Saugeen Conservation

Flood Forecasting in the Saugeen Watershed

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Saugeen CONSERVATION

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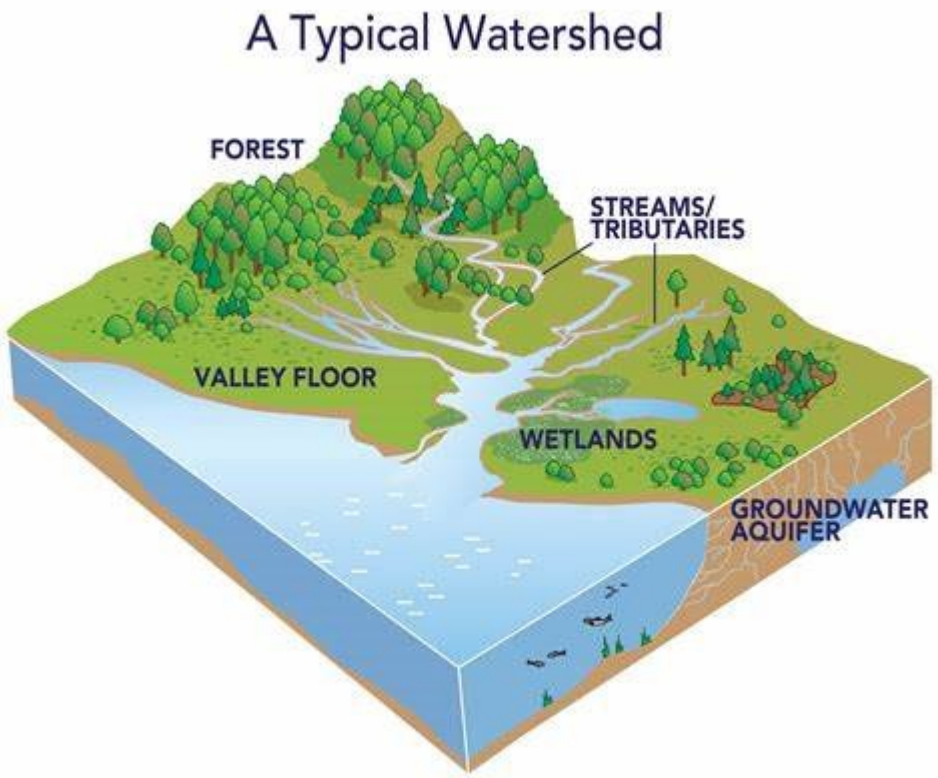
Jody Duncan serves as Flood Forecasting and Warning Coordinator at the Saugeen Valley Conservation Authority, boasting nine years of experience, with the last two in conservation.

His career has involved working with the province, private industry, and conservation in fisheries science, aquatic biology, and hydrology.

Jody is passionate about applying his knowledge to local conservation efforts and enjoys spending time at his family cottage in Temagami.

As a speaker to the Saugeen Naturalists, he brings a deep commitment to environmental protection, sharing insights from his background in flood forecasting and warning.

What is a watershed?

