

## 1.2 Cowichan Region – A Changing Landscape

*“You can never step into the same river twice, for it is not the same river and you are not the same person.”<sup>8</sup>*

Landscapes are constantly changing, and the Cowichan Region is no exception. All sorts of natural and human forces affect change – including climate, geology and biology. Below is a brief timeline that highlights some major changes that have already taken place in the region.

### Ice Age

The term “ice age” is generally used to refer to the period of extreme cold that began roughly 30,000 years ago and resulted in extensive ice sheets covering large parts of North America. During this glacial period the ice was hundreds of metres thick, and so heavy that Vancouver Island was depressed by more than 150 m.

Around 15,000 years ago the climate began to warm, and the ice sheets slowly melted and retreated. The release of the weight of ice eventually caused the land to rebound, evidence of which can be seen in the iconic shapes of Mt Tzouhalem near Maple Bay, and Mt Maxwell and Mt Tuam on Saltspring Island. Moving and melting ice cut major features into the landscape, including the U-shaped Cowichan Valley, the deep depression of Lake Cowichan, and the channels of the Cowichan River.

In place of the ice sheets, large deposits of glacial till (a mixture of soil, clay, sand and gravel) were left behind. Rivers transported this material to the lowlands, forming fertile pockets such as the Cowichan and Chemainus estuaries. Soon, pioneering species, such as pine, and oak savannas and alpine meadows re-colonized the landscape, aided by a mild, coastal climate, and sufficiently watered by winter rains and snow to be able to withstand summer droughts (Figure 1.4).

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<sup>8</sup> Paraphrase of Heraclitus, Greek philosopher.

Later, forests of conifers, mostly made up of Douglas-fir, colonized the landscape. Other trees that eventually flourished include western hemlock, arbutus, western flowering dogwood, bigleaf maple, grand fir and western red-cedar. These coniferous forests are accompanied by a varied understory, including Indian plum, salmonberry, western snowberry, Oregon grape, honeysuckle, and salal (Figure 1.5).

Animals, including insects, ducks, eagles, bears and elk, gradually began to fill the ecological niches of the region, Salmon returned to spawn in the gravels deposited in the rivers, and along with other fish found excellent rearing habitat in the lakes and channels of the area. The web of life in the Cowichan Region became complex and resilient.<sup>9</sup>

### First Nations Settlement

Aboriginal people reached the Cowichan Region not long after the glaciers receded (8,000 to 10,000 years ago). The people adapted themselves to the seasonal patterns of weather, fish, and plants – moving throughout the region according to the natural cycles (e.g., spawning salmon, or migrating elk and deer). The area's rivers, tributaries and estuaries provided ready access to a plentiful supply of food: the rivers supported abundant salmon and trout populations, the sea was rich in shellfish, marine plants and marine mammals, and the land supported healthy wildlife populations and a variety of edible and medicinal plants and construction materials such as western red-cedar. Garry oak meadows were once very common in this area, and were important food-gathering sites (e.g., for camas bulbs).

This abundance was accessed carefully. First Nations made only minor adjustments to the landscape (e.g., temporary fish weirs, camas "farms", or controlled burns), in recognition of the connectedness to all things and their role as caretakers of the land, animals and resources – and in order to ensure a sustainable supply of these resources for their people.

*"Our ancestors touched the lands, rivers, and oceans in our territory lightly and with respect. We used only what nature provided, and only what we needed."*<sup>10</sup> Cowichan Tribes

<sup>9</sup> See Westland Resource Group's 2005 Water Issues report, and the Capital Regional District's website about the geological history of Vancouver Island ([www.crd.bc.ca/watersheds/protection/geology-processes/geologicalhistoryVI.htm](http://www.crd.bc.ca/watersheds/protection/geology-processes/geologicalhistoryVI.htm))

<sup>10</sup> Quote from Cowichan Tribes website: [www.cowichantribes.com](http://www.cowichantribes.com)

