land along the Cedar River south of the purchased property (Figure 6).

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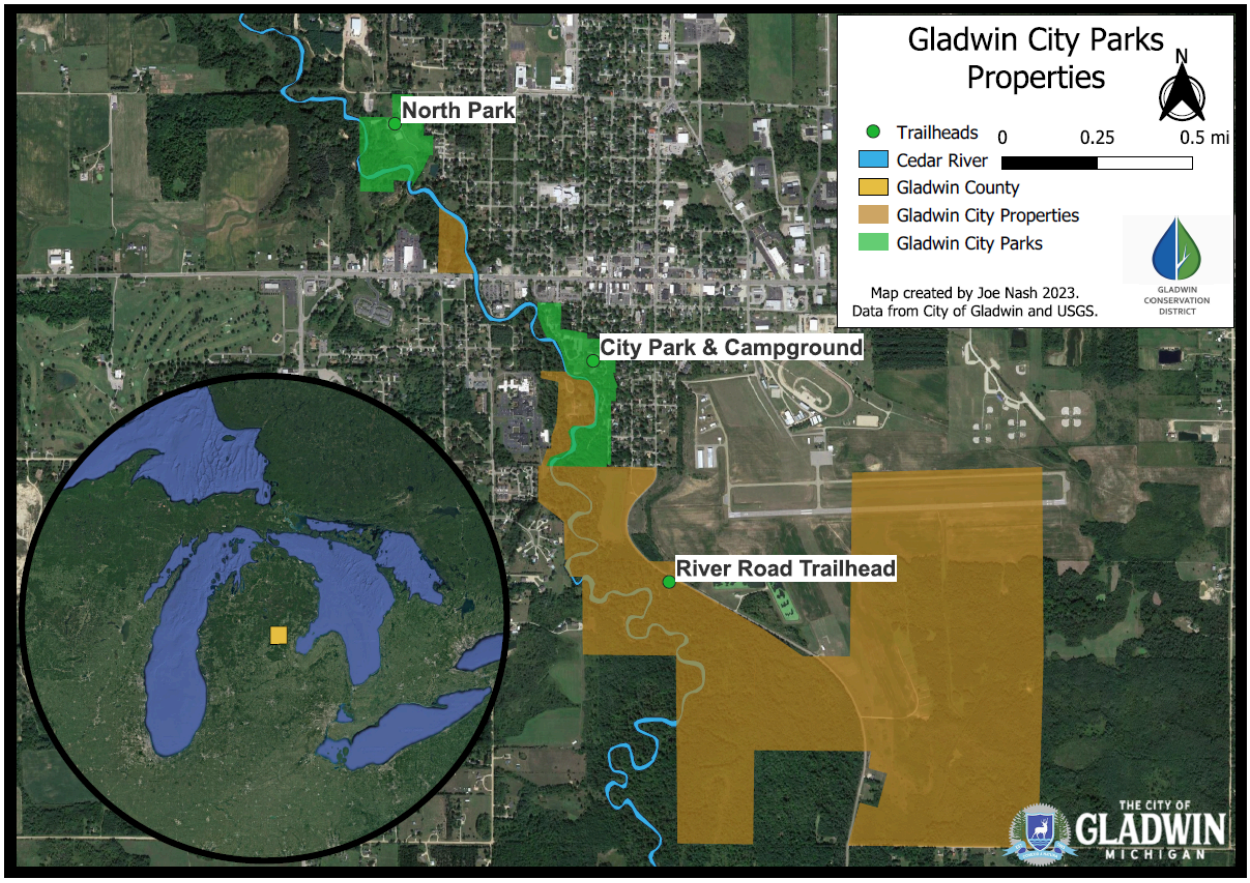

Figure 5. City of Gladwin's parks and adjacent properties.

The property to the south of North Park located on the west side of the Cedar River is the location of the City office. This parcel is forested and does house a section of the Trail of Two Cities following a pedestrian bridge that crosses the river. Additionally, south of the City Park and Campground the trail continues along the river to the River Road Trailhead. This parcel is also owned by the City of Gladwin and will be a source of much discussion in this management plan.

Historical Perspective

The Cedar River corridor near the City of Gladwin has a very interesting history that may not be easily recognized by residents and visitors. Upstream of Gladwin is Chappel Dam, below the dam begins the main branch of the Cedar River. Chappel Dam was built in 1912 as a source of hydroelectric power by Consumers Power. Upstream of the dam is Wiggins Lake which serves its residents with waterfront property. The dam has a history of failures that have caused flooding

downstream that certainly impacted the park properties. Evidence of dam failure include altered streambed sediment, streambank scouring, and altered hydrology. In addition to the Chappel Dam upstream of the parks, a dam existed at the current location of the City of Gladwin's North Park (Figure 6). This dam was known as "Schulz's Dam" because of its family ownership. Schulz's Dam created a lake that covered North Park and utilized the hydropower for a flour mill. The dam is said to have failed once in 1911 and been rebuilt, however, following the failure of Chappel Dam in 1928 Schulz Dam was swept away and never rebuilt (University Outreach, University of Michigan-Flint 2011).

