BUZZING ALONG THE WATERFRONT:

RETHINKING URBAN LANDSCAPES FOR POLLINATORS AND PEOPLE

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Abstract

The dynamism and evolution of Earth have long been influenced by natural processes, but in the Anthropocene — an epoch defined by significant human impacts on geography, geology, and ecosystems through urbanization, industrialization, deforestation, and climate change — these changes have accelerated. This epoch is used here as a framing device to emphasize the human-driven transformations that are increasingly divorcing urban environments from nature. This growing disconnect contributes to biodiversity loss, particularly on private lands, highlighting the need for policies that restore ecological networks such as pollinator pathways — interconnected habitats that support pollinator movement, feeding, and nesting across fragmented urban landscapes[1]. Pollinators (bees, butterflies, wasps, hummingbirds, etc.), which are responsible for pollinating 75% of food crops and flowering plants[2], are in alarming decline, with 40% of pollinator insects at risk of extinction[3]. Waterfront cities, like Toronto and Vancouver, present an opportunity to strengthen landscape connectivity. Waterfront cities present a strategic opportunity to strengthen landscape connectivity and foster urban biodiversity.

With 40% of Canadians living within 100 kilometers of a coastline[4], these areas concentrate a significant portion of the population in close proximity to natural ecosystems. This proximity offers an opportunity — and responsibility — for municipalities to engage residents in biodiversity conservation efforts, particularly on private lands where ecological interventions are often overlooked and underexplored policies. The research investigates how the evolution of urban policies supporting pollinator pathways reflects broader shifts in environmental values, particularly by reconnecting people with nature in waterfront cities. While policy alone may not yield immediate ecological outcomes, it plays a vital role in shaping public perception and fostering pollinator-supportive practices on private lands. By centering the human-nature relationship, this study aims to understand how municipal governance in urban waterfronts areas can nurture a more engaged and environmentally conscious society, driving collaborative action to support urban biodiversity

Keywords: Pollinator Pathways, Nature, Community Urban Biodiversity, Waterfront, Municipal Policy, Ecological Connectivity, Landscapes, Green Infrastructure, Climate Resilience

Table of Content

Introduction

1.1 Study Rationale

Urban landscapes are complex socio-ecological systems where biodiversity, policy, and design converge. Many Canadian cities have been built with insufficient regard for the non-human species that coexist alongside humans. Pollinators, essential for ecological health, food security, and climate resilience, face threats from habitat loss, fragmentation, and municipal bylaws that prioritize conventional landscaping over ecological functionality[5]. There is growing recognition of the significant decline of pollinating insects, often referred to as "insectageddon," which underscores the alarming loss of insect biodiversity[6]. This term reflects increasing public and scholarly attention to the crisis facing these species.

While conservation efforts in Canada have focused on public or Crown lands, most biodiversity is concentrated in southern regions, primarily private or urban lands. These areas present both challenges and opportunities for conservation. In rural and undeveloped regions, biodiversity is often preserved through protected lands and natural habitats. However, in cities, where much of the country's biodiversity resides, conservation efforts have historically been deprioritized. This is pertinent to global biodiversity goals, such as those outlined by the International Union for Conservation of Nature (IUCN) and the Kunming-Montreal Global Biodiversity Framework.

Waterfront cities, due to their high population densities and proximity to nature, represent critical intervention sites. A large portion of the global population lives near water, and urban waterfronts serve as spaces for public engagement and ecological reflection. While pollinators may not inherently thrive in these locations, urban waterfronts offer unique opportunities to redefine the relationship between people and nature. The focus of this research is on their potential for restoring human-nature connections through pollinator-supportive practices. As highly visible and contested areas, waterfronts are ideal for urban ecological experimentation.

These cities sit at the intersection of terrestrial and aquatic ecosystems, creating unique ecological corridors to connect fragmented habitats. Green and blue infrastructure (parks, riparian buffers, and pollinator-friendly green roofs) can act as stepping stones for pollinators. Riparian zones and wetlands, prevalent along waterfronts provide essential habitats for both migratory and resident species. However, these must not be seen as inherent solutions but as underutilized ecological assets that can be activated through policy and design to benefit pollinators.

The extent to which ecological corridors support pollinator pathways — especially on private lands — remains underexplored. While waterfront areas contain ecological features that enhance habitat connectivity, many cities lack comprehensive municipal policies to integrate these pathways into private land management.

This research investigates how municipal policies can encourage landowners to contribute to a more connected ecological network. There is a growing emphasis on urban biodiversity within Canadian conservation efforts. Federal bodies such as the Nature Conservancy of Canada (NCC) and Environment and Climate Change Canada (ECCC) continue to prioritize non-urban conservation while supporting select urban initiatives. Non-governmental organizations are leading a concerted push for urban biodiversity. The David Suzuki Foundation (DSF) champions the *Butterflyway Project,* which mobilizes community volunteers to plant native wildflowers and create pollinator pathways in cities. The Canadian Wildlife Federation (CWF) promotes urban biodiversity through initiatives like *Wild About Gardening* and *Grow It Don't Mow It*, encouraging pollinator-friendly planting and habitat restoration. WWF Canada supports native plant gardening and ecological corridor development in southern Ontario cities through its In the *Zone program*. Together, these efforts aim to restore fragmented habitats in human-dominated spaces, reflecting a broader shift toward valuing urban biodiversity.

Toronto and Vancouver, situated in distinct ecological and socio political contexts, serve as pivotal case studies for understanding urban development and dynamic aquatic ecosystems. Their proximity to water creates microclimates and ecological pressures that influence governance and environmental policies regarding biodiversity conservation. Both cities recognize the importance of integrating pollinator-friendly practices into urban planning. In Toronto, the *Pollinator Protection Strategy* emphasizes the need to connect habitats along the Lake Ontario shoreline. Similarly, Vancouver's *Greenest City Action Plan* includes habitat restoration in coastal zones like False Creek and Stanley Park, highlighting green spaces' role in supporting biodiversity. These initiatives showcase the need for a balanced approach to land and water management while advancing ecological sustainability.

Despite these efforts, a significant gap remains in understanding how municipal policies are enacted across different land ownership structures. While much focus has been on public or Crown lands, private lands play a crucial role in maintaining pollinator populations. Policies for private lands often lack cohesion and coordination, posing challenges to fostering urban biodiversity. This research aims to address this

gap by exploring how municipal policies in waterfront cities like Toronto and Vancouver can better incorporate pollinator pathways on private residential and commercial lands.

By comparing these metropolitan areas, this research examines how municipal policies can bolster pollination efforts and how strategies can be adapted across various urban scales. This analysis reveals the potential for enriching biodiversity and ecological resilience in urban waterfronts while demonstrating the critical role these cities can play in advancing pollinator protection and supportive policies. By integrating pollinator-friendly practices into urban planning, they can safeguard pollinators and facilitate habitat restoration and ecological connectivity along their waterfronts.

1.2 Research Questions and Objectives

Toronto and Vancouver, as major metropolitan areas, benefit from a rich diversity of flora and fauna supported by their extensive and varied green spaces — including riparian zones, wetlands, shoreline parks, and natural buffers along rivers and lakes. This research does not assume that pollinators are inherently drawn to or thrive in these waterfront ecosystems. Instead, it positions waterfront cities as critical opportunities to redefine and repair the human–nature relationship, particularly in contexts where urbanization has historically marginalized non-human species in planning processes.

The choice to focus on waterfront cities reflects their strategic potential to act as entry points for reimagining the relationship between urban environments and biodiversity — not because pollinators are uniquely suited to water-adjacent areas, but because these spaces offer opportunities to restore fragmented ecosystems and reconnect people with nature through integrated green and blue infrastructure. This Major Research Paper (MRP) investigates how Toronto and Vancouver can effectively reshape their municipal policies to promote the establishment of pollinator pathways on private lands. Rather than suggesting that water-adjacent environments are inherently beneficial to pollinators, this research uses waterfront cities as testbeds for exploring how cities can reconnect fragmented ecological systems by integrating pollinator-friendly practices into land use planning, particularly in ways that empower commercial and residential property owners, tenants, and stewards to contribute meaningfully.

The central research question guiding this paper is: ***How can Toronto and Vancouver reshape municipal policies to effectively support the establishment of pollinator pathways on private residential and commercial lands?***

This inquiry will be addressed through three interrelated sub-questions:

- What are the ecological, social, and economic advantages of implementing pollinator pathways in waterfront areas and beyond?
- What obstacles do these cities encounter in adopting pollinator-friendly practices on private lands in both urban and waterfront environments, and what strategies can be implemented to overcome these challenges?
- How can evolving urban policies that promote pollinator pathways align with broader shifts in environmental values and public awareness, especially in the context of waterfront regions?

By addressing these questions, this study will offer a robust framework for municipal policymakers, planners, and community stakeholders seeking to support Canada's biodiversity commitments while fostering ecological connectivity and pollinator health. The findings will emphasize the essential role of private lands as connective tissue in fragmented urban ecosystems, while advocating for policies that not only restore pollinator habitats but also reimagine the relationship between urban residents and the natural world. Ultimately, this research underscores that the success of pollinator protection in cities depends not on geography alone, but on how planners, policies, and people come together to prioritize ecological resilience and shared stewardship in the places we call home.

1.3 Paper Structure

This research is organized into six main chapters, each building upon the last to provide a thorough examination of how waterfront cities can adapt municipal policies to foster the creation of pollinator pathways on private lands. Each chapter explores a different aspect of the research, addressing both the ecological importance of pollinator pathways and the policy frameworks that support them.

Chapter Two: Literature Review
This chapter situates the research within the broader context of existing scholarship on urban biodiversity, pollinator conservation, and municipal policy frameworks. It is structured into three sections: (1) Biodiversity in the Anthropocene, which explores the challenges of preserving biodiversity in the face of urbanization and environmental degradation; (2) Connecting Urban and Natural Landscapes, which examines the role of pollinator pathways in bridging fragmented habitats, with a focus on green and blue infrastructure; and (3) Challenges and Opportunities for Urban Pollinator Conservation, which identifies key barriers to pollinator friendly practices and explores opportunities for integrating these into urban planning and policy.

Chapter Three: Methods
This chapter outlines the research design and methodology used in the study. It explains the qualitative and comparative research approaches employed to analyze municipal policies in Toronto and Vancouver. Specific components of this chapter include: (1) Case Study Selection and Rationale, which discusses the criteria for choosing Toronto and Vancouver as case studies; (2) Geographical Analysis, which assesses the geographic and ecological contexts of both cities; (3) Policy Scan, which reviews relevant municipal regulations and their impact on pollinator conservation; (4) Comparative Policy Analysis, which identifies key differences and similarities in policies across the two cities; (5) Thematic Analysis, which synthesizes emerging policy trends; and (6) Policy Recommendations, which presents actionable strategies for enhancing pollinator-friendly practices on private lands.

Chapter Four: Geographical and Ecological Analysis
This chapter provides the environmental context necessary for understanding the challenges and opportunities for pollinator conservation in urban waterfronts. It examines the unique ecological features of Toronto and Vancouver, focusing on their waterfront landscapes and how these spaces can serve as ecological corridors for pollinators. The chapter explores the natural features, climate conditions, and urban development patterns that shape both the pollinator habitats and the policy environments in these cities.

Chapter Five: Policy Scan
This chapter evaluates the regulatory frameworks that govern pollinator-friendly practices on private lands in Toronto and Vancouver. It identifies and analyzes key municipal policies, strategic plans, and zoning bylaws that either facilitate or hinder the development of pollinator pathways. The policy scan is organized into five central themes: (1) Regulatory and Policy Approaches, (2) Biodiversity Corridors and Connectivity, (3) Green Infrastructure and Climate Adaptation, (4) Public and Private Partnerships, and (5) Indigenous and Community-Led Approaches. This chapter also highlights policy gaps and offers suggestions for strengthening municipal strategies to support pollinator conservation.

Chapter Six: Policy Recommendation
Based on the policy scan, this chapter highlights key policy instruments that can support municipalities in engaging with pollinator-friendly on private lands.

Chapter Six: Conclusion: Private Lands, Private Responsibility
The concluding chapter synthesizes the findings of the research and emphasizes the role of private lands in urban pollinator conservation. It stresses the importance of integrating pollinator-friendly practices into private land management, particularly in waterfront cities, as a means of enhancing biodiversity and ecological resilience. These cities are not just ecologically strategic—they are symbolic and practical gateways to reshaping human-nature relationships in dense, built environments. The chapter outlines the implications of the research for future urban policy development, encouraging municipalities to adopt policies that support the integration of green and blue infrastructure into private developments. It also provides recommendations for further research and action to ensure that waterfront cities can lead the way in fostering pollinator-friendly urban environments.

Literature Review

2.1 Introduction

This literature review is an evidence-based exploration into the urgent and vital relationship between people, urbanization and pollinator biodiversity. As cities expand, pollinators face an uphill battle against habitat loss and environmental change. To combat this critical issue, we need robust municipal policies that integrate pollinator pathways into urban planning, fostering environments where both nature and humanity can thrive. This literature review contributes to a deeper understanding of humanity's relationship with nature within urban environments, and by extension, the complex ecosystems that exist within our cities. This chapter unfolds across three pivotal sections: Biodiversity in the Anthropocene; Connecting Urban and Natural Landscapes: Pollinator Pathways and Ecological Networks; and The Challenges and Opportunities for Urban Pollinator Conservation. Each section provides foundational insights into how cities can evolve to support the health of pollinators and the broader ecosystems they sustain.

2.2 Biodiversity in the Anthropocene

"In Wildness is the preservation of the World[7]".

These words, written by the naturalist Henry David Thoreau in his essay Walking, remind us of nature's intrinsic value and the imperative to protect biodiversity. Yet, in today's rapidly urbanizing world, this "wildness" is increasingly fragmented by human development, threatening the very ecosystems upon which life depends.

Biodiversity, while an unfamiliar term to many, is intricately woven into the fabric of daily life6. It encompasses the extraordinary variety of life on Earth and the abundance of life forms and processes[8,9]. Humanity's profound reliance on natural systems underscores the urgent need to understand and protect biodiversity[10]. Among the most vulnerable species in these shifting landscapes are pollinators (bees, butterflies, etc) that help transfer pollen between our wild plants and agricultural crops. Their decline, driven by habitat loss, urbanization, pesticide use, and climate change, causes an urgent need for conservation strategies that integrate biodiversity into urban environments[11].

While historical accounts have long acknowledged human impact on the environment[12,13], the concept of the **Anthropocene** lays bare the unprecedented scale of humanity's influence, from climate change to rampant species extinction[14]. This framework compels us to recognize that our daily actions shape ecosystems. Yet, as Govind (2020) emphasizes, we are part of a broader ecological community — a tapestry of more-than-human species that includes pollinators and other organisms[15]. Donna Haraway similarly insists on naming and engaging with the dynamic, symbiotic forces that shape our shared world, emphasizing that human flourishing is inseparable from the ongoing survival of multispecies assemblages[16,17,18]. Protecting biodiversity is therefore an environmental imperative and ethical and urban planning concern.

The concept of rewilding — which advocates for restoring ecosystems with minimal human intervention[19,20] — further highlights the need to rethink urban biodiversity management. Rather than viewing cities as separate from nature, rewilding envision urban spaces as integral components of ecological networks and flows, strengthening biodiversity while improving human well-being and connection to the natural environment. This perspective aligns with the concept of **panarchy**, which describes the dynamic, interconnected nature of complex adaptive systems. Urban environments, like forests or rivers, exist within hierarchical cycles of growth, accumulation, restructuring, and renewal[21,22,23]. Recognizing cities as part of these ever-evolving social-ecological systems highlights the need for adaptive, resilient approaches to urban planning — ones that support biodiversity, foster multispecies coexistence, and enhance ecological connectivity[24,25].

From Thoreau to Cronon, scholars and writers across ecology, geography, and the environmental humanities have long challenged us to look beyond the chaos of urban existence and reconnect with the essence of nature[26,27]. Thoreau distinguishes between the natural world and human civilization, suggesting that true connection with nature requires detachment from urban life:

Anthropocene: A proposed geological epoch that marks the period during which human activity has become the dominant influence on Earth's climate, ecosystems, and geology.

Panarchy: The interrelated systems of change and adaptation across different levels of scale, from local to global, and how these systems influence each other over time. It emphasizes the dynamic, non-linear nature of systems, where disturbances, transformations, and renewals occur in cycles across various levels, leading to both resilience and vulnerability.

“I wish to speak a word for Nature, for absolute freedom and wildness, as contrasted with a freedom and culture merely civil…”

Cronon extends this idea by portraying wilderness as a sanctuary from the pressures of urbanization, challenging the binary separation of humans and nature[28]. Their work reframes wilderness as a relational space, deeply entangled with human systems and values, particularly visible in urban contexts where natural systems are highly managed yet persistently resistant to full control.

Rewilding departs from traditional conservation by prioritizing the recovery of ecological functions over the restoration of past conditions. It emphasizes long-term relationships between people and wild species through land stewardship, allowing ecosystems to regenerate within the realities of contemporary urban life[29,30]. Pettorelli, Durant, and du Toit[31] support this approach, highlighting its ethical dimensions, while Leopold critiques the tendency to undervalue species and processes that lack immediate human utility[32]. These perspectives challenge urban planners and policymakers to support biodiversity through rigid control and by designing for complexity, adaptation, and multispecies care.

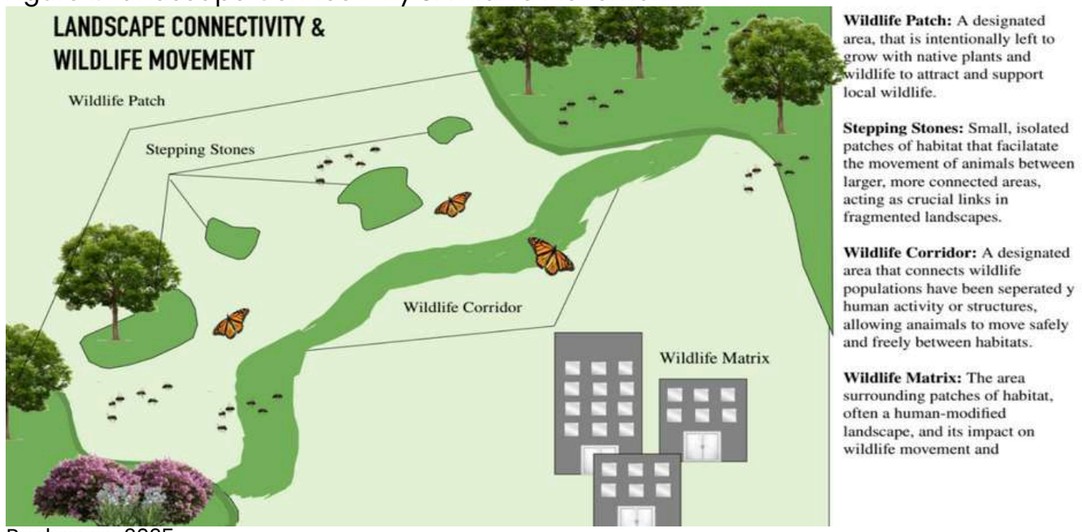
By embedding pollinator conservation within the frameworks of the Anthropocene, panarchy, and rewilding, this chapter positions urban landscapes as contested yet hopeful terrains. Especially in waterfront cities, where ecological and social thresholds collide, there lies an opportunity to reimagine planning as a human endeavor and a shared practice of sustaining life.

