



# LOCAL TERRESTRIAL ECOSYSTEMS & CLIMATE CHANGE

**Context:** The latest (2022) International Panel on Climate Change (IPCC) report states that because of human activities, Earth:

- is currently 1.1°C warmer than in preindustrial levels;
- is already experiencing impacts (see Gabriola specific below); **Need for adaptation**
- is likely to hit 1.5°C of warming within 20 years, with a narrow pathway to stay below that warming target; **Need for mitigation**
- must reach net-zero emissions by 2050 to avoid catastrophic warming, which means that emissions must be halved by 2030.

**Gabriola specific:**

- More extreme storms: tree damage, power outages, infrastructure damage;
- More extreme dry spells: drought and increased fire risk, reduced water supply, saltwater intrusion risk to groundwater.
- Intense rain events: flooding, slope failures, impacts on tree roots, etc.
- Temperature changes: disruption to seasonal timing of plant and animal life-cycle events, new invasive species, increasing danger of more frequent heat domes (atmospheric heat waves). (Islands Trust Conservancy, 2018)

Temperature changes	1970-2000	2040-2070	2070-2100
Annual avg. hottest day	30°C	33°C	36°C
Days (avg) over 30°C	2	10	27
Frost days	40	7	1
Max 1 day total precip.	41mm	47mm	50mm

(Pinna Sustainability, 2020) Based on business as usual

**Impact:** Due to the hotter temperatures, many of our flora and fauna species will no longer be able to thrive in this climate. Different species, more typical of those found in climates to the south of us, will start to replace them. Specific impacts on our ecosystems include:

**Trees<sup>1</sup>:** Stress created by warmer temperatures, increased summer droughts and increased winter rainfall have resulted in numerous impacts on local trees. In particular Arbutus trees, Western Red Cedars and Douglas Firs are dying due to:

- Heat and drought stress leading to compromised tree health;

<sup>1</sup> Information came from various sources including: Gabriola Lands and Trail Trust, District of Highlands Sustainable Land Use, and Raincoast, Islands Trust.

- Reduced moisture within the tree shrinks its inner core, creating space/habitat beneath the bark for insects;
- Insects taking advantage of the new habitat promote additional stress; and
- Natural fungal leaf blights move in, increasing the decay to stressed trees (particularly noticeable for Arbutus trees).

**Plants:** Weather extremes increase the likelihood of forest canopy loss, thus affecting the local soil ecology, impeding beneficial interactions between plants, microbes and mycorrhizae, and increasing the vulnerability of the forest understory to disease and infection. (Raincoast, retrieved 2022)

**Habitat and Species:** Climate Change is causing habitat and corresponding species loss. As land converted to human use goes above a 30–40% healthy ecological threshold, the number of species in a given habitat decline more rapidly. Gabriola is at approximately 28%. (Islands Trust, 2019)

**Birds:** More than 250 bird species live in or migrate through Gabriola. Their food sources and habitat are being affected by the impact of climate change on plants, trees and insects. The Double Crested Cormorant and the Marbled Murrelet have both been designated as Species at Risk. (Islands Trust 2019)

**Insects:** The decline in the numbers of insects and of insect species is increasingly well documented. Insects play significant roles, both as food and in the growth of food for many organisms. Insects are also recyclers, decomposing plant matter and animal dung and contributing to the organic content of soils. (Hainze, 2021)

Pollinators ensure the continuation of many plant species. Changed flowering times of plants and trees due to climate changes is causing lack of pollination for certain species. (Habitat Acquisition Trust)

**Eco-crisis Region:** Eastern Vancouver Island has been named one of nine “Eco-crisis Regions” by the Nature Conservancy of Canada (2021), where wildlife and its habitats are the most diverse and under the greatest threat, due to the combined impact of humans and climate change.

**Mitigation through Ecosystem restoration:** Healthy wetlands, grasslands and forests mitigate the impacts of climate change, while also cleaning our air and water. Healthy ecosystems:

- store carbon (Gabriola’s forests sequester 13,417 tonnes CO<sub>2</sub>e/year<sup>2</sup>);
  - store water for our ecosystems to access in times of drought;
  - conserve and restore habitats for species at risk, migratory birds and marine wildlife.
- (Islands Trust Conservancy, 2018)

The Nature Stewardship program (Gabriola Land & Trails Trust) provides extensive information and support to Gabriola residents, encouraging us to protect native species and enhance conservation on private property (the majority of land on Gabriola is privately owned), as well as in Gabriola’s public spaces.

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<sup>2</sup> For context, in 2019, personal vehicles on Gabriola emitted approximately 7,260 tonnes of CO<sub>2</sub>e.