

Beyond THE *Tides*

The Seasonal Journal of the Blomidon Naturalists Society

WINTER 2023

Vol. 50 No. 1

Hemlock
Forests in Peril

Feeding
the Birds

Climate Circles
in Action

FROM THE EDITOR

This issue focuses on the peril that hemlock forests face from the hemlock woolly adelgid, but also speaks to many broader environmental and conservation issues that we face as a region, country and planet. The five hemlock articles contribute very divergent perspectives: policy analysis, critical philosophy, emotional reflection, community action and scientific research. With differing perspectives, sometimes we struggle to appreciate other views and we believe that our approach is the only way forward toward achieving the overall goal. In this case it is restoration and protection of the forests. After learning a lot on the topic through putting this issue together, I doubt that there is one answer, and if we keep to only one focus, we can potentially miss broader questions.

Of all of the perspectives, I am most deeply challenged by Caroline Beddoe's analogy (p. 7) between coming to terms with the feelings, anxiety and grief for a life-threatening disease and potential death of a loved one and very similar feelings for a life-threatening disease and potential end of a forest. We want to do everything possible to save our loved one, and often it is helpful to become single-mindedly devoted to saving

the person whatever the prognosis. Others may feel that more intrusive treatment is making the person's last days worse. Maybe it would be best to step back and embrace the situation as palliative and recognize that resources need to go elsewhere to save lives. After all, we are a part of nature and ultimately we will pass on, and nature will continue in one form or another. Though some will try, immortality is neither a possible or desirable option. Do we preserve one individual life over another? What is best for the health of the community? Is community defined as human community or the broader ecological community? These same questions and conflicting values come into play when we take the government to court to protect endangered species (p. 18), or decide to put out bird feeders this winter (p. 24), or determine if and how we should take climate action (p. 14). So beyond considering the hemlocks, I hope this issue inspires deeper reflection on the values and dilemmas in our work to protect and conserve the ecosystems around us, in whatever forms it takes.

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LAND ACKNOWLEDGEMENT AND RECONCILIATION



Blomidon Naturalists Society activities take place in the district of Sipekne'katik in Mi'kma'ki, the traditional, ancestral and unceded territory of the Mi'kmaq. This territory is covered by the "Treaties of Peace and Friendship," first signed in 1726. These treaties did not implicate or affirm the surrender or transfer of land to the British, but recognized Mi'kmaq and Wolastoqey title and set the rules for what was to be a long-standing relationship between nations.

We are grateful above all to the land, air, water, and countless non-human beings that make life possible and inspire us every day. We recognize that outdoor learning, exploration and recreation would not be possible without access to the natural world, which has been stewarded for thousands of years by the many Indigenous peoples of this land. We have a responsibility to honour and learn about their histories and current cultures and to actively work in support of reconciliation. We are committed to fostering respectful and sustainable relationships with the Indigenous peoples of this land, with all other organisms, with the land and the water. We are all Treaty People.

Beyond the Tides is committed and working to include Indigenous voices and perspectives in this publication, and we are committed to a process of relationship building to facilitate contributions from Indigenous peoples. We also recognize the 400+ year history of communities of African descent and the 50 African Nova Scotian communities throughout the region today, and are committed to seeking out their perspectives and those of others not traditionally included in the work of the Society. We invite you to contribute to this process and/or encourage others to do so, and we welcome all comments and suggestions.

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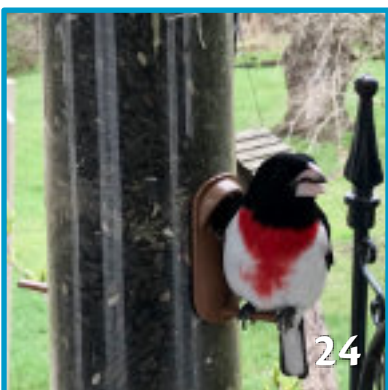
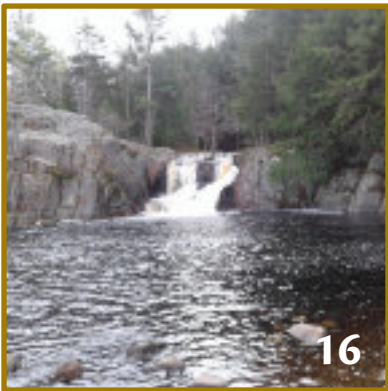
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FROM THE PRESIDENT

I am sure that as naturalists and conservationists, you have been asked the question, “So, what good are mosquitos?” If not mosquitos, then a myriad of other seemingly “unimportant” animals or plants. I have always had difficulty answering that question— to me it is obvious that all species have their roles within ecosystems. I have been thinking— how does one answer a question about the importance of a species? I think I have come up with an answer that may get at why all species are important and why species extinction is consequential.

Think of listening to music, especially a symphony presented by a whole orchestra. The music you hear is composed of many different sounds produced by diverse instruments. The notes played by all the various instruments vary in frequency and length with mesmerizing harmonics, but together create something pleasant to the ear and engender various emotions. You may pick out sounds from the string section, or the sound quality when a particular instrument, say a piccolo, can be distinctly heard, adding a unique element to the overall feeling of the music.

You would never ask the question, “what good is the French horn, the bassoon, or the need for the third violin

section?” All the instruments and all the notes written by the composer are necessary for the emotional impact of a particular symphony. Imagine if you were listening to a favourite symphony and slowly different instruments were removed, or notes from the sheet music were erased. Maybe initially, only people intimately familiar with the music would notice, but it wouldn’t take long before everyone would notice that something was amiss.

Well, it is the same with species within ecosystems. They are all necessary for the harmonious structure and sustainability of the system. This issue focuses on the threat facing the eastern hemlock. There may be discussion about how to cope with it, but not with the value of the hemlock to nature’s symphony. As for the hemlock woolly adelgid, think of it as a novel instrument added to the orchestra that is unsure of the tune that is being played and therefore adds a dissonant note that is out of place in the symphony. In time, it will add its special sound and fall into harmony, but not without first causing the audience to scoff at it.

Soren Bondrup-Nielsen
President, Blomidon Naturalists Society



The primary objective of the Society is to encourage and develop understanding, appreciation, and stewardship of nature in its members and the interested public. The word ‘nature’ is interpreted broadly and includes rocks, plants, animals, water, air, and the stars. We are a community grounded in nature exploration, education, and stewardship. We welcome everyone who is curious and wants to learn and share about nature. Our core values are environmental stewardship, building a connection to nature, community engagement and diversity, and collaborative knowledge -sharing.

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PHOTO: PARKS CANADA

Protecting the Hemlocks in Kejimikujik

Old growth hemlock forests face an existential threat to their survival.

BY MATTHEW SMITH

Old growth hemlock forests in Nova Scotia, of which there are very few, face an existential threat to their survival. National parks and protected areas are challenged to respond if these forests are to survive, particularly Kejimikujik National Park and National Historic Site. The invasive Hemlock Woolly Adelgid (HWA) was first detected in Kejimikujik in 2018 and has rapidly spread throughout the park, causing severe decline in areas that have been infested the longest. It is expected that HWA will result in the loss of 90% of the hemlock trees in Kejimikujik in the next 10-15 years. Time is running out to protect our hemlock trees.

Eastern hemlock is a foundational tree of the Acadian forest and hemlock stands represent some of the last old growth forest in the province. They create unique habitats that are important for a diversity of life including black throated green warblers, coral lichen, and American marten, and their dense canopy and cool rivers and streams create ideal conditions for trout and salmon. The Department of Natural Resources and Renewables estimates that Nova Scotia hemlock stands currently store 15-20 million tonnes of CO₂, meaning the loss of hemlock will release large amounts of carbon, exacerbating climate change.

The loss of hemlock will be difficult for many visitors to Kejimikujik. Hemlock stands cover just 9% of the forest, yet are a key part of the Keji experience—portages, campsites, campgrounds and trails all pass through hemlock stands. These include some of the most intact accessible and older stands in Nova Scotia, giving the general public an important appreciation of old growth stands, and why they are worth preserving. Dead hemlock trees will also pose a public safety hazard to visitors and a risk to buildings and facilities. We can not ignore the risk of HWA to our hemlock forests.

The United States has wrestled with HWA for many years. Since HWA was detected in 2002, Great Smokey National Park has treated tens of thousands of hemlock trees with systemic insecticides that are stem injected, sprayed on the bark or poured around the base of the tree. The most widely used pesticide has the active ingredient imidacloprid, which is in the neonicotinoid class of pesticides. It protects treated trees for 5-7 years. This long term commitment combined with the expensive chemicals makes it challenging to protect large areas of old growth.

Another strategy used in the US is biocontrol— the release of predators of HWA from their native range in

Asia or western North America. Since the 90's, hundreds of thousands of predators have been released in the eastern US, with the most successful being *Laricobius nigrinus* or 'Little Lari' beetle. Early signs are positive, but they will take decades to be successful. In the meantime, trees will need to be re-treated until some balance is returned to the ecosystem and the hemlock and HWA can coexist.

Parks Canada is governed by the Canada Parks Act, which states as its first priority the protection of ecological integrity, which includes maintaining native species and processes. The use of pesticides is highly regulated in Parks Canada, and neonicotinoids are only used in exceptional circumstances. With the Mi'kmaq of Nova Scotia, Kejimkujik co-developed a detailed impact assessment¹ that details the risks and mitigations to treating hemlock stands with pesticides (Parks Canada 2021). It has been determined the risks are outweighed by the nature and size of the potential loss of signature stands.

The rationale and framework for prioritizing stands for treatment is described for those interested on a story map website.²

Since the fall of 2021, over 2,300 hemlock trees have been treated in Kejimkujik, the majority being in old growth stands at Dennis Boot Lake, on the Hemlocks and Hardwoods trail, and Jeremy's Bay Campground. This represents roughly 30 hectares of forest. All of the treatments have been by stem injection with IMA-JET (a neonicotinoid with the active ingredient being imidacloprid). Each tree is GPS'ed, tagged, and its health will be monitored over time.

Our goal is not to protect the entire landscape of hemlock in Kejimkujik. We are focusing on priority stands and closely measuring the impact of pesticide on the environment. Parks Canada, together with the Canadian Forest Service and Acadia University, are supporting two Master's students, Cody Chapman and Luca Voskort (see article on p. 22), who are investigating the impacts of imidacloprid on non-target insects (canopy/soil arthropods and pollinators). Another student at Acadia University, Rebecca Mader, is studying the impact of hemlock loss on fungal biodiversity.³

Parks Canada will continue to develop a plan to treat additional priority stands with the Mi'kmaq of Nova Scotia. Long term strategies of using biocontrol will also be investigated with partners at the HWA Working Group-Maritimes. In the future, only a remnant of the great hemlock forests of Kejimkujik will survive. We are protecting exceptional trees and stands as an example for future generations of the giants that once covered the Maritimes. The time to act is now— the window to protect trees is rapidly closing.

