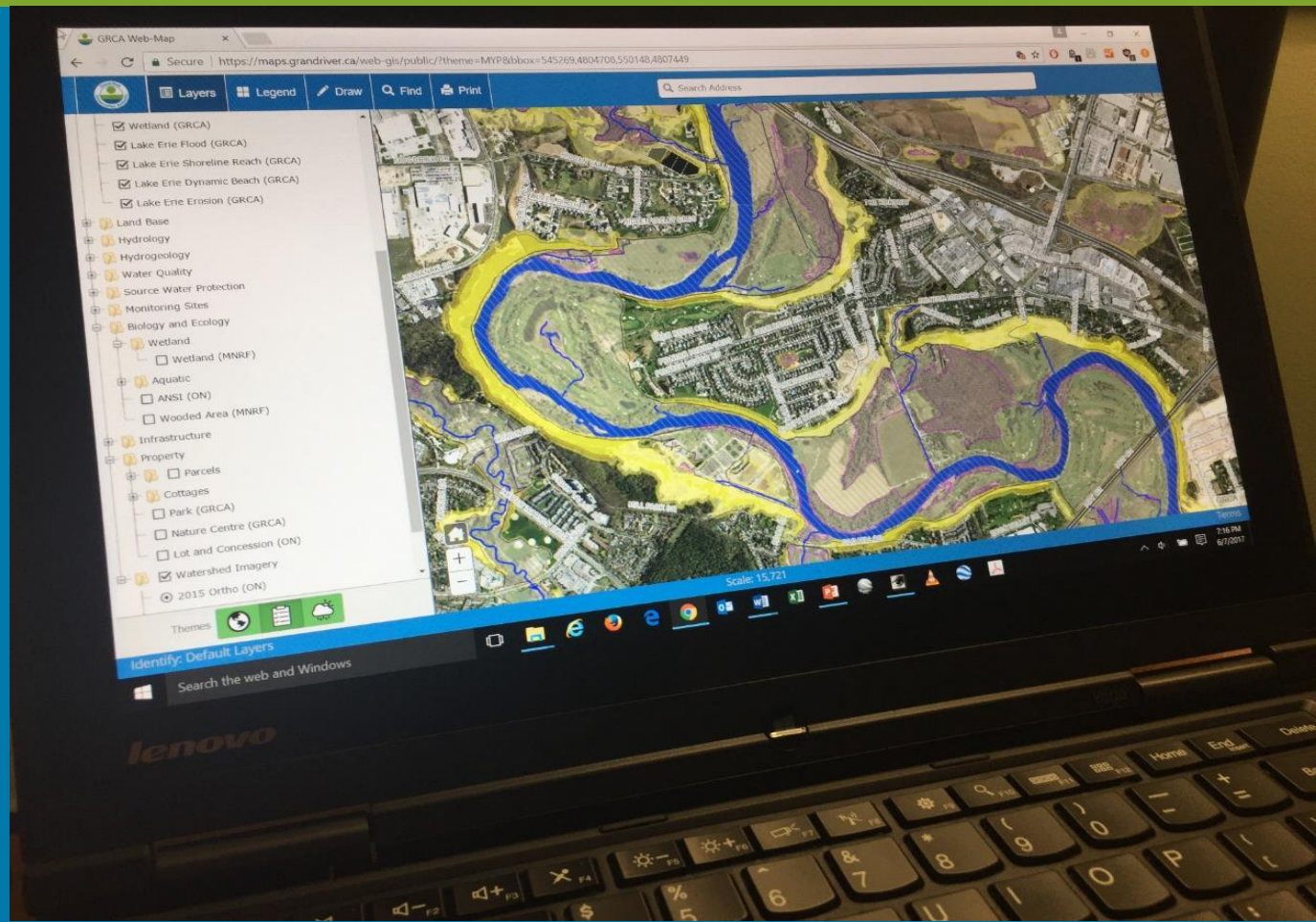
Communicating Flood Risk: The Data Management Considerations

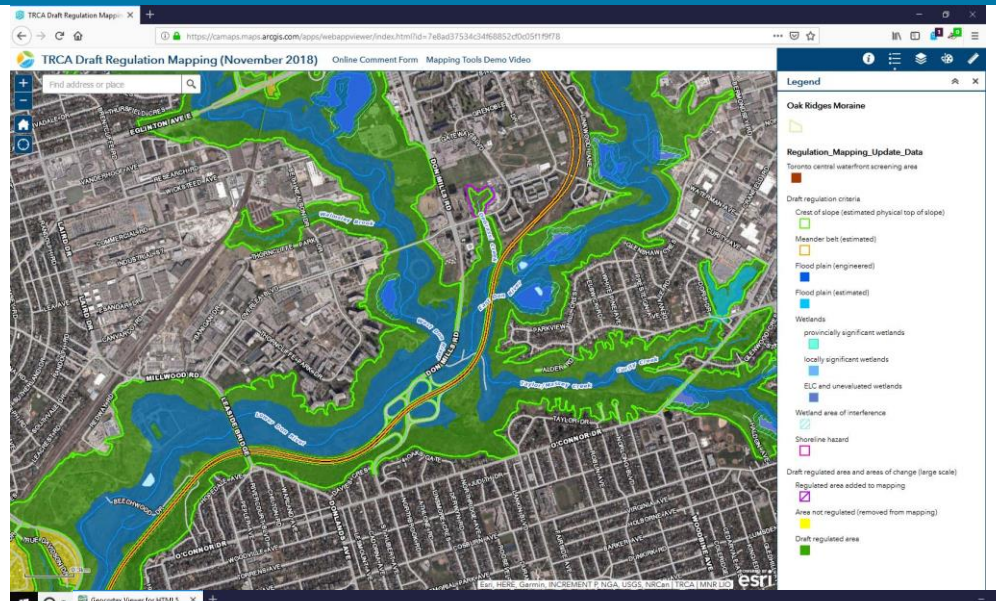
George Sousa, P.Eng.

