State of Climate Adaptation

Regional District of Central Kootenay – Area H

APPENDIX – CLIMATE DATA

March 2020

Photo: Jesse Schpakowski

COLUMBIA BASIN RDI RURAL DEVELOPMENT INSTITUTE Selkirk College

REGIONAL DISTRICT CENTRAL KOOTENAY

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Contents

This appendix is additional climate data that supports the State of Climate Adaptation for the Regional District of Central Kootenay Area H. Please refer to the full report for more detail.

About the Climate Data

Climate data for RDCK Area H locations were provided by Climatic Resources Consulting, Inc. and come from two main modeling sources. Technical information is presented below. Climate projections for the 2050s within this report are separated into two scenarios: low carbon and high carbon. Climate projections for the 2050s indicate the average for the 2041-2070 period. The low carbon scenario (RCP4.5) is considered to be optimistic and, although insufficient to maintain global temperatures to below 2°C warming above pre-industrial temperatures, would require significant international cooperation that exceeds current commitments of signatories to the Paris climate agreement.[i] The high carbon scenario (RCP8.5) is referred to as 'business as usual'. Global emissions are still moving along a trajectory that could lead to 3 to 5°C of global warming by the end of the century, highlighting the significant gap between the emission reductions pledged by Paris Agreement signatories and the reductions required to meet the 2°C global target.[ii] Consequently, it is important to also consider the high global emissions scenario (RCP8.5) in planning for climate change in the Columbia Basin and Boundary regions. Climate trends, i.e. rates of change, are expressed in units per century, meaning the change per 100 years.

Technical Information

Historical climate data was prepared using climate reanalysis ERA5.[iii,iv] Climate reanalyses combine past observations with models to generate consistent time series of multiple climate variables.[v] They provide a comprehensive description of the observed climate as it has evolved during recent decades, on 3D grids at sub-daily intervals. The estimates are produced for all locations on earth, and they span a long time period that can extend back several decades or more. Adjusted and Homogenized Canadian Climate Data (AHCCD) from Environment Canada provides long-term (since the early 1900s) observed data from a climate station in New Denver, which were used for some indicators. For total annual precipitation, data from climate stations in Creston, Kaslo, Castlegar, Fauquier, Warfield and Grand Forks were referenced in addition to New Denver climate station data.

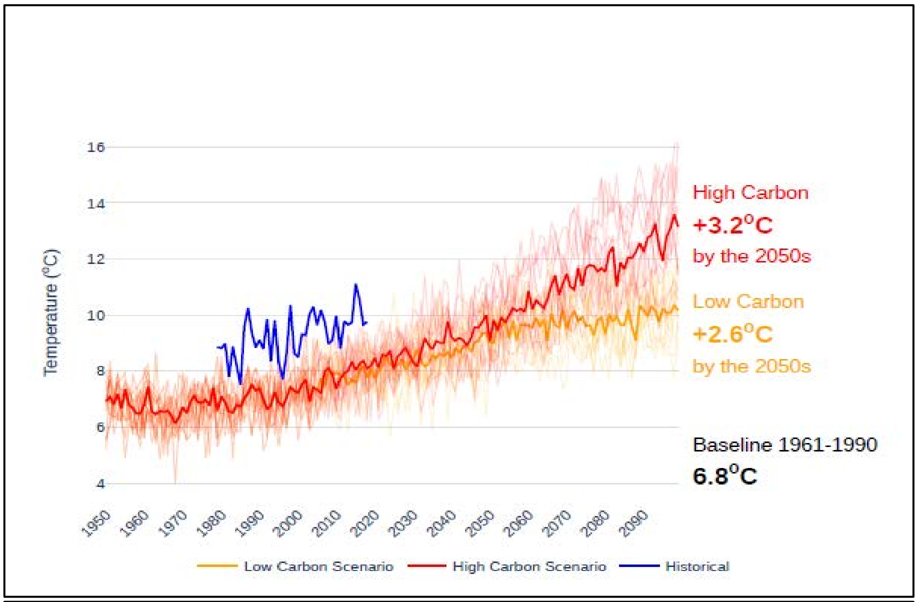
Climate projections are based on output from an ensemble of 12 statistically downscaled Global Climate Model (GCM) projections[vi] from the Coupled Model Intercomparison Project Phase 5 (CMIP5),[vii] and downscaled using Bias Correction/Constructed Analogues with Quantile mapping recording[viii] to a resolution of 10 km by 10 km. Representative Concentration Pathways (RCPs) are numbered (e.g. RCP8.5 or RCP4.5) according to the radiative forcing in W/m^2 that will result from additional greenhouse gas emissions by the end of the century. Modellers use RCPs to generate scenarios of future climate.

Important note: ERA5 and CMIP5 do not use the same spatial grid for climate analysis, which can cause more variation in mountainous regions as a result of differences in topography and elevation. The result is that climate plots (e.g., Figure 4 and separate Appendix for climate data) for Area H locations show a gap between historical and projected climate trends.

The following plots provide further insights on historic and projected climate for Area H. Seasons are defined as follows:

- Spring = March, April, May
- Summer = June, July, August
- Fall = September, October, November
- Winter = December, January, February

Historic and projected average annual temperature



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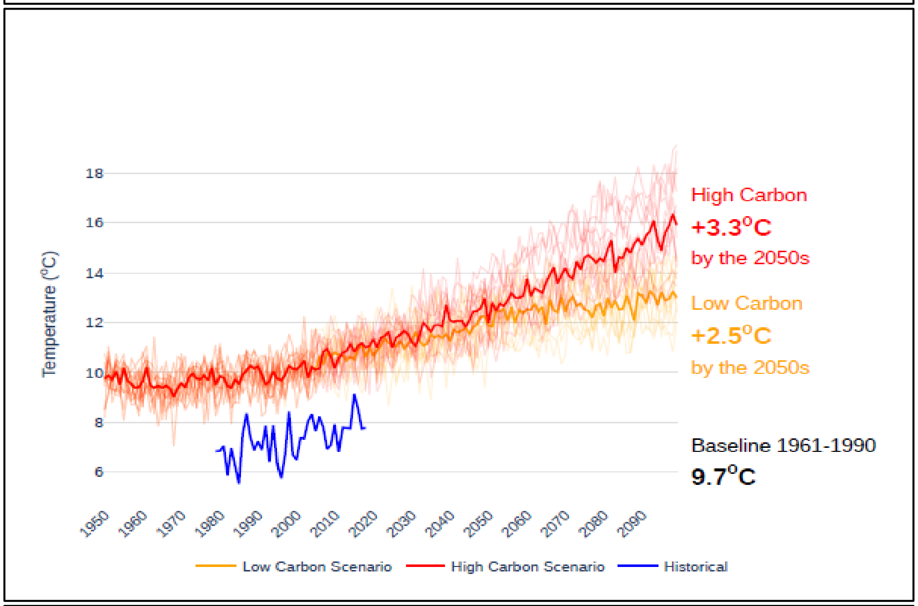

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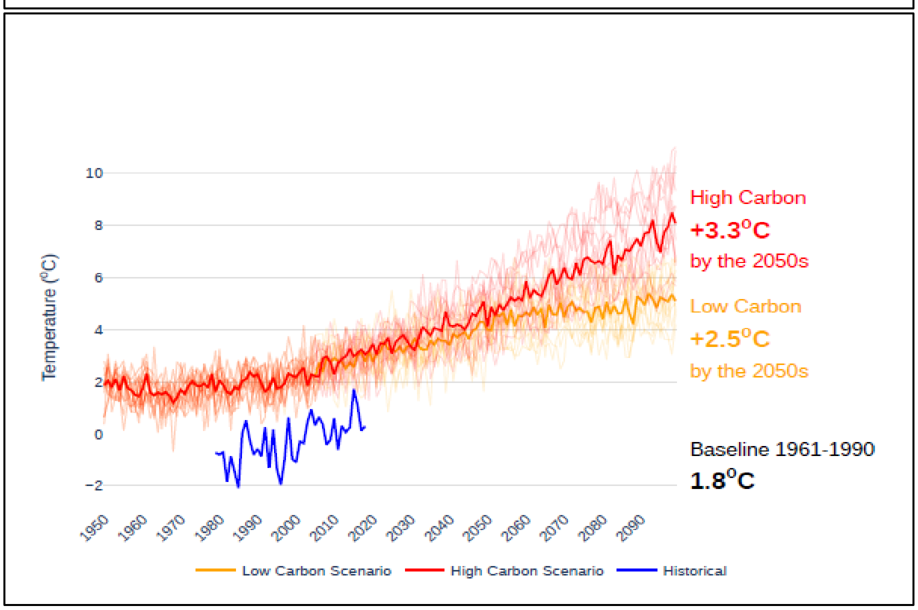
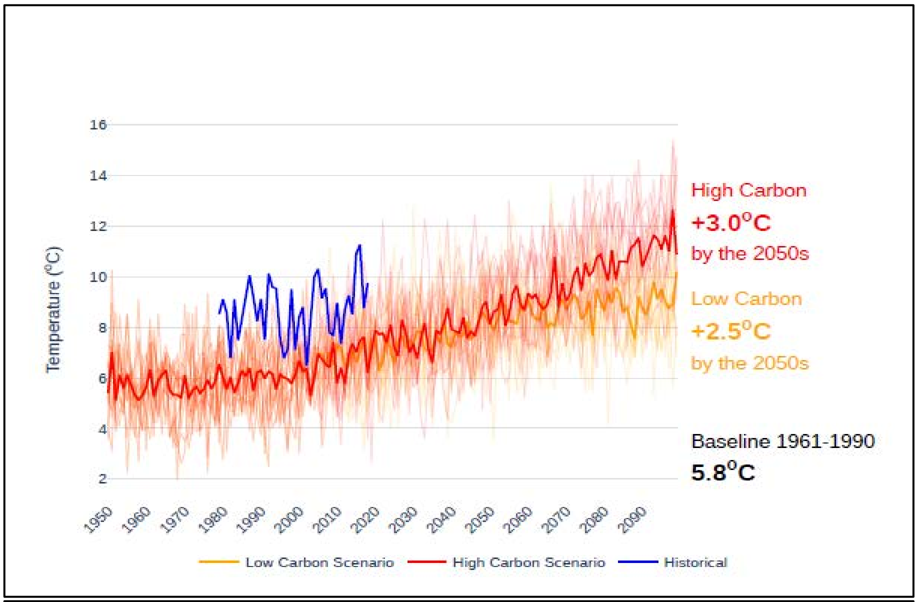


Figure 1.3
Valhalla High Elevation

Historic and projected average spring temperature



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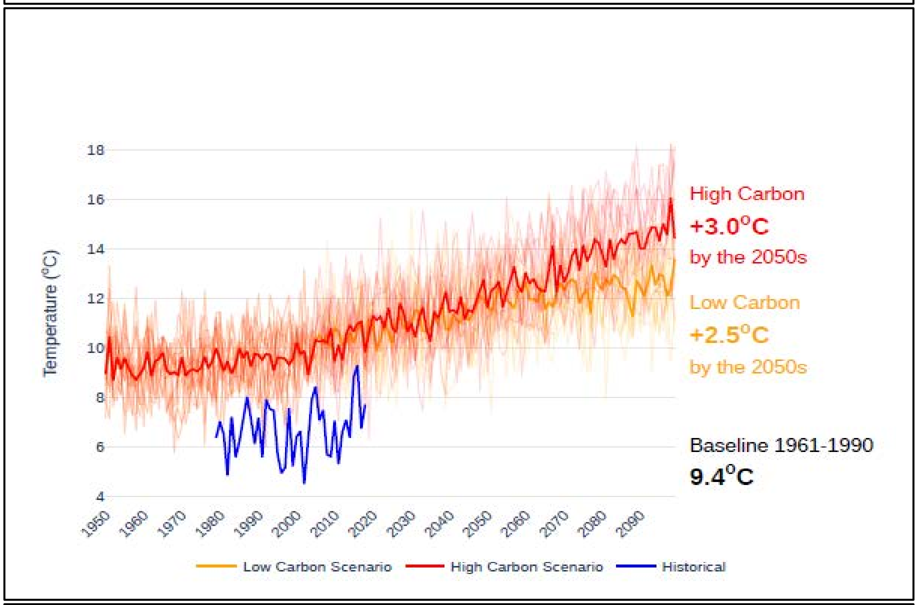

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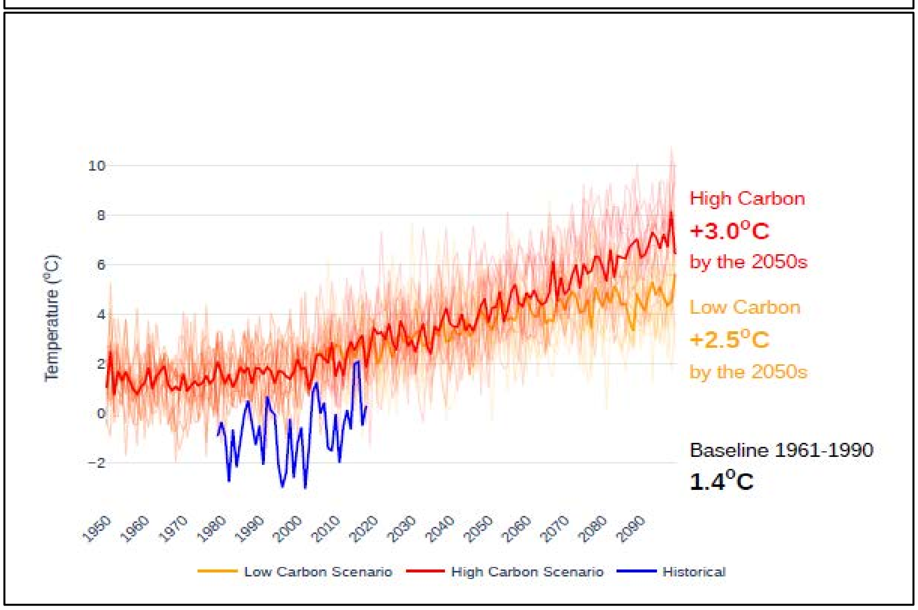
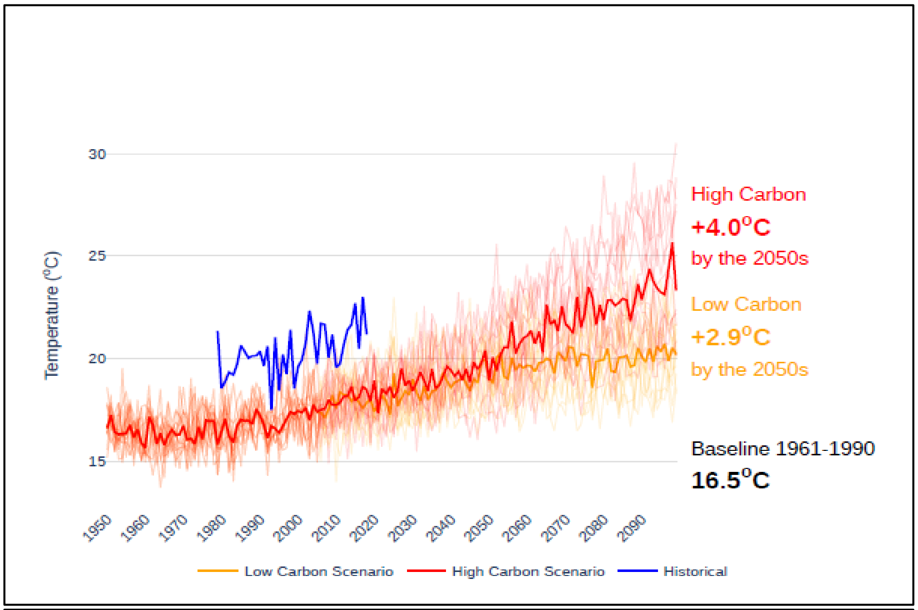