Matthew Smith is Nature Legacy Ecologist at Kejimkujik National Park and National Historic Site. He has been working on the Hemlock Project at Kejimkujik for the past five years and is co-chair of the HWA Working Group - Maritimes.

Notes

¹The detailed impact assessment is available at: <https://iaac-aeic.gc.ca/050/evaluations/proj/82824>

²See <https://arcc.is/iLGu8>

³Cody Chapman and Luca Voskort are supervised by Dr. Hillier (Acadia University) and Dr. Sweeney (Canadian Forest Service). Rebecca Mader is supervised by Dr. Walker.



Gathering with Mi'kmaw partners/Earthkeepers around a large mother hemlock tree, Dennis Boot Lake. PHOTO: DAWN MOORE



PHOTO: PETER WALLACE

A Critical Perspective on Controlling the Invasive Woolly Adelgid

The ecological costs of stand level injections may be greater than letting the disease run its course.

BY NICK HILL

The eastern hemlock is one of the dominant species of the Acadian forest, particularly in southwest Nova Scotia. The invasive insect, the Hemlock Woolly Adelgid (HWA), feeds on the sap of hemlock at the base of the needles and in 3 to 10 years, depending on site conditions, kills the tree.

The use of neonicotinoid insecticide (imidacloprid) is presently the only effective strategy for controlling the spread of these lethal aphid-like insects.

Neonicotinoids are highly regulated insecticides because of their impact on pollinating insects and on fish. In southwest Nova Scotia/Kesputwitk, neonic (neonicotinoid) stem injections have been used to maintain iconic hemlock individuals and whole stands at Kejimikujik National Park and Historic Site. They have also been used to protect more than 2000 trees in an old growth protected area at Sporting Lake island. A recent review notes that while insecticides may slow the spread of the insects and protect such iconic trees, "... due to the high resource and time investment, and significant environmental concerns associated with the use of insecticides in Canadian forests (e.g., Holmes and MacQuarrie, 2016), currently identified

insecticidal control agents of HWA, including neonicotinoids and tree injections, are unlikely to be feasible or desirable at the stand scale for hemlock."¹

We are confronted with a variety of crises that we know too well. In addition to the introduced tree diseases that impact elms, beech, ash and hemlock, there is a global biodiversity crisis and insects are a prime concern. Unfortunately, using non-specific, persistent insecticides to protect hemlock trees from the Woolly Adelgid makes the whole tree toxic to insects that feed on the needles, bark cambium and roots. This means that treated hemlocks will no longer feed warblers in the canopy with caterpillars, or nuthatches and woodpeckers foraging under bark for beetle larvae, or support a diverse insect community that other birds rely on for food. People concerned with the state of biodiversity and the natural world are drawn to actions where we can clearly do something to stand up for nature. But if the eastern hemlock is maintained by periodic neonic injections, what is the nature value to humans walking in a lifeless hemlock stand where the carbon energy flow from hemlock trees to a diverse insect community is shut off by

systemic neonics? What is the ecological value of a bird-less forest stand?

We do not control nature. While the human footprint or influence pervades, wild unpredictable nature has value and is endangered. The state of nature is a symptom of the human drive to control the unpredictable and optimize our chances for survival. All species have this drive and we have succeeded in removing ourselves from the vagaries of the natural environment that controlled the hunter-gatherer. Most would now understand that this control has come at great environmental cost.

We are no longer in control. We cannot be the great disturber and the arbiter of the natural response and each community interaction that we haven't invited or condoned. Nature is the sum of all organisms with their varied strategies/intelligence in DNA constantly shaped and responding to natural selection. Are we thinking that we should control this even in the arenas that we have dubbed protected areas? Five thousand years ago, the eastern hemlock was decimated throughout its range, maybe by a hemlock looper. It rebounded two thousand years later. We don't know the outcome of the present epidemic. The Woolly Adelgid has been in eastern North America for 50 years and no state has yet lost all its trees. There are hemlock trees resistant to it in a New Jersey forest.

It is too costly financially to win the war against the aphid by using insecticides. There will be non-target effects on insects, and possibly on trout in nearby streams. The ecological costs of stand level injections may be greater than letting the disease run its course. Apart from the ecological costs, there is a cost in our loss of trust in the effectiveness of nature. Let's allow nature to respond and restore woodland using whatever tree seeds— birches, maples, spruce and pines — are present. We can help nature make the transition to a new Acadian forest by providing seeds where needed and using natural models like gap formation and regeneration. Slowly we can thin out hemlock, leaving enough on the landscape to monitor for resistance. There will be much work to do restoring diseased forests. There are concerned people eager to help renew the forest by collecting and spreading tree seeds or planting yellow birch or white pine saplings where hemlock once grew. Let's work for nature and trust in its deeper Gaian intelligence.

To a hemlock

You are mossy and twisted
Cracked long ago
Raked cambium deeply
Big claws in a snow

The Ganoderma got you
Varnish shelved polypore
Lustrous and crimson
Feeding the scores

That turn in slow tunnels
Yellows and greys
Emerge into sunshine
To meet beetle day

The foot language of woodlands
Through tarsi and bristle
Of rain drops and wind blow
Of the warblers' whistles

Tell me, I'm wondering
On our journey so rare
Do they hear ruby and gold kinglets
Or do beetles not care?

Dr Hill is coordinator of the Southwest Nova Biosphere Reserve Association. His interests are the conservation of rare plants, wetlands and ecological restoration.

¹Emilson, C.E., & Stastny, M. (2019). A decision framework for hemlock woolly adelgid management: Review of the most suitable strategies and tactics for eastern Canada. *Forest Ecology and Management*, 444: 327-343.



PHOTO: PETER WALLACE

Honouring Grief Among the Hemlocks

What do we do when the places that we love are dying?

BY CAROLINE BEDDOE

I'm heading to the woods. It is a brilliant late fall day with a fresh cool breeze in the air. One of those afternoons where the light seems to drape itself onto the hillside, rich and golden, and glints off the white tail feathers of the two bald eagles soaring overhead. Soon enough, I get off my bike and enter the darkness of the woods. The temperature noticeably drops. There's enough of a trail to navigate the bumps and rocks by bike for part of the way, but I would rather walk, slowing down into the peace of the forest. A few chickadees flit overhead. Otherwise, it is quiet and tranquil. The woods are dominated by eastern hemlock (*tsuga canadensis*), a tree at once delicate and majestic, with its cracked and furrowed bark, tall and wide trunks, and thin branches with feathery needles. The sunlight shines through the tall trunks with brilliant contrast, falling in shafts onto the mossy and hummocked forest floor. Hemlock forests are cathedral-like—dark, tall, spiritual. I've come to seek a moment of reflection and solace.

Someone I love is dying of a terminal illness. I grapple with cherishing the moments we have left and reckoning with what's to come. By some instinct, I'm trying to mourn them while they are still present in my life. The process is tumultuous, so I'm trying to steady my heart with a walk in the woods. How do you even go about thinking about impending loss? However, amid the usual comfort of the trees, a certain uneasiness twinges at my heart: this beautiful hemlock forest may soon be dying as well. Stopping beneath a particularly large tree, straining my gaze upwards to the treetops of layered green needles, I realise I am experiencing the same transitional, anticipatory grief for these forests that I am for my loved one.

What do we do when the people we love are dying?
How do we try to prolong their life, stall time, prepare



for grief? I've been turning over all these thoughts. But now I also wonder: what do we do when the places that we love are dying? How should we try to preserve life here? How do we mourn and experience ecosystem change, anticipated losses, and losses that have been going on for decades? In a time of climate crisis and dramatic biodiversity loss, this grief settles in between every clear-cut and hurricane-felled tree, between every attempt to preserve and protect, each deafening space of silence where there once was birdsong.

Eastern hemlock is a foundational species, supporting rich ecosystems in countless ways. As I walk, carrying my bike across creeks and streams, my feet get wet. Here, the hemlocks provide vital shade to these waterways, keeping the water cool and providing habitat for other species, while also holding in the banks with their roots. Elsewhere in the forest, their long-lived presence provides habitat and food, and innumerable benefits, including the very air that we breathe. But now, these forests are being increasingly threatened by the invasive hemlock woolly adelgid. Forests in southwest Nova Scotia are seeing the implications. As I walk through the woods, I notice how my heart breaks at the worry of what's to come.

Now, this isn't to say something cannot be done—far from it. Just as we seek to extend the life of my loved one, so many caring people have been and are mobilizing to slow the spread in various ways and protect certain stands of hemlock forests through inoculation, particularly those that are old-growth and hold deep community reverence. But there has been so much lost already, and inevitably there will be more loss. Just as I



grieve the anticipated loss of my loved one in this tender, beautiful time while they are still alive, I find myself in the murky grief that comes with living in a time of profound environmental changes.

How can we understand such emotions? Glenn Albrecht coined the term *solastalgia* to express the deep existential distress felt when people experience change to a loved or familiar environment or landscape. Terms like ecological grief, ecological anxiety, and climate anxiety are increasingly prevalent. While this grief for the hemlocks differs from my grief for my family member, I realize that all life is worthy of mourning. This ecological grief may be inevitable, and should not be relegated to private confines.

How should we try to preserve life here?
How do we mourn and experience
ecosystem change, anticipated losses, and
losses that have been going on for decades?

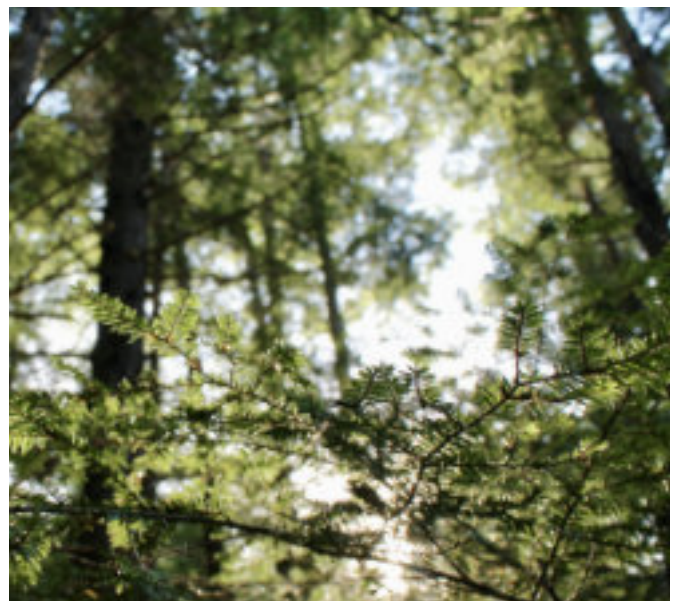
I lean my bike against a tree and sit down in the moss beneath a particularly large hemlock. Somewhere overhead, a red squirrel barks and chatters at me. I crack a smile. Evening is starting to fall, and above the trees and hills the sky is bruising purple and pink. The birds are singing their vespers. In the fading light of day, joy comes just as quickly as grief, the forest is devastating and delightful in its beauty.

