Final Report: Streets & Streams – Where They Meet

Road-stream crossings can adversely affect water quality and biological communities. These intersections can contribute to large amounts of road run-off and sediment entering the stream. Perched culverts or undersized culverts can act as a barrier to the migration of fish and other organisms. Poorly designed and/or failing culverts alter essential stream processes such as flow and sediment transport; and ultimately impact the water quality, fish and other biological communities. Historically, road/stream crossings have received little attention for ecological impairment inventories in the Clinton River watershed. While information on major road crossings may be available through road agencies/local governments, there exists a lack of information on smaller streams/tributaries. These streams play a critical role for providing additional energy and habitat resources and contribute to a 'healthy'-connected ecosystem.

For this project, the Clinton River Watershed Council (CRWC) evaluated existing habitat impairments caused by road crossings through a comprehensive volunteer-based inventory. The surveys looked at impacts to fish passage and helped to inventory stream impairments (e.g. erosion). The Clinton River Watershed Council trained volunteers and interns to survey road crossings within the watershed using the standardized methods from the "Great Lakes Road Stream Crossing Inventory Instructions". The project helped to build a volunteer-based program that will allow for the expansion of past inventories into rural areas that have not yet been surveyed and furthermore, foster natural resource stewardship and protection. Overall, this project builds on CRWC's mission to protect, enhance and celebrate the Clinton River watershed.

The specific goals of the project included the following:

- Build a volunteer based program to collect needed data and foster natural resource stewardship and protection.
- Fill data gaps within the watershed related to road crossings and ecological impairments.
- Begin a prioritized list of potential restoration sites and increase communication with Road Commission to combine / leverage future efforts.

To achieve these goals, this project included the following objectives/tasks:

1. Recruit volunteers to complete Road Stream Crossing surveys
2. Train staff and volunteers on standardized methods from the "Great Lakes Road Stream Crossing Inventory Instructions"
3. Purchase needed equipment to perform surveys correctly, safely, and efficiently.
4. Complete 50 – 75 road/stream crossings within the Stony Creek and Upper Clinton Subwatersheds (Figure 1).
5. Identify and prioritize sites based on their need for restoration, further monitoring, and current conditions.
6. Communicate and share results and priority list with Road Commission and partners to identify shared sites of interest that need future attention.

All objectives were completed during the grant period. Waders, hand levels, stadia rods, folding rulers, and GPS units were purchased to allow for 2 to 3 teams to be equipped out in the field throughout the 2016 season. Volunteers were recruited through communication with existing volunteer base, emails, website postings, and social media. A total of two trainings were offered by CRWC trained staff and 12 people attended these trainings including 5 volunteers, 6 CRWC

interns, and 1 road commission staff member. The four hour long training included a presentation on the project and a field portion visiting multiple road stream crossing sites. Throughout the survey season, a total of 9 Volunteers participated and were broken up into two survey teams. A third survey team was made up of CRWC interns. Volunteer teams had one designated team leader that had taken the training and was responsible for equipment, data, and team coordination.

Site selection consisted of a tiered approach first utilizing available aerial/GIS imagery to identify potentially impacted sites with consideration of longitudinal placement within the stream. A master list was then created consisting of general characteristics and descriptions. A map of all road stream crossing sites in both the Upper Clinton and Stony Creek subwatershed was created in ArcMap and sites were broken up in to clusters to be assigned to teams. Assigned sites started on the downstream portion of each subwatershed. Throughout the grant period a total of 77 sites were surveyed and completed; 58 from the Upper Clinton and 19 from the Stony Creek subwatershed (Figure 2). Additional sites were attempted but were not completed due to safety concerns or they were unable to be located. Each volunteer team went out on at least 3 different occasions on their own time. The team made up of interns were able to survey more often and complete a larger portion of the inventoried sites. Throughout the season, staff accompanied teams at least once out in the field as a form of quality assurance. In addition, data was entered as it was collected and staff checked in coming data for issues. Challenges included safety concerns stemming from major roads and traffic, as well as teams having difficulties identifying riffle / bank-full characteristics.

