

Survival in Drought



By
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The word 'drought' is everywhere lately. After a warm winter, and with much less snow than usual, rivers are low, and reservoirs are depleted. Without a substantial amount of spring rain, the prairies can look forward to another hot and dry summer, and these droughts are only expected to become more frequent and severe as the world warms.

Still, droughts are not unknown on the prairies, with their position in the middle of the continent and far from the humid ocean winds. Especially during long summer days, when the sun blazes for 16 hours in a cloudless sky, and dry winds steal away every drop they can reach, water quickly becomes scarce. For the plants growing in this severe environment, drought can be a natural occurrence.

To survive, prairie plants have developed traits and strategies that let them flourish despite the dry conditions. There are still many mysteries hidden in these plants, and we are only just beginning to discover all the fascinating traits these species have developed, from individual physiology to the communities they build that persist in a challenging climate.

FIRST IMPRESSIONS

The most visible adaptation is in the leaves. Long and narrow, this shape is assumed by many prairie plants, as it



A wheatgrass-dominated plant community, as with many prairie communities, has extensive fibrous roots reaching below the soil. These root systems improve water infiltration and can extend far below the soil surface, effectively finding and drawing water. Many plants also form mycorrhizal associations, further extending the reach of roots and improving access to water and nutrients. **Photo © J. Lancaster**

reduces the surface area exposed to sun and wind. Evaporation of water increases with surface area, so this shape also helps to minimize water loss from plants. Grasses, which dominate these lands, have mastered this shape, forming long blades that bend easily in the fierce gales, as well as retaining water through the dry season.

Forbs and shrubs, which produce broader leaves, have other strategies to prevent their desiccation, or drying out. For instance, a waxy coating can help to seal water inside the leaf, and additionally acts as a protective layer against pests and diseases. Some plants are covered with tiny hairs, giving the plant a silvery appearance. These hairs reflect sunlight and reduce wind speed at the leaf surface — two factors that increase evaporative water loss — to create a microclimate that retains moisture at the leaf surface. By reducing evaporation from the leaf, prairie plants can conserve water in hot and dry conditions.

Plants also lose a significant amount of water through their stomata, openings on the leaf surface that are used for gas exchange. When stomata are open, plants receive carbon dioxide and release oxygen, though they also release precious water.

Plants can close the stomata to save water, although, without the supply of carbon dioxide, photosynthesis — a process vital to plant survival — is severely limited. To restrict water loss through their stomata, some prairie plants have leaves that fold or curl inward to shield stomata. This helps to reduce direct sun exposure and cool the leaf, as well as block wind, lessening water loss from the leaf.

More than reducing water loss, plants need to reach water when soils dry. For this, plants rely on their roots. Prairie plants are well-known for their large root systems, often two or three times as deep as the plant is high, with some reaching over three metres belowground. In grasses, thin yet extensive fibrous roots spread across the land, quickly and efficiently absorbing any water it encounters. Other plants rely on deep taproots, able to penetrate far into the soil and reach water that has retreated from the upper layers. Through their taproots, plants can draw moisture to the surface, where it is needed. These roots also help to anchor the plant in soil, preventing the organism being blown or washed away in the constantly changing prairie.



Blue grama grass (Bouteloua gracilis), a drought-tolerant native grass, has narrow leaves that are often twisted and curled, reducing the sun and wind exposure, and evaporative water loss. It also has deep roots, on average two to three times longer than the height of the plant, and produces light seeds easily carried by the wind. Photo © J. Hildebrand

ACCLIMATIZATION

The impressive root systems of prairie plants mean most plant biomass is stored underground. So, any injury to shoots and leaves — for instance, from heat or fire — misses a majority of the plant, and most plants can survive the damage. In times of severe and extended drought, some plants survive by becoming dormant, letting their leaves die back and using energy already stored in their roots, waiting until conditions are more favourable.

Prairie plants also have growing points, from which the plant propagates, below or at the soil surface. This means that growing points are protected from heat, wind, and most fires. Once the threat has passed, plants can quickly regrow shoots and leaves. In this way, leaves that withered during droughts can be replaced as soon as water is available again, and even after intense drought, the prairie can recover.

For some prairie inhabitants, one strategy to deal with drought is avoidance. For instance, cool-season grasses, which begin growing in late winter, will usually have flowered, and produced seeds by early summer. By late summer, these grasses have gone dormant, avoiding the

worst of the heat and drought. Some plants will produce seeds and die before the dry summer arrives, leaving their hardier seeds to survive the water shortage and sprout the next spring. Similarly, even warm-season plants, which normally flower in late summer or early fall, may flower earlier during extended droughts, ensuring that at least some seeds are produced and can survive until rain returns.

CHEMISTRY

Plant biochemistry also plays an important role in allowing plants to survive drought. For instance, plants may produce osmoprotectants, chemical compounds that help cells retain water in very dry conditions. Water can also be stored in taproots and stems, sometimes as sap. Succulents, a group highly adapted to dry conditions, also have specialized parenchyma cells that are adapted to hold water.

Photosynthesis can also impact drought survival. There are two main photosynthetic pathways that prairie plants use, known as the C3 and C4 pathways. Globally, more plants use the C3 pathway, which requires fewer resources

and can be more successful in moist and cool environments. The cool-season grasses of the prairies mainly use C3 photosynthesis, which allows them to better tolerate the cold early spring conditions and grow rapidly, completing their life cycle before summer.

In contrast, many of the warm-season grasses use C4 photosynthesis. C4 plants work by building up high concentrations of carbon dioxide in chloroplasts, improving the efficiency of photosynthesis. They can store some carbon at night when temperatures are cooler and use this carbon for photosynthesis during the day. As a result, C4 plants can continue photosynthesis even with their stomata partially or fully closed, greatly reducing water loss through the stomata.

COMMUNITY

More than their individual adaptations, these plants must cooperate to create a landscape that can endure the summer drought. Cooperation begins with their roots, which not only allow the plant to reach water hidden deep belowground but also helps to aerate soil and prevent compaction. Through these actions, the extensive prairie root system encourages



Plants of the prairie community cooperate to survive drought and other climatic extremes, provide food and shelter for a range of other prairie species, and create a resilient ecosystem.

Photo © L. Wallis

water infiltration, allowing more water to be stored in soil rather than being lost over the land as runoff.

Roots, especially taproots, can further help to relocate water. Through a process known as hydraulic redistribution, water travels through roots from wet to dry areas. So, after rainfall, when more water is at the soil surface, roots help to carry water into deeper soil, where it is stored. During drought, when the top layers of soil begin to dry, long taproots can carry water from deeper, wetter soil back to shallower, drier soil, where more shallow-rooted plants can access water. Fibrous root systems can quickly and efficiently absorb excess water, reducing loss of soil moisture to evaporation and runoff. In this way, species with different types of roots can work together to relocate and use water effectively during drought.

Both types of roots are vital for providing soil structure. The intertwined and extensive root systems of prairie species anchor soil. Tiny hairs on some roots cling to soil particles, shielding them

from wind and water erosion. The soil, in turn, protects plant roots from wind, sun and other environmental hazards and provides the essential nutrients plants need to grow.

The soil is also home to a variety of other organisms, including microbes that play a role in drought tolerance. Soil microbes help build soil organic matter, a component that helps to hold water and increase soil moisture, as well as contributing to soil structure. Many prairie plants also have mycorrhizae associations, symbiotic associations between plants and fungi. In exchange for carbon from the plant, mycorrhizae can transfer nutrients and water to the plant. During drought, the expanded area of mycorrhizae may contribute to finding and absorbing water into root systems, bolstering plant performance and survival.

Beyond the soil and microbes, plants anchor much of the prairie community, and many of these organisms respond in a way that boosts plant health. For instance, they keep the soil together for larger

insects, including dung beetles. In turn, these beetles tunnel through the soil, improving soil aeration, water retention and nutrition. Pollinators, many of which depend on these plants for nectar, are critical for the seed production that allows these plants to reestablish after the drought has passed. The persistence of these plants through the harshest droughts is central to the survival of the grassland ecosystem and many of the species that rely on it.

INVADERS

Yet the prairie community is under attack. Conversion and development have fragmented the landscape, and with these changes, invaders have transformed the prairie. These invaders may thrive during the wet seasons, especially with human assistance. However, they lack the generations of evolution that native plants have endured, and the many adaptations that allow them to survive through heat and drought.

For instance, Kentucky bluegrass (*Poa pratensis*), a grass common to garden lawns, can grow up to 30 centimetres tall, though most of the roots were found to be in the top 15 to 25 centimetres of soil, far shallower than the several metres deep that native plant roots can reach. This species also has a high evapotranspiration rate, losing water easily through leaves, and the roots do not retain water well. Without a sufficient water supply, these invasive plants are likely to perish, leaving the soil bare and subject to erosion.

Over millions of years, the prairie ecosystem adapted to survive drought. The ecosystem has persevered through countless dry years, though now the grasslands are facing new threats, in the fragmentation of the open plains, the invasive species that are seizing the environment, and the increasingly common and severe droughts that drain the landscape. Still, compared to non-native species, this community is best prepared to survive the coming summer, and we may yet need to rely on the native plants to endure the anticipated droughts. 🌱

From Canopy to Currents: Exploring the Forest-Water Connection



By
Devon
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Forests stand watch over mountain streams. Photo © A. Toner

In much of southern Alberta, we almost made it to Christmas without a trace of snow on the ground. On top of climate anxiety, many Albertans worry the sparse snowpack this winter will mean water shortages this spring and summer. The province is under a Stage 4 drought, and many are calling on the government to declare a Stage 5 province-wide emergency. Meanwhile, provincially-approved logging plans in the Eastern Slopes headwaters were set to march forward with little to no consideration for how they might exacerbate the expected drought conditions.