I don't view my grief as defeatism, giving up or sabotaging the present moment. Grief is the complement to love. Grief makes clear the grateful interconnections

between me and all my relations, from the humans I hold dear to the lands and waters on which we depend. Sitting beneath the hemlock, each breath of air affirms that who I am extends beyond my body. My anticipatory grief for these hemlock forests reminds me of my love for them. So I wonder if a full, unabashed acknowledgement of this grief is needed for sustained ecological efforts and conservation work? Is mourning what we love the only way to keep going?

The sun has set as I leave the forest and get back on my bike. The wind has picked up, it stings my eyes, and tears bud. There is so much to break our hearts each day. I think grief in all its forms is part of living in this changing world, full of human tragedies as well as profound ecological losses and shifts. So let us share it, honour it, let it motivate us towards care, change, and action. Let us not become numb to the pains of the world. This grief is challenging, but in these trying times of loss and change and ecological care, I try to remain present to the wonders of life, the love of the people around us, and here, to the joys of the hemlock forest and the natural world. Maybe my grief can help me become more present to my empathy and love. I look back, and overhead, a few eagles make their way towards the forest by the river, settling into the trees and falling into darkness.

Caroline Beddoe is the current program coordinator of the BNS, and a keen observer and lover of nature. She can most often be found out cycling or curiously exploring local woods for wildflowers and mushrooms. All photos taken by Caroline Beddoe.



Lessons from Treating Our Hemlocks

We hope others can benefit from our learning and encouraging experience with hemlock injections for HWA.

BY CHRIS CROOKS

News of the coming of the hemlock woolly adelgid, HWA, struck terror into the hearts of Berwick Campers. This tiny aphid-like insect feeds exclusively on the sap of eastern hemlock and has been destroying hemlock forests in the north-eastern USA. We share our story of dealing with it in the hope that others can benefit from our learning and encouraging experience.

The United Church Camp Meeting Association, known as Berwick Camp, gathered last summer to celebrate 150 years since its founding in 1872. Situated in a beloved hemlock grove, the Camp has never missed a year even during the Depression, through two world wars, and recently the Covid pandemic, which, of course, required some extra planning. Many campers are generational, having attended for decades, while first timers are welcomed every year as well. Other faith, music and professional groups also love these sacred grounds and return every year to experience the serenity and calm offered there.

For the last 3-4 years we have been bracing ourselves for the inevitable arrival of the hemlock woolly adelgid. We watched as it crept closer to Kings County, educating ourselves as much as possible, and consulting with those knowledgeable in the field. Finally, it had been identified on both sides of Berwick Camp, in Greenwood and in Kentville, so the inevitable was upon us.

On the advice of Donna Crossland, forest ecologist, who had been working with us since earlier in the year, we decided we had to move ahead and treat our hemlocks. We divided our 27 acres into 12 sections that seemed manageable. A dozen campers came to the grounds over several days and teamed up to measure each hemlock tree with a specialized



Donna Crossland demonstrating treatment to volunteers..

diameter-measuring tape. We tagged and recorded over 1200 hemlocks, not including the tiny ones in their infancy.

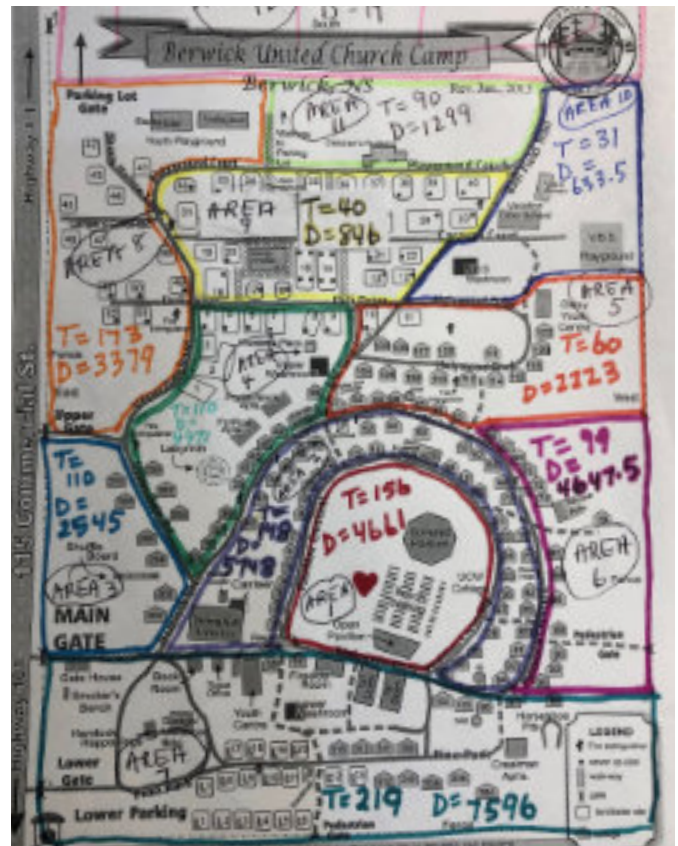
Next came the treatment choice: basal bark spraying (i.e., spraying the tree trunk at the base) or injecting the hemlocks. The basal bark treatment, recently approved in Canada, has label restrictions around how much can be used per acre per year. Alternatively, there is no maximum amount when injecting the chemical. When factoring that the two treatments last for differing amounts of time, it seemed that our record keeping would be very challenging to do a mix of the two in the same treatment period. Spraying alone, would require a multi-year effort. So, we decided to treat all the trees over 15 cm diameter by injection in the fall and to spray the trees under 15 cm, too small to inject, likely in the spring. This would decrease the number to be sprayed in each area, and help us focus on the oldest trees first, some more than 200 years of age.

The hemlock treatment was quite a production! Two full weekends were required. Again, Berwick Camp volunteers and staff, numbering about 20, stepped up. Under Donna's capable leadership, and with assistance from her associate Rick McMahon, we were taught how to drill the hemlock, insert the nozzle, fill and apply the canister, judge when they

were empty, strip them for refill, and tag each tree with a metal number. This number will refer us back to a chart containing all tree diameters to save from having to remeasure the entire grove next time. This treatment lasts up to four years. The chemical is absorbed into the tree's circulatory system and can take up to a year to be fully effective. The HWA die after they ingest the chemical. Thankfully it typically takes them a few years to decimate an untreated grove. We did find the HWA in two different areas of the Camp, which validated our treatment timeline.

Time, energy and good weather ran out so, first thing in the spring, we will begin the spray treatments on the smaller trees, which lasts for approximately seven years. Eight years from now, after the big trees have received their second treatment and the small ones are due again, we will be back on the same schedule and hope that by then, the biotreatments that are being researched now, may be available in the Maritimes. This would involve introducing a natural predator of the HWA into the grove.

The chemical is expensive. After treating our hemlocks this spring, we will have spent over \$30,000. Our Board unanimously decided to go ahead



with treatments before the funding was secured, as the life of our beloved Camp depended on them.

Having to cut down 1200 trees would have finished us financially. We were very blessed to have found a sponsor for Berwick Camp. The Municipal Group of Companies, including Dexter Construction, MBW Courier, EFR Disposal, and other member companies, was quick to help. This was a huge boost to our non-profit organization.

Treating our Berwick Camp hemlocks was a very spiritual experience. These trees have sheltered some of us our whole lives, seen us in our joy and comforted us in our sorrow, stood witness to rousing hymns, quiet prayers and soul-stirring preaching, and heard the reunions of many and the laughter of children playing below. It was indeed an honour to help them live on for future generations.

Chris Crooks is Co-Chair of Property and Grounds at Berwick Camp. Her family has attended Camp Meetings since the 1940's. Thanks to Donna Crossland for her advice in preparing this article. All photos contributed by Chris Crooks unless otherwise credited.



PHOTO: DONNA CROSSLAND

From Field to Fork to Future

FarmWorks... Building a Local and Sustainable Food System

BY GINNY POINT

Under the watchful eye of Cape Blomidon is an increasingly complex habitat buzzing with activity. It is barely detectable to the naked eye and the uninitiated observer probably would not understand the full extent of the daily activities. However, the goal is clear—“healthy farms and healthy food,” greater access to a sustainable local food supply for all Nova Scotians, and the numerous community benefits that are the result.

The queen bee behind much of the activity is Linda Best, the incredibly hard-working Managing Director of *FarmWorks*, a values-driven Nova Scotian organization that operates a Community Economic Development Investment Fund (CEDIF) that supports local and sustainable food systems. *FarmWorks* sells investment shares, and then loans the money to people who either produce local food, or use it in their food and beverage processing or restaurants. Traditional lenders often do not lend money to restaurants or other businesses that *FarmWorks* supports, so the loans are crucial. In addition, *FarmWorks* provides valuable non-monetary support



Kim and Steve Hatcher, owners of the Canning Sauce Company & Coywolf Farms. The farm is pictured below. PHOTO: GINNY POINT

to clients. What is the best way to meet a specific regulatory requirement? What is a good local source of a particular ingredient for a value-added food? Is there another *FarmWorks* client who can offer advice? *FarmWorks* is a vital connection point and support for clients.

The individuals who borrow money from *FarmWorks* are incredibly creative, down-to-earth, enterprising folks who share a deep commitment to local, sustainable agriculture. Thanks to *FarmWorks*, the provincial food landscape is changing for the better. Here are some local examples:

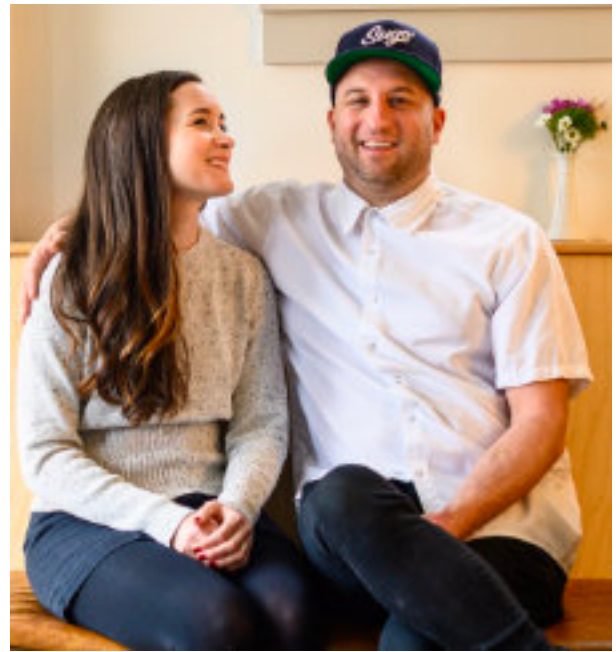
Steve and Kim Hatcher, owners of the *Canning Sauce Company* and *Coywolf Farms* laugh as they cheerfully explain that they grow most of the ingredients for



their sauces and soft flower jellies themselves, and the rest are all sourced locally— mostly within walking distance! Their delicious sauces are available locally, including at the Wolfville Farmers’ Market and its webstore, WFM2Go.ca. They also grow greens and other produce which they sell at the farm stand across from Canning Village Meats and elsewhere.