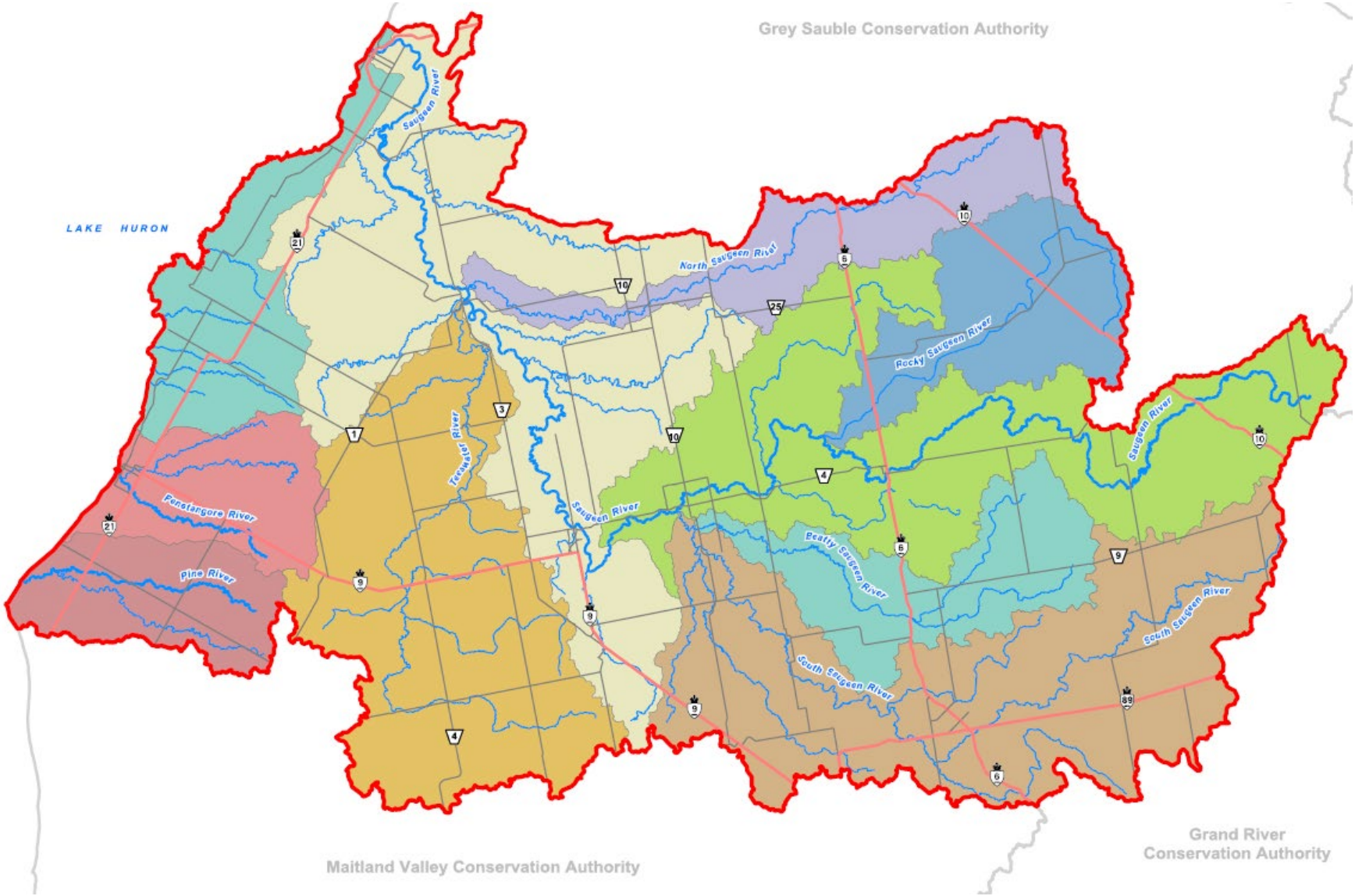


A watershed describes an area, and the waterways that flow through it towards a major outlet such as a lake. Everything in a watershed is connected and actions upstream can affect conditions downstream.

The SVCA watershed includes the Saugeen, Penetangore and Pine Rivers that flow to Lake Huron. It's a system of water that all comes together.

Everyone lives in a watershed.

Saugeen Conservation sub-watersheds

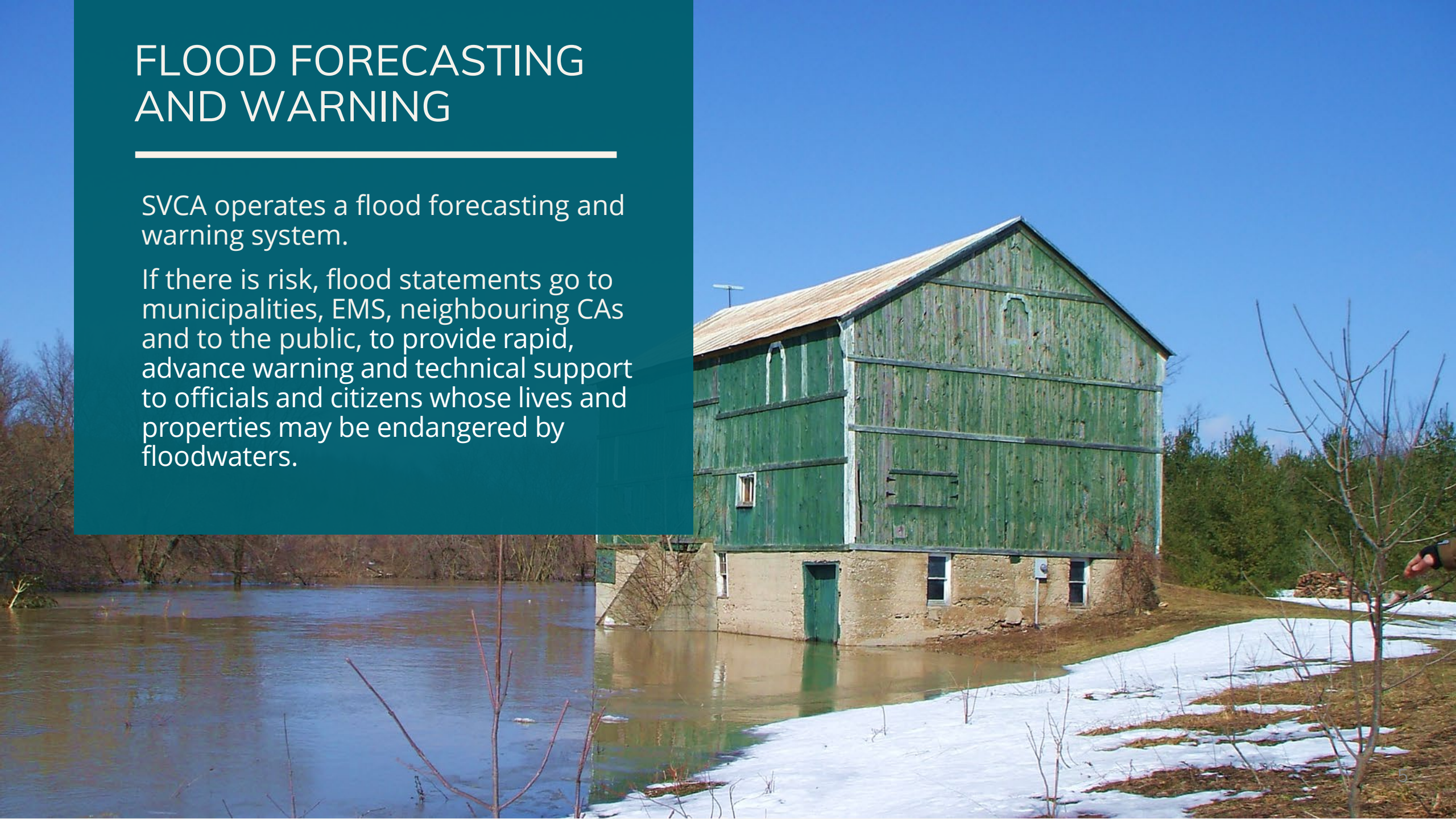


- Beatty Saugeen
- Lake Fringe
- Lower Main
- North Saugeen
- Penetangore River
- Pine River
- Rocky Saugeen
- South Saugeen
- Teeswater River
- Upper Main

FLOOD FORECASTING AND WARNING

SVCA operates a flood forecasting and warning system.

If there is risk, flood statements go to municipalities, EMS, neighbouring CAs and to the public, to provide rapid, advance warning and technical support to officials and citizens whose lives and properties may be endangered by floodwaters.



Flood Forecasting and Warning

- SVCA operates a flood forecasting and warning system, which uses three main sources of information: stream gauges, weather stations and weather forecast
- The daily planning cycle interprets information from those three sources
- From there, the question becomes “is there a risk of flooding”
- If there is a risk, location is further defined as either riverine or shoreline, as well the risk level
- Flood statements then go to municipalities, emergency responders, neighbouring conservation authorities, the media and the public

Causes and Seasonality of Flooding

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Rapid snowmelt	■	■	■	■								■
Combined rainfall and snowmelt	■	■	■	■								■
Localized ice jams	■	■	■									■
Moderate rainfall on saturated or frozen ground				■	■	■						
Extreme localized rain						■	■	■				
Severe widespread rain						■	■	■	■	■	■	
Lake Huron storm surge*	■	■	■	■							■	■

*Most likely during the months indicated but can occur at any time of year.

