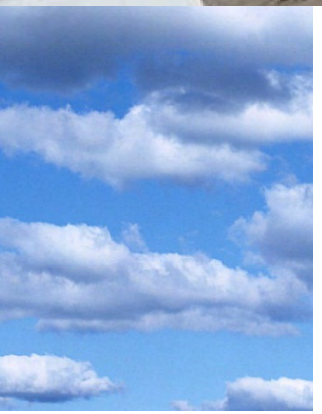
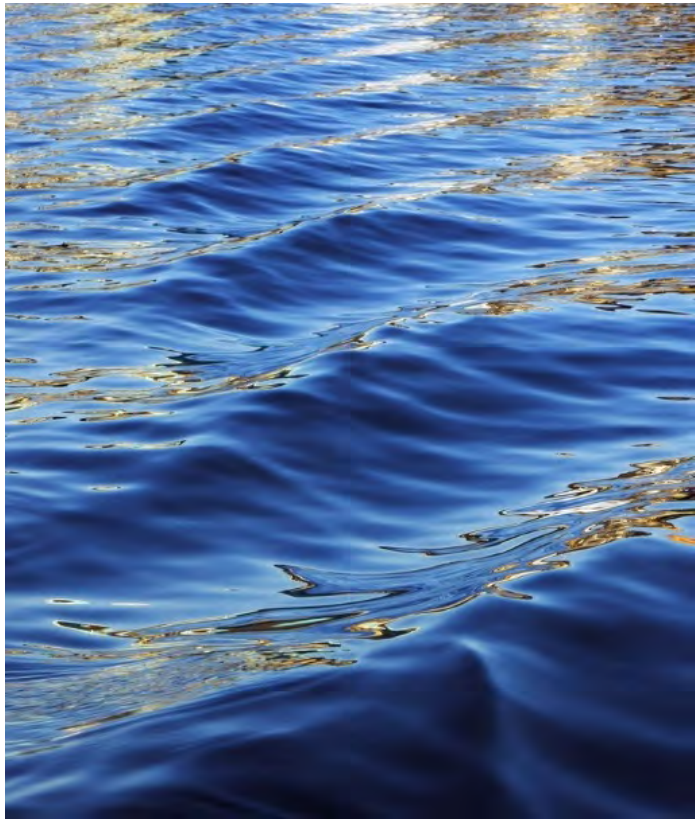


Come Hell or High Water

A Comparative Analysis of the 2013 High River Flood Response – Joe Angevine

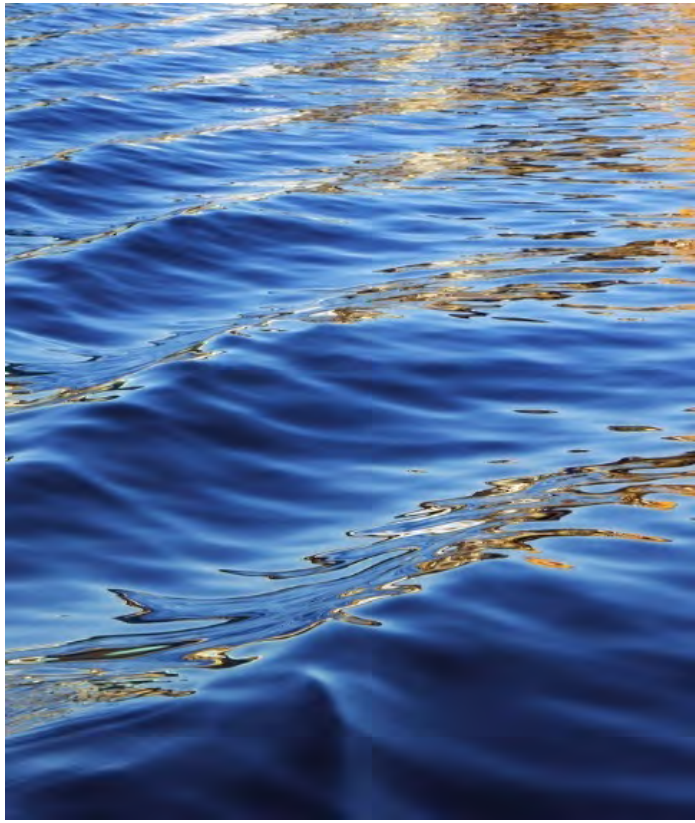


Presentation Outline

- Introduction to Disaster Debris Management
- Literature Review
- Methodology
- Results and Analysis
- Conclusions and Recommendations