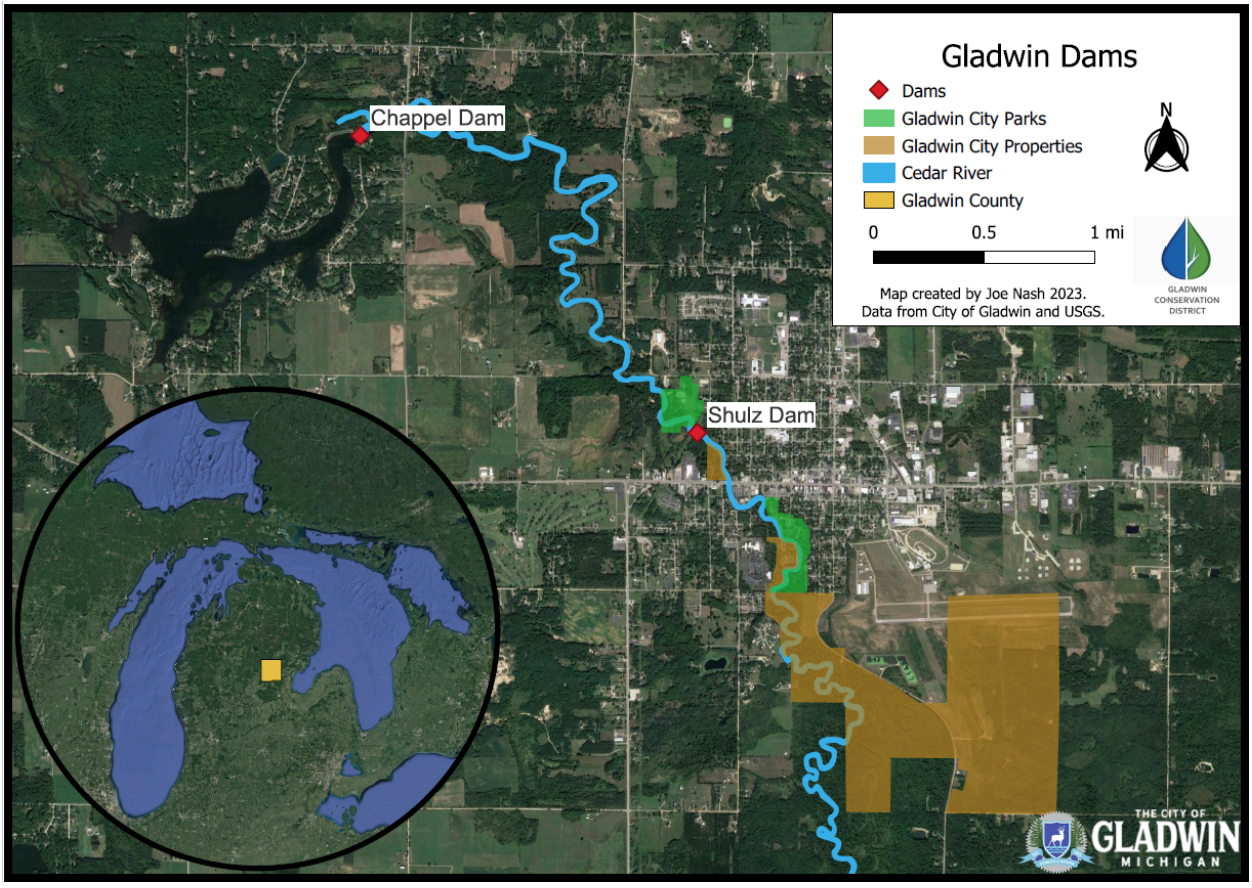

Figure 6. Dam locations on the Cedar River near the City of Gladwin.

In addition to dam failure the Cedar River is known to have been important during commercial logging operations in the 19th century. Waterways were important for transporting logs from areas they were cut to regionally based sawmills. The Cedar River would have connected Gladwin County to large sawmills in the Saginaw Bay/Bay City area via the

Tittabawassee river. Similarly to dam failure, logging has a large hydrologic effect on rivers: altered streambed substrate, altered streambanks, and hydrologic changes.

These two past uses have permanently altered the Cedar River corridor including the areas of North Park and City Park and Campground. It is important to understand historical uses and how they impact the present conditions when considering future restoration and management.

Climatic Information

The climate of Gladwin County is influenced by the Great Lakes with prevailing winds from the west. Mean annual temperatures range from 5.7 - 7.6 ℃ and mean annual precipitation ranges from 700 - 870 mm. Mean annual snowfall varies widely from year to year but averages at about 1.2 m. The average growing season in Gladwin county is about 120 days (National Oceanic and Atmospheric Administration 2023).

Geology and Physiography:

The City park properties are located on landforms known as ground and end moraines in the Wiggins Lake Subsection (Albert, 1995). Ground moraines are formed when glaciers quickly recede, depositing a small blanket of glacial sediment or till (Figure 7). End moraines take place at the margin or end of a glacier (Figure 8). End moraines have a larger amount of till deposited due to the conveyor action of a melting glacier. As a result, end moraines are hills or ridges of higher elevation consisting of till (Hansel 2023).

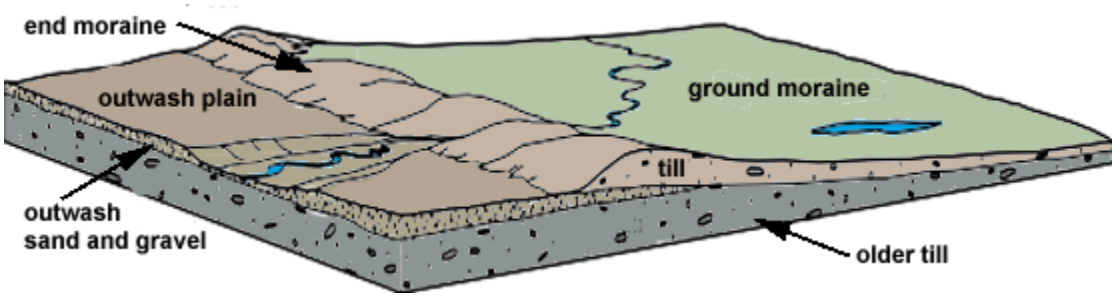

Figure 7. Location and physiography of ground and end moraines. (Hansel 2023)

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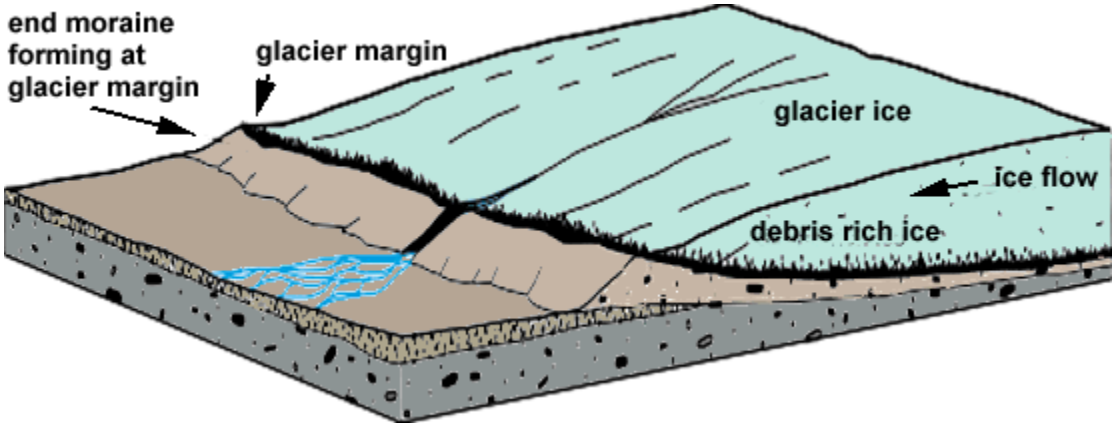

Figure 8. Formation of end moraine at glacier margin. (Hansel 2023)

Glacial deposits are estimated to be between 250 to 450 ft thick over top of a diverse geologic past. Bedrock is dominated by sandstone formations with minor components of limestone and gypsum from both the Jurassic (about 150 - 200 million years ago) and Pennsylvanian periods (about 300 million years ago) (Albert, 1995).

Topography

The topography of the city park properties ranges from flat to moderately steep, draining easterly into the Cedar river which runs North-South on the West side of the park properties. Elevations range from about 780’ - 800’ above sea level at both City Park and North Park (Figures 9 and 10).

