

## **Biodiversity Action Plan 20XX: Calgary's Strategy and Action Plan Towards Urban Conservation**

The following provides an overview of what will form the biodiversity plan for The City of Calgary. Each section of the document is presented along with the main points that will be addressed in the plan.

Draft actions, goals, outcome statements and targets are also presented in the table. **Why urban biodiversity conversation?**

*This section of the plan will provide an overview of the importance of urban biodiversity, or specifically the importance of cities in the role of biodiversity conservation. This importance can be recognized in part by the relationship of healthy natural areas and the ecological functions they perform, which has a direct empirical link to the overall function of the city in terms of the services it provides and the well-being of its citizens. As stated by the Secretariat of the Convention of Biological Diversity, biodiversity is distinct, it reflects our culture, it contributes to our quality of life and is often the biodiversity that many people experience.<sup>i</sup>*

The CBD Secretariat produced “a global assessment of the links between urbanization, biodiversity and ecosystem services.” The report is organized by ten key messages. As described in the report, the first statement recognizes that biodiversity conservation is a challenge and opportunity in an urban environment. The following nine explore the opportunities provided once the first statement is recognized. These statements provide the central direction for the plan.

1. Urbanization is both a challenge and an opportunity to manage ecosystem services globally.
2. Rich biodiversity can exist in cities.
3. Biodiversity and ecosystem services are critical natural capital.
4. Maintaining functioning urban ecosystems can significantly enhance human health and wellbeing.
5. Urban ecosystem services and biodiversity can help contribute to climate-change mitigation and adaptation.
6. Increasing the biodiversity of urban food systems can enhance food and nutrition security.
7. Ecosystem services must be integrated in urban policy and planning.
8. Successful management of biodiversity and ecosystem services must be based on multi-scale, multi-sectoral, and multi-stakeholder involvement.
9. Cities offer unique opportunities for learning and education about a resilient and sustainable future.
10. **Cities have a large potential to generate innovations and governance tools and therefore can – and must – take the lead in sustainable development.<sup>ii</sup> Urban biodiversity**

*This section will put biodiversity into a city perspective to recognize that global biodiversity is a land conservation issue, a management issue and a consumption issue. Canada being over 80% urban-based provides an excellent example for the very nexus for this.*

For the purposes of this plan, biodiversity is the term used to describe the variety of life and habitats in a given region. Biodiversity is an urban issue and managing and conserving biodiversity is an essential part of a sustainable city. Wildlife are not restricted to parks in cities; nor are we confined to indoors – together we are dependent upon the city as a whole. Accordingly, the urban fabric itself can support and protect biodiversity; and the long-term sustainability of wildlife populations and ourselves requires us to consider the management of our open space system as well as city design and growth.

The need for cities to incorporate and protect biological diversity within their urban fabric is an increasingly important issue for sustainability. Human-caused changes in land use patterns (through agricultural conversion, resource extraction and urbanization have created significant changes in the landscape), have implicated global food production, water availability and climate. The Convention on Biological Diversity recognizes the critical role that biodiversity plays in providing the ecological goods and services that we depend on for our sustainability and prosperity.

Research performed and consolidated by TEEB<sup>iii</sup> reveals that ecosystems and species are the foundation of our economy and provide vital ecosystem services. These include clean air and water, the absorption of carbon dioxide, locally produced foods in community gardens and backyards, sport fishing, pollination of crops and gardens, and climate moderation from our urban forest.

With a growing number of people living in cities, opportunities to experience and appreciate nature decrease. For many, the nature provided in city parks is their primary experience with biodiversity. Personal experiences with nature are important to truly understanding the value of biodiversity, and the value of aligning cities with nature.

Both cities and ecosystems are dynamic. As ecosystem change tends to be gradual, impacts may not be noticeable by one generation. Forming a baseline and tracking the history of a city and its development is important in protecting our natural environment. For examples, although the amount of natural areas in Calgary has increased three per cent between 2005 and 2007, with Calgary's population increasing at the same time, by 2009 the amount of natural area per person had actually declined by three per cent. Documenting and describing change will be one of the first steps of the biodiversity plan.

