



How Climate Change has Changed Managing Disaster Debris

Understanding the Impacts

2024 SWANA Canadian Conference

About Dillon:

- Canadian employee-owned firm
- Engineering, planning, management & environmental science services
- 25+ offices & 1,100+ employees



Disaster Debris Management Planning

Disaster Debris Management Planning Webinar

Join us in this national webinar and hear from different jurisdictions on their experiences with disaster debris management planning in the face of extreme weather events.

WHEN

Wednesday, April 19, 2023
2 Hour Session 12:00 PM CDT
10:00 AM PDT, 11:00 AM MDT, 1:00 PM EDT, 2:00 PM ADT, 2:30 PM NDT

OVERVIEW

We will open with a presentation about the impacts of a changing climate, followed by presentations from four different jurisdictions across Canada that have been impacted by recent disasters.

You will leave this webinar with an understanding of how to plan for potential disaster debris management.

PRESENTERS

Paul Donahue, Associate, P.Eng., *Dillon Consulting Limited*

Jake Gravelle, Area Manager for Suburban East, Roads, and Parking Services, *City of Ottawa*

Tracey Boutilier, Supervisor of Waste Process, *Regional Municipality of Wood Buffalo*

Karen MacDonald, CEO, *Island Waste Management Corporation*

Rick Anweiler, Leader of Landfill Operations, & **Christy Lyon**, Former Manager of Collection, *City of Calgary*

Heidi Gerlach, Associate, *Dillon Consulting Limited*

RSVP
(CLICK HERE)



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DISASTER DEBRIS MANAGEMENT PLANNING WORKSHOP

SWANA Natural Disaster Preparedness Summit

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Disaster Debris Management Planning

Dillon provides a suite of services for communities that are either preparing for, or in the midst of, dealing with emergency debris removal as a result of flooding, earth quakes, severe weather, hazardous material/spill incidents and/or acts of terrorism. Our process guides municipal officials by detailing the necessary measures to effectively plan for and manage disaster debris. This is particularly important when providing initial residential debris estimates and when reconciling funds received through Provincial Emergency Management programs.

PRE DISASTER PLANNING

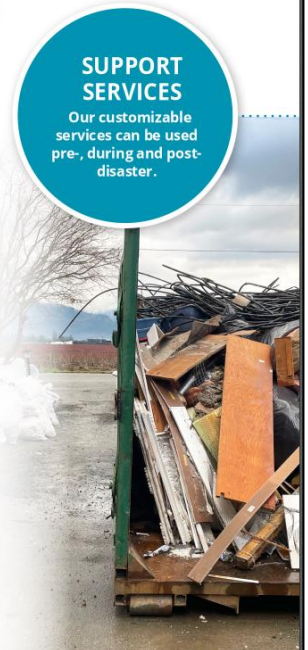
Disaster Debris Management Plan. A comprehensive plan to be used in conjunction with a community's emergency plans to prepare for disaster debris management that includes:

- **Templates and Protocols:** Develop protocols on how to define debris, handle various materials, deal with incoming vehicles and assign responsibilities.
- **Site Identification:** Identify and assess sites for possible use as temporary waste handling facilities for surge capacity based on the types of wastes.
- **Contractual Agreement:** Develop draft contracts and establish capacity of service and equipment providers.
- **Debris Clearing Prioritization:** Identify key transportation routes that will be prioritized for the activity of debris clearing.



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SUPPORT SERVICES
Our customizable services can be used pre-, during and post-disaster.



Have you Been Directly Affected by a Natural Disaster?



Flood



Avalanche



Tornado



Earthquake



Volcano



Drought



Hurricane



Severe storm



Wildfire



Mudslide



Tsunami



Heat / Cold event

10 Most Expensive Years for Natural Disasters in Canada – Insurance Claims

Rank	Year	Total loss (\$ billion)	Notable severe weather events
1	2016	5.96	Fort McMurray, Alberta, fire
2	2013	3.87	Alberta floods; Greater Toronto Area (GTA) floods; December GTA ice storm
3	2022	3.4	Multiple events
4	2023	3.13	Okanagan and Shuswap, BC, area wildfires; Nova Scotia flooding
5	1998	2.83	Quebec ice storm
6	2021	2.48	Calgary hailstorm; British Columbia floods
7	2020	2.46	Fort McMurray flood; Calgary hailstorm
8	2018	2.40	Multiple events: Ontario and Quebec rainstorms and windstorms
9	2011	1.97	Slave Lake, Alberta, fire and windstorm
10	2012	1.65	Calgary rainstorm

