Improving Water Quality and Advancing Climate Change Adaptation in Tantramar with Rain Gardens and Other Low Impact Developments – Year 3 Report

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Introduction

EOS Eco-Energy received support from Eco Action to plant and monitor a series of rain gardens and organize and monitor depaving events over a 3 three project. This report summarizes activities during the third and final year of the project. In year three, 11 rain gardens were planted in downtown, flood prone areas of Sackville, NB. An additional rain garden was planted in Richard Park in Dorchester, NB along with additional funding from TD Friends of the Environment. Rain gardens are depressions a few inches deep planted with native water-loving and drought tolerant plants that slow and absorb stormwater.[1] It is beneficial to have many smaller rain gardens throughout a flood-prone area to help slow and absorb water in numerous locations. Monitoring of the rain gardens and depaving sites from year 2 was completed and the number of volunteers, participants and behaviours changes were tracked.

This report summarizes the project objectives and goals, our methods in year three, the gardens planted in year 3 and monitoring, as well as community outreach efforts. The report concludes with a summary of the entire project and explains that all original targets were met or exceeded.

Priorities and Objectives

The project priorities are:

1. Canadians will build climate resilience through living natural infrastructure, such as rain (main priority)
2. Contribute to the diversion and reduction of substances that negatively affect water quality
3. Contribute to reducing climate-related hazards and disaster risks, specifically fresh water flooding
4. Canadians will contribute to the conservation and sustainable use of Canada's fresh water since rain gardens help recharge groundwater sources

The project objectives are:

1. Improve water quality of the Sackville Waterfowl park, storm water runoff and ground water in general where rain gardens are planted.

[1] *Bilingual EOS how-to guides on rain gardens are available on the EOS website at: https://eosecoenergy.com/fr/wp-content/uploads/2018/10/sm-FR-Rain-Gardens-How-to-Handout-for-Tantramar.pdf and https://eosecoenergy.com/en/wp-content/uploads/2018/03/sm-Rain-Gardens-How-to-Handout-for-Tantramar.pdf*

2. Increase local resiliency to climate change induced flooding and droughts using natural infrastructure (rain gardens, low impact developments).
3. Reduce climate change induced freshwater flood risks.
4. Improve and restore land to more natural features (rain gardens are planted with native plants, act like a wild meadow, and double as pollinator and butterfly gardens)
5. Increase capacity of local Canadians (including indigenous, youth, small businesses and the general public) to adapt to climate change using simple techniques.

Methodology: Our Process for Success

During year 3 of the project (2020-2021) we undertook the following steps:

1. Planted 10 gardens
    a. Ordered plants (purple aster, echinacea, joe pye weed, swamp milkweed, pink turtle head, black eyed susan, blue flag iris, bee balm, blood root, ostrich fern (fiddle heads), sedge, and rush, etc.).
    b. Homeowners wanted Labrador Tea and sweet grass which were not available from commercial sources. We carefully sourced 5 small Labrador Tea plants from a large patch in the woods behind an EOS staff member's house and sweet grass from previously planted rain gardens. Sweet grass spreads and grows easily and lends itself to be divided.
    c. Obtained compost and mulch in-kind from the Town of Sackville.
    d. Rounded up volunteers to help deliver the free compost and mulch.
    e. Contacted http://www.info-ex.com/ to locate any utility lines before digging. All sites were clear and safe.
    f. Dug and planted the gardens with the homeowners and volunteers.
    g. Homeowners watered and weeded their gardens.

Plants Selected for Rain Gardens in Year 3

Plant	**Location Preferences**	Height
Flowers		
Red aster - brocade	sun or partial shade, moist/dry	3ft
Purple aster - prof kipp	sun or part shade	1 ft
Echinacea (purple cone)	sun, adaptable	2-5 ft
Joe Pye weed	Tall, sun moist	3-5ft
Swamp Milkweed	Tall, Wet, sun, partial shade	up to 6 ft
Pink Turtlehead	sun, moist	2-4 ft
Black eyed susans	sun, moist, drained	1-3 ft
Blue flag iris	Wet	1.5 ft
Monarda (bee balm)	sun, light shade, moist, various hts	up to 2 ft

monarda fistulosa		up to 3 ft
Blood Root	short, shade, moist, drained	1/2 ft
Ferns		
Ostrich fern (fiddle)	shade, moist, wet	3-4 ft
Grasses		
Sedge (beak or lake)	sun, wet/moist	up to 3 ft
Sweet grass	sun, wet/moist	up to 2 ft
Rush	sun, wet/moist	up to 2 ft

Key:

Tall
Medium
Short

2. Monitoring
    a. Visited the gardens throughout the summer and fall.
    b. Took photos at about 3 months.
    c. Spoke to homeowners to see how their gardens did through large rain events and also drought periods.
    d. Monitored community rain garden site during rain events, took photos.
3. Signage and promotion
    a. Designed and ordered bilingual stone signs for each garden.
    b. Social media posts, stories in community newsletter, EOS newsletter, etc. We were not able to do in person promotion at community events as in the past, due to the Covid-19 pandemic.
4. Monitoring behavior changes
    a. We asked volunteers and homeowners about making behaviour changes. We also checked in with homeowners in the fall to see how they and their gardens were doing. Results are shared in this final report.

