



NATURAL RESOURCES CANADA - INVENTIVE BY NATURE

National Interface Mapping for Canada



ICLR Friday Forum Webinar

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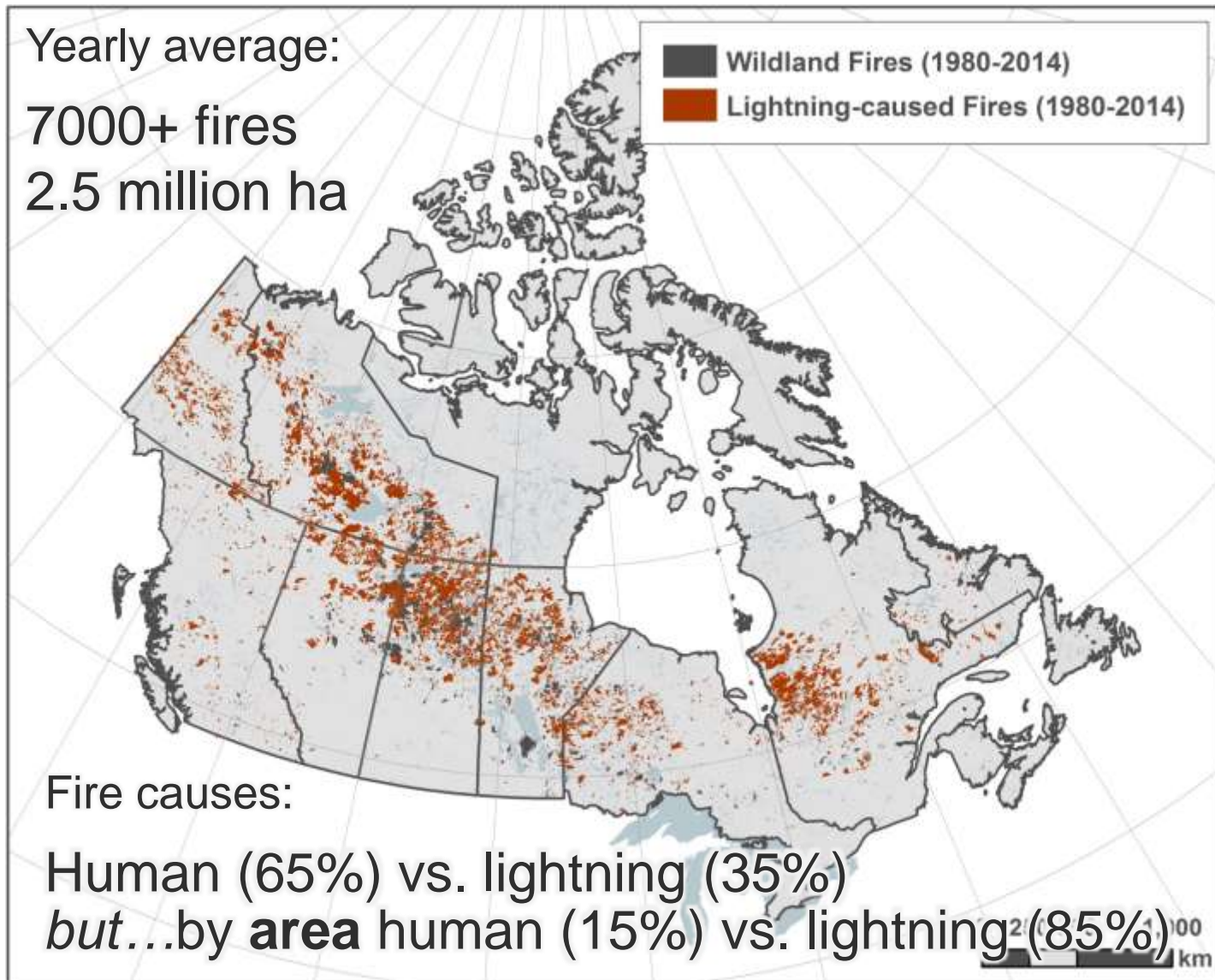


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Wildland Fire Background



Data: National Fire Database

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Fuels



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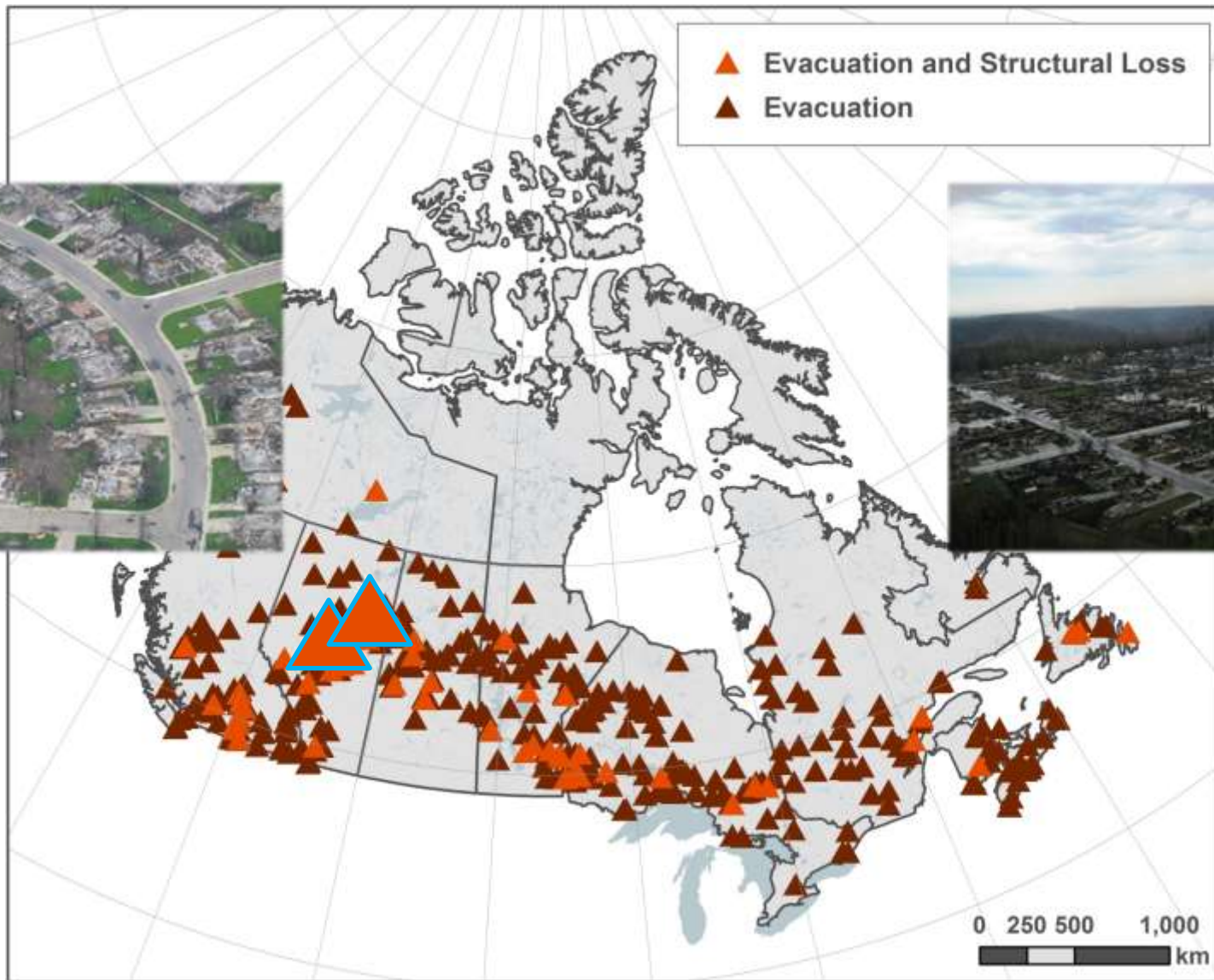
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Wildland Fire



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Evacuations



Data: Beverly and Bothwell (2011)

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Structure Ignition



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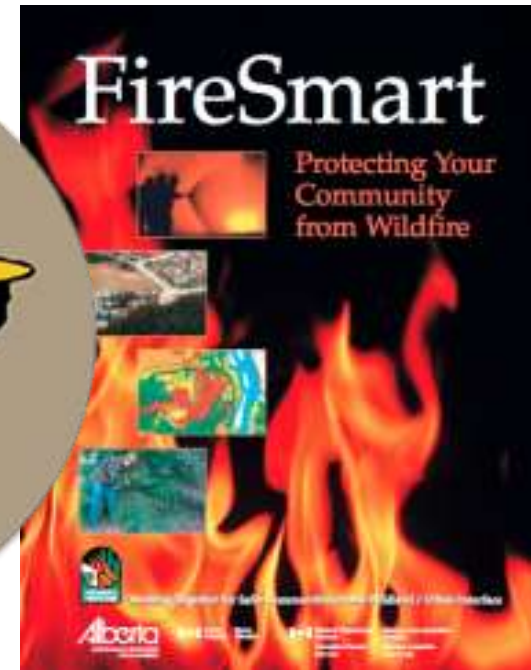


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Fire Mitigation



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Fire Management



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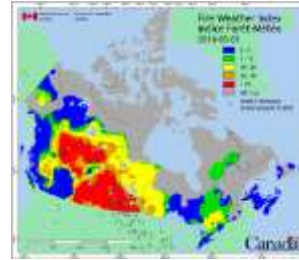
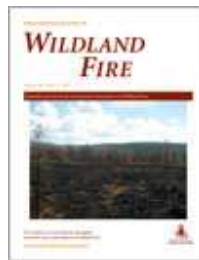


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Fire Research



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Knowledge Gap

Where are we most vulnerable/at risk to wildfire?



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Wildland-Urban Interface



Wildland-Urban Interface

Industrial Interface



Infrastructure Interface



Research Objective

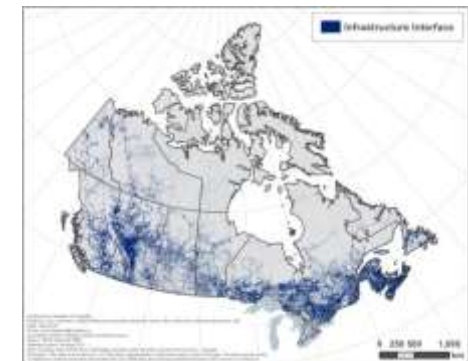
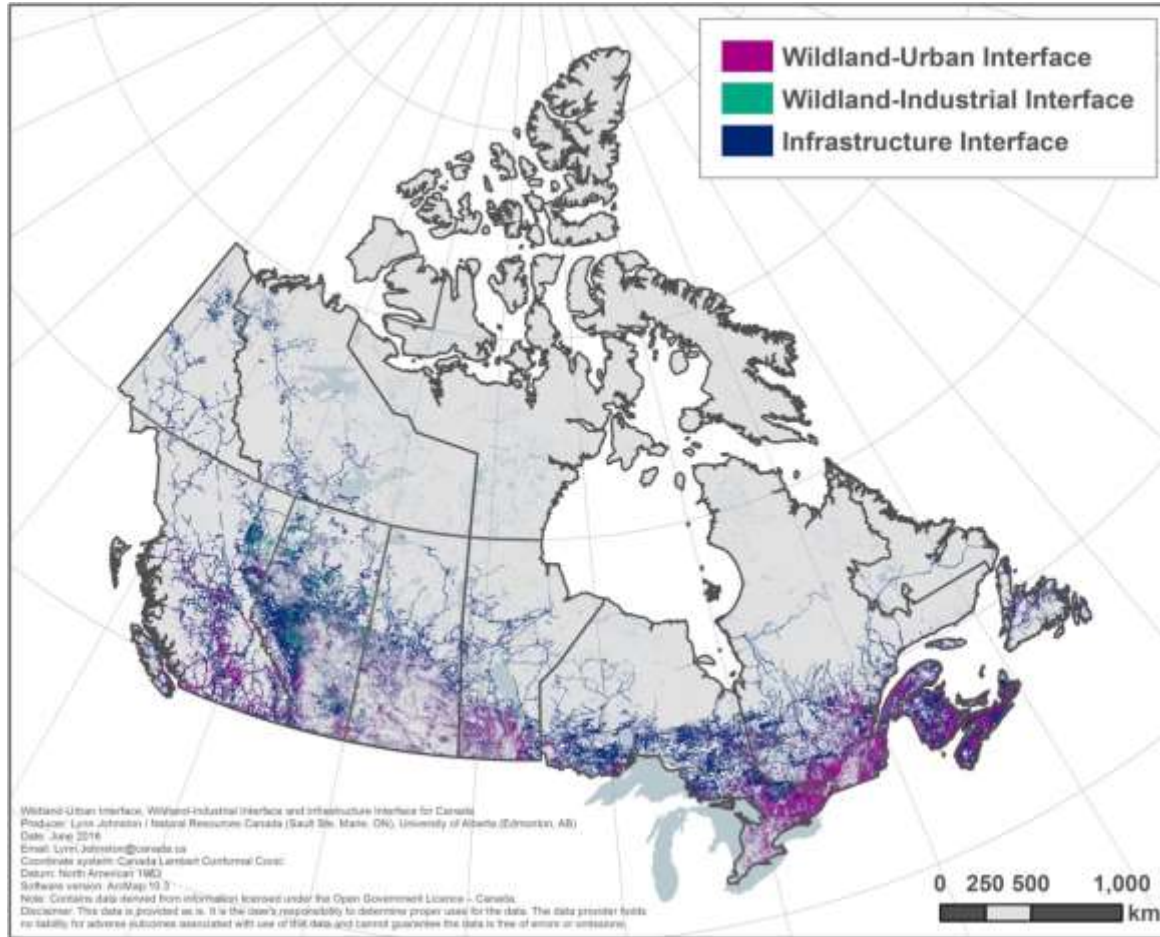
Produce maps of interface areas across Canada.

also...

Provide basic statistics on the interface and perform analysis of spatial patterns.



