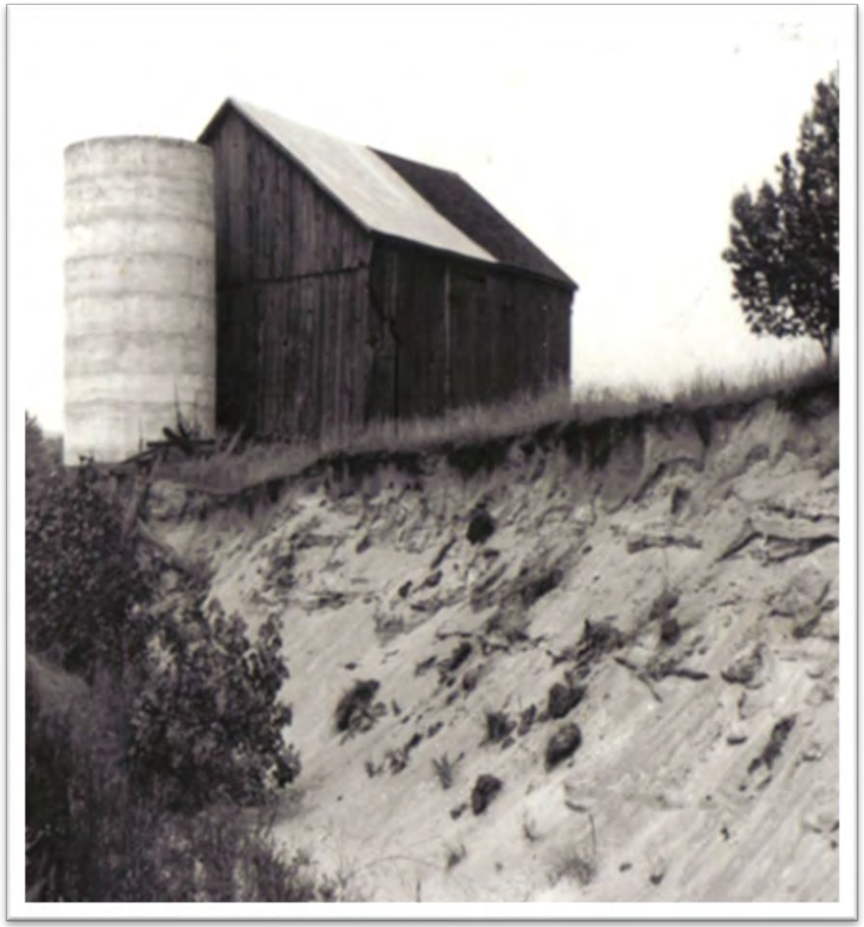
SVCA Flood Preparedness Session

Welcome and Introduction

Jennifer Stephens
General Manager / Secretary-Treasurer

2020-12-09

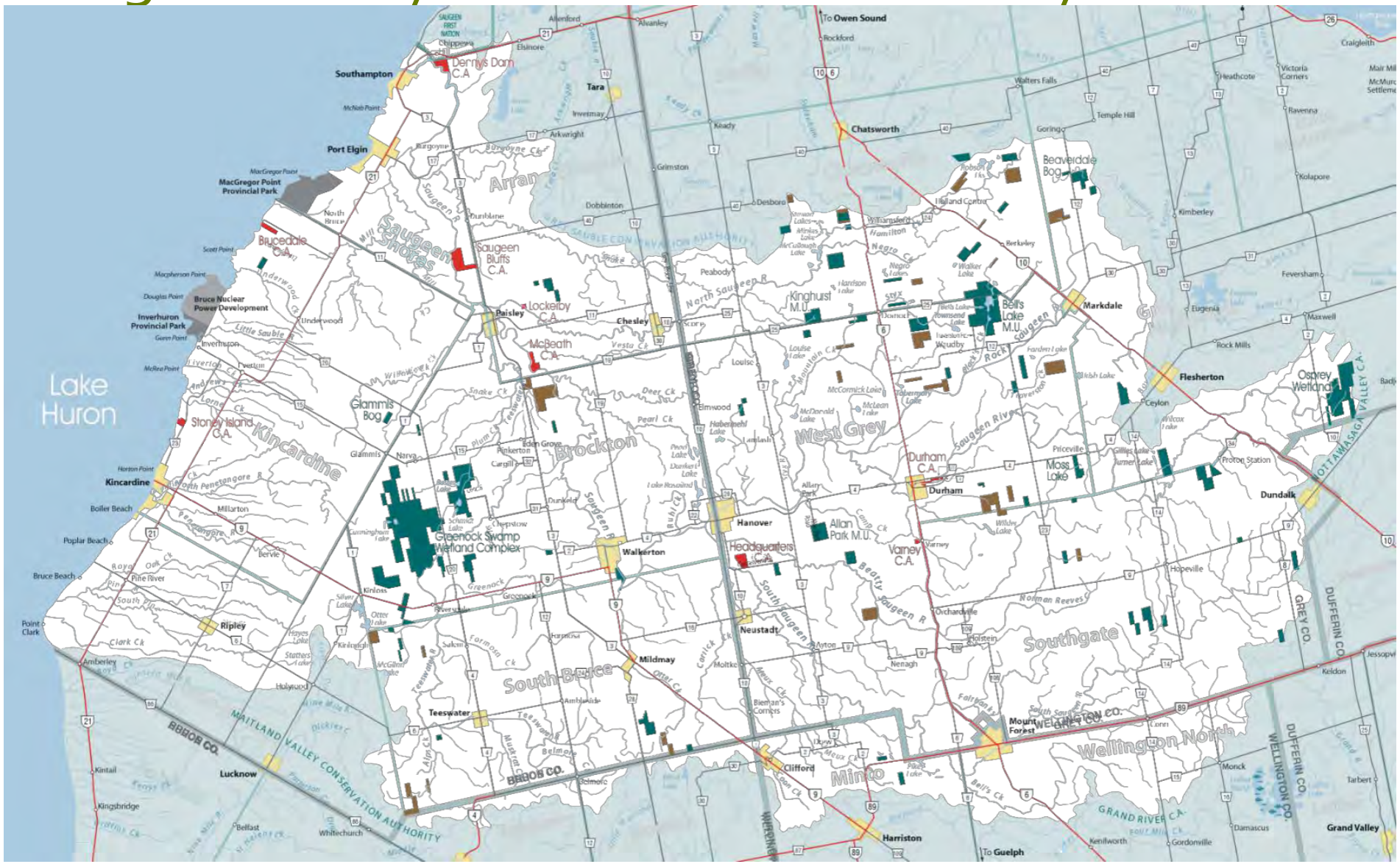


The genesis of Conservation Authorities
The *Conservation Authorities Act*, 1946

Watershed Based Decision Making

CAs have been monitoring and collecting watershed information for decades

Saugeen Valley Conservation Authority Watershed



Flood Forecasting and Warning

Shaun Anthony
Flood Warning / Water Quality Coordinator

We are one of 36 Conservation Authorities across Ontario under the umbrella organization of Conservation Ontario.

4632 sq. km

15 Municipalities

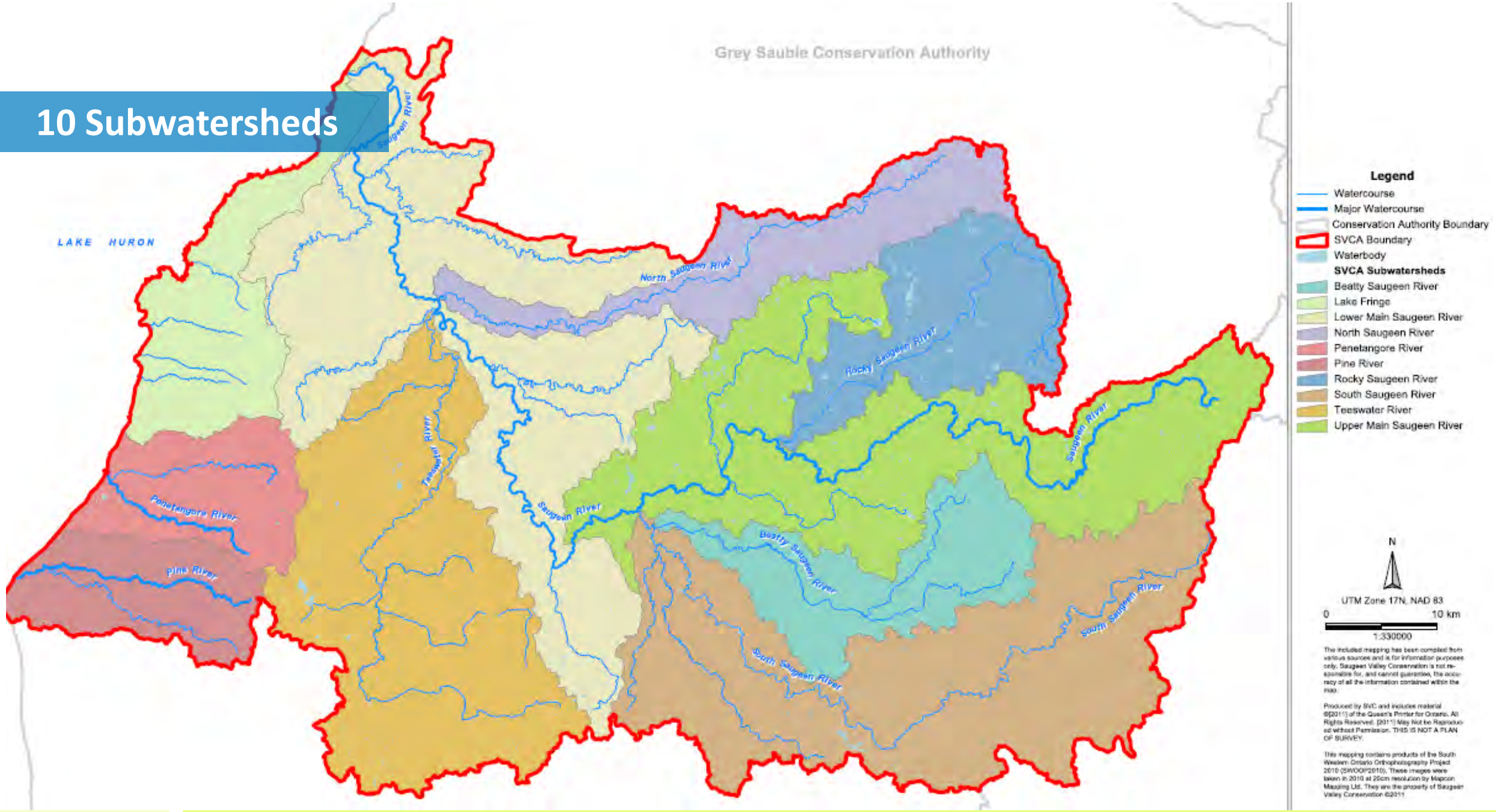
160 km long

Total fall ~300m

Source: Osprey Wetlands

Avg freshet >560cms

10 Subwatersheds



Primary Flood Damage Centres

Flood Management Program

Non-Structural Approaches
Keeping people away from water

- Regulation of development in floodplains
- Flood forecasting and warning
- Water infrastructure maintenance & inspection
- Emergency planning

Structural Approaches
Keeping water away from people

- **Dams** – to control flow of frazil ice
- **Dykes** – to restrict flows to the proper channel
- **Channel works** – to protect slopes from erosion

Causes of Flooding

YEAR	MONTH	SUBWATERSHED	FACTORS
2014	April	Watershed-wide	-No mid-winter thaw -Snowpack (high water content)
2016	April	North Saugeen	-Consecutive rainfalls -Saturated soils -Floating debris (dams)
2017	June	South Saugeen	-Convective thunderstorm -Heavy rainfall
2018	February	Watershed-wide	-Cold December -Early thaw creating ice jams (January) -Mid-winter thaw (February) -Snowpack -Rainfall -Floating debris

Water Volume

Debris

Convective Storms

Ice Jams

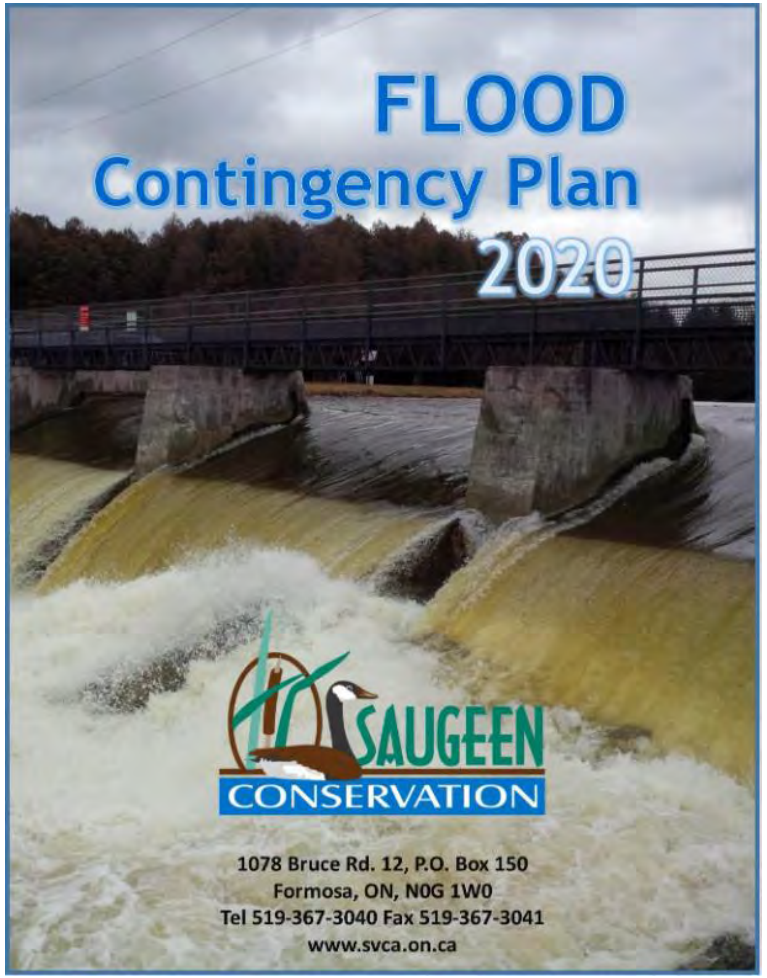
Flood Warning Program

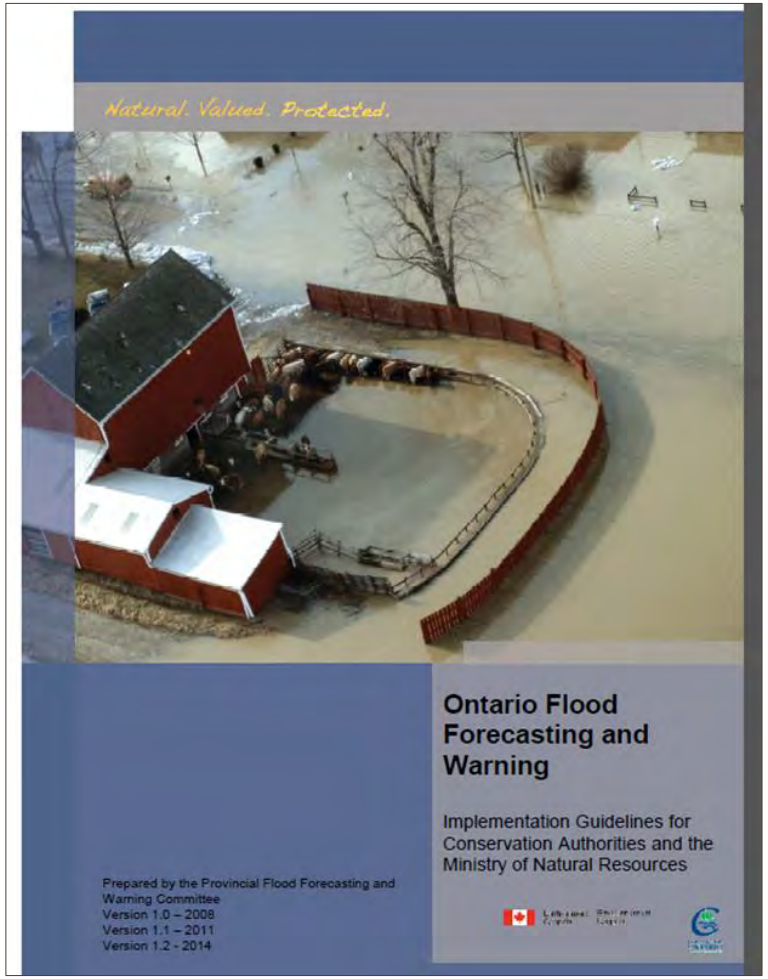
What is the Purpose?

1. To relay routine information concerning watershed river conditions to selected agencies and municipal officials.

2. To provide rapid, advance warning and technical support to concerned officials and to citizens whose lives and properties may be endangered by floodwaters.