Glossary of Terms

- **AEMA** **Alberta Emergency Management Agency**
- AEP Alberta Environment & Parks
- DMTF Debris Management Task Force
- EMC Emergency Management Coordinator
- **EOC** **Emergency Operations Center**
- EPA United States Environmental Protection Agency
- **GoA** **Government of Alberta**
- HHW Household hazardous waste
- **ICS** **Incident Command System**
- PPE Personal protective equipment
- RWRS Regional Waste Reduction Specialist
- **ToHR** **Town of High River**



Introduction

Disaster Debris Management

Recent Devastating Natural Disasters

Globally

- Puerto Rico – Hurricane Maria (2017)
- Houston – Hurricane Harvey (2017)
- The Philippines – Typhoon Haiyan (2013)
- New York – Hurricane Sandy (2012)
- New Orleans – Hurricane Katrina (2005)

In Alberta

- Fort McMurray wildfires (2015)
- High River and Southern Alberta flooding (2013)
- Slave Lake wild fires (2011)

The Town of High River

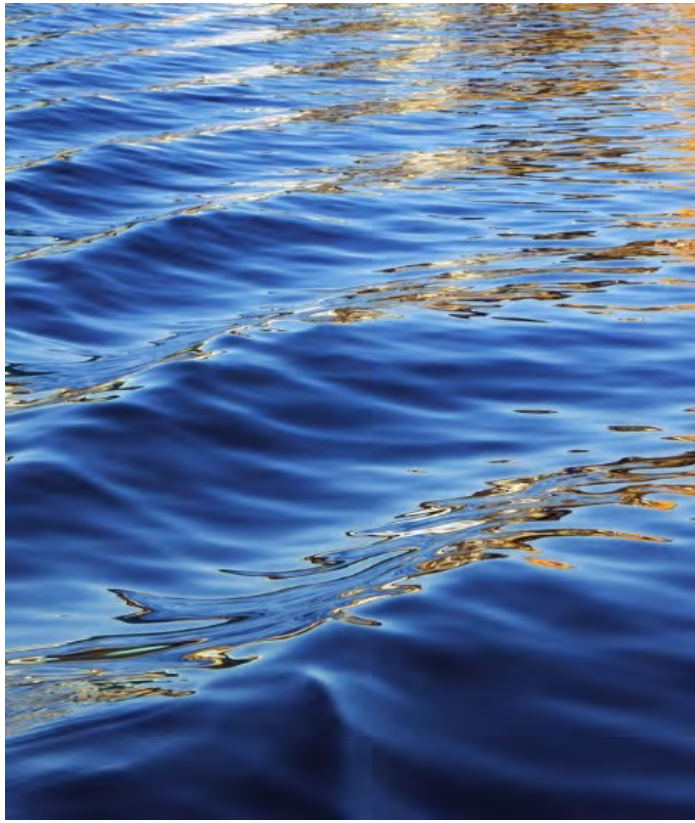
Disaster Debris Management

Research Questions

The purpose of this research, is to explore three questions, each pertaining to a specific period of the 2013 flooding in the ToHR:

- Were the Government of Alberta (GoA) and the Town of High River (ToHR) prepared, in advance, to properly haul and dispose of the debris generated from the 2013 flooding?
- Did the debris management strategies utilized in the ToHR, during the 2013 flood response and recovery, follow industry best-practices?
- What lessons learned can be implemented after the flooding in 2013, to improve the response capabilities of the GoA and municipalities for future natural disasters?