Interface Maps



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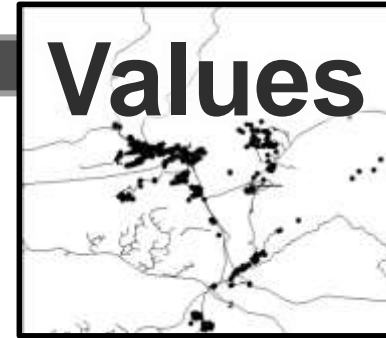
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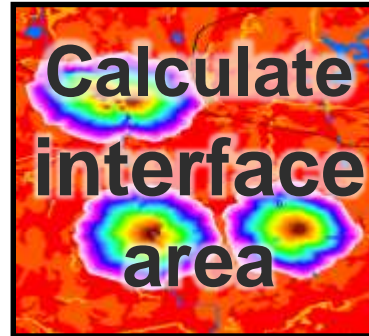
Mapping the Interface Area



Data source: LandCover 2000
land cover types and CanVec+



Data source: CanVec+



Product: three national
maps of interface areas



Wildland-urban
interface



Infrastructure
interface

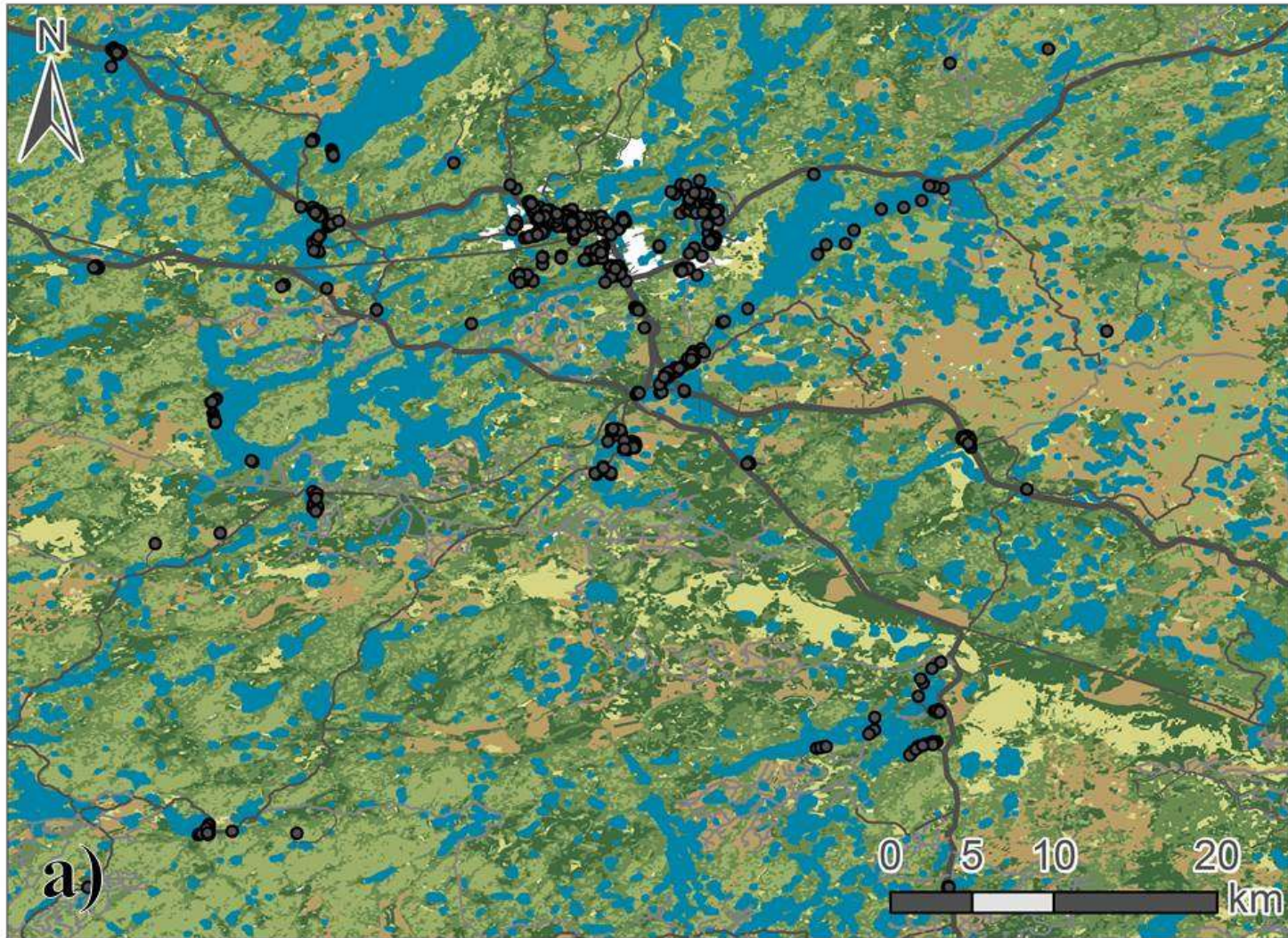


Wildland-industrial
interface

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Fuels and values:



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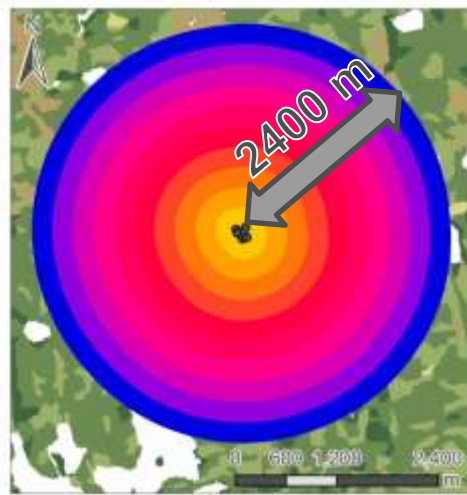
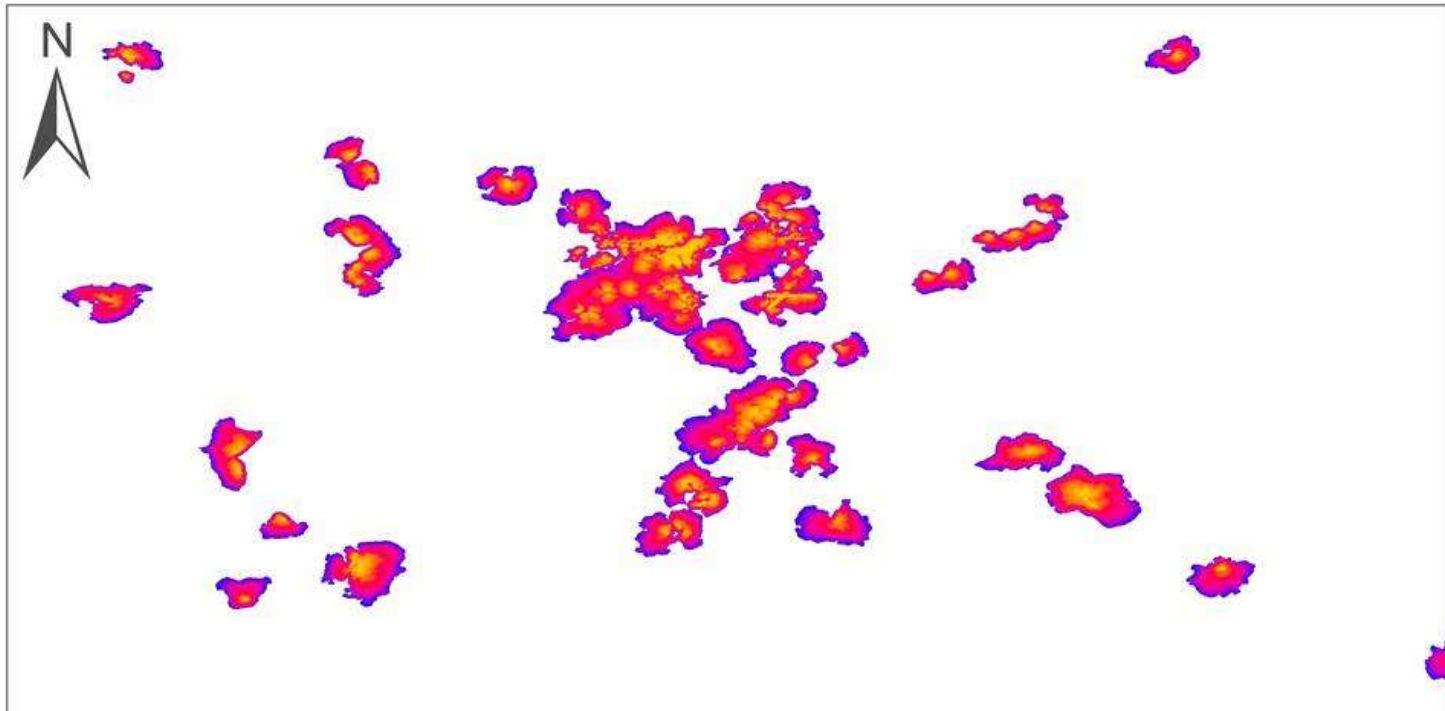


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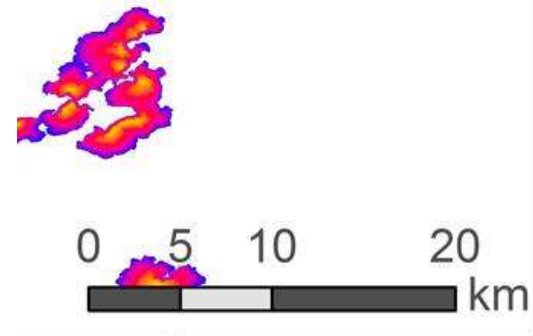
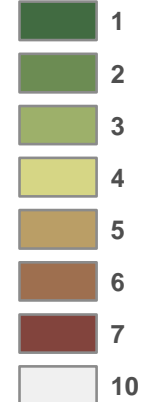
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Cost distance:

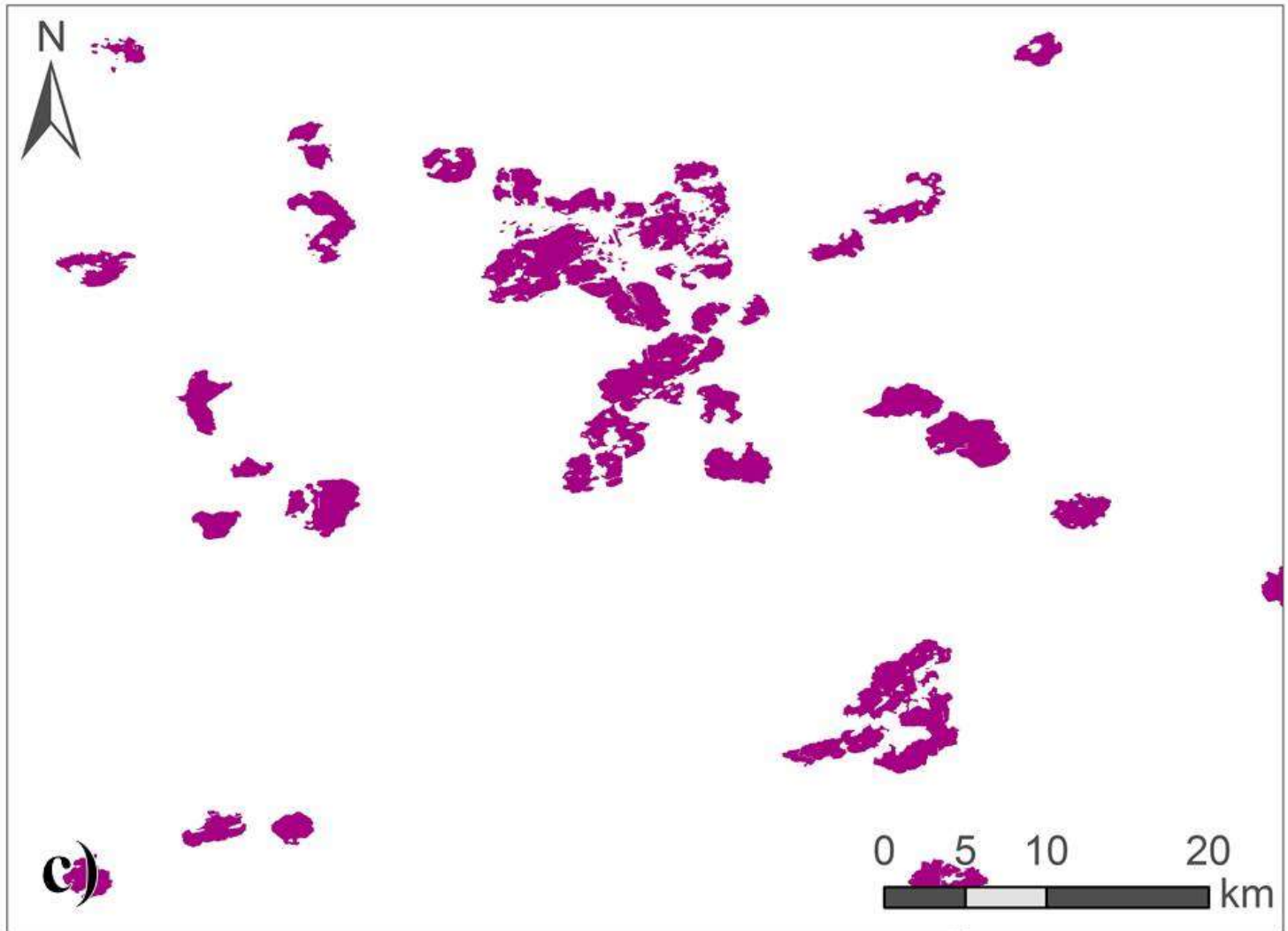


Fuel Weight



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Wildland-Urban Interface:



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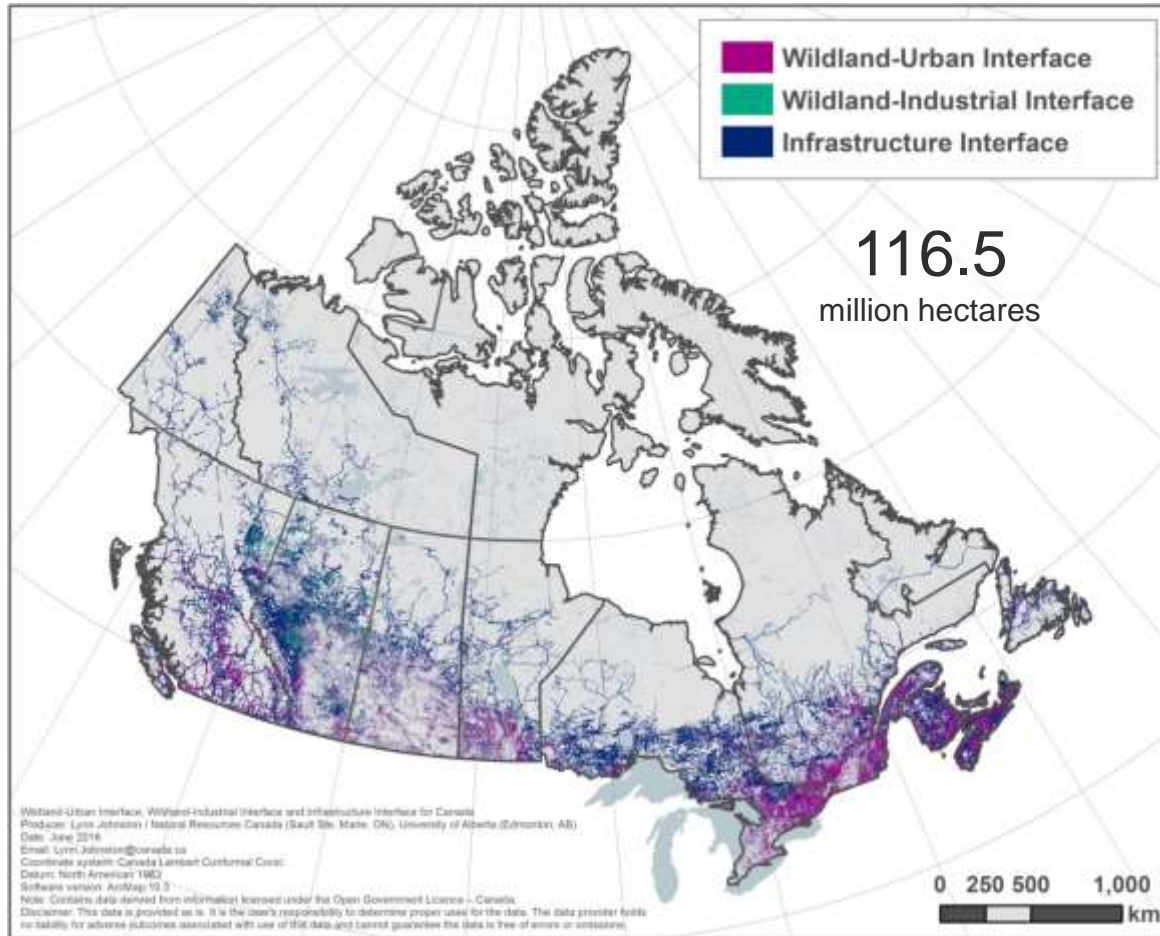


