



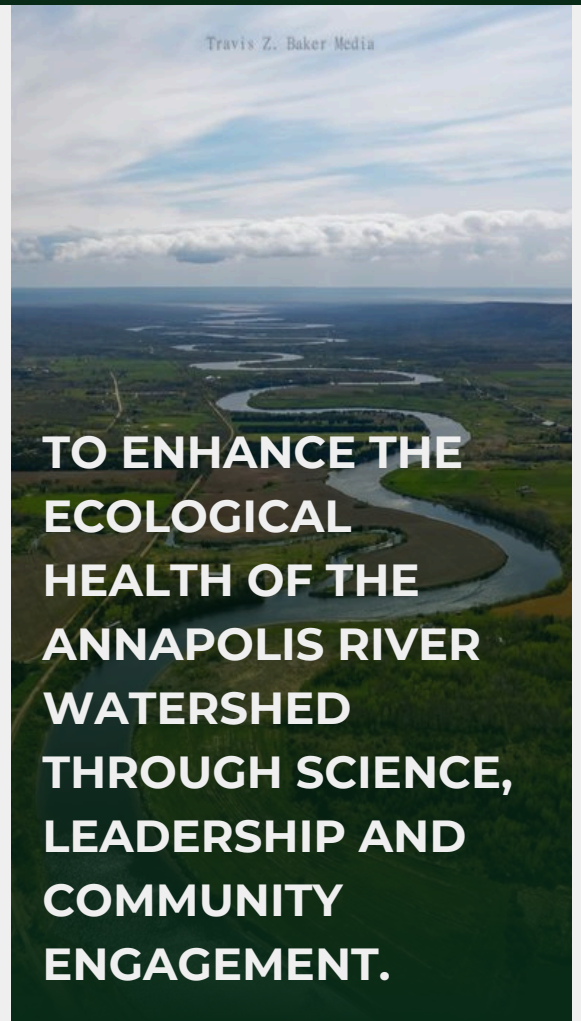
CLEAN ANNAPOLIS RIVER PROJECT'S

WATERSTRIDER

MARCH 2025

The Clean Annapolis River Project (CARP) is a charitable, community-based, non-governmental organization dedicated to enhancing the ecological health of the Annapolis River watershed. We're excited to bring back Waterstriders, our newsletter, after a short hiatus! In this edition, you'll find some updates on CARP's work over the past year, thought-provoking ecological pieces, engaging activities, and practical tips for supporting biodiversity in your watershed.

Thank you for your continued support for the Clean Annapolis River Project



**TO ENHANCE THE
ECOLOGICAL
HEALTH OF THE
ANNAPOLIS RIVER
WATERSHED
THROUGH SCIENCE,
LEADERSHIP AND
COMMUNITY
ENGAGEMENT.**



RESTORING FISH HABITAT IN THE FALES RIVER

By Rachel Walsh

Salmon and trout depend on healthy freshwater habitats, but human activities continue to threaten these species. To support their survival, Clean Annapolis River Project (CARP) carried out an in-stream restoration project on the Fales River in Greenwood, Nova Scotia, during the summer of 2024.

Why It Matters

Salmon and trout need clean, cool, and well-oxygenated water to thrive. They rely on gravel streambeds for spawning, deep pools for shelter, and riffles to boost oxygen and food supply. However, habitat loss, rising water temperatures, sediment buildup, and invasive species threaten their survival. Restoration efforts help to improve habitat conditions for salmon.

2024 Restoration Efforts

CARP's project focused on improving fish habitat and reducing fine sediment inputs and stabilizing eroding banks.

Key project highlights:

- Log crib – stabilized a 16-meter section of eroding bank.
- Digger log – enhanced pool habitat, restoring 958.4 m² of in-stream area.
- Two rock sills – improved riffle and pool habitats, restoring 1,643 m².
- Fish monitoring – 11 Atlantic salmon captured during electrofishing surveys.

How These Restoration Techniques Work

Log Cribs stabilize riverbanks and reduce erosion. Digger Logs create deep pools in areas where they are lacking.

