



Ecological Benchmark Networks in the Boreal Cordillera: Priority Areas for Conserving Ecological Values



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Ecological Benchmark Areas... Foundation of the Conservation Matrix Model

Characteristics

- intact ecological processes
- natural variability of ecosystems
- biodiversity at all levels
- ecologically functional wildlife populations
- terrestrial & hydrologic connectivity
- act as reference landscapes



Criteria for an Ecological Benchmark Area

Catchment-based: To protect terrestrial & hydrologic connectivity

Large Area: To support natural spatial & temporal dynamics of fire

Relatively Intact Landscape: Little or no footprint from human activity



Criteria for an Ecological Benchmark Network

Benchmark Network: A group of Benchmark Areas that together fulfill conservation objectives for the region.

Network Construction

Target Area: covers percentage of region (e.g. 50%)

Target Number: includes discrete number of benchmarks (e.g. 5)

Network Assessment & Ranking

Ecological indicators within network are representative of ecological indicators across the region



John Meikle

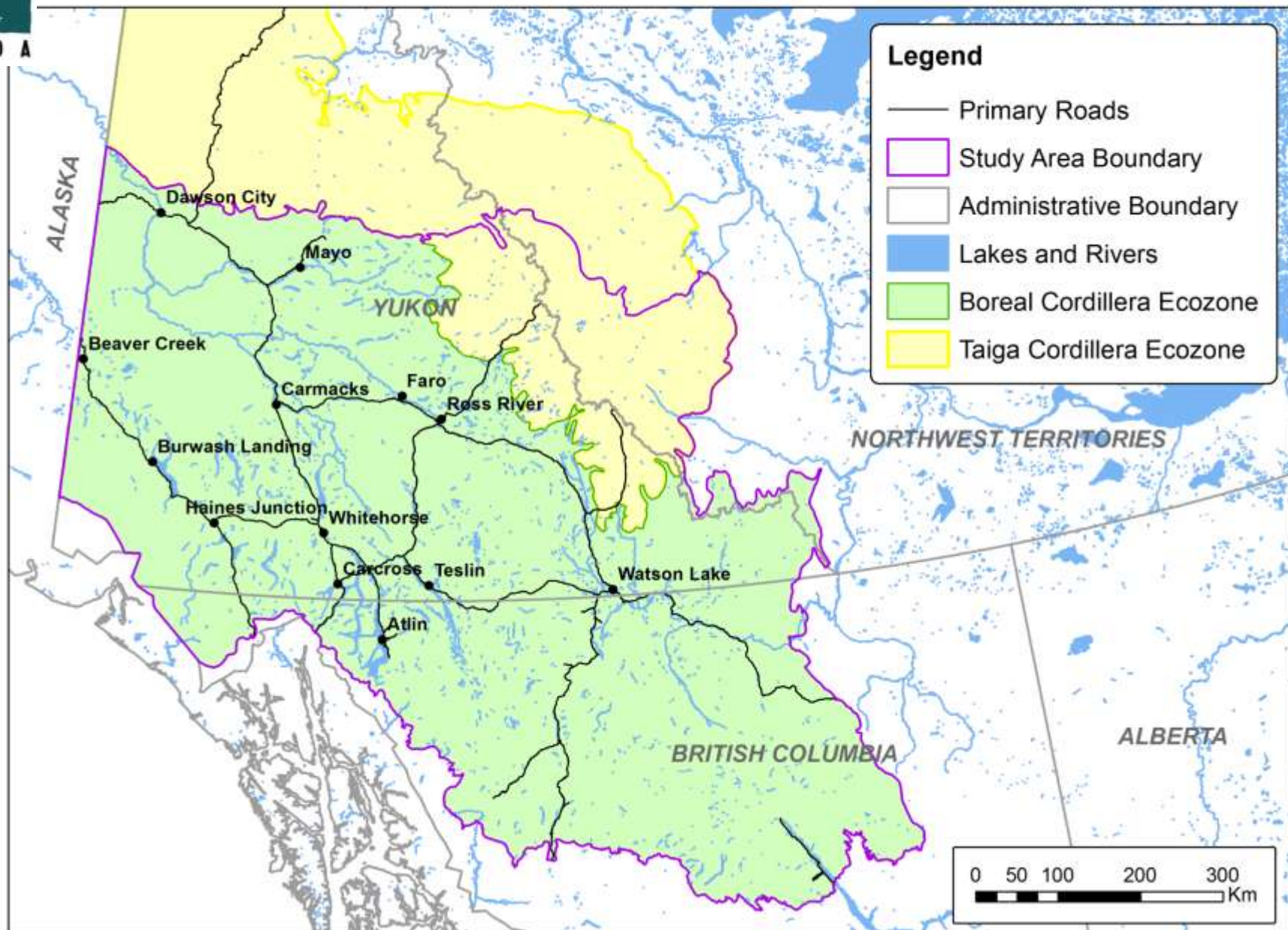


Project Goals

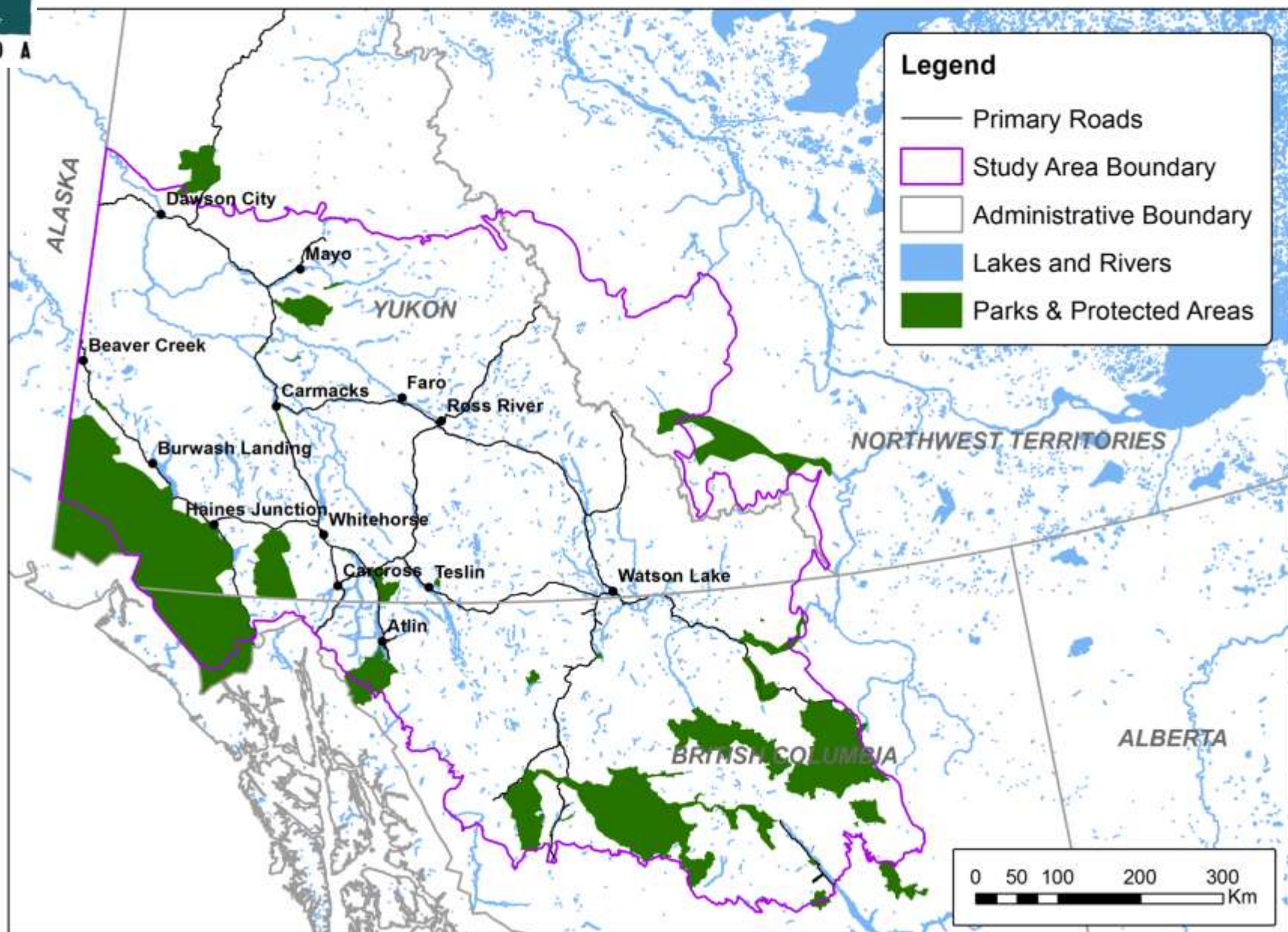
1. To identify ecological benchmark network for the boreal cordillera of Yukon & northern British Columbia
2. To refine benchmark network using regional maps & ecological values



