



Parks  
Canada

Parcs  
Canada

Canada



# Parks Canada Roadway Assets & Climate Challenges

May 30, 2024



Minister of  
Transportation

Minister of  
Environment and  
Climate Change

Minister of  
Infrastructure and  
Communities

President & CEO  
Parks Canada

Senior VP  
Operations

VP Real Property  
& Assets

Regions

Portfolio  
Management

Service Branch

Field Units  
(Parks)

Highway  
Engineering  
Services

Highway Operations  
Avalanche Programs  
Routine Maintenance  
Incident Response & Management  
Stakeholder & Public Relations

Highway  
Operations Unit

Inspections  
Network Assessment  
Investment Planning  
Construction Management  
Specialized Maintenance



## Parks Canada Agency

- 37 National Parks
- 10 National Park Reserves
- 171 National Historic Sites
- 5 National Marine Conservation Areas



## Roadway assets

- 25 National Parks & 27 National Historic Sites
- 3,315 two-lane km of roadway (2,060 miles)
- 630 vehicular bridges or other structures



Highway 5  
Wood Buffalo NP



## Parks Canada Roadway Categorization



Category 1

National  
Highways

Category 2

Provincial  
Highways

Category 3

Special  
Attraction  
Highways

Category 4

Access to  
Visitor  
Facilities

Category 5

Access to  
Private  
Facilities

Category 6

Access to  
Operational  
Facilities

45% total length  
75% of total replacement value





## Changing Climate > Growing Risks



Culvert Washout  
Cabot Trail,  
Cape Breton Highlands NP



Wildfire  
Kootenay NP

Increased frequencies, severities,  
of climate events leading to:

- Flooding and erosion
- Debris flows and washouts
- Roadside tree hazards



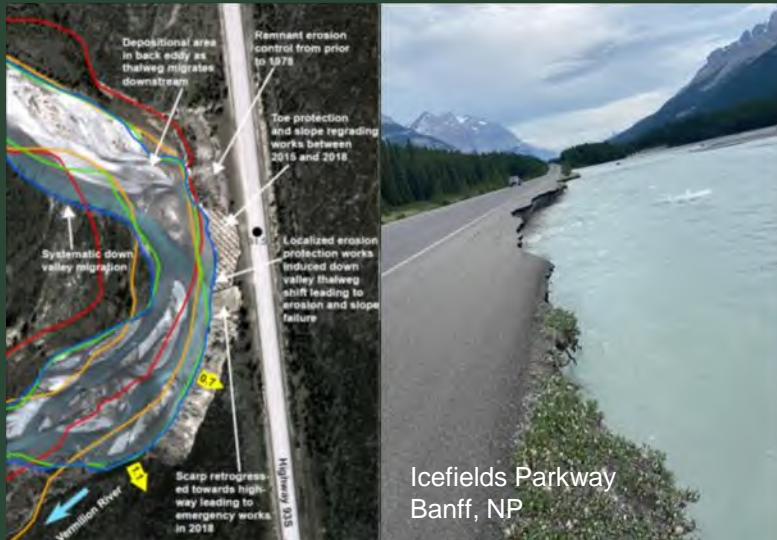
Embankment Erosion  
Icefields Parkway  
Banff NP