Rock Sills enhance habitat diversity by improving riffles and pools.

Looking Ahead

This project is part of CARP's ongoing efforts to restore fish habitat. Work will continue in the Fales River during the 2025 and 2026 field seasons.



INCREASING CARBON SEQUESTRATION IN AGROECOSYSTEMS THROUGH LIVING LABS

By Shauna Forrestall

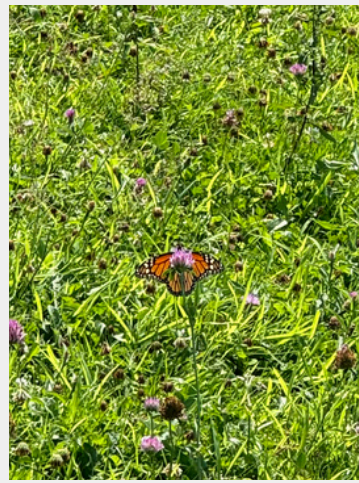
In 2024, the Clean Annapolis River Project (CARP) celebrated the third year of its Nova Scotia Living Lab (NSLL) initiative. NSLL is a five-year project that aims to implement and evaluate innovative best management practices (BMPs) in agroecosystems to help farmers address climate change.

What Is CARP's Role?

Over the past three years, CARP has led a forested riparian buffer zone (FRBZ) and shelterbelt (SB) project at six sites throughout the province.

Forested Riparian Buffer Zones: FRBZs are permanently vegetated areas along bodies of water, including rivers, streams, lakes, and ponds. They serve as transition zones between terrestrial and aquatic ecosystems and, when healthy, represent some of the most biodiverse and complex areas on land.

Shelterbelts: SBs are windbreaks composed of trees and shrubs. They obstruct wind from crops, structures, equipment, and animals while offering critical corridors for wildlife, particularly birds and pollinators.



In 2023, CARP staff diligently planted over 3,000 native trees and shrubs across the six locations and carried out a series of sampling events to monitor both biotic and abiotic changes. In 2024, CARP planted additional trees and shrubs and continued monitoring water quality, soil, greenhouse gases (GHG), and invertebrate biodiversity.

Key Project Highlights:

- Over 4,500 native trees and shrubs planted across all sites
- Approximately 27,900 m² of habitat planted
- 2 years of sampling, including:
 - Greenhouse gases
 - Water quality monitoring
 - Soil health and active carbon
 - Pollinator biodiversity monitoring at the SB sites with Malaise, Blue Vane, and cup traps (pictured)
 - Invertebrate biomass and biodiversity monitoring at the FRBZ sites with Malaise traps, sweep netting, and benthic macroinvertebrate sampling (pictured)



How FRBZs and SBs Reduce Greenhouse Gas Emissions and Support Biodiversity

FRBZs and SBs have a high potential to sequester carbon. The species diversity in these BMPs generates a high amount of woody biomass and soil rich in organic material, making them more productive than croplands. This allows them to capture and store carbon, reducing the GHGs emitted from agricultural activities.

Both FRBZs and SBs act as barriers or buffers to the impacts of agriculture, reducing negative interactions between wildlife and agricultural activity. FRBZs are vital to maintaining the ecological health of the aquatic systems bordering agricultural land on which fish and other wildlife rely. FRBZs reinforce streambanks, prevent flooding, provide shade, and filter nutrients and pollution. SBs diversify agricultural lands by creating corridors where FRBZs do not occur. Native pollinators are more abundant where SBs are present, reducing the need to bring in non-native honeybee hives.

Looking Ahead

CARP continues to monitor various parameters year-round to assess the impact of establishing SBs and FRBZs on agroecosystems. In 2025, CARP will complete survivorship surveys to evaluate the effectiveness of the strategies employed in 2023 and 2024. CARP will continue collaborating with producers to ensure the successful growth of trees and shrubs while making improvements that align with the land and the farmers' needs. With the support of Living Lab producers, site maintenance activities such as mowing and mulching will be essential over the next two years. Additional planting will also occur in areas where trees and shrubs are less successful. Over the project's remaining years, we will better understand how these practices benefit agro-ecosystems and how we can effectively encourage more farmers to adopt BMPs.



