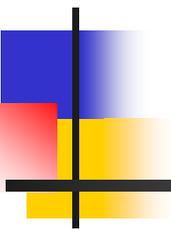


Mapping risk of exposure to contaminants among Aboriginal communities in Canada



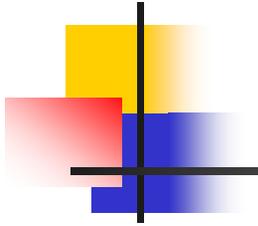
Laurie Hing Man Chan, Ph.D.

BC Leadership Chair
NSERC Northern Research Chair
Community Health Program

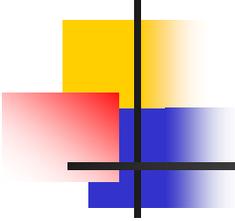
**Annual Meeting of the Consultative Group for the
North American Pollutant Release and Transfer Register
(PRTR) Project**

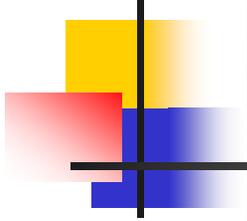
Nov 29th, 2006







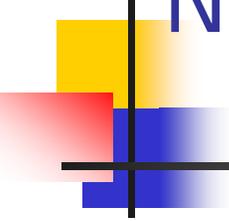




Self-reported WEB based database managed by Environment Canada

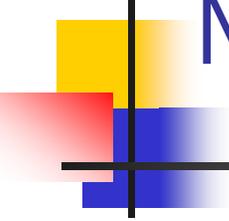
http://www.ec.gc.ca/pdb/npri/npri_home_e.cfm





National Pollutant Release Inventory

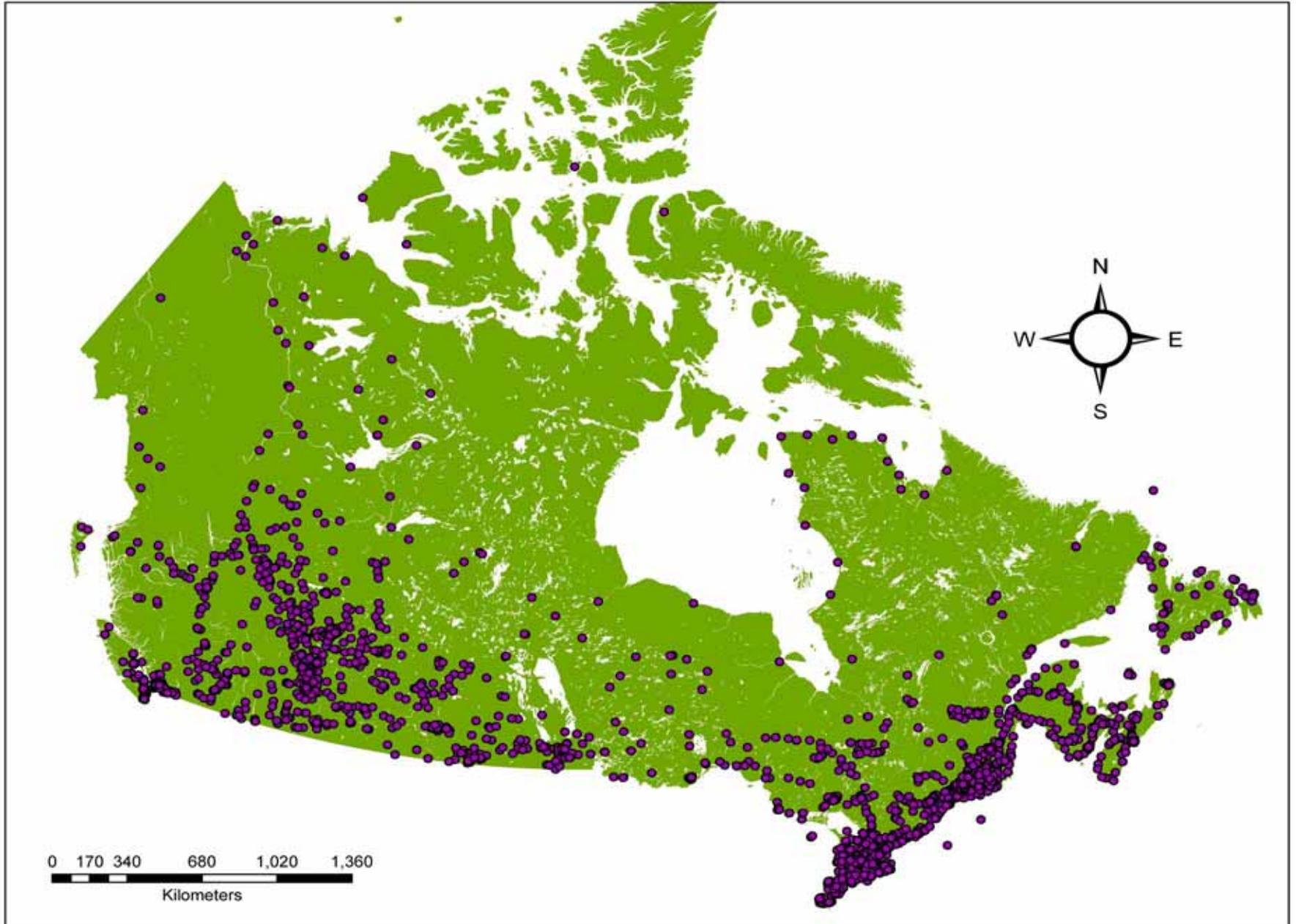
- Metal Ore Mining
- Electricity Generation, Transmission & Dist.
- Alumina & Aluminum Production & Processing
- Oil & Gas Extraction
- Pulp, Paper & Paperboard Mills
- Iron & Steel Mills & Ferro-Alloy Mfg.
- Foundries
- Waste Treatment & Disposal

