

# Elk Rapids River Corridor Assessment 2022

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## Introduction

At the request of the Village of Elk Rapids, Tip of the Mitt Watershed Council assessed the riparian corridor in Elk Rapids along the Elk River. The project area included the river and the riparian corridor downstream of the village boundary and Burnett Foods. For this project riparian corridor was defined as land adjoining both sides of the river to a distance of 100'. The assessment took place on June 7-8, 2022, with a brief follow-up survey on July 19, 2022. Watershed Council staff traveled throughout publicly accessible areas of the corridor on foot and by kayak to assess existing vegetation (species and general health), any invasive species, and areas where native vegetation should be enhanced. We also took note of any significant erosion, stormwater outfalls, and other conditions that may need future monitoring or restoration efforts. This report details our findings and outlines steps that the Village of Elk Rapids should consider with regard to future management of the corridor. It is organized around the following areas:

1. Invasive species
2. Greenbelts
3. Erosion and bare soil susceptible to future erosion
4. Stormwater outfalls and other pipes draining into the Elk River
5. Guidelines for landscaping and beautification in the river corridor



## Priority Survey Areas for the 2022 Elk River Corridor Assessment for the Village of Elk Rapids

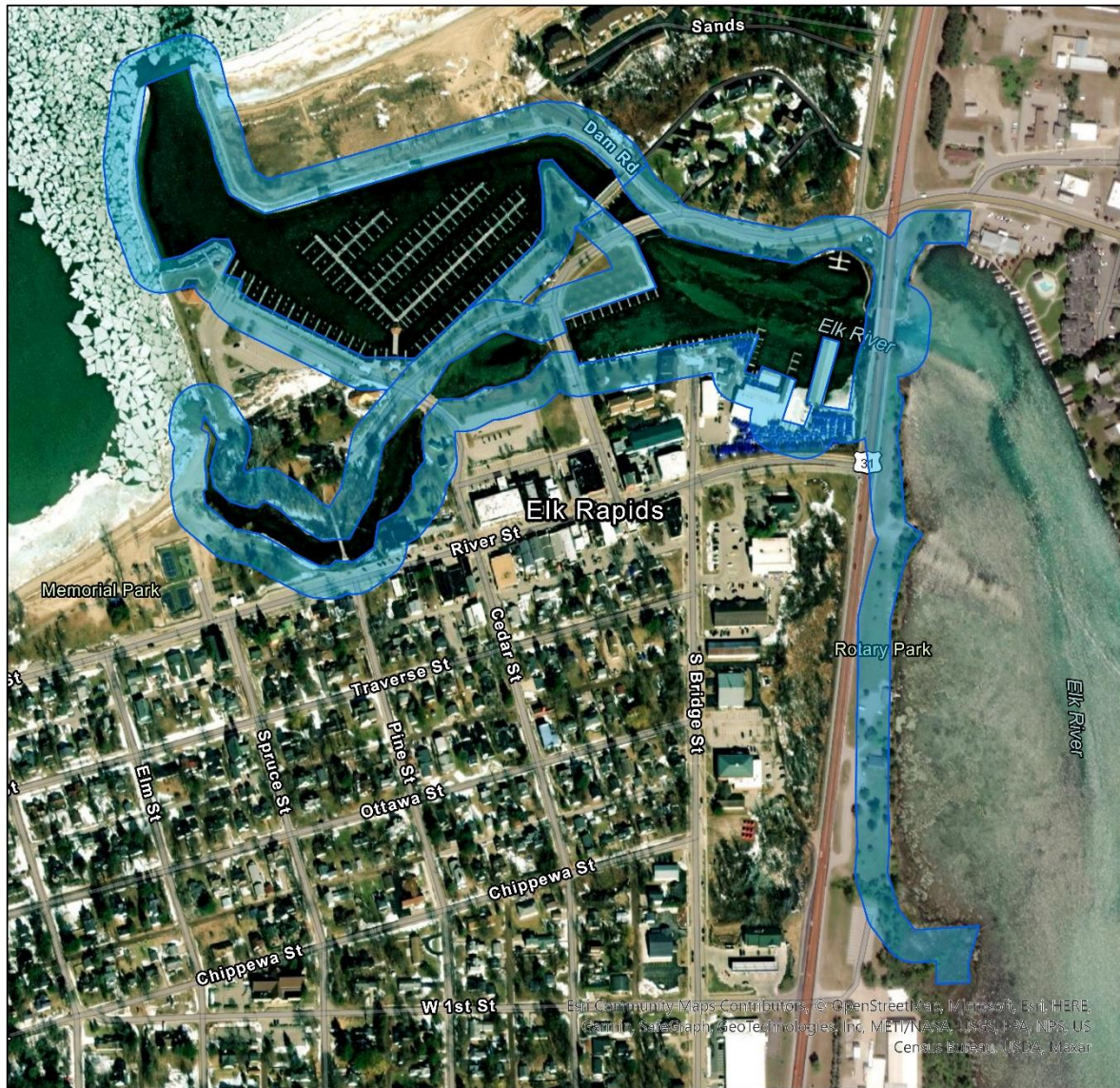


Figure 1: Areas of the Elk River corridor surveyed during Summer 2022

## Invasive Species

### Results:

As per Executive Order 13112 (Section 1. Definitions) an "invasive species" is a species that is:

1. non-native (or alien) to the ecosystem under consideration and,
2. whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

We found 23 different invasive species along the Elk River corridor (Table 1). Disturbances that remove or damage native vegetation often facilitate the establishment of invasive species by creating areas of bare ground that are easily invaded by non-native invasive plants. The urban environment, even for a small town like Elk Rapids, is characterized