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Interface Maps



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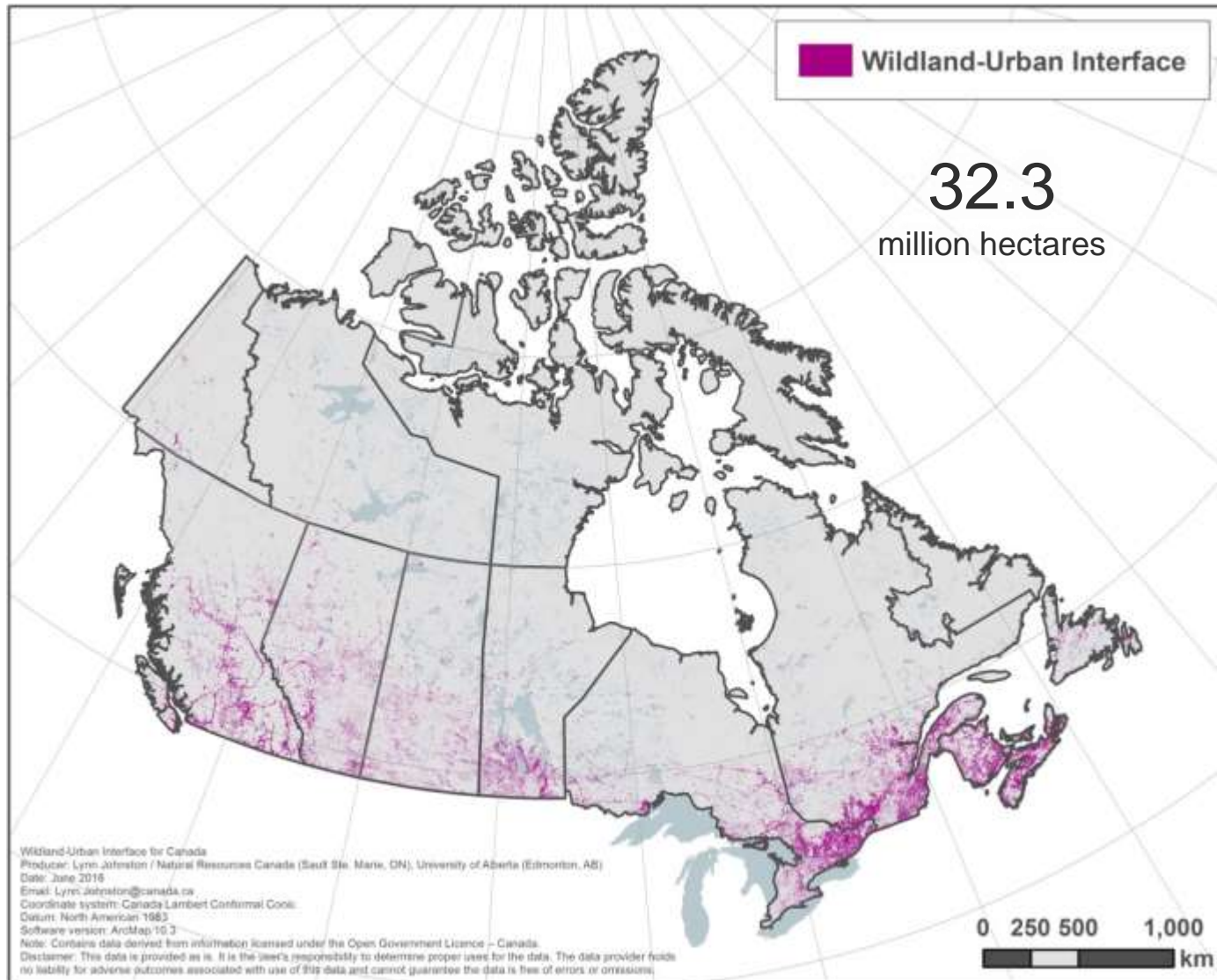


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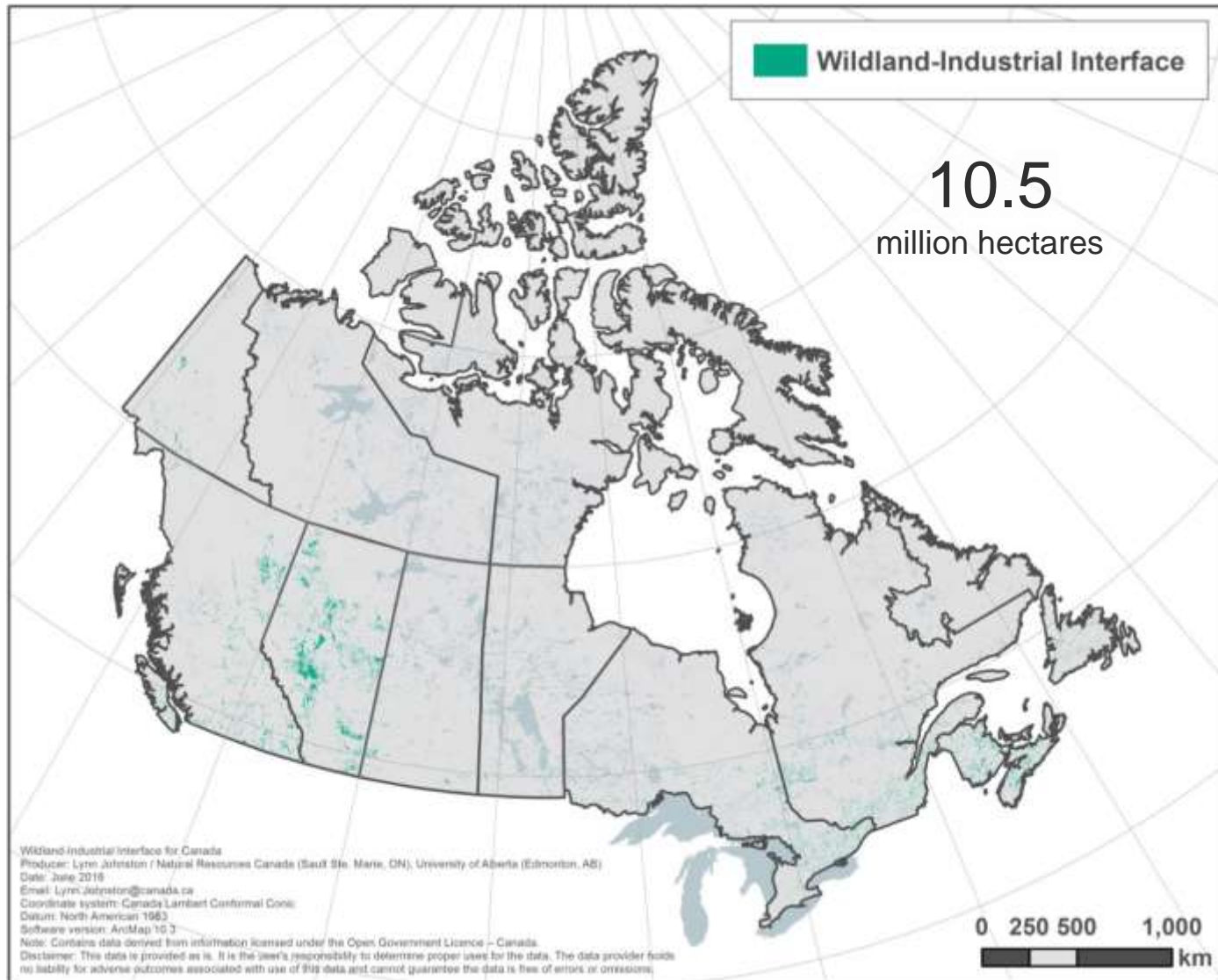


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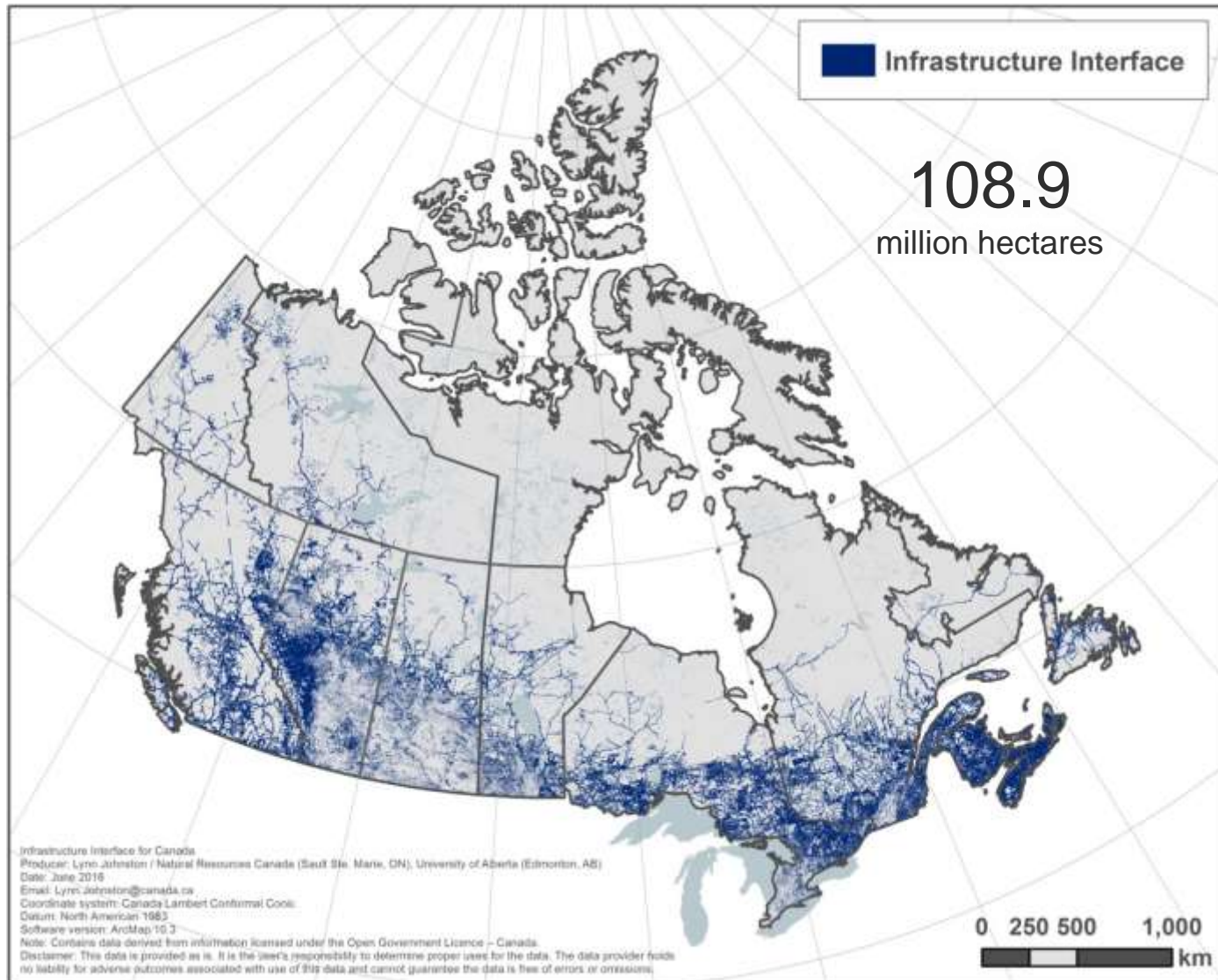


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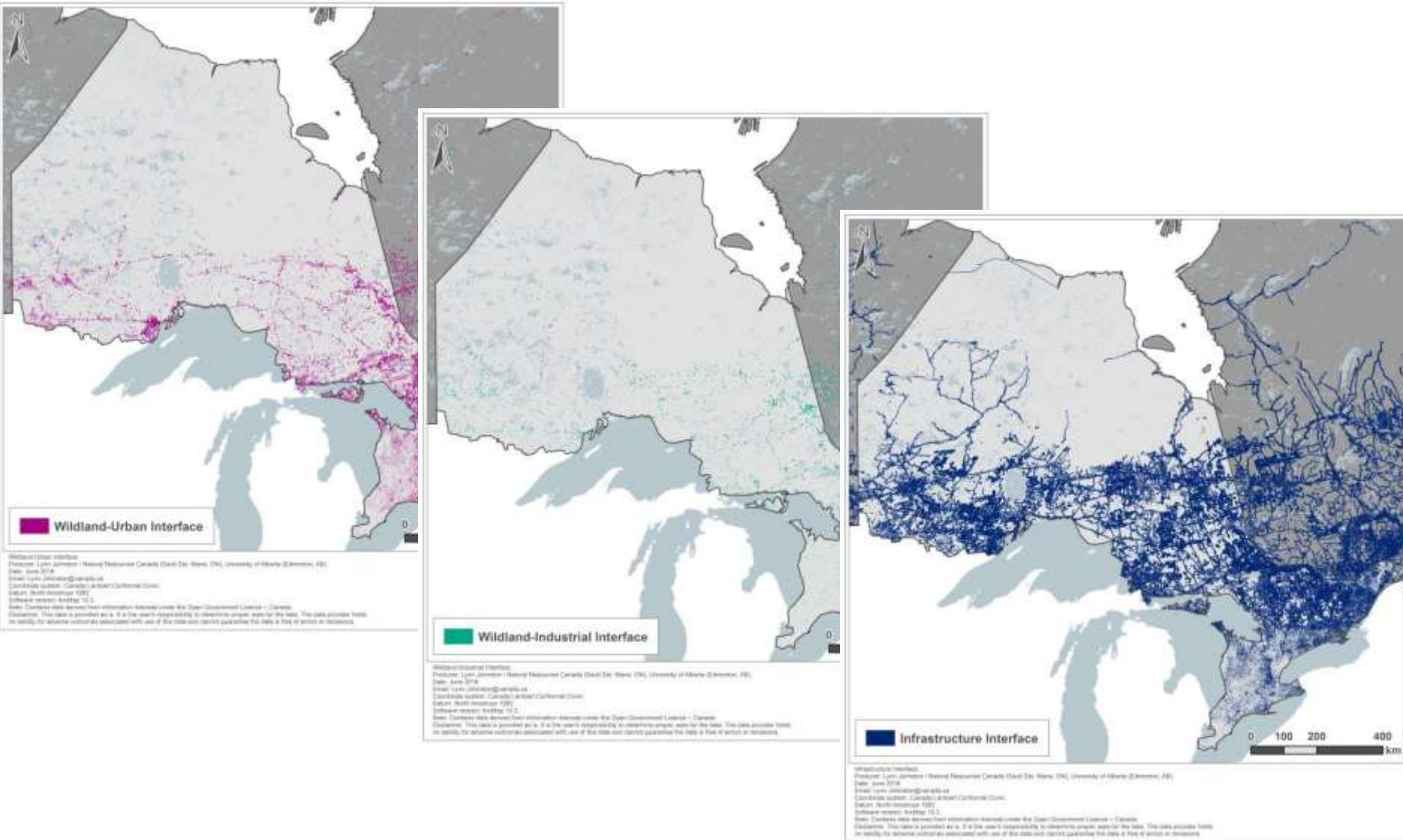


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Provincial/Territorial Maps



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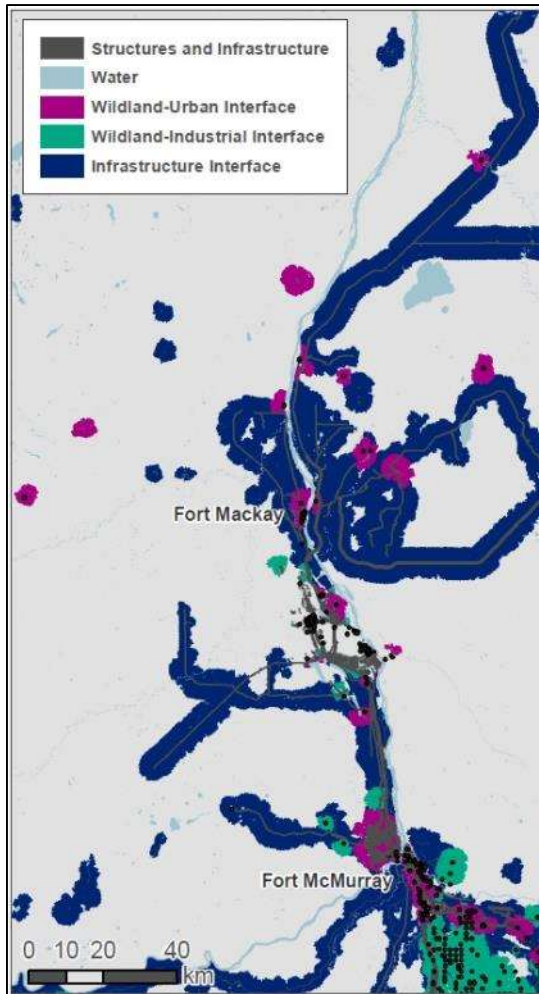


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Custom and Small Scale Maps



Wildland Fire Interface Areas Ontario Fire Response Sector E04

Description

Wildfires can cause significant destruction to values. This destruction typically occurs at the "wildland-urban interface" (WUI), which are areas where homes or other burnable community/public structures meet with or are scattered within wildland fuels.

