

Alberta Community Resilience Program

Supporting the development of long-term community-level resilience to flood and drought events, while supporting integrated adaptation planning and healthy, functioning watersheds.

Floods are commonplace in Alberta, but as more Albertans settle near waterways, flooding has become the greatest disaster risk in Alberta. With the devastating 2013 flood event dominating our recent memory, the Alberta Community Resilience Program (ACRP) gives communities the means to adapt to these new challenges today by protecting critical infrastructure and creating flexibility to react to more extreme weather events. The outcome will be the reduction in the province's overall disaster vulnerability and liability.

ACRP is structured as a 12-year, \$531 million grant program supporting the development of long-term community-level resilience to flood and drought events.

Municipalities, First Nations and Metis communities are eligible to apply for funding. The program works closely with partners to create climate responsive systems, building capacity to adapt to more extreme weather events.

 **24** Projects Completed

79   **54** 
Grants Communities

\$5B  **Insured Losses**
(since 2010)

\$1.7B  **Disaster Recovery Payouts (Uninsured)**
(since 2010)

 Accounts for **61%**  **Insured Damage**
(since 2010)

Every \$1 **Saves \$6**
Invested in resilience* Spent on societal costs

*Multihazard Mitigation Council (2018).
Natural Hazard Mitigation Saves: 2018 Interim Report.



Northwest Constructed Wetland Complex, Town of Coaldale, Alberta.

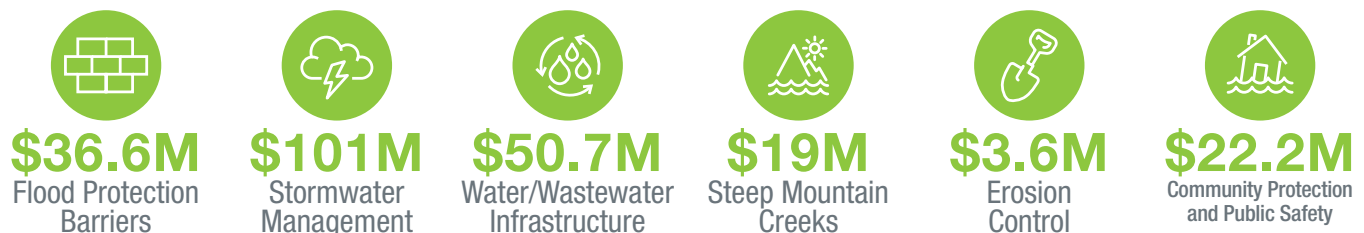
"The plain reality is that flood-proofing Canada will be staggeringly, historically costly. But the cost of not flood-proofing Canada will be incalculable."

- Neil Macdonald · CBC News

"This project is the lynchpin in the Town's overall stormwater resilience strategy and will prove to be absolutely critical in ensuring the Town continues to grow and prosper in the face of our future challenges."

- Andrea Koester,
Director of Engineering and Infrastructure,
Town of Coaldale

Albertans Investing in Resilient Infrastructure



<https://www.alberta.ca/alberta-community-resilience-program.aspx>

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Everyone Lives Downstream

Flood Protection Barrier



Project Lead: City of Medicine Hat
Nature of Flooding: Riverine
Historical Damages: \$45 million since 2005
Recent Events: 1995, 2005, 2010, 2011, 2013, 2014
Project Cost: \$12.3 million
Funding Partners: FREC (Flood Recovery and Erosion Control), ACRP, Ministerial Task Force 2013

Primary Project Beneficiary: Downtown/Flats Community in Medicine Hat
Secondary Benefits: Stormwater management
Cost Benefit Ratio (IBI): 7.1:1
Project Lifecycle: 75 Years
Design Level/Capacity: 1:100 year flood (5,480 m³/s) level plus 1.0 metre of freeboard

At the watershed level, we all live downstream of someone. Historical downtown Medicine Hat resides on the South Saskatchewan River at the confluence of Ross and Seven Persons Creeks. Identified as one of the highest risk areas of the city, the Lions Park barrier was constructed as part of the city’s comprehensive Overland Flood Protection Strategy. Completed in 2016, the 2,305-metre earthen berm starts at the downtown YMCA and continues through the city’s Strathcona Island Park, with a demountable floodwall to restrict road access during high water events.

