

Thinking beyond silos

Climate impacts in complex urban systems

27 November 2018
Advancing Collaborative Climate Adaptation in BC
Victoria



Trevor Murdock

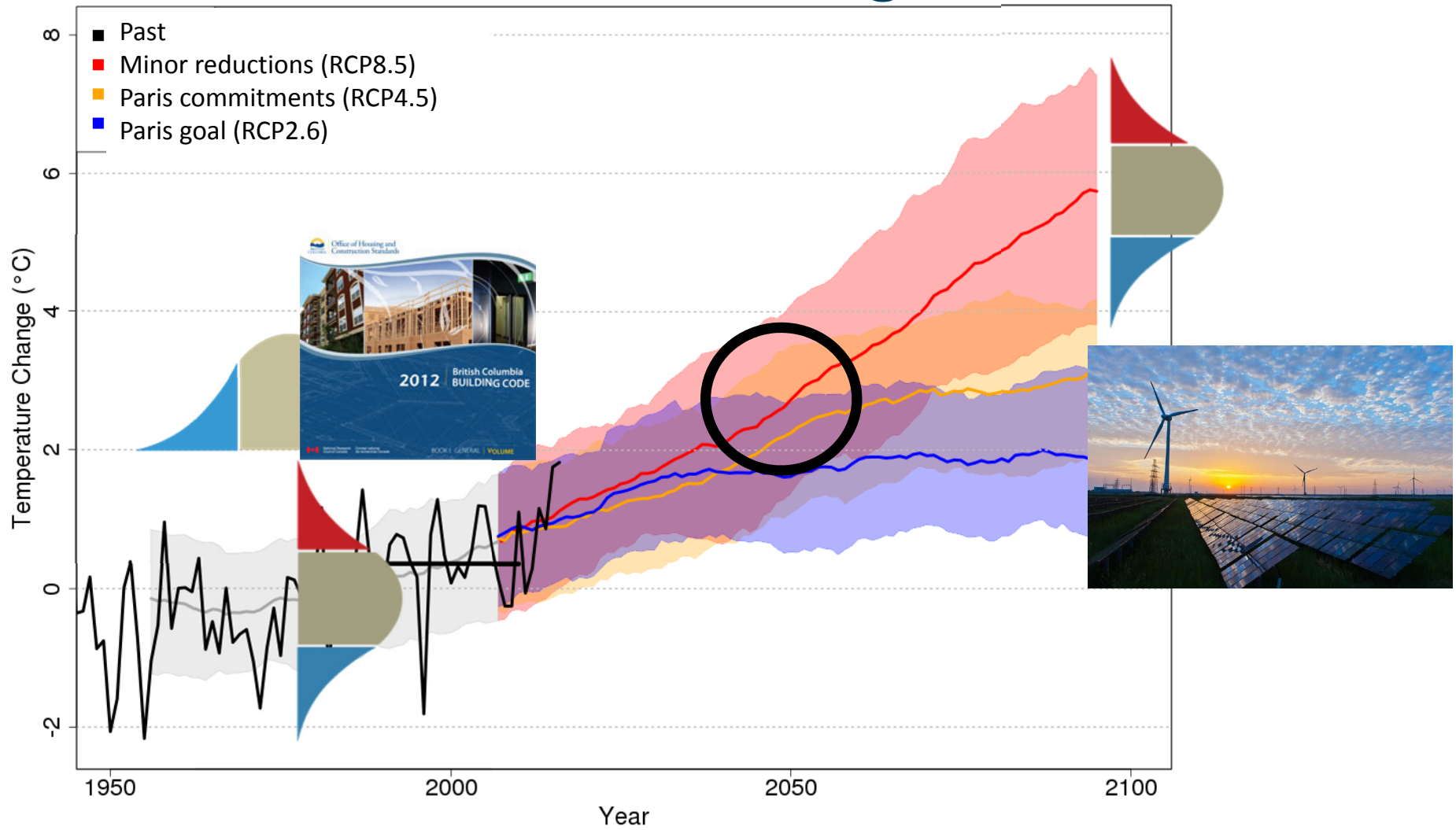
“Prediction is hard, especially about the future”