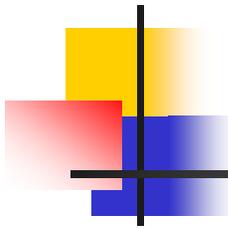


National Pollutant Release Inventory

- 5 Groups of Chemicals
 - Core industrial chemicals
 - Toxic metals, As, Cd, Cr, Pb, Hg
 - PAHs
 - Dioxins and Furans
 - Criteria Air Contaminants

National Pollutant Release Inventory Distribution

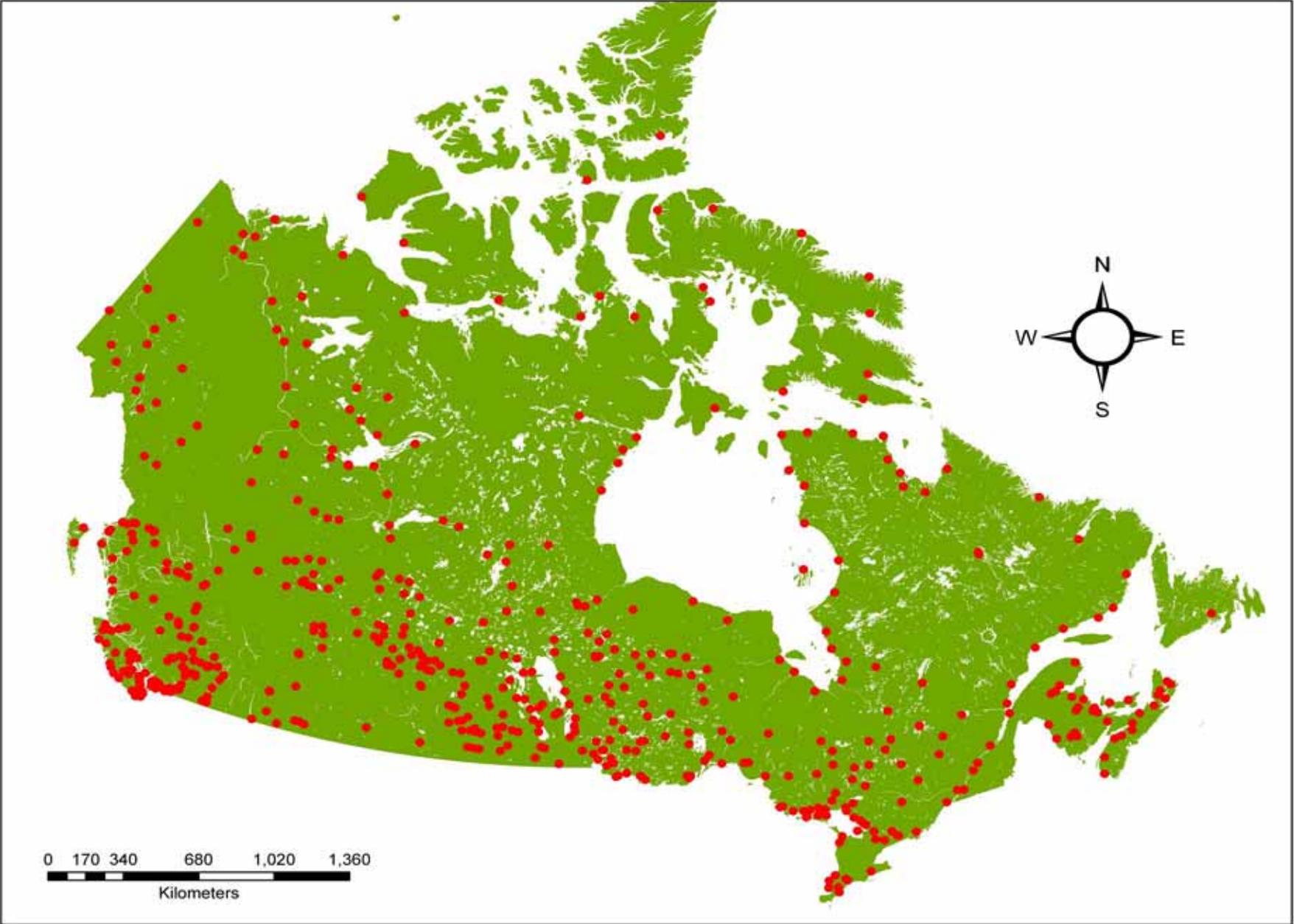




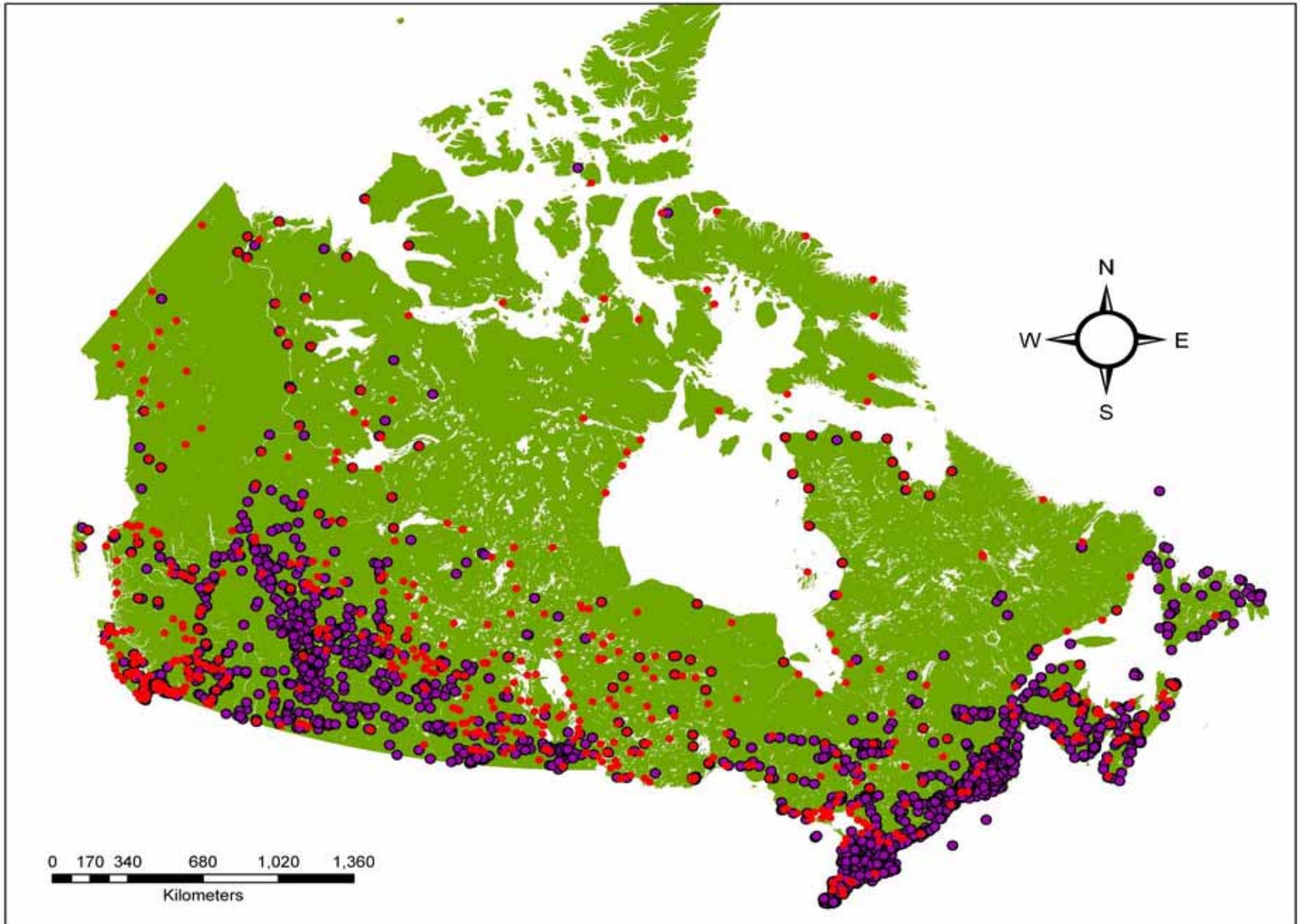