Figure 2.3
Valhalla High Elevation

Historic and projected average summer temperature



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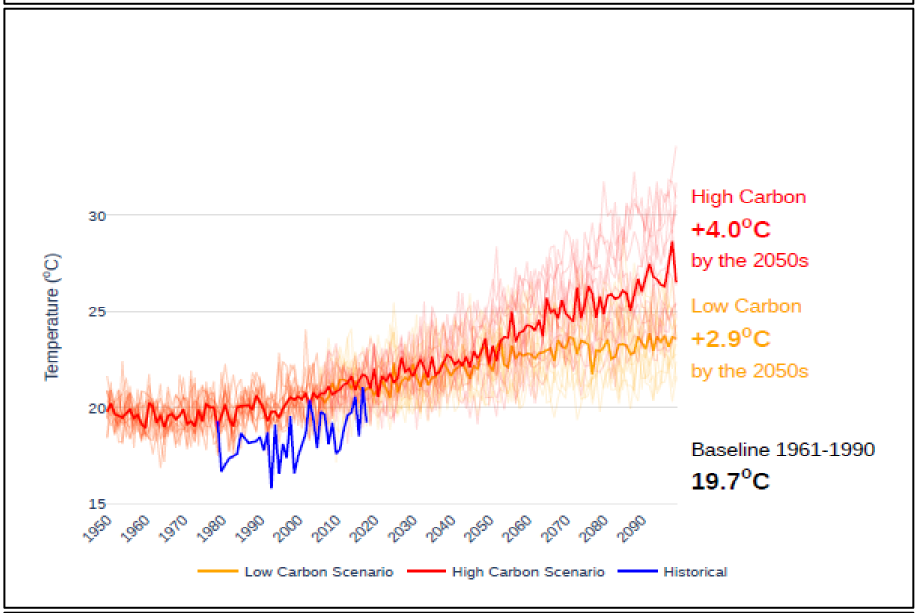

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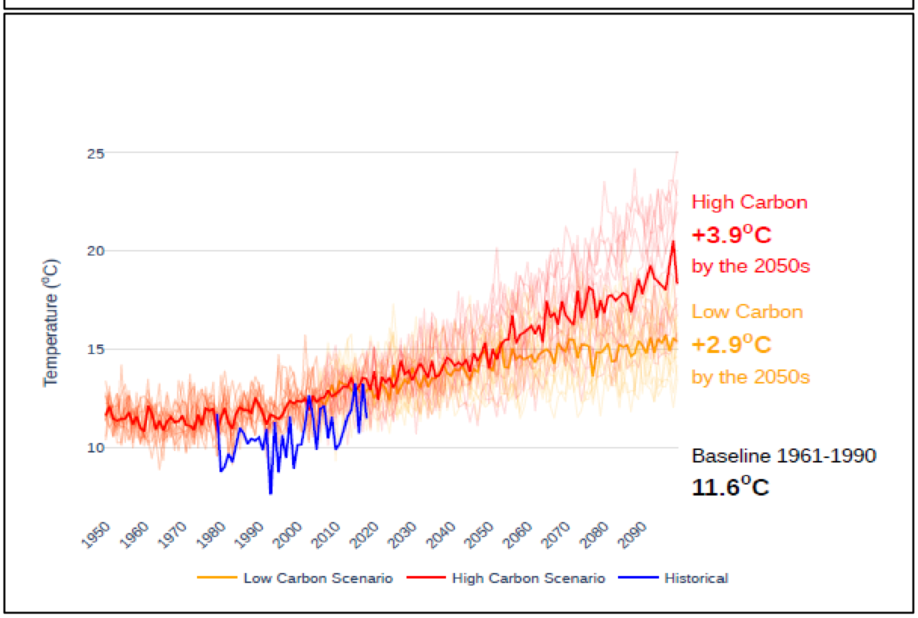
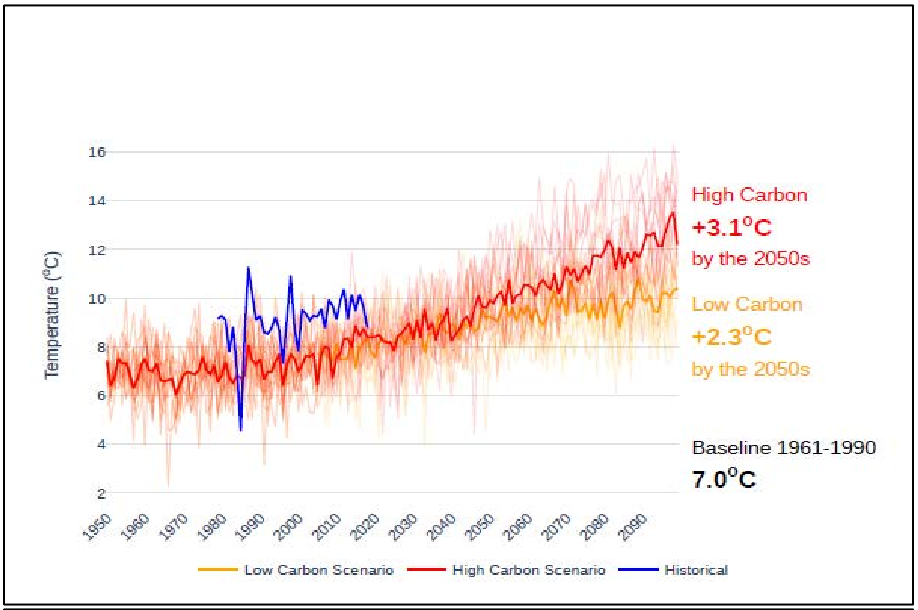


Figure 3.3
Valhalla High Elevation

Historic and projected average fall temperature



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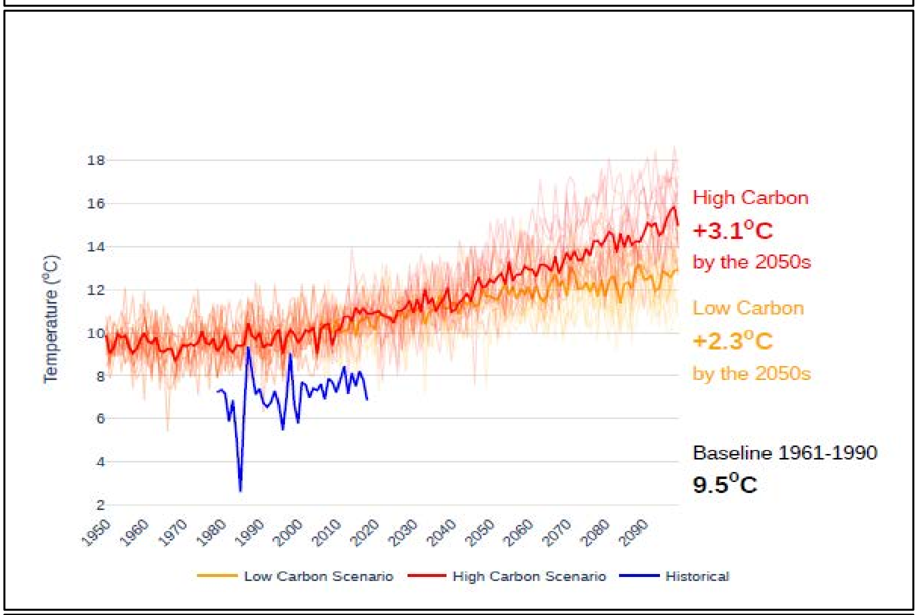

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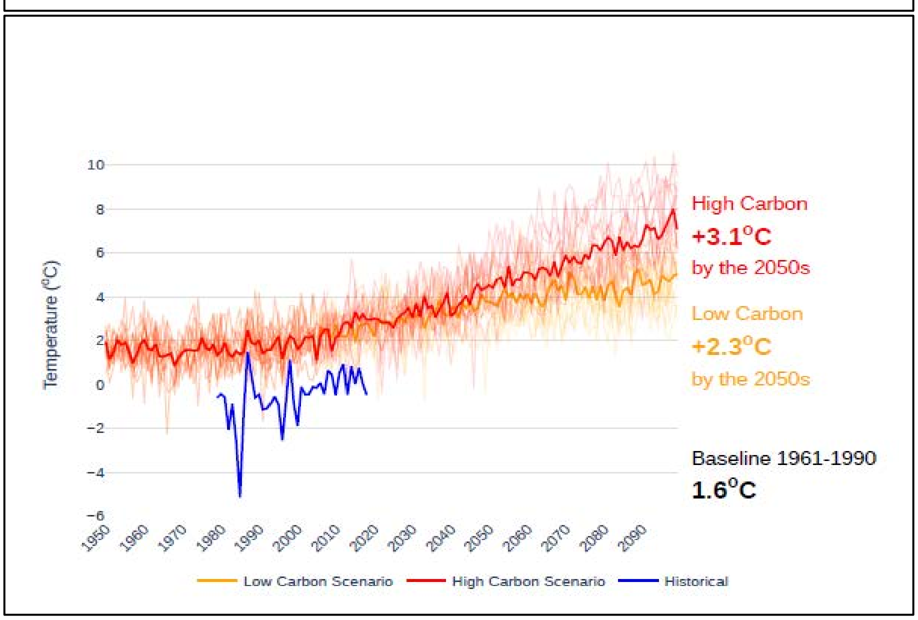
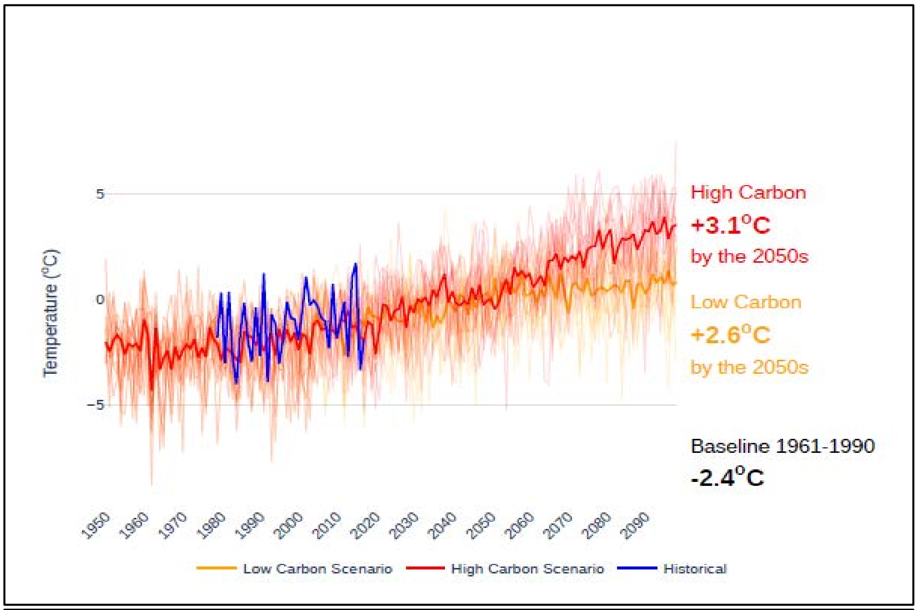


Figure 4.3
Valhalla High Elevation

Historic and projected average winter temperature



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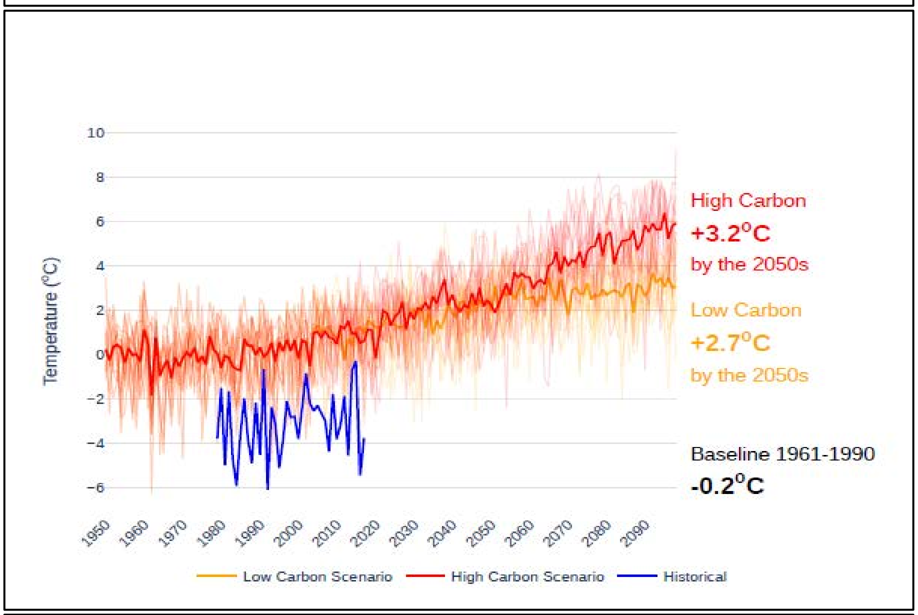

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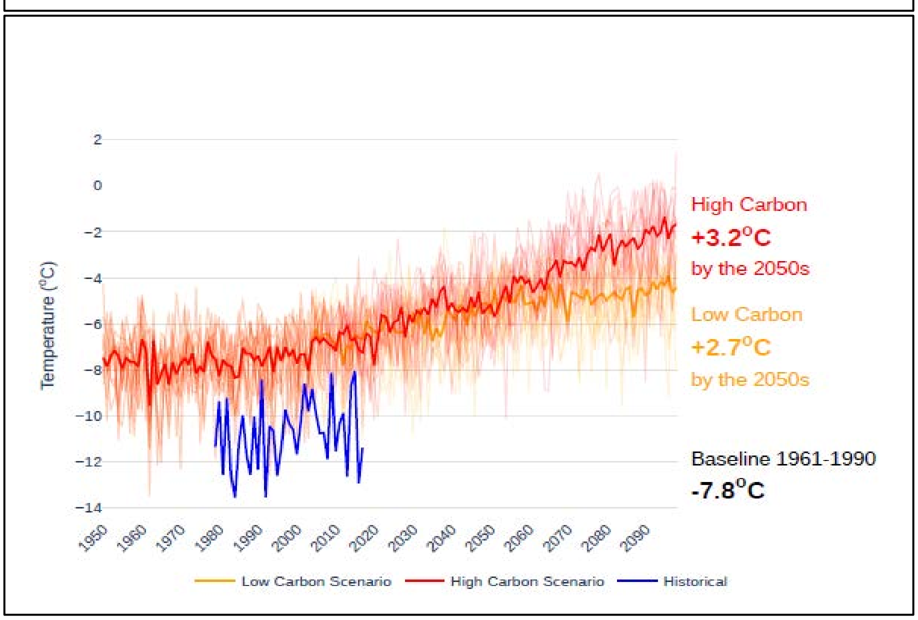
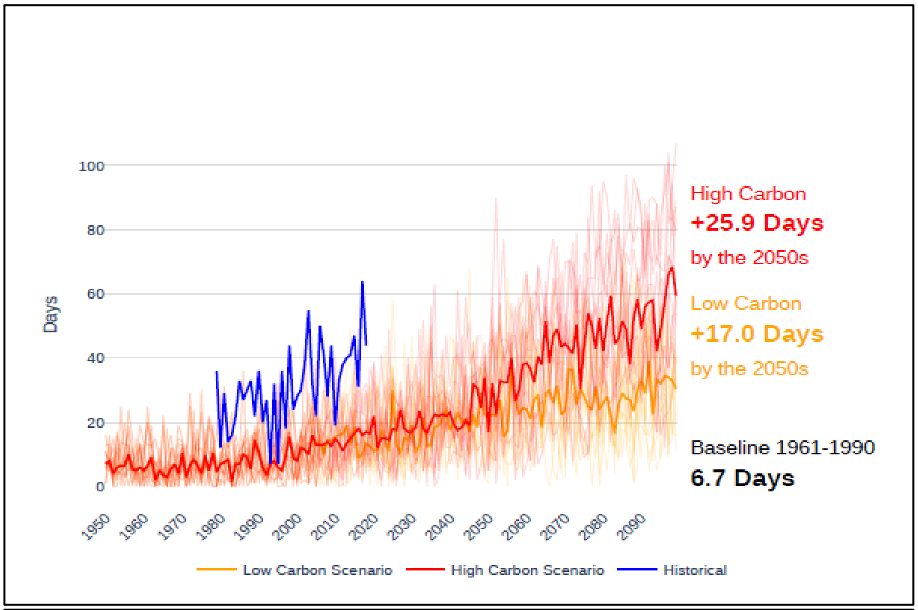


