



SAWIG

Stratford Area Watershed
Improvement Group

Management Plan
2023



Fullerton's Conservation Park. Credit: Odyssey Virtual, Michael Thompson

This Watershed Management Plan is the result of input from community members and watershed specialists alike. Further suggestions are appreciated, and essential for the continued success of the Stratford Area Watershed Improvement Group.

Please forward your comments to:
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Thank you for your support!



STRATFORD AREA
WATERSHED IMPROVEMENT GROUP

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
LAND ACKNOWLEDGEMENT	2
ACKNOWLEDGMENTS	2
AUTHORSHIP	4
MANAGEMENT FRAMEWORK	4
The Formation of the Stratford Area Watershed Improvement Group	4
Vision and Mission Statements	5
Board of Directors	5
Staff Members	6
Communications and Social Media	6
How To Get Involved	6
Membership	6
Volunteering	7
BACKGROUND INFORMATION	8
History of the Land	8
Physical Description	8
Sub-Watersheds	8
Natural Resources and Land Use	9
Agriculture	9
Forestry	10
Urban	11
Parks and Recreation	11
Aquatic and Riparian Zones	11
THREATS AND CONCERNS	13
Climate Change	13
Human Activity	16
Habitat Loss/Fragmentation	16
Runoff/Infiltration	17
Groundwater Recharge	17
Sound and Light Pollution	17
Litter	17

Erosion and Sedimentation	18
Invasive Species	19
Eutrophication	19
Organisational Capacity	20
Planning	20
MAJOR GOALS AND OBJECTIVES	22
Goal 1: PROTECT	22
Goal 2: PRESERVE and ENHANCE	22
Goal 3: EDUCATE	23
Goal 4: COLLABORATE AND ADVOCATE	23
Goal 5: ACQUIRE	24
Goal 6: IMPROVE	24
MAJOR ACCOMPLISHMENTS	25
Native Species Planting	25
Water Quality Monitoring	26
Invasive Species Surveys and Management	26
Coastal Health, Sedimentation and Erosion Control	27
Stream Enhancement	28
Stratford Community Gardens and Pollinator Gardens	28
Birdhouse/Birdfeeder Workshop	29
Water Conservation Outreach	29
Water School	29
Water Audits	30
Fix a Leak Week	30
REFERENCES	32
APPENDIX	35
Glossary of Watershed Terms and Acronyms	35
Funding Partners	37
List of Hyperlinked References	38

EXECUTIVE SUMMARY

The Stratford Area Watershed Improvement Group (SAWIG) is an environmental organisation that spans rural and urban communities situated on the southern shore of Prince Edward Island, across the Hillsborough River from Charlottetown. SAWIG was incorporated in 2009 by a group of community members concerned with the health and sustainability of the Stratford Area watersheds.

All aspects of life depend on the health of an area's water resources, and it is imperative that every effort be made to enhance and improve water quality. All flora and fauna in the region are connected to the watershed, and any activity performed, therefore, has an impact on the entire system. Given this interconnection, it is crucial land use planning considers all facets of the environment.

Vision Statement

We envision a community that works together to build, sustain, and restore healthy and biologically rich watersheds.

Mission Statement

To be leaders in protecting, educating, and fostering appreciation of our watersheds while ensuring the ecological integrity of Stratford and surrounding areas for present and future generations.

Our organisation has had a steady increase in the management of larger and longer-term projects. Here are some examples:

- We have worked with the Town of Stratford since 2010 on the **WaterSchool ("Water-is-Cool") Program**, a full-day watershed education and water conservation teaching initiative for students in the Stratford and Charlottetown area.
- We have planted over 10,000 trees and shrubs and have provided over 4,000 trees and shrubs to our members at SAWIG's annual **Tree Day** events.
- We have long-standing **working relationships with landowners** who allow us to conduct fieldwork on their properties such as: brushmat installation, water quality monitoring, and invasive species removal.



WaterSchool (2019)

LAND ACKNOWLEDGEMENT

“The Stratford Area Watershed Improvement Group acknowledges that our watersheds are located within the traditional and unceded Mi’kmaq territory. We pay our respect to Indigenous people of their territory, past, present and future.”

-Land acknowledgement created with assistance from the Mi’kmaq Confederacy of PEI

In addition, the Stratford Area Watershed Improvement Group aims to work with the Mi’kmaq to restore and sustain the land for current and future generations.



Province of PEI's Mi’kmaq place name sign installed in 2021, just outside of the Town of Stratford. Credit: Logan MacLean

ACKNOWLEDGMENTS

Watershed planning and implementation is an ongoing process that requires frequent attention and input from local residents, organisations, businesses, and all levels of government. The success of the Stratford Area Watershed Improvement Group is a result of this collaboration.

Management Plan Funding

The *BioTalent Canada's Science Horizons Youth Internship Program* provides wage subsidies to help recent graduates enter the environmental job field. Thank you BioTalent Canada for funding a significant portion of the wage used to update SAWIG's Management Plan. The Town of Stratford has also been a valuable participant in the development of SAWIG's Watershed Management Plan. Finally, the *Watershed Management Fund*, distributed by the P.E.I. Department of Environment, Energy and Forestry, grants financial support to watershed groups across the province. This fund provided a financial base for the development of the SAWIG Management Plan as well as its revisions.

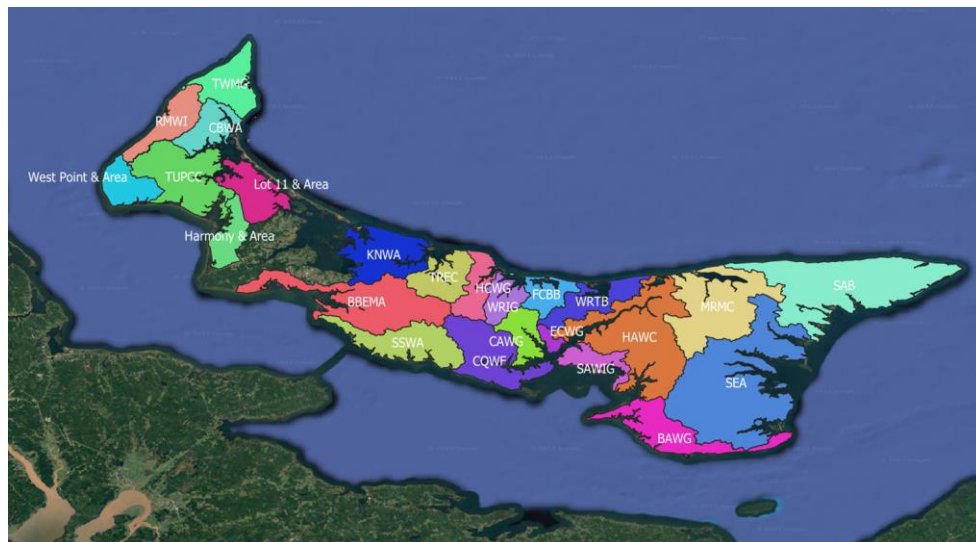
Community Members

Thank you to the many members of the community who have attended watershed meetings over the years and contributed their valued opinions to the planning process. Without their involvement, SAWIG's Management Plan would not be an accurate representation of the needs of the community.