Objectives

- To estimate the impact of industrial pollution on Aboriginal communities
- To identify hotspots for specific contaminants
- To explore the relationship between exposure and health outcomes

Distribution of Aboriginal Communities across Canada



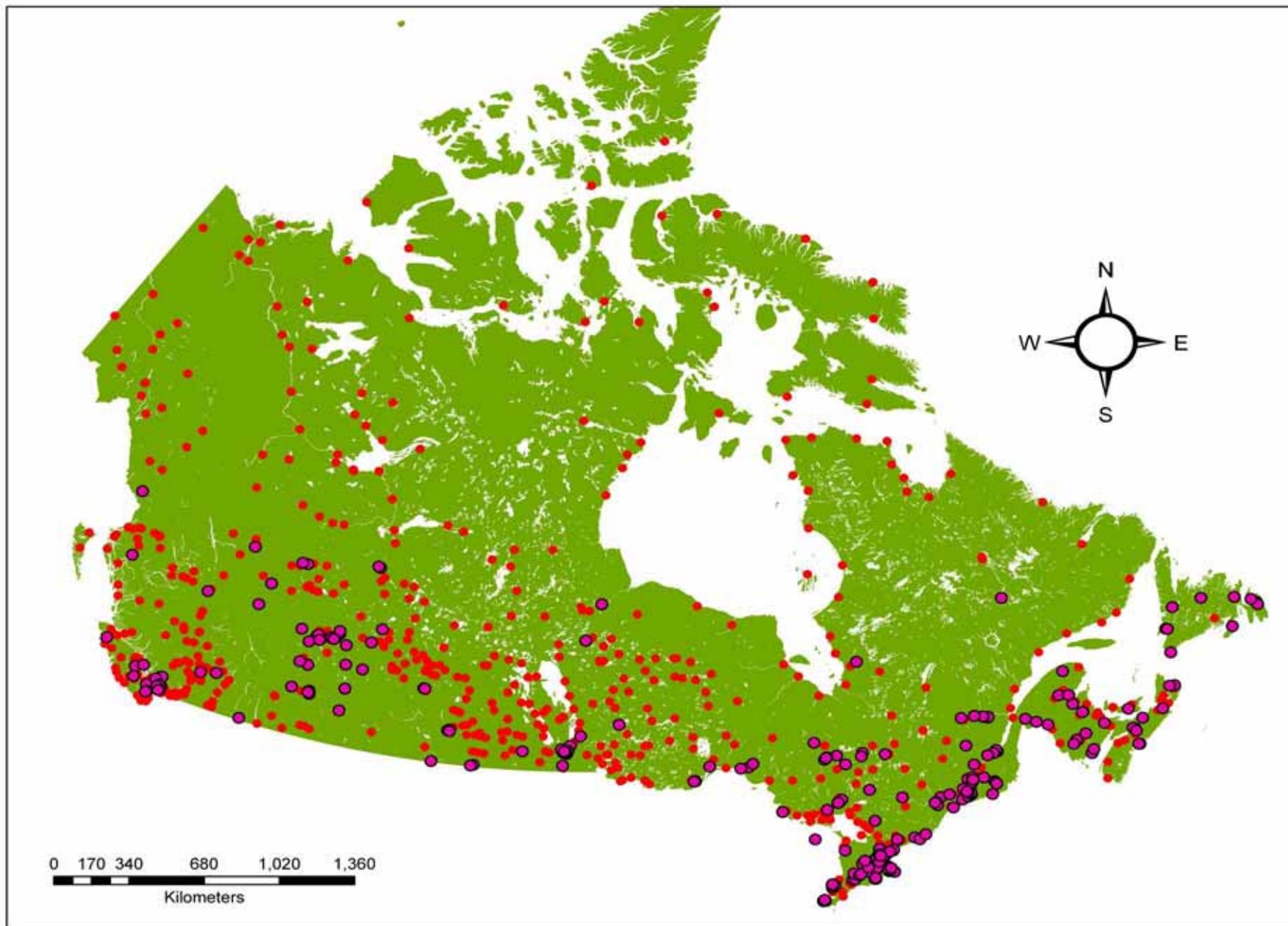
Aboriginal Communities and NPRI Facilities

