

February 28, 2023 | 1:00 – 2:30 p.m. MT

New Webinar

# The Map of Adaptation Actions:

## Advancing Climate Resilience in the Prairies



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada



# Who is ClimateWest?



- Regional climate services hub for the Prairies
- Part of a network of regional climate service providers
- Funded by Environment and Climate Change Canada
- Supported by governments of AB, SK and MB to improve climate resilience

**Training & Capacity Building**

**Data Access & Outreach**

**Risk Management & Adaptation Planning**

**Network Facilitation**

# Agenda

- Introduction to ClimateWest
- Environment and Climate Change Canada: Map of Adaptation Actions
- Town of High River, AB – 2013 flood event
- Questions



# Acknowledgement

ClimateWest's work occurs on the traditional land of Treaties 1 through 8, and 10. This area includes many Indigenous Nations. The ClimateWest office is located on Treaty 1 Territory, the historic meeting place of the Anishinaabeg, Cree, Inninewuk, Anishininiwag, Dakota and Dene, and the Homeland of the Métis Nations.





# Objectives of Today's Webinar

- **Raise awareness of the Map of Adaptation Actions:** features and functionality, and new enhancements
- **Highlight regional action:** learn about adaptation actions taken by the Town of High River, Alberta, following extreme flooding

# Getting to Know our Audience...

- Please use the Mentimeter link in the chat or use the QR code below to submit your answers.

- menti.com: **1165 6971**



# Map of Adaptation Actions

- One-stop-shop for **examples** of climate change adaptation actions from across Canada.
- Users can search hundreds of examples in an interactive and user-friendly fashion, refining their search through **filters** and **keyword searches**.
- Users can **submit** their own adaptation examples for inclusion on the Map.



# Demonstration of the Map

- Go to the link: [www.Changingclimate.ca/map](http://www.Changingclimate.ca/map)



# Typical Content on the Map

## Section 1: Brief Description

### 1.1 Title

### 1.2 Brief description of the example: location, actors, issue, action, outcome

### 1.3 Person responsible for the example (name of the organization)

## Section 2: In-depth Information

### 2.1 Understanding and Assessing Impacts:

- *Details the problem (especially its link to climate: impacts, risks, vulnerabilities) and how actors went about understanding*

### 2.2 Identifying Actions:

- *Details the planning phase and their approach to the planning phase*

### 2.3 Implementation:

- *Details the implementation of actions identified in the planning phase and their approach to implementation*

### 2.4 Outcomes and Monitoring Progress:

- *Details the results of the actions implemented or the planning phase*

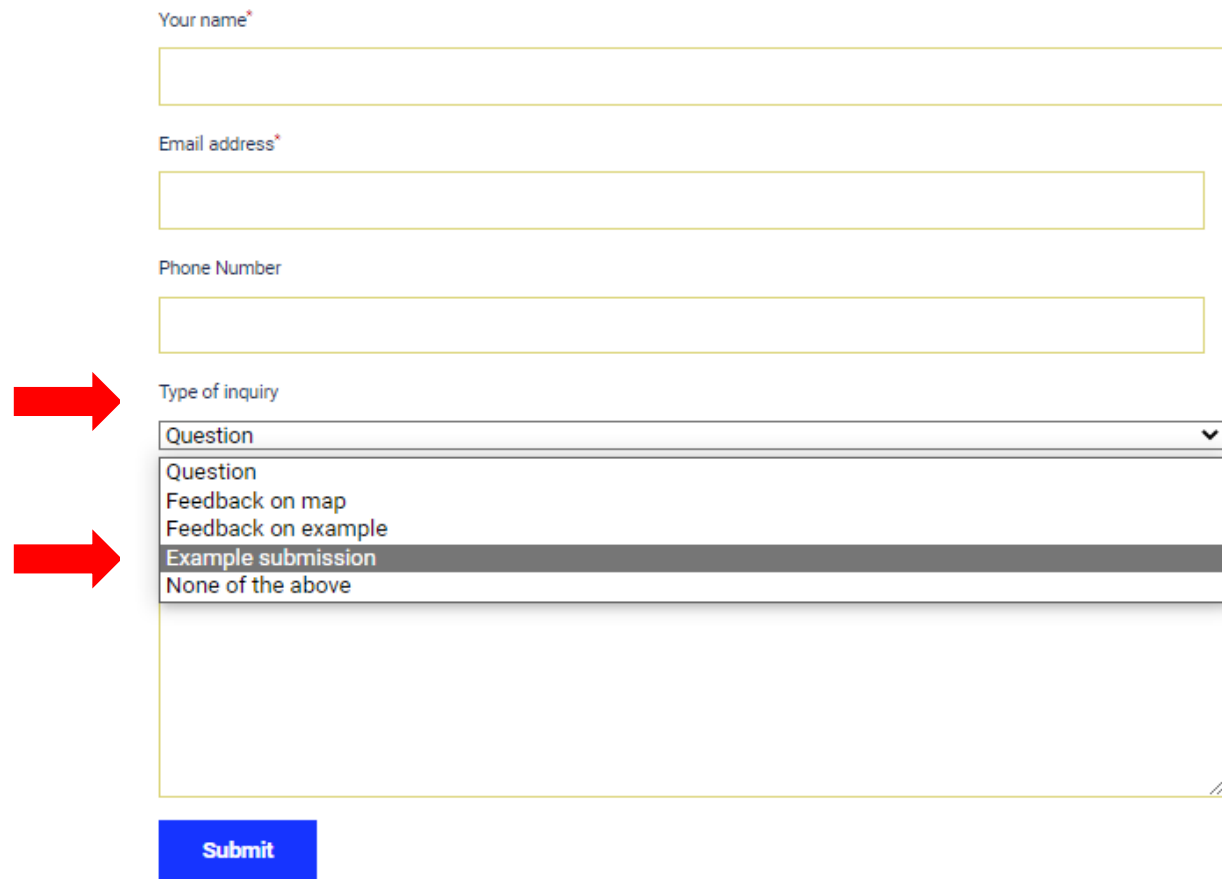
### 2.5 Next Steps:

- *Details the next steps in the example*

### 2.6 Resources:

- *Provides active links to resources that are relevant and complementary to the example*

# Submit Your Own Example



The form contains the following fields:

- Your name\***: A text input field.
- Email address\***: A text input field.
- Phone Number**: A text input field.
- Type of inquiry**: A dropdown menu with the following options:
  - Question
  - Feedback on map
  - Feedback on example
  - Example submission** (highlighted)
  - None of the above
- Submit**: A blue button at the bottom.

Two red arrows point to the 'Type of inquiry' dropdown menu.

- Do you have examples you would like to see on the map?
  - Submit them using the Contact Us form or send us an email at [carteadapt-mapadapt@ec.gc.ca](mailto:carteadapt-mapadapt@ec.gc.ca)
- We have a team available to develop the necessary content, taking different approaches depending on the information available.