Source: Insurance Bureau of Canada

2023 Insured Catastrophic Losses

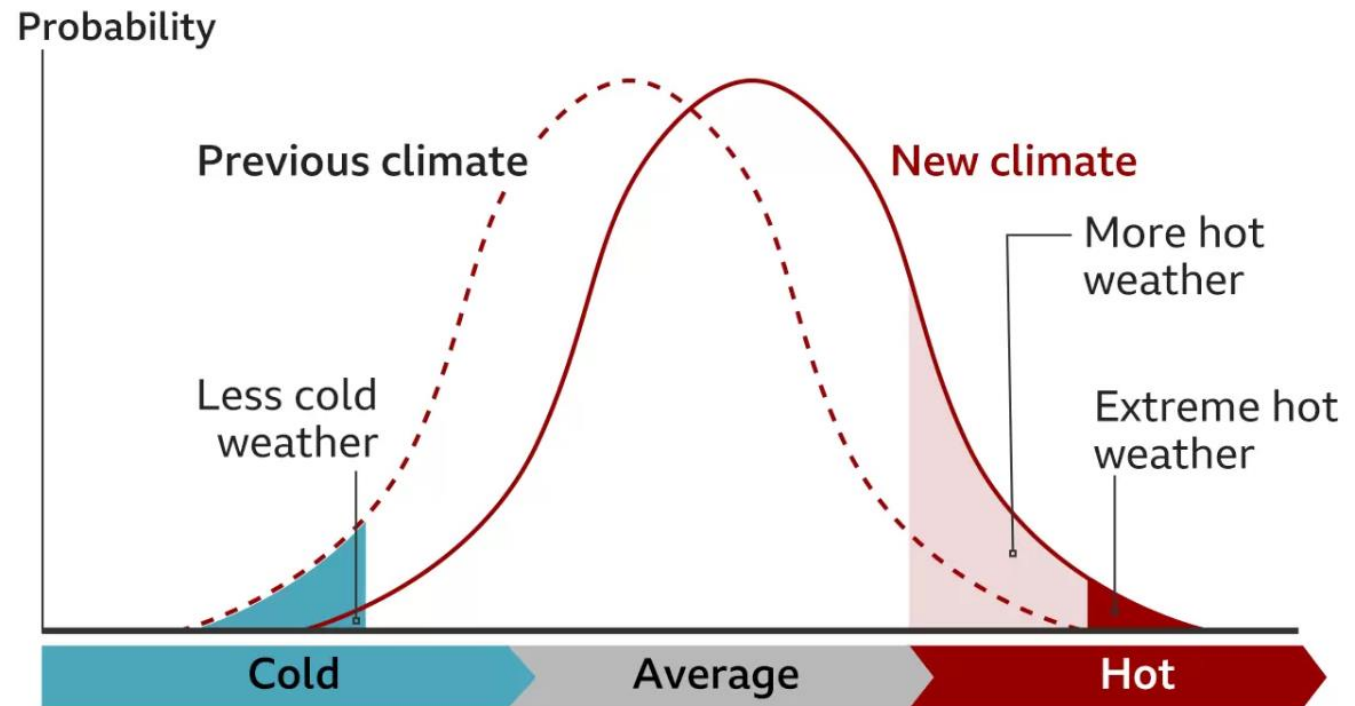


Source: Insurance Bureau of Canada

Changing Climate

What is being said:

- These weather trends are already affecting Canadians
- The climate will continue to change, with varying impacts across Canada's regions
- Severe weather is projected to increase over the next 40 years
- Canada must adapt to this new reality



Source: US EPA

Changing Climate

Our industry will be impacted by:

- Hotter temperatures
- More severe and violent storms
- Increased droughts
- Warming and rising sea levels
- Increase threat of fire
- Loss of species and biodiversity
- Health risks
- Poverty and displacement



Source: Canada's National Adaptation Strategy

What is Debris?