THE JOURNEY OF A RAINDROP

Forestry is a major disturbance in Alberta's wild lands and has well-known impacts on water quality and flow. This is because water's journey from clouds to rivers is deeply tied to the landscape. If a raindrop falls on a forest, its path may be intercepted by the canopy. Dense foliage will obstruct water on its way to the earth, diminishing the erosive forces of the rainfall. Droplets linger on tree needles and leaves, trickling down and percolating into the earth, replenishing soil moisture. Soil that is interwoven with

plant roots acts as a sponge, increasing infiltration, retention, and distribution of moisture in the soil matrix. The roots create small and large pores in the soil that facilitate water movement and storage throughout the rhizosphere — the area of soil where root activity occurs. Tiny pores in the soil store water that can be used by plants when rain is scarce, mitigating the impacts of drought on the surrounding ecosystem. The soil water nourishes the abundant life of the forest and may go on to recharge groundwater as gravity pulls it towards the low points of the landscape where rivers run and water bodies lie.

In the absence of plants, water droplets fall unhindered onto the earth. The impact of raindrops can compact the soil surface, creating a crust that impedes water penetration. This phenomenon, known as surface sealing, exacerbates runoff and erosion. As rainwater traverses the surface of the earth on its way towards a water body, it may pick up dirt, plant matter, and any pollutants it encounters along the way. This sediment is then introduced into streams and rivers and can suffocate fish and bury their habitat while reducing water quality. Surface runoff reaches its

destination quickly when compared to water that is sucked into the Earth.

This is why unvegetated areas are often prone to flooding.

Forest cover also plays a role in the dynamics of snowmelt. While the forest canopy does intercept snowfall, stands of trees facilitate snow deposition along windward edges. Trees trap snow on their branches and in their forest floor depressions. The shade provided by trees reduces the warmth and sunlight reaching the snow surface, delaying snowmelt and extending the duration of snow cover as temperatures heat up in spring. As the snow melts, it can be taken up by porous forest soils, delaying the onset of peak runoff and sustaining streamflow as the soils gradually release water.

In light of climate change, we expect much more frequent and severe floods and droughts, and there is a need to plan ahead to ensure that our landscapes are resilient to these changes. This means protecting forests in headwaters such as in Alberta's Eastern Slopes, which supply critical drinking water to Albertans and Canadians in the prairie provinces.



Logging activity over several years has affected the Horse Lake area within the Ghost Watershed. Photo © A. Tucker

LOGGING OUR WATERSHEDS

Although the Alberta government promises that only a small portion of Alberta's forests are logged annually, the majority of Alberta's forests are under Forest Management Agreements (FMA's), which give companies the right to log forests in vast areas for 20 years at a time and are typically renewed after that. Harvested areas are reforested after logging, but even when reforestation is successful, managed forests are not equal to natural forests when it comes to biodiversity, carbon storage, and watershed values. Despite this, logged areas are not considered "deforested," and so high-value forests continue to be logged and degraded while Canada boasts low deforestation rates.

Some of these high-value forests are the sentinels of our watersheds. If you haven't caught wind of the controversial logging plans for the Upper Highwood in Kananaskis, let me bring you up to speed. West Fraser Cochrane (formerly Spray Lake Sawmills) plans to log 1,100 hectares of mature forests in the lands surrounding Loomis Creek and the Highwood River over two years beginning in winter 2023 (as of February 2024, West Fraser has announced a

one-year pause on this logging plan).

Since these plans hit the headlines, they have been very unpopular with Albertans, who are frustrated that forests in Kananaskis are to be clearcut even though they pay a \$90 annual fee for "conservation" of the area.

The area makes up important habitat for bull trout, Alberta's provincial fish and a threatened species. Unfortunately for the public and the trout, the logging company has the green light to cut these forests down thanks to their Forest Management Plan rubber-stamped by the provincial government in 2021. The Upper Highwood is included in the Spray Lake Sawmills FMA. When the provincial government enters an FMA with a forestry company, there is no public consultation on the matter. Albertans never got a say in whether the Upper Highwood forests should be included in this FMA, even though these forests are a public resource on public lands. The Upper Highwood is just one example of countless unsustainable logging plans in the Eastern Slopes — it is a province-wide issue that stems from inadequate laws and policies governing forestry.

'SUSTAINABLE FORESTRY'

The provincial government and forestry industry assure us that their operations are 100 percent sustainable, although there is no evidence for this (native trout, caribou, and old forest birds all tell a different story). Alberta's forests are managed on a sustained timber-yield basis, meaning that the aim is to maintain the same amount of timber yield over time by reforesting harvested areas. Forest harvesting and operating ground rules (OGRs) add mitigation tactics that allege to lessen harm to the environment where logging occurs. The provincial OGRs set out restrictions such as how much buffer must be left between a water body and a forestry cutblock, and the planning phase requires a rudimentary watershed assessment. These measures fall far short of their goals of protecting water and fish.

The Spray Lake Sawmills 2021 Forest Management Plan (FMP) indicates that an Equivalent Clearcut Area (ECA) analysis is done to assess watershed risk from logging. In a nutshell, ECA refers to the percent of a watershed that is disturbed by logging, accounting for forest regrowth.

The management plan states that the ECA target over 200 years of harvesting is to be below a 30 percent threshold in each unit. Despite this, the ECA in one sub-watershed of the Upper Highwood will reach 46 percent if the planned Upper Highwood logging goes ahead. In a webinar hosted by CPAWS Southern Alberta Chapter, UBC forest hydrologist Dr. Younes Alila explains that the research that underlies ECA was conducted at the scale of small stream water catchments, and its ability to predict the magnitude and severity of floods falls apart at larger scales and when considering larger precipitation events – the scales that are relevant to people. The larger the scale we are looking at, the larger the effect of logging is on flood severity and frequency. This has been reported in the scientific literature, but that knowledge has not been incorporated into forest management planning. This is one example of how current forestry regulations do not reflect the best available science when it comes to protecting water.

WHO IS RESPONSIBLE FOR PROTECTING WATER?

In Alberta's Eastern Slopes policy (published in 1977 and revised in 1984), the first goal that is stated for management of the Eastern Slopes region is "To ensure a continuous, reliable supply of clean water to meet the needs of Albertans and interprovincial users now and in the future." The policy also states that "The highest priority in the overall management of the Eastern Slopes is placed on watershed management," and acknowledges the area as "the critical headwaters region for the prairie provinces." We now know that the way forestry is managed is not maintaining watershed integrity as the highest priority. Rather, timber interests frequently take precedence over water, and whatever mitigations exist to protect water and fish fall short (see Lorne Fitch's article in the Winter 2023 issue of the *Wild Lands Advocate* to learn how logging and flooding have negatively impacted bull trout in Hidden Creek).

Alberta is long overdue for almost all land-use plans under the Alberta Land-use Framework, which is intended to address cumulative effects of all activities on the land and set a long-term vision for each region that protects environmental, economic, and social values into the future.

“Forestry is a major disturbance in Alberta’s wild lands and has well-known impacts on water quality and flow.”

The boundaries of each region are based on major watersheds, which inherently reflect watershed integrity being the key intent of land-use planning. The South Saskatchewan Regional Plan (SSRP) is one out of seven regional plans that has been completed province-wide and is the management framework replacing the Eastern Slopes policy within the South Saskatchewan region. Like the Eastern Slopes policy, the SSRP also recognizes watershed integrity as the highest priority for management in the Eastern Slopes, and mentions forestry as an approved activity in 48 percent of forested areas in the region. However, the SSRP is a high-level plan, and specific details and thresholds to sustainable development are not addressed but are to be set out in various sub-regional plans.

To date, the only completed sub-regional plan under the SSRP is the Livingstone-Porcupine Hills plan. The SSRP's objective relating to forestry is that "the region's forestry industry is maintained and diversified," while promising that forest management plans in the region will be adjusted to align with the Alberta Forest Strategy. The mystical Alberta Forest Strategy was allegedly under development at the time of publication of the SSRP, but to our knowledge was never completed or released. The SSRP reaches its 10-year

anniversary this year, and thus is due for review.

While most issues on water and forestry are under provincial jurisdiction, Fisheries and Oceans Canada (commonly known as DFO) is responsible for protecting federally-listed aquatic species at risk, which includes endangered native trout that live in the Eastern Slopes. It is important to protect species at risk not only to keep them on the landscape, but also because they are indicators of the health of the ecosystems which they inhabit. Healthy populations of native trout rely on healthy, intact forests and a healthy landscape. To protect them, we must protect the forests that influence the water.

DFO fails to do this by permitting industry to damage critical habitat and failing to enforce their own rules. In the case of the Upper Highwood logging, Spray Lake Sawmills built a bridge over the Highwood River (a federally-listed critical habitat for bull trout) without applying for a permit from DFO. DFO was informed of this by concerned groups and individuals, and has said that they've opened up an investigation into the issue. We are not aware of any fines or enforcement actions that have been taken that would deter forestry companies from breaking the rules in the future to the detriment of fish and water.

CONCLUDING THOUGHTS

The intricate relationship between forests and water is fundamental to our ecosystem's health, particularly in regions like southern Alberta facing increasing climate variability. The current trajectory of forestry in Alberta's headwaters raises serious concerns about the sustainability of our water resources. Ongoing logging plans in the Eastern Slopes are a stark example of how short-term gains can jeopardize water security.