Algonquin Park

2.3 Connecting Urban and Natural Landscapes: Pollinator Pathways and Ecological Networks

Human land use and infrastructure have dramatically transformed landscapes across the globe, leading to widespread destruction of wildlife habitats[33]. This fragmentation has profound consequences for biodiversity, such as reducing plant abundance, species richness, and population sizes[34,35]. Ecological connectivity, as defined by the Convention on Migratory Species, refers to the unimpeded movement of species and the flow of natural processes that sustain life on Earth[36] (Illustration 1). Similarly, habitat connectivity describes the degree of functional linkages between patches of suitable habitat that support species’ survival and movement[37,38]. Baldwin et al. emphasize that landscape connectivity is vital for maintaining ecological processes across ecosystems, promoting the persistence and resilience of biodiversity by enabling species dispersal and gene flow[39]. Furthermore, connectivity plays a critical role in climate change adaptation, allowing species to shift their ranges in response to changing environmental conditions[40].

Figure 1. Landscape Connectivity & Wildlife Movement



Buchanan, 2025

Despite its importance for biodiversity, habitat connectivity is increasingly threatened by anthropogenic activities, leading to widespread fragmentation of natural landscapes[41]. The effects of habitat loss are detrimental to wildlife populations, eroding genetic diversity and weakening individual fitness[42]. The transformation of landscapes through urbanization, agriculture, and industrialization reduces habitat sizes and exacerbates the challenges faced by species as they navigate fragmented environments. As connectivity declines, so, too, does wildlife survival, with increased mortality risks such as predation, and retaliatory killings due to human-wildlife conflict[43,44,45,46]. This is especially concerning for species that rely on expansive, connected habitats to persist[47].


Urbanization


Agricultural


Industrialization

A key challenge in urban ecosystems is coordinating the cumulative management activities of multiple land managers to align with ecological processes. The spatial scale through which land is managed often does not match the broader scale of ecological dynamics[48], and many species rely on multiple habitat patches across the landscape to sustain viable populations. At the neighborhood level, property ownership is typically fragmented among various stakeholders — private residences, small businesses, public lands, and institutions such as schools and religious organizations — making it difficult to establish shared goals for green space management. As the number of stakeholders increases, achieving mutually beneficial management outcomes at both local and landscape scales becomes increasingly complex. For instance, in Leicester, United Kingdom, 80% of the City's green space is privately managed, with 40% of that land owned by 123,000 individual households[49]. This extensive network of private landowners contributes to what Odum termed the "tyranny of small decisions," where household-level management choices maximize habitat heterogeneity at the parcel scale but may be detrimental to species that require larger, contiguous habitat areas at the neighborhood scale[50].

Similarly, in Canadian cities like Toronto and Vancouver, private landowners also manage significant portions of urban green space. In Toronto, approximately 23% of space is privately owned[51], while in Vancouver, the percentage is lower at around 6%[52]. This highlights the significant role private lands play in shaping the city's ecological networks, and like in Leicester, the collective decisions made by these individual landowners can contribute to both habitat fragmentation and potential conservation opportunities at the neighborhood scale.

Urban landscape connectivity is critical for supporting pollinators, as they require access to a network of habitats that provide foraging resources and nesting opportunities[53,54]. The fragmentation of landscapes and the complex pattern of land ownership in urban areas make it especially difficult to ensure that pollinators can move between habitat patches, which is necessary for their survival and reproductive success[55]. Without this connectivity, the ability of pollinators to access diverse floral resources and nesting sites is significantly diminished, thereby threatening their populations. Plant-pollinator network analyses have shown that urban green spaces can support a high diversity of pollination interactions, though certain pollinator groups exhibit preferences for specific plant species. **Generalist pollination syndromes**, which attract a wide variety of pollinators, help maintain the diversity of interactions within a pollination network. This diversity plays a key role in ensuring the stability of the network, as it allows plants to rely on multiple species for pollination. Such diversity reduces the vulnerability of ecosystems to declines in specific pollinator species and ensures a more resilient pollination process overall.This diversity in pollinators helps maintain a stable and resilient pollination network by ensuring that plants can still be pollinated even if certain pollinator species are absent or in low numbers[56]. For example, native plant-pollinator connections, such as those between the Purple Coneflower (Echinacea purpurea) and the Eastern Bumblebee (Bombus impatiens), are critical for sustaining pollinator populations in urban ecosystems. Native plants, like the Purple Coneflower, provide specialized food sources and habitat for pollinators, supporting the biodiversity and stability of local ecosystems. In contrast, non-native species like Catmint (Nepeta x faassenii), while attractive to pollinators such as the Western Honey Bee (Apis mellifera), do not provide the same level of ecological support for local fauna.

Generalist Pollination Syndromes: A set of floral traits or characteristics that enable plants to attract a wide range of pollinators, rather than being specialized for just one species or group.

Yet, as green spaces become fragmented, the plant-pollinator networks can also suffer. Some species act as key hubs in these networks, and the loss of these species or their floral resources can significantly disrupt ecological processes[57]. In urban environments where connectivity is often disrupted by the built environment, it becomes even more difficult to maintain these vital relationships. This highlights the need for integrated management strategies that not only consider the ecological processes of species movement but also address the human-driven fragmentation of land. Urban areas increasingly require thoughtful planning to ensure that green spaces are not just available, but also interconnected in ways that allow pollinators and other wildlife to thrive.

The detrimental effects of fragmentation are observed across a wide range of taxa, affecting both natural ecosystems and those modified by human activity56. As habitat patches become more isolated, the viability of populations is reduced, and the risk of species extinctions escalates[57]. Urbanization represents one of the most significant and enduring human-driven alterations to landscapes, with profound consequences for ecosystem health and functionality [58,59]. As natural habitats are increasingly replaced by built environments, pollinators and other wildlife face reduced access to critical resources such as nesting sites and food, further threatening their survival. Habitat loss and fragmentation have become recognized as the primary threats to biodiversity on a global scale[60].

2.4 Challenges and Opportunities for Urban Pollinator Conservation

The effects of urbanization on pollinators are complex and vary widely depending on the specific characteristics of urban landscapes. While some studies indicate that cities may support greater pollinator diversity compared to surrounding rural or semi-natural habitats[61,62], other research suggests that urbanization can lead to decreased diversity[63]. These variations are influenced by the quality, quantity, and diversity of floral resources in urban habitats relative to other regional habitat types. Crucially, urban green spaces, which include remnants of native vegetation, urban wastelands, residential gardens, and engineered green infrastructure , often become the primary refuges for pollinators in increasingly urbanized environments[64].

Figure 2. Buzzing about Pollinators

Buchanan, 2025

As more than half of the global population now resides in cities — and projections suggest that by 2050, the urban population will equal today's total global population[65] — the challenge of conserving biodiversity in these environments grows ever more pressing. However, cities should not be seen only as sites of ecological degradation. Rather, there is growing recognition that cities have the potential to function as refuges for biodiversity, including pollinators. This shift in perspective has led to an increased focus on urban conservation strategies. Wenzel et al. emphasize the need for urban conservation initiatives[66], while Aronson advocates for cities to actively support native biodiversity through strategic planning, conservation efforts, and the management of urban green spaces[67]. These spaces play a pivotal role in supporting pollinators by enhancing food availability, providing nesting sites, and offering protection from toxins like pesticides.

In the context of urban planning, biodiversity conservation efforts must focus on protecting existing natural habitats, while promoting opportunities for recovering habitat and integrating green infrastructure into the urban landscape. A well-connected network of natural, restored, and constructed habitats can significantly improve conditions for biodiversity across both public and private lands[68]. This is true for private gardens, which serve as valuable microhabitats, supporting diverse flora and fauna and fostering human engagement with nature[69]. **Green infrastructure** can further enhance urban biodiversity when integrated into urban planning. These networks, including features like pollinator corridors, rooftop gardens, and flower-rich roadside verges, are becoming increasingly recognized as essential tools for mitigating biodiversity loss and improving ecological conditions within cities[70,71]. Through careful design and management, green infrastructure networks can effectively connect fragmented habitats, supporting the movement and survival of pollinators and other wildlife.

Urban green spaces, which encompass a wide range of vegetated areas in cities, are more than just patches of grass or planted areas. These spaces can include everything from public parks designed for recreation, to private gardens cultivated for aesthetic appeal, to more naturalized areas like green roofs or wildflower meadows (Figure 2).

Green Infrastructure: A network of natural and semi-natural systems that provide ecological, economic, and social benefits by mimicking or working with natural processes. It's a way of managing water, enhancing biodiversity, and improving urban livability using nature-based solutions.

Figure 1: Nina-Marie's Naturalized Garden Habitat

Lorraine Johnson

While the term urban green spaces is often used broadly, it is important to note that these areas can vary greatly in their ecological and social functions. Some urban green spaces are designed for human recreation, while others may be left to grow more naturally, fostering wildlife and supporting ecosystems. In the context of supporting pollinator habitats, these spaces play a critical role in providing essential resources like nectar, pollen, and shelter, thereby contributing to greater biodiversity in urban areas[72,73]. Pollinator-friendly modifications can be applied across a range of landscapes, from parks and community gardens to golf courses and urban farms[74,75]. Daniels et al., for example, compared the potential of urban and rural green spaces, such as recreational parks, cemeteries, and community gardens, to support pollinators. Their findings highlight that cities can play a crucial role in sustaining pollinator diversity, and even small urban green spaces, when designed and maintained with pollinators in mind, can contribute significantly to conservation efforts[76].

To optimize the potential of urban green spaces for pollinators, it is crucial to consider both the density and expanse of vegetation, alongside near-natural design and maintenance strategies. While the balance between these factors may vary in specific urban contexts, providing a mix of both dense, plant-rich areas and larger, continuous habitats can support a diversity of pollinator species. Silva et al. argue that for green spaces to effectively sustain pollinator communities, they must be rich in flowering plants and provide a variety of essential food sources and nesting opportunities[77]. The design of these spaces should focus on both plant diversity and the creation of varied microhabitats that support a wide range of pollinator species.

Pollinators exhibit diverse ecological traits, including nesting behavior, foraging distances, and habitat specialization, all of which are crucial considerations for urban biodiversity planning. Among the most significant urban pollinators, bees demonstrate considerable variation in foraging range: small-bodied species such as Lasioglossum spp. typically travel only 150–300 meters from their nests, while larger species like Bombus spp. and Apis mellifera can forage up to 1.5 kilometers or more[78,79]. These differences underscore the need for strategically connected pollinator habitats within cities,

particularly in landscapes fragmented by development and impervious surfaces, such as those found in Toronto and Vancouver[80,81]. The spatial configuration and continuity of floral and nesting resources directly influence which pollinator species can persist and thrive in urban areas.

Research by Ayers and Rehan further affirms the importance of local and landscape-level features in shaping wild bee populations, emphasizing how habitat composition, land use change, and floral resource availability collectively inform conservation outcomes across spatial scales[82]. In response to these insights, cities like Toronto — recognized as a Bee City for its proactive biodiversity strategies — have embedded pollinator conservation into municipal guidance documents. These efforts have been significantly shaped by Colla and McIvor, whose work on native bee ecology and urban pollinator strategies has laid the groundwork for locally adapted conservation practices[83,84].

Connectivity, particularly through green infrastructure and pollinator pathways, emerges as a foundational strategy in bolstering pollinator resilience. International examples, such as nectar-rich gardens in South Africa designed to support pollinator migration, further illustrate how urban interventions can serve as ecological stepping stones across fragmented landscapes. While birds play a limited role in pollination within these systems, bees, butterflies, and moths are drawn to these corridors, thereby facilitating pollen transfer between isolated habitats and reinforcing landscape-scale connectivity[85]. These examples demonstrate how a well-planned network of urban green spaces can support both species mobility and ecosystem resilience, and inform Toronto and Vancouver's own approaches to pollinator-supportive planning.

Locally, the quality and quantity of floral resources — specifically nectar and pollen — are essential for attracting and sustaining pollinator populations. Pollinators rely on these resources for nourishment and reproduction. Nectar provides energy, while pollen offers protein and other nutrients necessary for their development. The availability of these resources influences pollinator health, behavior, and reproductive success. Other local factors, such as soil and water availability, as well as management practices like mowing frequency, can further affect the quality of these resources[86]. For example,

reduced mowing frequency in private gardens can support higher bee populations by increasing the number of flowering plants and nesting sites[87]. At the landscape level, factors like urban heat, pollution, and the proportion of impervious surfaces (e.g., concrete or asphalt) can limit the suitability of urban green spaces as viable habitats for pollinators[88]. These factors interact in complex ways, leading to varied outcomes in different green spaces. In urban parks and lawns, for instance, chemical treatments often used for maintenance can be detrimental to pollinator health, further reducing the quality of available floral resources[89].

Pesticides, in particular, represent a significant threat to pollinators in both urban and agricultural environments[90]. Excessive use of nitrogen-based fertilizers can also degrade the quality of floral resources, making them less available to pollinators in parks and lawns[91]. However, intensively managed spaces like private gardens often benefit from regular irrigation, which improves the availability of floral resources for pollinators. Thoughtful management of mowing schedules, irrigation, and fertilization can create optimal conditions for pollinators by ensuring a steady supply of food and nesting sites while reducing harmful chemical exposure.

Optimizing the design and management of urban green spaces — encompassing natural, cultivated, and spontaneous vegetation — is essential for effectively supporting pollinators. In Toronto, while there are no known urban gardens or greenspaces explicitly designed with pollinator pathways in mind at present, emerging studies and conceptual frameworks suggest that such planning is becoming increasingly recognized as an important component of sustainable urban design[92]. These evolving ideas highlight the potential for integrating pollinator pathways in future greenspace development, even if these strategies have yet to be fully realized in practice. Others are intentionally planted to support wildlife, including pollinators[93]. Understanding the factors that influence these spaces is crucial for ensuring they provide the necessary resources and habitats for pollinators.

In addition to natural habitats, artificial (human-designed) structures like bee hotels and sugar water feeders are increasingly used to support pollinators in urban environments[94]. These structures provide nesting sites for solitary bees and nectar-feeding birds, but their effectiveness depends on the design and material choices. For example, modifying the size of nesting holes in bee hotels can exclude non-native bees, helping to support native species[95]. Such artificial structures, when designed with species' functional traits in mind, can enhance pollinator conservation efforts in urban landscapes.

Methods

This research employs a robust, multi-faceted methodological framework to investigate the central question: How can municipal policies be tailored to promote pollinator pathways on private residential and commercial lands, thereby helping to bridge the nature-human divide? By combining qualitative policy analysis with a comparative case study approach and geographical analysis, the study provides a comprehensive policy-oriented perspective alongside an in-depth examination of urban biodiversity connectivity. Each chapter is structured to present a distinct methodological analysis, ensuring a thorough assessment of the findings and their implications. This integrated approach adds depth of analysis and fosters actionable insights that contribute to effective policy development for urban biodiversity.

3.1 Case Studies and Rationale

This study employs a purposive sampling method[96] to select Toronto and Vancouver as case study cities, based on their strategic geographic locations, extensive waterfronts, and strong commitments to sustainability. Both cities are recognized leaders in urban ecology, with robust governance structures, comprehensive green building policies, and biodiversity-focused planning initiatives. Their advanced environmental legislation and integration of green infrastructure provide rich contexts for examining municipal strategies that support pollinator pathways. Purposive sampling is a well-established qualitative research technique that identifies information-rich cases to optimize limited research resources. This targeted approach enables a deeper investigation into cities actively implementing pollinator conservation policies. Toronto and Vancouver exemplify sustainable urban development and serve as models for integrating biodiversity goals within urban planning frameworks.

By focusing on these urban centers, the study captures a broad spectrum of municipal approaches to promoting ecological resilience. The research uncovers specific practices, challenges, and successes related to biodiversity policy in dense urban environments. Ultimately, this comparative analysis offers valuable insights for other cities seeking to strengthen pollinator biodiversity and advance sustainability outcomes through innovative governance and planning.

3.2 Geographical Analysis

In Chapter four, this study further substantiates the selection of Toronto and Vancouver as case studies. Building on this choice, a comparative case study approach is employed alongside a spatial assessment to evaluate the ecological suitability of these cities for establishing pollinator pathways. This methodology aligns with the process orientation in qualitative research, which highlights the interconnectedness of people, situations, events, and processes[9]. Here, “X” symbolizes the urban landscapes and governance frameworks of Toronto and Vancouver, while “y” signifies the correlation and establishments of such policies. By focusing on these cities, this process-oriented approach facilitates a deeper understanding of the myriad factors influencing the creation of effective pollinator-supportive environments and the importance of bridging the nature-human relationship for pollinators. This comparative analysis yields an understanding of how each City’s unique attributes, including its proximity to water and the challenges it presents, shape the implementation of strategies that support pollinators.

A key component of this analysis is a policy scan of urban green policies, aimed at identifying areas that currently support — or have the potential to support — pollinator habitats. This will involve secondary research and geospatial analysis to examine critical urban landscapes (parks, ravine systems, green spaces, and private residential areas), focusing specifically on their role in improving connectivity for pollinators.


Toronto


Vancouver

3.3 Comparative Policy Scan

The next phase of this research entails a comprehensive comparative policy scan of relevant policy documents from Toronto and Vancouver. These waterfront cities are ideal case studies because they house large populations living near the water, which makes bridging the nature-human relationship for pollinators particularly important. A policy scan is a systematic examination of existing policies, regulations, and strategies designed to assess their alignment with specific objectives, identify gaps, and inform necessary policy enforcements. Grounded in policy analysis, this process involves evaluating alternative policy options, compiling and integrating evidence, and predicting the potential impacts of various courses of action[98]. As House and Shull articulate, effective policy formulation for complex issues necessitates analyzing the source of the problem, establishing criteria for policy decisions, exploring possible alternatives, assessing their impacts, and considering the stakeholders involved[99]. In the context of this research, the policy scan focuses on municipal bylaws, strategies, and guidelines related to pollinator-friendly practices to facilitate comparisons across jurisdictions and generate evidence-based recommendations for enhancing pollinator biodiversity on private lands.

This research draws from a comprehensive review of publicly available policy documents, including:

- Municipal Bylaws such as Toronto's Turfgrass and Prohibited Plants Bylaw and Vancouver's Landscaping and Boulevard Planting Bylaws.
- City Strategies and Plans including Toronto's Biodiversity Strategy (2019) and Vancouver's Greenest City Action Plan (2020).
- Technical Guidelines and Frameworks like Toronto's Green Streets Technical Guidelines and Vancouver's Rain City Strategy.
- Climate Action Plans including Toronto's Strategic Forest Management Plan and Vancouver's Urban Forest Strategy.

These diverse sources offer a comprehensive overview of regulatory frameworks and municipal commitments to pollinator protection, at least on paper. While these documents signal strong intentions, they may vary in the degree to which they are operationalized or translated into effective on-the-ground actions[100,101].

To uncover relevant policies, a strategic keyword search is conducted using terms such as "biodiversity," "climate change," "pollinator strategies," and "green infrastructure." This method reveals a wide array of municipal bylaws, city strategies, technical guidelines, climate action plans, creating a multidimensional perspective on policy development, implementation, and efficacy in promoting pollinator-friendly practices.

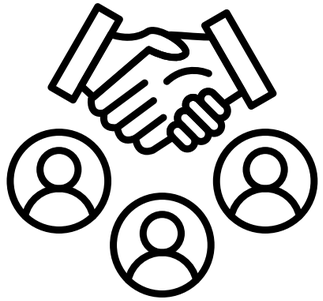
3.4 Thematic Analysis

In this study, thematic analysis was used to examine the policy documents collected during the review process. Thematic analysis began with an initial immersion in the materials, followed by systematic coding and categorization of relevant excerpts that aligned with the study's objectives. This process ensured a deep understanding of the content, which laid the foundation for identifying initial themes and patterns. The iterative engagement allowed for a nuanced interpretation of the policy documents.