## European Settlement

In the 1800s, European settlers arrived, bringing a different view of the region's landscape. Europeans imported the notion of private ownership and control ("taming of the wild"), and perceived apparently "unused" land as land simply waiting to be made useful. Oliver Wells, the first non-native person to conduct a detailed land survey of the Cowichan Valley (in 1859) described the landscape as: "45,000 acres of superior agricultural land that could be parceled into farms for 500 to 600 settler families."<sup>11</sup>

By the 1860s, logging and land clearing were well underway, and the low-lying areas of the region were being settled by farmers. In 1913, Canadian Pacific extended a rail line to Lake Cowichan. By 1920, 18 logging companies employed 1,200 men in the harvesting of the Cowichan Basin's forests (Figure 1.6).

FIGURE 1.6: Early logging camp in Rounds, BC (near Lake Cowichan)



Source: Kaatza Station Museum and Archives, accession number P983.28.60.

<sup>11</sup> Cited in Arnett 1999, 61, on the History of the Hul'qumi'num page of the Hul'qumi'num People website [people.www.hulquminum.bc.ca/hulquminum\\_people/cowichan?print=1](http://people.www.hulquminum.bc.ca/hulquminum_people/cowichan?print=1)

The new residents of the region made substantial modifications to many ecological systems. For example, the hydrologic system<sup>12</sup> was permanently altered, and not only by logging. The mighty Cowichan River was once made up of a series of rapids and waterfalls. Most of these falls were blown up with dynamite and/or removed, to facilitate greater access to and movement for harvesting. Eventually, log jams caused huge losses to logging operations and helped expedite the construction of a railway. The significant ecological impacts of these modifications are still felt today.

Winter floods threatened investments in roads and railroads throughout the Cowichan Basin and the growing settlement at Duncan. Dykes were the answer, and served to greatly narrow the Cowichan River's flood plain. Farmers capitalized on the rich soils that were a gift from the water in the Cowichan Basin; they straightened and deepened streams to hasten drainage, and drilled wells to extract water for irrigation.

With settlements came pavement, storm drains, septic fields, and sewage treatment plants, all of which affected the region's natural water cycles, as well as water quantity and quality. Industry, too, needed water, and soon extensive water licenses were being issued to support growing industries. For example, in the mid-twentieth century, the government agreed that the new pulp mill at Crofton could divert substantial quantities of water from the Cowichan River. A permanent weir was built at the outlet of Cowichan Lake to increase the capacity of the lake in order to store water for the mill.

During a period of roughly 30 years, beginning in the 1860s, virtually all land previously occupied by First Nations peoples came under the control of the region's new European settlers. In the 1860s and 1870s, about 60,000 ha of Hul'qumi'num land on Vancouver Island and the Gulf Islands were claimed and occupied by these settlers, including prime oceanfront and riverfront lands, and areas of the Cowichan and Chemainus valleys. The newcomers were settled among the long-established Hul'qumi'num villages, occupying and inhabiting many of the domestic and resource places previously occupied by Hul'qumi'num peoples. These newcomers brought smallpox, which decimated First Nations populations on the Island. (The estimated population before European contact and smallpox is between 5,000 and 10,000 people.)

In the 1880s, the bulk of Hul'qumi'num land was given to politician and businessman Robert Dunsmuir, in exchange for Dunsmuir's promise to build a railroad between Esquimalt and Nanaimo (E&N railroad). For the Hul'qumi'num peoples, this deal represented a loss of almost 85% of their traditional land and resources, and an almost complete erosion of their way of life (Figure 1.7).<sup>13</sup>

12 Hydrology encompasses the occurrence, distribution, movement, and properties of the waters of the earth. It involves the interaction of water with the physical and biological environment. A hydrologic system is a system of interrelated components, including the processes of precipitation, evaporation, transpiration, infiltration, groundwater flow, streamflow, etc., in addition to those structures and devices that are used to manage the system. A hydrologic system is subject to different kinds of weather pattern and spatial complexity, and is dynamic and random in nature.