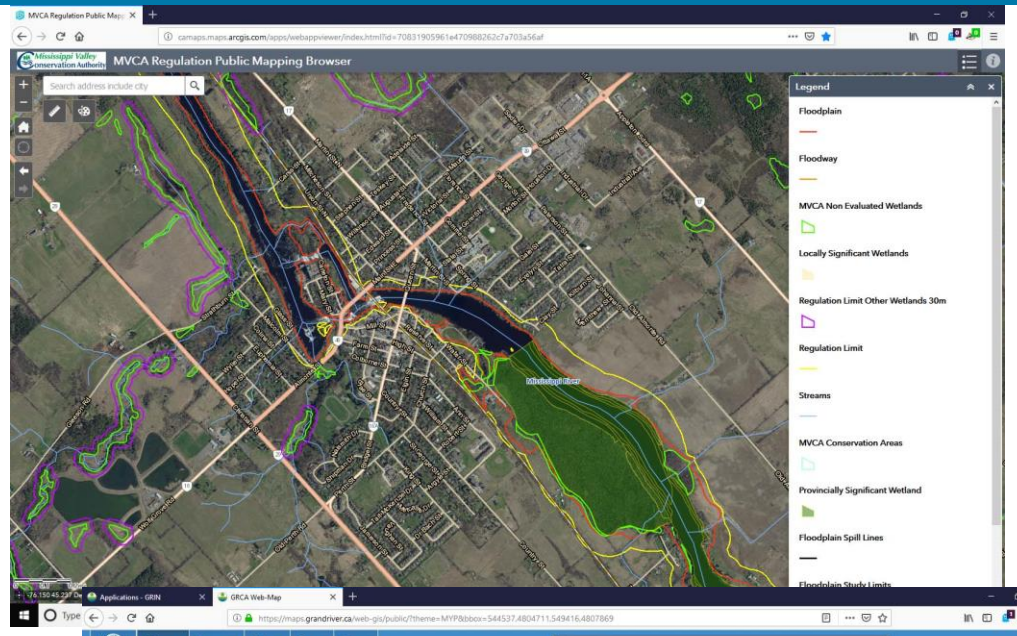


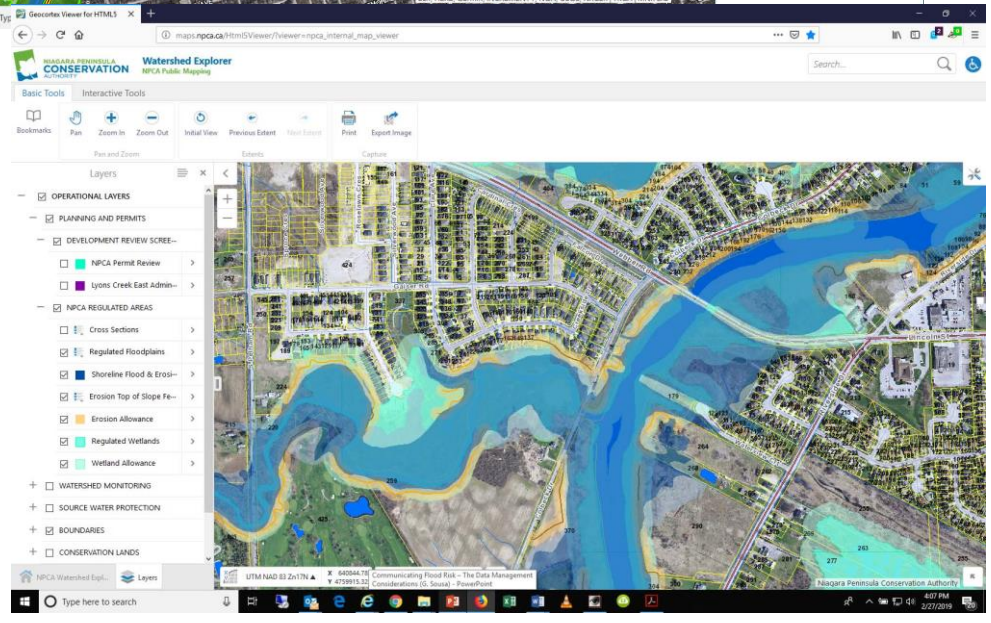
Overview

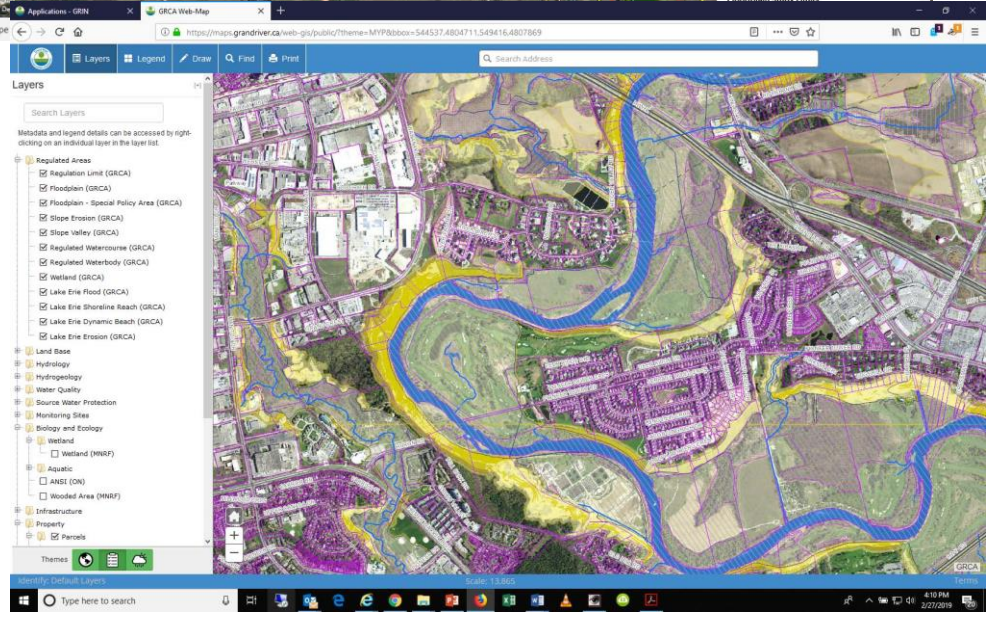
- Digital Floodplain Mapping today
- Emerging Mapping and Data Products
- What we've Learned to date
- Data Governance Framework that will help ensure that our Flood Risk Data and Communication Products are Relevant, Trusted, Maintained and Available

Current “Floodplain Data” Products









A Key Driver - Planning and Regulations

And where is the Floodplain Data?

Downloading Floodplain Mapping Data

Geospatial Downloads - GRIN

https://data.grandriver.ca/downloads-geospatial.html

GRIN

HOME | DOWNLOADS | WEB SERVICES | APPLICATIONS | ABOUT

Downloads Geospatial Data

Grand River Conservation Authority maintains a collection of data layers for its geographic information system (GIS). can download GRCA's GIS data directly from our data catalogue. Refer to the "Licence" column in the data list for deta on use constraints for each individual layer.

GIS Data Catalogue

By accessing or downloading any data or third party data, you agree to be bound by the by associated licence. Information on GRCA's data policies and licences can be found on the Licensing page.

Name	Last Update	Licence
Regulatory Floodplain	2018.09.25	GRCA Open Data Licence v2
Regulation Limit Ontario Regulation 150/06	2019.01.11	GRCA Open Data Licence v2
Rain Gauge Stations	2015.01.27	GRCA Standard Data Licence v3
Rail Trail Points of Interest	2007.01.05	GRCA Open Data Licence v2
Rail Trail	2007.01.05	GRCA Open Data Licence v2
Parks	2016.08.11	GRCA Open Data Licence v2
Nature Centres	2013.06.01	GRCA Open Data Licence v2
Municipal Boundaries LS	2018.06.19	GRCA Open Data Licence v2
Land Cover 1999	1999.09.03	GRCA Open Data Licence v2

More Information

Learn more about the data available from GI and find related resources.

Licensing Details

External Resources

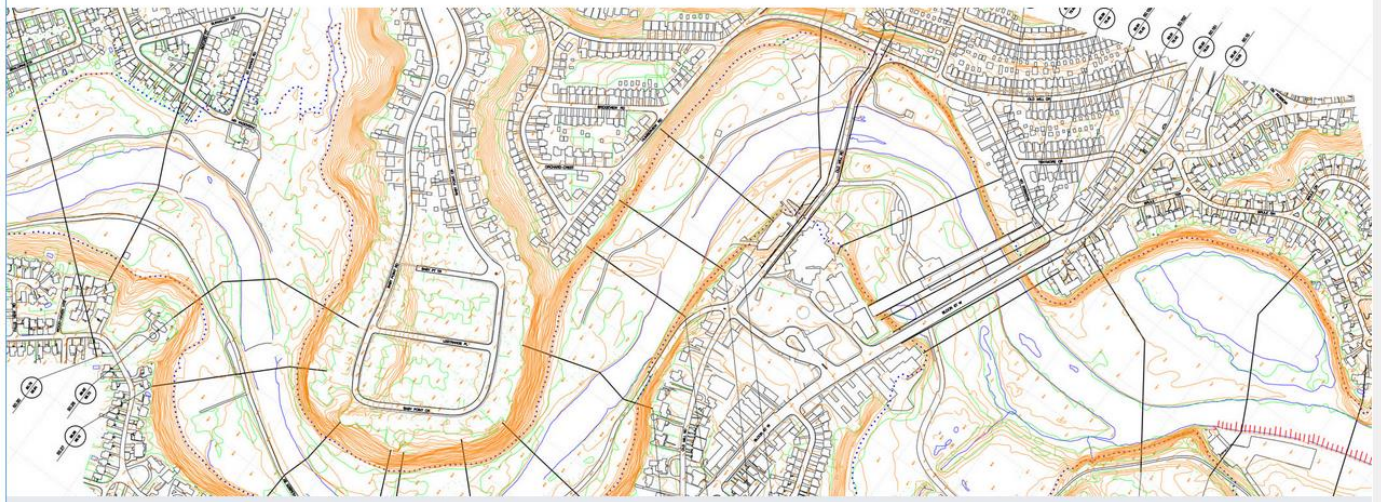
Floodplain | First Base Solution

www.firstbasesolutions.com/product/floodplain/

FIRST BASE SOLUTIONS GEOSPATIAL EXPERTS

Go to: MapWarehouse VuMAP MapCast 905-477-3600

COMPANY | INDUSTRIES | SERVICES



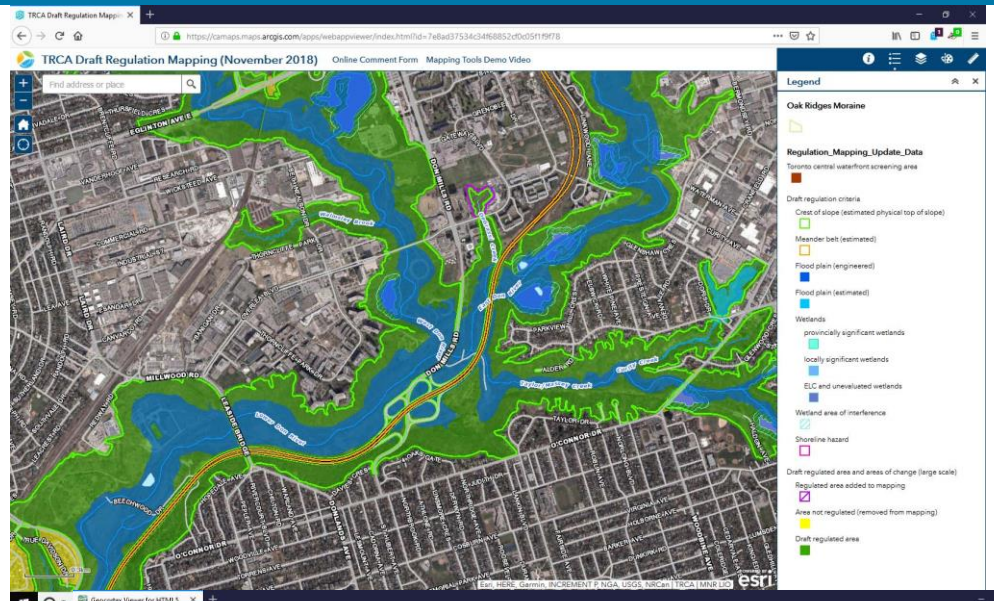
Floodplain

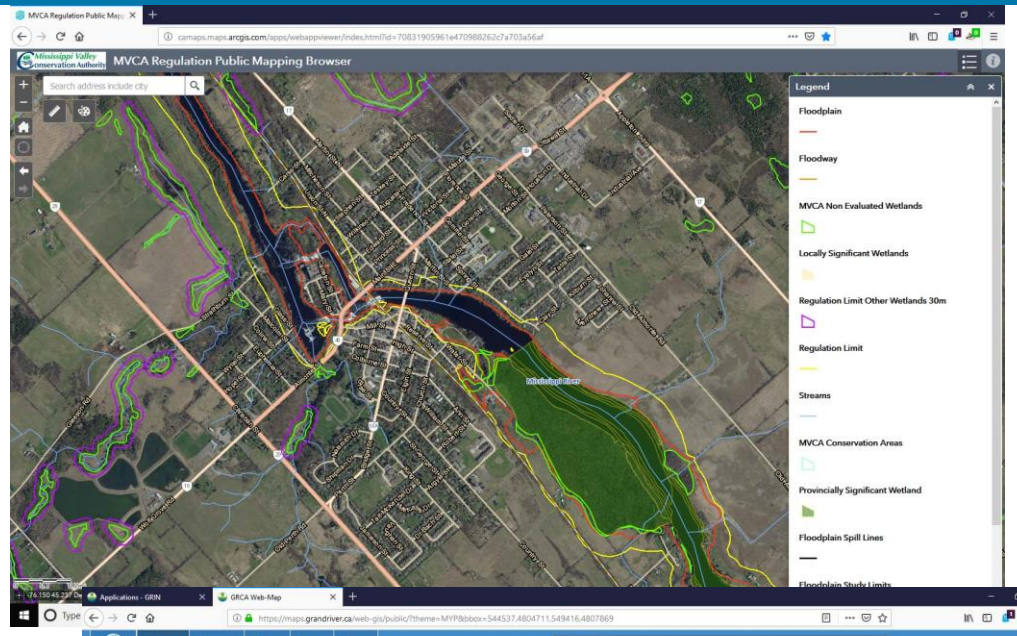
How To Purchase | Who's It For? | Discover More