Once data was collected, it was entered into the road stream crossing database provided by Patrick Ertel, with the MDNR. A spreadsheet was created with a list of sites classified as “Good”, “Needs Further Monitoring”, and “Priority”. Overall, 58 sites (75%) were classified as “Good”, and do not need any further attention. These sites were observed to have culverts or bridges in good condition that did not have any issues regarding erosion or fish passage. Of the surveyed sites, 14 (18%) were classified as needing further monitoring. These sites had some questionable characteristics or some type of issue observed (rusted, moderate erosion, high levels of invasives effecting flow, etc.). A total of five sites (7%) were classified as a “Priority” site. These road stream crossings, either had severe erosion and/or act as a barrier to fish passage. These sites need some type of attention and follow-up. Maps of road stream crossings and their conditions can be seen in Figure 3 and 4. Additionally, Table 1 shows all the sites that were classified as a priority or needing further monitoring. Attached is a summary sheets for each priority site.

This list is currently being shared with the Road Commission of Oakland County and CRWC continues to work with them to identify future projects and combine efforts where possible. These conversations will continue as sites are inventoried and more data is collected.

Road stream crossing surveys will continue into 2017. CRWC will complete both the Stony and Upper Clinton Subwatersheds and eventually all subwatersheds within the Clinton River watershed. This program is fairly self-sustainable being that it is volunteer-based and CRWC has all the needed equipment at this time. As the program expands and continues, any future funding or support needed will be pursued by CRWC through partnering organizations such as Trout Unlimited, Michigan Fly-fishing club, MiCorp, and others. Overall, this project is a great addition to our other volunteer programs, such as *Adopt-A-Stream* and the *Clinton River*

Coldwater Conservation Project, ultimately contributing towards increasing citizen science and stewardship while collecting environmental data.

Upon completion of the project, "Streets and Streams – Where They Meet", CRWC has determined this program to be successful in collecting preliminary data and identifying sites for further evaluation, as intended. Additionally, training and volunteer recruitment was a success. Feedback from volunteers was positive and many show interest in continuing with the program.

After further evaluation of the collected data, CRWC has identified the need for increased follow-up and training throughout the field season to ensure that volunteer feel comfortable with all components of the data collection. This will allow for more data and more accurate data.

Below are some highlights of accomplishments and results from this project:

1. 2 trainings held for 12 participants (5 volunteers, 6 Interns, 1 Road Commission Staff)
2. 9 Volunteers (2 teams) – 154.5 volunteer hours total
3. 58 sites in Upper Clinton Subwatershed monitored and surveyed
4. 19 sites in the Stony Creek Subwatershed monitored and surveyed
5. 58 total sites classified as "Good"
6. 14 total sites classified as "Needing Further Monitoring"
7. 5 total Sites classified as "Priority" for future attention

This project identified multiple areas that need future attention and possible restoration in efforts to protect water quality, fish and wildlife habitat, and improve continuity throughout our streams. In addition, this project has provided education to partnering organizations (Road Commission), volunteers, and residents on the potential issues with road stream crossings and how they can take an active role in helping to conserve and protect their watershed. Results benefit CRWC's management goals and will assist agencies such as the Michigan Department of Natural Resources (MDNR), Michigan Department of Environmental Quality (MDEQ), local road agencies and the Michigan Department of Transportation (MDOT) with identifying priority areas for ecological restoration and road/infrastructure improvements. Project results will aid progress towards the removal of the "Degraded Fish and Wildlife Populations", "Loss of Fish and Wildlife Habitat" and "Degradation of Benthos" Beneficial Use Impairments (BUI) for the Clinton River Area Of Concern.

