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Ecosystem services and biodiversity preservation in Prairie suburban areas

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Saskatchewan Prairie Conservation Action Plan

Introduction

How can suburban front yards become ecosystem service producers by transforming the lawns into native pollinator gardens?

1. Identify the **ecosystem services that suburban residential areas can provide** and their contributions to well-being (i.e., map the ecosystem services that are potentially produced).
2. **Determine the challenges homeowners face** to become ecosystem services providers, including monetary and nonmonetary factors.
3. Identify **willingness to pay for the benefits associated with ecosystem services** of native/pollinator gardens.

Ecosystem services

The production of **ecosystem services** is essential for cities to adapt to climate change in the Canadian Prairies.

Provisioning

Products humans obtain from ecosystems

- **Food**
- Fresh water
- Raw materials (wood, fibre, fuel)
- Medicine
- **Genetic resources**

Regulating

Services nature provides to regulate the environment

- **Air quality**
- **Climate regulation**
- Water purification
- Waste treatment
- **Disease and pest control**
- **Pollination**

Cultural

Non-material benefits of nature

- Recreation and ecotourism
- **Aesthetic values**
- Religious and spiritual
- **Mental and physical health**
- **Education**
- **Cultural heritage**
- **Sense of place**

Supporting

Services necessary for the production of all other ES

- **Soil formation**
- **Nutrient cycling**
- **Primary production**

Source: Ecosystems and Human Well-being: A Framework for Assessment (millenniumassessment.org)

Individual and community well-being

Practices that reduce water consumption, **control extreme temperatures, protect urban wildlife, and promote physical and mental health** will be fundamental to preserving individual and community well-being.




Where to produce urban ecosystem services?

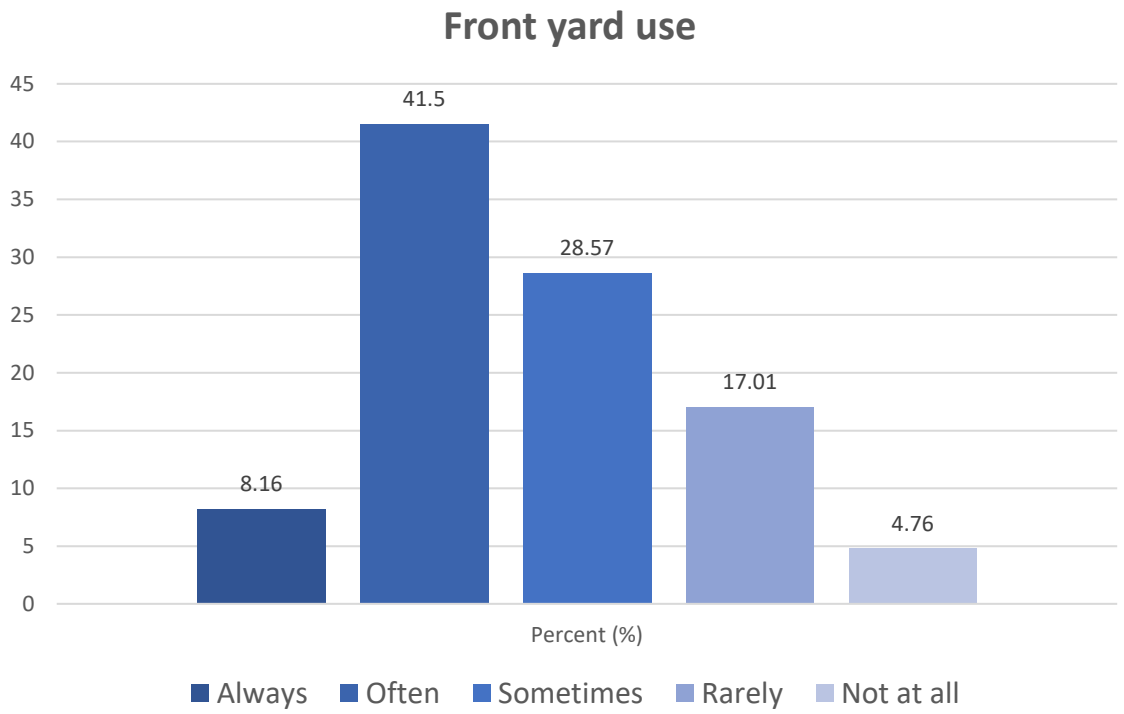
- Front yards
- Backyards
- Parks
- Community gardens
- Sidewalks and boulevards