Residential Rain Garden Planting Year 3

During late spring and early summer 2020 we planted 11 rain gardens on residential properties in flood-prone areas of downtown Sackville, NB. This total surpasses EOS' goal by one extra residential garden. The garden locations are represented on the following map. The locations include a good distribution around town with gardens near Sackville Waterfowl Park (Weldon St., Squire St.), uphill from the Lorne St. area which has suffered chronic flooding issues (Estabrooks St, Union St., Hillcrest Ave., Salem St., Brenmar Cres.), and finally up at the top of Charlotte St. at a higher elevation that then drains through town.

Map of Rain Garden Project Locations Summer 2020

9 Brenmar Cres.

A 100 sq ft rain garden was planted in the back yard to catch rain from the end of a drainage pipe that collects rain from the driveway and adjacent property to direct it towards a culvert under the road that tends to clog. This rain garden will help catch the storm water before it makes its way to the culvert, preventing clogging. Prior to installation of the drainage pipe, flooding would occur during rain events adjacent to the driveway and garage. 4 volunteers helped dig and plant and garden. Neighbours came by to see what was going on which offered an impromptu educational lesson. The homeowner committed to, not only maintaining the rain garden, but to planting a second one once the first grows and fills in and she can divide the plants. The garden contains the following plants:

Plant	**Count**
Aster	7
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	4
Black Eyed Susans	10
Blue Flag Iris	5
Monarda	10
Blood Root	3
Ostrich Fern (Fiddle Heads)	18
Native Sedge	
Sweet grass	1
Rush	
Labrador Tea	2
Total	**94**

176 Charlotte St.

The homeowners have seen evidence of water pooling in front of the house at the base of the slope from the driveway and surrounding land. They remarked that it looks like a pond with heavy rainfall or following spring melt since the soil is clay rich with poor permeability. There has also been flooding noted in the culverts in front of properties down the street. A small rain garden (50 sq ft) was planted to help reduce water accumulation in the front yard. Two volunteers helped plant the garden with 33 plants spread over a 50 sq foot area. Plants selected prefer wet to very wet conditions and don't mind the shadier spot where this garden is located. Both homeowners committed to looking after their rain garden. The garden contains the following plants:

Plant	**Count**
Aster	
Echinacea	
Spotted Joe Pye Weed	5
Swamp Milkweed	5
Pink Turtlehead	
Black Eyed Susans	
Blue Flag Iris	7
Monarda	
Blood Root	10
Ostrich Fern (Fiddle Heads)	6
Native Sedge	
Sweet grass	
Rush	
Labrador Tea	
Total	**33**

24 Weldon St.

This rain garden was placed in a publicly visible location on the front lawn. This is a popular residential street that people walk on to access Bridge St. or Waterfowl Park. Areas around this property are lower lying and impacted by floods and poor drainage. The homeowners reported flooding in their basement and neighbours' basements during heavy rain events. This rain garden will help catch rain off the house roof (no eaves) prior to reaching the storm drains on the Weldon St. The 100 sq ft garden meanders around an existing vegetable garden and around a tree, helping to remove more grass on the front lawn and improve permeability on the property. Three volunteers helped plant the garden. The garden contains the following plants:

Plant	**Count**
Aster	7
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	7
Black Eyed Susans	10
Blue Flag Iris	5
Monarda	10
Blood Root	4
Ostrich Fern (Fiddle Heads)	10
Native Sedge	3
Sweet grass	0
Rush	0
Labrador Tea	0
Total	**89**

17 Bowes Ave.

The rain garden was planted in the backyard near the bottom of the property. The land slopes toward the back of the property, bringing storm water from the driveway and upper part of the property, resulting in the bottom of the property being very soggy and muddy after rainfall and snow melt. The homeowner has started building a bio-swale at the bottom of the property to try to alleviate the sogginess. This rain garden will help catch water before it reaches the bottom, reducing the sogginess of the backyard. The garden was planted in an oval shape measuring about 100 sq ft. 4 volunteers helped dig and plant the garden. The homeowner committed to looking after the garden, watering it and maintaining it. The garden contains the following plants:

Plant	Count
Aster	9
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	7
Black Eyed Susans	10
Blue Flag Iris	6
Monarda	10
Blood Root	2
Ostrich Fern (Fiddle Heads)	10
Native Sedge	3
Sweet grass	
Rush	
Labrador Tea	
Total	**90**

