

Our Town Has Flood Risk Mapping: Now What?

Public Information Session: March 7, 2023
Portugal Cove-St. Phillip's

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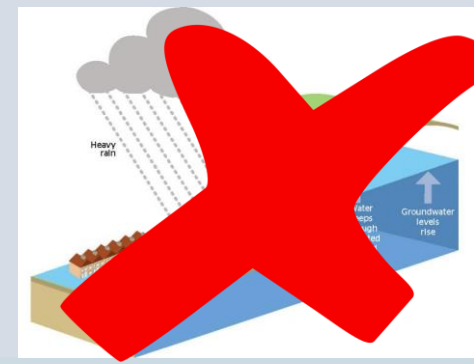
Water Resources Management Division

Department of Environment and Climate Change

Outline

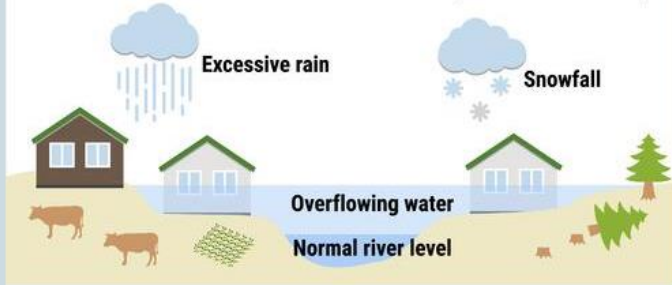
- Why Does PCSP Have Flood Mapping?
- 2015 PCSP Flood Risk Mapping Study
- How Does Flood Risk Mapping Impact the Town of PCSP?
- How Does Flood Risk Mapping Impact Residents?

Types of Flooding



Groundwater flooding

River floods (fluvial floods)

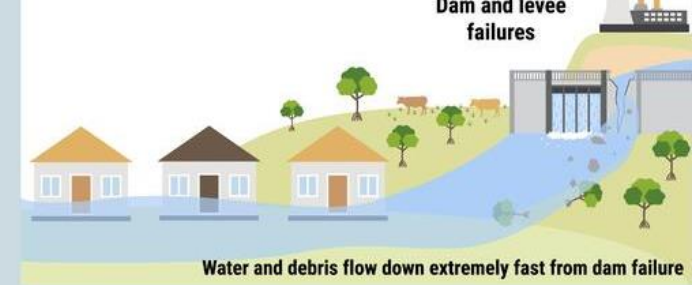


Flash floods



Water and debris flow down hillside

Man-made floods



Water and debris flow down extremely fast from dam failure

Coastal floods (storm surge)



Urban floods



The drainage system in a city cannot absorb the water

Pluvial floods



Flat areas can't absorb the rainwater, causing puddles and ponds to appear

Why Does PCSP Have Flood Mapping?

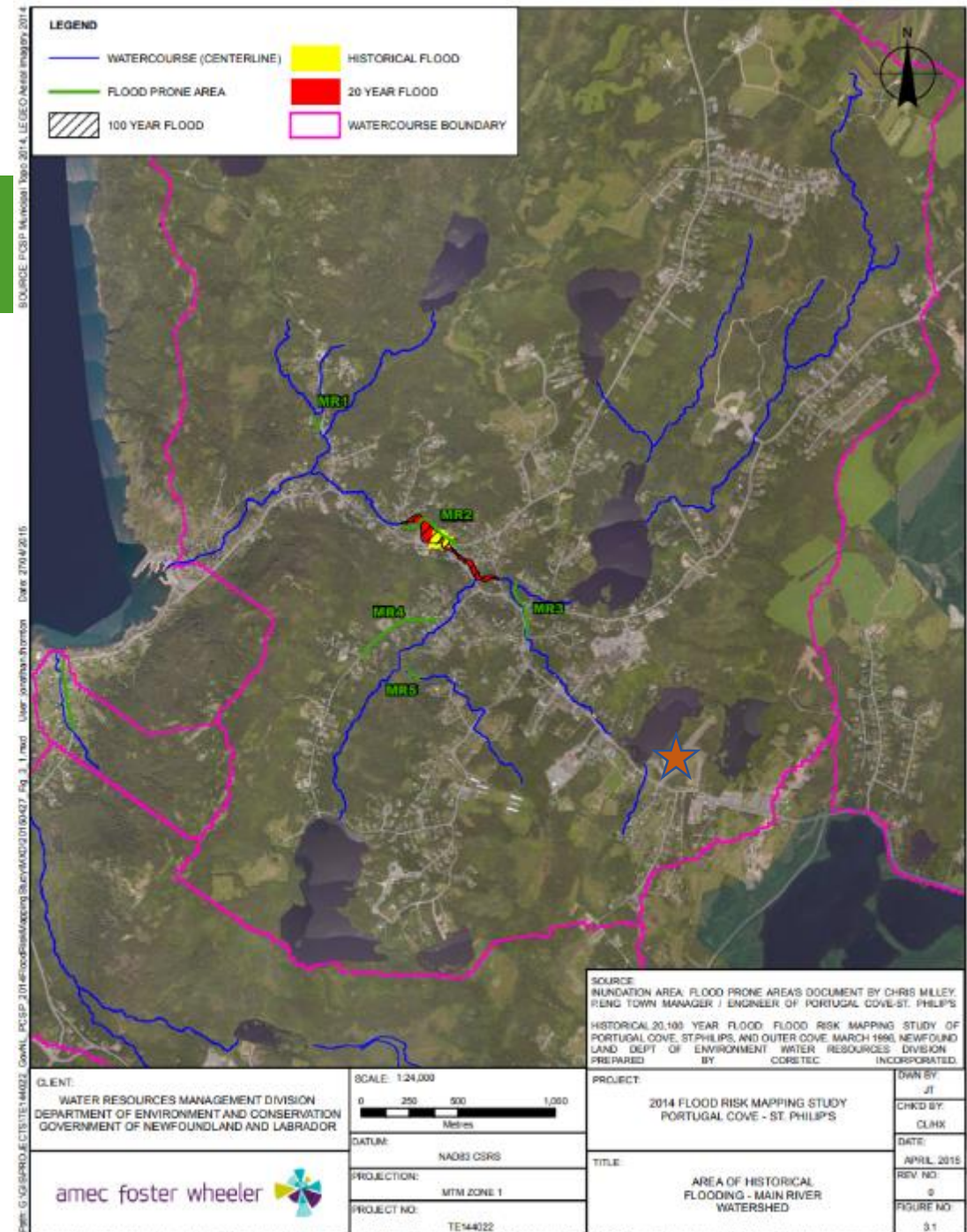
History of Flooding in PCSP

- Feb 1986 ice jam on Main River caused flooding
- Apr 1986 flooding on Main River caused by rain and snowmelt
- In 1986, 1989 and 1992 ice jam on the Broad Cove River caused flooding
- Jan 1999 Broad Cove River overflowed its banks after heavy rain
- Sept 2010- Hurricane Igor
- Nov 2014 heavy rainfall caused flooding
- April 2021- rainiest April in 70 years resulted in flooding
- Many past flooding issues are associated with localized drainage issues



Areas of Concern

- Additional flood prone areas:
 - Main River Watershed
 - Unnamed Stream Watershed
 - Beachy Cove Brook Watershed
 - Goat Cove Brook Watershed
 - Broad Cove River Watershed



