Jemseg Grand Lake Watershed Association
Final Report of the N.B. Environmental Trust Fund Project 220363

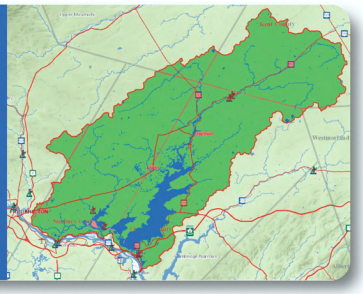
Riparian Zone Tree Planting in the Jemseg Grand Lake Watershed

by
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Jemseg Grand Lake Watershed Association



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Jemseg Grand Lake Watershed Association

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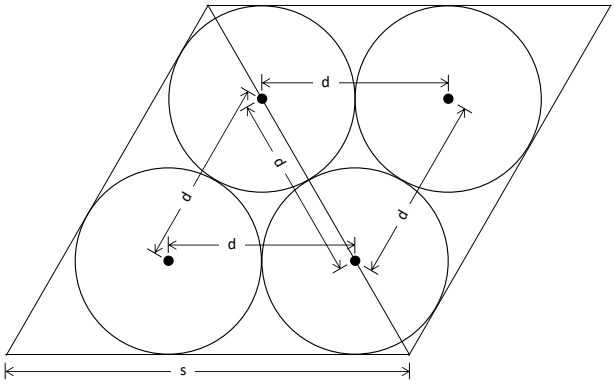
Executive Summary

Heavy wave action can quickly erode shorelines and riparian zones. Grand Lake is unique as the largest freshwater lake in the Maritimes, covering 171 square km, and its size gives rise to significant erosion caused by wave action. Establishing red-tip willows and other water-loving native plant species with strong root systems is an ideal way to help protect a shoreline from erosion. Restoring such vegetation helps protect properties from the destruction caused by flooding, strong currents, wave action and heavy rains, which is a concern to many residents and property owners.

A stable landscape and increased vegetation also contribute directly to the maintenance of a healthy watershed ecosystem. In addition, a green shoreline helps maintain water quality, moderate temperatures, and creates a habitat for wildlife.

In 2022 the Jemseg Grand Lake Watershed Association was able to deliver approximately 1,014 red-tip willows (*Salix eriocephala*) to 27 Association members for planting in riparian zones with the assistance of our part-time project coordinator and two University of New Brunswick Master of Environmental Management students. Efforts engaged approximately 54 individuals in this environmental education/awareness initiative for a total estimated 648 hours, covering activities such as learning about erosion and its various causes, effects and solutions, becoming part of the active response by planting red-tip willows in a riparian zone, as well as engaging in follow up care and monitoring.

Based on 1,014 red-tip willows planted, our efforts had the potential to restore approximately 0.1 ha (0.25 acres) at a plant spacing of 1 m on centre planted in a triangular pattern as shown in the figure to the right.



To understand if the restoration potential was fulfilled, we analyzed the results of responses from surveys sent out to Association members and site visits to 28 planting sites. Approximately 51% of the red-tip willows from both 2021 and 2022 survived until Oct. 8, 2022. For willows planted in 2022 only, there was an overall survival rate of 63%. At a 63% survival rate, the restoration potential is approximately 0.064 ha (0.16 acres) per 1,000 planted red-tip willows.

1. Project Description

The Riparian Zone Tree Planting project for 2022 built upon efforts conducted in 2020 and 2021. In 2022 we incorporated lessons learned regarding labelling and the need to protect the willow transplants from full sun. As well, due to the concurrent situation of no longer being able to access Irving Woodlands Ltd. Sussex greenhouse, our methods were adapted in 2022.

The main change was instead of distributing the majority of willows as rooted cuttings as we did in 2021, we distributed the majority of the red-tip willows as live stakes. We did however, also distribute a small amount of willows in six packs of rooted cuttings transplants at various outreach events throughout the spring and summer of 2022.

1.1 Project Timeline

a. From January to May 2022, it was advertised in the Association Newsletters that bags of 50 dormant red-tip willow live stakes were available for planting on member's properties to help with erosion protection.

b. In February 2022, Mike Thorne harvested 2,000 red-tip willow stakes, and stored them in his refrigerator in plastic zip-lock bags to keep them dormant.

c. On April 22, 2022, a WAWA permit application was submitted that would cover all Association members who received red-tip willows to plant on their properties.

d. On May 12, 2022, the WAWA permit 63190'22 (Appendix A) was received which permitted the members of the Association to plant red-tip willows on their properties using hand tools.

e. From May 7th to June 7th 2022, Mike Thorne and Brad Nickerson distributed live-stake willows to members to plant on their properties, along with a bag of potting soil, a bag of manure and a few purple topped stakes to mark the planting location. The purple topped stakes were marked with the year 2022, and the name of the plant, so that they would be easily identified for future site visits.

f. On May 5th, 2022, the Association attended the breakfast event at the Jemseg Lions Club. At this outreach event, Brad Nickerson and Mike Kelly gave out three bags of 50 like stakes to members of the Association. All recipients of the live stakes received a copy of WAWA permit 63190'22, along with planting instructions for the live stakes (Appendix B).

g. On June 17th, 2022, Brad Nickerson picked up 3 additional bags of red-tipped willows from Mike Thorne. He trimmed the ends of all 150 live stakes and added water to the three bags of 50 live stakes each.

h. On June 19th, 2022, Brad Nickerson, Kim Reeder, Aditi Kadam, and Patrick Oke travelled to Robertson Point where they planted 150 red-tip willow live stakes on the leased properties of the owner Elizabeth Kwiecien, with her permission and participation. The willows were planted in three locations, 100 on the back beach, and 25 each on two bare beaches of properties along the front beach.

i. On June 24th, Brad Nickerson picked up 17 six-pack trays of live stakes from Mike Thorne's property in Wiggins Point for distribution to a new member at Fanjoy's Point and to be able to give out on June 25, 2022, at the Association's outreach event at the Douglas Harbour community centre breakfast.

j. On June 25th, 2022, the Association was represented by Brad Nickerson, Mike Kelly, Aditi Kadam, and Patrick Oke at the community outreach event at the Douglas Harbour Community Centre. A table was set up outside the centre for their morning community breakfast. At the event, six six-pack trays of red-tip willows were given out to Association members. Members were also provided with a copy of WAWA permit 63190'22, as well as the Association's planting instructions for rooted cuttings.

k. On August 6th, 2022, the Life at the Lakes event at the Pines Conservation Park in Cambridge-Narrows was attended by Brad Nickerson, Kim Reeder, Aditi Kadam, Patrick Oke, Mike Kelly, Joy Thomas, Tom McAvity and Jennifer McPhail on behalf of the Association. A booth was set up where representatives of the Association engaged dozens of visitors and spoke to them about the Greening your shoreline initiative. Copies of the rooting cuttings planting instructions as well as a WAWA permit were given to two members who joined the Association, and each took a six-pack of red tip willow transplants.

l. On August 20th, 2022, Brad Nickerson, Aditi Kadam, and Patrick Oke attended the Douglas Harbour Community centre breakfast event on behalf of the Association. A booth was setup outside the exit where they talked to the public about the Association and the greening your

shoreline program. They gave out three six-packs of red-tip willow rooted cuttings, along with the planting instructions and the WAWA permit.

m. During September and early October, all Association members who had planted red-tip willows on their properties in either 2021 or 2022 were contacted by e-mail by Patrick Oke and Aditi Kadam. A survey (Appendix C) was sent out to members to gather information on the status of the willows. This email was also to request permission to visit the Association members properties to conduct site visits and assess the red-tip willows. Of the 64 members contacted, only 19 responded to either of the first two emails, and 4 members took the time to fill out the willow survey. An additional 23 responses were received during phone calls to Association members while site visits were being conducted in the area. Responses were never received by the remaining 22 members.

n. On October 3rd, 5th, and 8th, 2022, site visits were conducted at the properties of 28 members who had planted red-tip willows during 2021 or 2022 by Kim Reeder, Aditi Kadam, and Patrick Oke. The sites visited were located on both the east and west side of Grand Lake, in Princess Park, Cumberland Bay, Youngs Cove, Waterborough, Mill Cove, Whites Cove, and Robertson's Point. Other outlier sites visited were on Maquapit Lake, Indian Lake, Harts Lake, and in Lower Burton.

o. In the following months, the data collected from the Willow sites visits were recorded and analyzed to differentiate between planting variables.

1.3 Preparing and planting cuttings

The lives stakes were harvested directly from Red-tip willow stems, during the dormant season (usually in January or February, see Figure 1).





Figure 1. Harvesting (Jan. 23, 2021) stems of mature red-tip willow (Salix eriocephala) plants at Mike Thorne's willow plantation.

These live stakes establish a root system quickly and are advantageous for protection as they can be planted quickly and can rapidly establish cover to help stabilize slopes and shorelines. Due to the ease of planting, a large number of live stakes can be planted quickly and those that do not survive are easily replaced.

The red-tip willow live stakes (around 20 cm (8 inches) long) were cut from the stems of mature red-tip willows. The end with the angled cut is put into the ground and will begin to root if they receive lots of moisture, which occurs naturally in early spring. The live stakes must stay dormant until they are ready to be planted so they were kept refrigerators (in bags of 50) until two or three days before planting (see Figure 2).



Figure 2. Bags of 50 live stakes in cold storage (left), and a bag of 50 red-tip willow live stakes with ends trimmed diagonally soaking in a bag of water shortly before planting (right).