Figure 1. Clinton River Watershed Road Stream Crossing Project

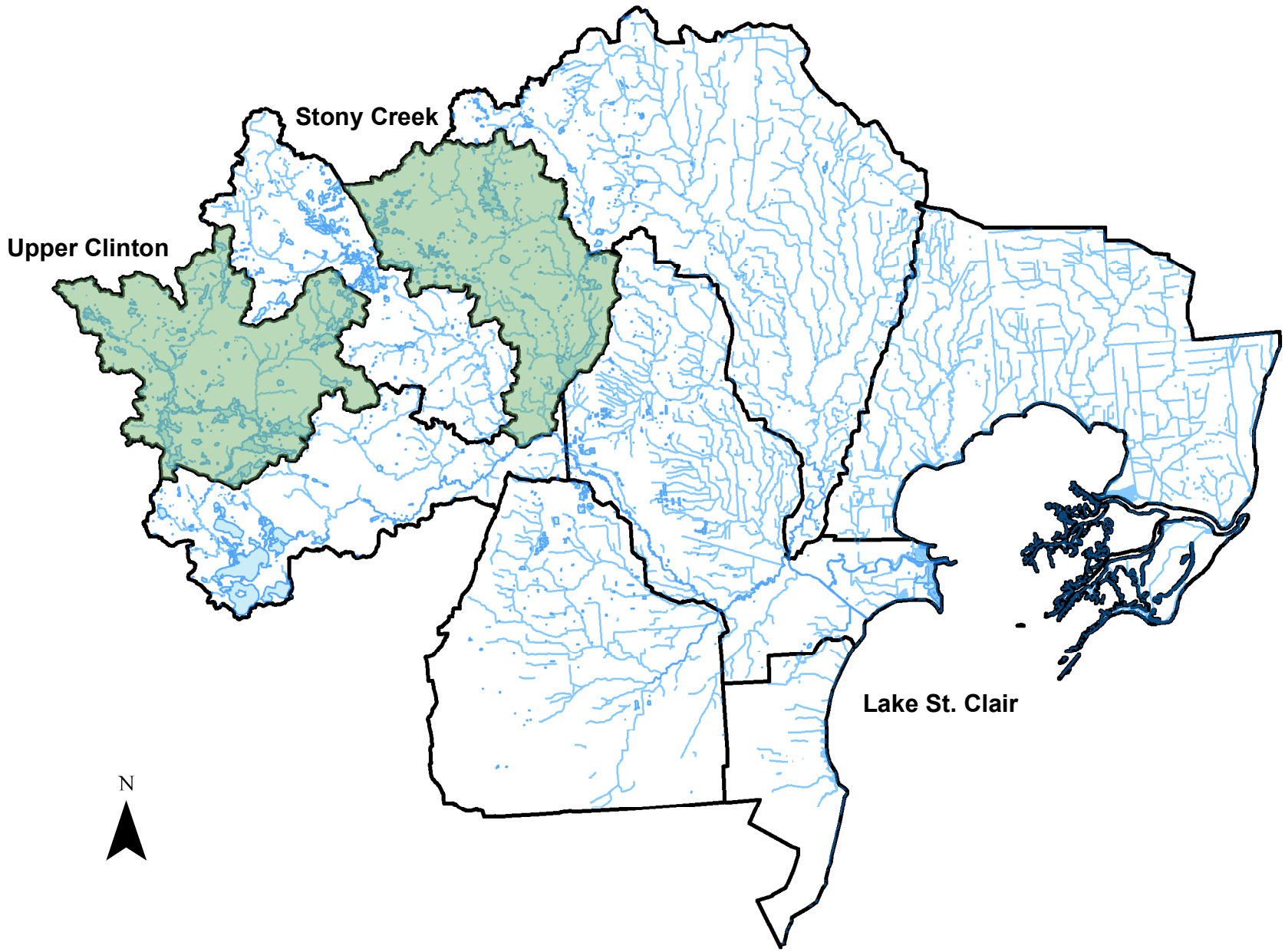

Figure 2. Road Stream