

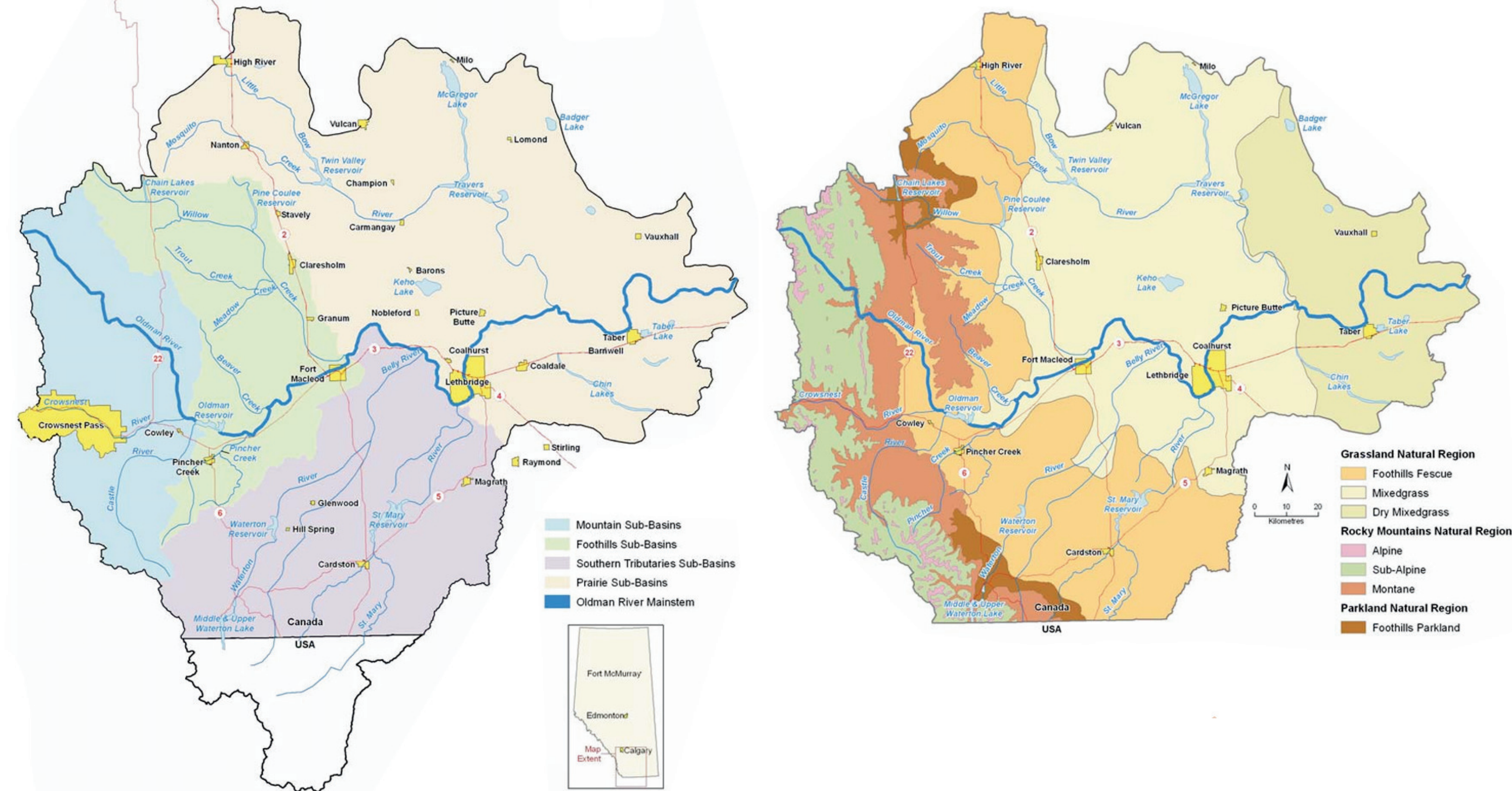
A SCOPING REVIEW OF MUNICIPAL BIODIVERSITY STRATEGIES: CASE ANALYSIS OF THE CITY OF LETHBRIDGE

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ABSTRACT

Biodiversity is defined as “the diversity or variety of life, i.e., plants, birds, insects, ecosystems, and genes, in a particular area” (Campbell-Arvai, 2019, p. 412). Humans are part of this diverse life and play a critical role, particularly in urban areas. Temperate grasslands, such as **Alberta’s prairie**, are “one of the most at-risk ecosystems in the world... over three quarters of Alberta’s species at risk are found in the grasslands” (Raven, Fent, Dyson, & Adams, 2022, p. 1). A municipal biodiversity strategy is “a comprehensive and systematic approach to protecting, developing and managing [...] natural and built environments for healthy ecological processes in support of biodiversity” (Calgary’s 10-Year Biodiversity Strategic Plan, 2015, p. 1).

