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March 21, 2022
Project No.: 1904003

Luisa Burhenne
Resort Municipality of Whistler
4325 Blackcomb Way
Whistler, BC V8E 0X5

Dear Luisa,

Re: Whistler General Climate and Climate Change Assessment

The Resort Municipality of Whistler (RMOW) retained BGC Engineering Inc. (BGC) to summarize climate change information delivered in a PowerPoint presentation to RMOW by Dr. Matthias Jakob, P.Geo., P.L. Eng. of BGC on December 2, 2021. This letter report summarizes climate and climate change projections for the community and not the adjacent ski areas, where terrain features can produce microclimates that differ from the climate of the community of Whistler. While climate change trends in precipitation and temperature described herein can be expected to broadly apply to these microclimates, an investigation of climate and climate change in the ski areas specifically is beyond the scope of this study but can be conducted by BGC upon request.

1.0 CLIMATOLOGY OF THE RESORT MUNICIPALITY OF WHISTLER

The RMOW climate is typical of the southern Coast Range of British Columbia (Figure 1-1). Based upon weather observations available from Environment and Climate Change Canada (ECCC) for the period 1981-2010[1], RMOW is characterized as a humid continental climate with an average hottest month (August) temperature of 16.5°C and a coldest month (December) average temperature of -2.8°C (Figure 1-2). The record hottest temperature is 42.9°C (June 29, 2021), and the record coldest is -29.2°C (Dec. 30, 1978). Hydrologically, RMOW experiences both rain and snow, with average annual precipitation of 1228 mm falling primarily between October and March. An average of 856 mm of rain falls throughout the year (Table 1-1), with the rainiest months (278 mm) being October and November. On average the location sees 419 cm of snow annually, with the most snow (222 cm) falling in December and January. Snowfall is enhanced in the surrounding mountains. The record 1-day rainfall is 89.6 mm (Dec. 9, 2014) and record 1-day snowfall is 54.5 cm (Nov. 2, 1984). Monthly and annual averages and extremes are presented in Table 1-1.

[1] Data source is the ECCC 1981-2010 climate normals website (https://www.climate.weather.gc.ca/climate_normals/index_e.html). Note: Normals for the 1991-2020 period have not yet been published by ECCC.

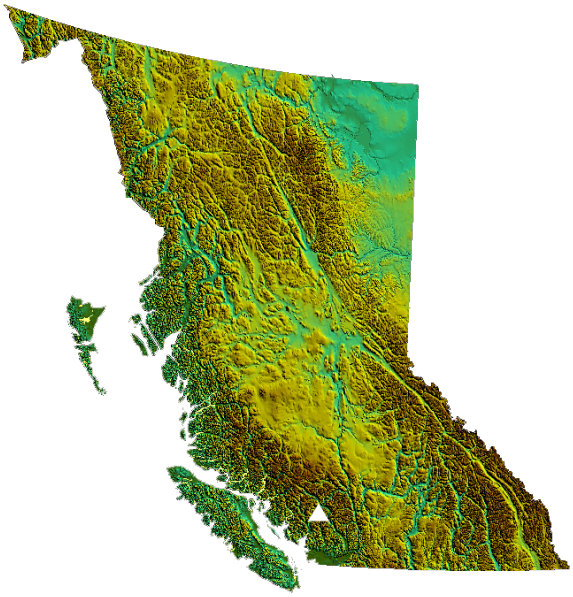

Figure 1-1. Relief map of British Columbia showing the location of Whistler (white triangle). Map source: ESRI.

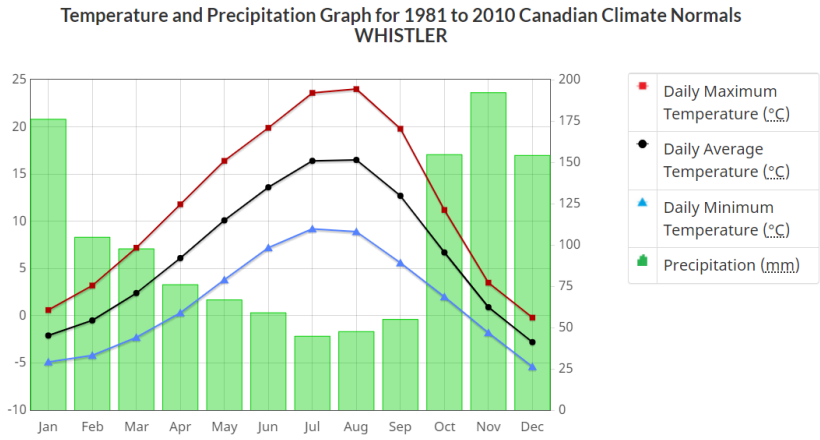

Figure 1-2. Monthly temperature and precipitation Normals at Whistler for the period 1981-2010. Source: ECCC (https://climate.weather.gc.ca/climate_normals/).

Although ECCC has not yet published official 1991-2020 climate Normals for RMOW, these variables have been calculated from existing daily weather observations taken at Whistler[2] (Table 1-2). These data are only used illustratively in this assessment because periods of missing observations have not been reconciled and the data have not been subject to the same level of review as the official 1981-2010 Normals. Figure 2-1 illustrates the comparatively small changes between the two periods relative to projected climate change by the end of the century.

[2] Weather station (WMO ID: 71687) located 175 m NNE of Nesters Market on Sea-to-Sky Hwy.

Table 1-1. Climatic averages for Whistler, BC for the period 1981-2010. Source: ECCC 1981-2010 climate Normals. Record High and Low temperatures and maximum precipitation have been updated to the present.

Variable	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Record High Temperature (°C)	8.9	14.3	22.7	28.0	35.6	42.9	38.8	38.0	35.0	26.8	14.6	11.0	42.9
Average High Temperature (°C)	0.6	3.2	7.2	11.8	16.4	19.9	23.6	24.0	19.8	11.2	3.5	-0.2	11.7
Average Temperature (°C)	-2.1	-0.5	2.4	6.1	10.1	13.6	16.4	16.5	12.7	6.7	0.9	-2.8	6.7
Average Low Temperature (°C)	-4.9	-4.2	-2.3	0.3	3.8	7.2	9.2	8.9	5.6	2.0	-1.8	-5.4	1.5
Record Low Temperature (°C)	-28.2	-24.1	-18.5	-9.3	-4.0	-0.7	0.3	0.0	-3.2	-14.2	-24.3	-29.2	-29.2
Average Precipitation (mm)	176.0	104.6	97.6	75.9	66.7	58.9	44.7	47.5	54.9	154.6	192.1	154.1	1227.7
Average Rainfall (mm)	84.7	50.2	55.4	61.2	65.7	58.9	44.7	47.5	54.9	146.7	131.1	54.8	855.9
Average Snow fall (cm)	103.0	64.2	47.4	15.8	1.0	0.0	0.0	0.0	0.0	7.6	65.7	114.0	418.7
Precipitation Days (≥ 0.2 mm)	18.9	14.9	16.9	16.2	15.0	13.8	10.0	9.2	10.0	17.3	19.6	18.0	179.7
Rainy Days (≥ 0.2 mm)	10.6	8.7	11.6	14.3	15.0	13.8	10.0	9.2	10.0	16.7	14.5	7.9	142.2
Days with Snow (≥ 0.2 cm)	13.7	10.1	9.2	4.4	0.50	0.0	0.0	0.0	0.0	1.4	9.7	14.6	63.5
Maximum Daily Rainfall (mm)	79.2	69.8	45.6	33.6	27.2	31.3	39.8	64.4	61.3	77.3	72.0	89.6	89.6
Maximum Daily Snowfall (cm)	52.6	42.8	40.0	47.0	8.0	0.0	0.0	0.0	2.1	30.4	54.5	51.2	54.5

Table 1-2. Climatic averages for Whistler, BC for the period 1991-2020. Source: ECCC daily weather observations. Record High and Low temperatures and maximum precipitation have been updated to the present.