# Town of High River Climate Change Resiliency

An Adaptation Story

February 2023





# High River Background

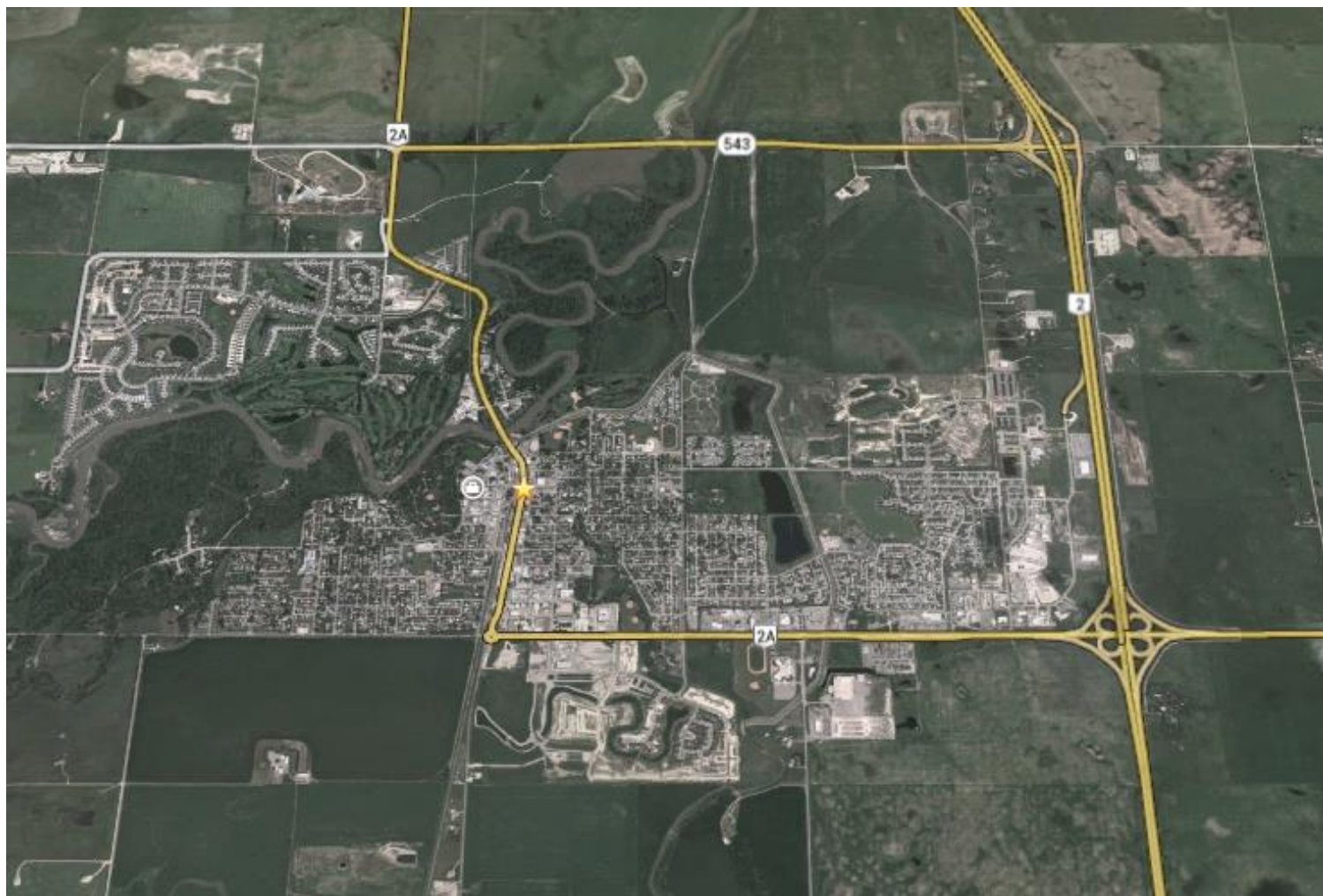


# High River Facts

- Located 35 minutes south of Calgary
- 2021 Census Population is 14,324
  - Increase of 5.4% since 2016
- 5950 Households within the community
  - Increase of 650 households since 2011
- High River takes up approx. 15 sq km