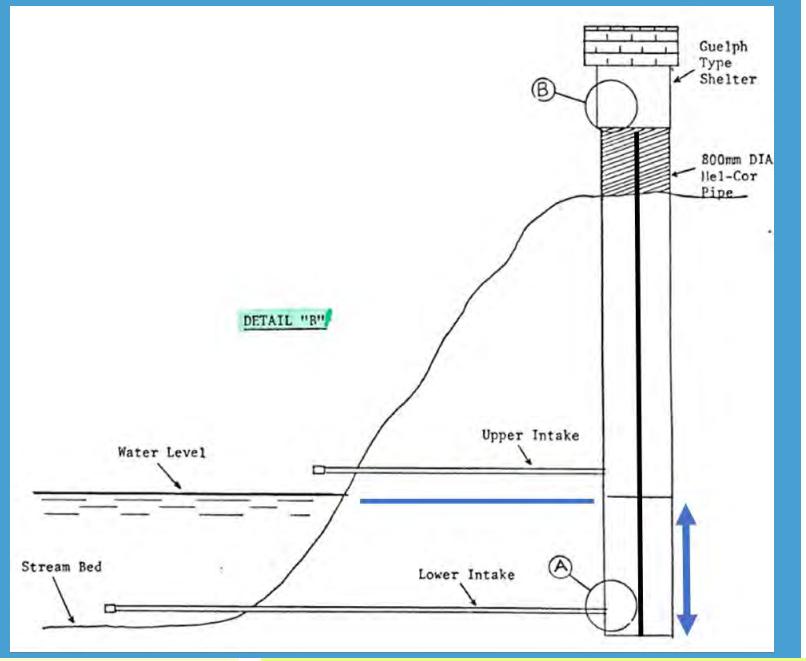
*The SVCA also maintains communications with the Ministry of Natural Resources during a flood event.





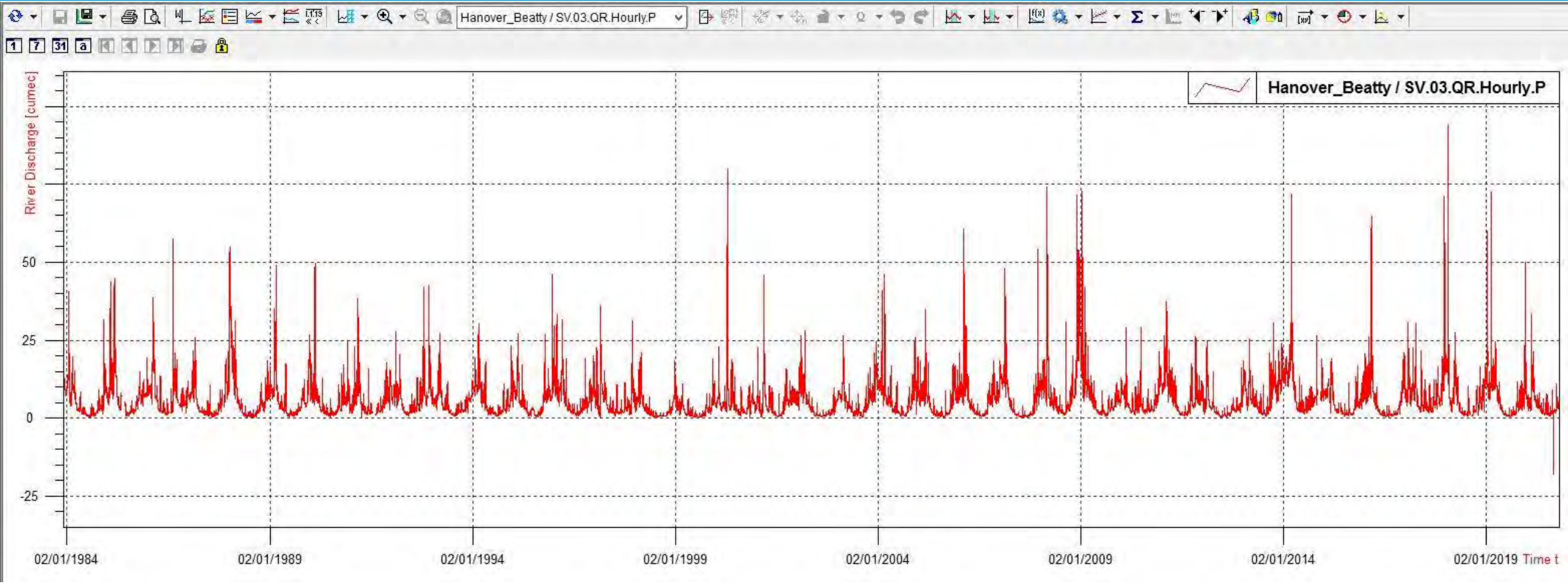
Stream Gauges

- 21 stream gauges
- Polled hourly
- Remote data acquisition
- Provide stream level data



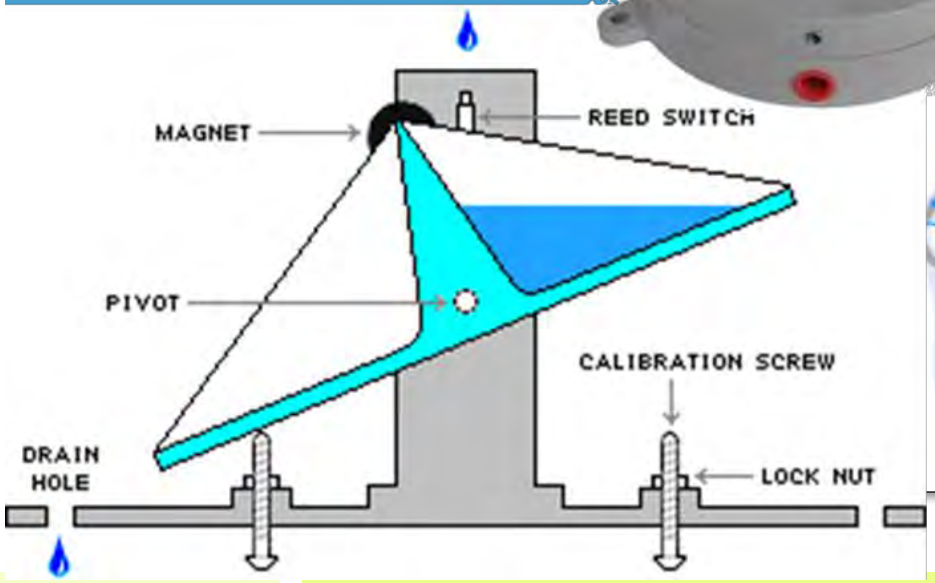
Stream Gauges

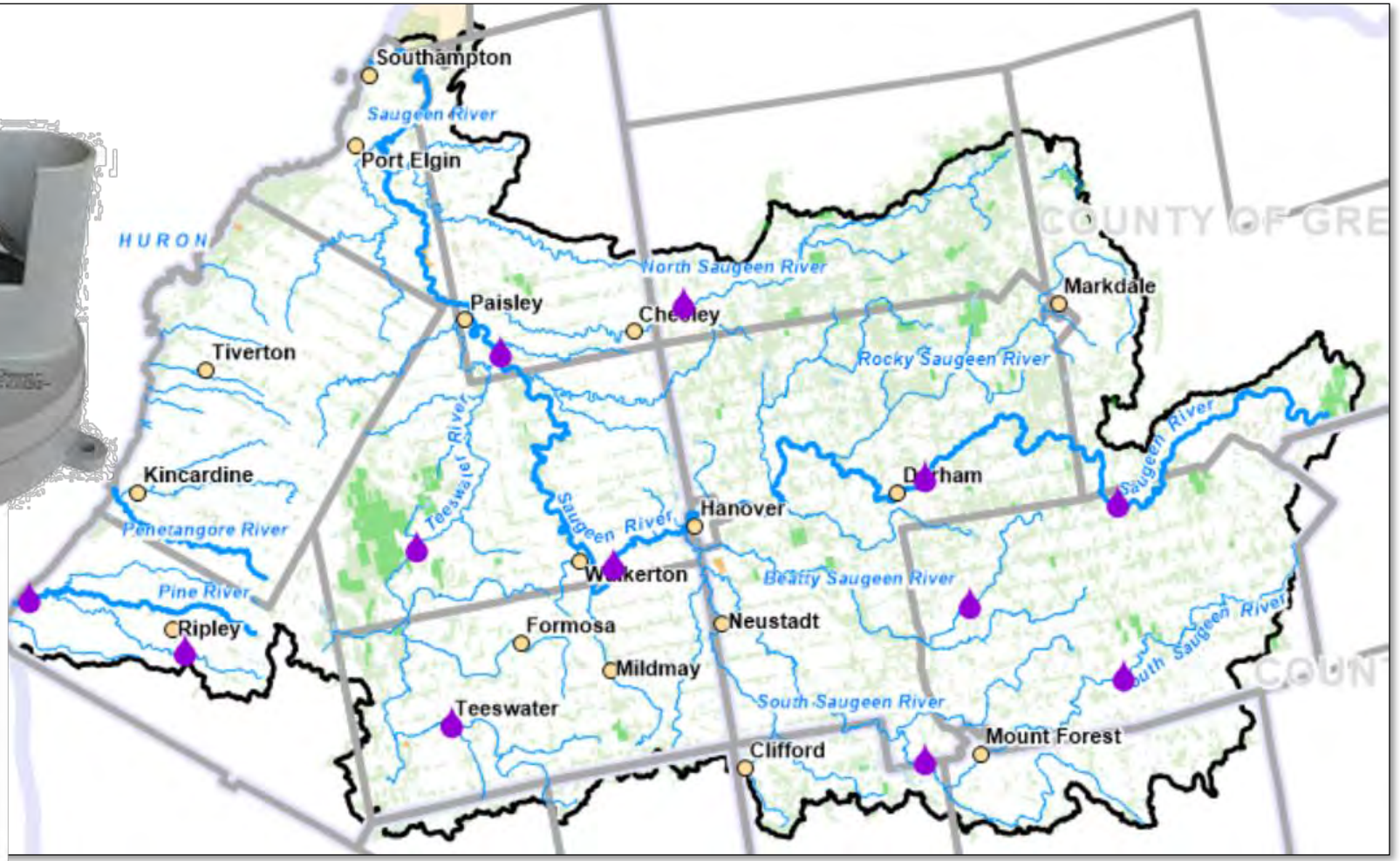
Historical Record Keeping



Rain Gauges

- 14 Rain Gauges
- Polled hourly
- Tipping buckets
- Rain rate (mm/hr)

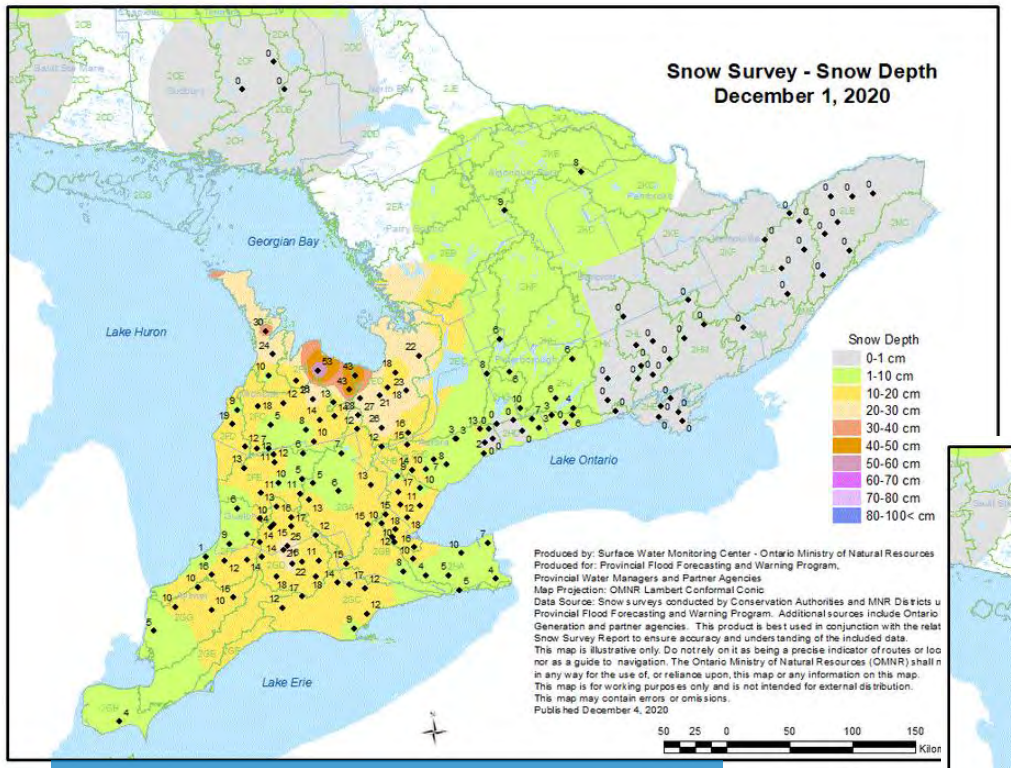




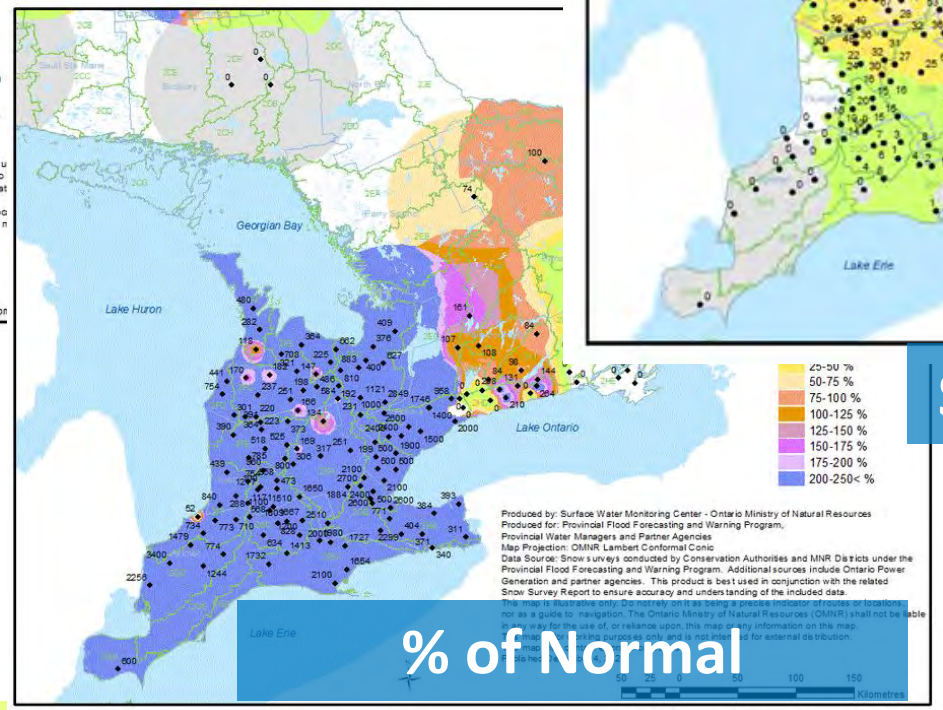
Snow Surveys

- 14 Snow Courses
- Bi-Weekly (Nov – May)
- Depth + Water Equivalent
- Some since 1950s