Data Collection Network

- 20 stream gauges throughout the watershed continuously monitor real time water levels

Water Levels

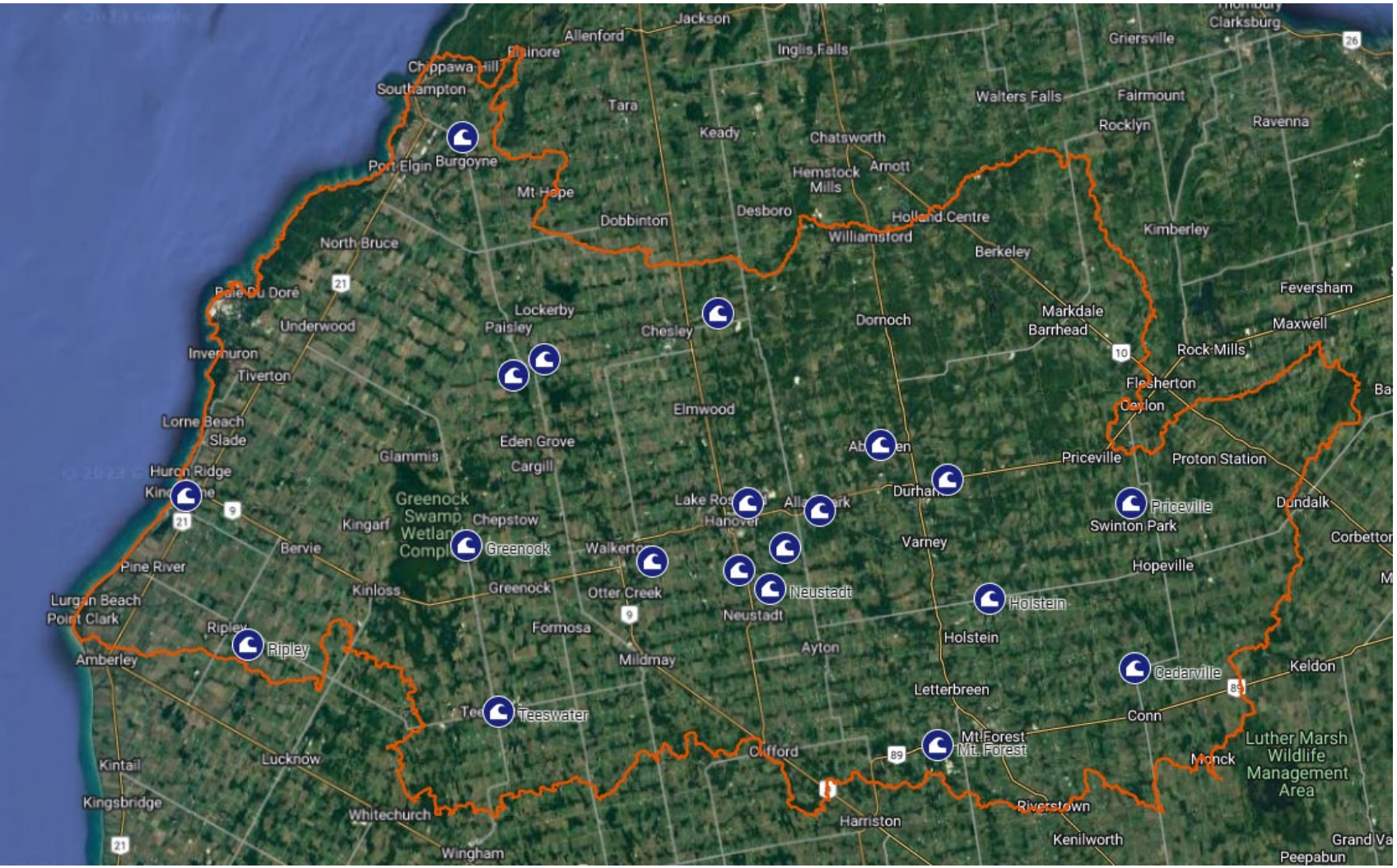
- Precipitation, wind speed, air temperature is recorded either manually or automatically at our stations
- Additional data comes from external sources

Weather Data

- From November to May, snow surveys are performed bi-weekly
- Measure snow depth and the snow to water equivalent