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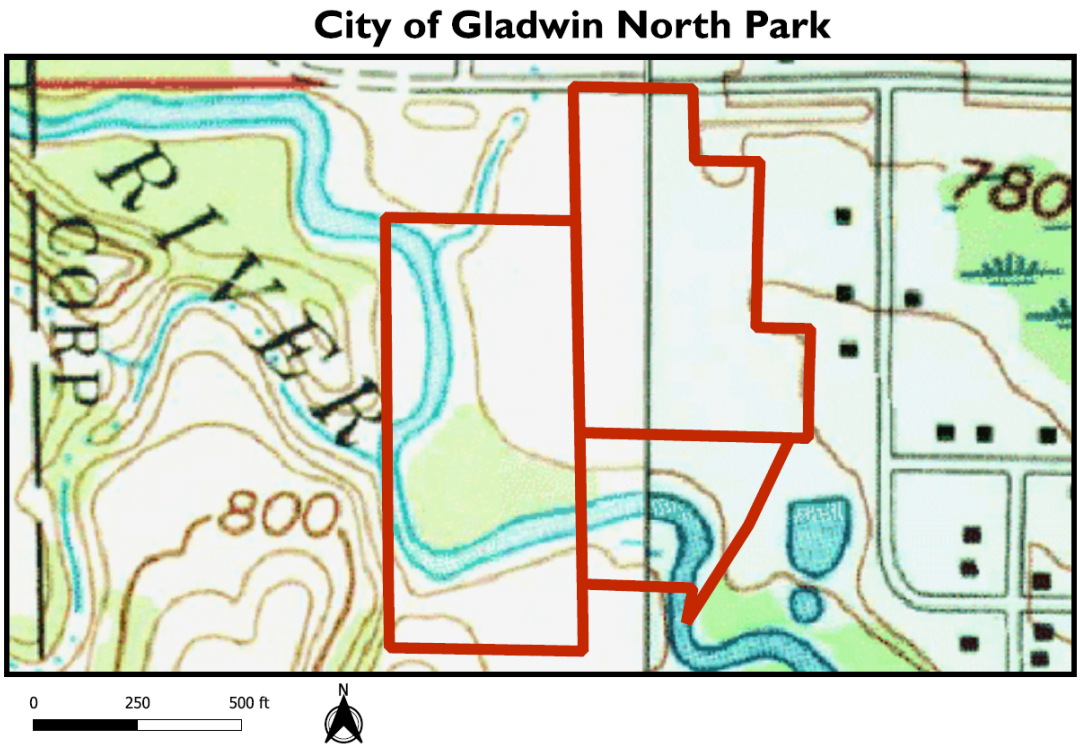

Figure 9. City of Gladwin North Park topographic map (USGS).

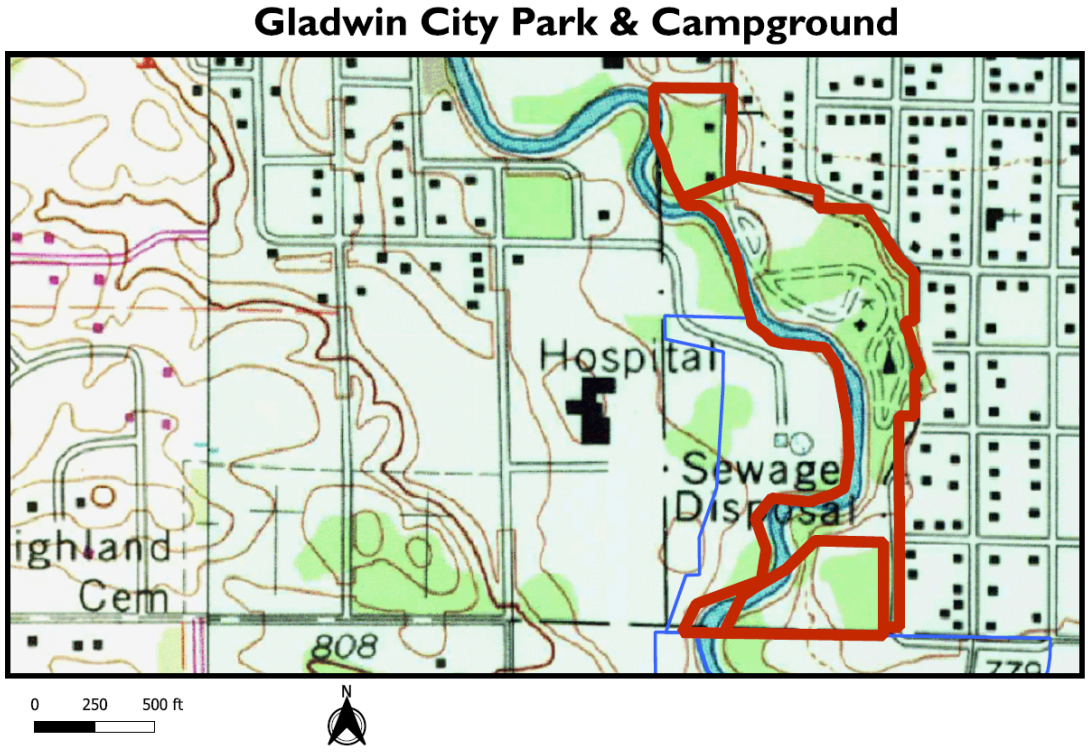

Figure 10. Gladwin City Park and Campground topographic map (USGS).

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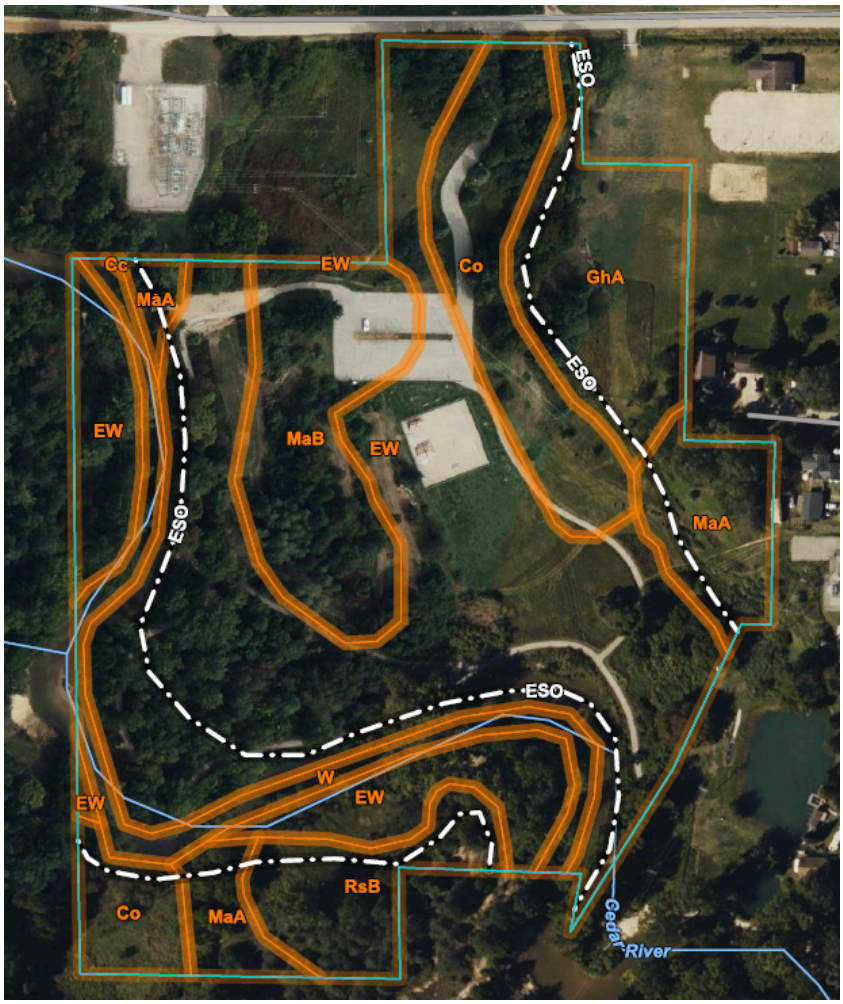
Soils and Productivity

North Park



Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cc	Ceresco loam	0.0	0.0%
Co	Cohoctah loam	2.7	11.8%
EW	Evart-Winterfield association	11.4	49.4%
GhA	Gladwin loamy sand, 0 to 2 percent slopes	2.2	9.5%
MaA	Mancelona sand, 0 to 2 percent slopes	1.8	7.7%
MaB	Mancelona sand, 2 to 6 percent slopes	2.4	10.4%
RsB	Rubicon sand, 0 to 6 percent slopes	1.2	5.3%
W	Water	1.3	5.8%
Totals for Area of Interest		**23.0**	**100.0%**