a) Yogi Berra

b) Albert Einstein

c) Mark Twain

Future Warming in BC



By the 2050s Vancouver will have

WARMER SPRINGS

72%
decrease
in frost days

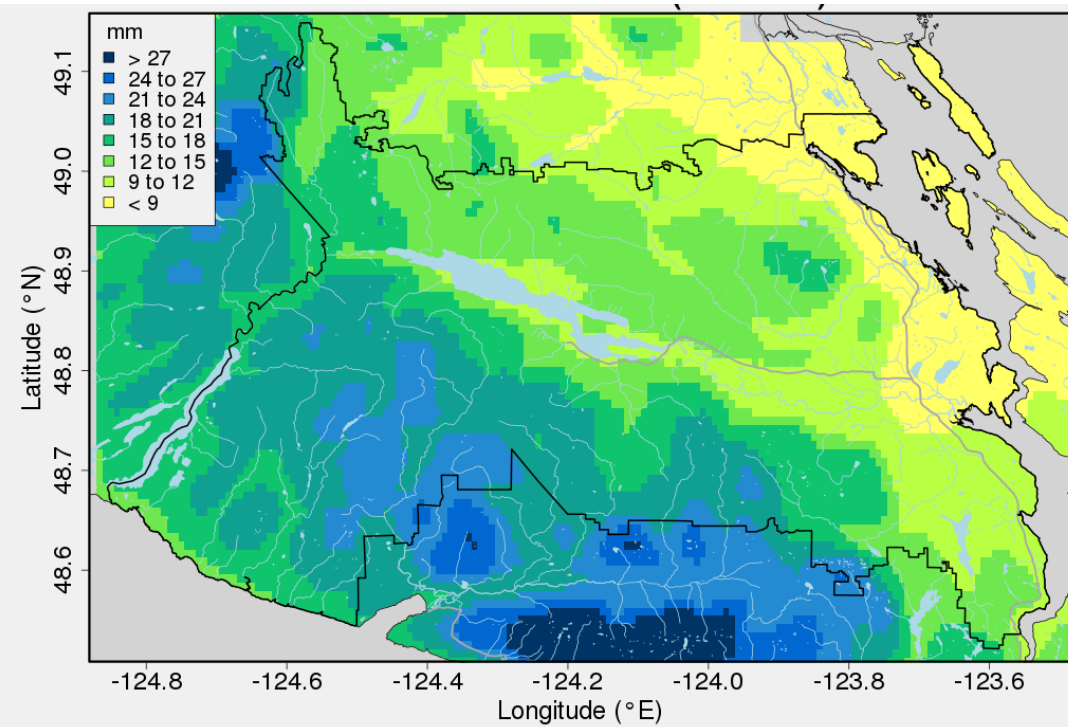
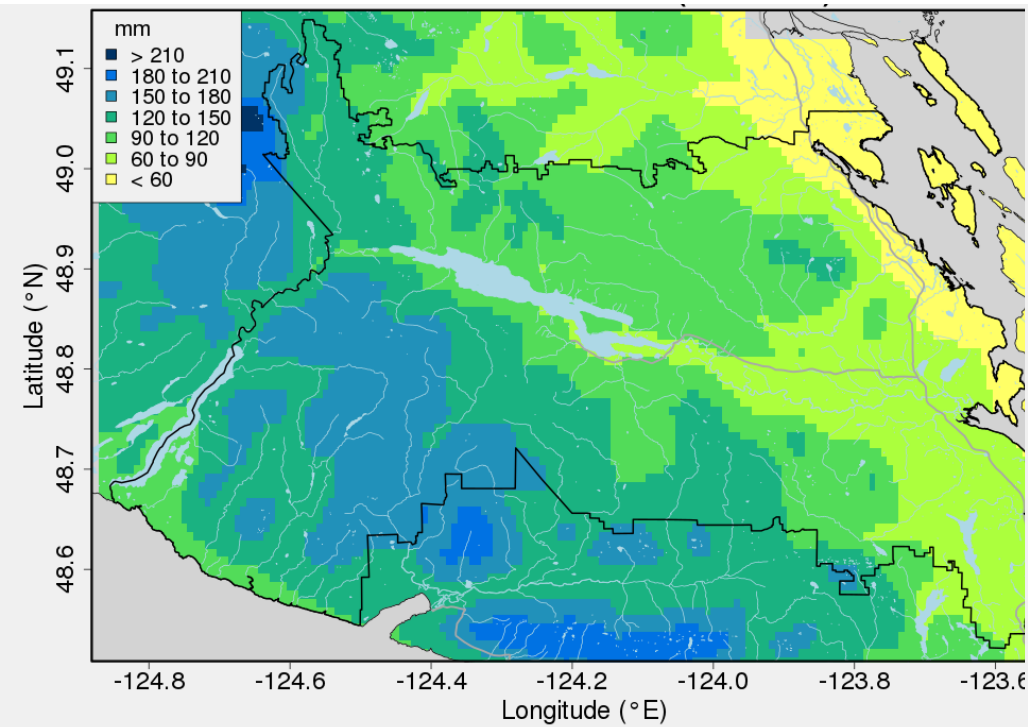