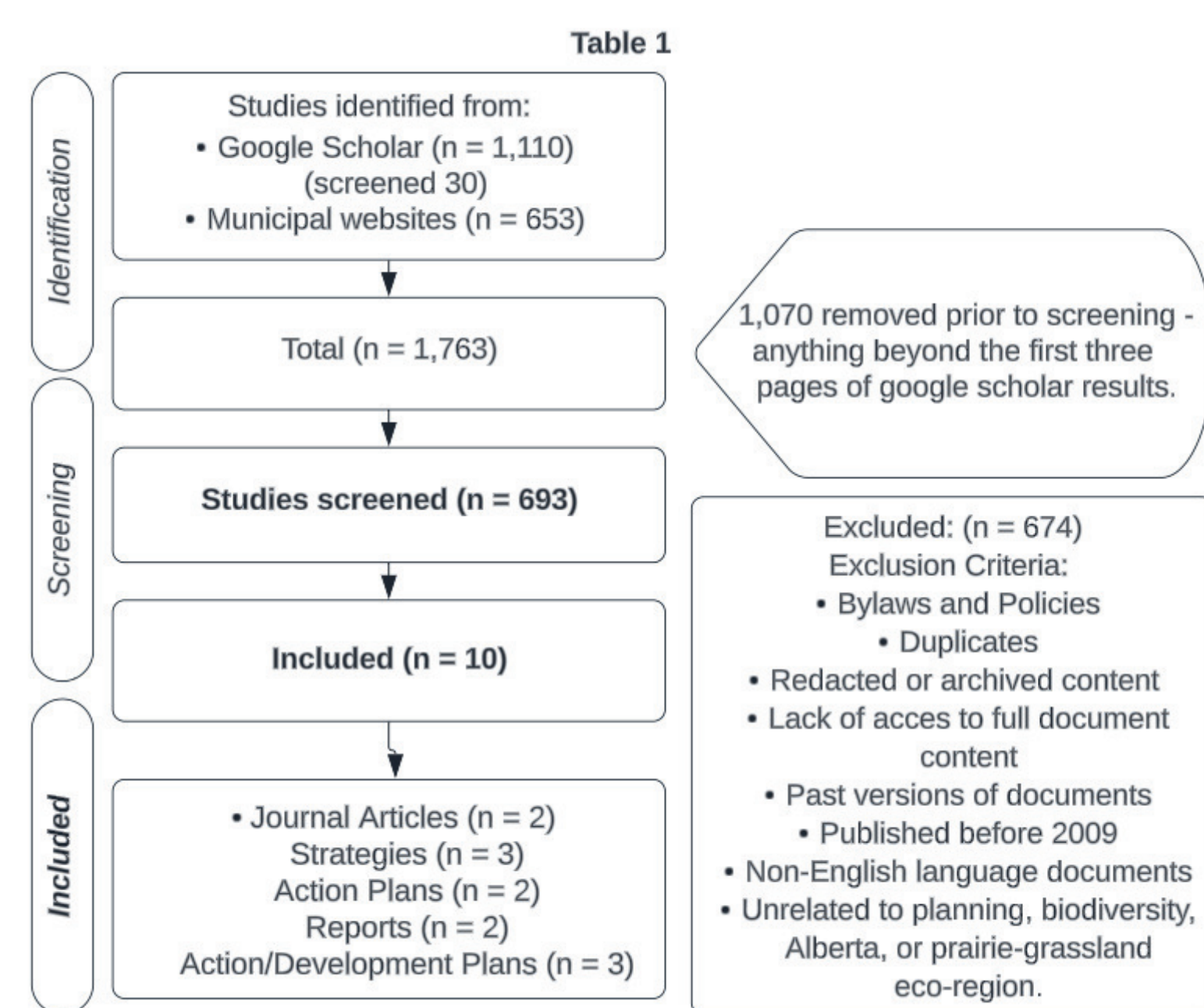


(Oldman Watershed Council, 2010, Figure 1.2; Oldman Watershed Council, 2010, Figure 1.1)

This scoping review identifies trends, gaps, and common elements in relevant municipal biodiversity strategies by addressing four research questions: (1) How do ecologically proactive municipalities define and measure local biodiversity? (2) What steps do these municipalities implement to develop comprehensive biodiversity plans? (3) What challenges hinder municipalities from advancing biodiversity strategies, particularly in the context of climate change and global warming, and how do these lessons inform Lethbridge? (4) What initiatives does Lethbridge, Alberta, currently implement to promote and protect biodiversity?