The City of Medicine Hat also completed flood protection barriers in the communities of Harlow and Riverside. Projects at Industrial Avenue and Kingsway Avenue are underway.



No Bones About It “We are a flood community”

Community Protection and Public Safety



Project Lead: Town of Drumheller
Nature of Flooding: Riverine / Overland Flooding
Historical (Annualized) Damages: \$4,264,554
Recent Events: 2005, 2013, 2018
Project Cost: \$55 M
Funding Partners: Disaster Mitigation and Adaptation Fund, Government of Alberta

Primary Project Beneficiary: 12 Communities in Drumheller
Secondary Benefits: Channel Capacity Improvements; Stormwater Improvements; Enhancement to existing flood infrastructure.
Cost Benefit Ratio (IBI): 5.5:1
Project Lifecycle: 100 years
Design Level/Capacity: Flow management up to 2100 cms

Resilient communities participate in, investigate, and champion mitigation measures to protect infrastructure and people from the impacts of flood and drought. They encourage multi-functional mitigation measures that allow the river to flood safely, while improving the resilience and retention quality of the surrounding areas. That is the challenge the Town of Drumheller is endeavouring to meet with its Flood Mitigation and Adaptation System. A community-wide mitigation system that will be implemented over the next ten years, the town is taking bold actions to mitigate the flood risks associated with the 100 kilometres of riverbank it has been tasked to defend.

The town is shifting its flood focus from design capacities to adaptive risk management, with a system that can remain flexible and responsive to a changing climate. Once complete, the system will include enhancements to existing mitigation infrastructure, new structural mitigation to minimize flood risk, increases to the Red Deer River channel capacity, and a robust public education program that preserves the cultural aspects of the region while promoting a “future-ready” community.

This program is cost shared between all three levels of government. Contributions from ACRP are subject to the program’s eligibility criteria.



Waste Not, Want Not

Water/Wastewater Infrastructure



Project Lead: Siksika Nation
Nature of Flooding: Riverine
Historical Damages: \$450,000 in 2013 to lagoon and lift station
Recent Events: 2005, 2013
Project Cost: \$5.9M
Funding Partners: Indigenous Services Canada
Cost Benefit Ratio (IBI): 2:1
Project Lifecycle: 25 years

Primary Project Beneficiary: Public Safety (Sanitation service to six communities the Blackfoot Crossing Historical Park and Crowfoot School)
Secondary Benefits: Removal of obstructive infrastructure from floodway; water quality (future untreated wastewater discharges)
Design Level/Capacity: 2013 Event plus 0.5 metres freeboard / 25 years growth capacity

The Siksika Nation's wastewater lagoon, sited on the banks of the Bow River, was significantly damaged by flooding in both 2005 and 2013. The lagoon was also years overdue for a significant capacity upgrade. After the flood in 2005, a berm was constructed around the existing lagoon. In 2013, when the lagoon was damaged again, it became clear that the lagoon was not sustainable in its current location, especially given the significant upgrade required. With mitigation options that would simply increase the amount of infrastructure at-risk of damage, Nation and ACRP representatives instead approached Indigenous Services Canada with a proposal to relocate the existing lagoon out of the hazard area. ACRP approved a grant for \$2.3M to relocate the existing lagoon capacity out of the flood hazard area. Indigenous Services Canada funded the capacity upgrade at the same time with a contribution of over \$3 million.

Siksika Nation has also undertaken three additional projects to relocate their drinking water wells out of the flood hazard area and raise existing wastewater lift stations to prevent flood damage.