Steve and Kim own a small plot of land with Cape Blomidon as a backdrop. They have “wonderful neighbours” who each invited them to use some of their land as well. They farm less than an acre. Steve is very connected to the land and practices no-spray and no-till agriculture. “Each plot is a different ecosystem,” and this knowledge helps him grow the best vegetables. Kim loves to cook and has been “obsessed with preserving” for years. She harvests and processes the fresh produce for the farmstand and donates all the unsold produce at the end of each weekend to the Food Bank. It is her way of reducing waste and giving back to the community. Kim notes that it is “pretty cool that FarmWorks is not a faceless entity. It is based on relationships, and there is a sense of security in a support system that is really geared towards individual businesses.”

Two other FarmWorks clients are Lucy and Geoff Hopgood, owners of *Juniper Restaurant* in Wolfville. Their commitment to local means buying ingredients



Lucy and Geoff Hopgood, owners of the Juniper Restaurant (pictured below). PHOTO CREDITS: LUCY HOPGOOD

for the restaurant from over forty-four local suppliers. As Lucy says, “We love this community. We just wanted to support all the farms and the businesses that are doing really amazing things here. The closest we get to a national distributor is perhaps to run across the street to buy a lemon or something.”

Geoff and Lucy started Juniper after a very successful restaurant career in Toronto. Geoff is a talented chef whose menus change week by week. From butternut squash agnolotti with Brussels sprouts, hazelnuts and lemon, to braised lamb shank with celeriac, potato mash and herb salad. It can be hard to choose what to order. Lucy does pretty much everything related to the restaurant except the cooking and serving.

COVID hit a few months after they opened, but as Lucy explains, COVID “gave us a chance to push ourselves.” They like doing that, so in early 2022 they opened *The Wolfville Cheese Shop*, co-owned with another FarmWorks client, Frederick Tandy of Ratin- aud’s cheese shop in Halifax. So far “it is a joy to run.” Customers rave about the cheeses, charcuterie, sauces and fresh bread. The bread comes from Bedard Bakery in Windsor, a FarmWorks client.

Lucy and Geoff say that FarmWorks has been very supportive. Lucy explains that “it was not just about gaining a loan to help us start. A big part of the draw was the community and purpose in joining us all



together. There needs to be more FarmWorks across Canada.”

Another example of energetic FarmWorks clients are Heather Lunan and Rebecca Tran. They are passionate about reducing food waste in the region. They purchase local produce that is too small, or too misshapen to be sold in traditional retail markets, and then create value added and upscaled food products. Rebecca notes that up to 40% of a given crop is often left in the field because it does not meet consumer expectations. In 2019 they bought the old school in Newport Station, and with help from FarmWorks, converted it into a food processing facility, and began to lease out space to other local food businesses.

Their business, the *Station Food Hub Company*, currently processes about 900 kg of potatoes each week, making a tasty mashed potato product that is sold primarily to the Nova Scotia Health Authority. They also are processing imperfect cauliflower and planning feasibility studies for processing non-marketable sweet potatoes, carrots, and cabbage. They are developing a line of specialty vegetarian frozen entrées using imperfect versions of those vegetables. These items are currently available in a few local stores, and will be elsewhere soon. They also have a line of baked goods featuring carrot cakes and scones made from mashed potatoes, among other things.

Rebecca is a former public health nutritionist, and Heather used to own and operate the food company Pie R Squared. Their ultimate goal is to work out a prototype program that could be replicated in other regions. Their success has been recognized as one of six finalists in Canada’s Food Waste Reduction Challenge, and they have received cash prizes totalling \$500,000. The final stage of the competition for first prize takes place in May.

Linda Best first introduced Heather and Rebecca. Four years ago, they all met at Rebecca’s kitchen table brainstorming ideas for how to address the problem of so much wasted produce here in the Valley. FarmWorks has supported them throughout their journey.

These are just some of the many talented and enterprising FarmWorks clients. The sad reality is

that Nova Scotia currently only produces about 15% of the food we consume, as compared with 50-60% in the 1940s and 1950s, so there is a lot of work to do. Over the past 11 years, FarmWorks has loaned approximately \$8,200,000 to 148 qualifying businesses across Nova Scotia.

Investors benefit from the investment as well by receiving tax credits from the Province. The investor receives a 35% tax credit the first year, provided the investment is not redeemed in the first five years. After that five-year mark, the investor receives another 20% tax credit, and then another 10% tax credit at 10 years. Investors still retain the value of their initial investment as well. The deadline to invest for the 2022 tax year is March 1, 2023.

FarmWorks is more than a regular money lender, and more than a typical investment fund. FarmWorks is all about relationships, community, and sustainable businesses that respect the earth. Linda Best and Ann Anderson, two founding board members, have been referred to as the “Hugging Bankers.” There may be a bit less hugging now due to COVID, but the concern for clients is still a driving force behind FarmWorks.

For more information about FarmWorks and how you could invest in it this year, please visit farmworks.ca.

Ginny Point is an avid gardener, local food advocate and a board member of Farmworks.



Heather Lunan (left) and Rebecca Tran at the Station Food Hub.
PHOTO CREDIT: HEATHER LUNAN

Climate Circles— What Do We Need for Local Climate Action?

People need to experience hope and solidarity through clear, achievable, and inspiring climate action projects that build networks and momentum.

BY CAROLINE BEDDOE & SARAH LAVALLÉE

We live in a world already impacted by the climate crisis. It is easy to feel hopeless and overwhelmed. Can we do anything about this mess? Some say we're too late, but we believe people are more resilient and stubborn than some think. We need hope, so sometimes we have to make it. By taking action, we affirm our potential. We need to remember our local and collective power.

The Blomidon Naturalists Society is addressing these issues by re-launching *Climate Circles* to meet regularly and spur action projects. We aim to convene community members to build trust and relationships, increase climate knowledge, assess local risks and opportunities, determine projects and priorities, promote equitable and diverse collaboration, and work strategically together.

We hosted three information-gathering sessions through late November and early December involving 60 participants in Wolfville, Kentville, online, and through a survey. We are heartened by the enthusiasm and participation of community members in this process. The graphic to the right summarizes the on-line feedback and the graphic on the facing page describes the Kentville session. Wolfville provided similar ideas.

What We Heard

Overall, we heard a sense of urgency for action; that people are feeling overwhelmed and alone, and that there is a desire for relationship-building and connecting with like-minded community members; a need to experience hope and solidarity through clear, achievable, and inspiring climate action projects that build networks and momentum.

We started off imagining our visions for local climate action and resilience— the first step towards making them happen. We heard a strong desire for walkable and cyclable communities, prioritising active transportation and vibrant streetscapes. A desire for public transit was echoed at all sessions, and many participants called to bring back the train! We also heard about disaster and emergency preparedness, local energy transitions, engaging youth and diverse perspectives, ending unsustainable land use and forestry practices, ending the use of glyphosate, supporting regional food systems, addressing recon-



ciliation and land back, and more. Participants called for this region to be a leader in terms of climate action and sustainability.

Participants identified many barriers preventing them from participating in climate action. Most notably, participants felt overwhelmed and alone given the enormous scope of the climate crisis. They articulated an urgency to “just do it!” (*i.e.*, just take action without overthinking it), but also a paralyzing uncertainty about what “it” is. Where to start? What could make a difference? Similarly, participants voiced concerns that Climate Circles may be “reinventing the wheel.” How can we ensure that Climate Circles builds on and amplifies the work of others?

There are also logistical barriers preventing people from regularly committing to Climate Circles. People need quality childcare, sustainable and reliable transportation to meetings, food provided, and meetings that respect other time commitments if they are to regularly attend. These logistical barriers reiterated the need to consider equity—we all have different capacities to participate in climate action. There were many discussions about who were not in attendance and why certain populations may feel unwelcome. How can we make Climate Circles inclusive to all? How can we ensure that everyone’s perspectives are heard equitably? Questions like these are complex and have no easy answers, but they are essential to grapple with for any sustainable climate action community.

What’s Next?

Given all the feedback and excitement generated by the initial sessions, we will continue the momentum by offering monthly meetings in Kentville at the Valley Community Learning Association. We will organize into groups around specific priority interests and action ideas from those generated. Another broader idea is to conduct a large group asset-mapping activity where we identify current individuals, organizations, and communities that may help with climate projects, or that are already taking action that we can learn from and support. These initial projects will help us build confidence and success in project management.

While our vision includes meetings, social gatherings, action competency courses, skill-sharing and action



projects, we are constrained by a lack of funding to support the work. While we apply for grants, we need leadership from community members to facilitate sessions, book venues, bring food, provide childcare, set-up, clean-up, organize project groups *etc.* All these actions are climate action—for without them, we cannot meet, connect, and take collective action for the sake of the planet and each other.

Our first session occurred on January 29th and we are planning monthly meetings in the short term as we build toward more robust activities. Stay tuned for meeting dates and locales in the BNS e-newsletter and through the Climate Circles e-mail list. If you are able to contribute, please consider volunteering and/or donating to our crowdfunding campaign hosted through the Small Change Fund (search for Climate Circles at smallchange fund.ca).

Caroline Beddoe is program coordinator of the BNS. She believes in making our her hope and is excited to be supporting and learning from Climate Circles. Sarah Lavallée is a recent Acadia Community Development grad, a board member of BNS, and is passionate about environmental equity. Graphics are by Sarah Lavallée.

Visit Crystal Falls ... A Superior Waterfall in Kings County

BY PETER WALLACE

Looking for a beautiful winter walk with charisma? The northern edge of the South Mountain from Windsor westward has numerous brooks and rivers cascading down the north-facing slope giving rise to cataracts and rapids, fast water and waterfalls. Crystal Falls is a great example of one of these on Mumford Brook, just south of Kingston/Greenwood. It is a four-season waterfall: in winter it cascades a beautiful array of ice formations; in the spring and fall the waters vary from moderate to torrential; and in the summer water flows over the rocks at lower levels. The falls occur where erosion-resistant, quartz sandstone beds are adjacent to eroded slate, their juxtaposition most likely caused by ancient earthquakes. The pool at the base of the falls is quite deep and a wonderful swim on a warm day—beware though, the water can be very cold!