by disturbance from construction, development, and concentrated use by people. Additionally, since the village was founded in the 1850's, the river corridor has been highly modified from its natural state by a series of dams and modifications to the river channel that have caused further disturbance to the natural vegetation. It is not surprising then, that numerous invasive species were found within the Elk River corridor (Table 1).

*Table 1: Invasive species identified in the Elk River Corridor in 2022*

Common Name	Scientific Name	Priority Level
Yellow flag iris	<a href="#"><i>Iris pseudacorus</i></a>	high
Japanese honeysuckle	<a href="#"><i>Lonicera japonica</i></a>	high
Glossy buckthorn	<a href="#"><i>Franqula alnus</i></a>	medium
Oriental bittersweet	<a href="#"><i>Celastrus orbiculatus</i></a>	medium
Norway maple	<a href="#"><i>Acer platanoides</i></a>	low
Lesser burdock	<a href="#"><i>Arctium minus</i></a>	low
Japanese barberry	<a href="#"><i>Berberis thunbergii</i></a>	low
Spotted knapweed	<a href="#"><i>Centaurea stoebe</i></a>	low
Canada thistle	<a href="#"><i>Cirsium arvense</i></a>	low
Lily-of-the-valley	<a href="#"><i>Convallaria majalis</i></a>	low
Mute swan	<a href="#"><i>Cygnus olor</i></a>	low
Autumn olive	<a href="#"><i>Elaeagnus umbellata</i></a>	low
Morrow's & Tartarian honeysuckles*	<a href="#"><i>Lonicera morrowii</i></a> & <a href="#"><i>Lonicera tatarica</i></a>	low
Woodland forget-me-not	<a href="#"><i>M. sylvatica</i></a>	low
White & yellow sweet clovers*	<a href="#"><i>Melilotus albus</i></a> & <a href="#"><i>Melilotus officinalis</i></a>	low
Field forget-me-not	<a href="#"><i>Myosotis arvensis</i></a>	low
Lombardy poplar	<a href="#"><i>Populus nigra</i></a>	low
Black locust	<a href="#"><i>Robinia pseudoacacia</i></a>	low
Bouncing bet	<a href="#"><i>Saponaria officinalis</i></a>	low
Crown vetch	<a href="#"><i>Securigera varia</i></a>	low
Mossy stonecrop	<a href="#"><i>Sedum acre</i></a>	low
Bladder campion	<a href="#"><i>Silene vulgaris</i></a>	low
Narrowleaf & hybrid cattails*	<a href="#"><i>Typha angustifolia</i></a> & <a href="#"><i>T. x glauca</i></a>	low

\*These species are very similar and we were not able to distinguish between them in the field.