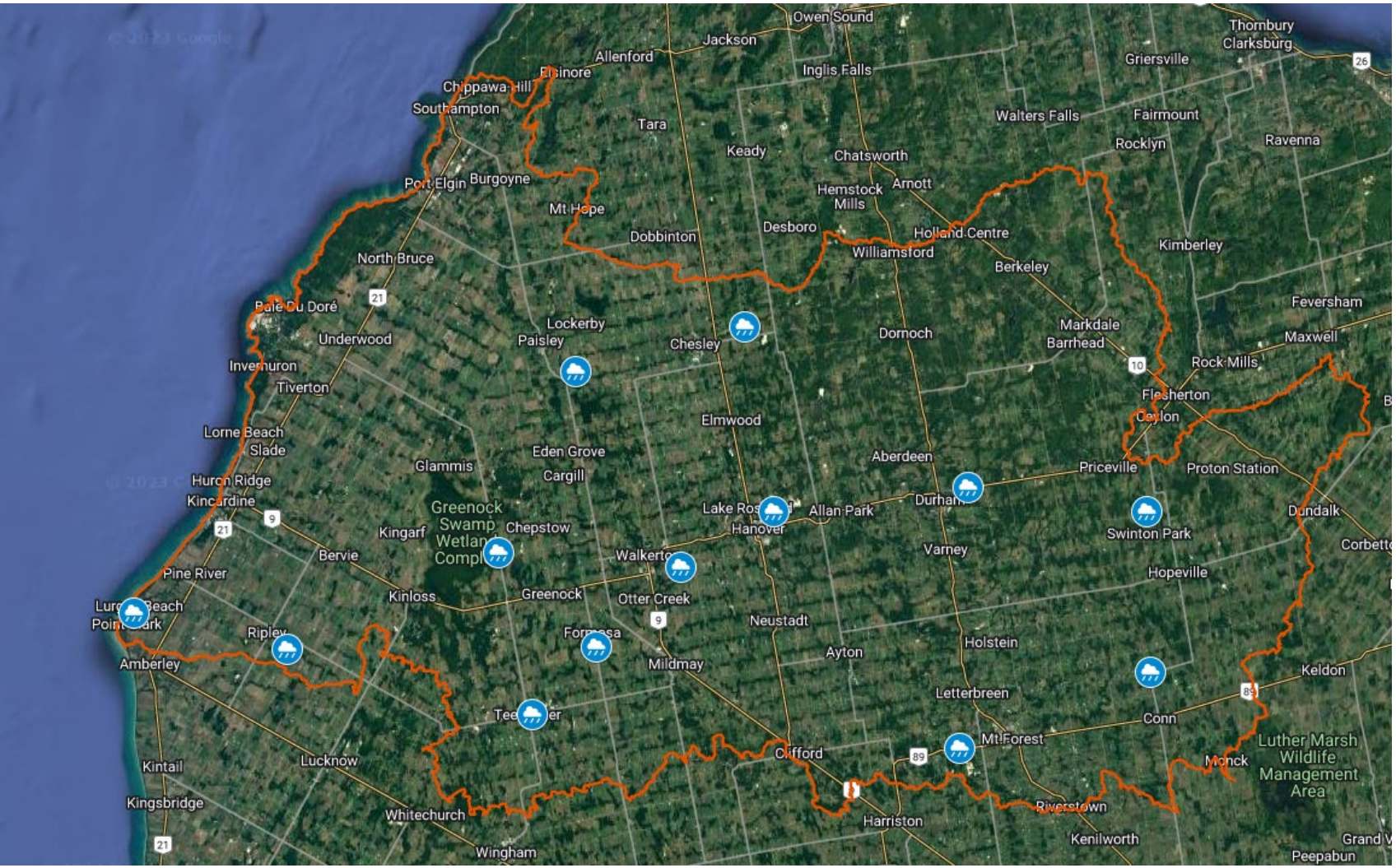
Snow Surveys

Stream Gauge Network



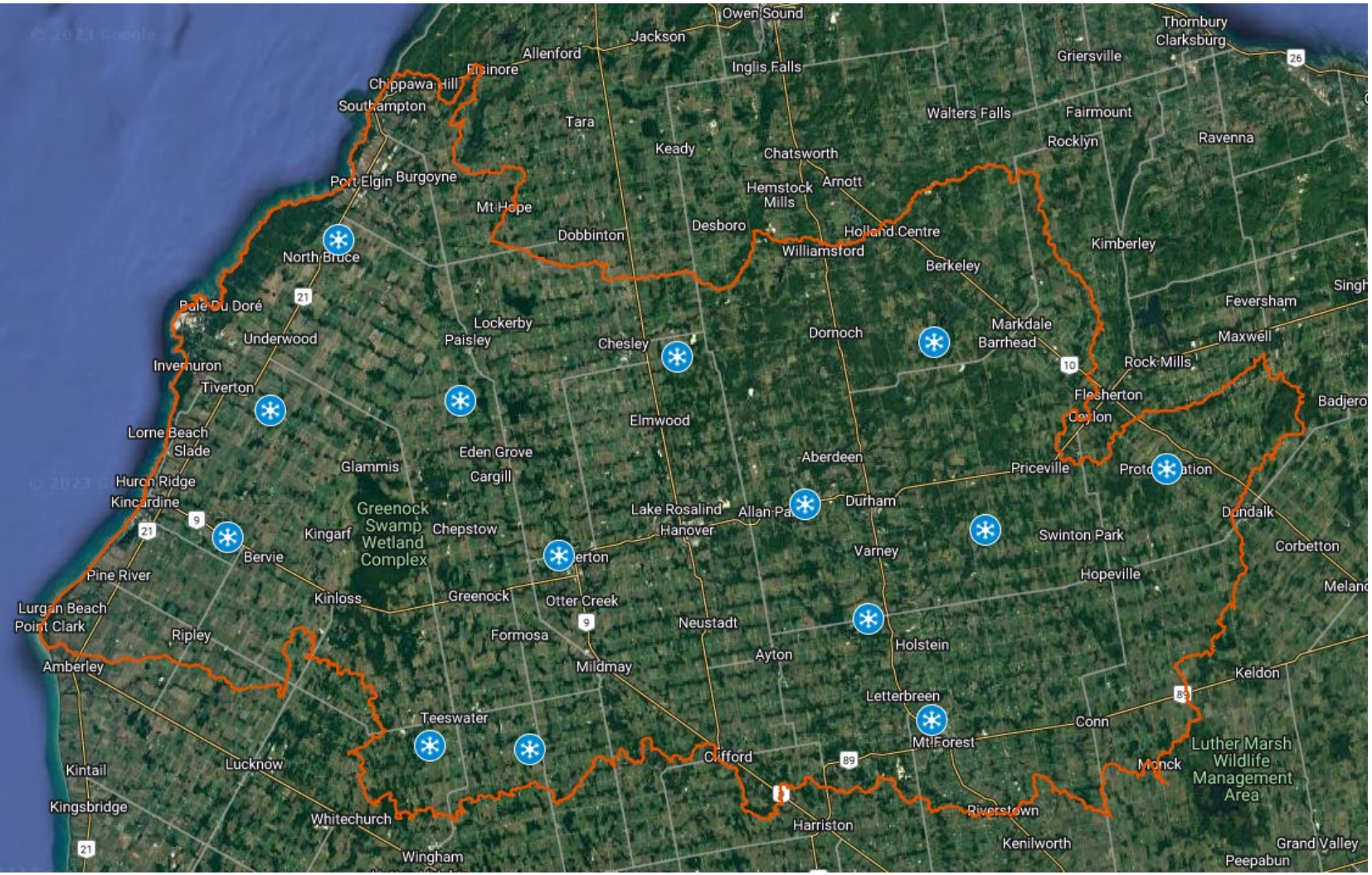
- 10 stations owned and operated by SVCA
- 10 stations owned and operated by Water Survey of Canada
- Continuously monitor water levels which can be viewed remotely
- Some stations also equipped with air and water temperature sensors

