

# **Environmental Racism Story Map and Dashboard**

**Enhancing Access to Environmental Justice for  
Racialized and Indigenous Communities in BC**

## **EXECUTIVE SUMMARY**

Prepared by:

Blessing Mangwanda, UBC Sustainability Scholar, 2020

Prepared for:

Jessica Clogg, Executive Director & Senior Counsel,

West Coast Environmental Law

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## Disclaimer

This report was produced as part of the UBC Sustainability Scholars Program, a partnership between the University of British Columbia and various local governments and organisations in support of providing graduate students with opportunities to do applied research on projects that advance sustainability across the region.

This project was conducted under the mentorship of West Coast Environmental Law staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of West Coast Environmental Law or the University of British Columbia.

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## Introduction

Racialized and Indigenous communities (and other historically marginalized groups) are often disproportionately impacted by pollution and unsustainable resource development. Through the development of an interactive dashboard with maps that chart racialized, Indigenous, and lower-income communities and highlight their proximity to industrial polluters such as toxic waste facilities, landfills, or other environmentally hazardous activities, and impactful resource development projects, the study seeks to track the disproportionate impacts of environmental harms on historically marginalized groups in British Columbia (BC). By identifying the environmental racism faced by communities in BC, West Coast Environmental Law seeks to target their environmental legal aid efforts better to support the environmental protection and sustainability of marginalized communities.

## Purpose of Project

An environmental racism mapping project has been conducted in Nova Scotia by [ENRICH](#) (Environmental Noxiousness, Racial Inequities, and Community Health). To our knowledge, no such project has been undertaken to explore the extent of environmental racism in British Columbia. West Coast Environmental Law would like to learn where their work is most needed to support community efforts to defend the health of their land, air, and water, thus contributing to a more sustainable British Columbia for all.

At this initial stage of the mapping project, the aim is to create an interactive tool to foster discussions with impacted Indigenous, racialized, and low-income communities in BC, to seek their input and expertise about their lived experiences of environmental racism.

Eventually, the completed environmental racism map and dashboard may also be shared publicly and could also be a resource to help West Coast and other community organizations and environmental non-profit organizations strategically focus their efforts to support communities disproportionately impacted by environmental issues.

## Sustainability Goal or Operations Plan objective

Sustainable Cities and Communities: Enhance access to environmental justice for racialized and Indigenous communities who are disproportionately impacted by polluting industries and unsustainable resource development by developing map-based products and related storytelling tools to inform access to justice programs at West Coast Environmental Law and more broadly create awareness of environmental racism in BC.

## Research Question

- Are Indigenous, racialized, and low-income people disproportionately impacted by polluters in comparison to the general population in British Columbia?
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## Background

West Coast Environmental Law uses the term environmental racism to encapsulate "the environmental impacts of colonialism, racist decision-making, and systems of oppression on communities that are primarily Black, Indigenous, and people of color (BIPOC). Environmental racism results in the disproportionate impacts of environmental issues on historically marginalized groups." For example, environmental racism is said to include but not be limited to the location of heavily polluting industries near poor communities of color who often do not have the resources to fight them (Galvez, 2020). The origins of these concepts of environmental racism are commonly traced back to the early 1980s and community concerns about the siting of toxic waste sites in predominantly black neighborhoods in the southeastern United States (Mitchell, 2015).

## Cases of Environmental Polluters Impacting Indigenous and Racialized Communities in Canada and BC

[Africville](#) in Halifax, Nova Scotia, and residents of Sarnia, Ontario face a severe environmental pollution problem. In 2005, the NPRI facilities in the Sarnia area released 5.7 million kilograms of "Toxic Air Pollutants" – pollutants that have been associated with reproductive and developmental disorders and cancer among humans (MacDonald & Rang, 2007<sup>1</sup>). Close to Sarnia is the Aamjiwnaang First Nation, who are involved in a fight to protect their people's health living in one of Canada's most polluted communities. The approximately 800 residents of Aamjiwnaang live next to industrial facilities that account for approximately 40 percent of Canada's petrochemical industry in an area commonly referred to as "Chemical Valley." (Mitchell, 2015). Residents of Aamjiwnaang have expressed concerns about health risks posed by pollution and its impact on their ability to hunt, fish, or plant food (Mitchell, 2015). These are but two examples of environmental racism in Canada.