mountain
snow melts
earlier

Learn more:
vancouver.ca/climateadaptation

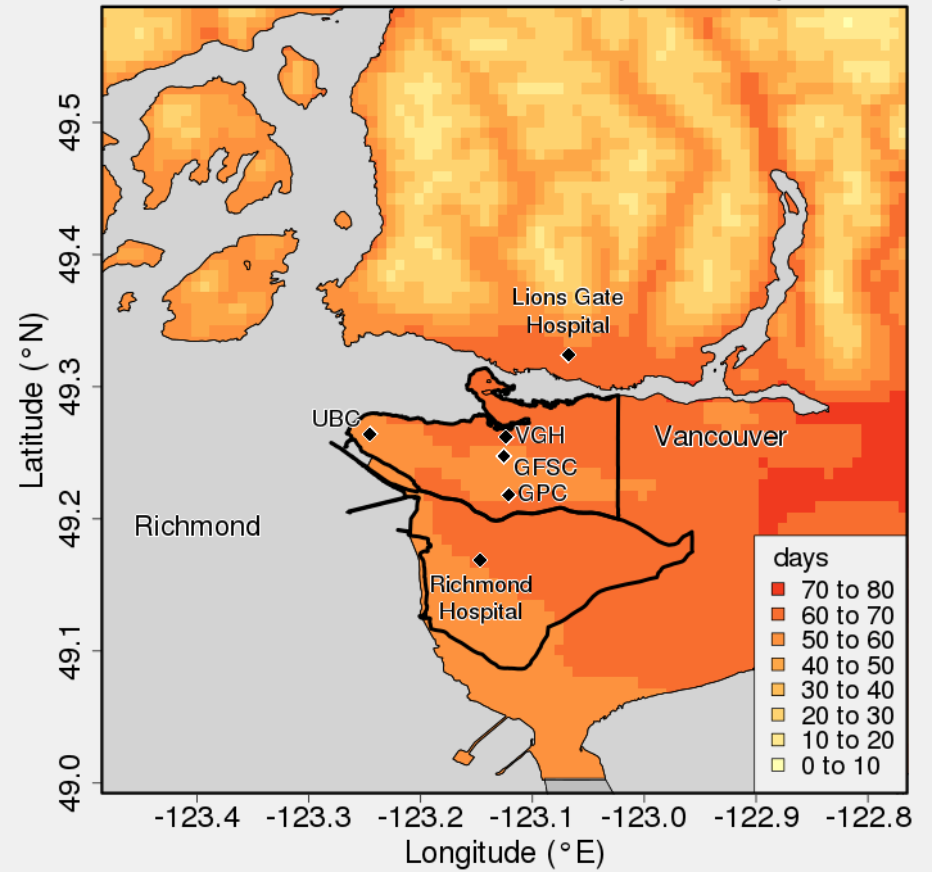
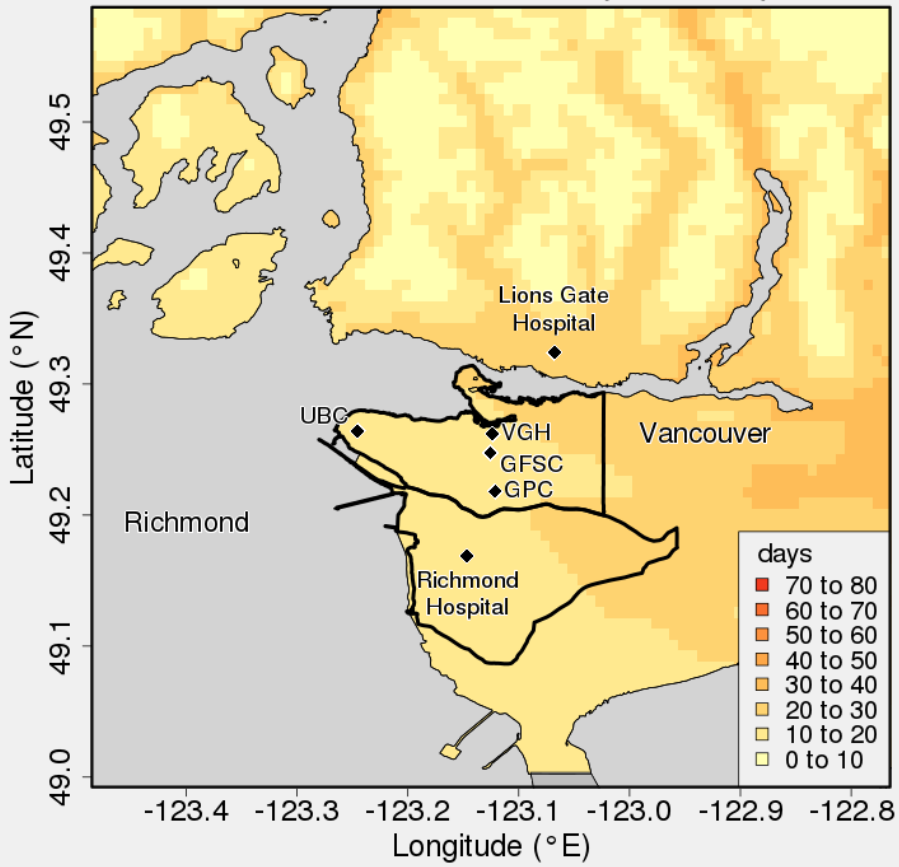


