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Experience and reflections on Statistic Canada's use of Ecosystem Services Classifications

Statistics Canada

June 20, 2016

Environment accounts: History



SNA '93: Satellite accounts for the environment

System of Environmental-Economic Accounting (SEEA, draft)

Millennium Ecosystem Assessment

SEEA-Water as a statistical standard

SEEA-Central Framework as a standard

SEEA Experimental Ecosystem Accounting

1993 — 2003 — 2005 — 2007 — 2012 —————>

— 1997 ————— 2005 — 2010 — 2011 — 2013 — 2014 — 2015 —————>

HAE Landscapes

HAE Agriculture EGS

HAE M.E.G.S.

Framework for Environmental Statistics

HAE Economy and the Environment

HAE Water Supply and Demand

Canadian Environmental Sustainability Indicators

Econnections: Linking the Environment and the Economy

Ecosystem Accounting at STC



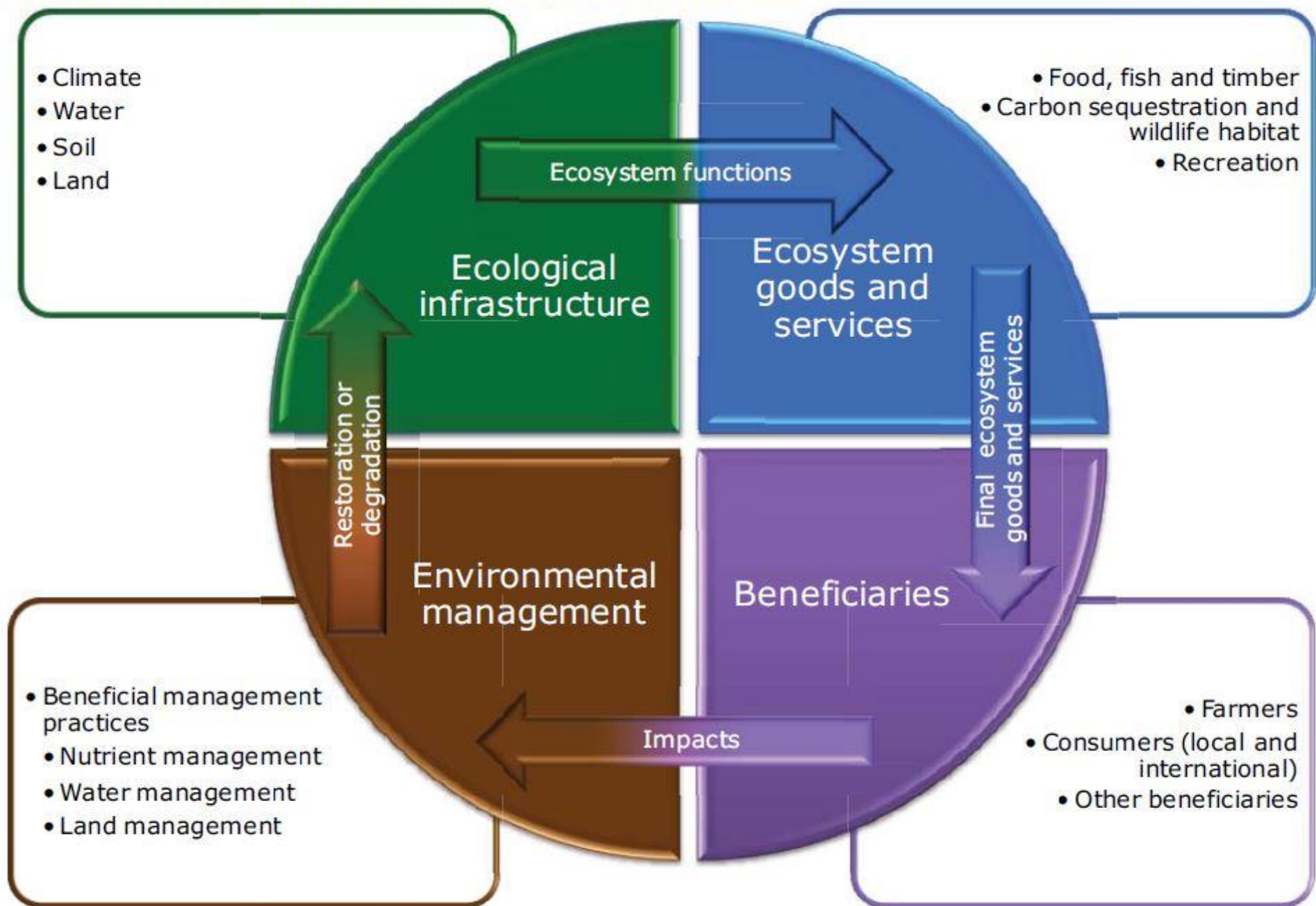
Classifying stocks

- It is possible to measure the extent, condition or quality of ecosystem assets, (but not there yet).
 - stocks of terrestrial ecosystems are classified based on land cover features subdivided according to local biophysical characteristics, such as soil type, elevation and ruggedness.
 - Given the advancement of spatial datasets and satellite image technologies, it may be possible to one day track them over time.