Study Area: Boreal Cordillera of Yukon & British Columbia

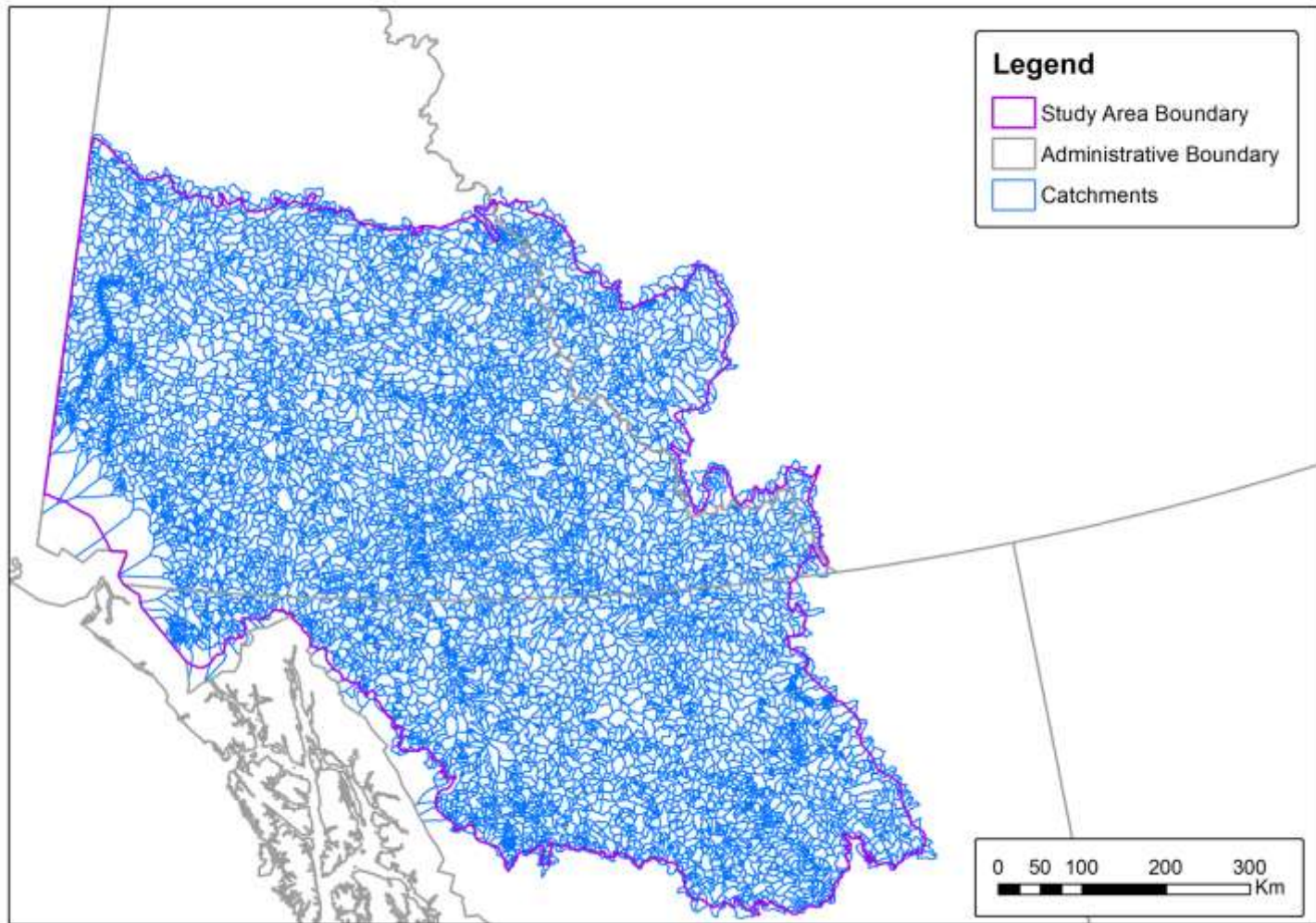


Study Area: Existing Parks & Protected Areas



Identifying Ecological Benchmark Areas

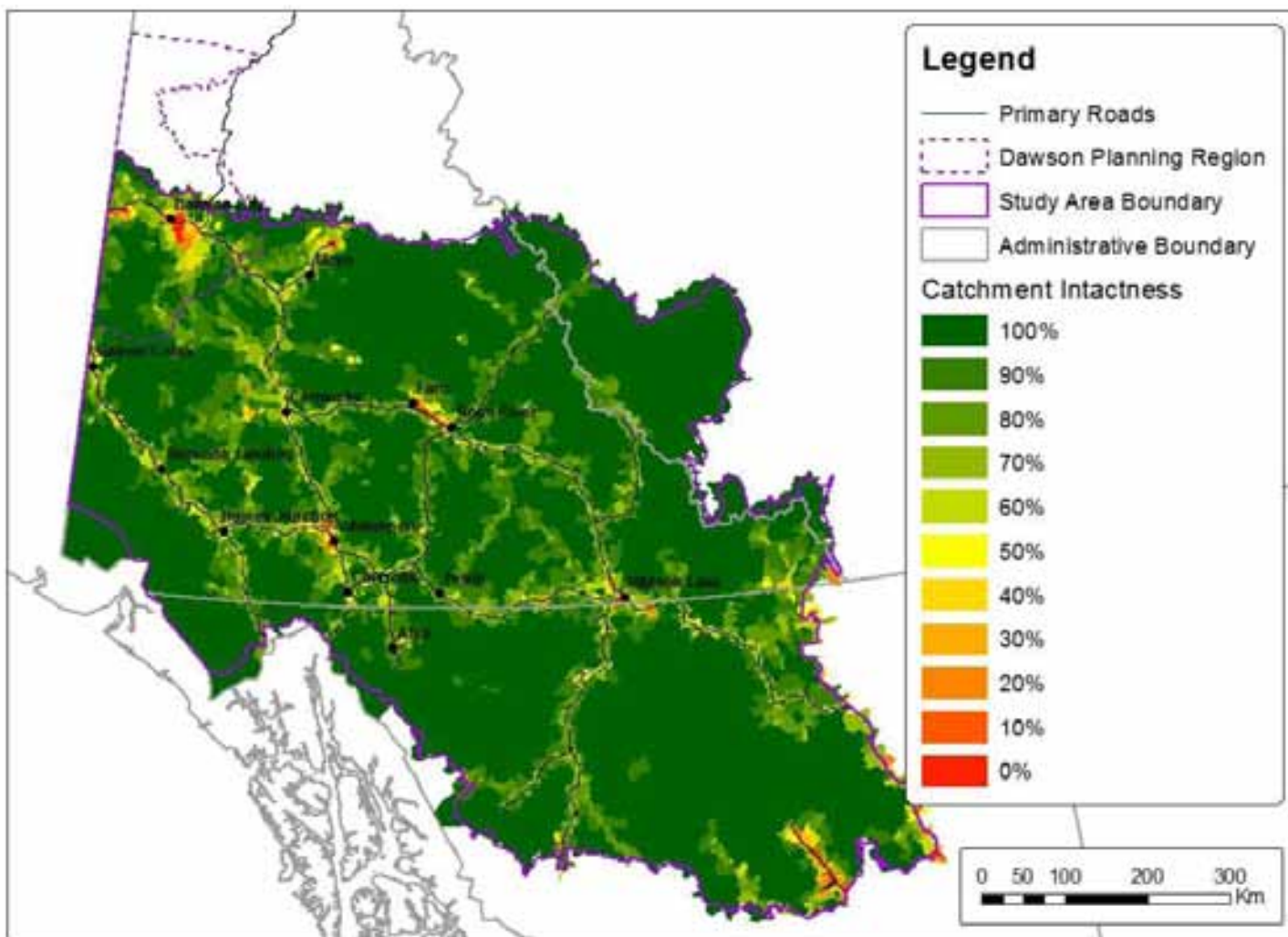
Catchment: an area of land that drains surface water and precipitation to a common low point or outlet such as a river or lake.



Identifying Ecological Benchmark Areas

Intactness: from Global Forest Watch Canada's Intact Forest Landscapes

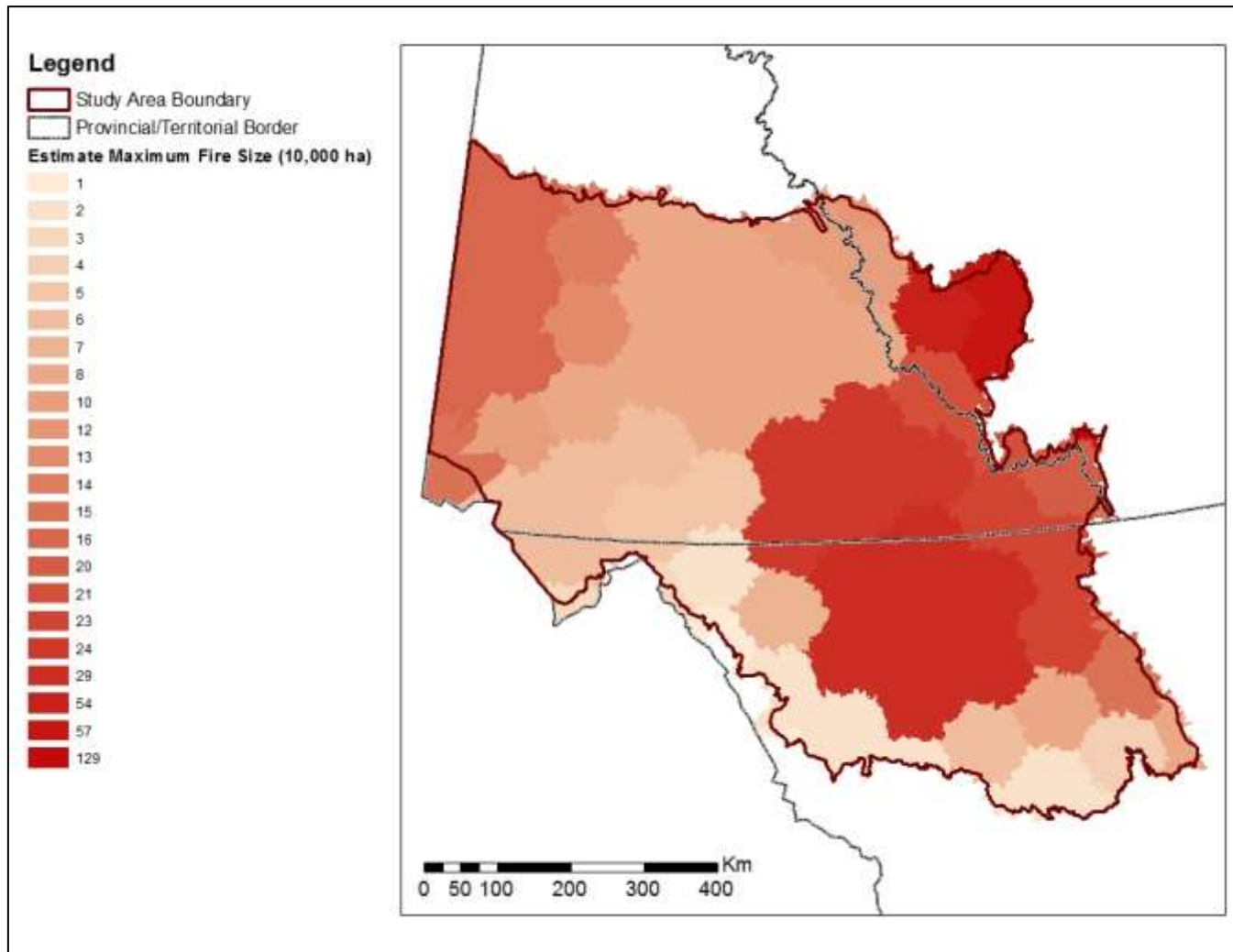
Intactness thresholds: Catchment-level & Benchmark-level



Identifying Ecological Benchmark Areas

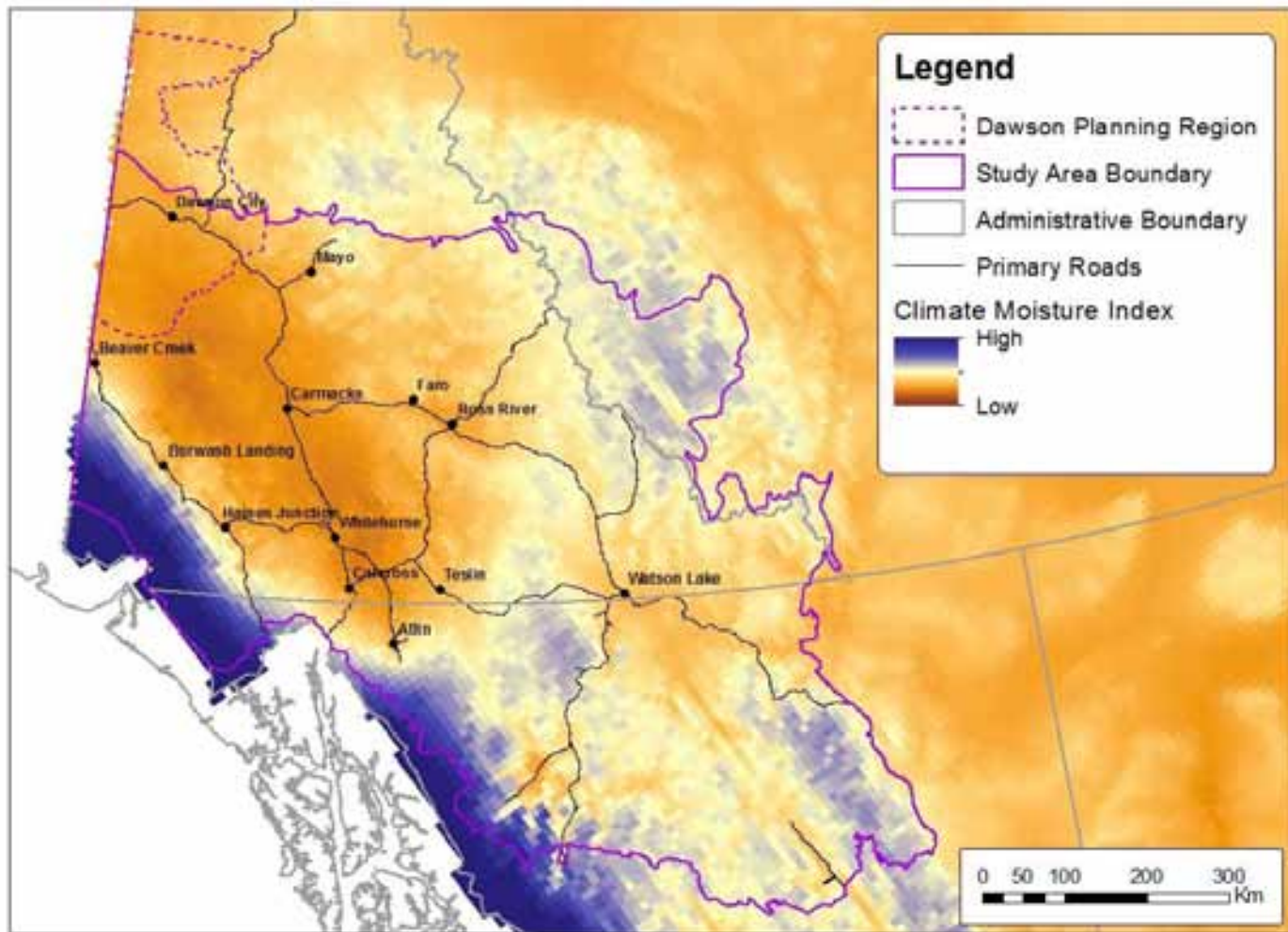
Estimated Maximum Fire Size: estimated from fire data within the region.

Benchmark Area: derived from the maximum fire size.