Literature Review



Key Points from the Literature Review

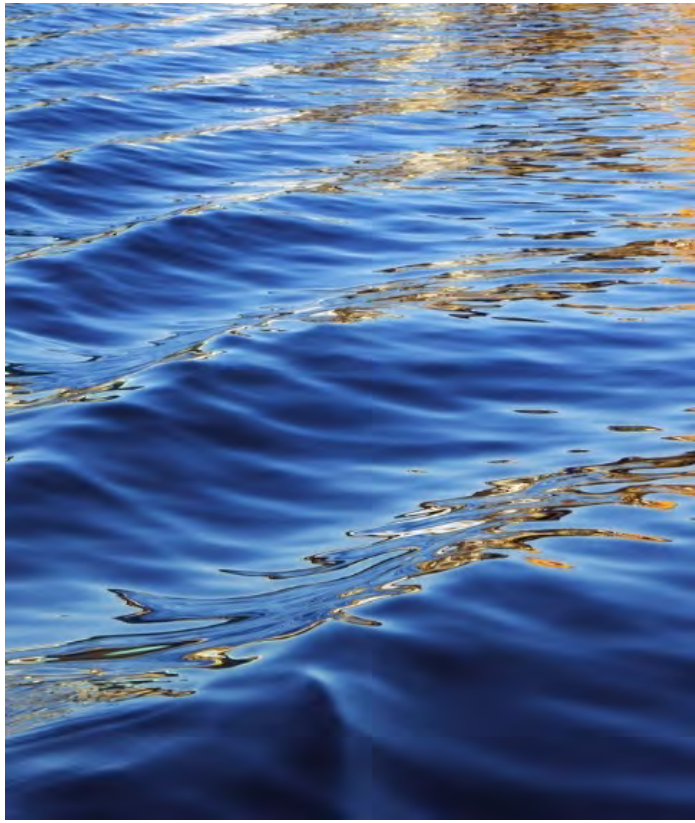
- **Preparation recommended before a disaster occurs**
- **Recommended components of a disaster response plan**
  - Having qualified people develop and utilize a disaster plan
  - Outlining goals and assigning responsibilities of responding organizations
  - Assessing regional capacities to manage and track disaster debris
  - Safety training and procedures
  - Contracting of disaster debris management activities
  - Developing procedures to estimate volumes of disaster debris
  - Communication with the public
  - Collaboration between all levels of government
- **Recommended debris management strategies for a disaster response and recovery**
  - Restoring accessibility to disaster impacted areas
  - Recycling disaster debris and minimizing waste

Table 2

Summary of best-practice themes discussed in interview questions

Disaster Response Best-Practice Theme	Relevant Research Questions
Existing disaster response plan	1
Lessons learned from previous disasters	1
Disaster response directories	1, 2, and 3
Combined plans with other government organizations	1, 2, and 3
Accessibility and re-entry plan	1, 2, and 3
Qualifications of disaster debris management team	1, 2, and 3
Safety training and procedures	1, 2, and 3
Disaster response communication	1, 2, and 3
Transfer stations	1, 2, and 3
Landfill operations	1, 2, and 3
Contracting of disaster debris management	1, 2, and 3
Recycling disaster debris and waste minimization	1, 2, and 3
Volunteer organization and safety	1, 2, and 3
Guiding documents of disaster response and recovery	1, 2, and 3
Material progression and handling strategies	1, 2, and 3
Hazardous waste disposal and asbestos exposure	1, 2, and 3
Updates made since the ToHR 2013 flooding	3
Lessons learned from the ToHR 2013 flooding	3

Methodology



Comparative Analysis

- Comparative analysis allows for a systematic comparison of cases and is appropriate for unique cases, such as a natural disaster
- Industry best-practices could be drawn from the literature review
- Best-practices compared with the strategies used in the ToHR for comparative analysis

Semi-Structured Interviews

- Most respondents did not have knowledge of every issue addressed in the literature review
- Semi-structured interviews have a set of questions designed for the participant, but is free to deviate from the script to adapt to the participant's experience

Sampling

- Expert sampling utilized
- The snowball sampling method was effective

Ethical Considerations

- Bias and sampling were noted ethical issues
- I experienced the flooding personally and managed the regional landfill site
- Any issues that could directly benefit my job were avoided
- The interview questions were drawn directly from the literature review
- Interviews were not conducted with anyone I currently work with, or had any power relationship with