13 Hul'qumi'num Treaty Group, The Great Land Grab in Hul'qumi'num Territory, [www.hulquminum.bc.ca/pubs/HTGRailwayBookSpreads.pdf](http://www.hulquminum.bc.ca/pubs/HTGRailwayBookSpreads.pdf)

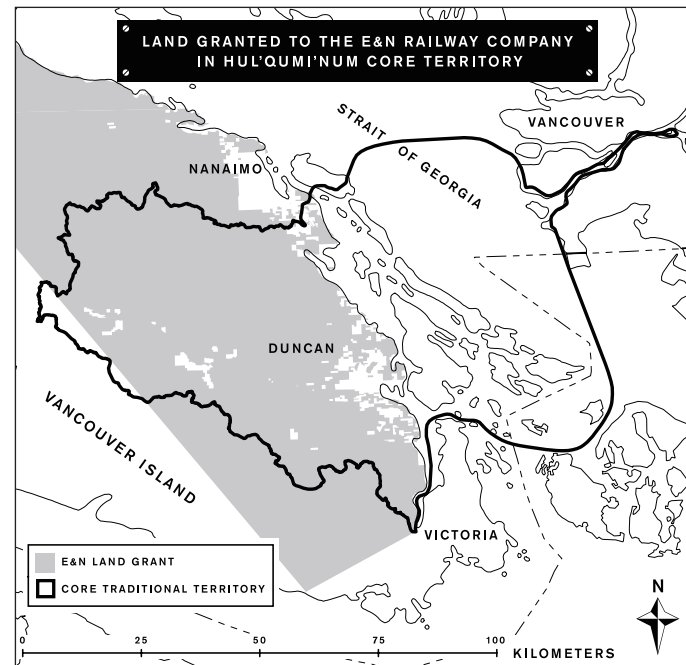


FIGURE 1.7: Portion of E&N Railway land grant in traditional Hul'qumi'num territory

Source: Robert Morales. 2007. The Great Land Grab.

## Ongoing Change

In the past 150 years, the face of the Cowichan Region has changed more than in the preceding 5,000 years. And the rate of change is accelerating. East-side old growth forests are nearly gone, replaced by young trees that are cut as soon as they become marketable – and long before they replace the functionality of a natural forest and the rich biological system it supports.

More and more water is being diverted from rivers and streams and pumped from aquifers, and natural green infrastructure (e.g., wetlands and watercourses that help recharge underground aquifers) are being filled or paved over. About 77,000 people call this region home, many times the number of people that lived here 100 years ago.

And growth is continuing – the region's population grew by almost 7% between 2001 and 2006,<sup>14</sup> Official Community Plans throughout the region predict more growth, and hundreds of thousands of visitors come here for recreation and tourism each year.<sup>15</sup> Figures 1.8 and 1.9 provide a visual image of some of the change in the region between 1974 and 2009. The extensive areas of yellow/brown are newly logged areas in 1974, and the bright green areas evident in Figure 1.8 represent areas logged in the 1950s. This pattern of extensive harvesting of entire drainage areas has resulted in the current condition of the landbase, with very little older forest remaining anywhere except on the West Coast.

<sup>14</sup> Census 2006.

<sup>15</sup> 431,483 parties visited Tourism Visitor Centres on Vancouver Island in 2006 (Source: Cowichan Region Accommodation Study <http://bc-cowichanvalley.civicplus.com/documents/EDC/Pdf/Accommodation%20Study.PDF>)

