CITY OF
COURTENAY

# Flood Management Plan

## *Flood Risk and Resilience 101*

A series of backgrounders are supporting public awareness around the Flood Management Plan project in Courtenay. This one provides an overview on flood risk and resilience in Courtenay. Learn more about the project below or visit courtenay.ca/floodready.

## Project Background

In the City of Courtenay, flood risk is present along the coast and the river systems. With expected changes in water levels from both the ocean and rivers, we are taking proactive steps to reduce impacts from future flood events.

The City of Courtenay is working with a team of consultants on the development of the Flood Management Plan. This project aims to understand the risk of flooding to our community and develop risk reduction strategies that reflect community priorities.

### Project Objectives

1. To outline a long-term approach (what needs to be done, by when)

2. To recommend specific actions for the next 5 years

3. To align our approach with international best practices, including the Sendai Framework for Disaster Risk Reduction, and the upcoming BC Flood Strategy.

## What is Risk and Resilience?

Risk is the "potential loss of life, injury, or destroyed or damaged assets and values which could occur to a system, society, or a community, determined as a function of hazard, exposure and vulnerability" (United Nations Office for Disaster Risk Reduction).

As shown in the figure to the right, risk is defined by the total area of a triangle, whose sides are hazard (in this case flood), exposure (the things people care about that are located within the flood hazard area), and the vulnerability or susceptibility of these things to being damaged by floodwaters.


When planning for flooding, it is also important to consider where and how communities can build resilience and adapt to flooding. Resilience is the "ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner" (United Nations Office for Disaster Risk Reduction).

# What Types of Flooding Do We Experience in Courtenay?

With climate change, communities are more likely to experience flooding than in the past. This is especially the case when sea level rise combines with high tides and coastal storms (e.g., storm surge, and wind and wave effects) or when extreme rain storms (e.g., atmospheric rivers) and/or snowmelt drive river water levels to rise.

## TYPES OF FLOODING

**Coastal flooding** is flooding that occurs along the shoreline and estuaries due to higher than typical water levels in the ocean. There are two main drivers of coastal flooding that this project is studying – **sea level rise** and **storm surge**. While sea level rise is a slower, climate change-driven process (see box to the right), storm surge occurs more suddenly when pressure changes from a storm cause water levels to rise.

### *Did you know?*

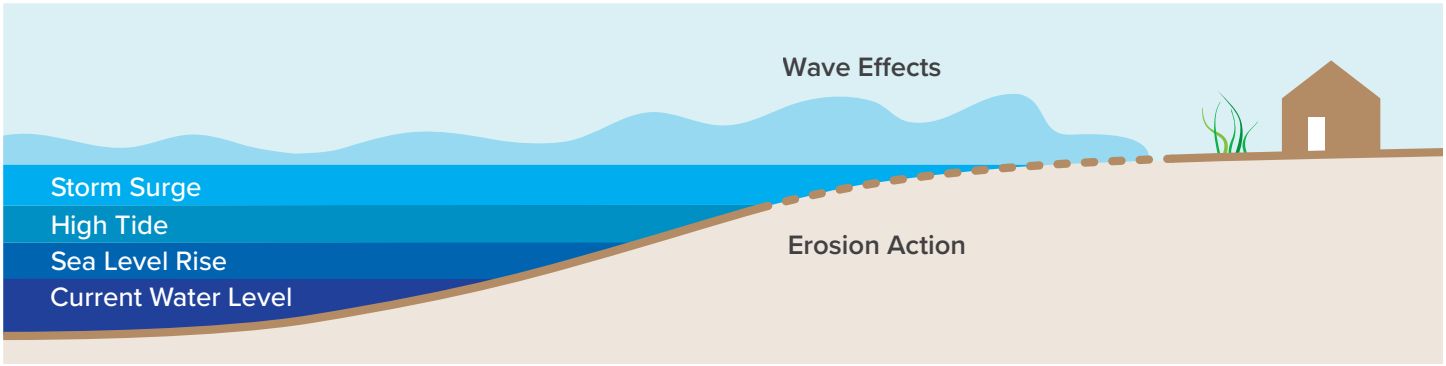
As global temperatures increase due to climate change, **seawater is expanding** as it warms, and **polar ice caps and glaciers are melting**, resulting in sea level rise around the world.