In BC, recent, high-profile situations that embody the problem of environmental racism in BC include events playing out in Northern British Columbia surrounding the Coastal Gaslink Pipeline project (Gilpin & McIntosh, 2020) and Site C Dam (Jones et al., 2016). The Wet'suwet'en people have denied their consent and protested against constructing a 670-kilometer proposed natural-gas Coastal Gaslink pipeline through their unceded, traditional territories. One of many issues involves potential harm to a reoccupation and healing center on Wet'suwet'en land. (Gilpin & McIntosh, 2020). West Moberly First Nation is seeking to halt construction of the Site C Dam and the restoration of the Peace River to its natural state, on the basis that the development is an infringement of its treaty rights (RAVEN, 2021).

## Actions on Environmental Racism

The efforts of Black communities in the United States in voicing concerns led to environmental justice being addressed within the US Environmental Protection Agency and presidential executive action (Galvez, 2020). In Canada, the ENRICH project and Waldon's work have generated legislative initiatives provincially and federally that have influenced the way we define and address environmental racism. Currently, Nova Scotia is the only province to have passed any provincial legislation to address Environmental Racism as a subsection of their sustainability and environmental agenda. The private member's Bill C-230 [\*An Act Respecting the Development of a National Strategy to Redress Environmental Racism\*](#) introduced by Nova Scotia MP Lenore Zann, has passed second reading at the time of writing.

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Canada will become one of the first countries worldwide to develop a national strategy to redress environmental racism if the bill passes.

## Research Approach [Methodology]

The geographic scope of the project is the province of British Columbia in Canada. The demographic and socio-economic data used in the study are from the 2016 Census by [Statistics Canada](#). [The information on polluters and resource development projects is principally from BC Catalogue](#) by GeoBC. Statistics Canada is the agency of the Government of Canada commissioned with producing statistics to help better understand Canada, its population, resources, economy, society, and culture. GeoBC is an agency of the Government of British Columbia that creates and manages geospatial information and products to help better manage natural resources in British Columbia. The data on environmental polluters was collected in November 2020. To ensure cross-reference analysis between data in the analysis, a data aggregation level was chosen- dissemination area. A dissemination area (DA) is a small, relatively stable geographic unit used by Statistic Canada to gather demographic information. DA's are designed to be uniform in population size, which is targeted from 400 to 700 persons. Thus, a DA can be thought of as a neighborhood or portion of a neighborhood within a larger city but might encompass a relatively larger rural geographic area. A DA is used synonymously with "community" in this study.

### Demographic Data

The 2016 Statistics Canada Data was accessed using [censumapper](#). Census mapper is an online web mapping and data access point to Statistics Canada census data. The data codes used on censumapper are listed in the Appendix. All data was downloaded as a spatial feature to enable mapping capability features and spatial analysis (proximity analysis).

### Communities

Three segments of the BC population were identified based on Statistics Canada data for this study: "Aboriginal," "Low Income," and "Communities of Color," as follows:

**Aboriginal:** All dissemination areas containing an "[Indian Reserve Administrative](#) (GeoBC) community" were identified as an Aboriginal community.

**Low Income:** The Statistics Canada data for [Low Income After Tax](#) (LIM-AT) was used. This measure identifies households whose income is less than 50% of the national median income. A natural break of 16.39% (1/2) for Low Income After Tax (LIM-AT) was used to define communities as low-income (above) and not (below).