It is foolhardy to allow resource extraction at a level that threatens such a vital need as water. It is akin to saying that short-term industry profits are more valuable than the oxygen that keeps us alive. If we shift our focus back to what is most important, we can support a resilient economy and create forest products in a way that doesn't threaten our fundamental needs of water and a healthy environment. 🌱

How Aquatic Species — and Their Fates — Can Help Explain the Failings of the *Species At Risk Act*



By
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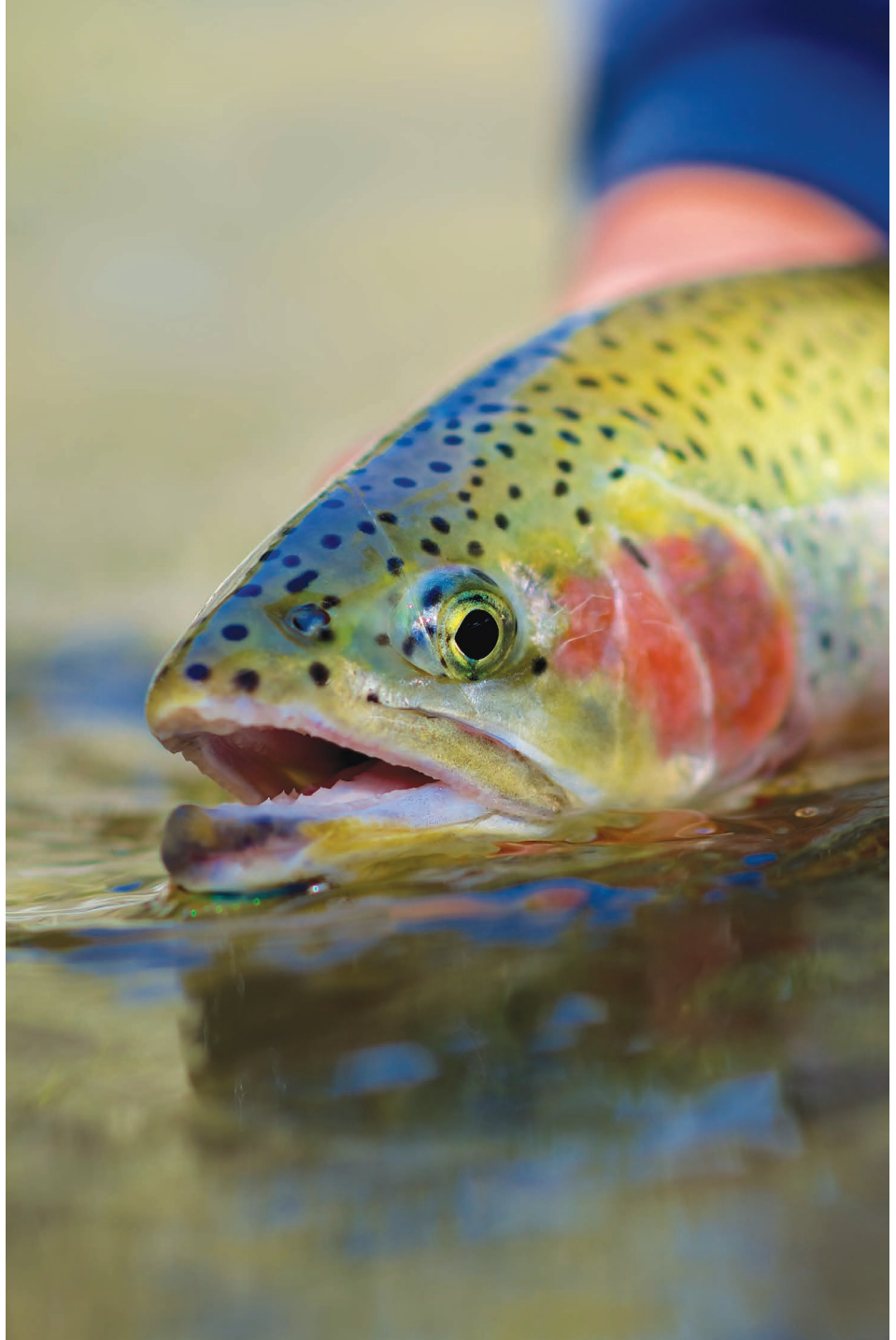
Editorial note: *This is the second of four articles explaining species at risk protection, why it is not working and what must be done to prevent the loss of more species. This article delves into how the Species at Risk Act is affected by varying levels of government.*

What makes protecting endangered aquatic species more slippery than a freshly caught fish wriggling in your bare hands?

In short, the complicated relationship between legislation and politics. And of course, government inaction.

Like all at-risk species — whether on land, in water, or in the air — the legal and political relationship between governments leads to chronic issues in effectively protecting species.

Aquatic species that make a home of Alberta represent a fraction of



There are 19 aquatic species listed under the federal Species at Risk Act (SARA).

Photo © A. Toner

the total number of species at risk in Canada — 19 out of 197 to be specific — but they are a focal point for the failed application of the federal *Species at Risk Act* (SARA) and chronic government failure in upholding their legal obligations.

The way *SARA* is applied is a result of the distribution of legislative powers set out in the *Constitution* in 1867, which is notoriously difficult to amend. Species at risk are a particularly difficult subject because

the “environment” was never part of the Constitution and therefore does not fall under the sole control of one level of government.

This limits *SARA*'s application across Canada. However, aquatic species happen to be one of three areas under direct federal jurisdiction, making them a tragically useful subject for exploring the application of *SARA* in the real world.

WATER BORDERS

“Aquatic species” has a broad definition under SARA that includes “a wildlife species that is a fish,” further defined in the *Fisheries Act* as all freshwater fish, crustacean, and shellfish species. Control extends to “habitat,” which includes all areas “on which aquatic species depend directly or indirectly in order to carry out their life processes.”

To better understand why SARA inadequately protects aquatic species, we must delve into how different levels of government control water. In addition to SARA, the federal government controls “fisheries” and “navigable waterways” through other legislation like the *Fisheries Act* and the *Canadian Navigable Waters Act*. At the same time, every province has control over the use of water and its surrounding ecosystems. Each province exercises its control slightly differently based on the laws they enact, which further complicates the application of SARA across Canada.

Alberta has a complex history of jurisdiction around water and now exercises broad control over its use and regulation through the Constitution and other legislation like the *Fisheries Act* and the *Canadian Navigable Waters Act*. This may seem counterintuitive based on the equally broad control of the federal government over what lives in and around water. For species at risk, it may be easiest to think of the relationship as constantly overlapping.

Canadian courts have historically encouraged governments to cooperate in these situations. But in reality, this ideal is often quickly forgotten once tough decisions arise. In his excellent analysis on this subject, *A Fish out of Water: Inland Fisheries, Water Management and the Constitution*, Jason Unger of the Environment Law Centre in Edmonton points out that even with relatively clear areas of control under the *Constitution*, the relationship



The Arctic grayling is designated as a Species of Special Concern in Alberta as a result of its vulnerability to angling pressure and habitat destruction. Photo © R. Blanchard

between Alberta and Canada when it comes to water is intimately connected. The application of these conflicting legal currents to protect at-risk aquatic species is at best inefficient, and at worst, totally ineffective. And it means that delay in providing adequate protections and adequate information is the norm rather than the exception.

WHOSE FISH IS IT ANYWAY?

The 19 aquatic species listed in Alberta are classified under SARA as either “threatened” or “endangered,” the two most serious designations that trigger stringent protections, legally obliging governments to take concrete conservation actions with clear deadlines. Familiar to many may be the westslope cutthroat trout, bull trout, and Athabasca rainbow trout. All three are nearing extirpation or extinction in Alberta and show few positive signs of recovery. All three provide some useful context because their historical habitat falls in areas with high population density and potential for resource development.

Jurisdiction has consistently acted as an effective shield for

governments to assert control over a preferred action or, consequently, to abdicate responsibility when an action is unpopular, expensive, or difficult. At times, both the provincial and federal governments have simultaneously asserted control and abdicated responsibility for protection of the fish. Delay is further exacerbated by poor implementation even once required plans are completed. This persists despite clear scientific evidence all three species are disappearing at alarming rates.

As far back as 2006, governments knew populations of westslope cutthroat trout had been reduced by 80 percent. This led to a designation of “threatened” by SARA’s scientific body the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2007. Once COSEWIC makes a designation, the responsible Minister and the Governor in Council (cabinet) should follow the intended outcomes of SARA and make a decision about listing a species within nine months. Reality is much different.

Despite this, the westslope cutthroat trout were not listed until 2013 and a federal Recovery

Strategy was not published until 2014, blowing past timelines in the SARA by almost a decade. By 2016, the trout's survived in less than 20 percent of its historical habitat. Ten years on, and things are even worse. Westslope cutthroat trout survive in about five percent of their range with critically low populations — a result of varying interpretations of SARA by successive governments that allowed them to sidestep decisive action.

Bull trout suffer a similar situation. Alberta's "official fish" were provincially designated as "threatened" in 2014 under Alberta's notoriously inadequate *Wildlife Act*, the province's only tool for protecting at-risk species. Under the Act, it is not clear if a "threatened" designation requires the creation of a recovery plan. In fact, it is not even clear what "threatened" means or how it is applied because it is not properly defined anywhere, a basic principle of legislation every law student learns in their first year of law school.

A provincial recovery plan was eventually published in 2023, seemingly prompted by the overdue federal designation as "threatened" (which thankfully has a clear legal definition) under SARA in 2019. The federal government was notified of the bull trout's "threatened" assessment in 2013. Incredibly, six years passed before any action was taken, again blowing past legally defined deadlines, a nine-year delay causing already vulnerable populations to decline further alongside the loss of viable habitat.

Tragically, Athabasca rainbow trout have suffered similar delays under the more serious COSEWIC designation of "endangered." This came in 2014 but the fish was not officially listed until 2019 because of "extended consultations." A federal recovery strategy was finally published in 2020, which should then be followed by an action plan. Like with species listing, the

wording of the SARA allows the federal government to find what are essentially loopholes in avoiding intended outcomes and delaying progress indefinitely. Four years on, and there is no indication how close an action plan is to completion.

Delays of this magnitude have wide-ranging effects because the federal designations of "threatened" and "endangered" prompt the mandatory creation of recovery strategies and action plans, the primary tools used to outline and implement conservation measures. These documents have further mandatory five-year reporting periods that must summarize and update progress until conservation goals are met, or the recovery of the species is no longer feasible. The collective delay from both levels of government seems to indicate they are hoping for the latter.

“As far back as 2006, governments knew populations of westslope cutthroat trout had been reduced by 80 percent.”

Secretive Permits

The SARA permitting process is similarly weak. Permits for some activities affecting the critical habitat for an at-risk species can be granted under section 73 of SARA, but a series of pre-conditions must be met. That includes scientific activities related to the implementation of recovery strategies. However, permits issued for development and industrial activity within critical aquatic species habitat is a recent trend in Alberta.