2015 Flood Study

- Requested by the Town of PCSP in 2011 with agreement to follow the provincial floodplain management policy
- 100% provincially funded
- Included additional areas of concern
- PCSP now incorporating flood zones into Municipal Plan
- Maps available at:
 - [Flood Extent Mapping \(arcgis.com\)](http://arcgis.com)



<https://www.gov.nl.ca/ecc/waterres/flooding/frm/>

2023 Broad Cove River FRM Update

- Currently working on an update to the Broad Cove River floodplain area after:
 - Construction of new school
 - Realignment of a section of the natural stream channel
 - Construction of a significant stream crossing structure
 - Changes to natural topography



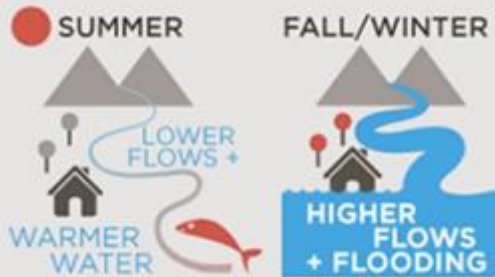
Its Going to Be Warmer, Wetter & Stormier in NL

INCREASED HEAT

By mid-21st century, temps are projected to rise 2-3 °C in Newfoundland and 3-4 °C in Labrador



EXTREME RIVER CONDITIONS



INCREASED OCEAN SURFACE TEMPERATURE

Warmer ocean means more intense storms & hurricanes



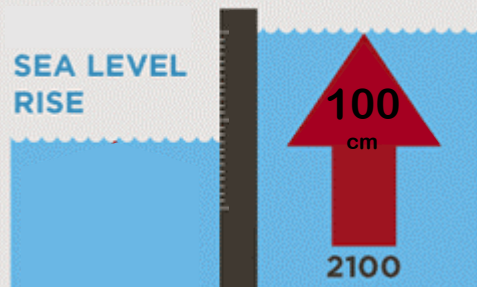
HEAVY RAIN EVENTS ARE INCREASING

12-33% increase in rain/snow by 2100



RISING SEA LEVEL

SEA LEVEL RISE



LESS SNOW

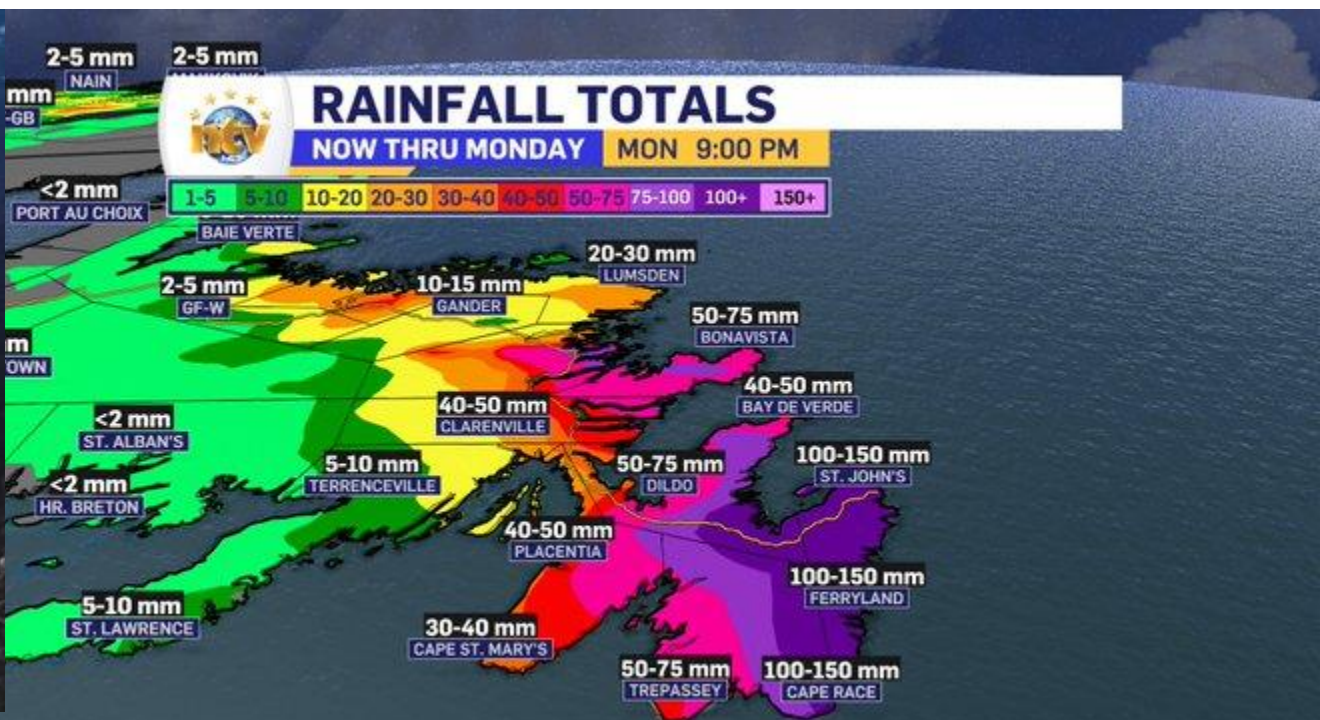
Less snowpack and earlier melting of snowpack



