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Climate Change Risk Assessment & Contaminated Sites

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TBS Greening Government Strategy

The Greening Government Strategy: A Government of Canada indicates that «Consistent with the Federal Adaptation Policy Framework, departments will:

- by 2021, and at regular intervals thereafter, take action to improve understanding of the risks posed by the impacts of climate change to federal assets, services and operations across the country
- by 2022, and following each subsequent climate risk assessment process, take action to reduce climate change risks to assets, services and operations, which could include:
  - incorporating and/or strengthening the consideration of climate change in business continuity planning, departmental risk planning or equivalent processes, and program design and delivery considerations
  - integrating climate change adaptation into the design, construction and operation aspects of all major real property projects

PSPC RP Sustainability Handbook

- Complete climate risk and vulnerability assessments (CRiVA) for crown-owned buildings and engineering assets by 2025
  - Identify and plan for the integration of adaptation measures required to reduce the asset's climate change risk.
- The CRiVA will be completed one year before the development of an asset's Asset Management Plan or as part of any major projects

Combined Bldg/Contaminated Site CRIVA

- Jean Canfield Building, Charlottetown, PE
  - Risk managed contaminated site with annual monitoring requirements

- Lessons Learned:
  - TOR needs to be explicit about the deliverables
    - Integrating contaminated sites requirements into our CRiVA TOR template

  - Ensure consultant has CRIVA and CS resources available.

  - Site visits are beneficial

CRiVA Experience

- PSPC TOR template ensures consistency
- PIEVC protocol
- Workshops are key

Risk Assessment Matrix							
Impact' Severity	Very Severe	5	5	10	15	20	25
	Severe	4	4	8	12	16	20
	Moderate	3	3	6	9	12	15
	Minor	2	2	4	6	8	10
	Measurable	1	1	2	3	4	5
			1	2	3	4	5
			Very Low	Low	Moderate	High	Very High
			Likelihood				

Risks Levels	
Risk (R) = Likelihood (L) x Severity (S)	
R < 5	Negligible
3 < R < 4	Low
R = 5	**Special Case**
6 < R < 9	Moderate
10 < R < 16	**Significant**
R > 20	**Major**

Region Wide CRiVA Screening Tool

CHALLENGE:

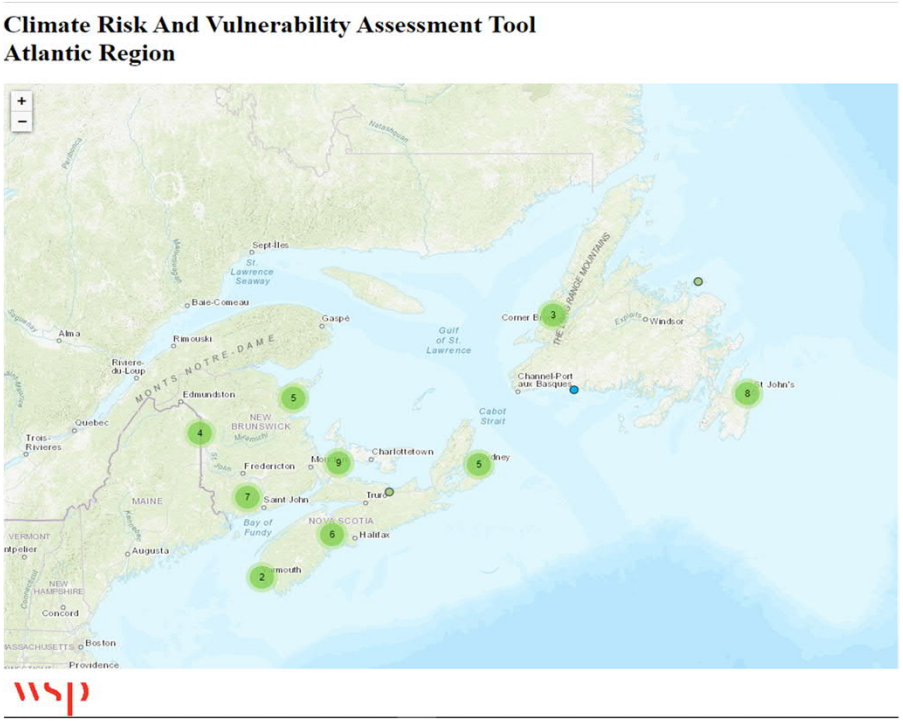
- Identification of elevated climate risk levels at PSPC facilities (outside of the Asset Management Plan five year cycle)
- Information on elevated climate risk at contaminated sites