Assessing & Ranking Benchmark Networks

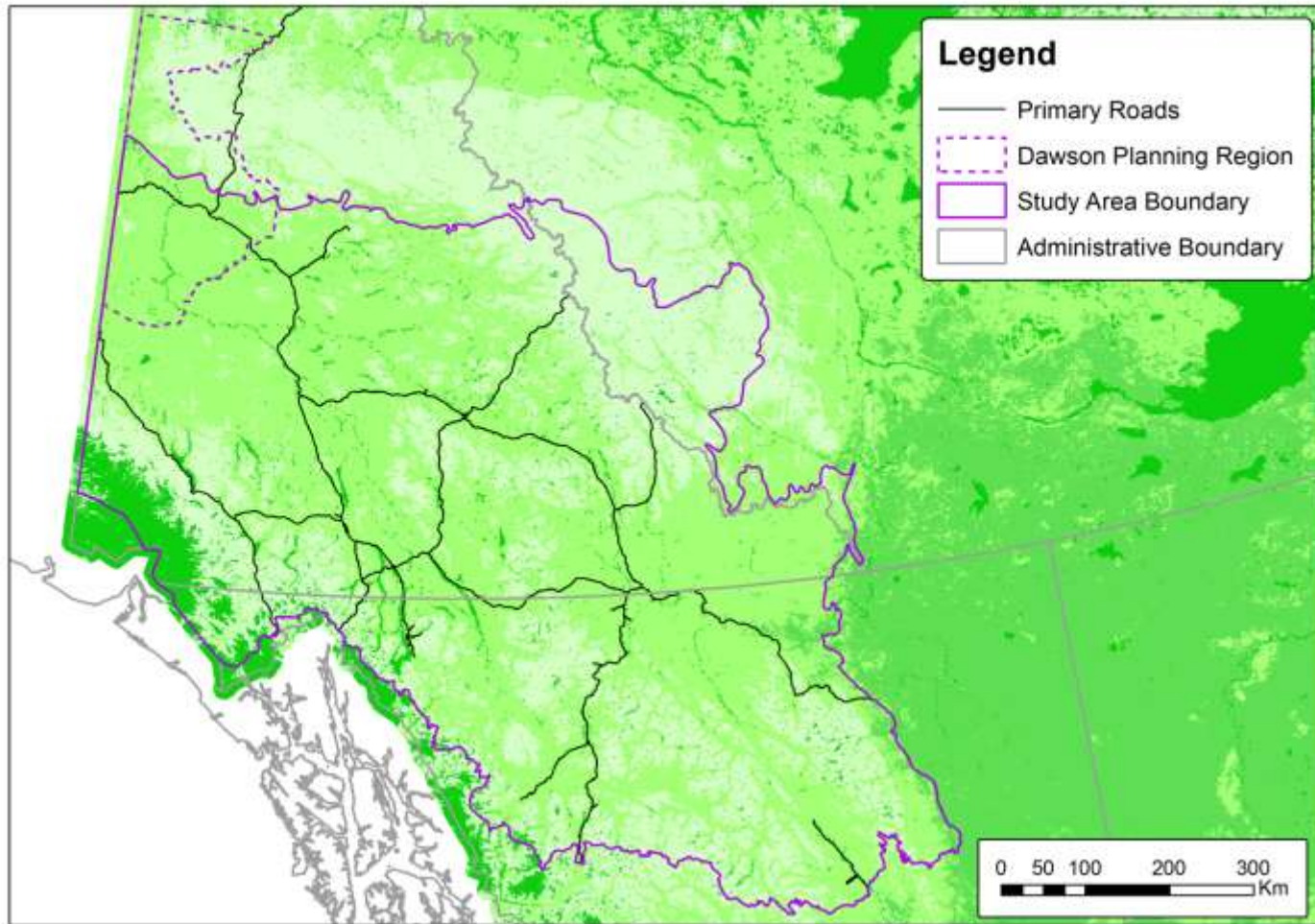
Ecological Indicator: Climate Moisture Index



A measure of water deficit (or surplus) in soil based on yearly average precipitation minus yearly potential evapotranspiration.

Assessing & Ranking Benchmark Networks

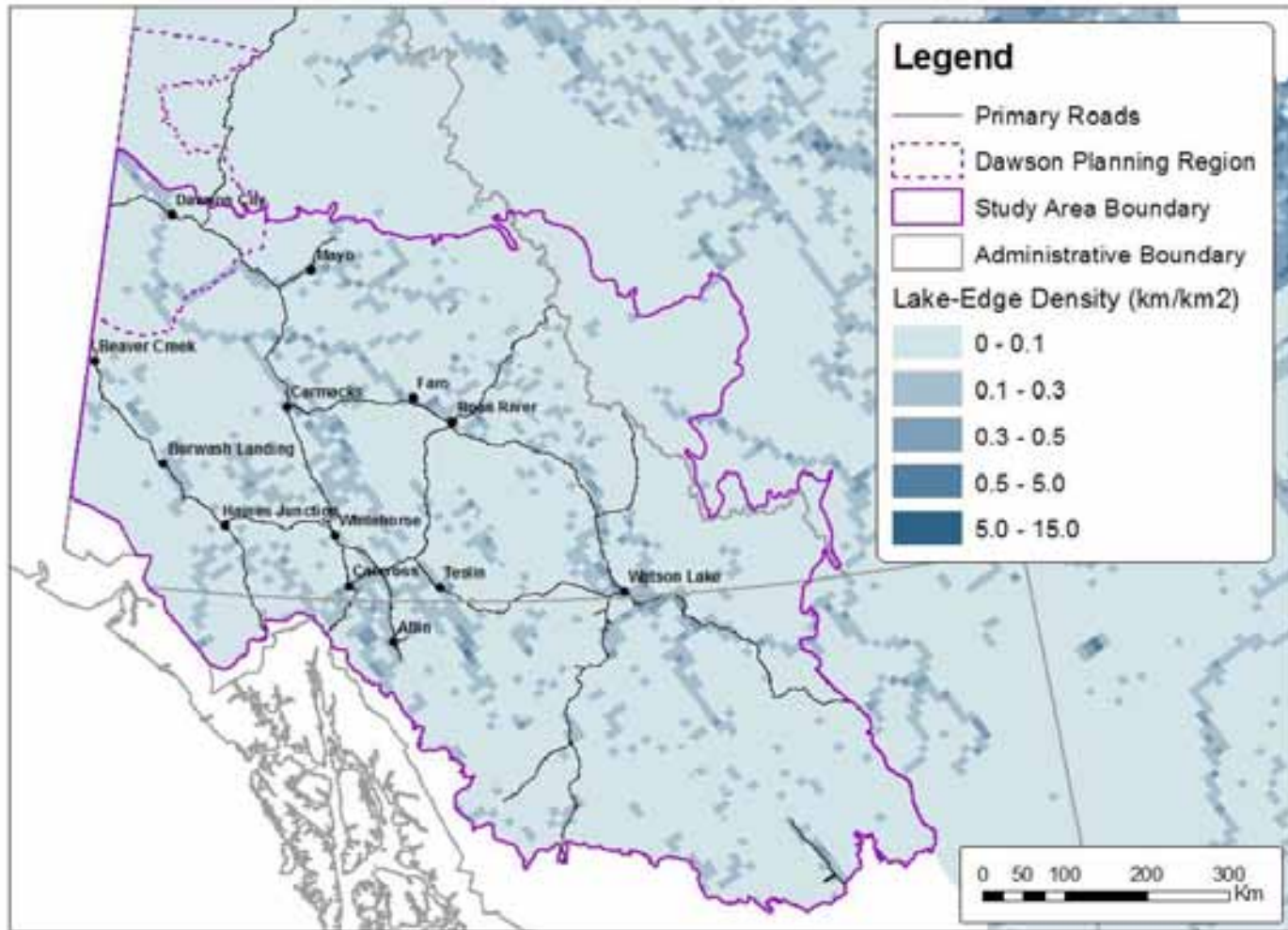
Ecological Indicator: Gross Primary Productivity



A measure of the carbon being absorbed by living plants or the amount of carbon absorbed during photosynthesis (Kg C/day).

Assessing & Ranking Benchmark Networks

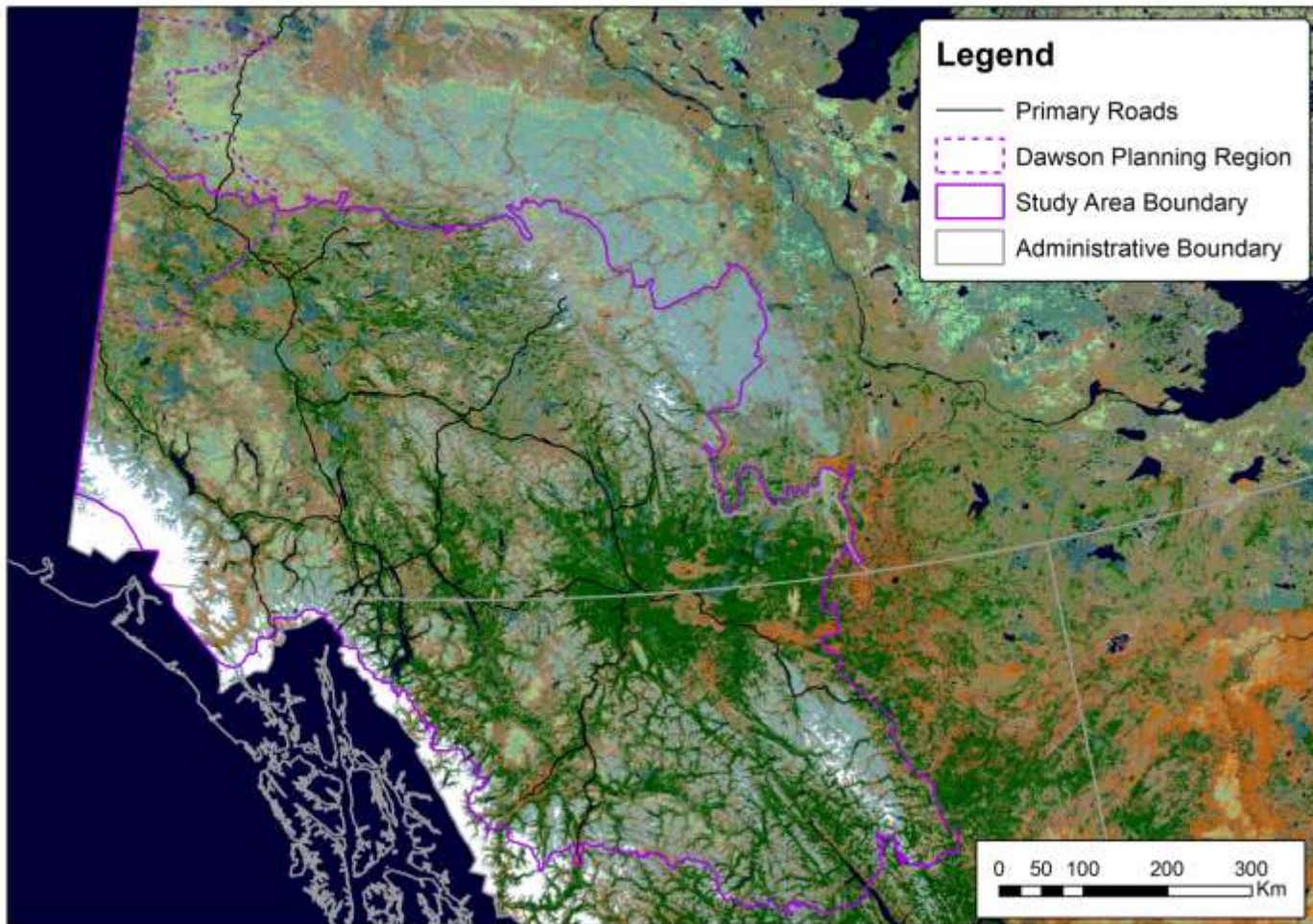
Ecological Indicator: Lake-Edge Density (km/km²)



Lake-edge density characterizes the density of riparian habitat in km/km² within 100 km² units.