**Biodiversity and Calgary, a history** *This section will address The City's approach to biodiversity. In 2011, The City of Calgary committed to signing the Durban Commitment and formally joined Local Action for Biodiversity. LAB is a global urban biodiversity program coordinated by ICLEI – Local Governments for Sustainability (previously, International Council for Local Environmental Initiatives), which was founded in 1990 when more than 200 local governments from 43 countries convened at the UN World Congress of Local Governments for a Sustainable Future.*

The LAB program gives The City an opportunity to work with leading experts in the fields of conservation biology, urban biodiversity management and to learn from and share experiences with the other cities that are demonstrating leadership in biodiversity conservation. As a part of the LAB program, ICLEI asks each municipality to consider signing the Durban Commitment on Biodiversity, which would demonstrate Calgary's commitment to conservation of biodiversity as well as social and economic sustainability. The commitments are focused on voluntary actions that can be taken to protect biodiversity.

A major step towards recognizing the importance of urban biodiversity for The City came in 2009 when Council formally committed to protecting biodiversity in its Municipal Development Plan stating a goal to conserve, protect and restore the natural environment of Calgary. **Alignment and authority**

*This section will highlight the higher-order legislative requirements that the biodiversity plan will accord with. The plan will align with the MDP along with imagineCalgary, a 100-year vision for the City and the Calgary Metropolitan Plan, a regional land use plan for Calgary and neighbouring municipalities. The plan is also directed by the Province of Alberta's draft South Saskatchewan Regional Plan, of which the CMP is a subregional plan to. Relating directly to biodiversity conservation land management, economic development and capacity building, the plan will also generally adhere to the principles behind the Canadian Biodiversity Strategy and the Convention on Biological Diversity Aichi Biodiversity Targets.*

Provincial, regional and municipal direction state the need to protect significant habitat and species, which are the foundation to successful biodiversity planning and management. The biodiversity plan will align with legislation and provide strategic direction to enhance biodiversity through stronger direction relative to planning and development, urban design, transportation, park management and engagement.

#### Land-Use Framework – South Saskatchewan Regional Plan (DRAFT)

Objectives will be established for biodiversity in the region, and an appropriate suite of biodiversity indicators that can be measured to assess if those objectives are being achieved will be identified. This will be done under this regional plan through development of a biodiversity management framework. A secondary intent of the management framework will be to support assessment of the health of ecosystems and the ecosystem services they provide.

#### Calgary Metropolitan Plan

Principle 1. Protecting the natural environment and watershed. We will ensure the natural landscapes, ecologies and water sources are identified, respected and stewarded to ensure their function and integrity over time as the region grows.

#### Calgary Transportation Plan

Preserve and enhance biodiversity to support the natural environment in and around mobility corridors.

#### Corporate Direction (MDP)

Goal: Conserve, protect and restore the natural environment.

Objective: Maintain biodiversity and landscape diversity, integrating and connecting ecological networks throughout the city.

### Calgary profile

*This section will be a brief synopsis of that which was covered in the first step of Calgary fulfilling its LAB commitments, the State of The City report. It will also highlight pressures on biodiversity and opportunities for its conservation, along with highlights of biodiversity projects outside of Parks' natural areas.*

Calgary is the largest City in the province of Alberta, and the third largest in Canada. Situated at 1048 metres above sea level, the climate is highly influenced by its geographic elevation and proximity to the Rocky Mountains. The city lies on the transition between the rolling landscape of the prairies and the Rocky Mountain Foothills.

The city has an extensive network of open spaces, consisting of local and regional parks and natural corridors. The most prominent natural open spaces are located in the City's periphery and along the creeks and waterfronts in the river valley system.

The City has taken a strong position on water quality and water resource management, and has been actively working on the protection of natural areas. The City's water management initiatives have evolved and grown in scope from site-specific practices and consumer education to larger scale actions such as changing by-laws to make water efficiency a requirement and working with industrial and commercial consumers to realize the value of water conservation. Land management of natural areas has transitioned from a period of protection for aesthetic purposes to one of conservation and recognition of the tacit link between natural areas and the services they provide. **Pressures** This section will list the current pressures on biodiversity in Calgary and map these threats as appropriate. These threats will be directly addressed by the correlating outcomes in the action plan.