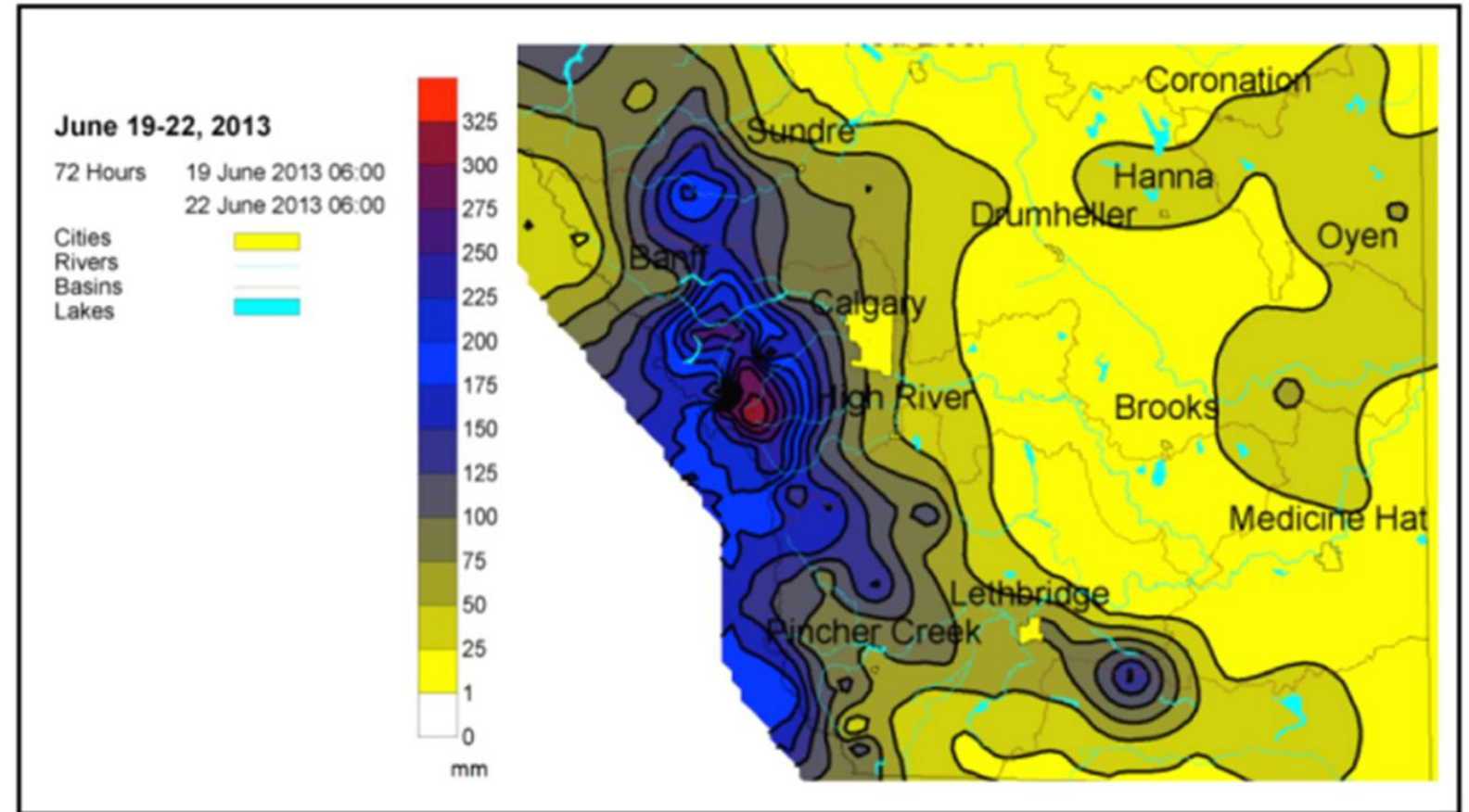






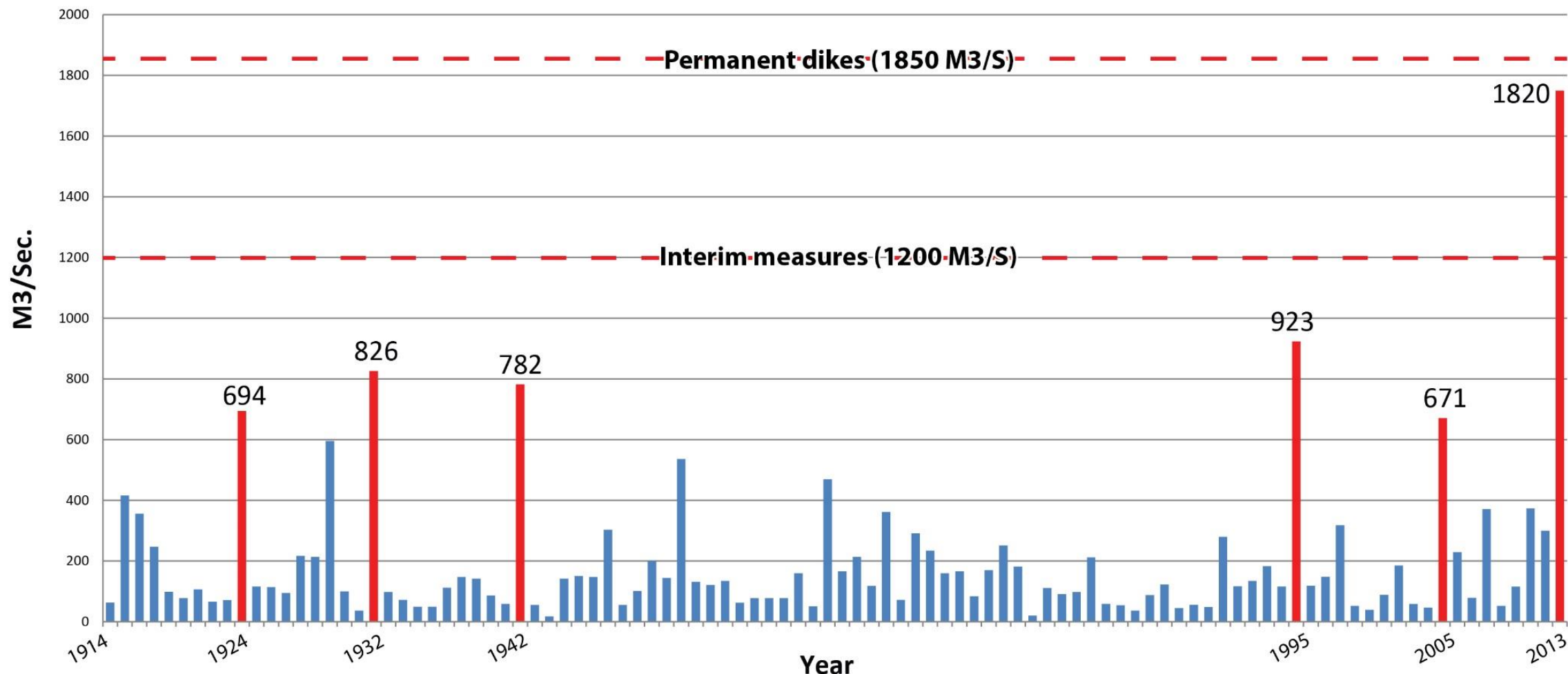
# The Storm

Alberta Environment and Sustainable Resource Development Precipitation Map (total precipitation in mm).



# The Highwood River Flows

## Highwood River Peak Flow Rates 1914-2013





# The Flood Event June 20, 2013





# The Flood Event

## June 20, 2013





# The Flood Event

## June 20, 2013



# The Impact



## The Impact

- 13,400 people were evacuated
- Over 5,000 homes were evacuated
- 10 plus other communities billeted residents



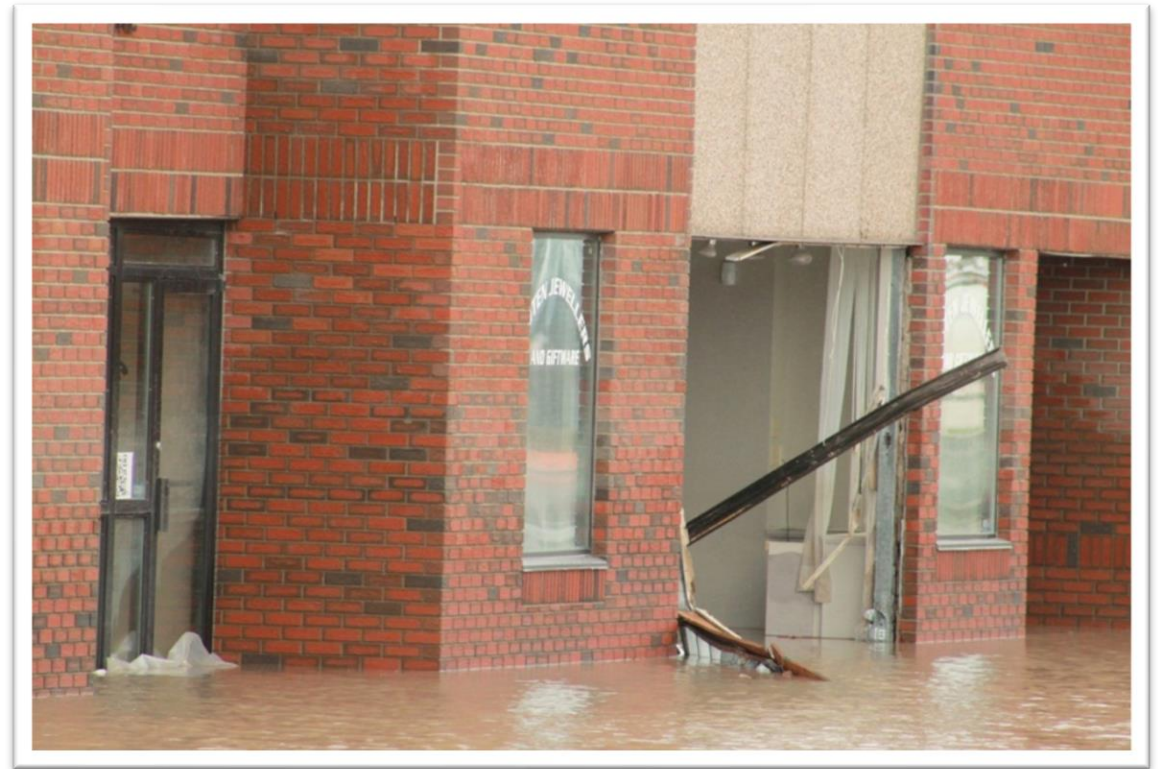




## Flood Statistics

- 8.5 hours for the river to peak
- 59 % of High River covered in water
- Over 70 % of homes were affected by water
- 79 of 83 Town buildings were moderately to severely damaged by water
- 13 lift stations were impacted
- 5 electrical substations were damaged
- 50% of communications infrastructure was damaged
- 4 gas lines were broken
- 4.8 sq. km “lake” covered a residential neighbourhood
- Loss of Tech services impacted response