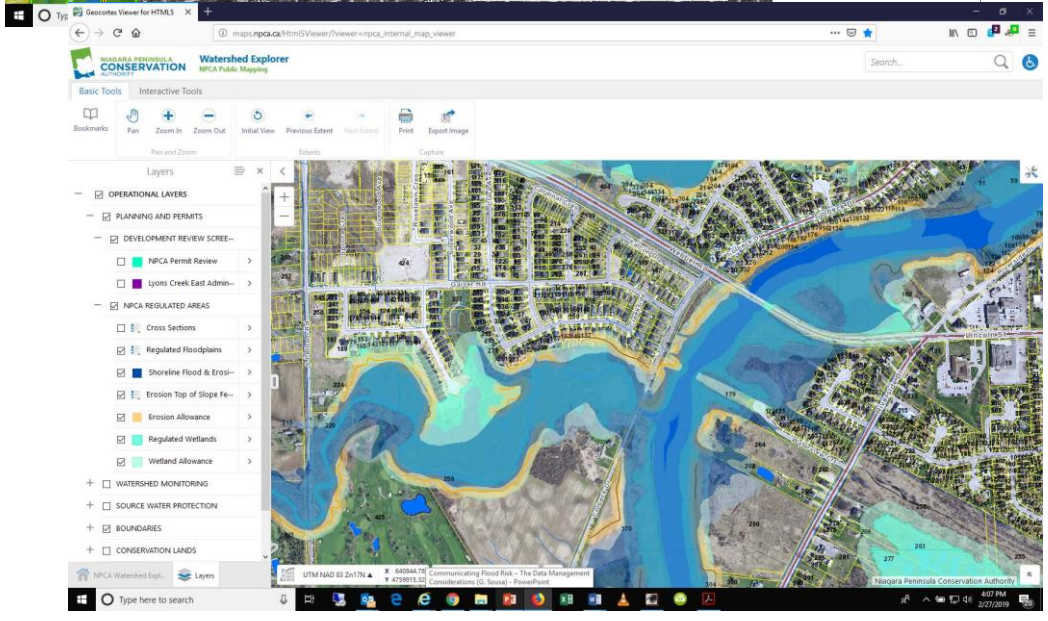
Regulatory flood line mapping defines the 100-year storm event for lakes and rivers in the

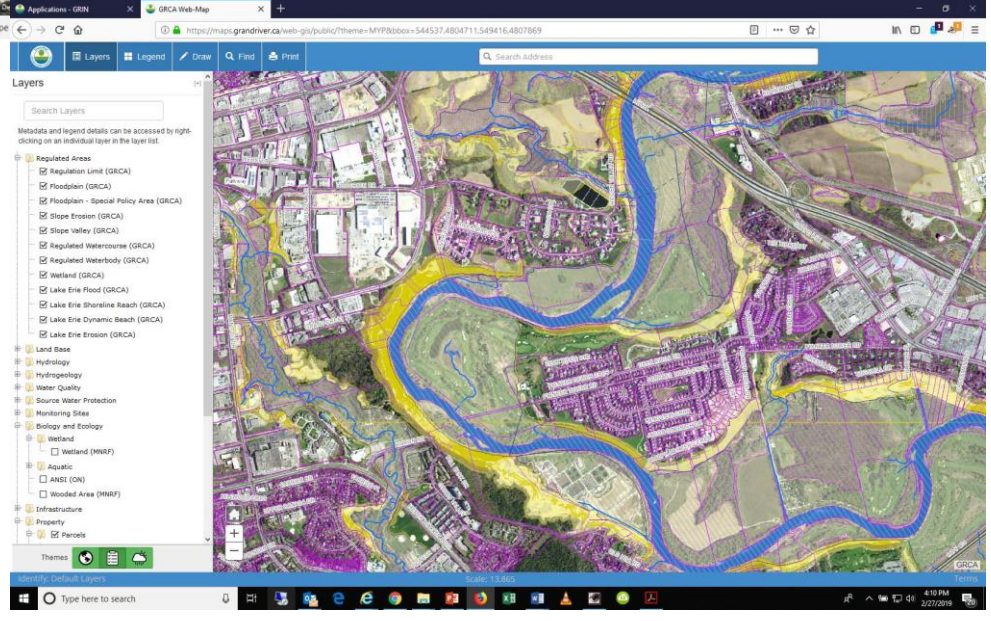
Predicted high water levels and historical observations from Hurricane Hazel can be used to estimate risk.

Why not More?


TRCA Draft Regulation Mapping (November 2018)
Online Comment Form
Mapping Tools Demo Video
Legend
Oak Ridges Moraine
Regulation_Mapping_Update_Data


MVCA Regulation Public Mapping Browser
Legend
Floodplain
Floodway
MVCA Non Evaluated Wetlands
Locally Significant Wetlands
Regulation Limit Other Wetlands 30m
Regulation Limit
Streams
MVCA Conservation Areas
Provincially Significant Wetland
Floodplain Spill Lines

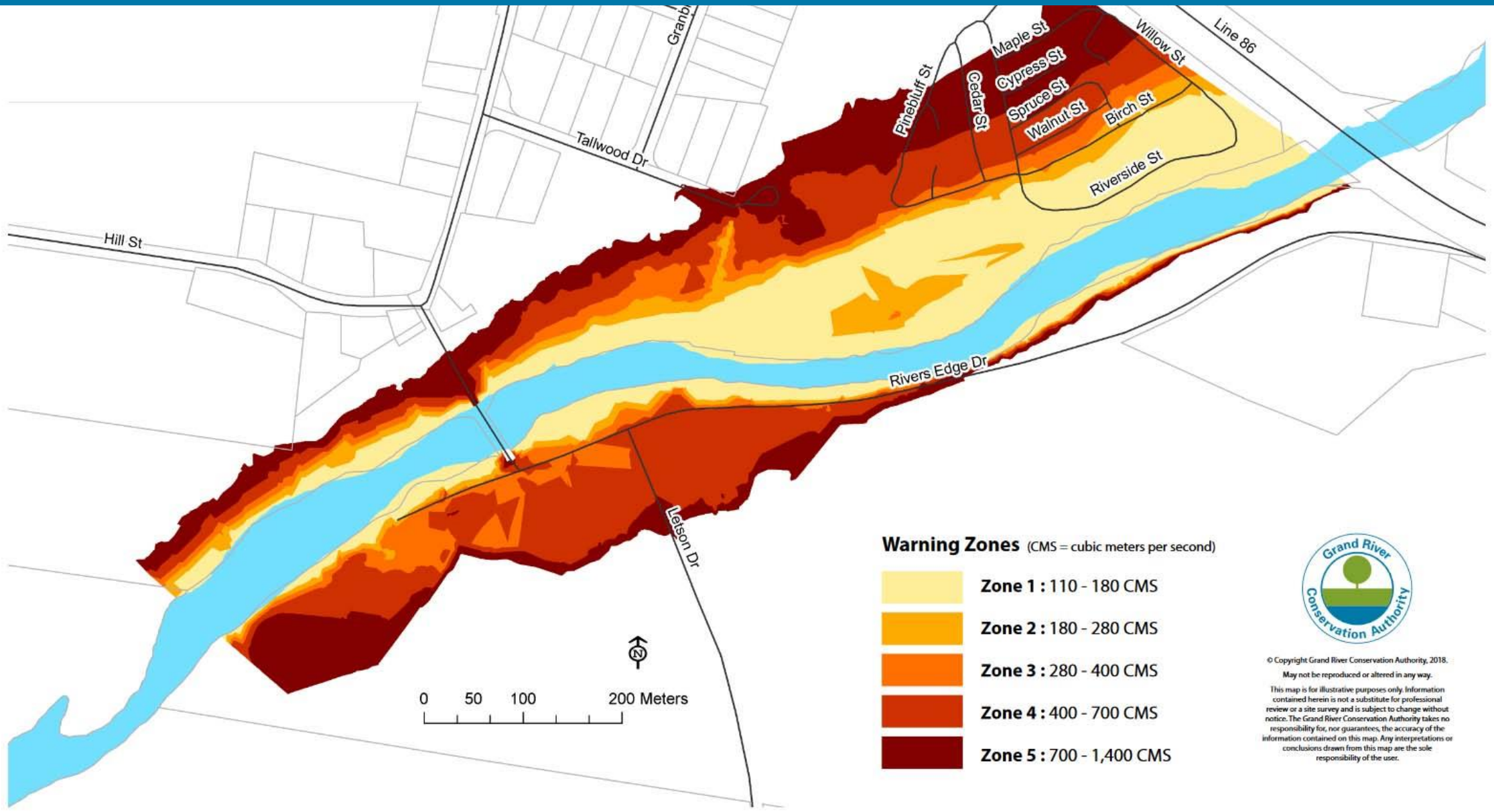

Watershed Explorer
Layers
OPERATIONAL LAYERS
PLANNING AND PERMITS
NPCA REGULATED AREAS