MORE FREQUENT COASTAL FLOODING

Increased frequency of storm surge events





2015 PCSP Flood Risk Mapping Study

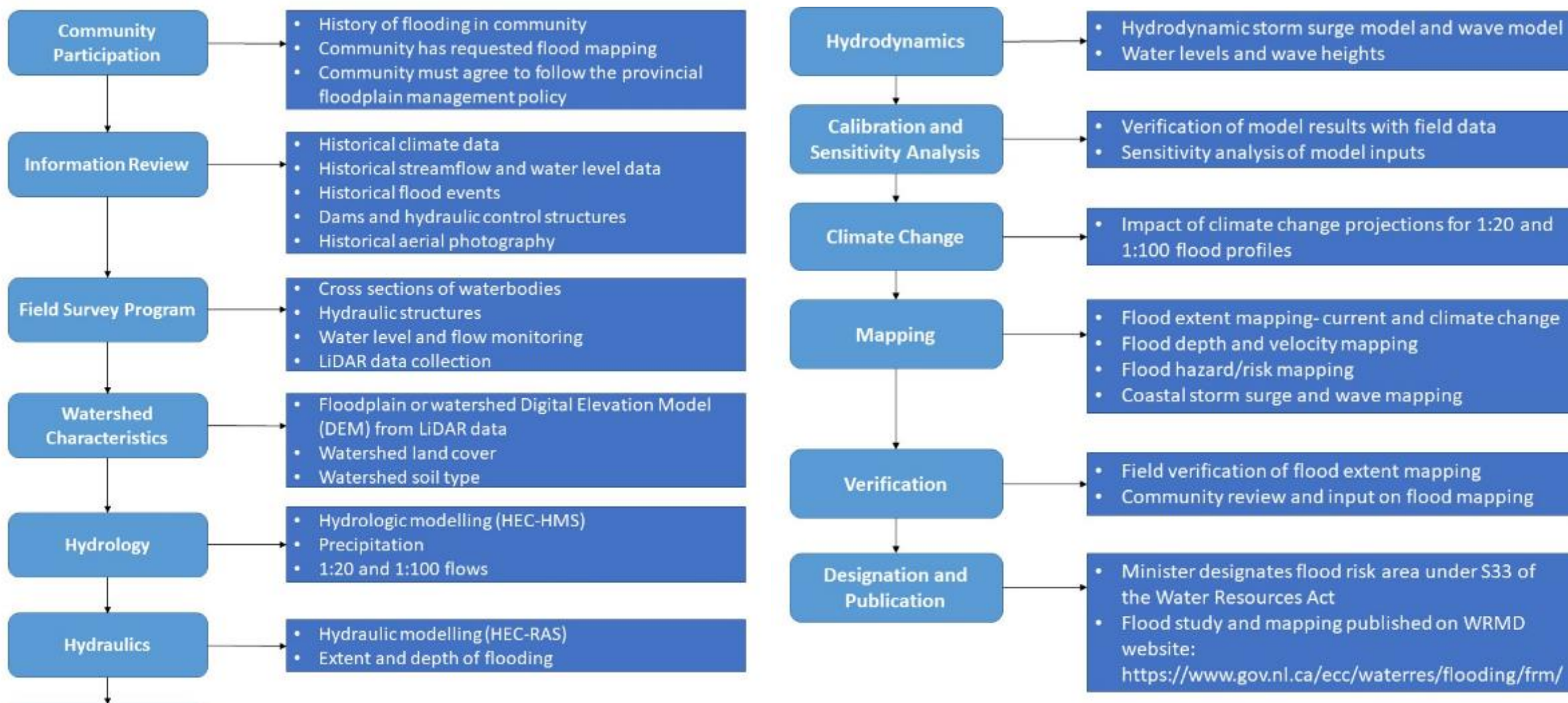


Flood Mapping Menu

1. Event Likelihood
 - 1:20, 1:100 AEP, return period
2. Climate Change
 - Change in discharge, sea level rise
3. Topography
 - LiDAR, DEM, flood defenses
4. Land cover
 - Aerial photos, satellite imagery
5. Future Land Use
6. Infrastructure Assessments
 - Culverts, bridges
7. Hazard Mapping
 - Depth and velocity
8. Coastal Storm Surge and Waves