Once ready to plant, they were removed from the cold and their ends were trimmed in a diagonal fashion (see Figure 3). The end with the angled cut is put into the ground and will begin to root if they receive lots of moisture, which occurs naturally in early spring (e.g. early May). The process of live staking involves planting live woody cuttings directly into the ground (Figure 4) with the buds pointing up and the freshly cut diagonal end buried 5 to 10 cm (2 to 4 inches in the ground. A copy of the planting instructions given to members who received live stakes is attached as Appendix B to this report. Members receiving red-tip willows at outreach events received six-packs of rooted cuttings of red-tip willows in pots. Instructions for planting the rooted cuttings of red-tip willows are different from the live stake planting instructions. The 2021 Riparian Zone final report (pages 14 and 15) contain the red-tip willow rooted cuttings planting instructions. Live stakes also need to be planted in early spring for the best chance of success, so rooted cuttings in pots or bags are best for later planting.

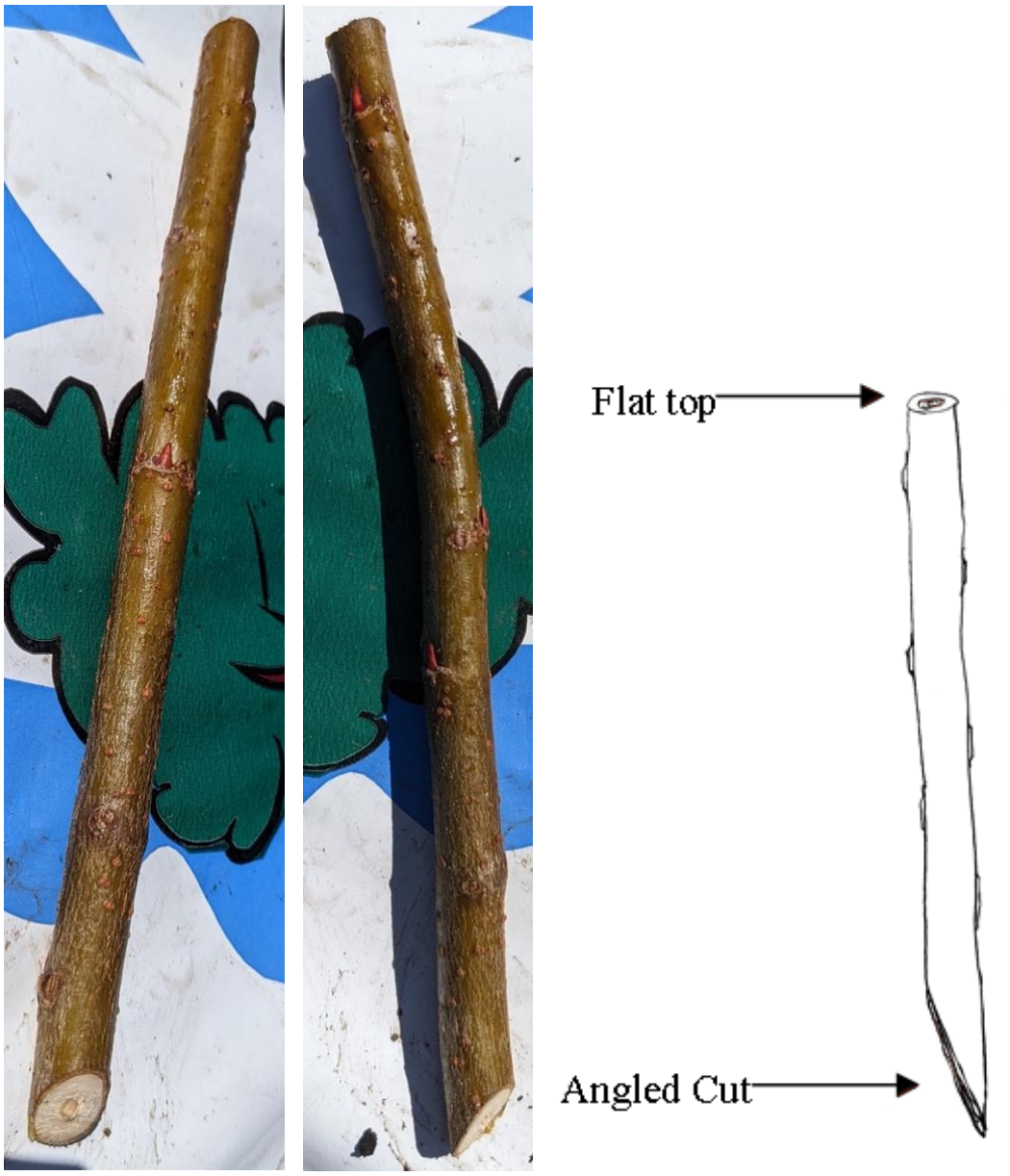


Figure 3. Trimming live stakes of mature red-tip willow (Salix eriocephala) plants. End trimming is done about 2 to 3 days before planting. All stakes need to be trimmed promptly (e.g. with sharp hand-held pruning shears) ***so that the buds are pointing up when the cut end is pointing down****. The freshly cut stakes are immediately placed in zip-lock bags that are then filled with water. Store the water-filled bags in a shady location outside to encourage the stakes to absorb water and start growing from their buds. The live stakes need to absorb water before they are planted, which takes a few days.*



Figure 4. Lives stakes starting to grow on a beach front shoreline in Grand Lake.

1.4 Distribution

The live stakes red-tip willows were distributed to members of the organization using a reservation list of Association members established in the early months of 2022. Willows were also distributed in six packs of rooted cuttings transplants to the public who signed up for the Association membership at various outreach events throughout the spring and summer of 2022.

1.5 Monitoring and Evaluation

Site visits were conducted at the properties of willing Association members who had planted red-tip willows during 2022 to check on the status of the willows and the success of the program. Data was compiled using excel and GIS.

2. Photos of work in 2022

Figures 5 through 8 reflect the various events between May 5th and August 20th during which Association members and contract staff engaged with the public on the topic of shoreline erosion, water quality, the danger of cyanobacteria to pets, and other environmental ecosystem topics. We also motivated booth visitors to join the Association. Those who became members were offered six-packs of potted red-tip willows to plant on their properties.



Figure 5. Outreach booth set up at the Jemseg Lions Club breakfast event, May 5, 2022.



Figure 6. Outreach booth set up at the Douglas Harbour Community Center, June 25, 2022.



Figure 7. Outreach Event booth set up at the Life at the Lakes event in Cambridge-Narrows, August 6, 2022.



Figure 8. Outreach booth setup at the Douglas Harbour Community Center, August 20, 2022.

Figures 9 and 10 reflect the June 19th planting at Robertsons Point. Site visits and data collection are reflected in Figure 11.



Figure 9 Planting Red-tip Willow live stakes on the back beach of Robertson's Point.



Figure 10. Planting Red-tip willows at Robertson's Point Back Beach.



Figure 11. Site visits and data collection being conducted on Association Member's properties.

3. Results Analysis

Throughout the 2022 planting season, a total of 1,014 red-tip willows (as live stakes or rooted cutting transplants in six-inch pots) were distributed to 27 members of the Association on 28 sites. Information on the progress of the willows was obtained through either site visits or survey responses from 12 of these members. Site visits were conducted at 28 properties of members who planted red-tip willows during 2021 or 2022. Information collected during the site visits included:

- A description of the soil type
- Sunlight condition
- Whether additional planting material (Manure, Peat, Bone Meal, etc.) was used
- Watering schedule by homeowner
- The current condition of the plants

- The number of Red-tip willows found dead or alive.
- A description of the site layout
- Pictures of the willows and each site

From the information collected, survival rates of the willows at each property were calculated. For the willows planted in 2022, the survival rate was 63%. For the willows planted in 2021, the survival rate was 45%, and the overall average survival rate was 51%.

Figures 12 and 13 reflect two different sites, both planted in 2021 and surveyed most recently in 2022, while figure 14 reflects 2 separate sites and captures willows several months after they were planted.



Figure 12. Site A - Example of willow planted during 2021, revisited and surveyed in 2022.



Figure 13. Site B - Example of willow planted during 2021, revisited and surveyed in 2022.



Figure 14. Site C and D – Examples of willows planted and resurveyed in 2022. The green ruler is approximately 30 cm (1 foot) long.

Soil Type

The Soil types were divided into four categories based on responses from landowners and visual observations. Factors such as the size of the particles and moisture content were considered to classify the soil into the following four categories:

- Sandy
- Silty
- Clay
- Peaty

Out of the total sites visited, 58% were found to have sandy soil followed by clay and silty soil at 21% and 12% respectively (Figure 15). Many locations had a combination of sand and clay. It is important to note that this classification was done visually and based on the survey filled by those individuals surveyed. Further analysis would have to be completed to get an accurate composition and classification of the soil.