Drew Yewchuk of the Public Interest Law Clinic ("PILC") in Calgary has undertaken years of process and procedure analysis under SARA.

His work on the permitting process has revealed a system that lacks accountability and transparency. The Act states that permits must be posted in the publicly accessible SARA registry to provide the opportunity for public participation and give insight into the government's decision-making process.

Yet, as Yewchuk points out, those permits are not posted publicly. Instead, the public is only provided vague explanations of why permits were granted, sometimes not even indicating the parties involved. And even these vague explanations are often posted months after a project is completed, nullifying any value they could have had. Without public notice, how can the public provide comments?

Yewchuk further notes that the federal government's process is not realistically compliant with the purpose of permits under the Act. They are meant to be limited by the criteria set out in legislation and Yewchuk says that keeping them secret until months after a project is completed prevents meaningful public objections and potential litigation. Both are crucial tools to hold the government accountable for following its own laws.

The construction of a bridge across the Highwood River in Kananaskis for clear-cut logging is a recent example of how this perpetuates harm to at-risk species. The Highwood River is one of the few remaining areas in Alberta capable of supporting bull trout. It is designated under SARA as a critical habitat with legally binding protections and limitations for activities that affect bull trout. Despite this, Spray Lake Sawmills was able to build a bridge right on top of an area subject to the most rigorous protections for endangered species under Canadian law.

When pushed for responses, none of the parties involved had answers or took responsibility for what happened. Instead, the public was left in the dark. It was only thanks to the careful eye



The bridge built over critical habitat for bull trout by Spray Lake Sawmills. Photo © A. Toner

of environmental consultant Michael Sawyer that the issue was brought to public attention at all.

Most concerning is that this could have all happened under the government's current approach to permits and the public would have had the same quality and quantity of information. As Yewchuk's research shows, it is possible, and even probable, that a permit for the construction of this bridge was granted and appeared on the SARA registry months after completion.

Will we ever know how this was allowed to happen? Will a permit be issued retroactively to allow the bridge to remain? Is this even allowed? It is difficult to say and just as difficult to find out. Yewchuk sums it up best in his analysis, stating that "No one can challenge a secret decision."

WHAT ARE OUR LEADERS DOING?

Unfortunately, these problems go beyond aquatic species. As recently reported, caribou in Alberta are facing imminent extirpation despite a conservation agreement

signed between Alberta and Canada in 2020 under section 11 of SARA. This agreement was made under threat from the federal government that they would step in to enforce adequate conservation actions to ensure the continued survival and recovery of caribou (check the Wilderness Watch section of the magazine for more).

Will the federal government do the same for these aquatic species if their numbers continue to decline? Its current hands-off approach has so far proven unsuccessful. And, its explicit failure to uphold its own mandatory deadlines does not provide much hope.

Yewchuk's years of research and analysis have been aimed at keeping our leaders accountable. He says that describing this situation as "complacency" is no longer accurate. Instead, he sees this as systemic, executive branch non-compliance or resistance. Quite simply, the responsible ministers do not fulfill the tasks required of them by SARA or the courts.

Governments at all levels continue

to rely on the actions or inactions of other levels of government to justify their own failures to protect species at risk. For Yewchuk, public pressure is needed to start to fix this problem, but it is not enough. He says that specific, effective, and strategic demands must be established before turning on public pressure. He believes this is necessary to prevent governments from redirecting responsibility or delaying until the issue floats away from public attention.

For Alberta's aquatic species at risk, meaningful steps cannot come soon enough with renewed calls for resource development in critical habitat along the Eastern Slopes and elsewhere. It is crucial we all understand how these laws work and what actions are available to experts and the public to hold governments accountable.

The third article in this series will appear in the Summer 2024 Wild Lands Advocate. It will explore how advocates for species protection fight back against chronic government inaction, the role of the courts in this process, and what members of the public can do to help. 🌲

Roadblocks to Conservation



By
**Phillip
Meintzer**

Back in November, AWA hosted a talk with Lorne Fitch to celebrate the release of his new book, *Stearns of Consequence: Dispatches from the Conservation World*. During the lively Q&A session towards the end of the evening, a member of the audience raised the issue of how difficult it can be within the environmental movement to educate the broader public on all the barriers that exist to prevent meaningful conservation work. This is also a topic I have wanted to write about for some time.

There likely isn't a cohesive public understanding of how environmental work is carried out. But, from my interactions with people outside of the environmental sector, I get the sense that many people assume that environmental non-governmental organizations (or ENGOs) are working on these issues and that we have the situation under control. This couldn't be further from the truth.

ENGOs like AWA aren't out there solving the climate crisis or preventing biodiversity loss on our own. I don't go to work every day and save X number of plants or wildlife from harm. ENGOs only really help to slow things down, to paper over the cracks, and serve as just another band-aid solution to the relentless pursuit of infinite profits. We still play an incredibly important role, by serving as a voice for the environment — for the plants and the animals and the ecosystems who cannot speak for themselves — at the decision-making table, but that's only if we're invited to participate. Our role is to make things a little slower and a little more difficult for

corporations (and the governments who support them) from causing greater harm while trying to convince the public that we need their support.

THE DIRECTLY AFFECTED TEST

In a capitalist economy, property rights are king, and that's also how we manage our natural resources. Our different levels of government (i.e., provincial or federal) are responsible for leasing off natural resource rights to corporate interests such as industry. If a corporation owns or leases the rights to the natural resources in a given area, such as mineral rights, water licences, or a forest harvest allocation, there's very little we can do ourselves to prevent the destruction from taking place.

A byproduct of this system of managing resources through private property rights is that ENGOs are often excluded from having a seat at the table in decision-making processes. In many cases and depending on the jurisdiction, environmental groups have no legal standing to get involved, to resist, or to even provide comments on particular issues (i.e., new industrial development projects) because we have no property rights that are being directly affected or infringed upon.

For example, in Alberta, the *Environmental Protection and Enhancement Act* (EPEA), and the Natural Resources Conservation Board Act (NRCB Act) only permit individuals and groups who are directly affected by a project to participate in assessment and decision-making processes. Government officials and courts have narrowly interpreted "directly affected" to require an individual's or group's interests to be personally, directly, and adversely affected by a project to participate in the decision-making process. For example, this might include someone with a nearby property that is at risk of being directly harmed by the project.

PRIVATIZING PUBLIC WEALTH

Seen in this way, private property rights can enable environmental harm and put the health of our planet at risk for the sake of corporate profits, while often barring environmental groups from providing feedback.

This system treats nature as just another

commodity that can be bought and sold at will. It allows corporations (Canadian, international, or multinational) to extract wealth from Alberta by turning our ecosystems (our "natural capital") into profits ("financial capital") only to line the pockets of shareholders who could live anywhere in the world, rather than providing tangible benefits to Albertans. This process is a great example of what's known as the Lauderdale Paradox, whereby collective public resources (i.e., Alberta's natural ecosystems) are privatized and sold off for the sake of private riches.

Yes, ENGOs are occasionally invited to provide comments or feedback on various issues, such as multi-stakeholder processes like land-use planning or cooperative management boards. But again, our involvement in those processes is not mandatory and is usually dependent on the goodwill of government and/or industry. And this sort of involvement doesn't guarantee that our input will be acknowledged or even considered, as our participation is oftentimes treated solely as a checkbox item so that government or industry can say they consulted with environmental groups. Our participation can feel wasted if our feedback isn't meaningfully reflected in the results of the decision-making process.

CHARITABLE STATUS

Many environmental groups or ENGOs exist as registered charities, which means that these organizations must rely on some combination of government support, grants, university partnerships, membership programs or charitable donations to cover their operational costs.

In many jurisdictions, ENGOs, charities, and non-profits are required to remain politically non-partisan (or unbiased) to maintain their status as charitable organizations. In Canada, the *Income Tax Act*: "prohibits a charity from devoting any part of its resources to the direct or indirect support of, or opposition to, any political party of candidate for public office." This significantly disadvantages ENGOs because it effectively muzzles these organizations by preventing them from advocating for specific political parties or movements that are aligned with their environmental goals.

For example, an ENGO couldn't outwardly support a political party that wants to



The Alberta government confirmed it received roughly 200 statements of concern from the public during the 30-day public feedback period in 2019 when Fortress Mountain Ski Resort requested to truck millions of litres of water per year from Kananaskis to sell as bottled water. Yet, none of these were considered 'valid' statements of concern since none of the citizens were 'directly affected', which in Alberta means having nearby property rights.

Photo © C. Campbell

phase out oil and gas, otherwise it might be seen as politically biased. The ENGO could publicly state that it supports a fossil fuel phase-out, but it couldn't be perceived as supporting a party that echoes those same demands. This forces ENGOs into this ridiculous contradictory position whereby we are trying to achieve environmental outcomes, but we are forced to remain politically neutral on the subject. To explicitly take a side would compromise our charitable status.

Losing charitable status would mean that some people might be discouraged from donating to an organization because they are no longer officially approved as a charity, and as a result, those donors would no longer receive tax write-offs for their donations. Tax breaks might not be the sole reason why people donate to charities, but it most certainly incentivizes greater contributions. These partisanship rules functionally limit the ability of ENGOs to achieve environmental outcomes.

Yet even with charitable status, most non-profit organizations suffer from chronic under-funding relative to their opponents. A lack of resources for ENGOs means that we lack capacity given the immense wealth available to billion-dollar corporations. This

wealth disparity often means organizations must prioritize certain issues at the expense of others which may be equally important. This lack of capacity seems to have resulted in the splintering of the environmental movement across multiple organizations, each competing for attention, public support, and funding, rather than fighting together against our actual adversaries who are driving environmental destruction. The fact that ENGOs manage to achieve so much, with the scales weighed so heavily against them, is testament to their dedication and efficiency.

WHAT IS TO BE DONE?

Environmental organizations don't have many tools available to us, but our position as advocates has the potential to be the most useful because public support on these issues is crucial. One of the best avenues available to the environmental movement (as with any other movement) is to get the broader public involved on these issues.