Variable	Month												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Record High Temperature (°C)	8.9	14.3	22.7	28.0	35.6	42.9	38.8	38.0	35.0	26.8	14.6	11.0	42.9
Average High Temperature (°C)	0.2	3.1	6.9	11.8	17.4	20.1	24.4	24.6	19.7	10.7	3.7	-0.3	11.9
Average Temperature (°C)	-2.3	-0.6	2.3	6.2	10.9	13.9	17.1	17.1	13.0	6.6	1.1	-2.5	6.9
Average Low Temperature (°C)	-4.9	-4.2	-2.3	0.5	4.4	7.6	9.8	9.6	6.3	2.5	-1.4	-4.8	1.9
Record Low Temperature (°C)	-28.2	-24.1	-18.5	-9.3	-4.0	-0.7	0.3	0.0	-3.2	-14.2	-24.3	-29.2	-29.2
Average Precipitation (mm)	193.8	101.8	108.8	78.8	59.6	60.2	43.0	52.2	76.6	164.7	224.0	173.3	111.4
Average Rainfall (mm)	88.7	44.6	59.6	66.9	59.1	60.2	43.0	52.2	76.5	156.8	155.5	66.8	77.5
Average Snow fall (cm)	116.1	67.0	51.8	11.1	0.4	0.0	0.0	0.0	0.1	5.9	65.1	121.6	439.1
Precipitation Days (≥ 0.2 mm)	20.4	15.2	18.1	17.3	14.5	14.7	10.1	9.4	11.4	19.3	20.5	19.7	190.7
Rainy Days (≥ 0.2 mm)	11.3	8.3	11.7	15.5	14.4	14.7	10.1	9.4	11.4	19.1	15.8	8.4	150.2
Days with Snow (≥ 0.2 cm)	15.2	10.9	10.7	4.1	0.4	0.0	0.0	0.0	0.0	1.3	9.6	16.0	68.0
Maximum Daily Rainfall (mm)	79.2	69.8	45.6	33.6	27.2	31.3	39.8	64.4	61.3	77.3	72.0	89.6	89.6
Maximum Daily Snowfall (cm)	52.6	42.8	40.0	47.0	8.0	0.0	0.0	0.0	2.1	30.4	54.5	51.2	54.5

2.0 CLIMATE CHANGE AT RMOW

In line with projected global climate changes, the climate of RMOW is anticipated to change over the next several decades. To assess changes in the RMOW climate, output from an ensemble of 38 global climate models (GCM) of the Coupled Model Intercomparison Project, Phase 5 (CMIP5) were obtained for the RCP 8.5 emissions scenario. This scenario assumes global carbon emissions will continue their current trajectory through 2100. This scenario was selected for several reasons. First, while efforts to mitigate the emission of greenhouse gases (GHGs) will evolve, their implementation and efficacy are unknown. Since the model start date of 2006, global emissions have most closely followed the RCP8.5 trajectory. Second, RCP4.5, RCP6.0, and RCP8.5 all project similar temperature and precipitation changes for the region, though the magnitude of those changes differs slightly (Ministry of Environment and Climate Change Strategy, 2019). Thus, key findings and risks are unlikely to be affected by using a lower emissions scenario. Finally, it is prudent to use the highest available emissions scenario to characterize potential vulnerably and associated risk. As such, ensemble GCM output under the RCP8.5 emissions scenario[3] is employed to highlight the direction and potential magnitude of change anticipated at RMOW.

As illustrated in Figure 2-1, a continued emissions trajectory leads to an increase in temperature in all months. Importantly, while this scenario suggests an overall increase in precipitation, there is a notable decrease in precipitation in the summer months of June through August.

[3] Data source KNMI Climate Explorer (https://climexp.knmi.nl/) downloaded November 2021.

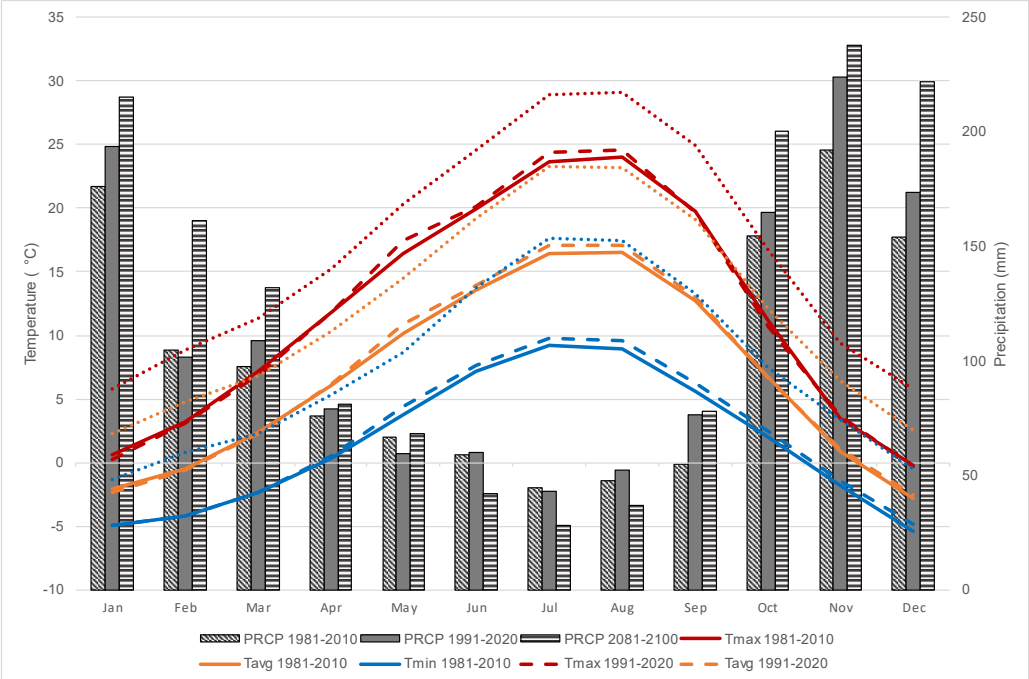

Figure 2-1. Monthly temperature and precipitation for three periods: 1981-2010 (solid lines and left, diagonally hashed bars), 1991-2020 (dashed lines and center bars), and 2081-2100. (dotted lines and right, horizontally hashed bars). Source: ECCC, KNMI, and UBC Climate-NA.