Rain Gauge Network



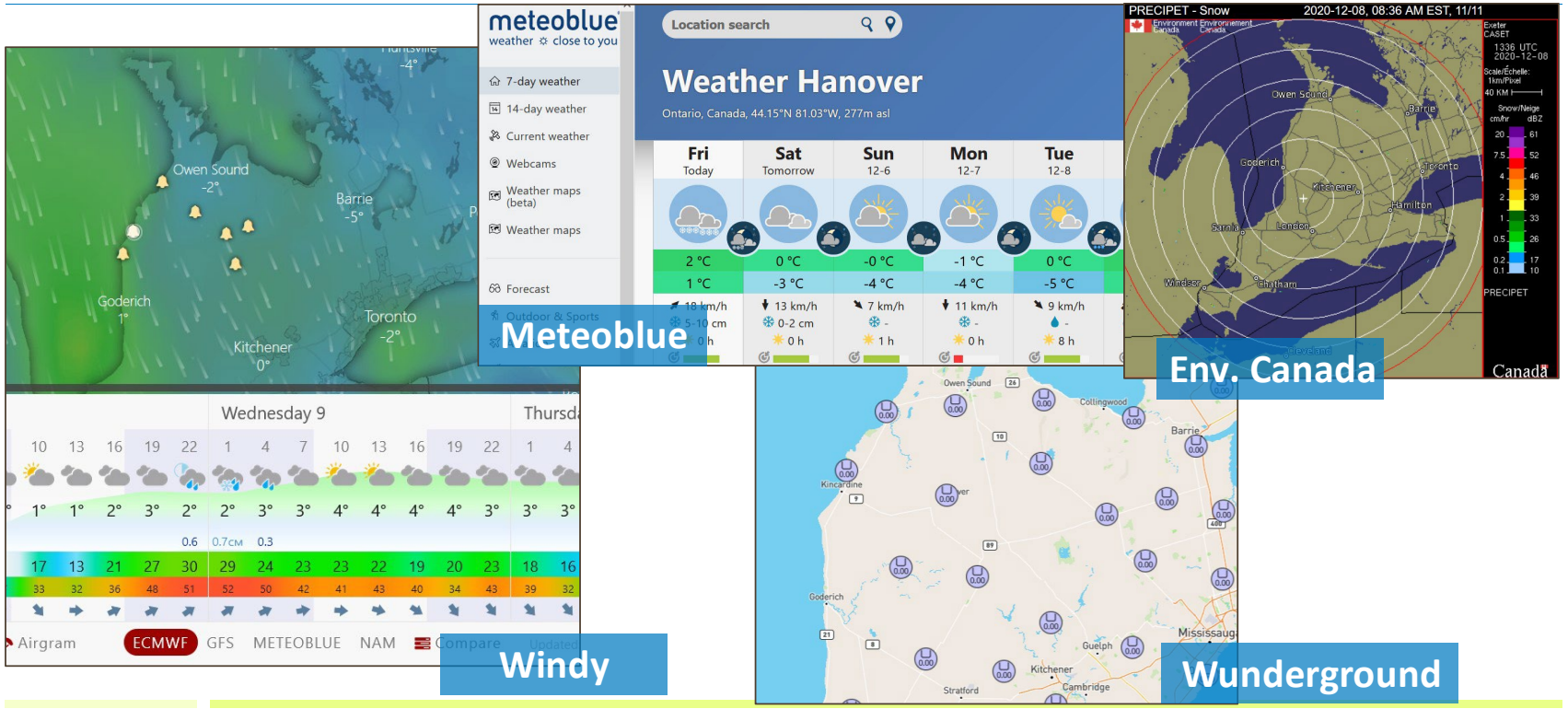
- All gauges are owned and operated by SVCA
- 10 are co-located with stream gauges and 2 are standalone weather stations
- At minimum, rain gauges provide hourly rain data
- Allow SVCA to determine rainfall intensity and estimate runoff volumes

Snow Survey Network



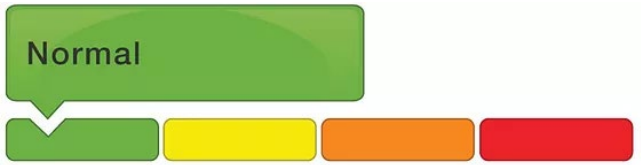
- 14 snow courses throughout the watershed
- Measured bi-weekly from November to May
- Snow depth and density are measured
- Estimates how much water would runoff during snowmelt

Weather Forecasting



- Weather forecasting is largely done using publicly available resources.
- Short and long-term weather forecasts are reviewed daily
- Provide information on forecasted precipitation, temperatures, wind speeds, and wave heights

Definitions - Normal



Watershed or Shoreline: Normal (green)

- No flood conditions present
- No messages required
- Normal risk conditions are assigned to each area of interest: the watershed (i.e. rivers) and the shoreline (Lake Huron)
- General risks associated with water still exist

Definitions – Water Safety Statement

Watershed or Shoreline Conditions Statement (yellow); Water Safety Statement

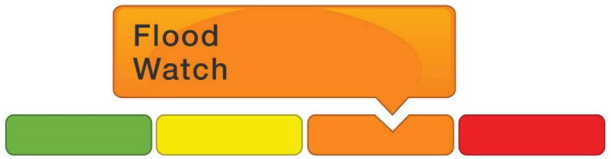
- There are two yellow watershed conditions statements; one is Water Safety and one is Flood Outlook
- Water Safety is a general notice of potential conditions that pose a safety risk
- Water Safety Statements are issued for the watershed (i.e. rivers) and the shoreline (Lake Huron)
- For the watershed, these statements let people know that inland water recreational activities such as fishing or canoeing might be dangerous, as water levels might quickly change
- For the shoreline, these statements let the people know high waves could result in flooding or erosion, and pose safety risks for commercial and recreational users