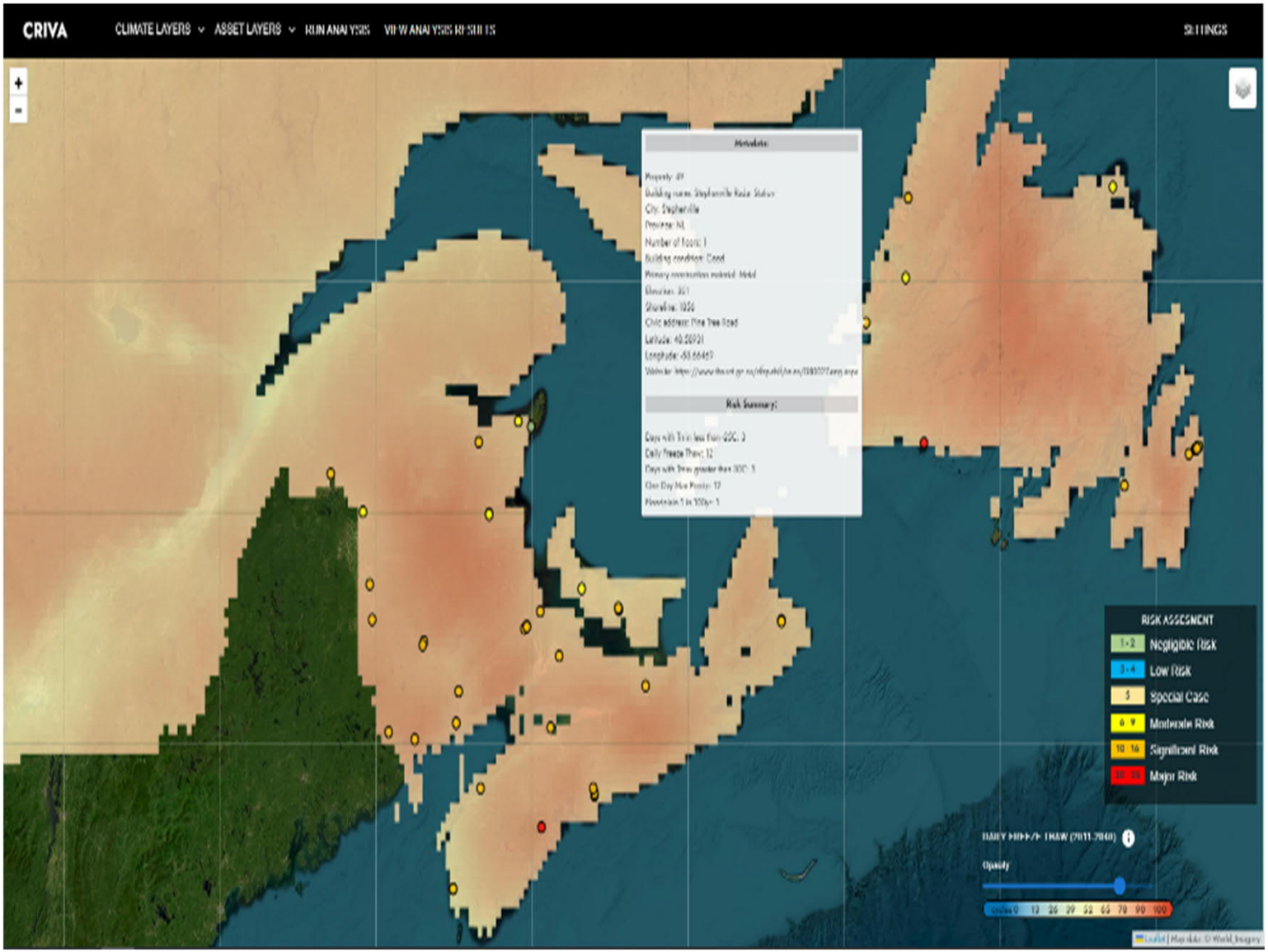
RESULT:

- Developed a region wide CRIVA screening tool pilot.
- Location-based climate risk of the assets our regional portfolio
- Prioritizing high risk sites
- Assessment methodology based on PIEVC and ISO standards