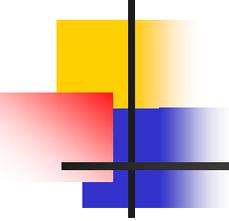


Releases of Pollutants Across and Number of Aboriginal Communities that are within 50 km

Pollutant	Facilities	Sum Release	Units	Communities	Population
Cadmium	151	160800	kg	145	83200
Lead	311	1670700	kg	176	91500
Arsenic	127	203700	kg	150	78100
Mercury	172	4500	kg	135	80100
Dioxins and Furans	190	70	g	212	99400
Ammonia	251	33900	tonnes	195	105900
Carbon Monoxide	503	544000	tonnes	291	145700
Sulphur Dioxide	344	1043700	tonnes	226	121300
Particulate Matter (PM)	565	107800	tonnes	291	144900
PM2.5	877	36600	tonnes	336	182900
PM10	978	62000	tonnes	348	177600
Volatile Organic Carbon	719	158900	tonnes	290	147600

Aboriginal Communities and Mercury Outputs

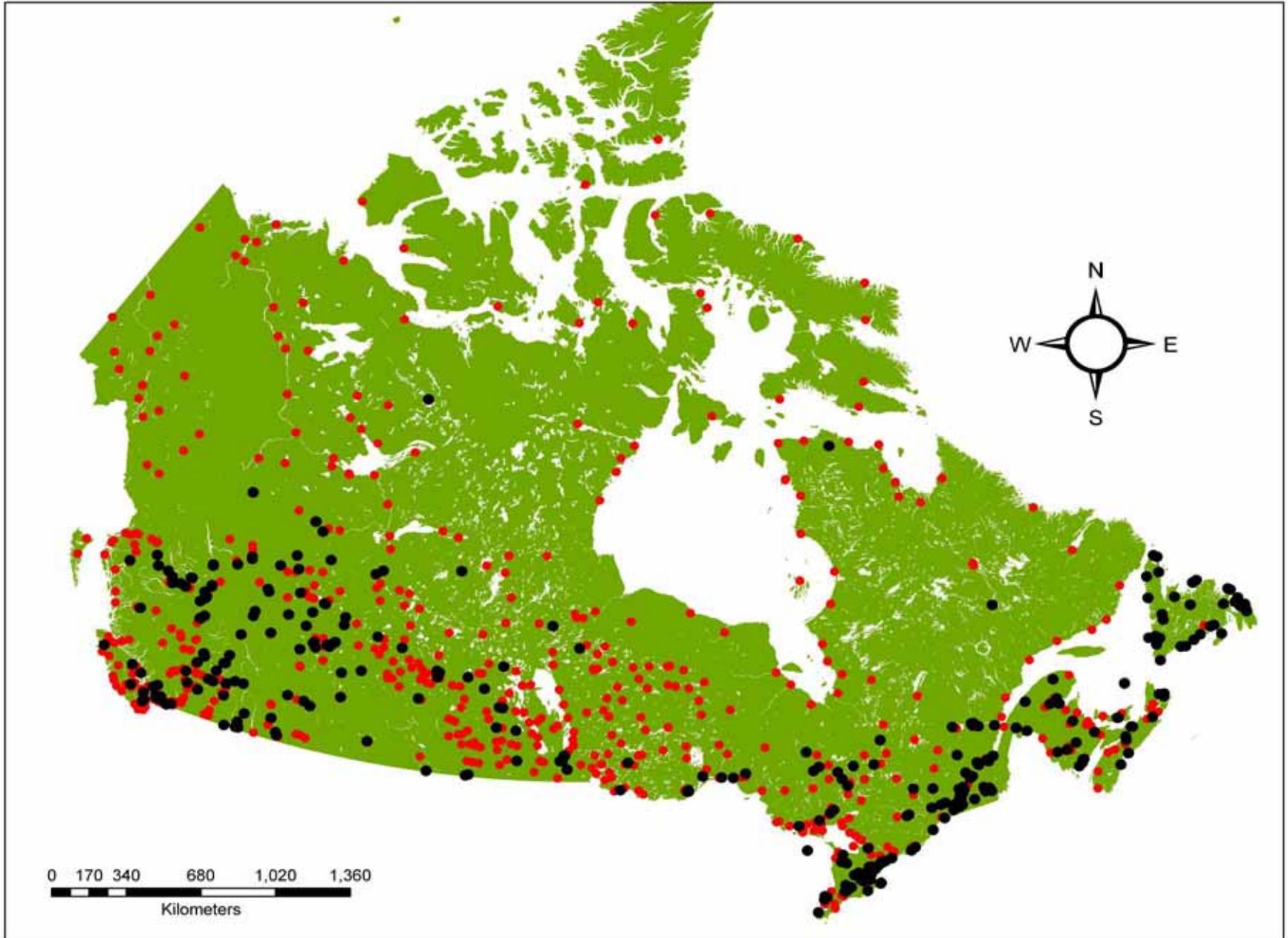




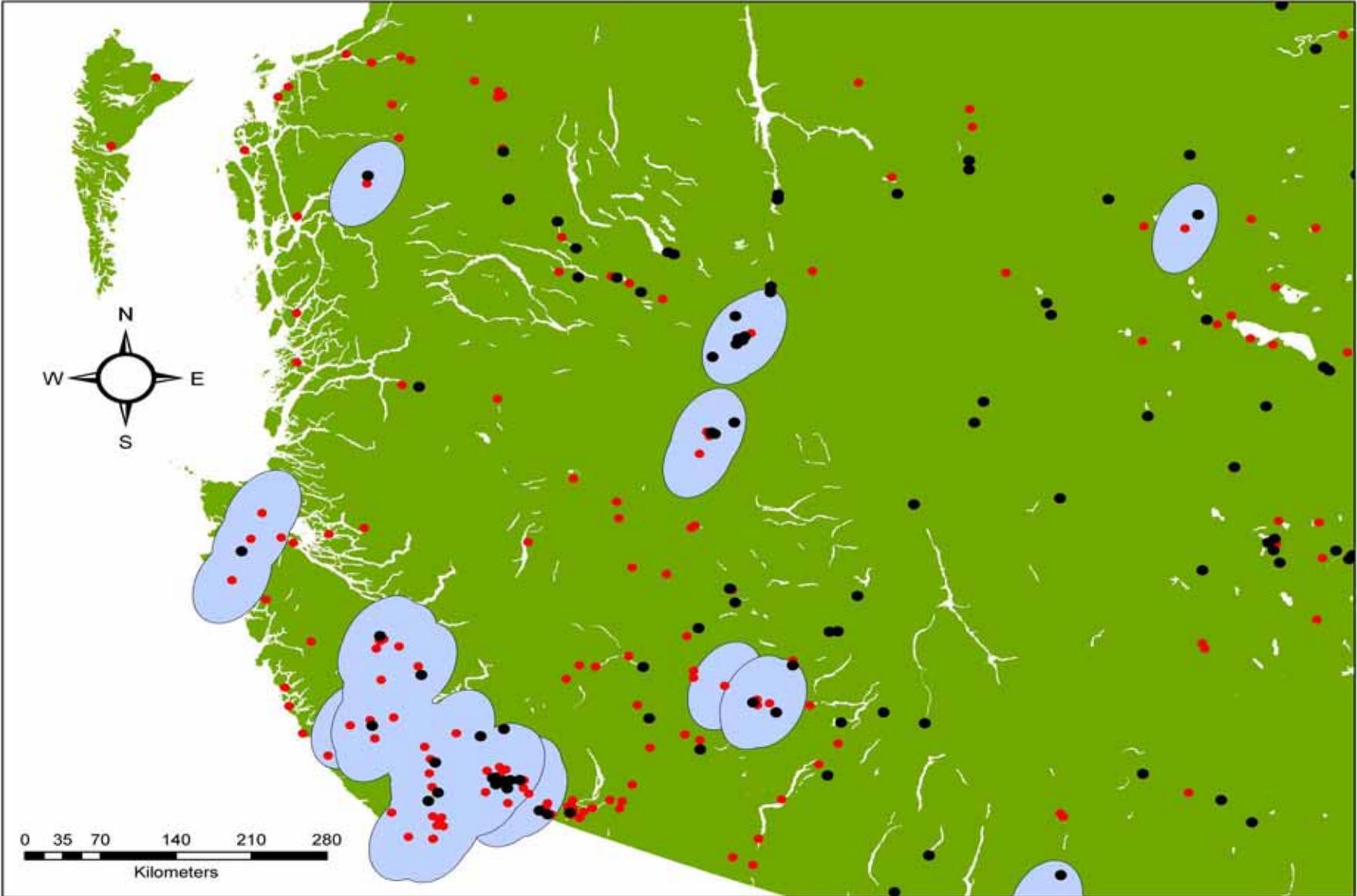
Hotspot for Hg pollution in Ontario

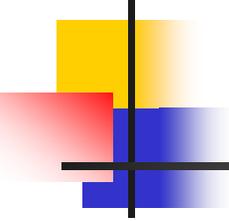
Company	Facility	Environmental Release (kg)	Total Popn
Ontario Power Generation Inc	Nanticoke Generating Station	520	770
City of Hamilton	SWARU Incinerator	25	
Ontario Power Generation Inc	Lambton Generating Station	219	6872
Ontario Power Generation Inc	Thunder Bay Generating Station	73	741

Aboriginal Communities and Dioxins and Furans



Aboriginal Communities within 50km of Dioxin & Furan Releases in southern B.C.