Definitions – Flood Outlook Statement

Watershed or Shoreline Conditions Statement (yellow); Flood Outlook

- There are two yellow watershed conditions statements; one is Water Safety and one is Flood Outlook
- Flood outlook messages provide early notice of the potential for flooding
- May be issued when a major storm is forecast, when above normal snowpack conditions exist or snowmelt is imminent
- Current watershed conditions along with forecast suggest high runoff potential

Definitions – Flood Watch Statement



Watershed or Shoreline Flood Watch Statement (orange)

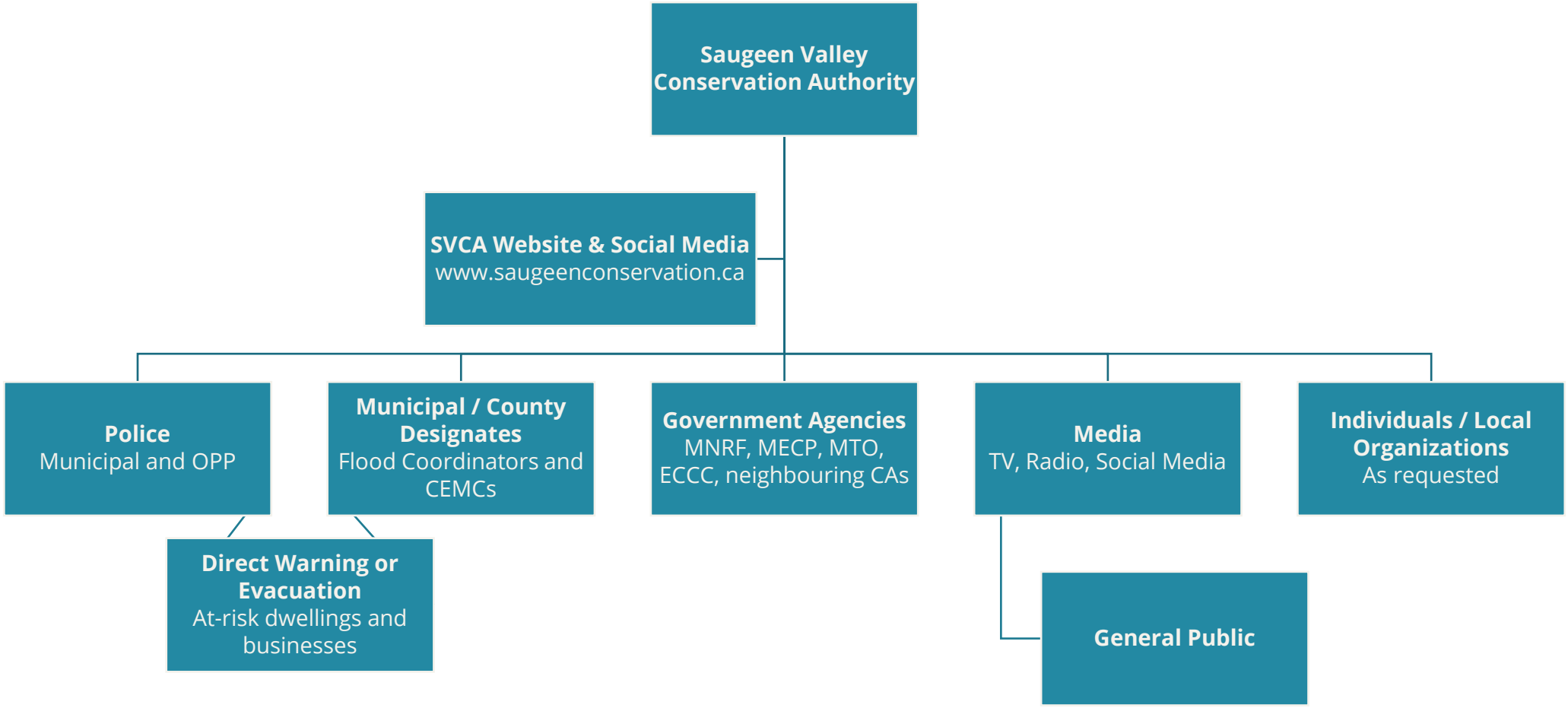
- Flood watch statements are issued for watercourses (i.e. rivers) and the shoreline (Lake Huron)
- These are issued to prepare people for possible flooding, alerting them to start taking precautionary measures
- Flood watch statements are often issued for specific watercourses, or other flood prone areas
- These may be updated with changes to the weather and watershed conditions and are cancelled or downgraded when the potential for flooding has passed
- The Flood Coordinator might activate the Flood Event System at this time

Definitions – Flood Warning Statement

Watershed or Shoreline Flood Warning Statement (red)

- Flood warning statements are issued for the watershed (i.e. rivers) and the shoreline (Lake Huron)
- These are issued when flooding is imminent or already occurring
- Flood warning statements are issued for specific areas
- Municipal staff from the affected area are contacted directly to mobilize their own response teams
- At this level, the SVCA's Flood Coordinator activates the Flood Event System, and the administration office in Formosa becomes the Flood Event Operations Centre (FEOC)
- All SVCA staff are alerted and will be ready to proceed with Flood Event team roles and responsibilities