## Lessons and action items > Assessment



Eastport Causeway  
Terra Nova NP



Icefields Parkway  
Banff, NP

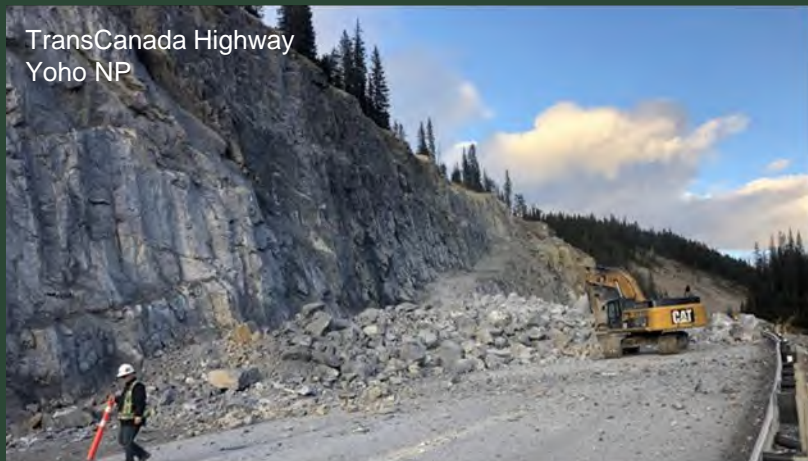
Continue to assess various climate risks to highway corridors:

- Accelerated river encroachments
- Sea level rise and wave action
- Intensified peak flows
- Debris flows
- Forest fires and destabilized soils





## Lessons and action items > Planning & Operational Preparedness



### Preparedness:

- Identify known higher risk areas
- Harvest or import materials
- Stage / stockpile materials





## Lessons and action items > Design and Construction



Akamina Parkway  
Waterton Lakes, NP

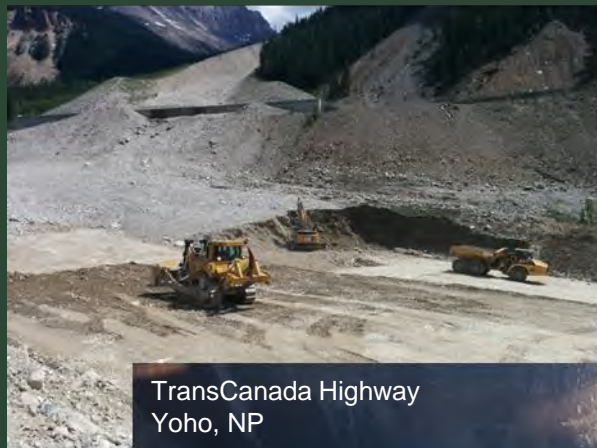
### Sustainable Design & Construction:

- Return period 'moving target'
- Freeboard clearances
- Abutment foundation considerations
- Catchment sizing for debris, avalanches
- Retention structures

