



System-Level Infrastructure Risk and Readiness

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Issue

Reliable access to health care, emergency services, and other essential services depends on functioning transportation, power, and communications networks. Recent flood and wildfire events in British Columbia have shown how quickly infrastructure disruptions translate into service loss. When key corridors or transmission routes fail, communities can be isolated, access to health care delayed, and supply chains disrupted, increasing risks to public safety and the economy.

This briefing note draws on [Vital Connections: Linear Critical Infrastructure and Climate Risk in B.C.](#), a recent report and companion video of B.C.'s critical infrastructure vulnerabilities developed by the Pacific Institute for Climate Solutions (PICS).

Recommendations

This report identifies practical actions governments and operators can take to better manage system-level infrastructure risk more efficiently.

- 1 Shift from asset condition to service continuity**
Focus resilience planning, performance standards, and investment decisions on keeping essential services operating under stress, rather than on individual asset condition alone.
- 2 Improve visibility into system interdependencies**
Build shared data and analysis to identify critical corridors, pinch points, and cross-sector dependencies before disruptions occur.
- 3 Clarify coordination for system-level risk**
Define roles, authorities, and decision pathways for managing infrastructure risks that span sectors, owners, and jurisdictions.
- 4 Build public understanding and support**
Strengthen awareness of service vulnerabilities and resilience trade-offs to sustain long-term planning and investment, not just emergency response.



Key Findings

- **Infrastructure failures increasingly disrupt essential services.** Recent floods and wildfires have disrupted transportation, power, and communications, limiting access to health care, emergency response, food, and fuel. During the 2021 atmospheric river, power outages affected more than 217,000 customers.
- **Cascading failures are now common and high impact.** In 2021 and again in 2025, flooding led to provincial highway closures that cut off the Lower Mainland from the rest of Canada by road and rail.
- **Risk is concentrated in a small number of corridors and pinch points.** Our network analysis identified more than 100 high-impact road pinch points where a single failure can fracture regional connectivity and isolate communities.
- **Service disruption drives the largest public and economic costs.** The 2021 atmospheric river contributed to an estimated 1.5 per cent reduction in provincial GDP growth and required approximately \$1 billion in emergency highway repairs, with the greatest impacts driven by prolonged service outages rather than physical damage to assets.
- **Limited redundancy extends outages and magnifies the impacts.** Dependence on single routes or providers increases vulnerability, particularly in rural and northern regions where alternatives are limited.
- **Infrastructure oversight remains siloed.** Planning, funding, and oversight remain organized by asset and jurisdiction, even as disruptions routinely spread across systems and boundaries.
- **System-level infrastructure failures increasingly affect national readiness.** Disruptions to transportation, energy, and communications corridors constrain mobility, logistics, and response capacity that underpin emergency and national security operations.

Implications for Decision-Makers

- **Governments are exposed to risks they not actively managing.** Federal, provincial, and municipal governments often manage infrastructure risk asset by asset. This leaves governments exposed when failures cascade across systems and disrupt essential services.
- **Fiscal planning is increasingly reactive.** Governments have limited visibility into how infrastructure systems depend on one another. As a result, costs are often incurred during emergencies rather than managed in advance, increasing fiscal uncertainty and emergency spending.
- **Fragmented roles increase the cost and duration of infrastructure failures.** Responsibility for infrastructure planning, funding, and response is divided across sectors and jurisdictions. When failures cross systems, unclear roles and decision pathways slow restoration and drive higher emergency spending.
- **Limited public understanding makes proactive resilience harder to sustain.** The risks associated with service disruption and system failure are not well understood outside of crisis periods. This makes it harder to maintain support for advance investment and shifts spending toward emergency response and recovery after failures occur.

Background

- This independent report and video was funded by the Ministry of Emergency Management and Climate Readiness to support provincial priorities on climate risk, emergency management, and disaster resilience.
- The report examines how disruptions to linear critical infrastructure, including highways, rail, energy transmission, and communications, can cascade across essential services and increase emergency response and economic costs.
- The analysis focuses on system-level risk, identifying critical corridors, pinch points, and interdependencies where a single failure can disrupt multiple services, rather than assessing individual asset condition.
- Climate change increases the likelihood of repeated disruption by amplifying floods, wildfires, and other hazards that affect corridor reliability and recovery timelines.
- While the case study centers on British Columbia, the findings apply to other Canadian jurisdictions that share similar infrastructure networks, corridor dependence, and governance arrangements.
- The findings are intended to inform planning, coordination, and investment decision-making, rather than prescribe specific programs or policies.
- To support public engagement on climate risk and critical infrastructure planning, PICS produced a video to increase knowledge mobilization.

About the Pacific Institute for Climate Solutions (PICS)

The [Pacific Institute for Climate Solutions](#) (PICS) was created in 2008 with an endowment from the Government of British Columbia to advance evidence-based climate policy. Through its multi-university structure, PICS mobilizes applied research and partnerships to support climate-informed decision-making across government.