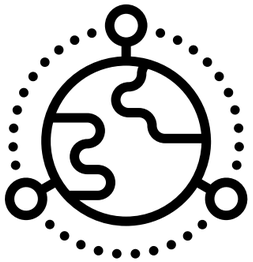
The themes for further analysis were not predefined but emerged organically from the data, based on the coding process. These themes were refined over time and eventually synthesized into broader categories. The thematic analysis in this study was structured around the following core areas, which represent key aspects of urban policy in relation to pollinator conservation:

- **Regulatory and Policy Approaches:** Examining zoning regulations and bylaws that either mandate or actively promote pollinator-friendly practices on private lands.
- **Biodiversity Corridors and Connectivity**: Exploring how strategically designed pollinator pathways across varied land tenures can rebuild ecological networks and sustain urban biodiversity.
- **Green Infrastructure and Climate Adaptation:** Investigating the role of green infrastructure (green roofs, bioswales, permeable surfaces, etc) in fostering pollinator habitats and supporting climate resilience.
- **Public and Private Partnerships:** Exploring collaborative efforts between municipal authorities, private landowners, businesses, and developers to advance and sustain pollinator initiatives.
- **Indigenous and Community-Led Approaches:** Analyzing the integration of Traditional Ecological Knowledge (TEK) and the role of grassroots community efforts in pollinator conservation.

Regulatory and Policy Approaches



Public and Private Partnerships



Biodiversity Corridors and Connectivity

Indigenous and Community-Led Approaches:

Green Infrastructure and Climate Adaptation

3.4 Thematic Analysis

These core areas were derived from a combination of iterative readings, coding, and thematic refinement, forming the basis for further analysis. The final themes were critical in developing the framework for the subsequent examination of how municipal policies are addressing pollinator conservation.

Each of these themes undergoes a critical examination to uncover strengths, limitations, and avenues for refining municipal policies, with a keen focus on harmonizing urban development with environmental sustainability and biodiversity objectives.

To maintain analytical integrity, each themes definitions and boundaries were refined by grouping related codes into cohesive categories. These refined themes establish a coherent framework for data interpretation, fostering structured connections to the research question[102]. Upon finalizing the themes, a thorough analysis of each was conducted, linking pertinent text excerpts back to the themes to construct compelling, evidence-based arguments that demonstrate how the data contribute to addressing the central research question.

The findings of this analysis are documented with each theme presented as a key outcome, bolstered by direct excerpts and illustrative quotes from the data. The presentation of these findings ensures that both the depth and breadth of the analysis are effectively communicated, making each theme robustly substantiated[103,104]. This flexible approach allows for new insights, fostering a nuanced and comprehensive interpretation of the key themes and patterns emerging from the policy documents[105].

GEOGRAPHICAL AND ECOLOGICAL ANALYSIS

To effectively frame the policy scan, it is crucial to establish the geographical and ecological context. This analysis involved mapping each city, illuminating its distinct natural and ecological features. By embedding the study within these environmental contexts, a more accurate identification of policy opportunities can be tailored to each city's specific challenges and needs. Urban geography plays a pivotal role in shaping pollinator habitats, significantly impacting the effectiveness of policies designed to create viable pollinator pathways. Factors such as topography, natural corridors, and land-use patterns dictate the interactions pollinators have with the urban environment, ultimately affecting the success of biodiversity-supporting initiatives.

4.1 Toronto

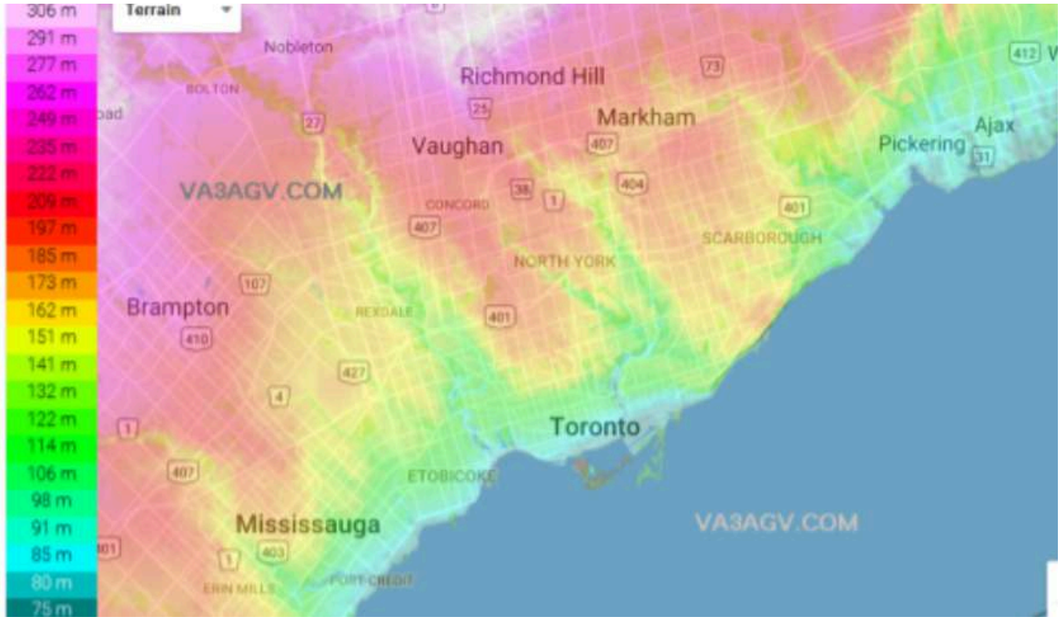
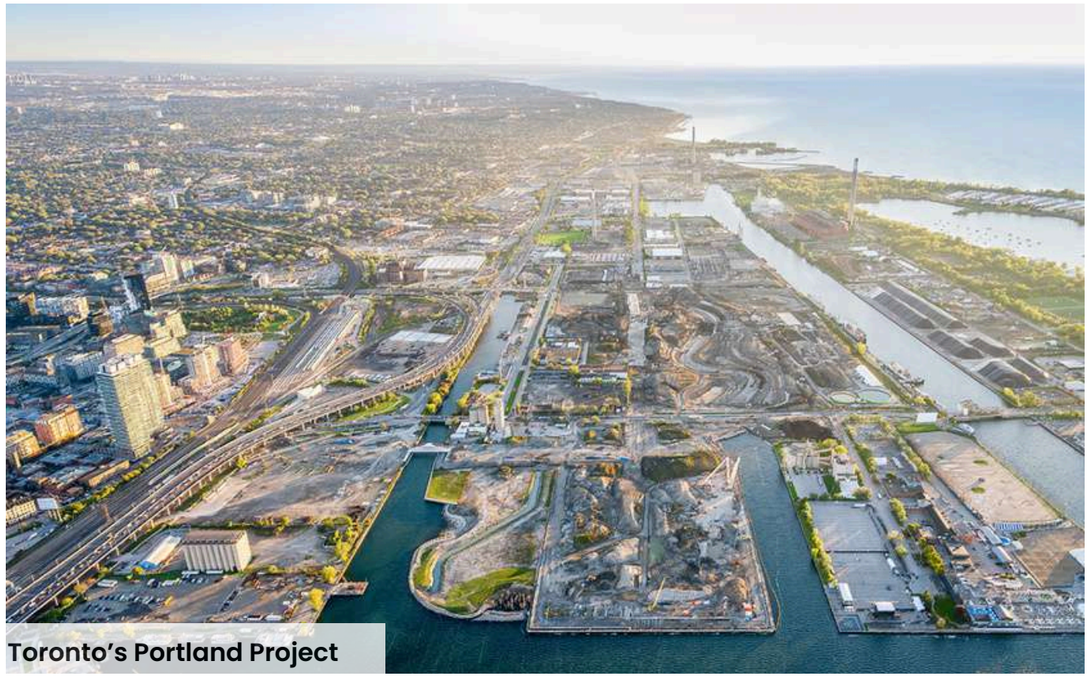


Figure 2. This map provides a color-coded representation of Toronto's elevation, illustrating the gradual rise from the lakeshore to the northern areas.

Toronto's geographical and ecological landscape is profoundly influenced by its location in southern Ontario, nestled on the northwestern shore of Lake Ontario. Spanning approximately 630 square kilometers, Toronto is Canada's largest City[106]. The City's topography is a striking interplay of flat plains and rolling hills, with elevations ranging from lake level to about 200 meters above sea level in Northern Toronto106 (Figure 2). Shaped by ancient glacial movements, this diverse landscape encompasses valleys, escarpments, wetlands, and ravines, which provide essential services such as wildlife habitat, water filtration, and carbon sequestration. These features are integral to the functioning of pollinator pathways, forming natural corridors that foster biodiversity and promote species mobility throughout the urban environment.

Toronto has one of the largest ravine systems globally, covering over 10,000 hectares, which is approximately 17% of Toronto's total area. These ravines serve as vital wildlife corridors, significantly contributing to the conservation of pollinator habitats by linking fragmented green spaces throughout the urban environment[107,108,109]. Additionally, the rivers coursing through the City, such as the Don and Humber, enrich riparian zones that support both aquatic and terrestrial pollinators. The interconnected network of parks and natural areas (High Park, the Toronto Islands, the Don Valley Parklands, and the new Portland's Redevelopment project) provides essential habitats for a myriad of species, including pollinators, birds, mammals, and amphibians.

Toronto's humid continental climate, characterized by four distinct seasons, nurtures a rich tapestry of ecosystems, including forests, wetlands, grasslands, and urban areas that host over 1,500 plant species. This plant diversity is crucial for pollinator networks, offering a variety of food sources and nesting sites for species such as bees and butterflies. Toronto's climatic conditions and varied topography create microclimates that influence species distribution and their interactions within the urban environment.



Toronto's Portland Project

4.2 Vancouver

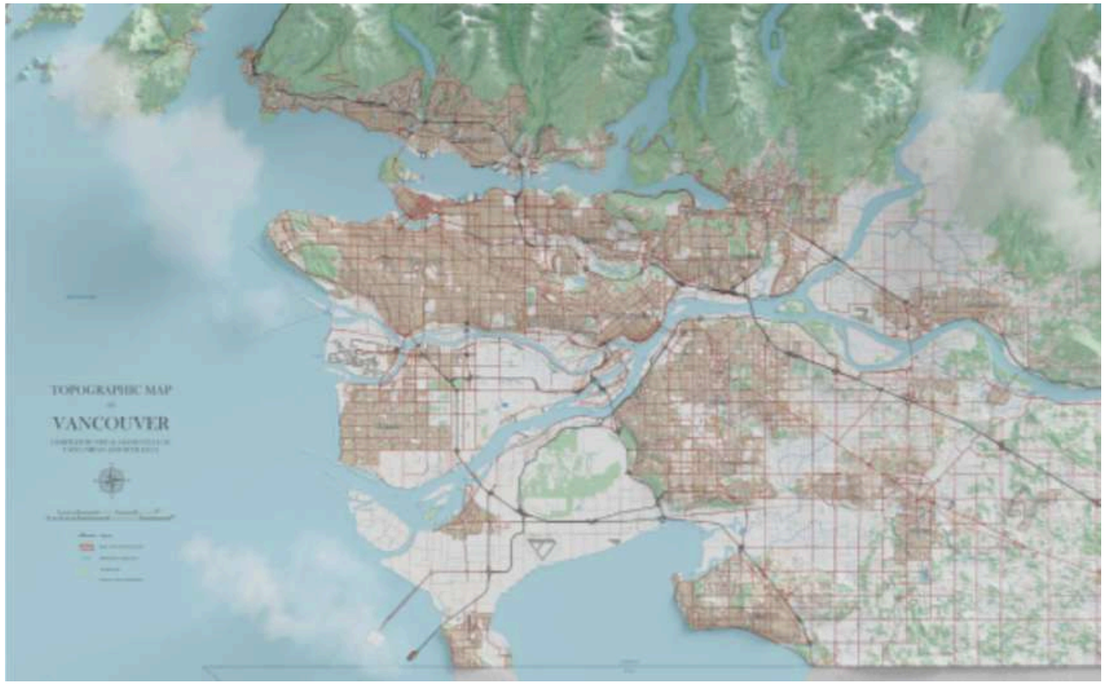


Figure 3. This map provides a detailed view of the City's elevation changes, illustrating the flat areas and hilly terrains within Vancouver.

Vancouver's geographical and ecological landscape is profoundly intertwined with its dramatic natural surroundings, shaped by its location in southwestern British Columbia along the Pacific coast. Framed by the majestic Coast Mountain range to the north, the City offers breathtaking views where towering peaks meet the ocean. Covering approximately 115 square kilometers, Vancouver ranks among Canada's most densely populated cities[110,111]. The City's topography is a captivating blend of coastal and mountainous terrain, with elevations ranging from sea level to more than 2,000 meters in the surrounding highlands (Figure 3).

Vancouver's position between the Pacific Ocean and the Coast Mountains grants access to diverse ecosystems, including temperate rainforests, estuarine wetlands, riparian zones, and coastal habitats. These ecosystems bolster a rich array of plant and animal species, enhancing biodiversity and equipping the city to better withstand the effects of climate change. The Fraser River, flowing just south of Vancouver, serves as a vital ecological corridor that supports both aquatic and terrestrial life. Furthermore, the city's extensive coastline, bordered by Burrard Inlet and the Pacific Ocean, provides essential habitats for marine and coastal wildlife. Natural areas like Stanley Park and Pacific Spirit Regional Park act as biodiversity sanctuaries, contributing significantly to the city's ecological health by providing critical habitats for a wide array of species, including pollinators.

Despite Vancouver's rich diversity of natural heritage, urban expansion has led to increasing fragmentation of these ecosystems. This fragmentation disrupts species movement and diminishes the provision of crucial ecosystem services, such as flood regulation and stormwater management. The encroachment of urban development on sensitive habitats complicates the connectivity necessary for robust pollinator pathways, which are essential for maintaining biodiversity across the urban landscape. As the city continues to grow, urban planning must prioritize the integration of ecological principles to ensure that development complements rather than disrupts natural systems.

Stanley Park

5. POLICY SCAN

5.1 Introduction

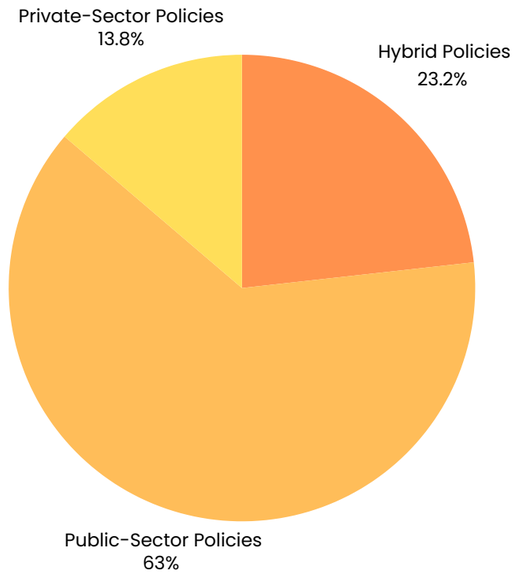
This policy scan conducts an examination of the regulatory frameworks governing pollinator-supporting practices on private lands in Toronto and Vancouver. It identifies best practices, uncovers regulatory gaps, and highlights significant implementation challenges. The findings underscore an urgent need for municipalities to evolve their policies proactively in response to escalating ecological and climate pressures. As urban centers serve both as catalysts for environmental disruption and as guardians of biodiversity, municipal policies are crucial for reversing the decline of pollinators and improving ecological connectivity across private gardens, streetscapes, and waterfront developments.

Toronto and Vancouver exemplify how cities can integrate ecological stewardship into urban policy through biodiversity strategies, green infrastructure initiatives, and targeted pollinator protection plans. However, conflicting bylaws, fragmented governance structures, and the predominant influence of private land ownership often hinder these efforts, creating a policy landscape rife with inconsistencies. In waterfront cities where development pressures are especially high, these challenges are exacerbated by land use and competing interests between urban growth and environmental sustainability. To surmount these challenges, municipalities just incentivize property owners to adopt pollinator-friendly practices and incorporate nature-based solutions 5 that prioritize biodiversity as a fundamental urban asset.

In light of increasing environmental uncertainty, the restoration of pollinator networks in waterfront cities becomes an ecological imperative rather than merely an aspirational goal. By adopting this commitment, municipalities can ensure a sustainable future where both people and pollinators thrive, leading to healthier and more resilient urban landscapes. The need to strengthen pollinator pathways in cities like Toronto and Vancouver is an ecological consideration that is mandatory to mitigate the effects of climate change, protecting urban biodiversity, and fostering a more resilient urban environment.

5.2 Policy Scan

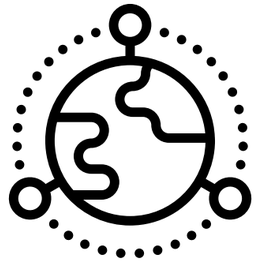
A total of 22 policy documents were reviewed, identifying 132 distinct policies related to pollinator conservation. This analysis sheds light on existing regulatory frameworks, best practices, and opportunities to enhance municipal governance, ultimately strengthening urban pollinator biodiversity and ecological resilience. Among the 132 policies, significant trends emerge regarding municipal approaches to pollinator-friendly practices and urban biodiversity. Of these, 17 policies (12.85%) specifically target the private sector, addressing private landowners, property developers, and non-public entities. The majority — 78 policies (59.09%) — focus on public spaces, city management, and infrastructure, highlighting the critical role of government in fostering urban environments that support pollination. This demonstrates a strong municipal commitment to pollinator protection through public infrastructure, such as parks, streetscapes, and urban planning (Figure 4).



However, the relatively low proportion of policies directed at the private sector suggests a governance gap, where voluntary measures may not be sufficient to ensure widespread action across urban landscapes. Notably, 37 policies (28.05%) bridge both private and public sectors, promoting collaboration between private landowners and public authorities to address shared challenges. These hybrid policies reflect an understanding that biodiversity conservation requires collective action, combining public resources with private land management to strengthen ecological resilience. While public-sector initiatives are robust, there is clear potential to deepen private-sector engagement and develop more integrated, cross-sectoral policies that support pollinator pathways.

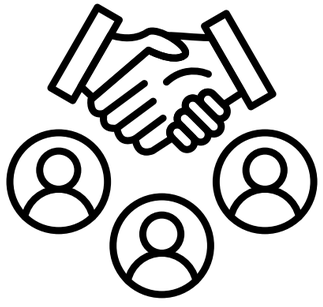
The thematic analysis of the 22 policy documents revealed five key focus areas related to pollinator conservation:

Regulatory and Policy Approaches

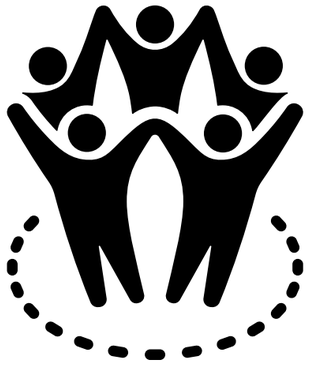


Biodiversity Corridors and Connectivity

Green Infrastructure and Climate Adaptation



Public and Private Partnerships



Indigenous and Community-Led Approaches:

Refer back to 23 for full theme descriptions

This policy scan provides a thorough evaluation of the strategies and initiatives implemented by municipalities to prioritize biodiversity conservation. These strategies are systematically categorized into the five key themes outlined above, which exhibit consistency across the cities studied. The following is a detailed overview of the policies identified in the scan for the City of Toronto and Vancouver.

