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Urban sprawl in calgary: patterns of growth and sustainability analysis

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Domain

The indicators within this domain assess how Calgary’s urban form evolves, focusing on the expansion of urban areas, the affordability of housing options, and the emergence of transit desserts. By analyzing these elements, we gain insights into the challenges of accommodating growth while maintaining sustainable, equitable, and efficient urban environments.

Indicator

This indicator examines the patterns and impacts of urban sprawl, highlighting its role in shaping the city’s growth dynamics. By analyzing the expansion of low-density, suburban developments, it assesses the implications for land use efficiency, infrastructure demands, and environmental sustainability. The indicator provides insights into how sprawling growth affects residential patterns and resource consumption, helping to evaluate the alignment of current development trends with sustainable urban form goals. Urban Sprawl is defined as the spreading of Urban developments on undeveloped land near a more or less densely populated city. (Merriam-Webster, 2024)

methodology

A mixed-method approach was employed to analyze Urban Sprawl in Calgary, which included incorporating spatial analysis, quantitative data interpretation, and literature review.

Data Sources:

* Maps: Two land use maps from 2011 and 2024, depicting the extent of urban development and undeveloped land.

Spatial Analysis:

* Both maps were overlaid to identify areas of urban expansion and the conversion of undeveloped land into residential, commercial and industrial zones.
* Growth corridors were analyzed for patterns of expansion.

Indicator-Based Assessment:

* The Assessment was done by analyzing four key indicators of Sprawl:
  + - Spatial growth trends
  + Transportation and infrastructure challenges
  + Environmental impact and land use efficiency
  + Housing affordability and socioeconomic consequences

A map of land use classification

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A map of land use

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*Figure 1. Map showing Calgary’s land use in 2011, highlighting residential, industrial, and undeveloped areas.*

*Figure 2. Map depicting Calgary’s land use in 2024, including residential, industrial, and remaining undeveloped areas.*

Spatial Growth analysis

The maps reveal Calgary’s urban expansion from 2011 to 2024. There is a clear outward progression from the city’s core into previously undeveloped areas.

Development Trends:

* There has been an 18% increase in residential land area, especially in the northern and southeastern regions.
* Industrial zones, particularly in eastern Calgary, have expanded to support economic growth, with a modest 2.14% increase in total industrial area.
* Parks and green spaces, while preserved, are now surrounded by urbanized zones, limiting their ecological connectivity.
* The undeveloped (residual) land area has seen a significant 37.95% decrease between 2011 and 2024, which emphasizes the ongoing pressure of urban sprawl on Calgary’s natural and open spaces.

This pattern aligns with global urban sprawl trends, where low-density housing and economic activity extend into peripheral areas due to growing population demands. While this creates space for housing and industry, it raises concerns about land use efficiency and sustainability.

|  |  |  |  |
| --- | --- | --- | --- |
| Category | 2011 | 2024 | Growth/Change |
| Residential Land Area (km²) | 452.84 | 536.78 | +18.54% |
| Industrial Land Area (km²) | 140.26 | 143.27 | +2.14% |
| Total Developed Land (km²) | 593.1 | 680.042 | +14.65 |
| Residual Land Area (km²) | 217.02 | 134066 | -37.95% |
| Population | ~1,087,038 | ~1,665,000 | +53.2% |
| Population Density (Residential) | 2,401 persons/km² | 3,102 persons/km² | +29.2% |

“Urban spread… in intermediate suburbs (20 to 30 minutes from downtown) increased by 23.3% between 2016 and 2019 (Statistics Canada, 2022).

A map of a city

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Figure 3. *Map illustrating changes in Calgary’s land use between 2011 and 2024, showing expansions in residential and industrial areas alongside the reduction in undeveloped land.*

Environmental and land use efficiency

Sprawl has significant environmental consequences, particularly regarding undeveloped land conversion. As highlighted in the maps, undeveloped land has diminished (-37.95%), primarily in favor of residential zones. Habitat destruction and fragmentation result from the expansion of urban and industrial zones into natural areas. Reduced green spaces and increases impervious surfaces lead to higher flood risks, as natural water absorption decreases. Calgary’s reliance on undeveloped land for growth reflects inefficient land use patterns. Compact, mixed-use development within the urban core could reduce the need for outward expansion while preserving land use patterns. Without strong land use policies, the city risks further ecological degradation, undermining its sustainable goals.

# Housing Affordability and Socioeconomic Impacts

Suburban growth in Calgary has been driven partly by the pursuit of affordable housing. However, this affordability comes with trade offs. Suburban developments offer lower housing costs compared to the urban core, making them attractive to families. These areas often lack housing diversity, focusing predominantly on single-family homes. However, this presents other economic challenges, since many families must look to such suburban areas for affordable housing options it also means that their commuting costs increase, sue to the transit deserts in these newly developed areas. Increased commuting costs essentially offset some affordability benefits, particularly for low-income households. Infrastructure costs for new suburban neighbourhoods such as roads, water, and sewer systems also place a financial burden on the city.

Calgary’s population grew from 1,087,038 in 2011 to approximately 1,665,000 in 2024, a **53.2% increase** within a 13 year period.

Conclusion and Recpommendations

Calgary’s urban sprawl between 2011 and 2024 illustrates a trend away from sustainable development. Sprawl has led to increased land consumption, car dependency and environmental challenges, while failing to address housing diversity and equitable access to transit. Based on the maps and supporting analysis, Calgary’s current growth trajectory is unsustainable, moving further from compact, Efficient urban development models. This demonstrates the need for policy interventions to promote sustainable urban development. The city must balance growth with ecological preservation, transportation improvements, and housing diversity.

# Recommendations

* **Implement Growth Boundaries**: Restrict urban expansion into undeveloped areas to protect natural ecosystems and promote infill development.
* **Promote Transit-Oriented Development:** Focus on creating mixed-use, high-density neighborhoods near public transit to reduce car dependency.
* **Enhance Housing Diversity**: Encourage the development of multi-family housing units within the urban core to address affordability and minimize sprawl.
* **Preserve Green Spaces:** Increase efforts to protect and connect parks and green corridors, maintaining their ecological integrity.
* **Adopt Land Use Incentives:** Provide financial incentives for developers to prioritize compact, sustainable development within the existing urban footprint.

By addressing these areas, Calgary can transition towards a sustainable urban future, reducing the environmental and socioeconomic cost of sprawl while enhancing the quality of life for its residents.

**Sources:**

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