Figure 5.3
Valhalla High Elevation

Historic and projected annual number of days over 30 ºC



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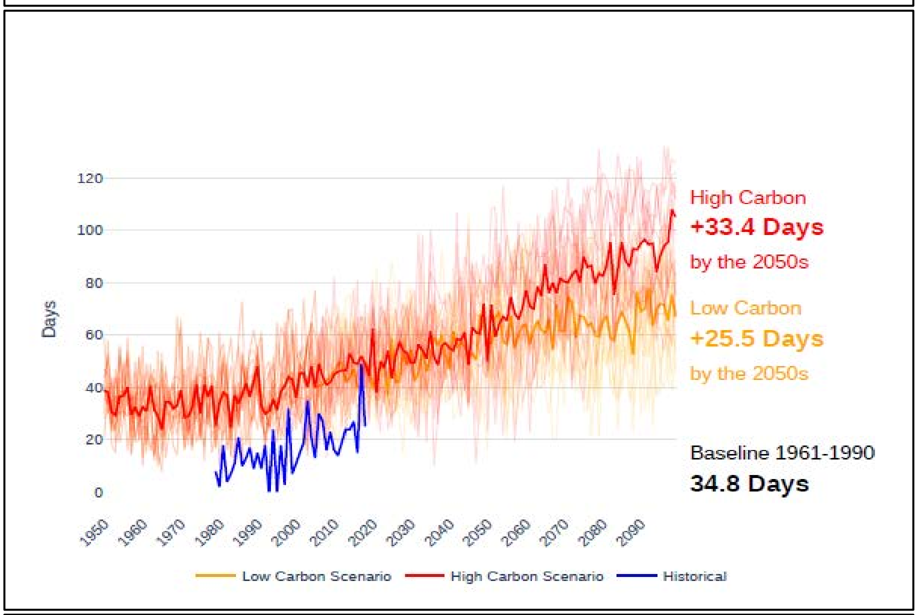

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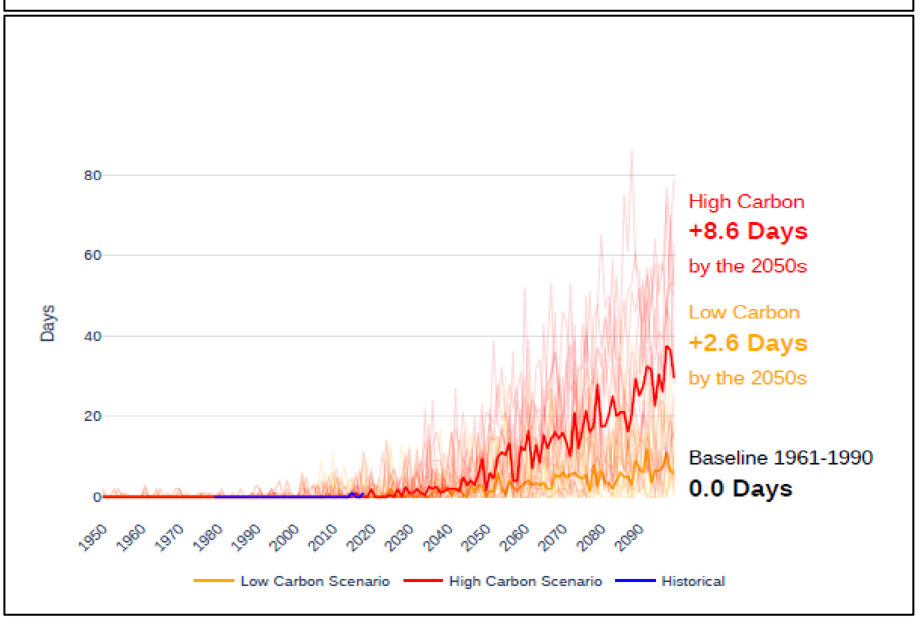
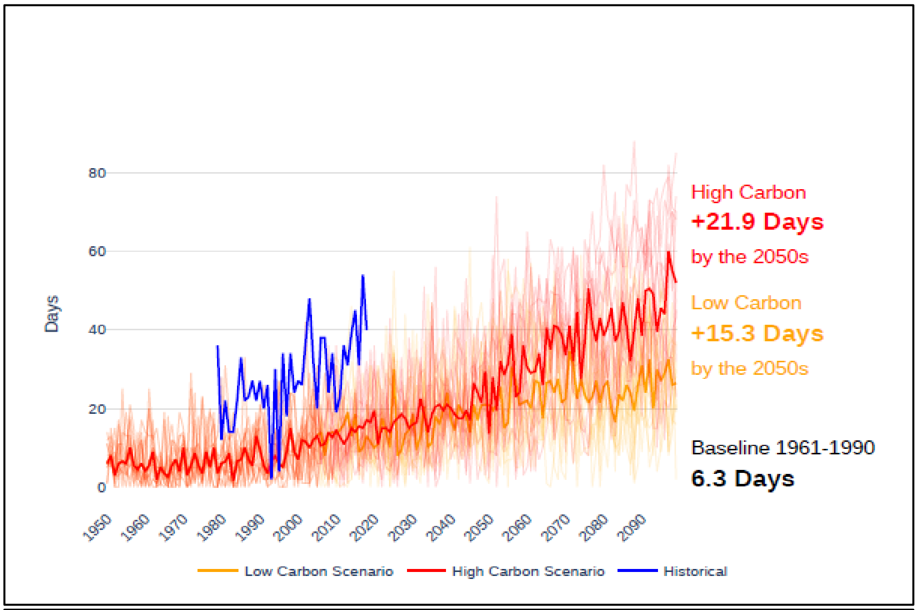


Figure 6.3
Valhalla High Elevation

Historic and projected number of summer days over 30 ºC



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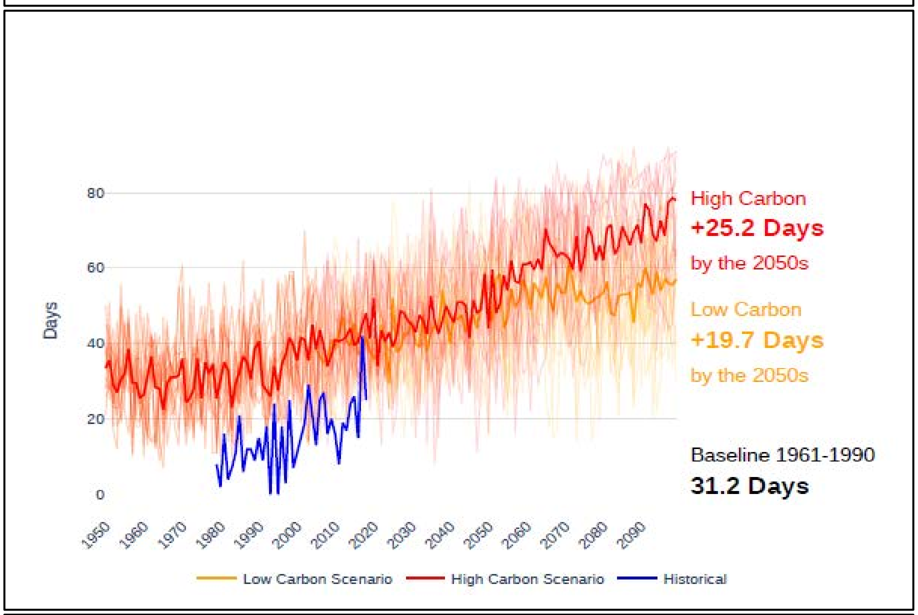

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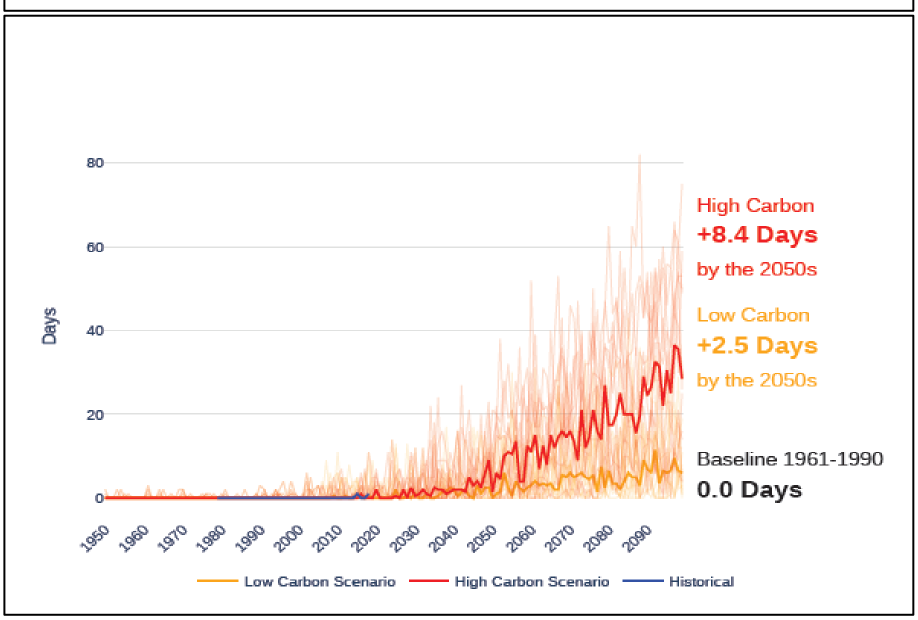
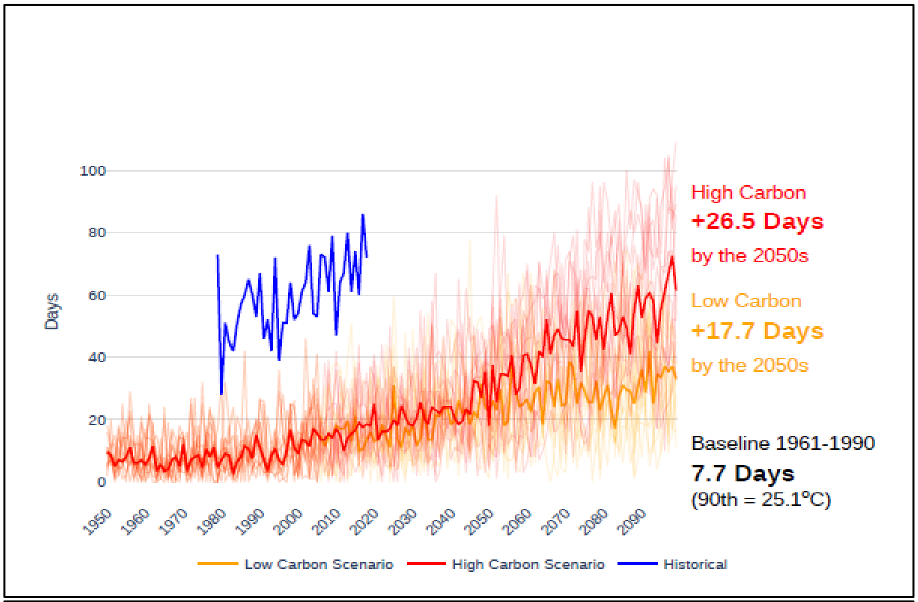


Figure 7.3
Valhalla High Elevation

Historic and projected annual number of days with maximum temperature over 90th percentile in the 1961-1990 period



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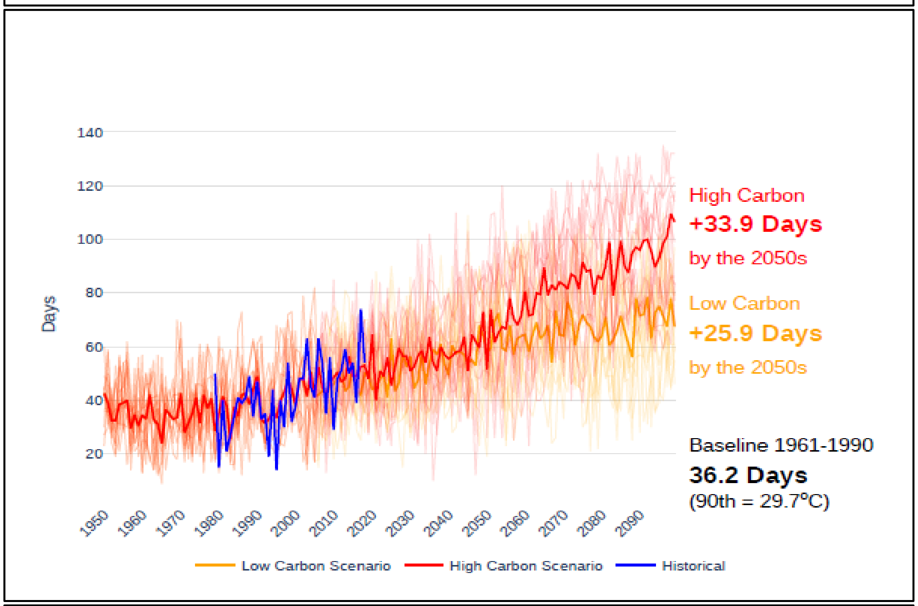

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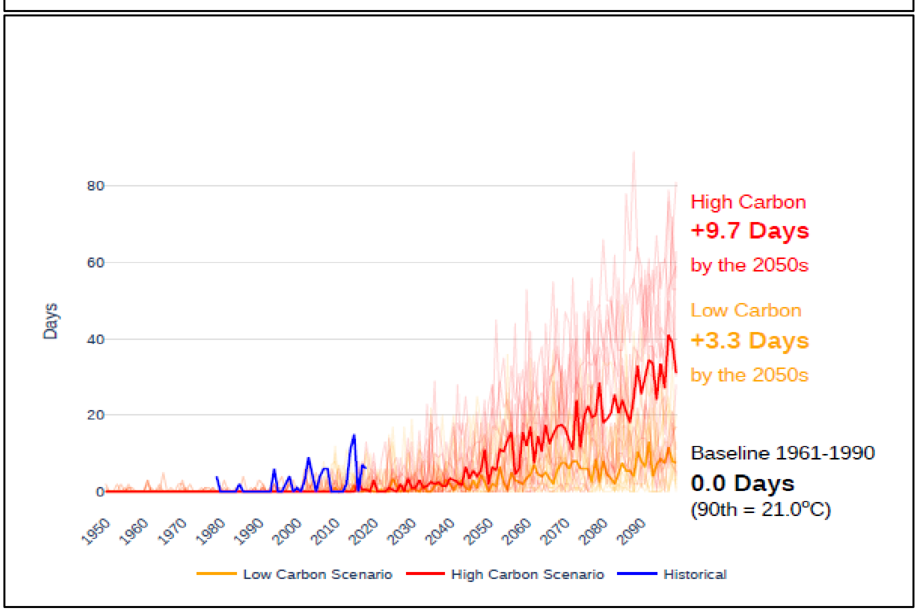