Biodiversity and the protection of natural environments are integral to the entire urban system. As Calgary has grown, its open space has grown as well. Over 50 per cent of Calgary's parks are classified as natural, this encompasses a diversity of habitat types such native prairie, aspen parkland, coniferous forest, wetlands and disturbed or naturalised non-native habitats. Natural Environment Parks are some of the most prominent and best-used parks in the city; however, maintaining them in a healthy condition can be challenging given numerous pressures such as climate change and the urban heat island effect, fragmentation and loss through insensitive development, invasive species and heavy use that comes with being in a large city.

To address this issue, park management has focused on habitat restoration, trail management and the development of park management plans to address habitat loss and degradation. However, the long-term effectiveness of these efforts is hampered by the lack of a system-wide approach to ecosystem conservation. Calgary's natural areas need to be planned and managed cohesively as an integral part of the urban fabric with more emphasis on re-establishing connectivity between key natural areas.

In the past, the City has been challenged when working within higher-order legislative frameworks and policies that do not provide the necessary tools for municipalities to protect environmentally significant areas. Provincial Legislation such as the *Municipal Government Act* is intended to be interpreted broadly by municipalities, and as a result land use decisions can vary considerably from one community to the next.

Open Space growth is driven largely by subdivision, primarily through the dedication of municipal reserve and environmental reserve. The intent of ER is to remove lands from development based on their lack of suitability for development rather than their inherent ecological value. ER dedication can be a very powerful tool for protecting lands that have ecological value, such as ravines, escarpments and wetlands, but ER dedication alone cannot be used to ensure that natural areas remain viable and sustainable into the future. MR lands can play an important part in protecting biodiversity but these lands are primarily dedicated for school sites and manicured local open space recreation areas. The limit in authority provided by the MGA is an obstacle for the City; having clear, consistent environmental protection guidelines would facilitate further municipal action.

Conducting a comprehensive assessment and prioritization of key habitats and parks is an important step in allocating resources to where they are most effective. This would ensure available Parks funding for site management and purchase is used where it will have its greatest effect. By shifting focus from subdivision allocation via the MGA and repair of

natural areas in decline to focus on strategically identifying lands, managing habitats proactively and designing natural areas appropriately, open spaces can remain viable as a natural system.

The following is an overview of the local threats to local biodiversity:

- Land management stressors
    - Lack of funding for protection and management
    - Lack of stakeholder awareness and/or action
    - Lack of legislative framework
    - Inability to implement conservation elements
  - Natural stressors
    - Land fragmentation
    - Land conversion
    - Invasive species
    - Climate change
    - Urban heat island effect
- Opportunities** This section will look to express what can be done, and what is being done at the local level to better protect and enhance positive actions towards biodiversity. For example, this section will highlight opportunities for naturalization projects and look to a regional approach for effectiveness of enforcement mechanisms. It's also important to recognize the scale of management and valuing biodiversity: from balcony planters and homeowner gardens, to street trees, to parks and watercourses and the overall green structure of the city. As described by H. Rudd, it is vital to “enhance the matrix of backyard habitat, planted boulevards, and utility right-of way found in a city. Strengthening such networks should work well to support the biota protected in urban parks and wildlife refuges and the seasonal migrants that sometimes depend on urban habitat for their survival.”<sup>iv</sup>

The following are possible programs for awareness and positive action:

- Engaging the gardening community
- Engaging the sports community
- Test experimental parks: vegetation, planting techniques, etc.
- Establish a Master Naturalist Program
- Advance outreach through “Yard-scaping”: Recommended planting list for backyards and planter boxes to enhance habitat and pollinator pathways for birds, bees and bats
- Initiate a yards decorating contest (e.g. Edmonton’s “balcony in bloom”/“front yards in bloom” contest)

**Noteworthy biodiversity projects**

*This section will highlight other business unit projects, as well as community and citizen initiatives.*

## 1. The plan

*This section will be the strategic plan. It will present the overall themes in which the plan will be based upon. It will present the context of the plan, its basic parameters, as well as have the vision and plan of actions. These collectively comprise the action plan.*

*The general themes for the plan are,*

- *Ecosystems (what we have)*
- *Governance (How we manage it)*
- *Integration (How to plan with it in mind)*
- *Participation (How we engage the greater community and how we collaborate)*

*The strategic plan will be composed of,*

- *Principles*
- *The scope*
- *A vision*
- *Targets*
- The strategic plan (key result areas, goals, outcomes, performance measures and example activities) **Principles**

The principles provide the essential structure to define the strategic plan goals and outcomes.