Under the RCP 8.5 scenario, average annual air temperature is expected to increase 4.5°C by the period 2081-2100 relative to the 1981-2010 average (67% increase; Figure 2-2). Winter (December-February) average temperature will increase by 4.3°C (+237%) in that timeframe (Table 2-1). These increases are due to a roughly 300% increase (4.7°C) in average annual minimum temperature and a doubling (5.1°C) in winter average minimum temperature. While annual and winter average maximum temperatures also will increase, 3.8°C and 4.5°C respectively, they are smaller increases relative to their 1981-2010 baselines.

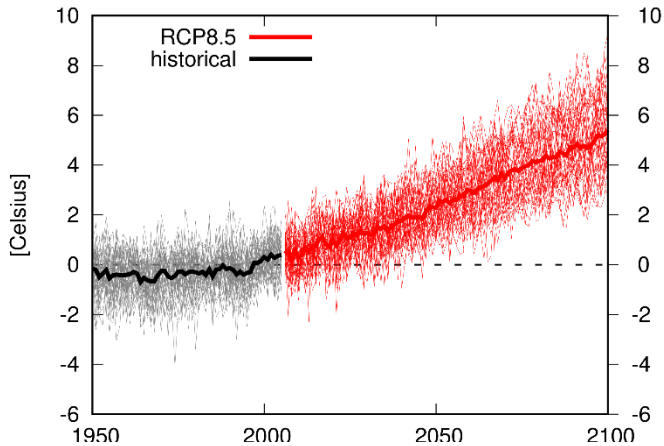

Figure 2-2. Ensemble-based average surface air temperature change (anomalies) from the 1981-2010 mean for the site location, based on CMIP5 RCP8.5. Thin grey (historical) and red (projected) lines represent each of the 28 GCMs used in the ensemble, and the thicker line is the ensemble mean. Source: KNMI Climate Explorer.

Table 2-1. Temperature change at the site from 1981-2010 to 2018-2100 under a high Carbon emissions scenario (RCP 8.5). Sources: ECCC (Historical Data), KNMI (Modelled Data).

Variable	Interval	1981-2010	2081-2100	Anomaly	% Change
Max. Temperature (°C)	Annual Average	11.7	16.2	4.5	38%
	Dec.-Feb. Average	1.2	5.0	3.8	317%
	Jun.-Aug. Average	22.5	28.1	5.6	25%
Min. Temperature (°C)	Annual Average	1.5	6.2	4.7	314%
	Dec.-Feb. Average	-4.8	0.2	5.1	105%
	Jun.-Aug. Average	8.4	13.3	4.9	58%
Avg. Temperature (°C)	Annual Average	6.7	11.2	4.5	67%
	Dec.-Feb. Average	-1.8	2.5	4.3	237%
	Jun.-Aug. Average	15.5	20.8	5.3	34%
No. of Frost Days[1]	Annual Average	149.8	78.0	-71.8	-48%
No. of Icing Days[2]	Annual Average	64.8	23.3	-41.5	-64%

Notes:

1. Days with minimum temperature below 0°C
2. Days with maximum temperature below 0°C

This change in temperature regime will noticeably reduce the number of frost days (days with Tmin < 0°C) by 48% and the number of icing days (days with Tmax < 0°C) by 64% (Figure 2-3). Such reduction suggests a later onset of winter, more winter precipitation falling as rain and an earlier average freshet date.

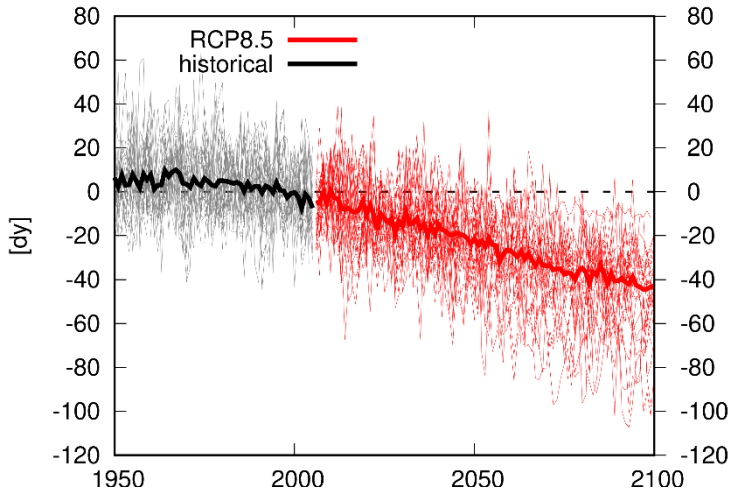

Figure 2-3. Change in the number of days where the maximum temperature is less than 0°C at the site location based on the 1981-2010 annual average, based on CMIP5 RCP8.5. Thin grey (historical) and red (projection) lines are estimates from individual models, while the bold line is the ensemble mean. Source: KNMI Climate Explorer.

Average annual and winter precipitation totals are also expected to increase by the period 2080-2100, but at a much lower rate than temperature. Average total annual precipitation will increase under RCP 8.5 by 11%, and average winter precipitation totals will increase by 14% (Table 2-2 and Figure 2-1). Conversely, 2080-2100 average total summer (June to August) precipitation will decrease by 11% (Table 2-2 and Figure 2-1). While annual precipitation is anticipated to increase, this increase is derived from a 30% increase in days with heavy precipitation (≥ 20 mm) but a decrease (-4%) in overall precipitation days (≥ 1 mm), as shown in Figure 2-4.

Further, the maximum length of dry spells (consecutive days without measurable precipitation) is expected to increase by approximately 6 days (+28%), while the maximum length of wet spells (consecutive days with measurable precipitation) will increase by just 0.3 days (+1%) (Table 2-2). The increase in dry spell length coupled with increasing summer temperatures suggest a potential for increases in wildfire occurrences, while more frequent heavy precipitation supports increased debris flooding, landslides, and debris flows. The increase in both winter precipitation and temperature means a shift from snow dominated to a mixed rain-snow regime with a likely earlier and perhaps more hazardous freshet and a thinner and less consistent snowpack.

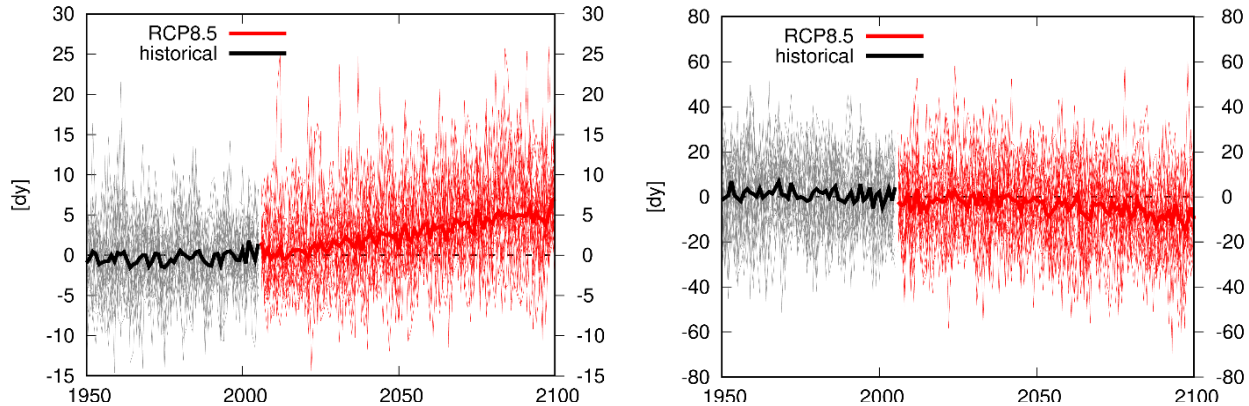

Figure 2-4. Change in the average number of days with heavy (≥ 20 mm) precipitation annually (L) and in the number of wet (≥ 1 mm) days per year (R) at the site location relative to the 1981-2010 average, based on CMIP5 RCP8.5. Thin grey (historical) and red (projected) lines are data from each of the 38 GCMs used and thick lines are the ensemble mean. Source: KNMI Climate Explorer.