However, not all invasive species are equal priorities. Some species pose a greater risk than others. Some are so widespread that trying to eradicate them is not really feasible. In the latter case, control efforts should be focused on high quality natural communities or other locations where they have high potential for harm. In addition to listing the invasive species found, Table 1 also describes the priority level for control of each species. This priority level, synthesizes both the level of risk and how widespread each species is, both in Elk Rapids and in the broader region based on our professional opinion and the publicly accessible database of the Midwest Invasive Species Information Network (MISIN, <https://www.misin.msu.edu/>).

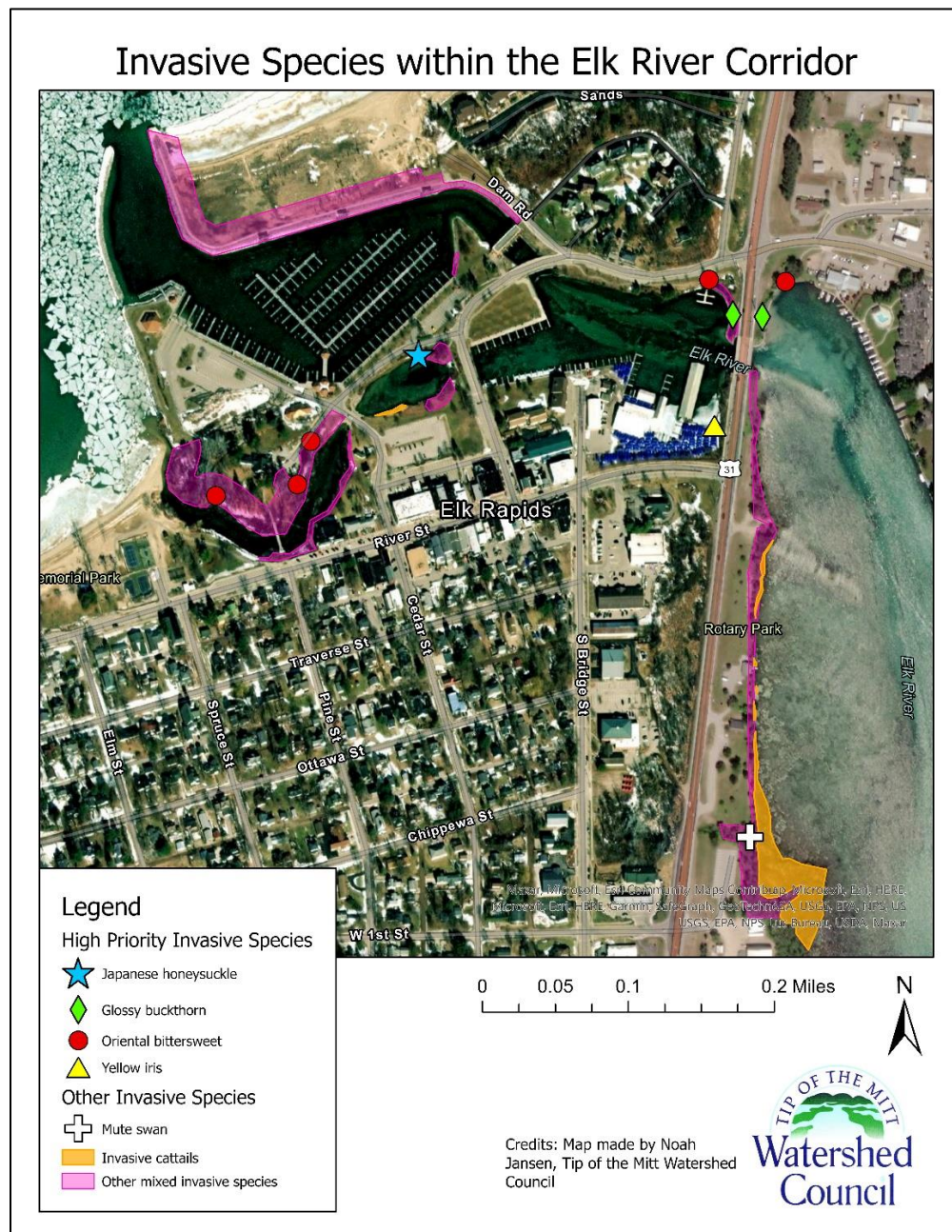


Figure 2: Invasive species locations within the Elk River corridor

### *Recommendations:*

1. Eradicate Japanese honeysuckle, yellow flag iris, and glossy buckthorn from the river corridor. Since there are only a handful of individuals of these species in the corridor, and they are not widespread in the region, they should be prioritized for eradication. The Charlevoix, Antrim, Kalkaska, and Emmet Cooperative Invasive Species Management Area (CAKE CISMA) is an excellent resource for invasive species information. They can recommend control methods and may be able to spray or remove invasive species as a contract service.
  - a. Only one Japanese honeysuckle vine was found. This is the only known record of this species in Antrim County and one of only a few in Northern Michigan. It should be eradicated as soon as possible. The CAKE CISMA can likely help with eradication, as spraying the leaves with herbicide (sometimes applied after cutting and re-sprouting) is reported to be the most effective control treatment.
  - b. Only one yellow flag iris was found. It can be removed by pulling or digging. Since the sap is poisonous and may cause a skin reaction, gloves and protective clothing should be worn when working with yellow flag iris. Care should be taken to remove all rhizomes, as re-growth will occur from missed rhizomes. An aquatic approved herbicide could also be used to control yellow flag iris, but an aquatic nuisance species permit from the Department of the Environment, Great Lakes, and Energy (EGLE) is required for application of pesticides to/over water.
  - c. Only a few stems of glossy buckthorn were found, along the boardwalk on the north side of the river. These can be manually removed using a weed wrench (available for check out at Boyne City Library) or work with CAKE CISMA to apply chemical treatments (e.g. cut-stump application).