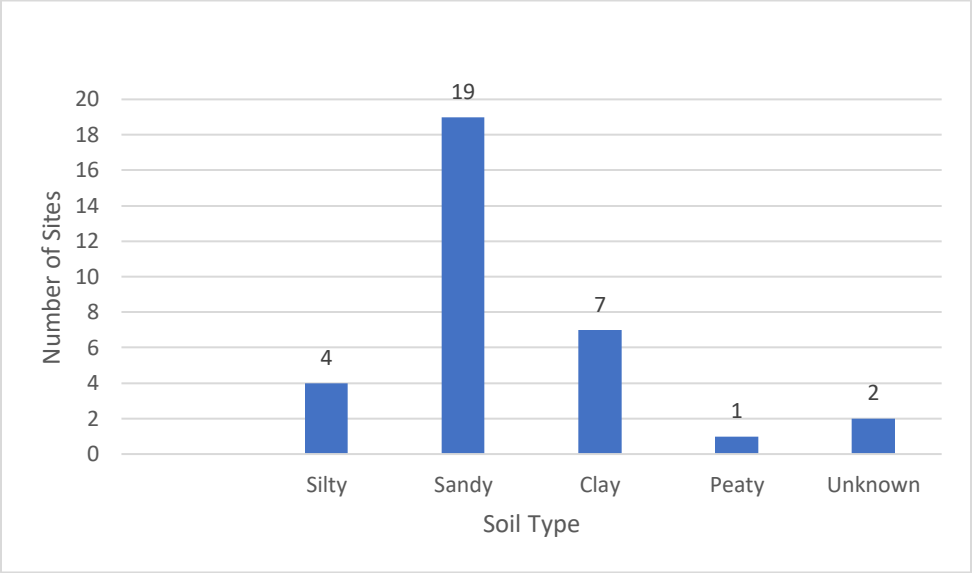


Figure 15. Soil classification of 2021 and 2022 red-tip willow planting sites, surveyed in 2022.

Sunlight conditions

To increase our understanding of the ideal conditions for red-tip willow growth, another factor investigated was exposure to sunlight. Using a rudimentary process of classification, red-tip willow exposure to sunlight was noted. Light conditions were divided into four categories (Table 1).

Table 1. Sunlight exposure classification used in 2022 surveys.

Classification	No. of hours of direct sun per day
Full Sun	6 Plus Hours
Part Sun	4 – 6 Hours
Part Shade	2 – 4 Hours
Full Shade	0 – 2 Hours

In previous years it was observed that the red tip willows thrive well in areas that receive lengthy (but dappled) sunlight, throughout the day. The majority of the members followed this advice (Figure 16).

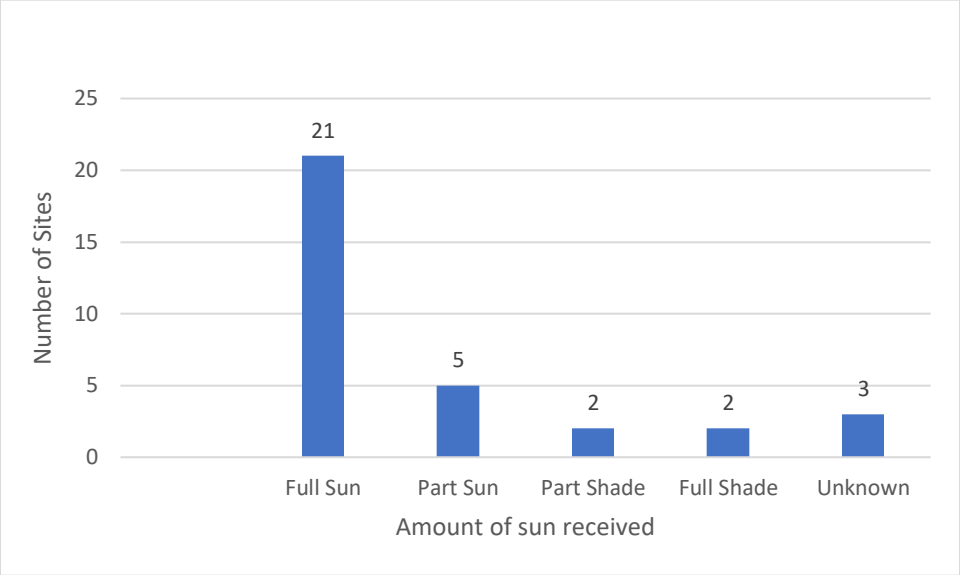


Figure 16. Sunlight exposure classification of 2021 and 2022 red-tip willow planting sites, surveyed in 2022.

The site visits in 2022 corroborated these findings as it was observed that the willows planted in areas with long exposure to sunlight grew better (Table 2 and Figure 17). Willows planted in “full sun” conditions showed better health than those planted in shade (see next section on *Health Classification* for more detail regarding classes).

Table 2. Sunlight to health comparison of willows planted in 2021 and 2022 and surveyed in 2022.

Light Classification	Number of Willows in Each Health Class						
	Excellent	Fair	Good	N/A	Poor	Unknown	Grand Total
Full Shade			1		1		2
Full Sun	6	5	9		1		21
N/A				1			1
Part Shade	1		1				2
Part Sun	2	2	1				5
Unknown						3	3
Grand Total	9	7	12	1	2	3	34

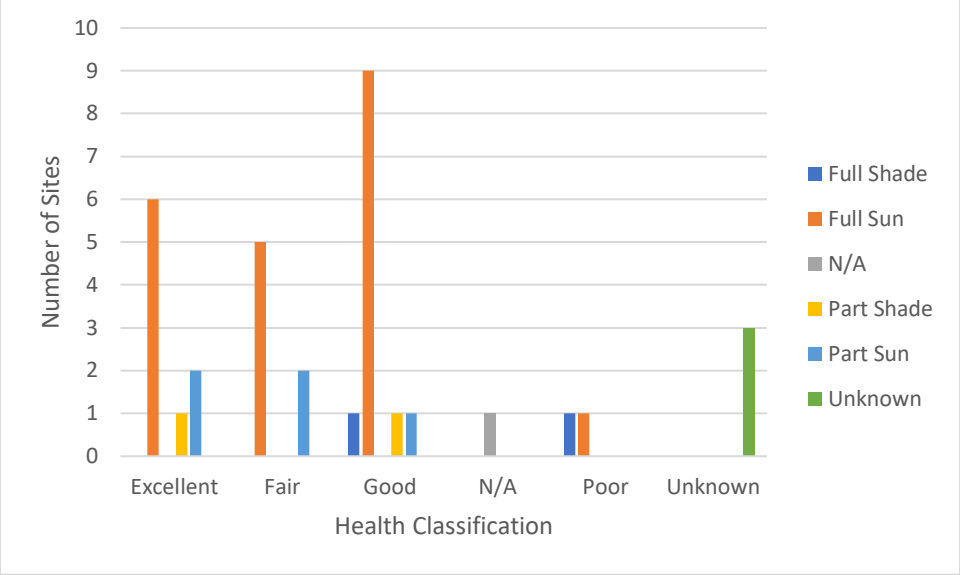


Figure 17. Sunlight to health comparison of willows planted in 2021 and 2022 and surveyed in 2022.

Watering Conditions

Willows that had access to water, that is, via rain or through ground water near lakes or were planted in wet areas, were observed to have the best growth (Figures 18 and 19).

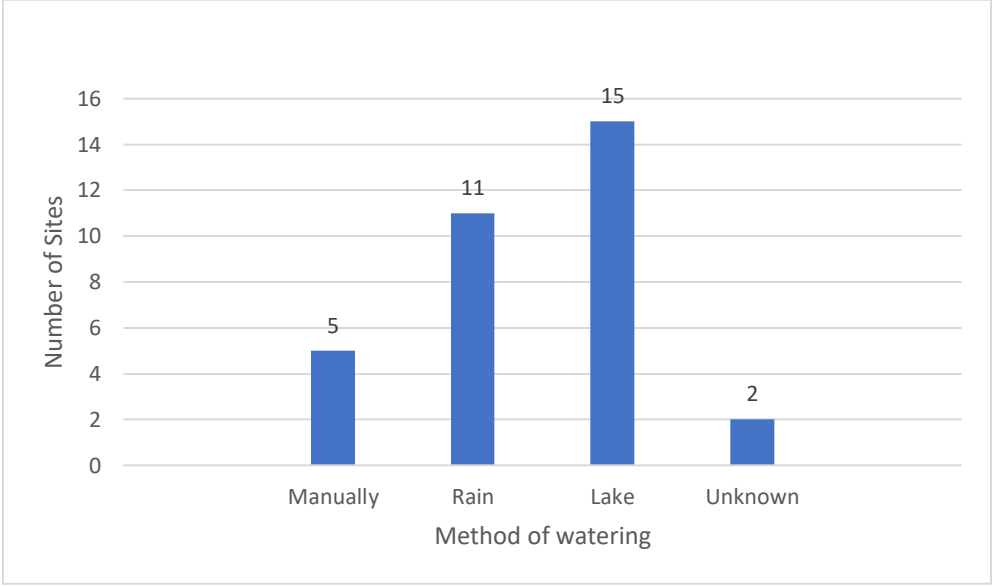


Figure 18. Access to willows planted in 2021 and 2022 and surveyed in 2022.