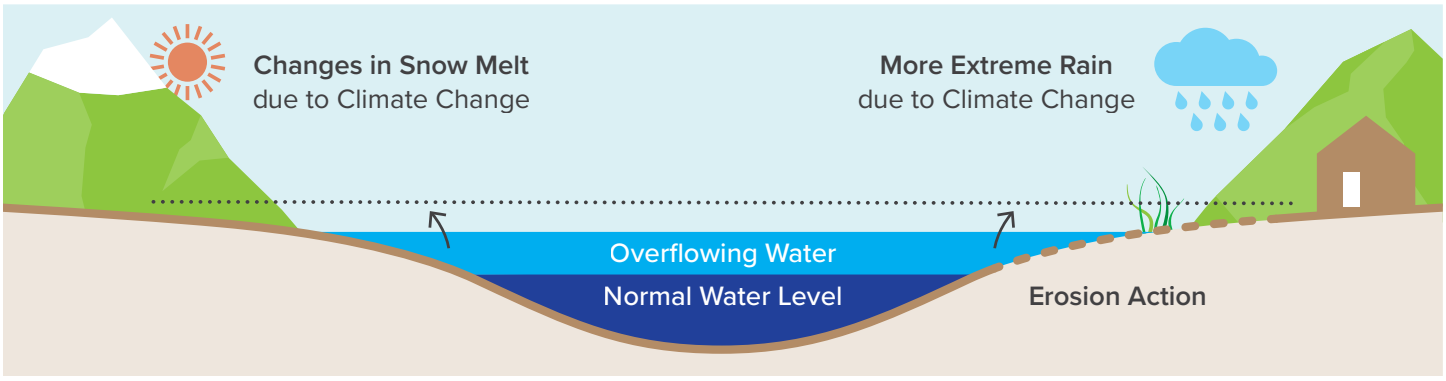
### *Did you know?*

**Atmospheric rivers** (ARs) are like long, narrow rivers in the sky. When they flow over land, strong ARs can bring extreme precipitation in a short amount of time, often resulting in **fluvial and pluvial flooding**.

**Fluvial flooding** occurs when extreme rain or snowmelt causes water levels in a river to overflow their banks onto adjacent land. This type of flooding can also cause damage to dikes increasing the area of flooded land.

**Pluvial flooding** (flash floods; surface water flooding) happens when extreme rain cannot be accommodated by drainage systems. This type of flooding can happen anywhere, even in places without a nearby river or estuary.




Larger floods occur less frequently and typically have a greater impact. However, the cumulative impacts of small, more frequent floods should not be underestimated. Frequent, smaller floods can damage assets along the shoreline or river bank over time.

# What Will Be Impacted?

Impacts from flooding can affect communities in different ways. In the table below, we provide examples to help you think about impacts in terms of five indicators: people, economy, environment, culture, and critical infrastructure. Note that there is no "correct" way to think about impacts, other than understanding that they can be very diverse, and that impacts overlap between indicators.

## TYPES OF IMPACTS

| | |
|---|---|
| **People** | People are affected in a range of ways by flood. This may include people who are injured or suffer other health effects (e.g., trauma or stress), are evacuated or displaced, or suffer due to compromised livelihoods (e.g., their uninsured house is damaged or they lose their job). |
| **Economy** | Flooding can cause potential economic losses through property and equipment damage and other far-reaching consequences. This includes repairs to public and private infrastructure, and losses due to reduced revenues (e.g., tourism operators, accommodations, businesses and food sectors) following a flood. |
| **Environment** | Flooding is an important component of many ecosystems and is a naturally occurring process. Green spaces can provide positive benefits by absorbing flood waters. On the other hand, floods may lead to the overflow or discharge of contamination sources into the environment, or cause damage to environmentally sensitive areas. Contamination may include sewage and fuel spills from flooded septic systems and storage buildings. |
| **Culture** | The cultural life of a community may experience various impacts due to a flood. This includes both Indigenous and non-Indigenous cultural sites, historic uses, beach access points as well as recreational spaces, trails, and sacred areas. It can also include community centres, schools, and other important gathering places. |
| **Critical Infrastructure** | Flood can impact many types of infrastructure that are regarded as necessary for communities to function. This can include transportation infrastructure such as ferry docks and highways, as well as health services, emergency response (police, fire, ambulance), and government facilities. Utilities, such as power systems, water and wastewater, and telecommunications, are also critical. |

## CASCADING IMPACTS

Many impacts can have consequences that are felt far beyond what is touched by the actual floodwaters. For example, damage to a ferry dock affects the communities and supply chains that are dependent on service from that station. Similarly, one localized disruption from a flooded road or power transmission pole affects a whole network. Remote areas have few alternative systems, meaning that these disruptions can severely reduce access to services and goods such as medical care, schools, and food. Proactive planning and preparation can minimize these cascading effects, and spare a community from devastating impacts

# Learn More

The City of Courtenay's Flood Management Plan includes opportunities for interested and affected parties, K'ómoks First Nation rights and title holders, and local residents to provide their feedback and inform this important collaborative effort to address flood risk across Courtenay. Sign up for email updates, follow the City's social media channels (Facebook - @cityofcourtenay, Twitter - @CityofCourtenay, Instagram - @cityofcourtenay), and stay tuned for opportunities to participate and provide your input! Check out the *Ways to Take Action* backgrounder to learn more.