Crossing Sites by Subwatershed

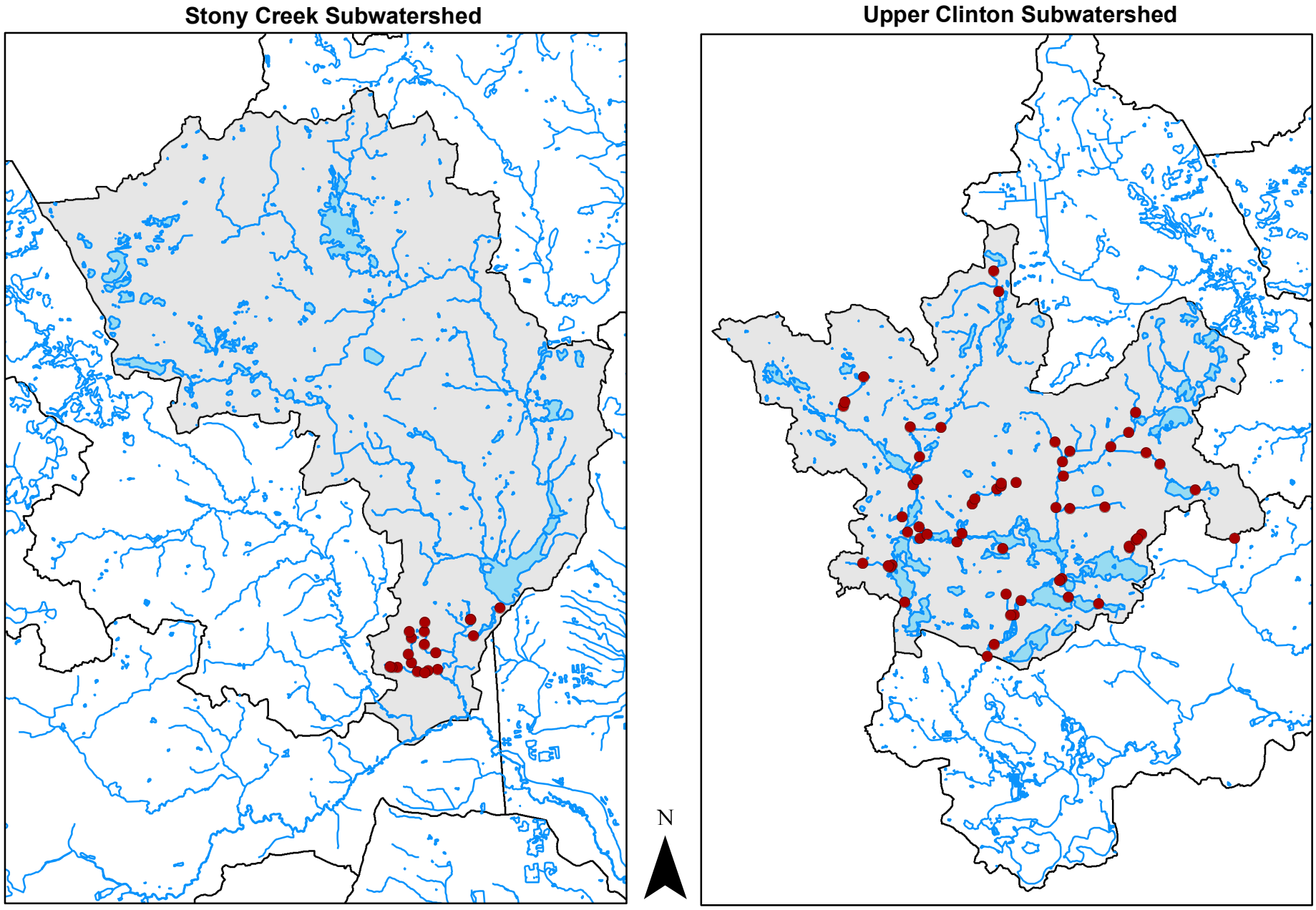

Figure 3. Upper Clinton Subwatershed Road Stream Crossing Sites