9 Hillcrest Ave.

This rain garden was planted on the left-hand side of the house catching rain off of the roof as two of the rain gutters/eaves are directed towards this site, as well as from the driveway since the property is sloped slightly down towards the back of the backyard. The road culverts around this property tend to fill in the springtime. The driveway used to pool water before the homeowners covered it in woodchips. The 100 sq foot garden has an organic kidney bean shape and is located in a shady area so that plants selected can tolerate at least some shade. Two volunteers, one homeowner and two children helped dig and plant this garden. The homeowner committed to maintaining his garden and directing a third downspout into the garden. He also committed to teaching his children about the plants in the garden and his young daughter was already an avid wild plant forager! They were excited to be planting wild beebalm (monarda). The garden contains the following plants:

Plant	**Count**
Aster	8
Echinacea	
Spotted Joe Pye Weed	
Swamp Milkweed	
Pink Turtlehead	
Black Eyed Susans	
Blue Flag Iris	
Monarda	14
Blood Root	14
Ostrich Fern (Fiddle Heads)	35
Native Sedge	14
Sweet grass	
Rush	7
Labrador Tea	
Total	**92**

15 Estabrooks St.

The location of the rain garden on this property changed slightly from the front lawn to the back yard as the backyard collects runoff from the road as well as rainwater from the roof. The location of the rain garden helps keep storm water out of storm drains further below on Park St. There are no roadside ditches or curbs on Estabrooks Street, so the rain & storm water travel downslope from the property across the street, into the front yard, and continue across the property down to the backyard where there has been evidence of flooding observed by the homeowners. The 100 sq ft rain garden was planted with the help of 3 volunteers and one homeowner. During the planting it was raining, and town staff came to house next door to investigate reports of flooding at that location. These next-door homeowners decided they too would look into a rain garden for the future. The homeowner committed to looking after his garden. The garden contains the following plants:

Plant	Count
Aster	7
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	7
Black Eyed Susans	15
Blue Flag Iris	10
Monarda	10
Blood Root	5
Ostrich Fern (Fiddle Heads)	
Native Sedge	
Sweet grass	
Rush	
Labrador Tea	
Total	**87**

30 Squire St.

This rain garden was placed in a publicly visible location between two driveways on Milner Avenue (the back entrance to 30 Squire). This street sees foot traffic from people walking to the Sackville Waterfowl Park entrance at the end of Morgan Ln. Water from 3 neighbouring backyards, and off of the garage roof, flow downwards towards the road. This rain garden will collect the water before it reaches the road, preventing it from entering the storm drain system. It is a small 50 sq foot garden containing 39 plants. One volunteer helped plant the garden. The garden contains the following plants:

Plant	**Count**
Aster	6
Echinacea	1
Spotted Joe Pye Weed	5
Swamp Milkweed	10
Pink Turtlehead	
Black Eyed Susans	
Blue Flag Iris	
Monarda	5
Blood Root	5
Ostrich Fern (Fiddle Heads)	5
Native Sedge	2
Sweet grass	
Rush	
Labrador Tea	
Total	**39**

76 Salem St.

Water collects and pools on the driveway located on the left-hand side of the house. There are no eaves on the house, so all the rain falls off of the roof as well. There is a slight slope, so the stormwater tends to flow off of the driveway towards the backyard. This rain garden will collect the storm water from the driveway, as well as off of the neighbors shed roof. The garden was dug in part of the heavily compacted gravel driveway as the homeowners wanted to reclaim some of the large parking area. This site was effectively a depaving site which received a rain garden. The homeowners spent many hours digging out the 100 sq foot garden. Thus, we had 4 volunteers help dig and plant the garden. The homeowners were thrilled to receive so many plants and apart from committing to maintain the garden, they also promise to share the plants once they grow and need to be divided. They are looking forward to helping create other rain gardens with their plants in the future. The rain garden is visible from Union St. The garden contains the following plants:

Plant	**Count**
Aster	9
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	8
Black Eyed Susans	10
Blue Flag Iris	10
Monarda	10
Blood Root	5
Ostrich Fern (Fiddle Heads)	5
Native Sedge	3
Sweet grass	0
Rush	0
Labrador Tea	0
Total	**93**

98 Salem St.

This 100 sq ft rain garden is located near the front of the property next to the house. It is an extension of a pre-existing garden. Runoff flows downslope from the driveway to the back field of the property where there is evidence of flooding in the spring. This rain garden will help catch water from the driveway, as well as part of the roof, as one of the eaves is directed toward the proposed garden location. Two volunteers and one homeowner helped with the garden. The garden contains the following plants:

Plant	**Count**
Aster	9
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	8
Black Eyed Susans	10
Blue Flag Iris	10
Monarda	10
Blood Root	5
Ostrich Fern (Fiddle Heads)	5
Native Sedge	
Sweet grass	
Rush	
Labrador Tea	
Total	**93**

30 Union St.

This rain garden was planted to catch rain off the garage roof and the sloped backyard. The site was changed from the proposed front lawn to the backyard because it receives more rainwater pooling, and a rain garden would be more beneficial there. It will help catch rain and reduce the amount of runoff that would reach a ditch behind the house. The homeowner has experienced basement flooding and has seen swampy patches in the backyard. The 100sq foot rain garden is visible from the street and was planted with the help of 4 volunteers, two children and one cat. The homeowner and her children were excited to look for butterflies that the garden would attract and committed to watering it a lot during this dry time of the summer and looking after it in the long-term. The garden contains the following plants:

Plant	Count
Aster	8
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	7
Black Eyed Susans	10
Blue Flag Iris	5
Monarda	10
Blood Root	0
Ostrich Fern (Fiddle Heads)	10
Native Sedge	3
Sweet grass	0
Rush	2
Labrador Tea	0
Total	**88**

Before *After*

4 Squire St.

This property is located in an area prone to flooding in Sackville. While the homeowners do not experience flooding on their property, they do see pooling of water in the park behind their property following a heavy rain and all the storm water on their property flows downslope to the park. This rain garden was located in the backyard to catch water downslope of the driveway before it reaches a municipal park and a street that is flood prone. The garden is visible from the municipal park at the rear of the house. The 100 sq foot garden was planted with 91 plants. Three volunteers helped the plant the garden. The homeowner committed to looking after and maintaining his new rain garden. He had many other beautiful gardens on his property. He also committed to chronicling the development of the garden and taking photos of it often to share with others. The garden contains the following plants:

Plant	Count
Aster	9
Echinacea	13
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	8
Black Eyed Susans	10
Blue Flag Iris	10
Monarda	10
Blood Root	5
Ostrich Fern (Fiddle Heads)	0
Native Sedge	3
Sweet grass	0
Rush	0
Labrador Tea	3
Total	**91**

Rain Garden Signage

As in year 2, bilingual signs were designed and made by Set in Stone of Moncton, NB using stones from the Bay of Fundy (for which they have a licence to collect). These were placed at each garden to help inform passersby that they are rain gardens. Stone was selected because it is natural and durable and blends well into the garden while still being visible and easy to read.

Bilingual rain garden sign made by Set in Stone of Moncton. Photo: A. Marlin

Rain Garden Monitoring and Follow Up

In year 3, gardens planted in summer 2019 were monitored to see how many plants survived the winter and gardens planted in summer 2020 were monitored a few months after planting to see how they did during rain events.

<u>Summer 2019 Gardens</u>

The 2019 rain gardens were monitored during spring 2020 to see how many plants survived the winter. Nine of the ten gardens did extremely well with many plant species spreading after a year. One average 85% of the plants survived the winter (see table below). Only one garden had less than 80 percent of plants return, but this is because the homeowner said she weeded too much and weeded out many of the plants we planted. All other gardens were fuller and denser than one year ago. There was one garden where only 2 of the irises survived but other plants had grown and filled in the space. And some homeowners had added other plants to their gardens including hostas, violets, allium, lily of the valley, lupins, forget me nots, tulips, daffodils, etc.

Percent of plants that survived after their first winter:

Garden	Planted	Survived	Percent Survived
9 Clarence	91	81	89%
13 Richardson	89	69	78%
39 King	89	76	85%
11 Morgan	93	64	69%
34 Queens	91	78	86%
21 West	86	75	87%
100 Bridge	76	76	100%
10 Bennet	88	70	80%
25 Harris	84	84	100%
17 West	121	100	83%
TOTALS	**908**	**773**	**85%**

Selected photos from the one-year-old rain gardens were taken in June and are below:

17 West Avenue

21 West Avenue

13 Richardson St.

10 Bennet Street. We had planted around a shrub which has since been removed by the homeowner and this is the bare patch in the garden.

100 Bridge Street. The addition of the rustic bench by the garden adds a nice touch.

25 Harris Street. The kidney shape and symmetrical planting looks great still.

11 Morgan Lane. The homeowner definitely over-weeded her garden. The perennials that remain will fill in and spread in over-time though.

9 Clarence St. Some of the irises did not survive in this garden and the homeowner has since replaced them with other flowers.

Summer 2020 Gardens

Follow up surveys and visits were done with the summer 2020 homeowners to see how their gardens were doing since planting. EOS staff also checked to see if homeowners had taken any additional steps to reduce flood risk, conserve water, or use rain as a resource. One homeowner planted more rain garden plants on other parts of her property. Another has plans to plant another rain garden with a neighbour. One homeowner chronicled the growth of his garden weekly throughout the summer and early fall. He noted how quickly things grew and filled in and the presence of bees. He also notes plans to harvest the swamp milkweed seeds and grow plants for other parts of his yard. It was a challenging summer and fall in the Sackville area with very little rain, but the rain garden still did well in more drought-like conditions and performed as expected in the rain events that did occur. More details and quotes from homeowners are presented below:

"Our rain garden is thriving! It really is beautiful; you did a wonderful job grouping things. I can easily identify what does belong…. Our neighbours and I would like to have a rain garden in between our two driveways by the sidewalk too stop driveway runoff…." – Homeowner