The concept of the "interface" can be extended to industrial structures (oil and gas, mining etc.), forming the "wildland-industrial interface" (WI). Also, infrastructure features such as railways, roads, and pipelines can be considered the third type of interface: the "infrastructure interface".

This project produced national interface maps for Canada. The interface is defined as the wildland fuel areas which, if involved in a wildland fire under the appropriate conditions, may potentially put nearby structures/values at risk. Interface areas shown on the maps may require fire mitigation or fire suppression if a fire occurs.

Input data was from two national datasets. Canvec+ provided the structure/infrastructure data, and the Land Cover 2000 dataset provided repeatedly burned and cover data that were converted to broad categories of relative fuel types. The "interface" was calculated as the fuel area surrounding structures, in a variable-width buffer based on fuel type categories and fuel arrangement. The buffer has a maximum potential distance of 2400m (in the most "hazardous" fuels, e.g. a continuous conifer stand), but most cases it is much less and depends on the spatial arrangement and type of fuel.

Outputs

This is the first national map of WUI for Canada, and the first map of WI and infrastructure interface in the world.

The map to the left shows the distribution of all three interface types for Ontario.

The three zoomed maps below show the distribution of each interface type for the E04 Fire Response Sector.

Province	Interface Area (km ²)		
	Wildland-Urban Interface	Wildland-Industrial Interface	Infrastructure Interface
Alberta	22.0 (1%)	3.4 (0.1%)	18.0 (0.1%)
B.C.	5.0 (0.1%)	1.8 (0.0%)	17.8 (0.1%)
Ontario	5.8 (0.0%)	1.2 (0.0%)	21.8 (0.1%)
Quebec	7.2 (0.0%)	1.9 (0.0%)	18.3 (0.1%)
Canada	51.2 (0.0%)	10.8 (0.0%)	108.2 (0.1%)

Interface maps are available in a variety of formats (e.g. images or GIS layers) and scales (from district to national) up to a 30 m resolution, available upon request.

Johnston, Lynn M. (2016) Mapping Canadian Wildland Fire Interface Areas. MSc thesis, Department of Renewable Resources, University of Alberta. 101 pp.

WESTERN PARTNERSHIP FOR WILDLAND FIRE SCIENCE

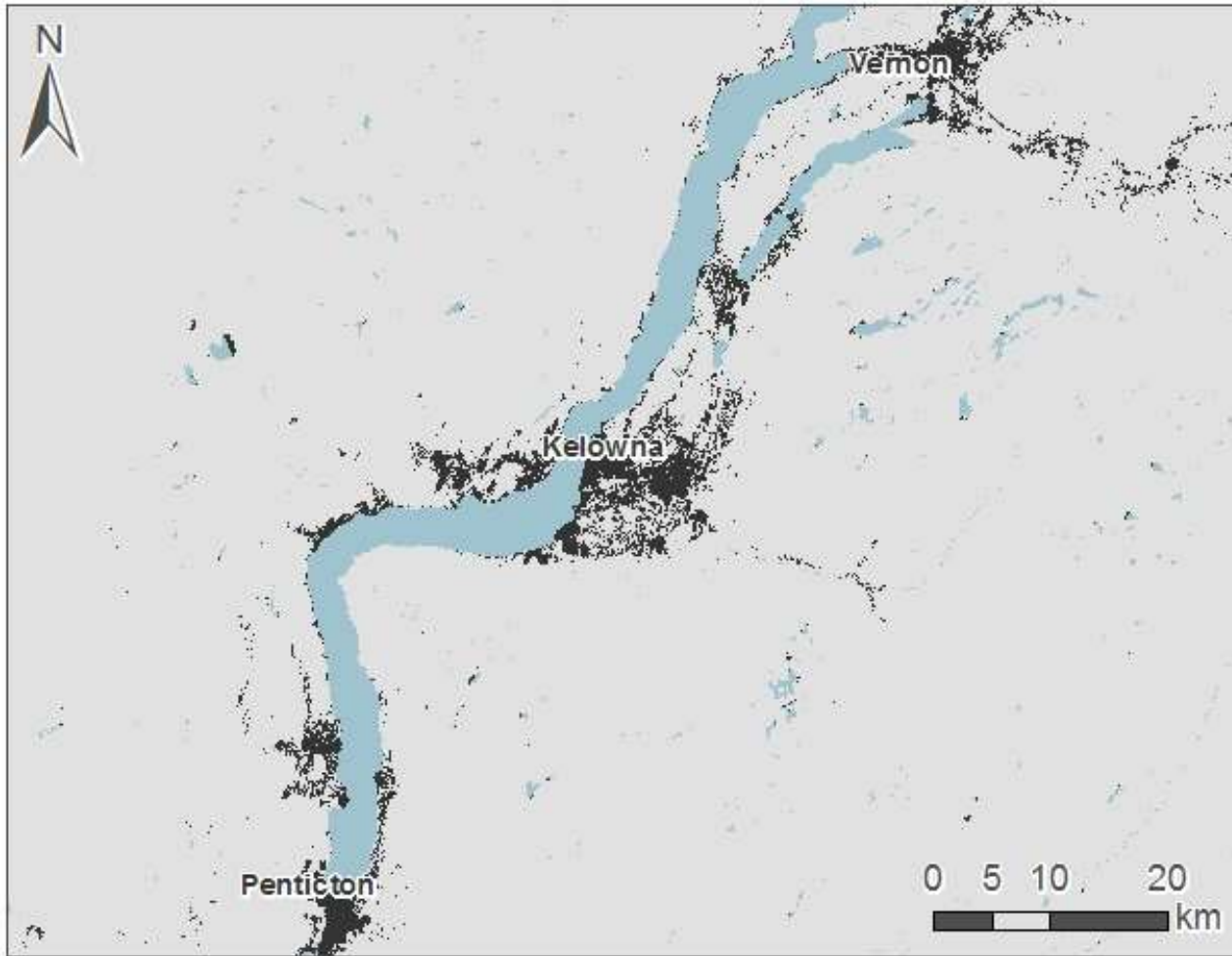
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Interface Maps - Fort McMurray and north
 Producer: Lynn Johnston / Natural Resources Canada (Sault Ste. Marie, ON), University of Alberta (Edmonton, AB)
 Date: Nov 2016
 Email: Lynn.johnston@canada.ca
 Coordinate system: Canada Lambert Conformal Conic
 Datum: North American 1983
 Software version: ArcMap 10.3
 Note: Contains data derived from information licensed under the Open Government Licence - Canada.
 Disclaimer: This data is provided as is. It is the user's responsibility to determine proper uses for the data. The data provider holds no liability for adverse outcomes associated with use of this data and cannot guarantee the data is free of errors or omissions.

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Local Interface Maps



- Wildland-Urban Interface
- Wildland-Industrial Interface
- Infrastructure Interface

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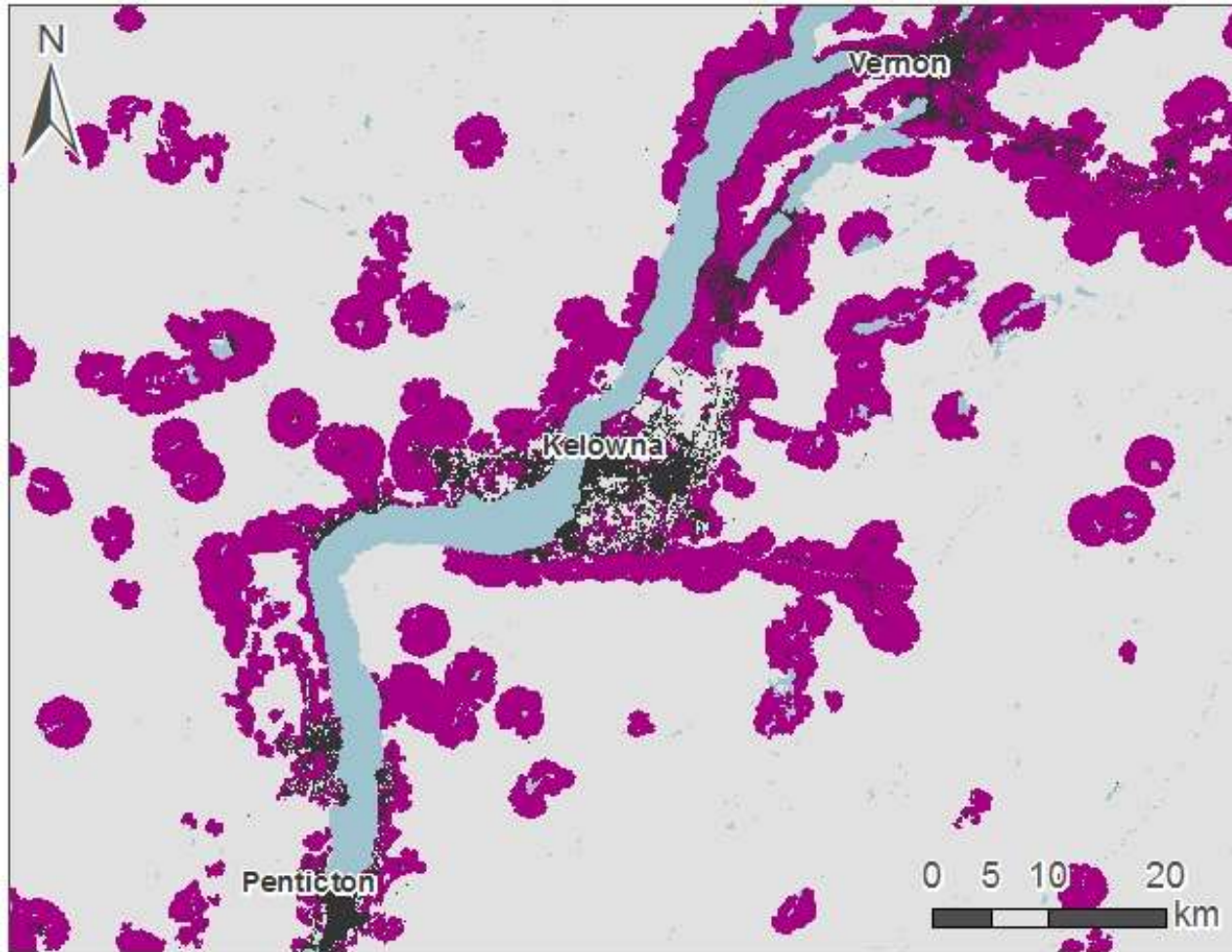


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Local Interface Maps



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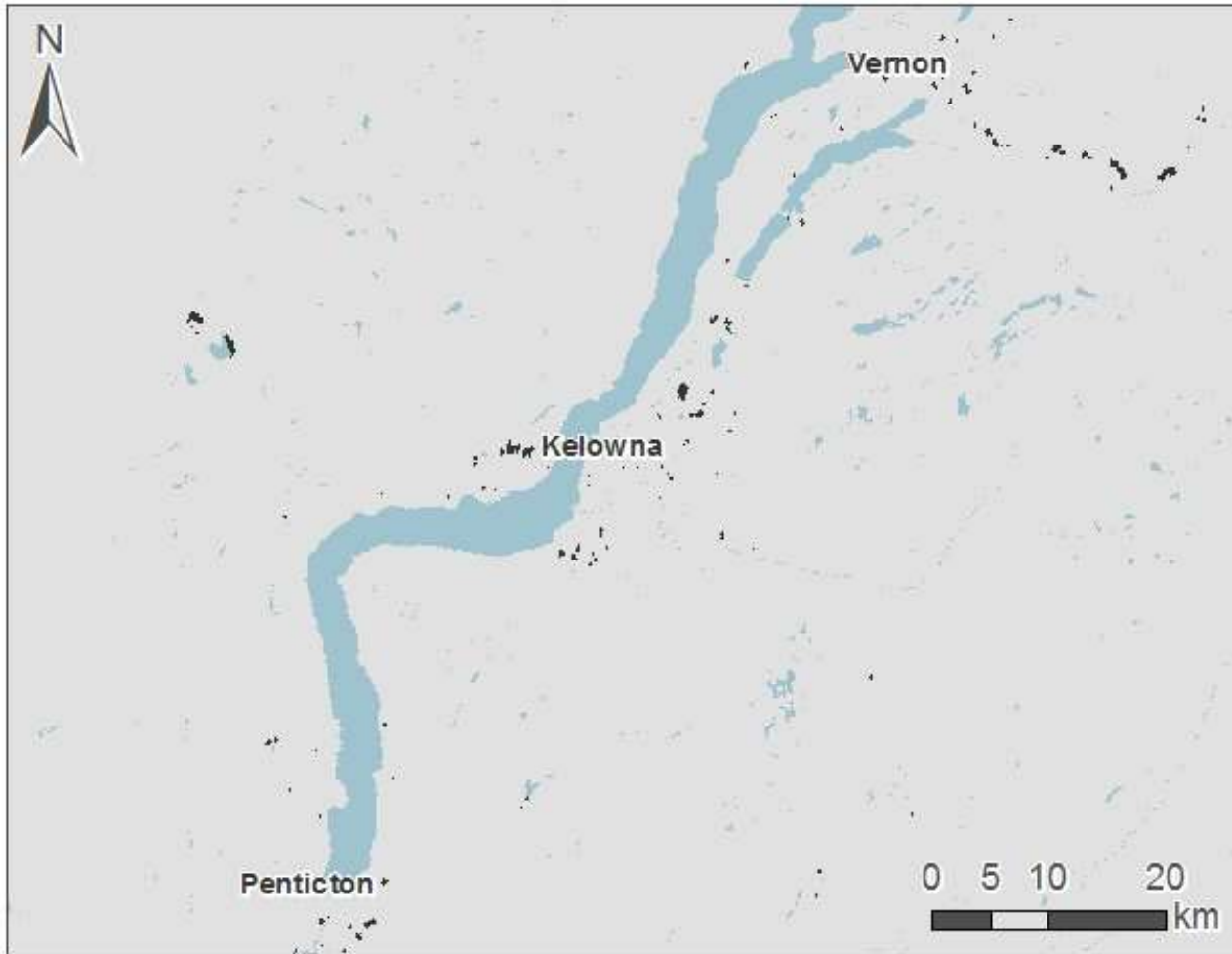