Prince Edward Island Watershed Alliance



The PEI Watershed Alliance is an umbrella group that acts as a unified voice for all island watersheds. The Alliance's partnerships with non-watershed groups significantly help SAWIG and other watersheds work towards their conservation goals. SAWIG is a founding and active member of The PEI Watershed Alliance and routinely attends meetings, webinars, AGMs, and workshops.



PEI Watershed Alliance group boundary lines (2023)

AUTHORSHIP

The 2023 updated document was written by Watershed Project Manager Lily McLaine (right), with assistance from Watershed Coordinator Kaylee Busniuk and Board Members Mary-Ellen MacMillan, Mary Hughes, Tyler Power, and Connie Gaudet.



Initial drafts of the Watershed Management Plan were written by previous Coordinators Kelley Farrar and Maddy Crowell with input from members of the Board of Directors.

MANAGEMENT FRAMEWORK

The Formation of the Stratford Area Watershed Improvement Group

The Stratford Area Watershed Improvement Group (SAWIG) was created in 2009 by a group of 14 community members concerned with the preservation and enhancement of the Stratford Area sub-watersheds. The process began with regularly held meetings among interested area residents. These included members of the agricultural sector, landowners, government representatives, as well as various local organisations and businesses. The result of public meetings was a list of concerns and goals to be addressed and prioritised by the watershed group.



Watershed Bus Tour (2009)

SAWIG's main governing document is our [bylaws](#). The bylaws regulate the conduct of directors, executive officers, and stakeholders, as well as SAWIG's internal affairs. This includes defining management's duties, meeting procedures and miscellaneous protocols that affect the organisation.

Vision and Mission Statements

To further promote SAWIG's goals, a vision and mission statement were sanctioned in 2022 and officially adopted at the 2023 Annual General Meeting (AGM).

Vision Statement

We envision a community that works together to build, sustain, and restore healthy and biologically rich watersheds.

Mission Statement

To be leaders in protecting, educating, and fostering appreciation of our watersheds while ensuring the ecological integrity of Stratford and surrounding areas for present and future generations.

Board of Directors

SAWIG's Board of Directors consists of Executive Officers (President, Vice-President, Treasurer, Secretary) and Directors at Large which are voluntary positions and voting members of the board. In addition, we have a representative from the Town of Stratford and also hold space for interested youth members to join. These two positions are non-voting positions on the Board. The roles of our voting members of the board are outlined in our bylaws.

Non-Voting Positions

Town of Stratford Representative: This seat is occupied by the Town of Stratford's Environmental Sustainability Coordinator. Tasks include managing the town's environmental initiatives and programs, assisting town staff with environmental sustainability strategies, and establishing and maintaining funding opportunities.

Youth Member: SAWIG has participated in the provincial government's Youth-on-Board program to introduce youth to the non-profit sector and encourage volunteerism within rural regions of Prince Edward Island. Additionally, we hold space for interested youth members to join apart from the program. These seat(s) are filled as interest arises and therefore, may not be filled each year.

Staff Members

Watershed Coordinator: Full-time year-round, employed by SAWIG and reports to the Board of Directors. Work includes applications for funding opportunities, reporting requirements for funding, developing projects, maintaining financial records, overseeing and coordinating staff, liaising with landowners, and maintaining a working relationship with other organisations.

Watershed Project Manager: Full-time year-round employee, if funding is available, and reports to the Watershed Coordinator. Work includes the revision and updating of documents and reports, leading and implementing projects, assisting the coordinator, and data management.

(Seasonal) Field Crew Supervisor/Project Lead: Employed by SAWIG and reports to the Watershed Coordinator (or Project Manager). Work includes supervising summer student field work, and assists with leading field work efforts, outreach, and data entry.

(Seasonal) Seasonal Staff/Students: Employed by SAWIG and report to the Field Crew Supervisor/Project Lead. Work includes performing fieldwork, data entry, and assisting with outreach and report writing.



Summer student (2018)
Credit: Winston Maund

Communications and Social Media



SAWIG maintains a community presence through multiple sources of traditional electronic and print communications, as well as social media. We include content in the Stratford e-Newsletter as well as the seasonal print publication Stratford's *Town Talk* mailed to all C1B postal codes. We also regularly participate in interviews on local television, radio, and print journalism ([SAWIG Media Coverage](#)). The Town of Stratford also maintains a section about SAWIG on their website listed in the *Naturally Stratford* section on the Town of Stratford [website](#).

SAWIG also maintains a website at www.stratfordwater.com and social media profiles. Follow us on Facebook ([@Stratfordwatershed](#)) and Instagram ([@stratfordwatershed](#)).

How To Get Involved

Membership

Stratford and surrounding area residents interested in getting involved and supporting SAWIG. In previous years, our group has sold annual [memberships](#) to the public and corporations. As of 2023, these memberships have been redesigned to be free of charge, however donations are encouraged. SAWIG always welcomes new members and volunteers to aid in the enhancement of the Stratford Area sub-watersheds.

Volunteering

“Community engagement is a priority for SAWIG because not only was our watershed group created by members of this community, but it was created for them as well.”

- Tyler Power, SAWIG Secretary

As an urban and rural watershed, we recognize the importance of community involvement for the long-term continuation of SAWIG's activities. Our management strategy will continue to create opportunities for community members and groups to participate in volunteer activities.

Some of our past volunteer activities include:

- Litter pickups
- Tree and shrub planting
- Community and pollinator garden construction
- Trail maintenance
- Invasive species removal
- Living shoreline building

If you are a community member that is interested in contributing to better water quality, species diversity, and healthy ecosystems, we encourage you to [contact us](#) and get involved in this important work!



Living shoreline installation (2021)

BACKGROUND INFORMATION

History of the Land

The Mi'kmaq people were the first to occupy and manage natural resources in what we now call the Stratford and surrounding area. Mi'kmaq families frequented both seasonally and permanently. There is only brief written evidence of encampments on land like Trout Point and Indian Cove in the Southport and Rosebank areas from 1859 to 1932. In addition, this watershed also has an Acadian history, dating back to the 1750's when several families settled in the Bunbury area.



Kelly's Pond, Southport.
Credit: Archives

Although predominantly an agricultural region, other early activities relied heavily on Stratford's water resources, such as shipbuilding, brickmaking, shingle-making, and dairy pasteurisation. Eventually, non-farming developments emerged in the vicinity of Ferry Point. This transportation and commercial hub moved to a new location with construction of the Hillsborough Bridge one kilometre northeast in 1905.

The official Town of Stratford was incorporated in 1995 and currently has a population estimate of approximately 12,414 people (2022) and has an area estimate of 22.5 square kilometres (5567.3 acres) (Population Statistics, 2022, Town of Stratford, n.d.b).

Physical Description

Sub-Watersheds

SAWIG's management area consists of five sub-watersheds, across the Hillsborough River from Charlottetown, Prince Edward Island.

