

Calgary



# Community Advisory Group – Meeting #1

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and Sandy Davis

March 15, 2016

Flood Mitigation Community  
Advisory Group, Meeting #1



- Overview - 2013
- Context – After the Flood
- Work for 2016 (Flood Mitigation Measures Assessment and Community Engagement)
- Key information
  - Land Use Policy
  - Overview of mitigation measures

Calgary





**1**  
THE **FLOOD**



The Bow river flows peaked at **2,400 m<sup>3</sup>/second, 8x** the regular flow and more than **3x the 2005 flood.**



The Elbow river inflow peaked at **1,240 m<sup>3</sup>/second, 12x** the regular rate and more than **3x the 2005 flood.**

Outflow below the Glenmore Dam was **700 m<sup>3</sup>/second,** about **7x normal** and about **2.5x the 2005 flood.**



2

## THE FALLOUT



Evacuations in **32 communities** affected **110,000 Calgarians.**



More than **1,600 people** registered at community support centres on the first day.



**16 LRT stations** were closed.

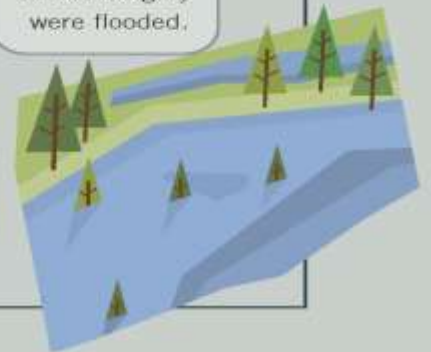
**More than 20 bridges** were closed.

**30 parks** across Calgary were flooded.



**More than 50 bus routes** were cancelled or detoured.

**34,000 locations** were without power.



- The Recovery Operations Centre (ROC) was initiated to coordinate recovery (until fall 2015)
- The Flood Recovery Task Force provided leadership, within the City of Calgary and the Calgary community, to identify and resource immediate flood recovery activities



## Expert Management Panel on River Flood Mitigation

- In July 2013, the River Flood Mitigation Program was established to develop a plan around flood mitigation and resilience
- We are currently working through the 27 recommendations of the Expert Management Panel on River Flood Mitigation.
- Recommendations comprise a holistic program to achieve flood mitigation and community resilience





## Flood Resiliency Strategy

**Resiliency** – capacity to endure and recover from disruptive events. Resilience requires appropriate action before, during and after an event to minimize negative effects. A more resilient city suffers less impact when disasters occur and recovers more quickly.





# INTEGRATED WATERSHED MANAGEMENT

Everyone participates in protecting our precious resource of water –  
The City, the community and the region

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**GOAL:**  
USE WATER WISELY

