

The Political Economy of Pollution Remediation on Public Lands

M. Martin Boyer, Ph.D. & Nicolas Legendre, Ph.D.
HEC Montréal, Université de Montréal

Abstract

This paper examines how investment in contaminant pollution remediation and abatement differs between different types of federal land. We use a unique dataset of 157,017 potentially contaminated sites in Canada.

When we isolate Indigenous territories, known as “Reserves” in the *Indian Act of Canada*, we find that, compared to other types of federal land, Indigenous territories are 20% more likely to be contaminated and progress more slowly toward pollution remediation.

In addition, after controlling for mitigating factors, we find that the investment in the remediation process of contaminated sites in Indigenous territories is on average 77% lower than the investment in other federal land.

Introduction

Governments worldwide have adopted pollution remediation initiatives for contaminated land (the Canadian equivalent of *CERCLA* is known as *CEPA*). We find that: **1-Reserves are 20% more likely to be contaminated**; **2- Investment in pollution remediation of contaminated sites is 77% lower**; and **3- Reserves are significantly less likely to move up the remediation process**.

We propose several explanations for our findings stemming from the tragedy of the anti-common and inefficiencies associated with multi-level governance. In the lens of the tragedy of the anti-common, the multiple veto rights from Indigenous peoples and the federal government lead to inefficiencies in the remediation of contaminated sites on reserves given that no entity has an outright veto.

To further examine our explanation, we investigate whether our findings are even stronger when additional parties with fragmented rights are involved in the remediation process. We therefore test whether contamination stemming from metal contaminants (i.e. from mining activities that are regulated by the provinces) exacerbates contamination problems. We find support that contaminated sites on reserves that are contaminated with metal contaminates and those near mining activities receive even less investment in remediation and are even less likely to move up through the remediation process.

Data

157,017 sites from the Canadian Federal Contaminated Sites Inventory (FCSI)

