



Project Overview

Timeline:

- 2018: FCL Study (Associated Engineering)
- 2019/20: Resiliency Strategy (Integral)

Objectives:

- Identify expected and current climate change impacts in the city
- Identify City actions to protect residents and municipal assets.

CITY OF NANAIMO
THE RESILIENT CITY

Climate Mitigation versus Adaptation

Mitigation: Actions taken to reduce the emission of GHGs into the atmosphere

- Community Sustainability Action Plan (2012)
- Nanaimo 2050 Climate Action Plan (2020)

Adaptation: Actions to anticipate and reduce the negative impacts of climate change and take advantage of opportunities

- Climate Change Resilience Strategy



CITY OF NANAIMO
THE QUALITY OF LIFE

Environmental Framework Core Principles:



CITY OF NANAIMO
THE QUALITY OF LIFE

Consulting Team

Lisa Westerhoff	- Principle	 INTEGRAL GROUP with Tamsin Mills Resilience Consulting
Tamsin Mills	- Principle	


DIAMOND HEAD

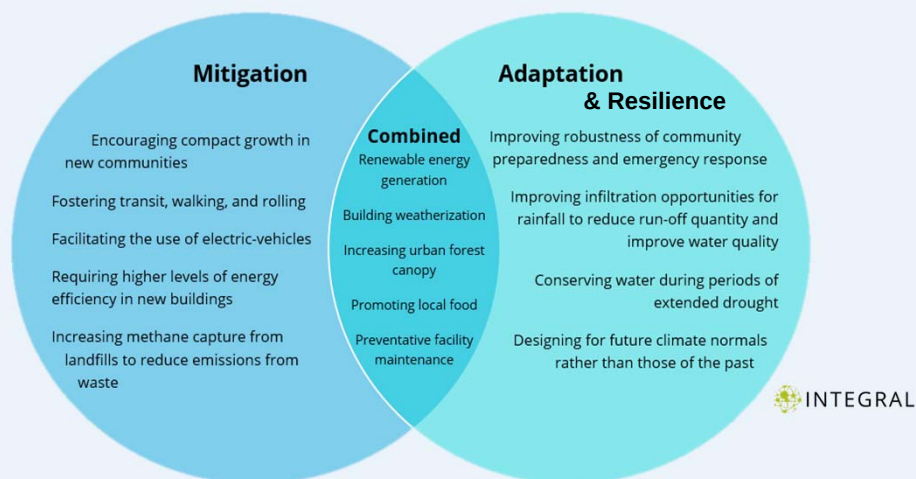





Tamsin Mills and Lisa Westerhoff

CITY OF NANAIMO CLIMATE CHANGE RESILIENCE STRATEGY

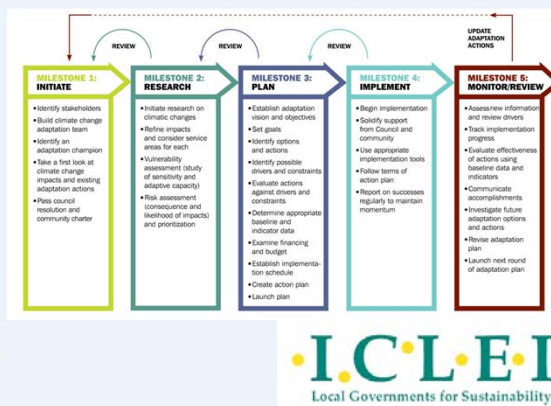
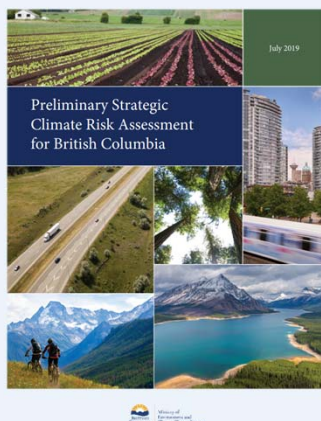
Responding to Climate Change