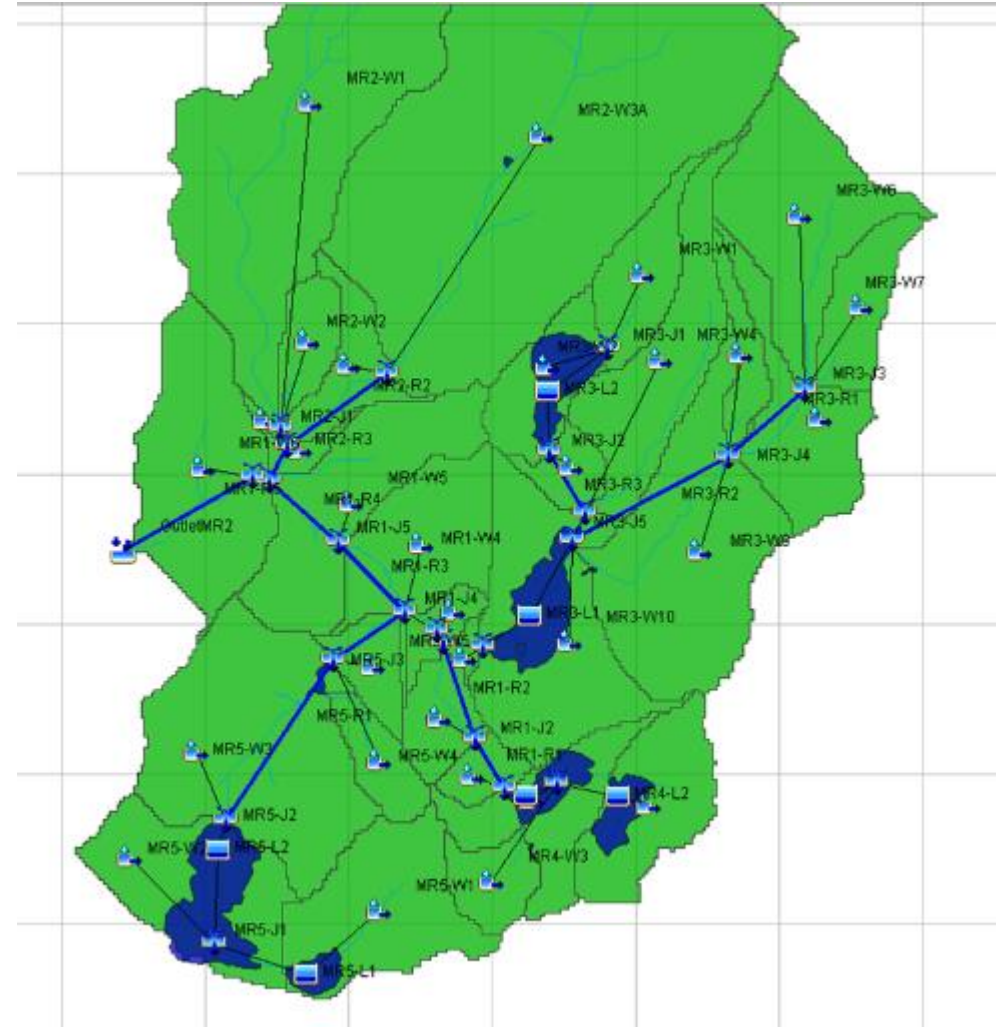
Flood Extent Mapping Process



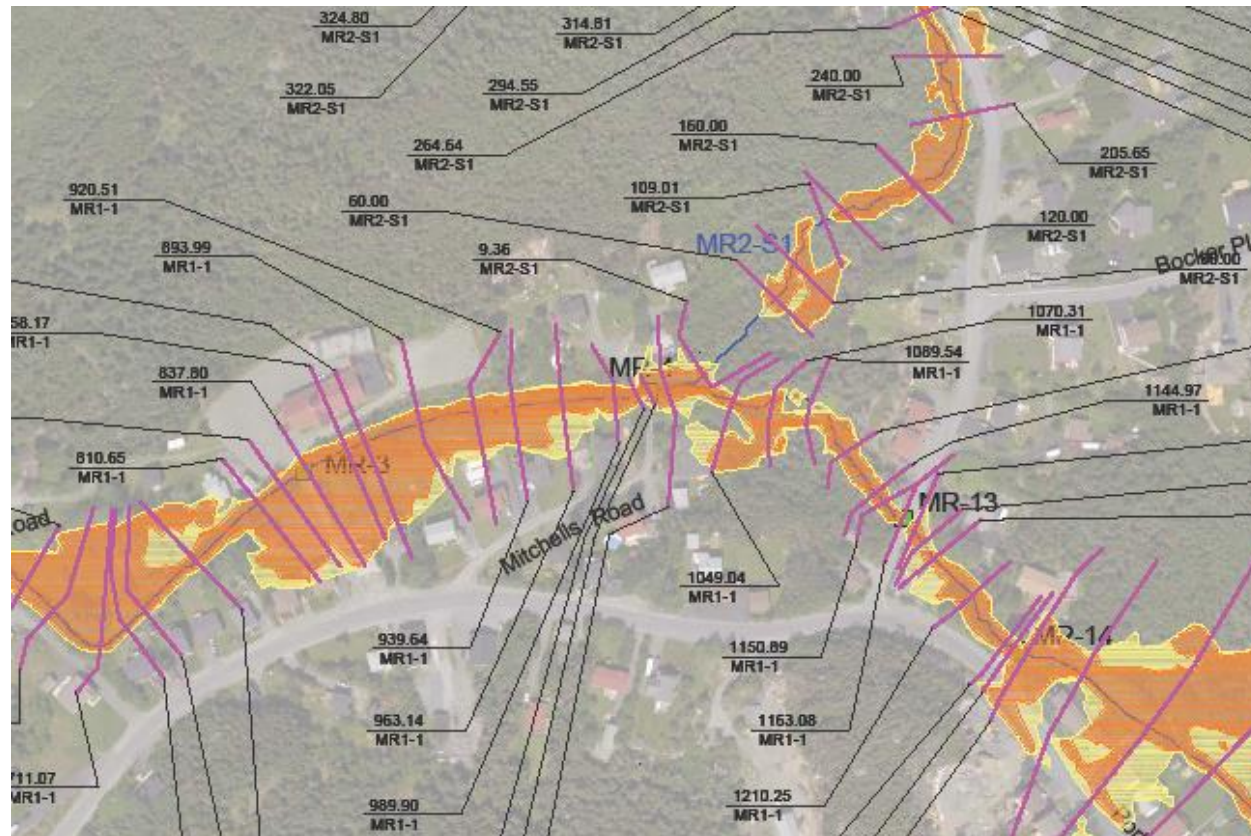
Deliverables

- 1:20 and 1:100 AEP FRMS
 - 1:20 and 1:100 AEP CC FRMS
 - 1:20 and 1:100 inundation depth and velocity mapping
 - 1:20 and 1:100 hazard mapping
- + Report, Appendices, and Data

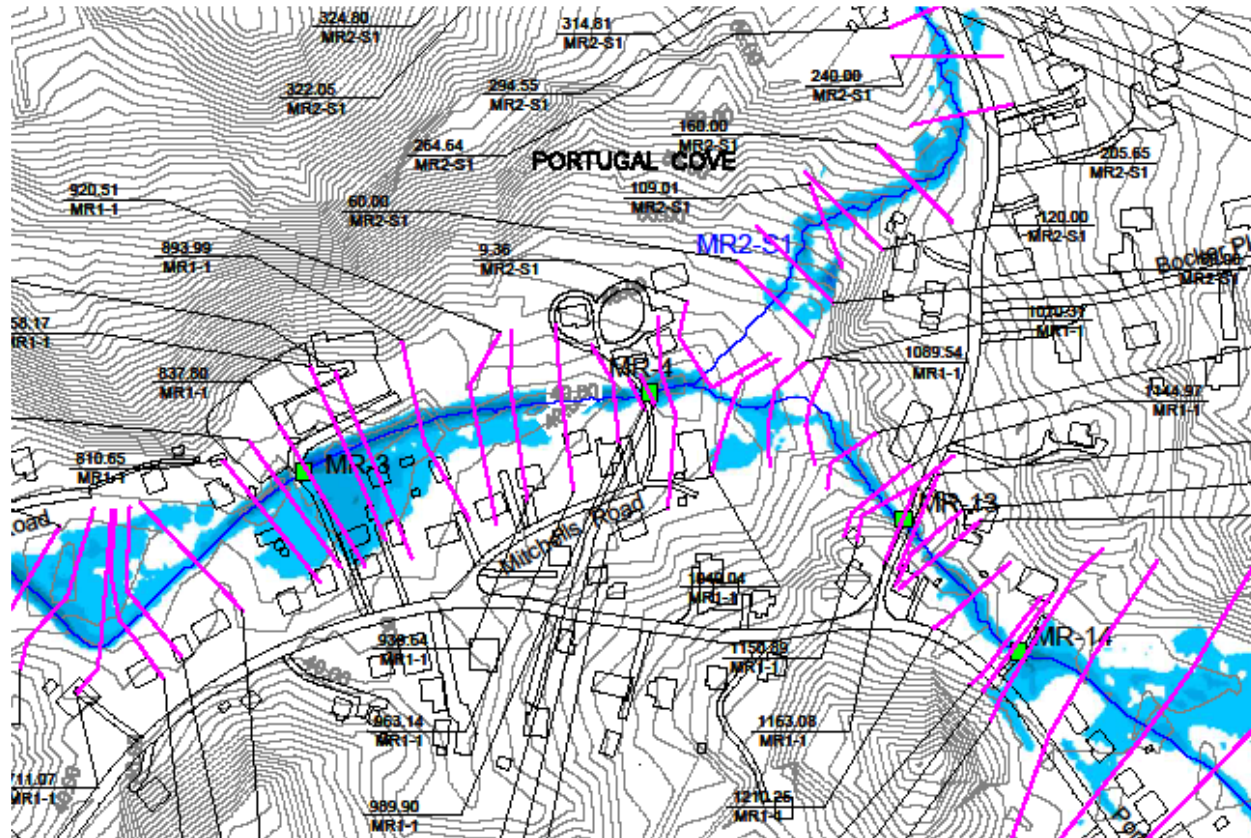
<https://www.gov.nl.ca/ecc/waterres/flooding/frm/>