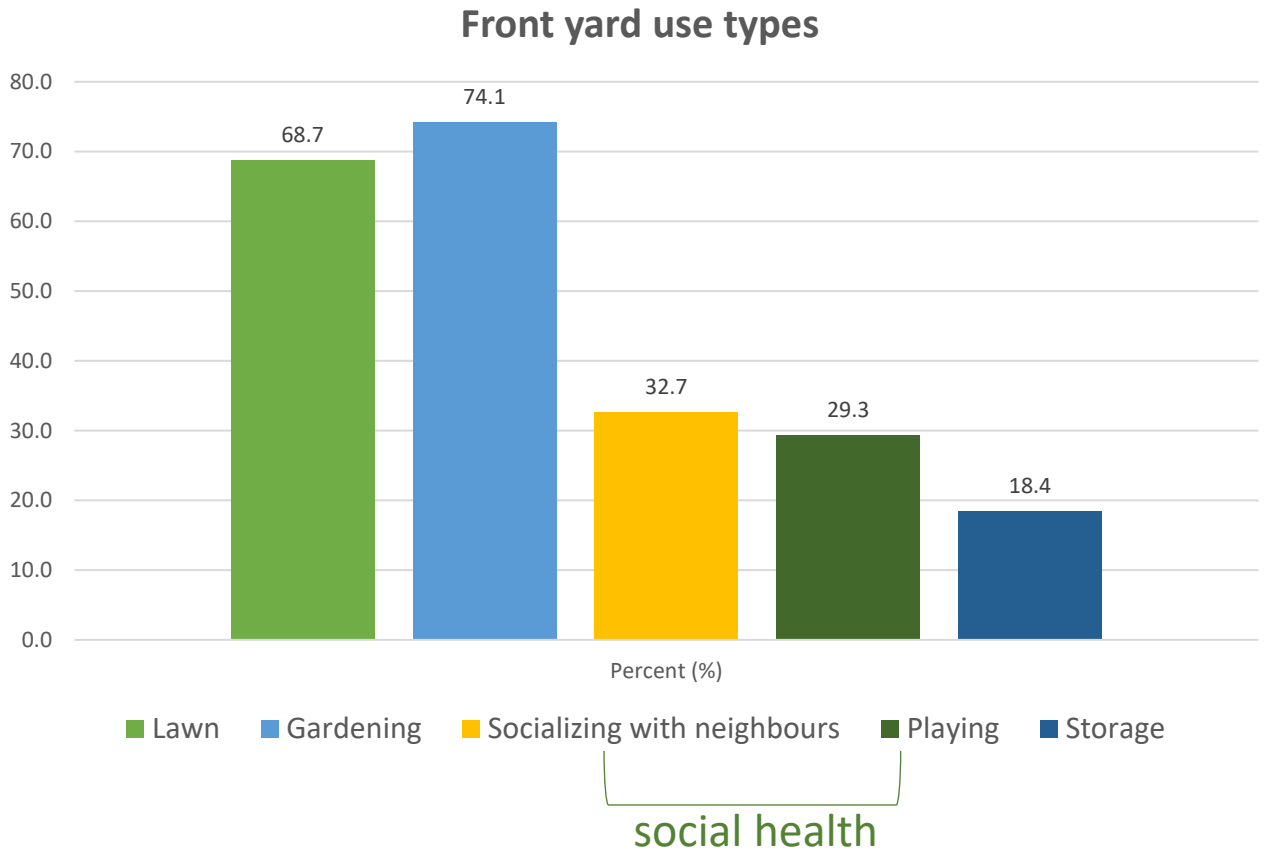
Individual's contribution

City's plans

Challenges to create a market for suburban ecosystem services

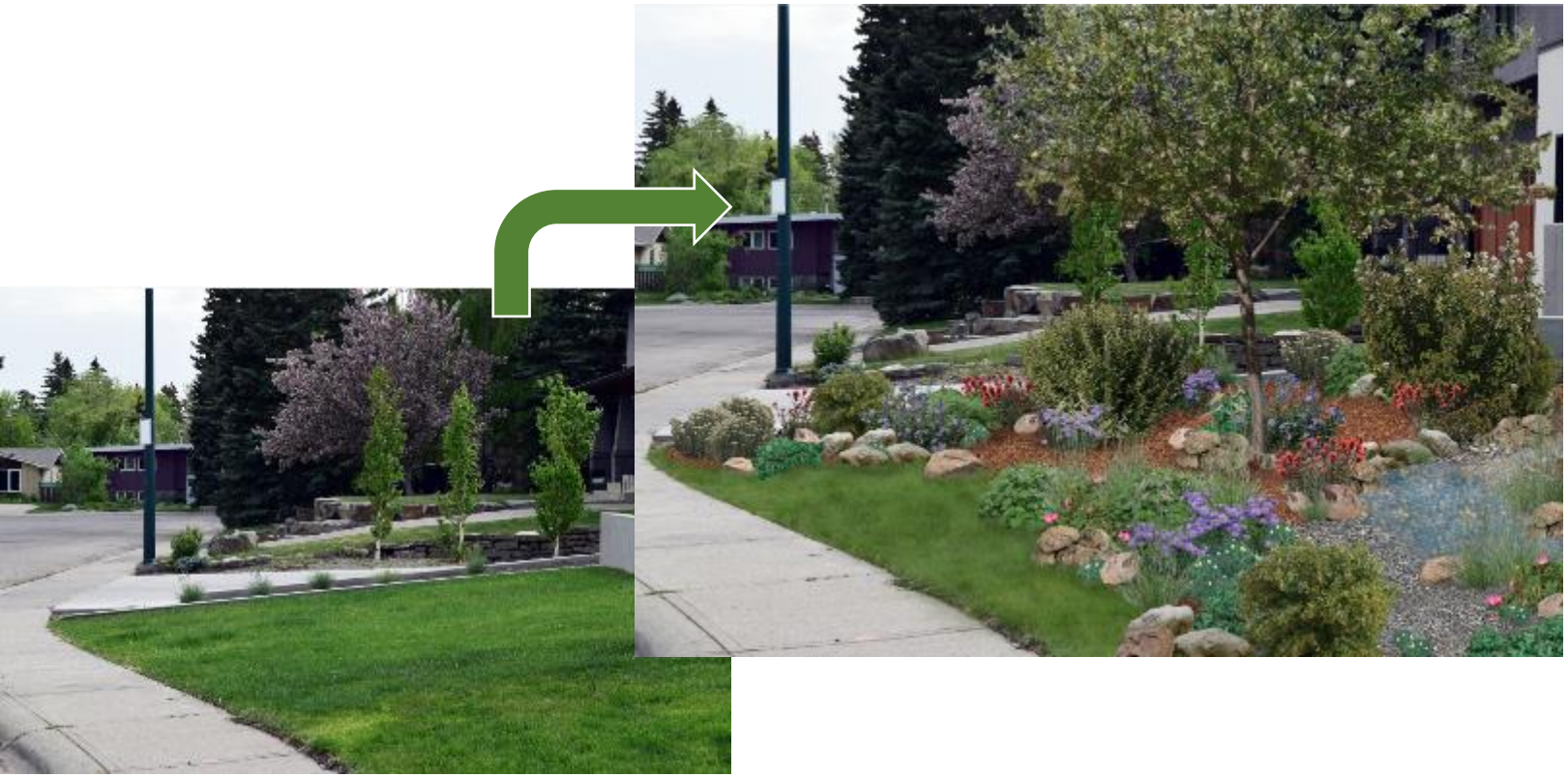
- *Front yard use*





Challenges to create a market for suburban ecosystem services

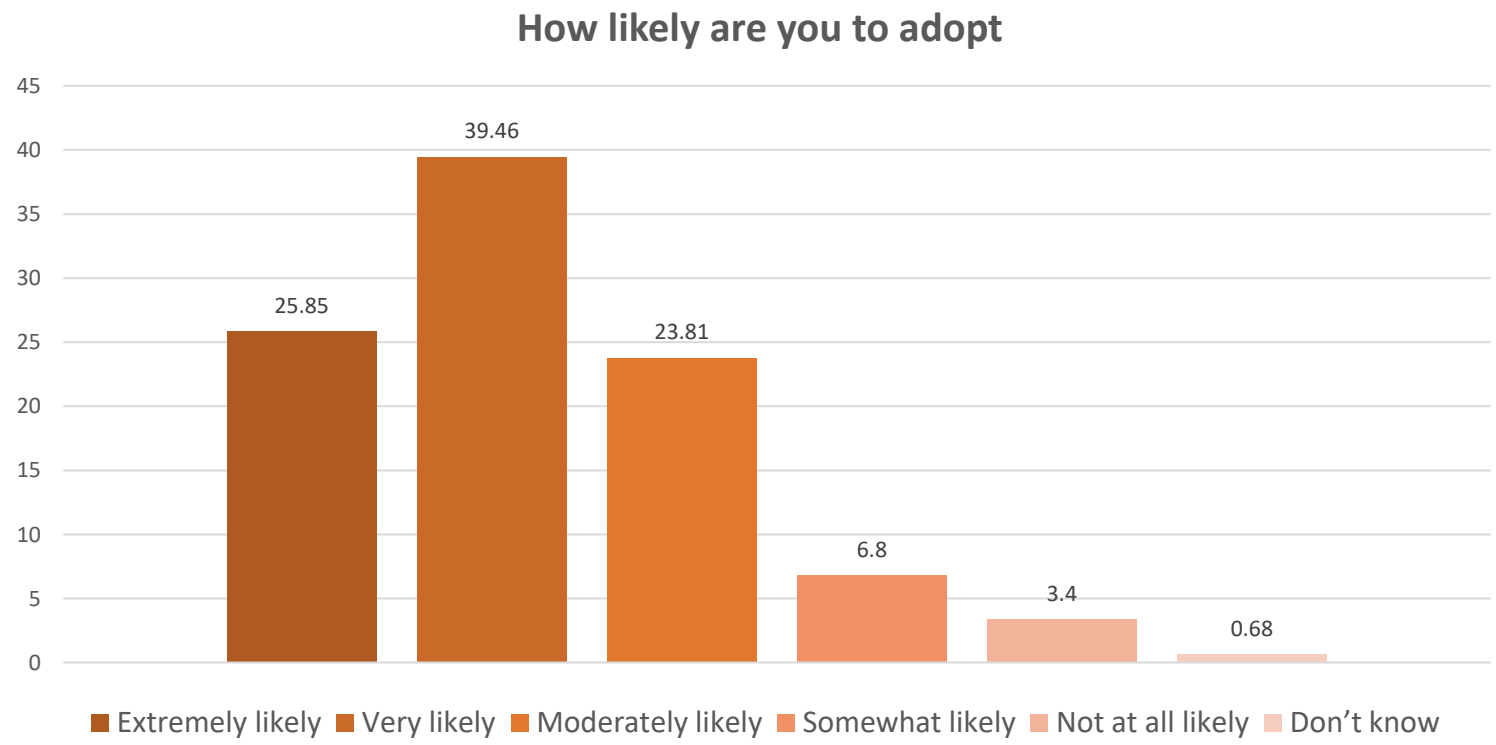
- **Lawn culture**
  - *Change the urban landscape*



- Social organization of Victorian times.
- Lawns instead of agricultural land to demonstrate higher social status
- Access to more land and resources.