"I have only kept unwanted plants out and watered once a day in the morning. I lost a valerian after a week of less frequent watering, and the small trio of plants that look like round lily pads has struggled consistently. I trimmed the bee balm last week to attempt to encourage a second wave of blooms. The assortment of plants is amazing, I was happy with your groupings. I hope the nourishment of daily water will keep them going strong into the fall." – Homeowner

"The garden is still part of the driveway and I hope to keep changing this tiny yard into a more permaculture style that will improve our dry under fertile soil over time. Looking forward to rain tomorrow!" – Homeowner

"I really enjoyed the rain garden; it was fun to see what each plant turned into as it grew." – Homeowner

"I really appreciated your work; the flowers were lovely, and they served their purpose with the water. Thanks a million for doing this." - Homeowner

Rain garden in late summer (planted in a driveway to help restore the soil and absorb runoff). Photo credit: L. King

9 Brenmar Cres.

The plants at 9 Brenmar Cres. grew exceptionally well and started to fill out the garden space immediately, aside from the bloodroot which did not do well. Some plants also experienced mildew (asters & monarda). The homeowner noticed that some of the first-year plants (e.g. brown-eyed susans) had grown even better than their more mature counterparts throughout the property. This garden had the tallest joe-pye weed and irises out of all the gardens we planted. Bees were spotted in the turtlehead during EOS' fall visit and the homeowner noted that the garden provided great habitat over the summer to bees, insects, birds, etc. The homeowner expanded their rain garden, prepared an additional space near a downspout for another, smaller rain garden (we had previously identified it as a good spot during our property assessment), and acquired a rain barrel to help with water conservation on their property.

Rain garden at 9 Brenmar Cres. Photo credit: KN Croucher

Rain garden expansion at 9 Brenmar Cres. Photo credit: KN Croucher

24 Weldon St.

Most of the plants at 24 Weldon St. did well over the summer, except for the ferns which appeared to have dried up following the hot, dry summer. The coneflowers were still thriving near the back of the garden during the EOS visit in the fall. The homeowner mentioned noticing the garden did hold back the water when it rained a few times during the summer & fall. The homeowners also acquired a rain barrel to further help with water conservation.

Rain garden at 24 Weldon St. Photo credit: KN Croucher

17 Bowes Ave.

The garden at 17 Bowes Ave. grew well throughout the summer, however the ferns did not do well due to the dryness and some plants also experienced mildew (asters & monarda). Bees were flying around the pink turtlehead during the fall EOS visit. The homeowner noted that the summer was so dry that even the base of their property which is usually always damp/soggy was dry. By the fall, the homeowner expanded their rain garden into a larger kidney bean shape and acquired a rain barrel to help with water conservation on their property.

Rain garden at 17 Bowes Ave. Photo credit: KN Croucher

9 Hillcrest Ave.

The garden at 9 Hillcrest Ave. took a bit of a beating with the dryness this summer. Some of the ferns were visibly dried up on our fall visit, however the other plants seemed to have fared well.

Rain garden at 9 Hillcrest Ave. Photo credit: KN Croucher

15 Estabrooks St.

The garden at 15 Estabrooks St. did very well over the summer. The homeowners noted an improvement in the area after rainfall that usually would be soggy. During our fall visit the brown-eyed susans, coneflowers, and pink turtleheads were in bloom and thriving with lots of insect visitors. The Town of Sackville did some work on the north side of Estabrooks Street to direct heavy rain flow along the street into the homeowner's sumac patch on the east end of their property instead of into their neighbour's house.

Rain garden at 15 Estabrooks St. Photo credit: KN Croucher

76 Salem St.

The garden at 76 Salem St was planted in part of the heavily compacted gravel driveway. The homeowners wanted to reclaim and restore this section of the driveway to catch rainwater and restore the soil. They have plans to use a permaculture approach in their small backyard. The garden was planted in full sun and did very well all summer. The homeowner would like to plant an additional rain garden.

Rain garden at 76 Salem St. Photo credit: KN Croucher

98 Salem St.

The plants at 98 Salem St. did very well this summer, aside from the joe-pye weed which dried from the bottom up despite the homeowner watering (potentially due to a nearby tree taking up the water instead) and the asters & monarda experiencing mildew. The homeowner was very happy with how the garden turned out. It was their first time having pink turtleheads in a garden and they flowered very nicely. The homeowner also enjoyed seeing the swamp milkweed flower and then produce seed pods.

Rain garden at 98 Salem St. Photo credit: KN Croucher

30 Union St.

The garden at 30 Union St. did well this summer, though the ferns didn't thrive. Bees were seen flying around the garden during our fall visit. The homeowner had a backwater valve installed earlier this year (through an EOS bulk purchase) and plans to install a few gutters on the house before the snow falls.

Rain garden at 30 Union St. Photo credit: KN Croucher

4 Squire St.

The garden at 4 Squire St. looked very healthy and well organized during our fall visit. Bees were visiting the flowering pink turtlehead and black-eyed susans. The homeowners acquired a rain barrel to further conserve water on their property. The homeowner was happy with the vibrant colours in the garden throughout the season and planned to save milk weed seeds to be planted elsewhere.