This is an easy walk of less than 4 km round trip. The soil at the start of the trail and east of the brook is mainly derived from granite boulder till and is sandier to the west of the brook. Some boulders along the brook are several metres in diameter, attesting to the strength of the brook during glacial melting. They make great icons and are worthy of close inspection, especially looking at the ferns, mosses and lichens

that grow on them. Up on top of the banks is a pioneer mixed forest, with mainly spruce and fir conifers. Down near the river is a more mature hemlock-bearing, mixed forest. On the west side, the tree cover is quite variable and younger because of more recent logging operations. Along some parts of the brook where the flow is low there are groves of alders. In the hemlock-bearing parts of the forest next to the brook, the ground is almost completely covered by moss. In the spring and summer the usual suspect wildflowers can be found like Red Trillium (*Trillium erectum*), Nova Scotia Mayflower (*Epigaea repens*), Twinflower (*Linnaea borealis*), and Blue Flag (*Iris versicolor*), to name a few but not abundant species.

Trail Directions: Park on the Harmony Road just south of Greenwood where the Greenwood Road T junctions into the Harmony Road. The trail in looks drivable from Harmony Road but don't attempt it. Even with a high clearance vehicle you will only go a short distance before having to park in a clearing. The access road is active with ATVs, and occasionally with logging vehicles doing work south and west of the falls.

From Harmony Road, walk a little over a kilometer to a fork in the trail just before the river (see map), the





key decision point. If you take the right fork, go over the bridge, up the rise, and past the next cleared area, going straight through for about 500 m. At that point, on the left, is a well-worn flagged trail going down a steep bank and across a swampy area with alders. Exit the other side of the alders and you are on the west bank of the pool looking full-square at the cliff and falls. If you take the left fork before the bridge, go up the road about 200 m and on the right is a sign pointing to a woods trail going to the falls. The short trail leads to the northern bank of the pool and a series of rocky outcrops. The falls are on the east side along the cliff at the back (the view is not full on here).

Some boulders along the brook are several meters in diameter attesting to the strength of the brook during glacial melting. They make great icons and are worthy of close inspection.

To return to Harmony Road from either trail, go back to the fork near the bridge. On the bank on the east side of the brook, about 15m up, you will see an obscure narrow trail leading off to the north (trending downstream). This is an old mountain bike trail that follows the brook, which goes through the hemlock-bearing forest, a delightful forest walk. About 500 m along this brook meander, the forest trail T's onto an ATV trail that goes back up to the main trail and Harmony Road.

The Crystal Falls trail crosses private land but the owners are amenable to hikers. The hike is easy but that does not mean there are no muddy bits, roots across the trail, or boulders on the trail that you must hop over. Hike the trail at your own risk. The pool at the base of the falls looks wonderful but contains hazards like rocks, sharp debris, and dead wood. Swim in it at your own peril. All hikers should practice good etiquette/ecological practices with regard to garbage and personal hygiene (take out what you pack in no matter how it was carried).

Make It a Two Waterfall Day!

If you have a bit of time left over at the end of the walk, check out McMaster Mill Historic Park and falls. Go 400 m further west down the Harmony Road and right for 50 m on the Rocknotch Road. It's a Nova Scotia Historic site with short (a couple of hundred metres), easy access trails showcasing beautiful rapids and dramatic falls with large easy to read and informative displays on logging and homesteading. This site is on Fales River, which has more water than the tributary Mumford Brook.

Peter Wallace is a retired geologist who lives on the South Mountain and leads a weekly hiking group of retirees to areas of natural beauty and interest in the region. Peter Wallace contributed the photos and map specifications.





PHOTO: ALAN WARNER

Fighting for the Piping Plover and Other Endangered Species

East Coast Environmental Law and Nature Nova Scotia are taking the Federal Government to court to ensure the habitat of endangered species is properly identified and protected, as required by the Species at Risk Act."

BY JOHN BURKA

Endangered species are iconic for their unique roles in the web of life, as indicators of ecosystem health and as rallying points for habitat conservation and biodiversity protection. The piping plover is one of the highest-profile species on the endangered list in Nova Scotia, especially since these small birds who inhabit pristine beaches so frequently come into conflict with human recreational and development ambitions. As with each endangered species, the federal government is required to take steps to protect them through a formal recovery strategy.

In 2021, fifty-two breeding pairs of plovers on fewer than fifty beaches were identified in Nova Scotia.¹ This is similar to the number in 2001. The plovers are not losing ground at the moment, but remain on the cusp of extirpation in this region despite the recovery efforts. Now the federal government is proposing to weaken the habitat protection measures for these birds with a bounding box approach that also threatens protection measures for other species at risk.

Given this context, Nature Nova Scotia and East Coast Environmental Law (ECEL) have initiated a lawsuit

against the federal Minister of the Environment and Climate Change, Steven Guilbeault, for weakening the habitat identification approach for the endangered piping plover. The Blomidon Naturalists Society is an active partner of Nature Nova Scotia, the provincial federation of natural history and environmental groups which supports networking, research, education, and advocacy for nature and the environment.

Why is this of interest to members of the Blomidon Naturalists? The federal Species At Risk Act (SARA) requires the Minister to publish a strategy for the recovery of each species listed as extirpated, threatened or endangered on the SARA wildlife species at risk list. The strategy must include, among other things, a description of the species' critical habitat. Certain sections in SARA then provide for protection of the identified critical habitat.

In 2012, the federal government first published the recovery strategy for the piping plover. The strategy identified piping plover critical habitat in a comprehensive and precautionary manner, including more than 200 beaches. Each beach site habitat was

identified by name and GPS location, including the entire beach area. In 2022, the Minister published an amended recovery strategy for the piping plover. The amended strategy indicates that it is providing “clarity” on the specific locations of critical habitat. Critical habitat is now identified as all areas of “suitable habitat” within defined grid squares. “Suitable habitat” relates to areas possessing a specific set of biophysical attributes, listed in the strategy, required for the piping plover’s life processes.

“Protecting and restoring natural habitats is a crucial response to tackling the biodiversity crisis and helping endangered species, like piping plovers, survive and recover...” – Sarah McDonald, Ecojustice

This is based on the probability of the endangered animal being in a certain area, thus limiting the protected area. This could mean that only certain areas on the beach would be protected instead of the entire beach. This could open up the possibility that beaches with nesting piping plovers could be used for other purposes including commercial or recreation activities, resulting in weakened protection for the species. Sarah McDonald, Ecojustice lawyer, emphasizes that “protecting and restoring natural habitats is a crucial response to tackling the biodiversity crisis and helping endangered species, like piping plovers, survive and recover. Environment and Climate Change Canada cannot be allowed to default to the weakened “bounding box” approach to habitat identification. There is too much at stake.”²

Each recovery strategy that the federal minister is required to make for a listed species is to reflect the unique circumstances of the particular species. However, there is a concern that the weakened approach used in the piping plover recovery strategy to identifying critical habitat could be relied on to identify critical habitat in other species’ recovery strategies. This could result in weakened protections for more at risk species. Other species on the federal at risk species list with published recovery strategies include

such Nova Scotia species as the peregrine falcon, chimney swift, wood turtle, southern flying squirrel, moose, inner Bay of Fundy Atlantic salmon, Atlantic whitefish and numerous lichens and plant species. Bob Bancroft, President of Nature Nova Scotia, is firm: “Strong, enforceable habitat laws are a necessity if we are to turn the tide of endangered species population declines in Canada.”²

Nature Nova Scotia and East Coast Environmental Law are asking the court to find that this new approach to identifying critical habitat in the piping plover recovery strategy is unreasonable and that it be reconsidered. The lawsuit is currently in its earliest stages and there will be updates as the matter progresses on the Ecojustice website.² You can help out with the court case by donating through Ecojustice below. If you have an interest in volunteering with the conservation efforts, visit the Birds Canada website.¹

John Burka is Secretary of the BNS Board and represents BNS on Nature Nova Scotia. He is a strong supporter of biodiversity and healthy ecosystems. Thanks to Melissa McDonald and Alan Warner for their feedback and suggestions in crafting the final article.

¹ The 2001 numbers are from the Nature Conservancy of Canada, and are included, as well as the 2021 numbers, in an interesting article by Laura Bartlett on plovers on the Birds Canada website at <https://www.birdscanada.org/bird-science/piping-plover>.

² <https://ecojustice.ca/case/fighting-for-a-comprehensive-approach-to-habitat-identification-for-piping-plovers/>



PHOTO: RICHARD STERN

Art for Activism

Flying Squirrel's Nature Bus Adventure

BY RACHEL CHERRY BRANNEN & JUDY LIPP

This fall we had a great opportunity to bring children and families together for a nature hike and artistic exploration at Ross Creek Centre for the Arts. Thanks to the initiative of Nature Canada and support from Ross Creek, we hosted an animal art workshop with artist Patrick Thompson to create art to decorate several buses that travelled to the COP15 biodiversity conference in Montréal.



In early November, over 30 families from across the Valley came together for a nature hike and multiple art stations. Everyone joined in on multiple art forms, from shadow puppets to large canvas drawing, self portraits, place-based collages, cookie decorating and more.



In partnership with Nature Canada, children and families took part in an endangered animal art workshop with Patrick Thompson. These large scale drawings were brought to life on the Nature Bus!



In December we met at Miner's Marsh for a Nature Bus visit on its way to the Nature COP15 conference. We viewed the bus, played with the mascots, and had our say on nature conservation. We wrote letters to Parliament and talked about the importance of conserving wildlife biodiversity. As we ended with a walk at dusk, we were reminded of how the land connects us all when it is respected and loved.



Nature Art Activities for All

There are lots of ways to explore nature through art with all ages, whatever the season. Here are a few ideas.

Frames. Make one out of wood or cardboard, or four sticks on the ground. Hold the frame at arms-length and look for interesting shots, zoom in on close-ups, or frame up something beneath your feet or in the trees overhead. Look for faces on tree trunks. Collect a few objects within the frame to create a piece of art. Split the group up and have different people work in different directions and then show off your art to one another in turns. There are so many possibilities.



Nature's Colour Wheel. As you explore your yard or in nature, see if you can build a rainbow with found nature objects. Don't be discouraged by less vibrant colours on a grey day, be creative and look closely— colours are open to interpretation. This can be done at any time in most places and with all ages.



Ice Sun Catcher. Should the temperatures plunge, there is nothing more beautiful than a sun catcher made of ice decorated with found natural objects. All you need: a pie plate, water, your found objects and some string. Place your found objects in the pie plate, pour in water and place a string tied in a loop so you can hang up your beautiful decoration. Let it freeze completely (the freezer will work too of course). Once completely frozen, remove it from the pie plate and hang it outside. Watch how your creations change as the temperature fluctuates.



Rachel Cherry is the communications/ program assistant and Judy Lipp is the program lead with Flying Squirrel Adventures. Photos were provided by Flying Squirrel Adventures. Alan Warner contributed the frame activity write up and photo.