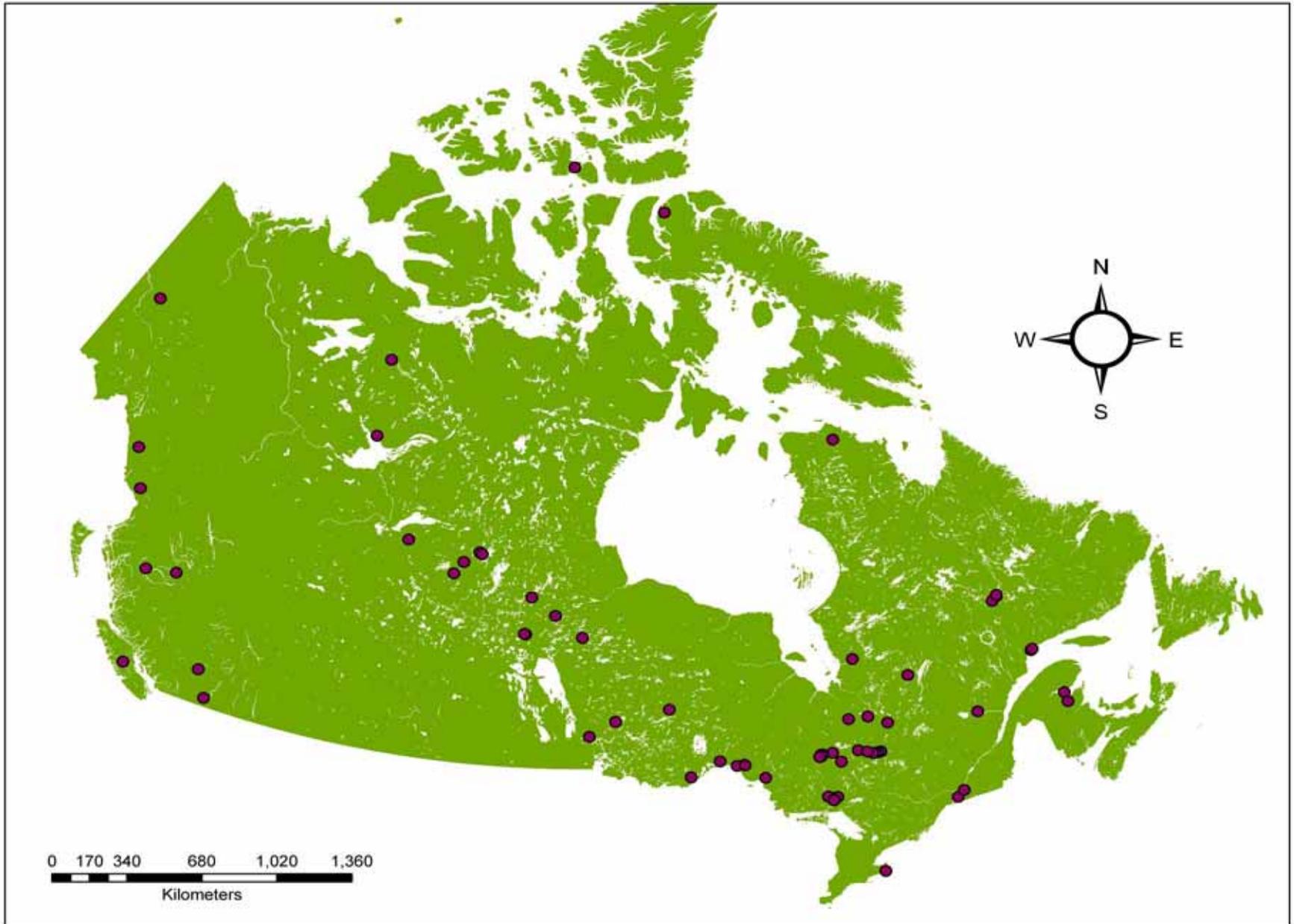




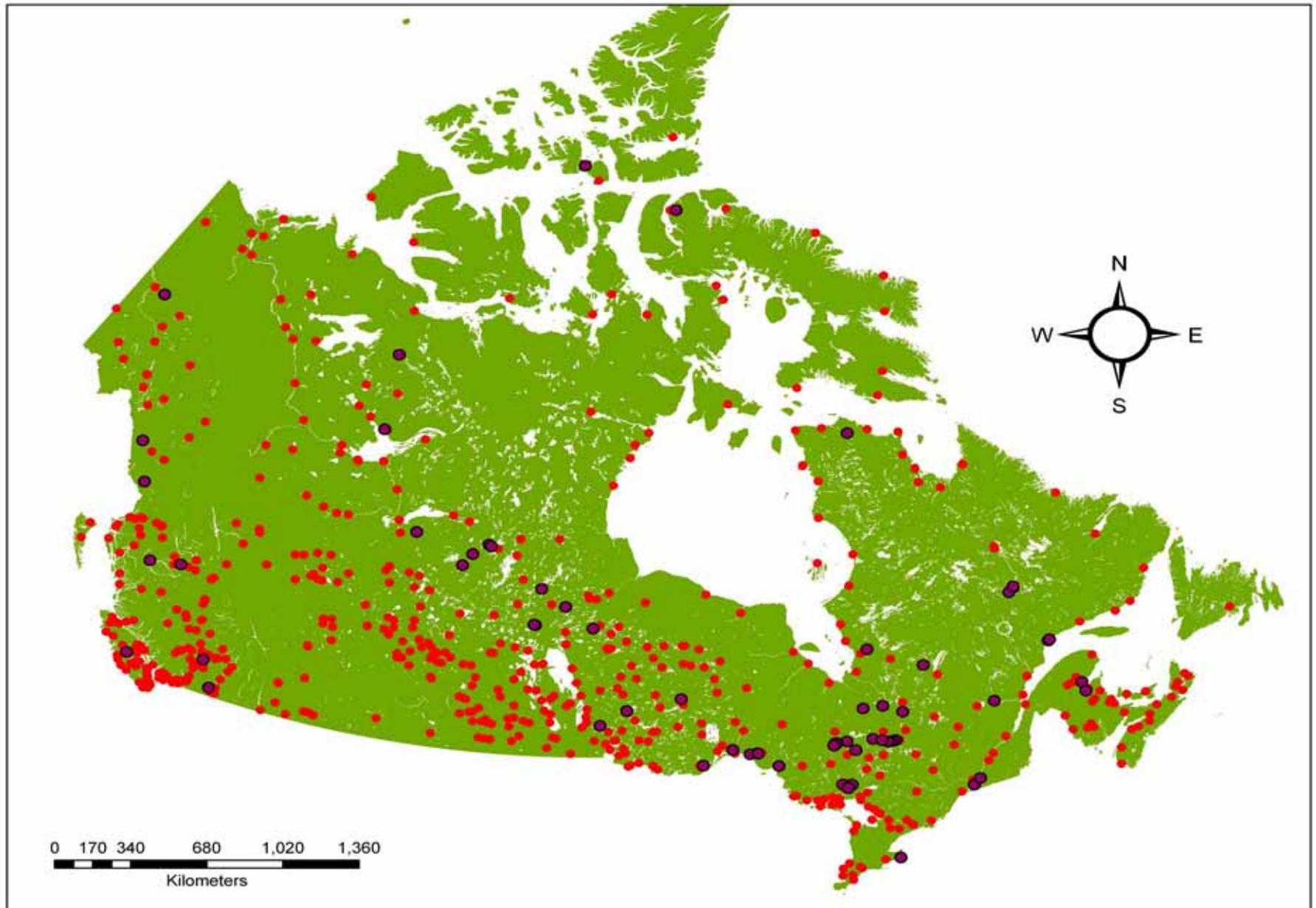
Hotspots for Dioxins and Furans in BC

Province	Communities	Population	Facilities	Total tonnes