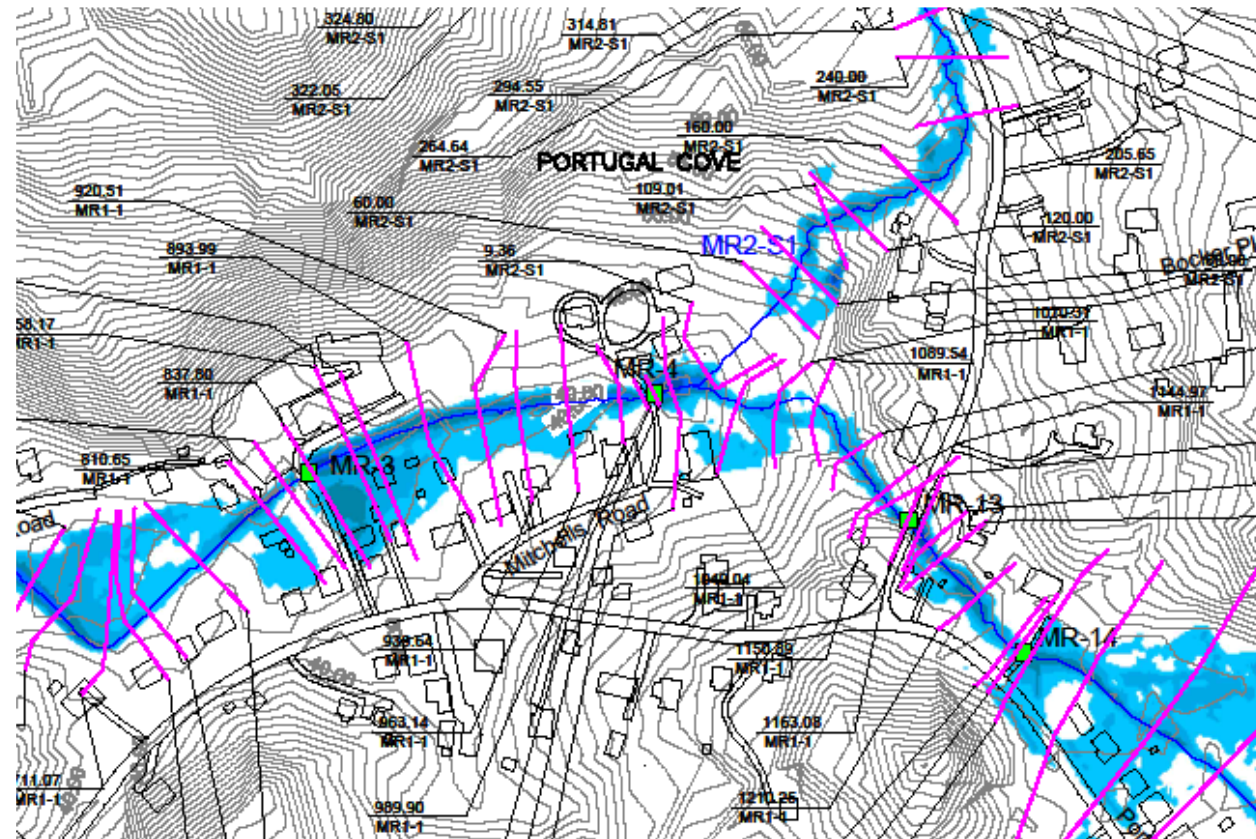
Flood Extents on Aerial Photo



1:20 Flood Mapping

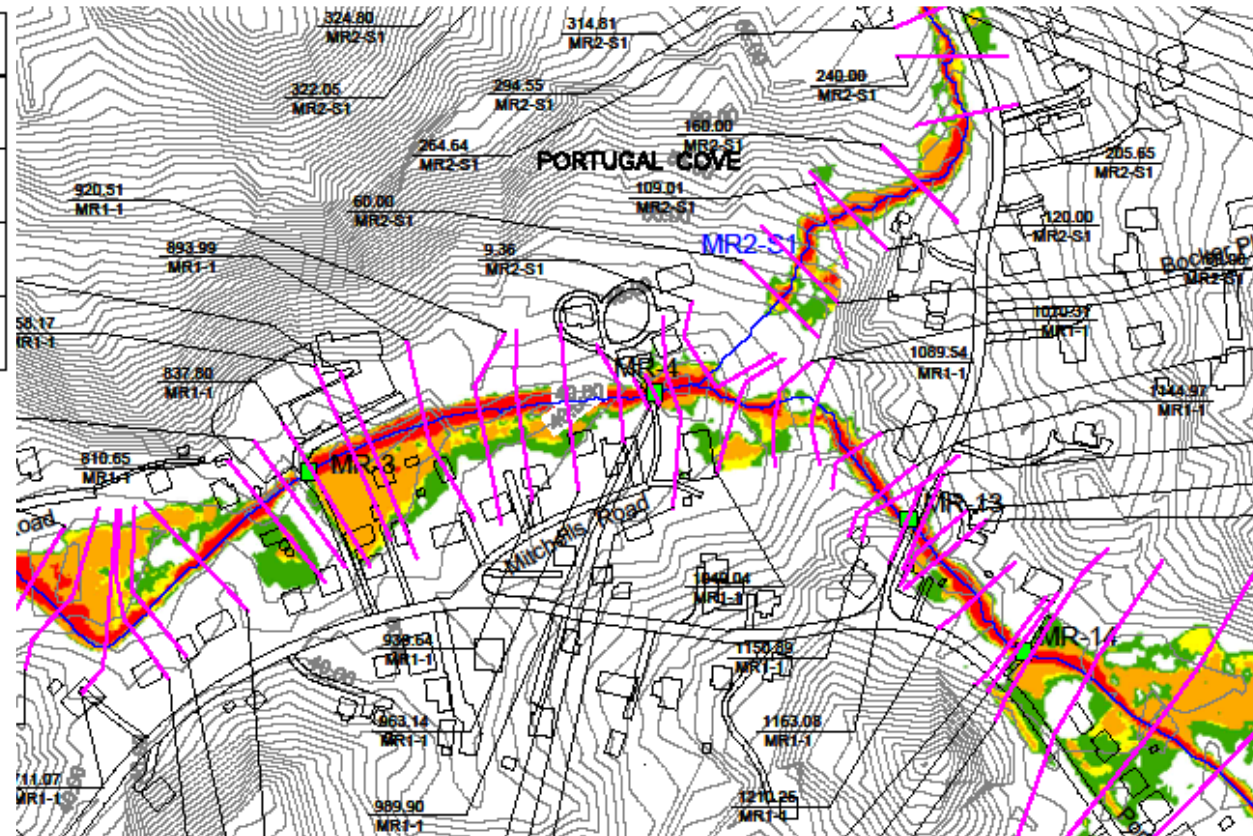


1:100 Flood Mapping



1:100 Flood Hazard Map

Degree Of Flood Hazard	Colour Code	Description
Low	Green	Caution
Moderate	Yellow	Danger for Some Includes children, the elderly, and the infirm
Significant	Orange	Danger for Most Includes the general public
Extreme	Red	Danger for All Includes the emergency services



Climate Change

Table 8.2 Comparison of Peak Instantaneous Flows for Current and Future (2050) Climate Conditions