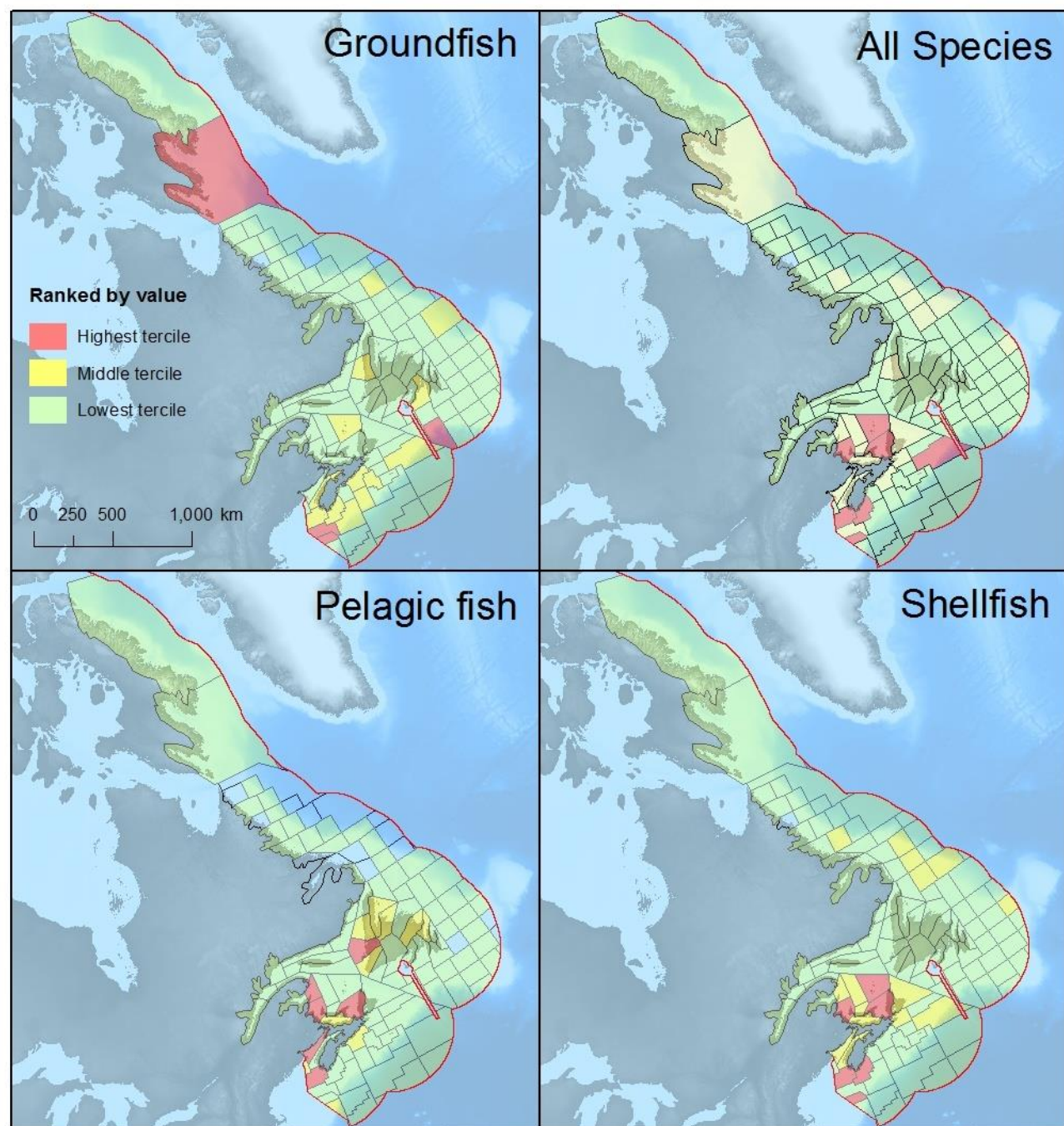
Classifying flows

- For the MEGS project, EGS flows are classified into three broad categories: ⁸
 - [Provisioning services](#)—the ‘goods’ in EGS—reflect the material and energy provided by ecosystems; for example, timber, fish, or plants that have a particular socio-economic use.
 - [Regulating services](#) result from the capacity of ecosystems to regulate climatic, hydrological and bio-chemical cycles, as well as biological processes.
 - [Cultural services](#) are generated from the physical setting and location of ecosystems and give rise to emotional, intellectual and symbolic benefits that people obtain from ecosystems through recreation, knowledge development, relaxation, and spiritual reflection.

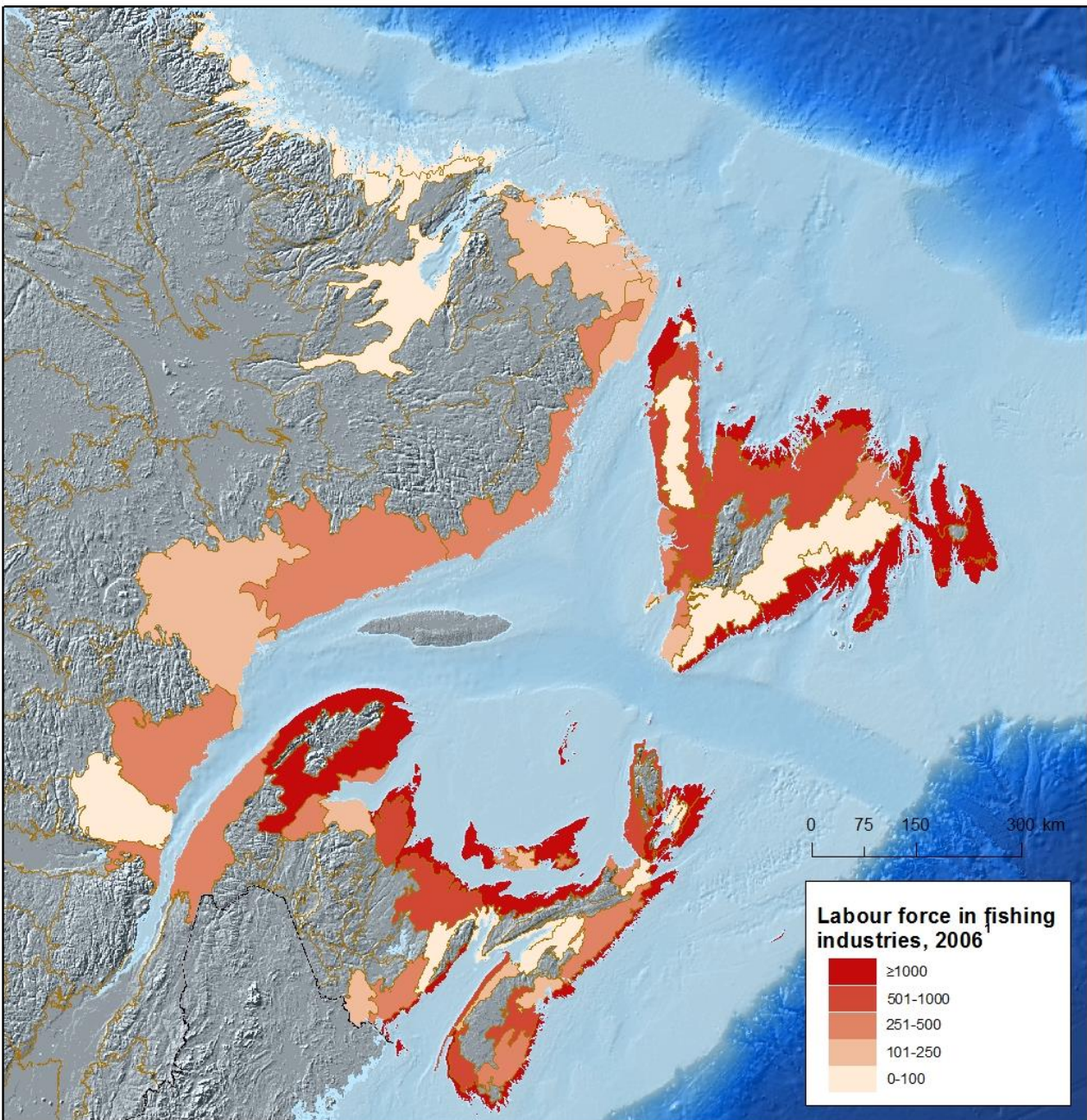
Ecosystem Goods and Services conceptual framework for agriculture