METHODS

This scoping review employs the PRISMA-ScR framework. The literature identification process includes peer-reviewed articles, reports, and grey literature, including municipal plans and policies, to inform biodiversity planning in Alberta municipalities. Two search strategies were performed on November 30, 2024: (1) Google Scholar search: (“biodiversity strategy” OR “conservation plan” OR “biodiversity management”) AND (“municipal” OR “urban” OR “city”) AND (“grassland” OR “prairie”) AND (“drought” OR “extreme heat” OR “high winds” OR “severe storms”) AND (Alberta OR “southern Alberta” OR Calgary OR Edmonton). The search yields 1,110 results, with the first 30 screened for relevance. Only English-language documents published after 2009 are included. (2) Municipal websites: (“biological diversity” OR biodiversity OR “biodiversity strategy”) AND (report OR “action plan” OR strategy OR framework), yielding 653 total results. The identification, screening and exclusion criteria is detailed in **Table 1**.



Academic publications support grey literature/municipal reports, and a 15-year publication limit reflects the most recent trends in biodiversity planning. Qualitative synthesis and descriptive analysis categorize findings by municipality, enabling localized comparisons of conservation strategies, challenges, and outcomes. The reliance on publicly accessible materials may exclude proprietary or unpublished documents, potentially omitting significant insights.

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RESULTS

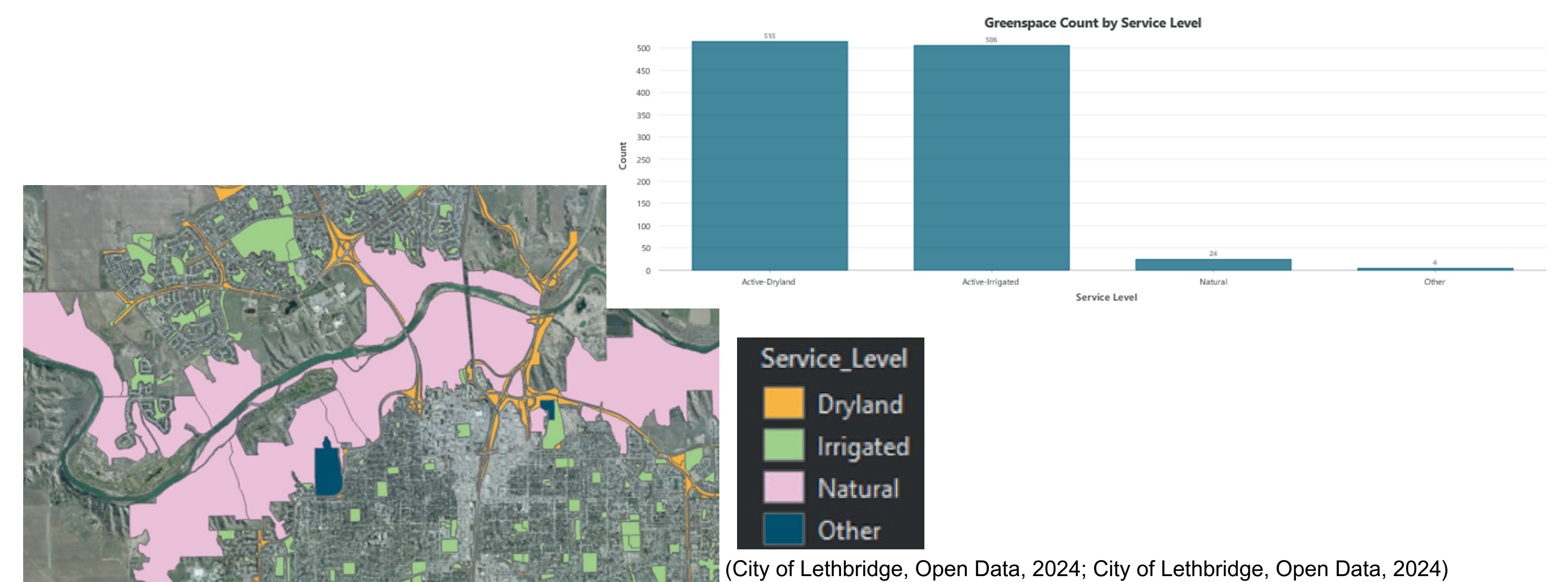
This review examines key biodiversity protection strategies in Calgary, Edmonton, Red Deer, and Lethbridge—the four largest municipalities in Alberta by population. **The prairie and parkland eco-region, which comprises less than one-quarter of Alberta’s land base, supports the majority of the province’s population.** As Lethbridge’s Climate Adaptation Strategy and Action Plan (CASAP) highlights, climate change acts as a “risk multiplier,” with drought, extreme heat, and severe storms threatening ecosystems and infrastructure (2024, p. 1). All four municipalities address climate risks in their planning through documents that emphasize drought resilience, water management, and biodiversity conservation (City of Lethbridge, CASAP, 2024; Government of Alberta, 2023; Raven, Fent, Dyson, & Adams, 2022).