1

**GOAL:**  
PROTECT OUR WATER SUPPLY

4

**GOAL:**  
BUILD RESILIENCY TO FLOODING

3

**GOAL:**  
KEEP OUR RIVERS CLEAN

5

**GOAL:**  
BE GOOD NEIGHBOURS

BEARSPAW  
WATER TREATMENT PLANT

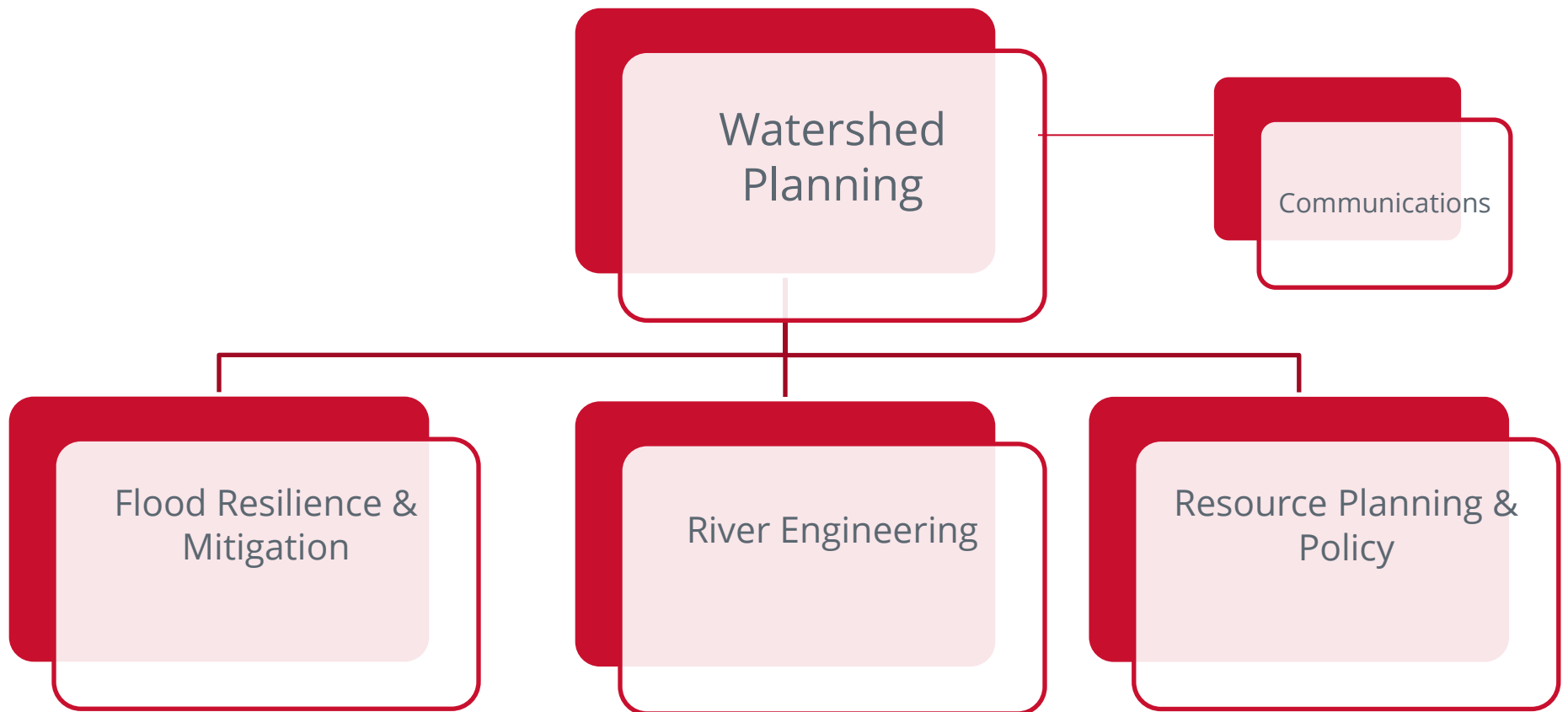
GLENMORE  
WATER TREATMENT PLANT

BONNYBROOK  
WASTEWATER TREATMENT PLANT





# Watershed Planning Division in Water Resources





# City of Calgary Flood Resiliency and Mitigation

- Completed or on-going flood mitigation work:
  - Technical understanding of our rivers (studies), updated FERM, bank stabilization projects, stormwater outfall improvements and several barriers restored or built
- ACRP funding totaling \$27.7 million for six key projects
  - Glenmore gates, Heritage Drive permanent barrier, Centre St. Lower Bridge deck flood barrier, stormwater outfall gate improvements, Bonnybrook WWTP flood mitigation program and West Eau Claire flood barrier



# Understanding Flood Risk

- Updated the Government of Alberta's Flood Damage Assessment Study
- Provided citizens with new flood inundation maps (5, 10, 20, 50 and 100 year events) on [calgary.ca/floodinfo](http://calgary.ca/floodinfo)
- Updated Flood Emergency Reference Manual (FERM) based on new mapping information
- Installed 14 temporary river level monitoring stations within Calgary on the Bow and Elbow Rivers to monitor ice jams
- Undertook river morphology and fish habitat studies
- Initiated project to explore climate modelling specific to our regional watersheds



# Flood Mitigation Measures Assessment

- Updated the Provincial Flood Damage Curve Assessment Study with latest hydrology, Triple Bottom Line (TBL) considerations and refined groundwater criteria
- Perform a TBL assessment of all flood mitigation options for the Elbow and Bow Rivers including upstream mitigation, local barriers, land use policy and non-structural measures
- Assessment will consider community input to understand community values, needs, perspectives, improve decision-making and provide education



# Implementing Calgary's flood resiliency & mitigation options analysis

## Decision Inputs

- ✓ Stakeholder engagement
- ✓ Updated IBI flood damage model
- ✓ Permanent barrier study
- ✓ Morphology study
- ✓ Upstream mitigation (GoA)
- ✓ Flood policy and mapping (GoA)
- ✓ Operational agreement with TransAlta (GoA)

## Flood Mitigation Options Assessment

Evaluate upstream, local, non-structural and structural options  
 + Stakeholder engagement  
 ↓  
 Develop a suite of recommendations

**Council Decisions**

## Implement suite of solutions – Flood Resiliency Plan

- ✓ Comprehensive approach to flood resiliency that puts into action the best mitigation solutions for Calgary



## Why is community engagement important?

- Including community voices builds a deeper understanding of community needs and perspectives.
- Considering community input improves decisions to plan the best solutions for flood mitigation.
- Involving citizens in decision-making allows better appreciation of why decisions are made.
- Helps The City provide information and education about the complexities of flooding and mitigation and everyone's role in building flood resiliency.