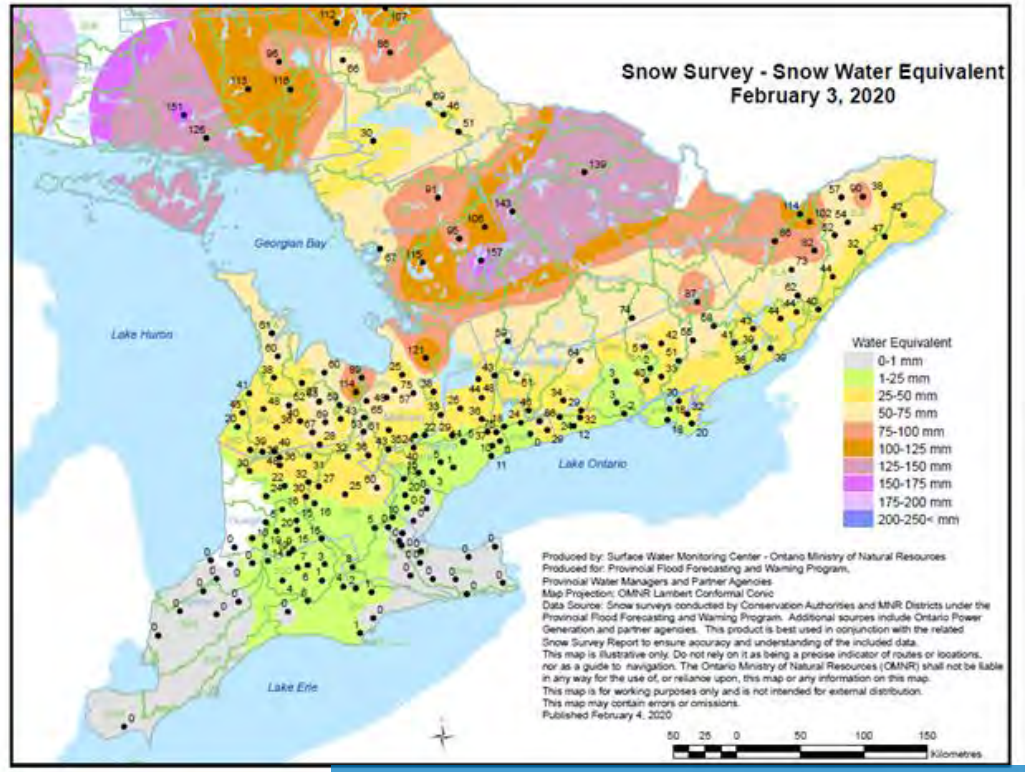
Forecasting - MNRF Products



Snow Depth



% of Normal

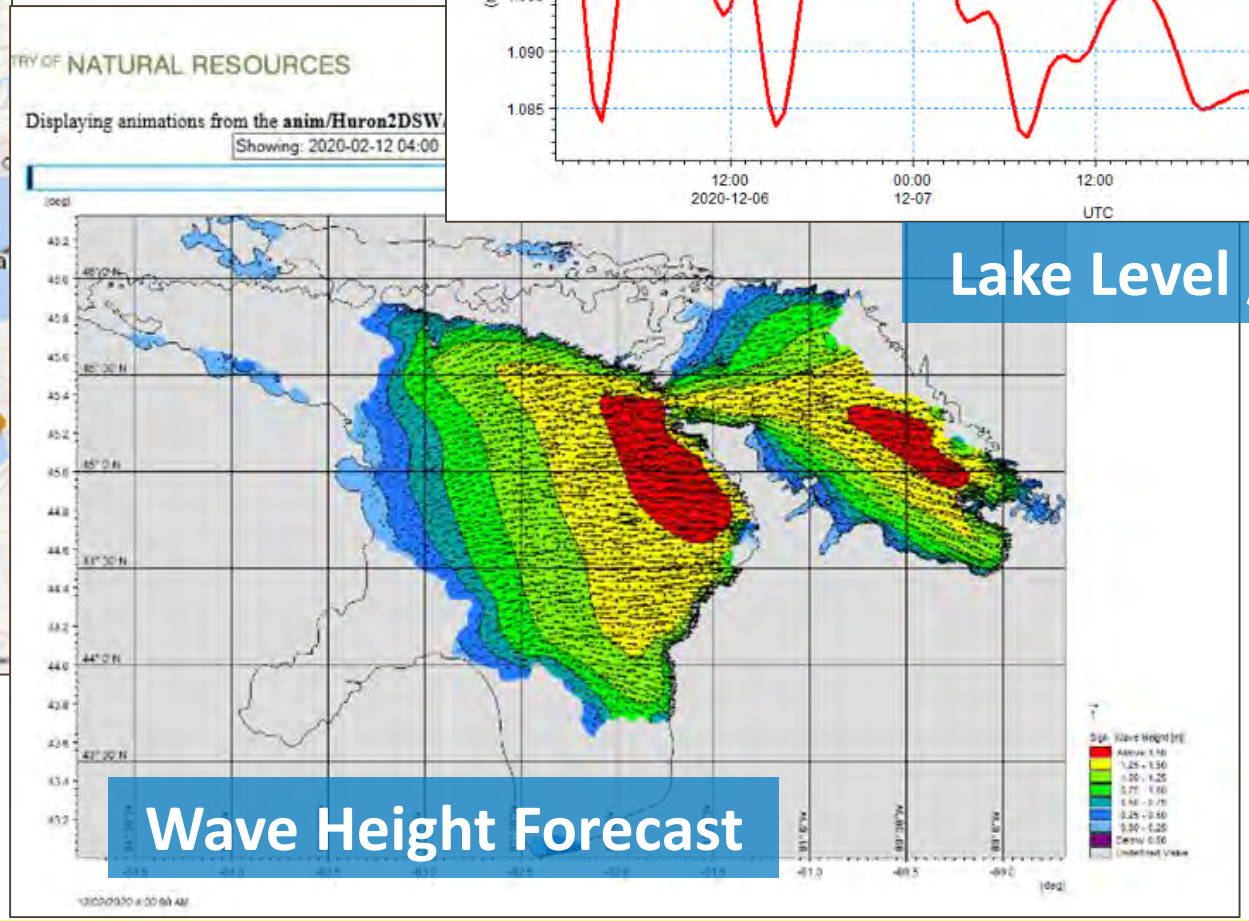


Snow Water Equivalent

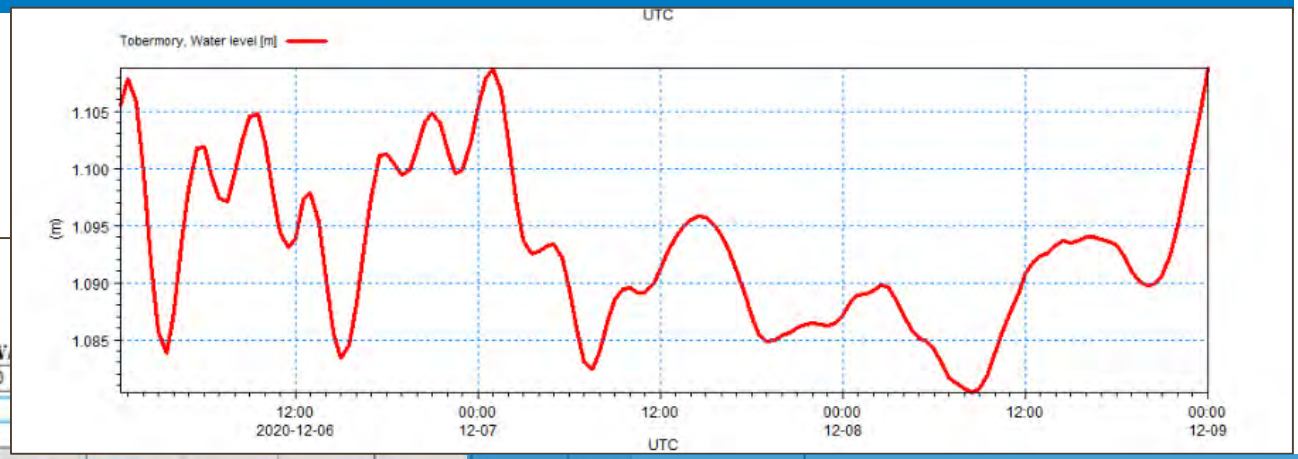
Forecasting - MNRF Products

Flood Message Map

www.ontario.ca/flooding

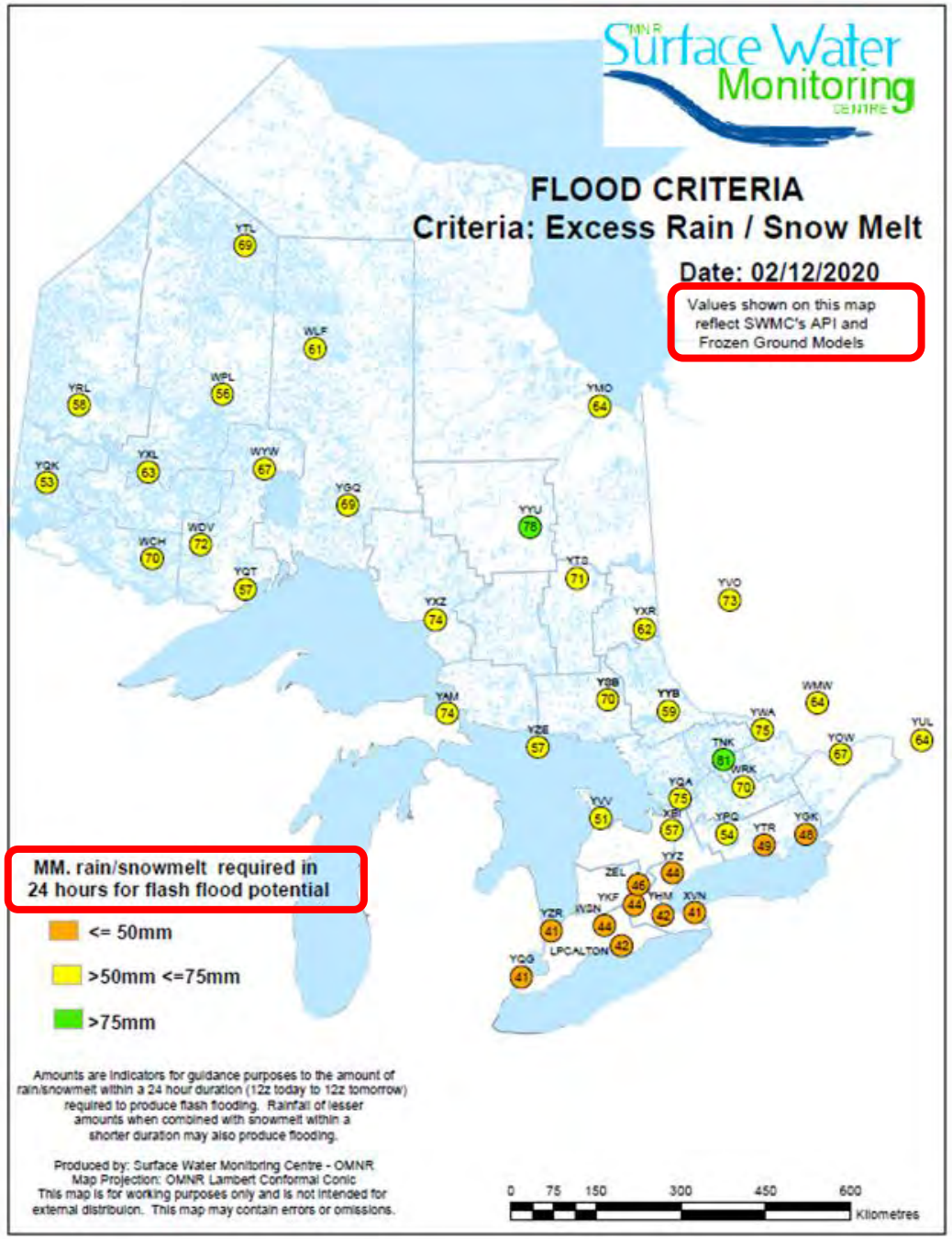


Wave Height Forecast



Lake Level / Surge Forecast

MNRF Products



Station: Saugeen River above Hanover (Wiski-0024)

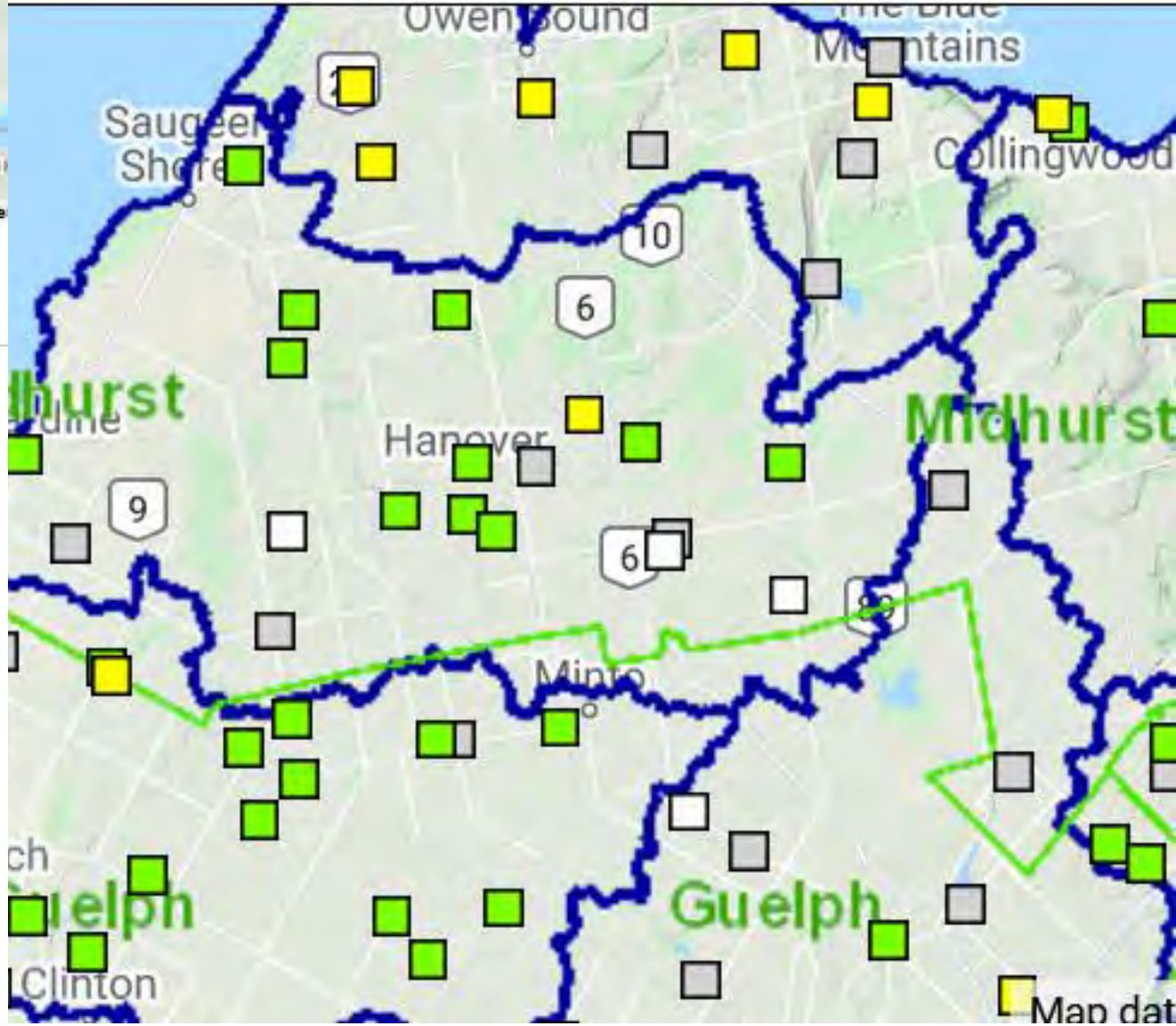
Station name	Saugeen River above Hanover
Station number	Wiski-0024
Latitude	44.16447047
Longitude	-81.01641614
Station type	General Surface Water
River	Saugeen River

Details

Overview

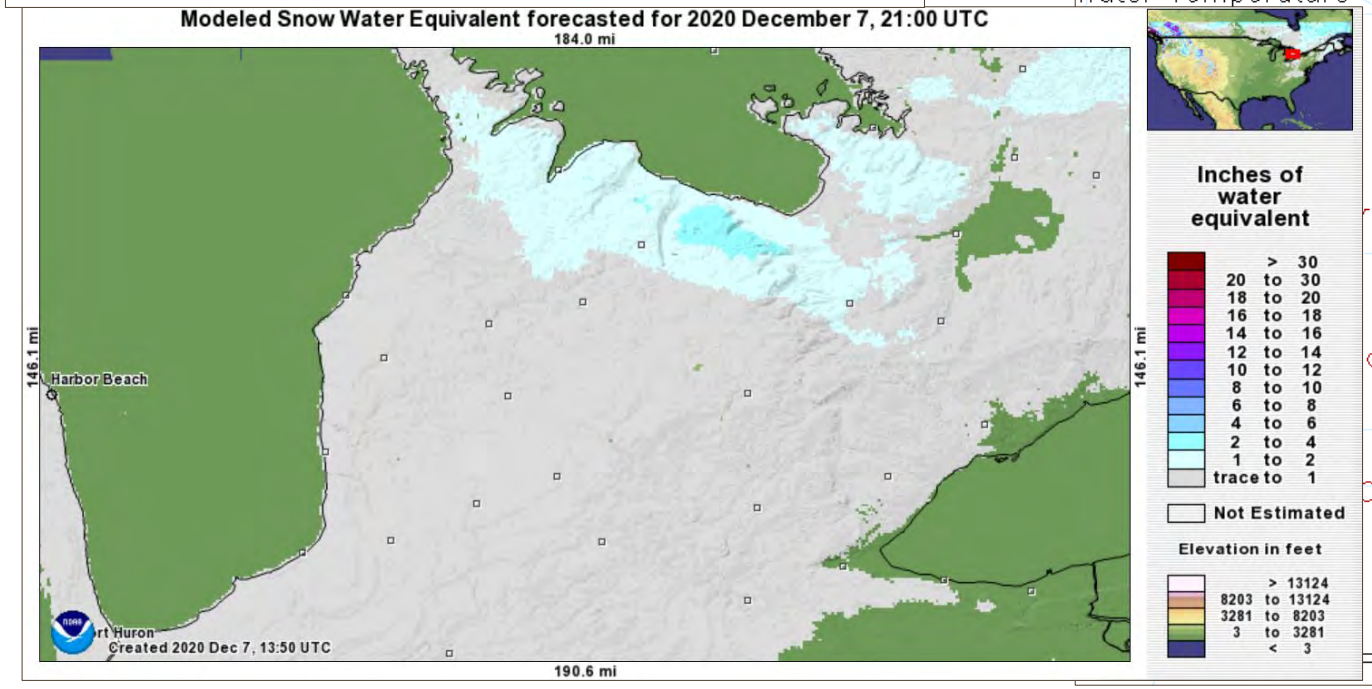
Flow | Waterlevel

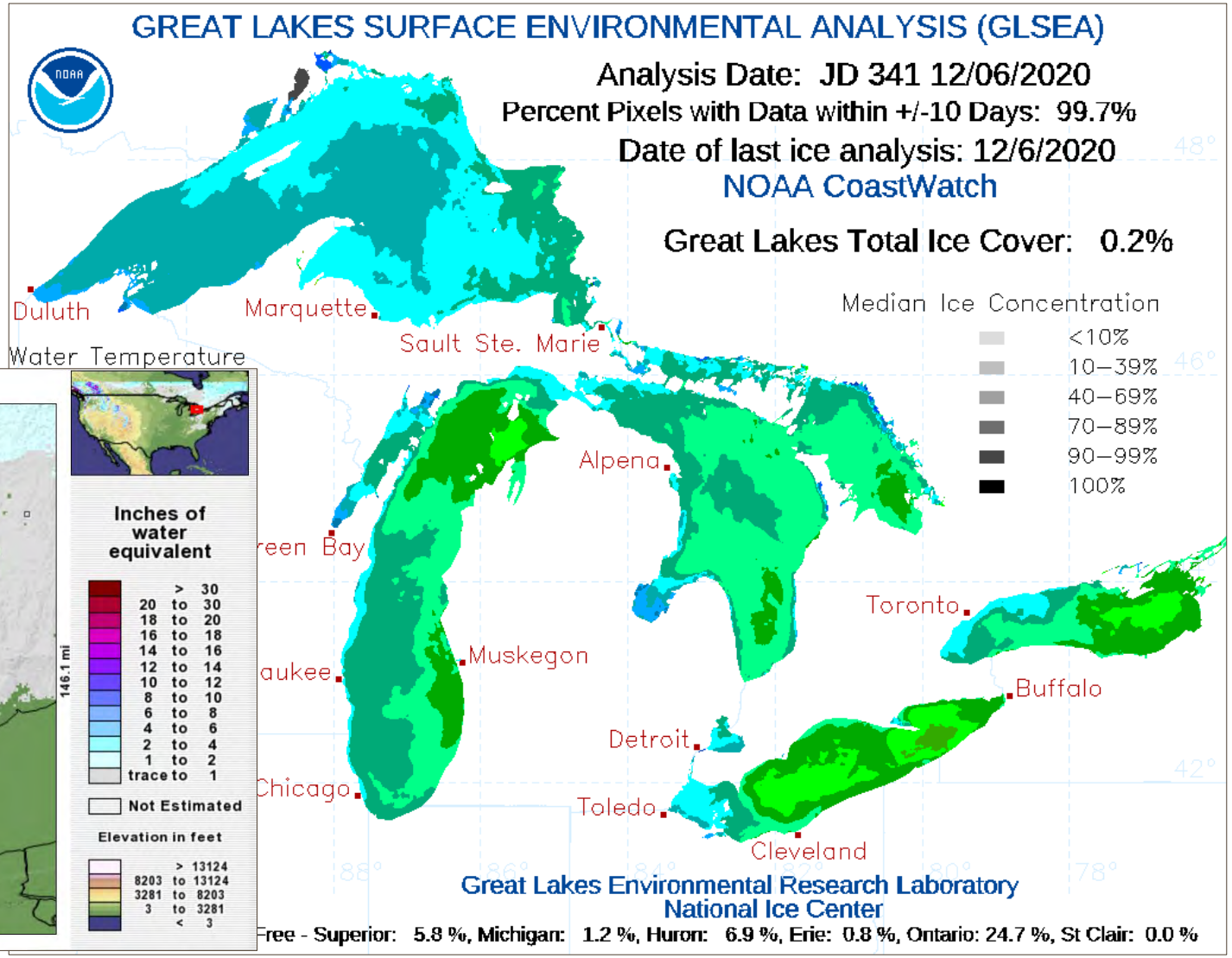
week | month | year | week | month | year