*Figure 3: Invasive species yellow flag iris (left) and glossy buckthorn (right) found in the Elk River corridor*



2. Work with the CAKE CISMA or a private contractor to control Oriental bittersweet. This species is a high priority for control in our region as it is not believed to be widespread yet. However, it is somewhat common in parts of the river corridor and will thus take more resources to control. It is most effective to use herbicides in the control of Oriental bittersweet, so partnering with CAKE or finding a contractor experienced in bittersweet control is recommended.



*Figure 4: Invasive species Oriental bittersweet*

3. If resources allow, consider removing Morrow's and Tartarian honeysuckles, autumn olive, and other invasive species (but not cattails). Planting native species (e.g. red osier dogwood, meadowsweet, native willow species, Canada anemone, blue flag iris, rushes, sedges, etc.) after control treatments will reduce the chance of invasive species re-invading the site. Choose one of two sites to begin the process, either rotary park or the peninsula of land on which the library is located. It is better to complete one site than do an incomplete job on both. If Rotary Park, any replanting could be done in conjunction with expanding the greenbelt there. Greenbelt at library is already at least 50 feet wide in most places and is not a priority for expansion compared to other areas.
4. Patches of invasive cattails were found along the shoreline at Rotary Park and on the south side of the pond between Cedar Street and Dexter. While invasive cattails readily form dense stands that eliminate other plants, they also provide habitat for wildlife, including beavers, muskrats, geese, ducks, and red-winged blackbirds. They are also widespread in northern Michigan and notoriously difficult to get rid of. As such, the invasive cattails should be monitored every 2-3 years to see if the patches are continuing to expand and displacing native plant species. If so, consider working with the CAKE CISMA to implement appropriate control treatments, which should begin with the smaller, outlying patches.
5. All sites where invasive species control occurs should be monitored a few weeks after treatment, and annually for a 3-5 years thereafter to ensure long-term effectiveness of the control treatment and to make sure native plants get re-established.