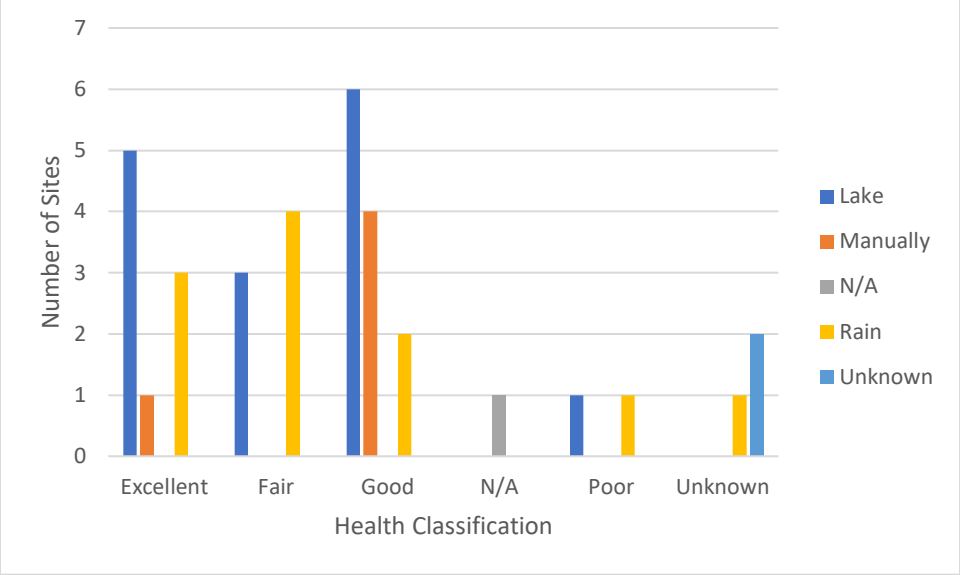


Figure 19. Water access compared to health status of willows planted in 2021 and 2022 and surveyed in 2022.

Health Classification

When assessing willows at each of the surveyed sites, they were distributed into categories of growth and health classification (Figure 20). These categories describe the average health of all the willows on the property. For example, if a property has a few standout willows that would be considered excellent, but the majority of the willows were only in fair condition, the overall rating for the site would be good.

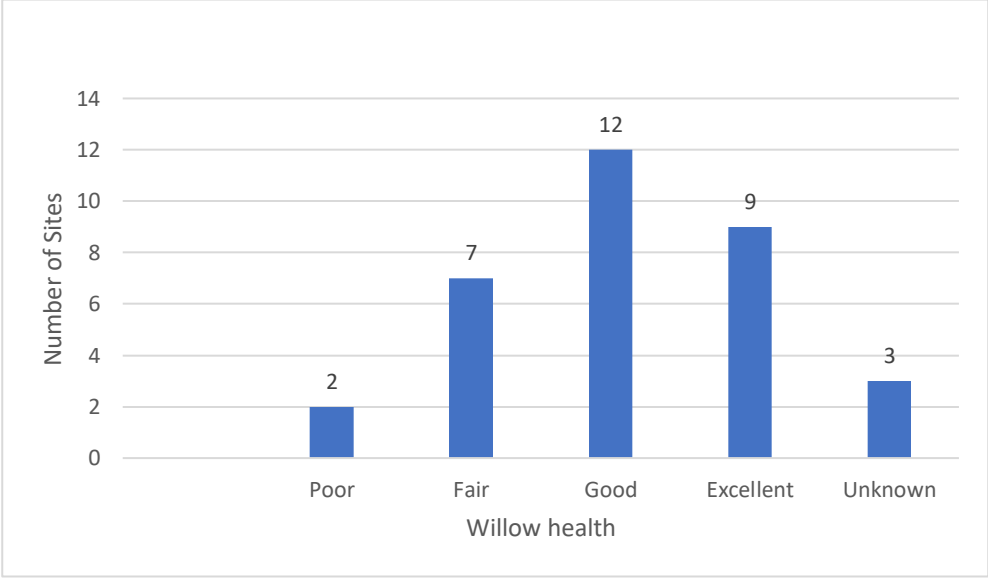


Figure 20. Number of sites classified into health categories.

As previously reported, the willows were propagated using a variety of methods, and distributed throughout the spring and summer months, over two years, with various planting materials, watering schedules and light exposure. Therefore, from this data we cannot define the specific variable(s) that

most affected the surveyed health condition, however, the data can used as a metric for general health status. Factors considered when classifying the health of the willows included their height, width, amount of offshoot branches from the main stem, number of leaves, colour of leaves, any disease indication, etc. Examples of health classifications are shown below, in Figures 21 through 24.



Figure 21 – Excellent



Figure 22 - Good



Figure 23 – Fair



Figure 24 – Poor

As noted previously, the green ruler is approximately 30 cm (1 foot) long.

Planting Materials

Some of the planting sites used materials to aid willow establishment and/or growth (Figure 24). The variety of planting materials included potting soil, manure, compost, bone meal and peat moss. A few locations used a combination of these materials. The exact quantity or frequency could not be determined as it ranged widely for different members. The extent of the role of the planting materials for establishment and/or growth is inconclusive as there are numerous varying factors which could have affected the overall health and condition. The height of the willows was also recorded to maintain a database and as a reference for future site visits (Figure 26).

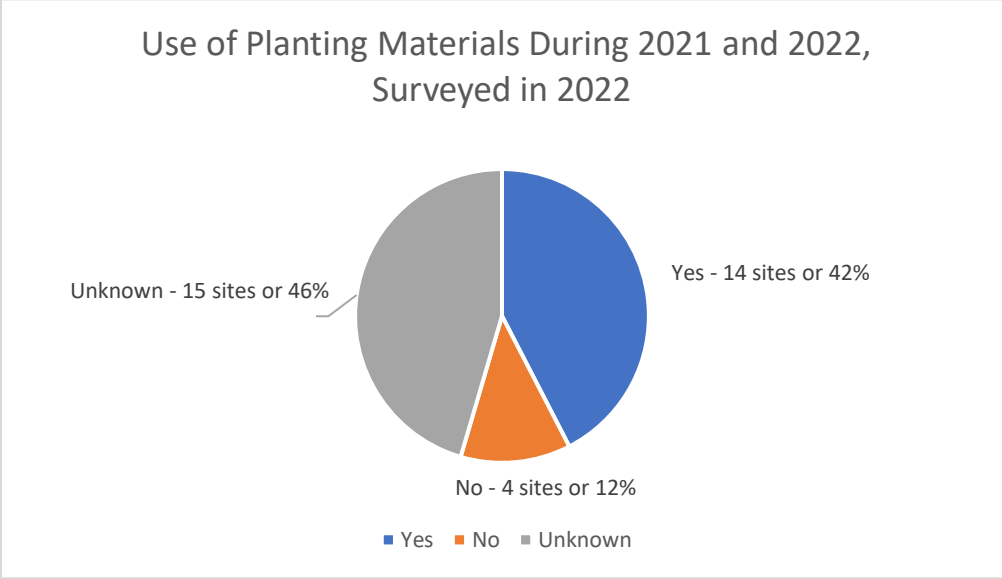


Figure 25. Planting materials used during willow planting.



Figure 26. Willow height at time of survey.

Survival Rates

The survival rate of the willows was also recorded. For the 2021 plantings, this is the least reliable metric as planting locations had not been obviously marked and in a number of cases, we could not locate the entire number of willows accepted by the member. Survival counts that could be accomplished included both a count of the dead stakes and live willow plants (Figure 27).



Figure 27. Example of survival – note also, that red-tip willows were not planted as per instructions at 3' centers. The green ruler is approximately 30 cm (1 foot) long.

GIS Geodatabase

A GIS Geodatabase of the willow information was created by the University of New Brunswick Masters students working on the project to provide a visual representation of the locations where willows have been planted in our watershed, and to provide reference for future site visits. Three individual layer files were made. These include the overall willows planted, the 2021 survival rate, and the 2022 survival rate. The following database elements were included:

1. The location of all willows planted during the 2021 and 2022 planting seasons. This layer includes the approximate longitudinal and latitudinal coordinates of the willows, the member's name, member number, address of the property, number of willows planted, the type (live stakes, rooted cuttings, etc.), and the year planted (Figures 28 and 29).

2. The survival of willows up until October 2021, based on data collected in 2021 by the project coordinator Kim Reeder. This layer includes the Member's name, member number, and the 2021 survival percentage of each member's willows (Figures 30 and 31).
3. The survival of willows up until October 2022, based on data collected in 2022 during the project site visits. This layer includes the Member's name, member number, and the 2022 survival percentage of each member's willows (Figures 32 and 33).