Assessing & Ranking Benchmark Networks

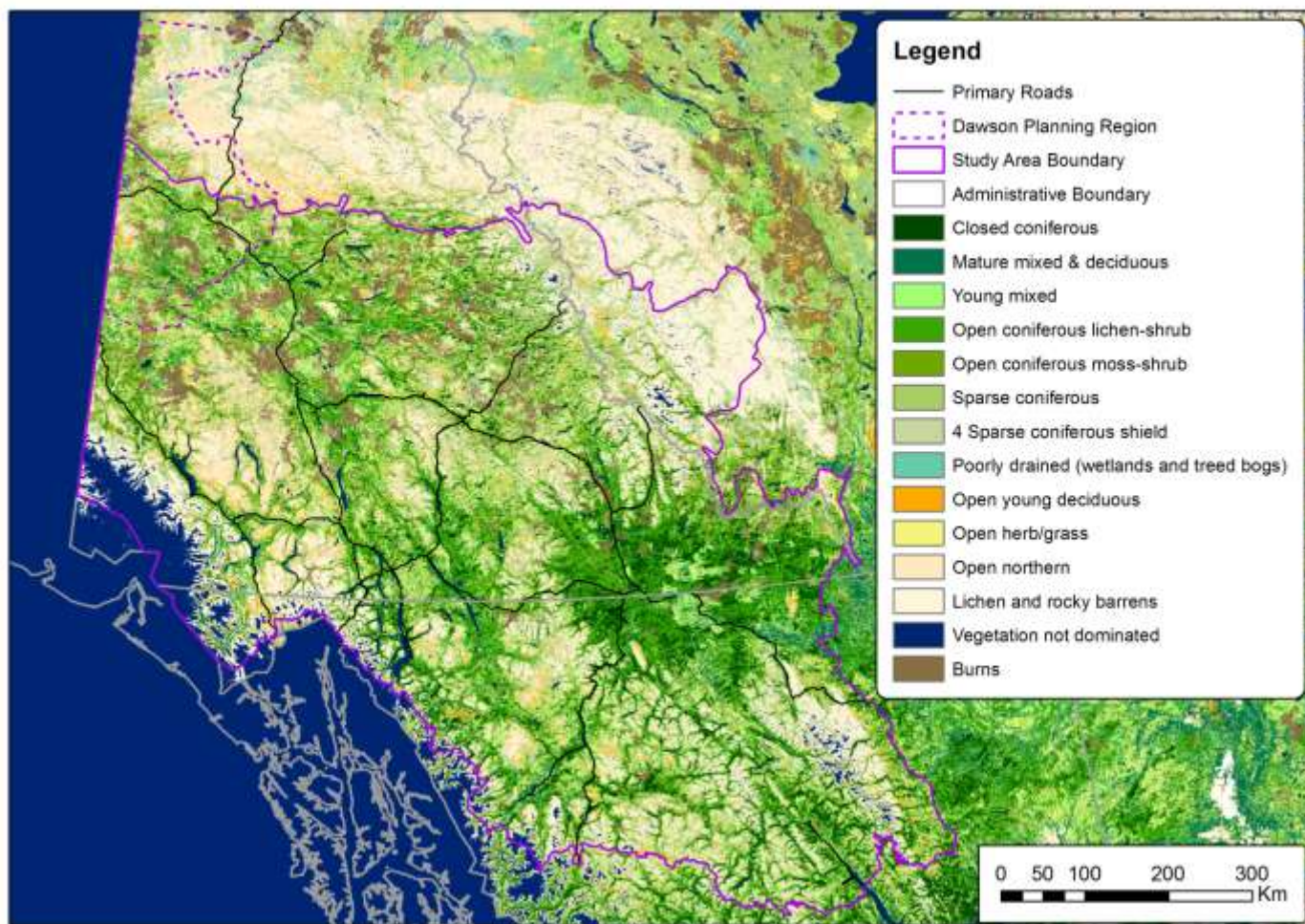
Ecological Indicator: National Land Cover Classification



Derived from 250-m resolution MODIS satellite imagery (Natural Resources Canada) that comprises 39 different cover classes.

Assessing & Ranking Benchmark Networks

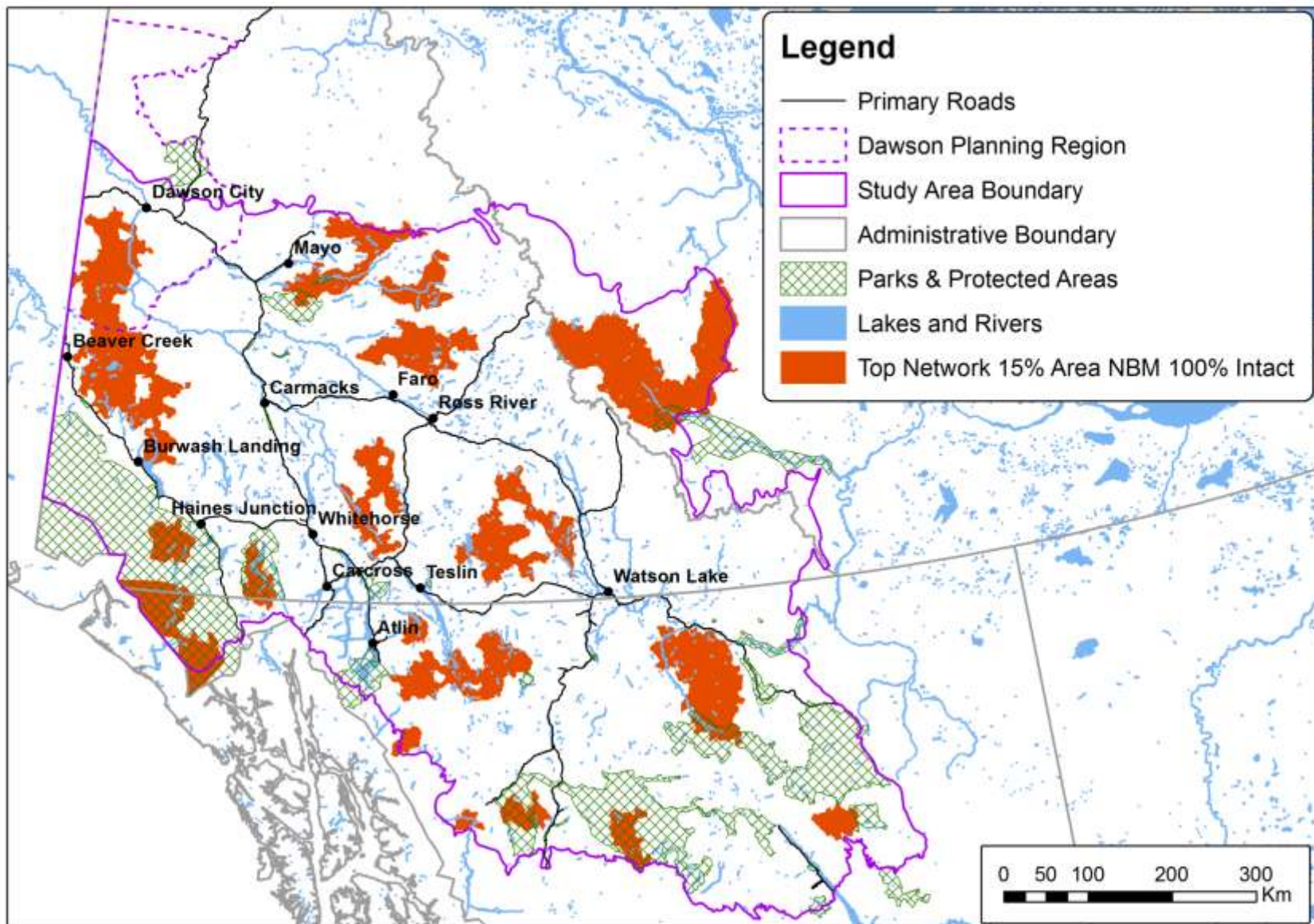
Ecological Indicator: Regional Land Cover Classification (NBM)



Reclassification of the National Land Cover into 13 regional classes

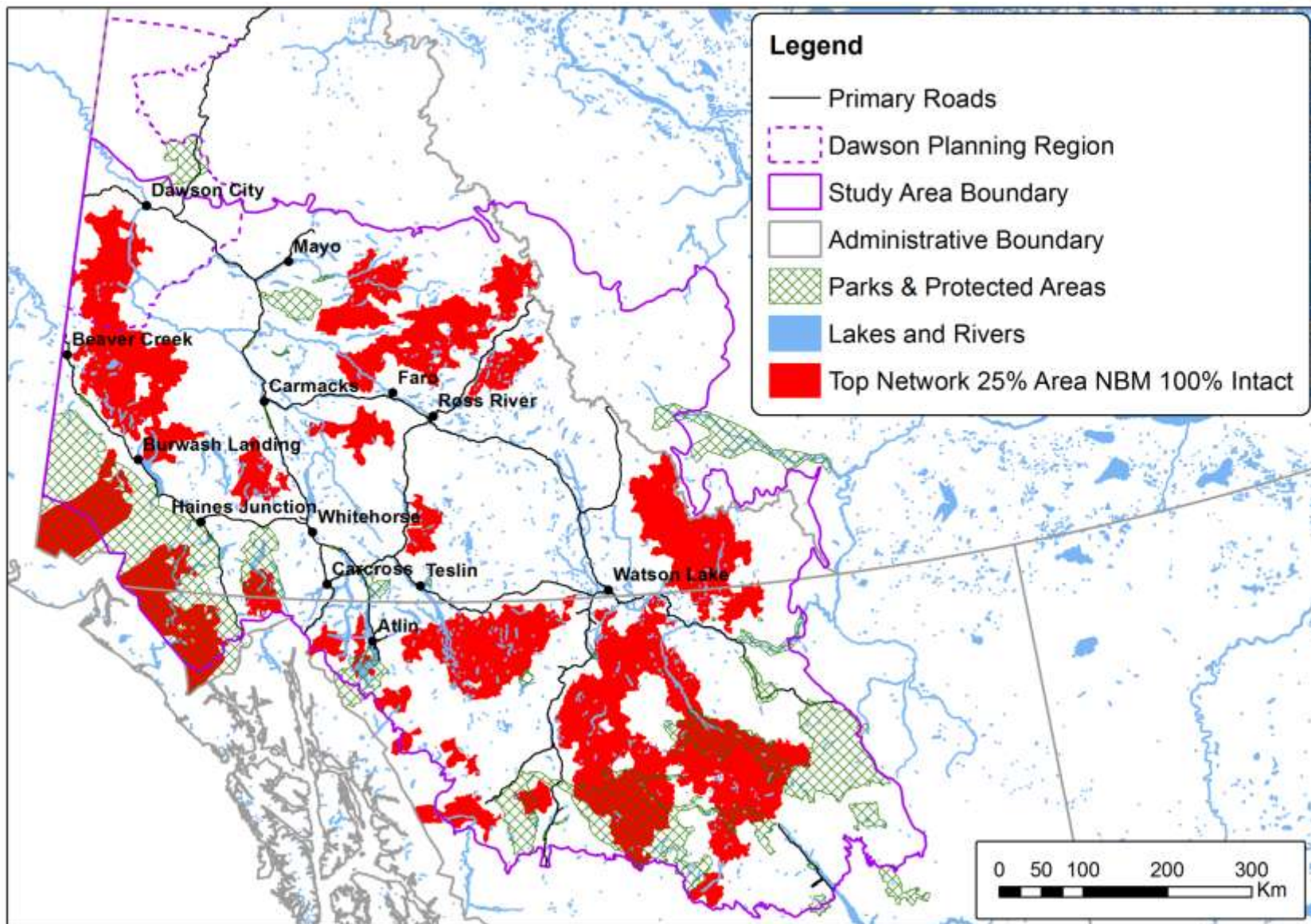
Results: Top Ecological Benchmark Network