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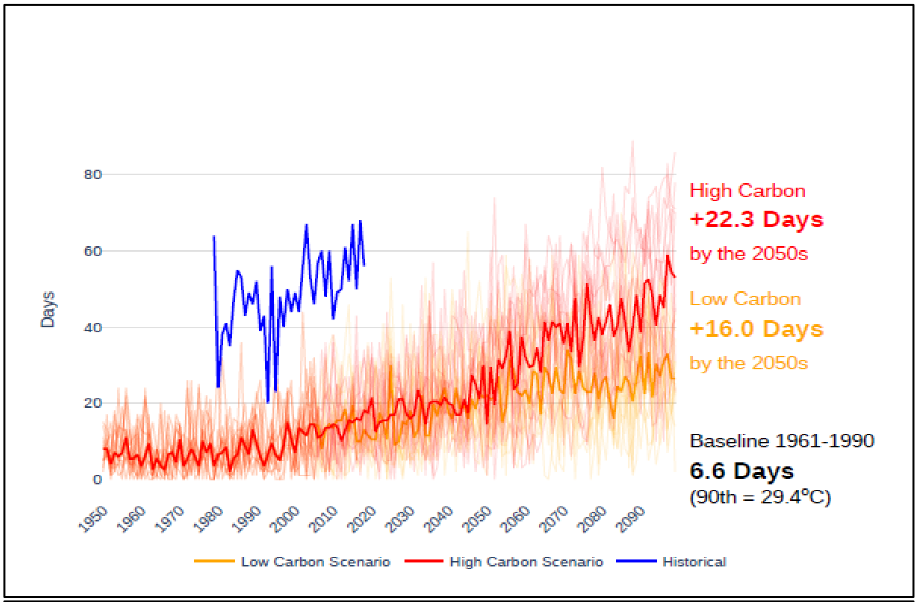
Valhalla High Elevation

Historic and projected number of summer days with maximum temperature over 90th percentile in the 961-1990 period



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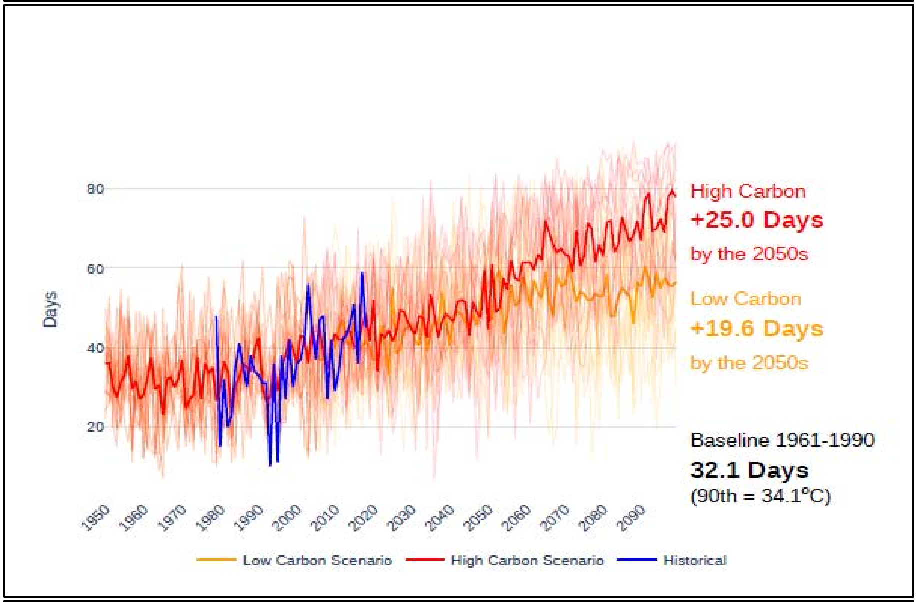

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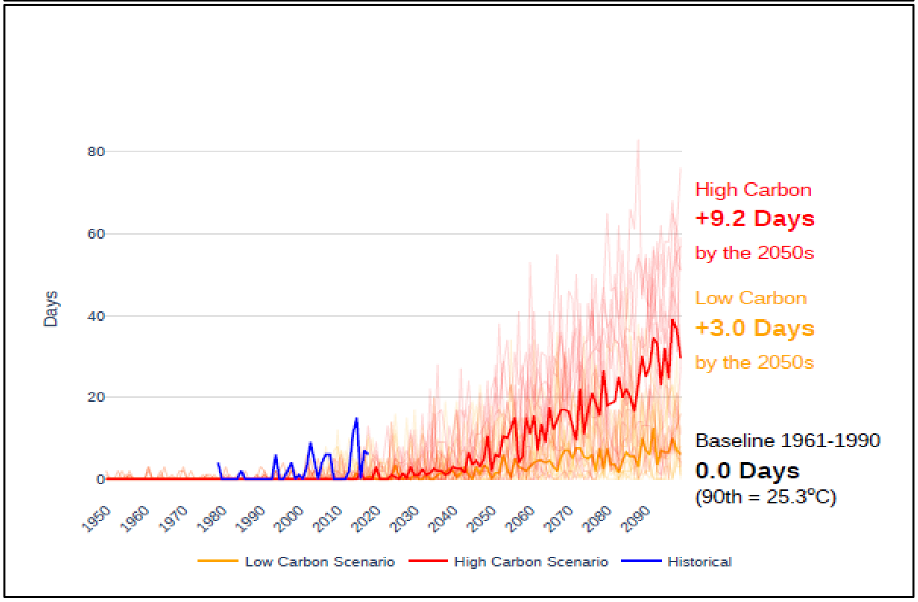
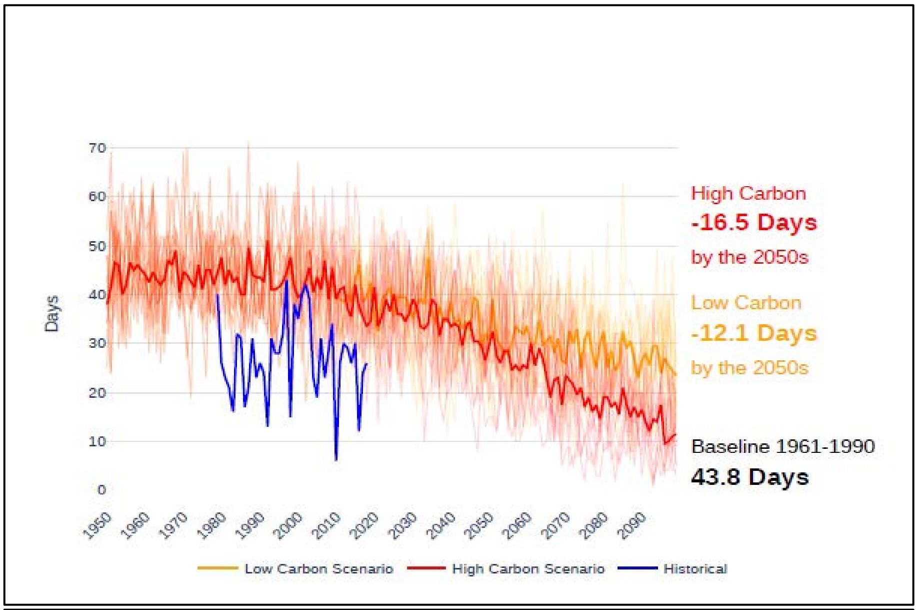


Figure 9.3
Valhalla High Elevation

Historic and projected annual number of daily freeze-thaw cycles



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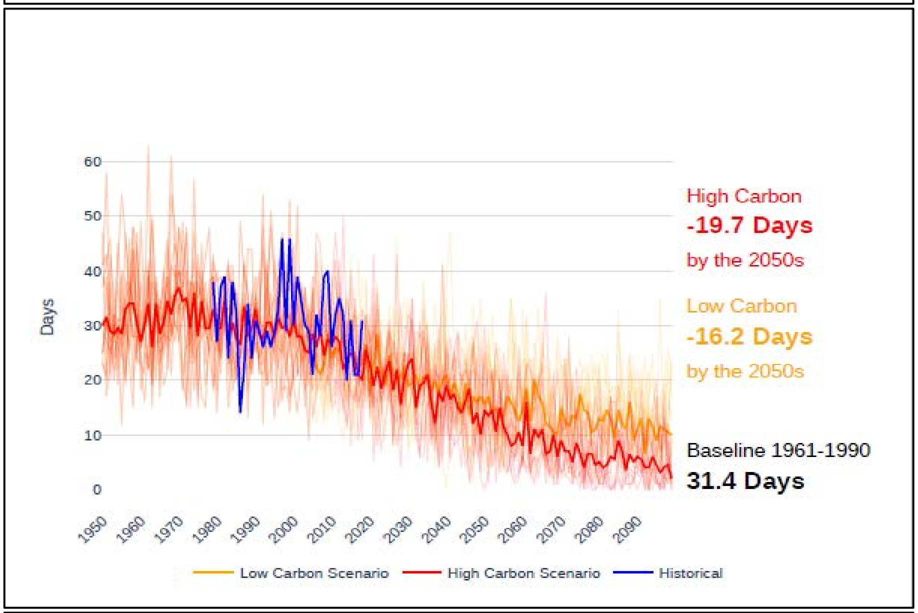

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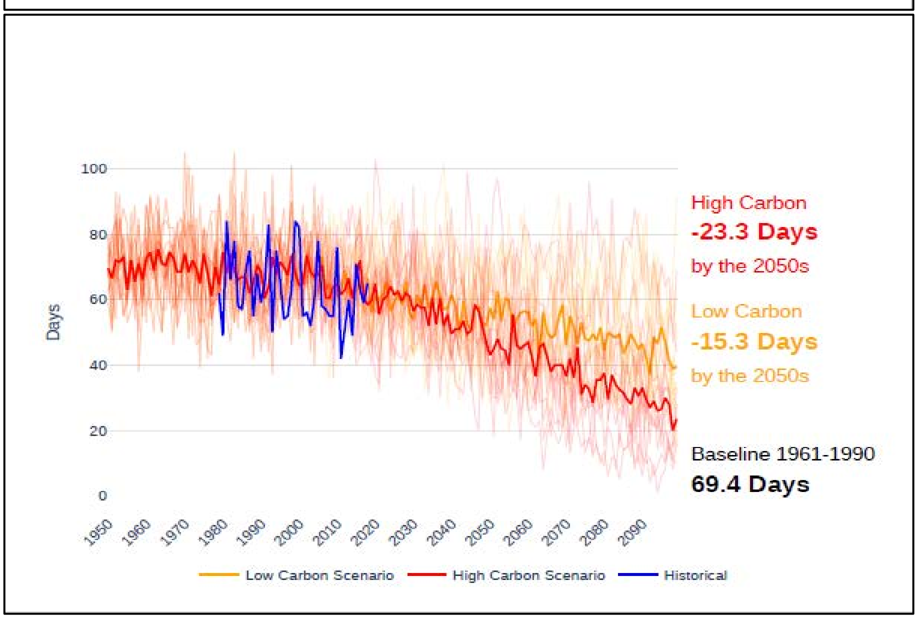
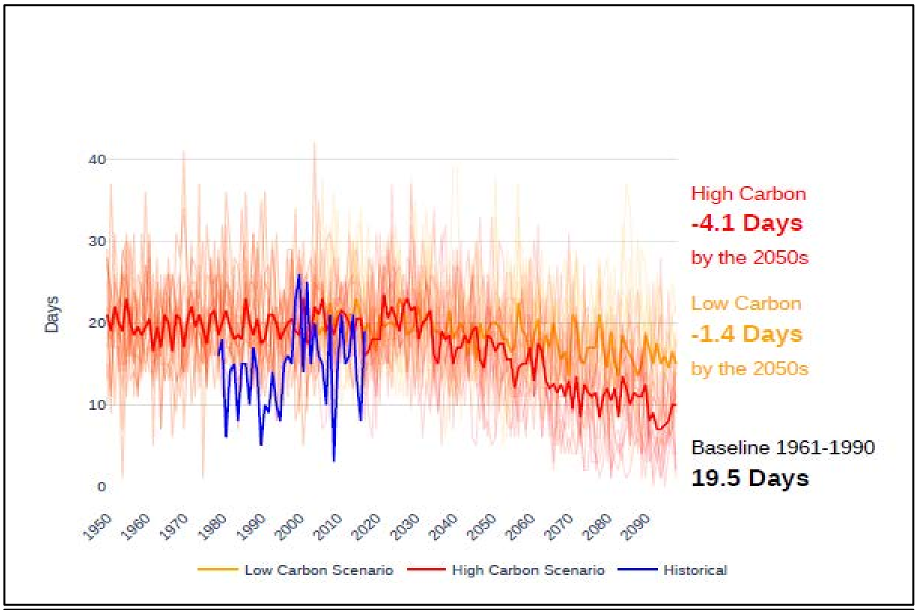


Figure 10.3
Valhalla High Elevation

Historic and projected number of daily freeze-thaw cycles in winter



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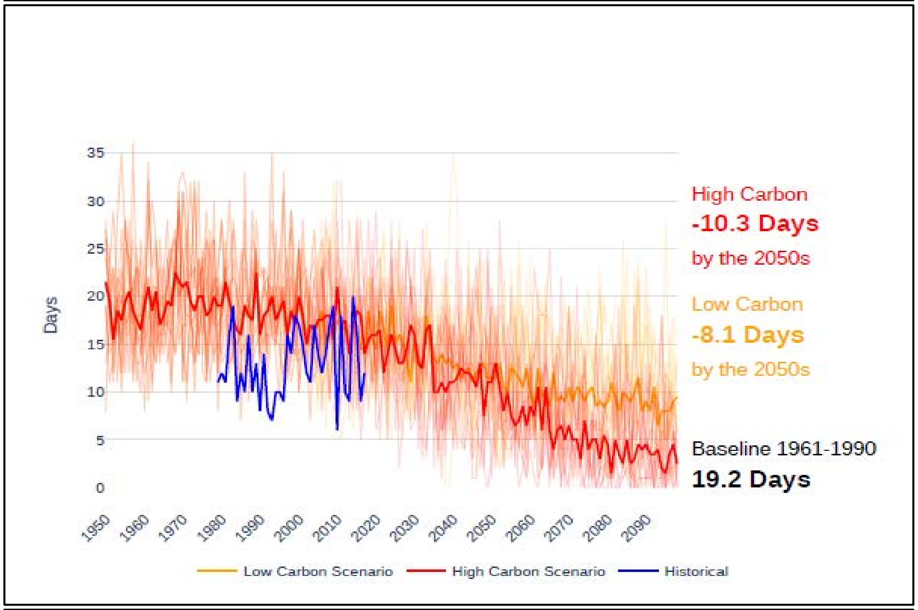