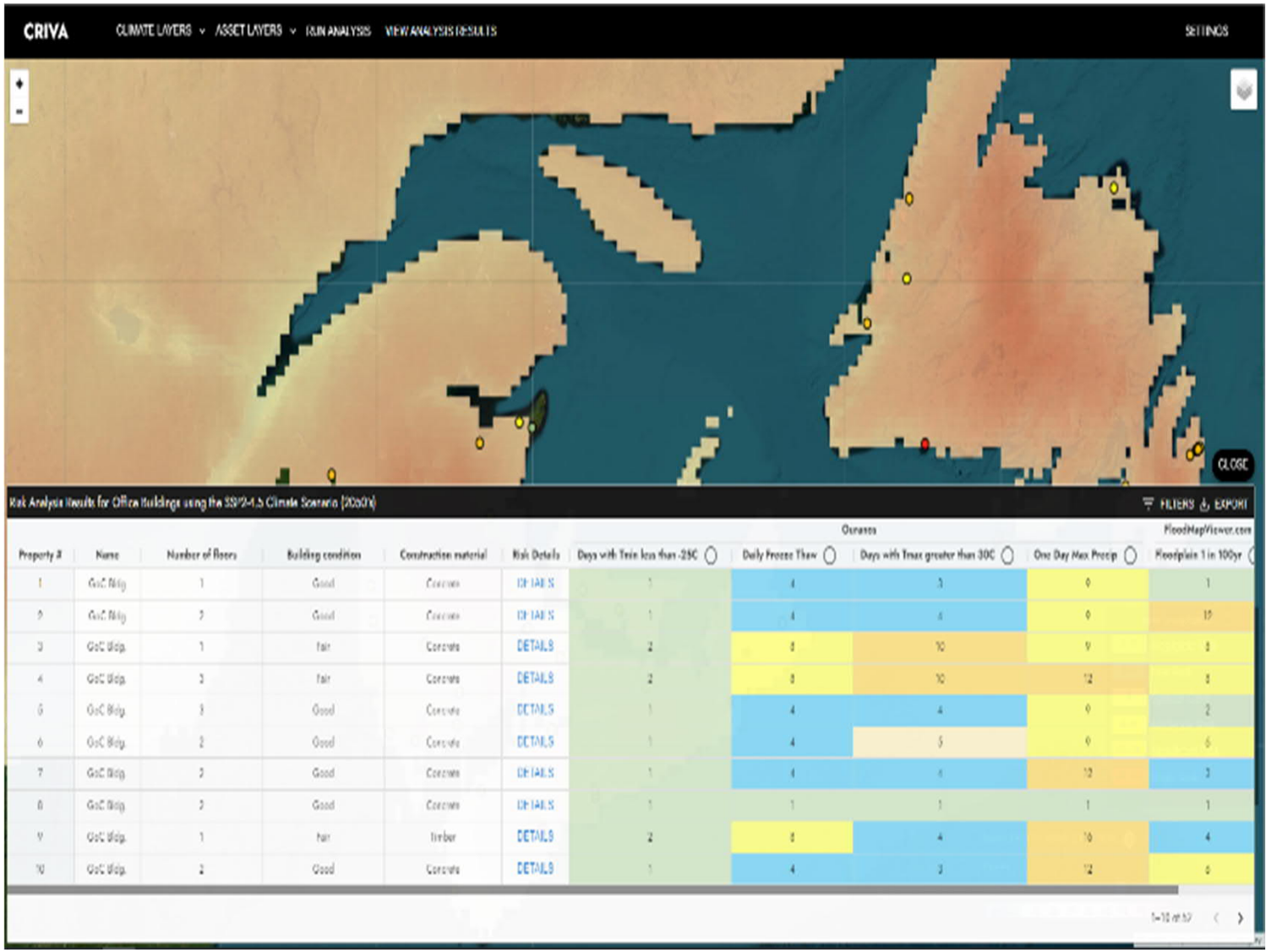
Region Wide CRiVA Screening Tool

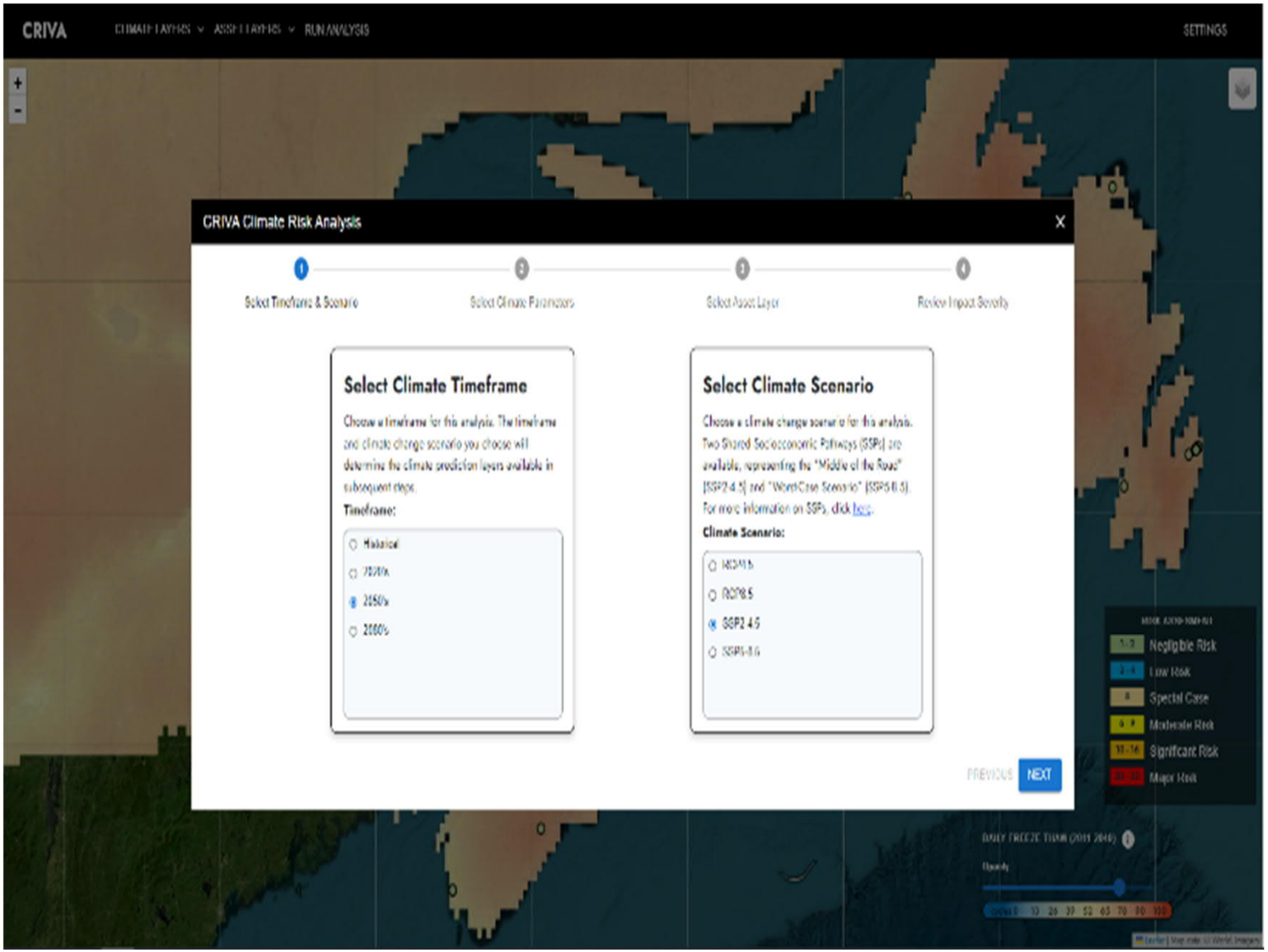
- Displays historical and future climate projection data
- Displays climate risk calculations for individual sites
- Personalized risk algorithm to incorporate, frequency, severity, spatial and temporal factors to determine a final historic/future risk level