Layers
Regulated Areas
Land Base
Hydrology
Infrastructure
Property

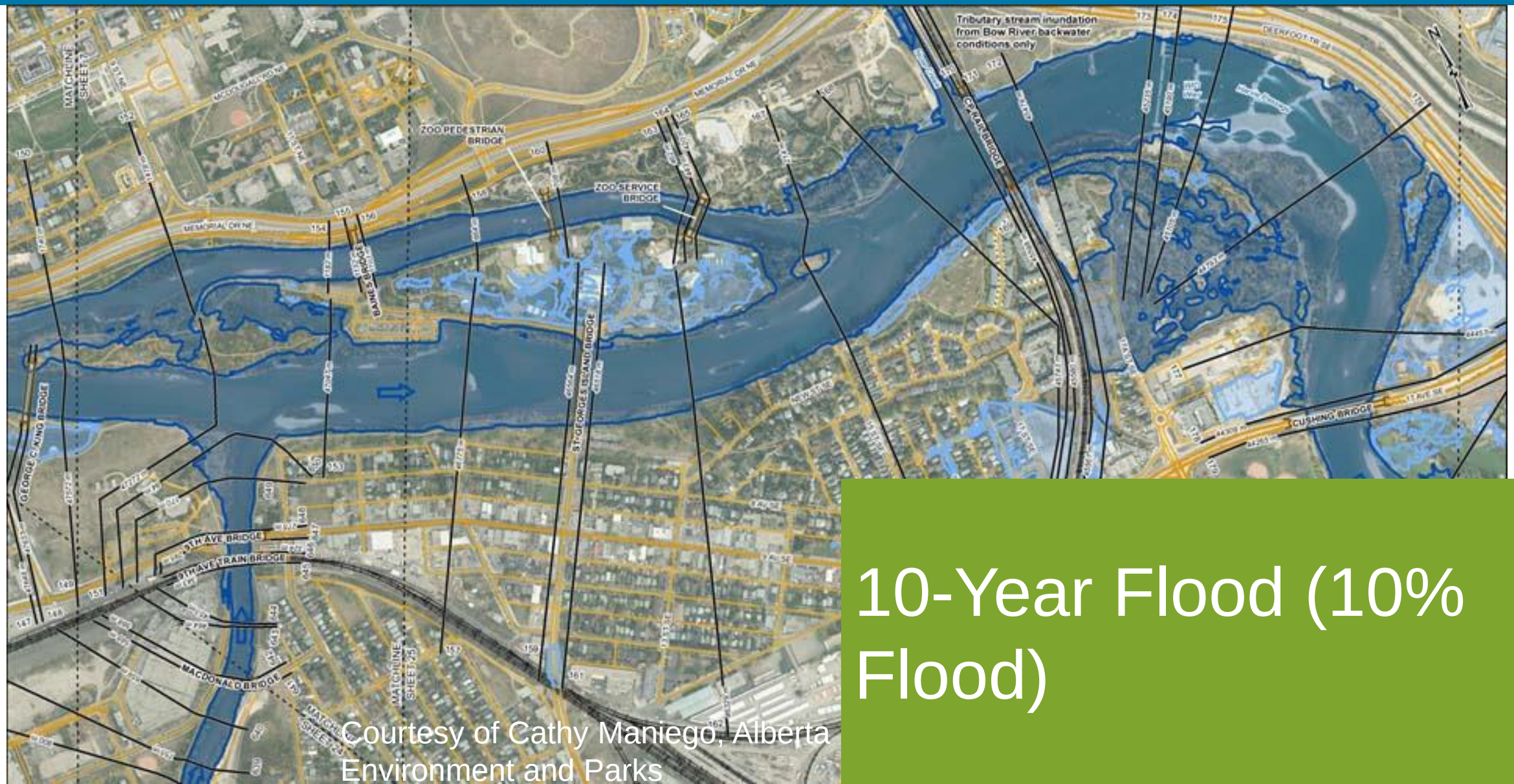

Risk
Confidence
Lawsuit
Maintenance
Resourcing
Capacity
Support
Cost Recovery
Documentation
Metadata

Emerging Flood Mapping and Flood Data Products

Flood Zone Mapping



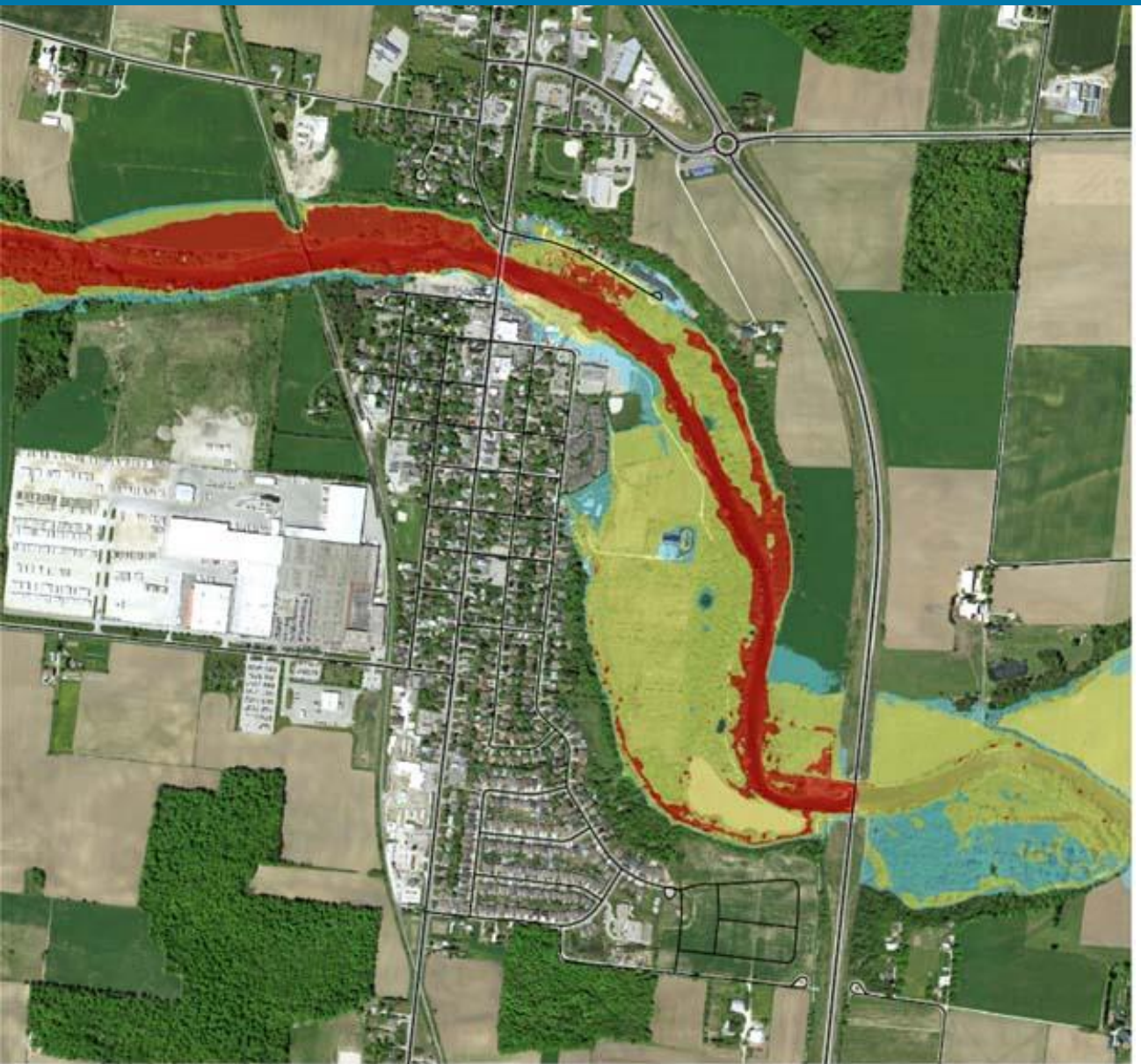
Flood Frequency Mapping



Courtesy of Cathy Maniego, Alberta Environment and Parks

10-Year Flood (10% Flood)