Table 2-2. Precipitation changes at the site from 1981-2010 to 2018-2100 under a high Carbon emissions scenario (RCP 8.5). Sources: ECCC (Historical Data), KNMI (Modelled Data).

Variable	Interval	1981-2010	2080-2100	Anomaly	% Change
Total Precipitation (mm)	Annual Average	1227.7	1362.1	134.4	11.0%
	Dec.-Feb. Average	435.0	488.8	53.8	12.4%
	Jun.-Aug. Average	151.1	130.2	-20.9	-13.8%
Max. dry spell length (days)	Annual Average	22.5	28.7	6.2	27.6%
Max. wet spell length (days)	Annual Average	20.3	20.6	0.3	1.2%
No. days ≥ 20 mm precipitation	Annual Average	17.8	23.0	5.3	29.6%
No. days ≥ 1 mm precipitation	Annual Average	197.3	189.0	-8.2	-4.2%
Max. 1-day precipitation	Annual Average	45.4	53.5	8.1	17.8%

4.0 KEY RISKS

The RMOW will experience a substantial increase in surface air temperature by the 2080-2100 period, potentially exceeding average warming estimates for the globe. It will also see an increase in precipitation, largely from an increase in high intensity precipitation events, but with a longer, warmer, and drier summer season (MacArthur et al., 2012 and this analysis). These changes will manifest in several risk areas that can affect the community and surrounding ecosystems. While they do not identify all possible risks associated with climate change, Tables 3-1 and 3-2 describe several key risk areas.

Table 3-1. Key risks from climate change including expected change in those risks and their potential impacts.

Key Risk	Expected Changes	Impact
Heatwaves	More frequent and intense	Human health and safety; wildfire risk; energy demand; early snowmelt; infrastructure damage
Wildfires	More frequent and widespread	Human health and safety; ecological losses; post-fire landslides and debris flows; infrastructure and built environment damage and disruption
Flash flooding	More frequent and intense	Human health and safety; infrastructure damage; landslides and debris flows
Snowpack	More variable; later onset; earlier melt; less consistent; and, decreased accumulation	Decreased water availability; ecological disruption; winter recreation disruption
Cold snaps	Less frequent	Human health and safety; ecological losses
Freezing level	More variable and increased altitude	Disruption and cost to ski economy; snowpack and flooding; ecological outbreaks
Drought	More frequent, intense, and long lasting	Insufficient water supply; wildfire risk; ecological losses; tourism losses

Table 3-2. Key climate change related risks by sector.

Sector	Climate Impacts	Risk Level*
Community	Damage and disruption to built environment from wildfires, flooding, and geohazards; Health and safety hazards to residents from heatwaves, wildfires, flash flooding	High
Transportation	Damage and disruption to mobility infrastructure from flooding, landslides and debris flows.	High
Energy	Energy availability/cost becomes more variable with increasing precipitation uncertainty.	Moderate
Recreation	Decreased recreational opportunities in summer due to wildfire risk, and in winter due to snowpack	Moderate
Tourism	Decreased tourism economy due to decreasing snowpack	Moderate
Environment	Loss of forest due to wildfire, invasive/damaging species outbreaks, and increased storms	Moderate

* Risk levels are qualitative based on the likelihood of the impact occurring and the adaptive capacity of the sector to respond to and recover from the impact. High risk suggests both a high likelihood of occurrence and a low adaptive capacity, while moderate risk suggests lower likelihood of occurrence and/or greater adaptive capacity. Quantitative risk assessment is beyond the scope of this work but can be conducted if requested.

In keeping with the findings of the IPCC (2021), over the 21st Century, the region around RMOW is anticipated to experience more frequent and intense extreme meteorological events (e.g., heatwaves, atmospheric rivers). Increases in winter surface layer temperature also raise the 0°C isotherm (i.e., snow line), decreasing lower elevation snowpack. The area will also experience a transition from snow dominated winters to a mixed (rain and snow) regime, with earlier freshet and more rain-on-snow events. Summer temperatures are expected to increase with a corresponding decrease in water availability, increasing the probability of extreme heatwaves, drought, and wildfires. In addition to high heat quickly drying 1-hr wildfire fuels (e.g., grasses and shrubs), heatwaves in the region pose a health danger to the community due to the normally high marine-layer humidity that inhibits overnight cooling coupled with a presumed low proportion of air-conditioned households (BC est. 34% in 2018[4]). An increase in wildfires will have a negative effect on regional air quality, including elevated quantities of particulate matter (e.g., PM2.5, PM10), volatile organic compounds (VOC), and Nitrous Oxides (Urbanski et al., 2009).

Increased temperatures year-round are also anticipated to raise the frequency and intensity of severe storms. This includes intense, localized summer thunderstorms that may spark wildfires, induce landslides and debris flows, and produce damaging debris flooding. Winter storm systems and atmospheric rivers are anticipated to become more frequent and intense (Radic et al., 2015, Cannon, pers. comm. 2022), and while cold snaps are likely to become less frequent, those that

[4] BC Hydro (https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/news-and-features/air-conditioning-report-july-2018.pdf)

occur can be as intense or even more intense than those at present (Kretschmer et al. 2018). Winter storms are expected to produce more rain and less snow, which reduces, but does not eliminate the chance of extremely snowy and stormy winters. A comprehensive analysis of climate related risk (e.g., quantifying change in the likelihood of a particular geohazard and its specific impacts due to climate change) is outside the scope of this assessment but may be conducted by BGC upon request.

6.0 CLOSURE

BGC Engineering Inc. (BGC) prepared this document for the account of the Resort Municipality of Whistler. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it is the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

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Yours sincerely,

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per:

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Senior Climatologist

Reviewed by:

Matthias Jakob, Ph.D., P.Geo., P.L.Eng.
Principal Geoscientist

EGBC Permit To Practice: 1000944

KS/MJ/SF/sjk

Attachments: Appendix – PowerPoint presented to RMOW by Dr. Jakob.