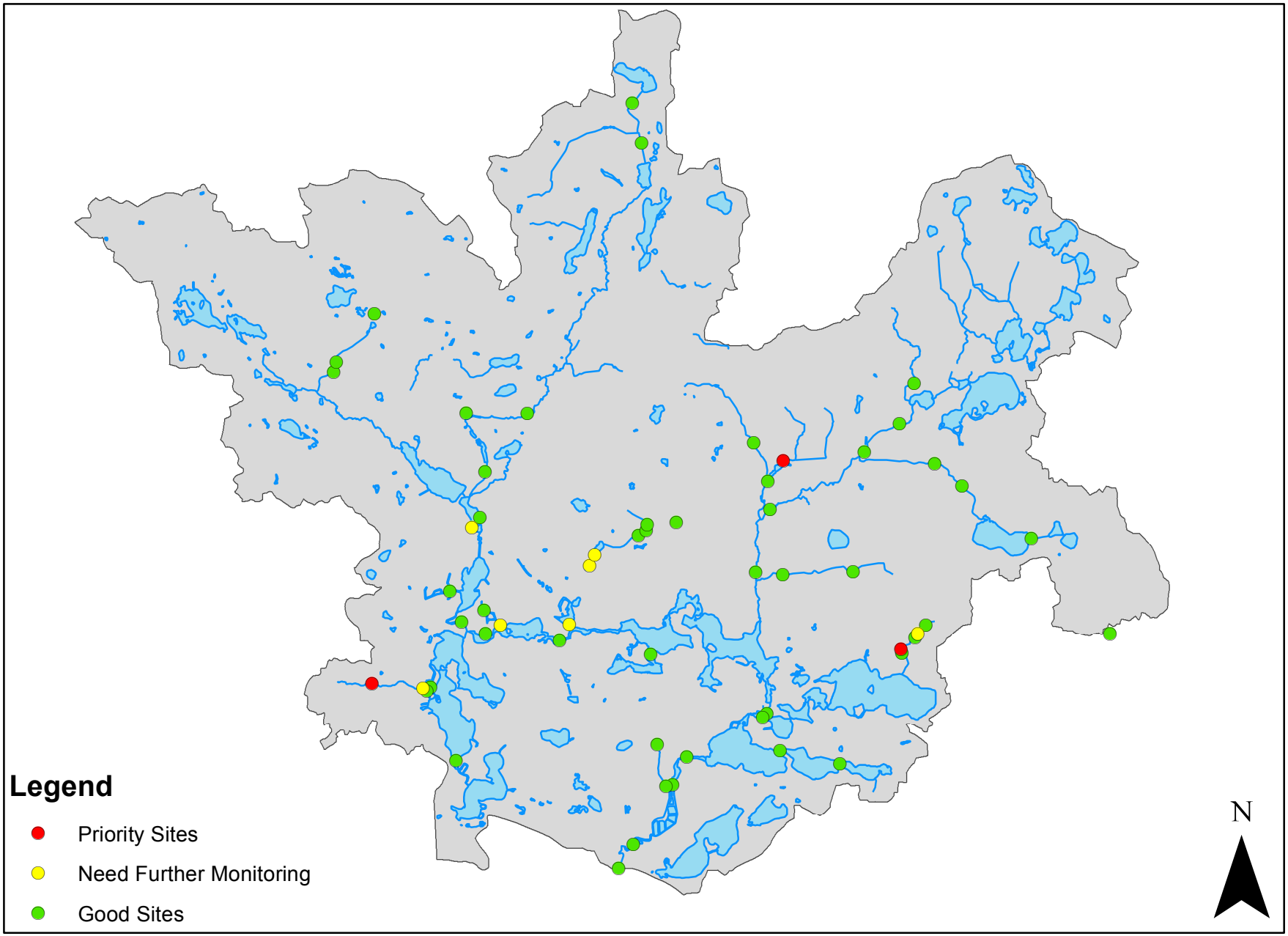

Figure 4. Stony Creek Subwatershed Road Stream Crossing Sites