**Communities of Colour:** Statistic Canada data in which individuals reported identifying as part of a "visible minority" was used. Household level data was used for this purpose, counting households with residents of multiple visible minorities only once. If the population of at least one visible minority in a DA is greater than the 3rd natural break (3/4) of that minority group in the overall population of BC (Table 4), its corresponding DA will be identified as a Community of Color. Natural breaks group similar values and maximizes the differences between classes. A third break was used to identify communities where there is a high concentration of people of color.

**BIPOC Communities:** In this study, BIPOC (Black, Indigenous, and People of Color) communities refers to the aggregation of dissemination areas that are either Aboriginal or Communities of Color according to the methodology as set out above.

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## Environmental Polluters

Data of about fourteen environmental polluters was collected from GeoBC, and corresponding polluters names from official sites using Google Maps. Polluters were superimposed on communities to show communities affected by polluters at five distances (0km – in community, 1km, 2km, 3km, and 5km[Max]). The map plots show instances of environmental racism affecting the three types of communities by showing the proximity to environmental polluters.

## Strength and Limitations

### Strengths

- Shows the spatial and quantitative impact of environmental polluters on communities and populations.

### Limitations

- The choice in methodology for identifying Indigenous communities did not adequately account for the diversity in population sizes between Northern and Southern BC. Northern BC has geographically large DAs compared to much smaller DAs in Southern BC (Figure 1) due to population distribution. The methodology for this study defined an entire dissemination area as Aboriginal if there was a reserve community within it. In Northern BC and in rural areas, the DA might be larger in geographic size than the reserve community, and thus encompass non-aboriginal residents as well. In Southern BC, by contrast, using a DA-based approach resulted in some Aboriginal communities appearing smaller or splitting one Aboriginal community into multiple “communities”.
  - The use of DAs in rural areas and Northern BC ignores clusters of communities and populations and assumes an even impact of a polluter throughout the DA.
  - Data on landfills, asphalt plants, and pulp and paper mills were downloaded from open data sources which are not official and have no authoritative reference.
  - The study does not communicate the actual magnitude of the impact of a polluter, only its proximity to any given dissemination area. For example, individual environmental remediation sites were included as polluters, despite the possibility that they may have a more geographically narrow impact than, e.g., pulp mills.
  - The inclusion of many potentially less impactful polluters may have exaggerated the overall number BC communities impacted by one or more polluters.
  - The study does not include nor communicate actual lived experiences of the communities.
  - Dissemination areas created by Statistics Canada were used to establish community boundaries, and did not account for how communities’ themselves may choose to identify their own geographic areas.
  - Some data on key polluters were restricted, including Hydro facilities and Municipal Waste Facilities. As such, these polluters were omitted from the study (latter) and others were collected from open data sources (former) and could impact the overall findings.
  - The study did not include logging, mineral exploration, land use conversion e.g., to agricultural or residential use, historic flooding from hydroelectric dams or the cumulative effects thereof.
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## **Environmental Racism Dashboard and Story Map**

ArcGIS Dashboards were used to create the Environmental Racism interactive dashboards that map, and chart racialized, Aboriginal and low-income communities and their proximity to industrial polluters and evidence of environmental racism in British Columbia. Two systems were created, one system to use as an interactive tool to foster discussions with Indigenous, racialized, and low-income communities and the other for showing evidence of Environmental Racism in British Columbia using Dissemination Areas as the base level of the analysis. A Template Environmental Story Map was created on ArcGIS Story Maps using information from the Dashboards.

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## Summary

The study showed that ~86% of communities in BC are affected by at least one polluter (Table 1). Communities that identified as Low-Income and BIPOC Communities are more affected by at least one polluter than those that identify as not. The percentage proportion of BIPOC Communities affected by at least one polluter is higher than that of the general population of British Columbia.

**Table 1. Communities Affected and Not Affected by Polluters in BC at a DA level.**

	COMMUNITIES				
	British Columbia	LIC	Not LIC	BIPOC	Not BIPOC
Affected	86%	90%	84%	87%	81%
Not Affected	14%	10%	16%	13%	19%

BIPOC communities have the highest population percentage affected by at least one polluter (~93%), followed by Low-Income communities (~92%), and the general population of BC (~90%) (Table 2). A higher percentage of Low-Income communities are impacted by polluters than BIPOC communities (90% versus 87% respectively), but both are more impacted than other BC communities (DA's) (Table 1). In summary, both BIPOC and Low-Income communities' populations are on average affected by one or more polluters at higher levels than the general population in BC.

