

Urban Biodiversity: Reframing green space in Canadian cities

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I grew up in Grande Prairie (GP), Alberta, a flat city, aptly named, approximately 200 km north of Grande Cache—gateway to Alberta’s famous Rocky Mountains. The city and surrounding area are representative of the Peace River Parkland Natural Subregion, which occurs in only three isolated patches in northwestern Alberta and accounts for less than 1% of the province’s total land base (Downing & Pettapiece, 2006). Despite its limited extent, due to its high productivity much of the region has been converted for agricultural use. The remaining natural areas are a mosaic of grasslands and aspen-dominated forest patches, but tree species common to the bordering Boreal Forest Natural Region such as balsam poplar, white and black spruce, and jack pine can be found here, along with Boreal-associated wildlife like black bears, moose, and American beaver. Despite the biodiversity of the surrounding area, Grande Prairie itself is largely untreed. Most parks favour recreation over restoration and the urban forest is sparse with a few habitat sinks on disparate ends of the city. However, there is one nature corridor that runs through the city’s centre. This forested ravine follows Bear Creek on its weaving, winding way to connect with Flying Shot and Bear Lakes to the west and the great Wapiti River to the south. This network of waterways is just one component of the Wapiti River Watershed, which then feeds into the Peace River and Slave River Water Basin, the largest in Alberta. It spans 1/3 of the province and provides much of the region’s drinking water (Mighty Peace Watershed Alliance, 2016). However, it is subject to significant pressure due to the industrial activity and consequential development common to this part of the country.

Among Canada’s fastest growing cities in the early 2000’s, GP’s population has more than doubled in the last three decades. As a result, between 1997 and 2010, 40 wetlands and four forest stands were lost within city limits, largely due to residential development (O2 Planning & Design, 2012). Though perhaps occurring more rapidly here comparative to other parts of the county, these development trends are, unfortunately, not unique. Rather, they are representative of the values and priorities that have historically dominated municipal planning and development in Canadian cities. Natural features and areas (i.e., forests, trees, parks, gardens, etc.) have traditionally been perceived as adding aesthetic and recreational value, but comparative to built infrastructure are rarely considered essential. Yet, it is becoming increasingly apparent that nature is as essential to urban areas as roads, bridges, and affordable housing, as has repeatedly been demonstrated by the posts in this blog series.



Some studies have found that built environments can create optimal habitats for non-native species (Shaffer, 2018) making urban biodiversity a controversial topic among ecologists. Some argue that planting native tree species can “promote the establishment of other native organisms and increase the ecological integrity of urban ecosystems” (Nitoslawski & Duinker, 2015) (see photo of the Halifax home with a yellow birch, a white birch, and a spruce planted in a copse). Others argue that non-native tree species are often better able to handle harsh urban environments and thus should be planted often and heavily (Chalker-Scott, 2015). Still others argue that non-native species that have migrated to urban habitats should be included in measures of biodiversity, especially if they are endangered in, or

extirpated from, their natural environments (Shaffer, 2018). What all these researchers with differing viewpoints have in common is their collective urging for better policy, planning, and management to maximize the ecological health of urban greenspace. As the world continues to urbanize, it will become increasingly important to stop thinking of cities as being separate from the biodiversity and ecological richness of wilder spaces and start planning to reflect and enhance their interconnectivity with surrounding natural places.



I moved across the country to Halifax in 2011, and though breaking free of the landlock was one of the things I loved most about my new home, it was the lush canopy over the West End streets that offered some reprieve from long days in the stacks of the Killam Library. Even in the dead of winter, long after Oxford Street's elms and lindens shed their foliage, I remember walking home from campus late at night feeling soothed by the naked branches of the mature trees against the dark sky. Apart from the saltbox houses and the peninsula's walkability, the presence of big street trees was one of the first differences I noticed between my hometown and Halifax. There are approximately 709,000 street trees representing almost 200 species in the Halifax Regional Municipality, about a quarter of which are planted and managed by the city while the remainder are naturally regenerated trees on public and private land (HRM Urban Forest Planning Team, 2013). According to the Urban Forest Master Plan, there are about 94,000 plantable spots in the streets of the urban core, and every year (except 2020 on account of the pandemic), at least 1,300 new trees are planted to fill these vacancies.