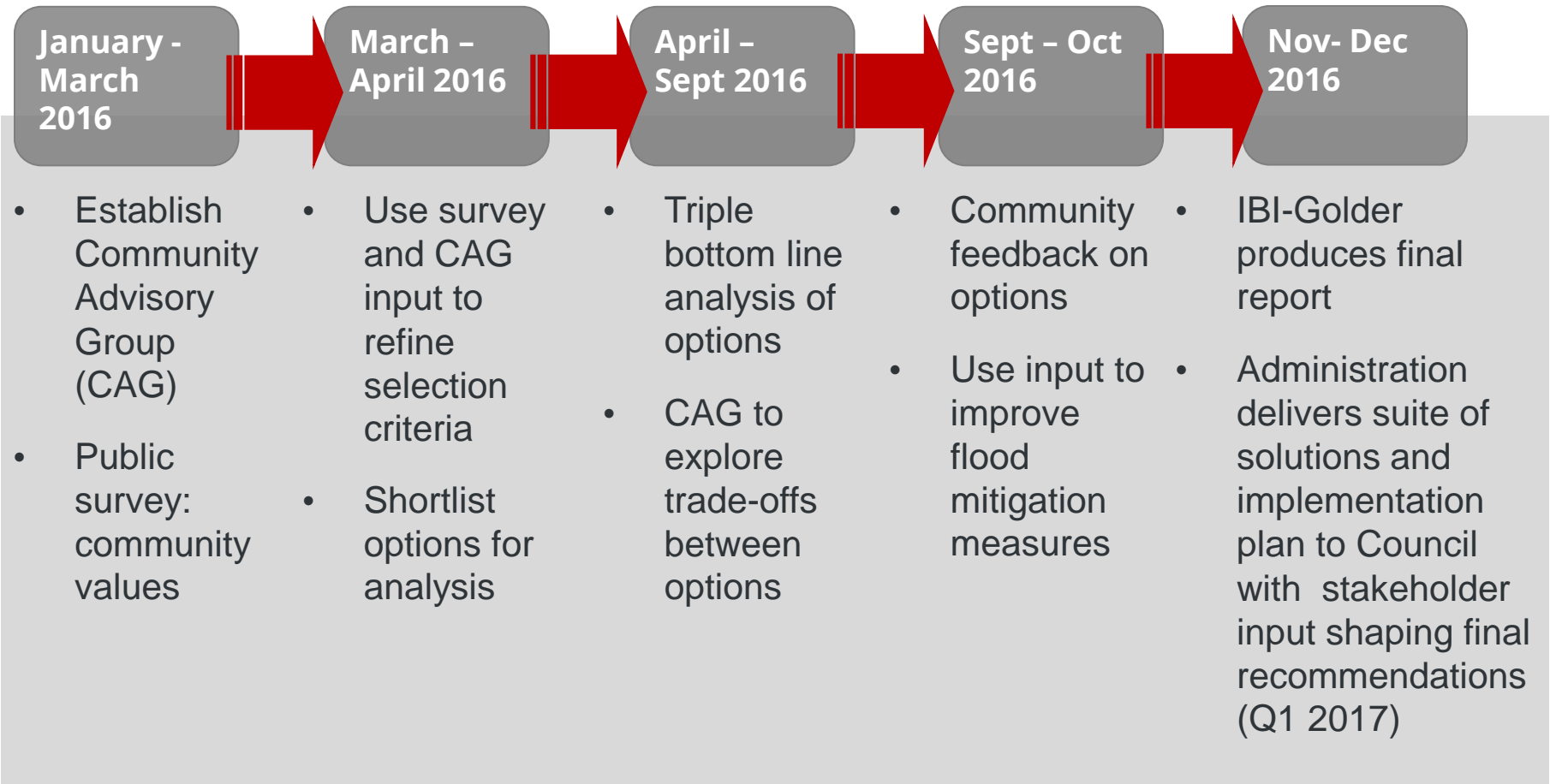
# Community Engagement Approach

- Public Survey (March-April)
  - gauge citizens' opinions on how the floodplain should be used and will inform screening criteria for option analysis
- Community Advisory Group (March-November)
  - Provide input into screening criteria for options analysis and delivery of community engagement, review mitigation options and liaison to respective stakeholder groups
- Community and stakeholder feedback on flood mitigation measures (September – October)
  - Engage communities and stakeholder groups to provide feedback on flood mitigation measures
- Provide a prioritized list of flood mitigation measures and action plan to Council (March 2017)





# Process and Timelines





## Community Advisory Group

- 17 to 21 members from flood-affected communities, businesses, watershed groups, as well as non-flood affected Calgarians.
- This is a reflection of the values and perspectives across Calgary not a technical group or decision-making body
- Provide feedback into criteria for our TBL analysis of flood mitigation options
- Provide input on the broader community engagement
- Review mitigation options including input into Bow River Working Group (if and when required), examine trade-offs, improve recommendations
- Act as a liaison to respective stakeholder groups



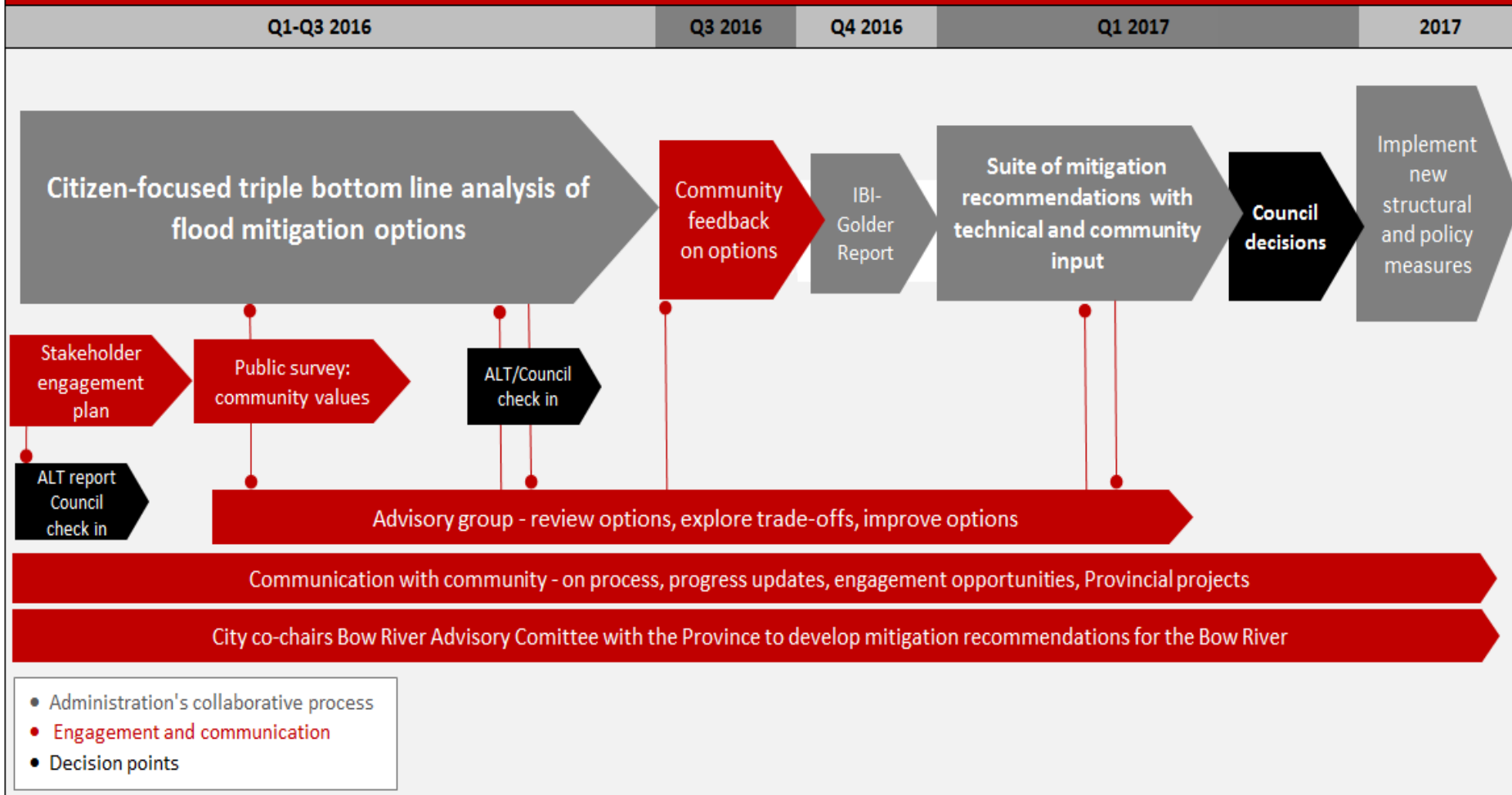
## Key messages

- Flood resiliency is a complex and long-term process. We each have a role in making Calgary more flood resilient.
- Inform citizens of the mitigation measures are being considered and why in a transparent way.
- We will ask for input on mitigation measures from all flood affected communities, as well as the Community Advisory Group and the general public.
- We will use this feedback to make the best decisions for Calgary.