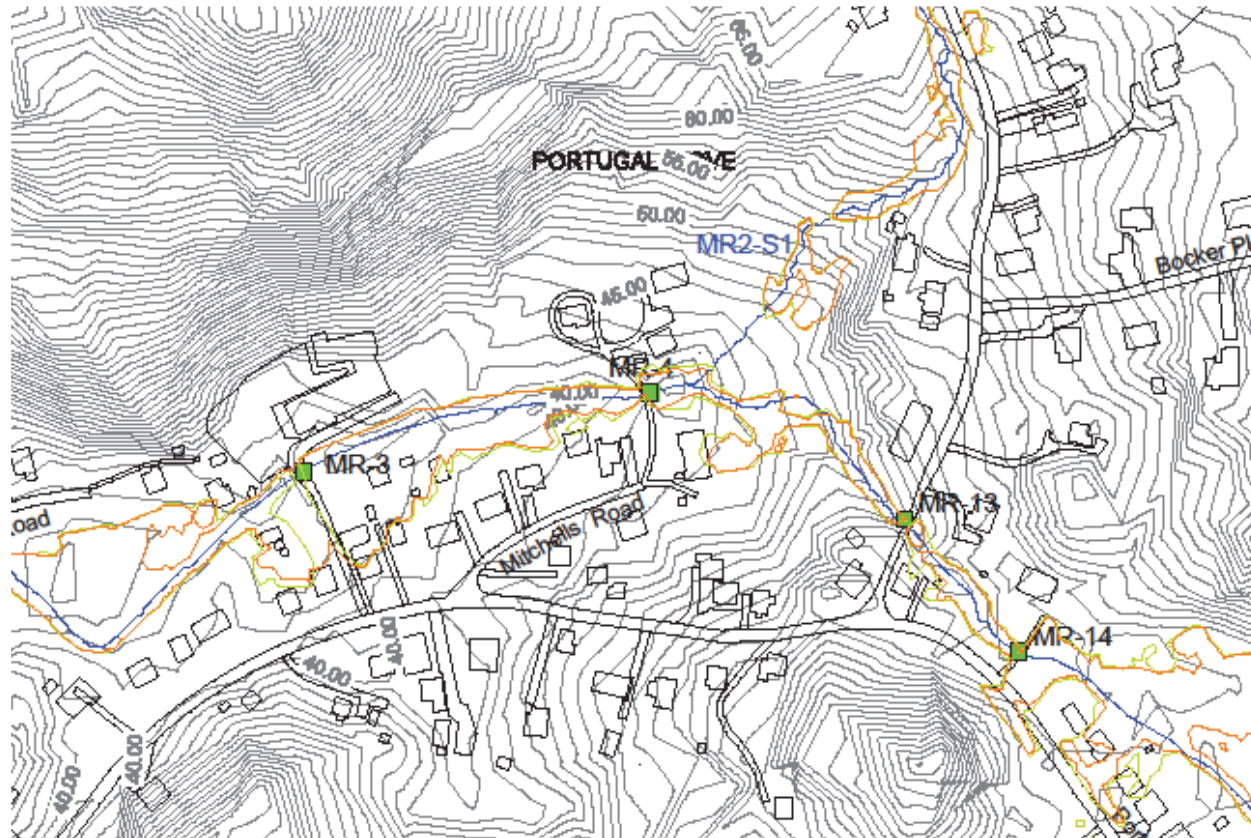
Location	HEC-HMS Element	Drainage Area	Return Frequency	Existing Climate	Projected Climate	Difference
		(km ²)	(yrs)	(m ³ /s)	(m ³ /s)	(%)
PT1	MR1-J6A	17.00	1:20	25.2	32.9	31
			1:100	39.1	50.9	30
PT2	MR1-J3A	6.50	1:20	10.6	14.5	37
			1:100	17.2	23.2	35
02ZM006	MR2-W3A	3.63	1:20	5.1	6.5	27
			1:100	7.8	9.9	27
PT3	BC2-J1	0.67	1:20	1.8	2.1	17
			1:100	2.3	2.7	17
PT4	GC1-J5A	2.41	1:20	4.9	6.0	22
			1:100	7.2	8.9	24
PT5	BR1-J8A	34.59	1:20	10.4	13.9	34
			1:100	17.4	22.8	31

Due to climate change, flow will increase by 17-37%

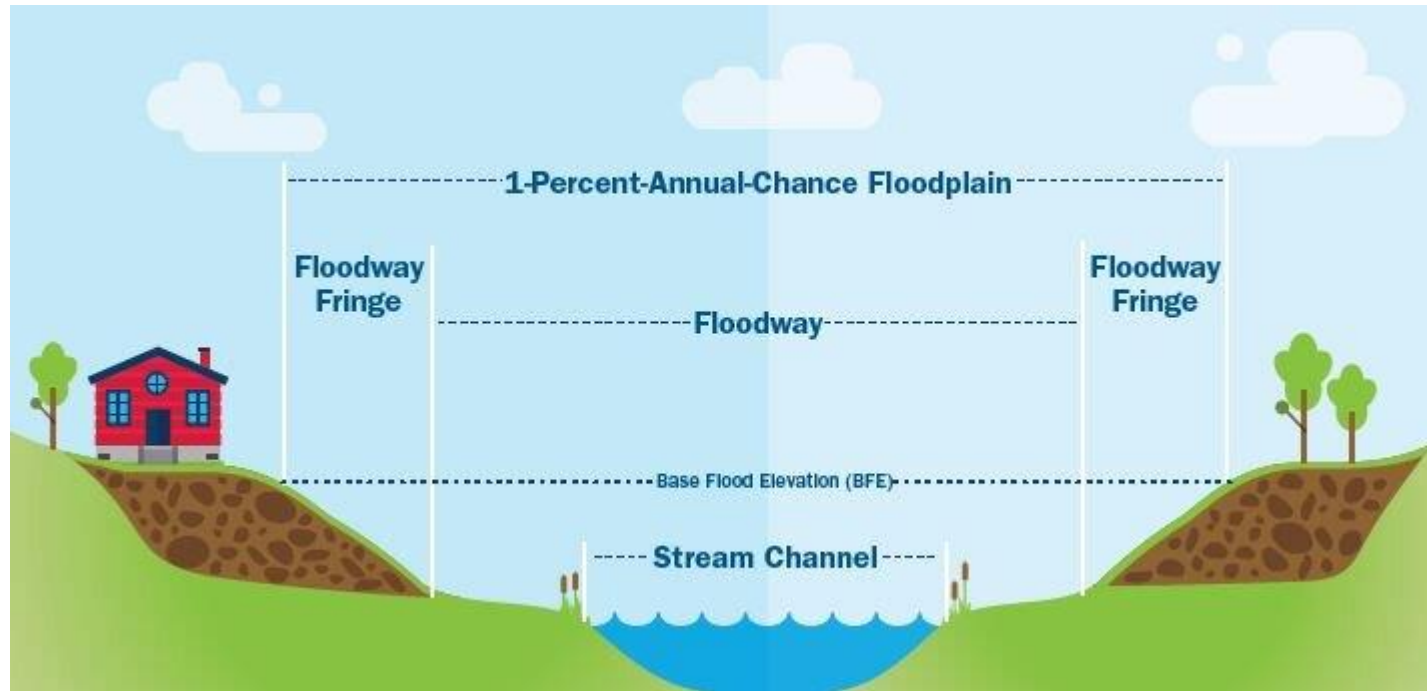
Comparison of Current and Climate Change FRM

Legend

- 1:20 AEP Floodline-Current Climate Conditions
- 1:100 AEP Floodline-Current Climate Conditions
- 1:20 AEP Floodline-Projected Future Climate Conditions
- 1:100 AEP Floodline-Projected Future Climate Conditions
- MR12 Watercourse Centreline and Identification
- MR1 Bridge Location Identification
- MR1 Culvert Location Identification



The Floodplain



- Floodplain is 1:100
- Floodway is 1:20

Category	Where Flood Plains are Designated			
	All Flood Plains	Floodway (1:20 year Zone)	Floodway Fringe (1:100 year Zone)	Climate Change Flood Zone
Temporary alterations	Permitted	Permitted	Permitted	Permitted
Non-structural uses	Permitted	Permitted	Permitted	Permitted
Structures related to use of water resources	Permitted	Permitted	Permitted	Permitted
Minor structural or other projects	Permitted	Permitted with conditions*	Permitted with conditions*	Permitted with conditions*
Other structures not used primarily for residential	Permitted with conditions*	Permitted with conditions*	Permitted with conditions*	Permitted with conditions*
Industrial Uses related to shipping (marine only)	Permitted with conditions*	Permitted with conditions*	Permitted with conditions*	Permitted with conditions*
Other industrial and commercial	Not Permitted	Permitted with conditions**	Permitted with conditions*	Permitted with conditions*
Institutional	Not Permitted	Not Permitted	Not Permitted	Not Permitted
Residential and other institutional	Not Permitted	Not Permitted	Permitted with conditions*	Permitted with conditions*
Hydraulic Structures	Permitted	Permitted	Permitted	Permitted