Value of commercial landings, Atlantic coast



Beneficiaries of marine ecosystem goods, Atlantic coast



Note(s): ¹ Fishing Industries include: the Fishing industry (NAICS 1141), the Seafood Product Preparation and Packaging industry (NAICS 3117) and the Aquaculture industry (NAICS 1125).

Source(s): Statistics Canada, 2013, 2006 Census of population, special tabulation.

Freshwater wetland ecosystem goods and services

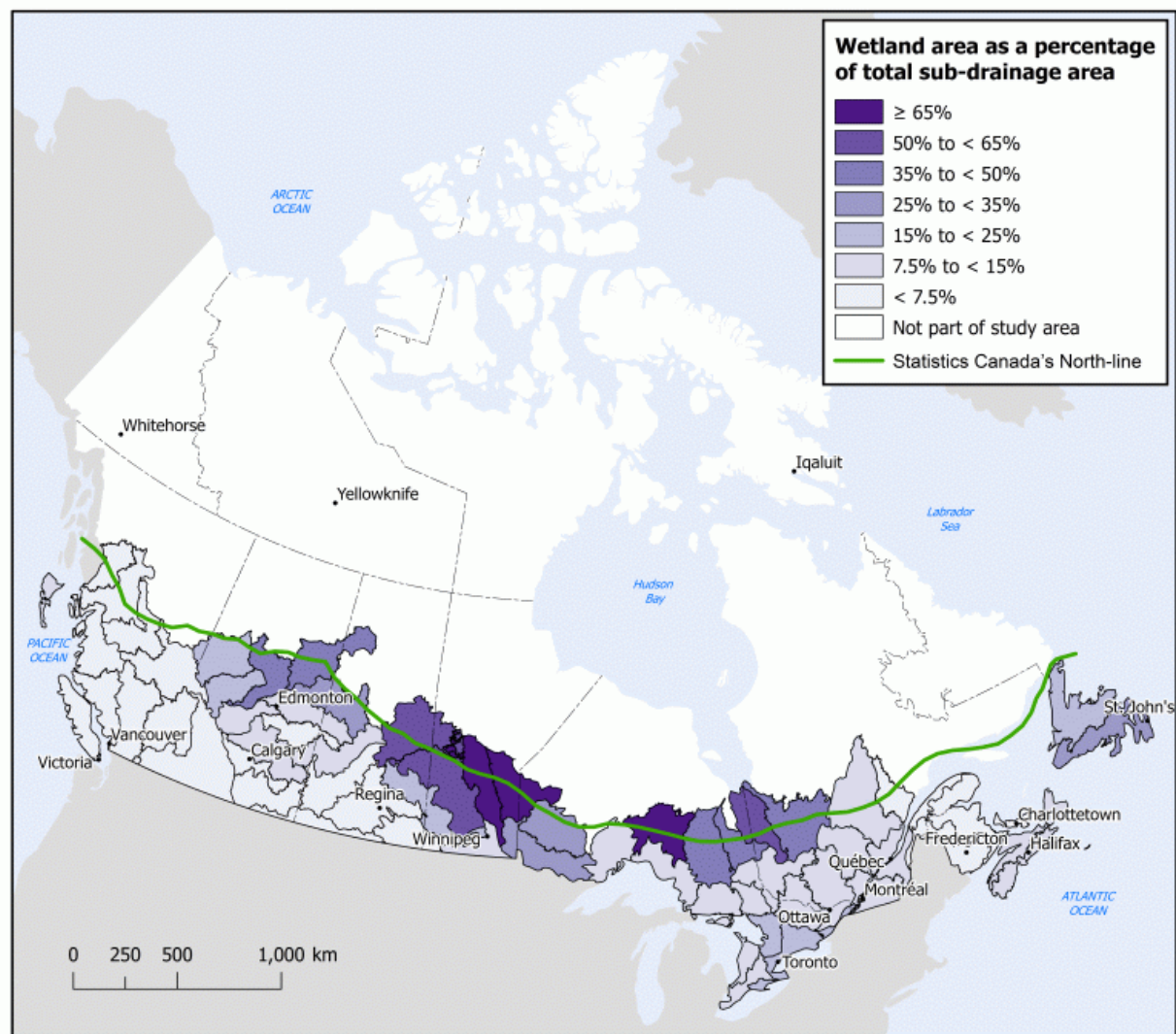


- **Freshwater wetland extent in Canada**
- **Streamflow regulating services**
- **Water quality regulating services**
- **Soil retention and formation services**
- **Habitat provision services**
- **Climate regulating services**
- **Recreation and education services**