If you look at other major social changes throughout human history, it's only through sustained demonstrations of public outrage, collective action, mass mobilizations, and sometimes civil disobedience that groups of people have forced their leaders to listen

to their demands. I am constantly inspired by Indigenous land defenders around the world who continue to put their bodies on the line to try and protect their Traditional Territories, and even striking workers in the labour movement who are fighting for better working conditions for themselves and their colleagues. It takes a commitment to solidarity and a significant group effort to mount this sort of resistance.

I don't know if there is a remedy for the issues described above without a massive shift away from treating nature as a resource that exists solely for profit. I often tell my friends that a huge chunk of my work for Alberta Wilderness Association is just trying to find novel ways to prevent or slow down the "speed of business" and the ceaseless pursuit of profits. Our ecosystems cannot keep up with the pace. And although I recognize that changing societal norms is a lot to ask for, that doesn't mean I'm pessimistic about the path ahead. I just think it's important for people to recognize the numerous hurdles that exist which prevent (or limit) ENGOs from doing the work we set out to accomplish. Whatever path we choose to follow, the fight must go on. 🌱

Busting the Boom: The Unintended Harm from Fireworks



By
**Joyce
Hildebrand**

Many of us love the pyrotechnics and body-thumping booms of fireworks. We gaze upwards, often in the company of complete strangers, in awe of the fountains of colour against the blackness of space. A few years ago, I invited friends to join me on the rooftop patio of my apartment building to watch the Canada Day fireworks. I was blissfully blind to the harm that this spectacle inflicts on birds and other animals, including humans, and on the air and water that supports life itself.

But as 2023 collided noisily with 2024, I lay awake feeling the explosions reverberate in my chest and wondering how the birds and beavers in Prince's Island Park and the coyotes on McHugh Bluff were dealing with the sudden ear-splitting racket. The next day, I began looking for answers and discovered that the pleasure we derive from fireworks is profoundly nonaligned with the desires and needs of the web of life.

DOMESTIC ANIMALS

According to the Canadian Animal Health Institute, in 2022 Canadians owned 7.9 million dogs and 8.5 million cats. We love our pets. And many of us have seen their reaction to fireworks. A canine friend of mine scrambles in terror under her human's bed with the first boom, a bed so low that when the cacophony is over, she can't get out on her own. A New Zealand survey of owners reported that 74 percent of companion animals of various species and sizes showed fear responses to fireworks. Many horse owners have noted increased running by horses in response to fireworks, sometimes resulting in fence-breaking and serious injury. In January 2022, CBC reported on a horse who fled in panic when fireworks began in the small town of Canning, NS, and had to be euthanized because of a related injury. Animal shelters report an increase in stray animals after fireworks displays — pets who, in confusion and terror, flee from the deafening blasts and flashes of light, even breaking windows and screens and digging under fences, and then become lost.

“Fireworks are most damaging at times when wildlife are especially vulnerable to stress, such as during breeding season and while birds are raising their young.”

BIRDS AND OTHER WILDLIFE

Most of us living in towns and cities love the wild residents of our urban areas. We thrill at the sight of bobcats in our backyards, porcupines and coyotes in city parks, and songbirds at our feeders. Yet we tend to enjoy the splendour of fireworks with little or no awareness of

the high cost to wildlife, who, like our domestic friends, experience fear, stress, disorientation, and panic. Even zoo animals, despite the best efforts of their keepers to protect them, show signs of anxiety and distress when they hear fireworks, according to recent studies. These responses to sudden loud noises aren't surprising: the use of cannons around tailings ponds in the tar sands to keep birds and wildlife away from these toxic lakes shows how sudden noises can frighten animals.

Wild animals are impressively resilient and adaptable in the heart of cities, often changing their activities, locations, and/or timing to avoid human contact. But unpredictable disturbances often lead them to respond as they would to predators — with flight. A 2023 study in the Netherlands found that when fireworks begin, many birds instantly leave their nests and nighttime roosts, flying much higher than they normally would. The researchers found that on New Year's Eve, the number of birds in flight in response to fireworks was about 1,000 times more than the number of birds in flight on other nights. Only at 10 kilometres away from the explosions did the numbers begin to even out.

Fireworks are most damaging at times when wildlife are especially vulnerable to stress, such as during breeding season and while birds are raising their young. Young storks and herons who have not yet learned to fly have been known to jump out of their nests during fireworks displays, becoming easy prey for predators as they are unable to get back to safety.

Because of their limited nighttime vision, many birds crash into power lines, buildings, automobiles, trees, and even each other during fireworks displays. Such high-speed collisions often result in serious injury or death. Fireworks in Beebe, Arizona, as 2011 became 2012 caused huge flocks of red-winged blackbirds to leave their night roosts and collide with each other in their confusion, causing thousands of deaths. Birds need all the energy that they build up from daytime feeding to cope with the challenges they face, and panicked flight,



Smoke from fireworks wafts into the night air during a Calgary Stampede firework display in July 2023.
Photo © A. Tucker

even if it doesn't result in immediate death, can cause weakened immune systems, vulnerability to parasites and disease, and breeding failure. A study in *Environmental Claims Journal* reports that in Valencia, Spain, the breeding

success of house sparrows was lower in towns hosting festivals with fireworks than in towns without festivals. During COVID, when no festivals were held anywhere, the breeding success in all the towns equalled out.

As for wild mammals, the little research that exists shows that their lives are also disrupted by fireworks. In California, sea lions and seals were observed leaving their resting places and entering the water when Fourth of July fireworks

began. A study conducted in Chile on sea lions in their breeding season showed that they immediately stopped vocalizing when fireworks began and a significant number left the breeding colony, taking more than a day to return.

Fireworks are very different from thunderstorms for birds and other wildlife. Like many domestic animals, they perceive the warning signs for storms long before the wind and weather arrive, but they have no such warning before the sudden boom of fireworks.

AIR, WATER, AND NOISE POLLUTANTS

A 2020 paper in *Environmental Monitoring and Assessment* describes fireworks as “composed of oxidant and fuel agents and other components such as agglutinants, colouring agents, smoke, and propellants.” The chemical reactions of these ingredients produce a fabulous light show, but they also permeate the air with harmful substances such as greenhouse gases, sulfur dioxide, particulate matter, and heavy metals. All present an immediate health risk to humans, including breathing difficulties in those with respiratory issues. In 2020, researchers from the NYU Grossman School of Medicine reported on how fireworks affect human health. They found that two of the 12 common brands of fireworks contained “harmfully high lead levels,” and their study detected “high levels of toxic metals lingering in the air” after big celebrations that included fireworks.

Fireworks have been identified as one of the main contributors to perchlorate contamination, a chemical that is a potent thyroid disruptor. Perchlorates have also been implicated in causing reproductive, neurodevelopmental, immunotoxic, and carcinogenic harm. Among the most vulnerable are children, including those still in utero.

Many of these chemicals, as well as the debris from fireworks, enter the soil and leach into groundwater, streams, and rivers. They are then consumed by fish, waterfowl, and other aquatic life, thus entering the food chain and polluting the water and soil on which

we, and our non-human kin, depend for life.

In addition to the harm to human and non-human physical health, fireworks impact those who suffer from PTSD. The sudden noise of fireworks can be extremely triggering for veterans, those who have lived in war zones, and anyone who has experienced intense trauma. According to clinical psychologist Leah Blain, “fireworks serve as a very significant reminder of these experiences, PTSD or no. So this really does impact people. It really disrupts sleep. It increases stress.”

ALTERNATIVES TO FIREWORKS

“Modern societies,” writes philosopher Freya Matthews, “will become environmentally sustainable when they fit into nature.” Fitting into nature, she explains, “is a matter of wanting what the biosphere needs us to want” and viewing ourselves as what we are — ecological beings, part of the web of life, with the same constraints and needs as the rest of the living world.

**“Wild animals
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human contact.”**

Human desires, unlike those of the non-human world, are largely created by culture, and many of our wants harm the living world. While the Elders of this planet have long known that we are interconnected with the rest of nature, many of us act contrary to that understanding. What if we lived with an embodied awareness of our ecological selfhood? What would our lives and cultures be like if we aligned our desires with those of the rest of the web of life? What if, as Matthews suggests, we

were “to allow the wider life systems to dictate our desires?”

In a world where many of us struggle with a sense of agency, we can start with the low-hanging fruit — small local changes that are easily within our power. Modern alternatives to fireworks, including reusable drones and laser-based light shows, offer safer, greener alternatives. We can maintain our beloved traditions with less harm to people, other animals, air, and water. Some municipalities have taken steps to address the concerns. In 2018, Banff moved to lower-impact pyrotechnic displays, and even these are now on hold as the town searches for alternatives with less impact on wildlife and birds. (One alternative, a friend suggested, would be to turn off all the lights and look upward into the star-filled sky!)

I wrote to the Mayor and Council of Calgary in early January requesting a change to less damaging alternatives to fireworks but received no reply from any of the 15 recipients of my email. Perhaps we — in an expression of care for ourselves, our domestic non-human companions, the wildlife and birds in our parks and backyards, and the more vulnerable humans among us — could support such a move by spreading the word and contacting our elected officials. A barrage of letters, emails, and calls might have some effect.

“The love of place can sustain a life,” writes American historian Rebecca Solnit, “and we usually talk as though it’s an unreciprocated love.” This is wrong, she says. “The places love us back in how they steady and sustain us, teach us, shelter us, guide us, feed us.” Botanist Stephen Harrod Buhner tells us, for example, that plants analyze our exhalations, detect signs of ill health, and then produce compounds that will move us toward healing. We can begin to respond to the Earth’s love for us by celebrating important occasions in ways that honour the needs and desires of all of the inhabitants of our place. 🌱

How to be a Good Bird Photographer



By
**Nick
Carter**

There comes a time in the lives of many nature lovers when we want to preserve the memory of what we've seen in the wilderness long after the moment has passed. This, of course, leads us to photography. Nature photography is a rewarding and, when done right, low-impact way of capturing a moment with a wild species. It used to be that amateur naturalists recorded the organisms they encountered by shooting, stuffing, pinning, and plucking whatever they wanted to preserve for themselves. Nowadays we can "collect" specimens in the form of photographs and leave nature unharmed.