- **Protect:** Planning and managing the city for productive, resilient, diverse ecosystems with the capacity to recover and adapt
- **Promote:** Encourage and support individuals and networks working to advance biodiversity and environmental resiliency in the city
- **Restore:** Re-establishing damaged natural ecosystems and managing them for ecological health
- **Collaborate:** Working jointly to advance local knowledge, innovations and practices associated with biodiversity conservation
- **Wise use:** The sustainable production and consumption of natural resources **Scope**

*The scope of the project is to support appropriate land stewardship, protection of water resources, open space and the correlating reduction in Calgary's environmental footprint. The scope also recognizes conservation corridors connecting to the region as well as the capacity for biodiversity protection and management to enhance the quality of life in Calgary and its related economic advantages.*

The scope of the project does not intend to include “sustainable” design practices, airshed management or address consumption patterns of citizens that effect global biodiversity loss. Although holistically relevant to biodiversity conservation, they do not directly connect with the LAB program. Only where they directly relate to conservation will they be addressed, i.e. the heat island effect vis-à-vis green roof development or sustainable products vis-à-vis procurement strategies. **Vision**

The vision describes a general desired state that the biodiversity project is aiming to achieve for the city of Calgary. A draft vision statement follows.

“A city rich in biodiversity and landscape diversity where an ecological network is integrated, connected and valued by the citizens of Calgary.” **Targets**

The over-arching or thematic target is a coarse representation of the full suite of biodiversity projects to measure program and action effectiveness. Achieving the goals of the biodiversity plan should be represented by meeting the overall target of biodiversity conservation in the City. **The strategic plan**

*As the higher order of the document has been established, this section will form the strategic plan. The plan aims to be results-based focusing on positive outcomes that are monitored through targets. Although the vision and overarching principles are resolved, the activities that can be carried out to reach them will allow for adaptability to new knowledge, techniques and avenues of action.*

The LAB program requires,

1. Well-defined strategies which contribute towards meeting the overarching biodiversity goals of The City. There are several layers starting with broader objectives and moving towards finer details or actions.
2. For each action there should be clearly stated time frames and resources (budget, staff, etc.) that are required for each action so that these can be factored into budgeting processes and staff time allocation.

Upon approval of the biodiversity strategy and action plan, the 4-year corporate business plans will accord with the outcomes and be acted upon through the 1-year work plans. At the end of three business plan cycles, the vision of the document should be achieved.

The following are the hierarchal categories that will form the strategic plan:

#### Key Result Areas (KRAs)

For the purposes of this plan KRAs are broad categories that organize the biodiversity goals into manageable groups.

#### Goals

A goal can be defined as a statement detailing the desired result of achieving the outcomes formulated to respond to the pressures on biodiversity that have been identified.

#### Outcomes

An outcome statement details the objective of a biodiversity project or action. The statement is quantifiable and therefore measured to analyse if the prescribed actions are meeting their objective(s). Outcomes are an intermediate step in reaching the overall project goals. Meeting the collective of these equates to achieving the overall vision for biodiversity in Calgary.

#### Indicators

Indicators are a numerical target to monitor, evaluate and report on the status of meeting an outcome. They are expressed as a target number, percentage, fraction or an all or nothing statement.

#### Performance measures (indicator, baseline, target)

A performance measure is the collection of indicator, the baseline for what is being measured and the target, the ideal state to meet the outcome). The performance measure amounts to the data that is collected, analyzed and reported on to monitor the performance of the plan. It is a metric that indicates successful achievement of the related outcome.

#### Actions

An action is a project or activities that are undertaken, as prescribed by the indicator, to achieve the defined outcomes.

The table will categorize strategies and nest them within overall goals of biodiversity in the city of Calgary. What follows are the broad “key result areas” that have been established to help organize the biodiversity goals. The table has been populated based on research, current city practices and stakeholder feedback. We are happy to receive any detailed comments that you or your organization might have on the table, the structure of the table, as well as additional objectives, performance measures, etc that you may have. The table will be further refined through engagement with subject matter experts.