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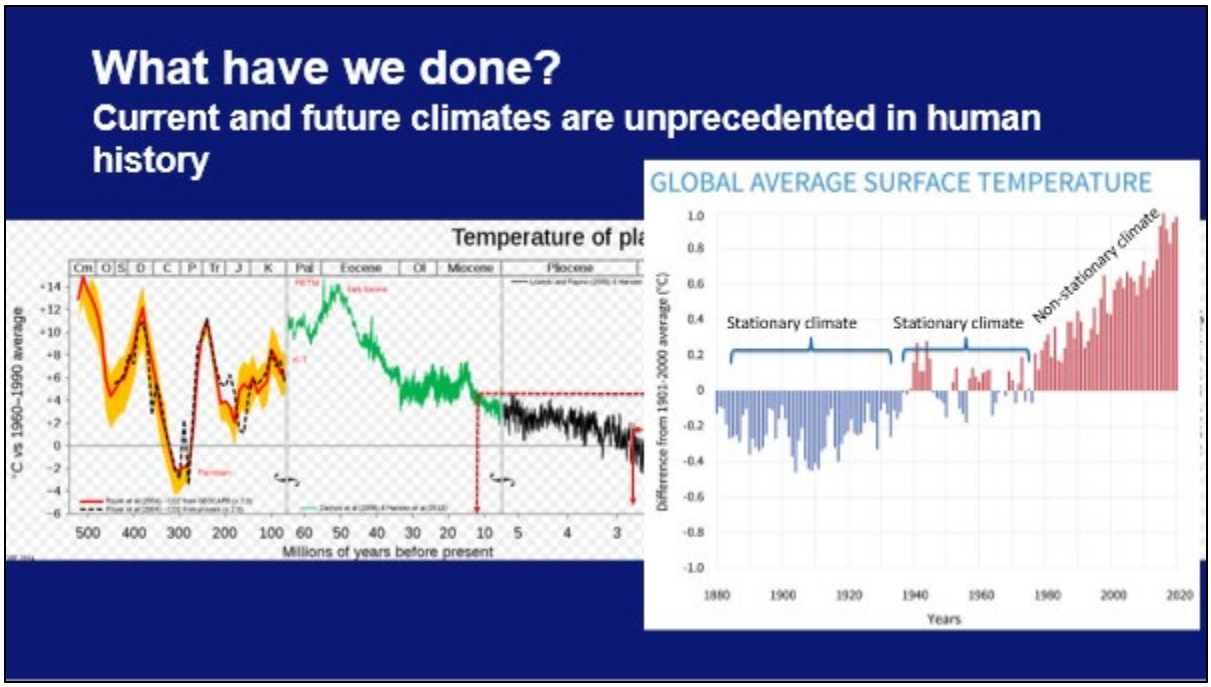
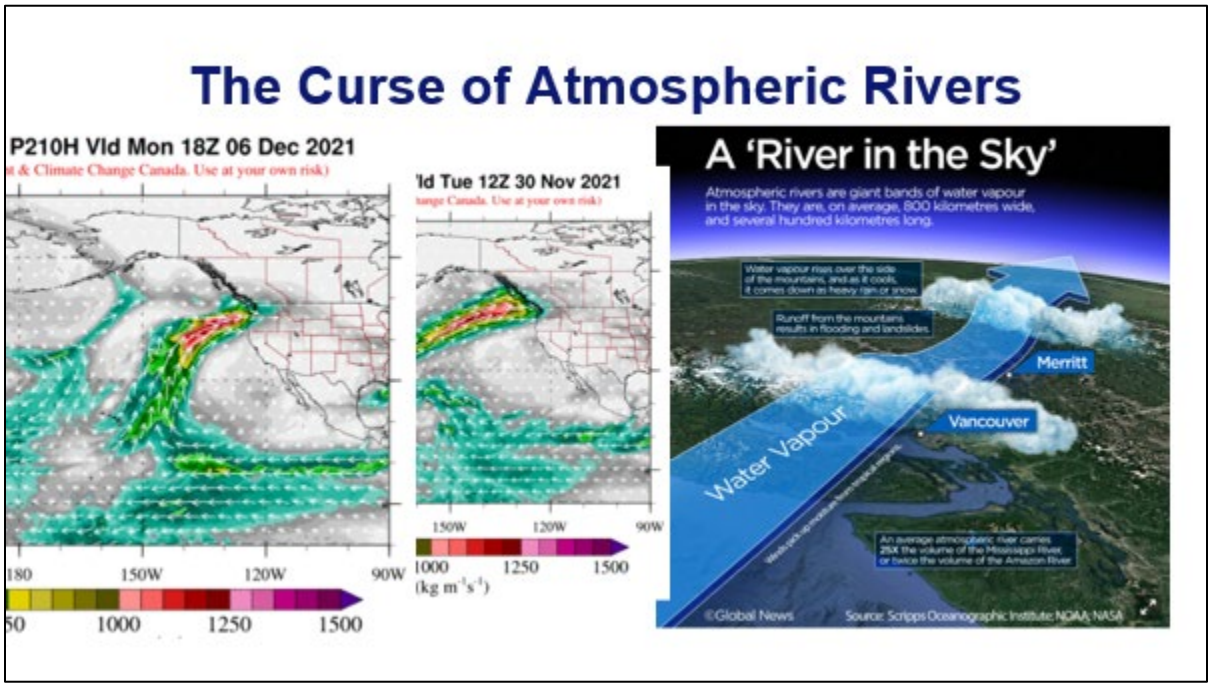
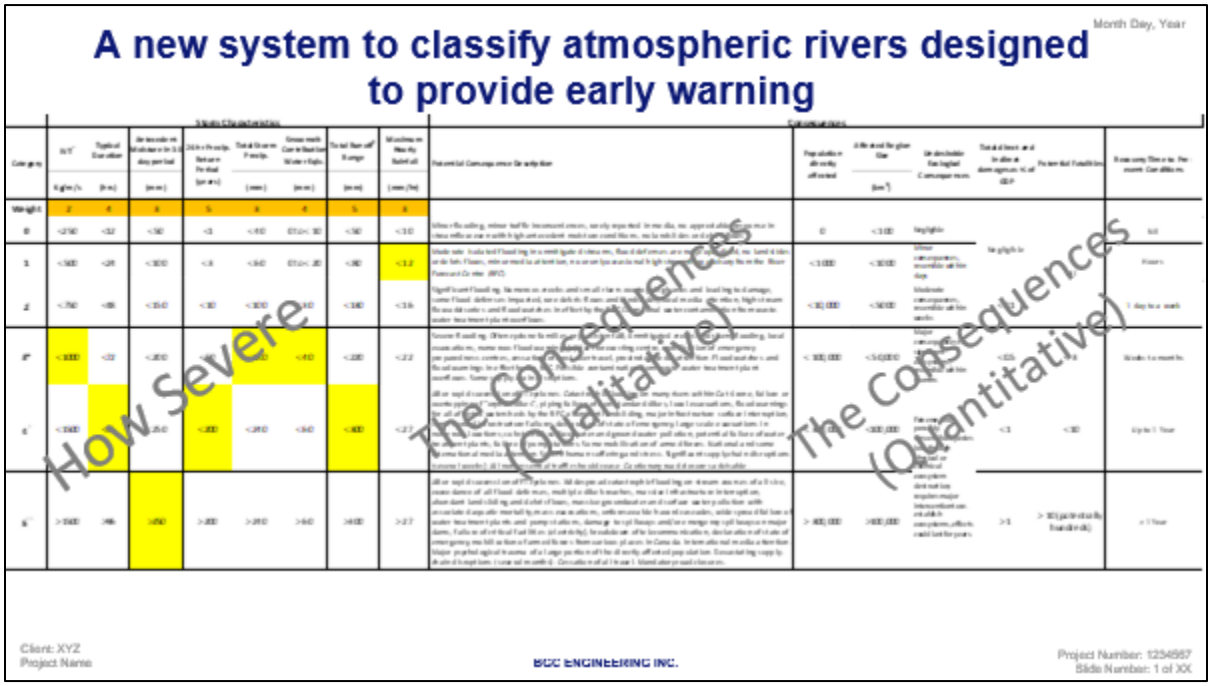
APPENDIX
POWERPOINT PRESENTED TO RMOW BY DR. JAKOB ON DECEMBER 2, 2021

This presentation provides a summary of the information contained in this report, including additional graphical information that may be of use in supporting this document. The following slides may contain animations.