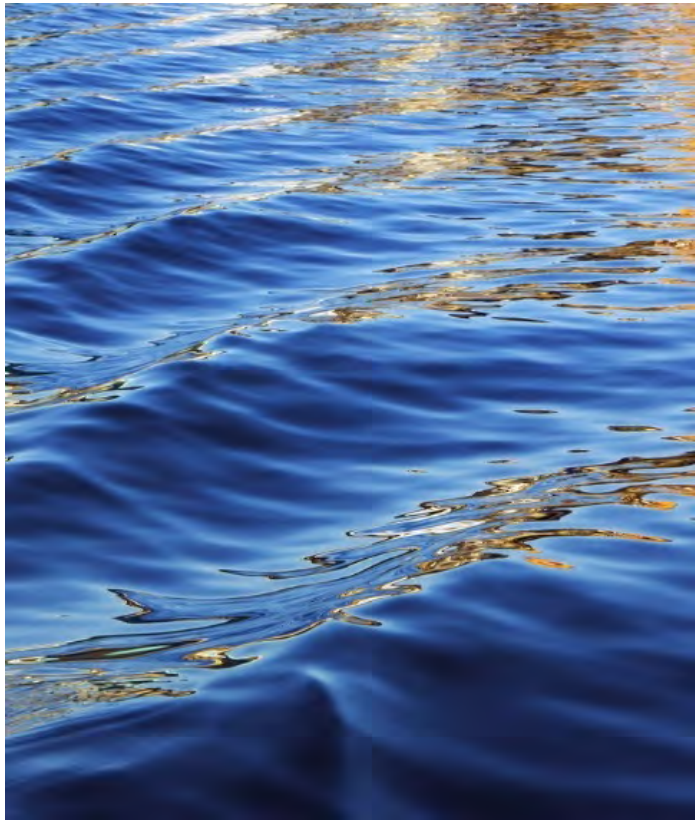
Participants

Table 1

Interview Participant data coding and background information

Code	Name	Title	Organization
P1	Anonymous	Resident	The Town of High River
P2	Anonymous	Senior Project Manager	Tervita
P3	Brent Davis	Emergency Response Manager	Samaritan's Purse
P4	Anonymous	EMC	The Town of High River
P5	Darwin Durnie	Emergency Response Advisor	Stantec
P6	Anonymous	RWRS	AEP
P7	Dean Leask	President	Contain-Away Services
P8	Jim Lapp	Board Member	SWANA
P9	John Deagle	Landfill Manager	Foothills Regional LRRC
P10	Anonymous	Supervisor	Hauling Company
P11	Anonymous	Managing Director	AEMA
P12	Shawn Zorn	Resident	The Town of High River
P13	Anonymous	Chief Financial Officer	The Town of High River
P14	Cameron McLean	President of Environmental Services	Tervita

Results and Analysis



Results for Disaster Preparedness

Table 3

Summary of recommended disaster response plan components present before the 2013 flooding

Recommended component of disaster response plans	The ToHR	The GoA or AEMA
Disaster response plan for the ToHR ready before 2013	minimal	no
Roles and responsibilities clearly assigned	no	yes
Mutual aid agreements in place before the 2013 flood	only on fire	no
Flood modelling completed before the 2013 flood	yes	yes
Disaster debris SOPs ready before the 2013 flood	no	no
Disaster response training for staff before the 2013 flood	some	yes
Disaster response communication before the 2013 flood	minimal	minimal
Pre-negotiated disaster debris management contracts	no	only with Stantec
Lessons learned from historical disasters implemented	no	minimal
High-risk communities prioritized	no	no

Analysis of Disaster Preparedness

Table 4

Summary of key points from analysis for research question one

Key points of analysis regarding preparation before 2013

1) The ToHR and GoA were missing most expert recommended components of a disaster response plan before the 2013 flooding
2) Residents of the ToHR were complacent about the risks of flooding
3) The GoA did not engage the ToHR to ensure readiness, despite it being a high-risk community
4) The Incident Command System is disconnected from debris and waste management
5) Disaster planning throughout Alberta may also be disconnected from debris and waste management

Results for Disaster Response & Recovery

Table 5

Summary of recommended disaster response and recovery strategies used in the ToHR

Expert recommended strategies	Summary of findings and responses
Re-entry and accessibility plan	Developed in the EOC after evacuation
Re-entry priorities of the EOC	Well executed, with some concerns
Response and recovery guiding documentation	Only high-level documentation available
Communication of debris management	Poor at the start, improved as time passed Some key stakeholders were left out Political mixed-messaging created anger
Qualifications of debris management task force	Disagreement over this issue
Material progression throughout the cleanup	Cleanup was reactive to materials Tonnage projection was not effectively used
Tracking of flood debris	Minimal tracking early, improved later
Flood debris handling and recycling	Some recycling done, but recycling and waste reduction were not prioritized