100% Intact Catchments & Benchmarks Areas, 15% Area Target for Network



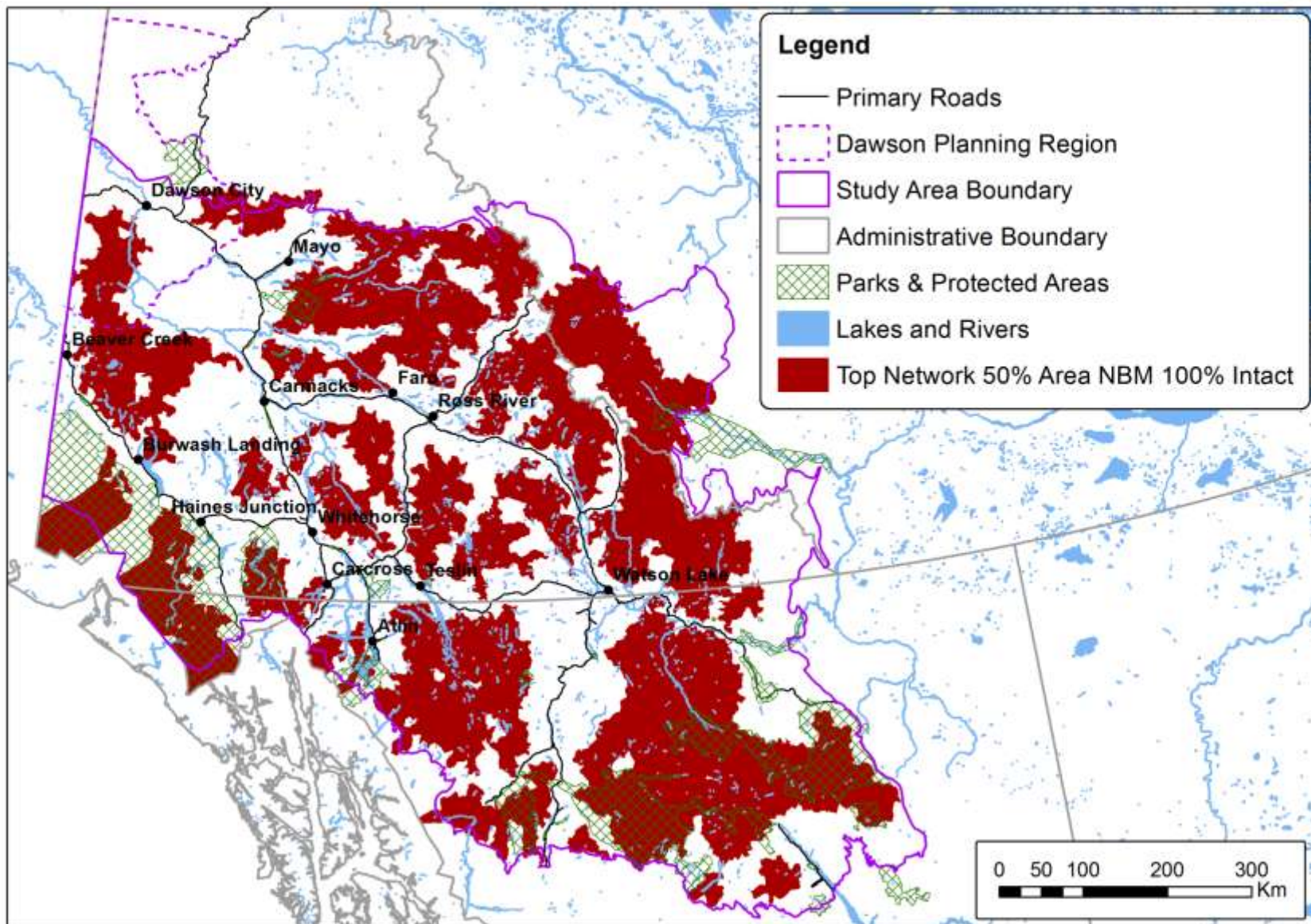
Results: Top Ecological Benchmark Network

100% Intact Catchments & Benchmarks Areas, 25% Area Target for Network



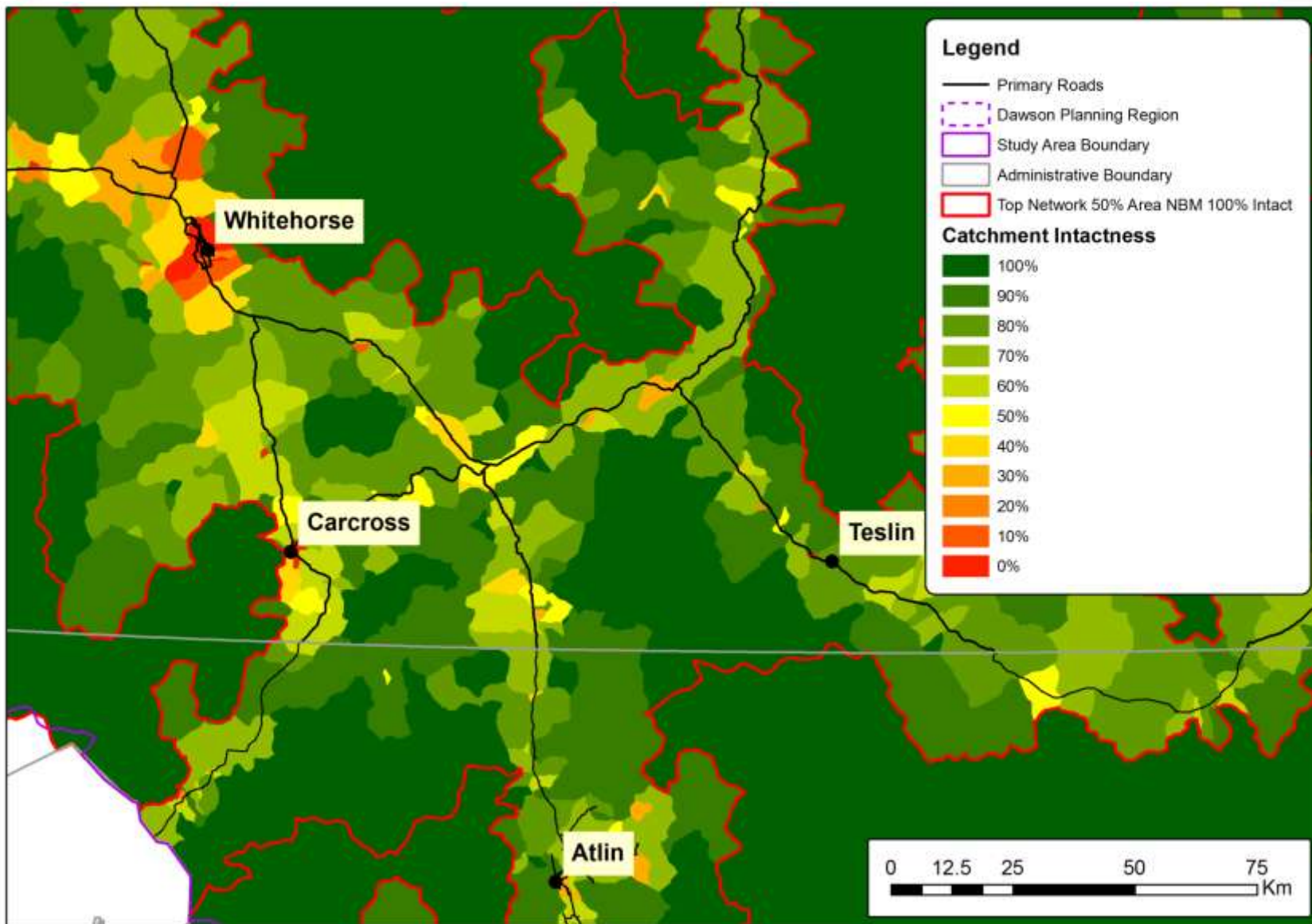
Results: Top Ecological Benchmark Network

100% Intact Catchments & Benchmarks Areas, 50% Area Target for Network



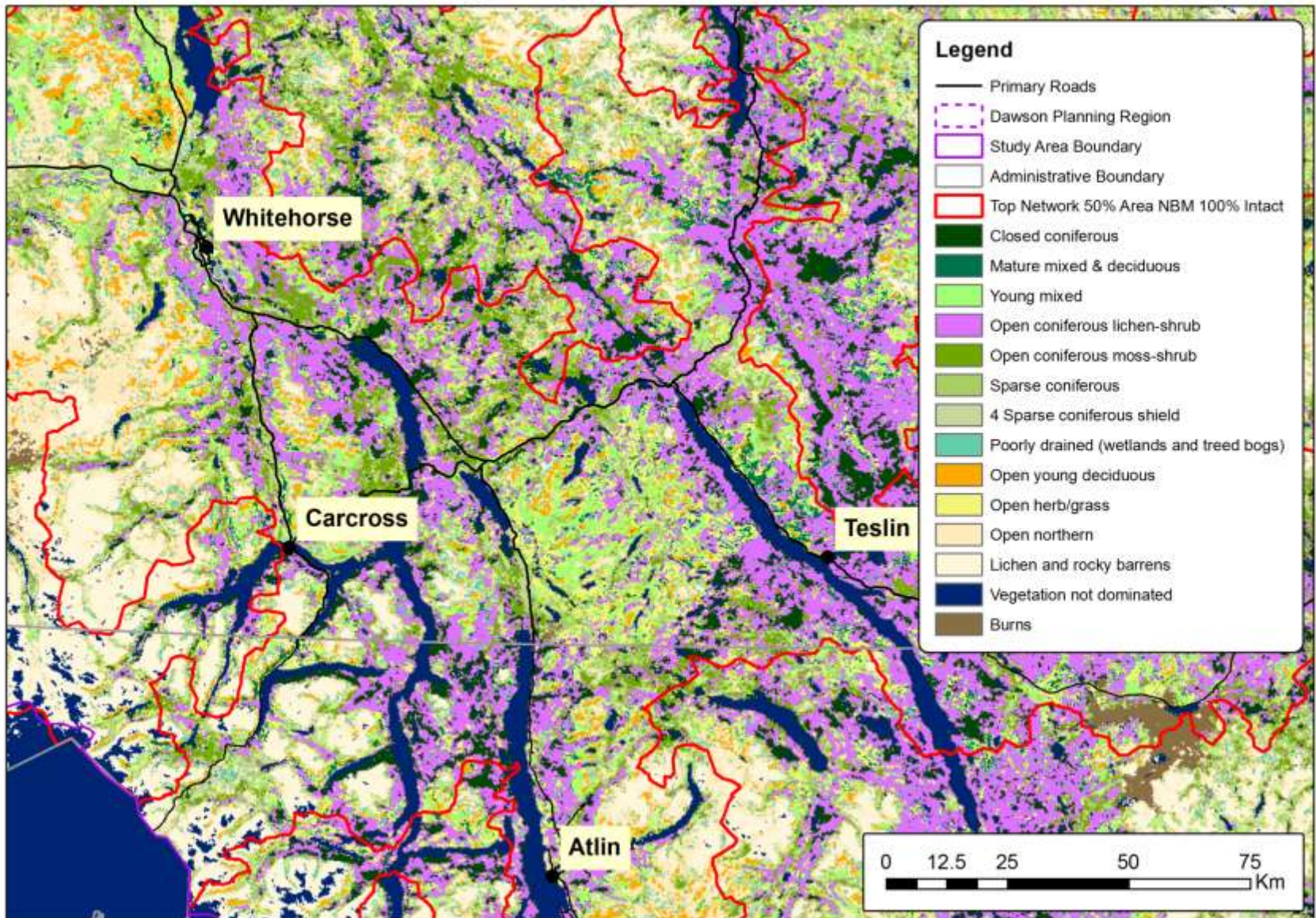
Intactness & Land Cover in Valley Bottoms