## Greenbelts and Streambank Armoring

### Results:

Streambank armoring includes any structures humans place on the streambank to protect the bank from the river's erosive forces. Common examples include seawalls and riprap. While these structures can be useful in preventing erosion, they also reduce habitat connections for animals that move between

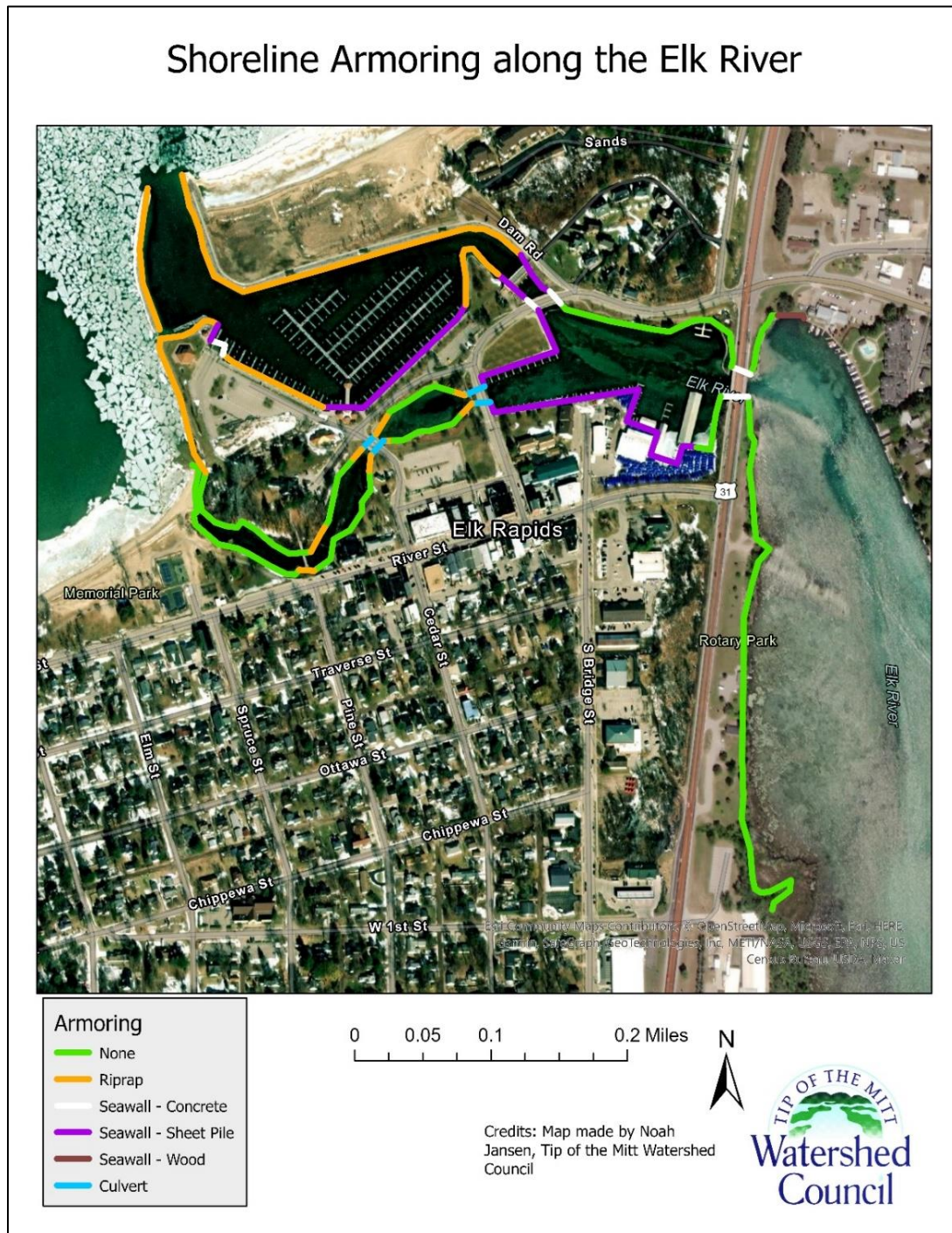


Figure 5: Natural and armored streambanks along the Elk River



aquatic and terrestrial habitats, particularly reptiles and amphibians. It can be difficult or impossible for frogs, toads, and turtles to get onto land to bask if seawalls and large bolder riprap border the water. Riprap can slow turtles pursued by predators as they attempt to escape into the water, making them more vulnerable to predation. Thus, areas of unarmored shore are important habitat for wildlife.