Challenges to create a market for suburban ecosystem services

- *Change the urban landscape – transform to a native pollinator garden*



Challenges to create a market for suburban ecosystem services

- *Adoption of native pollinator gardens*

"**We are experiencing biodiversity and climate crises.** Wild species around the world, including pollinators, are declining at a frightening pace."

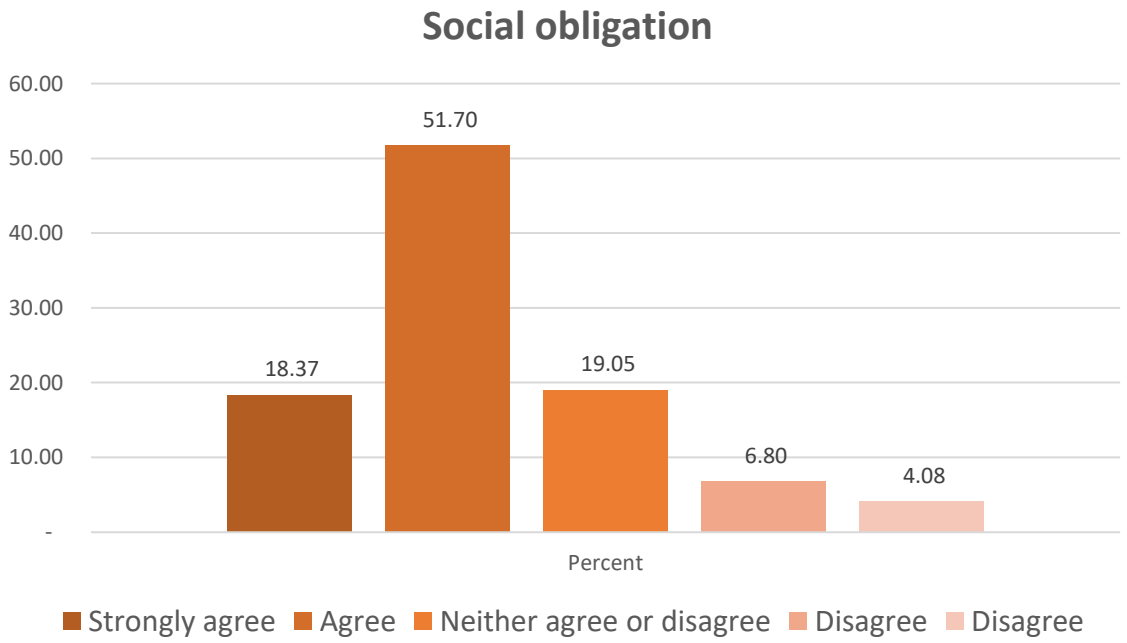
C. Cirillo (2022). Lawns are an outdated cultural norm. Let's lose them — before we lose the pollinators (thestar.com)

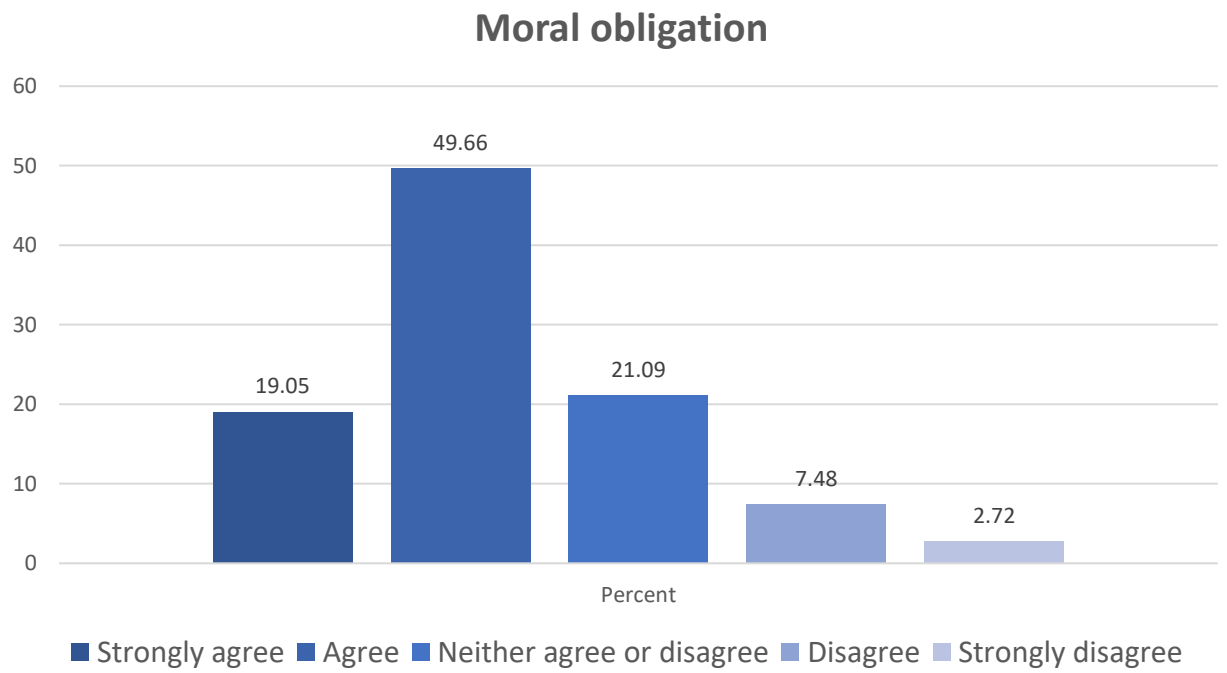
"Gardening **native species lowers the amount of water needed** in comparison to imported species. Other environmental benefits include **reduced weeding, pesticide use and overall maintenance.**"

A. Zimmerman (2009). Planting native species can reduce watering, pesticide use - ProQuest

Challenges to create a market for suburban ecosystem services

- *Adoption of native pollinator gardens*





How willing are people to pay for ecosystem services' benefits?