Dam Break Flood Mapping



PMP - Probable Maximum Precipitation

The Good News going forward…

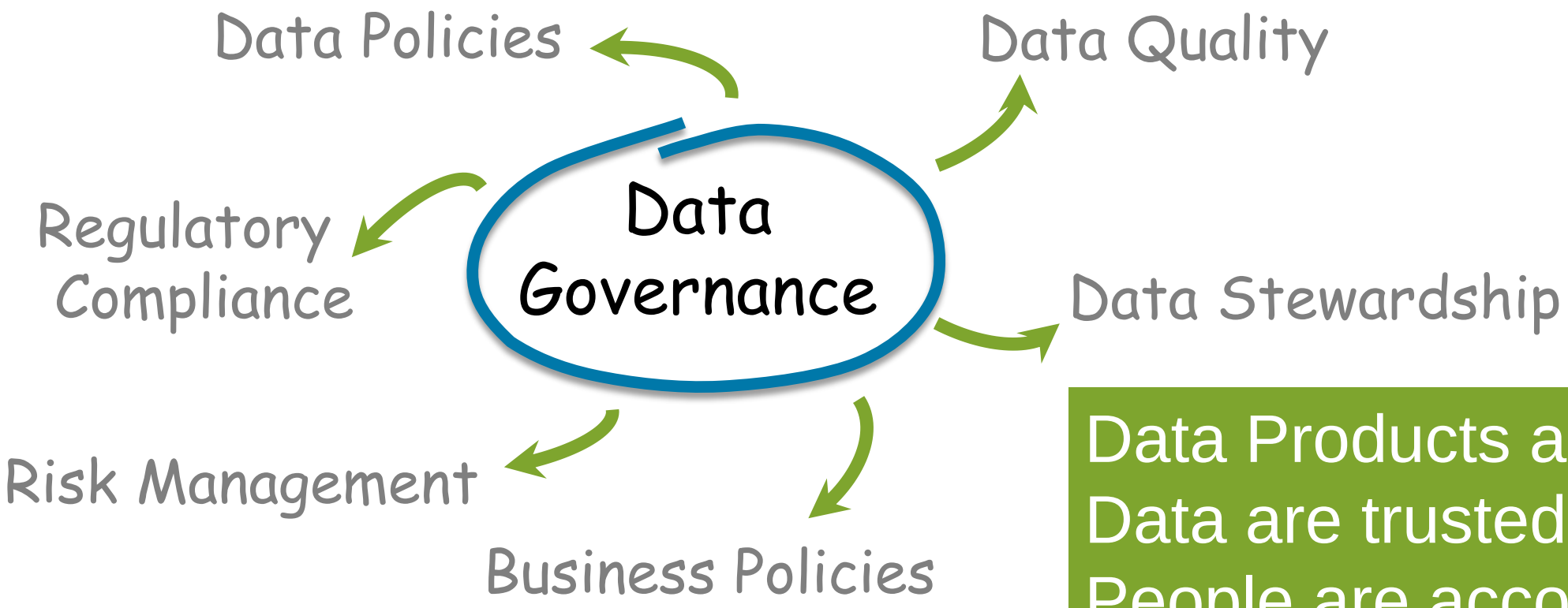
- **Better Input Data!**
- **Better Tools!**
- **Lower Costs!**
- **More and Better Outputs!**

Have we fallen short?

What have we learned and how do improve the odds of success?

Data is an Asset

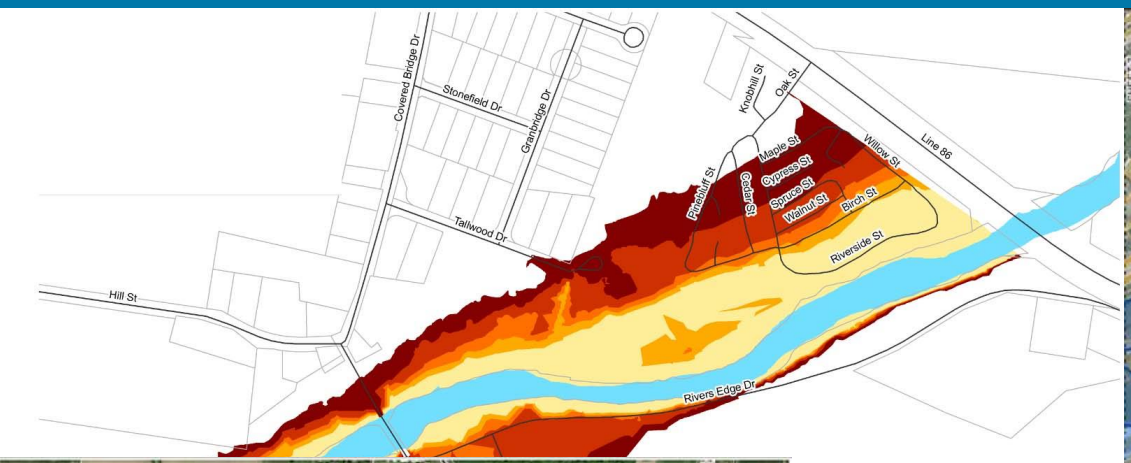
Data Governance

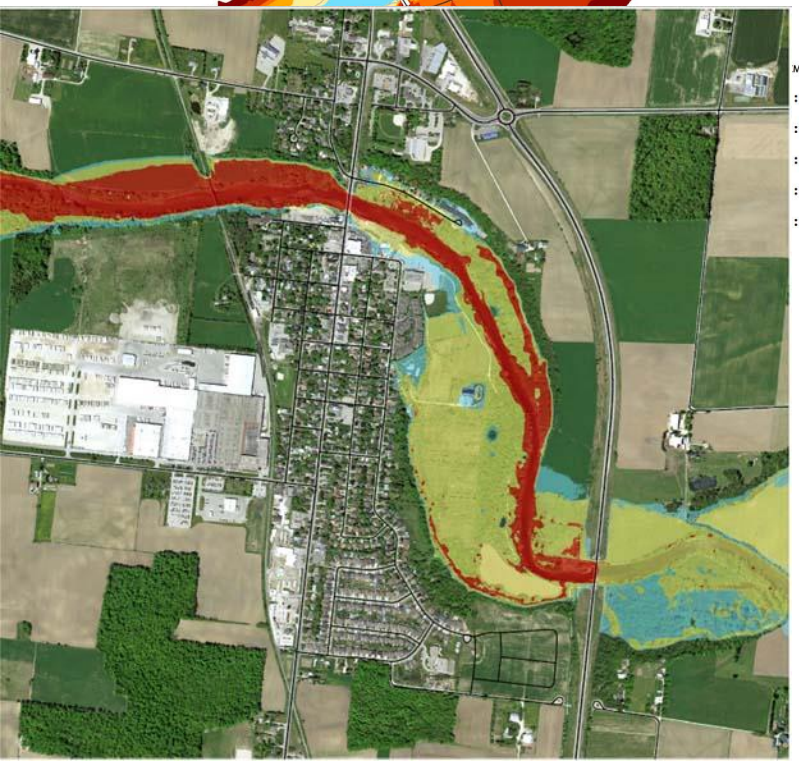


Data Products are defined
Data are trusted
People are accountable
Data are available
Risks are managed

Define the Product

Define the Product





MS = cubic meters per second)