100% Intact Catchments & Benchmarks Areas, 50% Area Target for Network



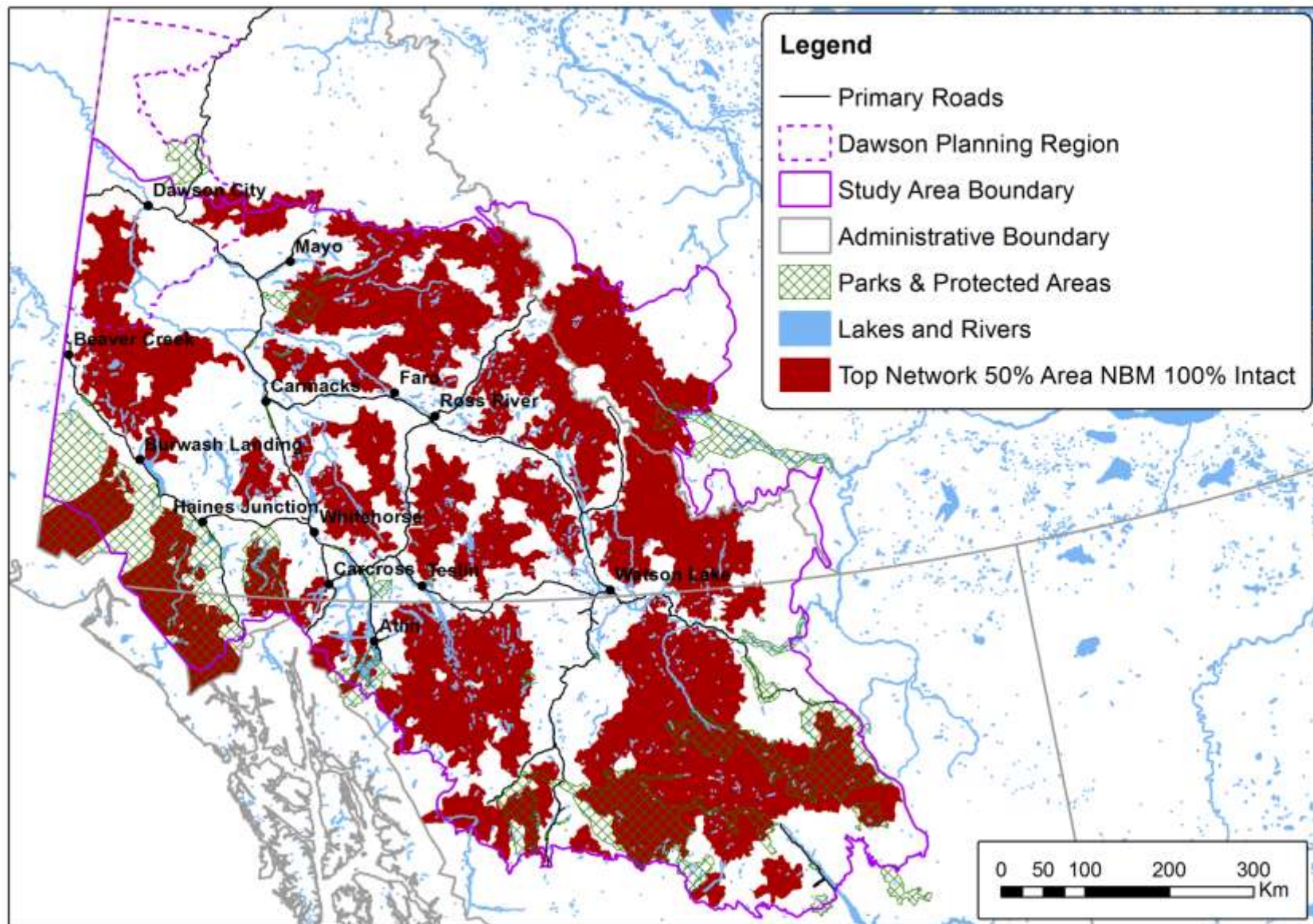
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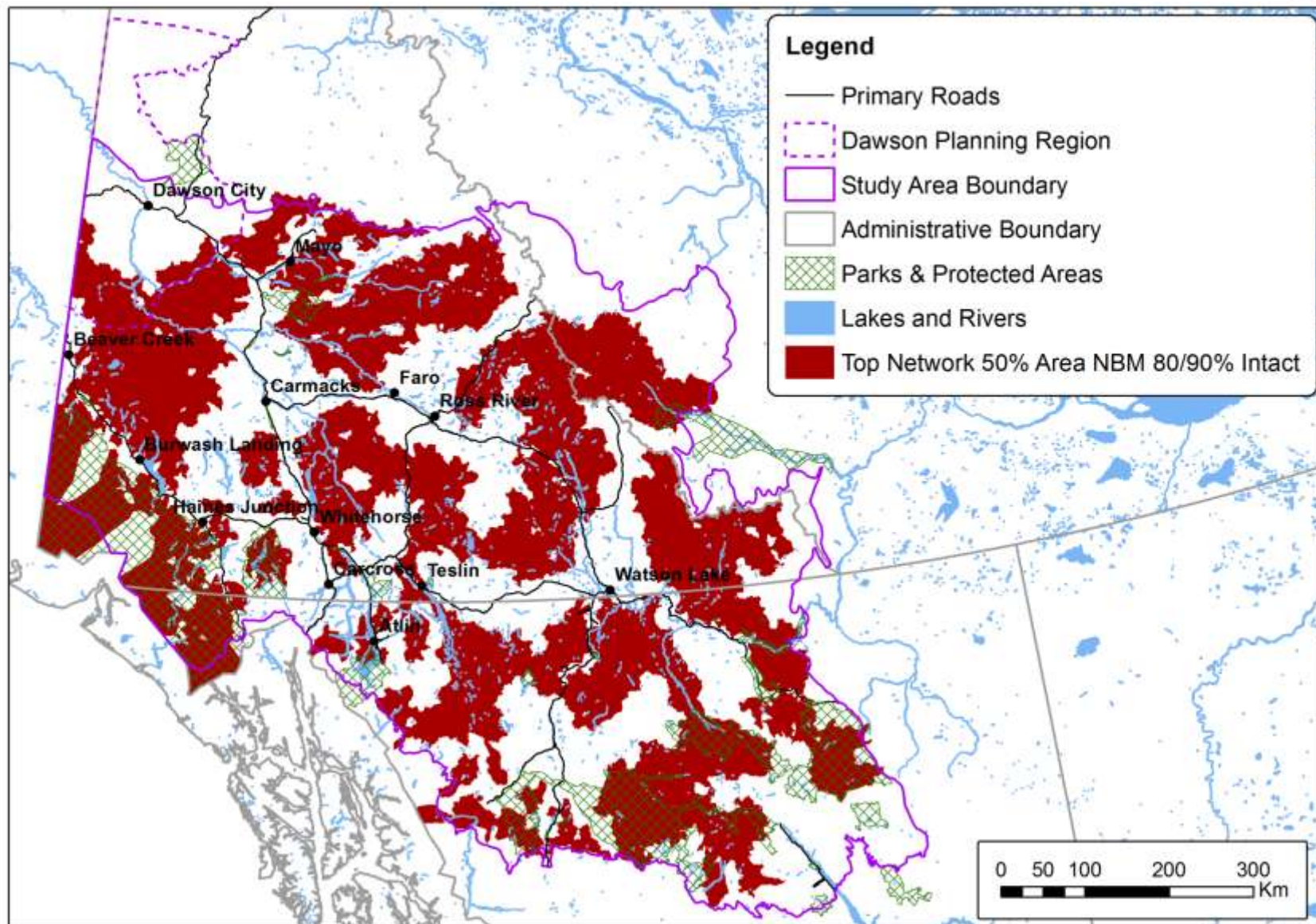
100% vs 90% Intact Benchmark Areas