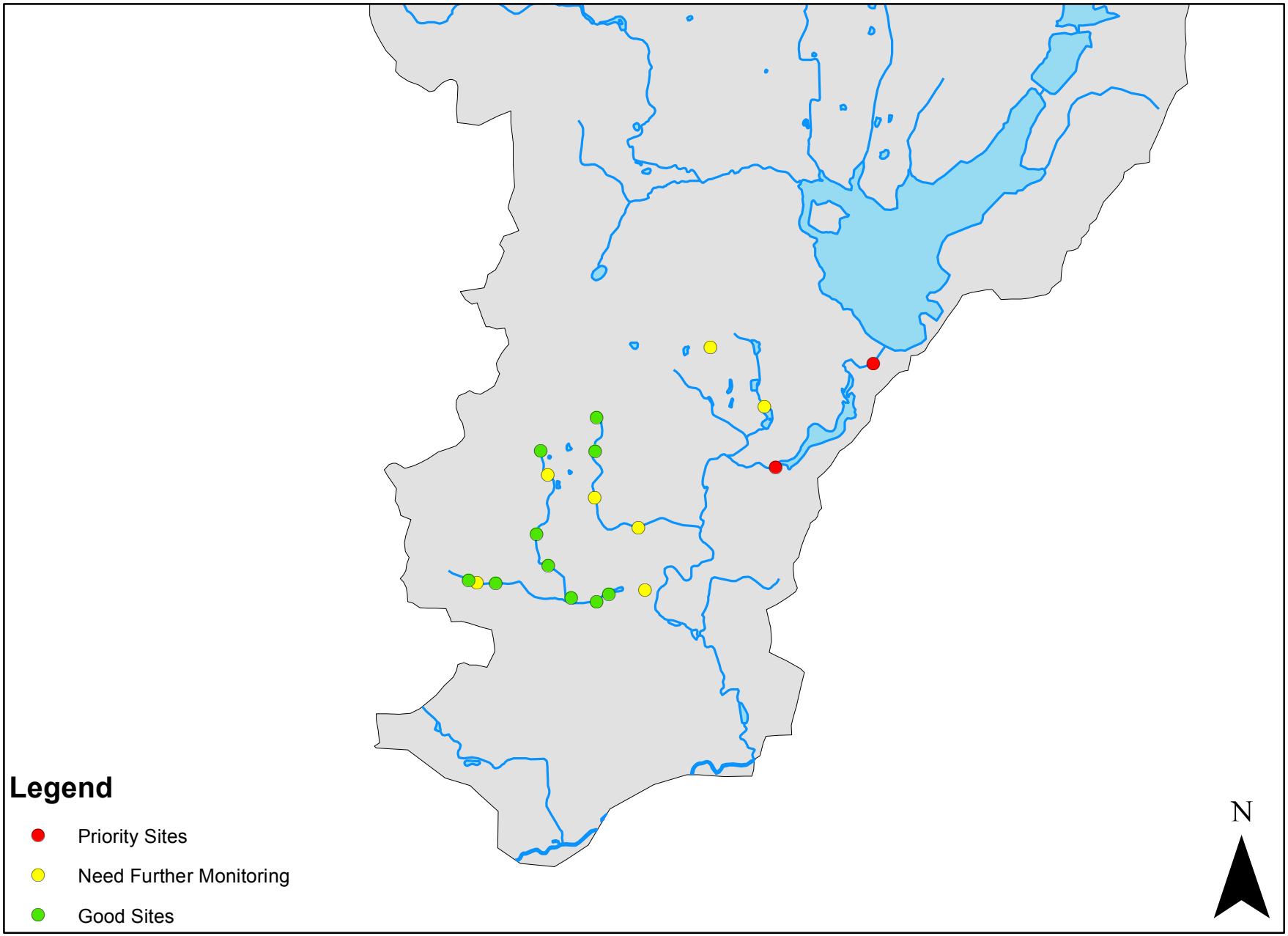

Table 1. Sites that Need Further Monitoring and Are a Priority for Future Restoration