Flood Message Fan-Out System



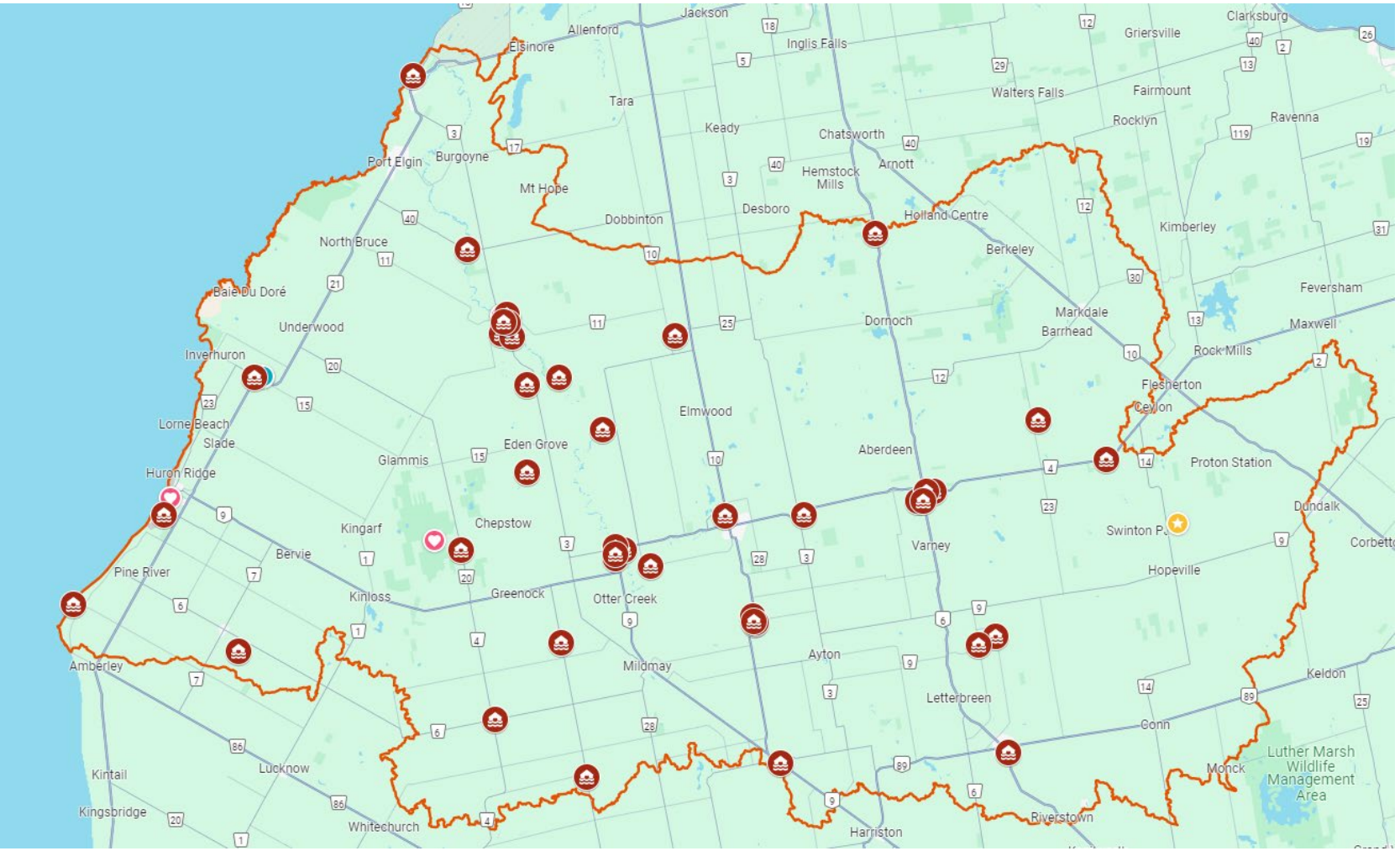
SVCA Flood Response Role

- Continuous assessment of watershed conditions and functionality of hydrometric network
- Provision of updated information and warnings to partners, clients and staff
- Provide advice to member municipalities in response to flooding
- Deployment and coordination of Flood Watch crews to document watershed conditions
- Operation and maintenance of structures used for flood and water control purposes
- Maintain awareness of the province's response to a flood emergency through consultation with the MNRF District Emergency Response Coordinator
- Advise MNRF District Emergency Response Coordinator when the flood emergency ceases to exist
- Provincial Flood Forecasting and Warning Program Implementation Guidelines for Conservation Authorities and MNRF

Flood Watch signage and public program

- Flood Watch location signs have unique reference numbers, BR indicates the municipality of Brockton, and 01 indicates the site number in that community
- Signs are being placed in order of priority, but will eventually be located in all member municipalities
- QR code and URL provided for public reporting

Flood Watch Locations



- 43 signs planned for installation
- Located in areas prone to flooding
- Publicly accessible and don’t pose a risk to safety
- Allows for crowd-sourcing of information

What is done with the information gathered?