**Table 2. Population Affected and Not Affected by Polluters in BC at a DA level**

	POPULATION		
	British Columbia	LIC	BIPOC
Affected	90%	92%	93%
Not Affected	10%	8%	7%

The geography of BC is shown in Figure 1, where we observed a high concentration and aggregation of environmental polluters in northeastern BC, such as environmental remediation sites and oil and gas activities that make the DA have a high polluter intensity (identified as a red area on the map). We observed few polluters in the central region of British Columbia (Figure 4). Figure 4 also shows the Greater Vancouver area, with Richmond, Delta and Surrey having a high concentration of polluters, and Victoria, which appears to have overall fewer polluter concentrations than Greater Vancouver, despite having nearby landfills.

## Discussion

This section discusses the methodology used and presents recommendations for a future iteration of the project.

The methodology used shows that a higher percentage of BIPOC communities and populations are impacted by one or more polluters than the general population of BC. The study showed more polluters in Southern BC where there is a high proportion of populations and communities of color. However, given that ~36% of the population in British Columbia was identified as BIPOC and is concentrated in the South of BC, where there are many polluters, further analysis would be required to distinguish the influence of demography from other factors underlying the findings.

The study shows that a high population proportion (~90%) in British Columbia is affected by at least one polluter. There is a high concentration of environmental remediation sites (~30,000) and major projects (~10,000) that are distributed across almost every community in BC, and therefore are recorded on the map as impacting most of BC's population. It is possible the study was over-inclusive of polluter types that are high in number, but have less impact (e.g., some remediation sites). It also failed to capture the real-life nuance of the differing levels of environmental and human health impact in communities from types of polluters and at differing distances from the polluter.

Two alternative approaches might be used with respect to identifying impacts on Aboriginal versus non-Aboriginal communities in future work. One approach would be to compare the situation of on-reserve communities to municipalities with regard to the proximity of polluters. Another might have been to use the same approach to identifying Aboriginal DAs as was used for People of Color, i.e., dissemination areas where the population of Aboriginal people was higher than their percentage of the general population (using the third natural break – see above). The former might work better in rural areas and the latter might provide more information about impacts of environmental racism on urban Aboriginal people. There are also other reasons why it may be helpful to separate rural and urban administrative boundaries in the methodology. This is because of different demographics, population and income. Rural areas have lower populations and mostly low-income revenue, and hence if used together with urban areas, they will get diluted, and their demographic data will be exaggerated. This is the same for people of color in British Columbia. For example, there is more than 75% people of color in Richmond, whereas there is less than 5% in the Logan Lake region.

Some data on key polluters were restricted, including Hydro facilities and Municipal Waste Facilities. As such, these polluters were omitted from the study (latter) and others they were collected from open data sources (former) and could impact the overall affect the findings. It would be helpful to apply for access to restricted data, which could help make the study results more authoritative.

The Environmental Racism Evidence dashboard (Figure 3) can facilitate a conversation and discussion with Aboriginal communities using participatory Geographic Information Systems as a baseline and show how

communities' lived experiences correlate with the study's findings. The Environmental Racism dashboard can be used to map the environmental racism of a polluter or community (DA) of choice in BC.