# Roadmap to building community resiliency

## Flood Mitigation Options Assessment





## **LAND USE PLANNING, POLICIES, BYLAWS**



# Strengthening Flood-Related Policies

- Expand the review of the Land Use Bylaw and other developmental regulation to update flood resiliency requirements for private property in flood risk areas
- Review The City's existing land-use planning documents and develop amendments, new guidelines or policies that will minimize development in the floodplain over time.
- Perform a social, economic, and environmental analysis to evaluate the need for a minimum flood protection level above the 1:100 flood for land-use planning and structural protection across Calgary



- Revised by Council in 2014 to provide high level guidance for planning and development decisions
- Priority over public good over private interests with emphasis on safety and reducing property damage
- Works in conjunction with land use bylaw to regulate development



## Land Use Bylaw changes for Flood Hazard Areas

- Removed “grandfathering” clauses that did not require certain redevelopment from meeting the current bylaw rules
- Made all uses in the floodway discretionary rather than permitted
- Created a sliding scale approach for resiliency measures in buildings based on the extent of redevelopment/renovation





## **TECHNICAL OVERVIEW**

## **WHAT IS THE GOAL OF MITIGATION?**

**There may be many goals, including:**

- **Protect public safety and property**
- **Reduce damages**

**How do we do that?**

**Either:**

- **Keep the water out**
- **Keep property out of the water**



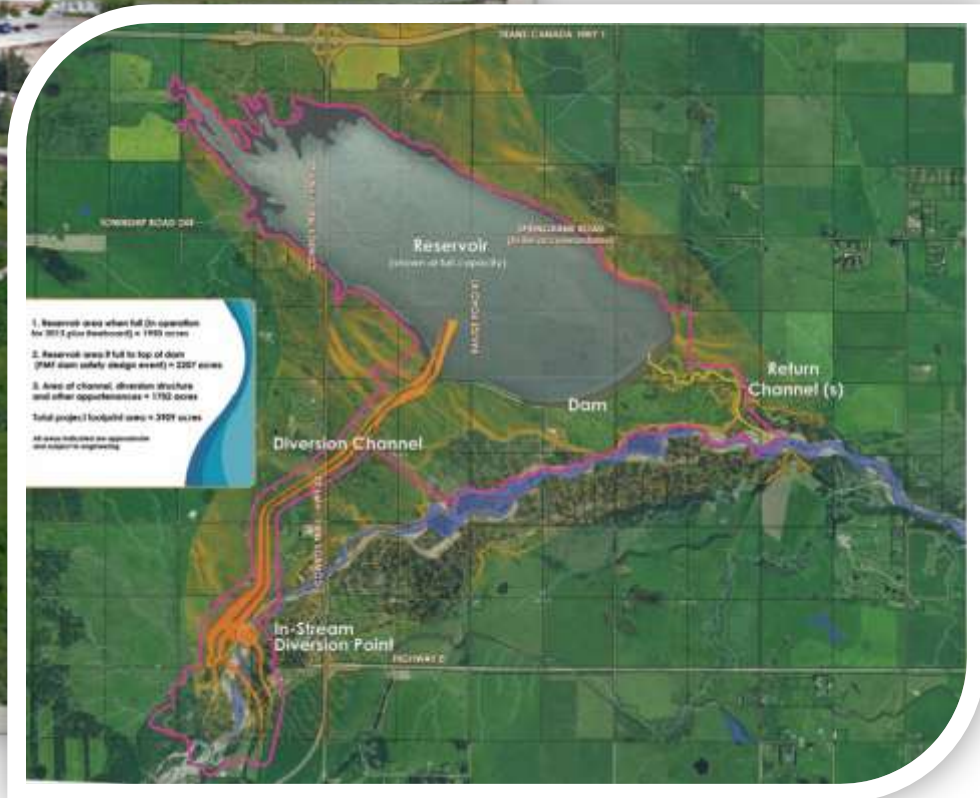
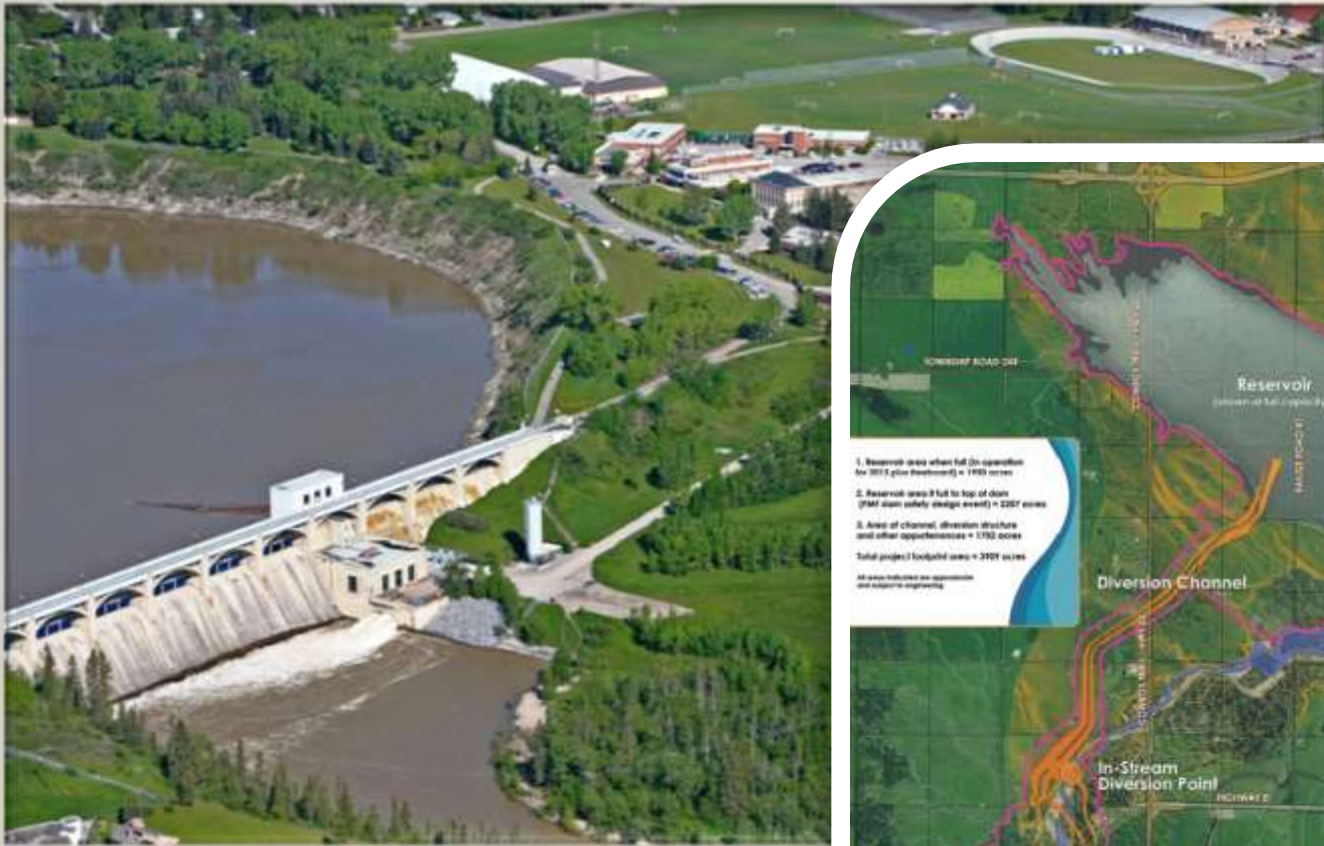
## Flood Mitigation Measures Assessment:

### “Long List” of Flood Mitigation Measures includes:

**\*Note: inclusion on this list does not indicate implementation**

- Reservoirs – improve operations of existing, or build new
- Barriers (or “berms” or “dykes”)
- Removing buildings or land use types from floodplain
- Improving bank stability
- Increasing capacity of river channels
- Healthy riparian areas / natural attenuation
- Diversion
- Policy, land use bylaw, permitting – e.g., building elevations, set-backs, no basements/lower suites?
- Improved forecasting and response
- Insurance

## Reservoirs



## Barriers



(Dave Martin/A

## Barriers



## Bank Stabilization



## Increasing capacity of river channel





## Healthy Riparian Areas and Natural Attenuation

Intact riparian area on Bow River

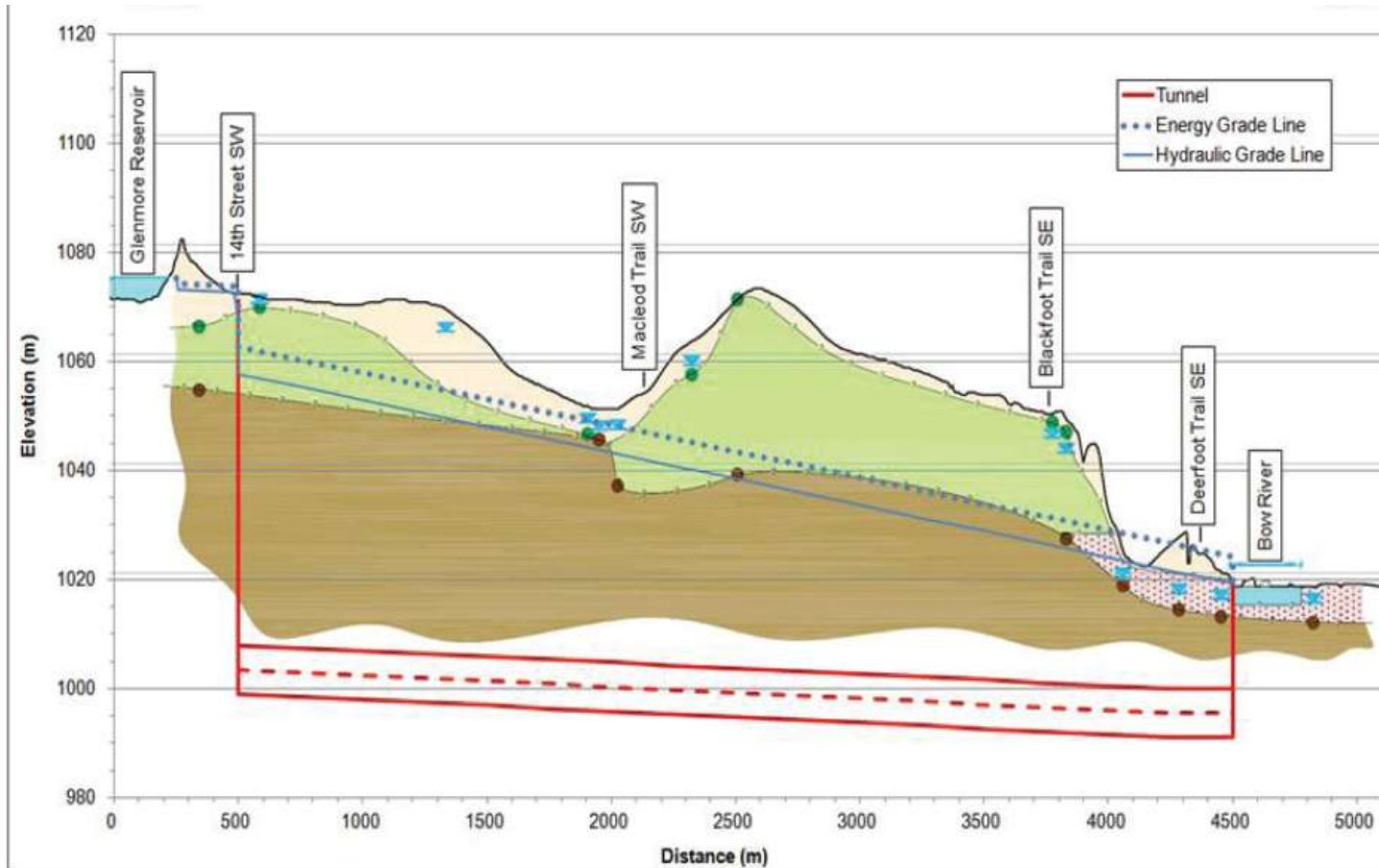