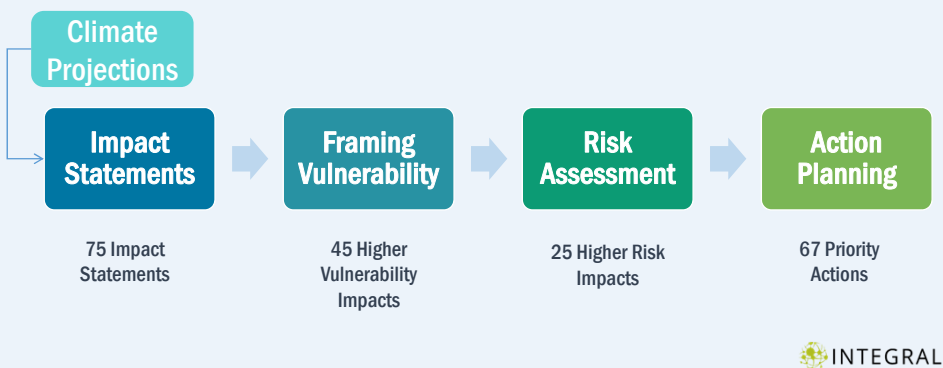
Responding to Climate Change



Assessing Risks to Climate Change



Our Process



Our Process

Climate Projections

We reviewed **projections** of global climate change downscaled to Nanaimo

TEMPERATURE CHANGES		Baseline	2050	2080
Summer Extreme Temperature	Hottest day time temperature averaged over a thirty-year period	31°C (1971-2000)	34.5°C	36.7°C
Freezing Conditions	Number of degrees temperature is below freezing days in a year			
PRECIPITATION CHANGES		Baseline	2050	2080
Extreme Short Duration Precipitation	Maximum volume of rain that falls in one day for a 1 in 50-year return period	106 mm (1980-2007)	131 mm	143 mm
Growing Season Length	The number of days and last six-day period temperatures above 5°C			
Extreme High Precipitation Over 5 Days	Maximum amount of rain over a consecutive 5-day period on an annual basis	177 mm (1971-2000)	194 mm	218 mm
Extreme Heat Events	Longest continuous stretch with each day receiving less than 1mm of rain per day	22 days (1971-2000)	26 days	29 days
Cooling Degree Days	Annual precipitation as snow	32 mm (1976-2005)	13 mm	7 mm
Snowfall	Annual precipitation as snow			
EXTREME EVENTS		Baseline	2050	2080
Wildfire Risk (Increase in Fire Spread Days)	Fire spread days are a measure of days in which wildfire, once initiated, would expand	1x (1976-2005)	1.5-2x	2-2.5 x
High Winds	Percent change in annual frequency of hourly 70 km/h wind gusts	0% (1976-2005)	20%	25%

Our Process

Climate Projections

Impact Statements

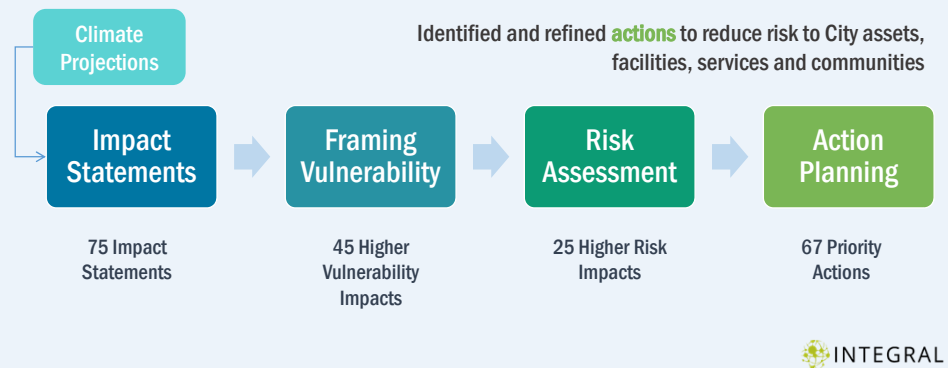
75 Impact Statements

We used projections to develop concise statements that clearly identify the climate-related **effect/hazard** and the **impact** of changes in climate

Our Process



Our Process



Example High-Risk Impacts

- Reduced water availability and strain on water supply from hotter, drier summers
- Impact of short duration/high-intensity rain on storm drains leading to flooding and potential property damage
- Potential changes to tree species' range and increased incidences of mortality, affecting urban forests and vegetation (e.g., cedar, salal)
- Incidences of heat-related illnesses exacerbated by aging demographics and rising homelessness
- Landslides may be triggered by saturated soils, leading to loss of homes and damage to infrastructure (e.g., storm and sanitary sewers)
- Increased stress and anxiety from those impacted, first responders, and supporting community members
- Long-term economic and social impacts, including challenges for the tax base, given expense of continued response and recovery