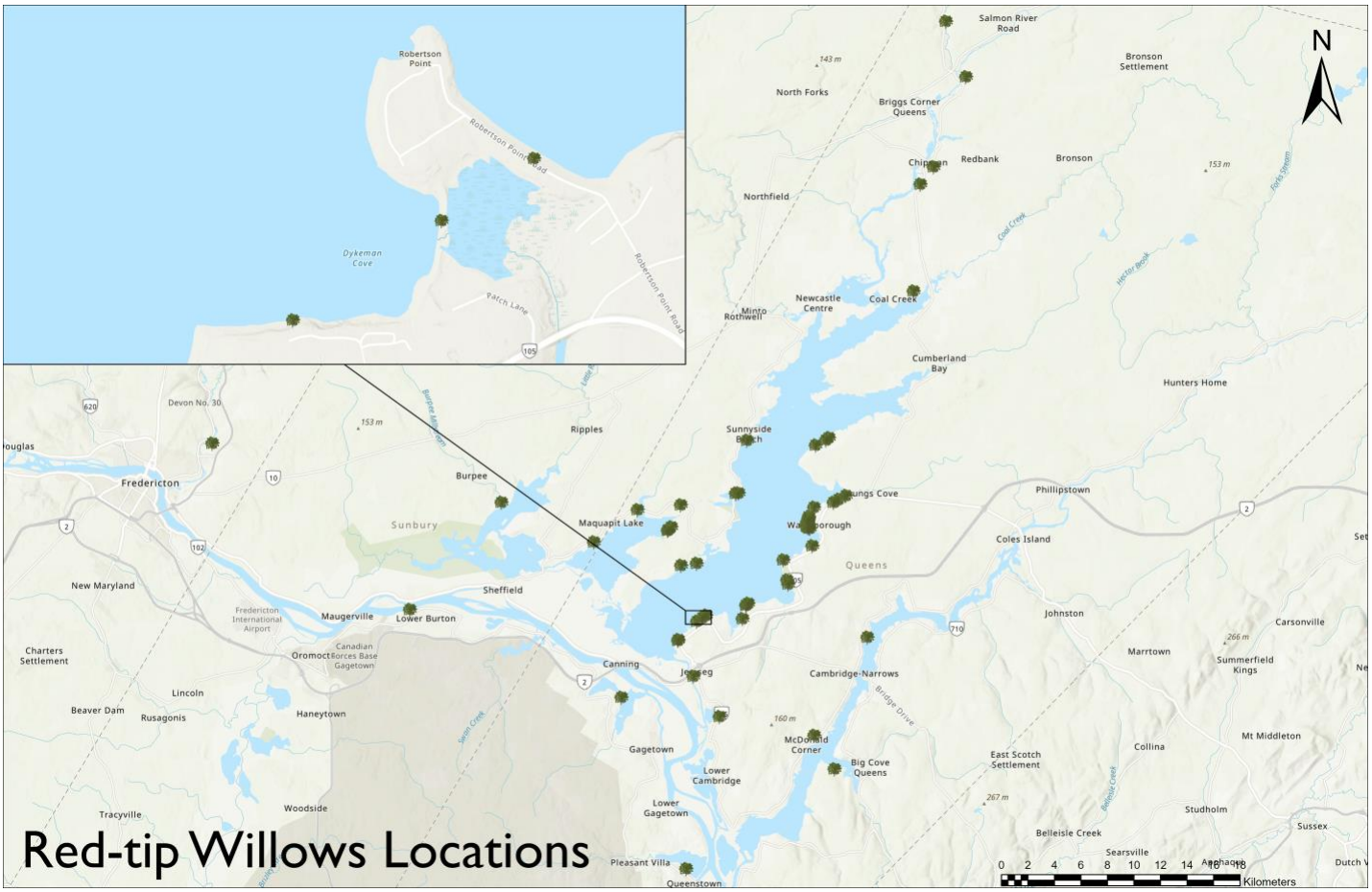


Figure 28. GIS Map of all red-tip willows planted by members of the Association within the Jemseg-Grand Lake Watershed. Willows are represented by a dark green shrub/tree icon.

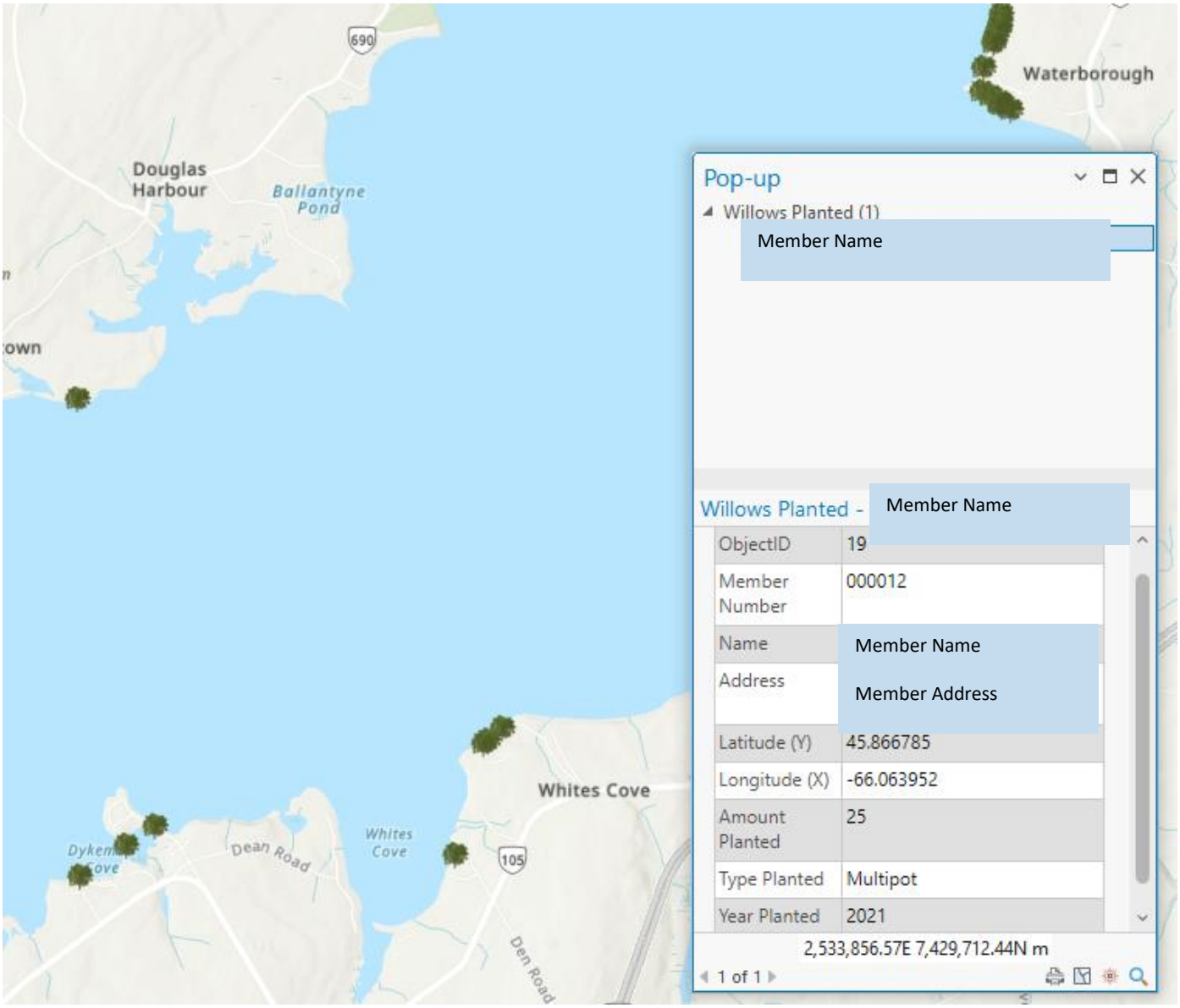


Figure 29. A snapshot of the information accessible when clicking on a Willow Icon in this layer.

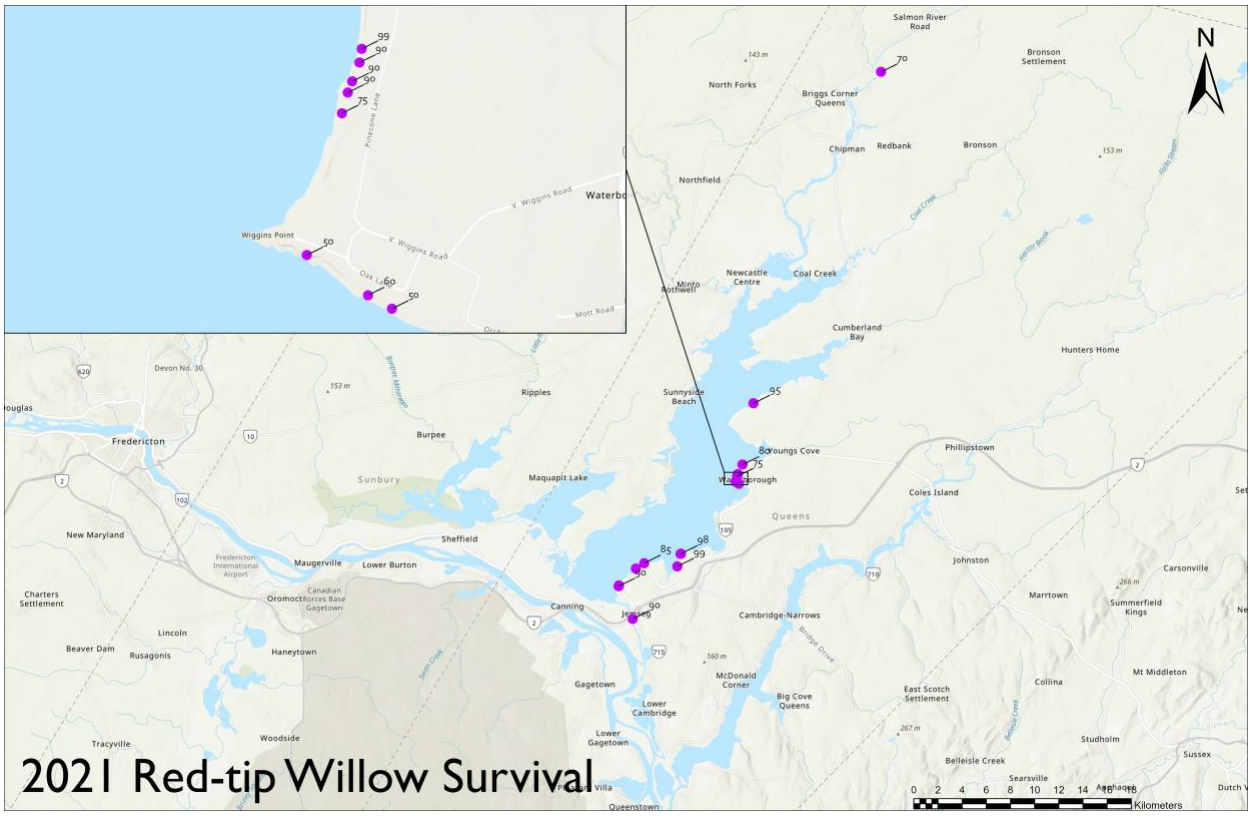


Figure 30. 2021 Survival Percentage layer of Red-tip Willows. Survival Percentages are labelled on the layer.