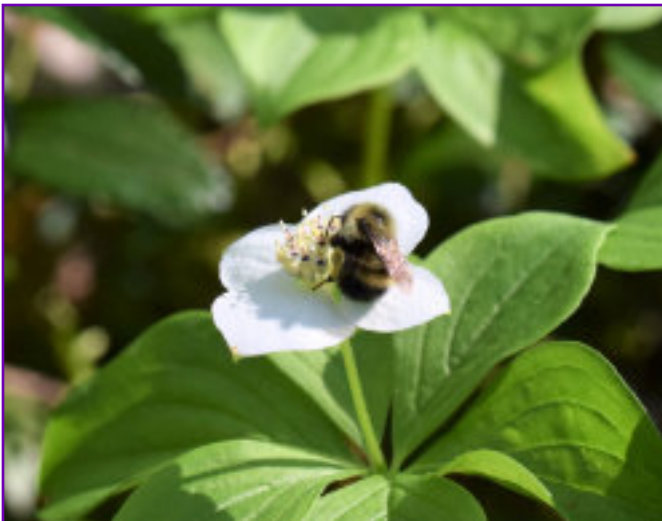
How are HWA Control Sprays Affecting Pollinators in Hemlock Forests?

Pollination is crucial in forests and a thorough assessment of the potential risks of basal bark sprays to pollinators is essential before widespread application.

BY LUCA VOSCORT

Who doesn't enjoy a stroll through a cool forest surrounded by ancient, towering trees on a warm summer's day? I certainly do. And to be precise, it would preferably be a stroll amongst my favourite trees, eastern hemlocks. Unfortunately, those walks amongst hemlocks are jeopardized by a tiny insect, the hemlock woolly adelgid, which is taking over Nova Scotia.

Hemlock woolly adelgid (HWA) and its management are the focus of my master's degree research in Biology at Acadia University. HWA is a destructive, non-native pest of eastern hemlock in eastern North America. Infestation with the pest causes rapid deterioration of the host tree, often resulting in its death. Originally found in East Asia, HWA was accidentally introduced to Virginia in the 1950s and has since rapidly spread across most of the eastern hemlock's range. HWA was first detected in Nova Scotia in 2017 where its continuing spread poses a significant threat to eastern hemlock forests and their



Bumblebee on bunchberry



Hemlock woolly aphid on hemlock needles

associated ecosystems. Different management techniques, including silvicultural approaches, biocontrol, and chemical control are currently being investigated to help contain the spread and mitigate the damage to host trees.

Biocontrol, meaning the introduction of a predator or natural enemy to HWA, may be the long-term solution to manage the pest, but research towards finding the best suitable predator, investigating its impacts on the ecosystem, and then rearing and introducing it, can take a long time. Due to the high mortality rate of infested hemlocks and the rapid spread of the pest, short-term management techniques, such as chemical control with an insecticide, play an important role in preserving hemlock in our province. A frequently used insecticide for chemical treatments of HWA infested trees is imidacloprid.

One method of applying imidacloprid is the topical application to infested trees via spray, also known as basal bark spray. Such treatments have shown high efficacy in the United States and can be applied rapidly to a large number of trees and are more cost effective compared to other application methods. There are risks to the use of imidacloprid. Imidacloprid's use in agriculture has been shown to have detrimental effects on insect pollinators. When used in a forest setting, the insecticide could leech into the soil

surrounding a treated tree, where it may be taken up by flowering plants that pollinators feed on. Ground nesting bees may also be affected when nesting in contaminated soil. Pollination is crucial in forest ecosystems as it provides food for wildlife and plays an essential role in plant reproduction. A thorough assessment of the potential risks of basal bark sprays is essential before there is widespread application.

I am investigating whether pollinator communities inhabiting eastern hemlock forests suffer harmful impacts following imidacloprid basal bark spray. My research focuses on two indispensable groups of pollinators in forests— wild bees and flower flies.

I have established four research sites throughout southwest Nova Scotia and conducted a series of experiments over two field seasons in 2021 and 2022. Two sites were treated with basal bark sprays in fall 2020 and 2021, one site was treated in spring 2022, and the last site remained untreated during the project.

I wanted to compare pollinators between treated and untreated stands and pre- and post-treatment within the same stand. I have used multiple pollinator sampling techniques at the research sites, including pan traps, blue vane traps, and sweep netting to get an accurate picture of the pollinator diversity and abundance at each site. Specimens are currently being catalogued and identified. I am also interested in the level of environmental exposure of pollinators to imidacloprid. I collected flower samples from various distances from treated trees and pollen samples directly from sweep-netted bees. Samples are currently being analyzed for the level of imidacloprid.

Furthermore, I want to dive into the life history of pollinators in eastern hemlock forests and potential plant-pollinator relationships. I am wondering which areas are preferred by certain species and why. I collected data on ground vegetation, blooming periods of flowering plants, tree composition, tree basal area, and canopy cover to further classify the research sites and look for correlations between pollinator numbers and forests' characteristics. Specimen identification, and sample and data analysis are ongoing, but preliminary results indicate that bumble bees are the most abundant group of bees in these stands. Notably, the yellow-banded bumble bee, a species listed as "Special Concern" under the Species at Risk Act (SARA), has



Blue vane trap for capturing pollinators

been identified at all research sites, further underlining the ecological value of the habitats provided by eastern hemlock stands.

I am hoping that the findings of my research will aid conservation practitioners to implement effective HWA management strategies, while mitigating impacts to native pollinators. I am also excited that my project will provide further insight into the natural history of native pollinators in a historically understudied environment.

Luca Voscort is completing a master's degree in Biology at Acadia University. He contributed all of the photos.

Editor's Note

Luca Voscort received the Merrit Gibson Scholarship in 2022 from the Blomidon Naturalists Society in support of this research. This BNS scholarship is awarded annually to a full-time honours or graduate Acadia University student. It serves to support aspiring naturalists in their endeavours to understand and protect the environment.

The deadline for this year's scholarship applications is April 22, 2023. Visit the Blomidon Naturalists website and go to the *Get Involved* menu for details.

To Feed or Not to Feed the Birds: The Threat of Avian Diseases

What are the threats? Should we use feeders? How can we attract birds in a healthy way?

BY JOHN BURKA

Bird feeders have become a point of contention for many people in Nova Scotia in the last few years. We love seeing our neighbourhood birds coming to our yards, especially when they bring their fledglings, or the occasional visits of less common birds such as grosbeaks. Unfortunately, diseases can be transmitted through birds interacting at our feeders. Avian influenza (AI) is the latest to hit the news. What are the threats? Should we use feeders? How can we attract birds in a healthy way? My aim here is to describe some of the issues and offer some advice.

First, we had warnings about summer feeding due to the spread of trichomonas, a microscopic parasite that causes respiratory distress in finches and doves, common visitors to our feeders. When you see a finch struggling to feed or drink, this could be a sign of trich. Salmonella and mycoplasma can also spread at

feeders. Mycoplasmosis occurs largely in finches and grosbeaks, causing an eye infection. It is common during colder weather, but can occur at any time. Salmonellosis occurs largely in winter and spring in many backyard species and causes inflammation of the esophagus and crop. The symptoms are similar to infection with Trich. Thus, threats are present at feeders at all times of the year.

We must now also be wary of AI, also known as “bird flu”. It has been in the news for several years after media started reporting culls on poultry farms. Beyond the major threat to poultry, it is also dangerous to wild birds. Avian influenza is typically caused by influenza virus A, which can cause symptoms ranging from lack of energy, appetite, and coordination, respiratory and gastrointestinal distress, impaired reproduction, to sudden death. There are two types of the AI virus, a highly pathogenic (HPAI) and a low pathogenic (LPAI) one, with various strains depending on the specific structure of the virus. Most strains have low pathogenicity, although HPAI strains can cause severe disease and death. Geographical variability is common where, for example, an H5N1 strain that has been reported with low pathogenicity in parts of Europe is highly pathogenic in Asia. The reasons for this are not clear.

The Canadian Wildlife Health Cooperative (CWHC) conducts year-round targeted surveillance for AI.¹ They tested an average of 6300+ birds (live and dead) per year between 2005 and 2016 with an average of about 14 positives per year. With increased submission of dead birds, CWHC reported 908 HPAI cases in 2022 up to early November, with 75 of those in Nova Scotia. They also reported 33 live birds with HPAI, 29 of which were in Nova Scotia. This indicates a significant increase in AI in Canada, including Nova Scotia, between 2016 and 2022.



Rose-breasted grosbeak. PHOTO: JOHN BURKA

The primary natural source of AI is waterfowl, though it is also observed in many raptor species including bald eagles and red-tailed hawks. Some waterfowl such as Canada geese and many ducks are asymptomatic carriers of AI, whereas colonies of northern gannets, puffins, and murrets have been devastated. Certain strains are of particular concern because they are often in waterfowl with low pathogenicity but can mutate to highly pathogenic strains when infecting poultry.

A good alternative to feeders would be to plant gardens with lots of berry bushes and other native, food bearing species that create a natural environment for the birds.

Wild birds with AI are a threat to poultry farms as they can move around freely and infect poultry that have access to the outside and encounter infected wildlife. It also seems that live poultry can infect wild birds, but poultry is generally inside. However, dead poultry has been used to feed raptors, both intentionally and inadvertently. Feeding eagles was a big tourist attraction in the Annapolis Valley but CWHC has strongly advised against this and the eagle watch activities in Sheffield Mills have been suspended. Bald eagles have died from AI. The more eagles gathering and eating from the same carcasses, the higher the risk of disease and death. Waste from poultry farms also can end up in manure spread on fields. Raptors, gulls, and crows often follow manure spreaders. It is unclear if AI can be spread this way.

AI can also affect humans, but only if people have had close contact with infected birds or heavily contaminated environments. For this reason, the Canadian Food Inspection Agency has strict guidelines for those working with infected birds. It is not likely that we will get AI from wild birds or from feeders. Hunters, people who band birds, researchers, and veterinarians are susceptible, but are usually aware of the precautions that must be taken.

Feeding the Birds

Despite the risks inherent in disease spreading at feeders, we don't seem to want to give them up. We all love the birds from our windows, which connect us

with nature in our gardens and neighbourhoods. Many also think we are helping the birds, especially during the winter, by supplying them with food. There are different points of view among experts about the danger of backyard feeding.² Ian Jones, a biology professor at Memorial University, suggests that the threat of avian flu spreading at backyard feeders is low. However, government officials across Atlantic Canada, the CWHC, as well as Bob Bancroft, President of Nature Nova Scotia, all indicate that the threat is too high and feeders should not be used this winter. Although most of wild bird AI cases have been seabirds, AI has also been confirmed in blue jays, crows, and doves, who frequent our gardens and feeders. Jones believes there is a greater risk of spreading AI in garbage dumps. This could well be, and perhaps government agencies should be looking at disease spread from these sources. However, considering the decline in songbirds and occurrence of diseases that affect them, such as trich, mycoplasmosis, salmonellosis, and now AI, it would appear that removal of bird feeders would be the responsible thing to do. A good alternative would be to plant gardens with lots of berry bushes and other



Evening grosbeaks. PHOTO: JEFF MOORE

native, food-bearing species that create a natural environment for birds. Leaving seed pods on flowers for the winter can also provide food for birds.