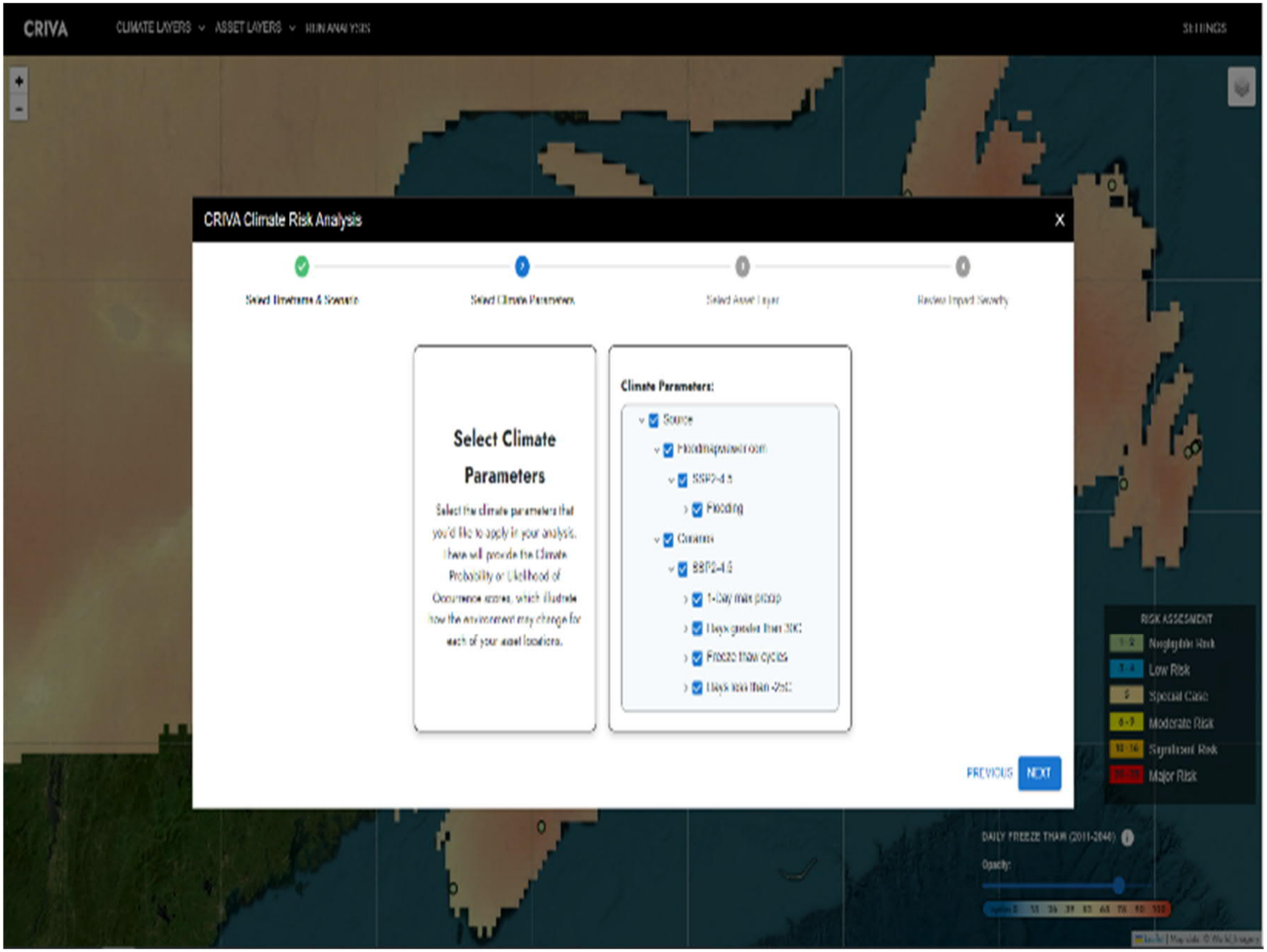


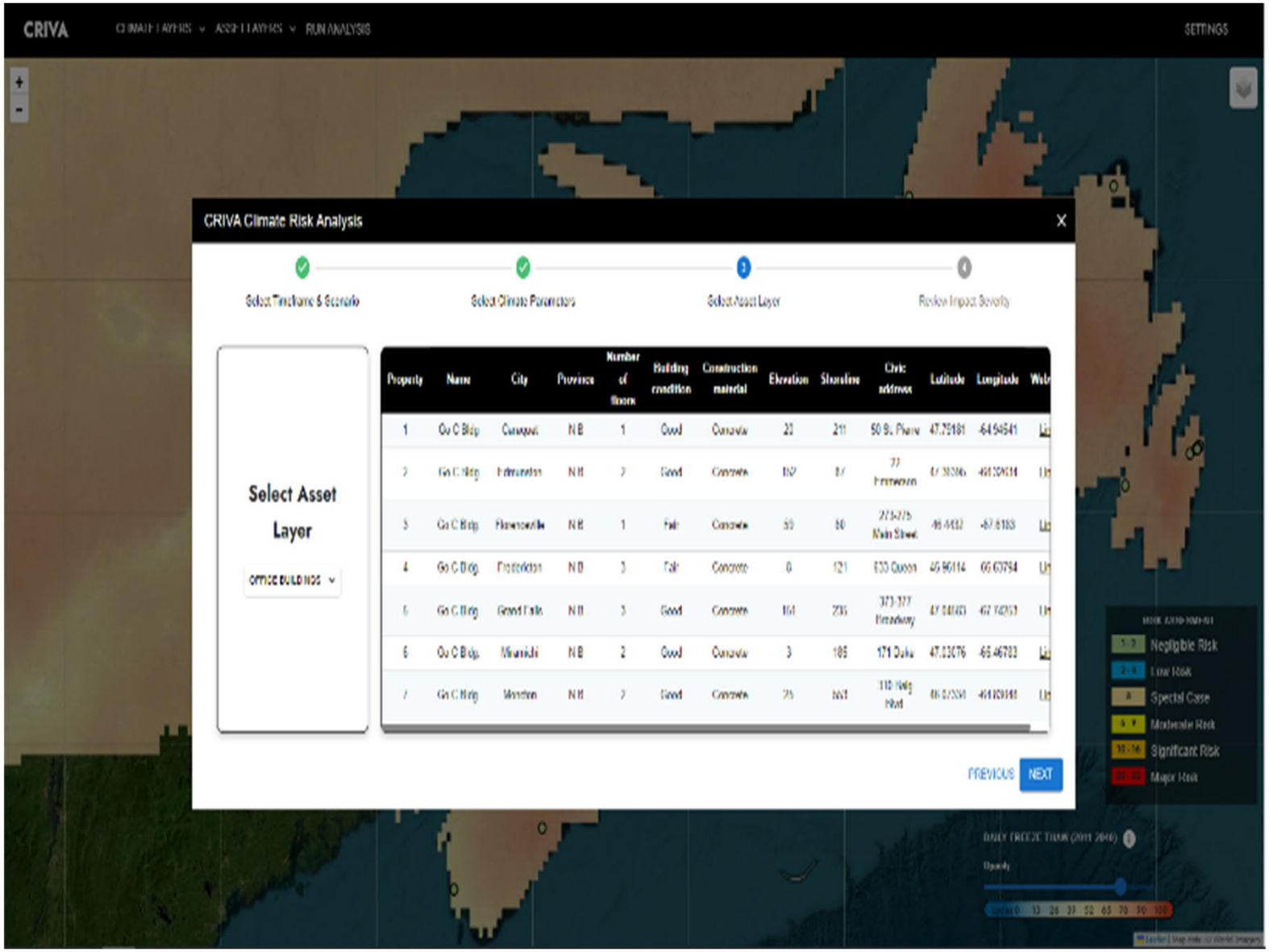

CRIVA
CLIMATE LAYERS
ASSET LAYERS
RISK ASSESSMENT
Negligible Risk
Low Risk
Special Case
Moderate Risk
Significant Risk
Major Risk