What have we done?
Current and future climates are unprecedented in human history
Temperature of pla
°C vs 1960–1990 average
Millions of years before present
GLOBAL AVERAGE SURFACE TEMPERATURE
Stationary climate
Stationary climate
Non-stationary climate
Difference from 1901-2000 average (°C)
Years


The Curse of Atmospheric Rivers
P210H Vld Mon 18Z 06 Dec 2021
Vld Tue 12Z 30 Nov 2021
(kg m⁻¹s⁻¹)
A 'River in the Sky'
Atmospheric rivers are giant bands of water vapour in the sky. They are, on average, 800 kilometres wide, and several hundred kilometres long.
Merritt
Vancouver
Water Vapour
©Global News
Source: Scripps Oceanographic Institute, NOAA, NASA


Nov. 14/15, 2021: A formidable storm, but not the worst credible!
Coquihalla Hwy.
Transcanada Hwy and CP Rail
Highway 8 (Nicola to Merritt)
Highway 7 near Agassiz


Month Day, Year
A new system to classify atmospheric rivers designed to provide early warning
How Severe
The Consequences (Qualitative)
The Consequences (Quantitative)
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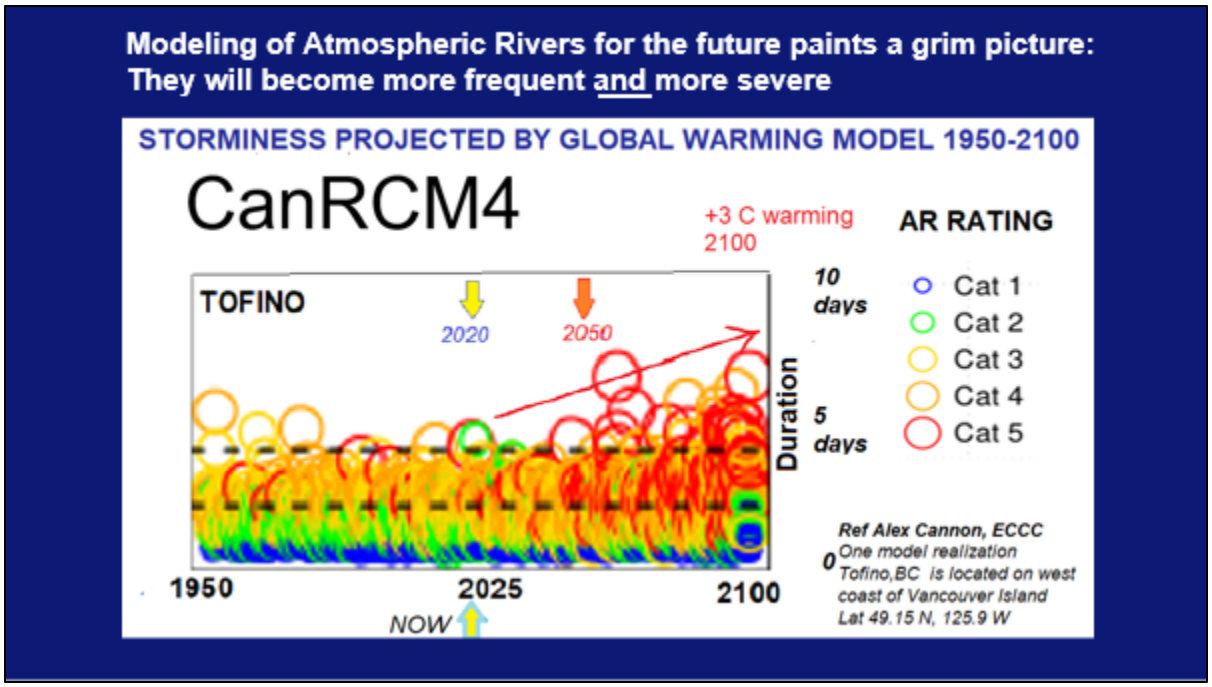
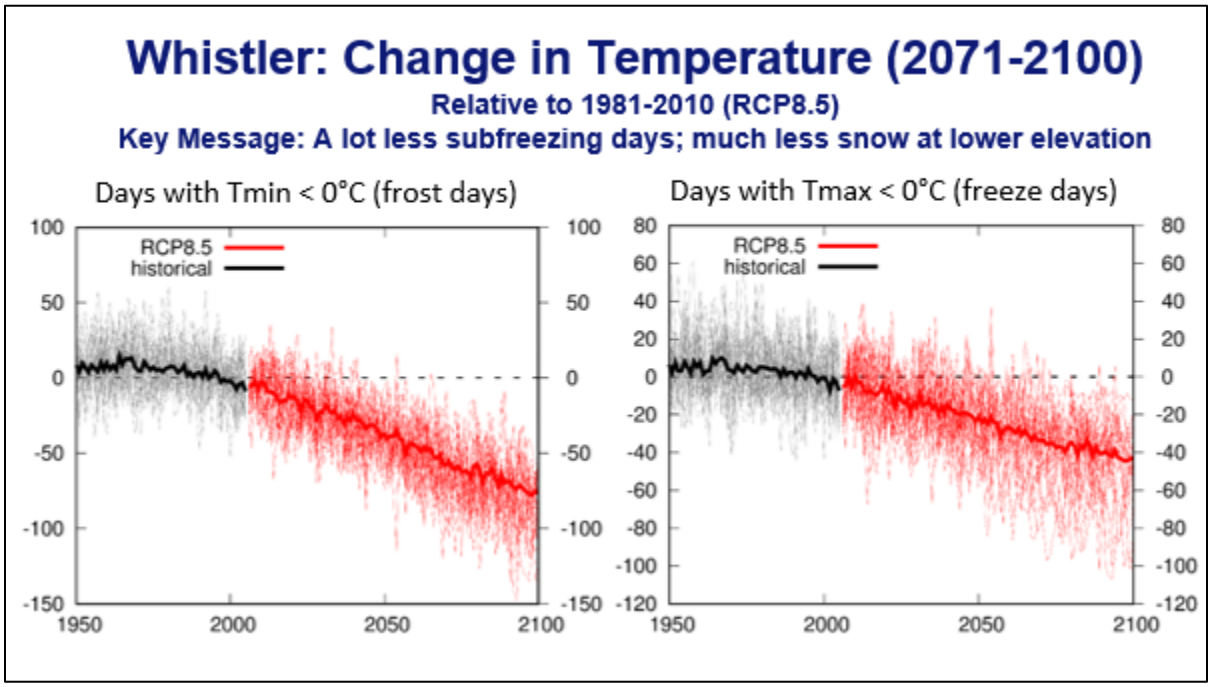
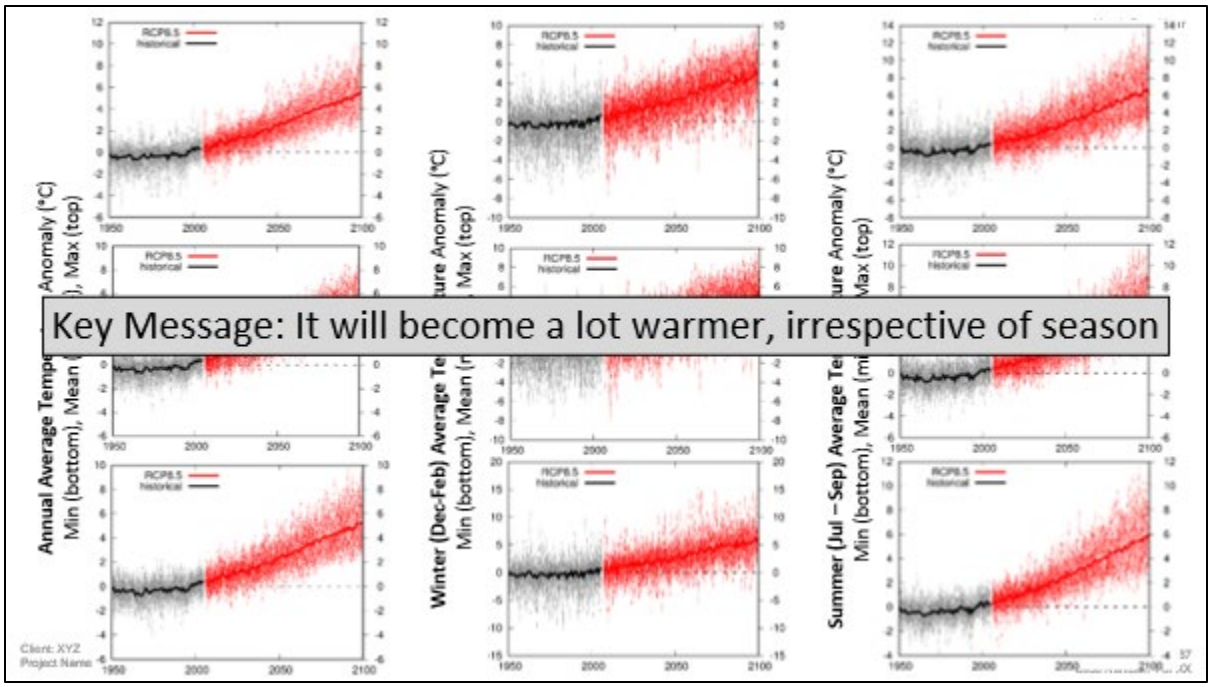