## The Impact





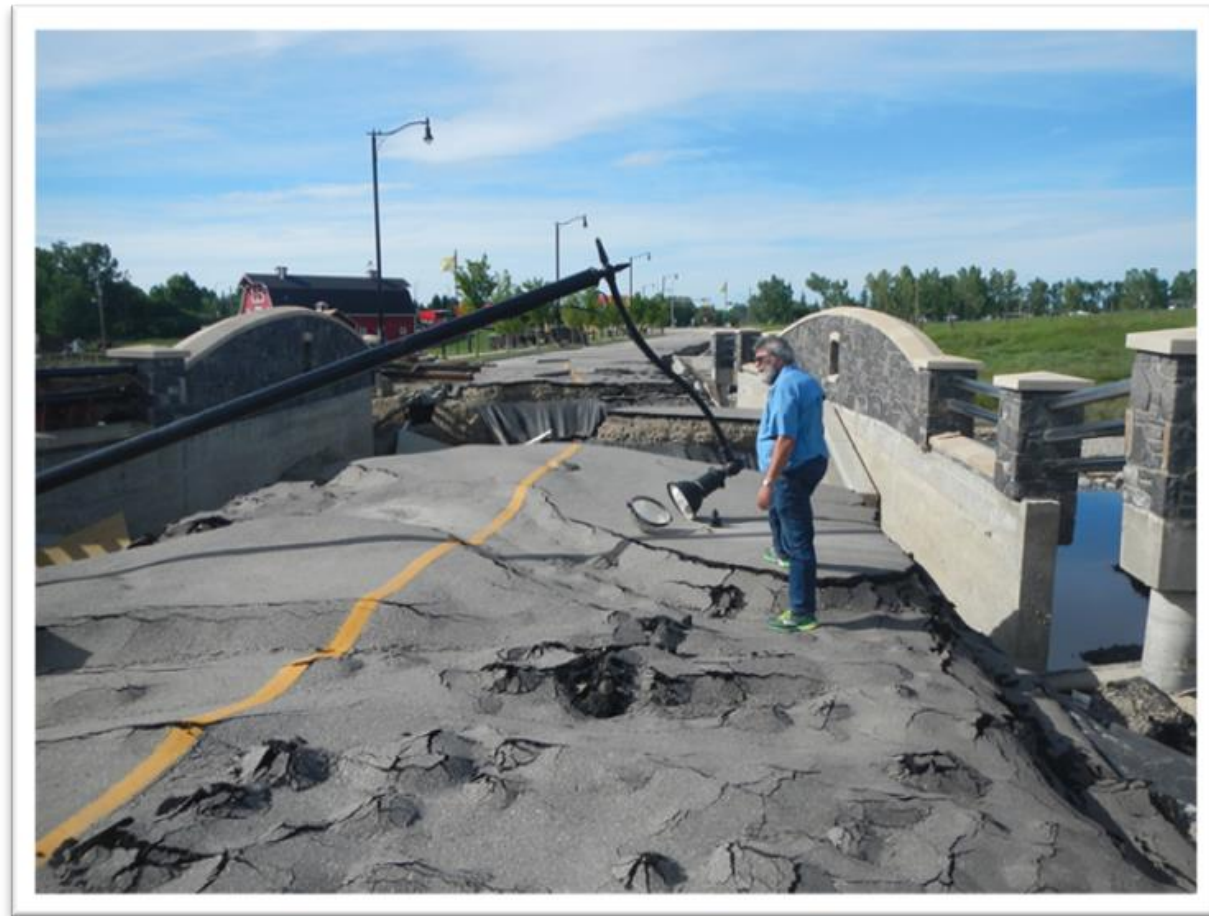
## The Clean-up

- 40,000 tonnes of debris removed from 5,000 homes over 16 days
- Average removal per resident in one year about 1 tonne



## Impact on Municipal Infrastructure

- Roads were heavily damaged
- Abandoned cars impeded recovery
- Sewer system was impacted with sediment
  - Lines and lift stations needed to be flushed
- Water system well heads and structures impacted
- Parks filled with sediment, debris and erosion
- Municipal facilities and buildings damaged including Town Hall, Library and Recreation Centre





# Rebuilding for Resiliency



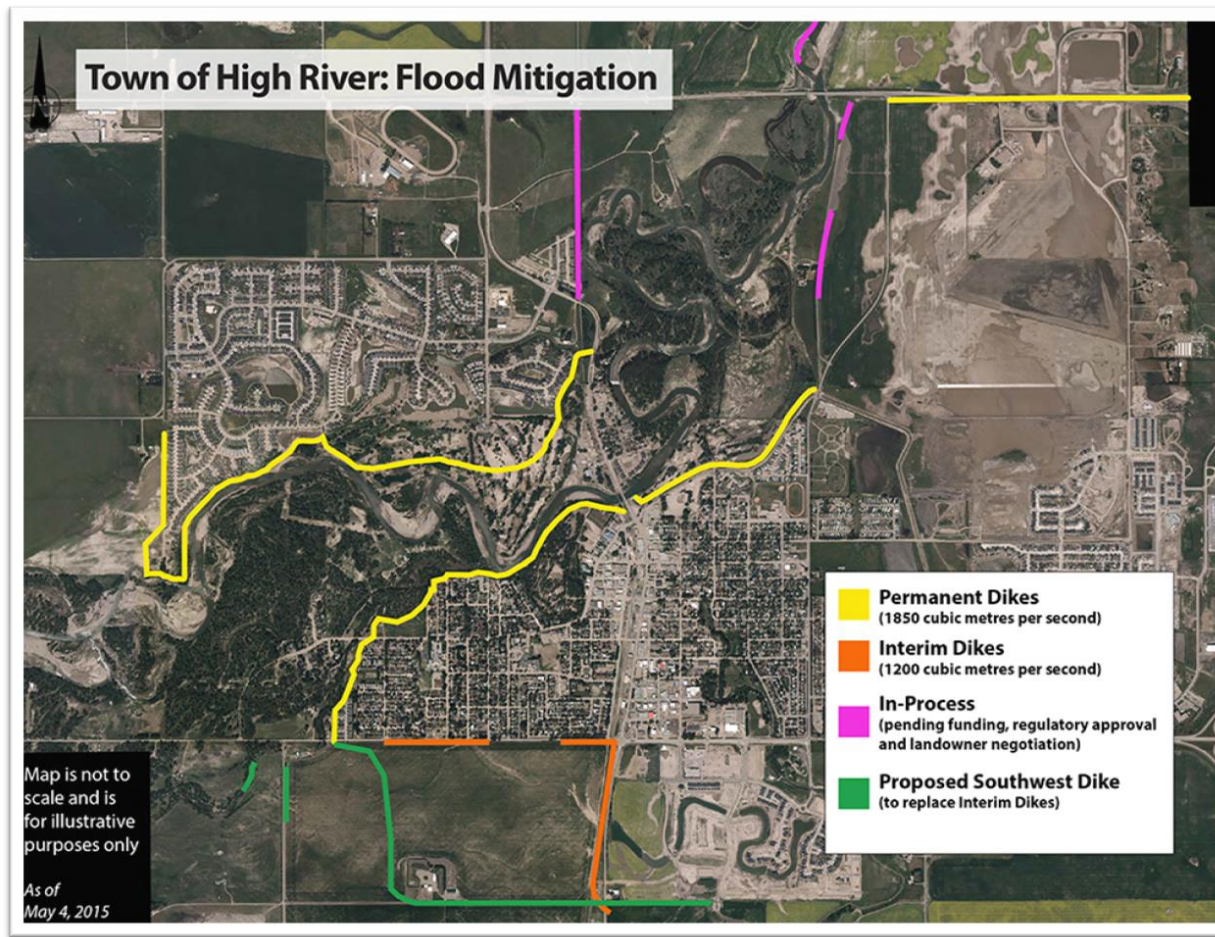
# People First ! A Roadmap to Rebuilding