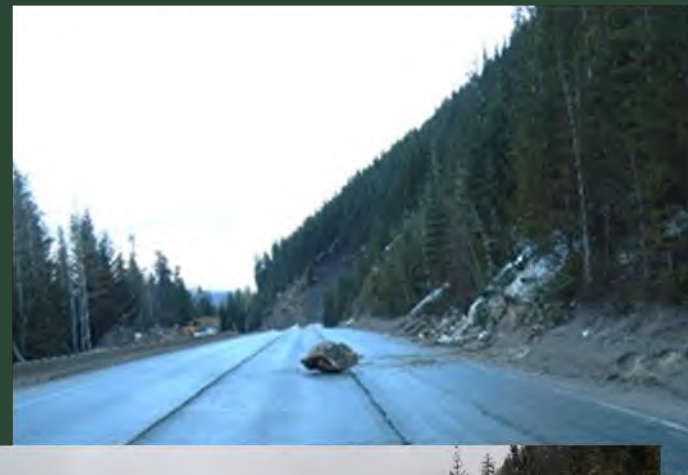




# Lessons and action items > Design and Construction



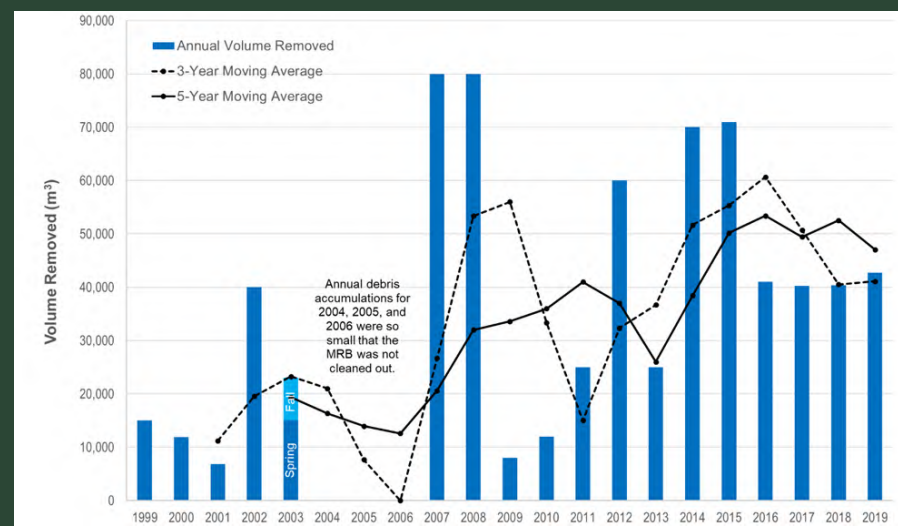
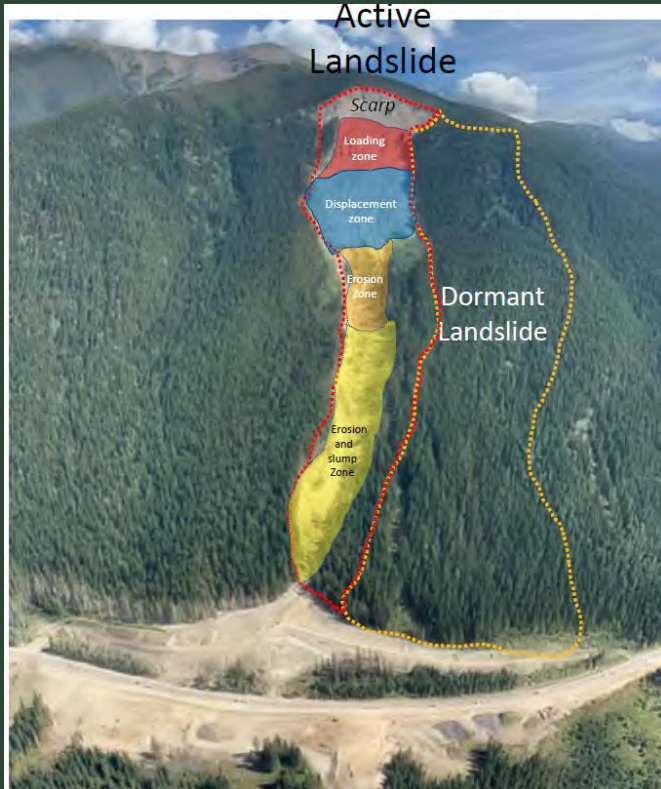
TransCanada Highway  
Yoho, NP