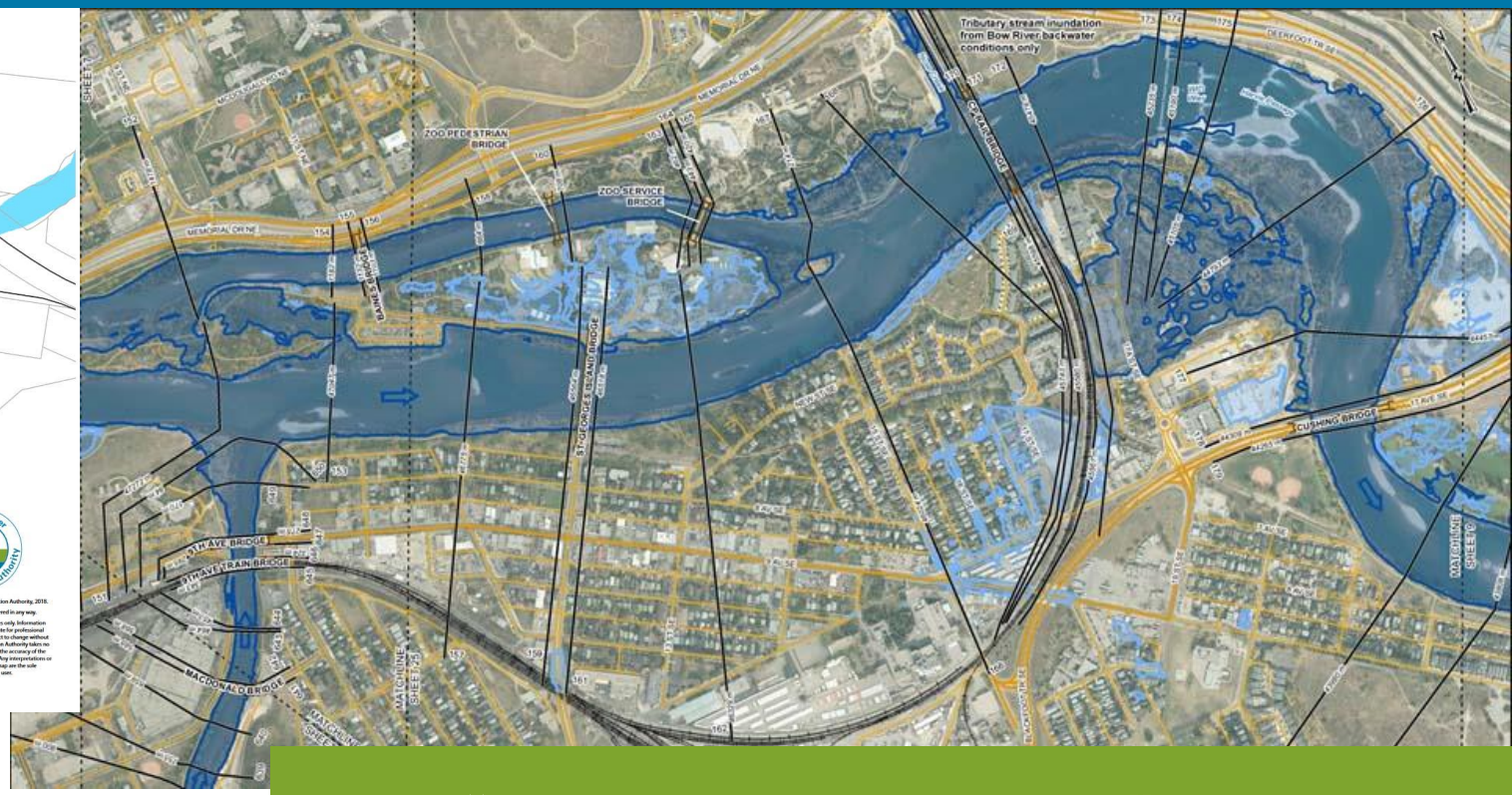
: 110 - 180 CMS

: 180 - 280 CMS

: 280 - 400 CMS

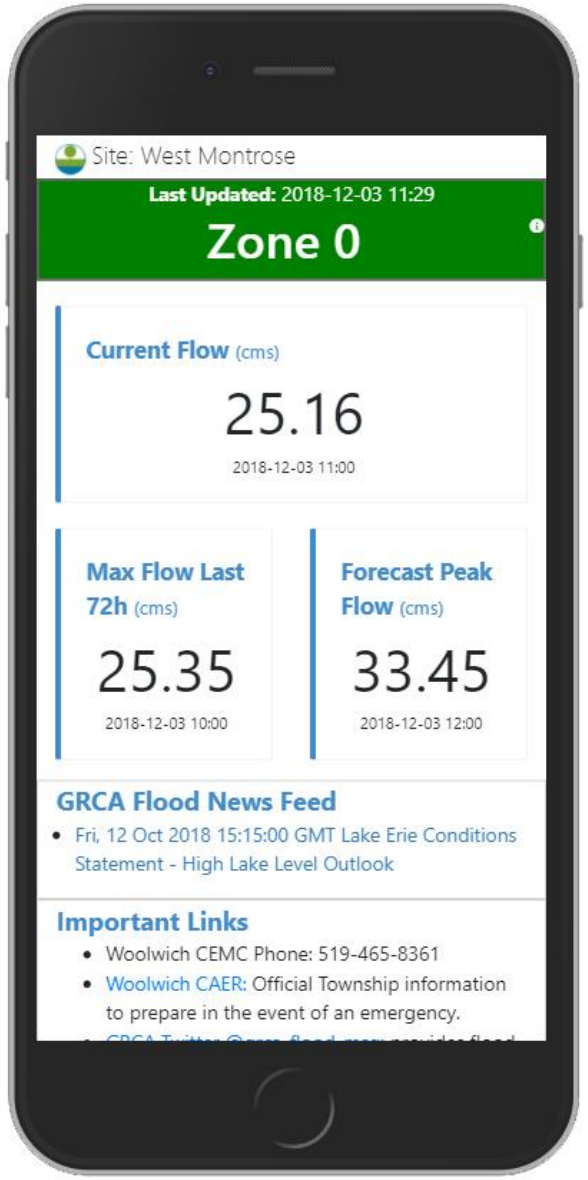
: 400 - 700 CMS

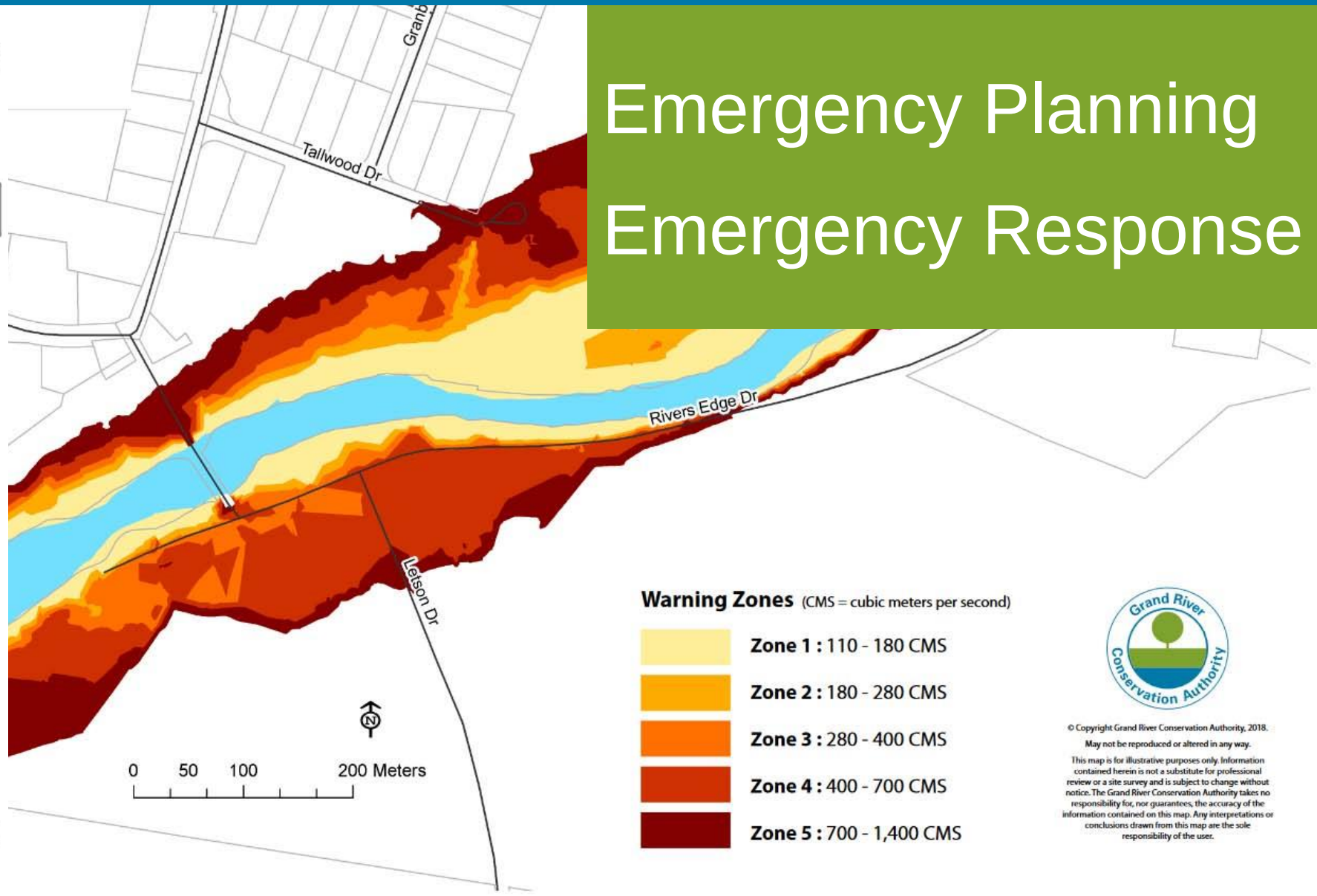
: 700 - 1,400 CMS



The “Flood Frequency” Product
The “Flood Zone” Product
The “Flood Risk” Product
The “Flood Depth” Product…

Define the Product - “Consider the Needs”





Emergency Planning

Emergency Response

Define the Product - Consider the “Audiences”

Nat. Hazards Earth Syst. Sci., 19, 313–323, 2019
https://doi.org/10.5194/nhess-19-313-2019

Natural Hazards and Earth System Sciences
Open Access
EGU

Communicating disaster risk? An evaluation of the availability and quality of flood maps

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Received: 11 September 2018 – Discussion started: 4 October 2018
Revised: 11 January 2019 – Accepted: 24 January 2019 – Published: 1 February 2019

Abstract. One of the key priorities for disaster risk reduction is to ensure decision makers, stakeholders, and the public understand their exposure to disaster risk, so that they can take protective action. Flood maps are a potentially valuable tool for facilitating this understanding of flood risk, but previous research has found that they vary considerably in availability and quality. Using an evaluation framework comprising nine criteria grounded in existing scholarship, this study assessed the quality of flood maps available to the public in Canadian communities located in designated flood risk areas. It found that flood maps in most municipalities (62 %) are low quality (meeting less than 50 % of the criteria) and the highest score was 78 % (seven of nine criteria met). The findings suggest that a more concerted effort to produce high-quality, publicly accessible flood maps is required to support Canada's international commitment to disaster risk reduction. Further questions surround possible weighting of quality assessment criteria, whether and how individuals seek out flood maps, and how flood risk information could be better communicated using modern technology.

certed effort to “reduce the damage caused by natural hazards … through an ethic of prevention” (UNISDR, 2018).

This strategy of disaster risk reduction is embodied in the Sendai Framework for Disaster Risk Reduction, an international agreement endorsed in 2015 by 187 United Nations members. The framework's first priority – understanding disaster risk – exhorts member states to “develop, periodically update and disseminate, as appropriate, location-based disaster risk information, including risk maps, to decision makers, the general public and communities at risk of exposure to disaster” (United Nations, 2015, p.15). This priority supports risk-based decision-making through the transparent exchange of accessible and up-to-date risk information (United Nations, 2015, p. 14).

In the context of floods, this priority suggests that stakeholders must understand the probability of flooding at their location, the likely inundation zone of a flood of a particular magnitude, possible impacts on their property and assets, and measures they can take to mitigate the risk. Flood maps – cartographic depictions of geographic areas that could

Photos

Personalized experience.

Local context.

Historical context.

Legend legibility.

Flood zone legibility.