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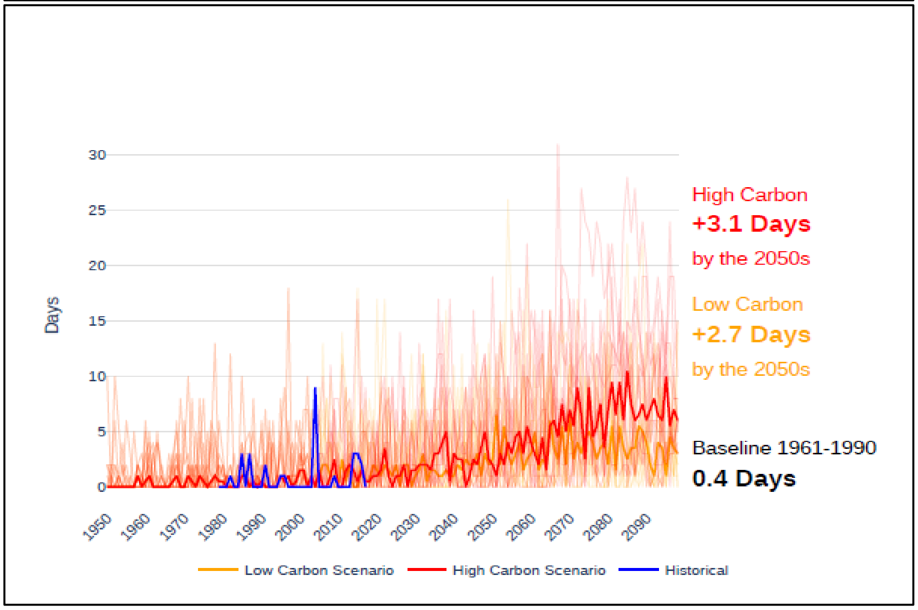
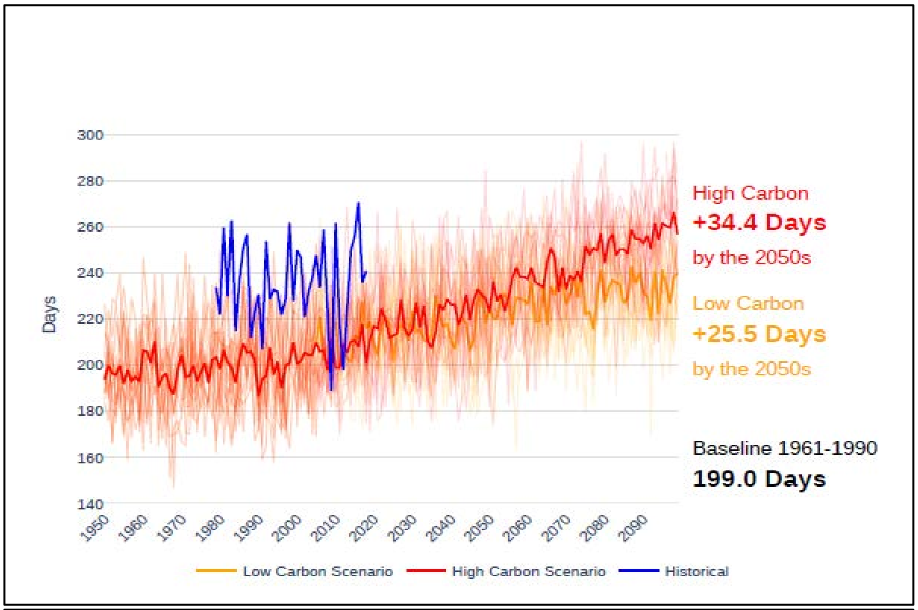


Figure 11.3
Valhalla High Elevation

Historic and projected growing season length



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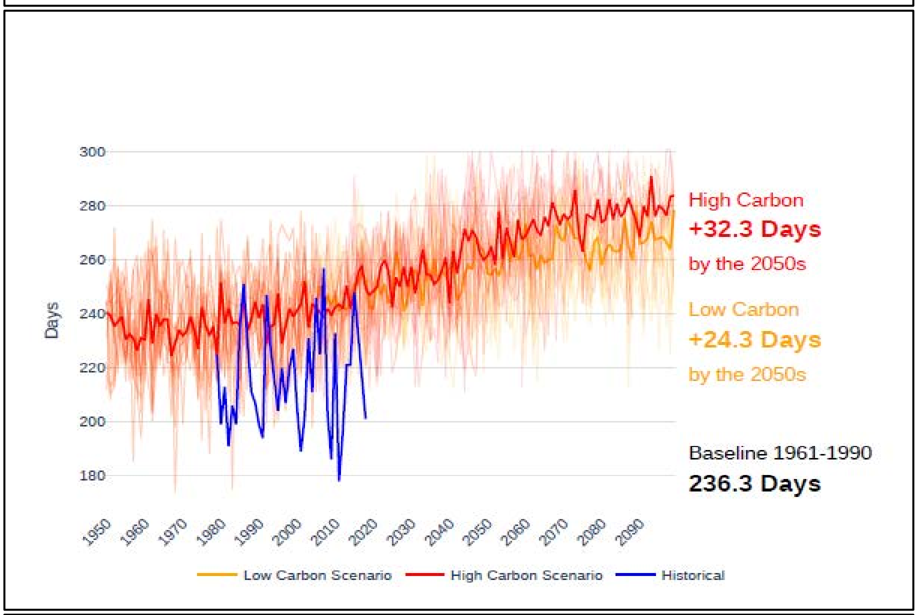

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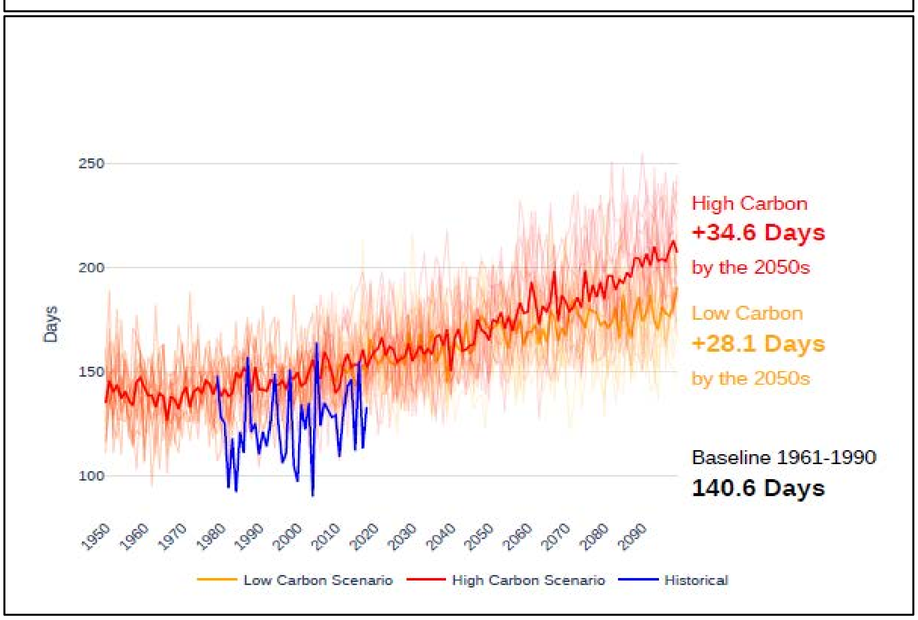
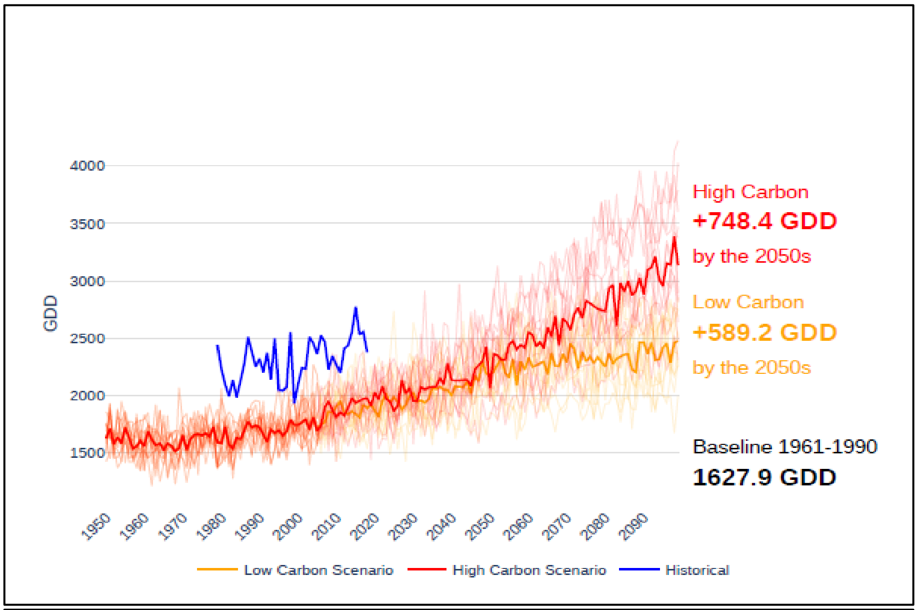


Figure 12.3
Valhalla High Elevation

Historic and projected growing degree days



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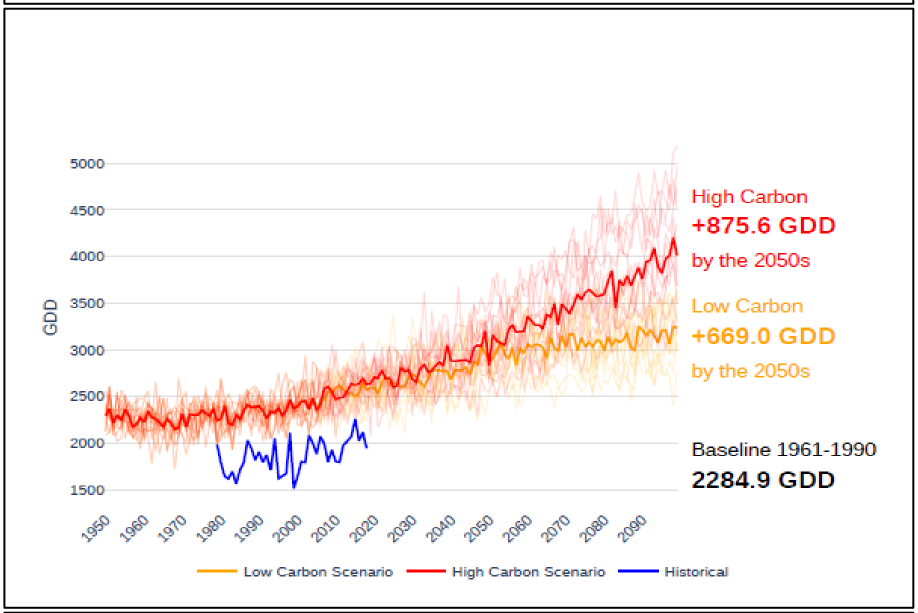

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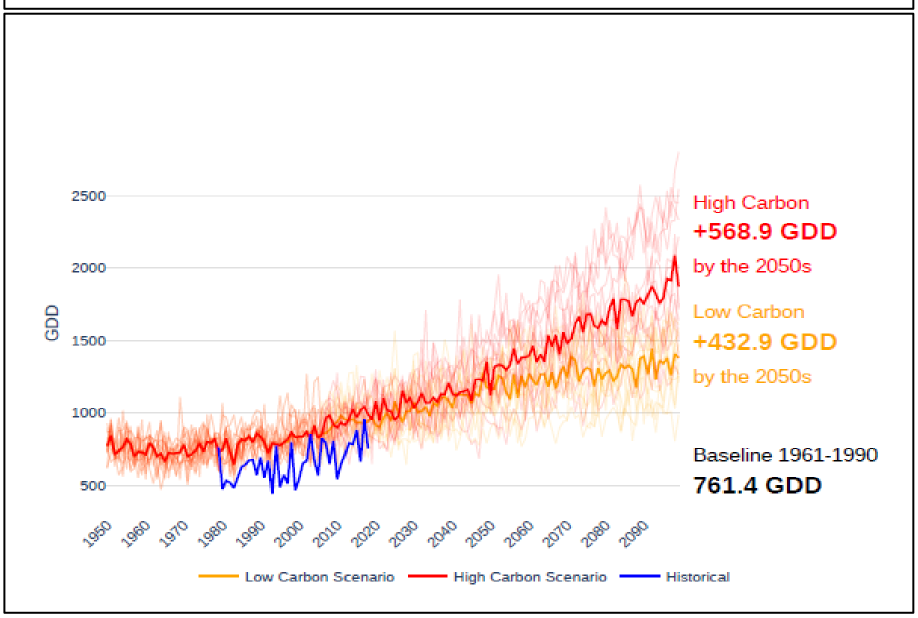
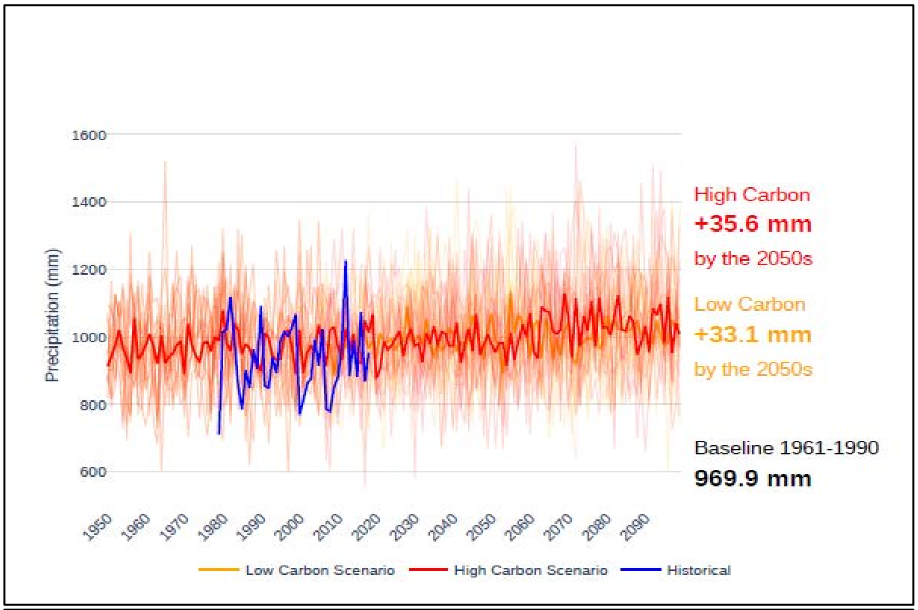


Figure 13.3
Valhalla High Elevation

Historic and projected total annual precipitation



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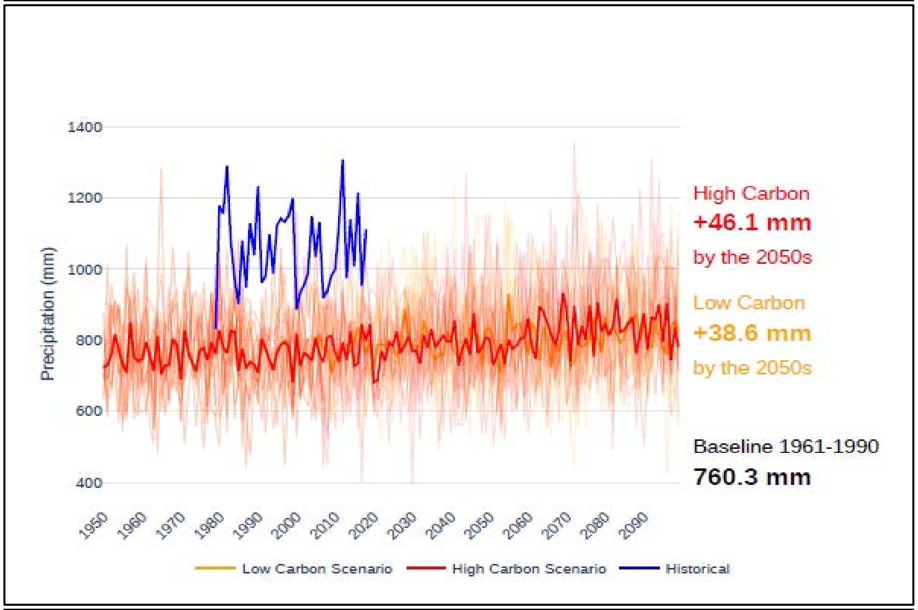