The geographic area is an estimated 92 square kilometres and extends north to Mermaid, west to the Hillsborough River, south to the Northumberland Strait, and east to the Earnscliffe peninsula. SAWIG boundaries encompass the Town of Stratford and adjacent communities including Alexandra, Hazelbrook, Pownal, Mermaid and Earnscliffe.

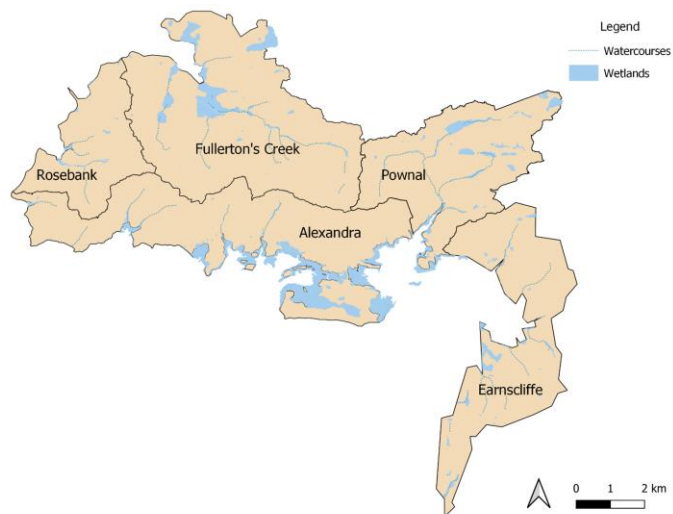


Fig 1. Sub-watersheds of the Stratford Area Watershed Improvement Group.

The topography of the Stratford area varies greatly with an elevation rise to 88.7 metres along the southern coast, in addition to a significant number of watercourses, and 62 kilometres of coastline.



Aerial View of the Stratford Area Watershed (2021)

Credit: Google

Natural Resources and Land Use

Land use in Stratford and surrounding areas has varied greatly over time, with an assortment of agricultural land, forest stands, commercial properties, and private residences existing within SAWIG boundaries. It is our hope that land use practices are also evolving to better prioritise our natural assets and preserve their ecological value.

Agriculture

Agricultural land makes up the largest component of our watershed. The total area of agricultural land within SAWIG's boundaries is 4385 hectares.

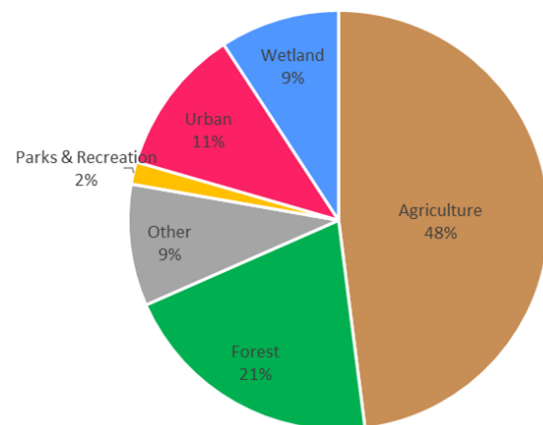


Fig 2. Average land use in the SAWIG watersheds. Data from PEI Department of Environment, Energy, and Climate Action, 2010. Data from 2020 has yet to be released.

Farming is present in all five of SAWIG's managed sub-watersheds, most prominently in rural areas including Alexandra, Pownal, and Earnscliffe. Commonly rotated crops include corn, potatoes, cabbage, squash, and forage crops.

Forestry

Within the boundaries of the Town of Stratford, there is an estimated 4.77 square kilometres of forest stands, while 14.8 square kilometres are forested within the five sub-watersheds managed by the Stratford Area Watershed Improvement Group (Town of Stratford, 2021a).

Table 1. Forested Land Breakdown of SAWIG Watersheds.

Watershed	% Forest	Acres	km²
Rosebank	9	190	0.77
Fullerton's Creek	23	926	3.7
Alexandra	21	1077	4.4
Pownal	30	112	4.5
Earnscliffe	18	766	3.1

Data from PEI Department of Environment, Energy, and Climate Action, 2010.

Data from 2020 has yet to be released.

All of Prince Edward Island belongs to the Wabanaki Acadian Forest Region which contains a rich variety of trees, shrubs, wildflowers, and other forest plants. Through natural succession the trees within the Wabanaki Acadian Forest would become an uneven, multi-aged stand-in structure, with the average age of dominant shade-tolerant trees being approximately 150 years; there would be plenty of standing dead and dying trees, with a copious amount of fallen, coarse woody debris in varying states of decay on the forest floor. Natural regeneration of trees would also occur within gaps of the canopy. This system would be self-sustaining and provide valuable habitat for old-growth dependent wildlife, such as den animals, cavity nesting birds, mammals, and lichens (Macphail Woods, n.d.; Mosseler et al., 2003).

The amount of old growth Wabanaki Acadian forested land has reduced drastically in the Stratford area most significantly in the past two decades. The Stratford area's remaining forested areas are a natural asset and are at risk of development and encroachment (Town of Stratford, 2021b). SAWIG's forest restoration efforts aim to emulate natural regeneration and help forest stands return to their previous states with minimal human intervention. In addition, we aim to return areas previously deforested back to healthy ecologically rich forests.



SAWIG staff at a workshop at the Morell River, an example of a healthy forested watercourse (2022)

Urban

The continual urbanisation of the Stratford Area watershed is to be expected given Stratford's increasing population and planned developments (ex. The Crossroads development) (Chang, 2021). Land use within the town boundaries is primarily residential; approximately 4667 private residential dwellings have been built in the municipality alone. Development makes up 62% of Rosebank's area, but only 11% in Fullerton's Creek (Government of Canada, 2023). This indicates that growth has remained mostly centralised within the Town of Stratford boundaries; however, we anticipate that developments will continue to expand outside of the town and into SAWIG's rural communities.

Commercial land use is also increasing in core urban areas as Stratford builds towards more retail activity downtown as well as in the Stratford business park. Currently approximately 193 registered businesses are located within the Town of Stratford (Town of Stratford, 2018).

Parks and Recreation

SAWIG's boundaries include approximately thirty-five parks, nine playing fields, and a multitude of trail systems. Although these spaces amount to a small percentage of overall land use, they offer significant social and ecological value. SAWIG partners with the Town of Stratford to enhance and protect parks and open spaces from threats including development, pollution, biodiversity loss, and climate change. This work is important as natural areas function to improve air and water quality, increase connectivity, improve mental wellbeing, and act as conduits for teaching environmental awareness and appreciation (Barton, J., & Rogerson, M., 2017; Environmental Protection Agency, 2022).



Horton Park (2022)

Aquatic and Riparian Zones

Our aquatic geographical features are diverse, with fifty-six kilometres of watercourses, over one-hundred kilometres of riparian zones, and over twelve-hundred hectares of wetland, including both salt and freshwater marshes. However, wetlands constitute a small percentage of land use of the watershed, and coverage varies from 1% in Rosebank to 12% in Alexandra. Some notable wetlands and tributaries boasting a variety of flora and fauna include: Belleview Cove, Fullerton's Marsh, Mount Mellick Marsh, Reddin Creek, and Crown Point (a portion of which is protected in perpetuity by Island Nature Trust).