Distribution of freshwater wetlands, southern Canada

- Waste assimilation
- Flood attenuation
- Habitat
- Biodiversity

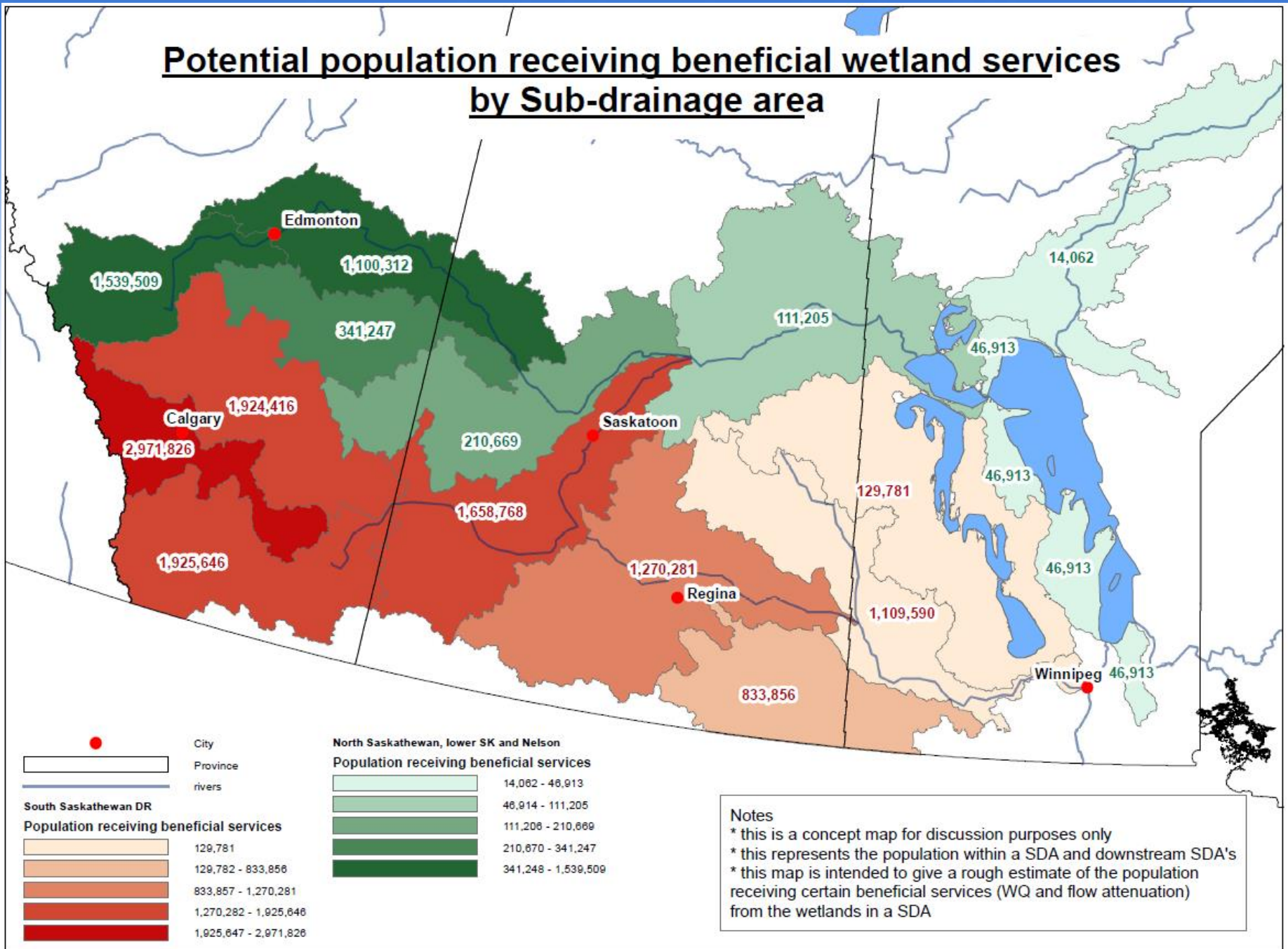
- ...



Note(s): Wetland estimates were calculated using coefficients derived from high resolution wetland datasets from the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Ontario, Quebec and Alberta and Environment Canada. Agriculture and Agri-Food Canada's 30 m land cover product was also used as a base layer reference. Wetland datasets represented full or partial coverage of the provinces.