BC	6	1271	1	0.0170
BC	34	10856	8	3.4210

Metal Ore Mining Sites Across Canada



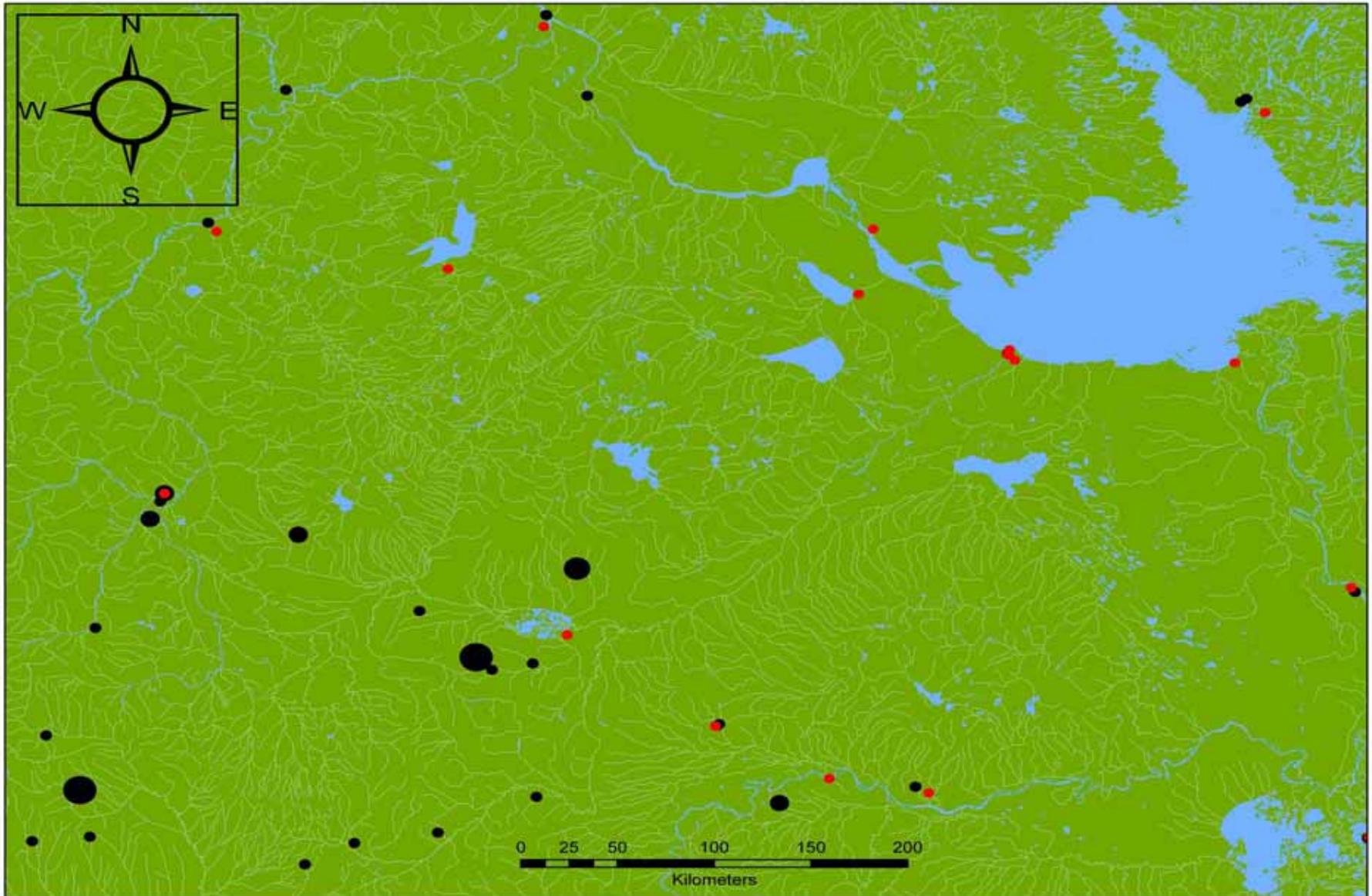
Aboriginal Communities and Metal Ore Mining Sites