- Rebuilding was focused on Five Pillars – People First, the Economy, the Environment, Reconstruction and Mitigation
- Council's Action Plan was adopted in the Spring of 2014 and built upon the Five Pillars
- Flood assessments were conducted throughout the community post-event
- Town, the Province, and other partners undertook a multi-year major infrastructure repair and replacement program
- Areas include:
  - Flood mitigation program
  - Policy changes
  - Infrastructure repairs and replacement
  - Early warning system
  - Rail and transportation infrastructure
  - Parks and greenspace remediation
  - Reconstruction of the downtown

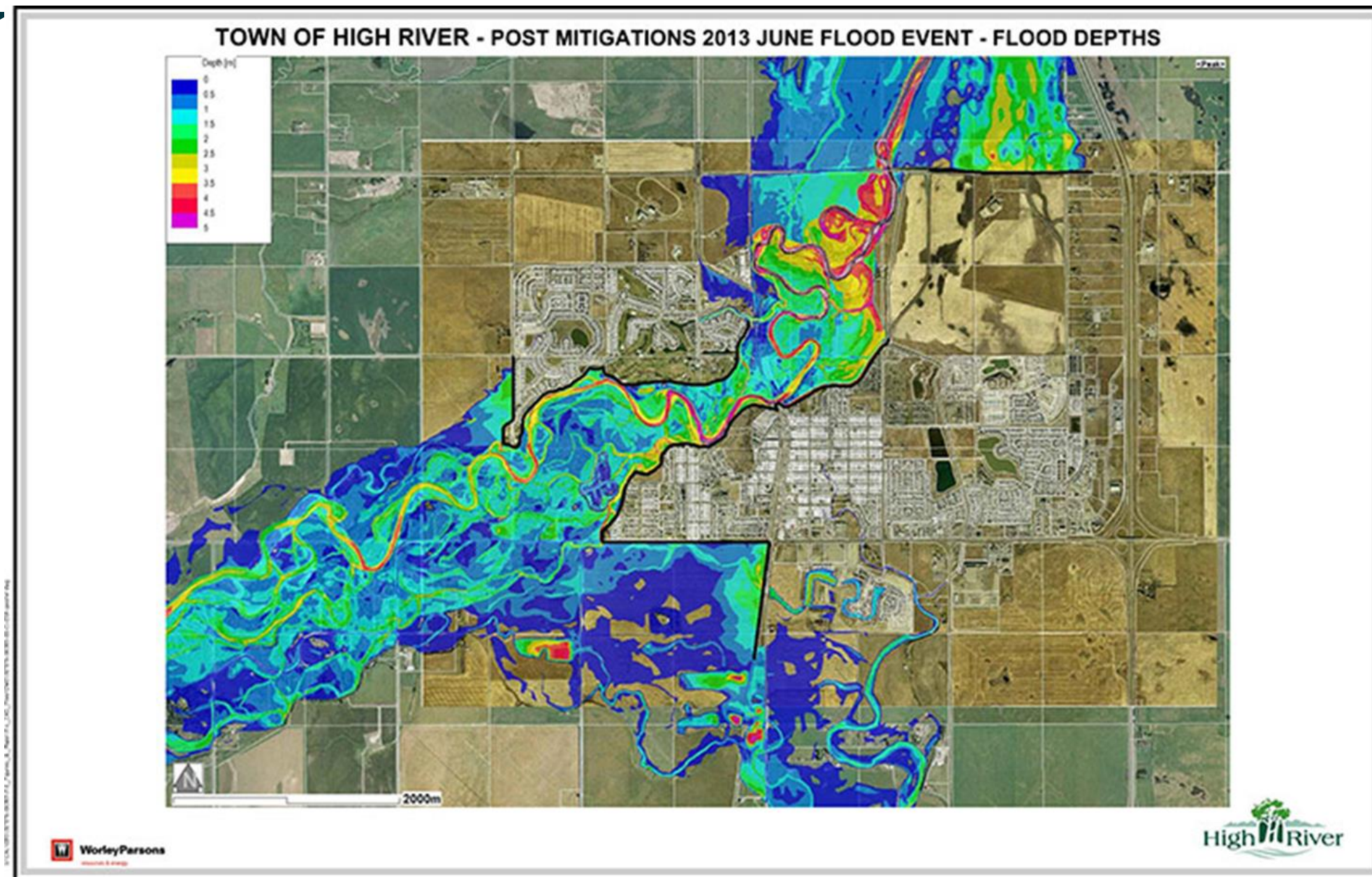


# Flood Mitigation – Dike Program



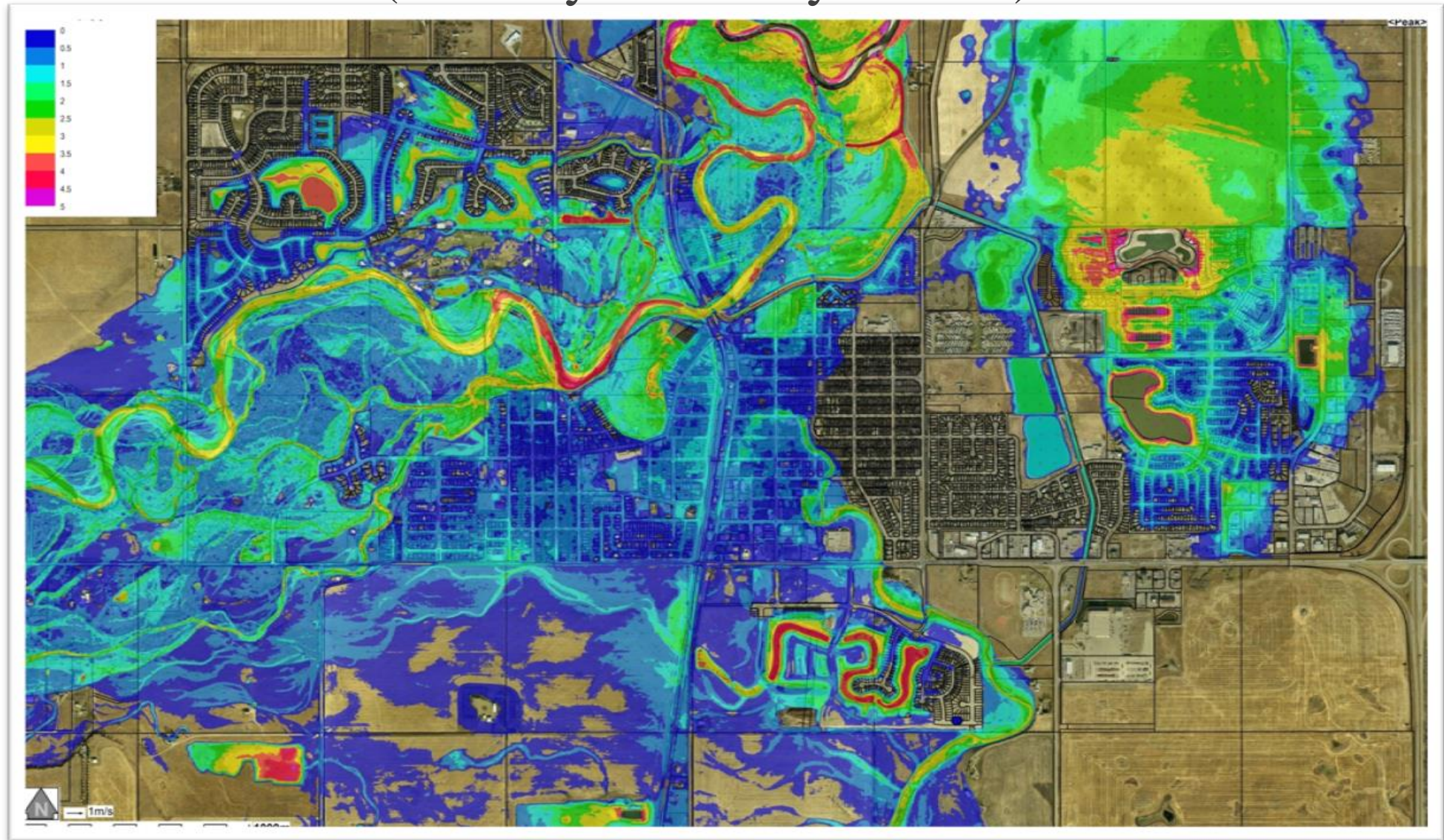
- \$200 million has been invested in flood mitigation
- 8.5 kms of permanent dikes have been constructed
  - Built to 2013 flood levels plus one metre of freeboard
- In partnership with the County, 498 Ave raised to protect access route and act as a dike
- Dikes designed to provide active transportation options
  - Connect neighborhoods, promote active lifestyles and alternative transportation option