The City of Toronto

Toronto has implemented a variety of public policy initiatives aimed at protecting and restoring pollinator biodiversity while enhancing climate resilience, including:

Policy/Strategy	Year	Relevance to Pollinator Conservation & Urban Biodiversity
Provincial Policy Statement (PPS)[112]	2024	Provides overarching land-use planning guidance, requiring municipalities to integrate biodiversity and climate resilience into development policies.
Toronto Official Plan[113]	2022	Prioritizes sustainable, inclusive, and climate-adaptive urban growth, including green infrastructure, natural heritage protection, and pollinator-supportive landscapes.
Toronto Green Standards (TGS) - Version 4[114]	2022	Mandates environmental performance standards in new developments, including requirements for native plantings, tree canopy expansion, and stormwater management.
Turfgrass & Prohibited Plants Bylaw (Chapter 489, Update)[115]	2022	Restricts invasive species and encourages native plant landscaping, reducing pesticide use and enhancing pollinator habitats.

Policy/Strategy	Year	Relevance to Pollinator Conservation & Urban Biodiversity
Toronto Biodiversity Strategy[116]	2019	**Establishes goals for urban biodiversity, including habitat restoration, ecological connectivity, and native species conservation.**
Toronto Ravine Strategy[117]	2017	Protects critical urban ecosystems by promoting biodiversity, ecological connectivity, and natural area preservation.
Parks and Recreation Facilities Plan[118]	2017-2037	Guides investment in public green spaces, ensuring accessibility and ecological health while integrating pollinator-friendly landscaping.
Green Streets Technical Guidelines[119]	2017	Promotes green infrastructure in streetscapes, including pollinator-supportive plantings, permeable surfaces, and urban greening.
Pollinator Protection Strategy[120]	2018	Directly focuses on creating pollinator-friendly habitats, increasing native plant coverage, and reducing pesticide application.
Strategic Forest Management Plan[121]	2013	Targets a 40% urban canopy cover, promoting tree diversity and urban reforestation efforts beneficial to pollinators.

The City of Vancouver

The City of Vancouver has introduced a diverse array of public policy initiatives aimed at protecting pollinator biodiversity while simultaneously reinforcing climate resilience. These initiatives include:

Policy/Strategy	Year	Relevance to Pollinator Conservation & Urban Biodiversity
Vancouver Plan[122]	PRESENT	A long-term land use strategy prioritizing complete neighborhoods, green infrastructure, and climate resilience, ensuring nature-based solutions are central to development.
Vancouver Climate Change Adaptation Strategy[123]	2024-25	Incorporates climate risk assessments and nature-based solutions, such as pollinator-supportive green spaces, to mitigate extreme weather impacts.
Blue Green Systems Typology Study[124]	2024	Identifies and integrates water- and vegetation-based infrastructure to enhance stormwater management, urban cooling, and biodiversity corridors for pollinators.
Metro Vancouver Connectivity Report[125]	ONGOING	Maps ecological corridors to strengthen habitat connectivity, reducing fragmentation and ensuring pollinators can thrive across urban and suburban landscapes.

Policy/Strategy	Year	Relevance to Pollinator Conservation & Urban Biodiversity
Greenest City Action Plan[126]	2020	Promotes sustainable urban development with an emphasis on green infrastructure, tree planting, and native vegetation to support pollinator populations.
Rain City Strategy[127]	2019	Implements nature-based stormwater management, including bioswales and rain gardens, to create pollinator habitats while enhancing climate resilience.
Urban Forest Strategy[128]	2014	Aims to expand Vancouver's urban tree canopy, prioritizing biodiversity and pollinator-friendly tree species to support habitat connectivity.
Landscaping and Boulevard Planting Bylaws[129]	ONGOING	Encourages native planting in public streetscapes, allowing pollinator-friendly gardens in boulevards and residential frontages.

5.2 Policy Scan

5.3 Toronto Policy Analysis

5.3.1 Regulatory and Policy Approaches

Toronto's policies establish a robust legal framework governing both private and public landscaping and are anchored in the Planning Act and the Official Plan (OP). This regulatory approach facilitates urban growth and integrates essential ecological considerations into the planning processes. The Planning Act, which serves as a guiding principle for the OP, mandates that municipal policies align with provincial planning priorities. Notably, Section 2(a) of Ontario's Planning Act underscores the critical importance of protecting ecological systems, including natural features and their functions, thereby reinforcing the province's commitment to environmental sustainability. However, the success of this mandate hinges on effective implementation at the local level and the efficacy of enforcement mechanisms. While numerous regulatory tools exist, achieving meaningful ecological outcomes necessitates a concerted commitment from municipalities to embed ecological resilience into all forms of development.

The OP articulates the need for resilient infrastructure and socio-economic systems capable of withstanding disruptions caused by climate change. A fundamental aspect of this vision revolves around creating a cohesive network of natural features and ecological functions that support biodiversity and enrich the urban experience. Section 3.4.1(d) highlights the importance of preserving and expanding Toronto's urban forest through several key strategies: (i) cultivating optimal growing conditions for trees; (ii) increasing tree canopy coverage and enhancing species diversity — particularly with long-lived native and large shade trees; and (iii) establishing regulations to protect trees from damage and destruction. This reflects a broader trend in urban policy, which increasingly recognizes the value of green infrastructure for improving the quality of urban life. However, while these regulations focus on broader ecological health, they fail to address more specific, yet equally critical, aspects of biodiversity, such as pollinator habitats and corridors. The human-nature relationship, as reflected in these policies, remains somewhat disconnected when it comes to pollinators. While there is a growing recognition of the need for ecological resilience, the limited focus on pollinator pathways underscores the broader challenge of integrating human and ecological systems in urban landscapes. Pollinators, as essential agents of biodiversity, need designated spaces that go beyond mere aesthetic integration into urban planning.

Despite the OP's emphasis on ecological connectivity across public green spaces, it falls short in providing comprehensive policy support for fostering such connectivity on private lands. The current framework prioritizes visual aesthetics over the creation of ecological corridors that could substantially enhance city-wide biodiversity. Specific provisions aimed at supporting pollinator pathways or other natural features that connect fragmented habitats are notably absent. The human-nature relationship, when framed through the lens of pollinator conservation, highlights a disconnect between urban development that prioritizes human-centric goals, such as aesthetics and property maintenance, and the ecological needs of non-human species. Pollinators, whose presence is vital to the health of urban ecosystems, are left out of this picture. This oversight impedes the growth of ecologically beneficial vegetation but also restricts the potential for private lands to act as integral parts of Toronto's ecological network.

Furthermore, the enforcement and application of ecological initiatives at the local level, especially concerning private land management, often lacks clarity. Without more robust enforcement mechanisms and clearer guidelines for private landowners, the City's ambitious ecological objectives are challenging to achieve. This is especially relevant in the case of pollinator habitats, which require specific management techniques (planting native, pollinator-friendly species, rather than general regulations focused on visual neatness.) The human-nature relationship here is one of imbalanced priorities, where the aesthetic appeal of urban landscapes is often placed above theecological value that such spaces could provide.

Section 3.4.1(b) accentuates the urgency of protecting and restoring Toronto's natural ecosystems while enhancing biodiversity through targeted ecological improvements. This includes support of habitats for native flora and fauna, the improvement of water and sediment quality, and the protection of critical landforms such as ravines, waterways, wetlands, and shorelines. The policy also highlights the necessity of maintaining natural linkages between the city's heritage systems and other green spaces to promote and advance ecological connectivity. Yet, this framework's focus on larger-scale, natural landscapes overlooks the crucial role that smaller, more localized pollinator habitats play in sustaining biodiversity. The relationship between humans and nature, particularly in urban settings, could be more closely aligned with the needs of pollinators by fostering these small-scale, yet ecologically significant corridors.

Toronto's Municipal Code further governs private landscaping through Chapter 489, which outlines requirements for turfgrass maintenance and imposes restrictions on certain types of vegetative growth. Section 489-2 mandates that property owners or occupants keep turfgrass trimmed to no more than 20 centimeters in height, maintaining vegetation to prevent obstructions on sidewalks and roadways to ensure safety and visibility at intersections. While these regulations maintain urban landscapes and minimize hazards, they inadvertently suppress the growth of ecologically beneficial vegetation, including pollinator-friendly meadows and native plantings. The focus on turfgrass management and the prohibition of "local weeds," as delineated in Schedule A, effectively deter the establishment of native plants and other vegetation that could exacerbate biodiversity. This policy reflects a broader societal tendency to favor human-centric designs, such as neatly manicured lawns, over ecological considerations. The result is a diminished capacity for private landowners to contribute to pollinator habitat restoration, ultimately weakening Toronto's broader biodiversity goals. The tension here, again, is between human aesthetic preferences and the ecological necessity of fostering diverse plant species that support pollinators.

5.3.2 Biodiversity Corridors and Connectivity

Toronto's framework for promoting biodiversity and enhancing the resilience of its urban ecosystems is commendable, featuring policies that emphasize tree protection, ravine conservation, and the integration of green infrastructure. Toronto's Green Standards (TGS) protection policies — EC 1.1: Tree Protection, EC 1.2: Preservation of Mature Trees, EC 1.3: Ravine Protection, and EC 1.4: Street Tree Retention — are intentionally designed to regulate the injury, removal, or destruction of trees. Coupled with Municipal Code Chapter 652-2, which prohibits tree removal in protected areas without a permit, these measures clearly demonstrate Toronto's commitment to safeguarding its vital tree canopy. Furthermore, the Official Plan prioritizes the creation of optimal growing conditions for trees, the enhancement of canopy coverage, and the diversification of species, particularly native shade trees, thereby reinforcing the urban forests integrity. The emphasis on greening streets and parking lots through policies such as EC 2.3 and EC 2.4 reflects a strategic commitment to mitigating urban heat islands and fostering habitat connectivity.

However, despite the significance of these policies, they largely concentrate on specific urban landscapes — such as protected areas, streetscapes, and publicly accessible spaces — failing to address or apply to private property.

A glaring omission exists in the guidance available for incorporating diverse native vegetation beyond trees into private properties, industrial zones, and other urban environments that fall outside the purview of current tree protection and green infrastructure policies. For instance, while EC 2.6 and EC 2.7 advocate for increased tree planting, there remains a notable gap in addressing the broader spectrum of native plants, such as ground covers and shrubs, which are essential for supporting a wider array of wildlife, including
indispensable pollinators.

Toronto's Pollinator Strategy, which aims to promote pollinator-friendly green infrastructure through policies like 2.3. Expanding Pollinator Habitat on Green Roofs and 2.5. Integrating Pollinator Plants in Green Infrastructure Projects, represents a positive step forward. However, this focus is predominantly limited to public or semi-public spaces, such as green roofs and streetscapes, lacking sufficient consideration for private properties and areas beyond current green infrastructure projects. Given the substantial potential for enhancing biodiversity on private lands, there exists a significant opportunity to implement policies that mandate or incentivize the creation of pollinator habitats across these spaces. For instance, PollinateTO grants of up to $5,000 are available to support community-led projects that create new pollinator or rain gardens, expand existing gardens by adding native pollinator-friendly plants, or convert lawn areas, boulevards, or hard surfaces into pollinator habitats. Such initiatives not only empower local residents but could also encourage private landowners and developers to integrate pollinator-friendly plants and trees into their landscaping designs, facilitating connections between fragmented habitats across the City.

Another critical shortfall lies in the enforcement of existing policies. While the City has made strides in advocating for pollinator habitat creation and tree protection, these initiatives often rely on voluntary compliance or lack rigorous regulatory frameworks. Without stringent enforcement mechanisms or compelling incentives, developers, landowners, and other stakeholders may prioritize low-maintenance, non-native plantings or the removal of trees in favor of more cost-effective options, ultimately undermining the ecological benefits these policies were designed to achieve. Toronto's approach to ecological connectivity and resilience could be significantly strengthened. While green infrastructure policies, such as those promoting green roofs, bioswales, and rain gardens, encourage selected pollinator plantings, there is insufficient focus on creating expansive ecological corridors or pathways that interlink isolated green spaces and bolster biodiversity across the City. Policies designed to promote connectivity between existing green spaces, ravines, and tree canopies are crucial for sustaining species migration routes and ensuring the long-term viability of both plant and pollinator populations.

Additionally, it is essential to integrate climate change threats into biodiversity policies. While drought-resistant landscapes are recognized as a strategy for urban resilience, there is a pressing need to address the impacts of extreme weather events (flooding and heatwaves) on pollinator habitats and the overarching urban ecosystem. These events can destabilize urban green spaces, underscoring the importance of adaptive strategies that preserve biodiversity in a changing climate.

5.3.3 Green Infrastructure and Climate Adaptation

The policies designed to amplify Toronto';s green infrastructure and facilitate climate adaptation reflect a forward-thinking approach to addressing climate change through urban planning. Nevertheless, a thorough examination reveals that while the City has made noteworthy advancements in environmental initiatives, significant gaps remain in their implementation and integration.

A primary concern is the inconsistent application of these policies, especially in the private sector. Initiatives like Toronto Green Standards (TGS) AQ 4.2 Enhanced Urban Heat Island (UHI), 6 Non-roof Landscape, and 5.1 Green serve to effectively combat the UHI effect and promote sustainable building practices. However, these policies primarily target new developments or public projects while lacking robust enforcement mechanisms to encourage the adoption of similar strategies in existing private properties. Private landowners may see little incentive to invest in green roofs without mandates or support through policy measures, such as grants, tax rebates, or zoning requirements that encourage sustainable practices.

Additionally, while the preservation and expansion of Toronto's urban forest form a cornerstone of the City's climate adaptation strategy, current policies inadequately address the broader issue of urban tree health. Regulations such as TGS EC 1.4 Street Tree Retention, EC 2.2 Soil Volumes, and EC 2.3 Street Frontage Planting emphasize the critical role of trees in enhancing air quality and biodiversity. Yet, the effectiveness of these policies hinges on ensuring that trees have access to the necessary resources, particularly adequate soil volume and maintenance (Figure 5). Currently, guidelines concerning soil volumes and tree care are often poorly enforced, resulting in neglected trees that struggle to thrive in urban settings. Stricter standards regarding soil health and maintenance is essential, and private developers must be held accountable for providing trees with the requisite space and resources to flourish, thereby contributing meaningfully to the City's green infrastructure (Figure 5).

Figure 5. Urban development often leads to soil compaction, which reduces pore space necessary for root growth and water infiltration. This compaction results in poor gas exchange, causing carbon dioxide to accumulate and hindering root respiration and growth.

The disconnect between policy integration for public and private sectors is also evident in the realm of pollinator habitat creation. Policies like TGS EC 2.7 Enhanced Tree Planting and the development of pollinator pathways outlined in Toronto's Biodiversity Strategy (2.1) demonstrate the City's commitment to fostering biodiversity. However, these efforts are predominantly limited to public spaces, such as hydro corridors and green roofs, exerting little influence over private properties. Enforcing policies that either mandate or incentivize the establishment of pollinator-friendly habitats on private land is vital for realizing a network of interconnected pollinator pathways across the city. In the absence of such policies, these initiatives will remain fragmented and disconnected from the larger urban ecosystem.

A more comprehensive approach is needed to integrate green infrastructure, climate adaptation, and biodiversity strategies. Although Toronto's policies are praiseworthy, they would benefit from a cohesive framework that aligns green infrastructure goals with broader environmental and social objectives, including affordable housing, urban equity, and public health. By integrating these policies with city-building initiatives and ensuring that marginalized and vulnerable communities gain from green infrastructure investments, Toronto can cultivate more inclusive, sustainable, and resilient urban environments.

5.3.4 Public and Private Partnerships

The collaboration between public entities, private stakeholders, and community groups are vital for advancing pollinator-friendly initiatives in urban environments. Toronto's Biodiversity Strategy effectively aligns city-led actions with private sector engagement and community involvement, prioritizing the creation of dedicated pollinator habitats, educational outreach, and the integration of pollinator protection practices into urban landscapes. Toronto's Pollinator Strategy policy directives, including 2.1 Improving Habitat Connections and 2.2 Revitalizing Hydro Corridors into Pollinator Pathways, underscore the importance of uniting fragmented habitats. The partnership with the Toronto and Region Conservation Authority (TRCA) to transform hydro corridors into vibrant meadows marks a promising step forward in restoring ecological Connectivity.

However, despite these initiatives, there are significant shortcomings that hinder broader success, particularly in addressing the challenges posed by urban sprawl, zoning regulations, and the expansion of commercial and residential developments that threaten to fragment pollinator pathways. Extending these initiatives to encompass private developments, institutional landscapes, and underutilized public spaces is essential for fostering a truly integrated ecosystem. A critical policy gap exists in ensuring that new urban developments proactively incorporate pollinator-friendly measures instead of relying solely on retrofitting existing infrastructure.

While Toronto has signaled a commitment to enhancing public spaces as models for pollinator conservation. Through initiatives such as PollinateTO, which supports community-led pollinator gardens, and efforts like the Don Valley Ravine naturalization and High Park's meadow restoration, park maintenance practices often remain conventional and may not consistently reflect pollinator-friendly approaches. These naturalization efforts aim to improve habitat connectivity and biodiversity in certain green spaces, but there remains a gap between policy goals and the widespread adoption of pollinator-friendly practices across all city-managed parks. This underscores the need for clearer standards and more consistent application of such initiatives in public spaces city-wide. By collaborating with the City Council to identify at least one City-managed site in each ward for pollinator enhancement, the City sets a compelling example of commitment. The establishment of a pollinator demonstration garden at Toronto City Hall acts as a prominent model for citizens, sparking public interest in conservation. However, this initiative could greatly benefit from a deeper exploration of how public spaces are utilized by various communities. Some neighborhoods may be more receptive to educational outreach, necessitating targeted, community-specific engagement strategies. The creation of "pollinator patches" in City-managed urban

agriculture sites, such as community and allotment gardens, not only supports pollinators directly but also provides enriching educational opportunities for local residents. Yet, these public efforts may fail to reach marginalized communities with limited access to urban green spaces, revealing a potential policy gap in ensuring equitable access to pollinator-friendly programs across all of Toronto. Many private spaces continue to rely on traditional landscaping methods that can be harmful to pollinator populations.

The City's leadership in the public sector is supported by strategic partnerships with private entities, though the extent of these collaborations is still emerging. Engaging with organizations such as the Toronto Association of Business Improvement Areas (TABIA), property and rental associations, and condominium boards offers a promising avenue for fostering collaboration with large property owners. These partnerships could facilitate the establishment of pollinator habitats by encouraging the incorporation of native plantings into private landscaping, although specific examples of such initiatives are still in development. In the future, these collaborations could be instrumental in expanding pollinator-friendly practices across both public and private spaces in Toronto. While these efforts enhance the city's green infrastructure, they may overlook smaller property owners who lack the resources or knowledge to implement pollinator-friendly practices. In this context, policy gaps exist that could better support private property owners, particularly in high-density urban areas, to contribute meaningfully to pollinator protection. The absence of regulatory frameworks requiring pollinator-friendly practices on private properties may limit the broader adoption of these initiatives. Collaborations with organizations like Toronto Master Gardeners can offer property owners expert insights and inspiration for integrating pollinator-friendly practices into private spaces. However, it remains unclear whether these efforts are effectively reaching all demographics, especially those without the means to participate. While these organizations contribute to raising awareness, the impact on widespread adoption of ecological property management practices may be limited. Toronto's collaborations with local growers and nurseries are also critical in enhancing accessibility to native, pesticide-free plants for consumers. For example, the Toronto plant market is one of the first local markets to focus on genetically adapted local native species in sufficient supply, further supporting the city's efforts to promote biodiversity and sustainable landscaping practices. Additionally, the city has partnered with organizations like the Toronto and Region Conservation Authority to offer programs that provide native plants at discounted rates to residents, further encouraging the adoption of pollinator-friendly gardening practices. By partnering with these stakeholders, the City is promoting habitat creation in both private and public settings.