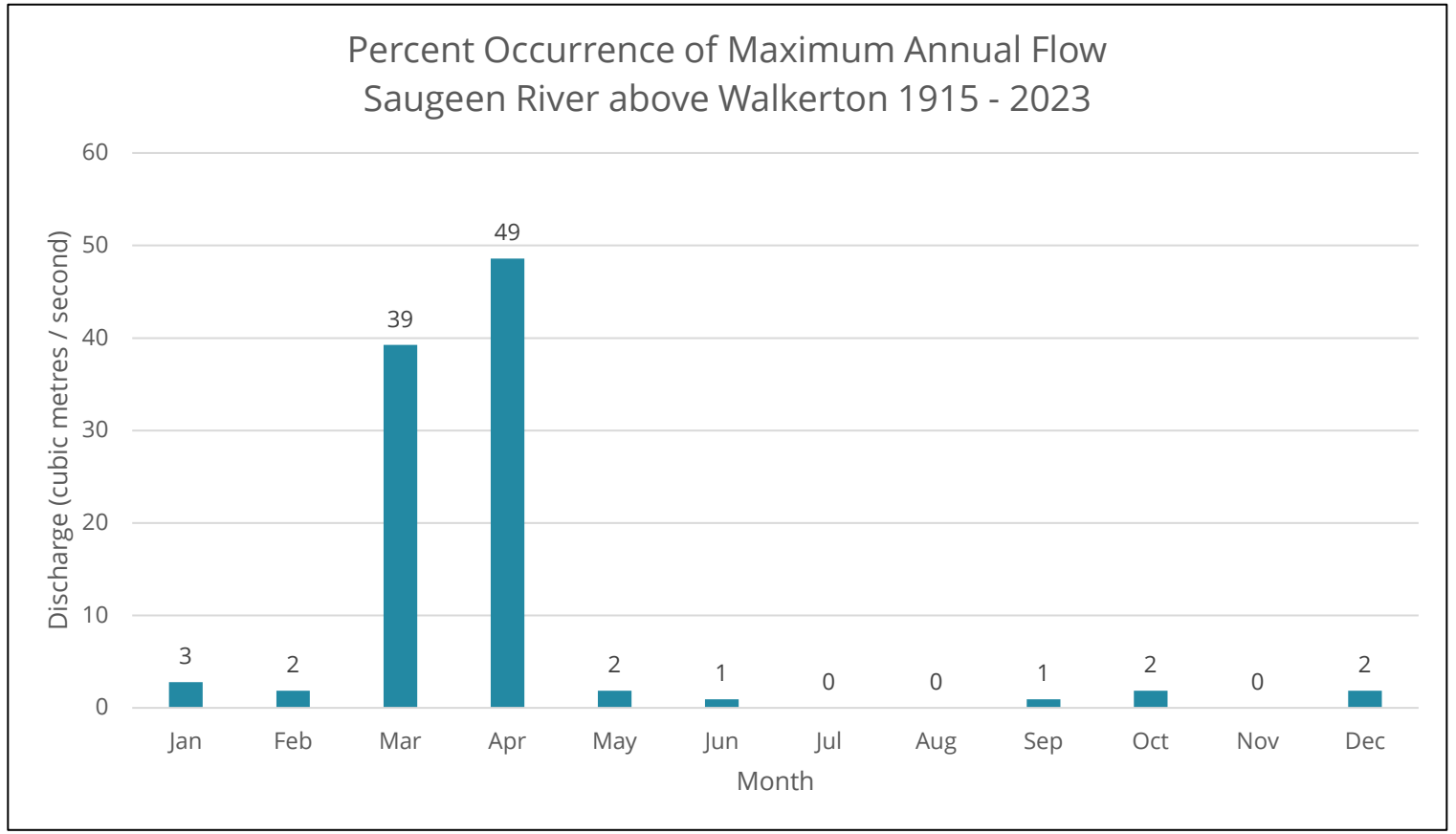
- Observations and documentation provided by Flood Teams help the Flood Coordinator determine the classification of the flood event and act accordingly
- Photos taken in the field may be used in the final flood summary report
- High water information gathered informs historical records of the watershed
- High water marks also help SVCA calibrate flow gauges and improve future monitoring accuracy
- Evaluated data can inform flood risk and evacuation plans, and planning applications for municipal partners

Saugeen River above Walkerton

Highlight of historical flow rates from an SVCA stream gauge station, measured in cubic metres per second:

- October 1954: 428 cms (Hurricane Hazel)
- October 2008: 428 cms
- May 2000: 368 cms
- June 2017: 322 cms
- Mean Annual Flood: 283 cms

Walkerton Flood Statistics



- Historically, 49% of max annual flows have occurred in March
- Typically associated with spring freshet
- Mid-winter thaws and rain on snow / frozen ground next most frequent cause
- Summer thunderstorms are becoming more frequent

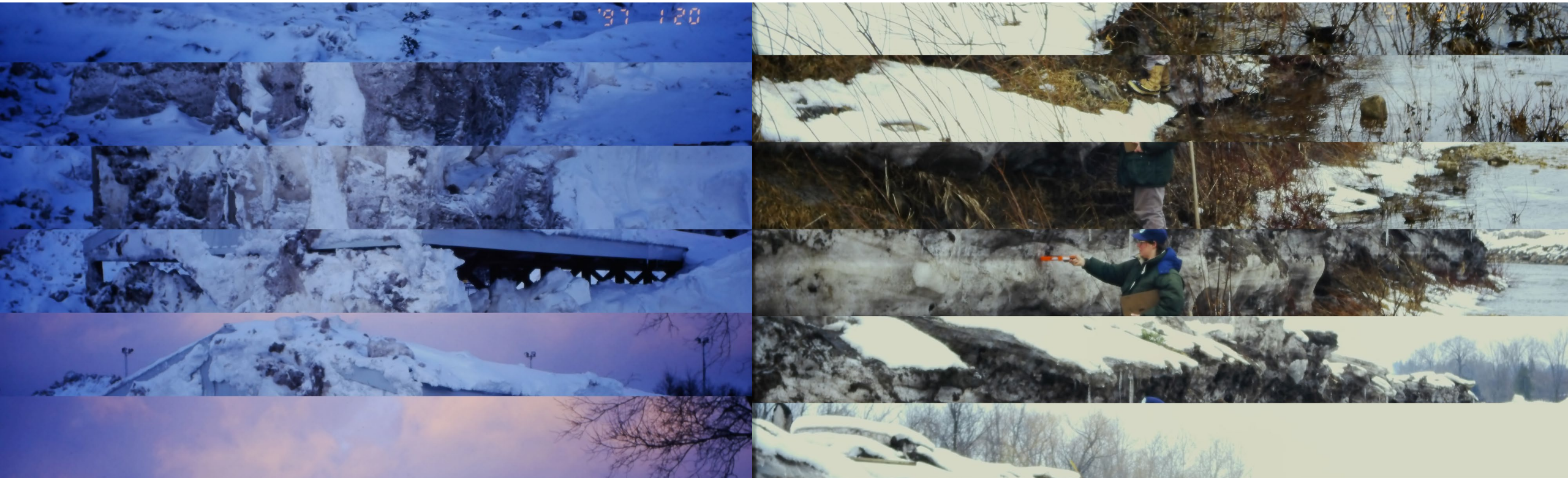
Flood Preparedness

- Monitor local forecasts and alerts from Environment Canada
- Subscribe to SVCA flood messages or monitor our social media accounts
- Review our regulations mapping to determine if you are in a floodplain
- Contact SVCA if you have concerns about flooding
- Refer to reputable online resources for flood preparation measures (e.g., Emergency Management Ontario)

January 1997 Durham

January 1997 Durham

January 1997 Durham



August 2010 Scone

August 2010 Scone

2014 Knappville / Hanover

2018 Paisley

2018 Paisley


Saugeen
CONSERVATION
Thank you.