			Performance Measure							
			Data collected, analyzed and reported on to measure the performance of achieving the outcome.							
KRAs	Goals	Objectives	Indicators	Current States	Targets	Pressures	Strategies	Tracking	Outcome Support	
Broad categories that organize the biodiversity goals.	The desired result of responding to the pressures on biodiversity.	Objectives are measurable – via the target – to analyze if the strategies are meeting their objective.	An indicator of success in the numerical form.	Baseline for the indicator, year and numerical value.	End state for the indicator, quantifiable and directs actions.	The threats to biodiversity that are being targeted.	A project or activity undertaken to achieve the related objective.	What is being monitored to ensure outcomes are being reached.	Documents, initiatives, policies, guidelines that will help advance activities to reach outcomes.	
<b>Planning &amp; Developing</b>	1. Land and water essential to maintaining local ecosystem function, resiliency and quality are preserved and connected.  2. Neighbourhoods develop and renew in a way that is sensitive to and promotes biodiversity.	The physical development of the city sees no net loss of environmentally significant areas.	<ul style="list-style-type: none"> <li>The percentage of environmentally significant areas identified in Area Structure Plans that were protected city-wide as measured from Outline Plans for each subdivision.</li> </ul>		By 2020, there is no net loss of environmentally significant areas from green field development.	Land fragmentation	<ul style="list-style-type: none"> <li>Develop a strategy for open space acquisition and disposition in both developed and developing areas.</li> <li>Develop a regulatory mechanism to protect environmentally significant areas.</li> </ul>		MDP, CTP, SSRP, MGA, TBL	
		Naturalized landscapes in open spaces are increased.	<ul style="list-style-type: none"> <li>The aggregate increase of natural areas in The City land inventory.</li> </ul>		By 2018, a long-term monitoring and reporting system for assessing the state of Calgary’s biodiversity is established and operating.	Invasive species	<ul style="list-style-type: none"> <li>Analyse lands in or adjacent to LID areas, natural areas, steep slopes and those not fit for mowing for naturalization projects</li> </ul>		Habitat Restoration Project Framework	
		Wildlife movement and connectivity patterns are maintained, or improved.	<ul style="list-style-type: none"> <li>Average public tree rating</li> <li>Ecologically Integrity Index scores (Patch size; Connectivity, fragmentation, stand age, structure; Diversity; Species (evenness, richness, diversity index); Species cover/abundance; Habitat representation.</li> <li>The percentage increase in tree canopy.</li> <li># of green roof permits granted.</li> <li>Tree species diversity</li> </ul>			Land fragmentation				
		There is an increase in aggregate hectares of protected natural areas.	<ul style="list-style-type: none"> <li>The percentage of natural areas with management plans in place</li> </ul>		By 2020, significant landscapes and habitats in Calgary are restored and/or reconnected.	Land fragmentation ; land conversion				
		Impacts from climate change and the heat island effect are addressed and acted upon.	<ul style="list-style-type: none"> <li></li> </ul>							
		The functional habitat diversity of the landscape is increased.	<ul style="list-style-type: none"> <li>Average public tree rating at 80%;</li> <li>Ecologically Integrity Index scores (Patch size; Connectivity, fragmentation, stand age, structure; Diversity;</li> </ul>							