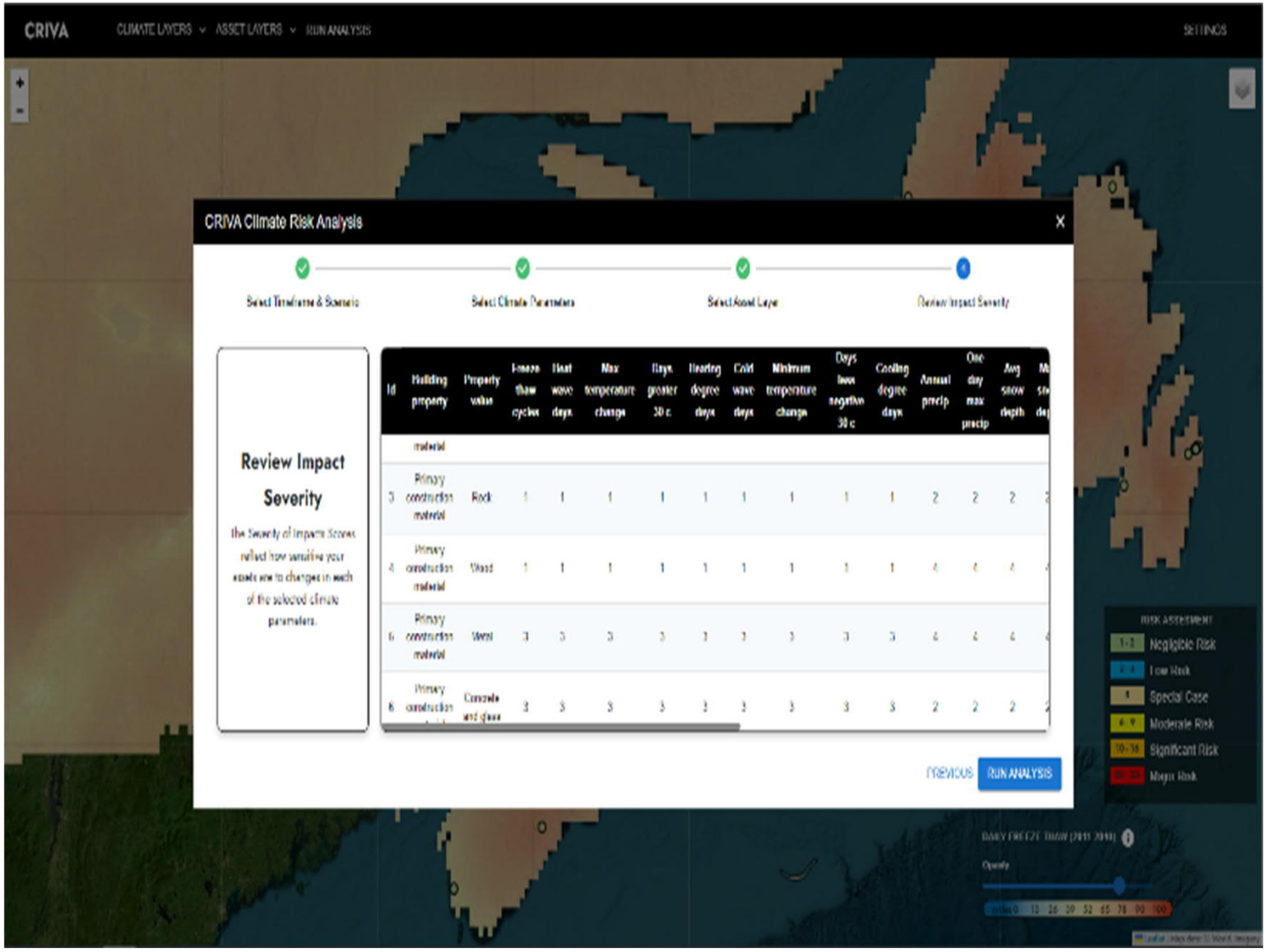

Metadata:
Property: 49
Building name: Stephenville Radar Station
City: Stephenville
Province: NL
Number of floors: 1
Building condition: Good
Primary construction material: Metal
Elevation: 361
Shoreline: 1856
Civic address: Pine Tree Road
Latitude: 48.58931
Longitude: -58.66469
Website: https://www.tbs-sct.gc.ca/dfrp-rbif/sn-ns/080027-eng.aspx
Risk Summary:
Days with Tmin less than -25C: 3
Daily Freeze Thaw: 12
Days with Tmax greater than 30C: 3
One Day Max Precip: 12
Floodplain 1 in 100yr: 1

