



Hazard Resilience Index (HRI)

Contamination

Air Pollution
Soil Contamination
Water Contamination

Contamination

Please refer to the Hazard Resilience Index Instructions (HRI) document for more information on using this document.

Air Pollution ^{1 2 3}

Hazard Resilience Rating	High Resilience <input type="checkbox"/>	Low Resilience <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
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Yes	No	Need More Info	Not Applicable	FACTORS	This factor is important to my community
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Businesses are encouraged to reduce air pollution and increased temperatures by reducing non-essential use of air conditioners which use power and emit heat.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Community-based air pollution exercises have taken place in the schools and community-at-large (e.g., table-top or full-scale exercises)	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In case of extended air pollution, there are plans to allow residents to evacuate to a designated shelter outside of the community	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Most residents check regularly with weather forecasting agencies such as Environment Canada	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Most residents have received education regarding air pollution and know strategies to reduce exposure to polluted air, such as by remaining inside.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community encourages community members and businesses to temporarily stop or reduce their emission of pollutants if there is serious air pollution, such as not driving or reducing vehicle usage.	<input type="checkbox"/>



Hazard Resilience Index

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community encourages increased green spaces, the planting of shade trees and use of light-coloured building and road surfaces.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has a “no idling” in your vehicle for more than one minute policy.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has identified “at risk” individuals to air pollution (e.g., those with asthma).	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community encourages and enforces industries to reduce carbon emissions.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify community residents of potential air pollution including from forest fires.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify police, fire and ambulance personnel of potential air pollution including from forest fires	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify transient, migrant and homeless people of potential air pollution including from forest fires	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Existing homeless shelters have made provisions for increased capacity, hazard specific conditions and evacuation procedures to other emergency shelters located outside of the community.	<input type="checkbox"/>

Soil Contamination ^{4 5}

Hazard Resilience Rating	High Resilience <input type="checkbox"/>	Low Resilience <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
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Yes	No	Need More Info	Not Applicable	FACTORS	This factor is important to my community
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If levels of contaminants are discovered in soils above baseline levels or at levels that pose risks to public health and the environment, the community requires repairs or adjustments to the pollution source and/or removal of soil contaminants by the polluter, future developer or government.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has identified and implemented appropriate soil contamination removal techniques, such as physical barriers that prevent contaminants migrating into groundwater, soil excavation, soil flushing, adding soil amendments, and bioremediation. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has regular inspections of potential polluting facilities and testing of surrounding soils and enforces compliance. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has well designed landfills and regularly tests for water contamination seeping from the landfill. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community is working with the Department of National Defence to ensure that all explosives and metals are removed from old military training sites.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community is working with the owners of past and existing firing ranges to ensure that all ammunition and metals are removed from the site.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community monitors the number and type of pesticides and fungicides that are used by farmers and encourages eco-sustainable methods of controlling pests.	<input type="checkbox"/>

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community prevents soil contamination by controlling the placement of potentially polluting facilities and chemical storage areas through zoning and designations.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community regulates the number and type of pesticides and fungicides that can be used by residents and encourages eco-sustainable methods of controlling pests.	<input type="checkbox"/>

Water Contamination ⁶⁷

Hazard Resilience Rating	High Resilience <input type="checkbox"/>	Low Resilience <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
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Yes	No	Need More Info	Not Applicable	FACTORS	This factor is important to my community
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If levels of contaminants are discovered in groundwater above baseline levels or at levels that pose risks to public health and the environment, the community requires repairs or adjustments to the pollution source and/or removal of water contaminants by the polluter, future developer or government.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has adequate storm sewage and human sewage treatment systems to prevent water contamination.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has identified and implemented appropriate techniques to remove groundwater contaminants, such as injecting oxygen into the groundwater to speed degradation of organic pollutants, placing porous treatment walls in front of a contaminated plume, or pumping out and treating the groundwater.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has regular inspections and testing of irrigation systems and farmland water sources and enforces compliance. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has regular inspections and testing of residential and business septic systems and well water.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has regular inspections of potential polluting facilities and testing of groundwater and enforces compliance. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community has well designed landfills and regularly tests for water contamination seeping from the landfill. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community prevents humans from accessing natural water shed areas.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The community prevents water contamination by controlling the placement of potentially polluting facilities and chemical storage areas through zoning and designations. .	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify community residents and visitors of potential boil water and “do not drink” advisories.	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is a warning system in place to notify police, fire and ambulance personnel of potential boil water and “do not drink” advisories.	<input type="checkbox"/>

References

- ¹ Gordon, James A. (2001). Risk Assessment and Management in Local Government Emergency Planning. Institute for Catastrophic Loss Reduction. Retrieved from http://www.iclr.org/images/Risk_assessment_and_management_in_local_government_emergency_planning.pdf
- ² Akbari, H., Pomerantza, M., Tahaa, H. (2001). Cool Surfaces and Shade Trees to Reduce Energy Use and Improve Air Quality In Urban Areas. *Solar Energy*, 70, 295-310.
- ³ Smoyer-Tomic, Karen E., Kuhn, Robyn, Hudson, Alana. (2003) Heat Wave Hazards: An Overview of Heat Wave Impacts in Canada. *Natural Hazards*, 28, 463–485.
- ⁴ Alberta Environment. (2010). Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Retrieved from <http://environment.gov.ab.ca/info/library/7751.pdf>
- ⁵ Lombi, Enzo, Wenzel, Walter W., Adriano, Domy C. (1998). Soil Contamination, Risk Reduction and Remediation. *Land Contamination & Reclamation*, 6, 183-19
- ⁶ Alberta Environment. (2010). Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Retrieved from <http://environment.gov.ab.ca/info/library/7751.pdf>
- ⁷ Environment Canada. (2002). Technical Assistance Bulletin #24: Remediation Technologies for GroundWater Contamination. Retrieved from <http://www.on.ec.gc.ca/pollution/ecnpd/tabs/tab24-e.html>