SPECIES-AT-RISK PROJECT HIGHLIGHTS FOR 2024

By Jessica Ferguson



Over the 2024 field season, CARP's Species At Risk crew spent more than 250 hours in search of elusive Wood Turtles. It was a hot year, so turtles were often tucked away to get some refuge from the heat.

Filling their backpacks with extra water and sunscreen, the crew worked tirelessly to collect as many observation records as they could. Among all the turtles spotted, 6 were new to our mark-recapture project! One turtle was observed in a "new" stretch of river, and another was an old fellow, estimated to be 40+ years old, at one of our most visited sites!



What is mark-recapture?

Mark-recapture is a type of monitoring that allows biologists to keep tabs on these at-risk turtles on an individual and population level. Each captured turtle gets a unique number to help us identify it in the future. We can track parameters like size, weight, and overall health. We can better understand movement patterns and preferred habitat. We can even link nesting turtles to their hatchlings!

All of these factors come together to illustrate how the population is doing. It helps us make informed choices to best protect their habitat. Each turtle is a piece of a bigger puzzle, and each one is a reminder that we still have much to learn from them. We are now gearing up for another season, and we'd love your help! Report your turtle sightings to CARP and get in touch to learn about upcoming volunteer opportunities!

BIRD FRIENDLY BACKYARD TIPS

By Grace Bowen-MacLean

1. Merlin & eBird

The Merlin Bird ID app helps you identify birds by sight and sound, while eBird lets you log sightings and contribute to global bird conservation efforts. Your observations help scientists track bird populations and migration patterns.

2. Bird Feeder

A well-placed bird feeder provides a consistent food source, especially in winter when natural food is scarce. Choose high-quality seeds and clean the feeder regularly to prevent disease.

3. Brush Your Dog Outside

Placing pet fur outside in spring gives birds soft, insulating material for nest-building. Hang it on shrubs or in a suet feeder to help them easily collect it.

4. Fresh Water

Birds need clean water for drinking and bathing. Adding a birdbath, small pond, or shallow dish with fresh water can attract more species and support their overall health.

5. Native Plants

Planting native flowers, shrubs, and trees provides natural food sources, shelter, and nesting sites. Native plants attract insects, a key food source for many birds, especially during breeding season.

6. Keep Cats Inside

Domestic cats kill millions of birds each year. Keeping cats indoors protects both local bird populations and your pet from predators, cars, and disease.

7. Leave the Leaves

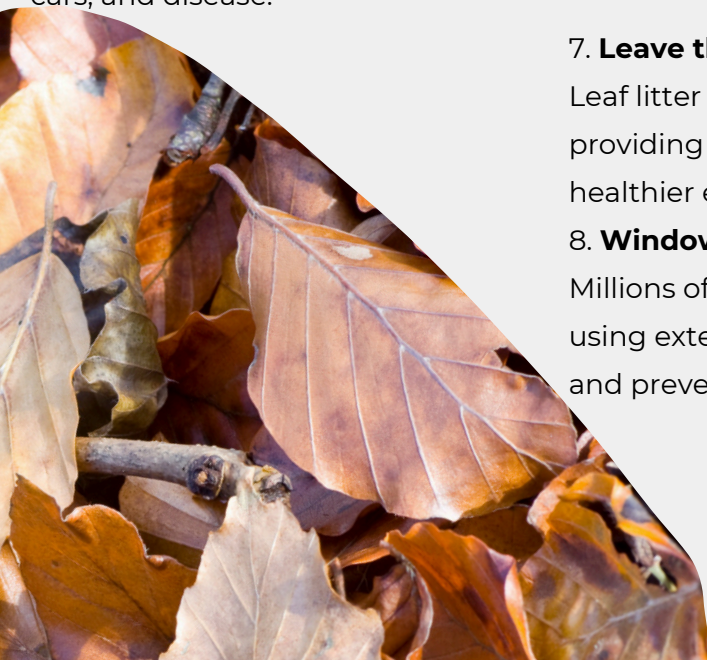
Leaf litter provides shelter for insects, which in turn support birds by providing a natural food source. It also enriches soil and helps create a healthier ecosystem.