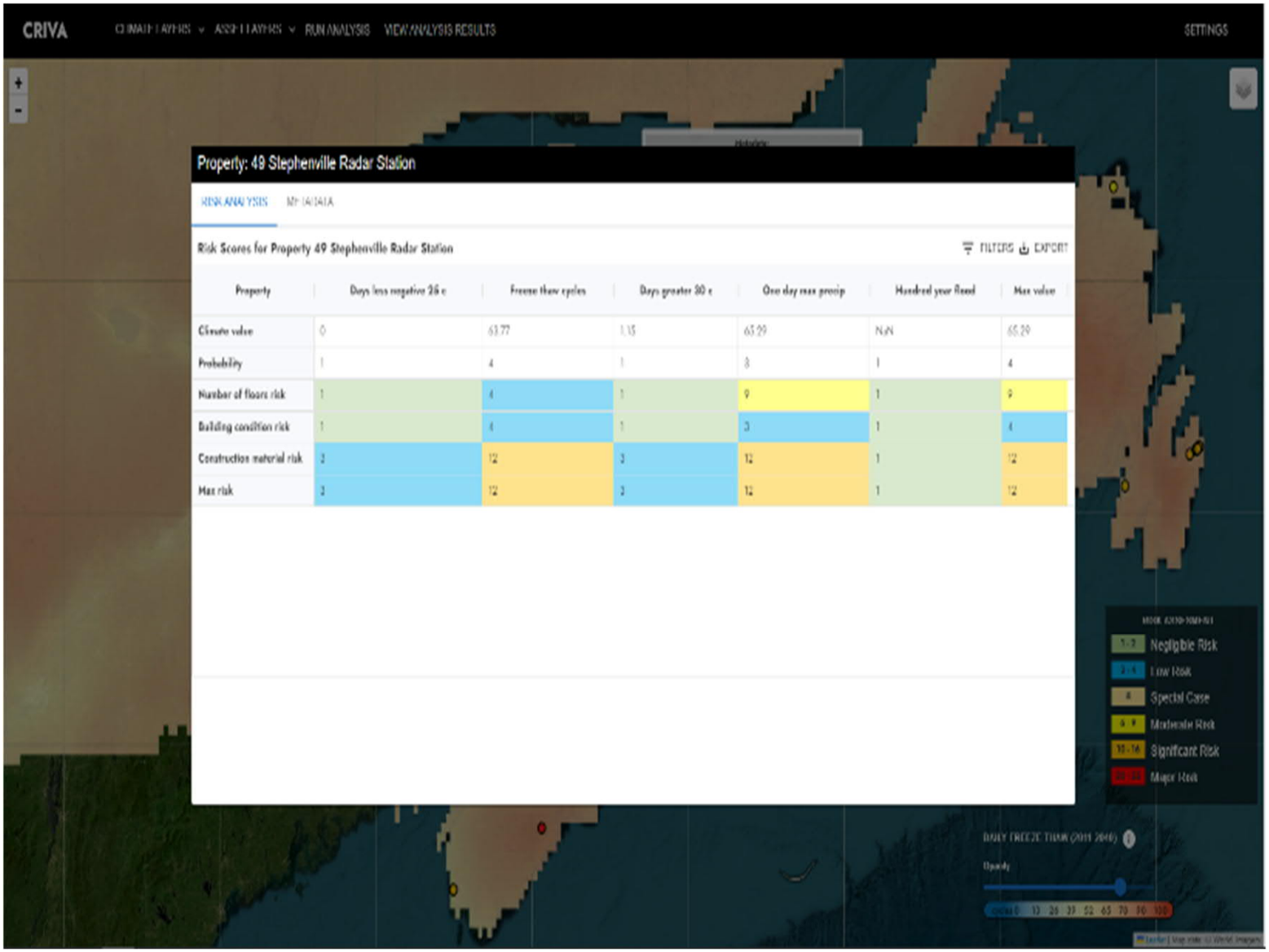

CRIVA
CLIMATE LAYERS
ASSET LAYERS
RUN ANALYSIS
VIEW ANALYSIS RESULTS
SETTINGS
CLOSE
Risk Analysis Results for Office Buildings using the SSP2-4.5 Climate Scenario (2020's)
FILTERS
EXPORT
Property #
Name
Number of floors
Building condition
Construction material
Risk Details
Days with Tmin less than -25C
Daily Freeze Thaw
Days with Tmax greater than 30C
One Day Max Precip
Floodplain 1 in 100yr
DETAILS


CRIVA
SETTINGS
CRIVA Climate Risk Analysis
Select Timeframe & Scenario
Select Climate Parameters
Select Asset Layer
Review Impact Severity
Select Climate Timeframe
Choose a timeframe for this analysis. The timeframe and climate change scenario you choose will determine the climate prediction layers available in subsequent steps.
Timeframe:
Historical
2050's
2080's
Select Climate Scenario
Choose a climate change scenario for this analysis. Two Shared Socioeconomic Pathways (SSPs) are available, representing the "Middle of the Road" (SSP2-4.5) and "Worst Case Scenario" (SSP5-8.5). For more information on SSPs, click here.
Climate Scenario:
RCP8.5
SSP2-4.5
PREVIOUS
NEXT
Negligible Risk
Low Risk
Special Case
Moderate Risk
Significant Risk
Major Risk


CRIVA
CLIMATE LAYERS
ASSET LAYERS
SETTINGS
CRIVA Climate Risk Analysis
Select Climate Parameters
Climate Parameters:
PREVIOUS
NEXT
RISK ASSESSMENT
Low Risk
Special Case
Moderate Risk
Major Risk


CRIVA
SETTINGS
CRIVA Climate Risk Analysis
Select Asset Layer
PREVIOUS
NEXT
Negligible Risk
Low Risk
Special Case
Moderate Risk
Significant Risk
Major Risk


CRIVA
CLIMATE LAYERS
ASSET LAYERS
RUN ANALYSIS
SETTINGS
CRIVA Climate Risk Analysis
Select Timeframe & Scenario
Select Climate Parameters
Select Asset Layer
Review Impact Severity
Review Impact Severity
the Severity of Impact Scores reflect how sensitive your assets are to changes in each of the selected climate parameters.
Id
Building property
Property value
Freeze thaw cycles
Heat wave days
Max temperature change
Days greater 30 c
Heating degree days
Cold wave days
Minimum temperature change
Days less negative 30 c
Cooling degree days
Annual precip
One day max precip
Avg snow depth
material
Primary construction material
Rock
Wood
Steel
Concrete and glass
PREVIOUS
RUN ANALYSIS
Risk Assessment
Negligible Risk
Low Risk
Special Case
Moderate Risk
Significant Risk
Major Risk


CRIVA
SETTINGS
Property: 49 Stephenville Radar Station
Risk Scores for Property 49 Stephenville Radar Station
FILTERS
EXPORT
Property
Days less negative 26 c
Freeze thaw cycles
Days greater 30 c
One day max precip
Hundred year flood
Max value
Climate value
Probability
Number of floors risk
Building condition risk
Construction material risk
Max risk
Negligible Risk
Low Risk
Special Case
Moderate Risk
Significant Risk
Major Risk