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Local Interface Maps



- Wildland-Urban Interface
- Wildland-Industrial Interface
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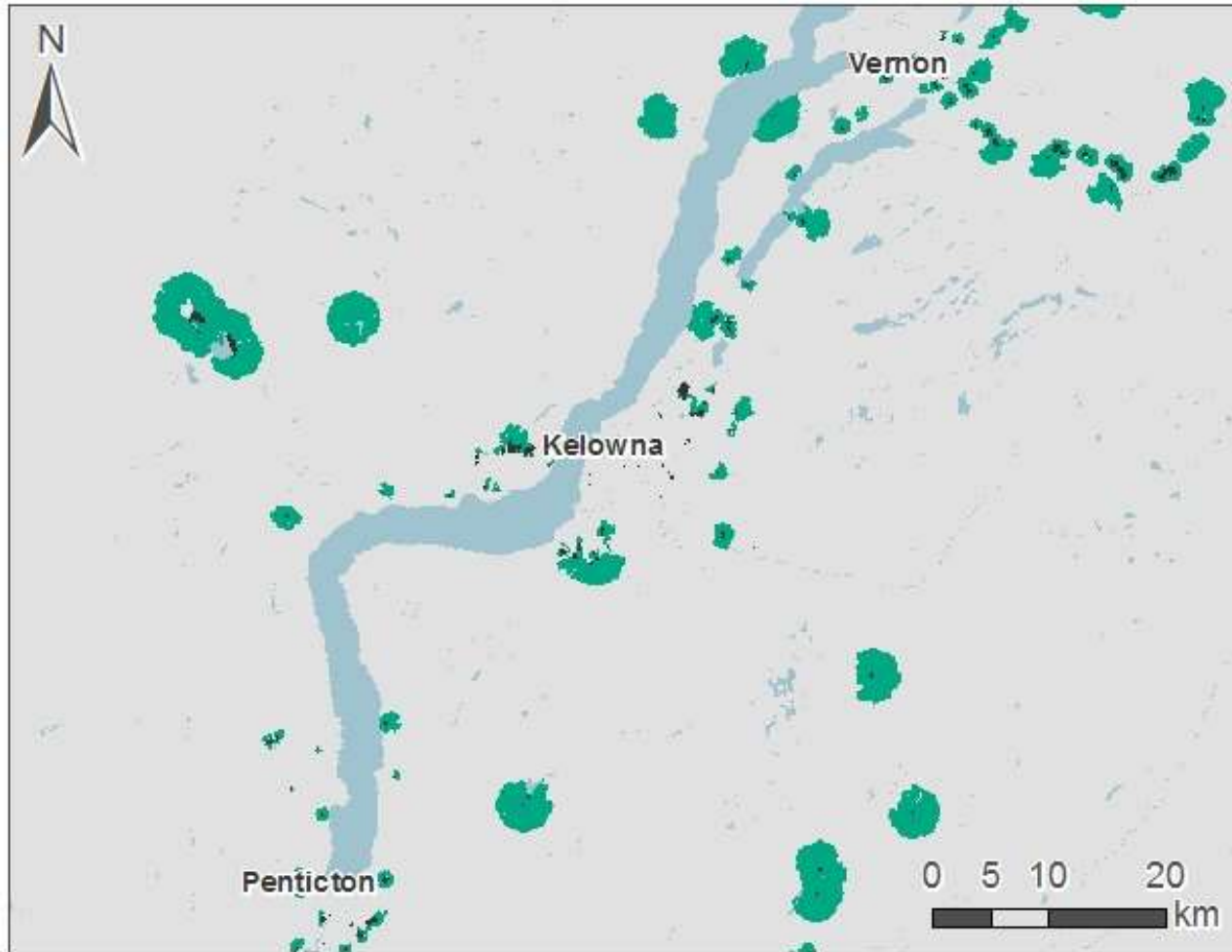


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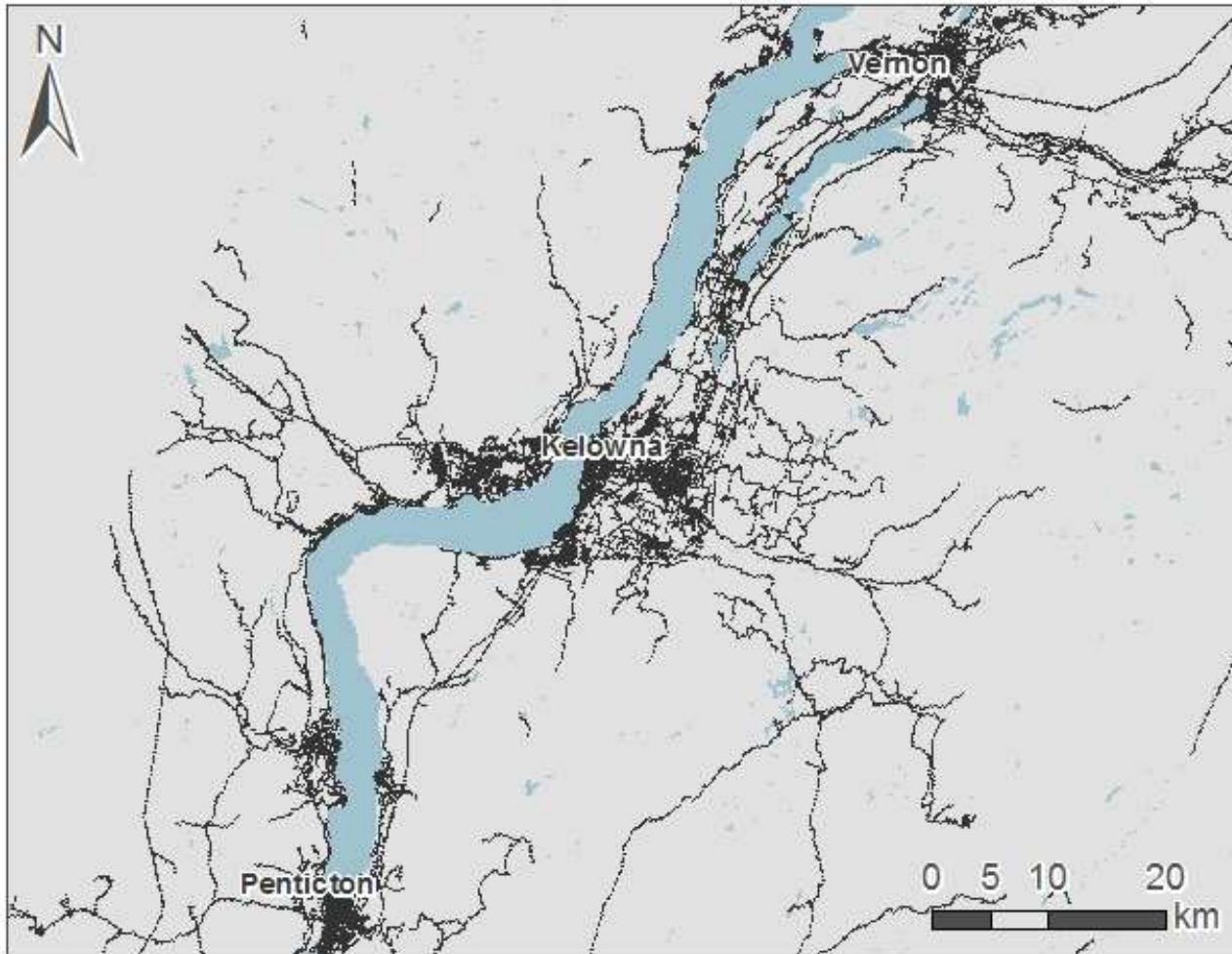


- Wildland-Urban Interface
- Wildland-Industrial Interface
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Local Interface Maps



- Wildland-Urban Interface
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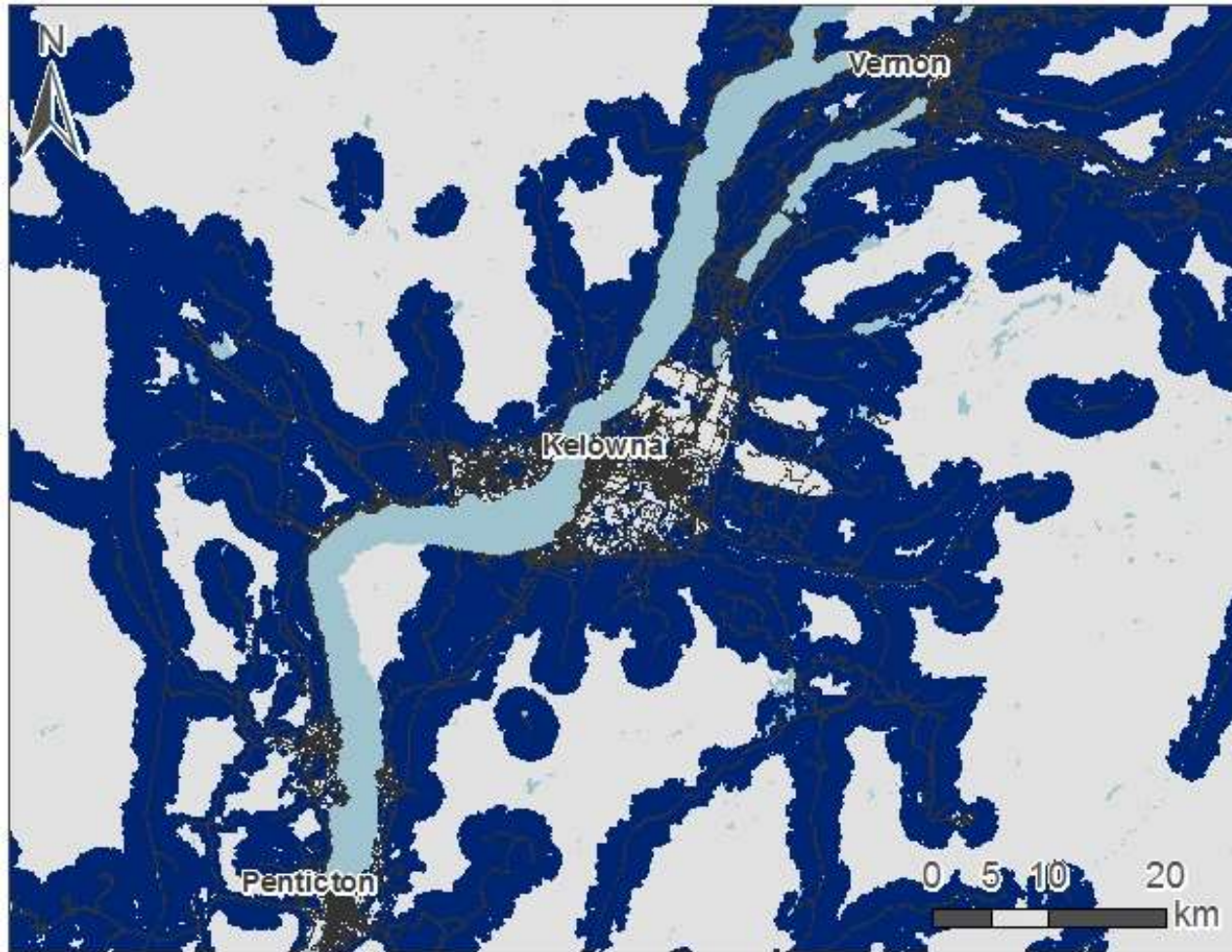


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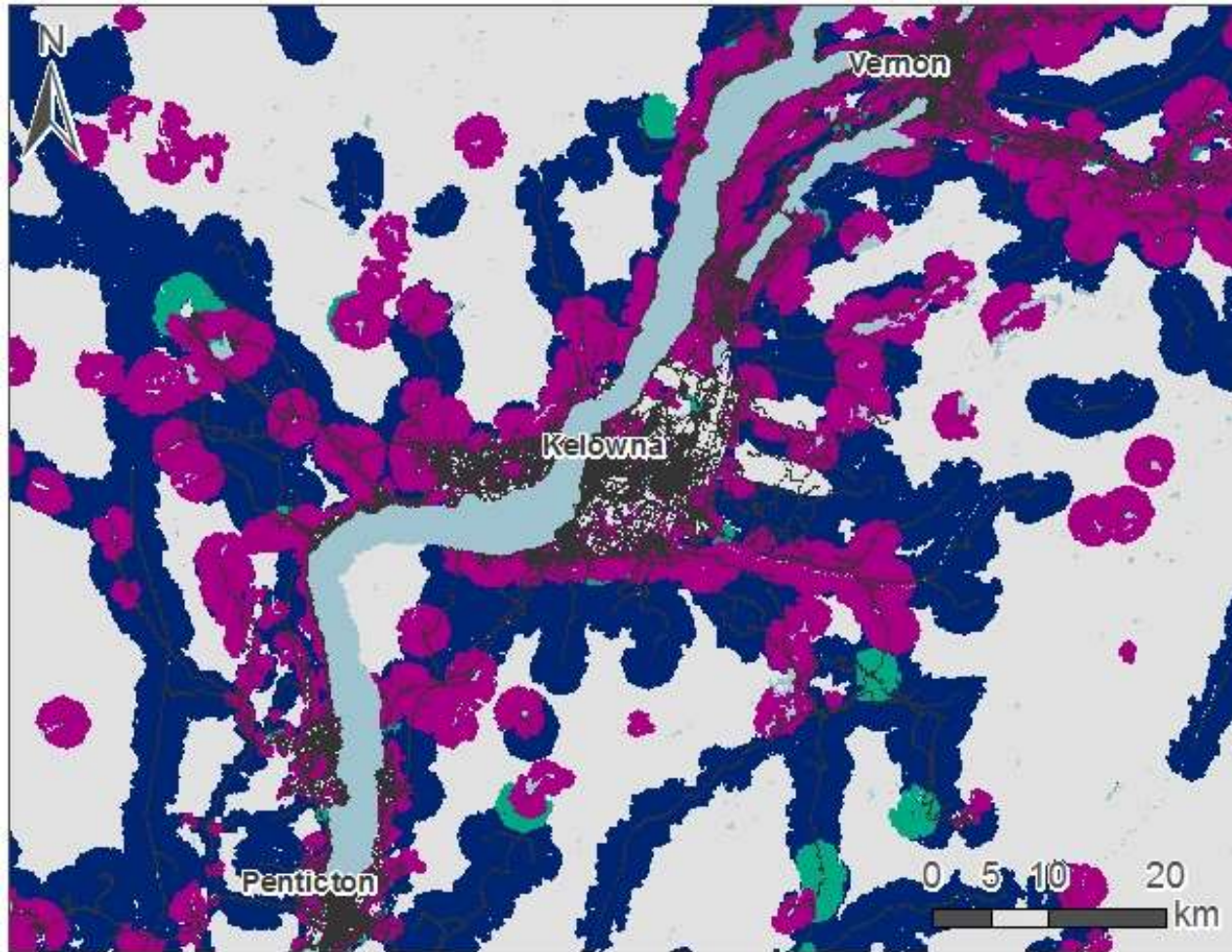