8. Window Protectors

Millions of birds die from window collisions each year. Applying decals, using external screens, or installing bird-friendly glass reduces reflections and prevents birds from flying into windows.

9. No Pesticides

Pesticides kill insects that birds rely on for food and can also poison birds directly. Opt for natural pest control methods to keep your yard safe and bird-friendly.



SNOWY WINTER- THE ROLE OF SNOW IN NOVA SCOTIA'S LANDSCAPE

By Ahniya Ustymenko

It has been a while since Nova Scotia experienced a winter as snowy as this one. But what does snow mean for landowners and biodiversity in the seasons ahead?

Snow is a welcome sight across the province. One of its most critical roles is replenishing aquifers, a hidden layer of rock or soil that can soak up and store water, like a giant underground sponge. It holds and moves groundwater, supplying wells and springs, reducing the risk of drought later in the year. However, despite its abundance, only about 1/16th of snow's volume translates into usable water.

Beyond water supply, snow acts as a natural insulator, protecting vegetation and soil from extreme temperature fluctuations. The air trapped within snow layers helps maintain stable soil temperatures, preventing winterkill and allowing perennial plants to survive underground—even when aboveground temperatures drop below freezing. Most of Nova Scotia's native species are well adapted to harsh winters, either by thriving in cold conditions or migrating to avoid them. However, increasingly mild winters have enabled invasive species and pests to take hold. For example, both Hemlock Woolly Adelgids and ticks have been spreading rapidly across the East Coast, as it takes temperatures below -15C to substantially impact their survival. Consistent snow cover, while beneficial in many ways, may also provide them with protection.

An old saying calls snow "the poor man's fertilizer." This is because snowfall captures dissolved compounds from the atmosphere and delivers essential nutrients—such as organic nitrogen, nitrate, and ammonium—to the soil. Combined, rain and snow contribute between 2 and 22 pounds of nitrogen per acre annually, a service valued at up to \$18 per acre in urea equivalency. These nutrients also help improve soil buffering capacity, an important factor in restoring balance to ecosystems still affected by acid rain, particularly in southwestern Nova Scotia.

Here's hoping for another snowy winter next year!





THE ENVIRONMENTAL IMPACT OF ROAD SALT

By Grace Bowen-MacLean

Here in Nova Scotia, road salt plays a crucial role in keeping our roads and walkways safe during winter—especially in a season as snowy as this one. While effective and affordable, the widespread use of road salt comes with significant environmental costs. Excessive salt application can contaminate drinking water, harm wildlife, accelerate soil erosion, and damage both private and public property.

The Hidden Costs of Road Salt

High sodium levels in drinking water can pose health risks, particularly for individuals with high blood pressure. Meanwhile, elevated chloride levels in surface waters are toxic to many fish, aquatic insects, and amphibians. In our watershed, high salt concentrations can be fatal to aquatic species, further stressing fragile ecosystems.

Road salt also accumulates along roadsides, killing plants and harming wildlife that ingest the salt crystals. Large mammals, such as deer and moose, are often attracted to salty roads, increasing the risk of vehicle collisions. Additionally, salt runoff can alter how water mixes in lakes, creating dense, saline pockets near the bottom.



Exploring Alternatives to Road Salt

Reducing road salt usage doesn't mean compromising safety. Several alternative methods can help minimize environmental damage while keeping roads and walkways clear:

- **Porous Pavements:** These engineered surfaces allow water to seep through, reducing ice buildup and preventing runoff. Studies show that porous pavements can decrease the need for road salt by up to 77%.
- **Sand:** A simple and effective alternative for driveways and walkways, sand absorbs sunlight, aiding in snow and ice melt while also improving traction. However, it can create a mess in the spring, requiring cleanup.
- **Coffee Grounds:** Like sand, used coffee grounds provide traction and absorb heat to help melt ice. They are biodegradable, making them an eco-friendly choice, though they may also require cleanup after winter.
- **Calcium Chloride:** A more effective ice melter than traditional road salt, calcium chloride has a relatively lower environmental impact. However, in large quantities, it can still increase salinity in waterways and harm vegetation near treated areas.