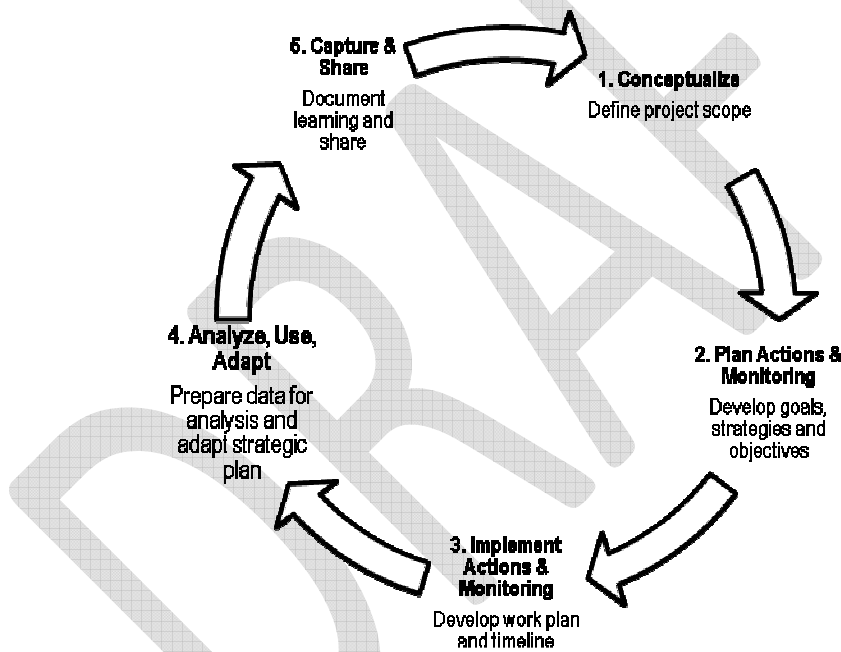
			Species (evenness, richness, diversity index); Species cover/abundance; Habitat representation.						
		Stormwater infrastructure and neighbourhood design achieves Low Impact Development principles.	<ul style="list-style-type: none"> <li>Runoff volume</li> <li>The percentage of hard surface areas</li> <li>Stormwater management plans</li> </ul>						
		Urban forestry and greenery deficiencies in neighbourhoods are lessened.	<ul style="list-style-type: none"> <li>The percentage increase in tree canopy.</li> <li># of green roof permits granted.</li> </ul>						
<b>Managing &amp; Operating</b>	<p>1. Land and water are managed to improve the status of biodiversity integrity, function and resilience.</p> <p>2. Human impacts are managed and the carrying capacities of lands are maintained at an ecologically appropriate level.</p>	Direct pressures on biodiversity are reduced through managing appropriate access and use in environmentally significant areas.	<ul style="list-style-type: none"> <li>The percentage of existing and new parks fall within a target ecological integrity index range based on park type.</li> </ul>		By 20XX, Plans for climate change mitigation are developed and implemented and contribute to Calgary's target to reduce greenhouse gas emissions by X per cent below XXXX levels.				
		Pesticide use is reduced.	<ul style="list-style-type: none"> <li>The percentage population reduction of priority invasive species in parks and open spaces as deemed successful according to park management plans [public].</li> </ul>		By 2018, strategic plans are in place to reduce threats posed to biodiversity by invasive species.				
		There is an improvement in water quality, quantity, timing (frequency) and temperature.	<ul style="list-style-type: none"> <li>Runoff volume</li> <li>Riparian health</li> </ul>		By 2018, the release of pollutants harmful to biodiversity is reduced.				
		The population of prohibited noxious, noxious and invasive weeds is reduced.			By 2020, Calgary's municipal waste generation is reduced by 80 per cent based on XXXX levels.				
		Excess nutrients entering waterways have been brought to levels that are not detrimental to ecosystem function and biodiversity.							Watershed plans
		Degraded habitats and the overall health of open space are restored.	<ul style="list-style-type: none"> <li>The percentage of restoration projects deemed successful according to project objectives.</li> </ul>		By 2020, there is an increase in naturalized landscapes in Calgary parks.				
		All known species of risk in Calgary parks have management strategies in place.	<ul style="list-style-type: none"> <li>The percentage of known species of risk with park management plans in place.</li> </ul>		By 2020, 100% of known species of risk in Calgary parks have conservation plans in place.				
		The management of land protects and enhances aquatic habitat-forming processes such as hydrology, sediment transport and vegetative succession.	<ul style="list-style-type: none"> <li>The percentage natural environment parks with complete management plans [public].</li> <li>TSS</li> </ul>						

		Invasive alien species and pathways are identified to reduce threats and measures are in place to manage pathways to prevent their introduction and establishment.	•						
		Conservation of locally adapted species minimizes loss of local biodiversity while invasive species populations are monitored and managed.	•						
		Good data enable continuous improvement of biodiversity management based on baseline through monitoring, reporting and acting.	•						
		Energy demand is lessened, alternate energy sources are supported.	•						
		Waste is reduced and used as a resource.	•						
		There is a decrease in wildlife strikes on roads in Calgary.	•						
<b>Supporting &amp; Mainstreaming</b>	1. The underlying causes of biodiversity loss are addressed by mainstreaming biodiversity awareness and natural heritage across government and society.  2. Communities are proactively involved in caring for and empowering others to enhance the benefit from biodiversity conservation.	Volunteer activities in the management of biodiversity are increased.	• Volunteers and hours accrued.		By 2018, biodiversity is a component of elementary and secondary school curricula.				
		There is an increase in private-, community-, business- and school-yard naturalization projects.	• Number of programs initiated.		By 2018, 80 per cent of Calgarians understand biodiversity and its relationship to our well-being.				
		There are established champions in City departments and business units to promote and advance the objectives of biodiversity conservation.	•		The number of Calgarians who participate in biodiversity conservation activities increases by 25 per cent.				
		Awareness of the value of biodiversity for staff, politicians and the public is increased.	• Internal and external surveys		By 2018, relevant policy and program Council reports quantify impact to the City's biodiversity.				
		Traditional knowledge, innovations and practices for biodiversity conservation is integrated into planning and decision making.	•						
		Biodiversity is recognized as an aspect of economic development planning.	•						
		Staff competency in biodiversity protection is increased.	•						
		Alternate funding sources for biodiversity projects are identified and allocated.	•						