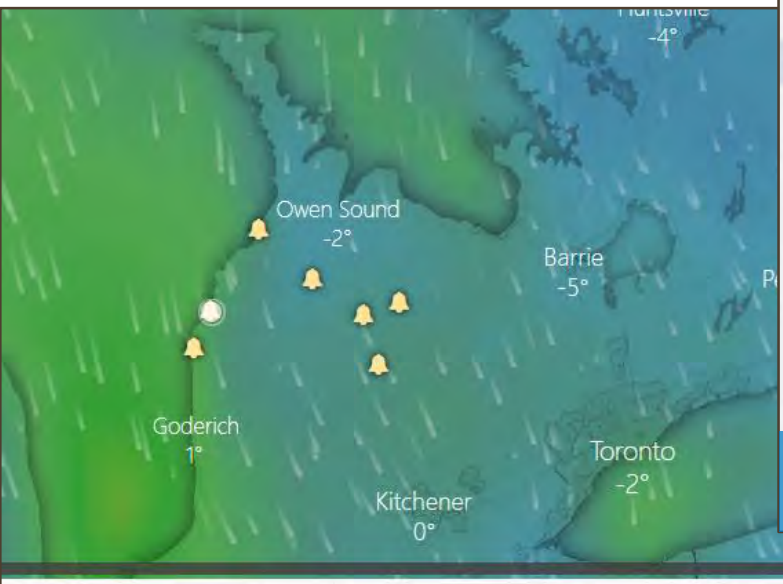
WISKI Web Pro

NOAA Products

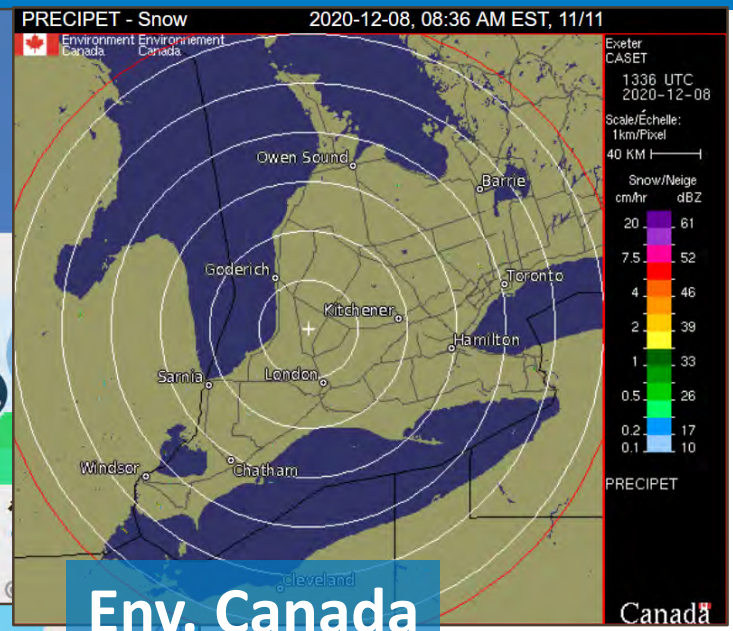




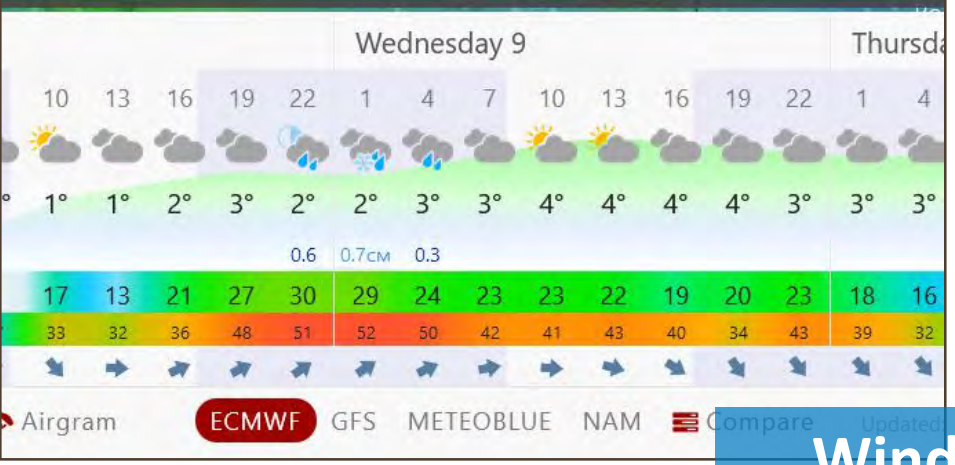
Weather Forecasting



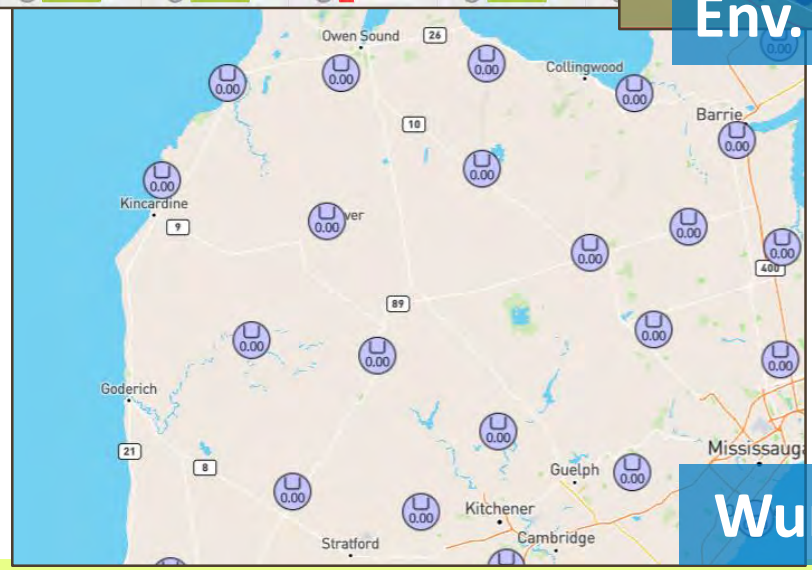
Meteoblue



Env. Canada

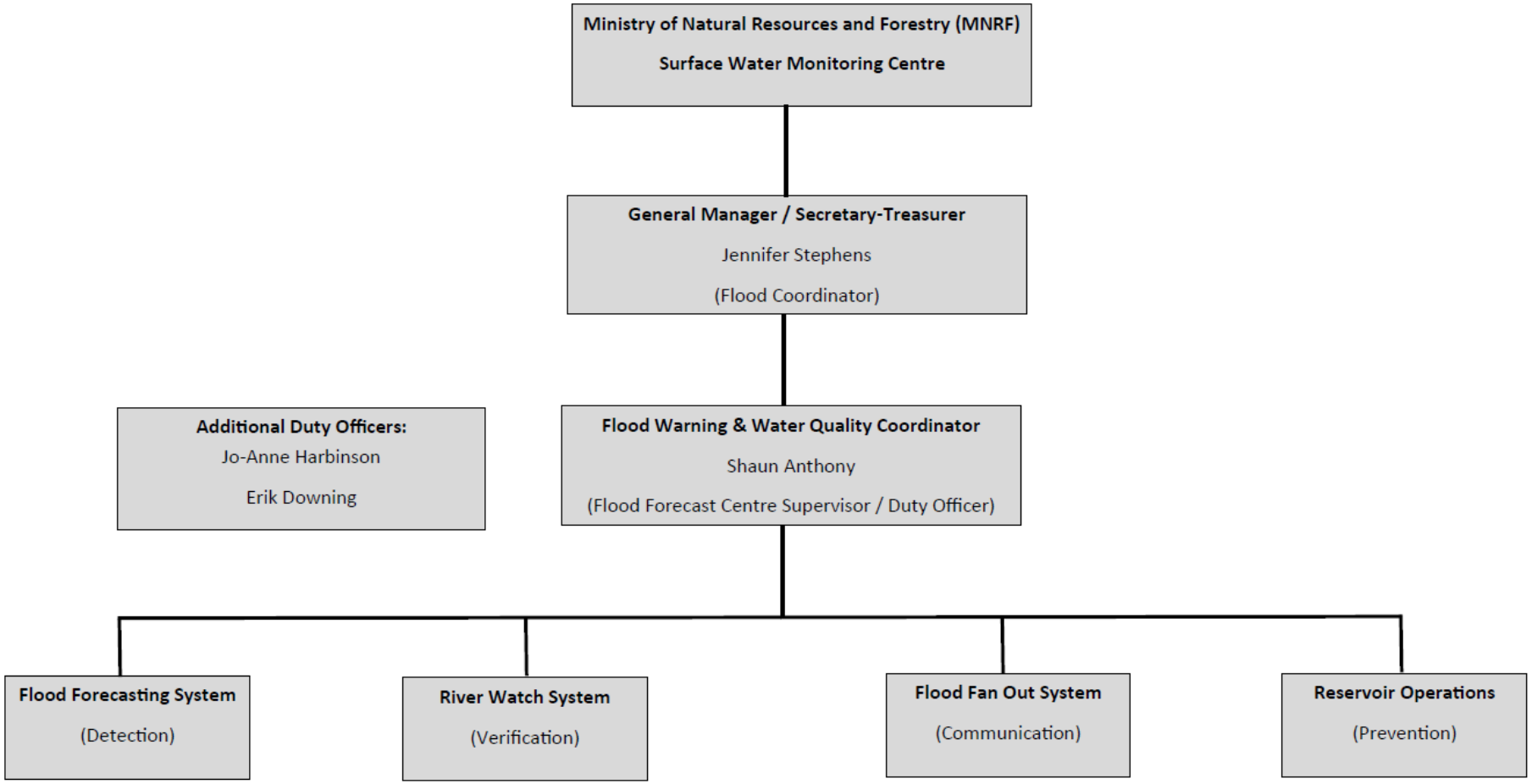


Windy



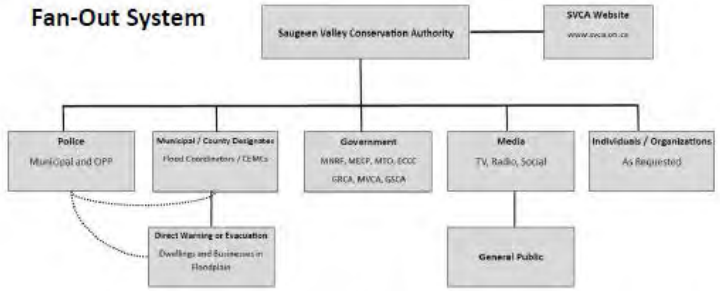
Wunderground

Flood Response Organization



Monitoring and Response

Automated flow, precipitation and weather alarms + Routine daily planning cycle.



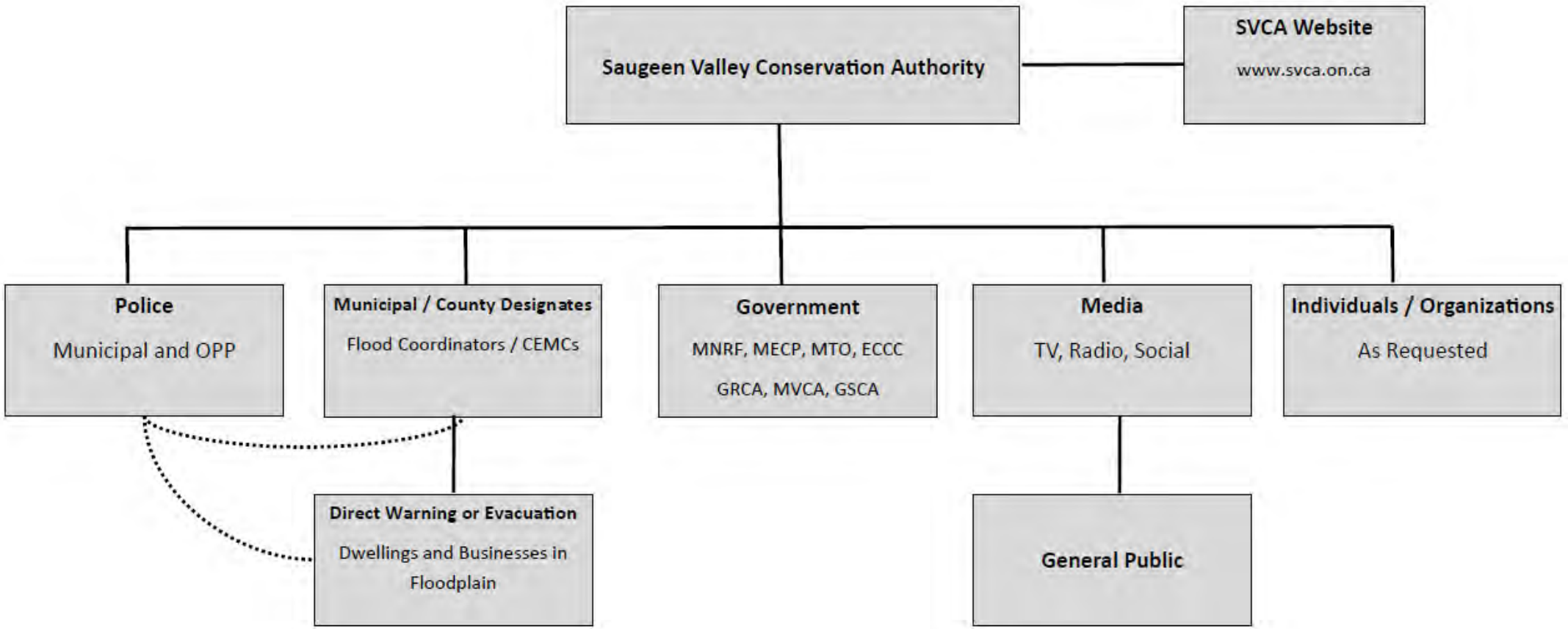
River Watch Personnel

Dam Operators

Flood Warning Coordinator

Duty Officer

Flood Message Fan-Out



email only

Types of Flood Warning Messages

Normal	**Green**	
Statement	**Yellow**	**Watershed Conditions Statements / Water Safety** are issued when general watershed conditions suggest high runoff potential that could lead to flooding and to remind the public that rivers, streams, and ponds may be unsafe for recreational or other activities. High flows, unsafe banks, melting ice or other factors that may result in watercourses being too dangerous for recreational users or the general public.
Flood Watch	**Orange**	**Flood Watch** messages are issued when the potential for generalized flooding exists throughout the watershed or identified for specific municipalities.
Warning	**Red**	**Flood Warning** messages are issued when flooding is occuring or about to occur. It typically applies to a specific area of the watershed.