For those continuing to use bird feeders despite the dangers, the CWHC suggests that you follow the ABCs of Healthy Bird Feeding:

- A: Avoid dangers in feeding that result from predation or trauma, such as hitting windows.
- B: Be vigilant with surveillance— be able to recognize diseases and remove feeders at the first sign of disease. Notify the CWHC so they can assess and understand frequencies and impacts of these diseases.
- C: Contact reduction— create circumstances that decrease contact between uninfected and infected birds or with contaminated environments:
 - i. Provide bird-friendly habitat to avoid supplemental feed to attract or nourish birds.

- ii. Ensure proper feeding techniques and hygienic feeding practices.

The details on these ABCs are in the pdf document available from the CWHC.³ The bottom line is that most experts believe that backyard feeders are currently a significant risk to birds. Attracting the birds to our native plants and getting out to spot them in nature are happy and healthy alternatives.

John Burka is Secretary of the BNS Board and represents BNS on Nature Nova Scotia. Thanks to staff at the Canadian Wildlife Health Cooperative for their assistance with this article.

¹Canadian Wildlife Health Cooperative Fact Sheet on Avian Influenza: http://www.cwhc-rccsf.ca/docs/fact_sheets/avian_influenza.pdf

²“Atlantic Canada experts divided on backyard feeders as bird flu continues to spread,” by Lindsay Armstrong, The Toronto Star November 5, 2022. <https://www.thestar.com/news/canada/2022/11/05/atlantic-canada-experts-divided-on-backyard-feeders-as-bird-flu-continues-to-spread.html>

³Canadian Wildlife Health Cooperative Fact Sheet on Trichomonosis: <http://www.cwhc-rccsf.ca/trichomonosis.php>

Does 2022 Valley Weather Reflect a Changing Climate?

Temperatures were up over 30-year averages with drier conditions since March.

BY LARRY BOGAN

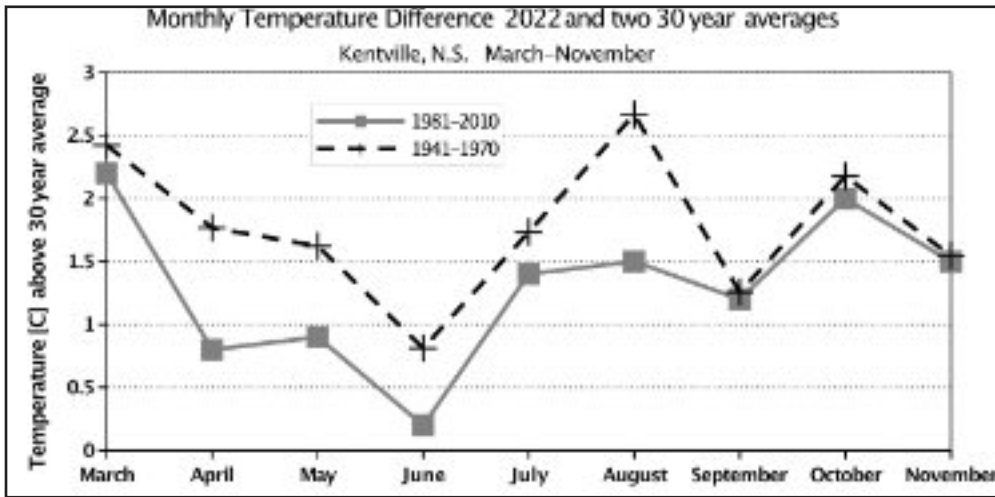
When comparing the current weather with a ‘normal’ year, we traditionally compare it with the averages of the last 30 years, for which 1981-2020 is the most recent period available. The oldest average from Environment Canada¹ for this area is 1941-1970. It is interesting to compare our 2022 weather with the two different 30-year averages because climate change was already in play with the most recent average.

Most every month of 2022 had above average temperatures, with March being the most extreme and June the least. In terms of seasons, this autumn was the most extreme (1.6 C° above normal) whereas this summer was the the least (only 1.0 C° above normal). Overall the period was 1.3 C° above normal relative to

the recent 30-year average. Looking back to the winter months, last January was the only month colder than normal, but only by 0.2 C°. February was above normal by 1.5 C°.

Seasonal Data and Averages
Kentville, NS by Environment Canada

	Max Temp.	Min Temp.	Mean Temp.	Precip. mm
Spring	11.6	1.2	6.4	218.9
1981-2010 avg.	9.9	0.3	5.1	304.6
Summer	24.8	13.9	19.4	252.2
1981-2010 avg.	23.6	12.7	18.4	242.3
Autumn	16.0	5.8	10.9	241.9
1981-2010 avg.	13.7	4.9	9.3	294.9



The graph above plots the monthly temperature comparisons with the 1941-1970 averages and shows that 2022 was even more extreme relative to those years. This is of course due to global warming, because the 1941-1970 years were on average cooler than those for 1981-2010 by about 0.3 C°. It is interesting to note that most of the change was in spring and summer while the autumn month values have not changed much in average temperature over time.

The graph below shows monthly total precipitation for 2022 compared with the two 30-year averages. The spring-summer-fall period was drier than normal by 15%. August was the wettest with 120 mm of rain whereas May and July were the driest with only 38 and 37 mm. Snow and rain for last January and February were 50% above normal and made 2022 near normal for precipitation.

The above numbers are compared with 1981-2010. That later period was wetter than 1941-1970, mostly in spring and summer. Monthly precipitation has not changed much for fall.

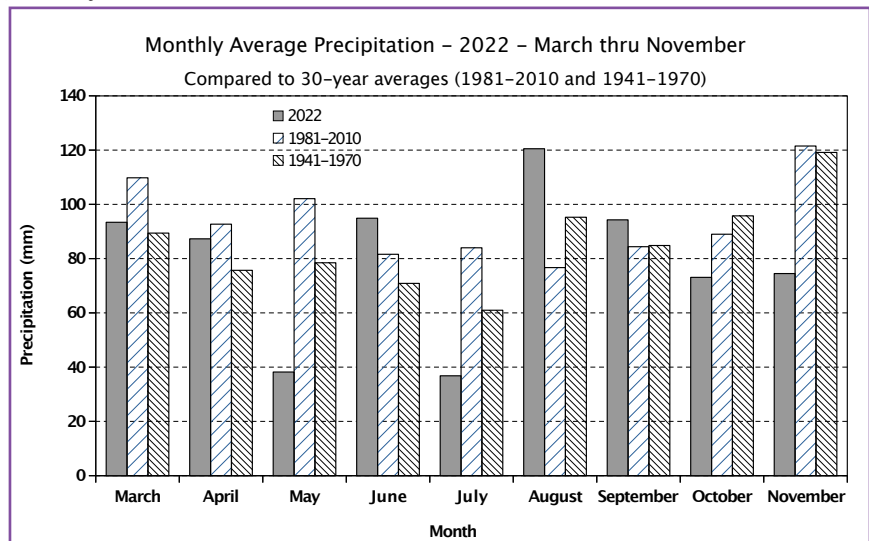
Moving forward, Natural Resources Canada reports² climate change modeling for the Maritimes that predicts 2 to 4 C° increases in summer temperatures and 1.5 to 6 C° degrees of warming in winter by 2050, depending on emissions scenarios and specific locales in the region. Precipitation is expected to increase and have more seasonal and yearly variation, which has been a long term trend since 1948. Deviations from

the average may be large depending on the locale.³

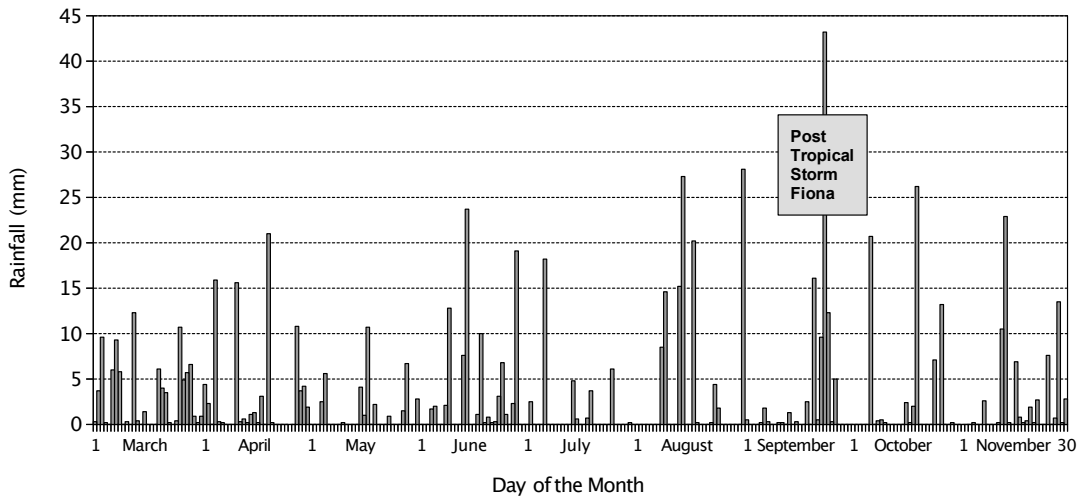
Daily Temperatures

The following trends in daily temperatures were evident across the 2022 March - November period:

- A week into March, the temperatures jumped above 0 C° and the snow on the ground (20 cm) melted.
- In early April there was another shift to a mean temperature above 5 C°.
- There was a small cool down in early May and then a very dramatic warm up in the second week.
- Late May and much of June had similar warm weather with occasional temperatures hitting 25 C°.
- The hottest temperatures were in the last half of July and early August when highs rose above 30 C°.
- After the first week in August, temperatures cooled and mean temperatures stayed around 20 C°.
- In the summer there was generally a wider spread between maximum and minimum temperatures due to heating from the greater amount of sunshine.
- In September, minimum (overnight) temperatures began dropping to 10 C°, but there was a warm up in the second week.
- After the middle of September, there were fewer maximum temperatures at 20 C° or above.



Daily Precipitation – Kentville, Nova Scotia
March thru November 2022



- The first frost was in early October but it was not until mid-November that there were sub-freezing days.
- In the spring and autumn more days had a narrow temperature spread due to increased cloudiness.
- In the spring and autumn, weather systems moved through faster and temperature patterns changed frequently from day to day.