## References

- Galvez, R. (2020, July 8). *Canada also has an environmental racism problem*. Canada's National Observer: News & Analysis. <https://www.nationalobserver.com/2020/07/08/opinion/canada-also-has-environmental-racism-problem>
- Gilpin, E., & McIntosh, E. (2020, January 22). *Coastal Gaslink pipeline threatens healing centre, says Unist'ot'en Camp*. Canada's National Observer. <https://www.nationalobserver.com/2020/01/22/news/coastal-gaslink-pipeline-could-harm-healing-centre-says-unistoten-camp>
- Jones, G. M., Gutiérrez, R., Tempel, D. J., Whitmore, S. A., Berigan, W. J., & Peery, M. Z. (2016). Megafires: an emerging threat to old-forest species. *Frontiers in Ecology and the Environment*, 14(6), 300–306. <https://doi.org/10.1002/fee.1298>
- Mitchell, K. (2015, May 6). *Environmental Racism: The first step is recognizing we have a problem*. Ecojustice. <https://ecojustice.ca/enviro-racism-we-have-a-problem/>
- Zann. (2020, February 26). *Private Member's Bill C-230 (43-1) - First Reading - National Strategy to Redress Environmental Racism Act - Parliament of Canada*. House of Commons. <https://www.parl.ca/DocumentViewer/en/43-1/bill/C-230/first-reading>

## Appendices

Table 3. Communities and Polluters Used in Study

ID	Data Title	Category 1	Data Type	Full Description and Source	Maximum Polluting Distance Used (km)
1	Indigenous (Aboriginal)	People	Points	<a href="#">GeoBC</a>	-
2	Indigenous (Aboriginal)	People	Polygons	<a href="#">GeoBC</a>	-
	Population in Indigenous Communities	People	Spreadsheet	<a href="#">GeoBC</a>	-
	Aboriginal Profiles and Portraits	People	Web and PDF	<a href="#">Profiles and Portraits</a>	
3	People of Color	People	Polygons	<a href="#">Statistics Canada</a>	-
4	Low Income	People	Polygons	<a href="#">Statistics Canada</a>	-
5	BC. Transmission Lines	Hydro, Other	Lines	<a href="#">GeoBC</a>	3
6	Mines	Mines	Lines	<a href="#">GeoBC</a>	5
7	<b>Major Projects Inventory</b>	Major Projects	Points	<a href="#">GeoBC</a>	3
8	Pipeline Right of Way Permits	Oil and Gas	Lines	<a href="#">GeoBC</a>	3
9	Oil and Gas Facilities	Oil and Gas	Points	<a href="#">GeoBC</a>	5
	Oil and Gas Fields		Polygons		
10	Oil and Gas Waste Disposal Sites	Oil and Gas	Points	<a href="#">GeoBC</a>	5
11	BC. Hydro Facilities	Hydro	Points	<a href="#">BC Hydro</a> and <a href="#">Google Maps</a>	5
13	Hazardous waste facilities	Waste	Points	<a href="#">GeoBC</a>	5
14	Oil and Gas Sumps	Oil and Gas	Polygons	<a href="#">GeoBC</a>	5
15	<b>Natural Resource Sector Major Projects</b>	Major Projects	Points	<a href="#">GeoBC</a>	3
16	<b>Pulp and Paper Mills</b>		Points	<a href="#">Paper and Pulp Canada</a> and <a href="#">Google Maps</a>	5
17	Environmental Remediation Sites	Environment	Points	<a href="#">GeoBC</a>	-
18	Landfill	Waste	Points	<a href="#">RDOS</a> and <a href="#">Google Maps</a>	5
19	Asphalt plants - <i>Petroleum products</i>	Chemical	Points	<a href="#">Google Maps</a>	5

Table 4. Jenks Natural Break (NB) for identifying Communities of Color by Population of Visible Minority Groups

NB	South Asian	Chinese	Black	Filipino	Latin American	Arab	Southeast Asian	West Asian	Korean	Japanese
1	140	110	1	1	1	20	1	30	30	1
2	460	340	20	20	30	105	30	110	135	20
3	1275	935	55	50	80	315	150	280	385	50
4	3495	3115	270	150	265	840	345	630	935	220

Average Population Natural Breaks (4) of DAs in BC by Visible Minority Groups. Natural breaks were used to show concentrations of Communities of Color using a higher population break. If a visible minority

group (any) population is greater than the population in the 3rd break, for a DA of choice then that DA is a Community of Color. The opposite is true.