The HRM is located in the Acadian Forest Region. A transitional forest bordering the Boreal to the north and the eastern hardwood forest to the south, the Acadian Forest is populated by a distinct and diverse mix of species including red spruce, Eastern hemlock, sugar maple (pictured in this South-End photo with an extensive excavation by a pileated woodpecker), and American beech. These forests have been found to support over 220 bird species, in addition to populations of black bear, red fox, marten, and moose (though Nova Scotia's mainland moose population has dwindled significantly in recent years) (Davis et al., n.d.). Despite this rich biodiversity, like the forests and grasslands surrounding GP, less than 5% of Acadian forests remain their pre-settlement state. They have been altered significantly through timber exploitation and there has been substantial conversion to agricultural and urban uses. Little old-growth forest remains prompting the World Wildlife Fund to classify Acadian forests as endangered. Via the Urban Forest Master Plan (as supported by the Green Network Plan approved by Council in 2018), the HRM has committed to planting more species representative of Acadian forests, further enhancing the city's 43% canopy coverage and thereby increasing the ecological integrity of this network of urban forest neighbourhoods (note the new mixed-species plantation of pines and spruces in what was formerly a softball diamond). This sort of planning that prioritizes the installation of native plant species has been found to result in higher proportions of native animal species (Shackleton, 2016; O'Brien, personal communication Feb 19, 2021).



My point here is not to reprimand cities for their neglect of urban nature. Rather, I aim to argue that though cities are historically defined by their human-made infrastructure, this does not have to be the way of the future. Urban landscapes are not isolated islands, separate from surrounding nature (though

we have made them seem that way). They are connected to larger ecosystems and watersheds, and how we manage them has impacts on these larger systems. Further, these management decisions have cascading effects on the wildlife species that depend on connected nature corridors for habitat, food, and safety from predators. According to Dr. Erin O'Brien, an avian biologist based in coastal BC, bird species are particularly strong indicators of ecosystem health (personal communication, Feb 19, 2021) and to maximize avian biodiversity in urban environments planners must prioritize increased patch size; greater vegetation complexity (i.e. greater diversity of structure and plant species); and maintenance of habitat connectivity.

Last month, *The Guardian* reported on the impact of COVID lockdown restrictions on urban nature in Barcelona, Spain. Because parks were closed and maintenance activities on hiatus, plant and insect life exploded. The spring of 2020 brought 74% more butterflies to the area than had been reported the previous spring. Fortunately, prior to lockdown, the city had been in a process of “rewilding” the city and as such, rather than resuming business as usual, city council is getting to work supporting the process that nature has already started. So far 200 nesting towers for birds and bats, 40 beehives, and 80 “bug hotels” have been installed, complemented by the publication of a biodiversity atlas listing all the city’s flora and fauna. One consultant interviewed for the article is quoted as saying: “People need re-educating... There is this idea that nature is something outside and that what’s natural for the city is for there to be nothing” (Burgen, 2021). In fact, what should be natural for cities is what is natural for the surrounding ecosystem.

I encourage all readers to notice the trees and greenspaces in your neighbourhoods. Notice the plants and learn to identify them, and as winter melts away to spring, notice the changes. Notice the birds, buds, and bees that start to appear as the weather warms. Notice when your city makes an effort to *not* cut the grass—could this be part of a larger re-wilding effort? And finally, notice when city council is having meetings or public consultations about decisions that could have impacts on urban biodiversity - these processes have a real impact on the way greenspaces are managed and adding your voice to that conversation could also have a real impact!



Recently, a 20,000-stem inventory was completed of city-owned trees in Grande Prairie, complemented by an extensive soil inventory, and last year the Parks Department established a tree nursery to improve species diversity. Combined, these initiatives help Parks staff determine which species should be planted and where. Use has also been made of iTree software, which calculates the monetary value of individual trees based on the ecosystem services they provide (e.g. stormwater filtration, amelioration of urban heat island effect, etc.). This has helped inform decision-making around which trees are removed for development, and how they should be replaced.

The time for green cities is now, dear reader, and I invite you to be part of the change.

For more information, check out the sources mentioned in this article:

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