Modeling of Atmospheric Rivers for the future paints a grim picture:
They will become more frequent and more severe
STORMINESS PROJECTED BY GLOBAL WARMING MODEL 1950-2100
CanRCM4
+3 C warming
2100
AR RATING
TOFINO
2020
2050
10 days
5 days
0
Duration
Cat 1
Cat 2
Cat 3
Cat 4
Cat 5
1950
2025
2100
NOW
Ref Alex Cannon, ECCC
One model realization
Tofino,BC is located on west coast of Vancouver Island
Lat 49.15 N, 125.9 W


Whistler: Change in Temperature (2071-2100)
Relative to 1981-2010 (RCP8.5)
Key Message: A lot less subfreezing days; much less snow at lower elevation
Days with Tmin < 0°C (frost days)
Days with Tmax < 0°C (freeze days)
RCP8.5
historical
100
50
0
-50
-100
-150
80
60
40
20
0
-20
-40
-60
-80
-100
-120
1950
2000
2050
2100



Change in Temperature (2071-2100)

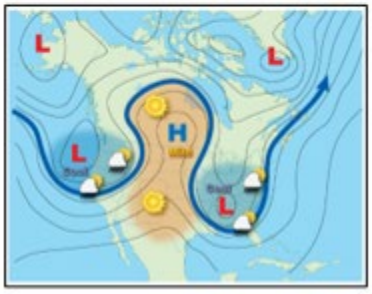
Relative to 1981-2010 under RCP8.5

- Doubling of annual average air temperature
- Winter minimum temperature & summer maximum temperature both increase by over 5°C
- Number of days temperature < 0°C cut in half

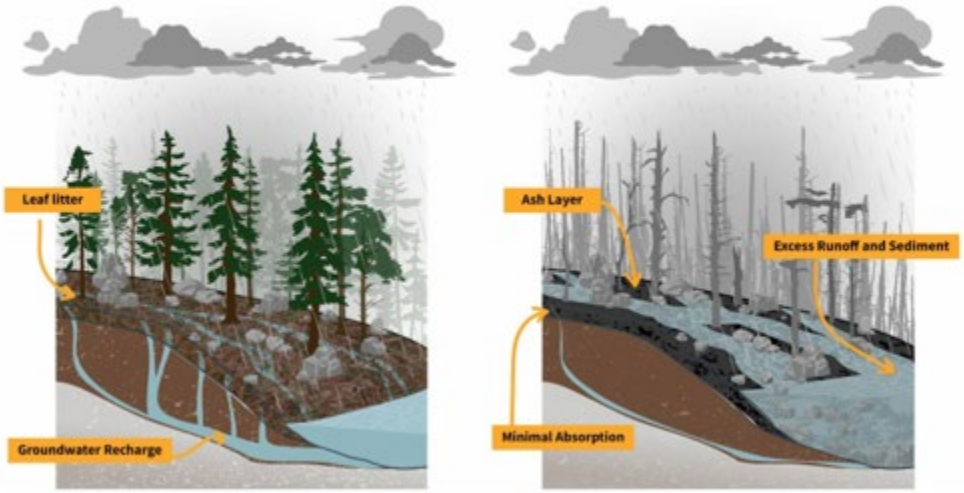
Data source: CMIP5 48-model ensemble RCP8.5 obtained from KNMI Climate Explorer

Expect a much-elevated risk of wildfires

- Longer droughts
- Much higher temperatures
- Extended wildfire season
- Hotter fires
- Heat domes (omega blocks)
- Human carelessness

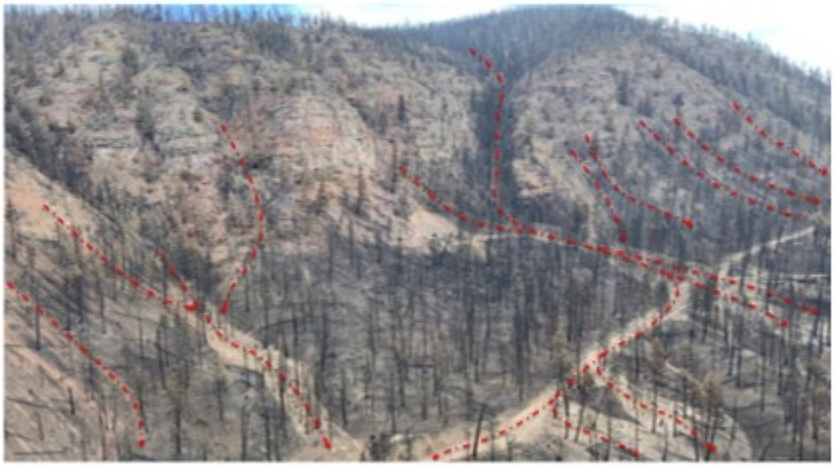


Combustion of vegetative canopy, litter and duff, introduction of ash, and development of water repellent soils increase runoff