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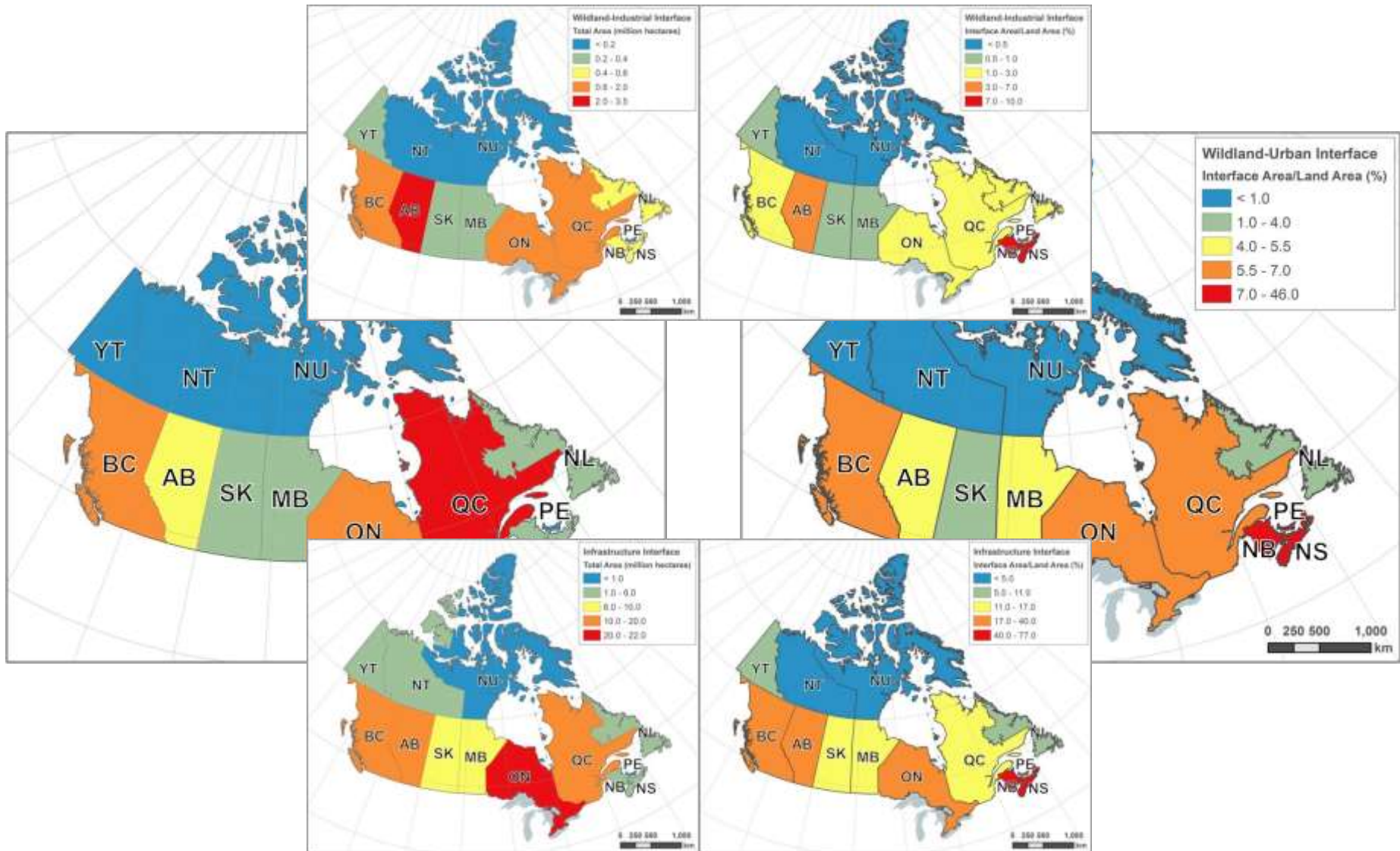


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Provincial/territorial Choropleth Maps



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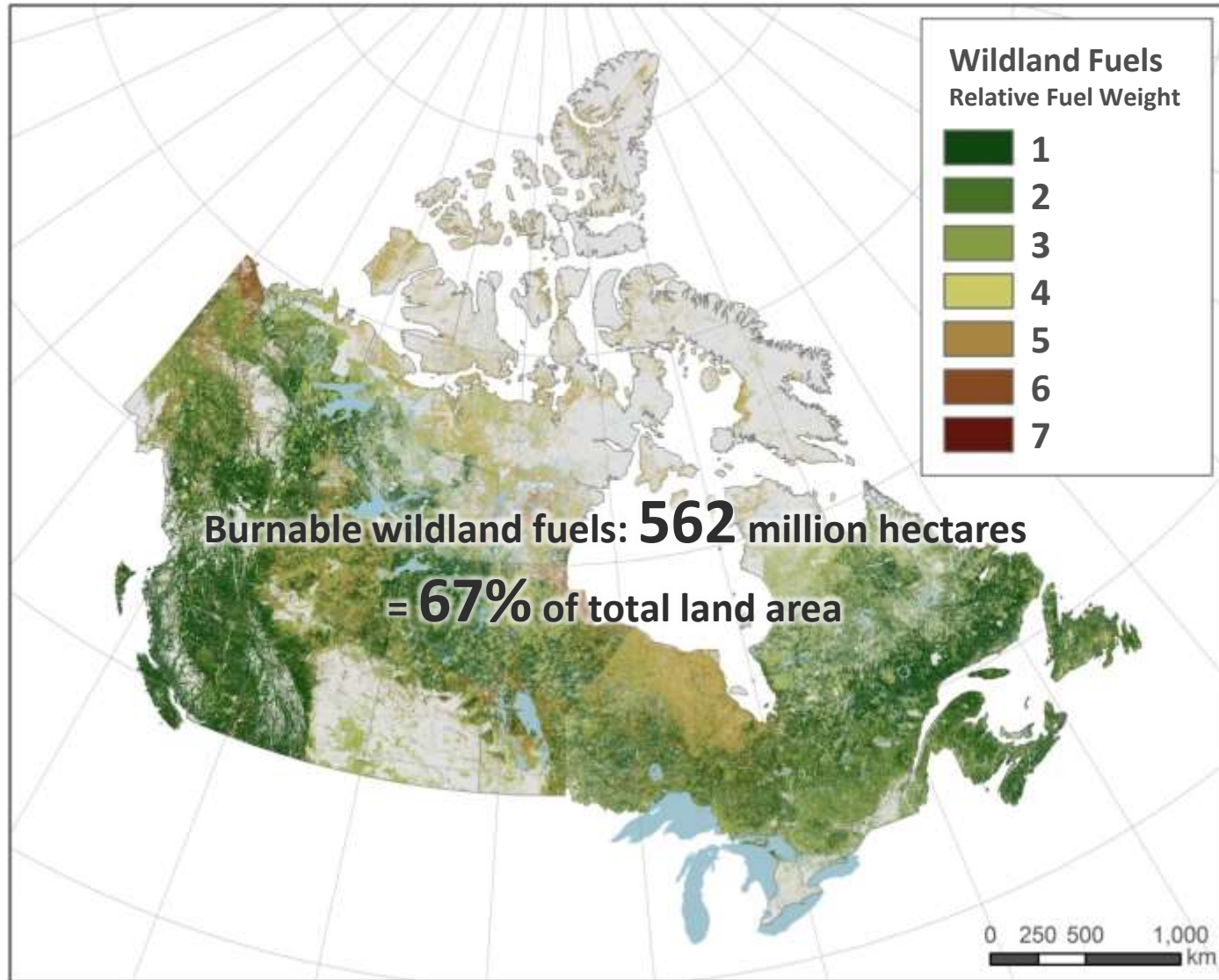


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Fuels



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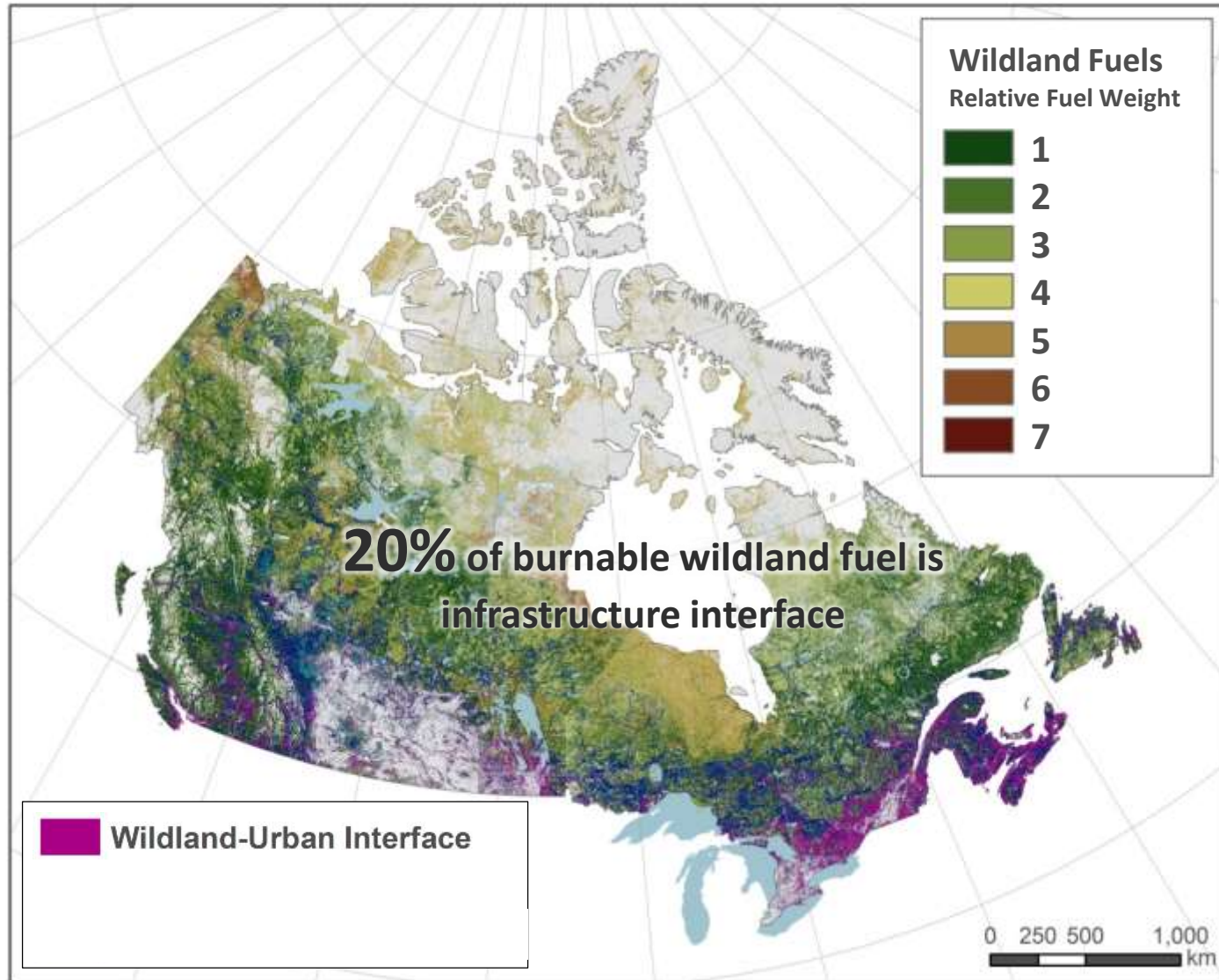


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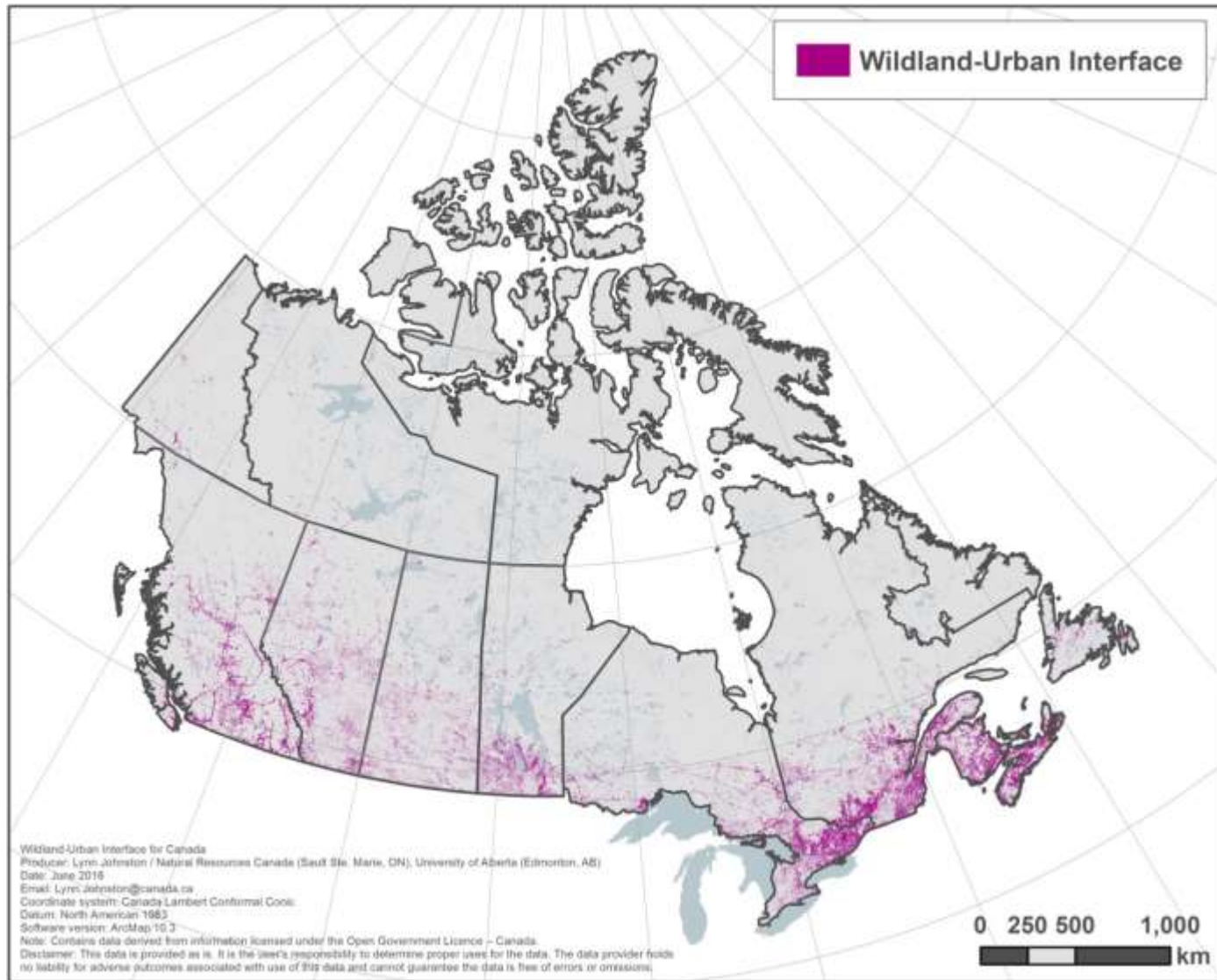