Climate Change West and Environment & Climate Change Canada Presentation  
Model of 2013 Flood Event  
(courtesy of WorleyParsons)







# The River Corridor – Balancing Nature and Adaptation



# Dike Construction





# Dike Construction - SW Berm Completion

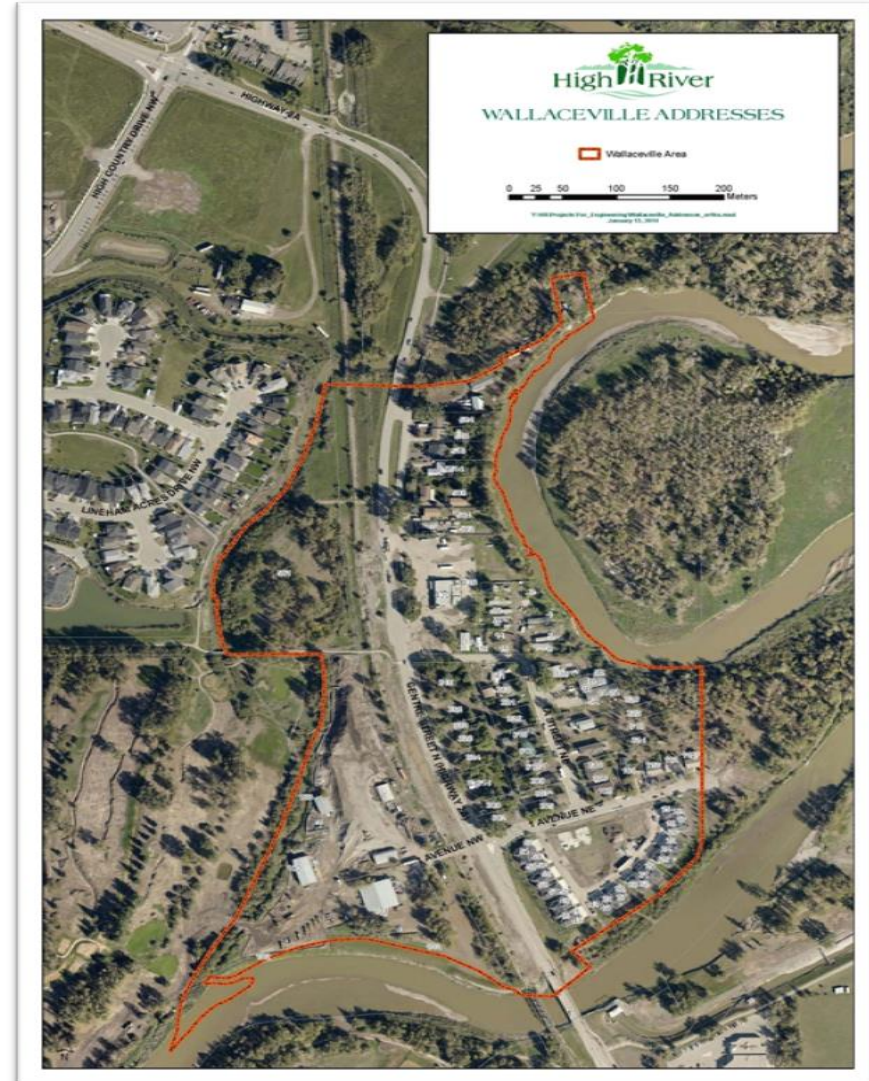




# Policy Choices – Tough Decisions

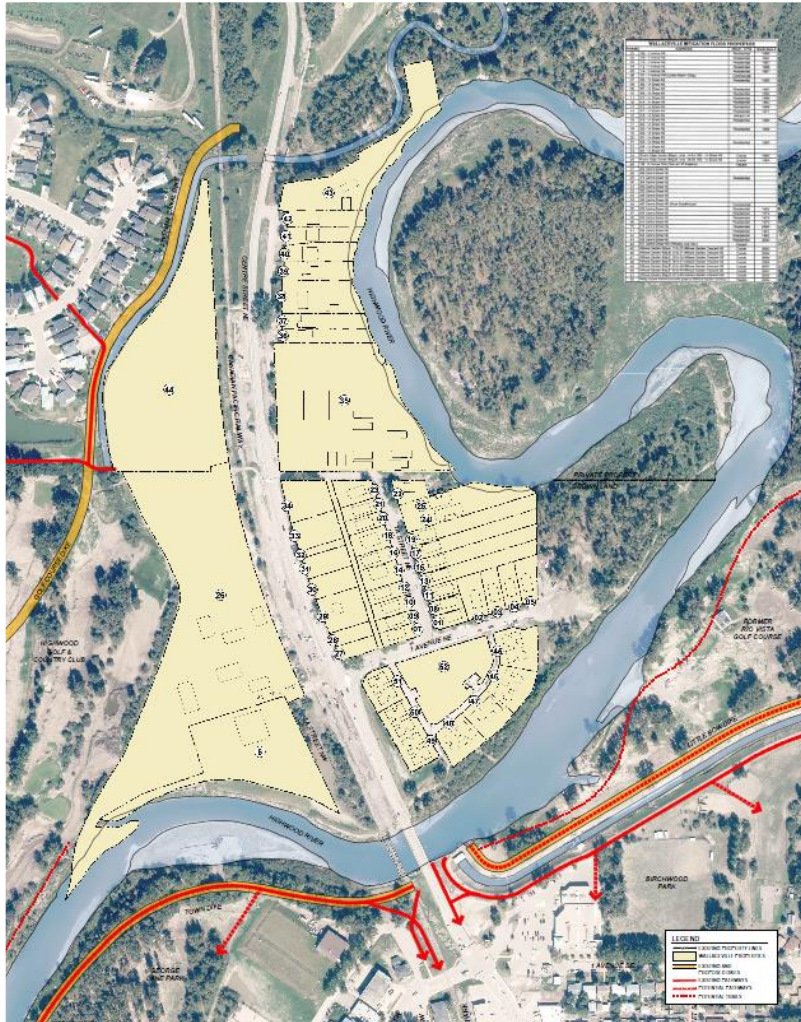
## Wallaceville

- Always first to flood
- Difficult to impossible to protect
- Council decided to return Wallaceville to undeveloped state
- Province bought out the property owners
- Key decision to design rest of mitigation around Wallaceville
- Lands now transferred to the Town for passive recreation uses and to protect floodway