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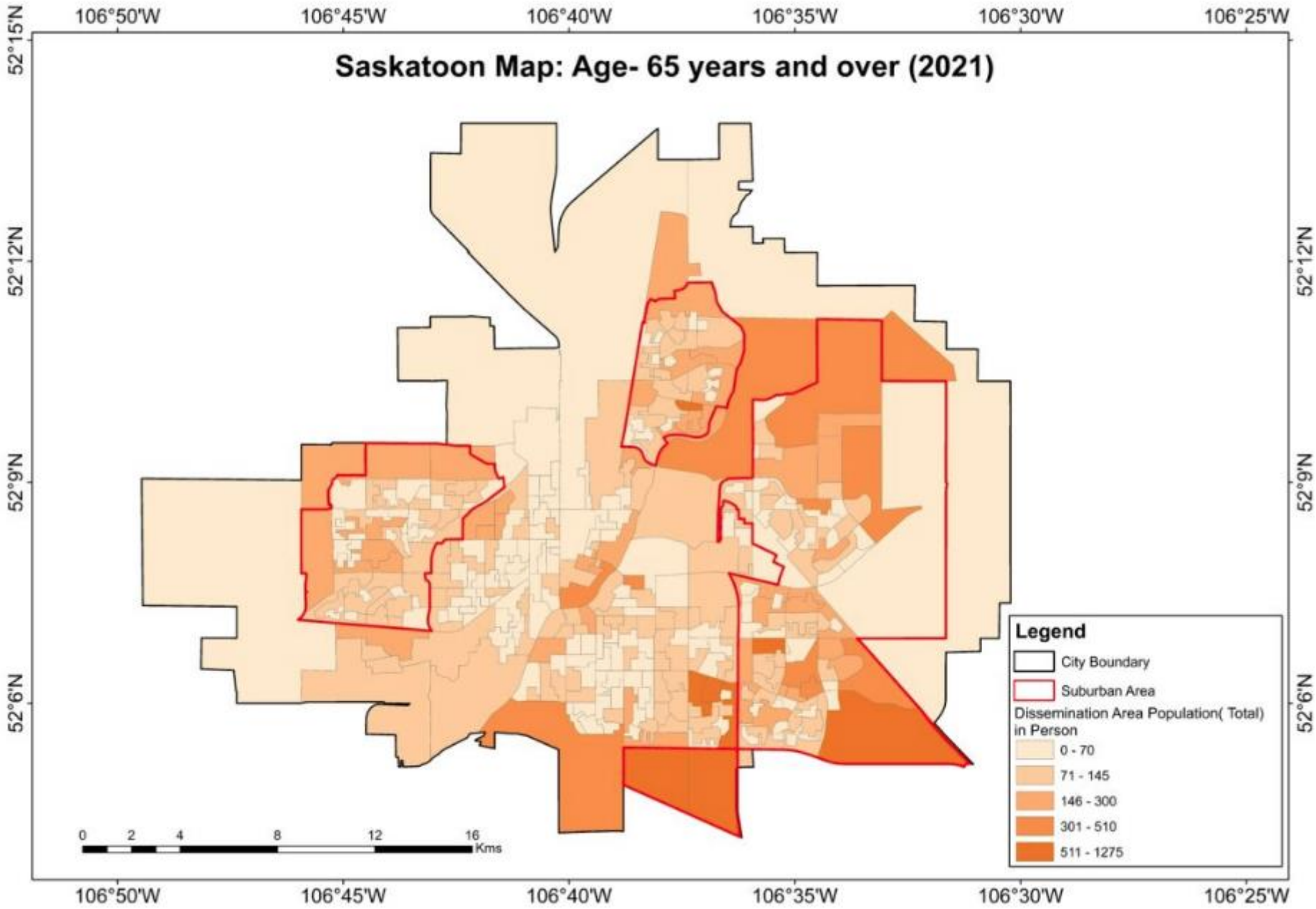
Who lives in suburban areas?

- Mapping of environmental features to understand the current conditions of these neighbourhoods.
- Greenness – Saskatoon *(Data 2019)*



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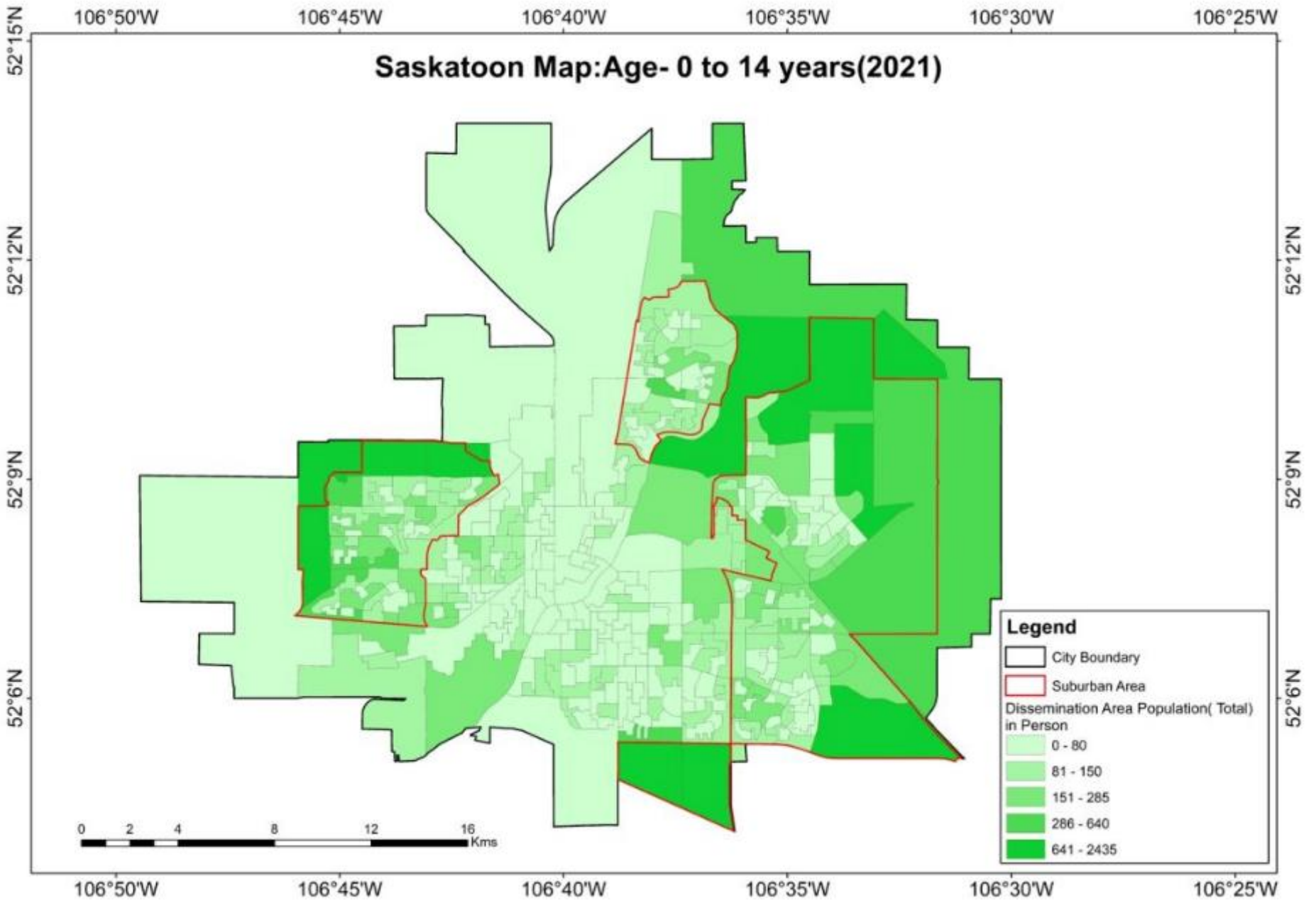