Communicating the Flood Message

Watershed Conditions Statement:

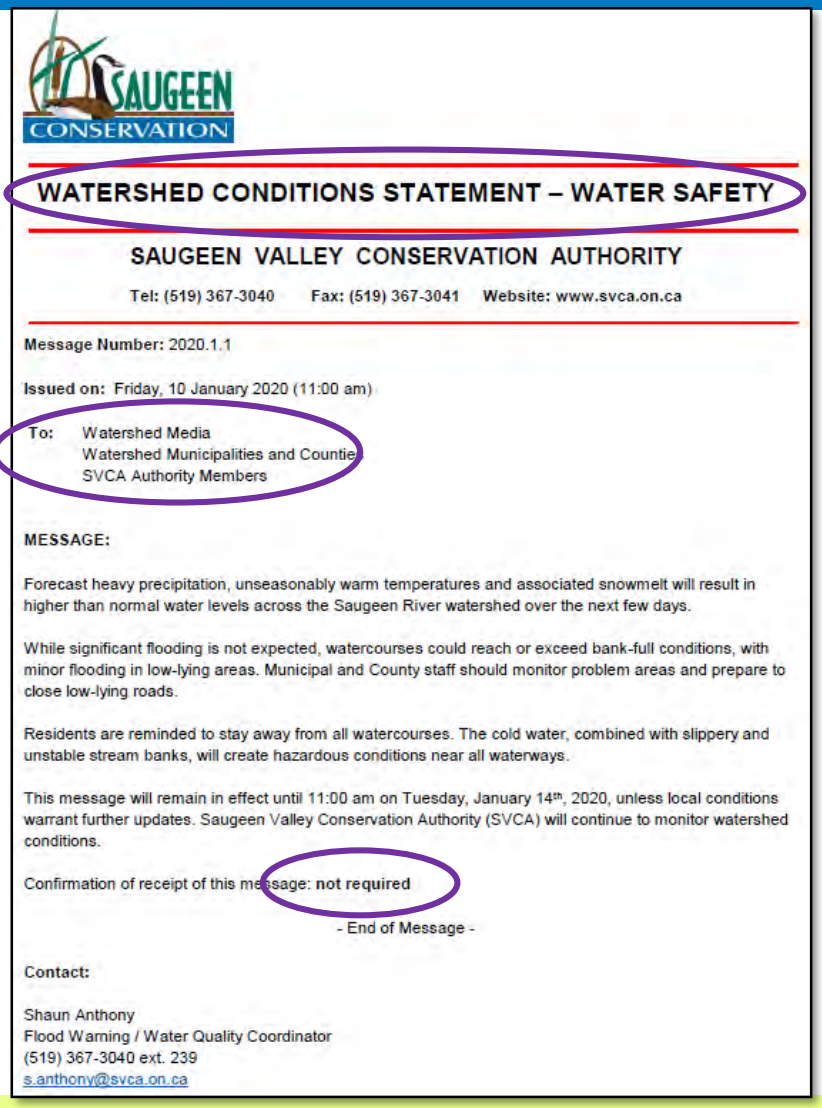
Water Safety and/or Flood Outlook

→ Emailed directly to municipal flood coordinators, CEMCs, and neighbouring CAs

Flood Watch

Flood Warning

→ Emailed to members of fan-out system



SAUGEEN CONSERVATION

WATERSHED CONDITIONS STATEMENT – WATER SAFETY

SAUGEEN VALLEY CONSERVATION AUTHORITY

Tel: (519) 367-3040 Fax: (519) 367-3041 Website: www.svca.on.ca

Message Number: 2020.1.1

Issued on: Friday, 10 January 2020 (11:00 am)

To: Watershed Media
Watershed Municipalities and Counties
SVCA Authority Members

MESSAGE:

Forecast heavy precipitation, unseasonably warm temperatures and associated snowmelt will result in higher than normal water levels across the Saugeen River watershed over the next few days.

While significant flooding is not expected, watercourses could reach or exceed bank-full conditions, with minor flooding in low-lying areas. Municipal and County staff should monitor problem areas and prepare to close low-lying roads.

Residents are reminded to stay away from all watercourses. The cold water, combined with slippery and unstable stream banks, will create hazardous conditions near all waterways.

This message will remain in effect until 11:00 am on Tuesday, January 14th, 2020, unless local conditions warrant further updates. Saugeen Valley Conservation Authority (SVCA) will continue to monitor watershed conditions.

Confirmation of receipt of this message: **not required**

- End of Message -

Contact:

Shaun Anthony
Flood Warning / Water Quality Coordinator
(519) 367-3040 ext. 239
s.anthony@svca.on.ca

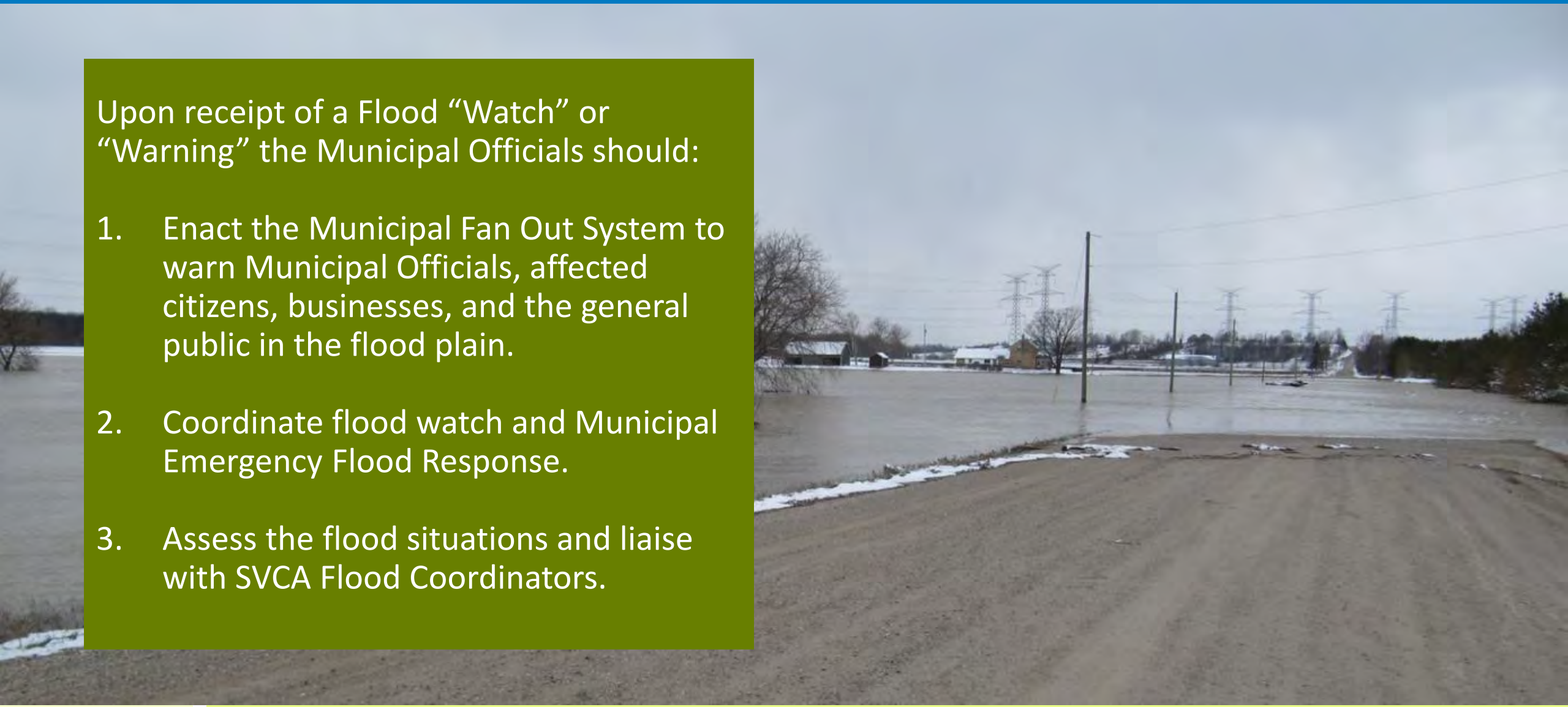
Municipal Role

Upon receipt of a Flood “Watch” or “Warning” the Municipal Officials should:

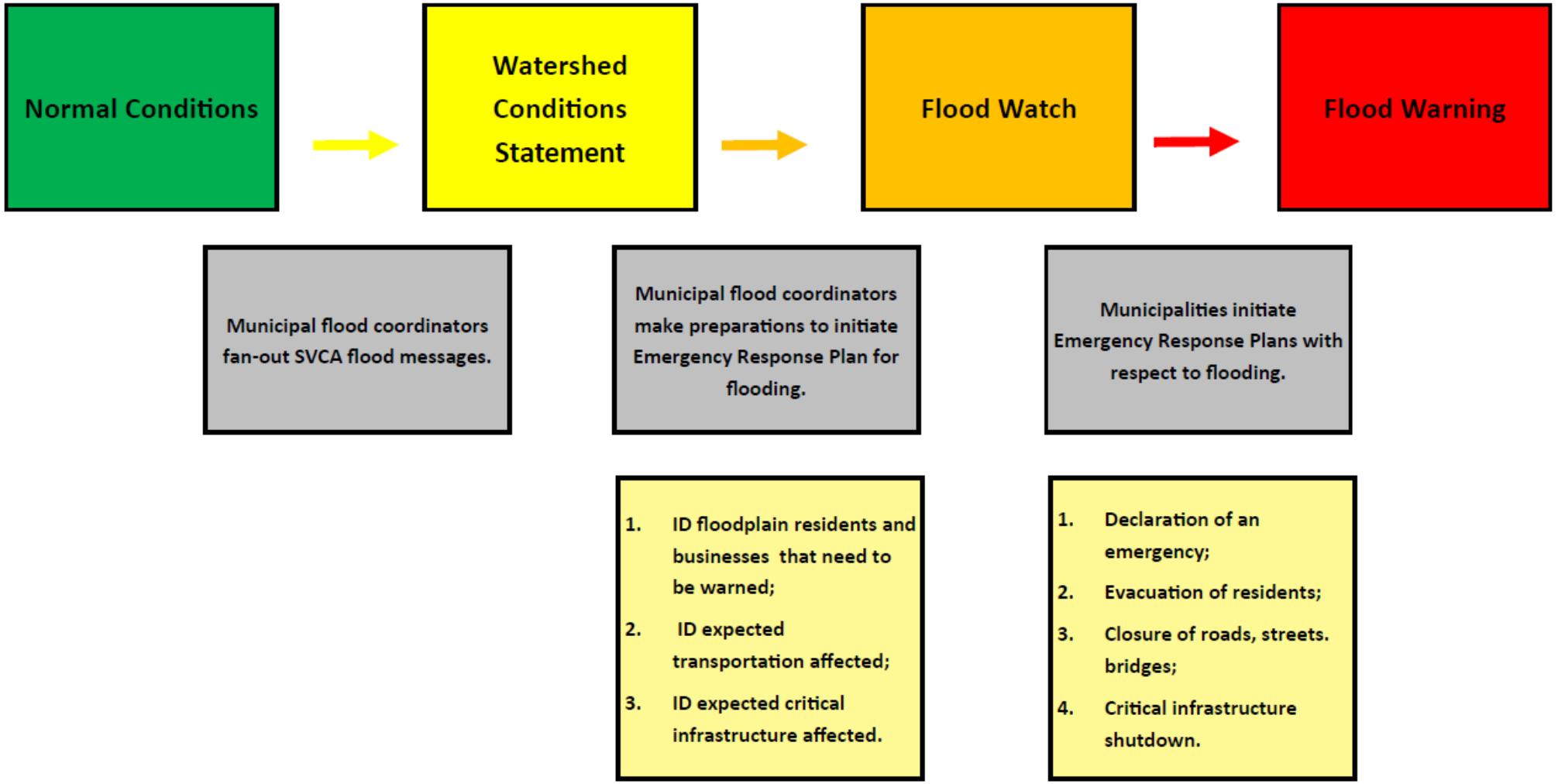
1. Enact the Municipal Fan Out System to warn Municipal Officials, affected citizens, businesses, and the general public in the flood plain.

2. Coordinate flood watch and Municipal Emergency Flood Response.

3. Assess the flood situations and liaise with SVCA Flood Coordinators.



Integration of Flood Warning with Municipal Emergency Response Plans



New Endeavours

Coming soon…

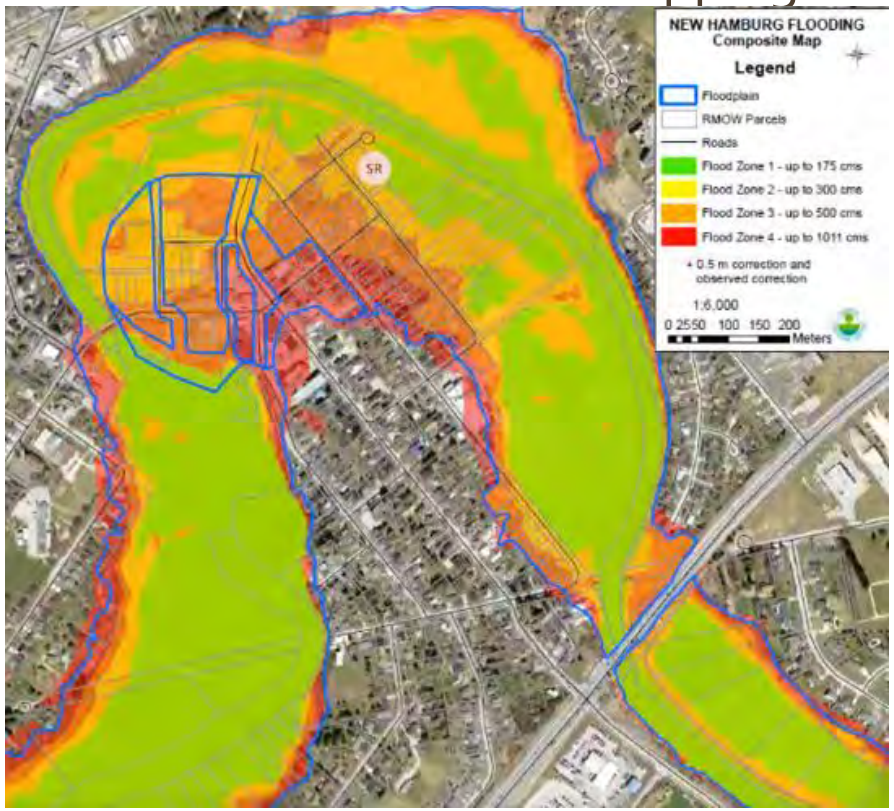
- Email sign-ups
- Emergency "Test" message
- Additional remote webcams

Just over the horizon…

- Real-time data on SVCA website
- Expansion of rain gauge network

In a perfect world…

- Flood Zone Inundation Mapping



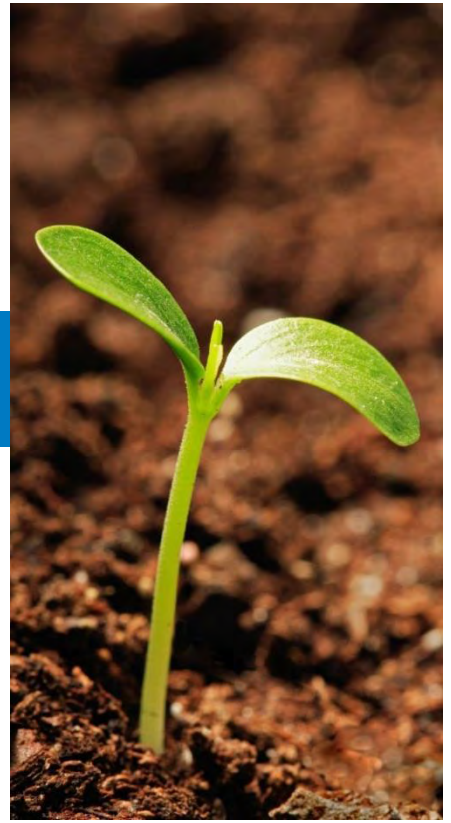
Long-Range Weather Forecast

Long-Range Forecast (MNRF)

- La Nina year
- Slightly below seasonal temps until about February
- Potential for fairly heavy lake-effect snow
- Expect temperatures to be variable – could result in mid-winter melt event(s)

Flood Control Structures

Jo-Anne Harbinson
Manager, Water Resources & Stewardship Services



Saugeen Conservation Flood Control Structures

Historical Development Along the Main Saugeen River and its Tributaries:

- For domestic and animal use
- For travel
- For waterpower

How do we reduce the risk of flooding?

Saugeen Conservation Flood Control Structures designed to protect life, property and reduce social disruption

Staff at the SVCA involved with Flood Control Structures:

- Jo-Anne Harbinson, Manager Water Resources and Stewardship Services
- Shaun Anthony, Flood Warning and Water Quality Coordinator
- Rick Rowbotham, Field Operations Coordinator
- Brittany Taylor, Water Resources Technician
- Lee Watson, Durham Park Superintendent
- Leander Emke, Field Operations Assistant

A total of 19 Flood and Erosion Control Structures have been constructed across the watershed costing a total of $13,500,000 –To protect 1,120 buildings, homes and businesses and approximately 4,500 people. Annual cost of maintenance – approximately $160,000.