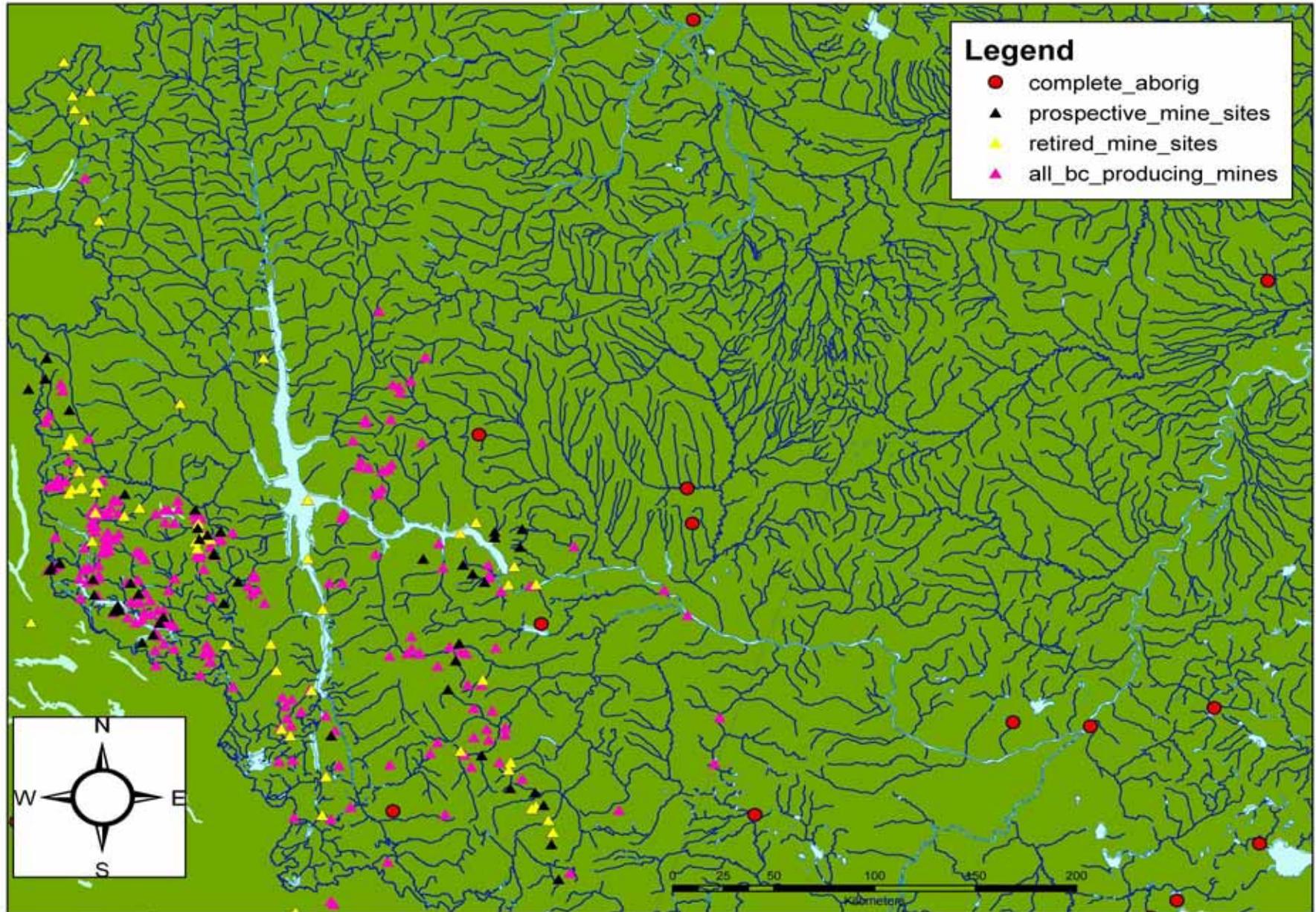
Hotspot of metal pollution in New Brunswick

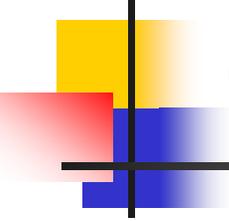
Noranda Inc	Brunswick Smelter	
Noranda Inc	Brunswick Mine	
<i>Eel River Bar First Nation</i>	<i>Eel River Bar</i>	<i>327</i>
<i>Micmacs of Gesgapegiag</i>	<i>Maria</i>	<i>524</i>
<i>Pabineau</i>	<i>Pabineau</i>	<i>93</i>

Aboriginal Communities & NPRI Sites in the Mackenzie River Watershed



Past, Present & Future Mine Sites in West Moberly

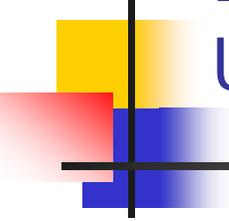




Adverse health outcomes associated with exposure to environmental contaminants

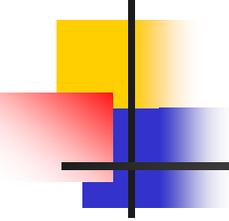
- cancer (various types)
- Infertility
- infant mortality
- spontaneous abortion
- congenital malformations and low birth weight
- neurological disorders
- respiratory outcomes
- overall mortality

Vassilev et al. 1999



Environmental Health Population-level Biomarkers Using Selected Birth Outcomes

- Sex Ratios
- Gestational Age
- Birth Weight at Term
- Stillbirths, Spontaneous Abortions
- Congenital Abnormalities and Malformations



Challenge to get reliable health outcome data

- Local health authorities
- Provincial database
- Statistics Canada
- First Nations Regional Longitudinal Health Survey (RHS) 2002/2003
- Ethnicity, mobile population, over/under reporting, data ownership