# Policy Decision – Elimination of Wallaceville



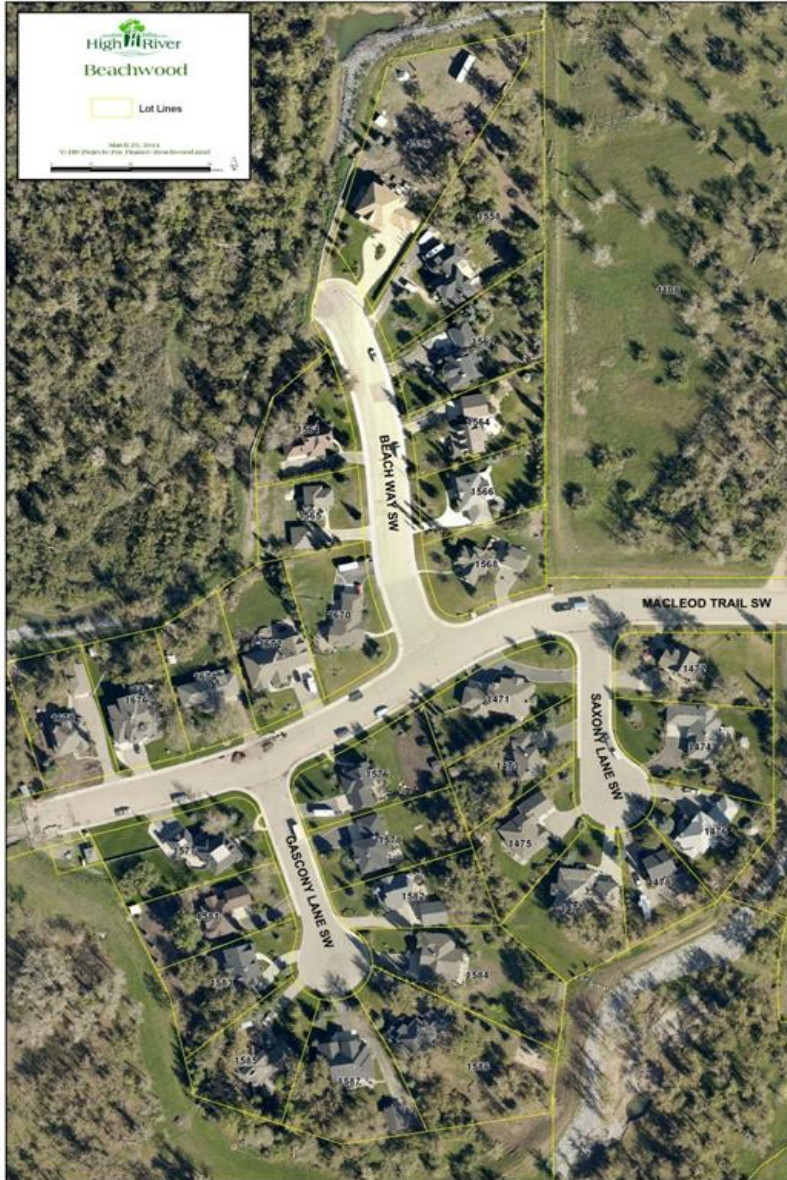
Wallaceville properties



Wallaceville in naturalized state



# Policy Decision – Elimination of Beachwood



- Constructed in floodway BEFORE it was designated
- Lands bought out by the Province after flood
- Lands transferred back to Town for floodway protection and passive recreation in 2022
- Recently used as a film site for "The Last of Us"
- Land has been remediated and all municipal infrastructure removed

# Downtown Reinvented



- Turned the disaster into an opportunity to reinvent downtown
- Underground services were damaged and needed to be replaced
- Vision to create a people friendly downtown core
- Allow for wide sidewalks, less vehicles and more event spaces





# Downtown Today



# Emergency Management

- Event identified gaps in emergency management response and preparedness
  - Improvements have been made to coordinate and plan based upon a people first focus
- Notification systems enhanced
  - Installation of two outdoor sirens
  - Includes regular testing
  - Mass notification system in place – continually improving and working with partners
- River monitoring cameras and sensors
- Annual emergency preparedness program education program
- Emergency Program is reviewed and updated annually
  - Increased staff training and Council participation



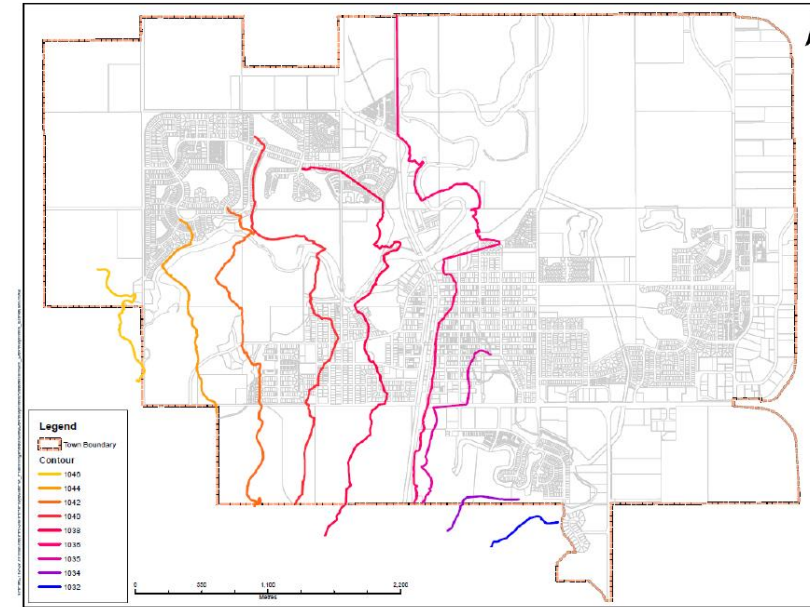


# Land Use Bylaw

- Adopt new Land Use Bylaw with Flood Elevation Measures
  - Created Flood Hazard Overlay area with flood construction elevations determined
  - Defined "Designated Design Event" as the 2013 flood and min flow rate of 1820 cubic metres/second
  - Established Restricted Development Areas where development needs to meet the *design event* plus one (1) metre of freeboard
  - Areas outside Restricted areas must meet new minimum development elevations
    - require all buildings to be adequately flood proofed to withstand the designated elevations plus 0.5 metres freeboard

PART 2: MAPS & OVERLAYS

Map 2: Flood Hazard Overlay Map



Town of High River Land Use Bylaw

# What next?

- One of five communities that participated in CSA's pilot project on Community Water Standards
- Initiated due to increase in weather related events specifically floods and rainstorms
  - Guide developed to assist municipalities to understand standards to enhance protection from flooding
- Committed to inserting guide into new Town Plan and new development servicing standards
- Town has been strong supporter of changing flood events from 1 in 100 to 1 in 200
  - Continue to lobby GOA and CMRB to change to 1 in 200 events for all development





# What next?

- Funding received for Adaptation Strategy under Municipal Climate Change Action Centre
- Building on the Flood Management Program and CSA Standards
- Being developed in conjunction with Active Transportation Plan
- Risk and Vulnerability Assessment underway
- Engagement at all levels and particularly at schools
- Continues the People First approach


## Addressing Climate Change

To address climate change, there are two main tools.