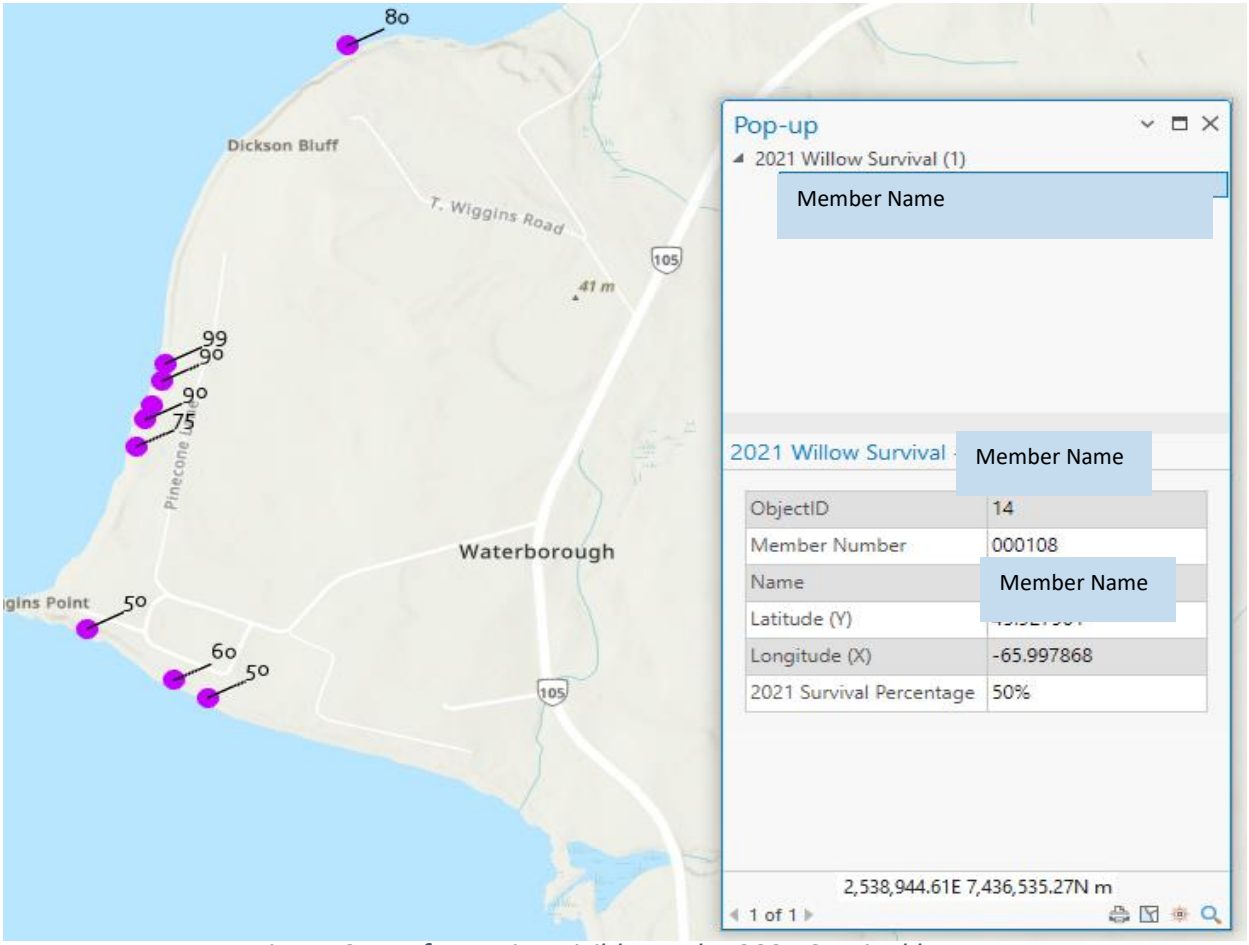


Figure 31. Information visible on the 2021 Survival layer.

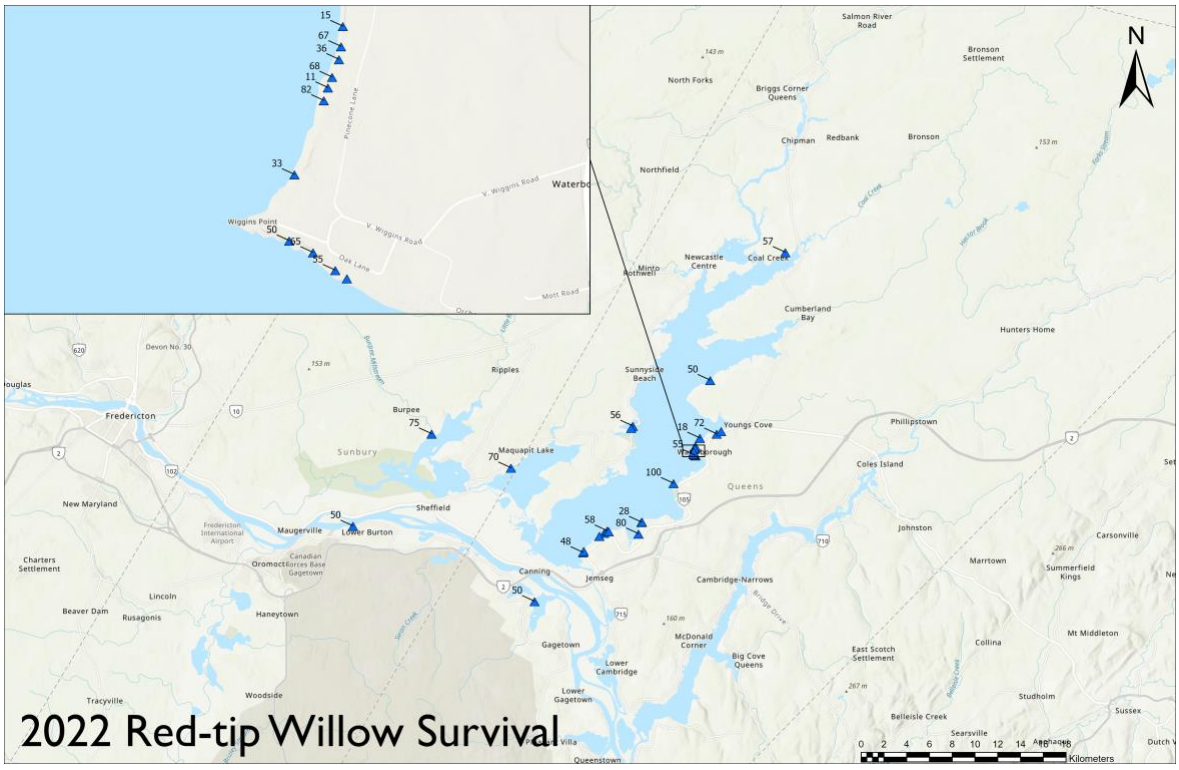


Figure 32. 2022 Survival Percentage layer of Red-tip Willows. Survival Percentages are labelled on the layer.