However, a significant gap exists in the availability and affordability of native plants in lower-income areas, highlighting the need for a broader shift in how we engage with these plants. It's not just about getting native plants into these spaces, but about changing our relationship with them. Native plants provide vital food and shelter for wild animals, and fostering an understanding of their ecological role is key to promoting a more sustainable and wildlife-friendly urban environment. Without targeted support to reduce costs or increase access to high-quality native plants, there is a risk that pollinator-friendly practices could become initiatives predominantly accessible to wealthier residents. This highlights the need for targeted policy interventions that ensure all Toronto residents, regardless of income, can access resources that empower them to create pollinator-friendly habitats.

5.3.5 Indigenous and Community-Led Approaches

The City's outreach efforts, within Toronto's Biodiversity Strategy. including the provision of valuable resources like pollinator-friendly gardening tips, plant lists, and seeds through initiatives such as Live Green Toronto and Community Environment Days, play a vital role in motivating residents to cultivate pollinator habitats on their private properties. Recognition signage, such as "Pollinators Are Welcome Here!" not only fosters community pride but also raises awareness about the essential role pollinators play in our ecosystems, inspiring individuals to take meaningful action in their yards and gardens. These initiatives also benefit from collaborations with local schools and the Toronto School Boards to establish teaching gardens, which serve as platforms for hands-on learning and habitat creation among youth. By incorporating Indigenous cultural content into its outreach programs, the City emphasizes the importance of culturally informed stewardship in pollinator protection. For example, initiatives may include workshops on Traditional Ecological Knowledge (TEK), guided medicine walks led by Indigenous knowledge holders, the planting of culturally significant species such as milkweed, sweetgrass, and sage, and the integration of Indigenous storytelling and teachings on the role of pollinators in ecological balance. Collaborations with Indigenous-led conservation groups, such as the Indigenous Land Stewardship Circle, further enrich these initiatives by centering Indigenous perspectives in urban biodiversity planning.

Toronto's proactive pursuit of external funding opportunities, including sponsorships and grants, ensures supplemental resources to support the pollinator strategy's implementation.

This synergy of public funding, private sector support, and external financial resources is essential for making the strategy both sustainable and scalable, thereby enhancing Toronto's ability to expand its pollinator protection efforts. The establishment of an Aboriginal Committee/Working Group to engage Indigenous communities in the strategy's execution represents a significant advance in embedding Indigenous knowledge into urban planning. This inclusion offers invaluable insights that inform the development of pollinator habitats across both public and private domains, promoting ecological practices that respect and honor cultural and ecological values. Despite these strengths, there are several critical policy gaps that should be addressed to further enhance the strategy. While bringing private landowners into the fold through partnerships with organizations like Toronto Master Gardeners, the strategy lacks strong financial or regulatory incentives to ensure that the creation of pollinator habitats on private properties become widespread. The introduction of tax rebates or expanded recognition, such as Pollinator-Friendly Property certification, could amplify the impact of pollinator conservation efforts. Building on programs like the Pollinator-Friendly Garden Certification by Pollinator Partnership and the Pollinator Habitat Certification by The Xerces Society, municipalities could expand these certifications to include a broader range of properties, such as businesses and schools. To make participation more accessible, cities could offer financial incentives, such as tax rebates or discounts on native plants through local garden centers. Additionally, incorporating pollinator habitat standards into urban planning for new developments would further institutionalize these practices, encouraging widespread adoption and fostering a culture of biodiversity conservation. Without formalized incentives, the program remains reliant on voluntary participation, thus limiting its scalability and long-term effectiveness.

Another area for improvement involves ensuring that Indigenous knowledge is not only consulted but truly integrated into urban planning processes. Although the establishment of the Aboriginal Committee is a positive development, a more structured collaboration with urban planners is necessary to embed Indigenous land stewardship practices — such as maintaining plant diversity — into the development of pollinator habitats. This integration would ensure that the city's planning processes reflect both traditional ecological knowledge and contemporary urban practices, fostering a more inclusive approach to habitat creation.

Moreover, while the city actively pursues external funding, reliance on grants can introduce financial uncertainty for long-term projects. Developing a more comprehensive funding model that combines public-private partnerships with dedicated government funding would bolster the financial sustainability of the pollinator protection strategy, ensuring its capacity to grow and adapt over time. Incorporating incentives for local businesses and developers to contribute to pollinator protection efforts could further enhance sustainability.

Additionally, a notable disconnect exists between the advice the city provides to homeowners regarding pollinator-friendly practices and how city staff maintain public parks and gardens. For example, while the City encourages homeowners to plant native species, reduce pesticide use, and create diverse habitats for pollinators, many public parks and gardens continue to feature non-native plants, highly manicured lawns, and reliance on pesticides. This discrepancy creates a gap between the City's messaging and the practices in public spaces, undermining efforts to foster pollinator-friendly environments across Toronto. The City's promotion of sustainable, biodiversity-supportive landscaping on private properties is not always mirrored in the design and maintenance of public spaces, leading to confusion among residents about the importance of pollinator-friendly landscaping and limiting the overall impact of conservation initiatives.

5.4 Vancouver Policy Analysis

5.4.1 Regulatory and Policy Approaches

Vancouver's regulatory framework marks a progressive move toward integrating ecological sustainability within urban planning; however, significant areas for improvement remains. The city's zoning regulations, urban forestry policies, and development guidelines do promote essential practices like tree retention, planting standards, and biodiversity integration, yet they frequently lack the enforceable mechanisms necessary to ensure long-term compliance. While the goal of increasing tree canopy cover to 30% by 2050 is commendable, the potential effectiveness of this policy may be compromised by the sluggish pace of implementation and the challenges associated with accurately measuring progress, particularly in densely developed urban areas.

Furthermore, the flexibility granted to property owners for tree removal under certain conditions, despite the requirement for compensatory planting, poses a risk to the integrity of the urban forest. This leeway can create loopholes that allow for excessive tree removal, especially if the compensation planting fails to recognize the broader ecological roles that mature trees play within the ecosystem. Additionally,

he spatial restrictions imposed on garden beds (limits on their size, placement, and design) may be overly prescriptive, potentially stifling innovative, community-led green Initiatives.

The integration of green infrastructure into building standards is a positive step forward; however, the absence of comprehensive city-wide guidelines for new developments could lead to inconsistent application, particularly in areas where real estate pressures are high. To truly foster ecological sustainability, it is essential that Vancouver develop more rigorous enforcement mechanisms and unified policies that not only support but also actively promote the long-term health of urban ecosystems. By addressing these critical gaps, Vancouver can enhance its commitment to sustainable urban development and environmental stewardship, ensuring that Vancouver remains a leader in ecological resilience.

5.4.2 Biodiversity Corridors and Connectivity

Vancouver's policies on ecological connectivity and green networks are vital for the conservation of urban biodiversity. These strategies aim to enhance the City's natural infrastructure through well-defined actions outlined in the Greenest City Action Plan. Key initiatives include the development of a new park at Yukon Street and 17th Avenue (5.1) and the acquisition of additional parkland along Cambie Street and the Fraser River (5.2), both of which significantly expand green spaces within the urban landscape. Moreover, the establishment of a new ten-hectare park system in East Fraserlands (5.3) further strengthens these important ecological corridors. Vancouver prioritizes urban forestry through extensive tree-planting efforts across private properties, streets, and parks (5.4), alongside the implementation of a comprehensive inventory system for trees on city land (5.5). Updates to tree management plans, planting standards, and best practices (5.6) are designed to ensure the long-term health and resilience of the urban forest. Additionally, the introduction of new policies and decision-making criteria to retain mature, healthy trees (5.7) underscores Vancouver's effort to ecological connectivity and biodiversity conservation.

Moreover, regulations that limit plant height and garden bed sizes — originally intended for visibility and safety — unintentionally restrict private land's capacity to bolster biodiversity. The city's regulations should strive for a balance between ecological enhancement and safety by offering zoning incentives or tax breaks to property owners who cultivate pollinator-friendly gardens or incorporate low-maintenance native plants. Expanding these allowances would significantly strengthen biodiversity corridors and enhance the urban green network across both public and private lands. Similarly, limitations on the height of raised garden beds could present a potential barrier to fully integrating private land use into broader urban sustainability efforts. These restrictions may limit the flexibility needed for property owners to create more diverse, functional gardens that contribute to urban biodiversity. Allowing for more flexibility in garden bed design could enable property owners to better align their private spaces with

broader sustainability goals, supporting pollinator habitats and enhancing green infrastructure. Public landscaping policies often prioritize uniformity, but private properties can serve as innovative testing grounds for urban agriculture and sustainable green infrastructure. By easing height restrictions and promoting strategies such as vertical farming, community gardens, and sustainable food production, Vancouver could enhance food security and climate resilience. Allowing taller raised beds and incorporating food production into residential zoning policies would broaden the benefits of urban planning beyond public spaces and empower community-driven sustainability initiatives.

Furthermore, Vancouver's climate adaptation policies and seismic risk reduction strategies primarily target public infrastructure, leaving private property under addressed. Retrofitting existing structures, promoting green building certifications, and implementing resilience measures on private land present significant opportunities for reducing environmental impact. Vancouver could motivate private property owners to adopt climate-adaptive strategies — such as green roofs, rain gardens, and permeable surfaces through a combination of financial incentives, building code revisions, and public-private partnership programs.

5.4.3 Green Infrastructure and Climate Adaptation

Vancouver's commitment to integrating green infrastructure into its climate adaptation strategies is commendable; however, significant policy gaps persist in ensuring these solutions are effectively applied across all areas of the city, particularly in underserved communities. Initiatives like the Strategic Retrofits Green Rainwater Infrastructure Program and the Blue-Green Systems Program showcase an innovative approach to climate adaptation, yet concerns remain about the equitable distribution of these vital resources. Low-income neighborhoods often encounter systemic barriers that hinder access to the benefits of green infrastructure, such as green roofs and rain gardens, primarily due to financial constraints and inadequate support for retrofitting existing systems.

While the city's focus on implementing permeable surfaces and enhancing stormwater management is crucial, these measures alone may prove insufficient in addressing the escalating frequency and severity of urban flooding driven by climate change. Furthermore, the current emphasis on tree management plans intended to bolster climate resilience overlooks the potential for more diverse, species-specific interventions that could enrich the city's biodiversity and enhance adaptability in the face of shifting climate conditions.

To foster meaningful resilience, Vancouver must undertake more targeted efforts to address the vulnerabilities faced by specific neighborhoods and incorporate a broader range of ecological solutions tailored to meet the unique environmental needs of various communities. By prioritizing inclusivity and diversity in its green infrastructure initiatives, the city can ensure that all residents benefit from enhanced climate resilience and environmental sustainability, ultimately paving the way for a more equitable future.

5.4.4 Public and Private Partnerships

The strategic expansion of tree planting across private properties, streets, and parks (5.4), coupled with the development of a comprehensive inventory system for trees on City land (5.5), is essential for achieving long-term urban sustainability goals, particularly in urban planning and public land management. These initiatives, when integrated with the creation of pollinator pathways, offer a unique opportunity to foster collaboration between public and private sectors, critical for nurturing a city that prioritizes both human and ecological health.

Public and private partnerships are pivotal in expanding tree planting efforts on public and private lands, vital for constructing a connected, green, and sustainable urban landscape. Urban trees offer a multitude of benefits, including improved air quality, the mitigation of urban heat islands, efficient stormwater management, and increased biodiversity. Strategic tree placement in urban environments facilitates the creation of pollinator pathways — continuous corridors that provide vital habitats for pollinators. Collaborations between municipal agencies, property owners, and environmental organizations can amplify the creation of these habitats, fostering greater ecological connectivity. By integrating pollinator-friendly plants alongside trees, cities can support diverse pollinator populations, enhancing biodiversity and contributing to broader sustainability objectives.

To maximize the impact of tree planting initiatives on private properties and public streetscapes, they must be thoughtfully integrated into urban planning policies. Urban planners can embed tree planting requirements into zoning codes, particularly within residential and commercial zones where significant canopy expansion is feasible. Collaborations with private developers, local businesses, and property owners are key to ensuring that these policies are effectively implemented, with incentives provided to integrate native, pollinator-supportive species into new developments. For example, Vancouver's Rainwater Strategy SPS-07 Streets and Public Spaces Adjacent to Schools Green Rainwater Infrastructure Retrofit Program serves as a model for how public-private partnerships can integrate green infrastructure, such as street trees, while also addressing pollinator needs. Expanding this initiative to create ecological corridors linking schools, parks, and communities could further strengthen the city's urban pollinator network.

Equity considerations must be central to these efforts. Wealthier neighborhoods often possess more resources for tree planting and green infrastructure, while low-income areas face significant barriers. Public-private partnerships, including collaboration with community-based organizations and local stakeholders, can bridge these disparities. By offering targeted incentives or grants to developers and property owners in underserved neighborhoods, these partnerships can promote tree planting and pollinator habitat creation in areas that need it most. Urban planners must ensure these initiatives are equitable, guaranteeing that vulnerable communities benefit from the environmental and health advantages of green infrastructure.

Establishing an accurate inventory system for trees on City land is crucial for informed urban planning and long-term forest management. This initiative should be supported by strong public-private partnerships, including collaborations with technology providers and community stakeholders. A GIS-based system tracking tree locations, species, and conditions, along with pollinator-friendly plantings, would provide valuable data for citywide policies on urban greening and biodiversity. Partnerships with local environmental organizations and community groups can further strengthen this system by incorporating citizen-driven monitoring and reporting features. These collaborations would enhance data accuracy and community engagement, ensuring that tree and pollinator data is consistently updated and accessible.

Ultimately, the success of these initiatives depends on ongoing partnerships between public agencies, private property owners, environmental organizations, and community members. Together, these stakeholders can ensure the development of a connected, sustainable urban landscape that supports both pollinators and human communities, fostering resilience in the face of urban challenges.

5.4.5 Indigenous and Community-Led Approaches

The Vancouver Rainwater Strategy and related planning documents compellingly advocate for the integration of **green rainwater infrastructure (GRI)**, pollinator pathways, and Indigenous knowledge into Vancouver's urban planning framework. It effectively highlights the interdependence of water management, ecological conservation, and reconciliation, while emphasizing the urgent need to ensure equity and accessibility in environmental initiatives. Furthermore, it recognizes the critical role of private landowners in conservation efforts and emphasizes community engagement and education as vital components in fostering ecological literacy. Despite these strengths, several significant gaps and contradictions require careful scrutiny to ensure that these initiatives translate into meaningful policies and actions.

Green-rainwater Infrastructure: Nature-based solutions and design practices that manage rainwater where it falls, mimicking natural water cycles. Instead of directing stormwater into pipes and sewers, GRI uses vegetation, soil, and permeable surfaces to slow, absorb, and filter runoff—reducing flooding, improving water quality, and providing co-benefits like biodiversity support and cooling.

One major shortcoming is the arbitrary implementation of policy mechanisms. While there is significant emphasis on the role of private landowners in conservation, no concrete strategies exist to guarantee their participation. Without clear mandates, incentives, or regulatory tools — including zoning reforms, tax incentives, or development charges — conservation goals risk being overshadowed by mounting urban development pressures. Moreover, institutional and bureaucratic barriers frequently obstruct Indigenous participation in municipal governance. Merely recognizing Indigenous knowledge without addressing these structural challenges can lead to symbolic gestures rather than genuine decision-making power for Indigenous communities.

Another critical gap lies in the tension between urban development pressures and conservation priorities. Striking a balance between economic demands—such as housing development and transportation infrastructure—and ecological preservation requires robust strategies that are currently lacking. For instance, Vancouver could adopt a net biodiversity gain approach, mandating that new developments contribute positively to ecological restoration. Additionally, integrating pollinator-friendly and water-sensitive urban design into affordable housing policies is crucial to preventing green infrastructure from exacerbating gentrification and displacement. Absent these strategies, conservation goals risk becoming secondary in the face of competing economic interests.

Moreover, there is a troubling lack of discussion regarding the monitoring and evaluation of these initiatives. There is no framework in place to assess the effectiveness of GRI and pollinator-friendly initiatives, nor is there clarity on the indicators to measure success in reconciliation, ecological connectivity, and climate resilience. Accountability measures must be embedded in these policies to track progress and ensure that initiatives do not remain theoretical. While concepts like pollinator pathways and urban biodiversity are highlighted, the broader climate adaptation functions of green infrastructure, such as heat mitigation, stormwater retention, and carbon sequestration, are insufficiently explored. Broadening the scope of climate adaptation beyond pollinators would significantly strengthen Vancouver's overall climate resilience efforts.

Although Vancouver is often positioned by the media as a leader in Indigenous collaboration, a critical examination of existing gaps is essential. A more nuanced discussion should evaluate whether reconciliation efforts are resulting in meaningful co-governance structures or merely yielding tokenistic gestures. Are Indigenous perspectives genuinely influencing decision-making, or are they acknowledged superficially. Addressing these concerns necessitates stronger commitments to Indigenous-led conservation initiatives, supported by governance reforms that ensure Indigenous communities play a central role in land-use planning.

To strengthen this approach, clear policy instruments must be proposed to encourage private landowners to actively engage in conservation efforts. This could include tax incentives for creating pollinator-friendly landscapes and mandating GRI adoption in new developments. Additionally, governance barriers must be addressed by identifying effective strategies for improving Indigenous co-management structures and establishing conflict resolution frameworks to safeguard ecological objectives from economic pressures. Furthermore, implementing robust accountability measures equipped with clear monitoring frameworks and defined metrics for biodiversity gains, community engagement, and Indigenous leadership would provide a concrete path Forward.

Expanding the discourse to incorporate broader climate adaptation perspectives, such as urban cooling and carbon sequestration, would also reinforce the ecological and climate resilience benefits of green infrastructure. By addressing these critical gaps, Vancouver's initiatives can evolve from general commitments into actionable policy solutions, thereby ensuring that the city's green infrastructure and ecological planning are both equitable and effective for all communities.

5.5 Conclusion: Reweaving the Pollinator-Human Relationship in Toronto

This research underscores the pivotal role that urban planning and policy play in creating environments where pollinators can thrive, focusing on the unique challenges and opportunities in waterfront cities like Vancouver and Toronto. These cities, where the majority of the population resides, offer significant potential to bridge the gap between human development and ecological health. The rationale behind this exploration lies in strengthening the connection between humans and pollinators, through strategic policy, enhanced ecological connectivity, and active community engagement. Vancouver and Toronto, each with their distinct policies and strategies, provide valuable lessons in advancing pollinator-friendly urban environments.

Key Takeaways and Insights:
Vancouver and Toronto have made progress in promoting biodiversity and climate goals, yet significant policy gaps persist. Vancouver's ambitious tree canopy and green infrastructure programs face challenges in implementation due to a lack of enforceable regulations, inconsistent application across public and private lands, and insufficient policies that engage the private sector. In Toronto, while the city has established tree protection measures, inconsistent enforcement across private properties, and gaps in policies regulating private land stewardship, create hurdles for advancing pollinator- friendly initiatives. Clearer, enforceable policies are crucial in both cities to ensure meaningful protection for pollinators.

Green infrastructure presents an effective solution to enhance climate resilience and support pollinator habitats, yet both cities would benefit from stronger integration of pollinator-friendly design principles in development guidelines. In Vancouver, the focus on urban green spaces and stormwater management could be expanded by integrating explicit pollinator habitat strategies into public works. Similarly, Toronto's policies could more deeply connect streetscape design, stormwater management, and green building standards to ecological goals, ensuring that green infrastructure serves a dual purpose of climate resilience and pollinator support.