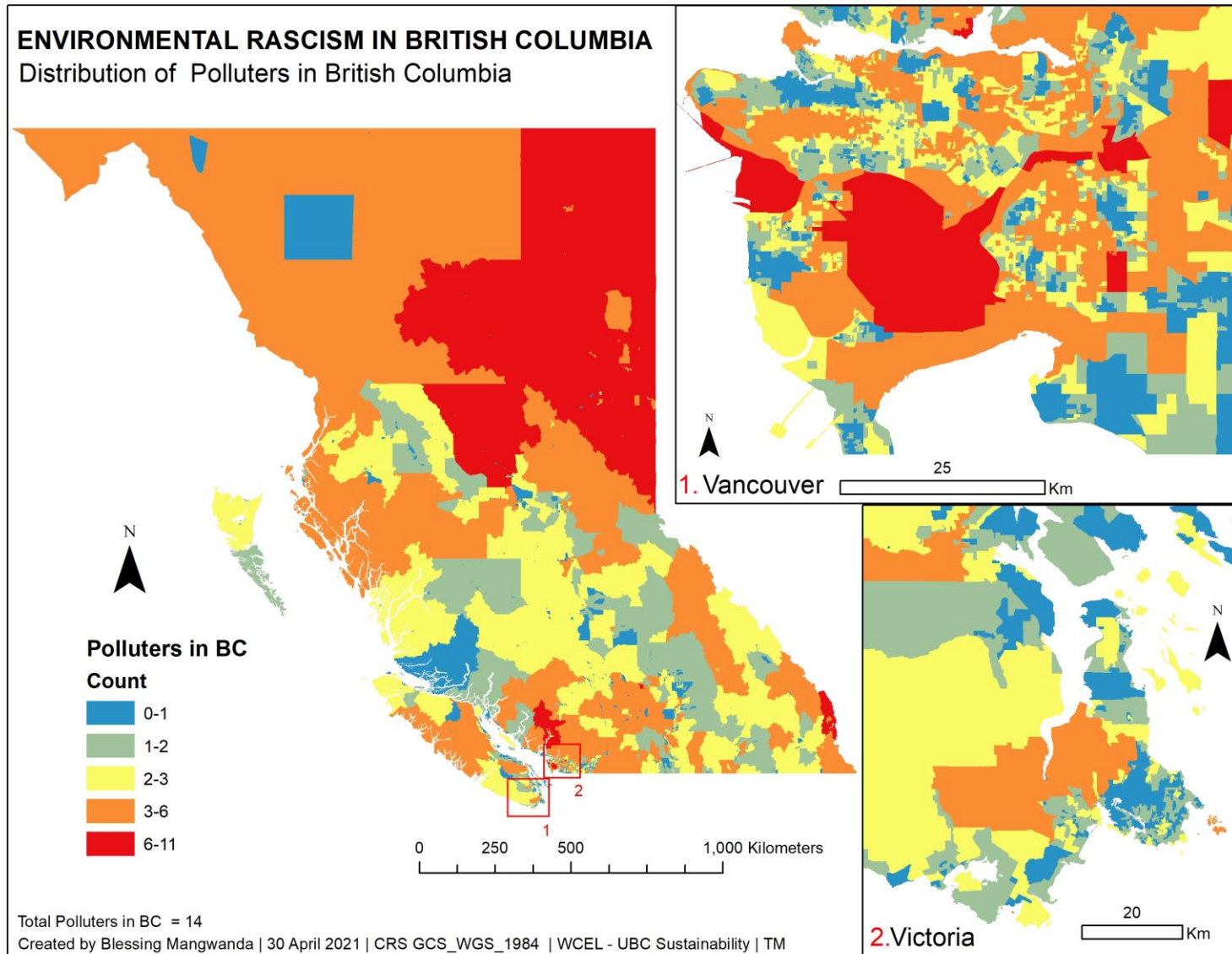


Figure 1. Map showing the intensity of polluters in British Columbia