Table 5

Summary of recommended disaster response and recovery strategies used in the ToHR

Asbestos exposure	Overlooked for residents and volunteers Managed properly by Tervita
Hazardous waste management	Most HHW went into the landfill
Transfer station use	Not used, led to major problems at landfill
Landfill hours and operations	7 AM – 7 PM worked for most participants EOC wanted 24-hour operation Second landfill eased traffic to local landfill
Volunteer organization and training	Incredible volunteer turnout and utilization Training developed in weeks before re-entry Safety training was rudimentary Volunteers were at risk & damaged homes
Contracting for debris management	Sole-sourced contracts seen as unfair Loose contracting, fraud, and confusion Many local contractors were not used
Safety training during the response and recovery	Tervita brought a strong safety culture PPE was readily available Safety was a priority for contractors Minimal training for residents & volunteers
Overall response and recovery organization	EOC lack of continuity created problems Bin system failed, wagon train worked well

Analysis of Disaster Response & Recovery

Table 6

Summary of best-practices followed in the Town of High River response and recovery

Debris management best-practices utilized successfully by the ToHR, the GoA, and AEMA
Re-entry priorities were managed effectively
Tervita was qualified to manage disaster debris, asbestos, and improved overall safety
Contractor safety was prioritized by the EOC
Volunteer turnout was high and helped speed the cleanup process
PPE was readily available for residents and volunteers
Landfill hours were effective for residents, volunteers, and haulers
The wagon train system for debris cleanup worked efficiently
Opening a second landfill helped ease traffic to the closest municipal landfill
Disaster debris materials were eventually tracked accurately

Analysis of Disaster Response & Recovey

Table 7

Summary of best-practices not followed in the Town of High River response and recovery

Debris management best-practices not utilized successfully by the ToHR, GoA, or the AEMA
Guidance documentation was not available for most staff
The DMTF in the EOC, was not managed by a waste management professional
Recycling and waste minimization were not prioritized by the EOC
Disaster debris communication was not pre-planned and was poor throughout
Debris material progression was not communicated effectively and led to confusion
Tonnage projection models were not utilized effectively
Lessons learned from previous disasters, were not transmitted effectively
A general disconnect exists between the AEMA and disaster debris management
A transfer station was not utilized, which created problems for haulers and the landfill
The bin system failed, caused numerous problems, and HHW was mostly landfilled
Volunteer organizations were not well integrated and were inconsistent with safety standards
Poor contracting practices, led to numerous problems
Safety training was rudimentary for residents and volunteers
Asbestos exposure was overlooked for residents and volunteers

Results of Improvements since 2013

Table 8

Summary of improvements made by the Town of High River since 2013

Disaster response improvements
Disaster response plan has been updated to CSA and EMAP standards
Worked through the *After Action Report,* of lessons learned from the 2013 flooding
Expanding mutual aid agreements
Improved volunteer utilization planning
Improved disaster response training for all staff

Results of Improvements since 2013

Table 9

Summary of improvements made by the Government of Alberta since 2013

Disaster response improvements
Created a list of standing offers from qualified contractors
Implemented the Community Emergency Management Program
Are more proactive about engaging high-risk communities for disaster preparation
Established a flood response materials stockpile in Southern Alberta
Started training politicians about appropriate disaster response communication