More frequent and more intense wet days



Wettest day of the year

Increased hot days



Days above 25°C

Where are these quotes from?

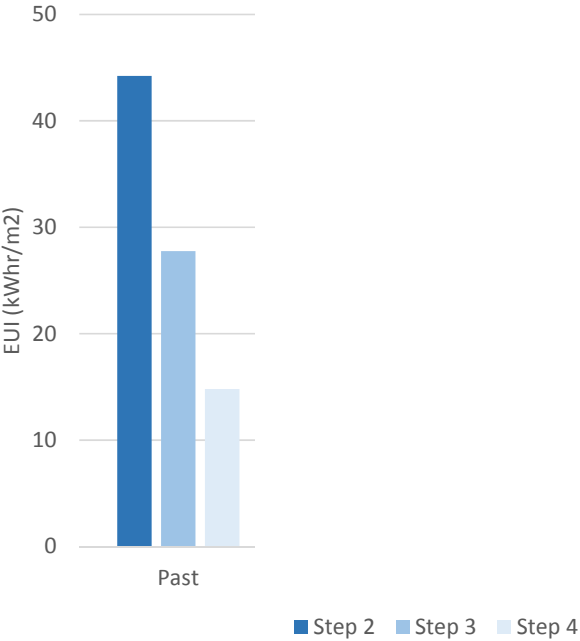
- “Climate is not static”
- “Past and ongoing... greenhouse gas emissions are expected to alter most climatic regimes in the future”
- “... buildings will need to be designed, maintained, and operated to adequately withstand ever changing climate loads.”



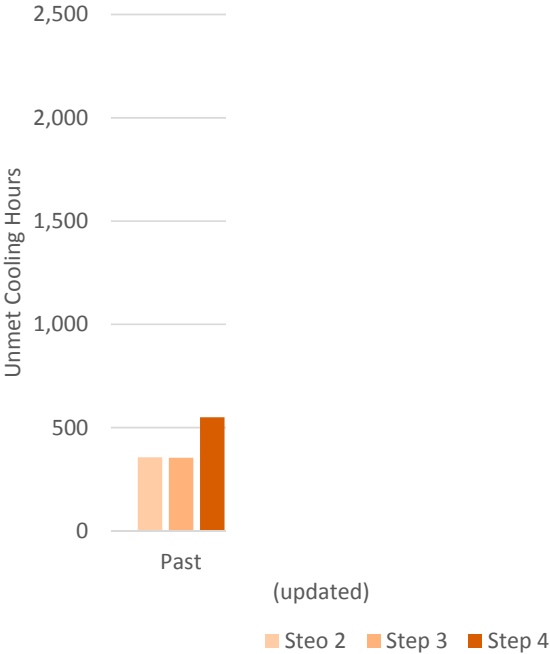
BC Building Code 2012

- “Climate is not static”
- “Past and ongoing... greenhouse gas emissions are expected to alter most climatic regimes in the future”
- “... buildings will need to be designed, maintained, and operated to adequately withstand ever changing climate loads.”
- “The analysis generally assumes that the past climate will be representative of the future climate”