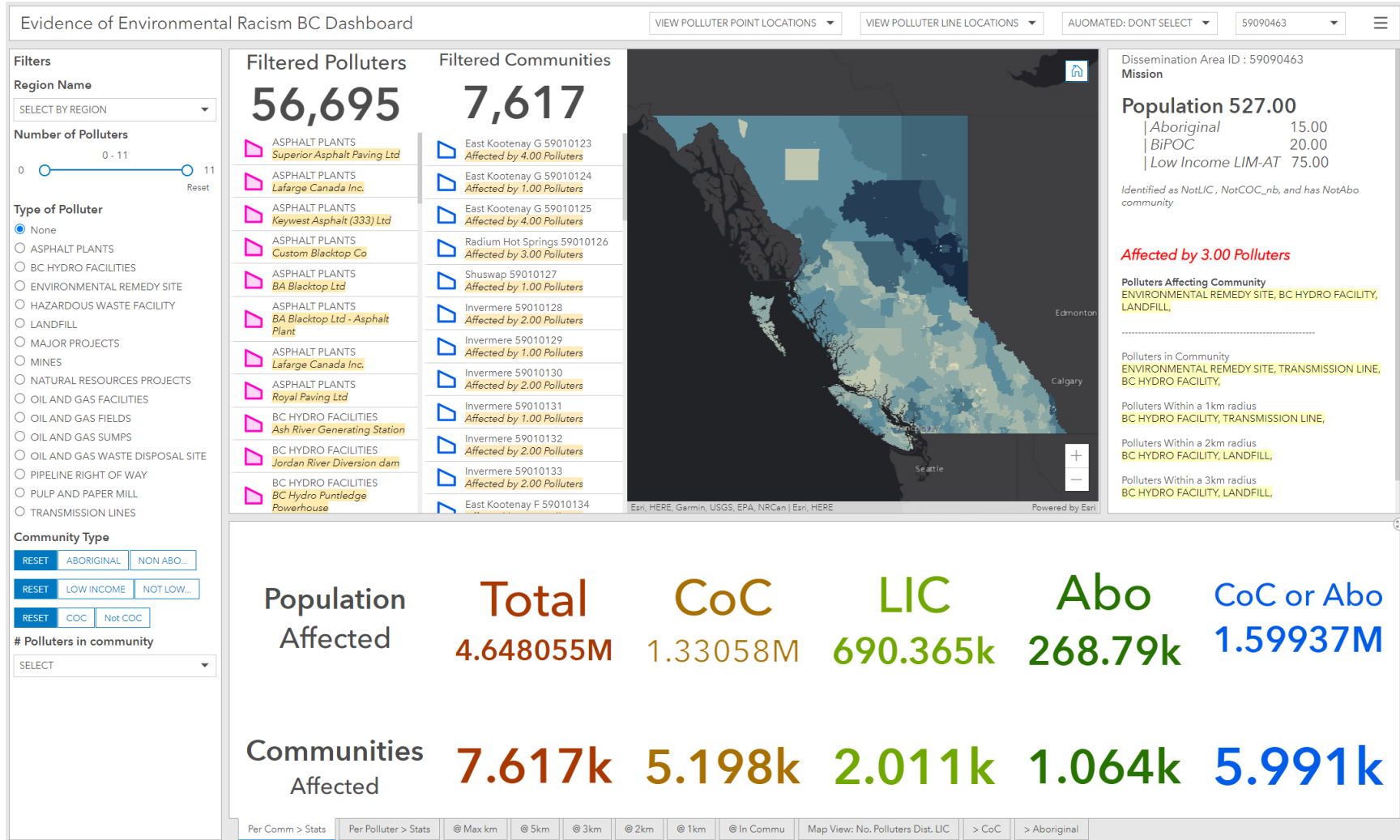


Figure 2. Evidence of Environmental Racism Dashboard for BC (DA)