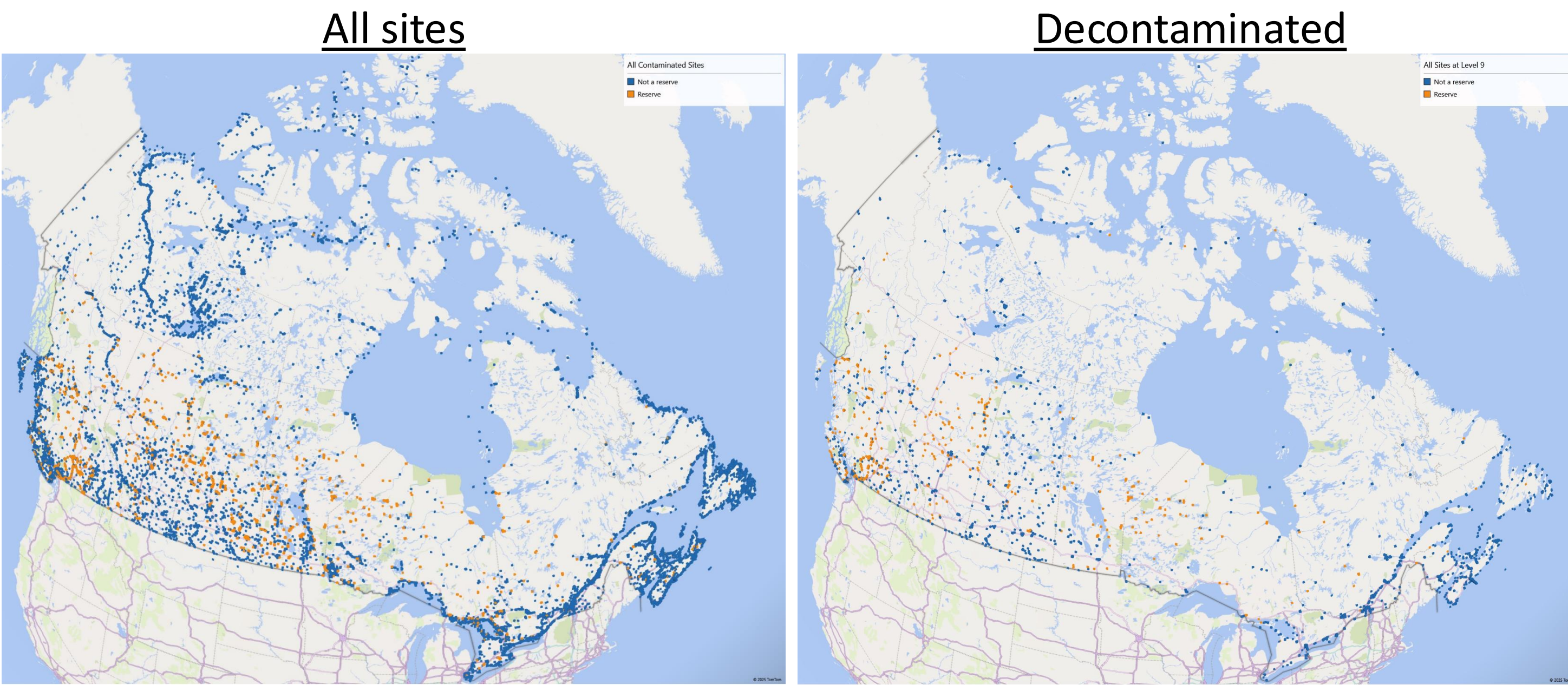


Table 5: Site contamination according to the different measures

	(1) Cubic meters	(2) Hectares	(3) Tons	(4) Any
Reserve	0.195*** (0.008)	0.030*** (0.008)	0.006 (0.007)	0.198*** (0.008)
Observations (Total)	147,101	102,657	96,341	157,018
Observations (Contaminated)	65,120	20,676	14,360	75,037
Pseudo R ²	0.428	0.471	0.451	0.435

Table 4: Descriptive Statistics

Contaminate type ^b	
Metal	0.392
Petrogenic (PHC/PAH)	0.350
PCB	0.024
BTEX	0.054
Pesticides	0.006
Other inorganics	0.020
Other organics	0.029
Microorganism	0.002
Halogenated Hydrocarbon	0.009
Other contaminants	0.004

Results

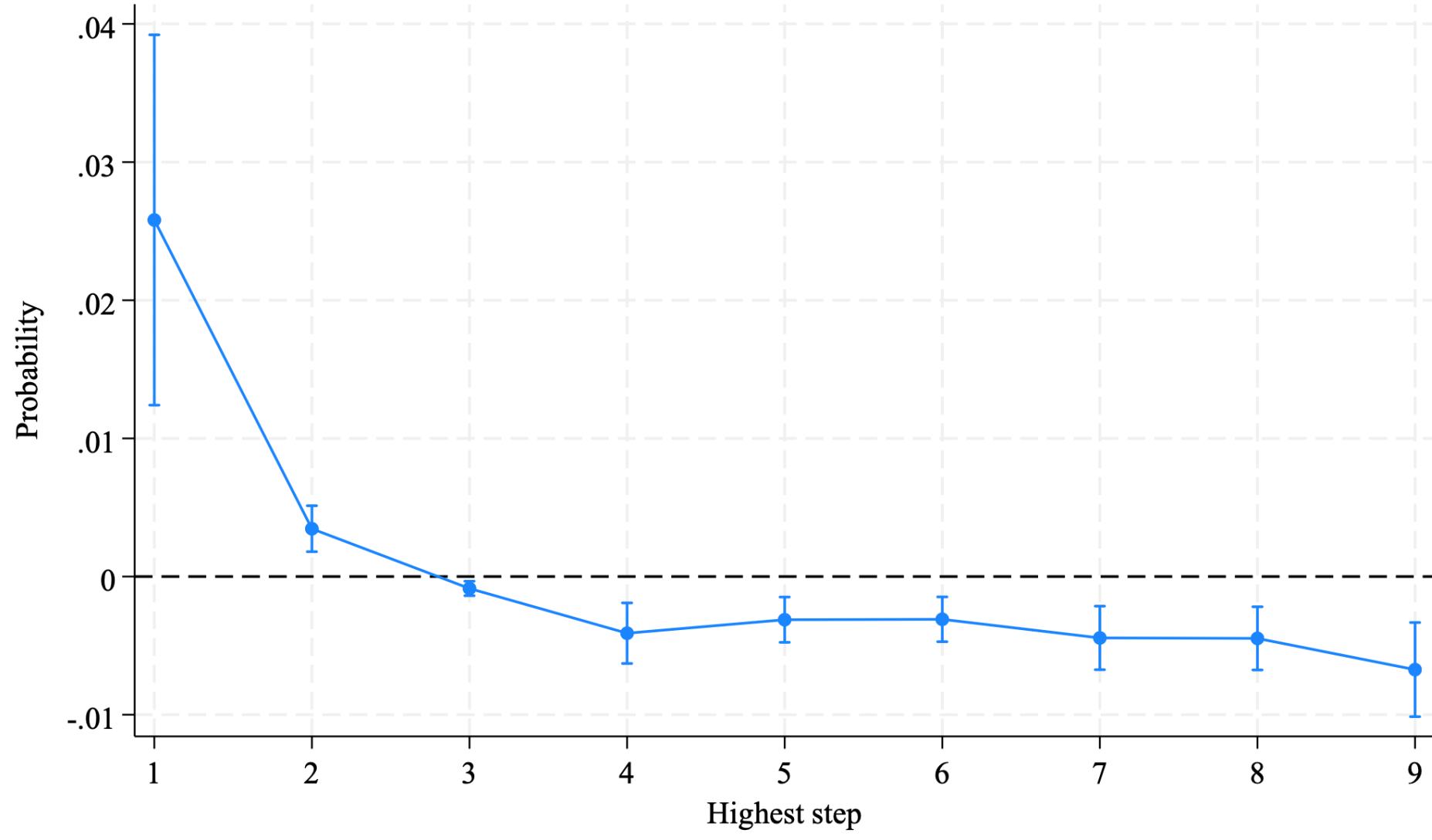
Table 6: Total remediation expenditures - By cubic meters only