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Structures



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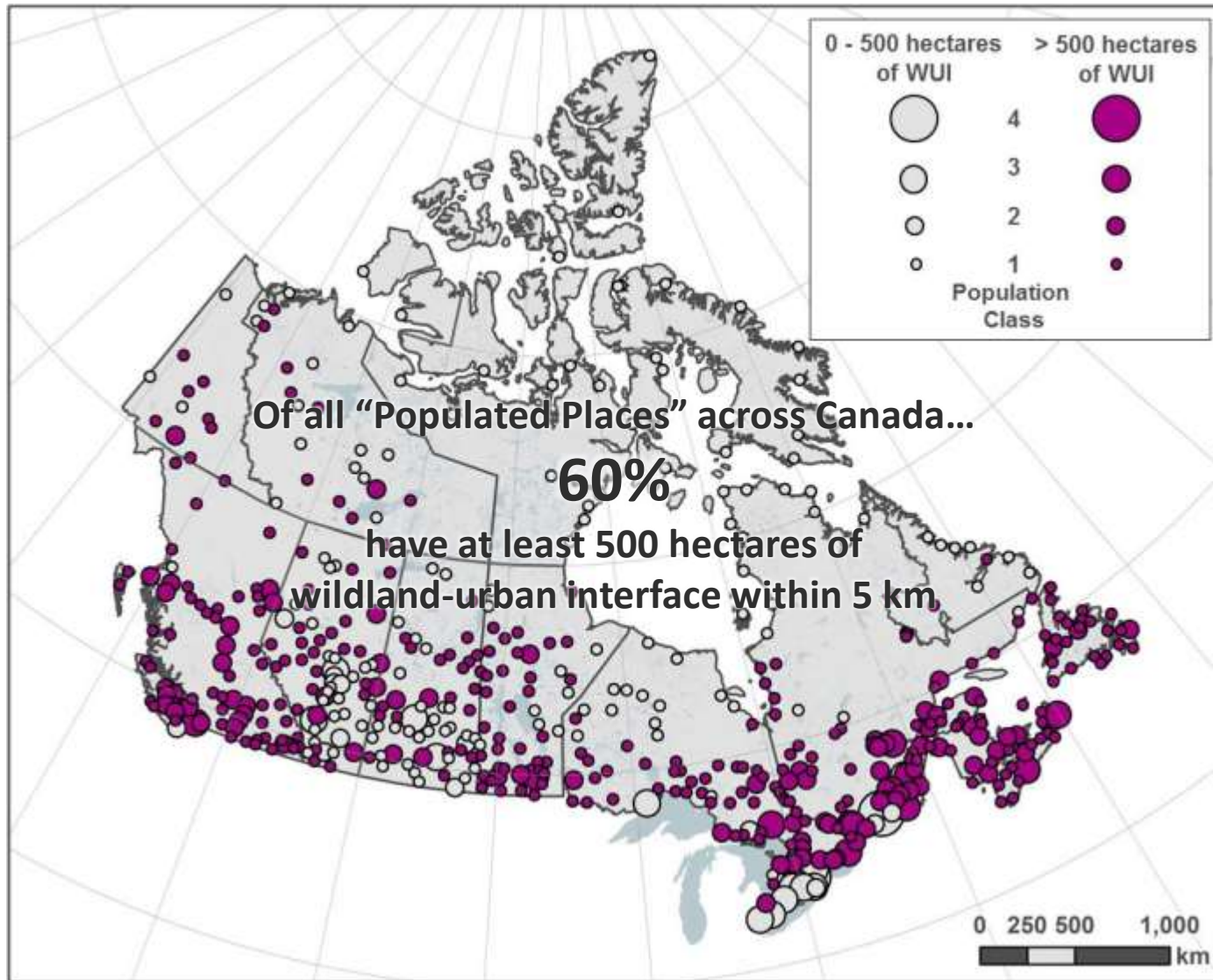


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Structures



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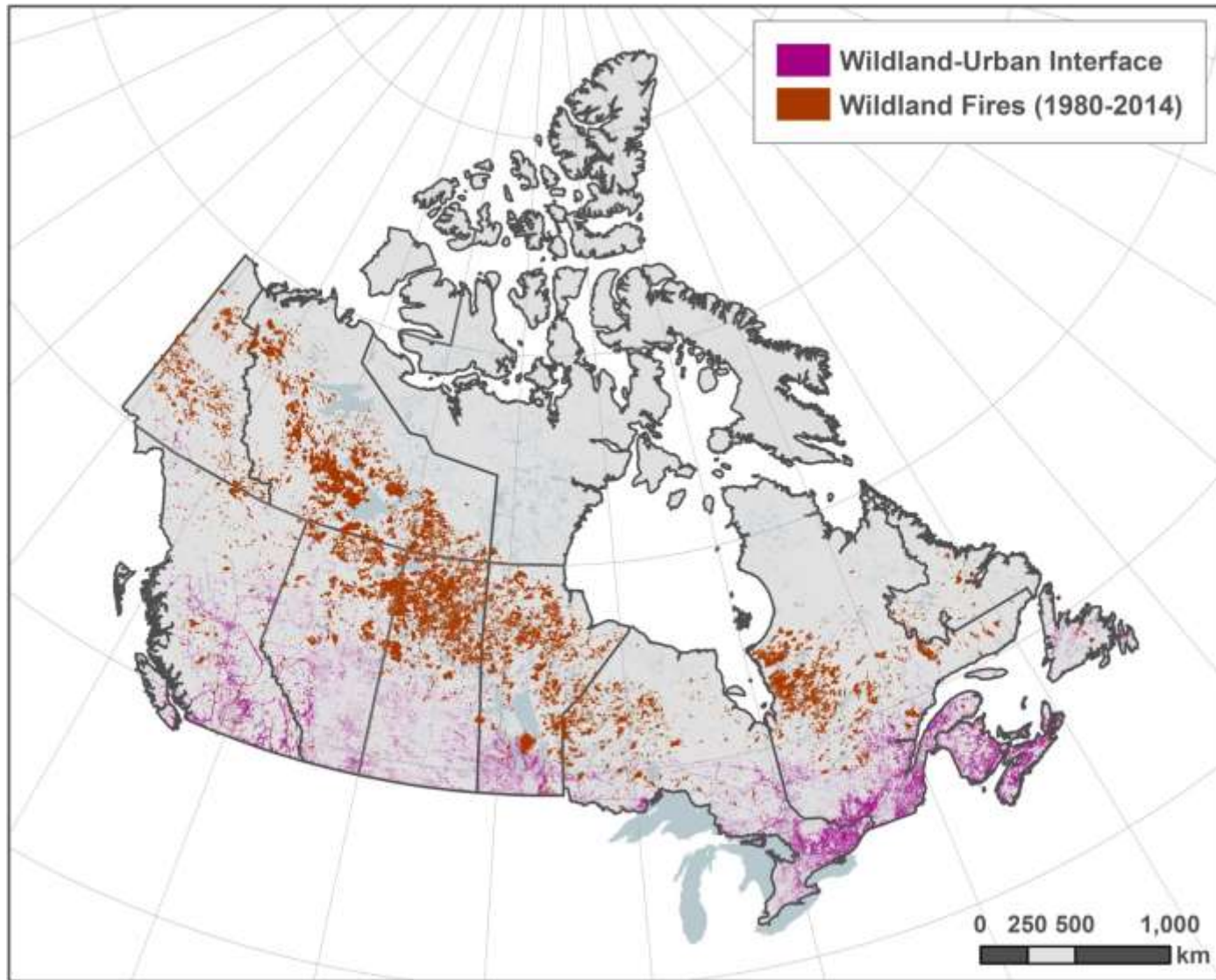


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Wildland Fires



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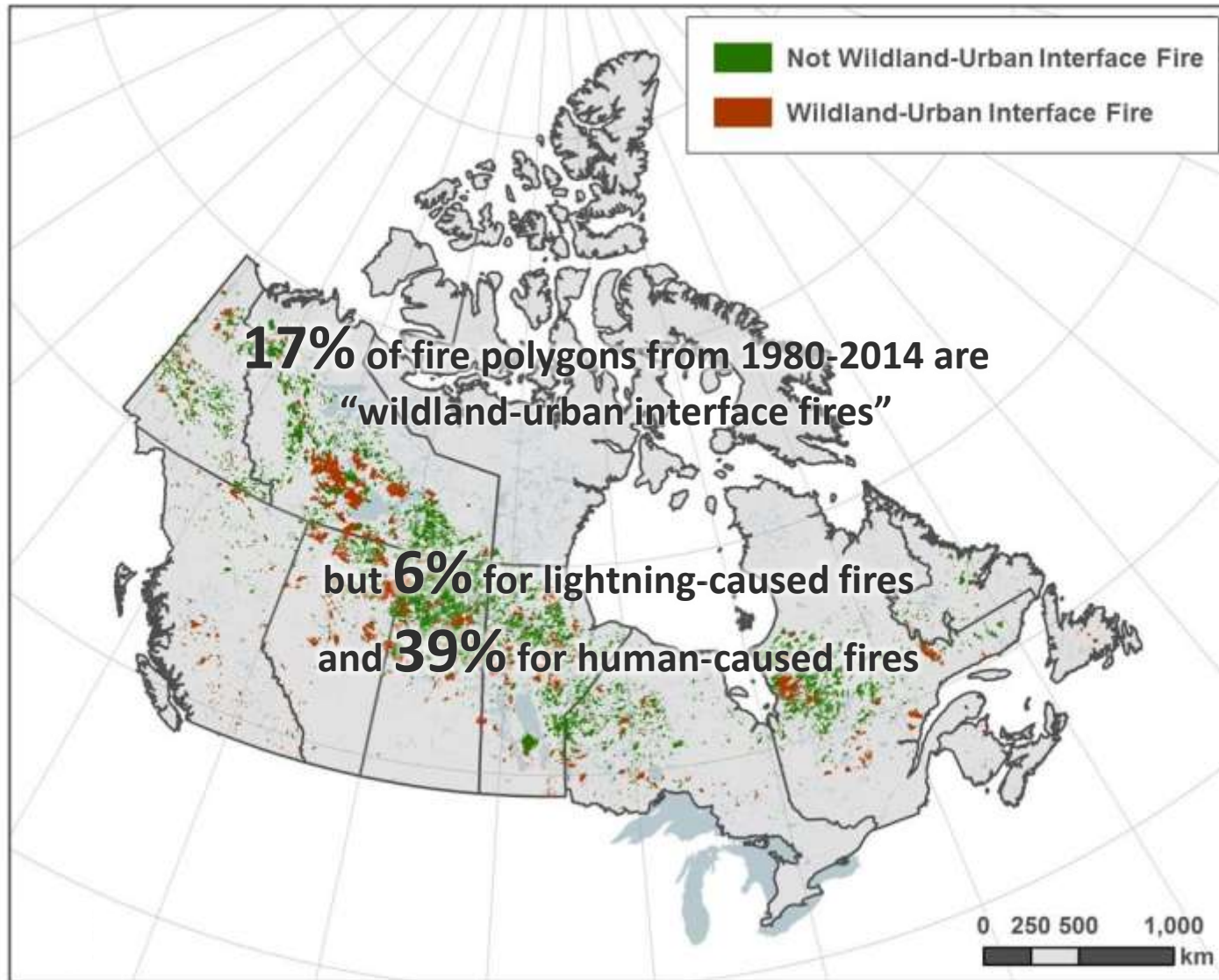


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Wildland Fires



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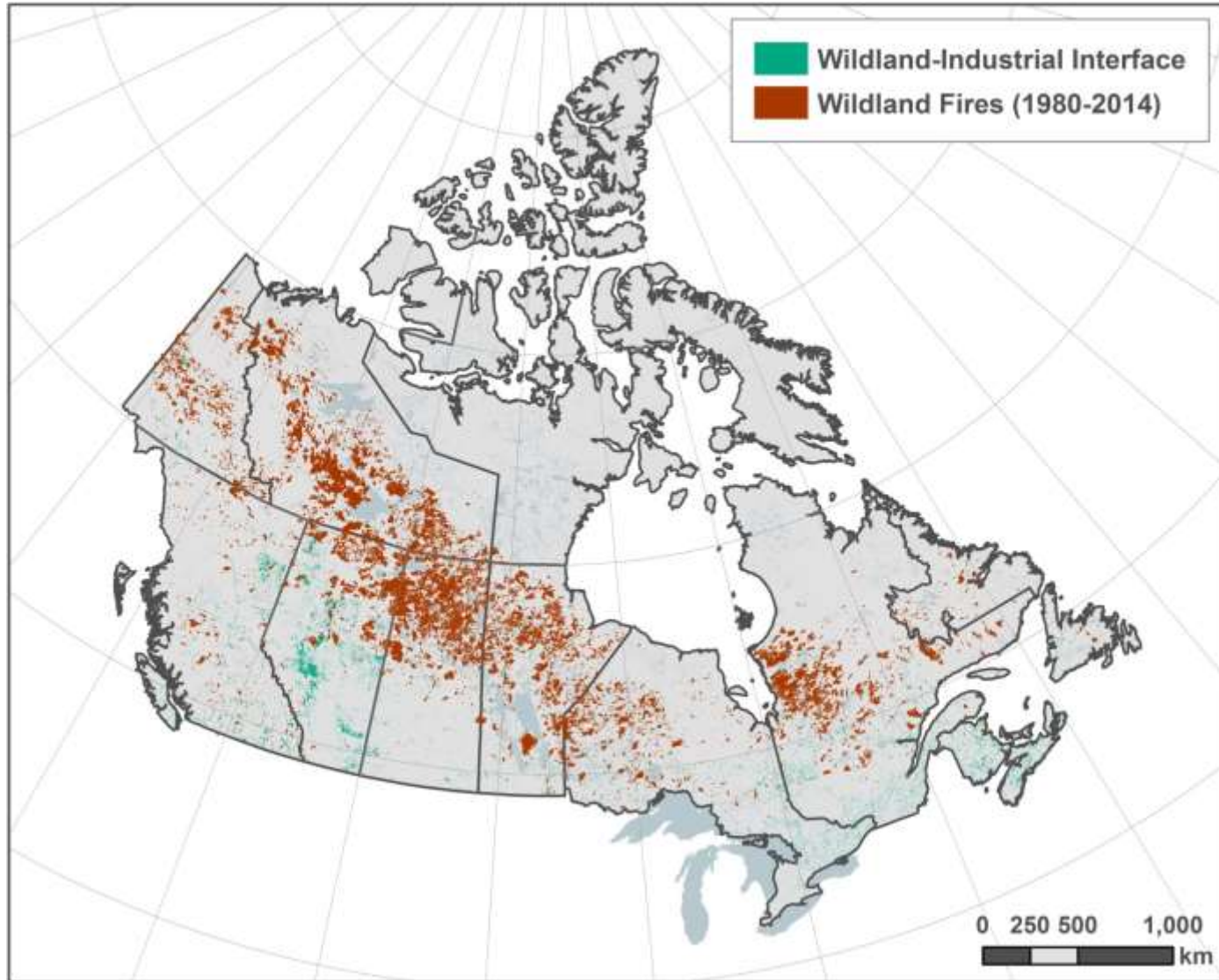