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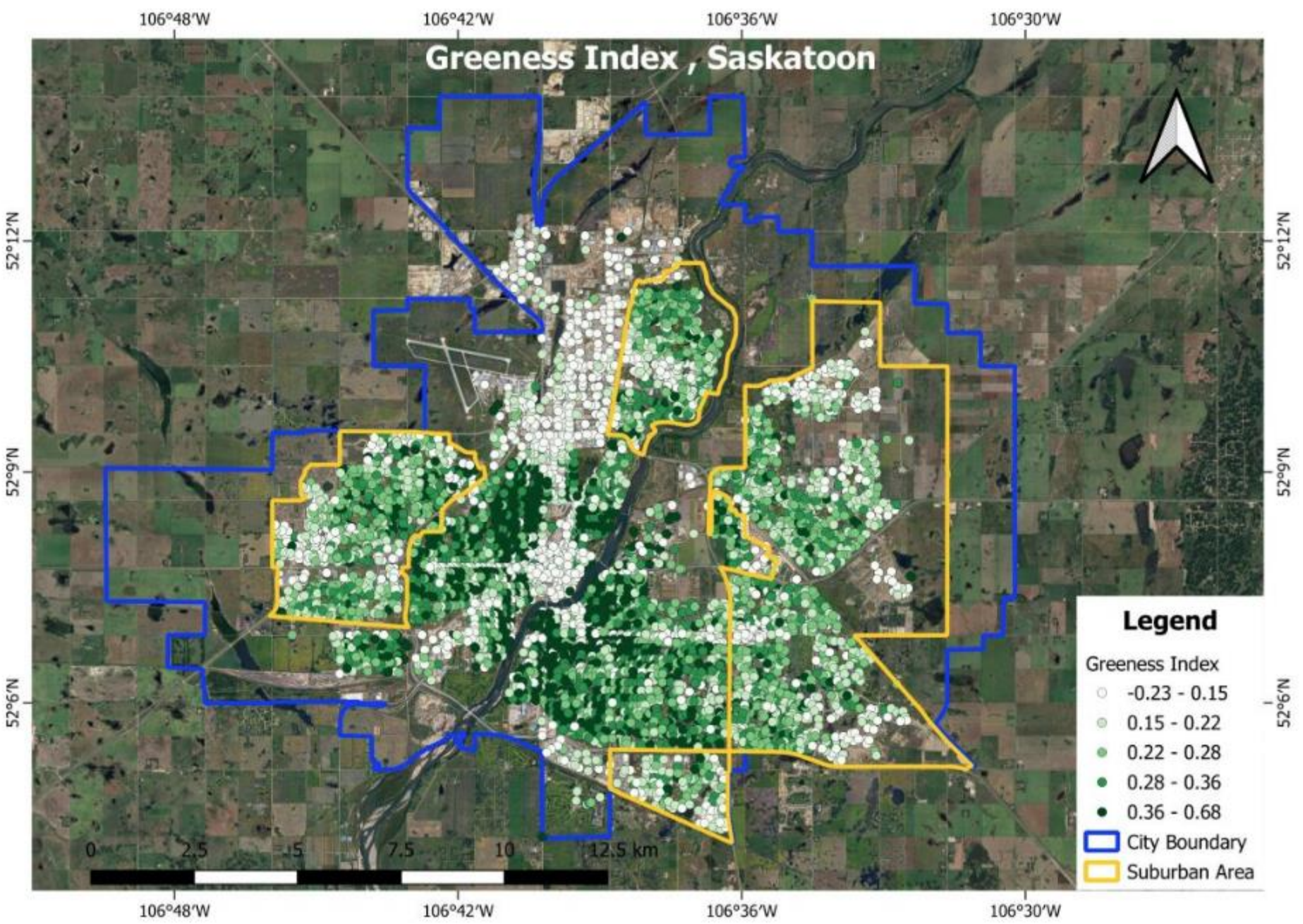

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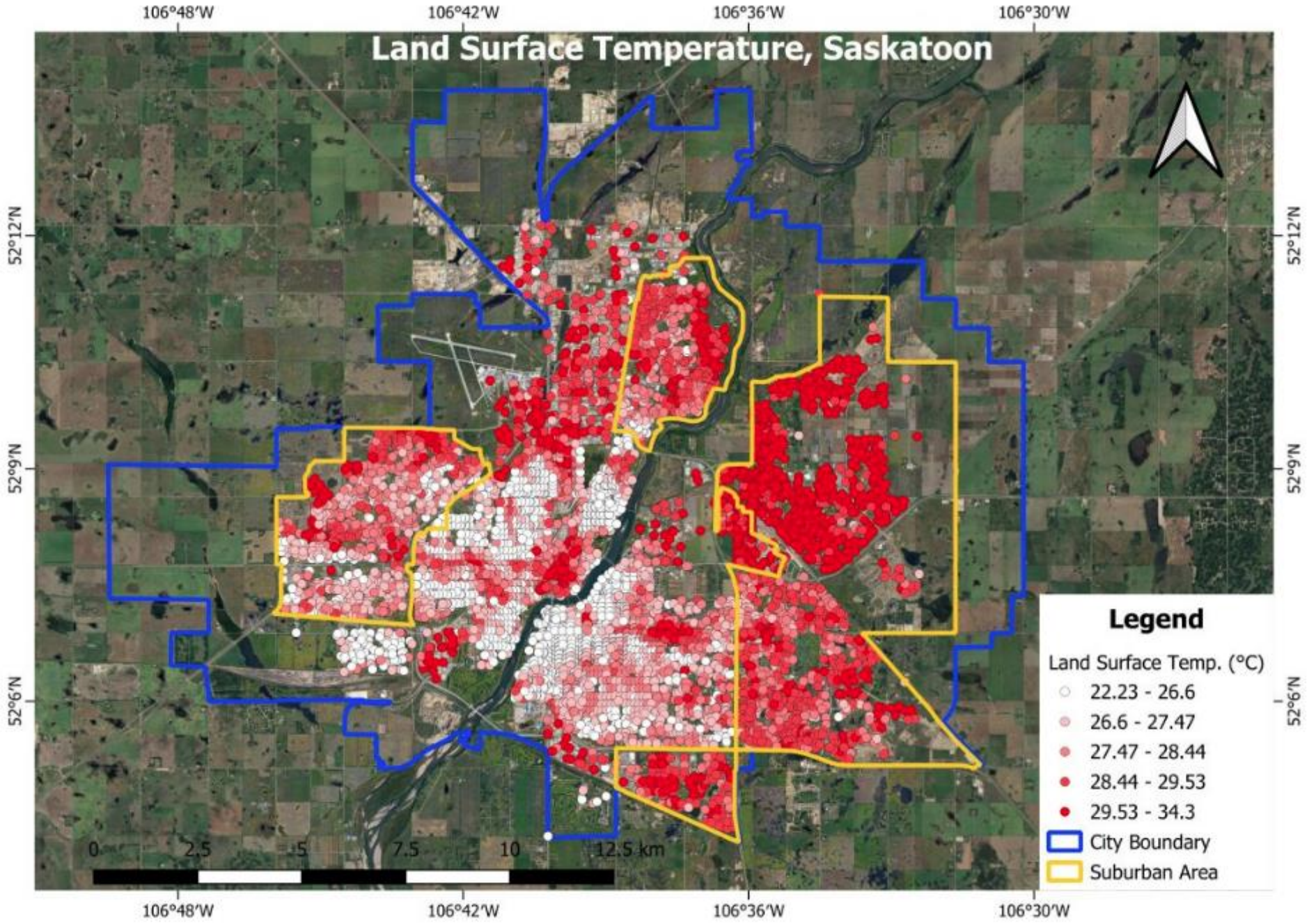
Environmental features of suburbia