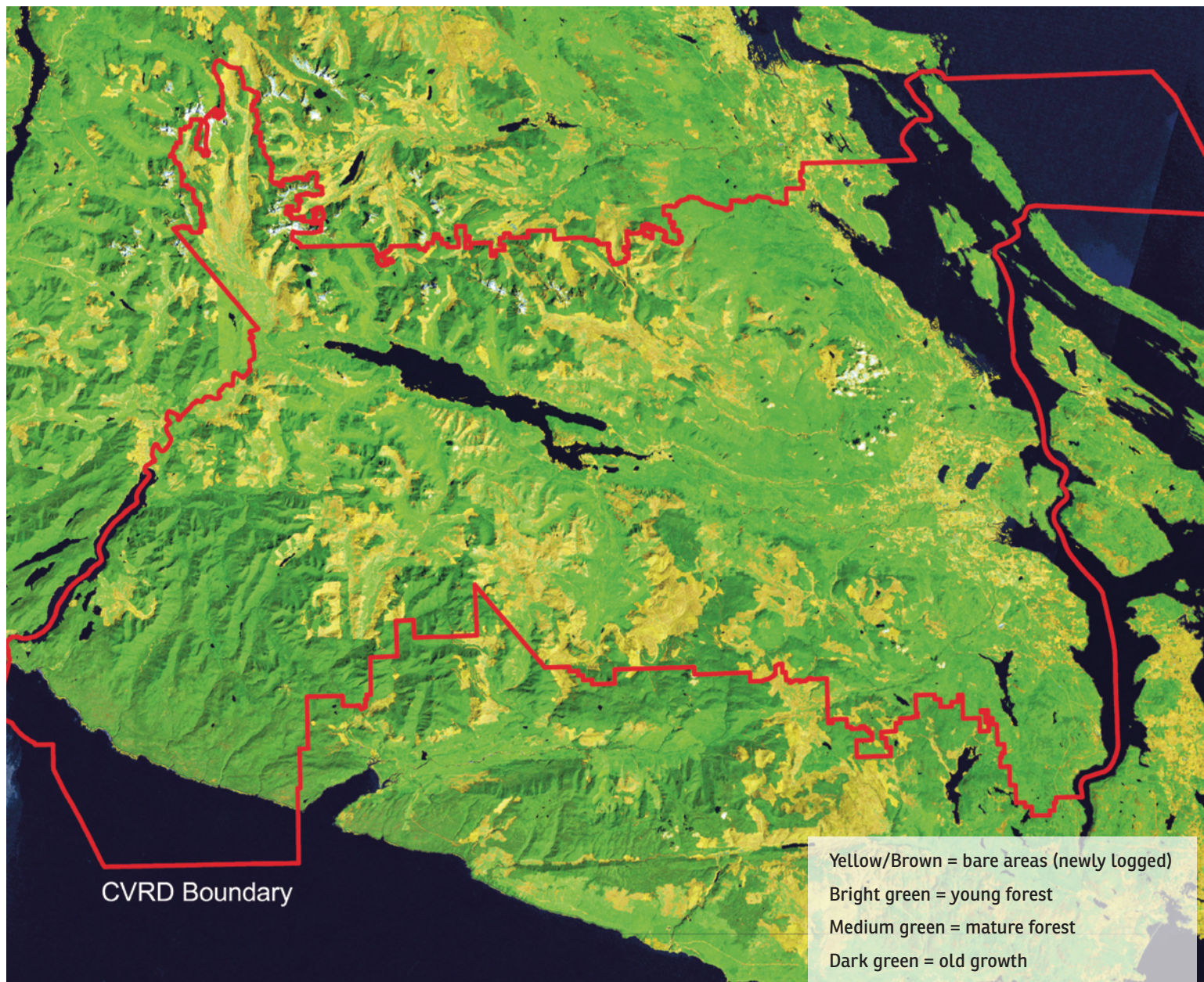


FIGURE 1.8: CVRD 1974, satellite image

Source: [www.glovis.usgs.gov](http://www.glovis.usgs.gov)

What is less clear from these satellite images, but equally telling, is that the Cowichan Region is unusual compared to many other areas of the Province. Here, a significant proportion of the landscape (with the exception of the outer west coast) has been harvested once or twice already – the image from 1974 shows extensive areas of progressive clearcutting in all the valleys around Cowichan Lake and through to the east coast plain present at that time. In 2009 there is