Wetlands are a vital element in any watershed and it is imperative they are preserved. Society is slowly changing its view that wetlands are low-value parcels of land, often previously used as landfills, and now understand that they perform critical tasks that allow a watershed to function efficiently as a whole. Wetlands provide services such as flood control, carbon sequestration,

water filtration, shoreline protection, groundwater recharge, ecosystem support, climate stabilisation, erosion control, and nutrient retention (Tomlin et al., 2019).

All of SAWIG's freshwater ponds and streams eventually feed into the Hillsborough River and Northumberland Strait. Ponds and streams play very important roles in our watershed such as flood mitigation, water purification, transportation, and supporting countless aquatic and terrestrial species (Environment, n.d.). Some notable streams and ponds in the Stratford sub-watersheds include Kelly's Pond, Moore's Pond, Jack's Creek, Pownal Creek, Kinlock Creek, and the tributaries of Fullerton's Marsh. SAWIG plays a critical role in the protection and restoration of these freshwater ecosystems.



Belleview Cove Salt Marsh (2021)
Credit: Kevin Chundooa

A buffer zone is a protected area alongside watercourses and wetlands (coastlines, stream banks, floodplains, etc.) (Department of Environment, Energy and Forestry, 2012). SAWIG protects and restores buffer zones because they are an effective and successful method of combating soil erosion and watercourse siltation as well as assimilating contaminants from surface runoff water. With over 32 kilometres of buffer zones in Stratford, their value cannot be understated.



Progression of the Kelly's Pond buffer zone restoration facilitated by SAWIG (left to right: 2001, 2010, and 2020).

THREATS AND CONCERNS

There are many ways that the ecosystems in our watersheds are being negatively impacted; SAWIG recognizes that these threats must be addressed in watershed management planning.

As both an urban and rural watershed, SAWIG faces a diverse list of environmental threats and concerns. These threats and concerns may differ between areas because rural watersheds have greater water infiltration and less development than urban watersheds (CRD, 2013). Since the Town of Stratford was once the fastest developing municipality on Prince Edward Island (2011-2016), and continues to grow rapidly today, we recognize this steady increase in development will continue to directly affect water supply and quality while indirectly impacting ecosystems in the town and surrounding rural areas (Town of Stratford, n.d.a).

Climate Change

Despite PEI being a low emitter of national greenhouse gases (0.3%), as a small low-lying island, we are (compared to other areas) significantly impacted by the effects of climate change.

The PEI 2021 Climate Change Risk Assessment determined that the most significant risks facing PEI result from the following hazards (Asam et al., 2021):

- Coastal erosion
- Post-tropical storms
- Heat waves
- Intense rain and flooding

According to the University of Prince Edward Island, an average of 28 centimetres of coastline is eroded on PEI each year and sea levels are projected to increase significantly (DUC, 2022). Additionally, milder winters and hotter summers will put water resources under pressure and impact a significant number of species of flora and fauna (Department of Environment, Energy and Forestry (d), n.d.).

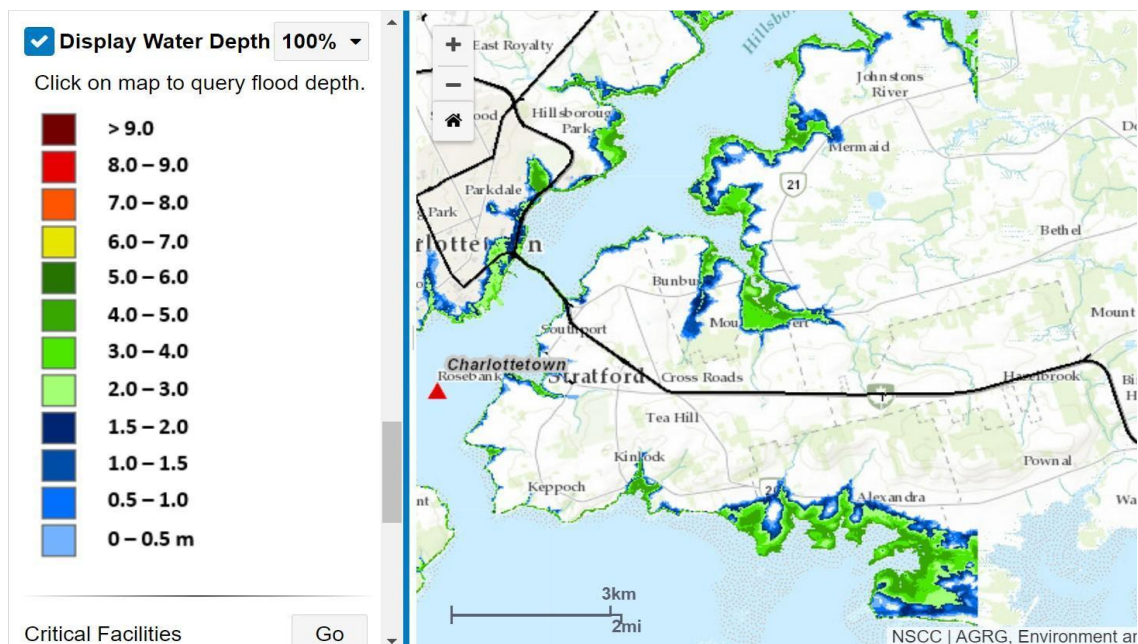
“A 30 cm sea level rise has been observed at the Charlottetown tide gauge since 1900. Climate change scenarios suggest that a rise of 100 cm can be anticipated by 2100.”

- Atlantic Climate Adaptation Solutions Association



Pondsides Park, Stratford, after hurricane Hanna (2008)

Our sub-watersheds are not exempt from these risks. Due to the many properties near coastlines or at very low elevations in relation to sea level; the increase in frequency and intensity of coastal erosion, sea level rise, storm surges, and overland flooding are looming sources of stress for homeowners.



Coastal Flood Risk Map of Stratford Area – 5 metre storm surge (2022)

Source: Maritime Real Time Coastal Flood Risk Mapping Application.

Since 2012, the Town of Stratford has conducted an Annual Residential Survey to gauge public opinion on a variety of topics including environmental responsibility. Each year, 95% - 99% of survey respondents feel it is *somewhat important* or *very important* for the Town to use resources to protect the environment (Town of Stratford 2012).

In 2010, the Town of Stratford and three other Atlantic communities were chosen by the Canadian Institute of Planners to create their own Climate Change Municipal Adaptation Plans. Stratford's plan identifies vulnerable areas and infrastructure, so flooding can be incorporated into policies and bylaws (Greene & Robichaud, 2010). Along with the creation of the Environmental Sustainability Coordinator position, the Town of Stratford has also created and worked with partners to launch programs to help home and business owners in Stratford combat climate change (i.e., PACE, Switch, Residential Tree Planting Program). SAWIG aims to work with the Town of Stratford where possible to mitigate climate change.