Currently, 55% of the 14,611 linear feet of streambank surveyed are armored with riprap, seawalls, or both (Table 2, Figure 3).

*Table 2: Streambank armoring along the Elk River corridor in 2022*

<b>Armor Type</b>	<b>Linear Feet</b>
None	6571
All Armor Types	8040
Culvert	314
Riprap	3935
Seawalls (All Types)	3352
Concrete	407
Sheet Pile	2836
Wood	110
Seawall + Riprap	439

In contrast to an armored streambank, natural streambanks are characterized by healthy greenbelts. A greenbelt is a strip of native vegetation bordering the river. Greenbelts create a buffer between the river and developed areas. They slow water running off the land, reducing gully formation and absorbing pollutants and excess nutrients before they reach the water. The roots of native plants also stabilize the river bank, preventing erosion.

The Watershed Council generally promotes a greenbelt width of at least 50 feet, as measured perpendicular to the water's edge. There are only a few places along the river corridor where this recommendation is met, including the north side of the south branch (behind the library) and between the beach and the river on the north side of the north branch. However, a narrower greenbelt still provides some water quality benefits. Narrower greenbelts are found in several locations, as shown in Figure 4.

### *Recommendations:*

#### Streambank Armoring

1. Avoid siting future structures and infrastructure within 50 feet of the water, where some level of erosion can be expected to occur, even under natural conditions. While some armoring is necessary to protect current infrastructure, future additional armoring should be avoided to preserve wildlife habitat. One way to do this is to avoid building close to the water, so there is no infrastructure in need of protection and armoring the streambank is not necessary.

## Greenbelts along the Elk River



Legend  
 Existing Greenbelts  
 Priorities for Greenbelt Creation/Enhancement

0 0.05 0.1 0.2 Miles



Credits: Map made by Noah Jansen, Tip of the Mitt Watershed Council



Figure 6: Greenbelts bordering the Elk River. Existing greenbelts are outlined in green. Existing greenbelts which are priorities for expansion or enhancement are shown in purple, while priority areas for greenbelt creation are shown in blue.



2. When existing armoring needs to be repaired or replaced, assess alternatives, such as restoring a more natural shoreline or using smaller, cobble-sized riprap. Although existing seawalls and riprap appeared to be in good condition, eventually they will need to be repaired or replaced. When that time comes, the Watershed Council can provide no cost consultations on alternatives and can design plans as a contract service.

### Greenbelts

1. Expand and/or enhance greenbelts in priority areas by planting native plants or establishing no-mow zones, allowing native plants to recolonize areas that are currently mowed. If greenbelt cannot be widened to the full 50 feet, expanding the greenbelts as much as practicable will still provide some benefits. Priority areas are shown in the map (below) in purple, and include:
  - a. On the south side of south branch of the river, both east and west of the south end of footbridge, enhance and widen greenbelts with added native plants.
  - b. On steep banks south of Harbor Drive, between Dexter and Cedar Streets, especially, which would benefit from deep-rooted native plants to increase stability.
  - c. Rotary Park
  - d. Along the north side of the river between US-31 and the dam
  - e. Expand the west end of the greenbelt on the south side of the south branch between Dexter and Cedar Streets
2. Monitor enhanced/expanded greenbelts for invasive species and remove as necessary.

## Erosion and Bare Soil Susceptible to Future Erosion

### *Results and Recommendations:*

Erosion and places with bare soil (susceptible to erosion) were found at several points along the Elk River corridor, as shown in Figure 7.

- Point 1 (Figure 8): On the south side of the south branch, west of the south end of footbridge – erosion at the base of the streambank
  - Enhance with riparian native shrubs, such as *Cephalothins occidentalis* (buttonbush), *Cornus amomum* (silky dogwood), *Cornus sericea* (red-osier dogwood), *Salix amygdaloides* (peach-leaf willow), *Salix bebbiana* (Bebb's willow), *Salix discolor* (pussy willow), *Salix exigua* (sandbar willow), *Salix eriocephala* (heart-leaved willow), *S. sericea* (silky willow), *Viburnum trilobum* (American highbush cranberry), and *Viburnum prunifolium* (black-haw).