100% Intact Catchments & Benchmarks Areas, 50% Area Target for Network



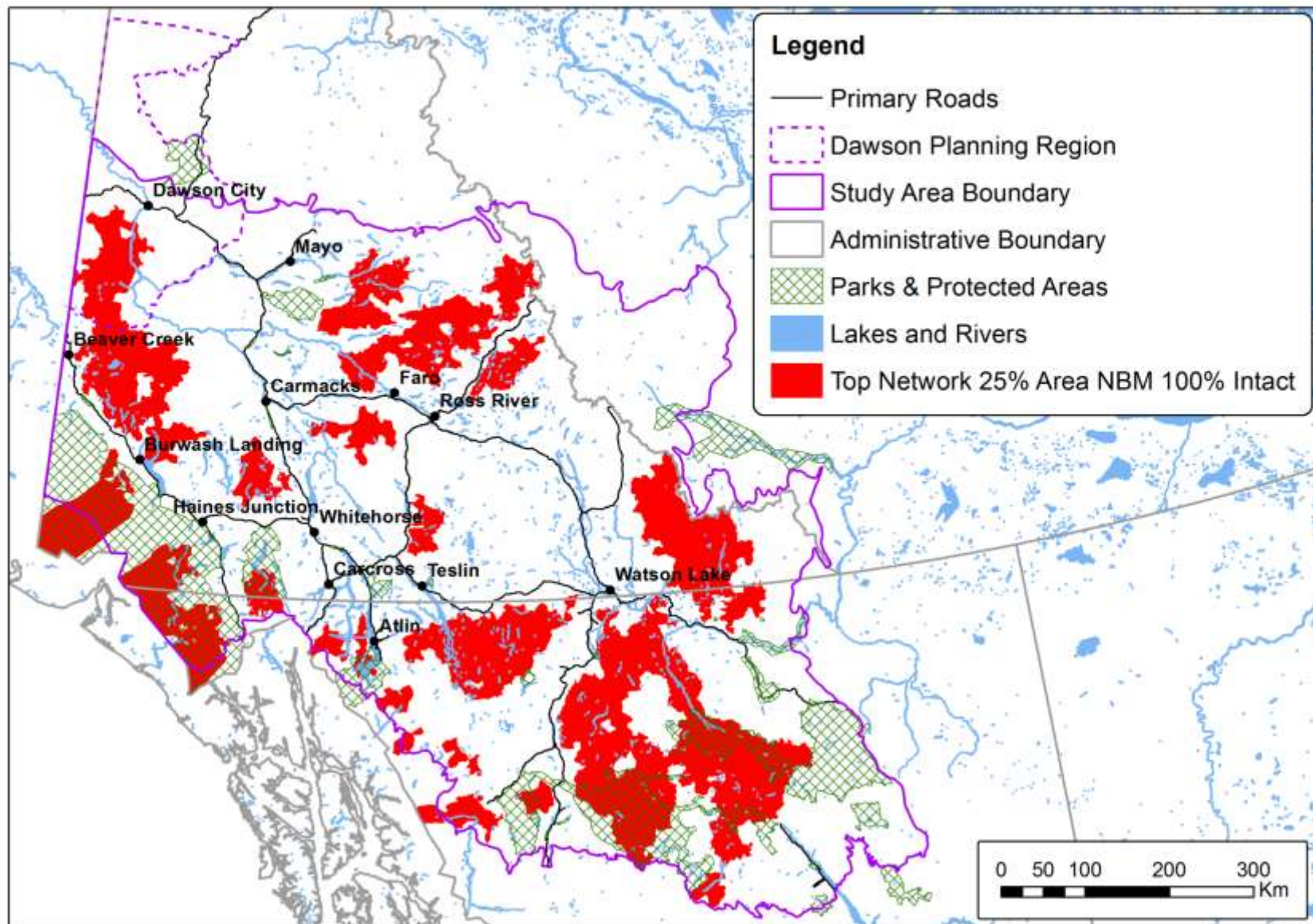
100% vs 90% Intact Benchmark Areas

80% Intact Catchments, 90% Intact Benchmark Areas, 50% Area Target



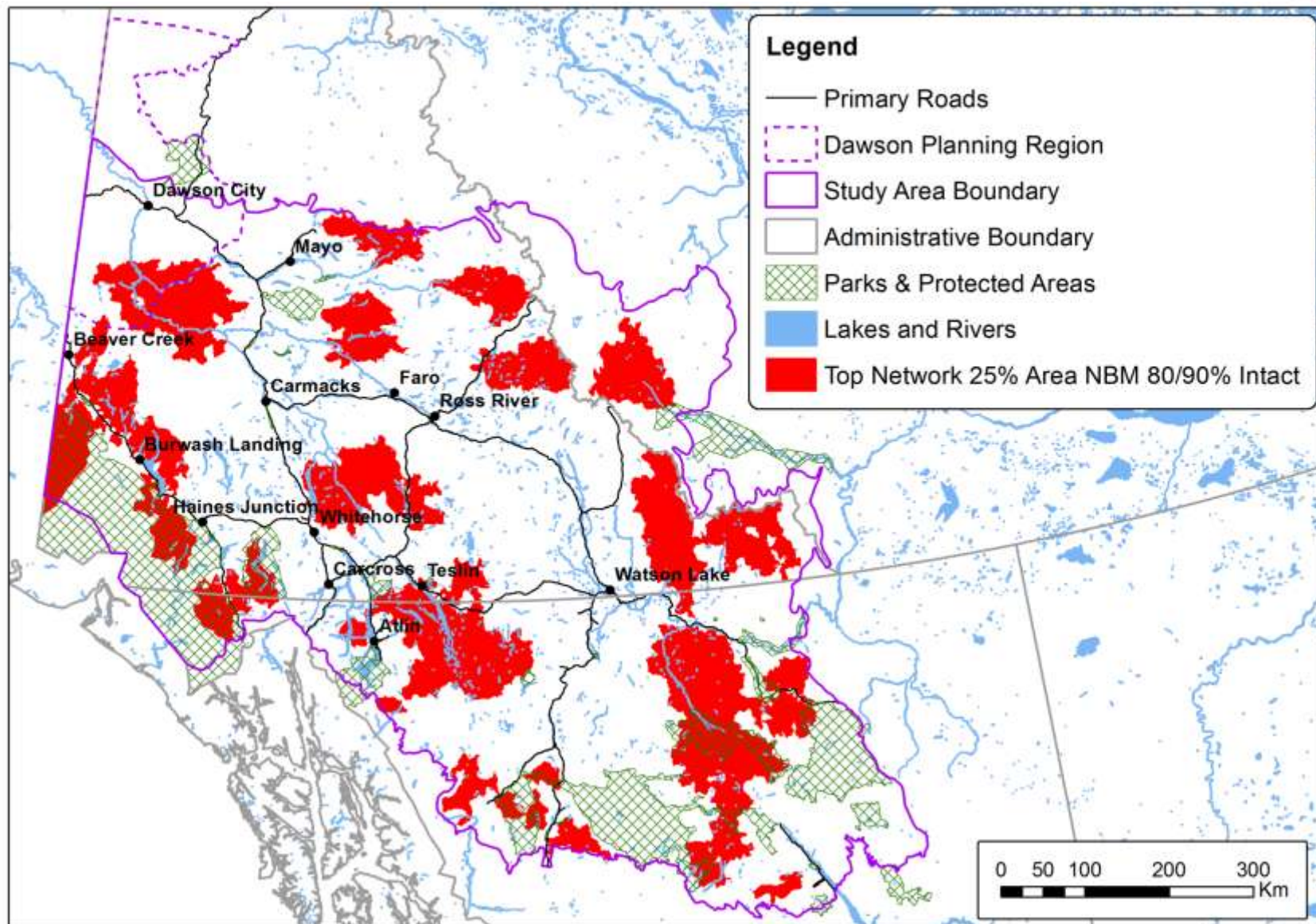
100% vs 90% Intact Benchmark Areas

100% Intact Catchments & Benchmarks Areas, 25% Area Target for Network



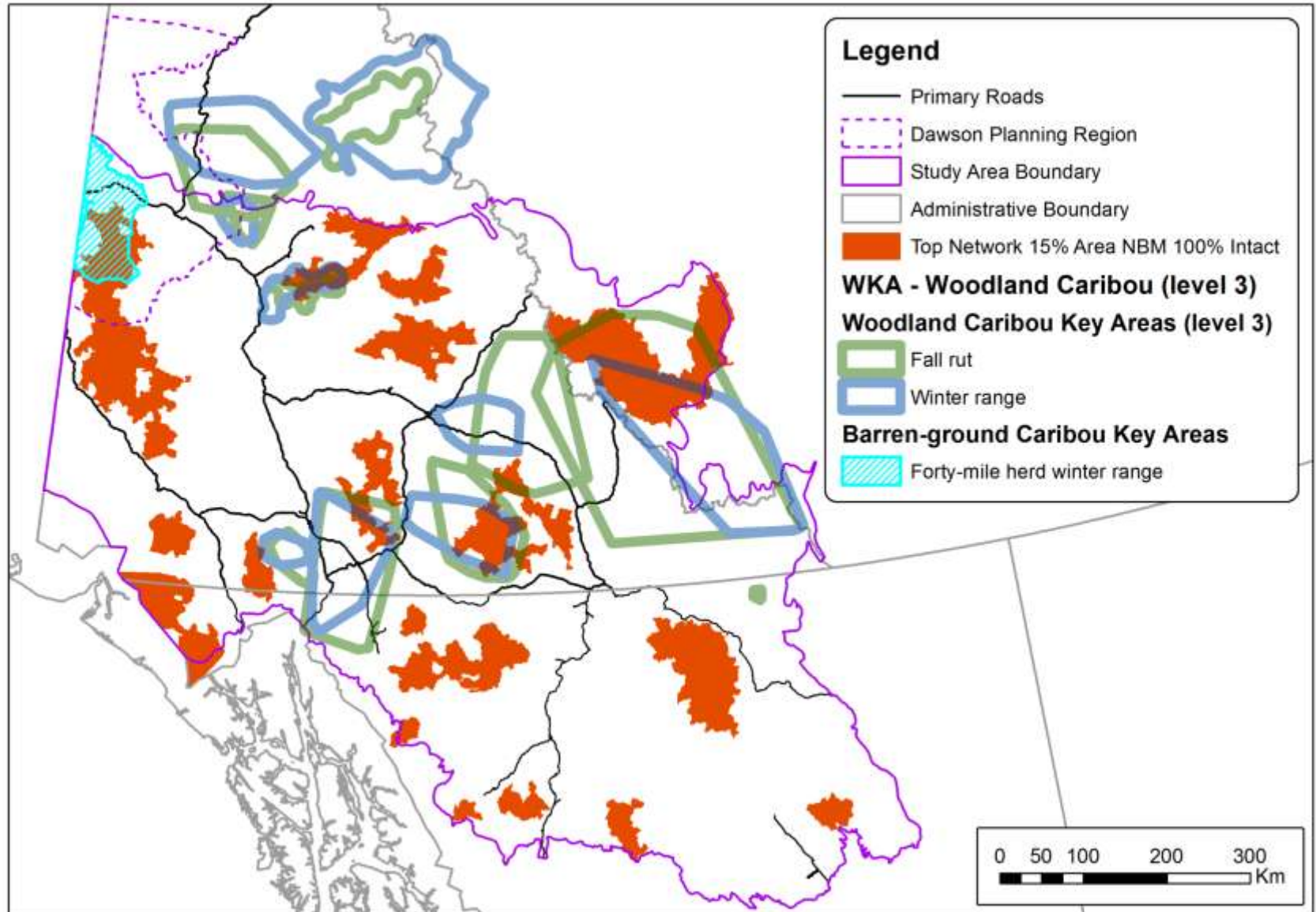
100% vs 90% Intact Benchmark Areas

80% Intact Catchments, 90% Intact Benchmarks Areas, 25% Area Target



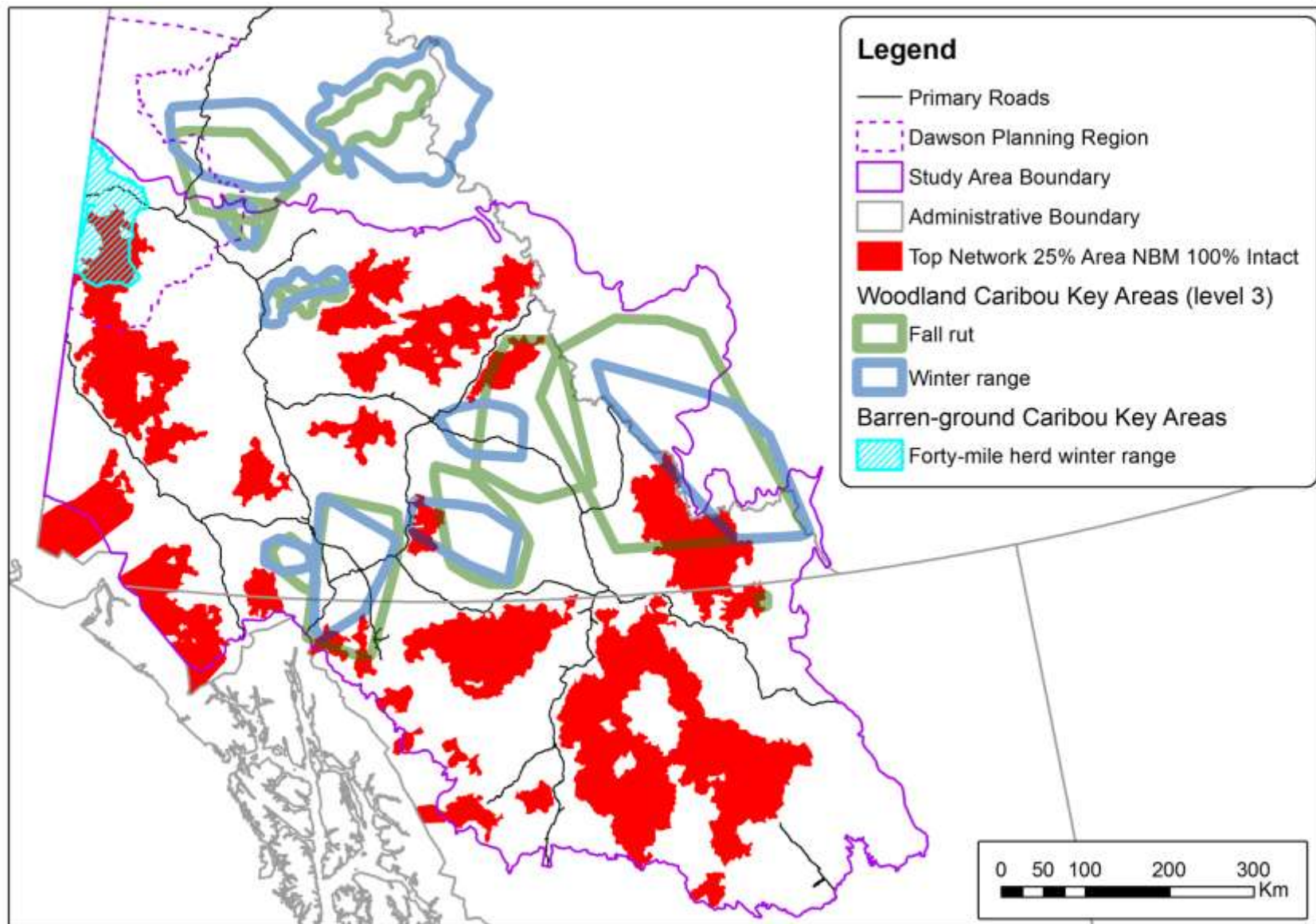
Refining Benchmark Networks: Key Wildlife Habitat