The gear and techniques used to photograph wild species vary to some degree depending on your intended subject. Birds are some of the most popular things in nature to photograph. They can also be some of the most difficult, but for those up for the challenge, it's worth it. To be a good bird photographer, you'll need to be a good birdwatcher and a good photographer; part scientist, part artist. Both can look intimidating to outsiders. Don't be afraid though — it's a lot of fun and, with enough practice, you'll get there. We were all beginners at one point.

For the uninitiated, birdwatching is simply the hobby of knowing where to find wild bird species, getting a look



Townsend's Solitaire photographed in the Edmonton's River Valley in December 2023.
Photo © N. Carter

at them, and identifying what you see. Non-photographers use binoculars or a spotting scope to view birds at a distance, while for those taking pictures, it'll be a telephoto lens. More on that later. Aside from a usable set of optics, a field guide to the birds of your area is a good thing to have if you care about knowing what species you're looking at — and why wouldn't you? Moreover, field guides can also be helpful in knowing where to go to find a particular species you might be interested in seeing. Don't worry about memorising every bird in there. Instead, focus on identifying each bird as you see it. Eventually, you'll become familiar with more and more species and will recognize them with ease.

Going out as often as you can and spending time looking for birds is the best way to get better at it, and if you can go on outings with experienced birders, all the better. Local nature clubs, societies, and other such groups can help to facilitate this, and in my experience, many of them tend to have plenty of members who are also passionate nature photographers.

With that, on to the photography aspect. Bird photographers have it hard compared to those who take portraits in studios. Lighting, weather, outdoor hazards, and uncooperative subjects are just some of the things we struggle with regularly. But the rules of photography remain the same. For gear, you'll need a camera body and a powerful telephoto lens.

Unless you're a real photography geek don't worry too much about what exact type of camera body you use — the lens is the really important part. You'll need something that will make wildlife look closer. Most birds out there are pretty small, often far off, and will fly away if you get too close. A 300mm lens is the recommended minimum for general wildlife photography needs, and for the most part, the further your lens focuses, the better.

It's also important to understand your camera's settings and how to make the most of them to get the best wildlife photos you can. This is where the general fundamentals of photography come into play; the balance of exposure, shutter speed, and sensitivity to light (or ISO).

Our source of light is the sun (don't use your camera's flash on birds or mammals, as it stresses them out), and since we can't control that, we're at its mercy. Contrary to what portrait photographers want, hard direct lighting is optimal for bird photography. It brings out all the details, colours, and textures. Great for feathery subjects. Cloudy days give you images with a soft focus which often look relatively flat and dull. Try to shoot with the sun to your back so that everything in front of you is illuminated.

This isn't always possible depending on the terrain and the position of the bird, so work with what you have.



Great Horned Owls in western North America tend to be more pale than eastern or west coast owls. Photo © N. Carter

Side-lit subjects can look great when done right. New photographers often assume that you should shoot towards the sun because, well, that's where the light is coming from. But no, you want the light reflecting off your subject and back to you, into the lens. Unless you're going for an artsy silhouette, that is.

Because birds don't warn us what they're going to do next, take as many photos in as short a time span as you can. That way you stand a better chance of catching it doing something interesting. Set your camera to continuously focus and fire off shots

as you hold down the shutter-release button. Quick reflexes and good luck help as well. I often come back from good bird photography outings with a few hundred photos, only a small handful of which are actually any good. This obviously eats up a lot of memory card space, so keep that in mind.

A high shutter speed (1/1000 s or more) will make sure photos of quickly-moving subjects don't come out blurry. Set a single focus point on your camera so that it's not deciding what to focus on for you. High shutter speeds mean less light getting to the

sensor, leading to dim, under-exposed photos. To compensate, you'll need a low f-stop value (this is what opens or closes your aperture, and controls how much light is captured in your photo). It also makes for blurry backgrounds. Such is the sacrifice we have to make, but the animal is the really interesting part anyway.

On that note, keep in mind where the bird or whatever else you're shooting is and what it's doing. This is the art of composition. A photo of an animal turned away with its back to the viewer is generally undesirable. A subject facing towards the camera with at least one eye visible and in focus is going to be more engaging. A shot from the animal's level helps to bring us into its world, and most photographers have found themselves crouching, kneeling, and lying on the ground in all sorts of conditions for that perfect shot. Consider the animal's posture and behaviour as well- what is it doing? A bird passively sitting on a branch or paddling around in the water is one thing, but if you can catch it doing something more, all the better. Stretching, flying, jumping, hunting, eating, fighting, displaying, and more are things that many people might not see animals doing all that often.

The last thing to know is the most important of all, and it's how to do bird photography ethically. We must always put the well-being of the animals, land, and other people ahead of getting a good picture. Photography can be a wonderful method for raising awareness of conservation issues, so we should practise what we preach and not make the lives of wild animals harder in doing it. Minimise the impact of your presence in the wilderness as much as possible. When the bird paparazzi crowds appear, especially to popular yet sensitive species like owls, it causes them undue stress. Same goes for baiting, approaching too close, and general harassment of wildlife.

As you can see, this all means that you've really got to earn your photos. But after all, that's half the fun of it. 🦉

Alberta Plans Irrigation Expansion, Prairies Prepare for Drought

Amid ongoing drought, Alberta is continuing their “historic” irrigation expansion in the South Saskatchewan River Basin (SSRB), pouring hundreds of millions of dollars towards growing water-loving plants in the driest part of the province. The project will further deplete rivers and destroy some of the last remaining sections of native prairie, as Alberta Wilderness Association (AWA) and other environmental groups have repeatedly warned. These warnings have largely been ignored.

In 2020, the Government of Alberta, in partnership with the Canadian Infrastructure Bank and eight irrigation districts, announced a \$815 million investment into irrigation in southern Alberta. By 2021, another \$118 million had been added, and two more irrigation districts had joined. The project claimed it would “improve water use efficiency” and “increase water security,” and expand irrigated agriculture by an estimated 230,000 acres of land, all without using more water. The “increased efficiency” is supposed to make up the extra water needed to expand, according to the proposal. The project was announced without public consultation, and details about the project have been scarce, despite attempts by environmental groups to understand more about the project.

In times of drought, irrigation is often presented as a solution, and

this project is no exception. Much of the justification around this investment centres on the necessity of irrigation for crop growth in southern Alberta, which has faced drought conditions for the past three years and is expected to have another dry growing season this summer. With climate change, these drought conditions are only expected to become worse in the coming years.

The project involves the expansion of four reservoirs, among them the Chin Lake and Snake Lake reservoirs. The potential benefits, such as reduced reliance on rainfall and more control of water supply during drought seasons, are highlighted in the project proposals for each. Both expansion projects were required to undergo Environmental Impact Assessments (EIA). The cumulative

can also contribute to climate change and exacerbate drought conditions. Reservoir surfaces release billions of tonnes of greenhouse gases a year, mostly from landscape disturbance during construction and underwater microbial activity that creates methane (CH₄), carbon dioxide (CO₂), nitrous oxide (N₂O) and other gases. The release of carbon is often worse when irrigation floods native prairie, as the Snake Lake Reservoir Expansion proposes, since native prairie stores significant amounts of carbon that will be released during construction.

As well, reservoirs can increase evaporation. The AIM program promotes an intention to modernise and increase water efficiency by converting open canals to underground pipelines, decreasing

“Riparian ecosystems, the ecological community that thrives near and supports rivers and lakes, reduce drought severity by shading river water and reducing evaporation.”

effect of the AIM program (Alberta Irrigation Modernization, previously known as the Irrigation Infrastructure Expansion project), including the consequences of expanding irrigated acres, is not being assessed. The proposed terms of reference for the Snake Lake EIA and the final terms of reference for the Chin Reservoir EIA have been released. AWA provided comments on both, emphasising their failure to adequately address water conservation objectives, native habitat destruction, and the negative consequences of reservoirs and irrigation on climate change.

It is true that reservoirs and irrigation can improve water control and could provide some resilience during droughts. However, reservoirs

water loss from evaporation. Supposedly, modernization of Alberta’s irrigation system will allow irrigation to be expanded without withdrawing more water. Yet, the higher evaporation from the increased surface area of expanded reservoirs may well equal or even exceed the water loss from canals, especially during the hot summers. Given the multi-year drought we are in, we cannot afford to lose more water. Alberta is again bracing for drought. Water reserves are running low, rivers are becoming shallower, and the glaciers that contribute to summer flows are receding. The news is filled with discussions of water restrictions and reducing water use. In these circumstances

— and with irrigation already by far the largest user of Alberta’s water — irrigation expansion is completely inappropriate.

Irrigation is a system that locks in reliance on water. Irrigated crops are often selected for their value or their yield instead of drought tolerance, making them more vulnerable to water scarcity than dryland crops. As well, irrigation can negatively affect the soil. Physically, irrigation can erode soils and cause a loss of nutrients, reducing soil health and making new plant growth more difficult. It affects the microbial community, which determines the nutrient content and drought tolerance of the soil. It can change the plant communities of nearby lands, encouraging the growth of more competitive, water-loving plants over the drought-tolerant native communities. As a result, when the rivers and reservoirs run dry, the devastation in irrigated acres could be far worse than for dryland farming.

There are other options. For instance, crop switching – switching to crops more suited to a drier climate – has helped reduce water use in the United States, India and China. Crop switching was more effective in

reducing water use than improving irrigation efficiency, and in many cases, crop switching also increased farmer profits. Crop rotation, the alternating use of different crops that have various water and nutrient requirements, has also been found to aid in soil structure and water retention, increasing water-use efficiency by up to 40 percent. Increasing the organic matter in soil, by leaving crop residues, can also benefit water retention, and the use of mulches or organic litter helps to shade soil and reduce evaporation. These techniques may aid in improving dryland farming without expanding irrigation.