Daily Precipitation

In 2022 there was a very good distribution of rainfall. There were very few times when there was a week with no precipitation. There were a total of 26 days with at least 10 mm of rain and there were two or more of these days each month except for May and July.

The abundant rainfall around September 23 was due to post-tropical storm Fiona. During that period, the Valley received 87 mm of rain. Only 7 mm fell in the rest of the month. The Valley was spared the wind (only 75 kph gusts) and rain seen in other parts of Nova Scotia. Eastern areas had rainfall amounts of 110-190 mm.

Wind Events

Post-tropical storm Fiona was the most significant event of 2022 for Nova Scotia. We had other wind

events that were as severe for the Valley. On the 7th and 12th of March we had wind gusts 70+ kph from the west and on the 30th of November there were 77 kph south winds. During Fiona, eastern Nova Scotia had wind gusts in the 100-170 kph range.

The path of Hurricane Fiona was north and east over the Atlantic Ocean and then quickly headed west to hit Nova Scotia. There is an interesting [video](#) showing the interaction of the jet stream with Fiona that pulled it over Nova Scotia.⁴

In short, 2022 was in line with climate change trends and predictions. Stay tuned for 2023.

Larry Bogan is a long term member and contributor to the Blomidon Naturalists.

¹ Environment Canada historical data is available at <https://climate.weather.gc.ca/>

² <https://www.nrcan.gc.ca/changements-climatiques/impacts-adaptation/climate-and-climate-related-trends-and-projections/10261>

³ See comparisons between locations at: <https://weatherspark.com>

⁴ <https://twitter.com/i/status/1573351195669823489>

Venus

What's in the Sky?

BY PATRICK KELLY

Callisto

Ganymede

Europa

Jupiter

Io

Highlights for February through May

Feb. 5: Full Moon

Feb. 20: New Moon

Feb. 20-22: High tides

Feb. 22: Jupiter 1.5° from Moon (6 PM)

Feb. 28: Mars 0.3° from Moon (1 AM)

Mar. 2: Jupiter and Venus 1° Apart in west (7 PM)

Mar. 6-7: Full Moon (it's almost full both evenings)

Mar. 12: Daylight silly time starts

Mar. 20: Equinox

Mar. 21: New Moon

Mar. 21-23: High tides

Apr. 5: Full Moon

Apr. 11: Mercury greatest elongation west (8:30 PM)

Apr. 20: New Moon

May 5: Full Moon

May 19: New Moon

Moon: The Moon will pass by Jupiter on February 22, closing to 1.5° at its closest approach. Unfortunately, it happens at 6:00 PM when twilight will interfere. This is offset somewhat by having a brilliant Venus, 6° below and to the right of the Moon. The view should improve as the Sun sets, darkening the sky.

Mercury: Mercury reaches its greatest angular distance from the Sun in the evening sky on April 11. At 8:30 PM, look for a really bright “star” above and left of the glowing area on the horizon that marks where the Sun has set. That is neither a star, nor Mercury— it is Venus! Find the brightest part of the glow on the horizon caused by the recently set Sun. Make a line from there to Venus. Mercury will be the bright star about 40% of the way to Venus. If you wait until 9:00 PM when it is darker, Mercury will be closer to the horizon and now about 25% of the way from the glow to Venus. After April 11, Mercury zips between the Sun and the Earth, reaching the greatest angle in the morning sky on May 29— just 48 days later, but it will be low to the horizon and fainter, and thus hard to spot.

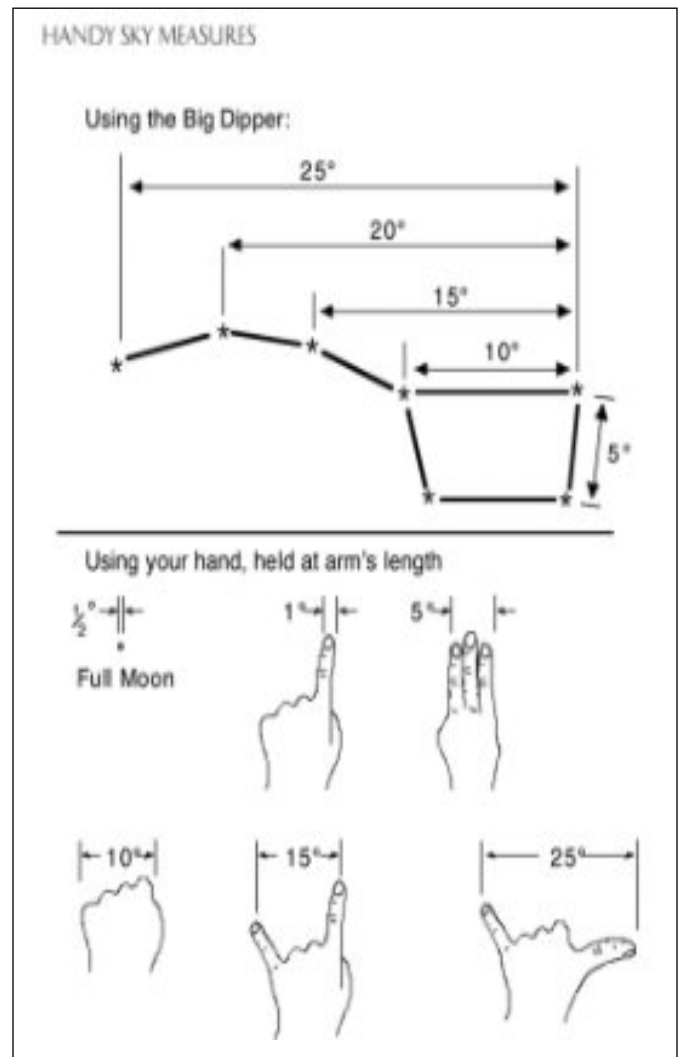
Venus: The Evening Star spends late winter and spring in the evening sky, slowly appearing farther from the Sun until early June. On the evening of March 2, Venus passes only 1° from Jupiter and will be very easy to find as soon as it gets dark. The image to the left is to scale,

which means that the two planets are the correct size relative to each other in the graphic, and the distance between them is correct relative to their sizes. All you need to do is face west and look up. Although the two planets appear closest around noon, they are not separated by that much by sunset. Venus is the brighter of the two. In a modest telescope at low power you will be able to see Venus, Jupiter, and Jupiter's four large Galilean moons all in the same field.

Mars: The Red Planet will be easily visible at sunset from February to May. At the start of this period, it will be the brightest red "star" and high overhead after sunset. By the middle of May, at sunset, it will be about halfway up the western sky, above and to the left of Venus, but it will be noticeably fainter. It will still be easy to spot as the only red object in that part of the sky. At 1:00 AM on the morning of February 28, the Moon will pass by Mars and will be only 0.3° from Mars. Look in the west and the Moon will be easy to spot as just past its first quarter.

Jupiter: After the Moon's close pass by Jupiter on February 22 (see Moon note), and a close pass with Venus on March 2 (see Venus note), Jupiter will be lost in the Sun's glare as the Earth moves ahead in its orbit so that the Sun blocks our view of the planet. Jupiter will reappear in the morning sky in late May, where it will join Saturn.

Saturn: Saturn starts in February on the far side of the Sun from the Earth. That will not last long and by middle March, Earth will have moved far enough along its orbit that Saturn will reappear in the morning sky low in the southeast until the end of May.



Measuring Angles on the Sky: Extend your arm fully. Each of the hand positions indicated will approximately show that angle on the sky. Don't worry about the size of your hand; hand size is proportional to arm length. GRAPHIC: PATRICK KELLY

Patrick Kelly has had a life-long interest in astronomy and has taught first-year astronomy for over 20 years, as well as presenting many shows at the Halifax Planetarium.

Have you read a good book lately about nature, conservation or sustainability?

We are looking for book reviews!

editor@blomidonnaturalists.ca



Elapultiek (*We Are Looking Towards*)

The biodiversity crisis is intimately connected to the subjugation, genocide, and oppression of Indigenous cultures, and ultimately we cannot meaningfully address one issue without addressing the other.

REVIEW BY ALAN WARNER

“Nat: You say you’ve been working on species at risk for many years but from what I can tell the situation isn’t getting much better. It seems like all you do is measure things. I sat and talked with the fire, which is my methodology -

Bill: That’s not a -

Nat: I’ve decided I won’t count the swifts with you tonight. You can do that with your mainstream eye, but what I need to do is use our cultural teachings.”

This is a short snippet from *Elapultiek (We are Looking Towards)*, wherein Nat, a young, female, Mi’kmaw ecologist, and Bill, an older, white Euro-Canadian biologist, are both standing before an old chimney of an abandoned cabin, perplexed by the loss of chimney swifts that they have been counting there over time. It addresses one of the many important messages in this play, written by Shalan Jodrey, a Mi’kmaw storyteller, poet, actor, and ecologist from Bear River First Nation. The point is that mainstream approaches to biodiversity conservation have failed in large part because they are products of the culture that has produced the crisis. This crisis is intimately connected to the subjugation, genocide and oppression of Indigenous cultures, and that ultimately we cannot meaningfully address one issue without addressing the other. There is much to be gained by working toward Truth and Reconciliation for both cultures. I can’t think of a more relevant context in which to consider these issues for the Blomidon Naturalists than watching chimney swifts.

Elapultiek has been performed outdoors around a fire by Shalan Jodrey and Mathew Lumley at the Ross Creek Centre for the Arts and numerous other community settings across the province. The play is a simple, yet humorous, complex and testy, dialogue over time between Nat and Bill. It sheds light on their respective worldviews, bringing the importance of “two-eyed seeing” to the forefront. Two-eyed seeing (*etuaptmumk* in Mi’kmaw) is a term articulated by

Elder Albert Marshall from Eskasoni, Unama’ki (Cape Breton), for the importance of considering a Mi’kmaw cultural lens as well as a mainstream lens in environmental and conservation work.

The written version of *Elapultiek* is powerful in its own right; you need not have seen it performed to find much learning and reason for reflection in this quick read. I highly recommend it. Shalan Jodrey uses few words in a rapid fire and engaging way to explore contentious and perplexing cultural and conservation topics. Sprinkled through it is a dry, Mi’kmaw humour that is both disarming and challenging. I have seen *Elapultiek* performed live around the fire on two occasions, but still found new meaning in reading it. It gave me more time to pause and think about the multifaceted meanings communicated in the conversation, which comes at you rapidly in the performance. Whether you have seen it or not, the written play is an engaging and challenging read.

Alan Warner is Editor of *Beyond the Tides* and keen to learn more about Indigenous perspectives.



Dive into *Beyond the Tides!*

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- reflections/feedback
- poetry
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Submission Deadlines: Spring 2023, March 15, 2023; Fall 2023, August 15



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PHOTO: GEORGE FORSYTH



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