

Re-examining the Risks and Environmental Indicators in the Closure Governance of Bauxite Residue Sites in Jamaica

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Abstract

Building on previous discussions of mineral resources governance as it relates to bauxite residue disposal areas (BRDA's) in Jamaica, re-examining the structure of environmental management in Jamaica is useful to map the ways in which risk assessments are being internalized into the process. Additionally, a review of the environmental indicators relating to environmental risk minimization is considered in the context of the national policies for development and the evolving metrics for environmental governance (for example, water quality impacts, closure planning oversight and community warning systems). The clear advantages of risk minimization through bauxite residue removal for reuse and recovery of constituents will be globally reviewed, however, environmental efficiency costs have to be considered, especially for closed and legacy sites in a small island developing state like Jamaica.

Keywords: Bauxite residue management, Environmental governance, Sustainable development goals (SDGs), Risk assessment, Community impacts.

1. The Jamaican Context

A full decade before Jamaica's independence in 1962, bauxite mining and refining had commenced in Jamaica. The first operating refinery was started in one of the major bauxite bearing parishes, Manchester, in the centre of the island at Kirkvine, and was owned by Alcan until 2001. Alcan then sold its Jamaica assets to Glencore, excluding several bauxite residue (BR or red mud) sites that were retained by Alcan to be closed. These BR sites were located at Kirkvine and at Ewarton, where their second alumina refinery operated [1].

There are five refinery locations in Jamaica (Figure 1), each with BR sites. Only two refineries currently remain in operation [2] – Jamalco's Clarendon Alumina Works and Windalco's Ewarton Works. JISCO Alpart suspended operations in 2019, and Kirkvine Works has not reopened since 2009 when the operations were halted during the worldwide economic crisis. Revere was closed and decommissioned in 1975; those BR sites have been mapped in Figure 1 but are derelict. The bauxite deposits are geographically located in the five central parishes of the nation, and each refinery had been strategically located to receive and process ore, as well as utilize port operations.

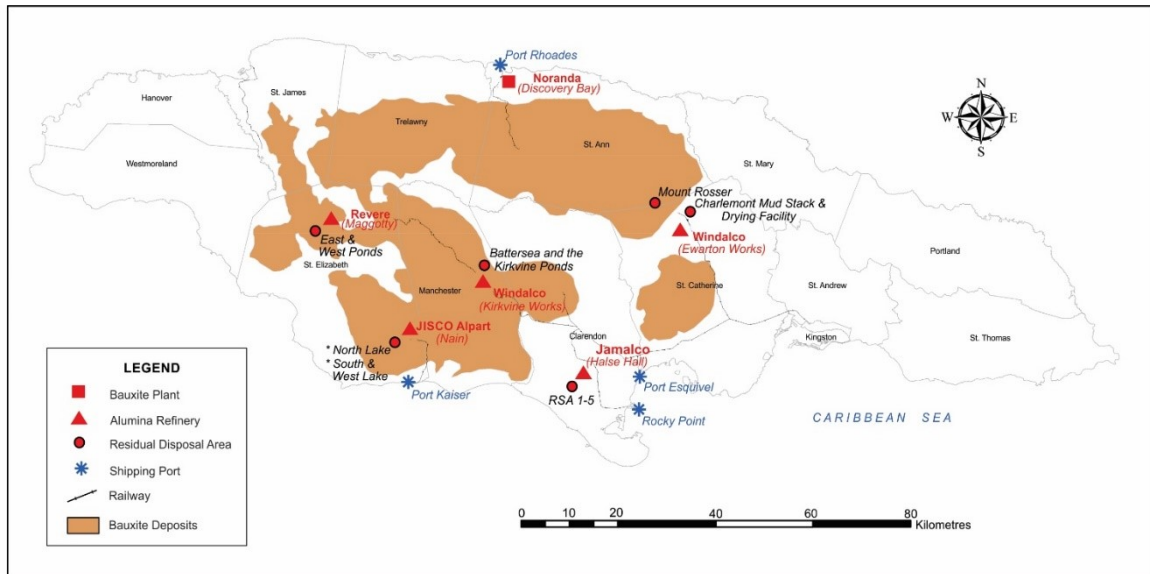


Figure 1. Location of bauxite residue disposal sites in Jamaica [2].

Jamaican bauxites generate approximately 1 tonne of BR per tonne of alumina [2], which closely resembles the global production average of 1.23 tonne of BR per tonne of alumina production [3]. The approximate BR volumes at each Jamaican location are shown in Table 1. In total, this amounts to nearly 150 million tonnes of BR stored in residue areas. Since the volumes were determined in 2022 [2], there has been marginal changes only for Jamalco and Ewarton Works, as the other refineries remain shut down.

Table 1. Current bauxite residue stored in Jamaica.

	Location	Parish	Area (ha)	Volume (Mt)
Kirkvine Works	Kirkvine Ponds and Battersea Mud Disposal Site	Manchester	100 (+ small ponds cumulative area)	22 (+ 3 in old Kirkvine Ponds)
	Mt Rosser Mud Disposal Site	St. Ann/St. Catherine	35	11
Ewarton Works	Charlemont Mud Stack	St. Catherine	100	16
	South/West Lake	St. Elizabeth	220	44
Alpart	North Lake	St. Elizabeth	40	
Jamalco	RSA 1-5	Clarendon	330	51
Revere	East Revere and West Revere Ponds	St. Elizabeth	2	0.6
Total			627	147.6

*Source: Monitoring Reports, JBI Economics Division, 2024.

adaptability. Global objectives for the role of mining in development [17, 3], has underscored that a sound approach to manage and close BR sites can yield measurable results.

Going forward, the precedent has been set in Jamaica, there is a strong approach for closing BR sites. Should the sites be considered useful for other types of exploitation, that mechanism would go through its own feasibility study and would further reduce the environmental impacts of BR sites.

5. References

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