"Climate change is a threat not only to the physical environment, but to places valued by local communities. This includes views, historical sites, and recreational and spiritual areas. It is imperative these locations are identified and protected by the local communities that value them."

- Katie Sonier, Former Town of Stratford Data Manager



Stratford Parks post-hurricane Fiona, 2022, Left to Right: Pondside Park, Robert L. Cotton Park, Fullerton's Creek Conservation Park

Human Activity

As the Town of Stratford and surrounding communities become more populated, even with sustainable management practices, the negative impacts that come with human disturbance will be more noticeable.

Habitat Loss/Fragmentation

As an urban watershed, development and urban sprawl is a major concern to SAWIG. The number of residential dwellings has increased tremendously since our group's creation in 2009 and is expected to climb in future years. A major threat development poses is habitat loss. This loss of natural resources is felt strongly by local flora and fauna as it reduces species biodiversity and creates habitat fragmentation and degradation (University of Berkley, 2022).

Decades of clear-cutting and harvesting have significantly reduced the species richness of the Island's forest stands. Additionally, tree diseases and pathogens, including beech canker and emerald ash borer, continue to be a threat to the area, which can have a significant impact on native trees (Macphail Woods, n.d).

“Forests and wetlands act as natural carbon sinks which is why excessive clearing for new buildings and roads in Stratford is harmful to our natural areas.”

- Mary Ellen, SAWIG Vice President

Although urban development is necessary, it needs to be completed sustainably and with the environment in mind. For example, culverts should be placed low in the stream bed to enable the flow of water to naturally pass through road systems, however this is frequently not the case. Depending on the design and installation of the culvert, the end result can be habitat fragmentation, often leading to isolated pockets of aquatic communities. This is evident when outfalls are above the water surface (i.e., hanging culverts). Even a small outfall can block fish movement and prevent them from spawning in appropriate areas of the tributary (Park et al., 2008; Wheatley et al.).



Example of a hanging culvert in Stratford.



Creekside development (2020)
Credit: Town of Stratford

Runoff/Infiltration

When it comes to planning and constructing new developments, a key concern of watershed groups is changes in topography of the area. Alterations to surface contours can change runoff volume and surface drainage patterns, therefore affecting the conditions of waterways (ex. burying natural springs), infiltration rates, and the capacity of stormwater systems.

Groundwater Recharge

As the only province that solely relies on groundwater for consumable water, land-based protection must be looked at to preserve a healthy and clean environment. Groundwater extraction can often result in unintentional stream flow reduction thereby decreasing stream levels. For example, there has been evidence of over pumping in Rosebank (Kelley Farrar, 2011).

Sound and Light Pollution

Sound and light pollution are both common disturbances in dense urban areas. They disrupt human and wildlife alike by causing stress, and limiting cycles that dictate sleep and migratory instincts. The Town of Stratford has a Noise and Nuisance Bylaw that aids with the enforcement of loud and prolonged noise (Town of Stratford Council, 2009).

Litter

Garbage is often a serious but overlooked disturbance in an urban area. Litter degrades water quality by obstructing sunlight to bottom dwelling plants and animals, clogging stormwater inlets, and altering water chemistry via leaching chemicals (TDS, 2023). Garbage regularly enters stormwater systems, ditches, streams, and rivers in the Stratford Area sub-watersheds.



Litter Clean-Up (2020)

Erosion and Sedimentation

Soil erosion has been identified as the largest environmental issue on PEI. Significant erosion has occurred in numerous places throughout the Stratford and surrounding area, but particularly along the Northumberland Strait coastline, including Tea Hill Park and Alexander Point (Gov. PEI, 2022). Seawalls and shoreline armoured constructed along private properties aimed to prevent shoreline erosion, however, this has been shown to cause a higher rate of erosion in adjacent properties that have not implemented armoured measures (Howard et al., n.d.). Due to our island's fine soil particulates, erosion significantly impacts surface water quality and wildlife health through sedimentation.

The increased concentration of suspended solids in watercourses and wetlands (EPA, 2009):

- Impedes water storage of natural infrastructure,
- Puts a strain on storm water systems,
- Creates costly future restoration projects,
- Reduces water visibility,
- Blocks sunlight from aquatic plants,
- Smothers benthic organisms,
- Reduces egg-laying habitat,
- Clogs fish gills, and
- Negatively impacts land dwelling wildlife who rely on surface water.



Stream feeding into Kelly's Pond after heavy rain event (2018)

Urban development and agriculture are the main sources of sedimentation in the Town of Stratford and surrounding area. Two prime examples of sedimentation can be seen at Cotton Pond and Kelly's Pond. Both ponds have been steadily filling with sediment for several years, especially during heavy rain events. Kelly's Pond is expected to be partially dredged in upcoming years.



Cotton Pond downstream of subdivision development (2021)

Credit: Town of Stratford/Maddy Crowell

Invasive Species



Purple Loosestrife
(2019)

Since the Stratford Area Watershed Improvement Group covers both urban and rural sub-watersheds, the spread of invasive species has presented a challenge to our ecosystems.

Invasive species are non-native flora or fauna that have:

- High reproductive rates and abundance
- Fast growth rates
- Zero or few natural predators
- High dispersal abilities
- High tolerance for a range of environmental conditions
- Long seed banks (flora only)

Invasive species outcompete native species and are difficult to remove, which threatens the biodiversity of our watershed by reducing species diversity and altering habitat. They can spread via wind, moving firewood, planting invasive plants in gardens, transporting contaminated equipment from one region to another, and transporting on the bodies of animals and insects (PEIISC, n.d.).

SAWIG works diligently to combat the introduction and advancement of invasive species within our watershed. Some invasive species that are a high priority for SAWIG include Canada waterweed (*Elodea canadensis*), Garlic mustard (*Alliaria petiolata*), Yellow-flag iris (*Iris pseudacorus*), Bittersweet nightshade (*Solanum dulcamara*), and Japanese knotweed (*Reynoutria japonica*) (PEIISC, 2021).

Eutrophication

Eutrophication is the process of over-enriching a body of water with nutrients such as nitrogen, phosphorus, and minerals. These nutrients typically enter waterways via runoff from urban catchments during rainfall events.

As a watershed that is quickly urbanising, the quantity of nutrient loading in our waters is of great concern. Although normal levels of nitrogen are essential for supporting aquatic life, high levels of nitrogen can be found in PEI groundwater, as well as rivers, streams, estuaries and ponds, making it a concern for the health of islanders as well as our wildlife. Eutrophication can cause increases in algal growth, frequent anoxic events, fish kills, recreational water closures, degrade drinking water, and decrease aquatic habitat (Gov. PEI, 2022; NOAA, 2019).



Irrigation pond at Fox Meadow
Golf Course (2022)

It's important that we continue to monitor our streams while also noting surrounding land use and developing strategies to fight the increasing trend of eutrophication

Organisational Capacity

Despite the growth of SAWIG, there are projects and events that we as a group would like to expand or establish but are limited by our organisational capacity.