**1. Programs of Study.** This section will describe the process that will be employed to implement the plan. Along with the LAB structure for developing a local biodiversity strategy and action plan, this plan aligns with the Conservation Measures Partnership Open Standards for the Practice of Conservation process. As described by the CMP, “The *Open Standards* are meant to describe the general process necessary for the successful implementation of conservation projects. ... [T]hey are meant primarily to guide *programmatic* decisions in project management (i.e., determining the best interventions for conservation success).”<sup>v</sup>

Adopted from the *Open Standard*, the cycle graph below outlines that strategic planning can be understood as a five step process. Simply, where do we want to be, where are we now, how will we get there, how will we know we are success, and documenting and sharing that can be added to the process.

Calgary’s biodiversity strategy and action plan, along with the State of the City report, complete steps one and two of the project cycle and provide the action structure for steps 3, 4 and 5.



The LAB program requires three biodiversity projects that implement biodiversity “on the ground.” Through the lens of the desired outcomes and ultimately goals, the projects require identification of timeframe to implement, resources required (budget, staff, etc.) The projects will in effect be steps three, four and five of the *Open Standards* process. It is these projects, along with other activities to be executed to align with the indicators and outcomes.

Operationalizing the plan through steps three and four will be based on the principles behind adaptive management: monitoring, reviewing, evaluating, amending (adapting, as applicable) and reporting. Timeframe, responsible party(ies), communications and resources required will be identified beside each outcome. The plan will also commit to regularly publishing biodiversity reports.

As per the discussions of the stakeholder sessions that were held during the initial phases of the biodiversity plan, the plan will create a framework for internal and external stakeholders to create their own biodiversity projects. The plan will define the parameters by which the biodiversity projects will be measured for approval to adhere to LAB requirements. The three themes of the projects will be,

- Education
- Policy
- Construction

1. **Corporate roles in biodiversity conservation.** *This section will be developed by each business unit in The City and will show how their activities are aligned to support biodiversity conservation in the City. An example follows.*

<b>Department</b>
Transportation
<b>Business Units</b>
Calgary Transit
Roads
Transportation Infrastructure
Transportation Planning
<b>Overall mandate</b>
We work to provide a safe, reliable, efficient, customer focused transportation system that supports all modes of travel and promotes sustainability and smart growth. The system contributes significantly to making Calgary a healthy, vibrant and dynamic community supporting the needs of residents, businesses and tourists. We continually enhance our services and expand and diversify the transportation system to meet the needs of a growing city, while aligning with environmental guidelines and legislation.
<b>Role in biodiversity conservation</b>
<p>Transportation business units have a role in the conservation of biodiversity during planning, development and operation of the transportation system. Planning studies are scoped to identify and address biophysical features and processes such as wildlife movement corridors and environmentally significant areas with the aim of avoiding or minimizing the loss of biodiversity through careful route alignment and appropriate mitigation measures applied to design and construction.</p> <p>Environmental construction operations plans guide the work done on transportation development sites, which are typically long and linear, and these plans include guidance on tree protection, aquatic habitat and water quality protection through erosion control, as well as weed control. Throughout construction, and later the operation of the system over the longer term, noxious weeds are monitored and controlled by means of mowing and herbicide application. This means that the second largest threat to biodiversity globally, after habitat loss and fragmentation, is being addressed locally along major roadways and other transportation facilities.</p>

1. *List of figures This section will have a list of figures, as required. For example,*

- A model of ecosystem services
- An ecological network structure – patch, corridor, network
- Biodiversity governance structure (fractal/feedback model vs. linear)

1. *References Preliminary references follow.*

The Conservation Measures Partnership. 2013. *Open Standards for the Practice of Conservation*. Version 3.0, April 2013.