Lessons Learned

Table 10

Summary of additional lessons learned from the 2013 Town of High River flooding

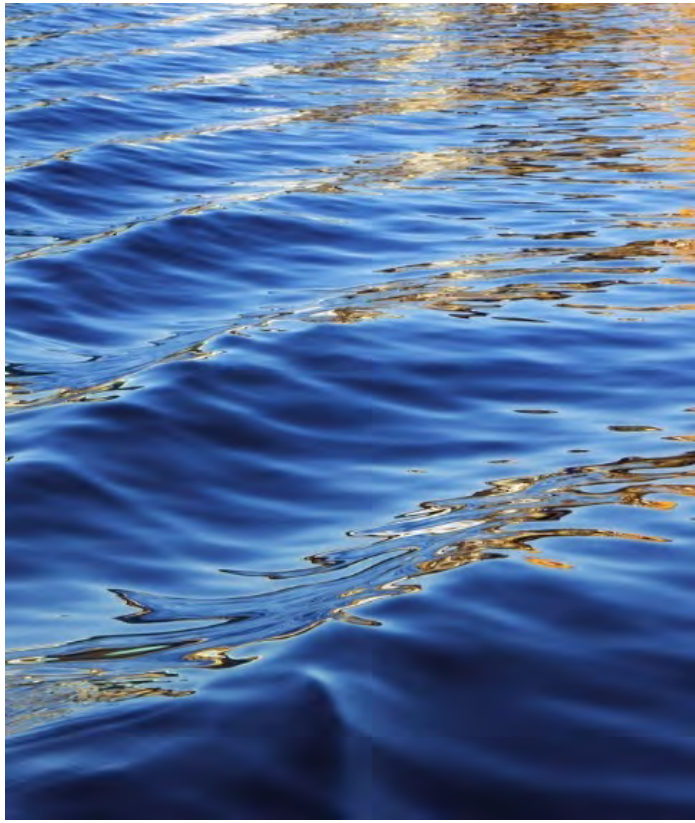
Additional lessons learned

1) Ensure pickup of sorted debris materials matches required sorting for residents
2) Prepare communication about options for salvaging family pictures and other items
3) Integrate volunteer organizations immediately with an EOC
4) Alberta could consider setting up a volunteer program modelled after BC
5) Pre-position pallets of safety equipment throughout the community for residents and volunteers
6) Utilize SWANA and other waste management organizations for debris management
7) Prepare clear communication of safety risks and reasonable expectations for home remediation to be distributed to the public and politicians
8) Hire an independent Contracting Manager for a disaster response EOC
9) Ensure pre-negotiated contracts and tenders have realistic expectations
10) Landfills and municipalities can rent-to-own equipment during a disaster response
11) Understand that many companies will try and maximize profit from a disaster
12) Create a committee to ensure lessons learned from past disasters are being implemented

Transfer Station

Conclusions

and Recommendations



Findings and Existing Literature

- Reinhart et al. (1999) found that at-risk communities were often ill prepared for disasters (p. 28).
  - Without effective disaster planning documentation, disaster responses will result in confusion, inefficiency, and wasted resources (p. 30).
  - Recycling of disaster debris is often not prioritized due to: safety concerns, political pressure to remove debris quickly, contamination levels of debris, and difficulty sorting impacted debris (p. 31).
- Solis et al. (1996) wrote that debris management is often overlooked by municipalities and waste management facilities across Canada (p. 2).

Table 11

Summary of recommendations

Recommendation	Responsibility
1) Develop a disaster debris management plan	AEMA and municipalities
2) Create a debris management specialist position in ICS training	AEMA
3) Conduct in-depth reviews of debris management	AEMA
4) Develop tonnage projection models for Alberta	AEMA
5) Develop a debris hauling procedure that can be replicated	AEMA
6) High-risk communities should be prioritized	AEMA and municipalities
7) Prioritize recycling and waste minimization during responses	AEMA and municipalities
8) Continue promoting disaster response training in Alberta	AEMA and municipalities
9) Create clear mission statements regarding disaster debris	AEMA and municipalities
10) Summarize lessons learned & best-practices	AEMA
11) Continue improving connections with volunteer organizations	AEMA
12) Limit the use of sole-sourced contracts	AEMA
13) Hire independent Contracting Managers	AEMA
14) Prioritize qualified contractors and minimize fraud	AEMA and municipalities
15) Prioritize the use of local contractors	AEMA and municipalities

Limitations and Extensions of this Research

- This study focussed on one community's flooding disaster
- The comparative analysis approach used, however, could be a useful approach to analyzing any disaster response
- The disaster debris best-practices outlined in this study could also be expanded to include other types of natural disasters, such as wildfires

Questions?

- Taleb (2010) asked “why we focus on the minutiae, not the possible significant larger events, in spite of the obvious evidence of their huge influence”? (The Black Swan, p. xxiii).