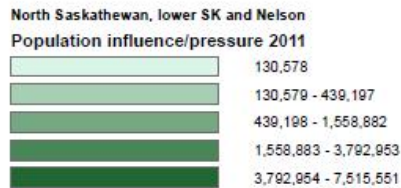
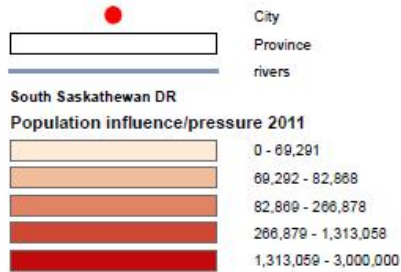
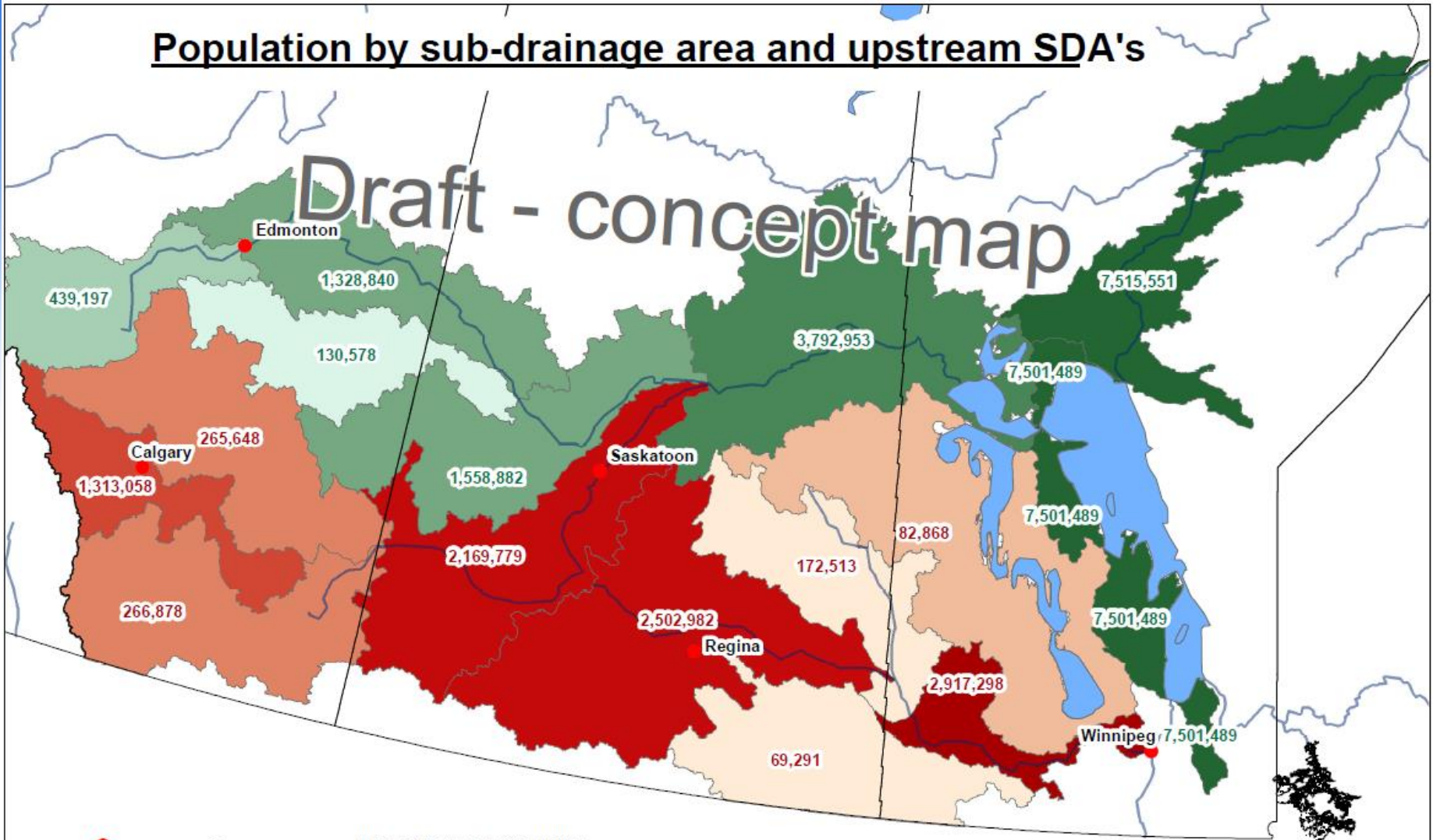
Source(s): Prince Edward Island Department of Environment, Energy and Forestry, 2009, *2009 PEI Wetland Inventory*, www.gov.pe.ca/gis/index.php3?number=1036522&lang=E (accessed December 2012). Nova Scotia Department of Natural Resources, 2013, *Forest Inventory – Geographic Information Systems*, http://novascotia.ca/natr/forestry/gis/dl_forestry.asp (accessed March 2013). New Brunswick Department of Environment and Local Government, 2013, *Regulated Wetlands*, www.snb.ca/geonb1/e/DC/RW.asp (accessed October 2011). Ontario Ministry of Natural Resources, Science and Information Branch, 2008, *Southern Ontario Land Resource Information System (SOLRIS)*. Alberta Environment and Sustainable Resource Development, 2011, *Alberta CWCS High – Resolution Wetland Inventory*, <https://maps.srd.alberta.ca/geoportal/catalog/search/resource/details.page?amp;uiid=%7B7A280790-2D88-4486-9D6A-B8CC2F6FEF1E%7D> (accessed March 2013). Environment Canada, 2012, *National Wetland Database*, Canadian Wildlife Service, Ottawa, Ontario. Agriculture and Agri-Food Canada, 2012, *2011 AAFC Crop Type Map of Canada*, ftp://ftp.agr.gc.ca/pub/outgoing/aesb-eos-gg/Crop_Inventory/2011/ (accessed October 9, 2012).