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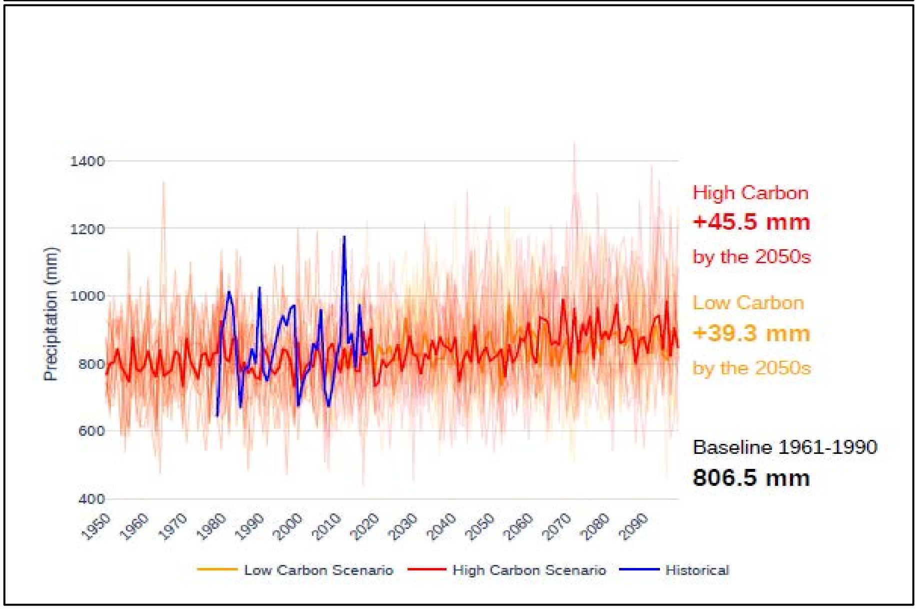
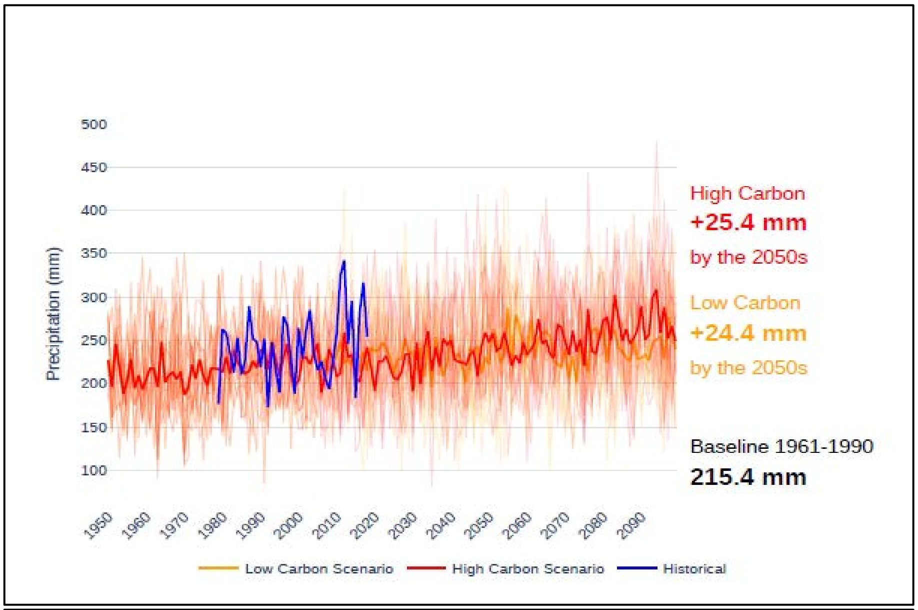


Figure 14.3
Valhalla High Elevation

Historic and projected total spring precipitation



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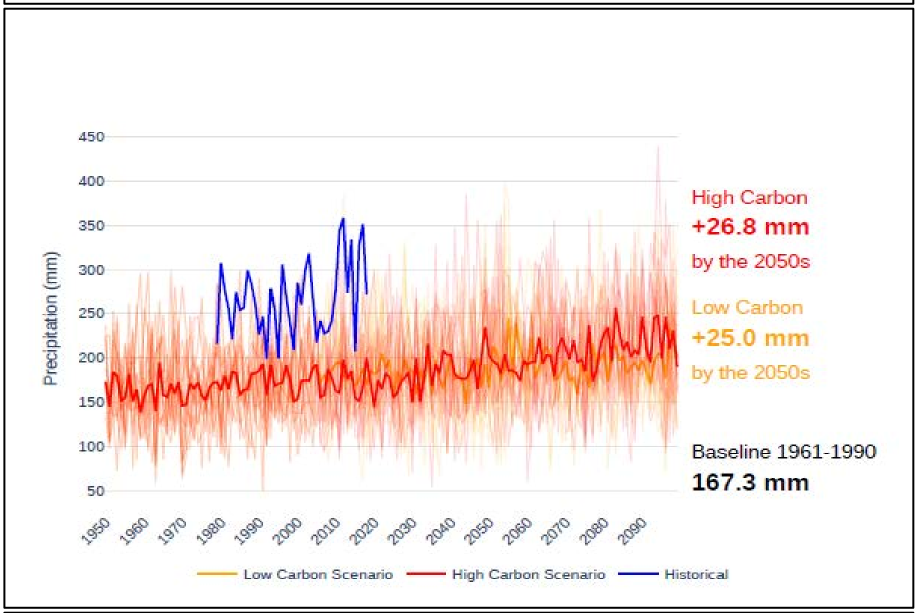

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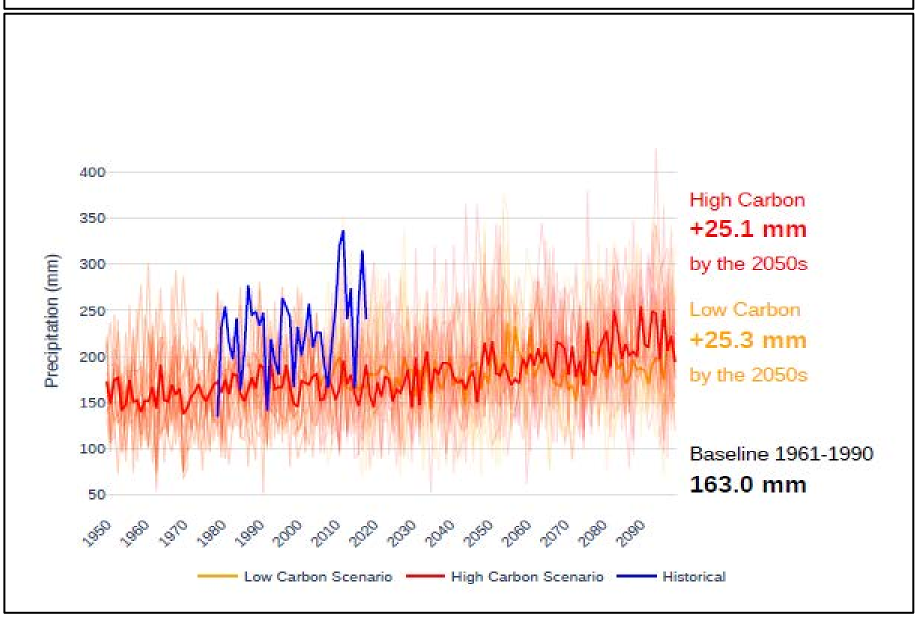
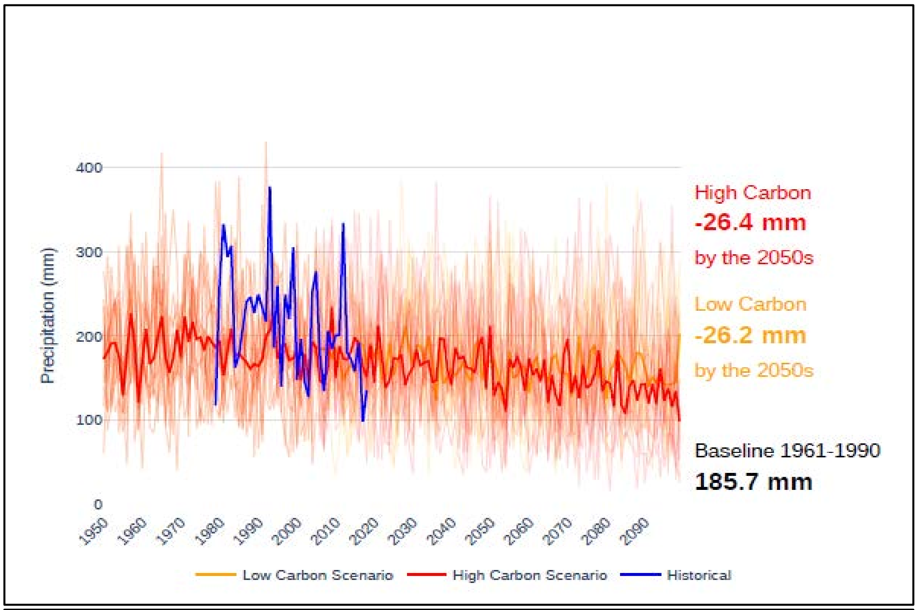


Figure 15.3
Valhalla High Elevation

Historic and projected total summer precipitation



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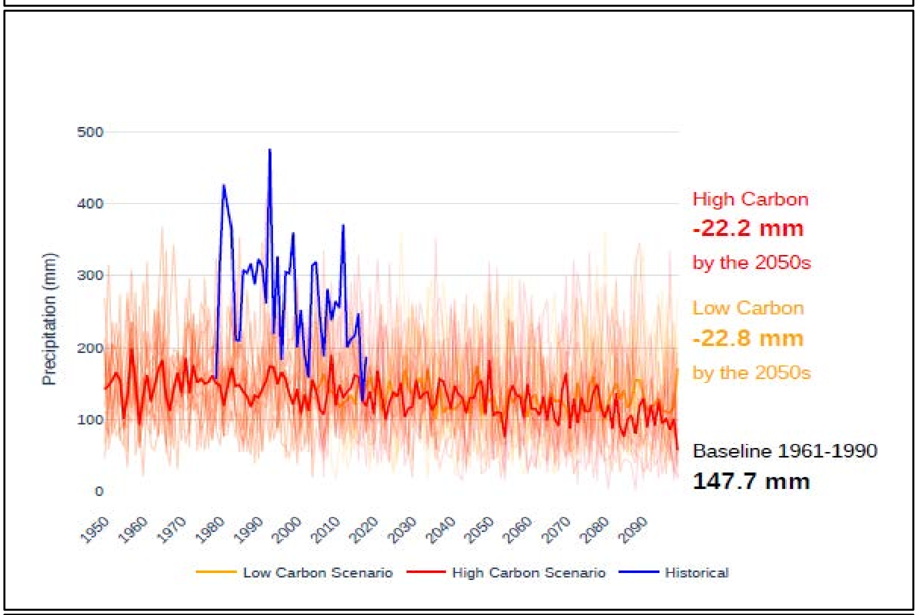

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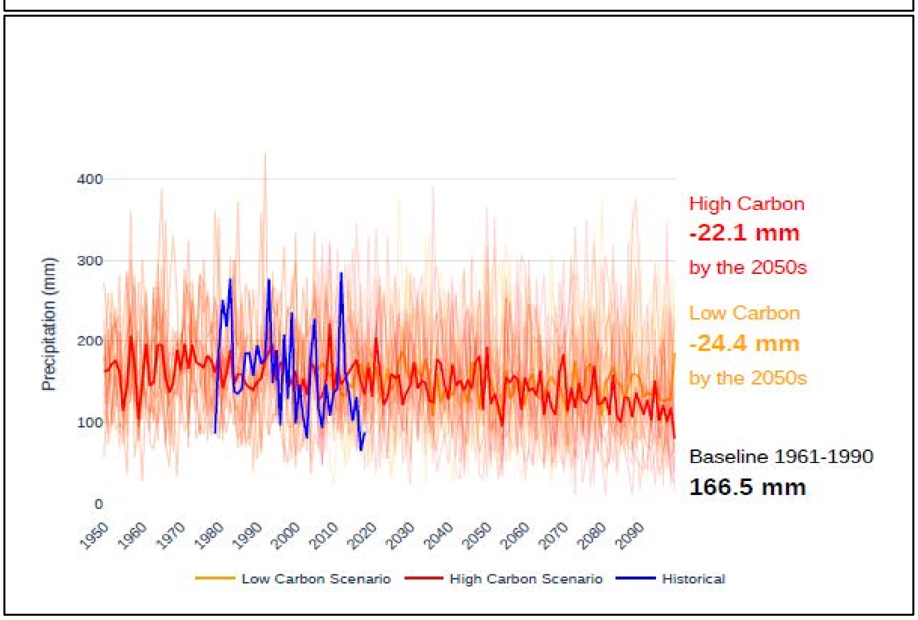
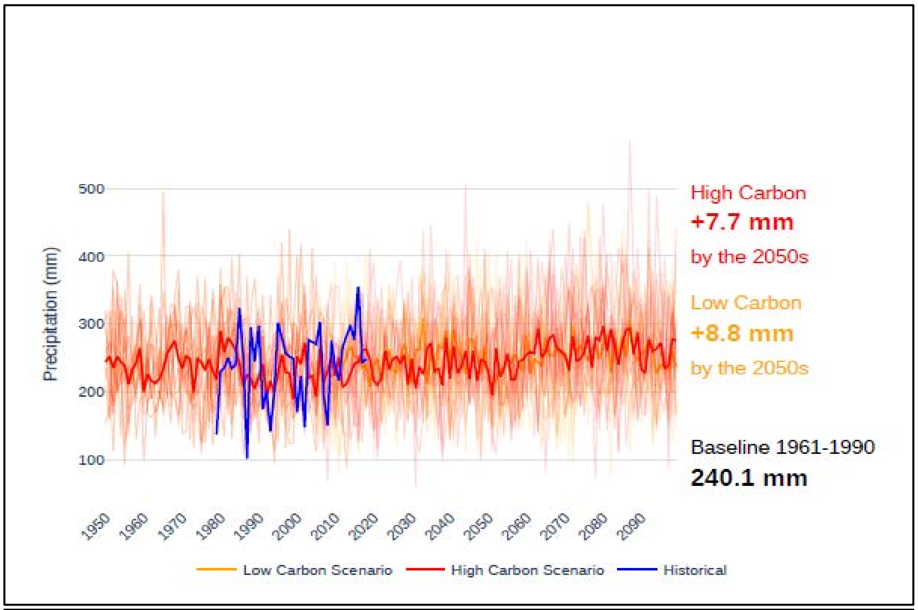