*Point 1: Eroding bank along south side of the south branch of the Elk River, near the footbridge*

## Priority Areas for Enhancement Planting and Restoration within the Elk River Corridor



### Legend

▲ Elk River Corridor points



0 0.05 0.1 0.19 Miles

Credits: Map made by Noah Jansen, Tip of the Mitt Watershed Council



Figure 7: Priority areas for restoration and enhancement plantings along the Elk River corridor. The description of each numbered point and its recommendations can be found in the text.



- Points 2a & 2b: Steep banks south of Harbor Drive, between Dexter and Cedar Streets – Only minor erosion was present, but turfgrass roots are not particularly good at stabilizing steep banks, so these slopes could fail in the near future. Mowing turfgrass in these steep areas is probably an unpleasant and potentially dangerous task anyway.
  - Replace turfgrasses with native plants such as *Rhus aromatica* (fragrant sumac), *Juniperus communis* (common juniper), and *Schizachyrium scoparium* (little bluestem). The native shrubs described under Point 1 can be used closer to the water.



*Points 2a and 2b have steep banks with high potential for future failures due to the poor stabilizing abilities of turfgrass*

- Point 2c: Greenbelt dwindles away on west end as it approaches Cedar Street
  - Expand the west end of the greenbelt with a no-mow zone 20-50 feet wide.



*At Point 2c, the greenbelt dwindles away as it approaches Cedar Street (on the left). This image was taken from the north side, facing south.*

- Point 2d: Minor erosion along the bank which is currently stabilized with riprap and geotextile.
  - Adding native plants, such as those described under Point 1, would offer a more resilient and self-repairing approach to preventing erosion. Existing riprap and geotextile can be left in place to avoid disturbing the bank.



*Point 2d: Minor erosion and bare soil along the bank on the west side of the Cedar Street bridge*



*Point 3: The rain garden southwest of the dam could be an eye-catching and functional example of nature-based stormwater management if it was better maintained.*



- Point 3: The rain garden in the corner of the parking lot to the southwest of the dam needs to be maintained to function as intended, and it also looks unattractive. In its current state, it is not going to encourage the public to desire more installations of pollutant-removing nature-based stormwater solutions.
  - The accumulated sediment and organic material that has collected in the stone fore-basin of rain garden should be removed.
  - Additional native plants should be planted, in both the basis of the raingarden and on its sloping sides.
  - Edging can be installed around the edges to create a line of separation between the rain garden and the adjacent turf. This will also keep turfgrasses from invading the rain garden.
- Point 4a: Bare soil northeast footing of the US-31 bridge
  - Add native plants to cover bare soil, such as *Rhus aromatica* (fragrant sumac), *Juniperus communis* (common juniper), and *Schizachyrium scoparium* (little bluestem). The native shrubs described under 1a can be used closer to the water.
- Point 4b: Eroding foot path at northwest footing of US-31 bridge
  - Install steps or block access with fences or with plantings of *Rubus allegheniensis* (blackberry) or other species that will deter people from using this as a river access point.



Figure 7: Points 4b (left) and 4a (right), showing bare soil and eroding path.

- Point 5: Thinly vegetated soil at southeast corner of Dexter St bridge east of the dam
  - Install steps or block access as described under 4b, above.
  - Widen greenbelt from bridge to east with a no-mow zone or by planting native plants



*Figure 8: Point 5 - Thinly vegetated soil at southeast corner of Dexter St bridge east of the dam*

- Point 6: Eroding beach access area along edge of woods west of the library, near the south corner of the marina parking lot
  - Install steps to channel traffic to a designated access point or points, allowing the vegetation in other areas to recover



*Point 6: The edge of the beach along the woods is eroding due to foot traffic*



- Point 7: Most of the Rotary Park shoreline has a very narrow greenbelt, often only 5-10 feet.
  - Widen the greenbelt at Rotary Park by marking out a no-mow zone and/or by doing plantings of native plants. Monitor for and remove invasive plants that attempt to establish themselves in the expanded greenbelt.
- Point 8: Monitor bare soil on steep slope in woods south of library
  - Check back every five years and add native plants if needed to stabilize the slope.