It's important we further our knowledge and reach in the agricultural sector as farming constitutes a large portion of the land cover in our watershed. There is a huge potential for SAWIG to partner with farmers to boost the sustainability of their land.

Additionally, SAWIG would like to host more educational events targeted to schools and youth groups/clubs. Increasing our presence and spreading environmental awareness to these groups benefits our communities greatly. Opportunities for outreach activities targeted toward students will become increasingly accessible with the anticipated high school in our area.



Macroinvertebrate identification using a microscope (2022)

Planning

SAWIG's Watershed Management Plan has been revised to serve as a blueprint to protect and improve the watershed's ever-changing water quality and natural resources. This plan will reflect the *key objectives* of the Stratford Area watershed communities while acting as a *living document* that responds to the ongoing environmental needs of the communities it serves in a sustainable way. This document will outline where we focus our energy and resources, as well as be flexible enough to assist our organisation in addressing environmental issues as they arise or encounter issues yet unforeseen. Each major issue will be included and have detailed strategies that will be implemented to address the concerns of the watershed board members and stakeholders.

Climate change is a major factor in planning practices and decision-making that will determine the health and long-term success of the sub-watersheds within the Stratford and surrounding communities. This Management Plan will be continuously revised and updated as our organisation grows, and the needs of Stratford area communities evolve.

The increasing complexity of the issues SAWIG faces with urban development, stormwater management, public education, and municipal environmental bylaws led to the change from a park-based management approach to a goal-based management approach in 2018. A goal-based approach ensures that our management efforts are being dispersed in all sub-watersheds and helps formulate SAWIG's goals and strategies moving forward. In 2021 and 2022, SAWIG's management zones were adjusted to incorporate a gain in area as well as ensure that each zone was a more ecologically accurate reflection of our 5 sub-watersheds (i.e., less waterways bisected into different zones).

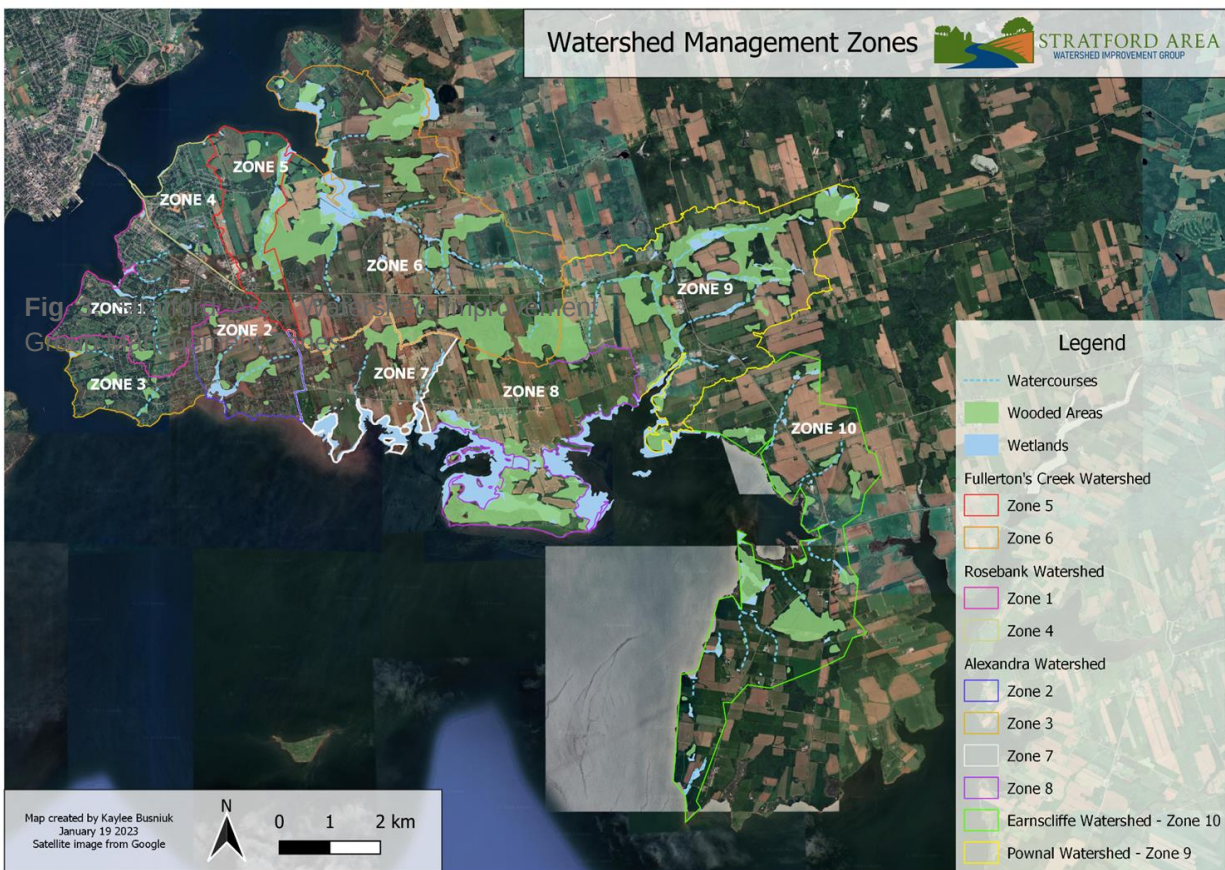


Fig. 3. Stratford Area Watershed Improvement Group management zones.

Success in watershed planning is dependent on collaboration between the SAWIG Staff, Board of Directors, the Town of Stratford, the province, and residents. SAWIG's planning process details the method by which the concerns of the community and needs of the environment translate into the Management Plan.

Planning and managing watershed activities is an ongoing process, requiring year-round and long-term funding. There is tremendous potential in the Stratford Area watershed for future activities and restorations and it is the hope of SAWIG that our work will be ongoing indefinitely, with continued support (see *Appendix* for a list of recent funding partners).

MAJOR GOALS AND OBJECTIVES

SAWIG examines and weighs threats to our ecosystem to establish goals and priorities that will have the greatest benefit to the health of the watershed and its many beneficial uses.

Goal 1: PROTECT

Protect, monitor and improve watershed ecosystems to restore stream connectivity and provide sustainable quantities of clean, safe drinking water for present and future generations by achieving acceptable CCME (Canadian Council of Ministers of the Environment) standards.

Goal 1 Objectives

1. Identify, implement, and reassess wetland and watercourse habitat restoration activities throughout the SAWIG watershed
2. Monitor chemical and physical parameters of watercourses and coastal ecosystems
3. Implement projects to reduce the amount of pollution, including litter and sediment, entering watercourses
4. Monitor developments threatening wetlands and watercourses

Goal 2: PRESERVE and ENHANCE

Preserve, enhance, and improve the structural and species diversity of watershed ecosystems to support healthy communities of plants and animals with particular attention given to coastal and riparian zones and decommissioned agricultural fields.