Green Infrastructure

While both cities have made strides in fostering partnerships with community organizations and developers, these collaborations often lack the structural mechanisms necessary for sustained long-term impact. Vancouver's efforts to engage the private sector in pollinator initiatives could be bolstered by introducing zoning incentives, tax breaks, and dedicated funding streams. In Toronto, further collaboration with the private sector is needed to build a clear framework for implementing pollinator pathways in both new developments and retrofits. These incentives could include grants for native plantings, habitat restoration, and urban agriculture projects that enhance pollinator habitats.

Both cities acknowledge the importance of Indigenous knowledge in sustainability efforts, but there is significant potential to deepen the integration of Indigenous governance models in planning decisions. In Vancouver, the use of Traditional Ecological Knowledge (TEK) in ecological stewardship could be enhanced through co-governance models, ensuring that Indigenous communities are key players in pollinator pathway design and decision-making processes. Similarly, in Toronto, further engagement with Indigenous communities can help foster land stewardship practices rooted in ecological knowledge, ensuring pollinator pathways are culturally appropriate and environmentally beneficial.

Lesson 1: Strengthening the regulatory framework is essential to ensure private landowners contribute to ecological connectivity, whether through stricter regulations or clearer guidelines that align private spaces with public policies.

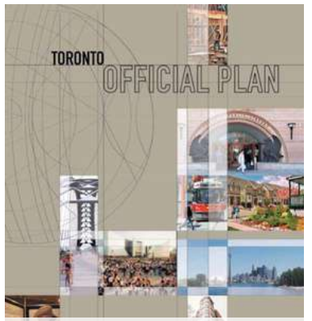
Lesson 2: Explicitly incorporating pollinator-friendly strategies into green infrastructure guidelines would allow both cities to leverage their existing infrastructure investments to support biodiversity.

Lesson 3: The formalization of public-private partnerships through clear incentives and funding mechanisms will be vital for expanding pollinator pathways in urban areas.

Lesson 4: Greater integration of Indigenous leadership and TEK into urban planning will help ensure that pollinator pathways are guided by the most knowledgeable custodians of the land, fostering deeper cultural and ecological connections.

Taken together, these insights demonstrate that advancing pollinator pathways in Vancouver and Toronto requires a fundamental shift in how urban planning is approached. Both cities must move beyond viewing private land as a separate entity and instead recognize it as an integral component of a broader ecological system. Planning for pollinators must be seen not only as biodiversity conservation but also as a critical aspects of climate resilience, community well-being, and social justice.

By aligning urban policies with ecological principles and fostering greater collaboration across sectors, Vancouver and Toronto have the opportunity to lead by example in sustainable urban planning. These cities can become models for others by recognizing pollinators as essential urban residents and embedding ecological goals in every aspect of planning, from green infrastructure to private land stewardship. Ultimately, this research reinforces the need for waterfront cities to prioritize pollinator pathways, recognizing that fostering these pathways is vital for both environmental sustainability and quality of life. The lessons from Vancouver and Toronto provide a roadmap for other municipalities, showing that balancing urban development with environmental stewardship is not only possible but essential for creating resilient, ecologically connected urban futures. The actions taken today to enhance pollinator habitats will shape more sustainable, biodiverse cities for generations to come.



Lesson One

Lesson Two

Lesson Three

Lesson Four

6. POLICY RECOMMENDATIONS

The policy scan identifies nine key policies, with 23 actions to enhance pollinator population, health, and landscape connectivity, while empowering public participation.

Policy 1: Revise Zoning Bylaws to Mandate a Minimum of 25% Native, Pollinator-Friendly Vegetation in New Private Developments

Policy Overview:
Zoning bylaws play a critical role that shape the built environment and nurture the connections between people and the ecosystems they inhabit. By mandating that at least 25% of land in new private developments be dedicated to native, pollinator-supportive vegetation, municipalities can foster more intimate, daily encounters with nature. This policy goes beyond biodiversity targets — it is about restoring sensory, emotional, and cultural relationships with the land in cities where such connections are increasingly fragmented.

Native plantings provide more than just food and habitat for pollinators. They introduce residents to seasonal change, support local identity and stewardship, and create opportunities for meaningful interaction with urban nature. Such integration transforms private yards, rooftops, and courtyards into shared ecological and experiential spaces.

Callout:
Mandating 25% native vegetation in new developments cultivates an urban fabric where people and pollinators thrive together. These spaces spark everyday moments of wonder — watching bees pollinate wildflowers, hearing birdsong, or feeling rooted through plant stewardship — that help rebuild a shared sense of place and responsibility toward nature.

Action	Timeline	Stakeholders	Metrics for Success
Action 1: Revise municipal zoning bylaws and site plan control regulations to require that a minimum of 25% of landscaped areas in new residential, commercial, and mixed-use developments be planted with regionally native species such as: ◦ Trees: Sugar Maple, White Oak ◦ Shrubs: Red-osier Dogwood ◦ Herbaceous Plants: Black-eyed Susan, Wild Bergamot	Short-term (0–6 months)	Urban planners, city council, developers, environmental advocates	% of new developments meeting the requirement
Action 2: Co-Create a Regionally Tailored Native Plant and Design Guide • Develop an illustrated, public-facing Native Plant and Landscape Design Guide to support compliance and inspire adoption. The guide will: ◦ Provide plant lists organized by sun/shade, soil, and water requirements ◦ Include planting templates for small lots, rain gardens, pollinator beds, and sensory gardens ◦ Highlight plants with Indigenous, cultural, and ecological significance	Medium-term (6–12 months)	Indigenous knowledge keepers, horticulturists, local artists, landscape designers	# of guides distributed; integration into development applications

Policy 2: Require Developers to Submit Pollinator-Focused Landscaping Plans as Part of Site Plan Approvals

Policy Overview:
As cities grow denser, site planning becomes a powerful act of storytelling — a chance to shape how spaces look and function, and how they feel and connect us to a place. By requiring pollinator-focused landscaping plans in all new developments, municipalities can reimagine private and semi-public outdoor spaces as bridges between people and nature. These plans provide opportunities to embed native plants into daily life, inviting pollinators and people into shared encounters within residential, commercial, and mixed-use landscapes.

Beyond listing plant species, these landscaping plans should illustrate a clear commitment to ecological reciprocity: including spatial layout for movement corridors, seasonal bloom sequences that cue the passage of time, and care practices that emphasize restraint and respect (e.g., no pesticides, staggered mowing). In doing so, development projects become more than buildings — they become habitats for co-existence and learning.

Callout:
Requiring pollinator landscaping plans transforms development from an extractive process into a regenerative one — one that sparks everyday moments of connection, awe, and care. These naturalized spaces allow children to chase butterflies, residents to watch goldenrod sway in late summer, and communities to rediscover their role in sustaining life.

Action	Timeline	Stakeholders	Metrics for Success

Action 3: Embed Pollinator-Focused Requirements into Site Plan Review Regulations
• **Update municipal site plan application guidelines to require pollinator-supportive landscaping plans that include:**
  ◦ A minimum of three native flowering species per season (spring, summer, fall)
  ◦ Host plants for butterflies (e.g., milkweed for monarchs)
  ◦ Habitat elements like:
■ Bare soil patches for ground-nesting bees
■ Bee hotels and wood/log features for cavity-nesting bees
■ Leaf litter zones and brush piles
■ Undisturbed buffer areas free from mowing or chemical inputs
• Integration with green infrastructure (e.g., bioswales, green roofs, rain gardens)
	Short-term (0–6 months)	Developers, municipal planners	% of new developments with pollinator plans

Action 4: Develop Visual Design Templates and Educational Tools
• Create illustrated templates and guides for developers, planners, and landscape architects that:
  ◦ Showcase small and large-scale pollinator garden layouts
  ◦ Emphasize multi-sensory value (e.g., fragrance, movement, colour)
  ◦ Provide species selection charts by soil, moisture, light, and pollinator type
  ◦ Include sections on maintenance (e.g., pruning, deadheading, seasonal care)
	Medium-term (6–12 months)	Environmental consultants, artists, Indigenous and local knowledge holders	# of guides distributed; inclusion rate in development proposals

Policy 3: Amend Property Maintenance Bylaws to Allow for Naturalized Landscapes[9] and Eliminate Turfgrass Mandates

Policy Overview:
Property maintenance standards shape how we define beauty, tidiness, and care in our everyday environments. Historically, these bylaws have privileged turfgrass — an ecologically barren, high-maintenance monoculture — as the standard of a "well-kept" yard. This policy proposes a shift: to make space for naturalized landscapes that reflect local ecologies, invite biodiversity, and rekindle relationships between people, place, and non-human life.

Amending maintenance bylaws to remove turfgrass requirements and explicitly permit native plants and pollinator-friendly designs opens the door to new ways of living with land. Naturalized yards become acts of quiet resistance and renewal—spaces where goldenrod replaces grass, milkweed supports monarchs, and neighbours reconnect through conversations sparked by wild beauty. This is not about neglect, but about redefining care: care for ecosystems, future generations, and the of the natural world.

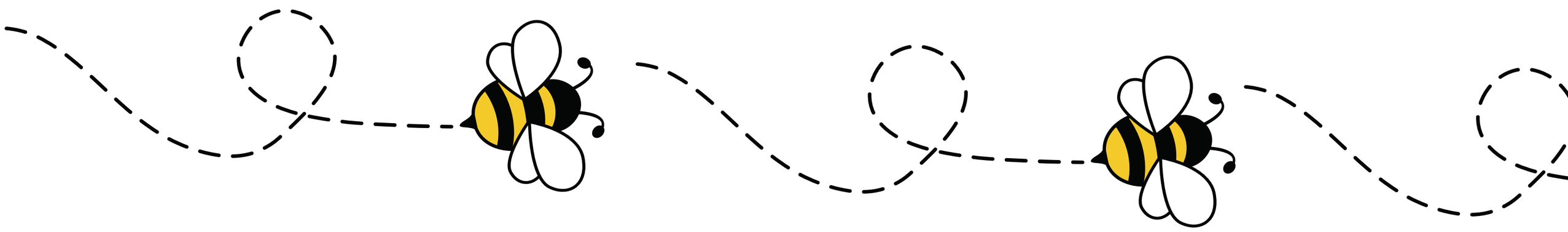
Callout:
By legitimizing naturalized yards in our bylaws, we affirm that nature belongs in cities and that our daily surroundings can be alive, responsive, and full of meaning. This change empowers residents to become stewards of the land, not just caretakers of appearances.

Action	Timeline	Stakeholders	Metrics for Success

Action 5: Amend Property Maintenance Bylaws
• Update municipal property maintenance bylaws to:
  ◦ Remove mandatory turfgrass requirements for front and back yards in residential, commercial, and institutional properties.
  ◦ Permit native and naturalized plantings (e.g., wildflowers, grasses, shrubs, and trees) as acceptable landscaping options in both front and back yards.
  ◦ Clarify that native plant gardens should be maintained in a manner that promotes ecological and aesthetic value, such as avoiding overgrowth or undesirable vegetation (e.g., invasive species).
	Short-term (0–6 months)	Municipal legal staff, environmental planners	# of bylaw amendments passed; % of residents aware of new allowances

Action 6: Launch Public Education Campaigns on Naturalized Landscaping
• Develop a comprehensive public education campaign to:
  ◦ Promote the ecological and aesthetic benefits of naturalized landscapes, highlighting how native plants support pollinators, conserve water, and reduce carbon footprints.
  ◦ Change perceptions of beauty by presenting naturalized landscapes as a desirable alternative to traditional lawns, emphasizing biodiversity, seasonal variety, and low-maintenance benefits.
  ◦ Partner with local media, influencers, and community groups to share success stories of residents who have transitioned to pollinator-friendly gardens.
	Medium-term (6–12 months)	Communications staff, environmental groups, artists	Campaign reach; changes in public perception via surveys

Action 7: Develop "Pollinator-Friendly Yard" Signage Program • **Create a Pollinator-Friendly Yard certification program to:** ◦ Offer "Pollinator-Friendly Yard" signage for residents and businesses that adopt naturalized landscaping practices, serving as both recognition and educational tools. ◦ Use signage to highlight native plants and habitat features such as butterfly host plants, bird baths, bee hotels, and seasonal flower displays. ◦ Encourage resident pride by promoting these gardens in the community and through online platforms to reduce neighbor complaints about non-traditional landscapes.	Medium-term (6–12 months)	Municipal offices, community groups, residents	# of signs distributed; complaint reduction metrics



Policy 4. Implement Tax Incentives or Development Charge Reductions for Pollinator Pathway Projects

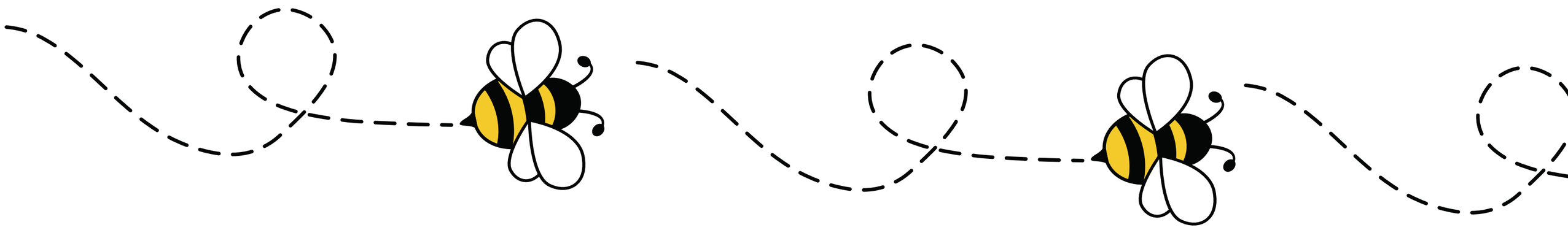
Policy Overview:
Financial incentives such as tax reductions or development charge cuts can encourage developers and property owners to integrate pollinator pathways into their projects. These pathways restore ecological connectivity across the city and foster deeper human-nature relationships by transforming urban spaces into shared habitats where pollinators and people thrive together.

When designed with intention, pollinator corridors serve as vibrant green threads weaving through neighborhoods — creating opportunities for residents to observe seasonal cycles, encounter biodiversity in their daily lives, and participate in nurturing ecosystems through stewardship and education. This policy recognizes that fostering ecological connection strengthens both environmental and social resilience.

Callout:
Tax incentives for pollinator pathways are not just about cost savings — they are invitations to reconnect with nature in the places we live and build. By supporting projects that restore habitat and beauty, cities empower people to co-create a more reciprocal and regenerative urban future.

Action	Timeline	Stakeholders	Metrics for Success
Action 8: Amend the municipal development charges by-law and relevant property tax codes to offer tiered incentives (e.g., 10–20% reduction in development charges or temporary tax abatements) for projects that meet specified pollinator habitat criteria, such as: • Minimum 50% native plant coverage • Inclusion of seasonal bloom variety (spring–fall) • No pesticide/herbicide use • Installation of habitat structures (e.g., bee hotels, undisturbed ground patches)	Short-term (0–6 months)	Municipal finance departments	% of projects incorporating pollinator pathways
Action 9: Publicize the program to developers, property owners, and residents through outreach emphasizing ecological and community benefits • Hosting developer-focused webinars on how to qualify • Distributing design guides and native planting templates • Collaborating with local Business Improvement Areas (BIAs) and real estate associations • Engaging the community through open houses and neighbourhood-level info sessions	Medium-term (6–12 months)	Developers, property owners, environmental NGOs	Number of developers utilizing incentives; engagement levels

Action 10: Track outcomes through mapping and monitoring of funded pathways to assess habitat connectivity, biodiversity impacts, and community engagement • Mapping all incentivized pollinator pathways using GIS • Partnering with local schools and NGOs to implement citizen science biodiversity counts • Measuring improvements in habitat connectivity and pollinator diversity over time • Encouraging residents to submit observations via apps like iNaturalist	Long-term (12+ months)	Urban ecologists, local schools, NGOs	% of new developments meeting the requirement



Policy 5: Mandate a Minimum Requirement for 50% Native Plant Coverage in New Developments and Major Redevelopments

Policy Overview:
Requiring that at least 50% of plantings in publicly accessible landscaped areas—such as courtyards, boulevards, plazas, and open spaces—consist of native species helps cities become living ecosystems once again. This policy ensures that urban developments not only meet aesthetic standards but also provide critical habitat and foraging resources for pollinators throughout the year.

Native plantings ground residents in a sense of place, reflecting the land's original character while reducing reliance on irrigation and synthetic inputs. By embedding native flora into the built environment, cities nurture biodiversity, deepen people's connection to the land, and create shared spaces where ecological and social resilience can take root.

Callout:
A 50% native plant requirement in public landscapes transforms urban development into a co-creative act—where humans and pollinators flourish side by side, and people rediscover a sense of rootedness in their environment.

Action	Timeline	Stakeholders	Metrics for Success
Action 11: Amend municipal bylaws to require that a minimum of 50% of landscaped areas in new developments and major redevelopments use native plant species. Applies to projects ≥1,000 m² of public space and enforced through site plan approval and occupancy permits.	Short-term (0–6 months)	Municipal planning staff, developers, landscape architects	% of projects meeting native plant coverage requirement
Action 12: Develop and distribute an illustrated native planting guide featuring regionally adapted species, pollinator benefits, and design templates tailored to site conditions. Include Indigenous plant knowledge and cultural symbolism.	Medium-term (6–12 months)	Horticulturists, Indigenous advisors, environmental NGOs	developers and residents using the guide
Action 13: Pair compliance monitoring with public education and community stewardship: signage, building certification, and "adopt-a-garden" programs run by schools and community groups.	Long-term (12+ months)	Municipal staff, community organizations, residents	Increase in pollinator presence, native plant diversity, and community participation

Policy 6: Promote and Support Existing Pollinator-Friendly Certification Programs

Policy Overview:
Municipalities can deepen pollinator awareness and habitat creation by promoting and integrating certification programs such as Bee City Canada, Monarch Waystations, Pollinator Pathways, and the Xerces Society's Pollinator Habitat Program. These programs offer standardized, science-based criteria that residents, businesses, and institutions can use to create recognized pollinator habitats.

Certification programs not only validate ecological action—they also cultivate a civic identity rooted in stewardship. Certified spaces act as living symbols of a city's commitment to biodiversity, while fostering public pride, education, and intergenerational learning opportunities in the process.

Callout:
Pollinator-friendly certification programs turn ecological stewardship into a shared civic identity — where developers, residents, and businesses work together to build cities that buzz with life and meaning.

Action	Timeline	Stakeholders	Metrics for Success
Action 14: Incentivize certification by integrating it into planning tools and financial programs. Offer expedited review for projects with certified pollinator-friendly spaces; incorporate certification into eligibility for Community Improvement Plans (CIPs), façade grants, or tax abatements.	Short-term (0–6 months)	Municipal planning staff, developers, environmental NGOs	Number of certified developments and businesses
Action 15: Co-develop seasonal engagement strategies, such as pollinator planting workshops, Monarch festivals, storytelling events, and community-led tours of certified sites. Provide branded signage kits co-designed with local artists.	Medium-term (6–12 months)	Municipal staff, community leaders, NGOs	Workshop participation rates, signage visibility, public feedback
Action 16: Amplify public visibility using municipal communications infrastructure: feature programs in newsletters, on transit ads, through city social media, and via open data maps. Create a "Pollinator Champions Map" to showcase certified projects.	Long-term (12+ months)	Communications staff, schools, libraries, environmental orgs	Growth in certified sites, increase in pollinator habitat coverage

Policy 7. Create Grant Programs for Property Owners to Develop Pollinator Habitats

Policy Overview:
Grant programs are essential to fostering a deeper connection between urban residents and the natural world. By providing property owners with financial resources to create pollinator habitats on private land, municipalities can empower individuals to become stewards of the ecosystems they inhabit. These grants can transform urban spaces into thriving, pollinator-friendly environments that reconnect people with the life cycles of bees, butterflies, and other essential species.