Bank / Riparian Hot Spot on West Nose Creek

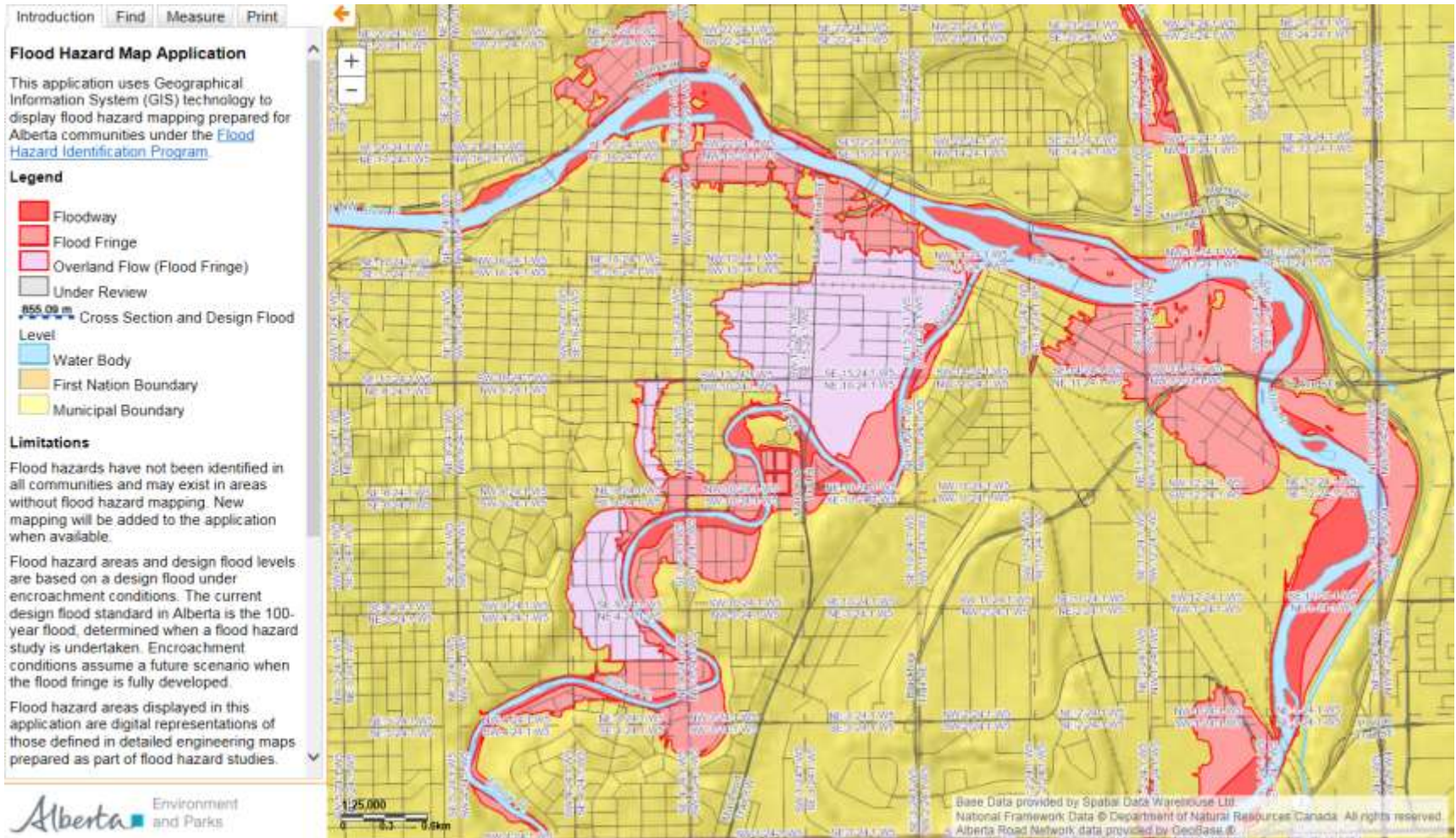




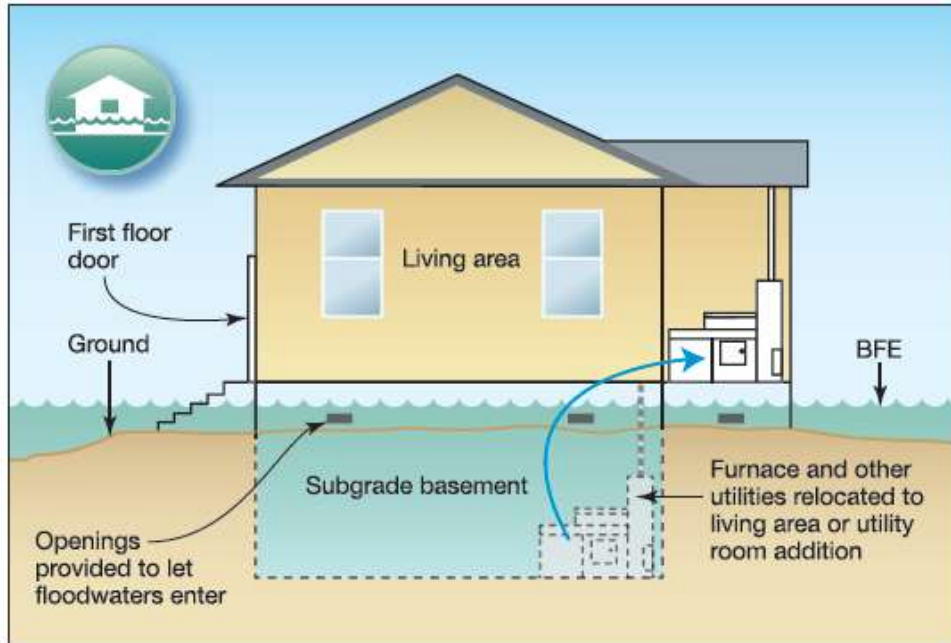
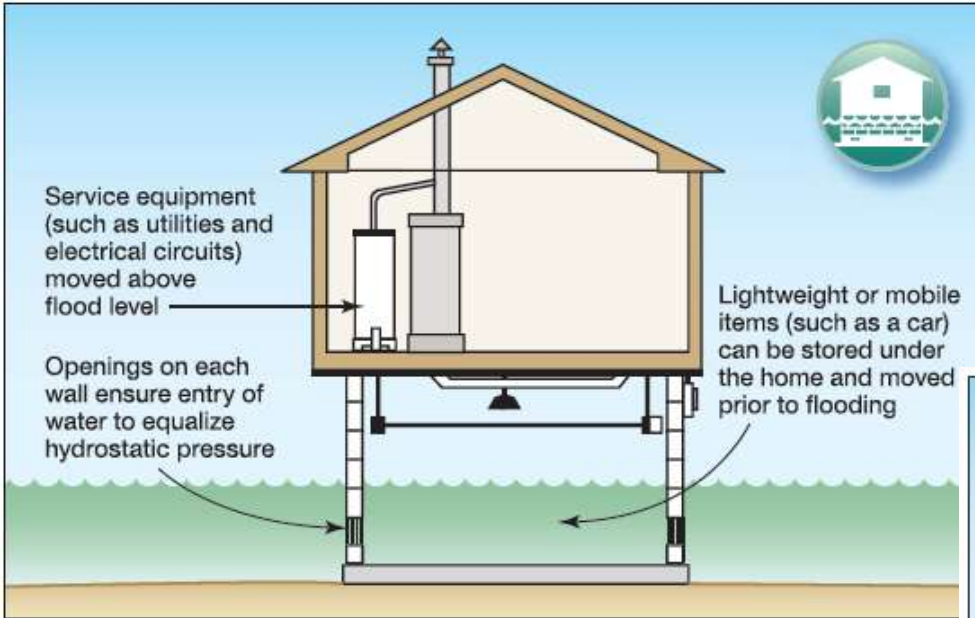
## Diversion



## Removing buildings or land uses from floodplain or floodway



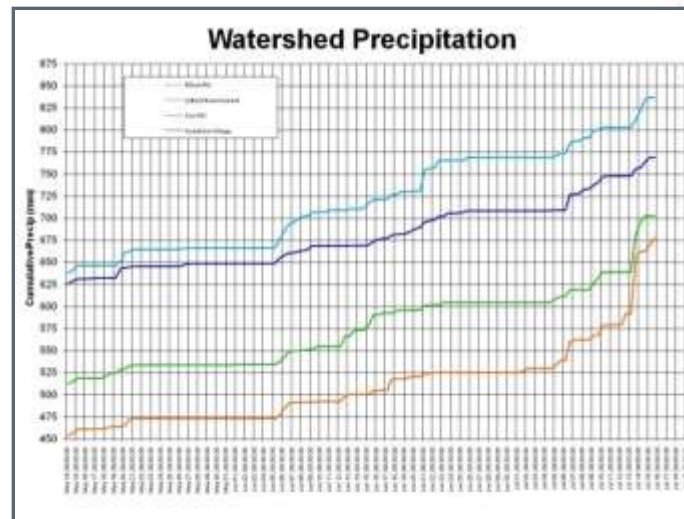
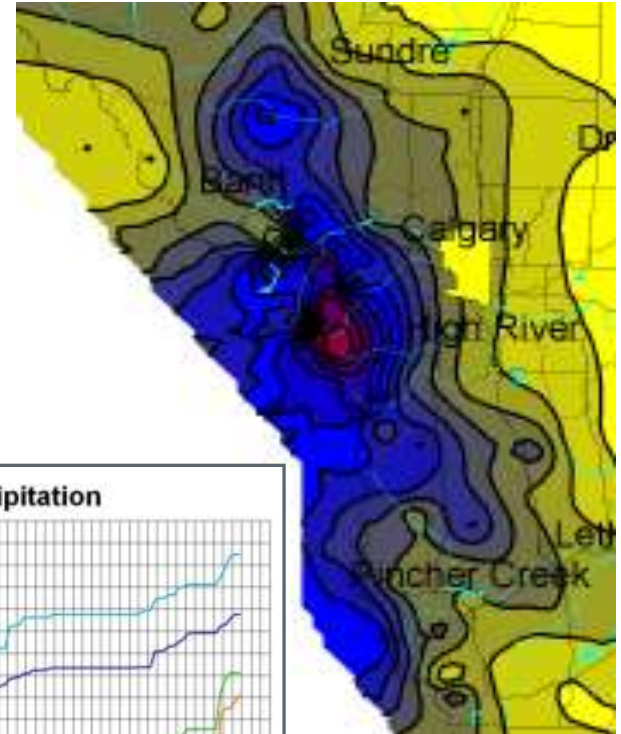
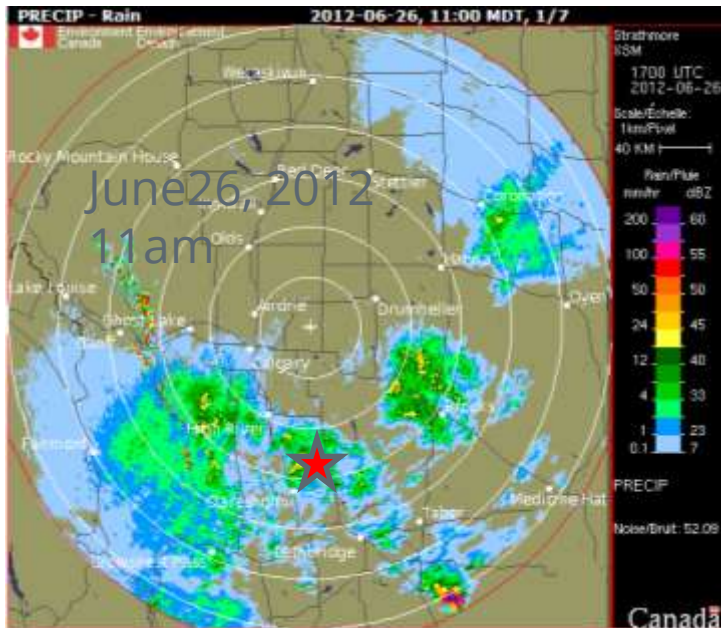
## Land Use Policy and Development Permits