Saugeen Conservation Water Control Structures designed to protect life, property and reduce social disruption

Durham Flood Control Project

- 1977-78, 1981, 1987-87, 2005

Walkerton Flood Control Project

- 1956-63, 1977, 1982, 1989, 1992

Pinkerton Dyke 1968-69

Knappville Flood Control Project 1984

Neustadt Flood Control Project

- 1978-82, 1991

Paisley Flood Control Project 1981-1986

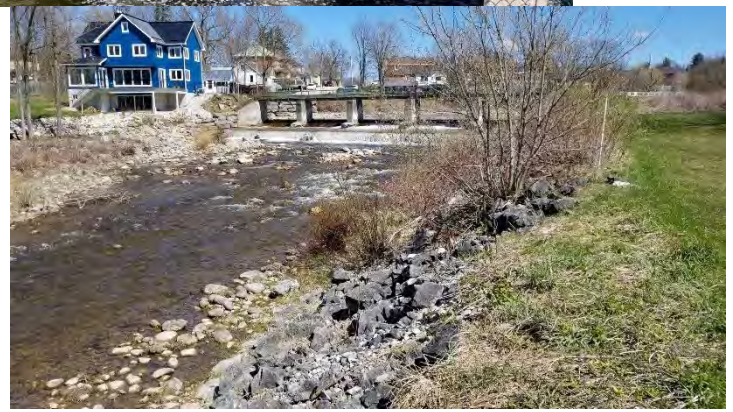
Inverhuron Flood Control Project 1987-90

Knappville

Walkerton Dyke

Saugeen Conservation Owns and Operates Three Dams

Municipality of West Grey



Upper Durham Dam – Municipality of West Grey

Upper Durham Dam – Municipality of West Grey

Upper Durham Dam – Municipality of West Grey

Middle Durham Dam – Municipality of West Grey

Lower Durham Dam and Ice Management Channel – Municipality of West Grey

Durham Ice Management Channel – Municipality of West Grey

Municipality of West Grey - Neustadt Flood Control Project 1978-82, 1991

Neustadt Flood Control Project 1978-82, 1991

Walkerton Flood Control Project 1956-63, 1977, 1982, 1989, 1992
Municipality of Brockton

Town of Walkerton - Municipality of Brockton

Town of Walkerton - Municipality of Brockton

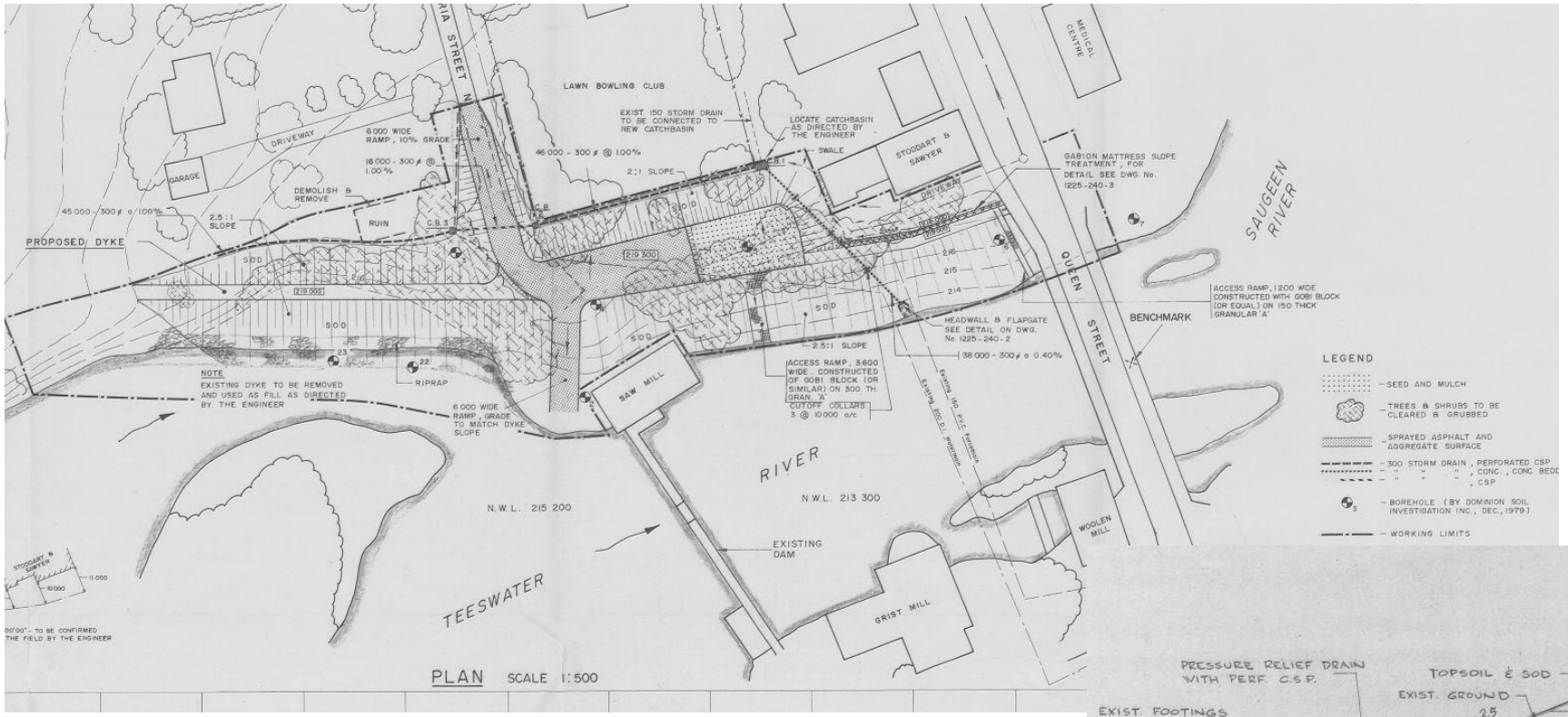
Water and Erosion Control Infrastructure MNRF funding for Walkerton Dyke Repair and Storm sewer outlet for drainage land side of dyke to Saugeen River

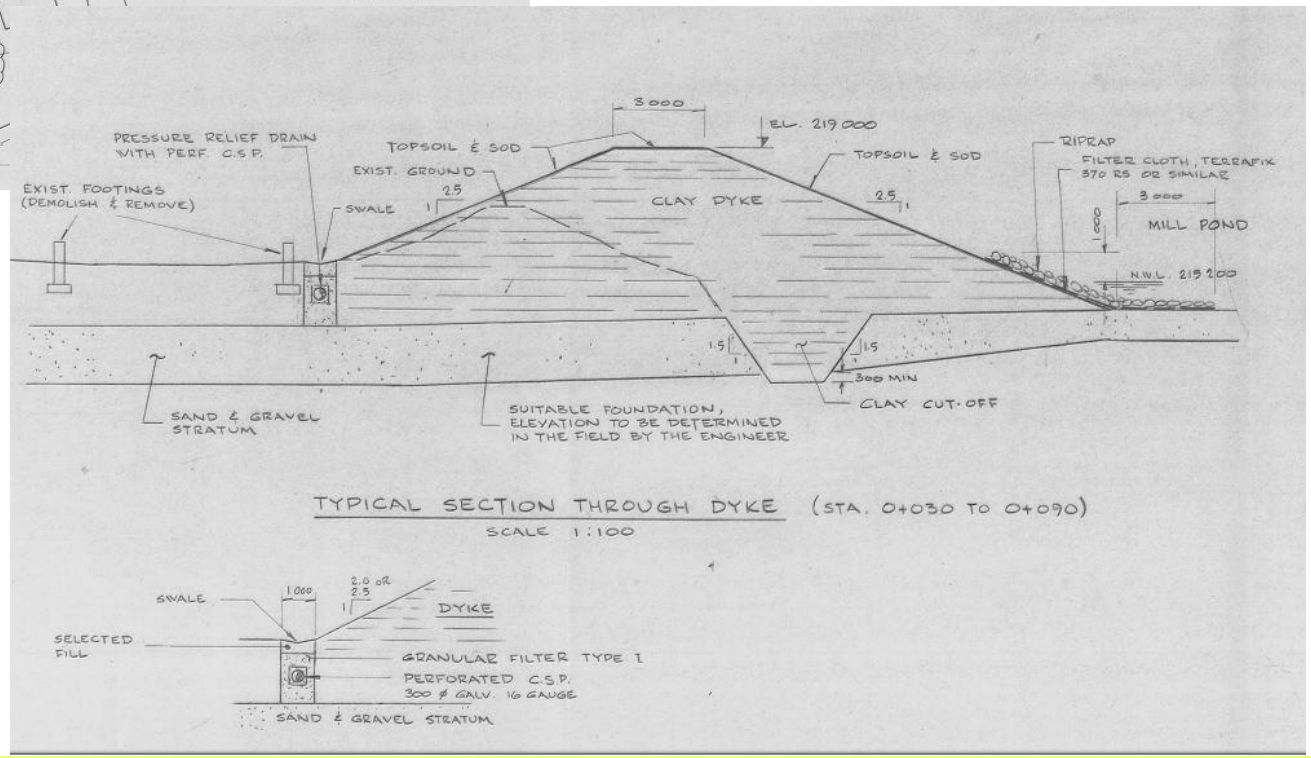
Town of Walkerton - Municipality of Brockton

Municipality of Brockton - Pinkerton

Municipality of Arran Elderslie - Paisley Flood Control Project 1981-1986

Paisley 1978





Paisley Flood Control : Drawings and Dyke cross section

Paisley Flood Control – Teeswater River

Paisley Flood Control - Municipality of Arran Elderslie – Saugeen River

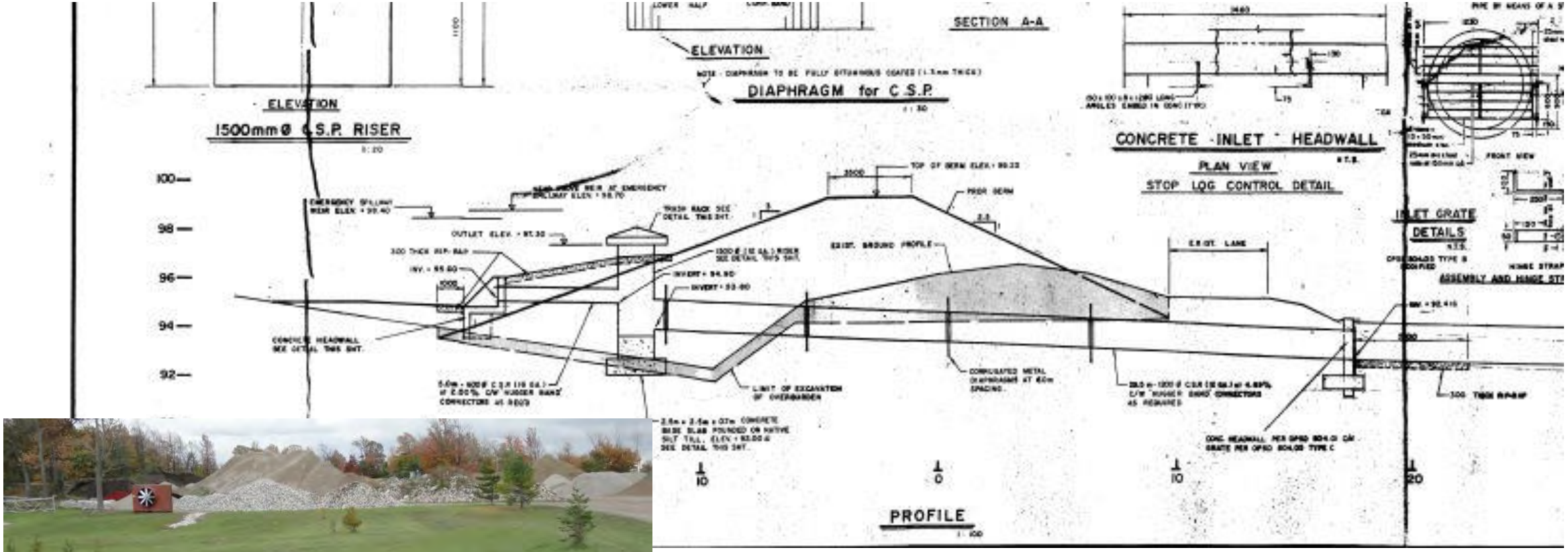
Paisley Flood Control – Willow Creek Dykes

Paisley Flood Control – Pump at end of George Street and Old Willow Creek channel

Land side of Dyke, Bird cage inlet from toe drainage

Typical outlet from stormwater system or toe drainage from land side of dyke

Inverhuron Flood Control Project 1987-90 – Municipality of Kincardine



Inverhuron Flood Control Project – Municipality of Kincardine

Inverhuron Flood Control Project – Municipality of Kincardine

Inverhuron Outlet at Lake Huron - Municipality of Kincardine

Lockerby Dam Removal and Reservoir Rehab. 2015

Before

After

SAUGEEN CONSERVATION

Bruce Power

Fisheries and Oceans Canada / Pêches et Océans Canada

Stewardship Grey Bruce — Sustaining Natural Resources Together

Community Foundation Grey Bruce

Environmental Planning and Regulations at the SVCA

Erik Downing
Manager, Env. Planning and Regulations

"...and this glorious cliff-top property has recently been reduced by fifty per-cent."

On the night of October 16, 1954 - Passenger Train No. 179, Engine 1319 left the city of Palmerston, Ontario. Destination: The city of Southampton located on the shores of Lake Huron. A storm named 'Hurricane Hazel' came inland and caused a great deal of flooding in southern Ontario. It was about a mile from Southampton, flooding had washed away the roadbed causing the train to derail, and the engine to roll over on its right side. The engineer Gordon McCallum, and his fireman Stewart Nicholson died from the results of this wreck. The bell off Engine 1319 is on display in the Southampton Museum.
PETER C. BART, C.N.R. Locomotive Engineer, Sarnia, Ontario

Bryan Mitchell, volunteer fireman—Raymore Drive Toronto

"... The incredible roar of the water, like the roar of Niagara Falls. It was a gigantic flood, with smashed houses and uprooted trees bobbing like corks, everything going down the river so fast. Houses crashing into the sides of other houses, people everywhere screaming. And then you couldn't even hear the screams anymore."