Figure 16.3
Valhalla High Elevation

Historic and projected total fall precipitation



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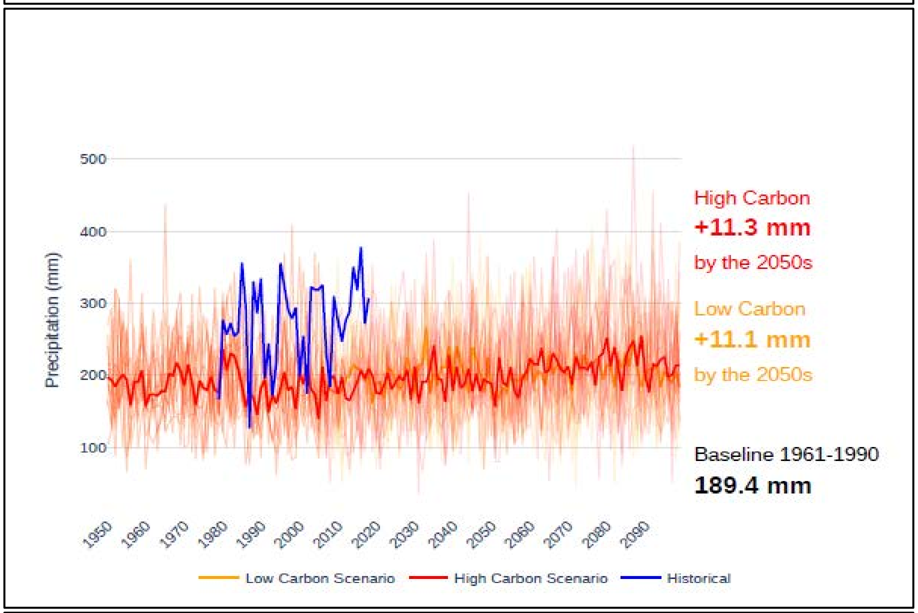

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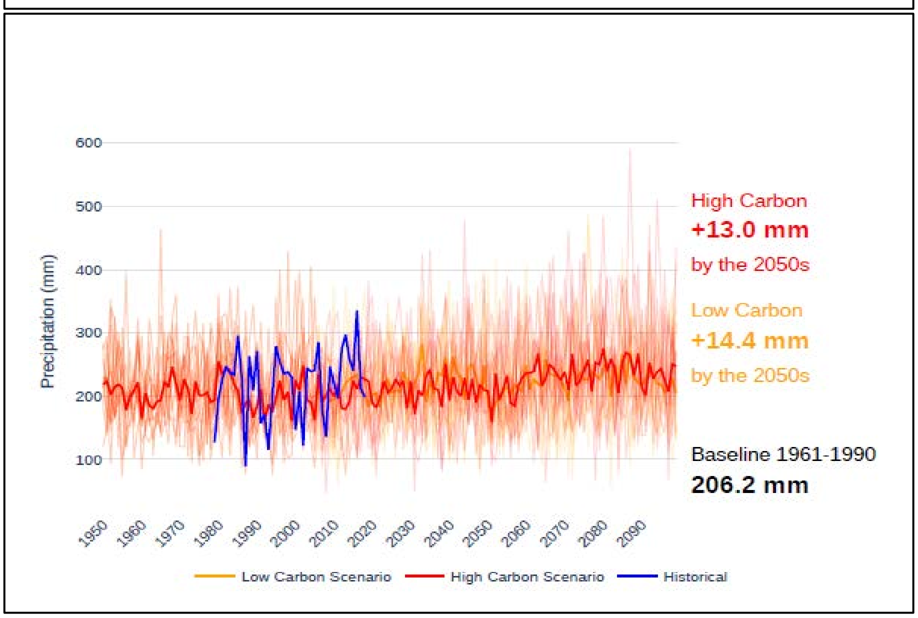
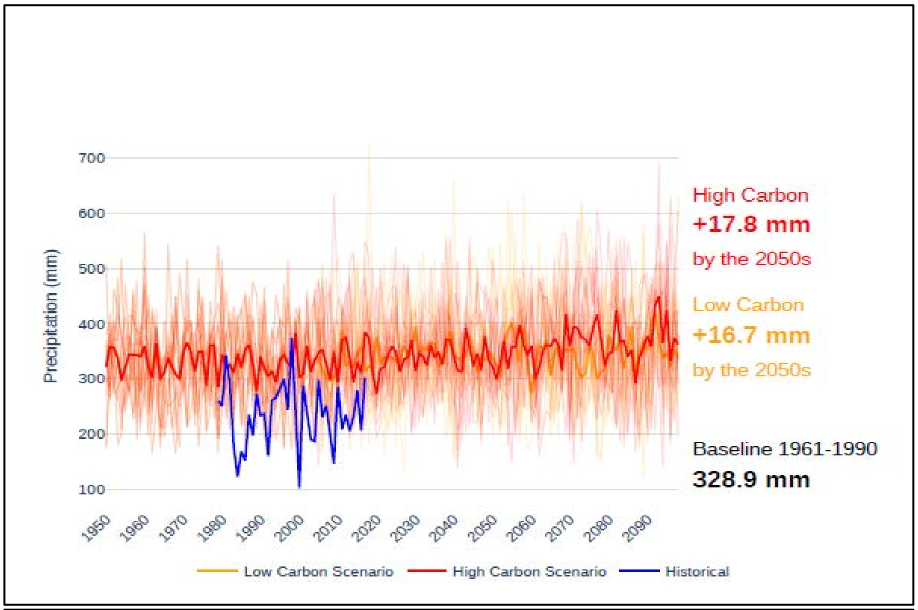


Figure 17.3
Valhalla High Elevation

Historic and projected total winter precipitation



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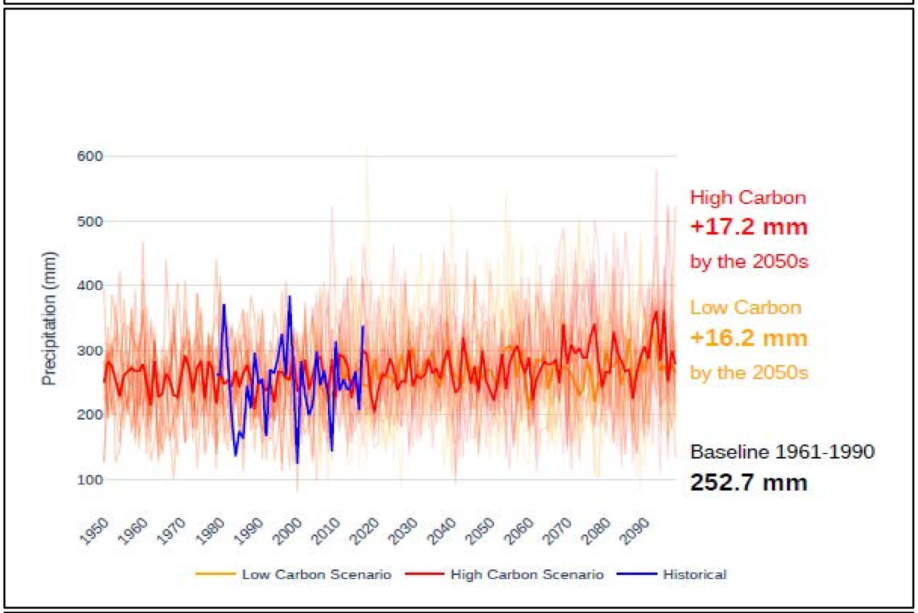

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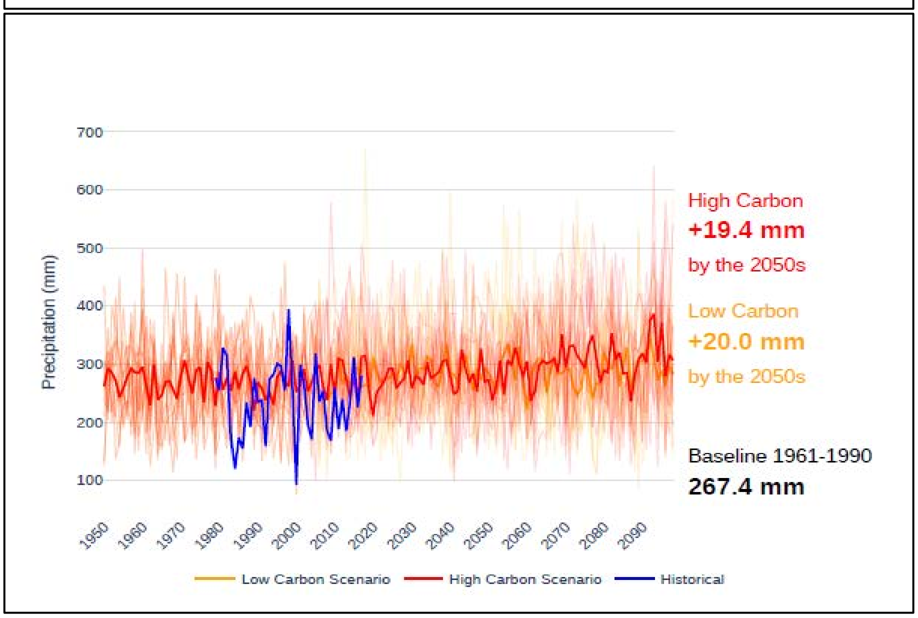
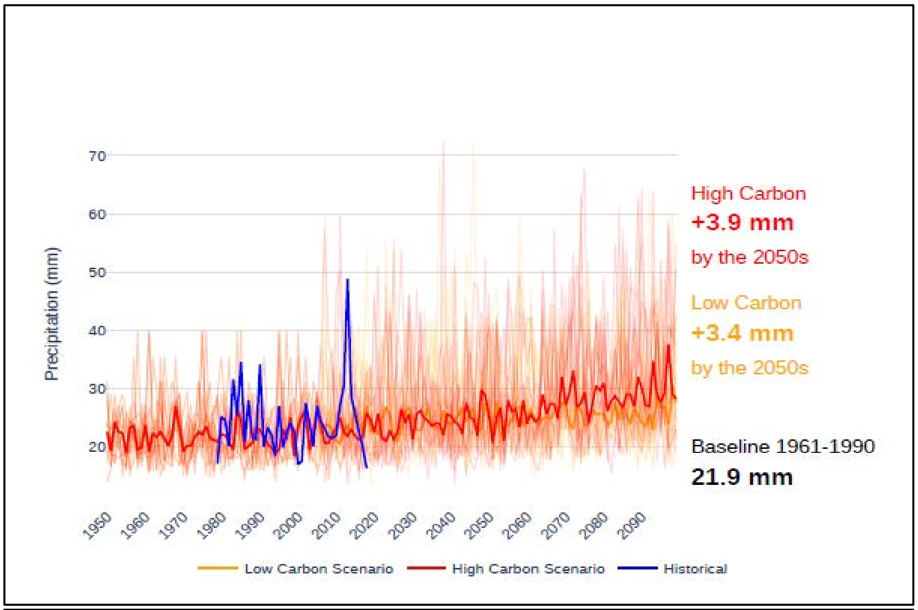


Figure 18.3
Valhalla High Elevation

Historic and projected maximum 1-day precipitation



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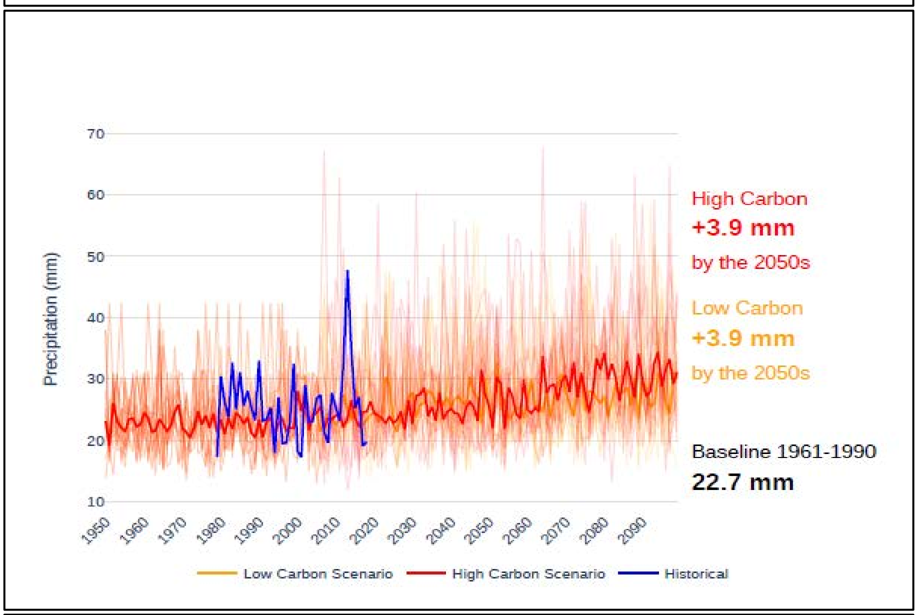

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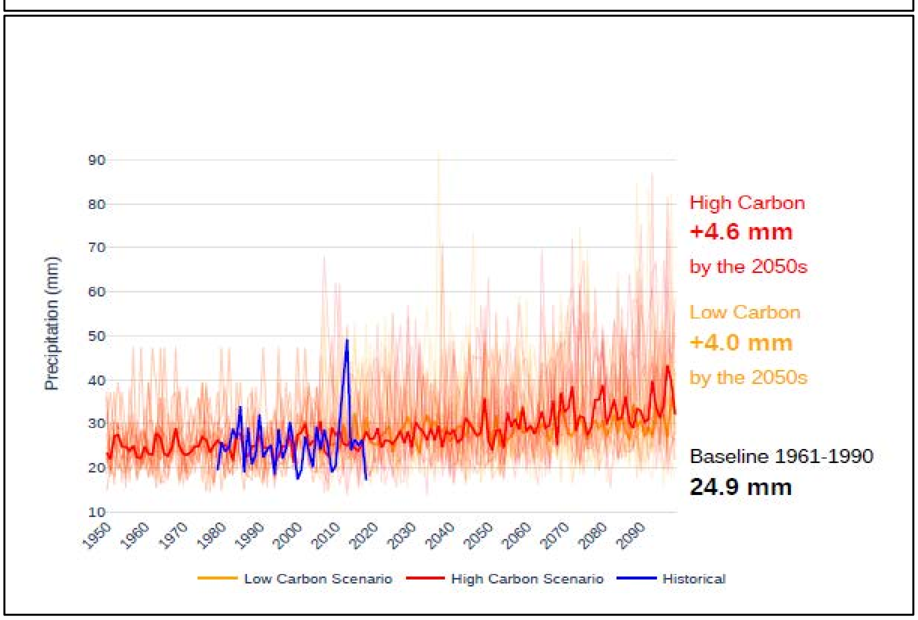
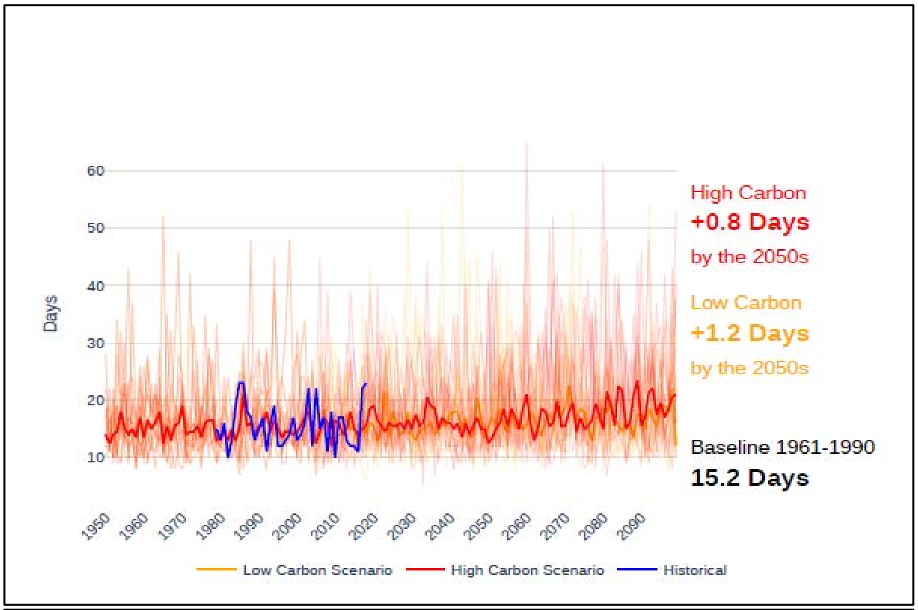