Potential population receiving beneficial wetland services by Sub-drainage area



Population by sub-drainage area and upstream SDA's

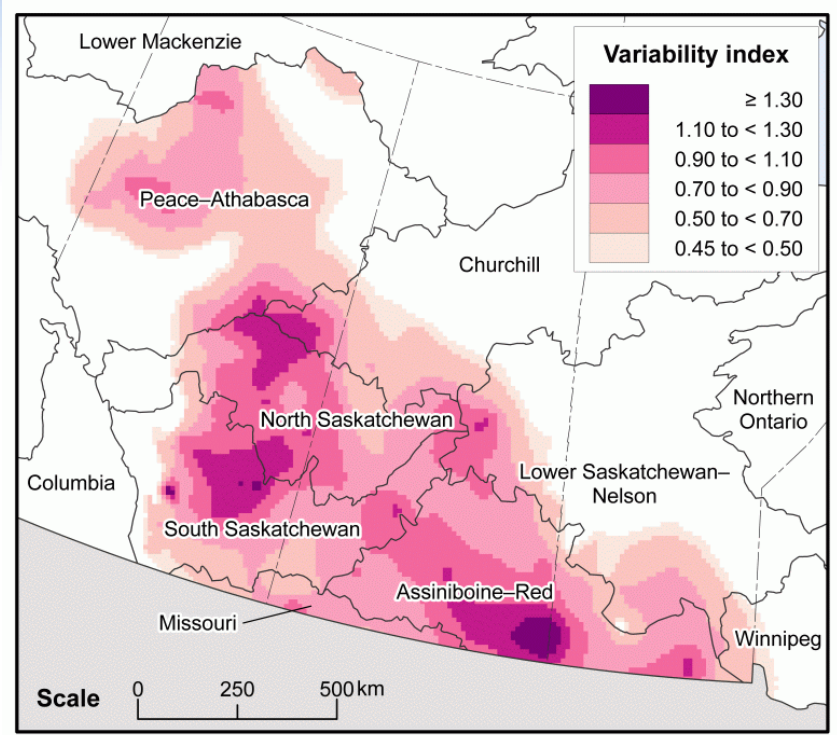
Draft - concept map



Notes
 * this is a concept map for discussion purposes only
 * this represents the population within a SDA and upstream SDA's
 * this map is intended to give a rough estimate of the population exerting pressure on the water of the main river of a SDA

Variability and trend in water yield

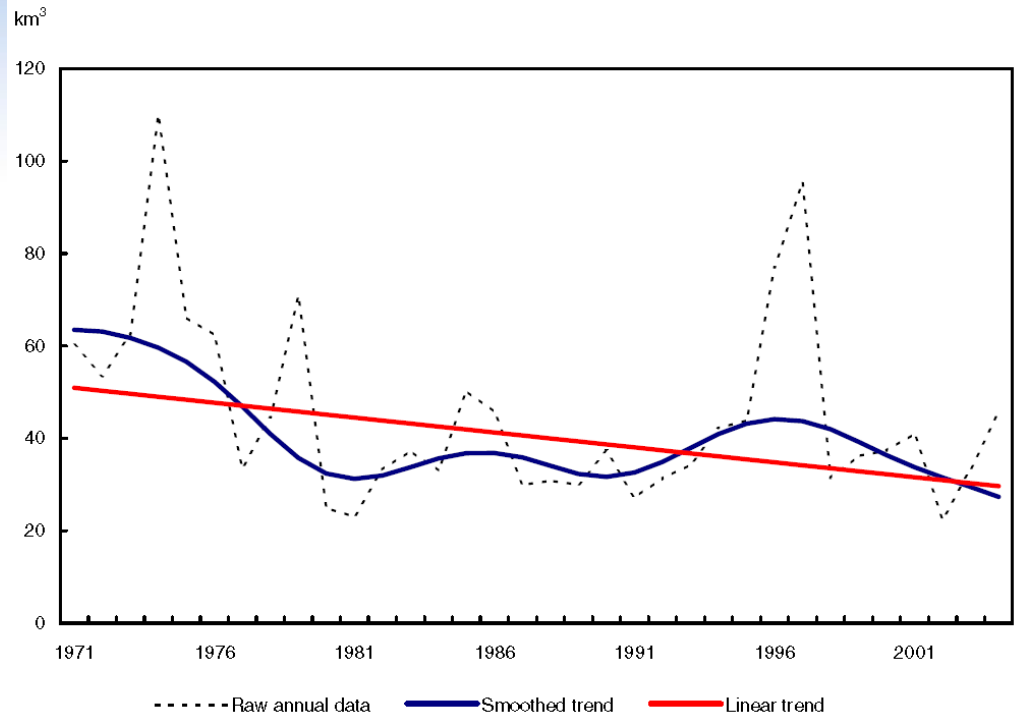
1971-2004 Variability (Prairies)