- Mapping of environmental features to understand the current conditions of these neighbourhoods.
- Land Surface Temperature – Saskatoon *(Data 2019)*



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Environmental features of suburbia

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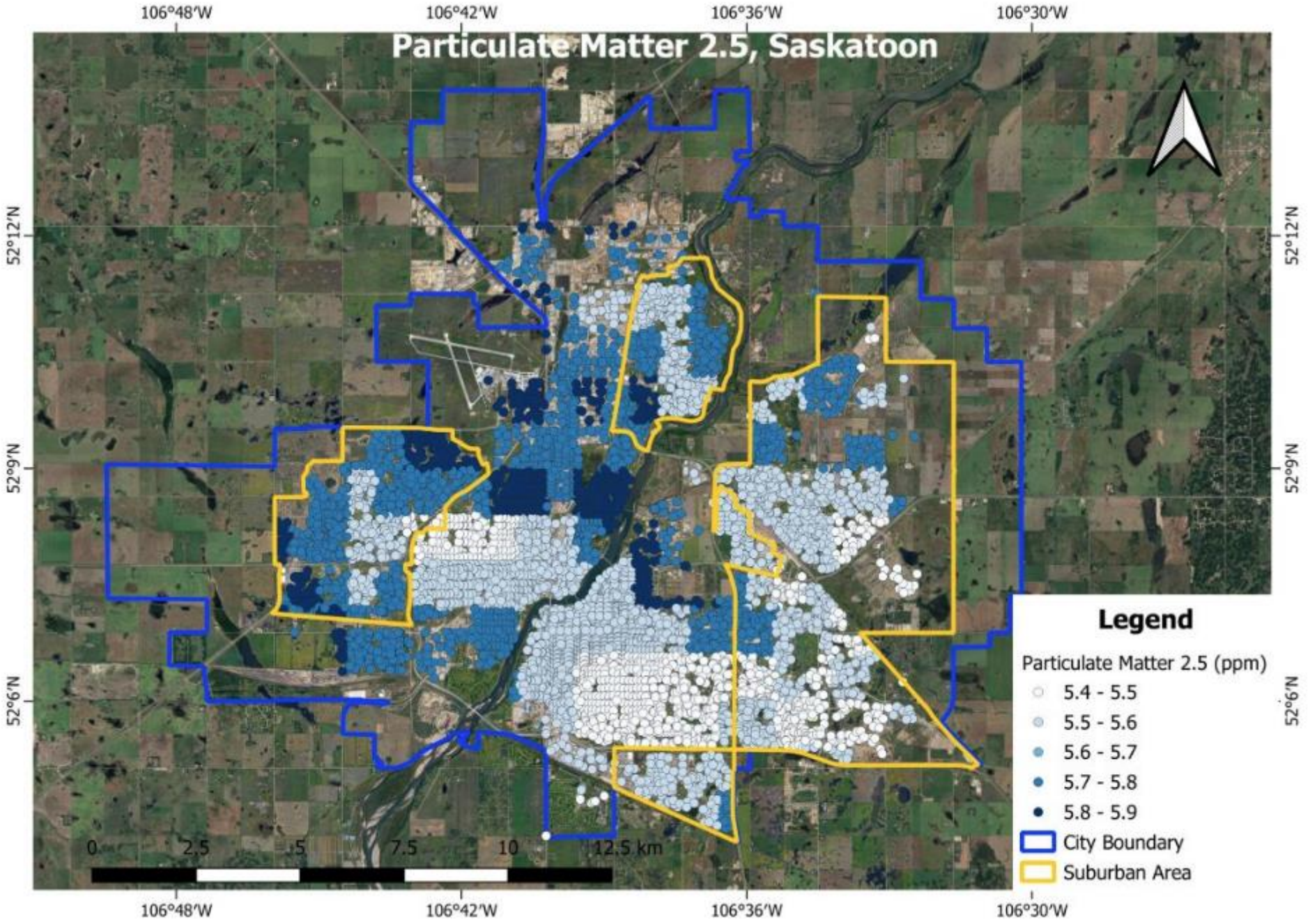
- Particulate Matter – Saskatoon *(Data 2019)*



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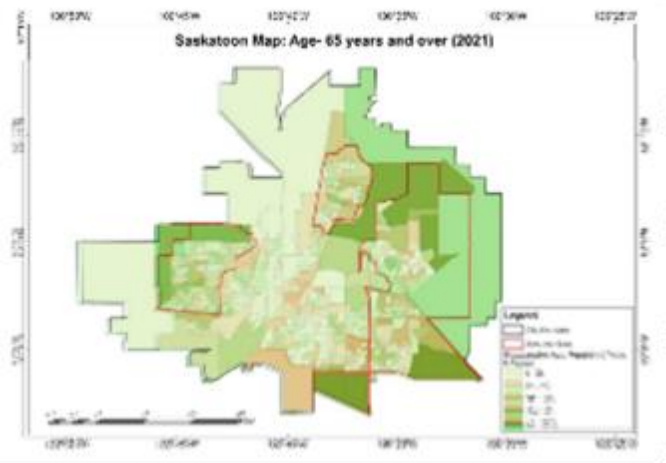
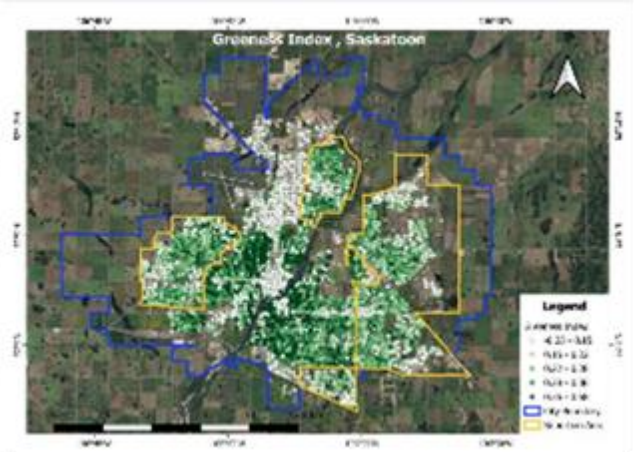
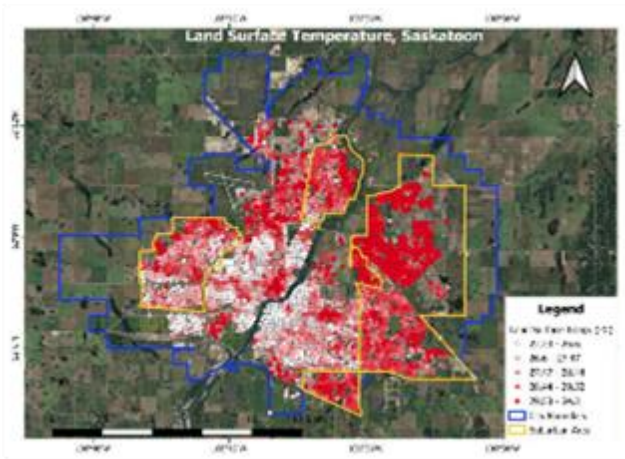
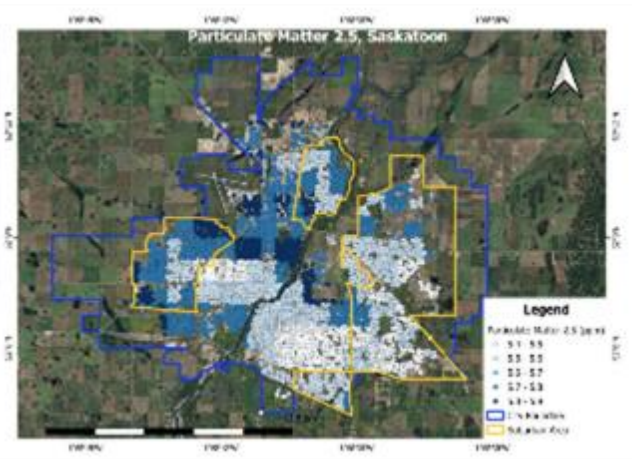
Ecosystem services and biodiversity preservation in Prairie suburban areas