During an emergency event, debris is classified as follows:

Incident

- Direct from disaster (e.g., rubble from damaged buildings and infrastructure, downed trees)
- Indirect from disaster (e.g., spoiled food resulting from power disruptions)

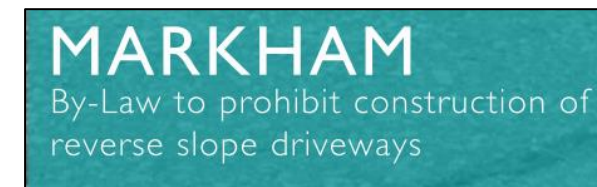
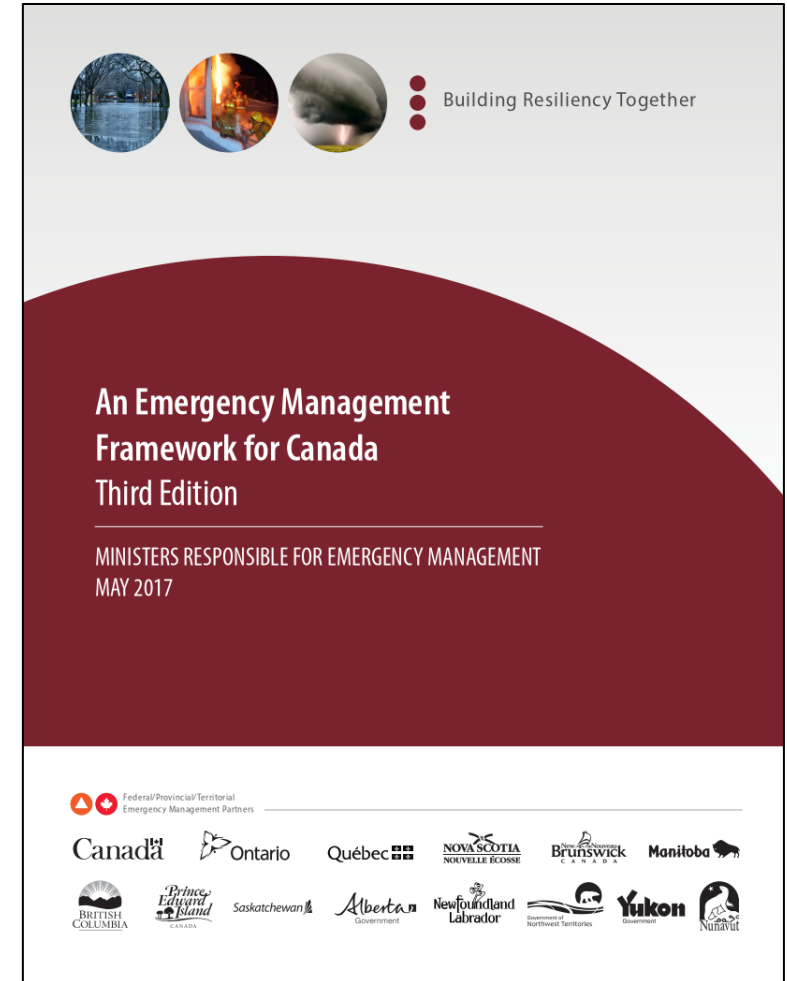
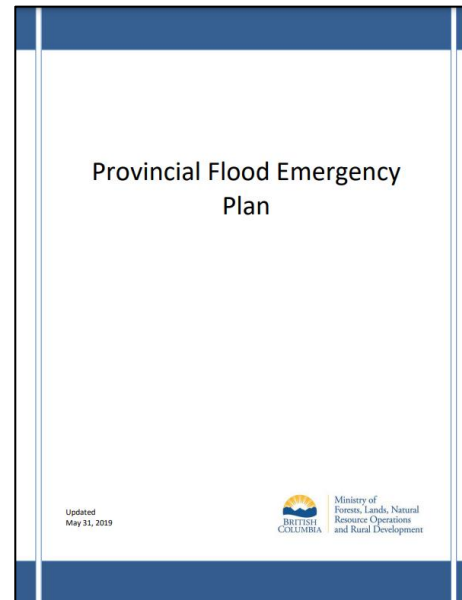
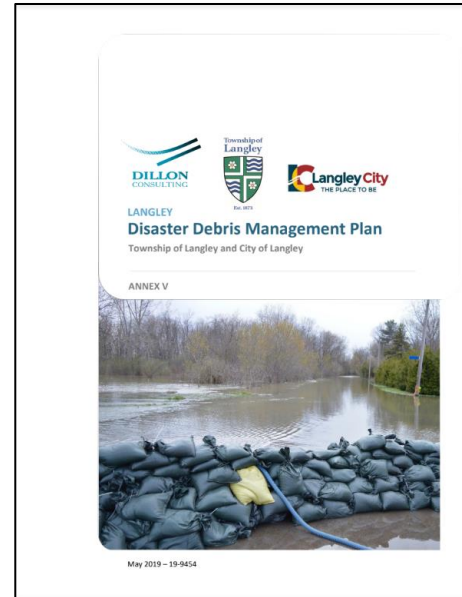
Post-Incident