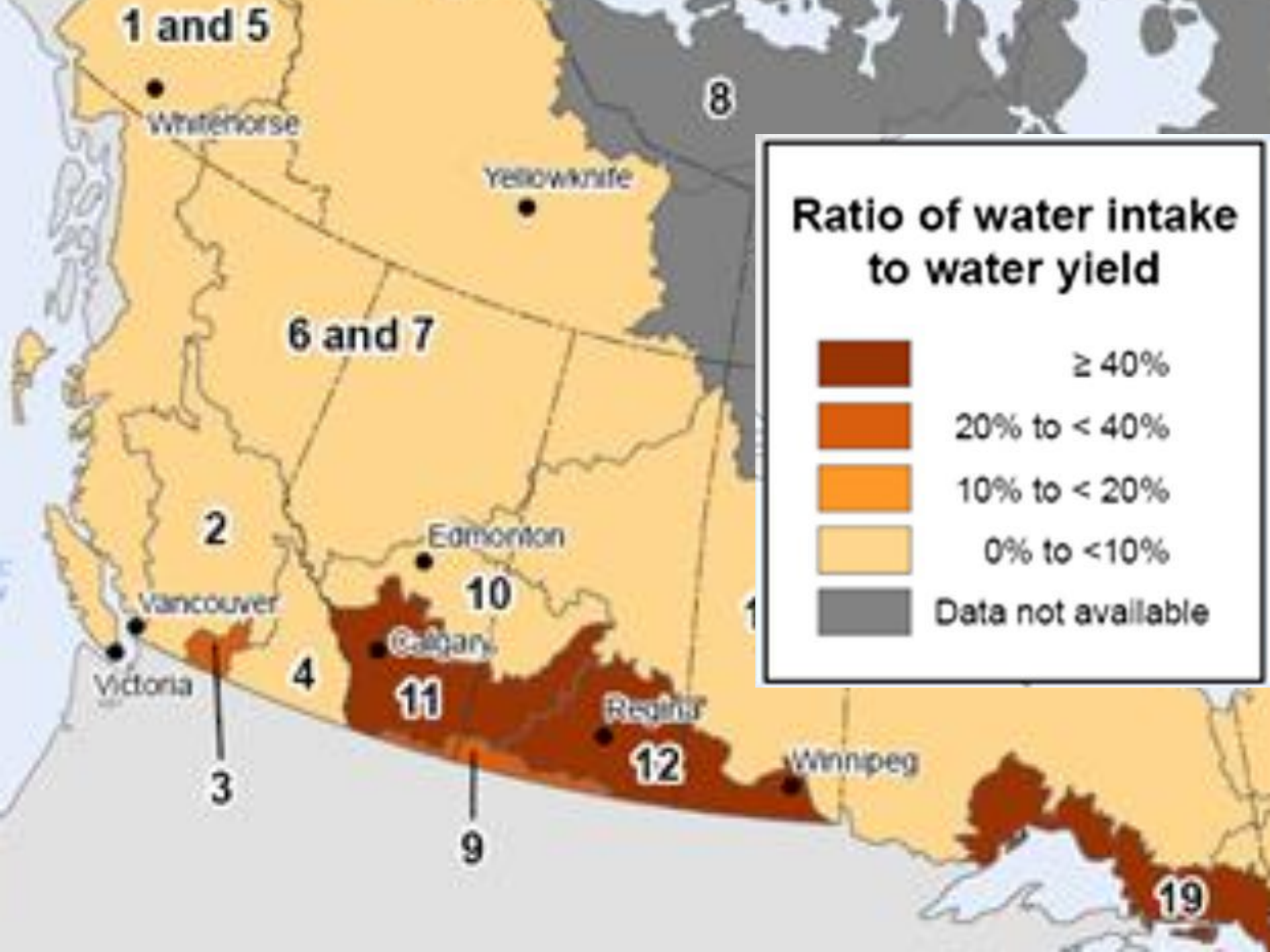


Note(s): Includes all or part of drainage regions 6, 9, 10, 11, and 12, the Peace-Athabasca, Missouri, North Saskatchewan, South Saskatchewan, and Assiniboine-Red.

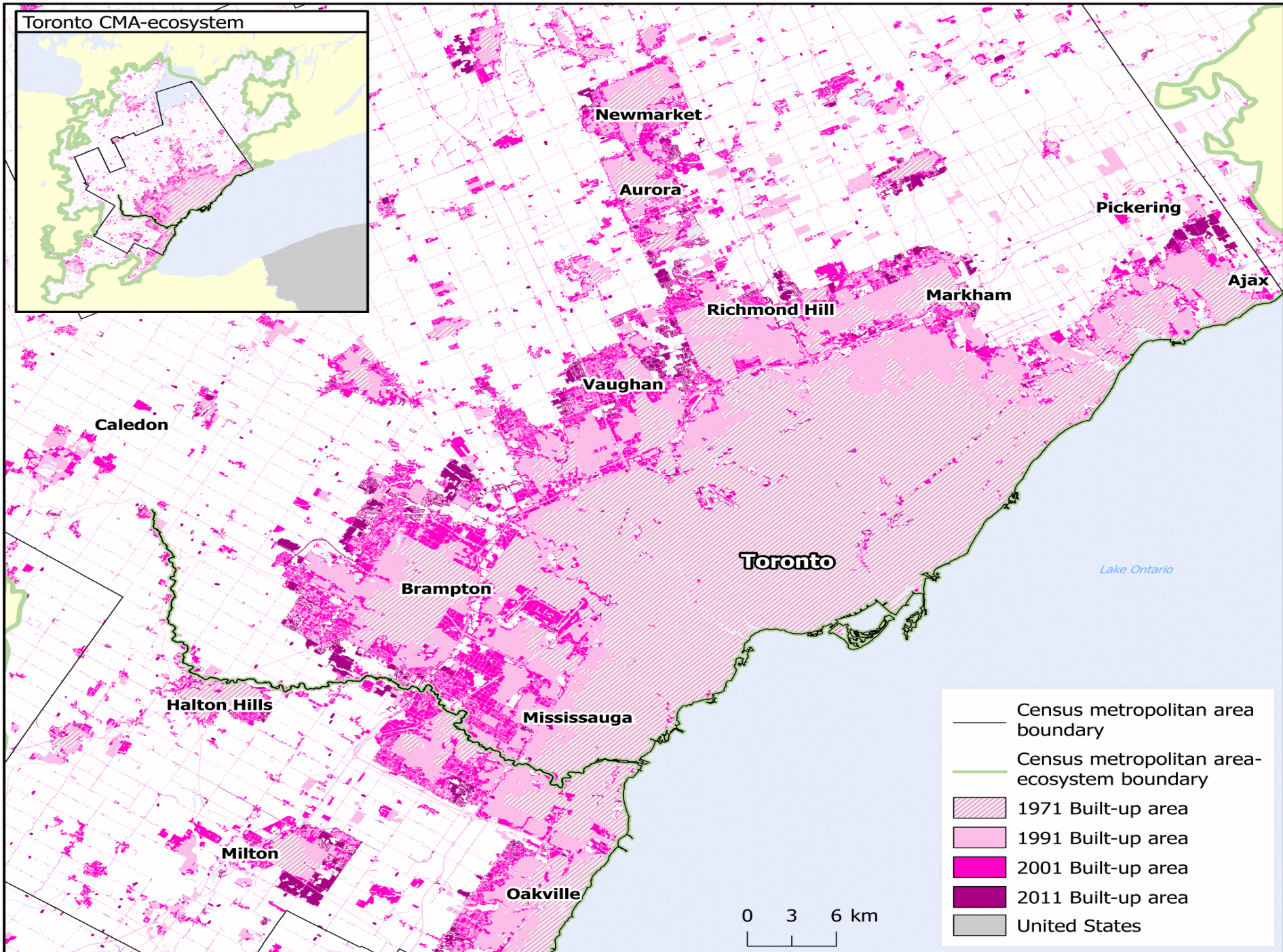
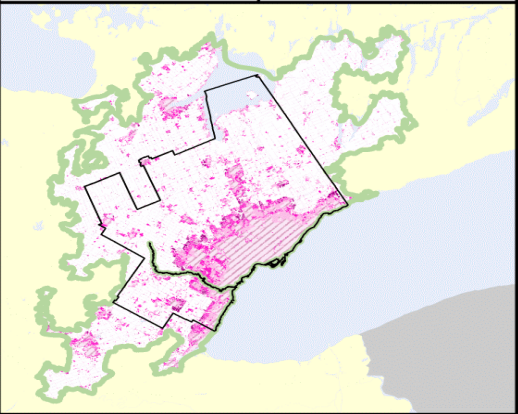
Sources(s): Statistics Canada, Environment Accounts and Statistics Division, 2010, special tabulation.