Themes & Objectives

WATER SUPPLY

- Prepare for more limited water supply over time and improve the resilience of the existing water supply infrastructure

FLOODING AND DRAINAGE

- Minimize urban and overland flooding resulting from heavy rainfall
- Prepare for the impacts of rising sea level and associated erosion and coastal flood risk

ENVIRONMENT, PARKS AND RECREATION

- Quantify and manage Nanaimo's urban forests to prepare for a changing climate
- Assess and restore Nanaimo's watercourse and marine ecosystems to become biologically diverse and resilient

Themes & Objectives

WELL-BEING AND PREPAREDNESS

- Work with community partners to minimize health impacts of extreme weather (higher heat days and poor air quality from wildfires) on residents
- Improve knowledge, capacity and response plans to deal with increasing risk of landslides and wildfires
- Improve community capacity and resilience following events by increasing public awareness of climate change, its expected impacts and how the community can prepare



Themes & Objectives

LAND USE AND BUILDINGS

- Incorporate resilience into new and existing facilities and support climate change resilience for homes
- Ensure development regulation and guidelines incorporate anticipated changes to climate-related natural hazards
- Prioritize hazardous areas in the City's property acquisition strategy



Themes & Objectives

CORPORATE GOVERNANCE AND MAINSTREAMING

- Improve the City's agility in responding and recovering from climate-related hazard events
- Work with neighbouring jurisdictions to support climate change resilience and limit transfer of risk across jurisdictional boundaries



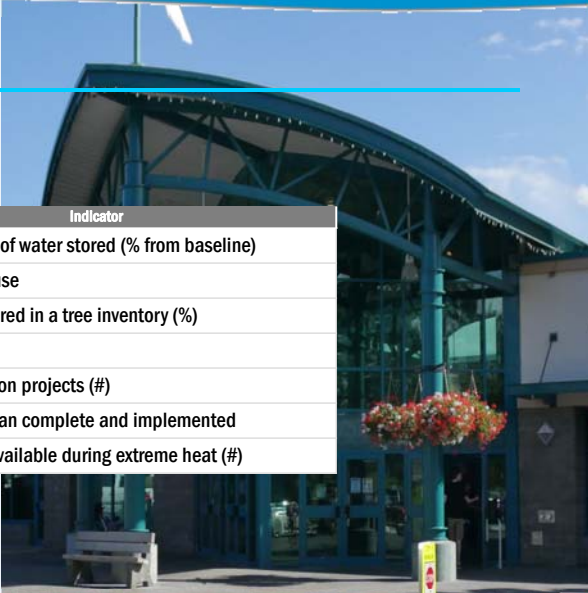
Building on Nanaimo's Existing Efforts

- ✓ **Robust Asset Management** planning
- ✓ **Urban Forest Management Plan** recognizes climate adaptation
- ✓ Community-wide programs to increase **tree canopy**
- ✓ **Sea level rise study** already being incorporated (waterfront walkway)
- ✓ **Engineering standards** recognize heavier rainfall and account for it
- ✓ **Water** conservation measures
- ✓ **Complete Street Guidelines** address social cohesion
- ✓ **DPAs** for hazard areas and environmental protection
- ✓ **Community Wildfire Protection Plan**



Monitoring Progress

Action Area	Indicator
Water Supply	Growth in volume of water stored (% from baseline)
	Per capita water use
Environment, Parks and Recreation	Urban trees captured in a tree inventory (%)
	Canopy cover
	Riparian restoration projects (#)
Well-being and Preparedness	Heat Response Plan complete and implemented
	Cooling centres available during extreme heat (#)



THANK YOU!

Implementation & Monitoring

For Each Action

Evaluation Criteria					Implementation Planning			
GHG	Resilience	Cost	Effort	Benefits	Start Date	Lead Dept.	Resources	Partners
Impact on GHGs	Impact on resilience	Order of magnitude	Level of effort	Complement to other priorities	Short-, medium-, long-term	City department	New or existing	Potential stakeholder partners