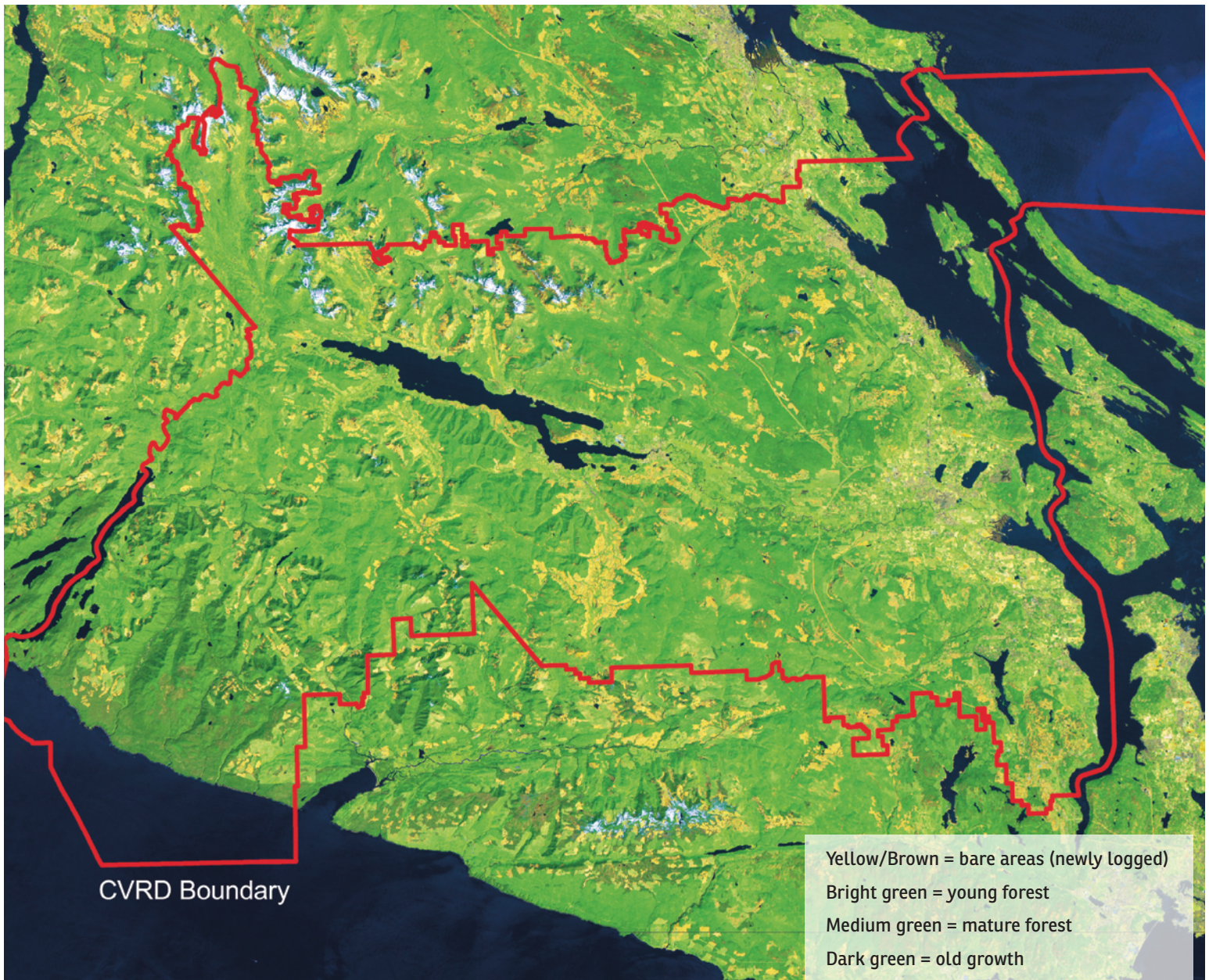


FIGURE 1.9: CVRD 2009, satellite image

Source: [www.glovis.usgs.gov](http://www.glovis.usgs.gov)

actually more mature forest than was present in the mid-1970s, as these harvested forests have regrown. However, a second or third pass of harvesting is beginning in many of these areas today. There are no intact watersheds remaining, and the area is fully roaded; there are no core protected areas to help maintain ecological systems in this region.