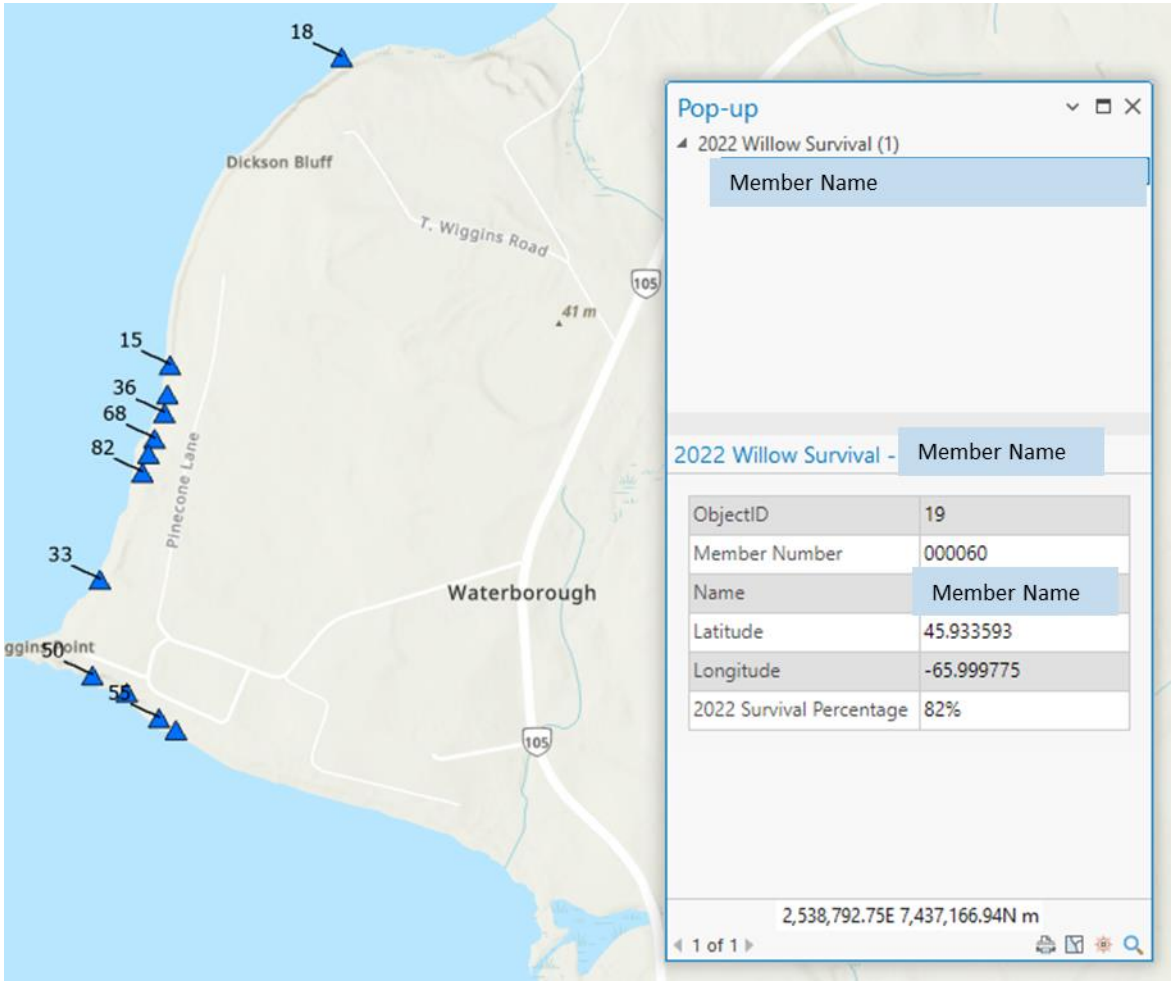


Figure 33. Information visible on the 2022 Survival layer.

These files can be used to infer information such as where most willows are located and can help to determine where efforts on willow planting should be increased. The majority of red-tip willows were planted on the East side of Grand Lake with very few on the West side near Douglas Harbour and Princess Park. There is minimal coverage on Maquapit Lake, Indian Lake, and French Lake. To further increase the scope of the project and work to stabilize a greater area of shoreline, this map can be used to focus on areas where the Association has not been as successful in attracting members who would consider planting red-tip willows in their riparian zones.

The GIS mapping also provides the ability to see where the survival of willows is the greatest. Of course, there are many variables that could affect this, but perhaps seeing that all the willows in a certain area are quite successful could indicate that the soil in this area is more suitable to red-tip willow growth. This could lead to an increase in effort in this area. The 2021 and 2022 survival layers can be toggled on and off to observe how willows in the same location fared year over year. Additionally, as the individuals and volunteers who carry out the site visits for the Association are likely to change from year to year, this map can be used as a guide to planning a route when conducting site visits.

4. Challenges and Lessons Learned

The Riparian Zone tree planting in the Jemseg Grand Lake Watershed project was met with many hurdles this year, but valuable lessons were learned. A new challenge for this year was that our Association was required to apply for a WAWA permit on behalf of all members planting willows on their properties. This presented a significant administrative burden on our Association to obtain and submit consent forms for the WAWA permit for each member planting red-tip willows on their properties. We recorded a log of activities, correspondence with NB DELG and our submitted recommendations, on this topic. Our primary recommendation is

> "to **add an exception to the WAWA regulations**, under
> 3(3) Persons undertaking or proceeding with any of or any combination of the following activities are exempt from the requirement to obtain a permit under paragraph 15(1)(b) of the Act: as follows:
>
> (g) property owner planting of New Brunswick native plant species **using hand tools only** in riparian zones or wetlands for the purpose of protecting, preserving and enhancing the Province's natural environment."

Due to the volunteer engagement utilized in our planting program, it is difficult to establish consistency in evaluating results as the methods used by members for planting and caretaking of

red-tip willows vary. This leads to difficulty in establishing any correlation or causation from the results of the data collected. We keep an accurate count of the willows as they are handed out to Association members, but from that point onwards tracking is difficult. For instance, some members plant the willows they were given right away, some members wait and do not track either how may survived until planting or where on their property they were planted. This makes establishing an accurate survival rate difficult as it is hard to determine how many willows were actually planted. One of the key challenges in collecting data about the willows is the lack of member response to inquiries. Despite multiple requests for site visits to collect data, we continue to have a low response rate from members. This limited the sample size of the willows distributed over the last two years, making it difficult to draw accurate conclusions.

Even at the sites we had access to, locating the willows can be a significant challenge. The dense foliage of competing plants on some properties and/or the size of properties with unmarked willows, as well as the reality that many members do not remember the exact location of their planted willows, can make it challenging to locate the willows especially on larger properties. There were minimal instances in which, during site visits, no willows were found. We have found it to be true that some members, though originally well-intentioned, do not plant their willows in a timely manner and the willows expire without proper care. Members, of course, are not keen to discuss this, but if approached kindly and prodded a little, members have told us what took place. In other instances, on a secondary or tertiary visit, when the surrounding vegetation has died back, or when the original person who planted the willows was on-site, we have later been able to identify planting locations missed on the first visit.

To aid members in marking the locations of the planted willows, they were provided with wooden stakes. However, the majority of members did not utilize them. In upcoming work, we should mark each willow transplant with a colourful piece of natural material such as wool yarn in addition to providing stakes to identify the general planting location.

Also potentially effecting survival rates, though members were given instructions on how to plant the willows, not all of them followed the instructions. For example, we suggested planting the willows in a triangle shape at a certain distance from each other (Figure 34). However, many members planted them in a crowded straight line (Figure 35), which could have resulted in some death due to

competition for nutrients. Additionally, the site visits were conducted in October when the leaves of the willows had already started changing color, making it harder to determine their health.





Planting rooted cuttings with potting soil and a small scoop of bone meal in 2021.



A group of red-tip willow rooted cuttings planted in a triangular pattern in 2021.

Figure 34. Ideal and suggested willow transplant spacing.



Figure 35. Example of improper willow transplant spacing.

In conclusion, the lack of member participation and non-uniformity in the planting methods used were significant challenges in collecting data about the willows. The inadequate sample size, coupled with the difficulty in locating the planted willows, made it challenging to draw accurate conclusions. To improve data collection in the future, it is essential members follow the suggested planting methods and mark the locations of their planted willows accurately. Due to human nature variability, however, we understand this may not be possible. Additionally, site visits should be conducted earlier in the year to determine the health of the willows more accurately.

With the aim of streamlining future project years, this year we compiled a comprehensive spreadsheet consisting of the contact details of all Association members who have previously planted willows. The spreadsheet includes various elements, such as whether site visits were conducted in prior years, whether the member responded to emails or calls in 2022, and whether we should contact individual members regarding their willows in 2023. The spreadsheet also justifies the decision to contact or not contact members, with reasons such as a member's request to not be contacted anymore, no willows being found during any property visits, or properties being outside the study area. In addition to the contact information, the spreadsheet contains multiple photos of willow locations at each property, along with detailed descriptions of where the willows are located. With these details, future project

contractors can quickly locate the willows, thus maximizing the time available for data collection. Thus, the detailed spreadsheet will serve as a valuable tool for the Association, making it easier for them to set up site visits and collect accurate data about the planted willows.

5. Plans for 2023 Season

To maintain a successful shoreline restoration program, and/or to expand the program, the following suggestions will be considered:

- Continue producing more live stakes of red-tip willows as planting has proven successful and efficient.
- Continue giving out willows during the outreach events as it helps attract crowds and garners their interest in environmental issues and the Association's projects.
- Increase the number of willows brought to public events.
- Learn about the members willingness to participate in the willow monitoring program while giving away willows. Their confirmation can be maintained in the database to ensure efficiency in planning site visits. For instance, attain their permission to visit the site whether they are home or not, and impress upon them the need to keep the colourful identifier intact.
- Purchase use 2 car door magnets to identify site inspectors.
- Continue to provide members with recommendations based on past experience for planting the red-tip willows in a written format along with the planting instruction to ensure higher survival rate.
- Decide whether to conduct soil analysis of locations that were observed to have healthy willows and use this information to target specific watershed planting areas.
- Consider targeting areas where it is likely to be flooded by the lake or river, as 2022 site visits indicated willows in these locations were successfully established and growing.
- Maintain the database of the results from the 2022 monitoring plan.
- Decide if and how to expand project efforts to the other side of Grand Lake and additional areas of the watershed (e.g. Gaspereau and Salmon River areas, Sheffield and Lower Maugerville, Chipman and Minto).

6. Reporting on Priority Area Measures

On June 30, 2022 the Association submitted revised priority area measures which included the following:

a) Protecting our Environment – Riparian zone restoration activities (e.g., tree planting, bioengineering).

Proposed: 300 square meters red-tip willow plants, estimate based on 28.8 sq m for one multipot of 40 red-tip willow rooted cuttings.

Delivered: 1019 square meters (0.1 ha or 0.25 acres) for 1,014 red-tip willow plants. This calculation is based on the fact that the area *A* cover by four red-tip willows planted in a triangular pattern, with plants spaced distance *d* apart is

$A = 4.0207\ d^2$ [see our 2021 Riparian Zone final report , page 3]

For 1014 plants spaced one metre apart, the area covered would be 1014/4 x 4.0207 = 253.5 x 4.0207 = 1019 square metres.

b) Increasing Environmental Awareness – This measure will track the number of participants in environmental education/awareness initiatives.