This initiative promotes a sense of shared responsibility and ownership, with the potential to generate a community-wide ripple effect. As property owners witness the ecological and aesthetic benefits of their gardens, they become active participants in sustaining biodiversity and reinforcing the value of green space in cities.

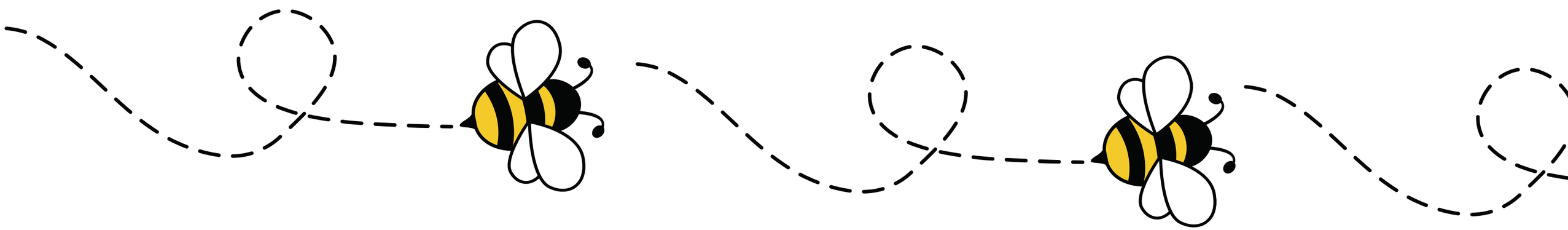
Callout:
Grant programs enable property owners to transform their land into pollinator sanctuaries, allowing them to become hands-on stewards of the ecosystem. These spaces serve as vital corridors for pollinators and offer both environmental and emotional rewards, fostering a stronger bond between people and nature.

Action	Timeline	Stakeholders	Metrics for Success

Action 17: Create a municipal grant program offering tiered funding amounts based on property type (e.g., residential, commercial, institutional, multi-unit). Eligible projects may include:
• Conversion of turfgrass to native pollinator gardens
• Installation of native plant hedgerows or rain gardens
• Green roof retrofits with pollinator habitat
• Bee hotels or monarch host plant beds
• Grant tiers example:
  ◦ Up to $1,000 for single-family homes
  ◦ Up to $5,000 for small businesses or multi-unit dwellings
  ◦ Up to $10,000 for institutions or commercial retrofits
	Short-term (0–6 months)	Municipal government, environmental NGOs, property owners	Number of grants awarded; geographic distribution of projects

Action 18: Establish clear funding guidelines that prioritize: • Use of native, locally adapted plant • Minimum maintenance plans (2+ years) • Design diversity (bloom time succession, nesting materials) • Ecological co-benefits (e.g., water infiltration, air quality improvements)	Medium-term (6–12 months)	Municipal planners, property owners, environmental consultants	Number of long-term maintenance contracts; longevity of habitats

Action 19: Conduct follow-up visits or virtual assessments at 6, 12, and 24 months. Provide technical support for: • Identifying issues (e.g., invasive species, plant loss) • Replanting or retrofitting where needed • Tracking biodiversity indicators (e.g., bee counts, bloom density)	Medium-term (6–12 months)	Municipal government, environmental groups	Number of follow-ups completed; improvements in pollinator populations
Action 20: Use results to iterate and scale the program: • Analyze monitoring data annually to adjust eligibility criteria and support underserved areas or species • Highlight pollinator champions and best-practice designs • Integrate program into permanent community improvement funding streams • Create an annual report card on performance, outcomes, and lessons learned	Long-term (12+ months)	Municipal government, environmental organizations, property owners	Improved biodiversity and ecosystem health; expanded program reach



Policy 8. Encourage Pollinator Habitat Creation in Mixed-Use Developments

Policy Overview:
Mixed-use developments present an important opportunity to integrate nature into dense urban environments. Encouraging pollinator habitat creation within these developments can help stitch together fragmented green spaces and enhance ecological connectivity in the city's core. Whether through green roofs, native plant landscaping, or pollinator gardens in shared courtyards and rooftops, these elements can transform sterile urban surfaces into life-supporting habitats.

By embedding pollinator-supportive design into mixed-use projects, municipalities can align private development with public sustainability goals. This approach also enhances livability, aesthetic appeal, and wellbeing for residents, visitors, and tenants alike—while providing food, shelter, and foraging opportunities for native bees, butterflies, and other pollinators.

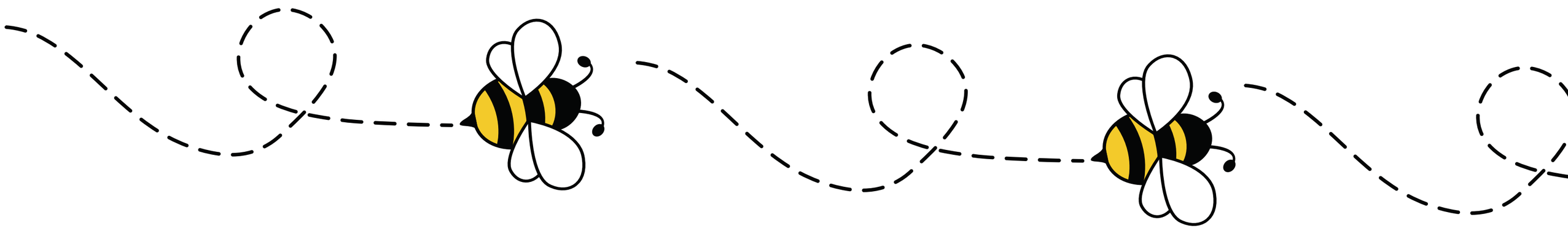
Callout:
Integrating pollinator habitats into mixed-use developments brings life to urban density — supporting biodiversity while creating inviting, green spaces for people and pollinators to thrive side by side.

Action	Timeline	Stakeholders	Metrics for Success

Action 21: Update development application requirements to include pollinator habitat plans for all new mixed-use projects
• Require site plans to identify pollinator-friendly elements such as:
  ◦ Native planting on rooftops, balconies, and shared green space
  ◦ Bloom succession and nesting materials
  ◦ Integrated stormwater features like rain gardens
• Encourage alignment with existing green standards (e.g., Toronto Green Standard)
	Short-term (0–6 months)	Municipal planners, developers, architects, landscape consultants	Number of projects integrating pollinator habitat plans; habitat square footage created

Action 22: Offer density or design incentives for developments that exceed minimum habitat requirements • Incentivize innovation in pollinator habitat design through bonus density, reduced fees, or expedited approvals • Prioritize developments in habitat-scarce urban districts	Medium-term (6–12 months)	Planning departments, municipal councils, developers	Number of projects using incentives; improved biodiversity in high-density areas

Action 23: Develop a recognition program for exemplary pollinator-supportive developments • Highlight projects that demonstrate innovation and biodiversity benefits • Promote through public signage, municipal websites, and planning awards • Encourage peer learning and best practice sharing among developers	Medium-term (6–12 months)	Municipal staff, industry associations, design professionals	Number of recognized projects; increased developer participation in habitat creation
Action 24: Monitor and evaluate habitat success in mixed-use contexts • Track indicators such as plant health, pollinator presence, and community use • Use findings to refine policies and design standards • Publish case studies to inspire replication and continuous improvement	Long-term (12+ months)	Municipal planners, ecologists, community stakeholders	Ecological performance metrics; replication of habitat features in future developments



Policy 9. Support the Integration of Culturally Significant Plants into Urban Landscaping Efforts

Policy Overview:
Integrating culturally significant plants into urban landscapes fosters a deeper connection between communities and the natural environment. For many Indigenous and cultural communities, plants are more than aesthetic choices — they carry meaning, memory, and ceremony. By making space for these plants in urban environments, cities can support ecological sustainability while honoring cultural knowledge, strengthening identity, and promoting inclusivity in public space.

This approach also contributes to urban biodiversity and climate resilience, offering ecological co-benefits through native species that support pollinators and wildlife. Embedding cultural narratives into the urban fabric creates more welcoming, representative spaces that reflect the histories and values of those who call the city home.

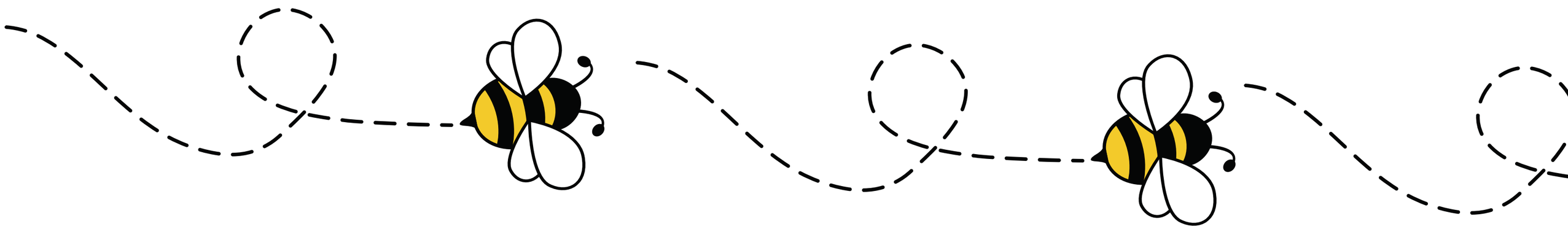
Callout:
Integrating culturally significant plants into urban landscaping not only celebrates cultural heritage but also fosters a meaningful human-nature connection. These plants provide opportunities for community engagement, learning, and environmental stewardship, helping people form a deeper bond with their surroundings.

Action	Timeline	Stakeholders	Metrics for Success

Action 25: Establish formal partnerships with Indigenous Nations and cultural organizations
• Convene a Cultural Plant Advisory Circle co-led by local Indigenous Nations (e.g., Mississaugas of the Credit, Huron-Wendat, Haudenosaunee) and cultural groups to:
  ◦ Identify culturally significant native plants
  ◦ Provide stewardship and planting guidance
  ◦ Ensure reciprocal relationships and decision-making authority
	Short-term (0–6 months)	Indigenous communities, cultural organizations	Number of plants integrated; public engagement levels

Action 26: Co-develop educational resources and public programming
• Create multilingual and culturally sensitive materials covering:
  ◦ Plant histories and ceremonial uses (e.g., sweetgrass, cedar)
  ◦ Stories from Elders and Knowledge Keepers
  ◦ Ecological roles (e.g., pollinator support, water retention)
• Deliver programs such as:
  ◦ Seasonal planting workshops
  ◦ Interpretive signage with Indigenous languages
  ◦ QR codes linking to digital stories
  ◦ School modules developed with educators
	Medium-term (6–12 months)	Indigenous communities, cultural organizations	Number of plants integrated; public engagement levels

Action 27: Embed learnings into long-term municipal policies and design guidelines
• Use pilot project insights and Advisory Circle recommendations to:
  ◦ Update planting guidelines to include culturally significant species
  ◦ Integrate cultural plant zones into streetscape manuals and infrastructure projects
  ◦ Require cultural engagement checklists in public realm design processes
	Long-term (12+ months)	Municipal governments, cultural organizations, community members	Number of successful pilot projects; community involvement in planting and stewardship



7. CONCLUSION: PRIVATE LANDS, PUBLIC RESPONSIBILITY

Urban pollinator biodiversity stands at a critical juncture, its future shaped by the policies that govern the spaces where the built environment meets nature. This research has highlighted both the strides made and the regulatory gaps that remain in cities like Toronto and Vancouver. While some municipalities have taken important steps toward pollinator-friendly practices, a fragmented and inconsistent policy landscape continues to limit the full potential of urban pollinator recovery.
To ensure meaningful and lasting change, municipalities must act with intention and resolve, embedding pollinator-supportive practices into the regulatory frameworks that shape private land use. From zoning and development approvals to financial incentives and public engagement strategies, a coordinated approach can transform private properties into vital ecological assets. The recommendations outlined in this study provide a roadmap for municipalities to take decisive action at every stage of the policy-making process.

Short-Term Priorities: Laying the Foundation for Pollinator Recovery

In the immediate term, municipalities must focus on removing policy barriers that prevent pollinator-friendly landscapes from flourishing on private lands. Outdated property maintenance bylaws that mandate turfgrass monocultures should be amended to explicitly allow for naturalized gardens and native plantings. Developers should be required to submit pollinator-focused landscaping plans as part of site plan approvals, ensuring that new private developments contribute to biodiversity rather than diminish it. Financial incentives, such as grants and tax reductions, can help accelerate the adoption of pollinator-friendly practices. Municipalities should create targeted grant programs to assist property owners in establishing and maintaining pollinator habitats, ensuring that financial constraints do not hinder participation. Collaborative efforts with Bee City Canada and Monarch Waystations can continue to promote certification programs that encourage landowners to integrate native plants, improve pollinator connectivity, and engage in long-term stewardship.

Public education efforts must complement these policy changes, shifting perceptions around naturalized landscapes and pollinator conservation. Many residents still associate native plant gardens with neglect rather than ecological value, making strategic engagement essential. Municipalities can launch “Pollinator-Friendly Yard” certification programs, similar to the David Suzuki Foundation’s Butterflyway Project, to recognize and celebrate homeowners who create pollinator habitats. Demonstration

gardens in public spaces (parks and community centers) can showcase the beauty and benefits of native plants, reinforced by interpretive signage. To further drive adoption, workshops and training programs can equip homeowners, landscapers, and developers with the knowledge to integrate pollinator-friendly practices. Public awareness can also be heightened through seasonal pollinator festivals, seed swaps, and guided garden tours, making conservation efforts interactive and accessible. Online resources and social media campaigns like interactive pollinator pathway maps, planting guides, and transformation success stories can extend outreach to a broader audience. Schools can play a vital role by incorporating pollinator education into curricula, fostering early stewardship through habitat projects and citizen science initiatives. To challenge lingering misconceptions, myth-busting campaigns can reframe naturalized lawns as valuable ecological assets rather than signs of neglect. By combining these initiatives, municipalities can cultivate widespread support, ensuring that pollinator-friendly policies are embraced and sustained across private spaces.

Medium-Term Priorities: Strengthening Connectivity Across the Urban Landscape

Rather than focusing solely on individual property-level changes, cities must embrace a more comprehensive approach to pollinator recovery by improving habitat connectivity. Pollinator pathways — stitched together through private yards, commercial spaces, and underutilized green infrastructure — must be formally integrated into municipal planning frameworks. Zoning bylaws should mandate a minimum percentage of native, pollinator-friendly vegetation in new developments to ensure consistency across private landscapes.

Incentivizing mixed-use developments to incorporate pollinator gardens in commercial and residential areas will also play a critical role in habitat expansion. These spaces serve as crucial ecological stepping stones, linking fragmented pollinator populations and creating corridors that allow species to move freely throughout the urban environment.

Collaboration with large institutional landholders (universities, hospitals, corporate campuses) can significantly expand the reach of pollinator-friendly landscapes. By offering financial incentives and technical guidance, municipalities can transform these high-impact properties into keystone sites for urban biodiversity.

Long-Term Priorities: Embedding Pollinator Recovery into Climate Resilience Planning

Looking ahead, municipalities must position pollinator recovery as a core element of broader climate adaptation strategies. Integrating pollinator-friendly plantings into stormwater management systems (bioswales, rain gardens, permeable green spaces) will enhance both biodiversity and urban resilience to extreme weather events. Green roofs and living walls can provide additional habitat, particularly in dense urban areas where ground-level plantings may be limited.

At a regional scale, policy harmonization is essential. By aligning pollinator-supportive bylaws and incentive structures across municipalities, cities can create a more cohesive and effective approach to urban biodiversity management. Advances in ecological monitoring technology, including remote sensing and community-led biodiversity tracking, can provide municipalities with the data needed to refine policies and measure long-term progress.

The Path Forward: A Shared Responsibility

The future of urban pollinator biodiversity depends on a collective commitment to integrating nature into our cities. By embedding pollinator recovery into municipal policies, incentivizing private landowners, and fostering cross-sector collaboration, municipalities can create landscapes that not only sustain pollinators but also enhance urban livability and resilience.

Private lands may be individually owned, but their ecological value extends far beyond property boundaries. The responsibility to restore pollinator habitats is shared by policymakers, developers, businesses, institutions, and residents alike. The policies outlined in this research offer a framework for cities to take action — turning fragmented efforts into a unified movement for urban biodiversity restoration.

By embracing these strategies, municipalities can transform the urban landscape into a thriving, interconnected ecosystem — one where pollinators, people, and nature coexist in harmony for generations to come.

Appendix

The policy scan identifies nine key policies, with 23 actions to enhance pollinator population, health, and landscape connectivity, while empowering public participation.