Finding a Balance

As we navigate winter road safety, it's important to recognize the environmental trade-offs of road salt. By adopting alternative solutions and using salt more strategically, we can protect our waterways, wildlife, and communities while maintaining safe roads.

GROW WILD: A GUIDE TO POLLINATOR-FRIENDLY GARDENING

By Shaeralee McCutcheon



As we emerge out of what felt like a long, dreary winter, the promise of a sunny spring season is just over the horizon. The warmer temperatures and sunny skies will soon usher in Birds, bats, bees, butterflies, moths and other insects, otherwise known as pollinators, in search of a spring meal of beautiful pollen laden flowering plants.

So what's the big deal about pollinators anyways? Bees, birds, butterflies and other pollinators are necessary for pollinating the plants that produce our food, as well as sustaining healthy ecosystems and improving biodiversity. Pollinators visit flowering plants to consume their food (nectar and pollen), and may accidentally brush against the flower's reproductive parts, depositing pollen from flower to flower. The plant will then use this pollen to produce a fruit or seed.

About 90% of flowering plants require pollination by animals or insects, and approximately 1/3 of the food we consume requires pollination to grow.

Many pollinator populations are declining due to loss of feeding and nesting habitats. Pollution, pesticide use, changing climates and disease are contributing factors to the loss in necessary habitats that support pollinator populations.



GROW WILD: A GUIDE TO POLLINATOR-FRIENDLY GARDENING

How can you help bring more pollinators to the yard?

Bring the pollinators to the yard by planting a new pollinator garden or adding native flowering plants to an existing garden is an excellent way to provide food and habitat for local pollinators. Pollinator gardens can be expansive, covering a large area of a lawn or garden bed, or can be as simple as a windowsill box of flowering plants. Even a small pollinator garden provides a new food source for pollinators within their flight range, increasing their chance of survival.

Plant a diversity of plants, and as much as possible, source native plants and seeds. Native plants are considered the best choice as they thrive in the soil and climate conditions of their native area and are generally low maintenance. Common Yarrow, Swamp Milkweed and Black-Eyed Susan are examples of native plants found in the Southwest Nova Scotia ecoregion which will add beautiful colour and diversity to your garden.

Limit or eliminate the use of pesticides. A healthy garden will support native beneficial insect species, reducing the need for pest control.

Spread awareness and educate others on the importance of pollinators and how they can take steps to increase pollinator populations.

Planting pollinator gardens is an important step to reducing the risk to our future food systems and ecosystems. Happy gardening!



PLANTING WITH A PURPOSE - SPRING IS ON THE WAY!

By Emma Walker



With warmer weather on the horizon, it's time to start planning your garden! Whether you want to attract pollinators, manage stormwater flooding, or create a beautiful space filled with native species, choosing the right plants can make all the difference.

The chart below highlights Nova Scotian native plants that serve these important purposes. If pollinators are your focus, keep in mind that bees are drawn to purple, yellow, and white flowers, while butterflies can see ultraviolet, violet, blue, green, and red. Many of the plants listed come in multiple colors, allowing you to create a garden that is both stunning and ecologically beneficial.



The chart also shows each plant's general bloom period. A well-planned garden includes species with staggered bloom cycles to ensure continuous flowering throughout the warm months—keeping pollinators coming back all season long!

If your property struggles with stormwater retention, consider the listed stormwater-mitigating plants. These species thrive in moist or wet soils and can absorb significant amounts of water, reducing pooling and erosion. Many of these plants are ones CARP regularly incorporates into our natural infrastructure projects.