TransCanada Highway  
Glacier, NP



# Heather Mountain 'East Gate Landslide'

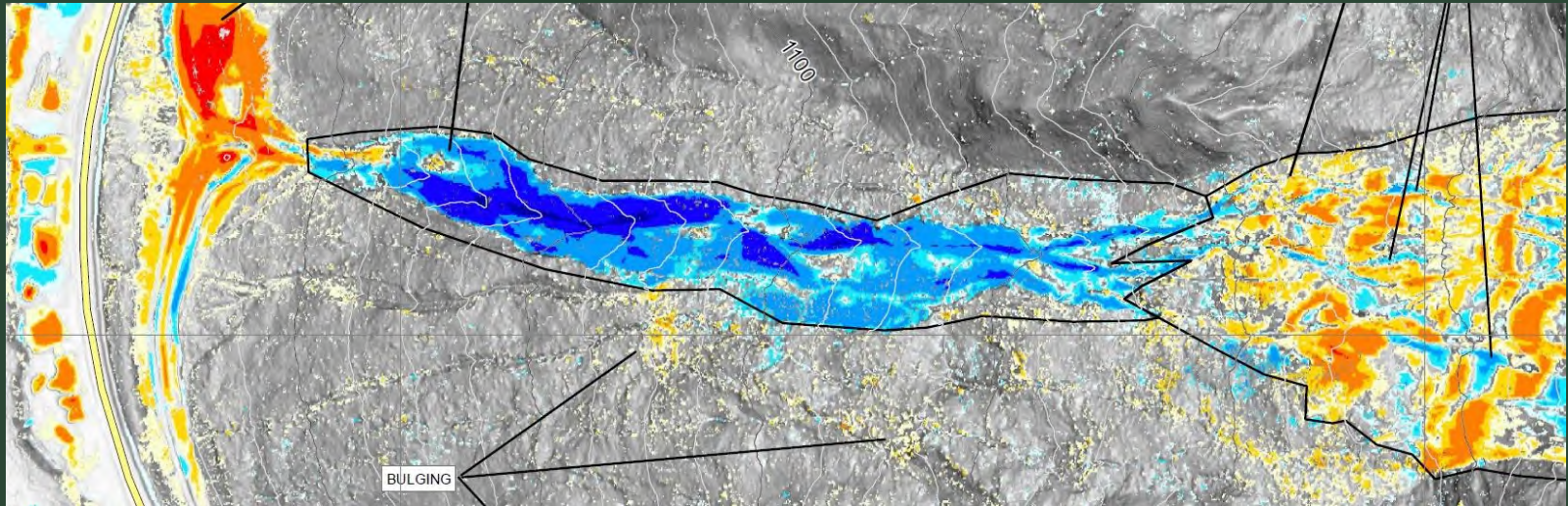




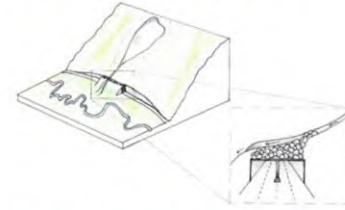


High Cost to Separate Highway from Risk  
> > > step back and assess

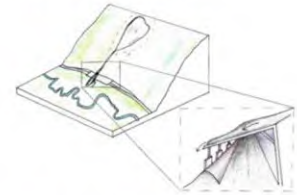
Gully Evolution:  
2015 LiDAR vs. 2018 LiDAR



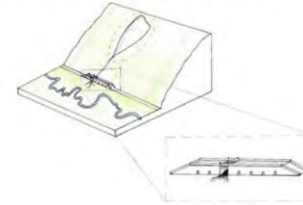
Cut and Cover Tunnel



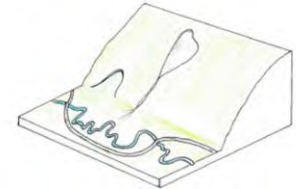
Shed Structure



Berm-to-Bridge Structure



Highway Realignment







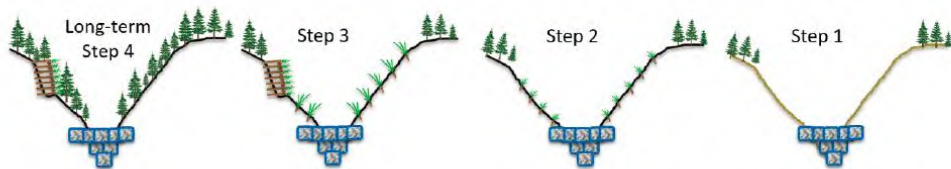
## Gully / thalweg stabilization



Progressive gully incision and widening



BGC's approach is a process reversal



- Step 4** Long-term monitoring and maintenance
- Step 3** Enhanced bioengineering (if required)
- Step 2** Select top to bottom benching and bio-engineering
- Step 1** a: Prevent further channel incision  
b: Surface flow diffusion  
c: Hydroseeding/mulching