Figure 19.3
Valhalla High Elevation

Historic and projected maximum dry spell length



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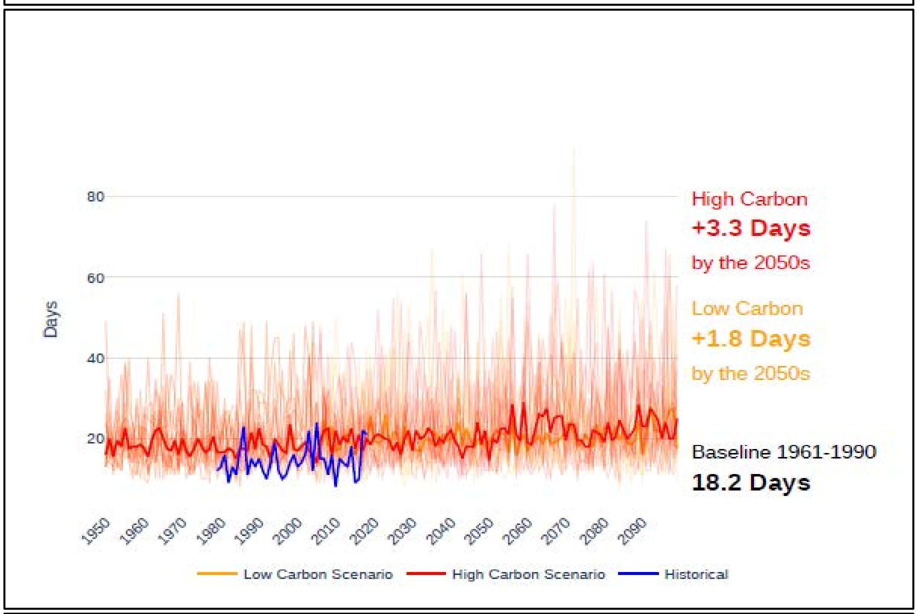

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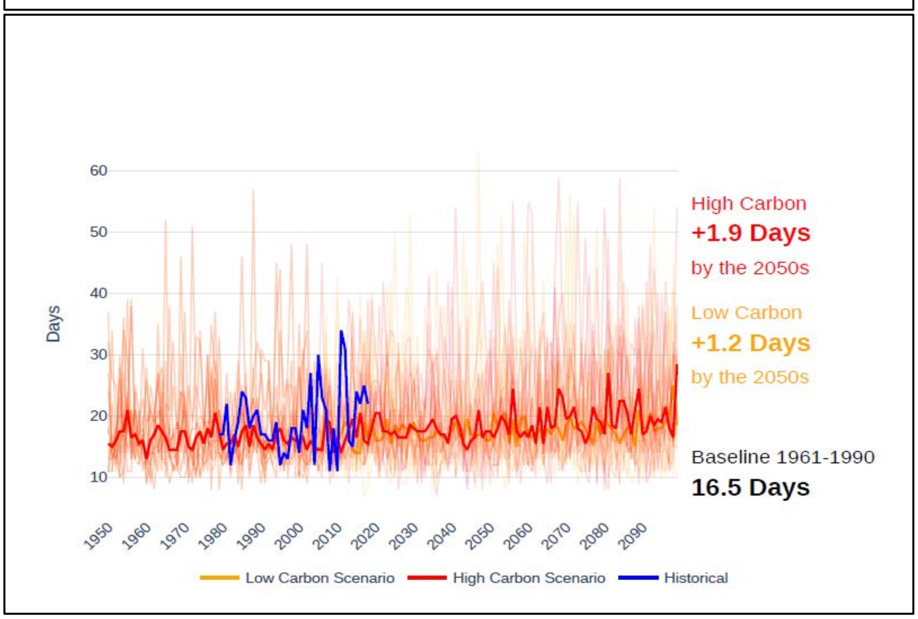

Figure 20.3
Valhalla High Elevation

Historic and projected annual precipitation above the 95th percentile in the 1961-1990 period

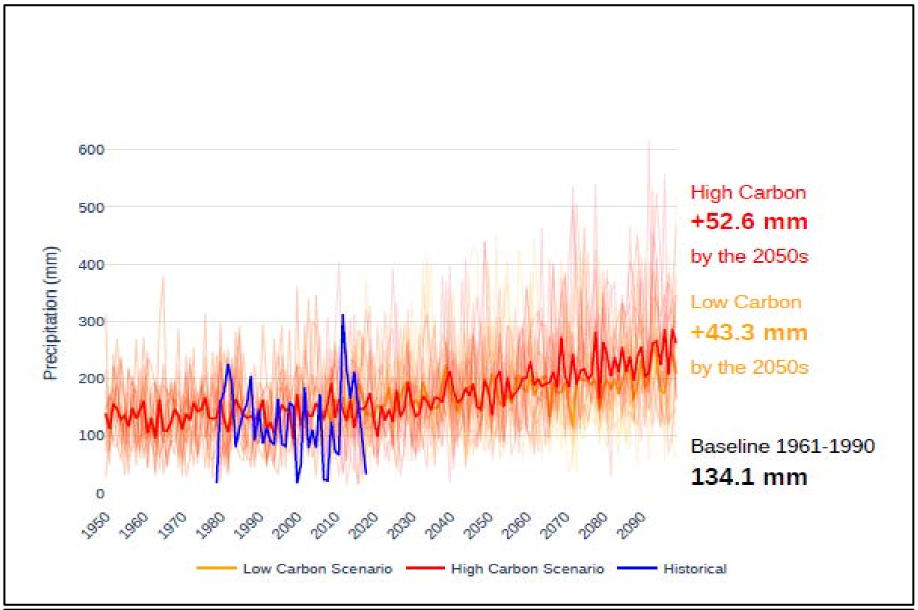

Figure 21.1
Silverton

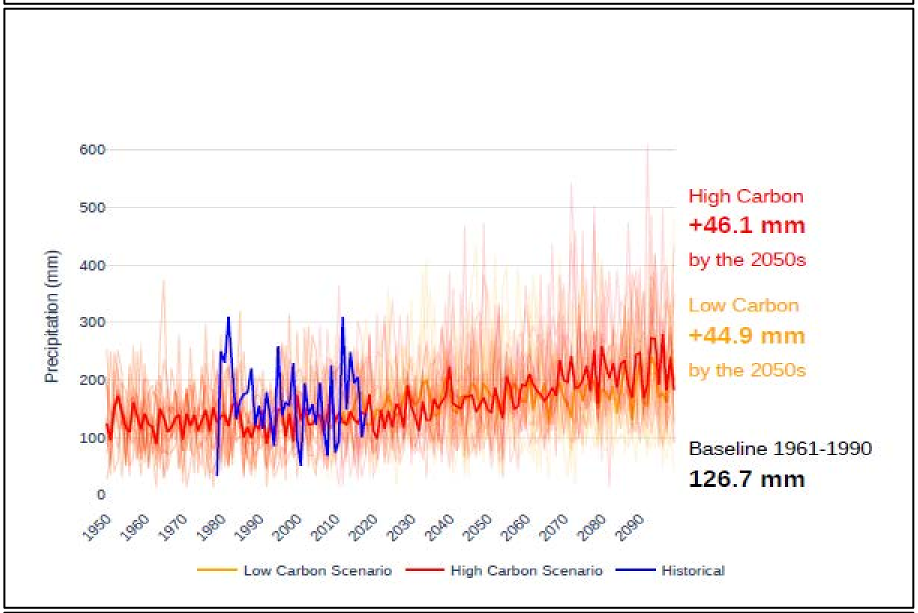

Figure 21.2
Krestova

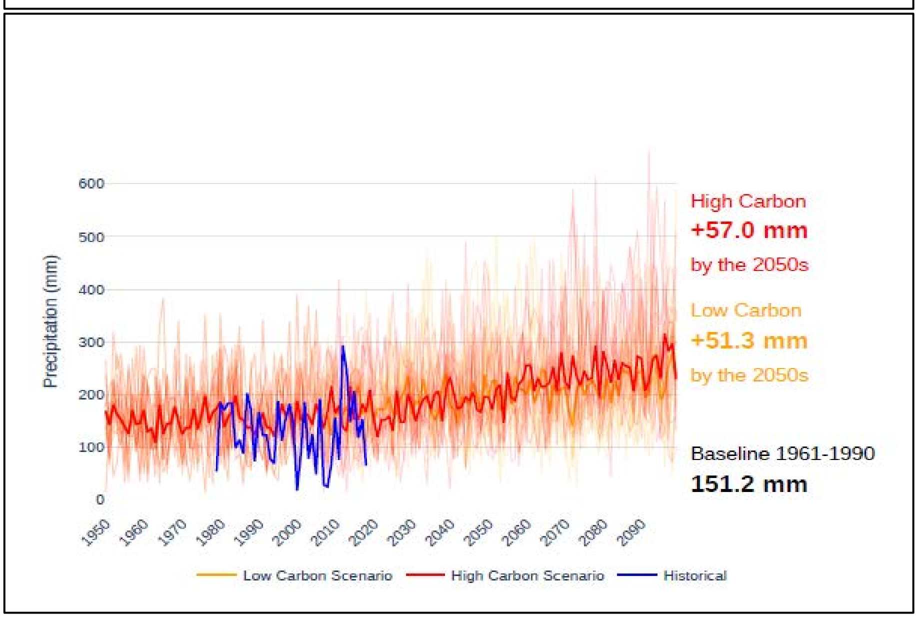

Figure 21.3
Valhalla High Elevation

Historic and projected number of days of precipitation above the 95th percentile in the 1961-1990 period

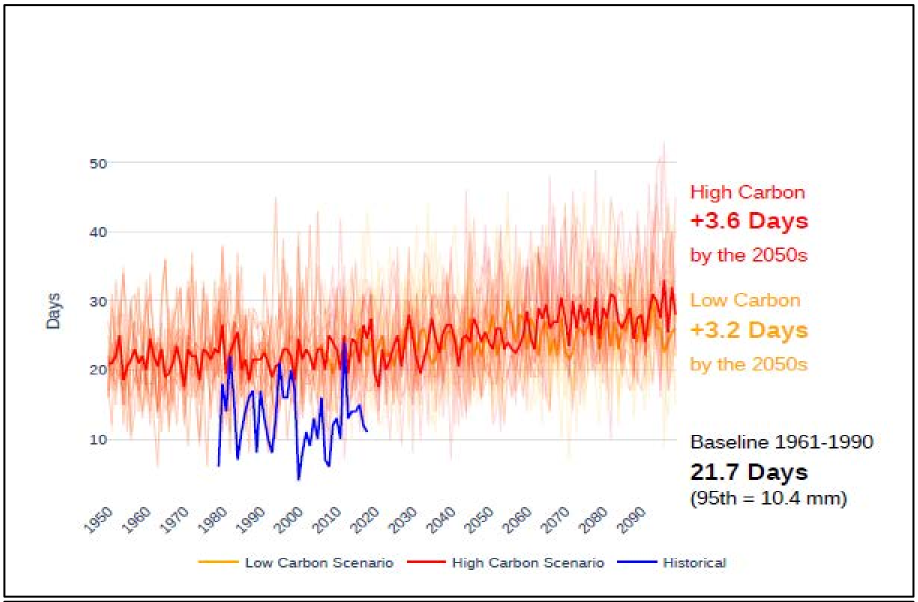

Figure 22.1
Silverton

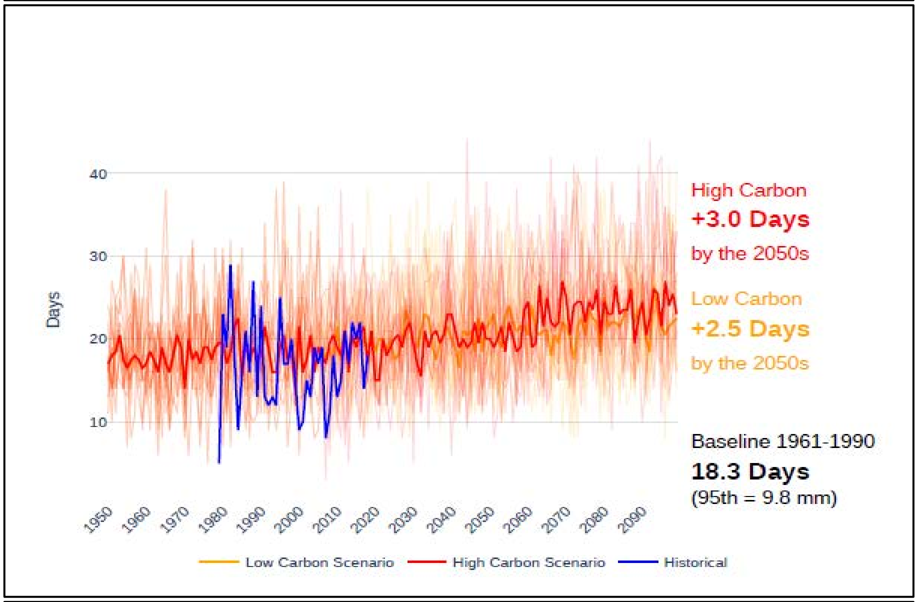

Figure 22.2
Krestova

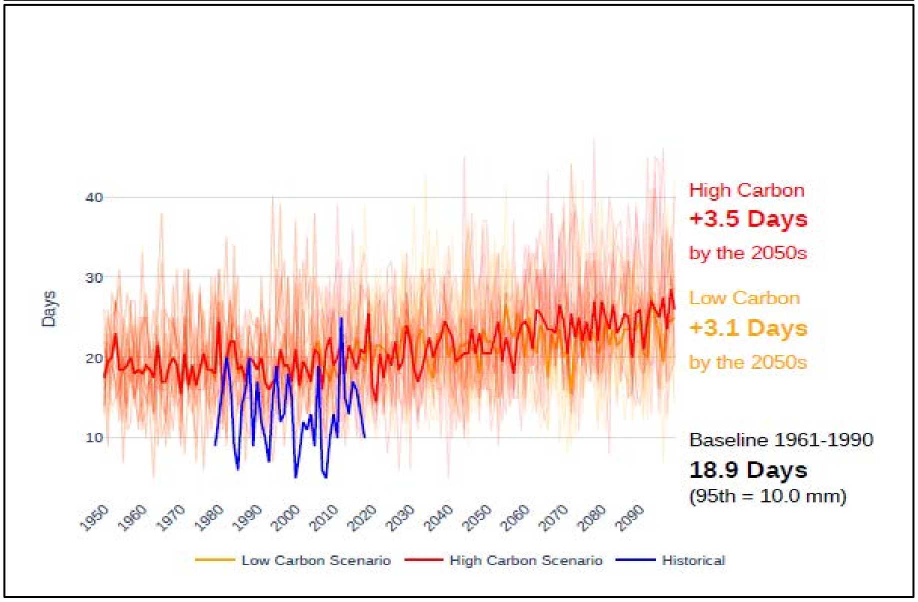

Figure 22.3
Valhalla High Elevation

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