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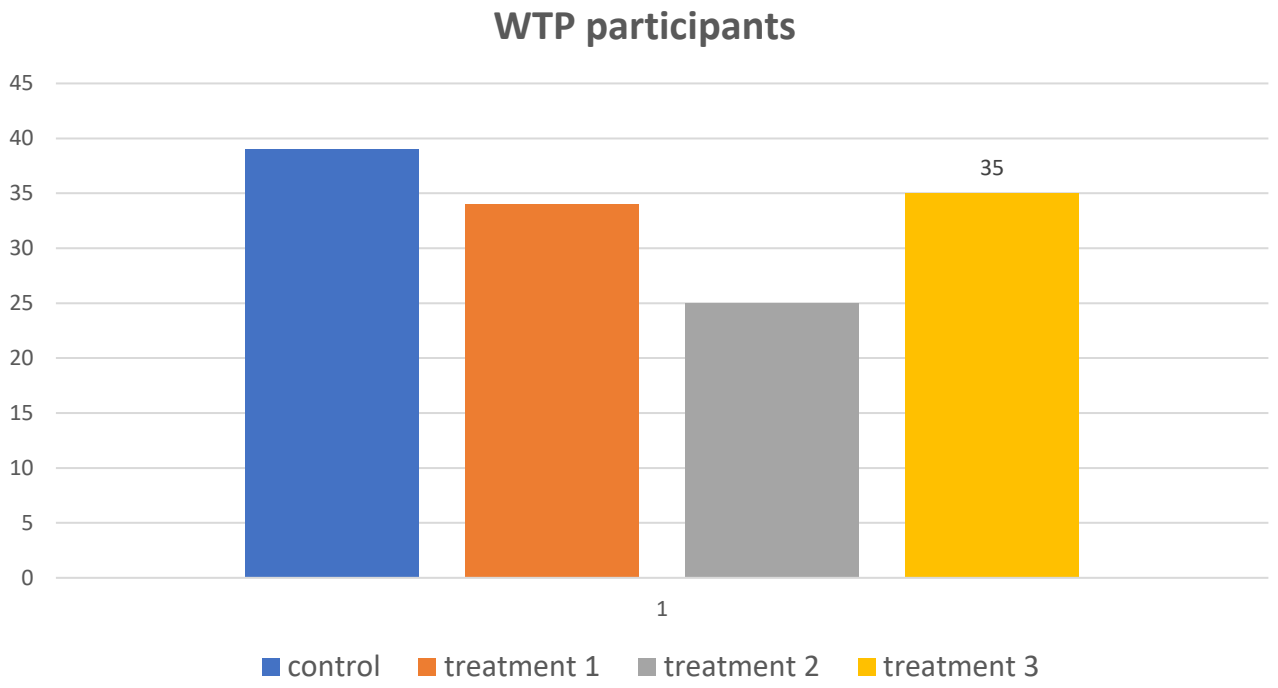
Willingness to pay for ecosystem services **experiment**

Willingness to pay for ecosystem services - experiment

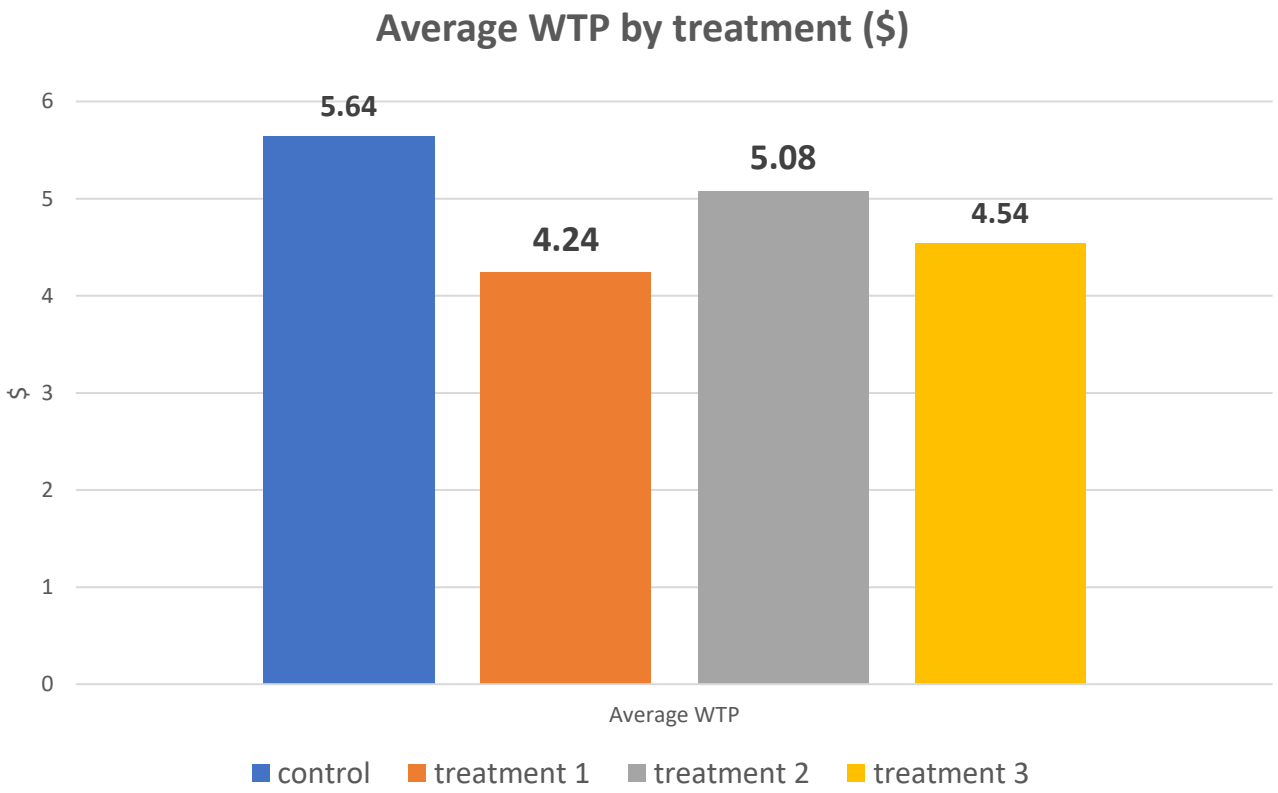
control | treatment 1 | treatment 2 | treatment 3