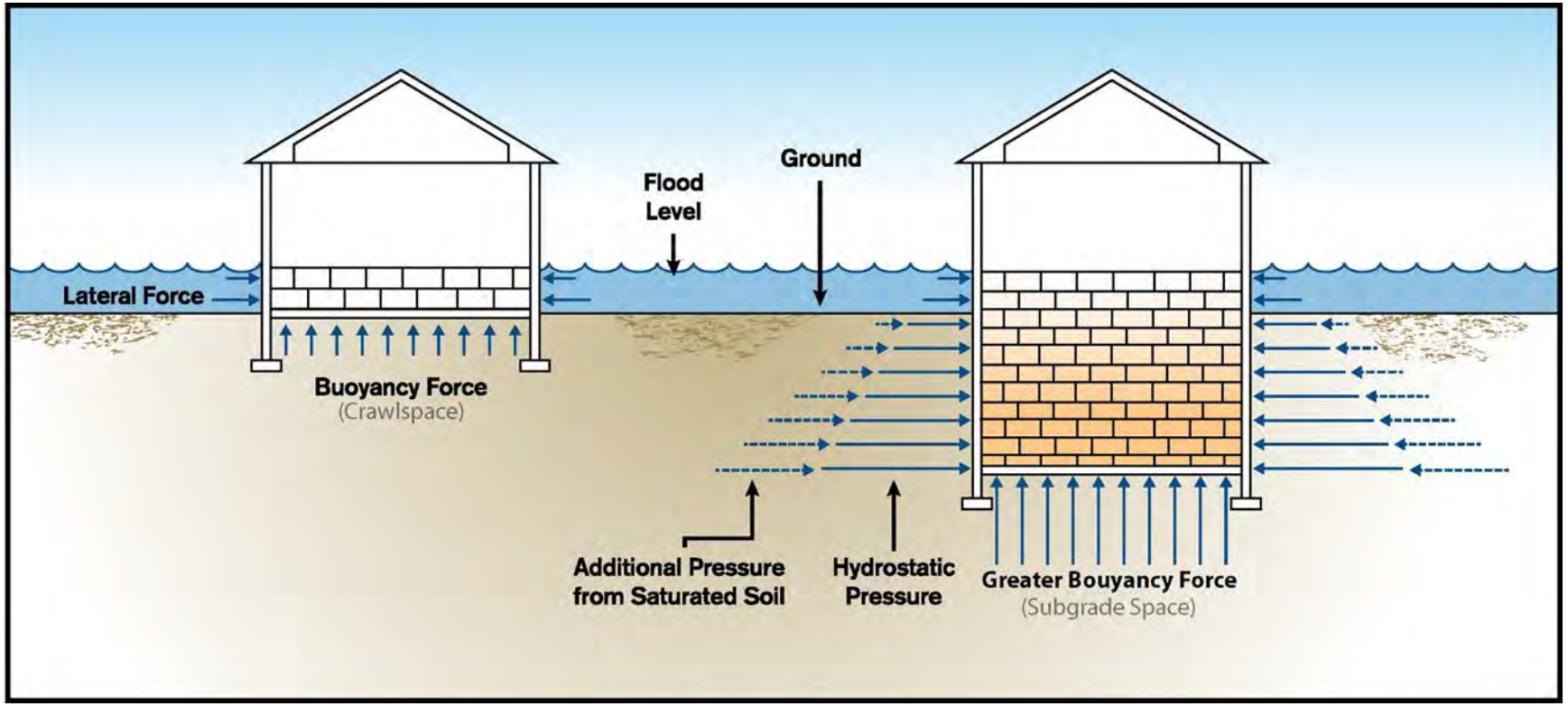
Toronto Star, October 14, 1984

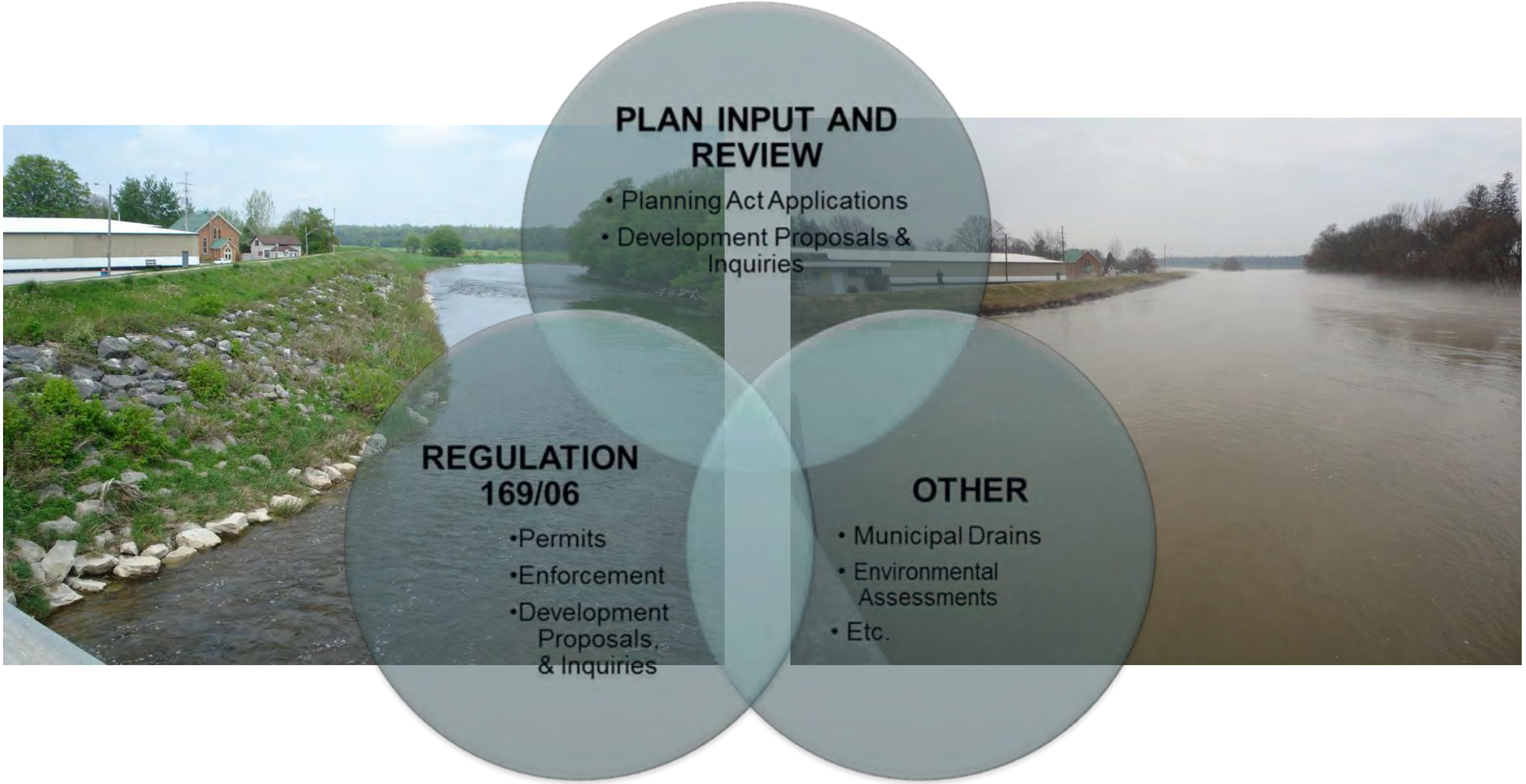
Impacts of Natural Hazards

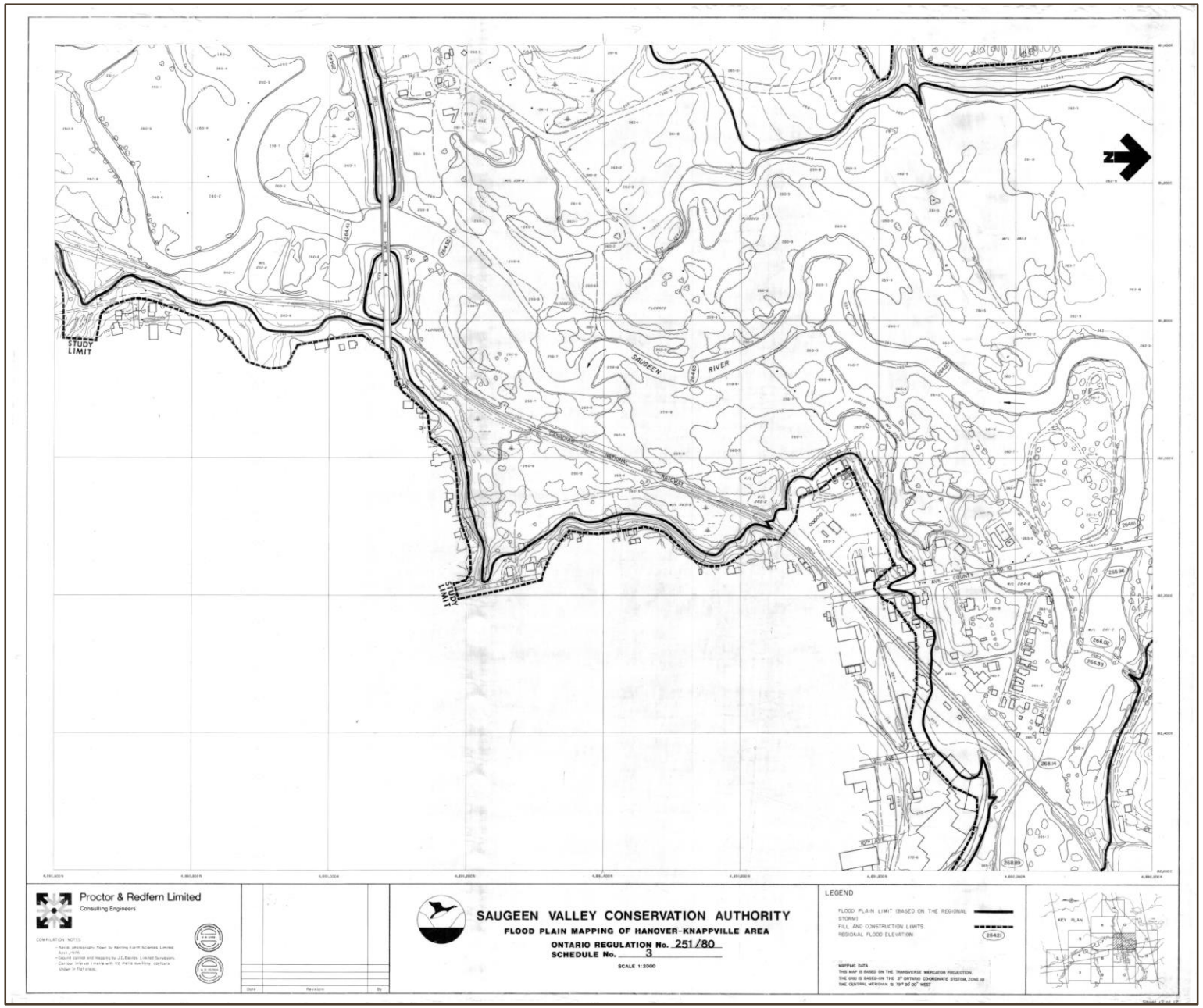

WHEELFAST
THE
BICYCLE
SHOPPE.

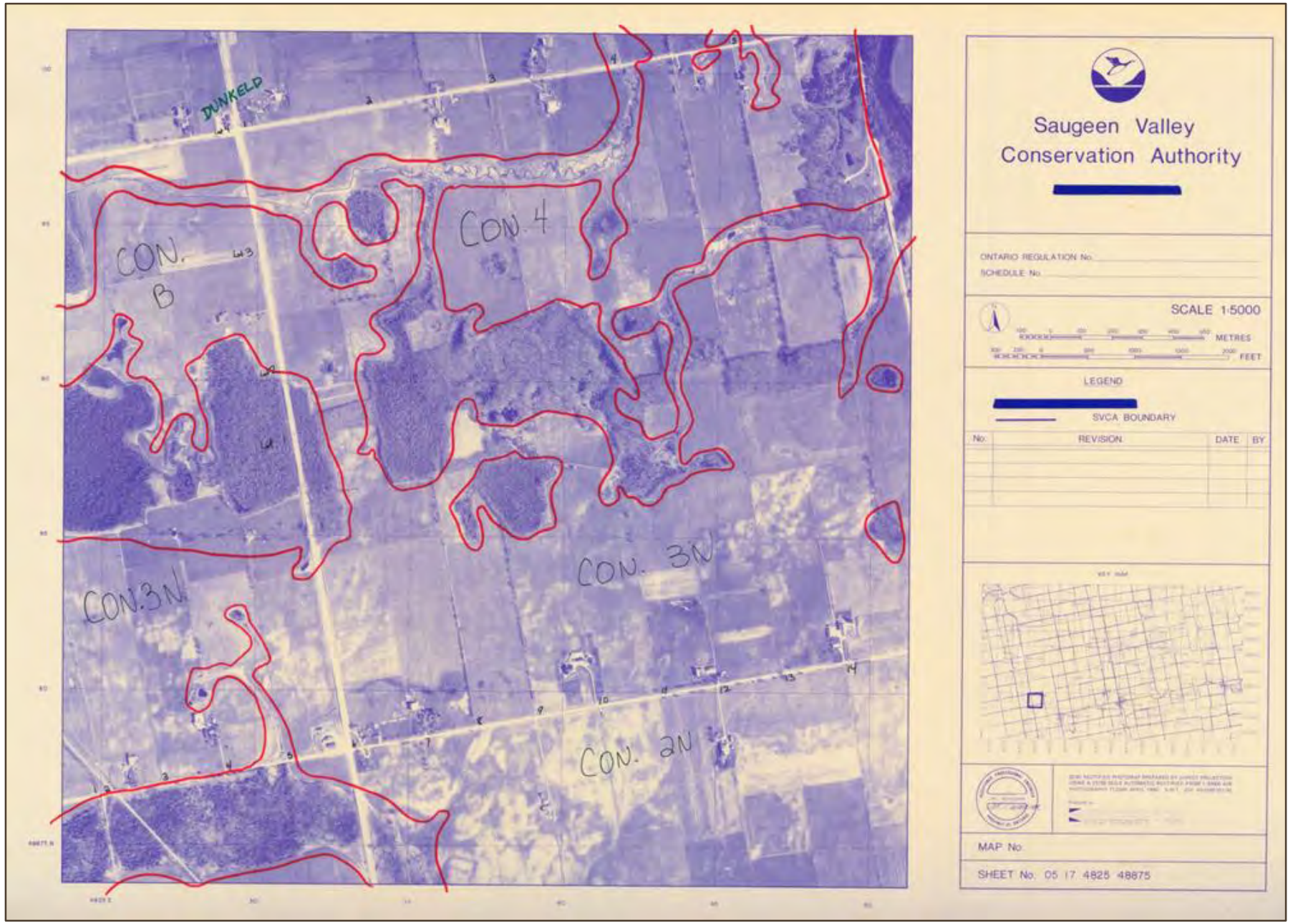

April 13, 2014

August 15, 2010


Flood
Level
Ground
Lateral Force
Buoyancy Force
(Crawlspace)
Additional Pressure
from Saturated Soil
Hydrostatic
Pressure
Greater Bouyancy Force
(Subgrade Space)


PLAN INPUT AND REVIEW
• Planning Act Applications
• Development Proposals & Inquiries
REGULATION 169/06
•Permits
•Enforcement
•Development Proposals, & Inquiries
OTHER
• Municipal Drains
• Environmental Assessments
• Etc.


STUDY LIMIT
STUDY LIMIT
SAUGEEN RIVER
N
Proctor & Redfern Limited
Consulting Engineers
SAUGEEN VALLEY CONSERVATION AUTHORITY
FLOOD PLAIN MAPPING OF HANOVER-KNAPPVILLE AREA
ONTARIO REGULATION No. 251/80
SCHEDULE No. 3
SCALE 1:2000
LEGEND
FLOOD PLAIN LIMIT (BASED ON THE REGIONAL STORM)
FILL AND CONSTRUCTION LIMITS
REGIONAL FLOOD ELEVATION
KEY PLAN


DUNKELD
CON. B
CON 4
CON. 3N
CON. 3N
CON. 2N
Saugeen Valley
Conservation Authority
ONTARIO REGULATION No.
SCHEDULE No.
SCALE 1:5000
METRES
FEET
LEGEND
SVCA BOUNDARY
No.
REVISION
DATE
BY
MAP No.
SHEET No. 05 17 4825 48875

THE GOALS OF REGULATION 169/06

- ***Protecting against loss of life, property damage and social disruption, from flood and erosion processes***

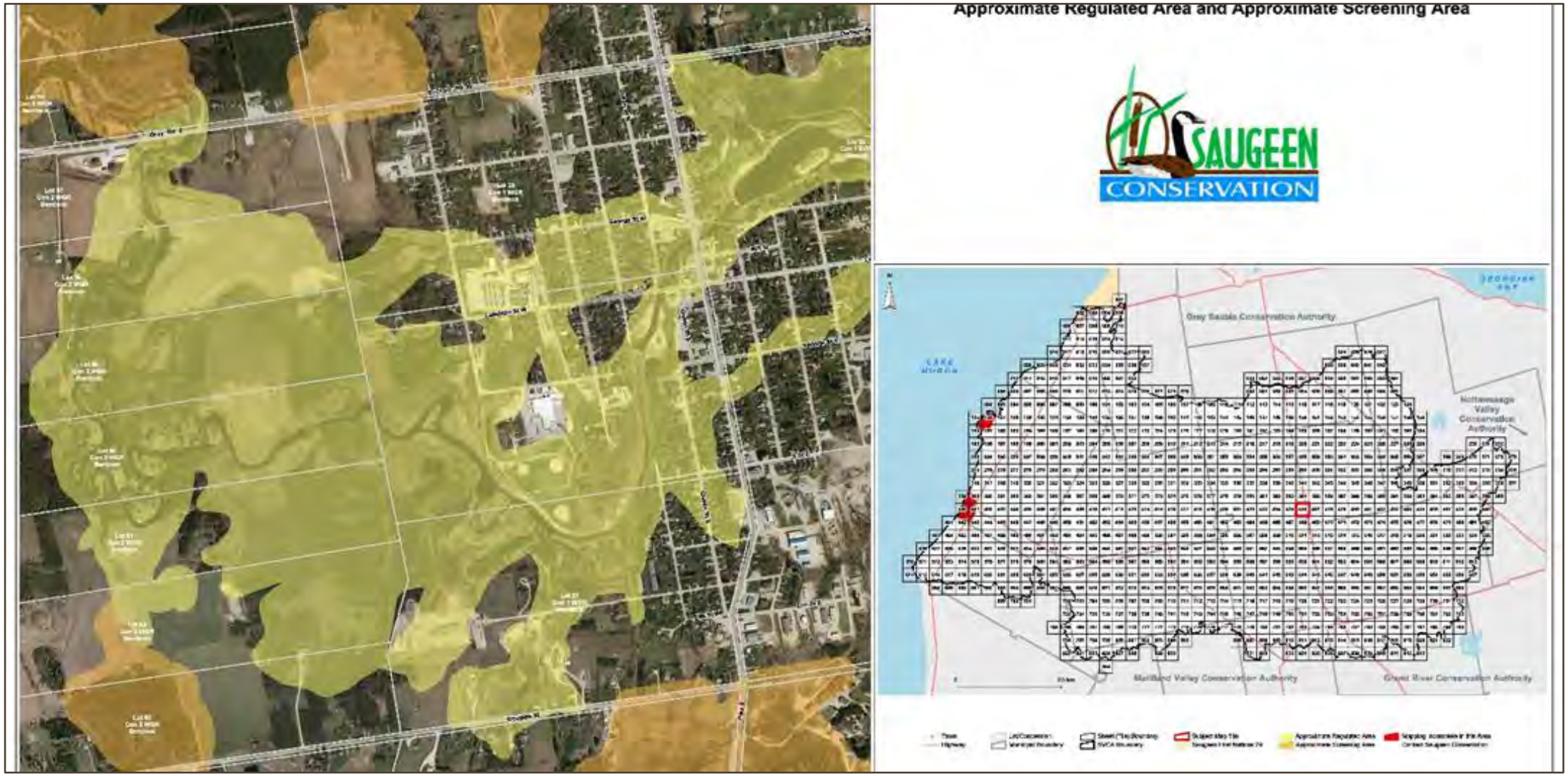
…and,

…the conservation of local ecosystems

AREAS THAT ARE REGULATED UNDER REGULATION 169/06

- Hazardous Lands
- River or Stream Valleys
- Shoreline of Lake Huron
- Watercourses
- Wetlands
- 'Areas of Interference' next to wetlands

Approximate Regulated Area and Approximate Screening Area



Section 28 (25) of the C.A. Act defines “Development” as:

(a) the construction, reconstruction, erection or placing of a building or structure of any kind,

(b) any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, or increasing the size of the building or structure or increasing the number of dwelling units in the building or structure,

(c) site grading,

(d) the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

Regulated Works Requiring Permission from the SVCA examples:

- New buildings and/or structures, and/or use changes or intensification of these features
- Watercourse clean outs, straightening, docks, crossings, enclosures
- Laneway works
- Drainage works
- Roadway works
- Filling, grading, or other site alterations
- Infrastructure works

Test of Regulation

While many projects are Regulated by the SVCA, this does not mean they cannot proceed as proposed, or be modified to address the Regulation and acquire a permit.

Section 28. of the Conservation Authorities Act indicates the SVCA has the power to:
(C) prohibiting, regulating or requiring the permission of the authority for development if, in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development;

Therefore, permission can be granted for anything in the Regulated Area provided the *'control of flooding, erosion, dynamic beaches or pollution or the conservation of land'* is not negatively impacted. If the proposal does not address these items the requirement for a permit remains but the SVCA should not issue that permit.

If SVCA staff and the proponent disagree SVCA staff cannot refuse a permit, only the SVCA's Board can do that. If proponent further disputes the Board's decision, the Mining and Lands Tribunal will make the final decision. The SVCA has never been unsuccessful at an appeal.

The SVCA has also not been sued for an inappropriate approval that was subjected to natural hazards.

Enforcement

Associated with the SVCA's Regulation the potential penalties include, if convicted:

- Fine up to $10000 (to MNRF, never to SVCA).
- Imprisonment of term up to 3 months.
- Removal and/or Rehabilitation of property to predevelopment conditions.