Now it's your turn—pick your favorites, get your hands in the dirt, and start planting with a purpose!

| Nova Scotian Native Plants | April | May | June | July | August | September | October | Perennial | Pollinator Attractor | Stormwater Mitigator |
|----------------------------|-------|-----|------|------|--------|-----------|---------|-----------|----------------------|----------------------|
| Anise Hyssop | | | | | | | | X | X | |
| Black-Eyed Susan | | | | | | | | X | X | X |
| Blue-Eyed-Grasses | | | | | | | | X | X | |
| Blue False Indigo | | | | | | | | X | X | |
| Blue Flag Iris | | | | | | | | X | | X |
| Blue Vervain | | | | | | | | X | X | |
| Boneset | | | | | | | | X | X | X |
| Bottle Gentian | | | | | | | | X | | X |
| Common Jewelweed | | | | | | | | | X | X |
| Canada Tick Trefoil | | | | | | | | X | X | |
| Canada Wild Rye | | | | | | | | X | | |
| Common Yarrow | | | | | | | | X | X | X |
| Cutleaf Coneflower | | | | | | | | X | X | X |
| Elderberry | | | | | | | | X | X | X |
| Fireweed | | | | | | | | X | X | |
| Flat-Top Goldentop | | | | | | | | X | X | |
| Golden Alexanders | | | | | | | | X | X | X |
| Joe Pye Weed | | | | | | | | X | X | X |
| New England Aster | | | | | | | | X | X | X |
| Square Stem Monkey Flower | | | | | | | | X | X | X |
| Switchgrass | | | | | | | | X | | X |
| Swamp Milkweed | | | | | | | | X | X | X |
| Thimbleweed | | | | | | | | X | X | |
| Wild Raspberries | | | | | | | | X | | X |
| Wild Strawberry | | | | | | | | X | | |

CLEAN ANNAPOLIS RIVER PROJECT'S

VOLUNTEER OPPORTUNITIES

Calling all photographers!

CARP is looking for photos of local plants and wildlife to use in public outreach. If you'd like to support our work by donating photos, please contact us. Images will be shared with credit.

You can submit your photos in two ways:

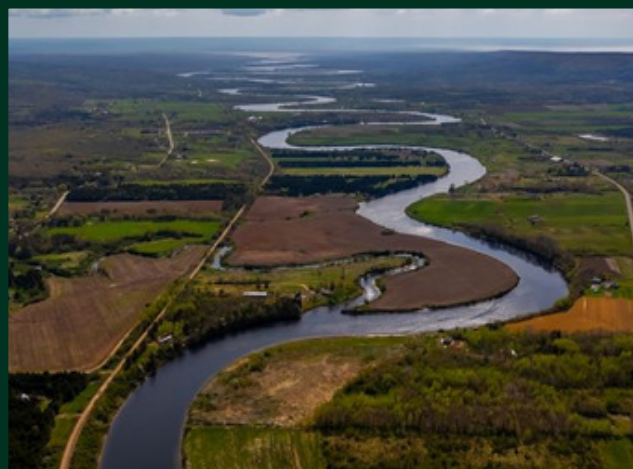
Method 1 (best for a small number of photos)

1. Label your photo(s) with the species and your name.

Email your photo(s) to gracebowen-maclean@annapolisriver.ca

Method 2 (best for a larger batch of photos):

1. Label your photos with the species and your name.
2. Upload your selected photos to www.wetransfer.com
3. Email the WeTransfer link to jessicaferguson@annapolisriver.ca
 - a. Please note that the WeTransfer link expires within 3 days, so it's best to send your photos between Monday – Thursday.



Wood Turtle Surveys

Field season is just around the corner, and we are looking for volunteers to help with annual Wood Turtle surveys. Surveys begin in April and continue throughout the active season. Please contact jessicaferguson@annapolisriver.ca for information on upcoming training opportunities.