- Abnormal behavioural patterns resulting from disaster (e.g., increased consumption of bottled water)

Policy and Legislative Response to Climate-Related Debris

Disaster debris management falls under jurisdiction of various levels of government:

- Emergency Management Frameworks (federal and provincial/territorial levels)
- Environmental protection legislation (federal and provincial/territorial levels)
- Building codes and standards
- Waste management regulations
- Emergency debris management plans
- Federal funding programs



Challenges with Managing Debris

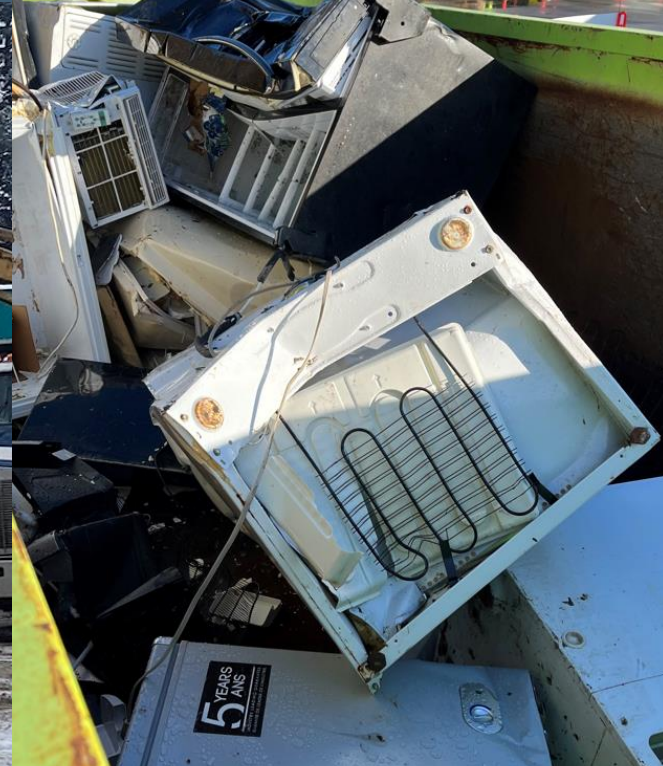


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Disaster: Hurricane



Disaster: Flood



Disaster: Fires



Disaster Debris Recovery - Fort McMurray

2016



JuxtaposeJS

2017



JuxtaposeJS

Source: Macleans's. Photo Credit: Amber Bracken

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Resilience Building and Adaptation Strategies



- Disaster Debris Management Plan – Develop and keep updated
 - Identify potential waste streams
 - Consider waste collection strategies
 - Determine locations for recycling and disposal for temporary and permanent facilities
 - Create a community outreach plan
- Roles and Responsibilities assigned
- Disaster response training
- Policy and legislation updates
- Modelling and risk assessment on community infrastructure
 - Identify important community infrastructure
 - Complete necessary updates, as required

Source: <https://climatlantic.ca/>

Lessons Learned

- Mobilization needs to be immediate
- Have pre-selected temporary sites
- Electricity and phone coverage can be spotty or out
- May need to waive disposal fees
- Curbside waste collection may be cancelled or modified
- Access to fuel can be difficult
- Clear, concise and timely communication to residents
- Ignore social media
- Dealing with challenging materials
- Need for close, ongoing review of contractor records
- Other communities around you may also have been impacted – competing for resources
- Don't be afraid to ask for help



Thank you!



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