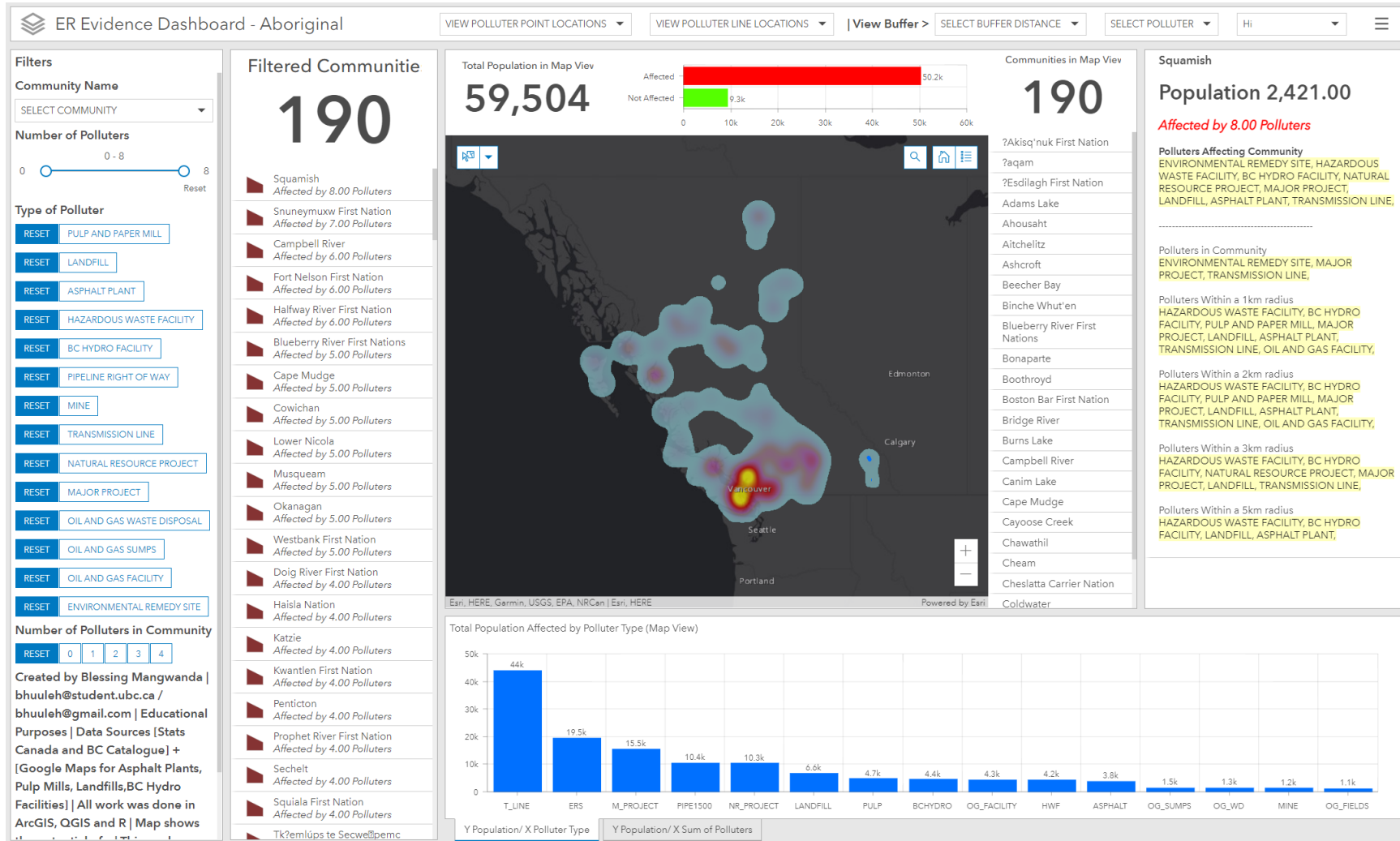


Figure 3. Evidence of Environmental Racism Dashboard for Aboriginal Communities (Indian Reserve Administrative Boundaries)