Rain garden at 4 Squire St. Photo credit: KN Croucher

30 Squire St.

The garden at 30 Squire St. did well over the summer and was observed by EOS staff to be growing well in the fall. The homeowner noted that the area of their yard where the rain garden was planted was a little dryer during rain and heavy rain episodes than before. The Town of Sackville also did road work adjacent to the rain garden to help with storm water in the area.

Rain garden at 30 Squire St. Photo credit: KN Croucher

176 Charlotte St.

Despite the dry summer, the plants at 176 Charlotte St. appear to have done well. The homeowners noted that the few times we did have a good rainfall, the rain didn't pool as long as it used to. The homeowner has had a rain barrel at the back of the house for a number of years, and recently acquired a 2nd to install at the front of the house.

Rain garden at 176 Charlotte St. Photo credit: KN Croucher

Community Project for Year 3

The COVID-19 pandemic presented some challenges for our year 3 depaving plans. Salem Elementary School was unable to participate in our planned depaving & rain garden project, and we could not find any other sites where people want to give up pavement and replace with 100+ rain garden plants. However, we were able to secure a site at Richard Park, a municipal park in the Village of Dorchester. This site along the back of the park is known to experience pooling of water as it is downslope from runoff from the playground, as well as the forested area behind which is quite compacted as it was an old road/cart path historically.

EOS was able to purchase 128 plants and the Village contributed funding for another 207. Because the funding from Dorchester came only late in the spring, our plant order has some substitutions (liatris and sedum) because no more native plants could be found so late in the season. These plants are favourable to pollinators and butterflies and are often found in rain gardens. The Village of Dorchester prepared the site with topsoil. EOS staff and seven volunteers helped plant the rain garden over an 8 hour day. The Village committed to watering the garden daily until it is growing on its own and they will continue to maintain it. They also plan to plant additional trees and shrubs along the back of the park. A neighbourhood child was also interested in the garden and told us she commits to bringing a water bottle to water the garden and look for butterflies.

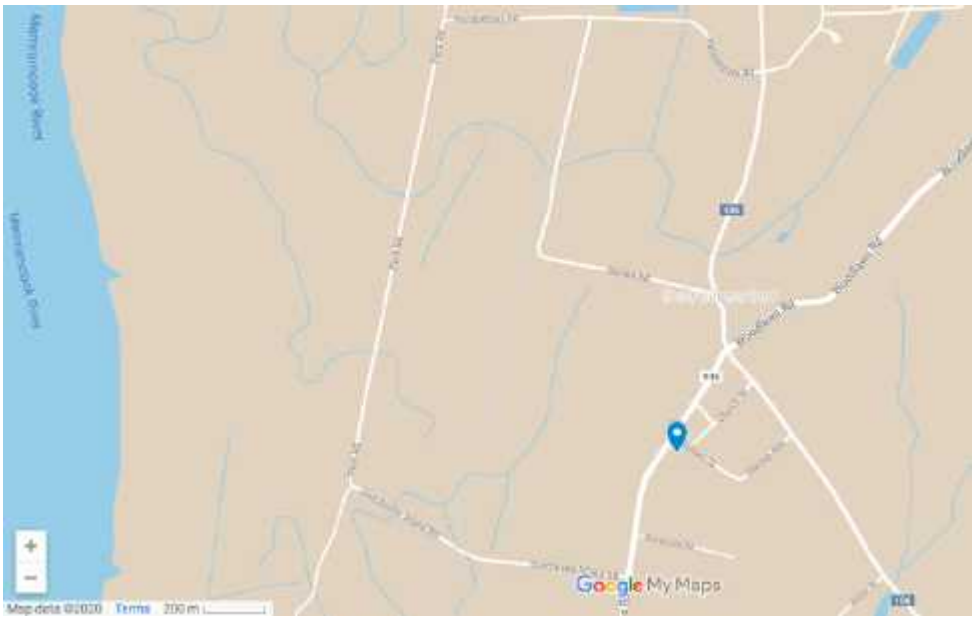
Plants in the Richard Park Rain Garden, Dorchester, NB

Plant	**Count**
Aster	12
Echinacea	15 + 30
Spotted Joe Pye Weed	10
Swamp Milkweed	10
Pink Turtlehead	5
Black Eyed Susans	15
Blue Flag Iris	14 + 4
Monarda	10
Blood Root	20
Ostrich Fern (Fiddle Heads)	17
Native Sedge	0
Sweet grass	0
Rush	0
Labrador Tea	0
Butterfly weed	62
Sensitive fern	10
Liatris	30
Day lily	20
Sedum autumn joy	32
Native holly	12
Total	**128+207**

Planting the Dorchester Rain Garden. Photo credit: A. Marlin

Freshly planted Dorchester Rain Garden. Photo credit: A. Marlin

Location of Village of Dorchester Rain Garden



Signage in Richard Park

EOS commissioned a large stone sign depicting both funders for the rain garden in Richard Park in Dorchester.