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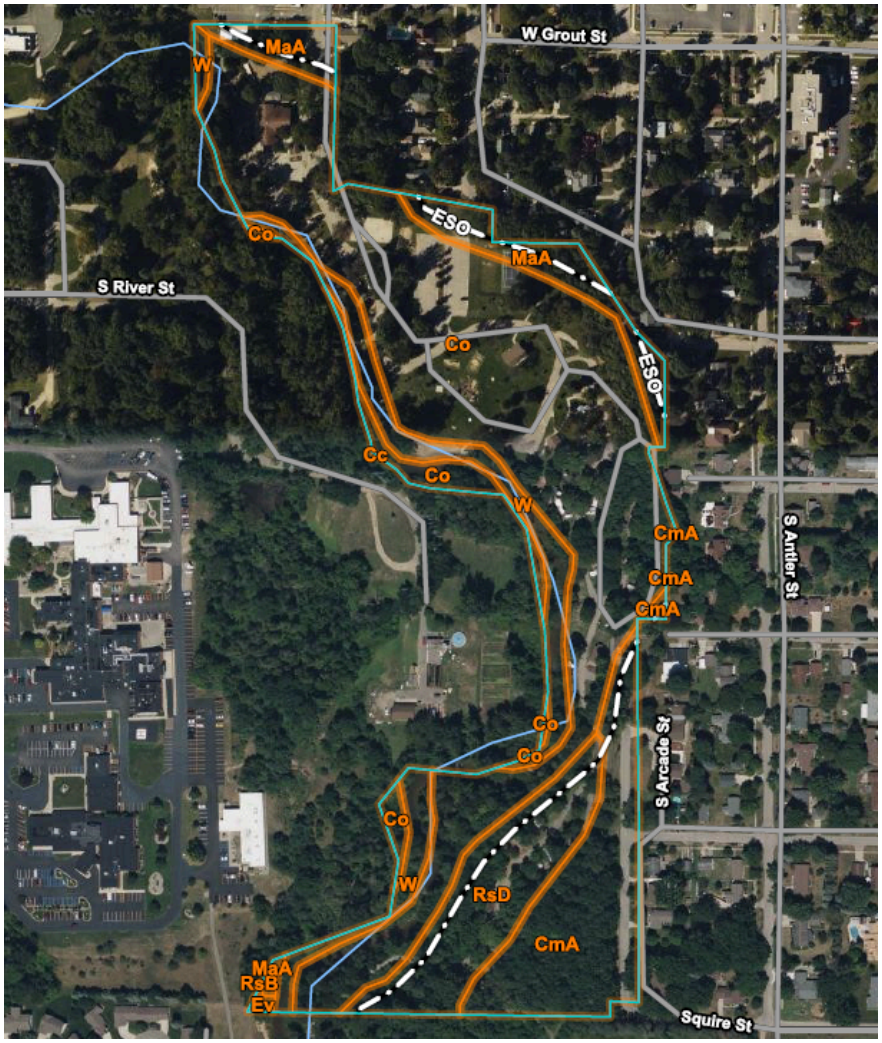
City Park and Campgrounds



Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cc	Ceresco loam	0.0	0.0%
CmA	Covert sand, 0 to 3 percent slopes	3.5	13.9%
Co	Cohoctah loam	14.7	58.3%
Ev	Evart loamy sand	0.0	0.2%
MaA	Mancelona sand, 0 to 2 percent slopes	1.8	7.3%
RsB	Rubicon sand, 0 to 6 percent slopes	0.0	0.0%
RsD	Rubicon sand, 6 to 18 percent slopes	2.7	10.9%
W	Water	2.4	9.4%
Totals for Area of Interest		**25.3**	**100.0%**

Cc—Ceresco loam:

Landform: Flood plains

Parent Material: Loamy and sandy alluvium

Drainage Class: Somewhat poorly drained

Frequency of Flooding: Frequent

Available Water Storage: Low (about 5.3 inches)

Co—Cohoctah loam:

Landform: Flood plains

Parent Material: Sandy and loamy alluvium

Drainage Class: Poorly drained

Frequency of Flooding: Occasional

Available Water Storage: High (about 9.5 inches)

EW—Evart-Winterfield association:

Landform: Flood plains

Parent Material: Sandy alluvium

Drainage Class: Poorly drained

Frequency of Flooding: Frequent

Available Water Storage: Low (about 5.1 inches)

GhA—Gladwin loamy sand, 0 to 2 percent slopes:

Landform: Lake plains, outwash plains

Parent Material: 20 to 40 inches of sandy material over calcareous sandy and gravelly glaciofluvial deposits

Drainage Class: Somewhat poorly drained

Frequency of Flooding: None

Available Water Storage: Low (about 3.6 inches)

Link to notes document

MaA—Mancelona sand, 0 to 2 percent slopes:

Landform: Outwash plains, lake plains

Parent Material: 18 to 40 inches of sandy and/or gravelly material over calcareous sandy and gravelly glaciofluvial deposits

Drainage Class: Somewhat excessively drained

Frequency of Flooding: None

Available Water Storage: Low (about 3.8 inches)

MaB—Mancelona sand, 2 to 6 percent slopes:

Landform: Outwash plains, lake plains

Parent Material: 18 to 40 inches of sandy and/or gravelly material over calcareous sandy and gravelly glaciofluvial deposits

Drainage Class: Somewhat excessively drained

Frequency of Flooding: None

Available Water Storage: Low (about 3.8 inches)

RsB—Rubicon sand, 0 to 6 percent slopes:

Landform: Till-floored lake plains, deltas, drainageways, moraines

Parent Material: Sandy glaciolacustrine deposits

Drainage Class: Excessively drained

Frequency of Flooding: None

Available Water Storage: Low (about 4.3 inches)

CmA—Covert sand, 0 to 3 percent slopes:

Landform: Knolls on outwash plains, flats on outwash plains, lake plains

Parent Material: Sandy glaciofluvial deposits

Drainage Class: Moderately well drained

Frequency of Flooding: None

Available Water Storage: Low (about 4.0 inches)

Ev—Evart loamy sand:

Landform: Flood plains

Parent Material: Sandy alluvium

Drainage Class: Poorly drained

Frequency of Flooding: Frequent

Available Water Storage: Low (about 5.1 inches)

RsD—Rubicon sand, 6 to 18 percent slopes:

Landform: Moraines, terraces

Parent Material: Sandy glaciofluvial deposits

Drainage Class: Excessively drained

Frequency of Flooding: None

Available Water Storage: Low (about 4.0 inches)

Equipment Limitations

This table provides interpretive ratings for the use of harvesting equipment and for log landings and haul roads. The ratings are both verbal and numerical.

The rating class terms are expressed as *Well suited, Moderately suited,* and *Poorly suited. Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified forest management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Limitations in this table are given for the most limiting season of the year, generally spring or late fall. In some areas, however, the most limiting season is during dry periods in summer, when loose sand can limit trafficability on deep, well drained, sandy soils.

The paragraphs that follow indicate the soil properties considered in rating the soils for the forest management practices in this table. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Suitability for use of harvesting equipment refers to the use of equipment in logging areas and on skid roads. These are areas where some or all of the trees are being cut. Generally, equipment use is least intensive in these areas. The ratings in this column are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, and ponding.