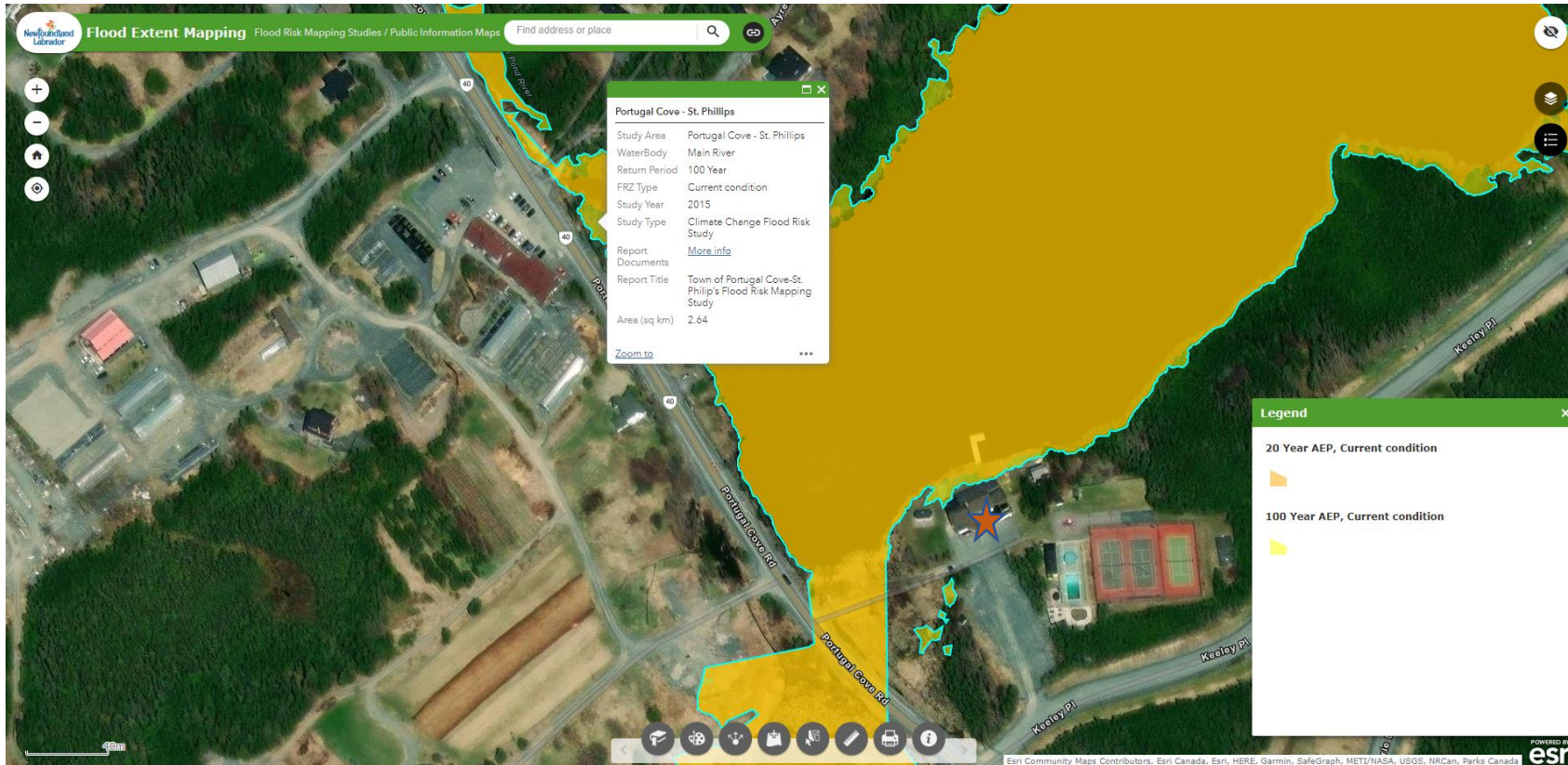
Floodplain Policy

- Section 33 of the Water Resources Act allows the Minister to designate flood risk areas
- Policy for Flood Plain Management regulates development in flood risk areas
 - <https://www.gov.nl.ca/ecc/waterres/regulations/policies/flood-plain/>
- Urban and Rural Planning Act allows municipalities to develop municipal plans and development regulations
- Towns can adopt flood risk zones in their municipal plan

Objectives of Floodplain Management Policy

- To prevent loss of human life and avoid personal hardships
- To minimize flood damage to properties, infrastructure and the environment
- To restrict activities which would degrade water resources
- To maintain the natural capability of waterways to convey flood flows
- To minimize disruption of transportation, social and business activity
- To minimize costs to the taxpayers of Newfoundland and Labrador

Publication of Flood Extent Mapping



- All FRM studies, maps and GIS files are available on WRMD website and Land Use Atlas:
 - <http://www.mae.gov.nl.ca/waterres/flooding/frm.html>
- Flood Extent Mapping Application:
 - [Flood Extent Mapping \(arcgis.com\)](http://arcgis.com)
- Land Use Atlas:
 - <https://www.gov.nl.ca/landuseatlas/details/>

How Does FRM Impact the Town of PCSP?



Implications for Town

- Town agreed to follow the province's policy for floodplain management for designated flood risk areas
 - Have accepted tradeoff between flood risk and development
- Town will have reduced vulnerability to:
 - Flood damage to property and infrastructure
 - Loss of life, injury and personal hardship
 - Costs of emergency assistance, clean-up and remediation



Land Use Planning

- Floodplain can be left undeveloped or only low consequence development allowed, such as parks and walking trails
- Areas for future community development such as new subdivisions can be located outside of the floodplain



Changes to Municipal Plan

- Adopt flood zones into municipal plan
- Development regulations for the new flood zones
- Process initiated with the Department of Municipal and Provincial Affairs (MAPA), Local Governance and Land Use Planning Division
 - Several legislative steps to the process laid out in the Urban and Rural Planning Act
- Adopt a net zero runoff policy to ensure that any new developments do not result in net increases of stormwater discharge to rivers and streams in the community



Municipal Infrastructure



- Upgrade infrastructure (culverts and bridges) that have been identified as not having sufficient capacity from the flood study
- Consider construction of flood mitigation measures to protect the community and structures from flooding (e.g., retaining walls, river diversions, dykes or berms to confine extreme flood flows to the river channel)
- Assess the buildings and infrastructure that will be affected by the 20 and 100 year floods
- Develop a municipal stormwater drainage system for the town
- Reduce infiltration and inflow into sanitary sewers
- Ensure stormwater sewer systems have sufficient capacity
- Apply for funding

Further Action by Town

- Raise public awareness of newly developed flood risk mapping
- Refer any development applications or building permits within the designated floodplain to the WRMD
- Incorporate flood hazard maps into the municipal Emergency Management Plan

Enter
Municipal Logo
Here
(If available)

The [Enter Municipal Name Here]

**(Regional) Municipal Emergency
Management Plan**
Template Version 1.1 (November 2010)

This version was adopted by council on
insert date here

Insert date of council meeting where this version was adopted

Anything highlighted in Grey in this MEMF is for explanatory
purposes and must be deleted/changed prior to approval by council

How Does FRM Impact Residents?