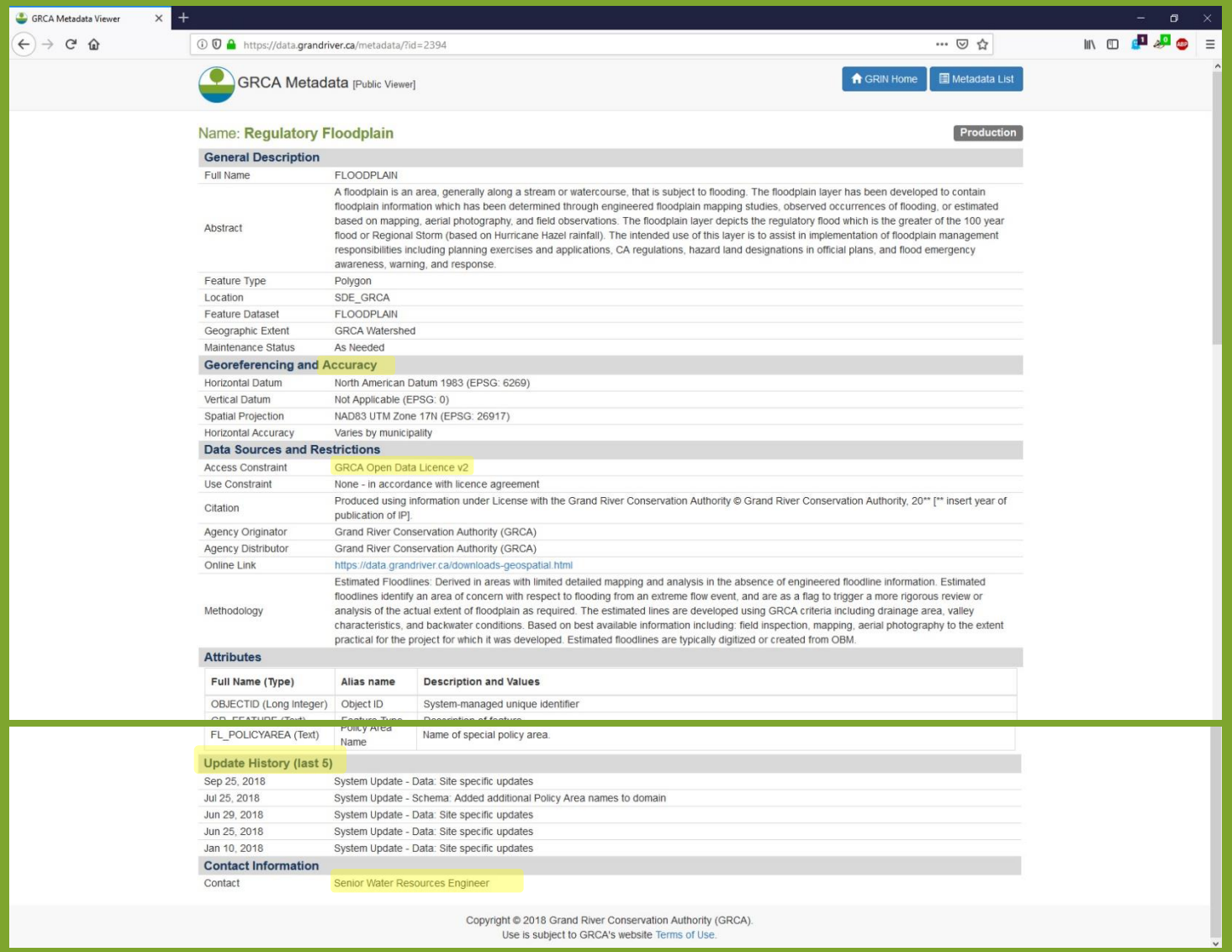
Explanation of technical terms

Risk reduction advice.

Transparency about limitations and uncertainty.

Depiction of multiple flood hazards.

Define the Product - Develop Documentation



GRCA Metadata Viewer

https://data.grandriver.ca/metadata/?id=2394

GRCA Metadata [Public Viewer]

GRIN Home | Metadata List

Name: **Regulatory Floodplain** — Production

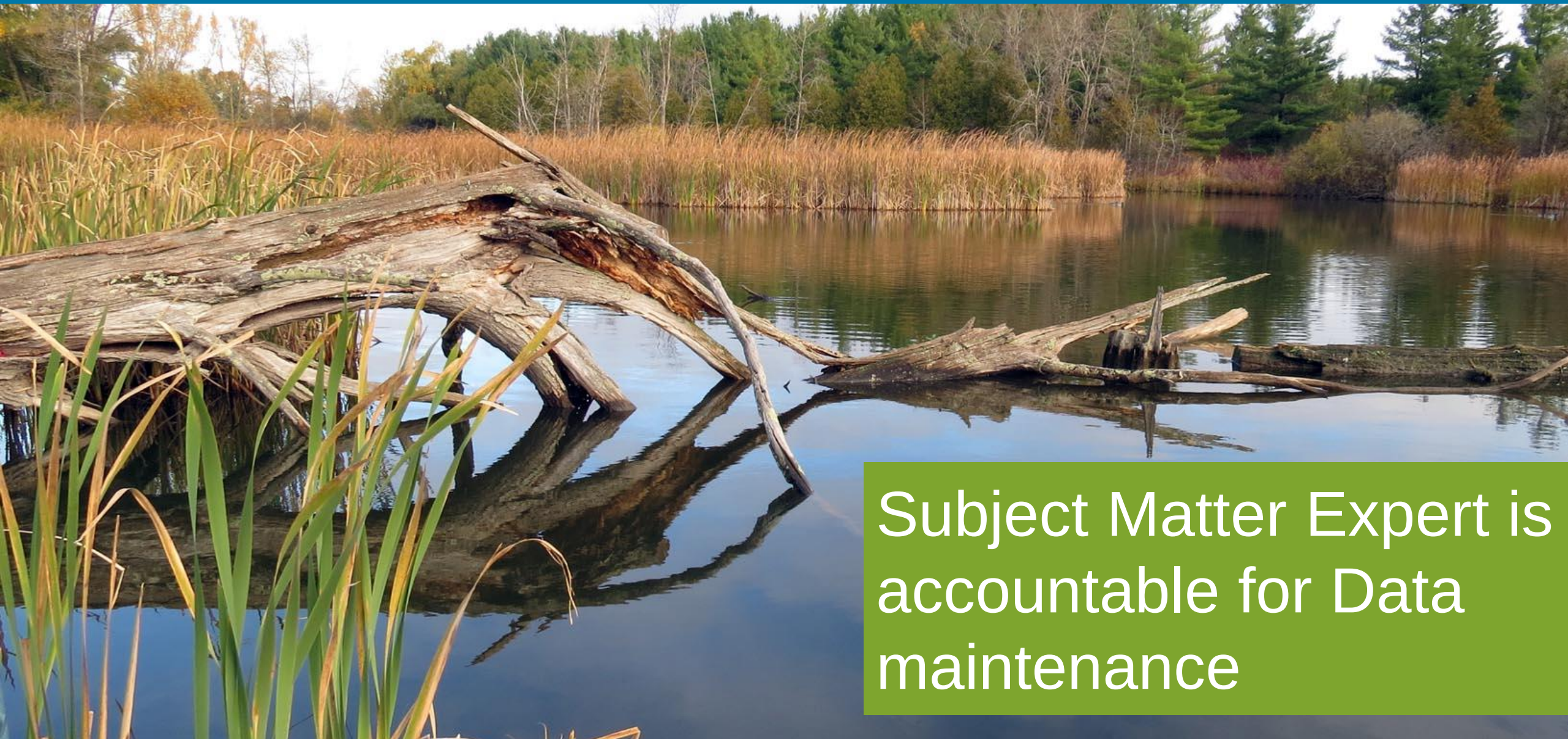
General Description	
Full Name	FLOODPLAIN
Abstract	A floodplain is an area, generally along a stream or watercourse, that is subject to flooding. The floodplain layer has been developed to contain floodplain information which has been determined through engineered floodplain mapping studies, observed occurrences of flooding, or estimated based on mapping, aerial photography, and field observations. The floodplain layer depicts the regulatory flood which is the greater of the 100 year flood or Regional Storm (based on Hurricane Hazel rainfall). The intended use of this layer is to assist in implementation of floodplain management responsibilities including planning exercises and applications, CA regulations, hazard land designations in official plans, and flood emergency awareness, warning, and response.
Feature Type	Polygon
Location	SDE_GRCA
Feature Dataset	FLOODPLAIN
Geographic Extent	GRCA Watershed
Maintenance Status	As Needed
Georeferencing and Accuracy	
Horizontal Datum	North American Datum 1983 (EPSG: 6269)
Vertical Datum	Not Applicable (EPSG: 0)
Spatial Projection	NAD83 UTM Zone 17N (EPSG: 26917)
Horizontal Accuracy	Varies by municipality
Data Sources and Restrictions	
Access Constraint	GRCA Open Data Licence v2
Use Constraint	None - in accordance with licence agreement
Citation	Produced using information under License with the Grand River Conservation Authority © Grand River Conservation Authority, 20** [** insert year of publication of IP].
Agency Originator	Grand River Conservation Authority (GRCA)
Agency Distributor	Grand River Conservation Authority (GRCA)
Online Link	https://data.grandriver.ca/downloads-geospatial.html
Methodology	Estimated Floodlines: Derived in areas with limited detailed mapping and analysis in the absence of engineered floodline information. Estimated floodlines identify an area of concern with respect to flooding from an extreme flow event, and are as a flag to trigger a more rigorous review or analysis of the actual extent of floodplain as required. The estimated lines are developed using GRCA criteria including drainage area, valley characteristics, and backwater conditions. Based on best available information including: field inspection, mapping, aerial photography to the extent practical for the project for which it was developed. Estimated floodlines are typically digitized or created from OBM.