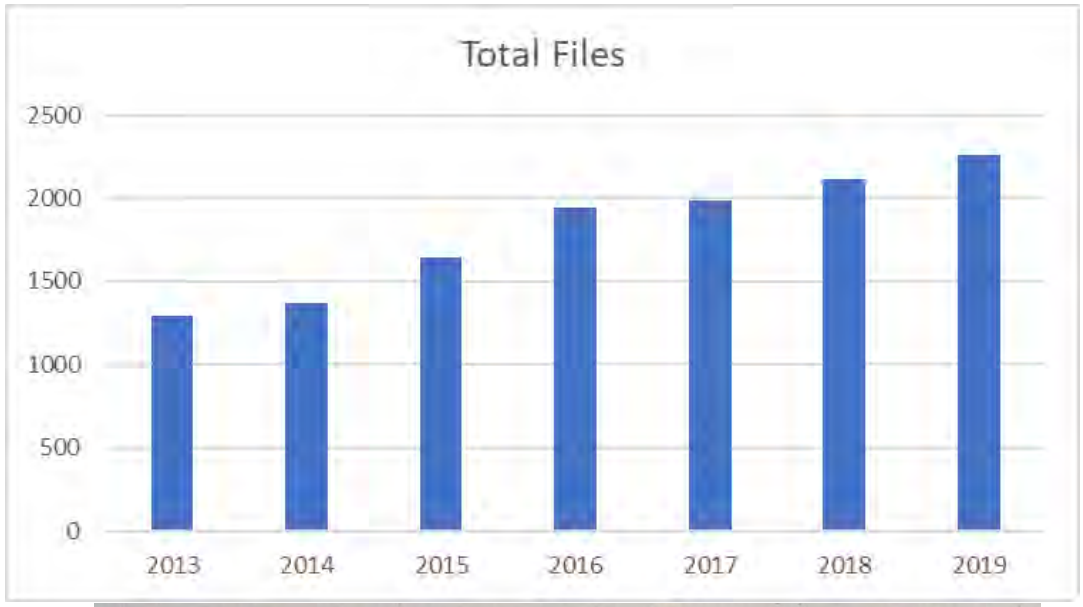
The SVCA has not been unsuccessful in a prosecution to date. The Regulation being in place in some form since the 1970s.

Highlights of Regulation

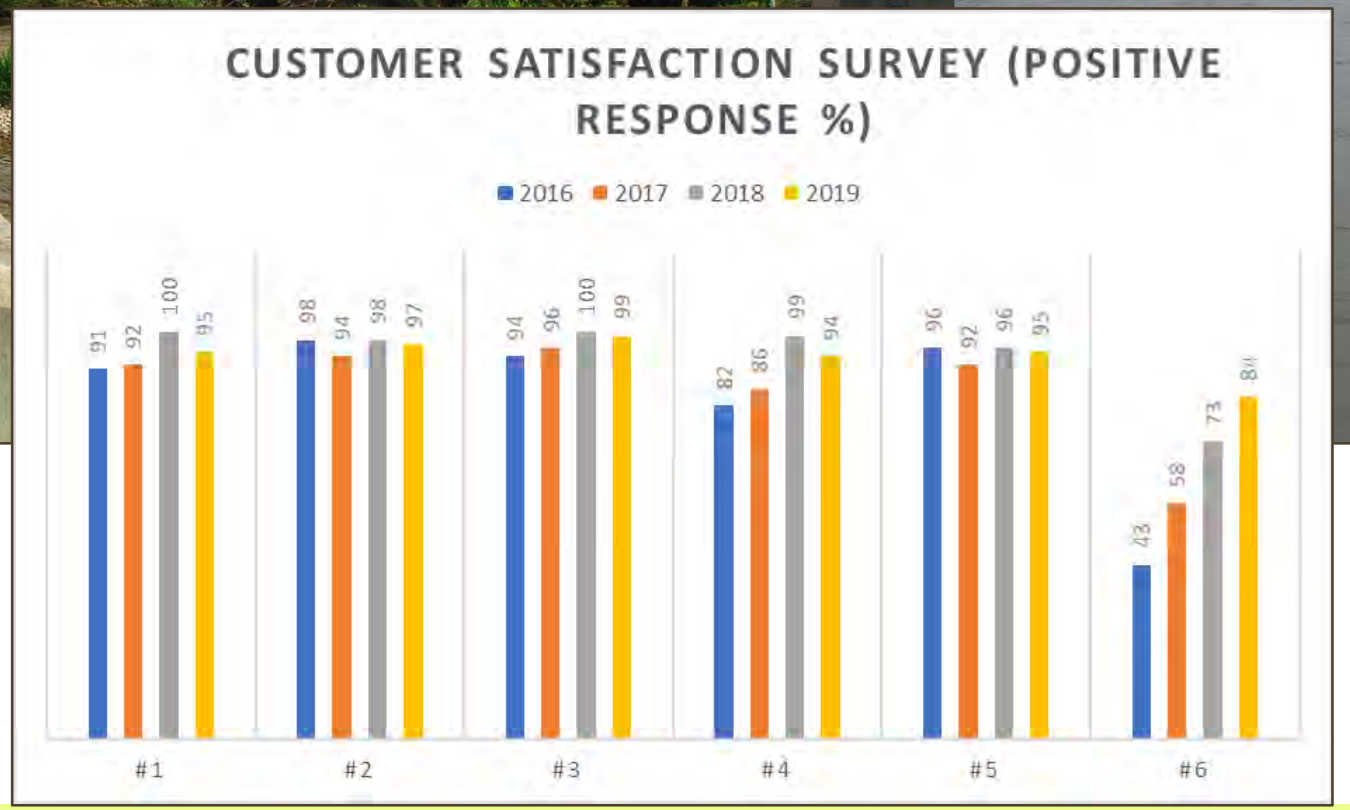
- Protects the wetlands and headwater areas of the Saugeen Valley Watershed thereby retaining flood storage, protecting downstream communities, and maintaining base flow for agricultural, tourism, and sporting uses.
- Maintains boundaries of existing floodplain areas in the watershed, to ensure existing property and development downstream or upstream of works does not experience increased risk from development.
- Protects new development, and potential residents of new development (present and into the future), from being subjected to Natural Hazards.
- Makes SVCA accountable for new works in Regulated Area being subject to, or subjecting others to Natural Hazards.
- Protects watercourses from alterations that could impact flood storage, flow conveyance, and resulting increased erosion and flow velocities.
- Protects development in hazardous shoreline areas.
- Is a template for other areas that just had their watershed event (Calgary, High River, Houston, etc.) with regards to floodplain management and avoidance.

Also notable is that the Regulation does all this across political and county boundaries, and still retains control by a Local Board of Directors.

Statistics


Total Files
2500
2000
1500
1000
500
0
2013
2014
2015
2016
2017
2018
2019


Permits
350
300
250
200
150
100
50
0
2013
2014
2015
2016
2017
2018
2019


CUSTOMER SATISFACTION SURVEY (POSITIVE RESPONSE %)
2016
2017
2018
2019
91
92
100
95
98
94
98
97
94
96
100
99
82
86
99
94
96
92
96
95
43
58
73
#1
#2
#3
#4
#5
#6

Other Reviews

Environmental Assessment Review - Review of large-scale projects that may, or may not, be subject to SVCA Regulations. Allow projects that would have impacts on Natural Hazards to be reviewed by SVCA in all cases. (Bridges, Transmission Corridors, etc.)

Drainage Act Review – SVCA permission is required for new drains or drain maintenance. Review and tests of the SVCA's Regulation, and its purpose applicable to these projects as well. SVCA is involved early in the process and works with landowners, municipal officials, etc. to work towards resolution.

Renewable Energy Act proposals – SVCA's Regulation is still applicable to REA proposals.

Aggregate Extraction Proposals – Approval with MNRF, No SVCA Regulation

Land Use Planning for Natural Hazards

Brandi Walter
Environmental Planning Coordinator

Content of Presentation

- How/Why is SVCA involved with land use planning?
- What are Natural Hazards?
- Review of Provincial Natural Hazard Policy
- Establishing Principal of Development
- SVCA Planning Review Process
- SVCA as Planning Partners

SVCA is Involved with Land Use Planning Under *Planning Act* in 5 Ways

- As an agency with provincially delegated responsibility for the natural hazard policies of the Provincial Policy Statement (PPS); made under the *Planning Act*
- As a municipal technical advisor;
- As a public body under various regulations made under the *Planning Act*;
- As a watershed-based resource management agency; and,
- As landowners.

Provincially Delegated Responsibility

Hurricane Hazel – Toronto 1954

All CAs have been delegated responsibility under the Provincial One Window Planning System for Natural Hazard management .

As outlined in a CO/ MNRF/MMAH Memorandum of Understanding (MOU) CAs have been delegated responsibilities from the MNRF to represent the **provincial interests** regarding natural hazards encompassed by Section 3.1 of the Provincial Policy Statement (PPS).

These delegated responsibilities require SVCA to review and provide comments on municipal policy documents (Official Plans and comprehensive zoning by-laws) and development applications.

SVCA's purpose is to ensure municipal policy documents and development applications are consistent with the natural hazard policies of the PPS.

Provincially Delegated Responsibility

This delegated provincial responsibility is typically included in local SVCA-Municipal Planning Review Agreements.

Natural hazard policies of the PPS closely parallel SVCA's Regulatory requirements under Section 28 of the *Conservation Authorities Act* with the same hazard features and similar management and avoidance policies.

It makes sense for SVCA to be the one agency to review these items at the planning stage, which avoids duplication, and helps ensure the opportunity for compliance at the SVCA permitting stage.

Notably, *Planning Act* and the *Conservation Authorities Act* are separate pieces of legislation. Decisions made under one Act do not override the other, both must be addressed independently.

Corner of Yonge and Durham Streets, Walkerton1994

Technical Advisors

SVCA provides a technical advisory role to municipalities negotiated under the terms of Planning Service Agreements / Memorandum of understanding (MOU).

Planning service agreements guide SVCA's participation in the planning process, including scope of review, details of review, timelines, fees, etc.

Scope of review: includes matters related to policy input and advice, environmental impacts, watershed science and technical expertise associated with **natural hazard** and natural heritage management.

SVCA currently has a number of agreements in place with our member municipalities. These agreements are currently being updated with a target date of June 2021 for all agreements to be finalized.

Natural Hazards

Flooding hazards, erosion hazards and **dynamic beach hazards** adjacent to the shorelines of the Great Lakes - St. Lawrence River System and large inland lakes

Flooding and erosion hazards adjacent to river, stream and small inland lake system

Hazardous sites
(leda clays, unstable bedrock and organic soils)

Provincial Policy Statement (PPS, 2020)

Section 3.1, Natural Hazard Policies

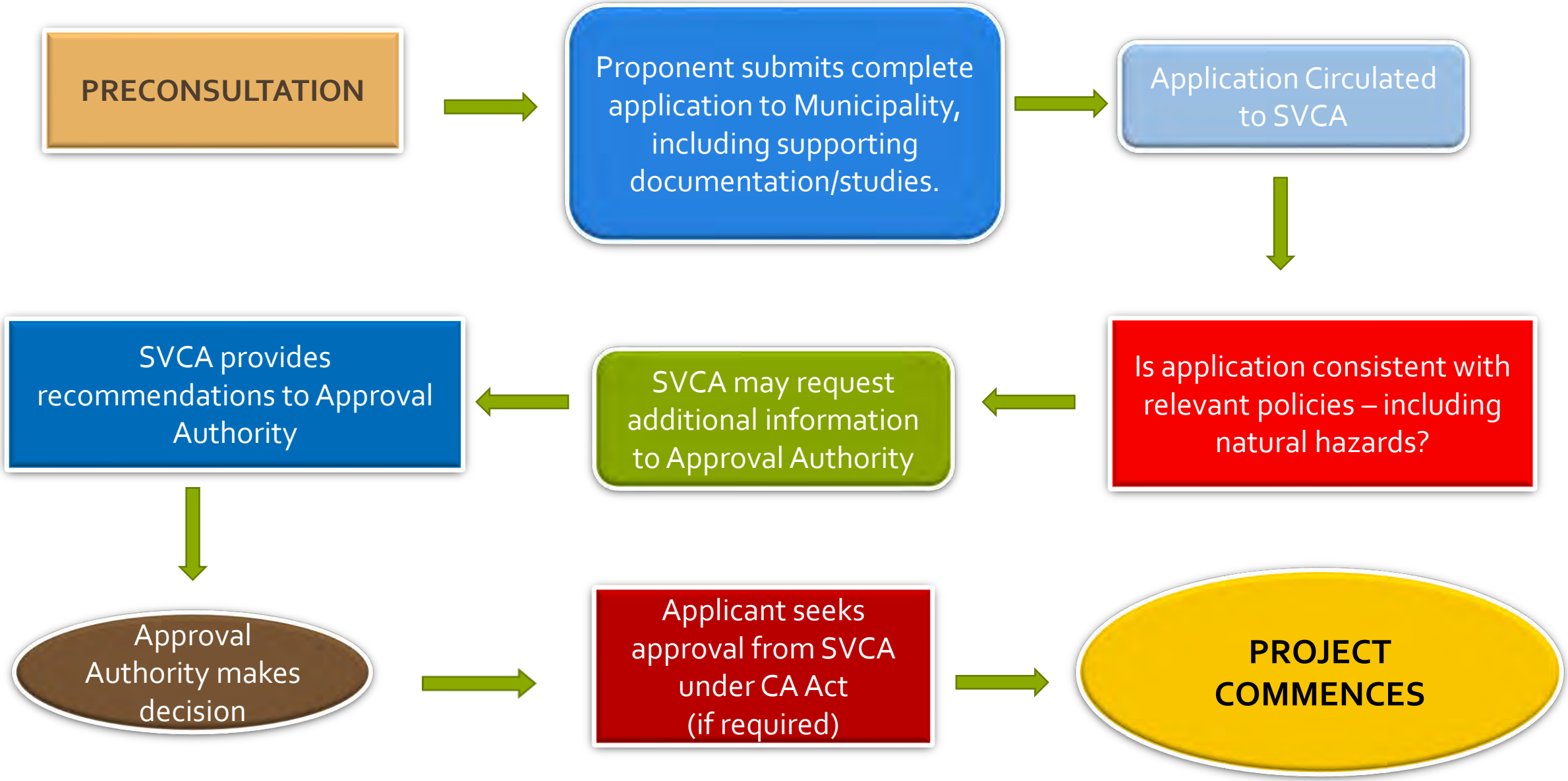
GOAL: Ontario's long-term prosperity, environmental health and social well-being depends on reducing the potential for public cost or risk to Ontario's residents from natural or human-made hazards.

To accomplish this goal, the "Principal of Development" is established through the PPS.

The natural hazard policies of the PPS are designed to direct development away from areas of natural or human-made hazards where there is an unacceptable risk to public health or safety or of property damage, and not create new or aggravate existing hazards.

Principal of Development

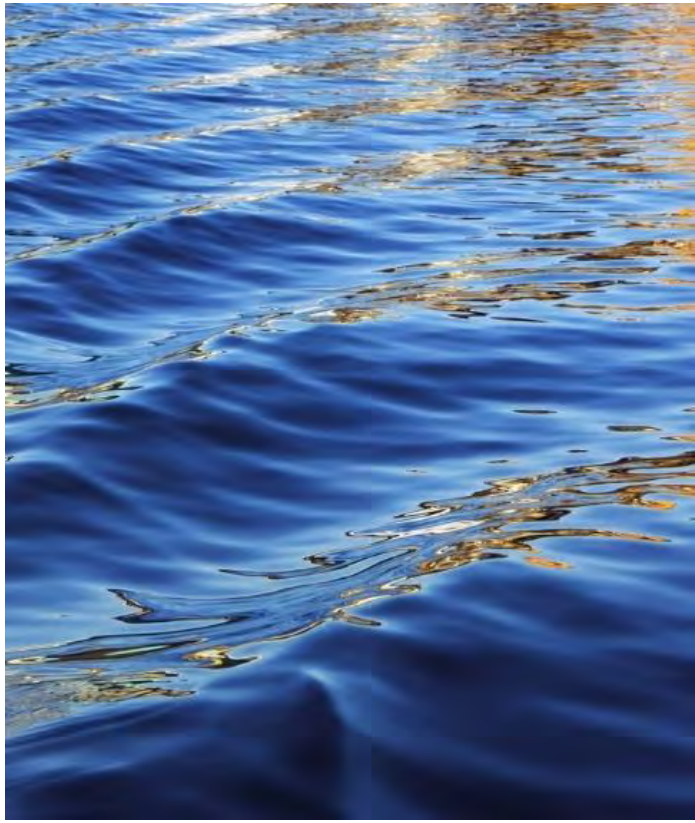
- The "principle of development" is established first through *Planning Act* approval processes.
- First step in natural hazard planning process is to locate development safely away from hazardous lands in accordance with the Provincial mandate for public safety.
- Separate process from CA Act permitting, which provides for technical implementation of matters pursuant to Section 28 of the CA Act, with the end goal of protecting both the natural feature and public safety.
- SVCA must ensure concerns regarding the establishment of the "principle of development" are conveyed to planning approval authority during the preparation of a municipal planning documents (Official Plan, secondary plans or OPA), or during the *Planning Act* approvals process and not through the CA Act S. 28 permitting process.


PRECONSULTATION
Proponent submits complete application to Municipality, including supporting documentation/studies.
Application Circulated to SVCA
Is application consistent with relevant policies – including natural hazards?
SVCA may request additional information to Approval Authority
SVCA provides recommendations to Approval Authority
Approval Authority makes decision
Applicant seeks approval from SVCA under CA Act (if required)
PROJECT COMMENCES

SVCA AS A PLANNING PARTNER

- Through the delegated/legislated *Planning Act* process, SVCA has become an invaluable participant in land use planning around Natural Hazards.
- With current weather patterns it has become evident planning for safe development is critical.
- SVCA's goal is to work cooperatively with our municipal partners to plan for development that would not be impacted by natural hazards.

Thank You



Questions


#ConservationMatters