Site_ID	Subwatershed	Stream Name	Road_Name	GPS_Lat	GPS_Long	Crossing_Type	CRWC Status	Notes/Issues
CR 17	Upper Clinton	Clinton River	Pinehurst Ct	42.7241	-83.42438	Bridge	Needs Further Monitoring	Poor Condition
CRSCUT 6	**Upper Clinton**	**Sashabaw Creek Unknown Trib**	**Waldon Rd**	**42.7346**	**-83.345805**	**culvert(s)**	**Priority**	**Poor Condition, Severe erosion, crushed**
CRUT 12	Upper Clinton	Clinton River Unknown Trib	Waterford Rd	42.70561	-83.400694	culvert(s)	Needs Further Monitoring	Slightly Rusted Through
CRUT 13	Upper Clinton	Clinton River Unknown Trib	Chanto Dr	42.71639	-83.39519	culvert(s)	Needs Further Monitoring	Poor Condition
CRUT 14	Upper Clinton	Clinton River Unknown Trib	Maybee Rd	42.71830	-83.393805	culvert(s)	Needs Further Monitoring	Slightly Perched
CRUT 18	Upper Clinton	Clinton River Unknown Trib	Curtis Ln	42.70588	-83.418	culvert(s)	Needs Further Monitoring	
CRUT 22	Upper Clinton	Clinton River Unknown Trib	Maiden St	42.69469	-83.437888	culvert(s)	Needs Further Monitoring	Needs to be resurveyed for outlet
CRUT 24	**Upper Clinton**	**Clinton River Unknown Trib**	**Cross Rd**	**42.69581**	**-83.45061**	**culvert(s)**	**Priority**	**rusted, erosion, high quality area**
CRUT 4	**Upper Clinton**	**Clinton River Unknown Trib**	**N. Lake Angelus Rd**	**42.69911**	**-83.31781**	**culvert(s)**	**Priority**	
CRUT 9	Upper Clinton	Clinton River Unknown Trib	Amberwood St	42.70181	-83.3135	culvert(s)	Needs Further Monitoring	Deposition
SCDS 1	Stony Creek	Stony Creek	Mead Road	42.7122	-83.104	culvert(s)	Needs Further Monitoring	currently under water
SCDS 14	Stony Creek	Stony Creek	Little Creek	42.7072	-83.1283	culvert(s)	Needs Further Monitoring	Need more information
SCDS 18	Stony Creek	Stony Creek	Old Orion Ct	42.6986	-83.1366	culvert(s)	Needs Further Monitoring	Need more information
SCDS 2	Stony Creek	Stony Creek	winkler mill road	42.7121	-83.1098	culvert(s)	Needs Further Monitoring	Slightly perched
SCDS 3	Stony Creek	Stony Creek	clear creek dr	42.70261	-83.1185	culvert(s)	Needs Further Monitoring	Invasives control
SCDS 4	Stony Creek	Stony Creek	clear creek dr			culvert(s)	Needs Further Monitoring	Invasives control
SCDS 9	Stony Creek	Stony Creek	Clear Creek	42.6975	-83.118	culvert(s)	Needs Further Monitoring	Needs more information
SCM 11	**Stony Creek**	**Stony Creek**	**Mt. Vernon**	**42.7154**	**-83.0918**	**Bridge**	**Priority**	**Crossing being Redone**
SCM 12	**Stony Creek**	**Stony Creek Trib**	**Mead**	**42.7122**	**-83.104**	**Bridge**	**Priority**	**Severe Erosion**