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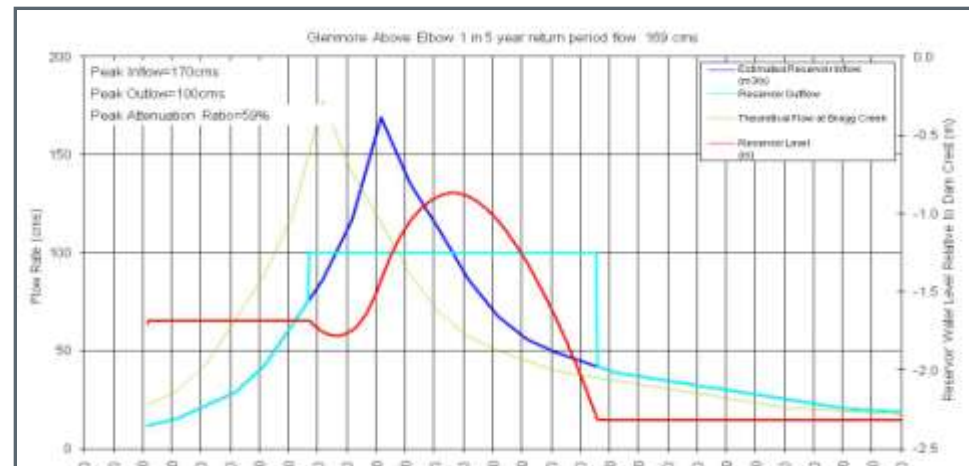
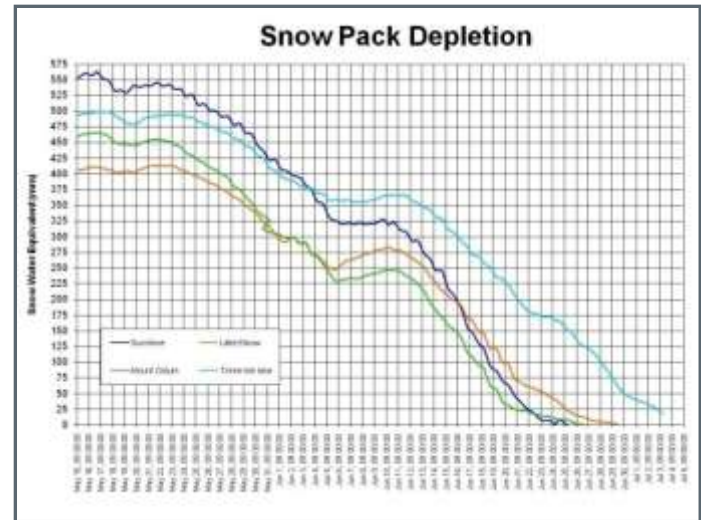
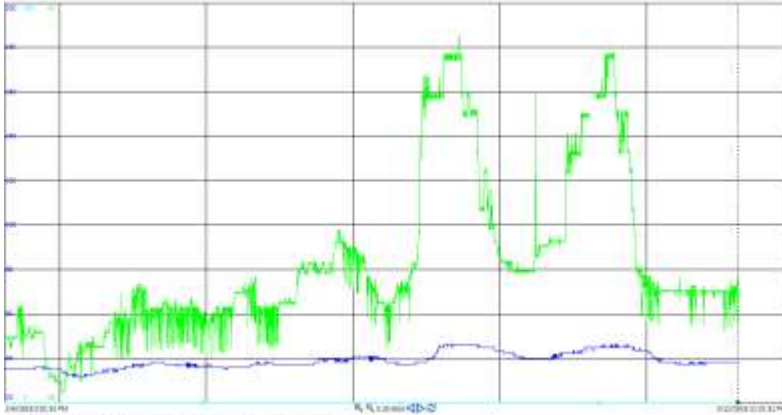


## Improved forecasting and response





## Improved forecasting and response





## Insurance

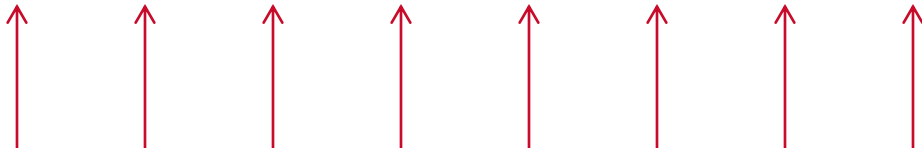
The screenshot shows the CBC News Calgary website interface. At the top, there is a navigation bar with categories: TV, RADIO, NEWS, SPORTS, MUSIC, ARTS, LOCAL, and MORE. To the right are buttons for WATCH, LISTEN, LOG IN, and a search bar labeled SEARCH CBC.ca... Below this is a banner for CBCnews | Calgary featuring a row of six news anchors. A live stream widget on the right shows 'LIVE Calgary More Streams' with 'The Homestretch' and a 'Listen Live' button. A secondary navigation bar includes Home, World, Canada, Politics, Business, Health, Arts & Entertainment, Technology & Science, Trending, and Video. Below this, 'Canada' and 'Calgary' are highlighted, with a link to 'Photo Galleries'. The main headline reads 'EXCLUSIVE | Overland flood insurance available in Calgary' in large, bold letters. A sub-headline states 'Insurance covers damage caused by water entering a home through doors, windows'. At the bottom, it says 'By Carla Beynon, CBC News | Posted: Jun 05, 2014 11:09 AM MT | Last Updated: Jun 05, 2014 9:10 PM MT'.





## Mitigation Planning and Implementation:

Taking the time to make sure we do the right things, do things right, and end up with holistic and sustainable solutions



Completing “no-regrets” or “slam-dunk” projects that will have benefit no matter what else gets done, as we get funding