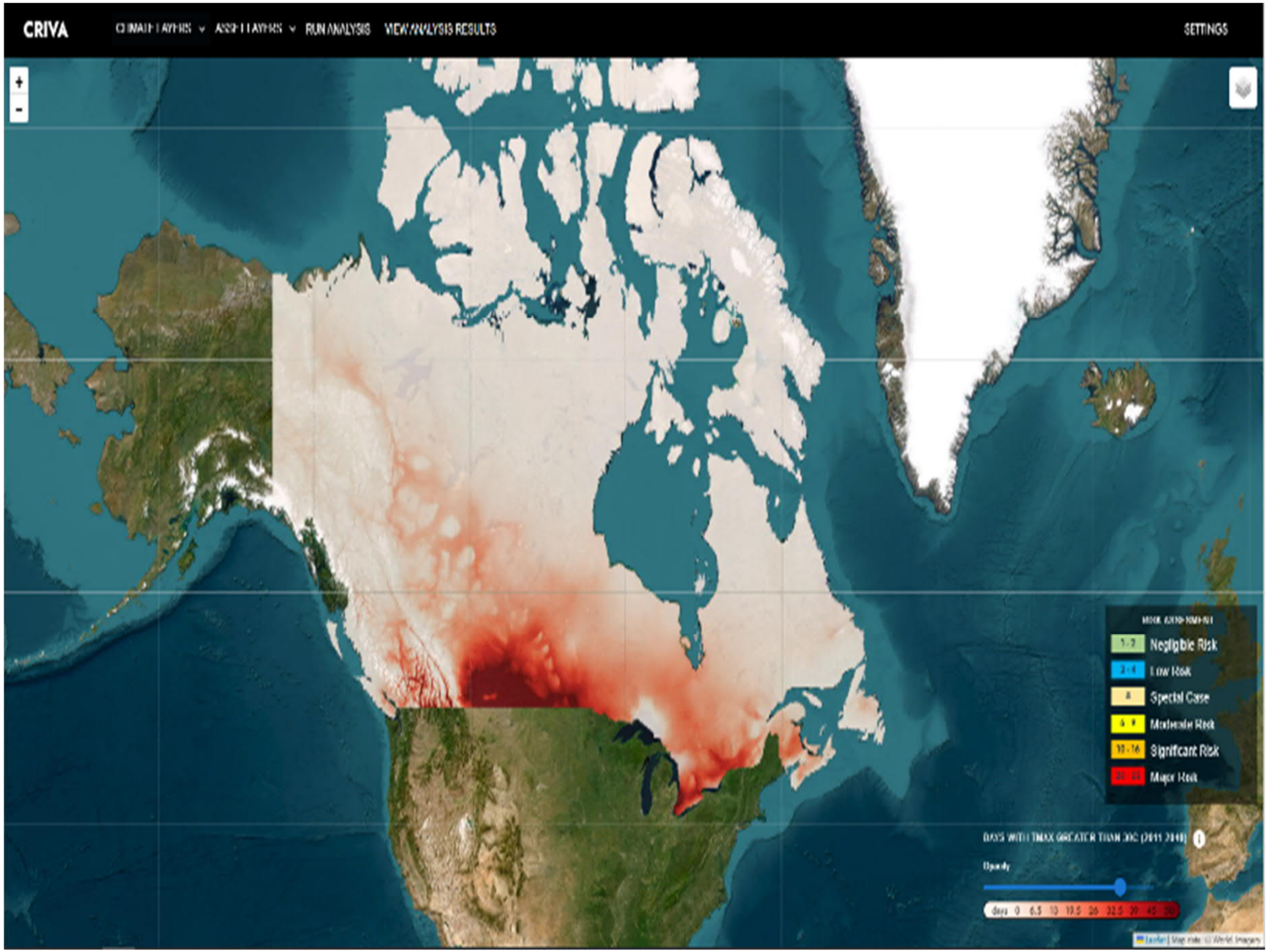
Property: 49 Stephenville Radar Station

RISK ANALYSIS | METADATA

Risk Scores for Property 49 Stephenville Radar Station

FILTERS EXPORT

Property	Days less negative 25 c	Freeze thaw cycles	Days greater 30 c	One day max precip	Hundred year flood	Max value
Climate value	0	63.77	1.15	65.29	NaN	65.29
Probability	1	4	1	3	1	4
Number of floors risk	1	4	1	9	1	9
Building condition risk	1	4	1	3	1	4
Construction material risk	3	12	3	12	1	12
Max risk	3	12	3	12	1	12


CRIVA
RUN ANALYSIS
VIEW ANALYSIS RESULTS
SETTINGS
Negligible Risk
Low Risk
Special Case
Moderate Risk
Significant Risk
Major Risk

Region Wide CRiVA Screening Tool

- Prioritize higher risk sites for detailed analysis
- Maximizes limited internal resources and the consulting industry to focus on the higher risk sites
- Cost vastly reduced per site vs full CRiVA

Thank you!