Attributes

Full Name (Type)	Alias name	Description and Values
OBJECTID (Long Integer)	Object ID	System-managed unique identifier
FL_POLICYAREA (Text)	Policy Area Name	Name of special policy area.

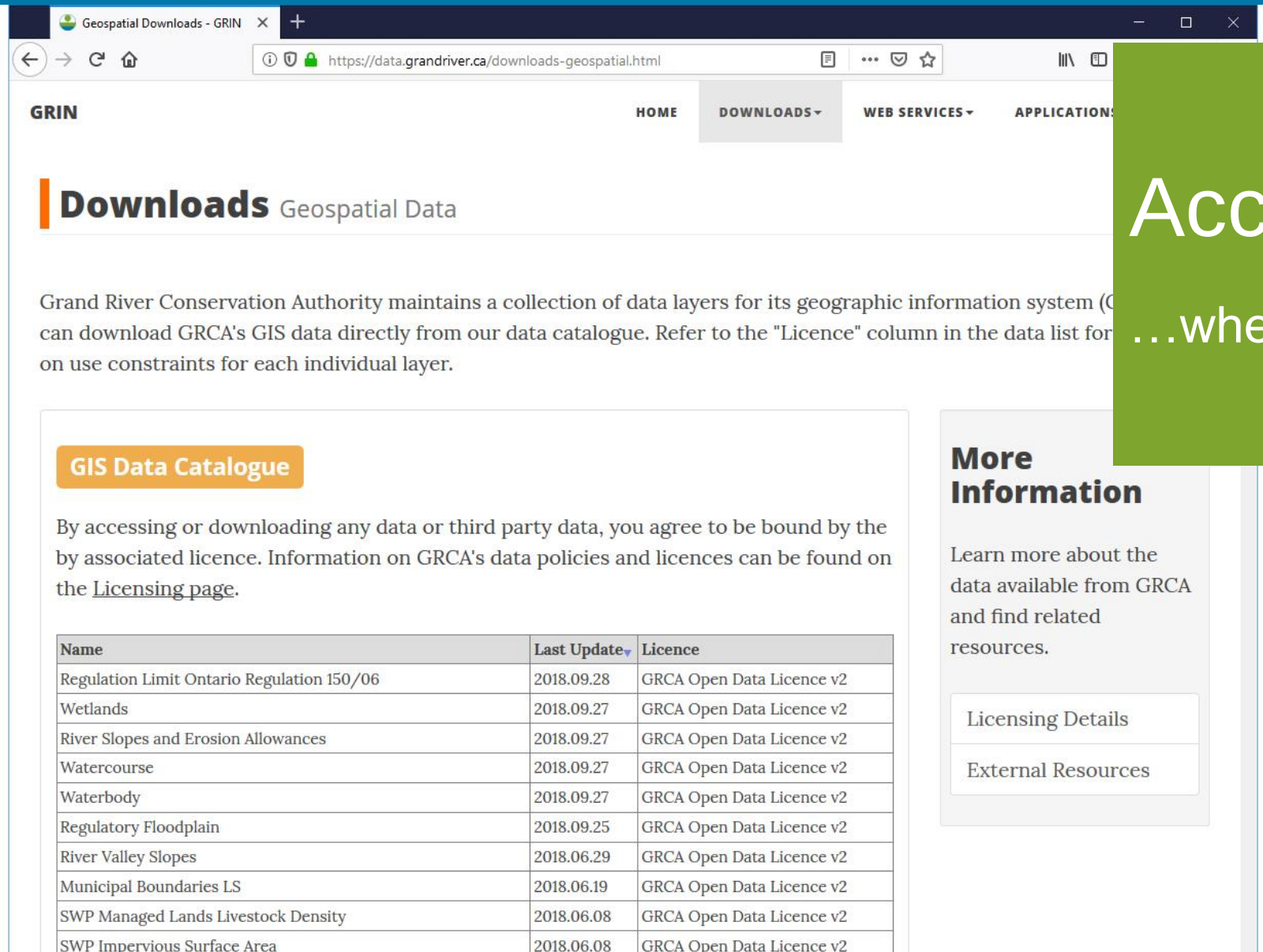
Update History (last 5)	
Sep 25, 2018	System Update - Data: Site specific updates
Jul 25, 2018	System Update - Schema: Added additional Policy Area names to domain
Jun 29, 2018	System Update - Data: Site specific updates
Jun 25, 2018	System Update - Data: Site specific updates
Jan 10, 2018	System Update - Data: Site specific updates
Contact Information	
Contact	Senior Water Resources Engineer

Trust and Accountability - Data Custodian



Subject Matter Expert is accountable for Data maintenance

Make the Data Available to Others



Access to Data

…where knowledge is freely shared

Data Access - Consider Web Services

Data,
Web Services, and
Applications

Downloads

GRCA maintains a collection of data available for download. This includes GIS, river and climate monitoring, and other datasets that are frequently requested.

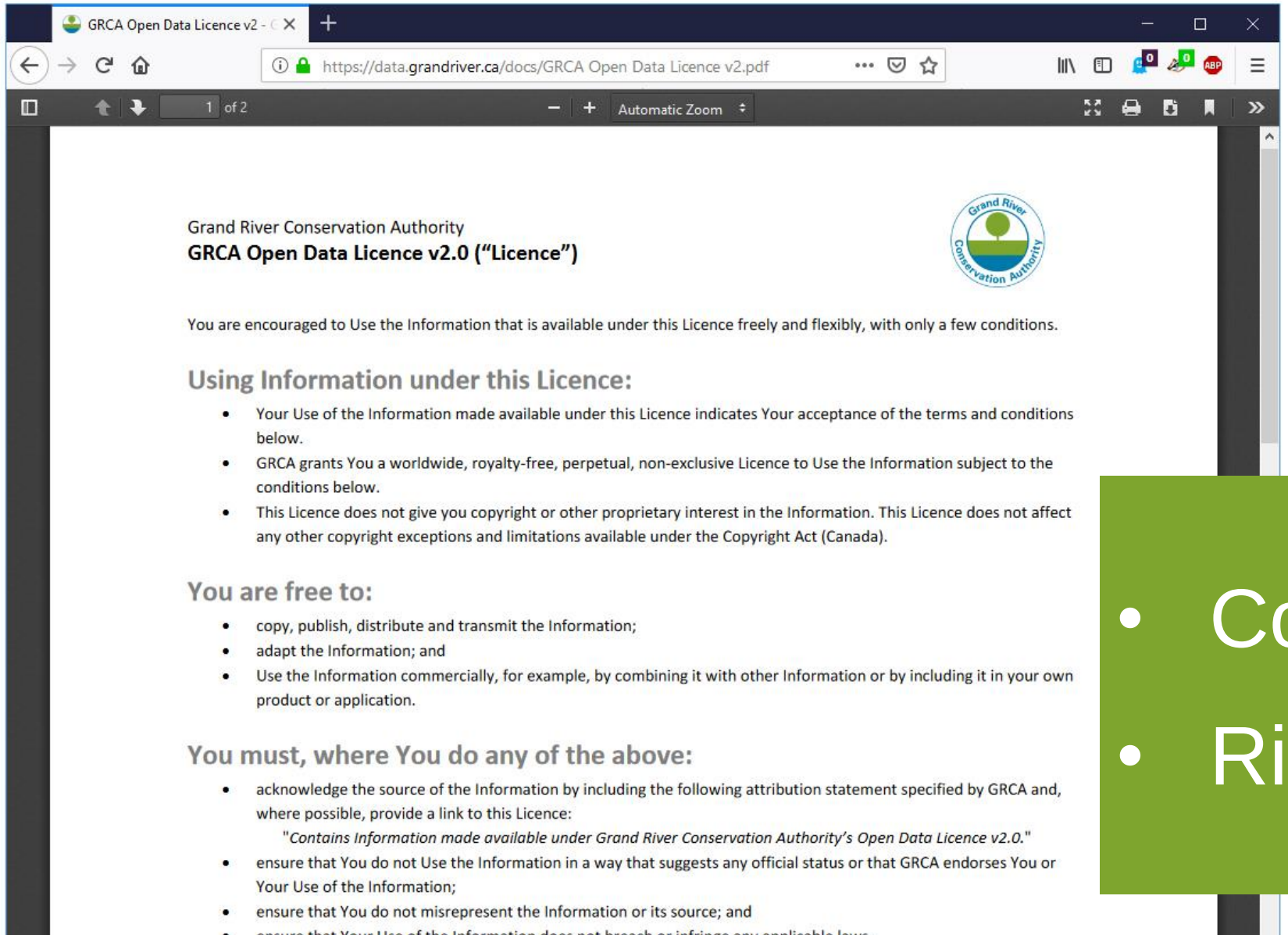
Web Services

Web services and APIs provide developers the tools to build great applications while connecting our information directly into your applications.

Applications

Applications built by our team at GRCA which allow you to visualize data, generate maps, and plot interactive charts.

Manage Risk



- Copyright Act
- Risk Mitigation

Understand Your Insurance Coverage.

“Errors and Omissions”
“Commercial General Liability”

Review your Risk Management and Risk Mitigation Strategy with your Insurer.

Summary

- Digital Floodplain Mapping
  - it’s happening
- - it’s evolving
- We’ve Learned a lot
- We can and must ensure that our Flood Risk Data and Communication Products are Relevant, Trusted, Maintained and Available

Thank You!

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@george_sousa