### Adaptation

Taking action to be prepared to face the impacts of climate change that we are already experiencing and developing proactive tools to address the changes that we expect to experience.


**Example:** Dikes built along the Highwood River to protect the community from floods.



### Mitigation

Taking action to reduce the amount of greenhouse gases being released into the atmosphere which causes climate change.


**Example:** Active transportation networks help communities to reduce their dependencies on fossil fuels and release fewer greenhouse gases.



## Understanding Climate Hazards


Climate change is already impacting the conditions and weather events in our region and will continue to do so in the future, these events are referred to as **Climate Hazards**.

A review of the most current climate change predictions and historical data has been completed to understand how the Town is expected to be impacted by seven (7) different climate hazards moving forward.




### Extreme Heat

During the summer months, days over 30°C will occur more frequently.




### Drought

Changes to our water cycle due to climbing temperatures and reduced snowpack will create conditions where droughts will become more frequent and severe.




### Wildfires

With a dryer and hotter climate, vegetation and natural soil moisture will diminish, creating ample fuel for wildfires resulting from lightning strikes, natural disasters, and human activity.




### Short-Duration, High-Intensity Storms

**(Often known as cloud bursts, microbursts or atmospheric rivers)** – Events where large precipitation volumes fall within a short time frame causing conditions that can lead to localized flooding as stormwater systems become overwhelmed.




### Heavy snowfall

Heavy snowfall events will become less common, impacting our available snowpack in the mountains and the headwaters of our rivers.



### Severe Storms (Hail and Tornadoes)

Destructive storm events will become more common as the available energy and increased temperatures create favorable conditions for hail and tornadoes.



### Flooding

As precipitation patterns and types (rain instead of snow) shift, the timing of winter melt, and seasonal run-off will change resulting in earlier flood seasons and the potential for more flood events.

Sources reviewed included:  
Emissions Scenario: WCP's, Pacific Climate Impact Consortium, June 2010 - IPCC Science Panel report the  
RCP 8.5 emissions scenario (represent 'business as usual'). City of Calgary, January 2022 - Climate Resilience  
for Calgary, The Climate Atlas of Canada, ECF, CC 2018



**Choose to Act!**  
**Choose to Create!**  
**Choose to Build!**





Thank You

Please reach out with any questions

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# Any Questions? and/or Feedback?





Government  
of Canada

Gouvernement  
du Canada

Canada

# Thank you

## Website

English:

[Changingclimate.ca/map](https://changingclimate.ca/map)

Français:

[Changingclimate.ca/fr/carte](https://changingclimate.ca/fr/carte)

## Map of Adaptation Actions Team

@ [carteadapt-mapadapt@ec.gc.ca](mailto:carteadapt-mapadapt@ec.gc.ca)

# Contact Us

**climatewest.ca**

 204-995-6514

 Kerra Chomlak: kchomlak@climatewest.ca

▶ Twitter: @climatewest\_ca ▶ LinkedIn: @ClimateWest



# ClimateWest Forum

- The Benefits of Early Adaptation
- May 3 & 4
- Inn at The Forks, Winnipeg
- Sign up to the ClimateWest newsletter





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of Canada

Gouvernement  
du Canada

Canada

# Annex A: Extra Slides

Map of Adaptation Actions and  
Canadian Center for Climate Services

CANADIAN CENTRE FOR  
CLIMATE SERVICES

CENTRE CANADIEN DES  
SERVICES CLIMATIQUES

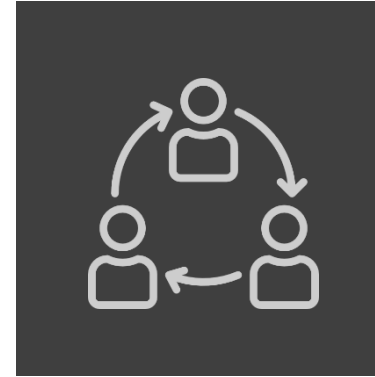
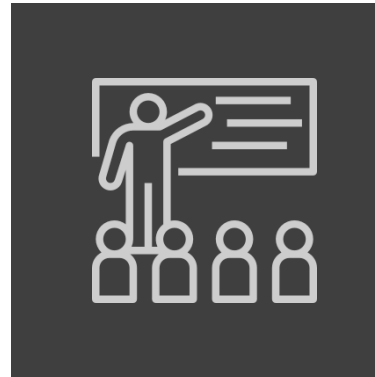
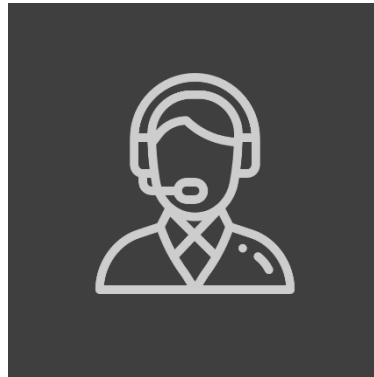
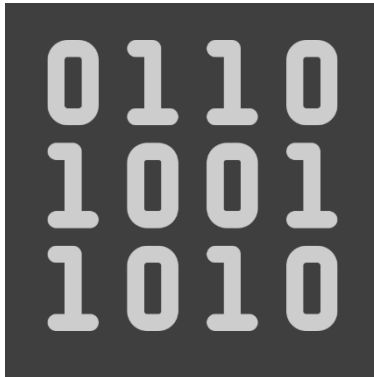


# Two initiatives became one tool

- Natural Resources Canada (NRCan) planned an interactive map to allow visitors to search “case stories” from the reports under *Canada in a Changing Climate: Advancing our Knowledge for Action*, the National Knowledge Assessment.
  - These “case stories” are short, non-technical, real-world examples of adaptation in action across Canada
- Environment and Climate Change Canada (ECCC)’s Canadian Centre for Climate Services (CCCS) planned an interactive map of case studies from a range of sources across Canada
  - These case studies are longer and more technical but are similarly real-world examples of adaptation in action across Canada
- ECCC and NRCan decided to develop a single, searchable map so that visitors only had to go to one place to find them all.

# Canadian Centre for Climate Services

Provides Canadians with information and support to consider climate change in their decisions



- **Increasing awareness and access** to climate data and information
  - **Providing training and guidance** on using climate data
    - **Engaging with users** to understand needs
- **Developing new products** by collaborating with experts and users



Canada.ca/climate-services



1-833-517-0376



[ccsc-cccs@ec.gc.ca](mailto:ccsc-cccs@ec.gc.ca)



# ClimateData.ca

## Climate Data

- Climate Data
- High resolution climate data
- Temperature and precipitation variables and climate indices
- Sea level rise
- Observed climate normals and daily data download
- Intensity Duration Frequency (IDF) curves
- Local and national scale charts and maps
- Ability to compare emission scenarios
- Customizable tools to analyze and extract data

## Helpful Resources

- Sector modules with tailored case studies
- Learning Zone