NOVA SCOTIA WILDLIFE TRIVIA

1. Raccoons wash their food before eating it. True or false?
2. Which of Nova Scotia's carnivorous land mammals is the most widely distributed on Earth?
a. Bobcat b. Black Bear c. Coyote d. Red Fox
3. What does the name "moose" mean?
a. Moss eater b. Diving deer c. Twig eater d. Sloping back
4. What is Nova Scotia's provincial fish?
a. Brook Trout b. Atlantic Salmon c. Brown Trout d. Rainbow Trout

E Y L S Z P T Y Y M C F W F P
M S J U C S C B H F O P O E Q
W N W S E J S U V C N U O C H
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W R W Y N S Y H I I U R K M R
P D B I O D I V E R S I T Y E

sustainability

biodiversity

conservation

woodturtle

ecosystem

invasive

habitat

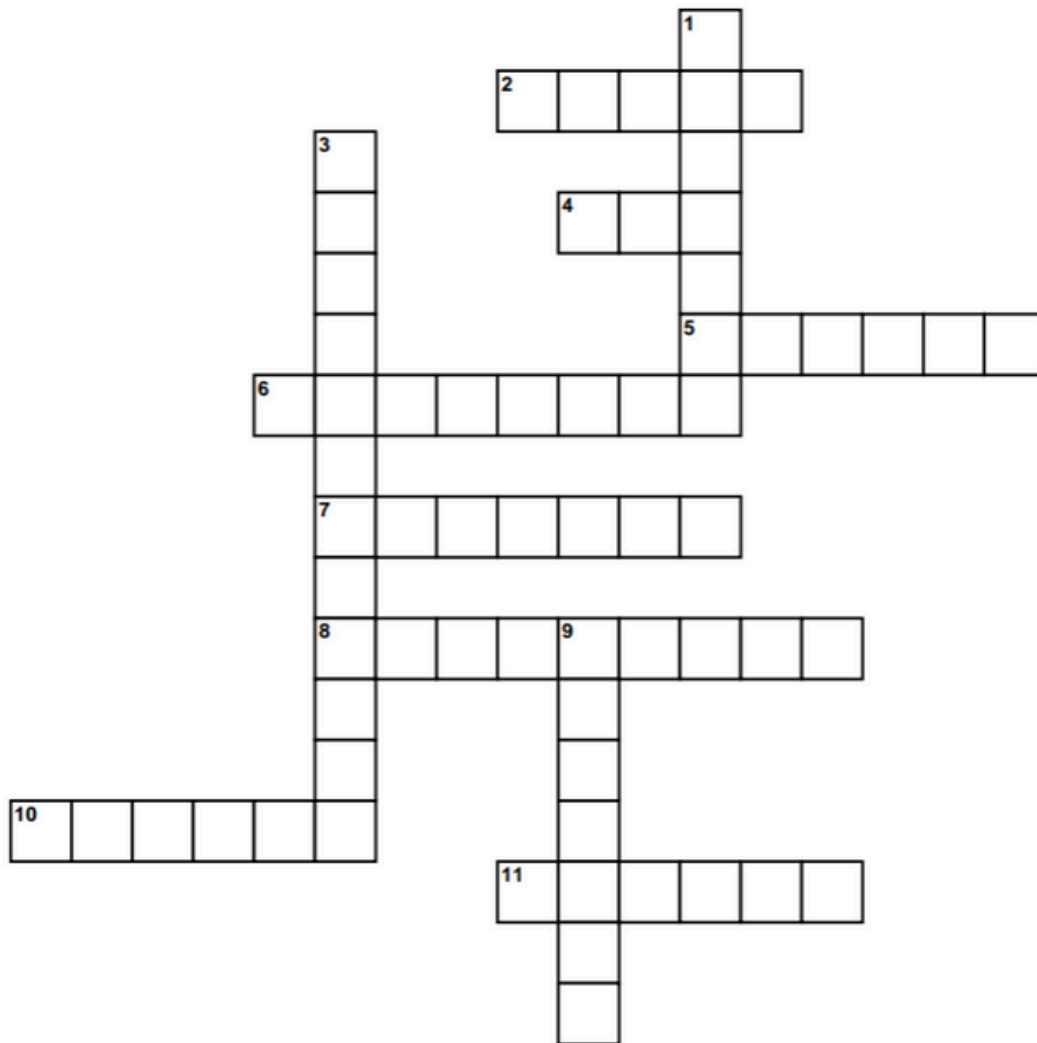
estuary

butterfly

ecology

salmon

carp



Across

- [2] Bay of Fundy has the largest in the world!
- [4] Swims to spawn in the Sargasso sea, a delicacy.
- [5] When deciding what to plant in your garden, always choose these plants.
- [6] Where number [9] lays their eggs exclusively.
- [7] Process of losing land to wind or water.
- [8] Regularly flooded ecosystem.
- [10] Lowland carved by a river or stream.
- [11] Where we can walk over rivers without getting wet