Ecosystems in the east and central part of the region have significantly less than 30% of their historic natural levels of old forest remaining. Drawing down the natural capital so far has a significant impact on ecological resources, including the ability of the landscape to produce clean water and the biodiversity values that are so unique to this region.

## Climate Change

Global climate change will significantly affect the Cowichan Valley. The Ministry of Environment notes that many changes are already affecting this region's climate:

- > "The average air temperature has become higher in many areas. Air temperature on the coast has been less affected than in the interior and northeast of the province.
- > The sea surface temperature has risen along the coast, and deep-water temperatures have increased in some inlets on the South Coast.
- > Relative sea level has risen along the BC coast, except in those areas being pushed upward by geological processes."<sup>16</sup>

In general, climate change in the Cowichan Valley is expected to create milder and wetter winters and drier summers, with some local and regional variation. The sea level is expected to rise by at least 1 m by the end of the century – and more recent science predicts that sea level rise will be greater than this.<sup>17</sup> Storm surges – both windstorms and rainstorms – are expected to be more frequent and more intense.

Recent flooding in the Lower Cowichan Basin has raised awareness of the social and economic costs of such events. Changes in surface water temperatures and flow rates (less snow means less storage, more drought means less rain) will have major impacts on the habitat and recharge of lakes and rivers, resulting in cascading systems collapse. For example, during the summer of 2009, the water temperature as it was released into the river from the warm lake<sup>18</sup> measured 26° Celsius (due to low flow, warmer weather and increased evaporation). This is roughly the same temperature that results in "fish kills."

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<sup>16</sup> Ministry of Environment, State of Environment Reporting, [www.env.gov.bc.ca/soe/bcce/03\\_climate\\_change/overview.html](http://www.env.gov.bc.ca/soe/bcce/03_climate_change/overview.html) accessed January 29, 2010.

<sup>17</sup> The Copenhagen Climate Science Update identifies significant feedback loops that make the 2007 projections of sea-level and temperature rise very conservative: see [www.climatecongress.ku.dk/pdf/synthesisreport](http://www.climatecongress.ku.dk/pdf/synthesisreport)



The Ministry of Environment provides some additional predictions for the future:

- > "A reduced snow pack in southern BC and at mid-elevations in the mountains
- > An earlier spring freshet<sup>19</sup> and reduced water flow in the summer particularly on river systems that depend on snow melt as a source of water
- > Warmer water in lakes and rivers
- > Changes in ocean temperature, salinity, and density, which, in turn, may affect productivity [and species diversity – especially at the freshwater/saltwater interface]
- > Lower soil moisture in the summer
- > Increased frequency and severity of natural disturbances, such as fire, and pest outbreaks, such as mountain pine beetle
- > Large-scale shifts in ecosystems and loss of ecosystems, such as some wetland and alpine areas
- > An increase in number of growing days each season for crops."<sup>20</sup>

### Change – For Better or For Worse

Change will continue in the Cowichan Valley, driven by changing climates, growing population, and changing human values and land uses. This State of the Environment report provides a reference point and a way to view these changes – are we maintaining the quality of the natural environment as well as the quality of human life? Are there aspects of our lifestyles that we need to manage differently to ensure that this happens? Overall, are we happy with the trends outlined in this report – and if not, how should we respond?

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18 BC Conservation Federation data, provided to Kate Miller by Craig Wightman, Senior Fisheries Biologist, BC Conservation Foundation.

19 A freshet is a sudden rise in the level of a stream, or a flood, caused by heavy rains or the rapid melting of snow and ice.

20 Ministry of Environment, State of Environment Reporting, [www.env.gov.bc.ca/soe/bcce/03\\_climate\\_change/overview.html](http://www.env.gov.bc.ca/soe/bcce/03_climate_change/overview.html) accessed January 29, 2010