Energy Use



Unmet Cooling Hours

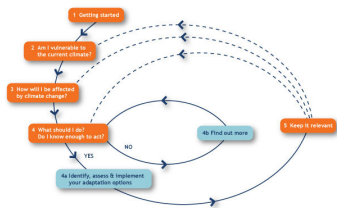


Source: UBC (Campus and Community Planning) with RDH Building Science

Best practices for considering future climate



- Make use of available climate information
- Consider a range of future projections
- *Practice cross-disciplinary engagement*
- Iteration, iteration, iteration



Taking future climate into account is

necessary

possible

Online adaptation tools webinar

<https://www.youtube.com/watch?v=jxj-3gPkDW4>

Resources to accompany BC Regional Adaptation Collaborative webinar
30 November 2016

Plan2Adapt <http://pacificclimate.org/analysis-tools/plan2adapt>

PICS short course [http://pics.uvic.ca/education/climate-insights-101#quicktabs-climate insights 101=1](http://pics.uvic.ca/education/climate-insights-101#quicktabs-climate%20insights%20101=1)

ClimateBC

- HectaresBC <http://www.hectaresbc.org>
- ClimateWNA <http://genetics.forestry.ubc.ca/cfgc/ClimateWNA/ClimateWNA.html>
- ClimateBC Online <http://www.genetics.forestry.ubc.ca/cfgc/ClimateBC40/Default.aspx>
- BC Climate Explorer <http://www.bc-climate-explorer.org/>

PCIC Data Portals <https://pacificclimate.org/data>

Data Basin

<https://nplcc.databasin.org/galleries/5a3a424b36ba4b63b10b8170ea0c915e#expand=105363%2C106698%2C106712%2C110010%2C105359%2C105364>



PACIFIC CLIMATE
IMPACTS CONSORTIUM

PLAN2ADAPT

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Summary of Climate Change for Fraser-Fort George in the 2050s

Climate Variable	Season	Projected Change from 1961-1990 Baseline	
		Ensemble Median	Range (10th to 90th percentile)
Mean Temperature (°C)	Annual	+1.7 °C	+1.2 °C to +2.6 °C
Precipitation (%)	Annual	+7%	-1% to +13%
	Summer	-1%	-8% to +5%
Snowfall* (%)	Winter	+10%	-3% to +18%
	Spring	-57%	-75% to -11%
Growing Degree Days* (degree days)	Annual	+245 degree days	+152 to +407 degree days
Heating Degree Days* (degree days)	Annual	-624 degree days	-944 to -432 degree days
Frost-Free Days* (days)	Annual	+20 days	+12 to +31 days

The table above shows projected changes in average (mean) temperature, precipitation and several derived climate variables from the baseline historical period (1961-1990) to the 2050s for the Fraser-Fort George region. The ensemble median is a mid-point value, chosen from a PCIC standard set of Global Climate Model (GCM) projections (see the 'Notes' tab for more information). The range values represent the lowest and highest results within the set. Please note that this summary table does not reflect the 'Season' choice made under the 'Region & Time' tab. However, this setting does affect results obtained under each variable tab.

* These values are derived from temperature and precipitation. Please select the appropriate variable tab for more information.

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PCIC* climate tools for BC

- Plan2Adapt
- Regional Analysis Tool
- *ClimateBC / ClimateWNA / HectaresBC / EmissionsBC*
- PCIC data portals
 - BC station data
 - High-resolution climate data
 - Statistically downscaled climate data
 - VIC hydrology data
 - Station history data
- Seasonal maps

BC STATION DATA

PCIC provides station observations of weather and climate variables (such as temperature and rainfall amounts) in British Columbia, from 1870 to the present day.

HIGH-RESOLUTION PRISM CLIMATOLOGY

Obtain high-resolution climatologies of maximum, minimum, and mean temperature and precipitation in British Columbia, on a monthly and annual basis at 30 arc second (~1 km) resolution (developed using PRISM).

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Single location Decimal Degree

Latitude: 49.65 Elevation (m): 19

Variable Selection **Emission Scenario Selection**

tasmax - Daily Maximum Near-Surface Air Temperature rcp85

CanESM2 tasmax rcp85

Model Period	Run	Min	Max	Mean	Median	Std.Dev	Units
2010 - 2039	r11p1	228.08	306.22	275.41	279.22	21.58	K
2040 - 2069	r11p1	230.2	307.53	276.57	279.99	21.03	K
2070 - 2099	r11p1	230.81	308.11	277.27	280.31	20.58	K