100% Intact Catchments & Benchmarks Areas, 15% Area Target for Network



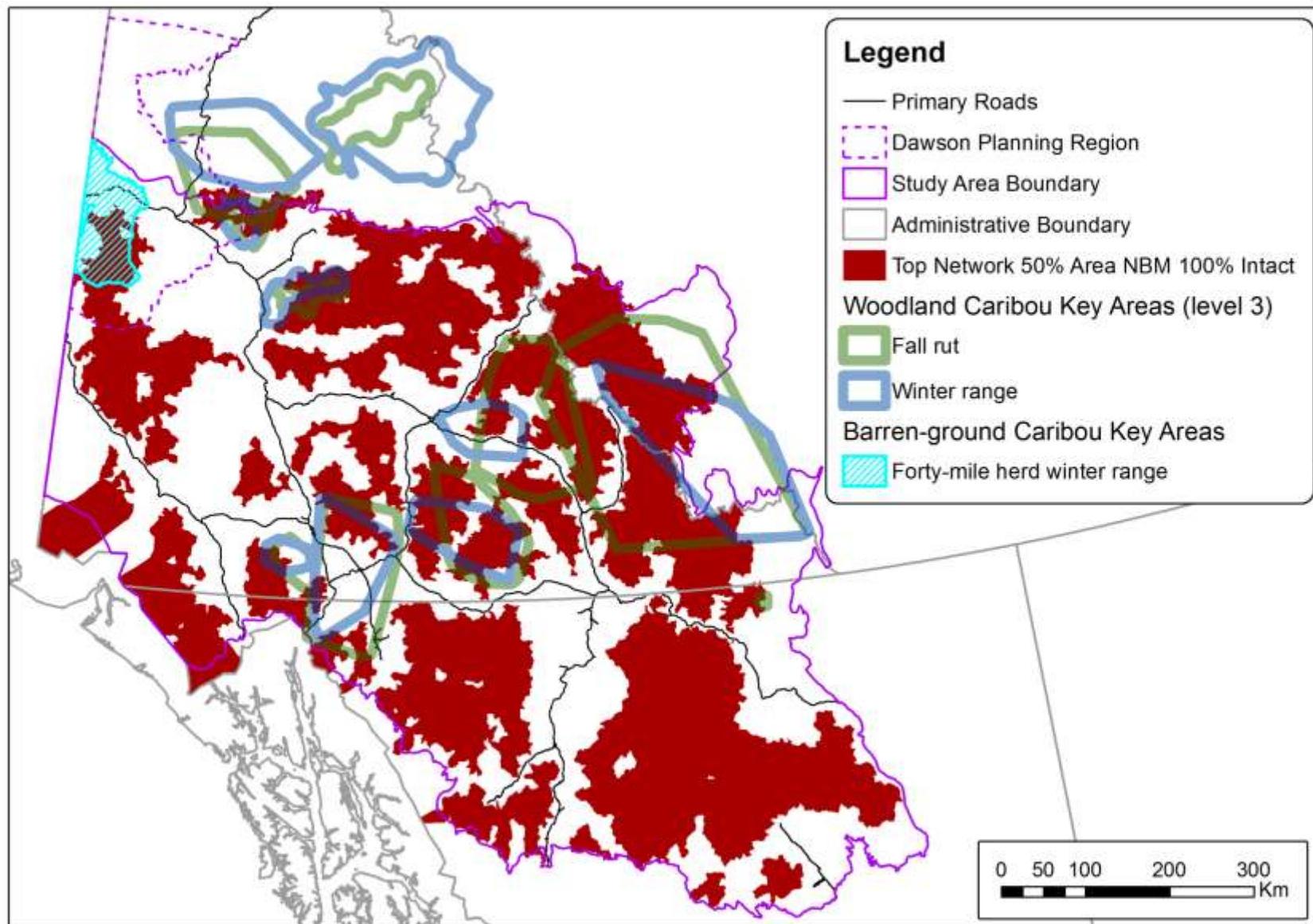
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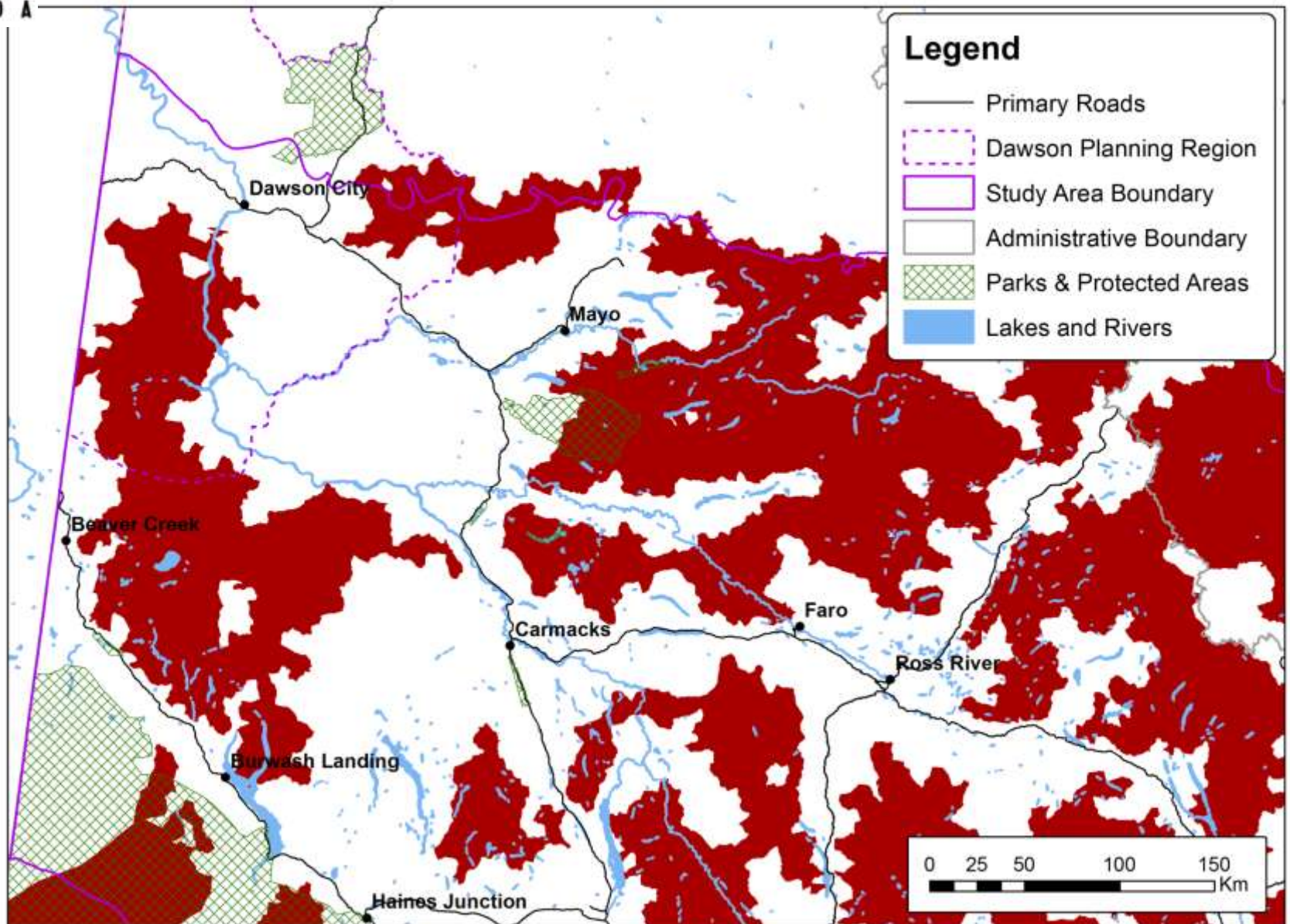
Refining Benchmark Networks: Key Wildlife Habitat

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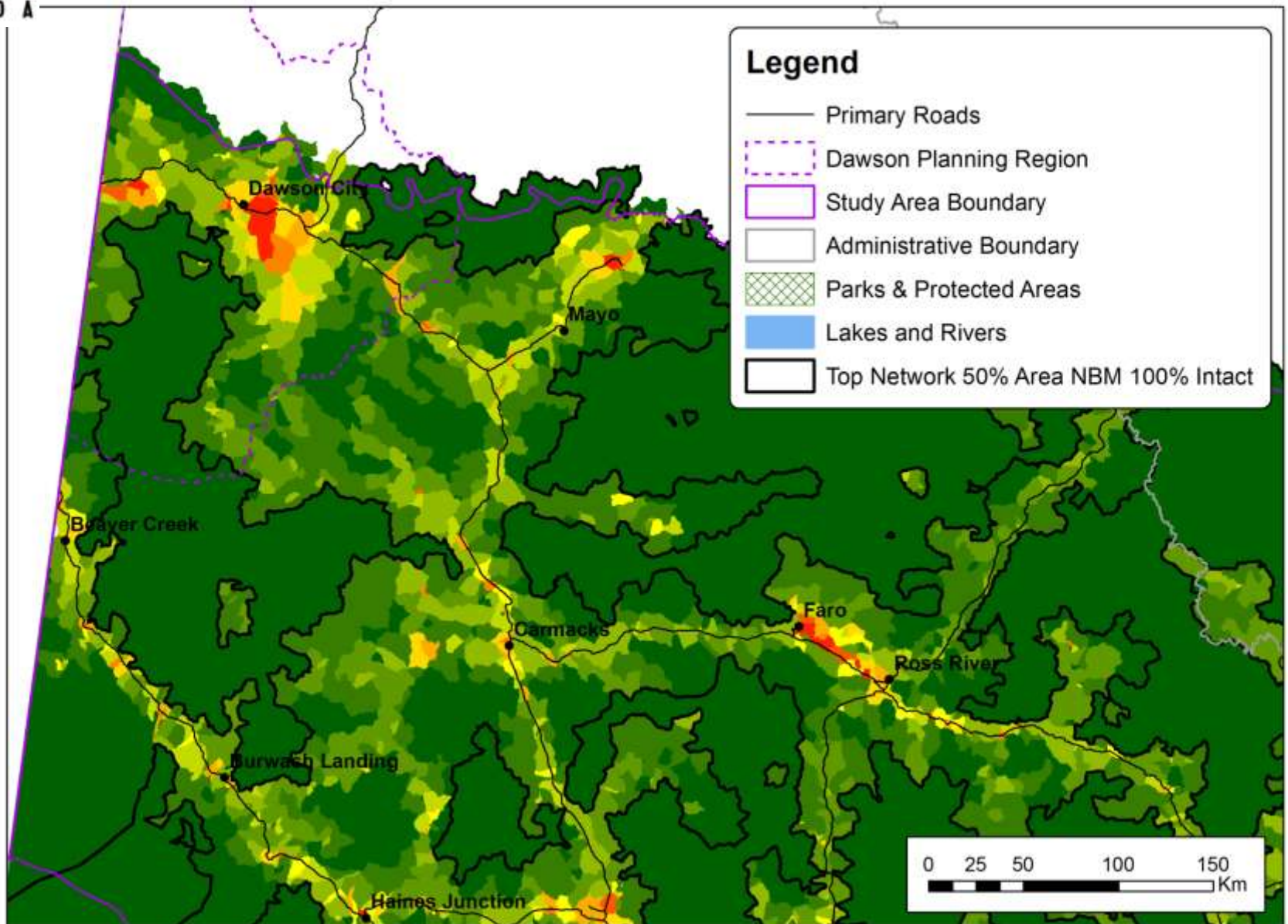
Refining Benchmark Networks: Disturbance Mapping

100% Intact Catchments & Benchmark Areas, 50% Area Target



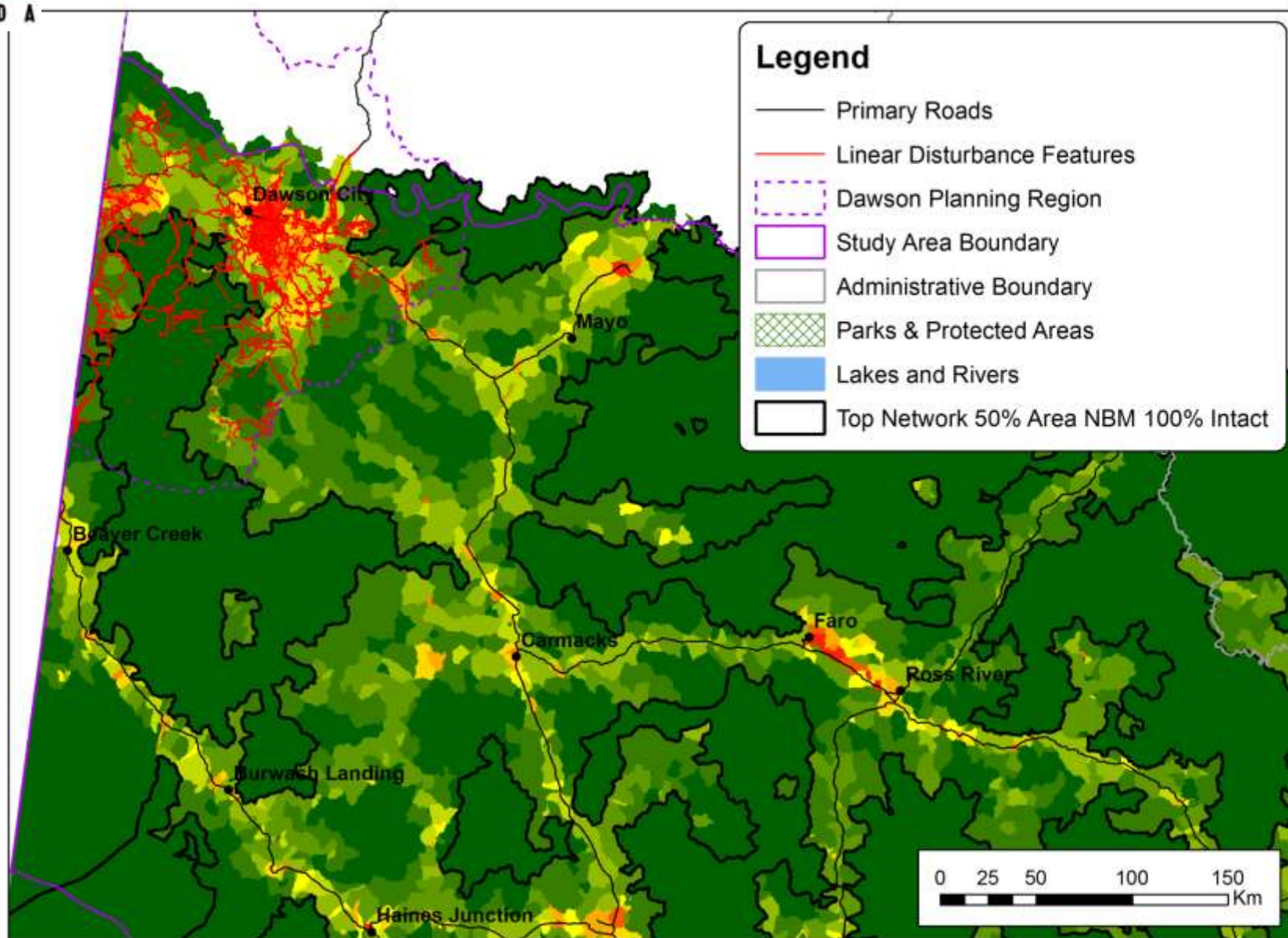
Refining Benchmark Networks: Disturbance Mapping

100% Intact Catchments & Benchmark Areas, 50% Area Target



Refining Benchmark Networks: Disturbance Mapping

100% Intact Catchments & Benchmark Areas, 50% Area Target



Insights & Cautions from Exploratory Analysis

- 100% intact benchmarks: important ecosystems likely excluded
- Excluded ecosystems may disproportionately occur in valley bottoms
- National intactness data likely not capturing existing disturbance
- Identify & assess benchmark networks using regional ecological values
 - detailed human disturbance mapping
 - regional ecological land classification
 - local & scientific knowledge of key wildlife habitats



Questions?



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