City/Location	Policy Document	Policy	Private	Both	Public	Theme
Toronto, ON	Toronto Green Standards	AQ 4.2 Enhanced UHI, Non-roof landscape	☐	☑	☐	Green Infrastructure and Climate ...
		5.1 Green & Cool Roofs	☐	☑	☐	Green Infrastructure and Climate ...
		EC 1.1 Tree Protection	☐	☑	☐	Biodiversity Corridors and Connec...
		EC 1.2 Preservation of mature trees	☐	☐	☑	Biodiversity Corridors and Connec...
		EC 1.3 Ravine Protection	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec...
		EC 1.4 Street tree retention	☐	☑	☐	Green Infrastructure and Climate ... Biodiversity Corridors and Connec...
		EC 2.1 Tree Planting	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec...
		EC 2.2 Soil Volumes	☐	☑	☐	Green Infrastructure and Climate ...
		EC 2.3 Trees along street frontages	☑	☐	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		EC 2.4 Trees in parking lots	☑	☐	☐	Green Infrastructure and Climate ... Biodiversity Corridors and Connec...
		EC 2.6 Enhanced trees in parking lots	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		EC 2.7 Enhanced tree planting	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		4.1 WQ Drought-tolerant landscapes	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Parks and Recreation Facilites Master Plan	Sustainability: Incorporating environmentally friendly practices in the development and operation of facilities to promote long-term ecological balance.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		#58 Update the Parks and Recreation Facilities Master Plan every five years, aligning with related initatives (e.g. Parks and Recreation Service Plans, Parkland Strategy, Ravine Strategy, Ravine Strategy, etc) and Planning Studies	☐	☐	☑	Regulatory and Policy Approaches
		#61 Establish guidelines for engaging residents, stakeholders, and City Staff in the planning of local parks. and recreation facilities.	☐	☐	☑	Public and Private Partnerships
		Embed existing policies and standards into facility design and development processes, including responses to climate change change, environmental sustainability, energy conservation, accessibility, etc.	☐	☑	☐	Regulatory and Policy Approaches

	Chapter 658, Ravine and Natural Feature Protection	652-2.A No person shall injure, destroy, remove or permit the injury, destruction or removal of any tree on any land in a protected area, unless authorized by permit to do so.	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec...
	The Green Streets Technical Guidelines	1. Seek ways to incorporate and provide healthy growing conditions for trees and/or landscaping to improve air quality, mitigate urban heating island effect, enhance ecosystem health, and contribute to community character.	☐	☑	☐	Regulatory and Policy Approaches
		7.2 - frontage zones, planting and furnishing zones, curbsides, median or raised islands	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Toronto's Official Plan	Infrastuture and socio-economic systems that are resilient to disruptions and climate change	☐	☑	☐	Green Infrastructure and Climate ...
		A connected system of natural features and ecological functions that support biodiversity and contribute to civic life.	☐	☑	☐	
		3.4.1(d). identifies the need for preserving and enhancing the urban forest by: i) providing suitable growing environments for trees, ii) increasing tree canopy coverage and diversity, especially of long-lived native and larger shade trees; and iii) regulating the injury and destructive of trees.	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		3.4.1(b) identifies the importance of protecting and restoring the health and integrity of the natural ecosystem, supporting bio-diversity in the city, and targeting ecological improvements, paying particular to: i) habitat for native flora and fauna and aquatic species; ii) water and sediment quality; iii) landforms, ravines, watercourses, wetlands and shoreline and associated biophysical processes; and natural linkages between the natural heritage system and other green spaces.	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Toronto's Pollinator Protection Strategy	1.1 Plant more pollinator-friendly native plants, trees, and shrubs in City Parks and facilities, with the goal of creating pollinator habitat in every park, where feasible.	☐	☐	☑	Regulatory and Policy Approaches
		1.2 Work with members of City Council to identify at least on City-managed site in each ward that can be enhanced for pollinators and serve as a model garden, and establish a pollinator demonstration garden at Toronto City Hall	☐	☐	☑	Regulatory and Policy Approaches Public and Private Partnerships
		1.3 Create "pollinator patches" at urban agriculture sites managed by the City by incorporating pollinator-friendly native plants into community gardens and allotment gardens.	☐	☐	☑	Public and Private Partnerships Regulatory and Policy Approaches
		1.4 Work with Solid Waste Management Services to identify City-owned closed landfill sites that may have the potential to become high quality pollinator habitat,	☐	☐	☑	Regulatory and Policy Approaches
		1.5 Review the City's landscaping practices, including mowing and mulching activities, with the goal to preserve pollinator habitat.	☐	☐	☑	Public and Private Partnerships Regulatory and Policy Approaches
		2.1 Identify opportunities to improve connections between exisiting habitat, and encourage the creation of "pollinator pathways" to foster corridor creation across the City.	☐	☐	☑	Regulatory and Policy Approaches Public and Private Partnerships Green Infrastructure and Climate ... Biodiversity Corridors and Connec...
		2.2 Continue to support the work of the TRCA to revitlize hydro corridor space in Toronto and transform it into high functioning meadow habitat that supports pollinators, by contributing staff time and exploring funding requiremenrts needed to advance these efforts.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships Green Infrastructure and Climate ... Biodiversity Corridors and Connec...
		2.3 Enhance area of the City Hall podium green roof with pollinator habitat, where possible, accompanied by educational signage, to demonstrate the role green roofs play in pollinator habitat and corridor creation.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships Biodiversity Corridors and Connec...
		2.4 Engage with developers, property owners and landscape architects to encourage the creation of pollinator-friendly landscapes and promote biodiverse, pollinator-friendly green roofs, by updating information in the City's Guidelines for Biodiverse Green Roofs and by offering support through the City's existing Eco-Roof Incentive Program.	☐	☑	☐	Public and Private Partnerships Biodiversity Corridors and Connec...
		2.5 Work with relevant City divisions to ensure native, pollinator-friendly plants are considered in the implementation of green infrastructure projects undertaken by the City, and included in City guidelines such as the Green Streets Technical Guidelines, Complete Street Guidelines, the Toronto Green Standard, the Wet Weather Flow Master Plan and Policy, Greening Surface Parking Lots, Streetscape Manual and other relevant policies.	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec...
		3.1 Engage with the Toronto Association of Business Improvement Areas (TABIA), property and rental associations, condominium boards, faith groups and other large property owners to encourage the creation of pollinator habitat through native plantings.	☑	☐	☐	Public and Private Partnerships Biodiversity Corridors and Connec...
		3.2 Partner with Toronto Master Gardeners, Landscape Ontario and horticultural and				

City/Location	Policy Document	Policy	Private	Both	Public	Theme
		3.3 Continue to work with local growers and nurseries to encourage them to provide native, pesticide-free plant material and seeds for pollinator habitat, and explore ways to make these items easier for consumers to identify in stores.	☐	☐	☑	Public and Private Partnerships
		3.4 Support university and college-led research and monitoring projects, and citizen science initiatives that support the goals of this Strategy, and provide data to track and measure the success of implementing the actions in the Strategy.	☐	☑	☐	Public and Private Partnerships Indigenous and Community-Led A...
		3.5 Convene an Aboriginal Committee/Working Group to provide ongoing feedback on the incorporation of Indigenous knowledge, practices, and approaches into the implementation of the Strategy.	☐	☐	☑	Public and Private Partnerships Indigenous and Community-Led A...
		3.6 Continue to coordinate with the Province of Ontario on the Pollinator Health Action Plan, and the Provincial Apiarist on the Ontario Bees Act.	☐	☐	☑	Public and Private Partnerships
		4.1 Develop and seek funding sources for an incentive program that provides modest financial support to encourage community-led pollinator habitat creation or enhancement, and pollinator education initiatives.	☐	☑	☐	Indigenous and Community-Led A...
		4.2 Explore the creation of a City procurement policy to purchase more pollinator-friendly native plants, and to select plants and seeds that have not been treated with systemic pesticides (e.g. neonicotinoids) for use in City-managed spaces, and incorporate these guidelines into tender documents for all City divisions.	☐	☐	☑	Regulatory and Policy Approaches
		4.3 Inspire residents to create pollinator habitat by offering resources such as pollinator-friendly gardening tips, plant lists, seeds, and recognition signage (e.g. Pollinators Are Welcome Here!) through Community Environment Days and Live Green Toronto outreach events.	☐	☐	☑	Public and Private Partnerships Indigenous and Community-Led A...
		4.4 Update the City's Street Tree brochure to include information on how trees benefit pollinators, and identify which trees are pollinator-friendly.	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		4.5 Seek sponsorships, grant and external funding opportunities to support the actions presented in this Strategy.	☐	☑	☐	Public and Private Partnerships
		5.1 Develop pollinator-friendly gardening practices tips and share lists of pollinator-friendly native plants, trees and shrubs suited to the Toronto area.	☐	☐	☑	Biodiversity Corridors and Connec... Public and Private Partnerships Indigenous and Community-Led A...
		5.2 Work with Live Green Toronto to develop and deliver outreach on pollinator stewardship, and look for opportunities to incorporate Indigenous cultural content into educational initiatives.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships
		5.3 Engage with Toronto School Boards to encourage schools to create pollinator habitat, with the goal of creating a teaching garden at every school, and investigate support for ongoing garden maintenance.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships
		5.4 Continue and expand training for City staff on pollinator protection practices through the Horticulture Program of Excellence and identify pollinator-friendly native plants on the plant list available to City horticulture staff.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships

		5.5 Collaborate with the Ontario Beekeepers' Association, Toronto-based beekeeping groups, and the Provincial Apiarist to facilitate informed beekeeping in Toronto by creating best practices, promoting training for novice beekeepers, and educating potential beekeepers about habitat creation as a more effective way to help pollinators.	☐	☑	☐	Indigenous and Community-Led A... Public and Private Partnerships
		6.1 Celebrate and promote National Pollinator Week and Toronto's status as the first Bee City in Canada by undertaking at least one public education and/or habitat creation or restoration activity each year.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships
		6.2 Work with relevant partners such as Canadian Wildlife Federation, Monarch Watch, Pollinator Partnership, World Wildlife Fund, Carolinian Canada, and others to promote existing certification programs, mapping tools and other resources that guide and recognize Toronto property owners in creating pollinator habitat.	☐	☑	☐	Indigenous and Community-Led A...
		6.3 Add a pollinator-friendly garden category to the City's existing Garden Awards program, and inspire others by offering in person and virtual tours of award-winning gardens.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships
		6.4 Investigate the opportunity to incorporate pollinator protection initiatives into the City's existing Urban Design Awards.	☐	☐	☑	Indigenous and Community-Led A... Public and Private Partnerships Regulatory and Policy Approaches
	Toronto's Strategic Forest Management Plan	Toronto's diverse urban forest is the vital geen infrastuture that creates healthy neighbourhoods, supports habitat and biodiversity, promotes clean air and water, offers opportunities for recreation and education, fosters economic prosperity and enhances quality of life for everyone in the city.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Regulatory and Policy Approaches
		Guiding Plans + Strategies: 1) Toronto's Wet Weather Flow Master Plan 2) Climate Change, Clean Air and Sustainable Energy Plan 3) The Climate Change Adaptation Strategy	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	The Planning Act	Section 2 (a) The protection of ecological systems including natural areas, features and functions.	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Provincial Policy Statement	2.1 2. the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored, or where possible, improved, recognizing linkages between and amount	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...

	Toronto's Biodiversity Strategy	Identify and protect areas critical for biodiversity through official designations and appropriate management practices.	☐	☐	☑	Regulatory and Policy Approaches
		Continue and enhance efforts to control invasive species that threaten local ecosystems.	☐	☐	☑	Biodiversity Corridors and Connec...
		Undertake projects to restore and expand habitats, such as wetlands and forests, to support diverse species.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		Encourage the use of indigenous plants in public and private spaces to strengthen local ecosystems.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
		Incorporate natural elements like green roofs and rain gardens into urban planning to support biodiversity.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		Create and enforce regulations that facilitate the inclusion of biodiversity considerations in all city planning and development processes.	☐	☐	☑	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		Encourage residents to engage in biodiversity initiatives through stewardship programs and citizen science projects.	☐	☑	☐	Indigenous and Community-Led A...
		Develop educational campaigns and materials to raise awareness about the importance of biodiversity and how individuals can contribute to its preservation.	☐	☑	☐	Public and Private Partnerships Indigenous and Community-Led A...
	Toronto Ravine Strategy	Create a dedicated team within the city's administration to oversee the implementation of the Ravine Strategy and coordinate efforts across departments.	☐	☐	☑	Public and Private Partnerships
		Develop and execute plans to control and prevent the spread of invasive species that threaten native biodiversity.	☐	☐	☑	Regulatory and Policy Approaches
		Improve and expand trail networks to provide safe and sustainable public access while protecting sensitive habitats.	☐	☐	☑	Biodiversity Corridors and Connec...
		Create programs and materials to educate the public about the ecological and cultural significance of ravines.	☐	☐	☑	Public and Private Partnerships Indigenous and Community-Led A...
		Launch the "InTO the Ravines" Micro-Grant Program: Support community-led projects that promote ravine stewardship and engagement.	☐	☑	☐	Indigenous and Community-Led A...
	Chapter 813, Trees	813-1. Inspection for presence of Asian Long-Horned Beetles and other pests; removal of infested trees.	☐	☐	☑	Regulatory and Policy Approaches Green Infrastructure and Climate ... Public and Private Partnerships

	Turfgrass & Prohibited Plants Bylaw, Chapter 489	489-2. The owner or occupant of private land shall cut the turfgrass on their land whenever the growth of turfgrass exceeds 20 centimetres in height or length.	☑	☐	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
		The owner or occupant of private land shall maintain all vegetative growth on their land according to the following requirements: (1) Private land shall be kept free of any local weed listed in Schedule A; (2) Vegetative growth on private land shall not obstruct sidewalks or roadways; (3) Vegetative growth on private land shall not restrict driver and pedestrian sight lines at intersections, driveways, sidewalks, walkways, or visibility to all traffic control devices; and (4) Any other conditions respecting health and safety as the Executive Director considers advisable.	☑	☐	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
Vancouver	Boulevard Gardening Guidelines	Maintain a path of at least 30cm wide along the curb edge to allow pedestrians to easily open and close vehicle doors, and cross to the sidewalk from the street. Garden beds should be no longer than 6m without a break.	☑	☐	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		Plants must be no taller than 1m. Choose plants that grow to a mature height of 1m or less or keep plants low by trimming.	☑	☐	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec...
		Keep plants low closer to intersections, driveways, curbs, sidewalk edges and/or where visibility may be a concern. Plants should be no taller than 60cm in these locations.	☑	☐	☐	Regulatory and Policy Approaches Green Infrastructure and Climate ...
		The recommended height for a raised garden bed is between 15cm and 45cm. Raised garden beds should not exceed 45cm.	☑	☐	☐	Regulatory and Policy Approaches Green Infrastructure and Climate ...
		Plants must be no taller than 1m, measured from the ground level, not the surface level of the raised garden bed. Plants should be kept to a maximum of 60cm closer to intersections, driveways, curbs, sidewalk edges and/or where visibility is a concern.	☑	☐	☐	Biodiversity Corridors and Connec...
	Greenest City Action Plan	5.1: Complete the new park at Yukon Street and 17th Avenue.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		5.2: Acquire four hectares of park land at Cambie Street and the Fraser River.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		5.3: Realize a new ~ten hectare park system in East Fraserlands.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		5.4: Strategically expand private property, street and park tree planting.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
		5.5: Create a new inventory system for trees on City land.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
		5.6: Update tree management plans, planting standards, and best practices.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Regulatory and Policy Approaches

					Regulatory and Policy Approaches
	5.7: Develop additional policies and decision-making criteria to retain healthy, mature trees.	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec...
Rain City Strategy		☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Increase total green area that treats urban rainwater runoff.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	S&PS -02 Strategic Retrofits Green Rainwater Infrastuture Program	☐	☐	☑	Green Infrastructure and Climate ...
	S&PS -03 Blue-Green Systems Program that Enable Water Management and Biodiversity Program	☐	☐	☑	Green Infrastructure and Climate ...
	S&PS-07 Streets and Public Spaces Adajacent to Schools Green Rainwater Infrastuture Retrofit Program	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
	B&S-03 Single Family Dwellings, Laneway Homes, and Townhouses - Assessing New + Exisiting Building Opportunities	☑	☐	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ... Public and Private Partnerships
	B&S-06 Resilient Roof Program	☑	☐	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	P&B-01 Green Rainwater Infrastuture Integration into Park Development Standards	☐	☐	☑	Green Infrastructure and Climate ...
	P&B-04 Green Rainwater Infrastuture Integration into Playing Fields	☐	☐	☑	Green Infrastructure and Climate ...
	P&B-06 Create a green network that will connect our parks, waterfront, and recreation areas.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	P&B-06 Enhanced urban forest program.	☐	☐	☑	Biodiversity Corridors and Connec...
	P&B -09 Minimize pervious surfaces within recreation spaces.	☐	☐	☑	Green Infrastructure and Climate ...
Urban Forest Strategy	Increase the city's tree canopy cover from the current 23% to 30% by 2050.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Implement policies that preserve, protect, and strengthen the urban forest, while allowing property owners to remove trees for maintenance and development under specific conditions.	☐	☑	☐	Regulatory and Policy Approaches Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
Vancouver's Plan	Protect waterfronts and waterways.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Make space for nature, protect habitat and ensure healthy, thriving ecosystems	☐	☐	☑	Green Infrastructure and Climate ...
	design infrastuture with nature in mind.	☐	☐	☑	Biodiversity Corridors and Connec...

		Plant more trees in areas with limited tree canopy to take advantage of all the natural benefits trees provide.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		L 1.1.4 Mitigate the loss of ecology as neighbourhoods densify by retaining trees and native soils where possible, improving public realm ecology, and integrating ecological function into the design of new buildings.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		L 1.3.7 Ecology. Improve tree canopy, especially in DTES, and integrate green space for rainwater and urban drainage.	☐	☐	☑	Green Infrastructure and Climate ...
		I 1.4.4 Connected parks and plazas. Ensure park spaces are connected through enhanced walking routes that are pleasant, comfortable, and safe for all. New urban plazas and key community facilities will improve opportunities for social connectivity and combat isolation and loneliness.	☐	☐	☑	Biodiversity Corridors and Connec...
		L. 1.5.9 Ensure parks, open space, streets, and private developments strongly consider ecological function and provide opportunities to enjoy nature with special consideration for durable landscapes that can thrive in high traffic areas.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		L. 1.6.8 Nature. Explore opportunities to retain trees and preserve native soils wherever possible. Integrate ecological landscaping and function into the design of new private developments.	☑	☐	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		L. 1.9.4 Develop City policies and leverage partnerships with Provincial and Federal governments to adapt buildings to climate change and reduce seismic risk. Promote reinvestment and renewal of existing rental housing stock without displacement of low income, elderly, or other equity- denied persons.	☐	☑	☐	Regulatory and Policy Approaches
		L 2.1.5 Connected public realm. Consider a connected network of parks, open spaces, and walking/biking routes as an organizing element in neighbourhoods.	☐	☐	☑	Biodiversity Corridors and Connec...
		L 2.3.1 City in nature, nature in the city. Foster a greater connection to the land through building and site design that provides space for nature, reflects local landscapes, and celebrates views and connections to Vancouver's beautiful natural setting.	☐	☑	☐	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
	Blue Green Systems Typology Study	The study identifies nine distinct types of blue-green systems suitable for Vancouver's urban landscape. These typologies serve as models for implementing green rainwater infrastructure that mimics natural hydrological processes. Examples include green streets, urban wetlands, and rain gardens.	☐	☐	☑	Green Infrastructure and Climate ... Biodiversity Corridors and Connec...
	Metro Vancouver Connectivity Report	Prioritize the conservation of ecologically significant and relatively unmodified sensitive ecosystems, including wetlands, older forests, and woodlands. This involves implementing protective measures to prevent degradation and promote the health of these critical habitats.	☐	☐	☑	Biodiversity Corridors and Connec...
		Incorporate green infrastructure solutions, such as green roofs, rain gardens, and urban forests, into urban development projects. These features help maintain natural hydrological cycles, support biodiversity, and enhance ecological connectivity in urban areas.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...

		Identify and restore key ecological corridors that facilitate wildlife movement between habitats. Restoration efforts may include reforestation, wetland rehabilitation, and the removal of physical barriers that impede species migration	☐	☐	☑	Biodiversity Corridors and Connec...
		Promote public awareness and involvement in ecological conservation through educational programs and community-led initiatives. Encouraging local stewardship fosters a sense of responsibility and supports the successful implementation of connectivity projects.	☐	☐	☑	Indigenous and Community-Led A...
		Establish monitoring programs to assess the effectiveness of connectivity measures and adapt strategies as needed. Regular data collection and analysis ensure that policies remain responsive to changing environmental conditions and emerging challenges.	☐	☐	☑	Biodiversity Corridors and Connec...
	Vancouver Climate Change Adaptation Strategy (2024-2025)	A1.3 Update Resilient Neighbourhoods Toolkit with community-led climate resilience actions to adapt to climate change and align with Neighbourhood and Community Placemaking Grants for 2024.	☐	☐	☑	Public and Private Partnerships Indigenous and Community-Led A...
		A1.4 Continue to advance risk management initiatives for park trees, street trees, and forested areas to address risks associated with climate-related events such as wildfire and pest and pathogen outbreaks.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		H3.1 Continue to advance tree planting on public land to support efforts to increase the urban forest canopy to 30% by 2050, with a focus on below average canopy neighbourhoods.	☐	☐	☑	Biodiversity Corridors and Connec... Green Infrastructure and Climate ...
		H3.2 Install 20-40 new tree pits (and planted trees) in low canopy areas per year, including appropriate soil volume improvements.	☐	☐	☐	Biodiversity Corridors and Connec...
		H3.3 Assess the resilience of specific climate-adapted tree species to extreme heat and drought by implementing and monitoring three pilot tree-planting projects, and use the outcomes of these pilots to inform the use of climate- adapted species in future tree-planting projects.	☐	☐	☑	Green Infrastructure and Climate ...
		H3.4 Explore priority areas for tree planting and retention on private land.	☑	☐	☐	Biodiversity Corridors and Connec...
		H3.5 Following update to the Tree Bylaw, develop a monitoring approach to track changes to tree coverage on private land as a result of permitted tree removal.	☑	☐	☐	Regulatory and Policy Approaches

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