Down

- [1] Area where water is present on the surface of the soil, for long periods of time
- [3] Abundance of species that keep ecosystems resilient
- [9] Sovereign head of state, or a migrating butterfly (endangered).

SIMPLE TIPS FOR SUPPORTING BIODIVERSITY ON YOUR YARD

By implementing these simple changes, you can create a healthier, more vibrant ecosystem right in your own backyard!

1. NO MOW MAY

Letting your grass grow in May provides vital nectar for pollinators like bees and butterflies when food is scarce.



2. POLLINATOR GARDEN

Planting native flowers supports bees, butterflies, and hummingbirds by offering food and shelter throughout the seasons.



3. ADD A BIRD FEEDER

Feeding birds, especially in winter, helps sustain local populations and attracts a variety of species to your yard.



4. AVOID PESTICIDES

Pesticides harm beneficial insects and disrupt ecosystems. Natural pest control keeps your yard healthy and wildlife-friendly.



5. ADD A BAT BOX

Bats eat thousands of insects each night, including mosquitoes. A bat box provides them with safe shelter and supports natural pest control.





OUR TEAM

Levi Cliche

Executive Director

levicliche@annapolisriver.ca

Susan Lane

Administration Manager

susanlane@annapolisriver.ca

Rachel Walsh

Aquatics Program Manager/ Freshwater Habitat
Project Lead

rachelwalsh@annapolisriver.ca

Shaeralee McCutcheon

Terrestrial Programs Manager

shaeraleemccutcheon@annapolisriver.ca

Jessica Ferguson

Species-at-Risk Project Lead

jessicaferguson@annapolisriver.ca

Shauna Forrestall

Living Labs Project Lead

sforrestall@annapolisriver.ca

Grace Bowen-MacLean

Habitat Restoration Project Lead/ Communications &
Outreach Lead

gracebowen-maclean@annapolisriver.ca

Ahniya Ustymenko

Agro-ecosystem Project Lead

AhniyaUstymenko@annapolisriver.ca

Emma Walker

Coastal Wetland Project Coordinator

emmawalker@annapolisriver.ca

Answers:

1. Raccoons wash their food before eating it. True or false?

Answer: False. The term “wash” may not accurately describe what these critters are actually doing. While humans and many other animals use their eyes to interpret food, raccoons rely on their sense of touch. Raccoons have highly sensitive paws, which contain ten times the number of nerve endings found in a human hand! Water stimulates the nerve endings in their paws by softening the tissue. If you observe a raccoon playing with its food in water, it is likely studying it, which helps them recognize their meal and locate specific foods in the future.

2. Which of Nova Scotia’s carnivorous land mammals is the most widely distributed on Earth?

- a. Bobcat b. Black Bear c. Coyote d. Red Fox

Answer: Red Fox. This species occurs naturally throughout most of North America, Europe, Asia, and Northern Africa and was introduced to Australia.

3. What does the name “moose” mean?

- a. Moss eater b. Diving deer c. Twig eater d. Sloping back

Answer: Twig-eater. The name “moose” comes from the Algonquin word “mooswa” which means “eater of twigs” or “stripper of bark.” The twigs of trees and shrubs, such as willows, aspens, and balsam fir, comprise the bulk of a moose’s winter diet. In summer, this diet of twigs is complemented by leaves, herbs and grasses. Despite their large, heavy bodies, moose are strong swimmers and will dive for submerged vegetation such as the water lily.

4. What is Nova Scotia’s provincial fish?

- a. Brook Trout b. Atlantic Salmon c. Brown Trout d. Rainbow Trout

Answer: Brook trout, also known as speckled trout.