Goal 2 Objectives:

1. Perform assessments of watershed ecosystems as a baseline for environmental restoration and management projects
2. Encourage the retention and creation of diverse forested habitats throughout the SAWIG watershed to support wildlife by planting native tree and shrub species
3. Increase shoreline and riparian zone protection
4. Preserve and enhance habitat for pollinators, urban wildlife, and species-at-risk
5. Monitor the presence and distribution of invasive species and manage identified species with methods recommended by the PEI Invasive species council
6. Monitor developments threatening green space

Goal 3: EDUCATE

Improve community awareness, knowledge, and engagement in watershed education and our anthropogenic impacts on watershed ecosystems to increase interest in environmental stewardship.

Goal 3 Objectives:

1. Increase youth engagement in watershed management activities and initiatives
2. Develop and disseminate information on environmental issues using appropriate public outreach including social media, print, broadcast, and meetings
3. Increase volunteer opportunities for watershed residents to become engaged in their watershed at the decision-making and management level
4. Maintain a motivated, diverse, and experienced Board of Directors
5. Hold public community events including workshops, seminars, field trips and meetings to disseminate information about watersheds and receive feedback for future events
6. Encourage exemplary behaviours that contribute to watershed management within the SAWIG area

Goal 4: COLLABORATE AND ADVOCATE

Enhance and establish partnerships with community members, businesses, organisations and government departments to actively engage in watershed management and to take initiative to protect and manage watershed ecosystems.

Goal 4 Objectives:

1. Meet with elected officials and government department members as needed to address concerns arising from Goals 1- 3
2. Collaborate with appropriate organisations to implement established best management practices for Goals 1 and 2
3. Work with the community, businesses, and all levels of government to protect the watershed from further environmental degradation
4. Advocate for the enforcement of existing environmental regulations as well as the proposal of new regulations which may be enacted (i.e. buffer zone enforcement and expansion)
5. Partner with other organisations and governments to pursue joint projects and leverage funding

Goal 5: ACQUIRE

Increase the organisational capacity of the Stratford Area Watershed Improvement Group by pursuing and acquiring funding and knowledge to implement projects in the watershed which are consistent with the priorities established by the first four goals.

Goal 5 Objectives:

1. Apply for funding from various organisations to diversify funding for projects
2. Expand employee knowledge through training and knowledge transfer
3. Pursue opportunities to expand staff and outsource tasks as appropriate

Goal 6: IMPROVE

To improve the data and information management practices of the Stratford Area Watershed Improvement Group.

Goal 6 Objectives:

1. Improve information collection, storage, and security of data, information, and files
2. Improve the quality and open-source availability of data collected

To accompany these goals, we have long-term action plans. We will publish our yearly workplan, drawn from the action plans, with an update of activities at the end of the fiscal year.

MAJOR ACCOMPLISHMENTS

Refer to past published field reports on our website for more details:

<https://www.stratfordwater.com/publications/past-field-reports>

"A watershed houses all of our essential natural resources that are shared and utilised by all. Therefore, it is the responsibility of governments, environmental groups, and private citizens to work together to protect and preserve it."

-Kaylee Busniuk, Director-at-Large and Former SAWIG Watershed Coordinator

Native Species Planting

One of SAWIG's longest running activities is tree and shrub planting and disbursing native species to our membership. Every summer, SAWIG holds its annual *Tree Day Membership Drive* which is an event held for the public where we give away native trees and shrubs while encouraging them to renew their membership or become a new member. Our membership plan has recently been restructured; signing up/renewing a membership is now free, and donations are encouraged. Since the 2011 field season, our group has been planting native shrubs and trees across our watersheds. As of 2022, SAWIG has planted approximately 11,500 trees in our watershed and has provided about 4,100 plants to our members at our annual *Tree Day* event.



Tree Day Membership Drive (2016)

The Stratford area must enhance and maintain its remaining forest stands. SAWIG will continue to work with the Town of Stratford to increase habitats and enhance forests on municipal-owned land. We will also continue to partner with landowners throughout our sub-watersheds who express interest in the protection and preservation of woodlands and the reforestation of grassy areas. Additionally, SAWIG strongly prioritises planting in riparian zones, specifically to ensure that buffer zones extend at least 15 metres from watercourses and wetlands. Tree planting near streams not only stabilises banks but will supply necessary stream cover to maintain cool water temperatures during the summer months.

As climate change progresses, we will continue to work in synergy with our environment by planting and giving away tree and shrub species that follow the predicted distribution and forest composition changes caused by climate change.

“It is this enhancement planning that will determine the health and long-term success of the Wabanaki Acadian Forest in Stratford.”

- Maddy Crowell, Town of Stratford Environmental Sustainability Coordinator and former SAWIG Watershed Coordinator



Left to right: Staff tree planting in 2013, 2017, and 2022.

Water Quality Monitoring

Beginning in late spring and ending in early fall, SAWIG completes water quality monitoring in the Stratford area streams and ponds using both field and laboratory analyses. Weekly general parameter testing is conducted within these sites (i.e., water temperature, pH, conductivity). We also collect samples for total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP) to send to the PEI Analytical Lab regularly. To complement our weekly sampling, we have logging devices deployed that measure water temperature and dissolved oxygen in sampling sites of interest. SAWIG's results are uploaded to an open-source water quality data sharing platform called [Atlantic DataStream](#).

SAWIG's water quality monitoring is fully funded by the Town of Stratford and could not be completed without their continuing support.



Top to bottom: Dry-bank measurements and logging device maintenance.

Invasive Species Surveys and Management

In 2015, SAWIG created a website to raise awareness and encourage the reporting of invasive species. This program has since closed with the growth of the PEI Invasive Species Council (PEI-ISC). The PEI-ISC is a non-profit group focused on the creation of a framework for the management of invasive species that threaten Prince Edward Island's environmental, economic, and social health. SAWIG is one of the council's Watershed Representatives and attends council meetings and AGMs.



Over the years, SAWIG has gathered baseline invasive species data. This way, we can prioritise management by species type as well as distribution and create an effective management strategy. Invasive species SAWIG has worked to manage in our watershed include Garlic Mustard, Yellow Archangel, Himalayan Balsam, and Japanese Knotweed, among others. Proper removal techniques are used to manage selected invasive species patches based on research and recommendations from the PEI-ISC.



Left to right: Yellow archangel tarping, goldfish collection, Himalayan balsam removal.

Coastal Health, Sedimentation and Erosion Control

SAWIG's role in erosion prevention and shoreline protection is to advocate, monitor, and actively manage sites of concern. In 2012, staff completed a full coastal zone assessment along our area's coastline to create a baseline for coastal health.

In recent years, SAWIG has been involved in the installation and trialling of living shorelines on private and public land. Offering tree and shrub planting for the upper bank of coastal properties has also been a great activity to increase bank stabilisation and promote infiltration in our area.



Living shoreline installation (2021)

In addition to reducing coastal erosion, SAWIG is also involved with reducing and monitoring sediment influx during rainfall event, which is an ongoing issue across PEI. This issue is most prominent in areas where sediment is regularly exposed such as development sites and agricultural fields. During heavy rain, we collect runoff samples to test for total suspended solids (TSS) to monitor the impact that upstream runoff has on our streams. Additionally, SAWIG aims to work with development contractors to encourage best practices for sediment and erosion control. We have also developed quick reference cards and checklists for sediment and erosion control best practices that have been made available to developers working in our watersheds.