Log landings are areas where logs are assembled for transportation. Wheeled equipment may be used more frequently in these areas than in any other areas affected by logging. The ratings in this column are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage.

Haul roads are access roads leading from primary or surfaced roads to the logging areas. The logging roads serve as transportation routes for wheeled logging equipment and logging trucks. Generally, they are unpaved roads. Some are graveled. The ratings in this column are based on slope, flooding, permafrost, plasticity index, the hazard of soil slippage, content of sand, the Unified classification, rock fragments on or below the surface, depth to a restrictive layer that is indurated, depth to a water table, and ponding.

Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the five most limiting features for any given soil. The soil may have additional limitations.

[Link to notes document]

North Park

Equipment Limitations on Woodland (MI)–Gladwin County, Michigan							
Map symbol and soil name	Pct. of map unit	Suitability for use of harvesting equipment (MI)		Suitability for haul roads (MI)		Suitability for log landings (MI)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Cc—Ceresco loam							
Ceresco	93	Moderately suited		Poorly suited		Poorly suited	
		Low strength	0.50	Flooding	1.00	Flooding	1.00
		Wetness	0.50	Low strength	0.50	Low strength	0.50
				Wetness	0.50	Wetness	0.50
Co—Cohoctah loam							
Cohoctah	100	Poorly suited		Poorly suited		Poorly suited	
		Wetness	1.00	Flooding	1.00	Flooding	1.00
		Low strength	0.50	Wetness	1.00	Wetness	1.00
				Low strength	0.50	Low strength	0.50
EW—Evart-Winterfield association							
Evart	65	Moderately suited		Poorly suited		Poorly suited	
		Wetness	0.50	Flooding	1.00	Flooding	1.00
				Wetness	0.50	Wetness	0.50
Winterfield	35	Moderately suited		Poorly suited		Poorly suited	
		Wetness	0.50	Flooding	1.00	Flooding	1.00
				Wetness	0.50	Wetness	0.50
GhA—Gladwin loamy sand, 0 to 2 percent slopes							
Gladwin	90	Moderately suited		Moderately suited		Moderately suited	
		Wetness	0.50	Wetness	0.50	Wetness	0.50
				Sandiness	0.50		
MaA—Mancelona sand, 0 to 2 percent slopes							
Mancelona	93	Moderately suited		Moderately suited		Moderately suited	
		Too sandy	0.50	Sandiness	0.50	Too sandy	0.50
MaB—Mancelona sand, 2 to 6 percent slopes							
Mancelona	100	Moderately suited		Moderately suited		Moderately suited	
		Too sandy	0.50	Sandiness	0.50	Too sandy	0.50
RsB—Rubicon sand, 0 to 6 percent slopes							
Rubicon	92	Moderately suited		Well suited		Moderately suited	
		Too sandy	0.50			Too sandy	0.50
W—Water							
Water	100	Not Rated		Not Rated		Not Rated	

[Link to notes document]

City Park and Campground

Equipment Limitations on Woodland (MI)–Gladwin County, Michigan							
Map symbol and soil name	Pct. of map unit	Suitability for use of harvesting equipment (MI)		Suitability for haul roads (MI)		Suitability for log landings (MI)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Cc—Ceresco loam							
Ceresco	93	Moderately suited		Poorly suited		Poorly suited	
		Low strength	0.50	Flooding	1.00	Flooding	1.00
		Wetness	0.50	Low strength	0.50	Low strength	0.50
				Wetness	0.50	Wetness	0.50
CmA—Covert sand, 0 to 3 percent slopes							
Covert	82	Moderately suited		Moderately suited		Moderately suited	
		Too sandy	0.50	Wetness	0.50	Too sandy	0.50
		Wetness	0.50			Wetness	0.50
Co—Cohoctah loam							
Cohoctah	100	Poorly suited		Poorly suited		Poorly suited	
		Wetness	1.00	Flooding	1.00	Flooding	1.00
		Low strength	0.50	Wetness	1.00	Wetness	1.00
				Low strength	0.50	Low strength	0.50
Ev—Evart loamy sand							
Evart	100	Moderately suited		Poorly suited		Poorly suited	
		Wetness	0.50	Flooding	1.00	Flooding	1.00
				Wetness	0.50	Wetness	0.50
MaA—Mancelona sand, 0 to 2 percent slopes							
Mancelona	93	Moderately suited		Moderately suited		Moderately suited	
		Too sandy	0.50	Sandiness	0.50	Too sandy	0.50
RsB—Rubicon sand, 0 to 6 percent slopes							
Rubicon	92	Moderately suited		Well suited		Moderately suited	
		Too sandy	0.50			Too sandy	0.50

Equipment Limitations on Woodland (MI)–Gladwin County, Michigan							
Map symbol and soil name	Pct. of map unit	Suitability for use of harvesting equipment (MI)		Suitability for haul roads (MI)		Suitability for log landings (MI)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RsD—Rubicon sand, 6 to 18 percent slopes							
Rubicon	92	Moderately suited		Well suited		Moderately suited	
		Too sandy	0.50			Slope	0.50
						Too sandy	0.50
W—Water							
Water	100	Not Rated		Not Rated		Not Rated	

Erosion and Windthrow Potential

This table provides interpretive ratings for off-road or off-trail erosion and for the windthrow hazard. The ratings are both verbal and numerical.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest impact on the specified forest management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Ratings in the column hazard of off-road or off-trail erosion are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of slight indicates that erosion is unlikely under ordinary climatic conditions; moderate indicates that some erosion is likely and that erosion-control measures may be needed; severe indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and very severe indicates that significant erosion is expected, loss of soil productivity and offsite damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column windthrow hazard indicate the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. The windthrow hazard is described as slight, moderate, or severe. A rating of slight indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of moderate indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of severe indicates that many trees can be blown down during these periods.

[Link to notes document]

North Park

Forestland Erosion and Windthrow Hazard (MI)–Gladwin County, Michigan					
Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion (MI)		Windthrow hazard (MI)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Cc—Ceresco loam					
Ceresco	93	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.37
Co—Cohoctah loam					
Cohoctah	100	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.50
EW—Evart-Winterfield association					
Evart	65	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.50
Winterfield	35	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.24
GhA—Gladwin loamy sand, 0 to 2 percent slopes					
Gladwin	90	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.50
MaA—Mancelona sand, 0 to 2 percent slopes					
Mancelona	93	Slight		Slight	
		Slope/erodibility	0.02		
MaB—Mancelona sand, 2 to 6 percent slopes					
Mancelona	100	Slight		Slight	
		Slope/erodibility	0.08		
RsB—Rubicon sand, 0 to 6 percent slopes					
Rubicon	92	Slight		Slight	
		Slope/erodibility	0.06		
W—Water					
Water	100	Not Rated		Not rated	

[Link to notes document]

City Park and Campground

Forestland Erosion and Windthrow Hazard (MI)–Gladwin County, Michigan					
Map symbol and soil name	Pct. of map unit	Hazard of off-road or off-trail erosion (MI)		Windthrow hazard (MI)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Cc—Ceresco loam					
Ceresco	93	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.37
CmA—Covert sand, 0 to 3 percent slopes					
Covert	82	Slight		Slight	
		Slope/erodibility	0.02		
Co—Cohoctah loam					
Cohoctah	100	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.50
Ev—Evart loamy sand					
Evart	100	Slight		Moderate	
		Slope/erodibility	0.02	Wetness	0.50
MaA—Mancelona sand, 0 to 2 percent slopes					
Mancelona	93	Slight		Slight	
		Slope/erodibility	0.02		
RsB—Rubicon sand, 0 to 6 percent slopes					
Rubicon	92	Slight		Slight	
		Slope/erodibility	0.06		
RsD—Rubicon sand, 6 to 18 percent slopes					
Rubicon	92	Slight		Slight	
		Slope/erodibility	0.20		
W—Water					
Water	100	Not Rated		Not rated	