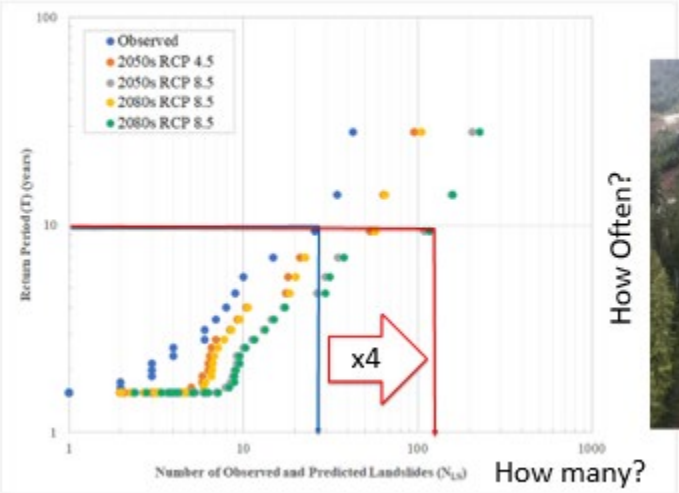


https://labs.waterdata.usgs.gov/visualizations/fire-hydro/index.html#/

Post-Fire Debris Flows
will become common place even in coastal forests



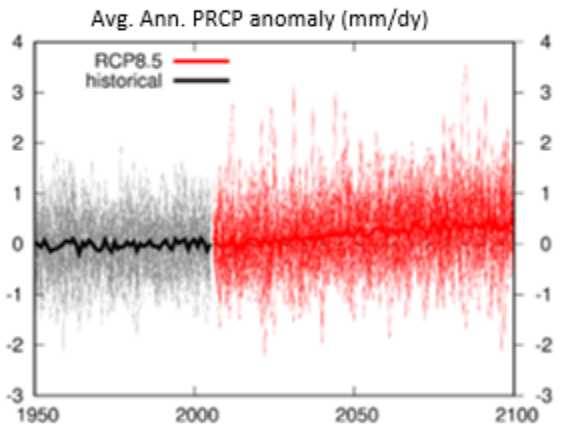
Shallow landslides may quadruple by the end of the century in coastal areas

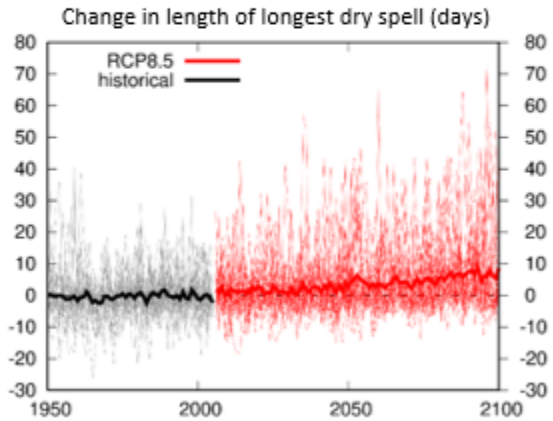


How Often?

Month Day, Year

Changes in Precipitation (2071-2100)
Relative to 1981-2010 under CMIP5 RCP8.5





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Month Day, Year

Change in Precipitation (2071-2100)
Relative to 1981-2010 under CMIP5 RCP8.5

- Slight increase (~8%) in annual precipitation
  - 10% increase in the winter (more snow at high elevation)
  - 7% decrease in the summer (lower flows for hydropower)
  - ~ 30% increase in maximum length of dry spells
- Little change in maximum length of wet spells
- 30% increase in days with ≥ 20 mm precipitation

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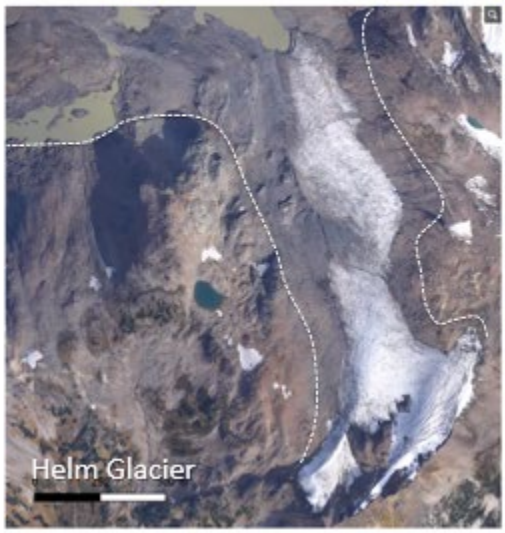
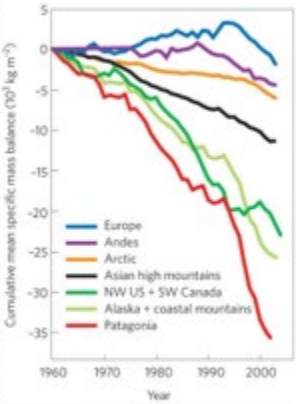
Higher flood hazard and substantially more gravel transport on Fitzsimmons Creek

Glacier shrinkage is accelerating and all of southwest BC's glaciers will be gone by the end of the century





Forest fires accelerate melt by changes in ice reflectivity through ash

Month Day, Year

Good-bye Glaciers

- https://couplet.unbc.ca/data/RGM_archive/RGM_movie_archive/Whistler-Garibaldi,%20BC/AccZone/MIROC-320km/RCP85/view_02/view_02.avi

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Summary of Climate Change Effects

- More winter rain and rain-on-snow events
- Later first snow and earlier freshet dates
  - Impact on overall annual snowpack depth is uncertain
- Drier, hotter summers with increased wildfire risk
  - Increased chance of "heat domes"
- Increased chance of Atmospheric Rivers
  - Traffic disruptions to/from Vancouver
  - Increased chance of landslides and rapid snowmelt
- Increased interannual and event variability
  - Extreme events will become more extreme, and swings from year to year may be notable.
  - Global warming does not rule out Arctic outbreaks and heavy snow events, or even great snow seasons (they just become less frequent)

The biggest source of CO_2 emissions are the guests

- 23,000 in March/day. Assuming that 90% of that traffic comes from Vancouver, that's 20,700 vehicles
- 5.8 Million km driven every day (~ 7 times to the moon and back), about 1300 tons of CO_2 per day
- Summer traffic is ~27,000 cars, spring and fall traffic less. Assuming an all-year average of 15,000 cars, the total is 970 t/day or ~350,000 CO_2 tons per year.

Month Day, Year

Closure

This presentation required a number of complex issues to be reduced to general concepts in a series of concise bullet points, photographs and/or diagrams. The content of this presentation is not intended for design decisions or construction. This presentation is for general informational purposes only. BGC's report(s) may contain more specific details concerning the issues identified in this presentation.

Please consult BGC for further clarification if you have any questions or concerns.

Prepared by: Dr. Karsten Shein and Dr. Matthias Jakob
Reviewed by: M. Jakob
Client:
Date: November 26, 2021

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