1971-2004 Trend (Prairies)





Toronto CMA-ecosystem



- Census metropolitan area boundary
- Census metropolitan area-ecosystem boundary
- ▨ 1971 Built-up area
- ▨ 1991 Built-up area
- ▨ 2001 Built-up area
- ▨ 2011 Built-up area
- ▨ United States

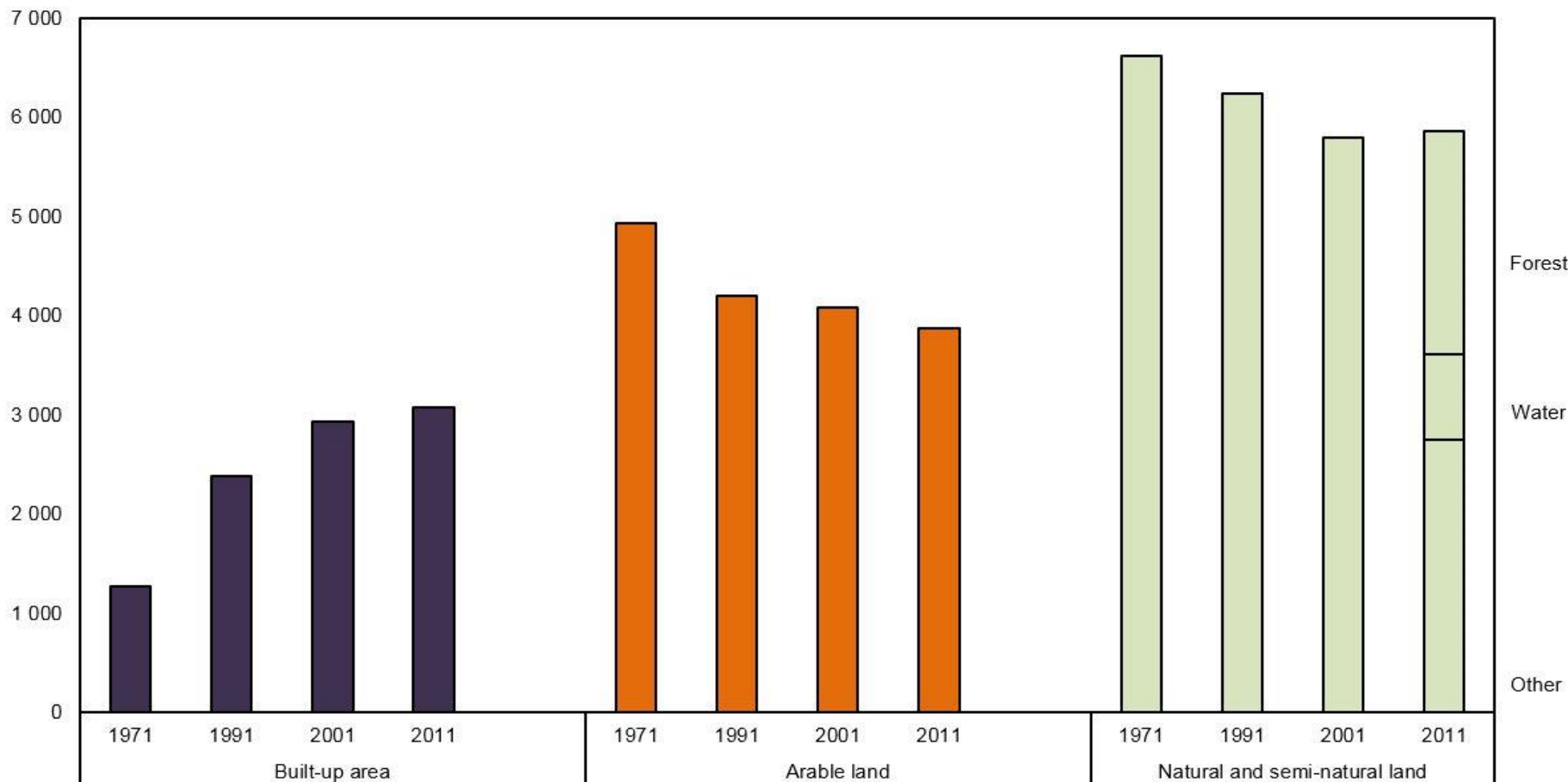
0 3 6 km



Toronto's built-up area grew by 1,189 km² from 1971 to 2011

Land cover and land use, Toronto census metropolitan area-ecosystem (CMA-E), 1971, 1991, 2001 and 2011

square kilometres



Land cover and land use

HAE 2015: The changing landscape of CMAs

Section 3 – The atlas

Ecosystem asset account, Toronto census metropolitan area-ecosystem , 1971 to 2011

	Total built-up area ¹		Arable ²	Natural and
	Settled	Roads		semi-natural ³
	square kilometres			
Opening stock 1971	850	418	4 930	6 615
Land lost to settled area	-961	-448
Balance of change ⁴	1 409	403	-102	-300
Closing stock 2011	2 260	821	3 867	5 866