## Parks Canada Roadway Categorization



Category 1

National  
Highways

Category 2

Provincial  
Highways

Category 3

Special  
Attraction  
Highways

Category 4

Access to  
Visitor  
Facilities

Category 5

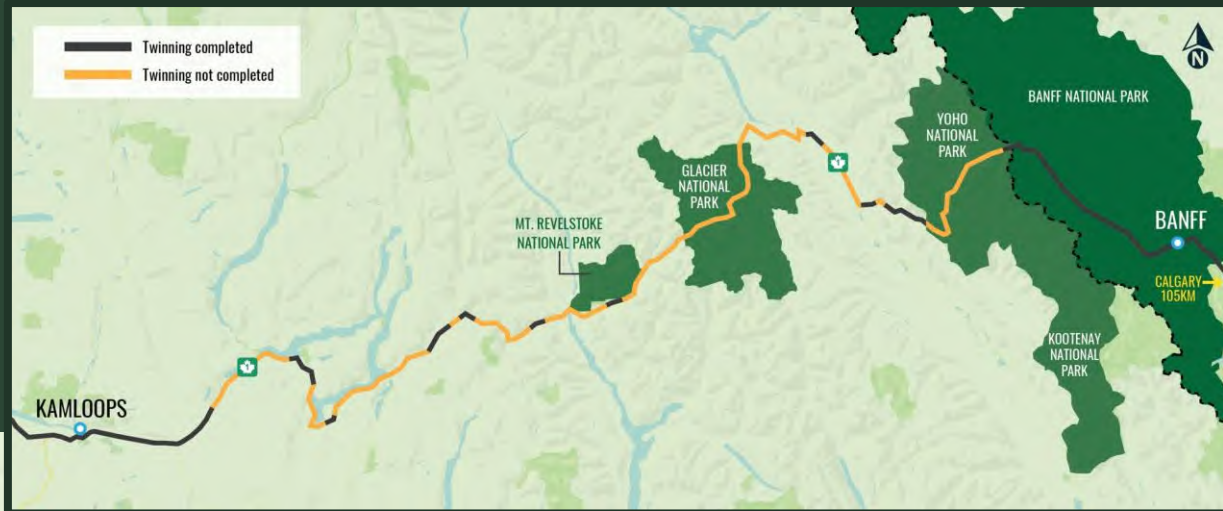
Access to  
Private  
Facilities

Category 6

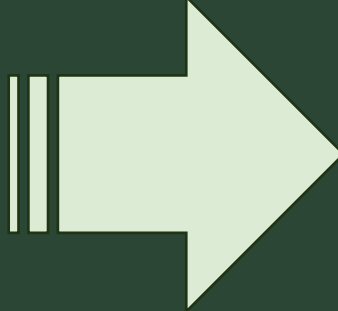
Access to  
Operational  
Facilities

45% total length  
75% of total replacement value



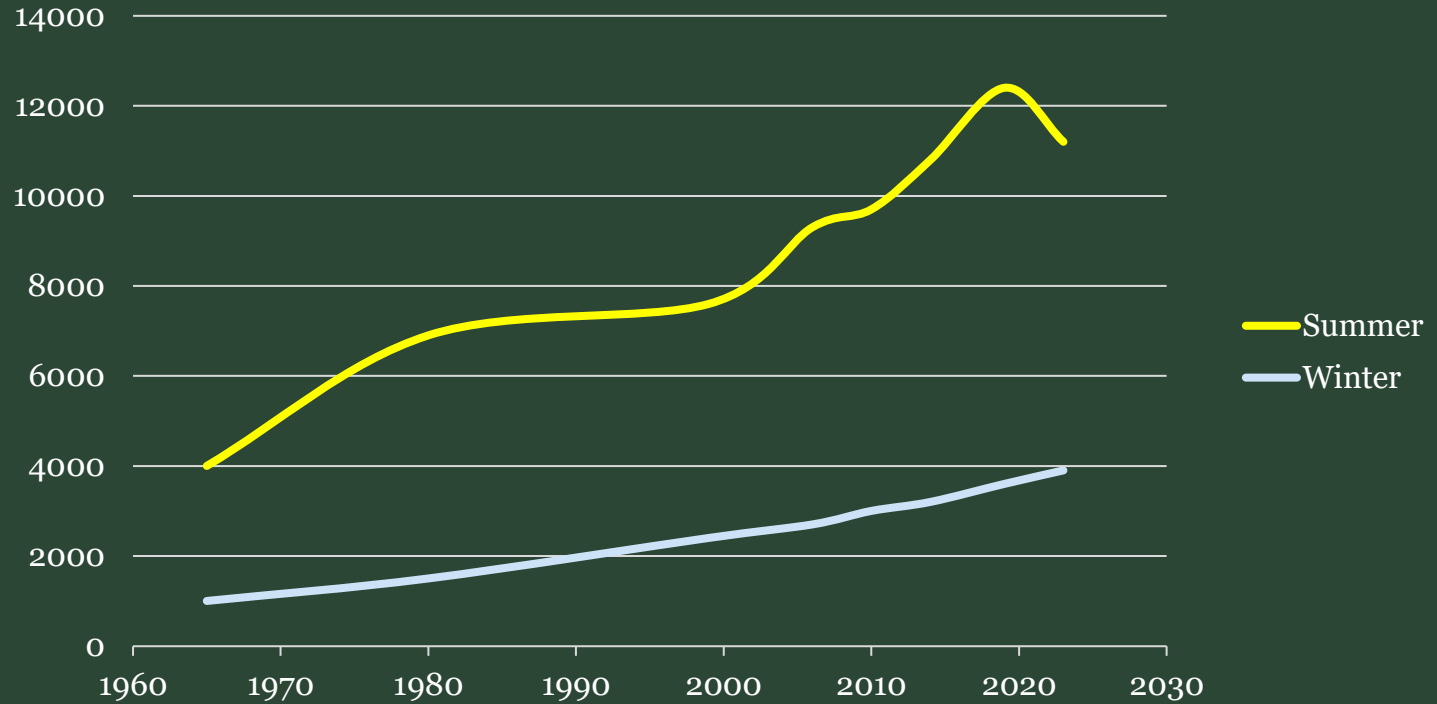






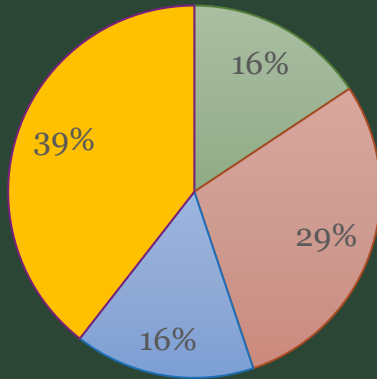


## TCH Daily Traffic Rogers Pass





## TCH GNP 2014-2020 \$150M



- Safety Improvements
- Winter Reliability
- Structural Rehab
- Hwy & Slope Deferred

Table 2 – Scoring metrics used to evaluate mitigation measures.

Metric Description	Project Objective
Reduction in Avalanche Hazard Index (AHI) (Schaerer, 1989) <sup>[1]</sup> .	Reduce winter highway risk.
Reduction in Residual Avalanche Hazard Index (RHI) (Schaerer, 1989) <sup>[1]</sup> .	Reduce winter highway risk.
Effect on Closures.	Improve winter highway reliability (reduce closure time).
Effect on Program Efficiency.	Improve avalanche program efficiency.
Compatibility with potential TCH Twinning.	Minimize potential loss of effectiveness of the mitigation measure due to potential future twinning of the highway.
Capital Cost.	Achieve the optimal risk reduction in relation to the capital cost (cost-benefit ratio).





RACS at Mt. Stephen  
Yoho NP



Snow nets,  
Glacier NP



Radar installation  
Rogers Pass ADN





**Mounds Stopping Berm  
Glacier NP**