As well, rather than building more dams and pipelines, perhaps we should be investing in ecosystems. For instance, wetlands can capture excess water during wet periods, slowly releasing the water during dry periods and acting as a source of water during extended droughts. Healthy native grasslands are well-adapted to extreme drought, with deep roots that not only allow plants to reach lower pools of water, but also improve water infiltration and retention in the soil. Some native plants, such as sagebrush, can also

enhance surface soil water by lifting deep water through its root system, supporting other plants with shallow roots. Riparian ecosystems, the ecological community that thrives near and supports rivers and lakes, reduce drought severity by shading river water and reducing evaporation. Riparian communities also help to bring water from the river into the soil through their root systems, improving groundwater recharge. These benefits are lost as the natural community is disturbed, though they can be regained through careful restoration and cultivation of these important ecosystems.

Drought is a major concern for southern Alberta and is likely to become worse as climate change progresses. However, the South Saskatchewan River Basin irrigation expansion and other proposed expansions — such as in the Special Areas of Alberta — are likely to cause more harm than good. Other options, such as enhancing the efficiency of dryland farming and improving or restoring native ecosystems, may provide more long-term benefits and should be thoroughly explored before considering irrigation expansion.

-Ruiping Luo

Without a paddle? No, Without a River!

Alberta’s public water stores are at all-time lows, however, private reservoirs, like those used for irrigation, are in a “fairly good” state, according to the provincial government. This was just part of the alarming news we learned from a presentation in January about Alberta’s planning process for potentially severe drought conditions this year.

A regional director with Alberta



The Oldman Reservoir pictured in late February 2024. Photo © L. Wallis

Environment and Protected Areas (EPA) told us, alongside other concerned environmentalists from across Southern Alberta, that river flows in 2023 ranged from 37 to 59 percent below average, depending on the basin. As of January, water storage is drastically below normal at the Oldman, St. Mary, Pine Coulee, and Waterton reservoirs. The St. Mary reservoir, in particular, is at only nine percent of its storage capacity when it would normally be between 50 to 74 percent full at this time of year. According to one slide: “Without significant precipitation, spring water levels are expected to be dire.” Based on the presentation, it seems the situation is already dire.

The EPA regional director said the last major drought in Alberta was in 2001/02, but staff and leadership turnover since then has meant that EPA has no established processes to rely on for direction. And, the director added that they lack the institutional knowledge that would be useful for tackling this problem. Based on this information, it seems that the Government of Alberta has no internal capacity — or expertise — to deal with water management issues.

The Alberta government is considering the option of declaring a Stage 5 Emergency under Section 107 of Alberta’s *Water Act*, which would give the province additional legislative powers to suspend nonessential water uses and prioritize water allocation to maintain the health and safety of humans and aquatic environments. But EPA said that declaring Stage 5 would only be considered as a very last resort if and when all other measures have failed. Until then they will be relying on water “collaboration agreements” between licensed water users in the hopes that this will reduce water consumption.

When asked whether EPA has a specific threshold that would trigger the declaration of a Stage 5 emergency, we were told that they are currently preparing a briefing note for cabinet on this very topic since no thresholds or triggers have been developed before. This seems to indicate that the province doesn’t know how bad things must become before they are willing to declare an emergency.

One person in the group asked why the province can’t declare a Stage 5 emergency today so that the

government is given the power to compel water users to adjust or limit their diversions. “Wouldn’t that be the more conservative and proactive approach, rather than only reacting when it becomes even worse?”

The response from EPA was less than reassuring. They stated that the current water crisis is not just a Government of Alberta problem and that everyone in Alberta needs to take responsibility for their water usage, which is why EPA is relying on water restrictions and water collaboration agreements before declaring an emergency.

This seems like a ridiculous position for EPA to take when certain water users (i.e., irrigation agriculture, energy industry, golf courses, etc.) have a vastly greater water consumption footprint than others, and EPA is the sole entity with the power to compel or enforce changes to water use. But there seems to be no willingness from EPA to use that power — at least not at this stage anyways.

For now, we will just have to wait and see how bad things get.

-Phillip Meintzer

Long-Awaited Caribou Conservation Report Released

In 2020, the Alberta and federal governments signed an agreement under Section 11 of the *Species at Risk Act*, which is intended to protect caribou and their habitat. The agreement also called for an annual implementation report, meant to outline progress made in caribou recovery.



Woodland caribou file photo. Photo © J. Marriott

Over three years after signing the agreement, on Jan. 19, the provincial government released its first implementation report, outlining progress made in 2021 under the agreement. While we are glad to see the first implementation report, delays in caribou conservation commitments are becoming a trend that keeps caribou on a slippery slope.

It’s been a decades-long struggle to protect the iconic woodland caribou in Alberta. Human impacts, including forestry, oil and gas development, settlement, and other industrial activities, have destroyed and fragmented the caribou’s habitat, turning Alberta’s caribou ranges into some of the most highly disturbed in Canada. The Little

Smoky caribou herd's range in west-central Alberta has only 0.7 percent undisturbed habitat. Caribou need at least 65 percent undisturbed habitat within their range to have a 60 percent chance of recovery.

While the need for caribou protection has been recognized since the 1940s, it wasn't until 1985 that woodland caribou were designated as 'Threatened' under Alberta's *Wildlife Act*. The decline in population numbers and distribution prompted a similar 'Threatened' designation under Canada's *Species at Risk Act* for both southern mountain and boreal woodland caribou in Alberta in 2003.

The urgency of caribou conservation was recognised in 2018 when the Minister of Environment and Climate Change Canada determined that southern mountain caribou were facing imminent threats to their recovery. She recommended an emergency protection order for southern mountain caribou, and a habitat protection order for boreal caribou to cabinet. Rather than enacting emergency and habitat protection orders, the Government of Canada entered into the Section

11 Agreement in 2020, entrusting Alberta to take the necessary steps to protect caribou and their habitat, including conducting range planning.

EFFICIENCY AND TRANSPARENCY: A CALL FOR ACTION

Since the Section 11 agreement's signing, AWA and others across the conservation community have raised concerns about the pace and transparency of caribou range planning. Delays in finalizing range plans and the absence — until now — of any annual implementation reports have led to an absence of crucial information needed for public understanding and to ensure government accountability. Despite a commitment in the Section 11 agreement to complete caribou range plans within five years, only two range plans have been finalized since 2020, with the Cold Lake and Bistcho plans released in April 2022, yet both missed their 2021 deadline. The Upper Smoky sub-region's draft plan, scheduled for 2022, has yet to be released, casting doubt on the agreement's ability to meet its objectives by its 2025 expiration.

Despite these efforts, the

threats to caribou recovery persist. Unsustainable levels of forest harvesting and delays in implementing protective measures mean that caribou in Alberta still face imminent dangers. The destruction of critical habitat also perpetuates the reliance on intensive and unethical wolf culls. The need for strong and immediate action is urgent.

We welcome the release of the implementation report, as it provides an important update on habitat disturbance levels and caribou population growth in each of the caribou ranges. However, given that the annual report is now several years outdated, we cannot be confident that the state of caribou populations and their habitat is improving. We will continue to call for better, timely transparency from the provincial government regarding the measures taken to protect caribou and the current population and habitat metrics. AWA conservation specialists are in the process of reviewing the implementation report, and will be sure to keep our members in the loop.

-Devon Earl

Update: Alberta Prairie Conservation Forum

The Alberta Prairie Conservation Forum (PCF) is a non-profit organization whose members have interests in protecting Alberta's prairies, guided by five-year Prairie Conservation Action Plans (PCAP). Members include representatives from agricultural groups, conservation groups, land and resource management organizations, federal

and provincial agencies, municipalities, industry, academia, and individuals. The organization and its members have been working towards the conservation of Alberta's grassland and parkland landscapes for over 30 years.

Currently, the PCF is following the seventh PCAP. Three main outcomes have been identified for this PCAP: maintain large native prairie and parkland landscapes, conserve connecting corridors for biodiversity, and protect isolated native habitats. To achieve these, smaller committees were established that concentrated on and guided work on each outcome. Alberta Wilderness Association participates in the Connecting Corridors and State of the Prairie committees.

To guide conserving connecting corridors for biodiversity, the PCF has been working with researchers at the University of Toronto Mississauga (UTM), in collaboration with Alberta Biodiversity Monitoring Institute, Miistakis Institute, Nature Conservancy Canada and other partners to develop maps on landscape connectivity and conversion risk. These maps consider development and landscape features to determine likely areas for animal movement and consider how movement corridors are affected by increasing conversion of native habitat to cropland.

The maps will be added to the mapping tool already available on the PCF's website, where several data layers have already been gathered as



Manyberries pictured in a file photo from 2013. Photo © C. Olson

a publicly accessible and centralized location for geospatial information. The aim of this tool is to guide land-use planners and other users in recognizing high value habitat that should be avoided, or identifying areas that could benefit from restoration and mitigation actions. To aid these efforts, a workshop on the connectivity map is planned for next year.

The PCF is also working on an update to the *State of the Prairie* report, an effort to outline the extent and changes in grassland and parkland area over the past few years. This understanding is important for tracking prairie loss and focusing conservation efforts. A previous report was published in 2019, along with videos and other communication materials, and an interactive map is available online.

Work to identify isolated habitats — based on a definition narrowed through

extensive literature review, and with maps of isolated habitats for example species being produced — is ongoing.

Additionally, the PCF continues to deliver its annual Range Stewardship Course. The course took place at the Cottonwood Ranch from July 5 to 6 this year, focusing on important range management principles and issues, and best practices for sustainable stewardship. Another program that was developed by the PCF, “Deep Roots – Exploring Alberta’s Grasslands,” aimed to educate youth on the importance of grasslands through videoconference presentations and accompanying activities. The program is aligned with the Alberta Science and Social Science curriculum and is expected to be delivered to up to 30 classrooms in the coming year.

Finally, as part of the Transboundary Grasslands Partnership (TGP),

PCF is working with colleagues in Saskatchewan, Montana and beyond. The TGP, comprising organizations and individuals working towards healthy grassland ecosystems and communities, aims to share information and encourage collaborative work across jurisdictions and sectors to save the vanishing prairie landscape.