	(1) OLS Amount	(2) OLS Amount	(3) Tobit Amount	(4) Heckman Amount	Contam.
Reserve	-0.580*** (0.129)	-0.348*** (0.088)	-4.357*** (0.696)	-1.483*** (0.088)	0.808*** (0.034)
Observations	65,120	147,101	147,101	147,101	65,120
R ² (Pseudo R ²)	0.197	0.221	0.222		
$\hat{\rho}$				-0.854	
LR test chi ² p-val				0.000	

Table 9: Total remediation expenditures - Proximity to mining activities

	(1) Heckman	(2) Tobit	(3) Heckman	(4) Tobit
Reserve	-1.444*** (0.091)	-3.603*** (0.727)	-1.382*** (0.099)	-1.674** (0.827)
Mine	-0.114 (0.086)	-0.458 (0.564)	-0.114 (0.086)	-0.439 (0.563)
Metal	0.112** (0.056)	2.155*** (0.450)	0.158** (0.071)	3.295*** (0.530)
Reserve × Mine	-0.281*** (0.106)	-4.501*** (1.332)	-0.269** (0.106)	-3.928*** (1.345)
Reserve × Metal			-0.148 (0.109)	-4.685*** (0.982)
Observations	65,120	147,101	65,120	147,101
Pseudo R ²		0.223		0.224
$\hat{\rho}$	-0.854		-0.853	
LR test chi ² p-val	0.000		0.000	

Marginal effect of Reserves on the probability of attaining each remediation level



Additional Results

- *Year-specific effect*: No, average marginal effect of Reserve is negative and significant at each year
- *Systemic racism*: Not likely, given that investment is higher for reserves when excluding zeros from analysis.
- *Clustering*: Results hold for site-level, province-level, contaminate-level and highest-step-level clustering.
- *North effect*: Results hold when controlling for sites above latitude 51 or higher
- *Territories*: Results hold when excluding the three territories of Canada.

Conclusions

Our results suggest a significant gap in the contamination and remediation process between Indigenous lands and other types of federal land.

Potential explanations:

1. Tragedy of the anti-commons: many Indigenous communities must navigate a network of federal and provincial regulations, in addition to conflicting local leadership in the reserves between band councils, established by treaties with the Canadian Government, and hereditary leadership.
2. Problems of multi-level governance: overlapping responsibilities between the federal government, provincial government, and Indigenous people.

Policy implication: clear call for governments, federal and provincial, and Indigenous communities to collaborate in reducing the inefficiencies surrounding the contamination and remediation processes.

Contact

Nicolas Legendre, Department of Finance, HEC Montréal
Email: nicolas.legendre@hec.ca
Website: <https://www.hec.ca/profs/nicolas.legendre.html>