A) Number of Participants – Proposed: 25

Delivered: 27 sites, but at various sites, more than 1 individual was engaged, for example some sites engaged an individual, other sites engaged a family of 4 or 6, as well, some sites engaged many neighbours. For reporting purposes, we have adopted an average of 2 individuals/site engaged in environmental education/awareness initiatives. This results in 54 individuals having participated.

B) Type of Activity – Planting red-tip willows in a riparian zone, followed by watering and caring for them (e.g., weeding if required) during the growing season. Proposed: 150 red-tip willows

Delivered: 1,014 Red-tip Willows planted

C) Activity Duration – 12 hours per participant. Proposed: 600 Hours

Delivered: 648 based on an average of 2 individuals/site engaged in planting, watering, and caring for willow transplants.

Appendix A – Watercourse and Wetlands Alteration Permit

New Nouveau Brunswick

PERMIT FOR WATERCOURSE AND WETLAND ALTERATION
ALT 63190'22 Original

(Regulations 90-80 under the Clean Water Act Chapter C-6.1, Act of New Brunswick 1989)

PERMITTEE Jemseg Grand Lake Watershed Association

LOCATIONS

Easting	Northing	Datum	Zn	Easting	Northing	Datum	Zn

see description below...

Affected Watercourse/Tributary: Various

Affected Regions: ENV - **DFO -** **DNR -**

1:50.000 Maps - Various **County -** Various **Parish -** Various

PERMIT VALID FOR THIS PERIOD FROM 2022/05/12 (yyyy/mm/dd) TO 2022/10/31 (yyyy/mm/dd)

Description of Watercourse/Wetland Alteration(s):

This multiple permit consists of planting live willow stakes within 30 metres of a watercourse and in and within 30 metres of a wetland or Provincially Significant Wetland.

This project is part of the permittee's initiative titled "Riparian Zone Tree Planting in the Jemseg Grand Lake Watershed", where new members are provided with red-tip willow stakes to plant on their own shoreline. The permittee is to send the property location of new members where trees are to be planted two days following their events (or after receiving a new membership).

The Permittee may undertake only those Watercourse/Wetland Alteration(s) described above hereby approved by the Minister. Refer to Conditions of Approval stated on the attached Document "A". Responsibility for any action arising from any watercourse/wetland alteration must be borne by the Permittee and no liability shall be incurred by the Minister or the Department. This permit does not exempt or exclude the Permittee from the provisions of any Act of the Legislature of New Brunswick or of Canada to serve as legal defense to any action commenced by landowners who are adversely affected by the alteration.

Number of conditions attached to this permit: 13

Date of Issuance: 2022/05/12 (yyyy/mm/dd)

for the Minister of Environment and Climate Change

Jemseg Grand Lake Watershed Association

DOCUMENT "A" Attached to ALT 63190'22 Original
CONDITIONS OF APPROVAL

(Regulations 90-80 under the Clean Water Act Chapter C-6.1, Act of New Brunswick 1989)

(1) The permittee is responsible for obtaining permission from all landowners listed on the property where the alteration is to take place before commencement of the work.

(2) The permittee is responsible for contacting the regional service commission, City, or Town prior to commencing the project to ensure that all local/municipal by-laws are adhered to. The permittee is responsible for obtaining all additional permissions and permits prior to work commencement.

(3) If it is suspected that archaeological objects are discovered during construction, operation, maintenance, or during any other project related activity, as per the New Brunswick Heritage Conservation Act, all activity shall cease near the find and the Archaeology and Heritage Branch of the New Brunswick Department of Tourism, Heritage and Culture shall be contacted immediately at (506) 453-2738 for further direction.

(4) Other than the alteration(s) described on this permit, no additional alteration shall be carried out in or within 30 metres of a wetland or the shoulder of the bank of a watercourse.

(5) A copy of this permit, including the “Conditions of Approval”, shall be kept at the alteration site throughout the duration of the project. A copy shall be produced upon the request of an inspector designated to act on behalf of the Minister of Environment and Local Government, or an employee of Fisheries and Oceans Canada.

(6) The permittee shall ensure that all persons involved in the project are aware of and comply with the scope and conditions of this permit.

(7) The Department of Environment and Local Government – Fredericton Office (elg.egl-region5@gnb.ca or 444-5149) shall be notified at least 2 working days prior to project commencement.

(8) Preventative measures shall be taken to prevent demolition debris, spoil, and excavated material generated by the project from entering a watercourse/wetland. Excavated materials, as well as any material that inadvertently falls into the water/wetland, shall be disposed of where they cannot be washed into a watercourse/wetland by floodwaters or overland runoff events and any debris generated from the project shall be entirely collected and disposed of outside a regulated area, in a manner acceptable to the Department of Environment and Local Government.

(9) The permittee shall ensure that all steps necessary are taken to prevent noticeable suspended sediment from reaching a watercourse or the open-water portion of a wetland as a result of the alterations covered by this permit.

(10) Alterations in and within 30 metres of a wetland or the shoulder of the bank of a watercourse shall be carried out manually using handheld equipment only and be limited to the planting of tree stakes.

(11) If live stakes are being placed, they shall be driven vertically into the ground and spaced between 0.3 metre and 0.5 metre apart. Soil must be packed around each live stake to ensure they are firmly anchored in the ground. If any live stake was damaged by hammering, the damaged top of the stake(s) must be cut off. Stakes that have split during installation must be replaced.

(12) All vegetation used as part of the biotechnical bank stabilization shall be limited to native, non-invasive species only.

(13) The permittee shall send the property location of new members where trees are to be planted two days after receiving a new membership. The information can be sent to wawa@gnb.ca, while making reference to the file # 63190’22.

Appendix B – 2022 Live Stake Planting Instructions

Jemseg Grand Lake Watershed Association

www.jemseggrandlakewatershed.ca

New Nouveau Brunswick
Your Environmental Trust Fund at Work

May, 2022 Instructions and Questionnaire for planting, care, and reporting results for growing red-tip willows (*Salix eriocephala*) live stakes

Planting instructions

The red-tipped willows that you plant will benefit the local ecosystem and help stabilize your shoreline. Further information is available at our website under PROJECTS > Shoreline Green Zones.

Where it works: In a partial shade location on your shoreline, in a place that has some gravel, sand or soil. The finer material is usually underneath the larger rocks or coarser gravel.

Preparation: If you pick up the live stakes before you are ready to plant them, make sure you keep them dormant by storing in a refrigerator. About 2 to 3 days before planting, cut the bottom end of the live stakes diagonally (see Figure 1). Pruning shears are helpful here. This ensures that fresh live cells are available to absorb water, and that *the buds point up when planting*. Fill the bag with water, reseal it, and place it in a shaded place so the live stakes can absorb water.



Figure 1. Live stake with diagonal cut on the bottom, buds pointing up.

Planting: Take a **shovel or hand tool** and make holes (at least six inches deep) around 60 to 90 cm (2 to 3 feet) apart in a triangular pattern. Place some potting soil and/or well-rotted manure and a small amount of bone meal (if available) in the hole. Plant the stake (***buds pointing up, diagonal cut at the bottom***) with about 2/3 of the stake in the ground. Push down firmly on the soil so the stake is snugly packed in the surrounding soil (roots don't like air pockets). Water each stake well as you plant them. They will sprout roots and leaves as they grow. Please water your willows and provide general care to give them a good chance of getting established. **Watering in dry weather is the most important factor for success**. The willows can be planted directly and do not require any "hardening off".



Planting rooted cuttings with potting soil and a small scoop of bone meal in 2021.



A group of red-tip willow rooted cuttings planted in a triangular pattern in 2021.

After planting: Place a stake with a painted top near your planted red-tip willows, and mark the date they were planted on the painted stake. This helps significantly in identifying where your red-tip willows are in follow-up visits to track their progress, especially if planted in multiple locations.

Appendix C - Questionnaire

Site visit and/or Questionnaire. As described in the email, we shall try to select a date that is best for the majority of Association members, but it may not be possible to conduct site visits when each member is available. We will be visiting multiple sites per day and will work collaboratively so that our presence does not hinder your day to day activities. Having your permission to visit your property in your absence will help us in making these site visits more efficient. **Please fill in the following survey if you won't be available on the days mentioned.**

1) Whether or not you have planted the willows provided. Please do not hesitate to mention if you haven't planted them. We understand if you haven't had the chance to do so. But, in that case please do let us know so that we can update our database accordingly.

2) If the willows are healthy. Please send us pictures of your willows it would be of great help as it would help us judge the status of the plant health and might even save a trip to your property. (=less fuel consumption!)

3) Plant location. We do not require a formal address of the plant location - you provided that already. But if you can't meet with us, we need to be able to find the willows. A small description of the area would do.

4) The date on which you planted the willows If known, the date when you planted the willows.

5) Number of plants <u>PLANTED</u>, (this may be different from the number you received)

6) Description of the soil where the willows were planted. Example, gravel, clay, rocky, sandy, silty, peaty If you are not aware of the type of soil, please send us a photo with a ruler in the picture if you can, or at least a coin for us to reference soil particle size.

7) Did you use potting soil or other material (example, manure, bone meal) when planting the willows? If so, approximately how much for each plant was used?

8) How often did you water the willows? Willows love water. In dry weather, regular watering is important as the plants take root. But, if you have not been able to water as much as you wanted, please let us know.

9) How many of the willows survived until September 24, 2022?

10) Do we have your approval to conduct site visit on your property in your absence?