Forest Productivity

This table is designed to assist forestland owners or managers in planning the use of soils for wood crops. It provides the potential productivity of the soils for wood crops. Potential productivity of merchantable or common trees on a soil is expressed as a site index and as a volume growth rate number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Common trees are those that forestland managers

generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet. The Base Age is the age of trees in years on which the site index is based. "TA" indicates total age. "BH" indicates breast height age. "N/A" indicates that base age is not applicable. The Site Index Curve Number is listed in the National Register of Site Index Curves. It identifies the site index curve used to determine the site index. The Volume Growth Rate is the maximum wood volume annual growth rate likely to be produced by the tree species. This number, expressed as cubic feet per acre per year, is calculated at the age of culmination of the mean annual increment (CMAI). It indicates the maximum volume of wood fiber produced per year in a fully stocked, even-aged, unmanaged stand.

North Park

Forestland Productivity–Gladwin County, Michigan				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			Cu ft/ac/yr	
Cc—Ceresco loam				
Ceresco	American basswood	65	57.00	Eastern white pine, Northern red oak, Northern white-cedar, Norway spruce, White spruce
	Balsam fir	61	114.00	
	Northern white-cedar	45	72.00	
	Quaking aspen	—	0.00	
	Red maple	61	43.00	
	Swamp white oak	66	43.00	
	White ash	65	57.00	

[Link to notes document]

Forestland Productivity–Gladwin County, Michigan				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			Cu ft/ac/yr	
Co—Cohoctah loam				
Cohoctah	American elm	—	0.00	—
	Balsam fir	—	0.00	
	Black spruce	—	0.00	
	Northern white-cedar	—	0.00	
	Paper birch	—	0.00	
	Quaking aspen	—	0.00	
	Red maple	—	0.00	
	Tamarack	—	0.00	
	White spruce	38	72.00	
EW—Evart-Winterfield association				
Evart	Balsam fir	40	72.00	Black spruce, Tamarack
	Black spruce	15	29.00	
	Northern white-cedar	15	29.00	
	Quaking aspen	45	29.00	
	Red maple	40	29.00	
	Swamp white oak	—	0.00	
	Tamarack	35	29.00	
Winterfield	Balsam fir	—	0.00	Eastern white pine, Northern white-cedar, White spruce
	Black spruce	—	0.00	
	Eastern white pine	—	0.00	
	Quaking aspen	70	86.00	
	Red maple	65	43.00	
	White ash	—	0.00	
	White spruce	—	0.00	
	Yellow birch	—	0.00	

[Link to notes document]

Forestland Productivity–Gladwin County, Michigan				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			Cu ft/ac/yr	
GhA—Gladwin loamy sand, 0 to 2 percent slopes				
Gladwin	Balsam fir	—	0.00	Eastern white pine, White spruce
	Bigtooth aspen	—	0.00	
	Eastern white pine	55	100.00	
	Paper birch	69	86.00	
	Quaking aspen	68	72.00	
	Red maple	—	0.00	
	White oak	55	43.00	
	White spruce	—	0.00	
MaA—Mancelona sand, 0 to 2 percent slopes				
Mancelona	Eastern white pine	—	0.00	Eastern white pine, Jack pine, Red pine
	Jack pine	—	0.00	
	Northern red oak	—	0.00	
	Red pine	—	0.00	
	Sugar maple	58	43.00	
	Yellow birch	—	0.00	
MaB—Mancelona sand, 2 to 6 percent slopes				
Mancelona	Eastern white pine	—	0.00	Eastern white pine, Jack pine, Red pine
	Jack pine	—	0.00	
	Northern red oak	—	0.00	
	Red pine	—	0.00	
	Sugar maple	58	43.00	
	Yellow birch	—	0.00	
RsB—Rubicon sand, 0 to 6 percent slopes				
Rubicon	—	—	—	—
W—Water				
Water	—	—	—	—

[Link to notes document]

City Park and Campground

Forestland Productivity–Gladwin County, Michigan				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			Cu ft/ac/yr	
Cc—Ceresco loam				
Ceresco	American basswood	65	57.00	Eastern white pine, Northern red oak, Northern white-cedar, Norway spruce, White spruce
	Balsam fir	61	114.00	
	Northern white-cedar	45	72.00	
	Quaking aspen	—	0.00	
	Red maple	61	43.00	
	Swamp white oak	66	43.00	
	White ash	65	57.00	

[Link to notes document]

Forestland Productivity–Gladwin County, Michigan				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			Cu ft/ac/yr	
CmA—Covert sand, 0 to 3 percent slopes				
Covert	Bigtooth aspen	—	—	Eastern white pine, Red pine, White spruce
	Eastern white pine	—	—	
	Jack pine	53	1.46	
	Northern red oak	—	—	
	Quaking aspen	68	1.56	
	Red maple	—	—	
	Red pine	60	2.02	
Co—Cohoctah loam				
Cohoctah	American elm	—	0.00	—
	Balsam fir	—	0.00	
	Black spruce	—	0.00	
	Northern white-cedar	—	0.00	
	Paper birch	—	0.00	
	Quaking aspen	—	0.00	
	Red maple	—	0.00	
	Tamarack	—	0.00	
	White spruce	38	72.00	
Ev—Evart loamy sand				
Evart	Balsam fir	40	72.00	Black spruce, Tamarack
	Black spruce	15	29.00	
	Northern white-cedar	15	29.00	
	Quaking aspen	45	29.00	
	Red maple	40	29.00	
	Swamp white oak	—	0.00	
	Tamarack	35	29.00	
MaA—Mancelona sand, 0 to 2 percent slopes				
Mancelona	Eastern white pine	—	0.00	Eastern white pine, Jack pine, Red pine
	Jack pine	—	0.00	
	Northern red oak	—	0.00	
	Red pine	—	0.00	
	Sugar maple	58	43.00	
	Yellow birch	—	0.00	

[Link to notes document]

Forestland Productivity–Gladwin County, Michigan				
Map unit symbol and soil name	Potential productivity			Trees to manage
	Common trees	Site Index	Volume of wood fiber	
			Cu ft/ac/yr	
RsB—Rubicon sand, 0 to 6 percent slopes				
Rubicon	—	—	—	—
RsD—Rubicon sand, 6 to 18 percent slopes				
Rubicon	Bigtooth aspen	61	66.00	—
	Eastern white pine	53	80.00	
	Jack pine	53	78.00	
	Northern red oak	51	—	
	Pin oak	—	—	
	Quaking aspen	59	62.00	
	Red maple	—	—	
	Red pine	51	68.00	
	Sugar maple	55	—	
	White oak	—	—	
W—Water				
Water	—	—	—	—

Threatened and Endangered Species

Although there are no known threatened or endangered species present within the Gladwin city park properties, the habitat supports several species listed as special concern in the state of Michigan. Management activities that could disturb or displace species of special concern will be limited to areas that these species are unlikely to occupy. All of the species of special concern utilize riparian zones for habitat. Management activities will be buffered by 150 ft directly adjacent to the cedar river as part of the riparian management zone (RMZ). Those species include:

- Ellipse (*Venustaconcha ellipsiformis)*
- Wood turtle (*Glyptemys insculpta*)
- Creek heelsplitter (*Lasmigona compressa*)
- Pickerel frog (*Lithobates palustris*)

A survey of nesting birds will be conducted prior to management activities at the park to ensure that sites occupied by nesting birds are not disturbed.