Rudd, H et al. 2002. “Importance of Backyard Habitat in a Comprehensive Biodiversity Conservation Strategy: A Connectivity Analysis of Urban Green Spaces.” *Restoration Ecology*. Vol. 10 No. 2, pp. 368-375. June 2002.

Schaefer, V et al. 2004. *Urban Biodiversity: Exploring Natural Habitat and its Value in Cities*. Captus Press.

Secretariat of the Convention on Biological Diversity. 2012. *Cities and Biodiversity Outlook Action and Policy*. <http://www.cbd.int/en/subnational/partners-and-initiatives/cbo>.

1. *Glossary This section will be a list of terms that require explanation.*

1. *Engagement This section will recognize stakeholder support and outline the engagement process that was undertaken.*

1. *Appendices* This section will outline how citizens can be involved in the goal of advancing biodiversity conservation in the City.

Possible appendices may include outlining,

*A pollinator pathway program (pollinatorpathway.com)*

*Native and non-invasive species plantings in yards and balconies provide important wildlife habitat in increasingly fragmented urban landscapes.*

*Plant suggestions can be found on the Alberta Invasive Plants Council's brochure: Weed Wise, Gardening in Alberta: A Gardener's Guide to Non-Invasive Plants*

*Roadsides: A Guide to Creating a Pollinator Patch, Ontario Horticultural Association, 2010*

*Naturalization projects*

*Removing manicured lawns for:*

- Water conservation*
- Biodiversity*
- Pest management*
- Food source*
- Less green house gas emissions*
- Hobby*

*Habitat*

*The following is adopted from Urban Biodiversity: Exploring Natural Habitat and its Value in Cities<sup>vi</sup>.*

*Four elements of habitat: space, food, water and shelter. These four elements can collectively be called wildlife habitat.*

- Space: The habitat you create connects with other areas in your neighbourhood to provide important corridors for wildlife to move throughout different habitat.*
- Food: Planting a diversity of vegetation helps support a wide variety of wildlife.*
- Water: It is important to ensure that your water source is close to shelter so that wildlife using it feels protected.*
- Shelter: Most species require a variety of shelter when nesting or feeding; it also protects creatures from predators, wind and rain.*

*Floral diversity not density will determine how far a bumblebee will fly (ScienceDaily article):*

- Plant in groups*
- Layer vegetation*
- Edge effects, where habitats meet*
- Select plants to meet your yard or balcony's condition*

- Wall plantings*
- Window box plantings*
- Rooftop gardens*
- Raised garden beds*
- Nesting boxes*
- Bat boxes*
- Butterfly boxes*

*Ownership*

Explore the 'adopt-a-patch' idea, where volunteers take ownership of and look after their own small area as done in Perth, Australia, <http://www.bushlandperth.org.au/member-groups>

Citizen science

*The Great Sunflower Project – better understand reasons behind the decline of bee populations*

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<sup>i</sup> Adopted from, “Urban Biodiversity and the Case for Implementing the Convention on Biological Diversity in Towns and Cities” by Muller, N and Werner, P in *Urban Biodiversity and Design*, 2010, p 21-24

<sup>ii</sup> Secretariat of the Convention on Biological Diversity. 2012. *Cities and Biodiversity Outlook Action and Policy*. <http://www.cbd.int/en/subnational/partners-and-initiatives/cbo>.

<sup>iii</sup> TEEB - *The Economics of Ecosystems & Biodiversity for Local and Regional Policy Makers*. 2010.

<sup>iv</sup> Rudd, H et al. 2002. “Importance of Backyard Habitat in a Comprehensive Biodiversity Conservation Strategy: A Connectivity Analysis of Urban Green Spaces.” *Restoration Ecology*. Vol. 10 No. 2, pp. 368-375. June 2002.

<sup>v</sup> The Conservation Measures Partnership. 2013. *Open Standards for the Practice of Conservation*. Version 3.0, April 2013.

<sup>vi</sup> Schaefer, V et al. *Urban Biodiversity: Exploring Natural Habitat and its Value in Cities*. 2004. Captus Press.

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