Total Suspended Solids
Sample (2022)

Stream Enhancement

Stream enhancement is an important part of watershed management and restoration. Watershed staff conduct surveys identifying areas of priority for further assessment and management.

During the field season, SAWIG staff typically conduct activities such as:

- Performing stream assessments and/or rapid geomorphic assessments
- Installing brush mats
- Clearing blockages in streams
- Completing benthic macroinvertebrate surveys
- Conducting culvert passage assessments
- Planting in riparian zones
- Removing invasive species



Macroinvertebrate collection (2022)

Stratford Community Gardens and Pollinator Gardens

The Stratford Community Gardens is an initiative between the Town of Stratford and SAWIG to encourage gardening. This garden is located in the heart of Stratford where residents can rent garden plots for the growing season. Find more information here:

<https://www.stratfordwater.com/programs-and-projects/community-gardens>

Maintaining the community gardens involves active maintenance such as weeding and laying wood chips as well as monitoring gardeners by hosting introductory sessions and performing garden inspections.

The Monarch Waystation Garden is located at the Stratford Community Gardens and requires spring maintenance and monitoring during late June to August for emerging monarch butterflies.



Left to right: Stratford community gardens, Monarch Waystation.

Birdhouse/Birdfeeder Workshop

"Building Better Backyards for Birds" is a series of workshops that have occurred intermittently over a number of years. At these events, the community is invited to build bird houses and bird feeders with SAWIG. Members of the board volunteer to build the bird feeder and birdhouse kits and also teach this event. Due to COVID, SAWIG has added an additional do-it-yourself option for individuals to build their kits at home. These workshops are always a popular event and are positively received by members of the community.



Left to right: Birdfeeder workshop in 2022 and DIY birdhouse kits in 2021.

Water Conservation Outreach

Water School

It is vital that environmental education is targeted at the youth of the Stratford area, as they are the future leaders of the community. Water School / "Water is Cool" began in 2011 and is a day-long annual field trip which introduces hundreds of Grade 5 students from a variety of local schools to water conservation and watershed education in an interactive and activity-based environment.



Left to right Water School 2022 (Photo Credit: CBC) and 2013.

Water Audits

Water Audits are conducted in collaboration with the Town of Stratford to provide a complimentary service to residents of Stratford. The goal of the audit is to assist homeowners in resolving water consumption issues, including high-flow fixtures and leaks, and to promote responsible water conservation practices. During the in-home audit the homeowner is shown how to read their water meter and all fixtures are measured to determine their flow rate and if there are any leaks detected within the property. After the audit the homeowner is provided with a leak and fixture report to allow them to make changes to their fixtures to reduce their water consumption.

Fix a Leak Week

In partnership with the Town of Stratford, the City of Charlottetown, and the Town of Cornwall, SAWIG promotes water conservation through the US EPA Fix a Leak Week initiative. This initiative provides public education around the volume of water wasted in common household leaks and encourages residents to fix leaks on a regular basis.



LOOKING AHEAD

"SAWIG's Management Plan will act as a 10-year strategic document that may adapt to the changing conditions within our community and physical environment. Our employees, board members and volunteers are committed to our short and long-term goals. We will continue to work diligently in protecting, educating, and fostering appreciation of the Stratford Area watersheds for present and future generations."

-Connie Gaudet, *President*



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APPENDIX

Glossary of Watershed Terms and Acronyms

Wabanaki Acadian Forest - presence of Red Spruce is characteristic but not exclusive to the Wabanaki Acadian Forest region, as well as Yellow Birch, Red oak, Sugar Maple, White and Red Pine, American Beech and Eastern Hemlock. In low land areas, Black Spruce, Larch and Red Maple are common. Other species of note are White Spruce, White Elm, White Ash, White and Grey Birch, Eastern White Cedar, as well as poplars

Benthic - the lowest part of a body of water.

Biodiversity - biological variety in all its forms.

Buffer Zone – 15 m strip of land adjacent to watercourses, coastlines and wetlands primarily aimed at maintaining good water quality, controlling erosion, or providing wildlife habitat.

Carbon Sequestration - the process of capturing and storing atmospheric carbon in a liquid or solid.

Ecosystem – system formed by the interaction of a community of organisms with their environment.

Eutrophication – having waters rich in mineral and organic nutrients will promote a proliferation of plant life, primarily algae, which reduces the dissolved oxygen content and is detrimental to most forms of aquatic life.

Fragmentation - when a habitat is split into unconnected areas naturally or by human activity (i.e. forest fires, roads).

Invasive Plants – species that are not native to Prince Edward Island.

Living Shoreline – a nature-based approach to coastline protection. Using the strategic placement of plants, stone, and other organic materials, living shorelines work with coastal processes to reduce erosion, trap sediment, and filter water, all while increasing valuable habitat. (SOP Living shoreline PEI WA).

Nitrates – water soluble form of nitrogen and one of 2 primary nutrients to limit aquatic productivity. Nitrate enters groundwater primarily through percolation. Extreme levels can lead to excessive growths of vegetation and anoxic conditions.

Recharge – total amount of groundwater that recharges a watershed on an annual basis.

Restoration – conducted by summer staff and volunteers in the watercourses within the watershed.

Riparian zone - a vegetated strip near the edge of a stream. Riparian zones help shade and partially protect the stream from the impact of adjacent urban, industrial or agricultural land use.

Runoff - the draining away of water and substances carried in it from the surface of an area of land.

Sediment – loose clay, sand and silt that settle at the bottom of a body of water. Sediment can come from soil erosion or the decomposition of plants and animals. The primary concern of most watershed groups on PEI.

Siltation - the build-up or blockage of something (i.e. a watercourse) with particulate material.

Watershed – all land on PEI can be divided into areas called watersheds. Each watershed consists of all the land that surface water and groundwater flows over or through to get to a particular river or stream. Watershed boundaries are high points of land where water flows into distinct waterways at lower elevations.

Watershed Alliance – an affiliation of groups representing common interests of all PEI watershed groups, established in 2008.

Watershed Planning – a community-driven process of managing natural resources, particularly water, to ensure environmental, economic and social sustainability.

Funding Partners

Partners from April 1, 2021 - March 31, 2023:



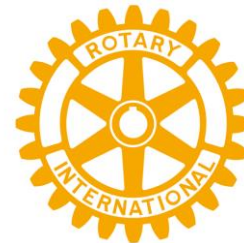
Government of Prince Edward Island:

Watershed Management Fund
Climate Challenge Fund
Jobs for Youth
Skills PEI Post-Secondary Program



Government of Canada:

Canada Summer Jobs
Nature Smart Climate Solutions Fund
EcoAction Community Funding Program
Habitat Stewardship Program



**Rotary Club of
Charlottetown Royalty**



List of Hyperlinked References

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