Rain Garden Sign. Photo credit: L. Clark

Monitoring

A follow up visit was performed later in the fall to see how the rain garden did throughout the summer. The Village thought the rain garden project worked out great. They stated that "The garden has helped beautify a section of Richard Park which has needed attention for many years. The project was the motivator to clean up the area." The garden creates "a pleasing transition from park to wooded area where trails are being added". The plants all seemed to do very well at this location. It was great to visit the garden at different times throughout the summer & fall to see the colour scheme change as the different plants flowered.

Dorchester Rain Garden in the fall. Photo credit: KN Croucher

Education, Promotion and Commitments

The project in year 3 had some challenges regarding outreach and education due to the COVID-19 pandemic (no local newspaper, no festivals to have information booths at, etc.) but a number of educational and promotional activities were still able to take place.

Media Coverage

The Dorchester Newsletter (August 2020 edition) featured an article about the Dorchester rain garden which can be found at: https://dorchester.ca/wp-content/uploads/2020/08/AUGUST-2020-Newsletter-FINAL.pdf. The community newsletter goes out to 1000 residents in Dorchester. The Summer 2020 edition of the EOS newsletter (mailed to over 450 people) also featured articles on our rain gardens with photos and links to our rain garden how to guide.

The Village of Dorchester and EOS Eco-Energy Partner to Plant a Rain Garden

By Truman Wood, Summer Intern

On July 1st 2020, EOS Eco-Energy, the Village of Dorchester and volunteers planted a rain garden in Richard Park with funding from TD Friends of the Environment Foundation and Environment and Climate Change Canada's Eco Action Fund. A rain garden starts with a shallow depression dug in the ground that is then planted with native deep-rooted and water-loving plants. The plants help take up excess rainwater and their deep roots help break up the soil to improve water filtration into the ground. This new addition to the park consists of over three hundred of these deep-rooted native plants that will help reduce stormwater runoff, improve water quality, and prevent localized flooding and erosion in the area. As an added bonus the rain garden will also provide a habitat for butterflies and pollinators. If you'd like to plant your own rain garden, check out the EOS website for more information including our handy how-to guide and plant list.

EOS and Volunteers Planted 11 Rain Gardens in Sackville this Summer!

By Amanda Martin, Executive Director

EOS had a busy spring and early summer planting 11 rain gardens thanks to funding from Eco Action (Environment and Climate Change Canada). The rain gardens are on various residential properties in down Sackville. Thank you to all the homeowners for committing to look after their gardens and for doing their part to reduce flood risk in Sackville. All plants were purchased locally from Anderson's Greenhouse. If you'd like to plant your own rain garden, check out the useful EOS how to guide and send EOS a photo or video of your garden.

Rain garden information in the EOS Summer Newsletter.

EOS Rain Gardens on YouTube and Facebook

EOS also a shot a video for our Youtube Channel while planting a rain garden this year in order to further promote the gardens and why you should plant one. The video can be seen here: https://www.youtube.com/watch?v=ORM_Yqjk3uw and has received 35 views to date on Youtube and another 177 on Facebook. We also shared posts about rain gardens on our social media pages such as Instagram and Facebook. There are 871 people who follow EOS and our posts on Facebook.

Rain garden Youtube video

Rain Barrel Education and Give Away

In fall 2020 EOS offered a rain barrel give away. Very quickly all 29 wooden barrels hand made from the Acadian Village were given out and there as a waiting list with 16 more names on it. See Appendix 1 for the maintenance handout that EOS created to go along with each barrel. We also gave out a bilingual educational brochure about water conservation. The brochure is also available for free at: https://eosecoenergy.com/en/wp-content/uploads/2018/03/water-conservation-flyer-final-2014.pdf

EOS gave out 29 free wooden rain barrels. Photo credit: K-N Croucher

Challenges

The Covid-19 pandemic presented a few unexpected challenges for the project in its third and final year, but EOS found ways to overcome them all. Salem Elementary School was meant to be the site of the second depaving project. A section of the playground was going to be depaved by students and replanted with a 100 sq foot rain garden in the spring. However, due to Covid-19 the school closed in the spring and so EOS had to look for another location. Luckily, the Village of Dorchester, NB was keen to have a rain garden planted in part of their downtown municipal park that had been prone to flooding. EOS and the Village found additional funding from TD Friends of the Environment to create a larger 350 sq foot rain garden. Thus, in the end we were able to restore a larger area of land and plant more plants than originally planned.

The pandemic also meant it was a challenge to promote the project and do community outreach. There were no community festivals or events, and even our local newspaper folded and closed due to Covid-19. However, EOS used its seasonal newsletter, website and social media sites, including Youtube, to help spread messages about the benefits of rain gardens.

Covid-19 presented limits on gatherings during spring and summer 2020 and so this meant no volunteers could help plant the gardens other than homeowners. All EOS staff also helped plant the gardens and while sometimes it took longer to plant a garden than it did in the past, we got the work done and the gardens were completed successfully.