PCIC* climate tools for BC

	Primary* audiences	Ease of use	Flexibility	Type of output
Plan2Adapt	Planners Decision-makers Consultants	Easy	Low	Summary table Maps Possible impacts
Regional Analysis Tool	Impacts researchers Engineers	Difficult → Medium	High	Maps Plots Regional analysis
PCIC data portals	Impacts researchers Hydrologists Consultants	Medium	Medium	Data
Seasonal maps	Managers	Easy	Low	Maps
<i>ClimateBC</i> <i>ClimateWNA</i> <i>HectaresBC</i> <i>Databasin</i>	Foresters Ecologists Impacts researchers	Medium	High	Data Maps
<i>BC Climate Explorer</i>	Foresters, general	Easy	Medium	Maps Plots

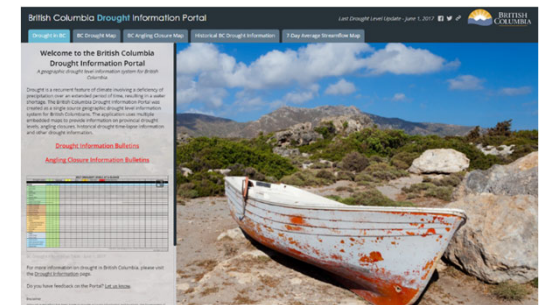
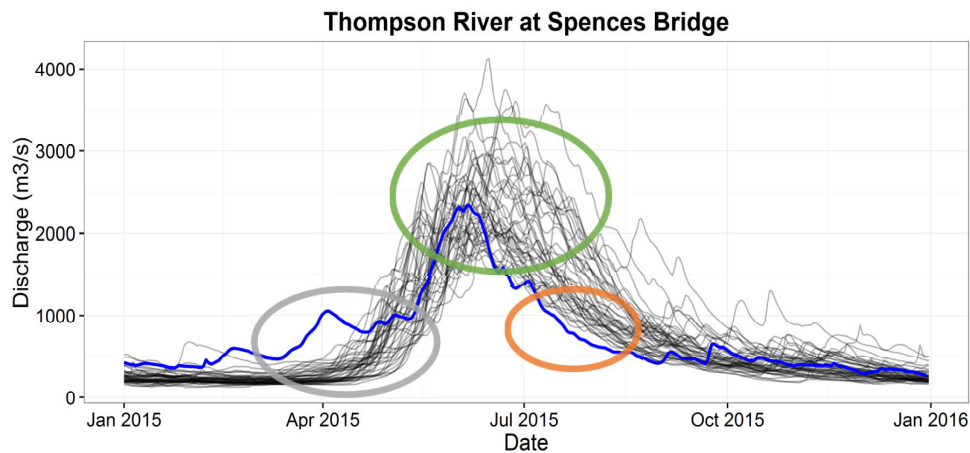
More resources

- Educational/background
 - [CBC podcast mini series](#)
 - [Pacific Institute for Climate Solutions \(PICS\): Climate Insights 101](#)
 - [What if climate change is real? – Katherine Hayhoe Ted Talk](#)
- Adaptation guidance
 - [PICS adaptation in buildings infographic](#)
 - [Infrastructure Canada Climate Lens](#)
 - [BC Ministry of Transportation and Infrastructure Technical Circular](#)
 - [EGBC guidance document](#)
 - [Climate / engineering language primer](#)
 - [National guidebook on climate scenarios](#)

And even more resources

- Climate Projections Reports released by regional districts
 - [Climate Projections for the Cowichan Valley Regional District](#)
 - [Climate Projections for the Capital Region](#)
 - [Climate Projections for Metro Vancouver](#)
 - [Climate Projections for Whistler](#)
 - [City of Vancouver Climate Impacts Summary](#)
- Webinar: Three important factors for adaptation: location, location, location
<https://goo.gl/cVWJZ1>

2015 / 2016 /2017 weather events, seasons



2015 [https://www.pacificclimate.org/sites/default/files/publications/2015 Year in Review-Final.pdf](https://www.pacificclimate.org/sites/default/files/publications/2015%20Year%20in%20Review-Final.pdf)

2016 <https://www.pacificclimate.org/news-and-events/news/2016/bc-track-set-new-temperature-record-2016> and
<https://www.pacificclimate.org/news-and-events/news/2017/climate-variability-hot-cold-winter-%E2%80%9916-%E2%80%9817>

2017 [https://www.pacificclimate.org/sites/default/files/publications/PCIC Update Mar 2018.pdf](https://www.pacificclimate.org/sites/default/files/publications/PCIC%20Update%20Mar%202018.pdf)

Thank you

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www.PacificClimate.org



Questions?