*Point 7 (left): Narrow greenbelts at Rotary Park could be widened to improve their ability to protect water quality and provide wildlife habitat. At right, Point 8: Bare soil on a steep slope in woods near the library should be monitored for signs of erosion.*

## Stormwater Outfalls and Other Pipes Draining into the Elk River

### *Results and Recommendations:*

We didn't observe any erosion problems at present where stormwater outfalls or other pipes empty into the Elk River, but they should be monitored for problems in the future (approximately every 10 years) or after changes to infrastructure that could affect how they function.

## Guidelines for Landscaping and Beautification in the River Corridor

Elk Rapids has an active gardening community that takes pride in the town and thrives on beautifying its public spaces. This is a tremendous asset for the community. However, landscaping and gardening within the river corridor can have negative impacts on water quality and wildlife habitat if not done correctly. The following are general recommendations for landscaping and beautification projects in the Elk River Corridor:

1. Maintain and improve existing landscaping before beginning entirely new projects. Two sites in particular come to mind:
  - **The rain garden** southwest of the dam could be an eye-catching and functional example of nature-based stormwater management if it was better maintained. See recommendations under Point 3, above.
  - **The butterfly garden** near the intersection of Dexter and Bayshore Dr could use some weeding, as it has many weeds and invasive species present. These include spotted knapweed, Oriental bittersweet, and sweet clover. Additional plantings of desired plants will help cover the open ground created by removing the weeds.
2. When possible, make plantings both beautiful and functional by designing to enhance greenbelts, increase stormwater infiltration (rain gardens, for example), and reduce erosion. Prioritizing the areas listed under the section of this report addressing *Erosion and Bare Soil* would be a good place to start.
3. Promote less mowing to edge of the water to enhance greenbelts or create new ones. Prioritize new projects that will replace turfgrass and leave native vegetation intact.
4. Avoid further shoreline armoring (55% of the riparian shoreline surveyed is already armored).
5. Avoid major alterations to slopes or hydrology (water flow). When soils are disturbed on slopes, use biodegradable erosion control blankets to stabilize soils until plants are well-established.
6. Prioritize the use native plants. Native plants are adapted to our climate and have communities of native pollinators and other wildlife that depend on them. If the native plants are chosen to match site conditions, native plants often require less fertilizer and watering than the exotic species commonly used in horticulture. This does not mean that no non-native species can be planted, but the use of natives should be considered first. The Michigan Natural Shoreline Partnership has lists of native plants adapted to different zones along shorelines, and most of these will also work along the Elk River <https://www.shorelinepartnership.org/plants-for-inland-lakes.html>. Suppliers of native plants are also found on this webpage. The Watershed Council can also offer site-specific guidance on selection of native plants. We would also be happy to do an educational presentation on landscaping with native plants for the garden clubs.
7. Budget for maintenance of new and existing plantings to keep them looking good and ensure their longevity. The following maintenance activities can be expected.
  - After planting, apply 1-2 inches of mulch for 2-5 years until plants are established and fill the site. Mulch helps maintain soil moisture, and it reduces germination of weed seeds.
  - If possible, water newly planted plants often during first year or two as plants get established. Shoot for 0.5-1 inch of water per week, including rainfall. In subsequent years, properly selected native plants will need supplemental water less often, likely only during times of drought to keep them looking good.



- Weeding once or twice a month. More often during first 2-3 years as plants get established and less often after that. Weeding will also help ensure that plantings don't become new homes for invasive species.
- Deadheading can be done for aesthetic purposes, but consider leaving seed heads of native grasses and aster family species (black-eyed Susans, coneflowers, sunflowers, etc.) over winter as food for birds.
- Cut down and remove dead stalks of non-woody perennials in autumn after a killing frost or wait until the following spring
- Pruning, as desired to maintain size and shape of trees and shrubs or to promote a healthy structure in trees
- From time to time, plan to replace plants that die. This is often overlooked as something to budget for, but it is an important part of maintenance, especially in the early years after planting when plants are not well-established and at higher risk.