When It Rains, It Drains

Stormwater Management



Project Lead: Town of Claresholm
Nature of Flooding: Overland Drainage / Stormwater
Historical Damages: 2014 event exceeded \$10 M
Recent Events: 2014, 2018
Project Cost: \$6.7M
Funding Partners: ACRP, DRP, ACP
Primary Project Beneficiary: 1650 homes and 190 non-residential properties

Secondary Benefits: 140,000 wetland plants / 32 hectares of habitat
Cost Benefit Ratio (IBI): 1.17:1 (Damage only)
Project Lifecycle: Indefinite (wetland) / Drainage ditch 50 years
Design Level/Capacity: 1:100 design level / 195,000 cubic metres of water storage

In 2014, the Town of Claresholm was one of many communities on the receiving end of over 160mm of rain in two days - an event that would cost Albertans over \$22 million in damages. Quickly overwhelming their stormwater system, this storm caused significant damage to the town's infrastructure and downstream on Frog Creek. The project, a drainage diversion channel paired with a constructed wetland, provides nearly 200,000 cubic metres of active storage and prevents run off from inundating the community from the rural areas to the west and north. It also prevents an uncontrolled discharge to Frog Creek. This project has "already demonstrated its benefits to the community, protecting the town from flooding during the 2018 spring snow melt" (Associated Engineering).

Constructed wetland projects are also moving forward in a number of other communities, including Sexsmith, Westlock, Coaldale, Coalhurst, Taber, and Magrath.



Unearthing An Entirely Different Beast

Steep Mountain Creek



Project Lead: Municipal District of Bighorn
Nature of Flooding: Steep Creek
Historical Damages: \$21 M (2013 Direct Damages)
Recent Events: 2013
Project Cost: \$12.5 M
Funding Partners: Build Canada Fund, ACRP, LafargeHolcim

Primary Project Beneficiary: Hamlet of Exshaw; LafargeHolcim
Secondary Benefits: Highway 1A, CP Railway
Cost Benefit Ratio (IBI): 2:1 (Hamlet of Exshaw only)
Project Lifecycle: 100 years
Design Level/Capacity: 1:500 Debris Flow / 1:500 Sediment Yield (49,000 cubic metres)

Debris flows and flooding along mountain creeks poses a unique and significant hazard to infrastructure and mountain communities in Alberta. Unpredictable and volatile, flooding on steep mountain creeks can occur very rapidly and allows very little time for at-risk communities to construct temporary protection measures such as sandbagging or temporary dykes. During the June 2013 extreme rainfall event, Canmore, Exshaw, Lac des Arcs and other mountain communities experienced significant damage from erosion, debris flows, debris floods, and debris accumulation. This included the severing of two major highways: the Trans-Canada Highway and Highway 1A (as pictured above through Exshaw), along with railway lines.

The costs associated with the infrastructure solutions required to manage the severity of steep creek hazards are prohibitive for many mountain communities without assistance. Debris flow mitigation projects are now underway, in partnership with the province, including a dam upstream on Cougar Creek in Canmore, and a sediment trap and flood barrier on Exshaw Creek in the Municipal District of Bighorn.



Exceeding the Benchmark

Flood Protection Barrier



Project Lead: City of Calgary
Nature of Flooding: Riverine / Groundwater
Recent Events: 2013
Project Cost: \$2.1 million
Funding Partners: ACRP
Primary Project Beneficiary: Downtown Calgary

Secondary Benefits: Integrated urban design; Stormwater Management
Damage Averted (Lifecycle): \$41.7 million
Cost Benefit Ratio (IBI): 47:1
Project Lifecycle: 100 years
Design Level/Capacity: 1:200 year flood design level plus 0.5 metres of freeboard

The West Eau Claire flood protection barrier in the City of Calgary promotes both integrated design and collaboration. Part of an extensive flood protection system to protect downtown Calgary, the project was undertaken in partnership with other city departments as part of a park redevelopment plan. Now, there are flood walls integrated into garden beds, rock terraces, as well as over a kilometer of park bench. Pedestrian pathways between and adjacent to flood walls are designed with public safety and access in mind with demountable flood protection panels hidden in plain sight, on-site, for rapid deployment to close these access points during a flood event. The city has even integrated stormwater management into the park re-design, using rain gardens in areas behind the wall structure to provide storage when the river is too high for discharge. This project will tie into the Downtown Flood Protection Barrier, which is the city's highest priority ACRP project.