Calgary leads with a comprehensive biodiversity strategy that includes the protection of riparian zones, wetlands, and urban green spaces, supported by water-efficient policies and collaboration with stakeholders. Red Deer integrates water efficiency and drought resilience into its Environmental Master Plan (2019), with a focus on urban planning for water bodies and ecosystems. Lethbridge acknowledges the impacts of drought in its CASAP (2024) and promotes proactive water conservation efforts. All four municipalities recognize biodiversity’s critical role in ecosystem services, such as water filtration, air quality, and temperature regulation, but vary in their focus on prairie ecosystems. Calgary and Edmonton prioritize biodiversity in their planning, with Calgary’s detailed assessments of at-risk species and ecosystems, Red Deer and Lethbridge also include ecological conservation but place less focus on prairie/grassland conservation.

While this review does not evaluate the quality of the municipalities’ efforts, it highlights that **grassland protection is often underrepresented.** Calgary stands out as a model in biodiversity protection strategies, having released several updated biodiversity reports (most recently in 2014), published a 10-year strategic plan (2015), and developed a climate resilience strategy (2018). Lethbridge’s planning documents, such as the Municipal Development Plan (2021) and updated Sustainability Annual Report (2022), provide a foundation for ongoing biodiversity initiatives.

DISCUSSION

The City of Lethbridge utilizes Geographic Information Systems (GIS) to log and maintain assets. The Greenspace Count by Service Level histogram represents the number of planting beds categorized as active-dryland, active-irrigated, natural, or “other.” Each planting bed is counted as one unit, regardless of its size. This means that a small planting bed and a large planting bed are treated equally in terms of count. For example, a tiny flowerbed and a large, landscaped area both count as “1” in the histogram. Active dryland refers to a greenspace that is maintained but not irrigated, while active irrigated refers to a greenspace that is both maintained and irrigated. Natural greenspace has minimal human intervention, with the majority of Lethbridge’s natural greenspace located in or bordering the River Valley. “Other” refers to cemeteries, which are mostly irrigated, with some dryland types of greenspaces within the municipal boundary.



To build an effective biodiversity strategy, the City of Lethbridge should consider adopting the Durban Commitment, a non-binding pledge already signed by Calgary and Edmonton. This global initiative encourages municipalities to take local action for biodiversity, and formal commitment has to be an effective step. Research highlights the importance of community engagement and fostering understanding; conducting a survey to assess local knowledge of biodiversity and understand what is important to residents is a strong next step. Setting both short-term and long-term goals, helps the community and professionals see results, building support for the biodiversity initiative. In addition, continuing to support projects like the City Scholars Biodiversity Strategy research and focusing on the development of sustainable landscapes will be vital.

Given the changing climate, planning for prevention and identifying tangible measures of biodiversity health is essential. This includes consulting with experts from organizations such as the Lethbridge Agricultural Research Station, (LAB), Alberta Biodiversity Monitoring Institute (ABMI), and municipal officials to tailor strategies that address local needs. Projections for warmer winters, drier summers, and more frequent droughts highlight the need for improved water management. Drought not only impacts water supply but also affects ecosystems, agriculture, tourism, and creates socio-economic challenges, especially for vulnerable communities.

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