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Wildland Fires



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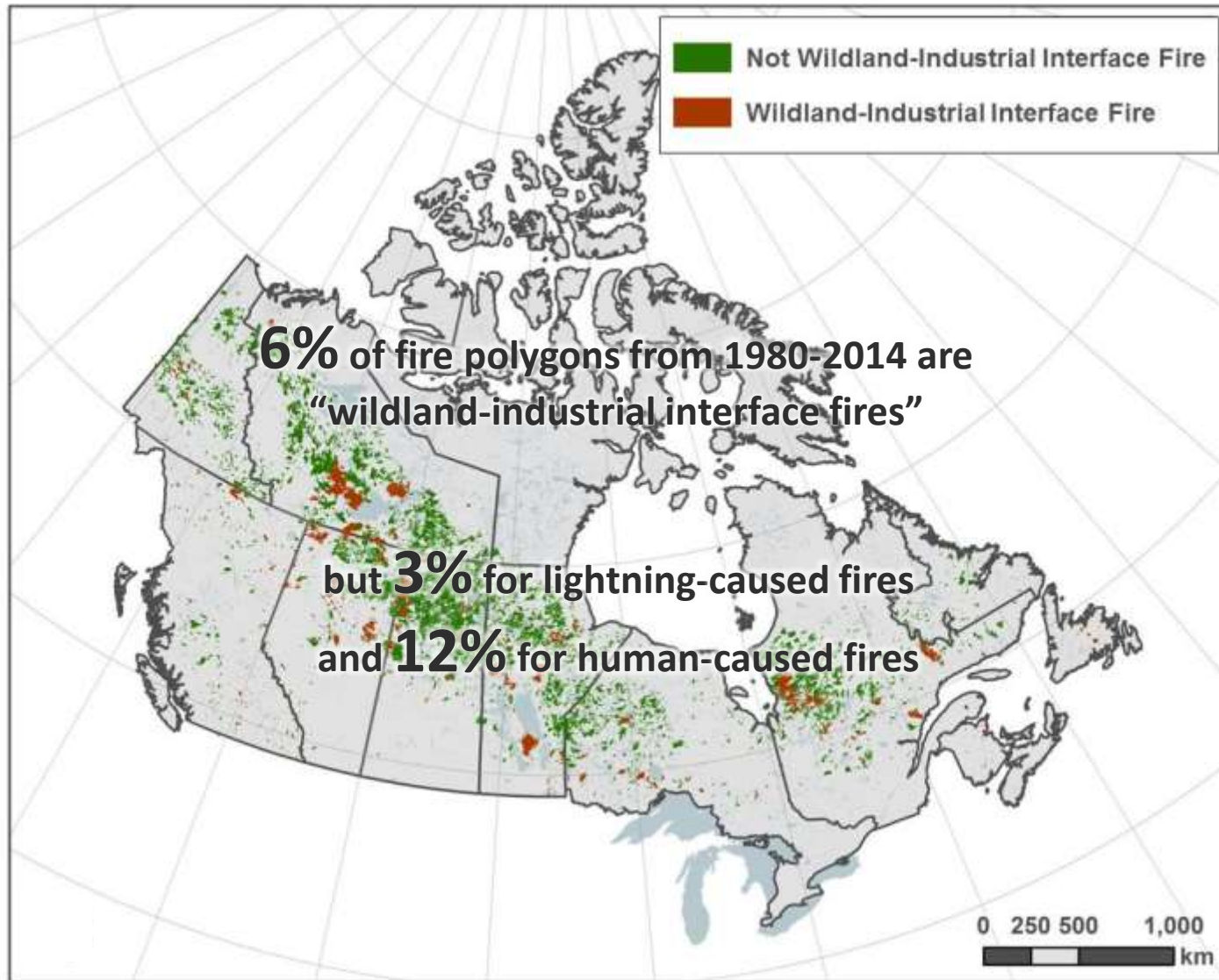


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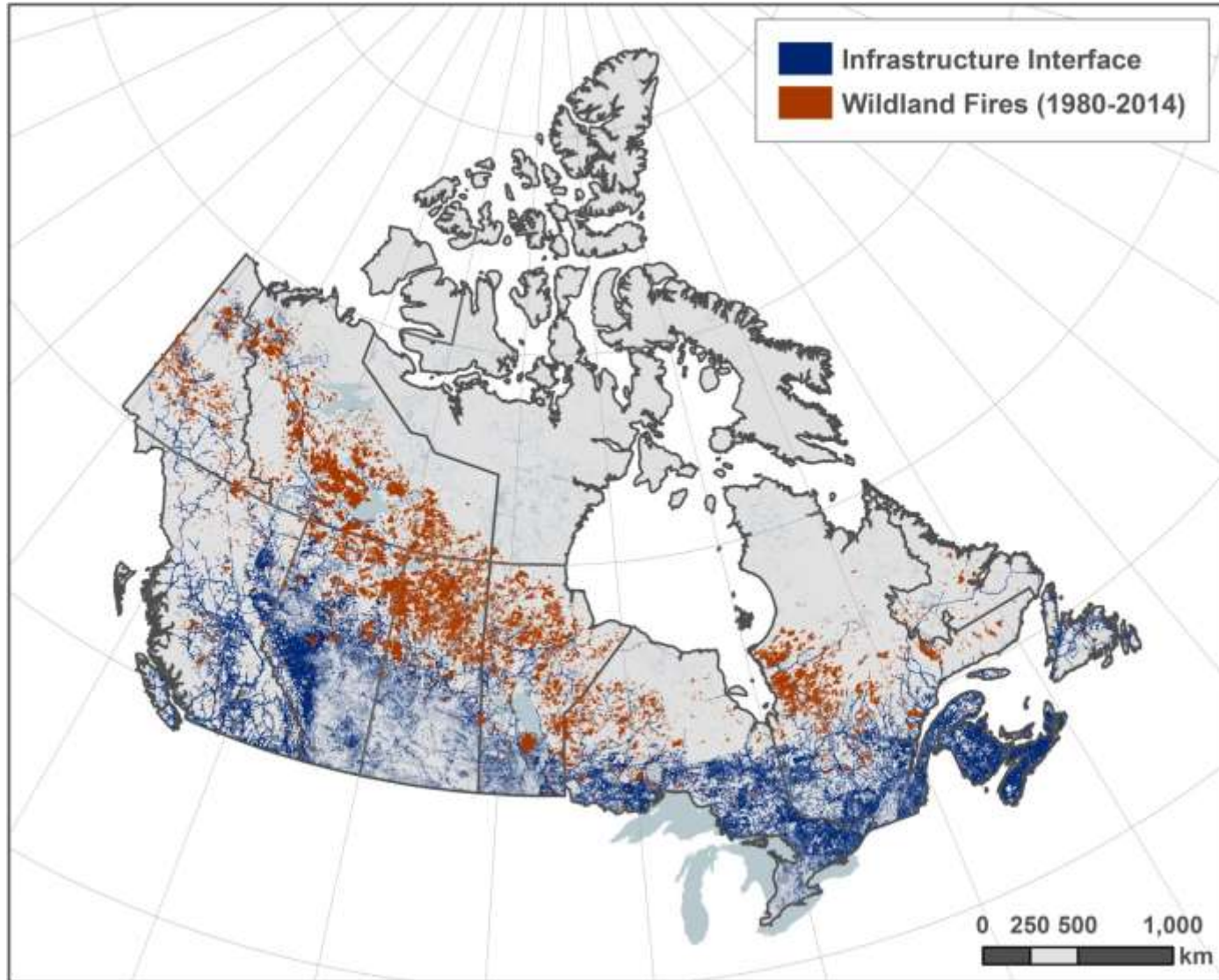
Wildland Fires



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Wildland Fires



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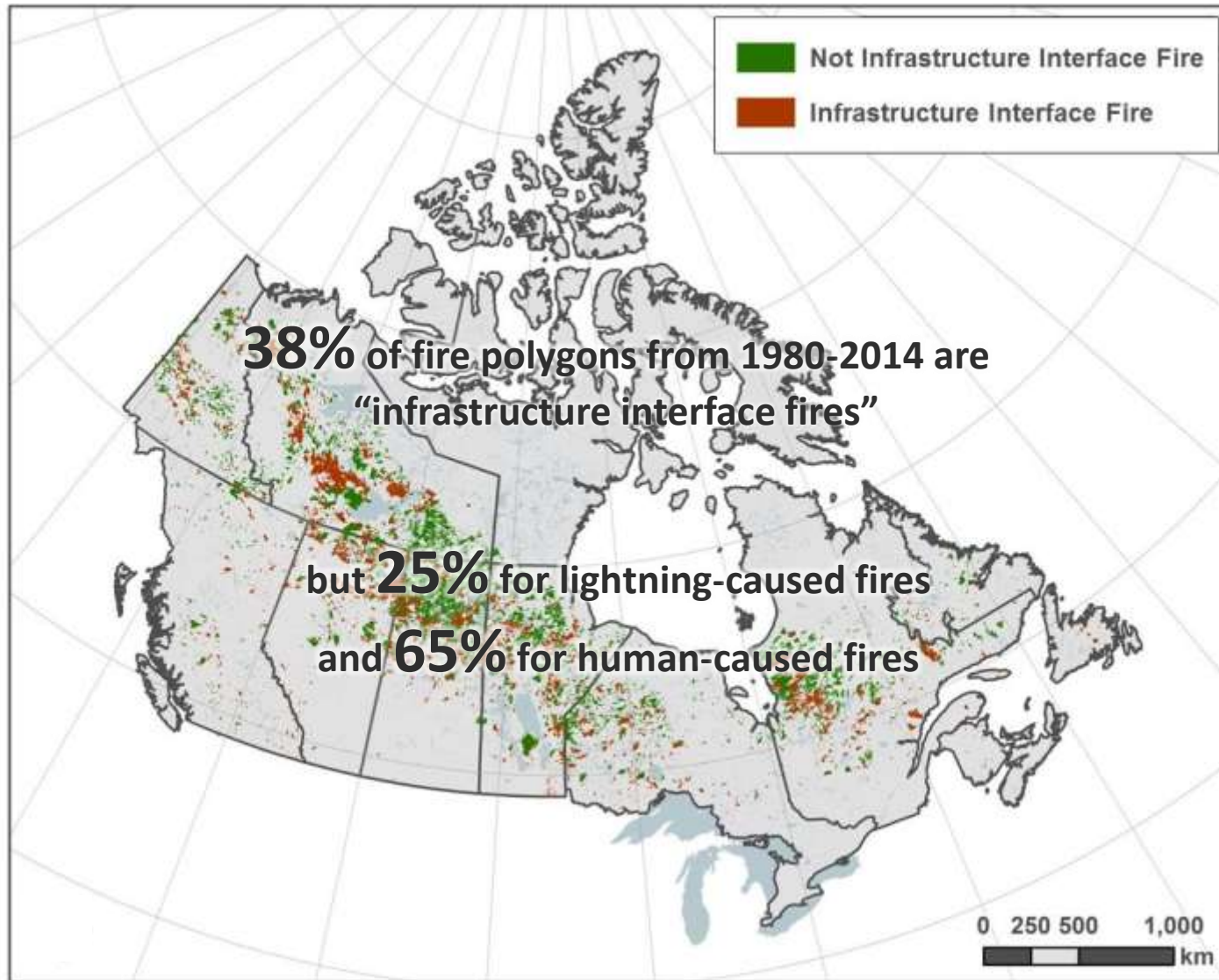


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Wildland Fires

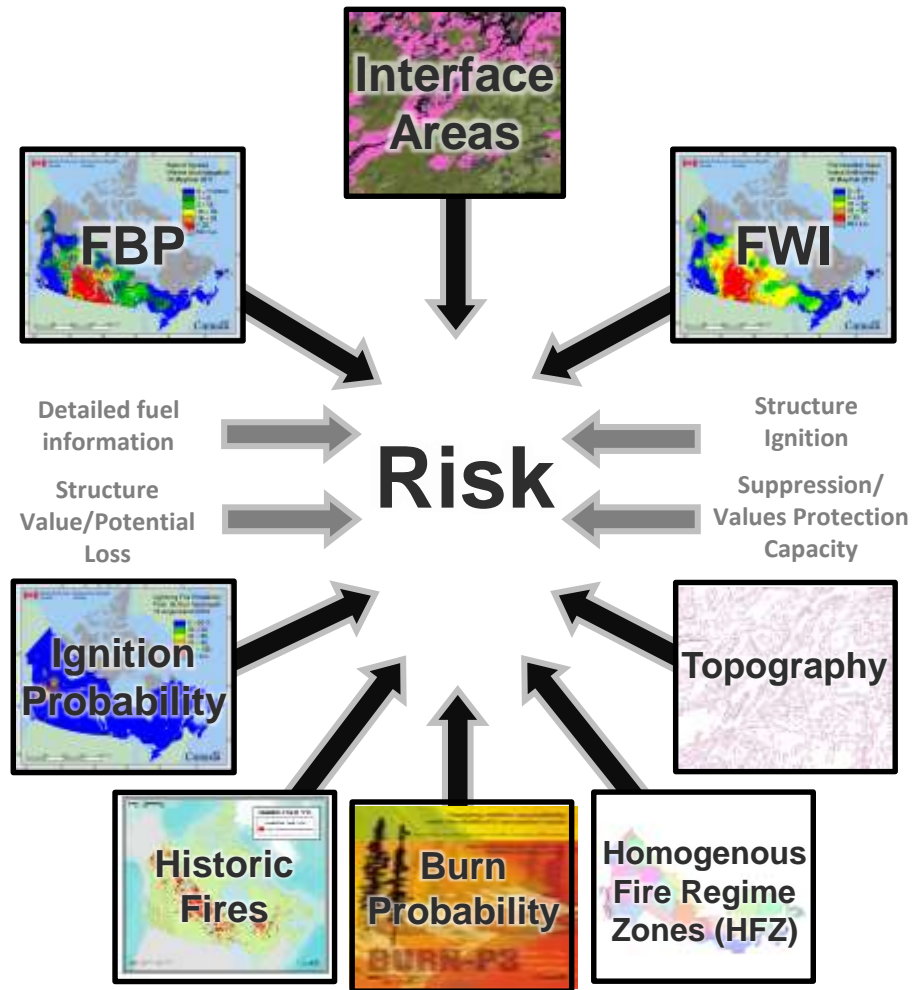


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Future Work

Fire Risk in Interface Areas



Change Detection and Future Prediction



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Applications of the Interface Maps

The three maps of interface areas (urban, industrial, and/or infrastructure) will be freely available.

Can easily be combined with other spatial data.

Can be used in multiple applications:



Wildfire Mitigation Planning

- FireSmart
- Fuel treatments
- Building codes
- Municipal bylaws
- Industrial fire regulations
- Infrastructure fire mitigation

Decision Support

- Resource repositioning
- Fire prioritization
- Interface fire alerts
- Values protection
- Incorporate into risk models

Long-term Planning

- City planning
- Evacuation planning
- Insurance
- Fire management budgeting, purchases
- Railway policy/planning
- Powerline safety

Thank You!



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Mike Flannigan
Tara McGee
Jen Beverly
Kelsy Gibos

Canadian Forest Service

Joshua Johnston
Xianli Wang
Francois Robinne
Karen Blouin
Laura Gray
Emily Tuomi
Jeremy Johnston
Brian Wiens



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Questions?



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