Willingness to pay for ecosystem services

- *WTP – experiment - participants*

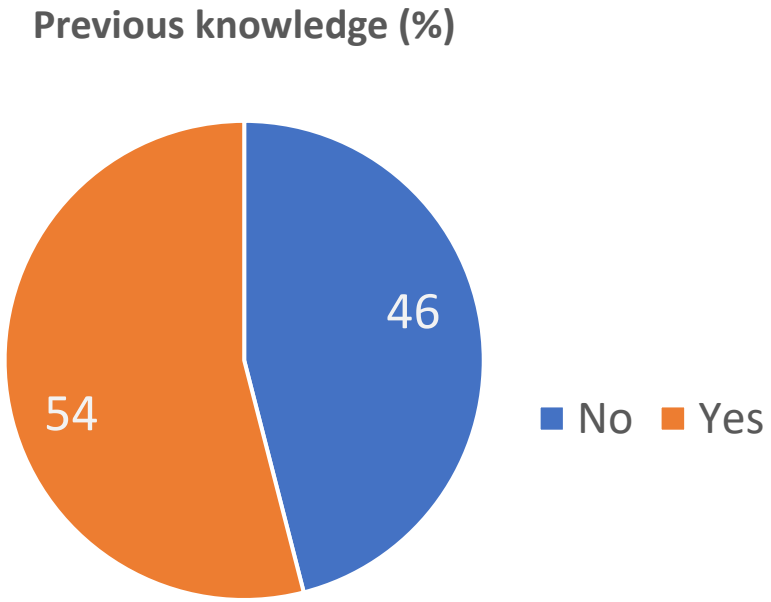


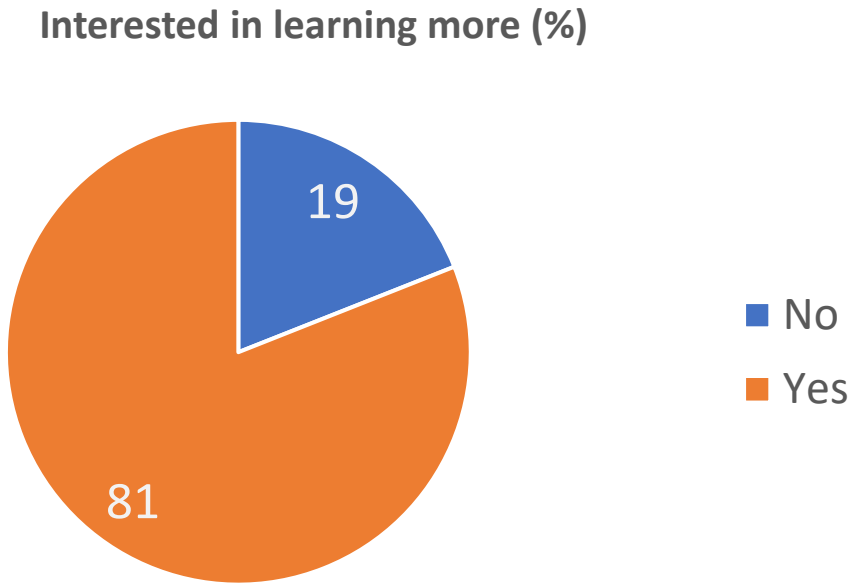
Willingness to pay for ecosystem services, payment



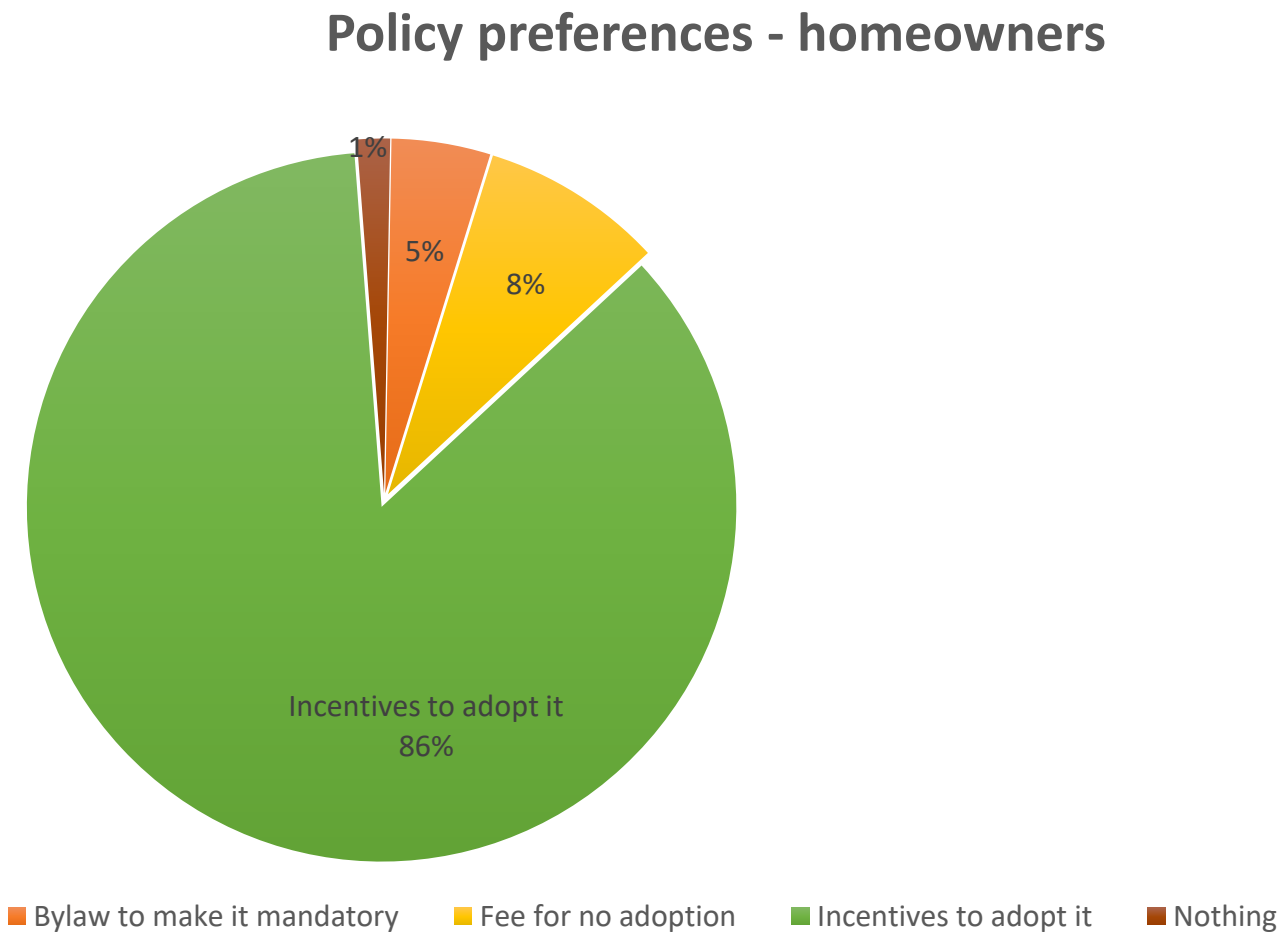
Willingness to pay for ecosystem services

- *WTP – experiment - knowledge*





Willingness to pay for ecosystem services, homeowners' policy preferences



Conclusions

Conclusions

- There is a growing interest and a great potential to **create pollinator corridors** in urban areas.
- The benefits of greenery in cities include **controlling surface temperature and reducing particulate matter (ecosystem services)**.
- Climate-resilient cities are needed to preserve **residents' well-being**.



Conclusions

- The production of ecosystem services is fundamental to **adapting cities in the Canadian Prairies to climate change** and scenarios of water scarcity, heat waves and health impacts.
- There are opportunities for municipalities to get involved and **promote the adoption of native pollinator gardens**.



Thank you!

Questions and comments:

oscar.zapata@usask.ca ana.hidalgo@usask.ca

https://research-groups.usask.ca/urban-ecoservices/

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