Special Sites

There are no known cultural heritage sites within the Gladwin City Park Properties. The State Historic Preservation Office Database (www.Michigan.gov/Archaeology) shows no known presence of historic sites within this section of the township. Special sites also include unique natural communities (mnfi.anr.msu.edu/communities) but there are no natural communities within the Gladwin City Park Properties.

Forests of Recognized Importance (FORI)

The Gladwin City Park Properties are not located within a "Forest of Recognized Importance" (FORI). FORI are Michigan forests that are located along the Great Lakes coastline, along Natural or Wild and Scenic Rivers, rare forest types (old growth), or forests that provide important wildlife habitat (>500 contiguous acres in the southern Lower Peninsula, or required habitat for threatened or endangered species statewide). Management within a FORI should protect the ecological integrity of those vital habitats.

Past and Present Vegetation

Prior to European settlement the areas occupied by Gladwin City Parks were predominantly sugar maple-beech-hemlock forests with lowlands characterized by mixed conifer swamps (Comer et al. 1995). The forest landscape in Gladwin was significantly altered by humans during the logging boom in the mid to late 1800s and subsequent wildfires (Karamanski 1989). Clearcutting of native forests and the wildfires that followed resulted in bare mineral soil across much of the landscape in Gladwin.

Both Gladwin City Park and North Park are now characterized by mature quaking (*Populus tremuloides* Michx.) and bigtooth aspen (*Populus grandidentata* Michaux), cottonwood (*Populus deltoides* W.Bartram ex Marshall), and basswood (*Tilia americana* L.), with minor components of pin (*Prunus pensylvaniva* L.f) and black cherry (*Prunus serotina* Ehrh.), northern red oak (*Quercus rubra* L.), northern pin oak (*Quercus ellipsoidalis* E.J.Hill), white oak (*Quercus alba* L.), bitternut hickory (*Carya cordiformis* K.Koch), hackberry (*Celtis occidentalis* L.), red maple (*Acer rubrum* L.), and American beech (*Fagus grandifolia* Ehrh). Emerald ash

borer has resulted in widespread mortality of ash trees (*Fraxinus spp.*) at both parks and there is presently no mature living ash within the park limits. Tree regeneration is sparse throughout much of the park properties as a result of the heavy infestation of invasive species that limit the amount of sunlight reaching the forest floor. Boxelder (*Acer negundo* L.) stump sprouts dominate the area west of the airport that was cleared for a line of sight for the runway.

Forest Health Issues and Invasive Species

Throughout the majority of the park, a wide array of invasive plant species can be found with populations ranging from only a few plants, as is the case with black jetbead, to monocultures covering large swaths of land like the oriental bittersweet. The primary concern is trail safety, with the bittersweet not only choking out native and invasive plants alike, but also causing dead trees to become top heavy with the living bittersweet still growing within the crowns. These dead, top heavy trees are becoming hazardous, as tops of the trees will eventually break off as a result of the biomass and the lack of structural integrity.

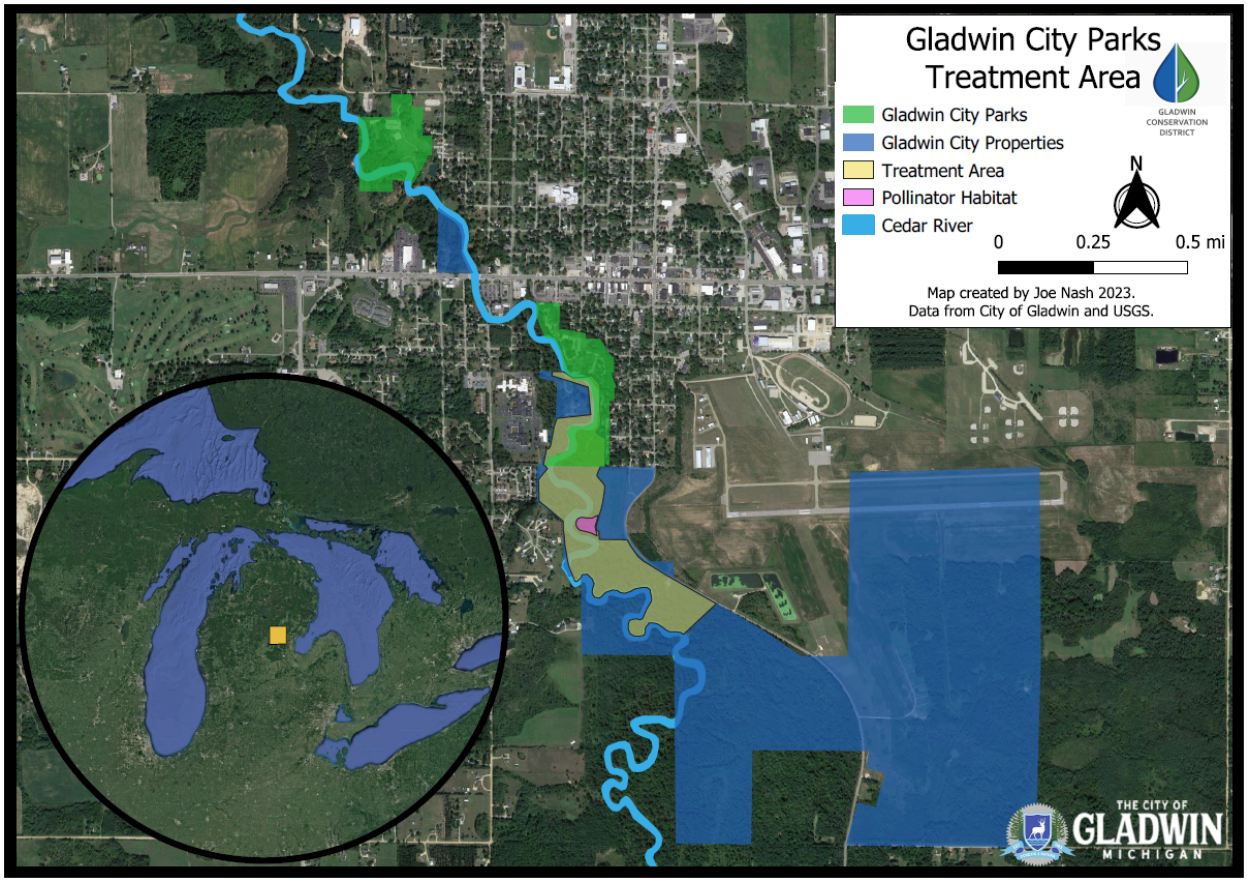
Along with the safety concerns, there is the long-term health and level of biodiversity in the area to consider. With so much of the ground being covered by new and old bittersweet vines and other invasives, there is no space or sunlight on the forest floor to enable the new growth of native species. Some species, like black jetbead, are just beginning to establish themselves within the forest and we want to be certain that we mitigate its spread early on before it is allowed to grow to similar numbers to comparable species, like buckthorn and autumn olive.