It was a very dry summer and fall which meant homeowners had to keep a more careful eye on their gardens and water them more frequently. Despite the dry weather, all gardens were in good shape when we monitored them in the fall and some of the homeowners had mentioned that when it did rain, their properties were better able to absorb the rainfall and run off compared to before they had a rain garden.

Despite the above challenges, the rain gardens are still performing their function and will long into the future. All challengers were overcome, and a successful project was completed on time and on budget.

Next Steps and Recommendations

EOS highly recommends the planting of rain gardens locally and across Canada. They are easy to dig and plant and have multiple benefits for freshwater management and help to build community resilience to climate change. The native, water-loving plants have deep roots and help increase the permeability of the soil. Additional sites in Sackville, NB for more rain gardens were noted throughout year 3 of the project. These sites became known to EOS either by noticing more areas that flood during rainstorms, or from more homeowners requesting a rain garden later in the year. Sackville locations include sites along Pickard Place, King St, Salem St and the lower side of Estabrooks St. There is a lot of potential to continue planting more rain gardens in the future in Sackville, NB.

Summary of the Project

Year 3 Summary Results

The results for year 3 of the project saw 12 rain gardens planted. This included 1,222 plants and 1350 sq feet or 125.42 sq meters of area restored. The community project in Dorchester's Richard Park covered an area of 350sq feet. A total of 44 volunteers helped with the rain gardens in year 3 and at least 1750 people were reached with educational and promotional information. Thirteen homeowners and their family members committed to looking after their gardens, sharing plants in the future, helping others plant gardens, learning about the plants, and chronicling the growth of their garden, etc. Additional site visits and follow up surveys/questions with homeowners revealed that some of them had taken additional steps to reduce flood risk at their homes such as extending their rain gardens, flood proofing their basements, getting a rain barrel or second rain barrel, etc.

Summary of the Project

The table on the next pages summarizes and combines results from years 1, 2 and 3. Our original goals were all met or surpassed and the project was highly successful.

Summary Results of Entire Project

Indicator	Year 1	Year 2	Year 3	Total	Original Goal	Difference
Area of habitat restored	n/a	92.9 sq m	9 x 100 sq 2 x 50 sq ft 1 x 350 sq ft Total = 1350 sq ft or 125.42 sq m	310.32	180 sq meters	We restored 130.32 sq meters more than originally planned
Native plants planted	n/a	908	1015 + an extra 207 plants in Dorchester park rain garden	2130	2000	Surpassed the goal by 130 plants
Percentage of plants that survived the first winter	n/a	85%	n/a	85%	80%	+5%
People reached via project activities (education and promotion)	380	1000+	1662+ (450 EOS mailing list, another 300 from Facebook, 1000 population in Dorchester who receive village newsletter, 212 people who viewed video)	3042+	3000	42 people beyond our original goal
Jobs created	3	4 EOS staff people worked on this project including the executive director, watershed coordinator and two summer students.	3 EOS staff people worked on this project	3 to 4 jobs over the course of the project	3 jobs	Met the goal
Volunteers (helped with rain gardens)	n/a	93	44	137	120	Surpassed the goal by 17 people
People who said they would modify their behaviour	n/a	21 commitments were gathered during #RainAsAResource campaign in year 2	13 homeowners and their family members committed to looking after the gardens, sharing	63	35	Surpassed by 28 people

			plants in the future, helping others plant gardens, etc. 29 people participated in our rain barrel give away and will be conserving more water.			

Appendix 1 – Rain Barrel Handout

ECO-ENERGY
ÉCO-ÉNERGIE

How to take care of your wooden rain barrel

Initial set-up

- To open up the barrel: take the top metal ring off, take the lid off, and put the ring back on. Give the bottom boards a knock to ensure they are tightly in place.
- Place opened barrel under down spout.
- The barrels may leak at first. A few days after it's been filled with water, the wood will expand and become water tight.

Winter care

- In the late fall, before the weather gets too cold, drain all the water from the barrel to prevent it from freezing and expanding.
- Barrels can be stored inside or outside over winter. If storing outside, covering your barrel with a tarp will prevent the wood from becoming too dry and will help retain the humidity to keep the barrel water tight once rain returns in the spring.

Dry weather

- Dry weather can cause the wood to dry out and the metal rungs to slip. If this occurs, press the rungs into their original position and add water to the barrel. Wait a few days for the wood to expand and become water tight. Note: This can occur again in the spring if the wood has dried out significantly.

What's your aesthetic?

- For a more natural, rustic look, you can let your rain barrel weather and gray naturally.
- If you would like to preserve the colour of the barrel, a water and weather sealer can be applied to bring out the grain of the barrel or you can use a wood finish to stain the barrel a colour of your choice.

New Barrel

Naturally Weathered Barrel

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Environment and Climate Change Canada | Environnement et Changement climatique Canada

New Nouveau Brunswick