The annual TGP workshop rotates annually between Montana, Alberta and Saskatchewan, presenting case studies, and traditional or local knowledge from different sectors and jurisdictions. Last year, a hybrid TGP workshop was held in Medicine Hat, with over 60 in-person participants, and 30 to 40 virtual attendees. Collaboration across borders will continue to be an important aspect of prairie conservation as the PCF and other organizations work to protect the fragmented prairie landscape.

-Ruiping Luo



Neil Kathol, *What's Wrong with the Oldman?*, 2023-2024 oil on canvas, 30 x 48.

What's Wrong with the Oldman?

By Amy Tucker

With more time to spend in the Porcupine Hills area of Alberta after wrapping up a 40-year career in law, Neil Kathol has more subjects than he could possibly ever paint.

Though parts of the area escaped continental glaciation, two major ice sheets migrated into, around and through the hills from the north, east and south, carving out long, flat valleys, leaving large, deep bedrock coulees and channels along its eastern parts. In today's form, with its rolling, tree-covered hills, vast skies, jutting-out rocks, and wildflowers, it makes for a perfect art study.

"All make great subjects for me to work with [when it comes to] my interest in colour and brush stroke,

which you'll see in my pictures."

But recently, something other than the area's natural beauty caught his attention.

"This fall, when the Oldman Reservoir dried up, it really struck me," Kathol said.

When he looked upon the reservoir, his two dogs at his heels, it was a mass of greyish-green landscape, with significantly less water. "Basically, a silt kind of clay ... you can go on it, you can park, walk around," he said. Some water still flowed, seemingly through the Oldman River's ancient path.

But the mostly empty space, Kathol said, felt like an emotional blow. It "kind of hurt my feelings."

Kathol's focus has shifted to art in the last three years since he retired from practising law. For 20 years, in parallel with his legal career, he worked on an art degree. He has now increased his time for artwork in his studios in his home and at his cabin in the Porcupine Hills

area. He continues his "en plein air" practice but also focuses on larger, abstract pieces that are colour and composition-driven.

"One of the main purposes, or motivations, I should say, is concern for the environment and how it's changing," Neil said of his art. "I felt, like where my cabin is, that I want to make a record ... I feel like I want to put it down as it will change and there'll be some way of looking back."

With forecasts for a severe drought in the spring, the significantly drier Oldman River has become a place to meditate on just what we've done with our scarce water.

"What we've done upstream, what we do downstream, it triggers the whole memory of the history of the dam."

It was built over 30 years ago during a time of drought as a misguided attempt to save water for agriculture. The project was met with large public outcry. Kathol

remembered that “every major musician on the map” came to protect it in the form of a protest concert.

“It was a big deal. But the dam got built and now what are we doing? Now, we’ve got this big grey mess.”

The Oldman Reservoir sits at about 30 percent full as of mid-February,

compared to about 60 percent of its usual capacity, according to an Alberta Reservoir Storage Summary Report. The Oldman River Watershed Council said the reservoir is close to its lowest storage level since it was built in 1991, and that the water levels indicate a low water supply throughout the Oldman watershed.

Neil said “it’s heartening” to see the Oldman River is still running, even though it’s struggling and no longer represents the clean, strong river it used to be.

“It’s still doing what a river should — and will — do. It’s [trying to] resist what we’ve done to it.”

Are you an environmentalist?: AWA’s book club premiere!

By Kennedy Halvorson

The inaugural meeting of AWA’s quarterly book club commenced on a chilly Tuesday evening in January, with a handful of participants braving the cold and blowing snow to join staff in discussing *Finding the Mother Tree: Discovering the Wisdom of the Forest*.

Dr. Suzanne Simard packs the pages of her debut novel with decades of ground-breaking, paradigm-shifting research on forest ecosystems, but the theme of connections is truly the central taproot off which all other anecdotes, lessons, and revelations sprout.

“The roots of these distinguished birches drank the water of the glacial-fed river, the water turning red with spawning salmon in the fall.” – pg. 280.

Published in 2021, the autobiography plants its beginnings in interior British Columbia, within temperate rainforests of towering western hemlock and red cedar, in lush stands of Douglas fir and white pine. Simard’s ancestors made their living homesteading and logging along the Arrow Lakes of the Columbia Basin, sowing the seeds for Simard’s love of forests long before the self-proclaimed “dirt eater” could get a taste of her first humus.

“When plant
and animal matter
decays in the soil,
it forms a dark,
organ, nutrient rich
material
called humus.”

While family bonds and ties anchor Simard’s journey, the connections the forest ecologist makes with both human and non-human counterparts throughout the novel inform and influence her work. Simard reiterates often that her research with mycorrhizal root networks relies on the hard work, goodwill, and cooperation of many — inquisitive colleagues, enthusiastic pupils, supportive friends and partners, patient Mother Trees.

This parallels key findings of Simard’s work; forests are centres of inter- and intraspecies cooperation, where trees can transfer water and essential nutrients like carbon,

nitrogen, and phosphorous between each other with fungi as a mediator in differing times of need. These connections can help facilitate seed establishment and plant growth, permitting trees to communicate, adapt, and even warn each other of environmental stressors. Forests form a community as interconnected, dynamic, collaborative, and complex as our own.

Simard’s findings are revolutionary because, in evolutionary biology, competition has long been considered a dominant driver of natural selection, with kin connections existing as one of the few exceptions to explain why organisms would instead cooperate and share resources. Her research paints a much more compassionate picture of nature than those that came before, discrediting assertions of a cold, unforgiving, survival-of-the-fittest style wilderness.

Similarly, Simard’s personal story directly contrasts the well-worn, wearisome narrative of the lone genius who solved it all on his own. Because this book is also about the institutions of gender and patriarchy and the norms they impose.



Armillaria mellea is a fungus commonly found in forest soils that facilitates decay. The fungus can also parasitize healthy trees, causing root rot. It can be particularly destructive to conifer species. Dr. Suzanne Simard found that the presence of birch and the community of mycorrhiza and bacteria they foster in the soil help conifer species resist infection. Image © 1973, Canadian Forestry Service, Department of the Environment, Ottawa

Familiar to any woman or other marginalized gender who has traversed a male-dominated field, Simard faced barriers, resistance, and disrespect that simply would not have existed should she have been a man. Her experiences of being dismissed, tokenized, and discriminated against, along with overt sexism galvanized Simard in her work.

But that doesn't justify it happening. To challenge long-held paradigms that predicate an extremely lucrative industry, while simultaneously breaking into the

boy's club is no joke, and not for the weary or faint of heart. Simard and many others like her have paved the way for people, including myself, to pursue the sciences and other once-male-dominated vocations with relative ease.

“Antithetical to ecosystem-based management, free to grow is a policy in

BC that recognizes all non-conifer plants as weeds and eradicates them from reforested plots, to permit conifer seedlings to grow without

competition. Alberta's forestry sector employs similar management practices.”

Simard also navigated the career-stalling (sometimes ending) impact of starting a family, which is largely unexperienced by men. This is likely because despite making up half of the workforce, women are still overwhelmingly responsible for the majority of domestic labour on top of their jobs (as recent as 2015, male parents were only doing 28% of the cleaning, 35% of the child care, and 35% of cooking in the Canadian household). Simard specifically cites the support of her husband at the time and his willingness to raise her daughters while she researched as crucial to her achievements. Once

again reiterating, no one does it alone, severing connections does not leave us “free to grow,” and we are stronger with reciprocity.

Simard's tenacity and resilience resonated with the book club, many participants stating they were inspired and proud of the work she has done, particularly as a woman and mother. Debate was had over the ratio of personal stories to research, with some enjoying the autobiographical touch and others preferring Simard's summaries of her studies and findings. If you are looking for something strictly scientific, this is likely not the novel for you.

However, Simard does well enough to weave the two with shared themes; one throughline is the linkage between the forest's health and Simard's own, whereby moments of environmental degradation are often accompanied by bodily threats and illness. The portions that do discuss Simard's research are in-depth and detailed.

Some members of the book club found them overly technical, and those that listened to the audiobook noted Simard narrated these sections less passionately, taking instead the practised, professorial tone of one well-versed in presenting peer-reviewed literature.

Ultimately, the AWA book club enjoyed and would recommend *Finding the Mother Tree*; it is certainly worth the trees it was printed on. Simard's novel is a great addition to the growing body of popular science books, rescuing research from languishing beneath journal paywalls and delivering it to the masses. If you are interested in following along with her current work, be sure to check out The Mother Tree Project.

Join us in April to discuss the AWA book club's next read, *The Bees* by Lauline Paull. Departing from the world of nonfiction, this dystopian fantasy follows one bee navigating the rigid, hierarchical, totalitarian state of her hive.

Meet the Newest AWA Board Member: Nicholas Goodwin



Nicholas Goodwin is AWA's newest board member. Photo © Nicholas Goodwin

Nicholas is originally from Toronto, but was lured west in 2011, after graduating from Queen's University with a BSc in Earth System Science.

Since that time, Nicholas has been working in an environmental capacity within the energy industry — first as a consultant, then as an in-house advisor responsible for regulatory permitting and compliance. In 2020, Nicholas completed a Master of Public Policy degree through the University of Calgary, where his attention turned to the intersection of federal and provincial energy and environmental policy.

Nicholas has always been fond of wild places and wild spaces,

from the ravines and woodlands behind his childhood homes, to the mountain tops and backcountry of the Appalachians and the Canadian Rockies. Recently, Nicholas and his family drove across Canada and visited all ten provinces along the way.

The vast natural beauty and diversity of landscapes that exists “in our own backyard” continues to inspire Nicholas' love for the outdoors. Currently, Nicholas resides in Calgary with his wife and young son—with another child on the way!



Alberta Wilderness Association

TREAD LIGHTLY

In an effort to reduce AWA's environmental footprint, we are asking our members to notify us if you are interested in switching to the digital-only version of the Wild Lands Advocate.

Photo © P. Meintzer

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