Wildfire Risk and Prevention

The tree species composition and mesic habitat within the city park properties do not pose a major risk of wildfire. The Cedar river would prevent the spread of any potential wildfire west of the city park properties and roads (i.e River Rd) would prevent the spread east of the park properties. Even with low wildfire risk prolonged droughts have the potential to create conditions conducive to wildfire ignition and spread. Limiting fuel loads (brush and woody debris) will reduce the potential for wildfires within the city park. The initial forestry mowing treatment (scheduled for winter of 2023) will greatly reduce these fuel loads.

[Link to notes document]

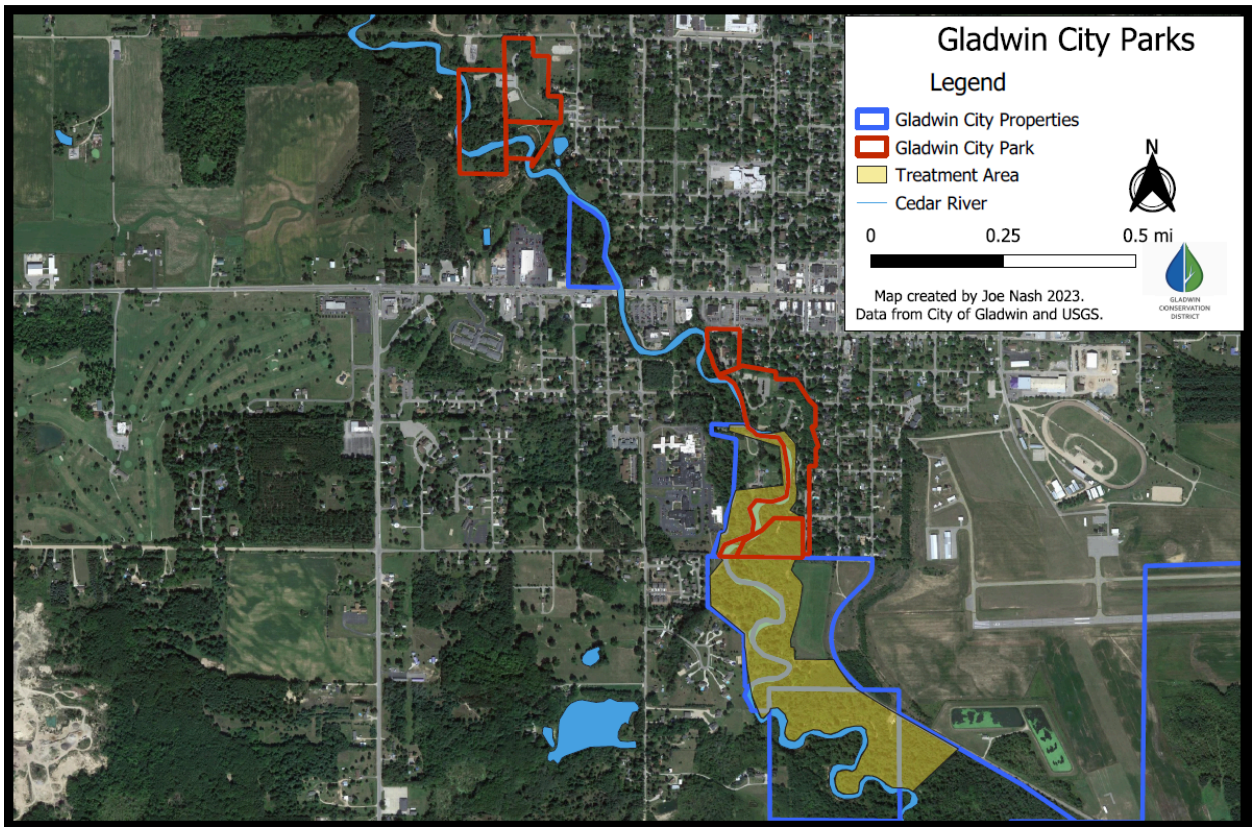
Management Units



Initial treatment area - 60 acres:

The initial treatment area includes ~ 60 acres at the south end of the City Park and Campground. This is a highly trafficked stretch of the trail of two cities and also includes the most heavily infested portions of the City Park properties. This initial treatment area also includes the DNR land on the west side of the Cedar river. It is imperative that both sides of the river are treated for invasive species (especially oriental bittersweet) as the seeds will be easily translocated by birds, wind, and water if a stable population is left intact on either side of the river.

[Link to notes document]



Pollinator habitat - 1.2 acres:

The area scheduled for native pollinator habitat establishment is 1.2 acres directly west of the Charles C. Zettel Memorial Airport in Gladwin. The Federal Aviation Administration (FAA) has required this area be cleared of all trees due to the visual block for the airstrip. The land clearing has removed all large trees and the area is now overgrown with the invasive wildflower dame's rocket (*Hesperis matronalis*). Management in this area will be aimed at chipping the brush and woody debris in this area, eradicating the dame's rocket, and establishing native wildflowers. Additionally, through funding from the Saginaw Bay WIN grant, a rustic trail and gazebo will be established in the area for public use.

North park - 23 acres:

North Park is connected to Gladwin City Park via the Trail of Two Cities and is also in need of considerable invasive species work. The primary concern at this park is autumn olive rather than oriental bittersweet, although bittersweet and several other invasive species are also present here. Due to the size of this park and the level of invasive species present, it has been

determined that brushcutting and herbicide application would be a more appropriate treatment method rather than the forestry mowing that will be used at Gladwin City Park.

Adjacent city properties - 533 acres:

Adjacent properties to Gladwin City Park will be monitored during and following this project to mitigate spreading of invasive species from one area to another in order for treatment efforts to have the greatest long-term success. Any invasive species concerns on adjacent properties will be handled in accordance with the current BMPs and with all necessary permissions and permits.

Planned Activities 2023 - 2025

Fall of 2023:

- Marking and non-mower-navigable area brush cutting and treating *(completed)*
- Sign design and installation along trail/main treatment areas *(completed)*
- Training/workshop with park staff *(completed)*
- Community education workshop *(completed)*
- Educational hikes with public *(completed)*

Winter 2023/2024:

- Contractual forestry mowing *(completed)*
- Brush cutting in non-navigable areas *(completed)*
- Community education workshop and educational hikes *completed)*

Spring of 2024:

- Spot treatment of resprouts *(completed)*
- Herbicide dame's rocket in pollinator habitat *(completed)*
- Continued hikes with public *(completed)*
- Training any new parks staff *(completed)*
- Native tree plantings *(completed)*

Summer of 2024:

- Continued spot treatment *(completed)*
- Continued hikes *(completed)*
- Build gazebo and establish rustic trail for pollinator habitat area *(postponed)*

[Link to notes document]

Fall of 2024:

- Continued spot treatment *(completed)*
- Native tree plantings *(completed)*
- Spot treatments of dame's rocket in pollinator habitat area *(completed)*

Winter of 2024/2025:

- Brush cutting *(completed)*

Spring of 2025:

- Spot treatment of resprouts and dame's rocket *(completed)*
- Native tree plantings *(completed)*

Fall of 2025:

- Volunteer hand pulling of dame's rocket resprouts in pollinator habitat *(completed)*
- Native wildflower seeding *(needs attention)*

Current Funding 2023 - 2025

USFS GLRI Grant April 3, 2023 - April 3, 2025: $48,868

Saginaw Bay WIN Grant 2023 - 2024: $12,000

Additional funding sources will be sought upon close of the above grants.

Link to notes document

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