Am I in the Floodplain?



[Flood Extent Mapping \(arcgis.com\)](https://arcgis.com)

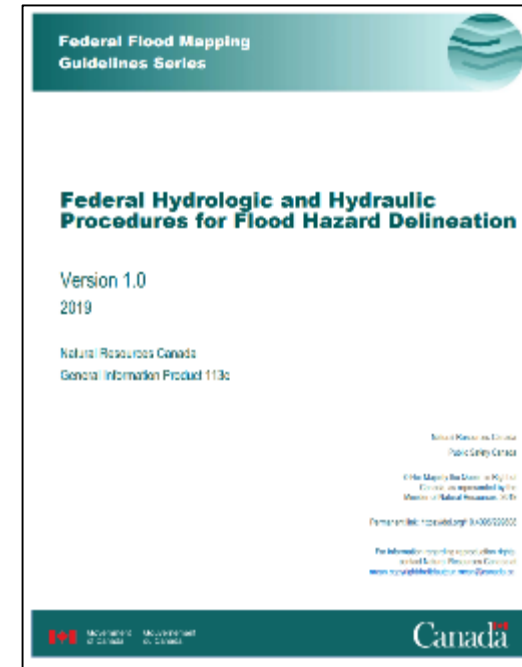
Common Questions & Comments

Do I have to move if my home is located in the floodplain?

- No, existing homes are considered grandfathered

I do not agree that my property is located in the floodplain.

- Mapping has been developed by professional engineers following industry-standard methodologies
- Any issues with the flood mapping produced should be brought to the attention of the town, province, and engineering consultant responsible for the mapping



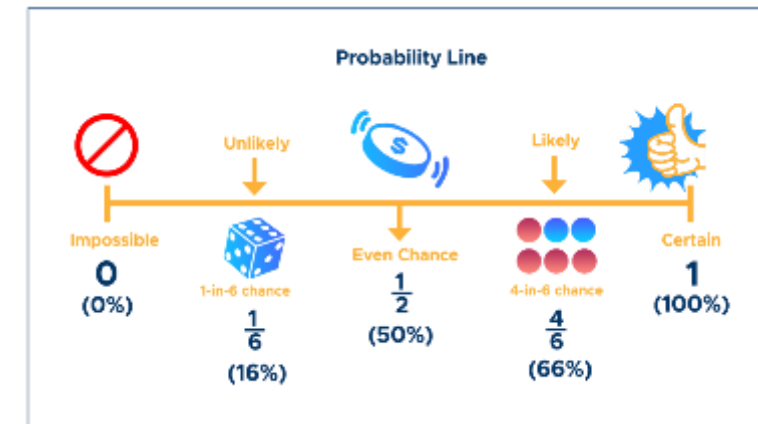
Common Questions & Comments

What is the risk my property might flood?

- 5% probability that you may experience flooding in any given year in a 1:20 year flood zone
- 1% probability that you may experience flooding in any given year in a 1:100 year flood zone

What can I do to protect my home against flooding?

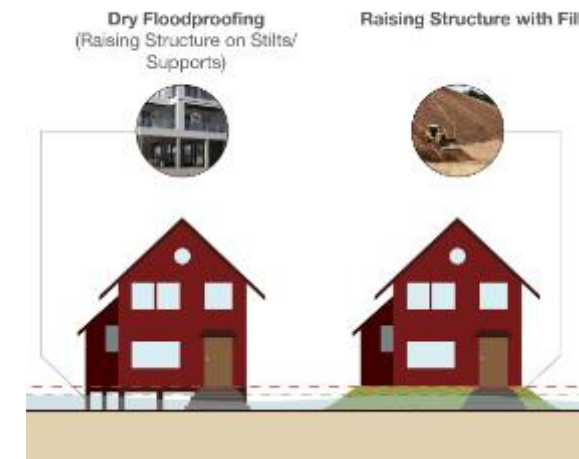
- Use appropriate floodproofing measures
- Guidance on how to floodproof your property:
<https://www.gov.nl.ca/ecc/files/waterres-flooding-floodproofing-protect-your-home-against-flooding-.pdf>
- A property owner is responsible for floodproofing their own property



Common Questions & Comments

What am I permitted to do with my property now that I am in a floodplain?

- 1:20 year flood zone
 - Not permitted to expand the building footprint on the property (e.g., shed, horizontal extension of a home)
 - Permitted to make changes in grade on your property to try and floodproof your property
- 1:100 year flood zone
 - Ground floor elevation of the structure must be above the 1:100 AEP flood level
 - Structure must not obstruct or displace any water in a way that worsens flooding for other properties
 - Follow Department's floodproofing guidelines
 - Entrances and exits of the building must be safe to use without hindrance in the event of a flood



Common Questions & Comments

What can I do with undeveloped property in the 1:20 flood zone?

- Cannot be used for residential development due to the risk of flooding, however, non-structural uses and some non-residential structures may be allowed

Will I be able to get home flood insurance?

- You may not be eligible for overland flood insurance if you are located in a designated flood zone, or you may have your premium reassessed
- Flooding caused by storm surges, tsunamis or tidal waves is typically not covered by insurers
- Check with your insurer

Common Questions & Comments

Will being in the floodplain affect the value of my home?

- There are studies that have shown that property in flood zones sells for less and appreciates slower over time than similar property outside flood zones

What do I do if my home is damaged or destroyed in a flood?

- Contact your insurer to see if there is any coverage available
- When authorized by the province in response to a specific emergency financial assistance may be provided to eligible residents through the NL Disaster Financial Assistance Program



Common Questions & Comments

If my home is identified as being in the floodplain will government pay me to move?

- No, however, if your home is damaged by flooding during a storm event you may be eligible for disaster financial assistance if authorized by the province

How does flood mapping help me as a homeowner?

- Provides property owners or those seeking to become property owners with the information needed to make smart decisions:
 - Personal flood risk management- do I want to live in a floodplain?
 - Floodproofing- extent and depth of flood water
 - Financial planning for floodproofing

Only **6%**
of Canadians living in designated
flood-prone areas are aware of
their flood risk.¹



1. Ziolecki, Anna., Thistlethwaite, Jason., Henstra, Daniel., Scott, Daniel. (September 2020). Canadian Voices on Flood Risk 2020: Findings from a national survey about how we should manage an increasingly costly and common peril. Waterloo, Ontario: Partners for Action, University of Waterloo

In Summary

We need to...

- protect the public from the risk of flood events.
- make people more aware of their flood risk.
- reduce flood risk for both current and climate change conditions.
- reduce the damages and disruption caused by flooding.
- update FRM on a regular basis.
- incorporate coastal storm surge into flood mapping program.

Useful Links:

The Floodplain Belongs to the River:

<https://www.youtube.com/watch?v=pTYGo3dmCtl>

FloodSmart Canada: <http://floodsmartcanada.ca/>

Insurance Bureau of Canada: <http://www.ibc.ca/on/>

NRCan Flood Mapping Guidelines:

<https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/ndmp/fldpln-mppng-en.aspx>

Questions



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