The British Columbia Heat Impacts Prediction System (BCHIPS)

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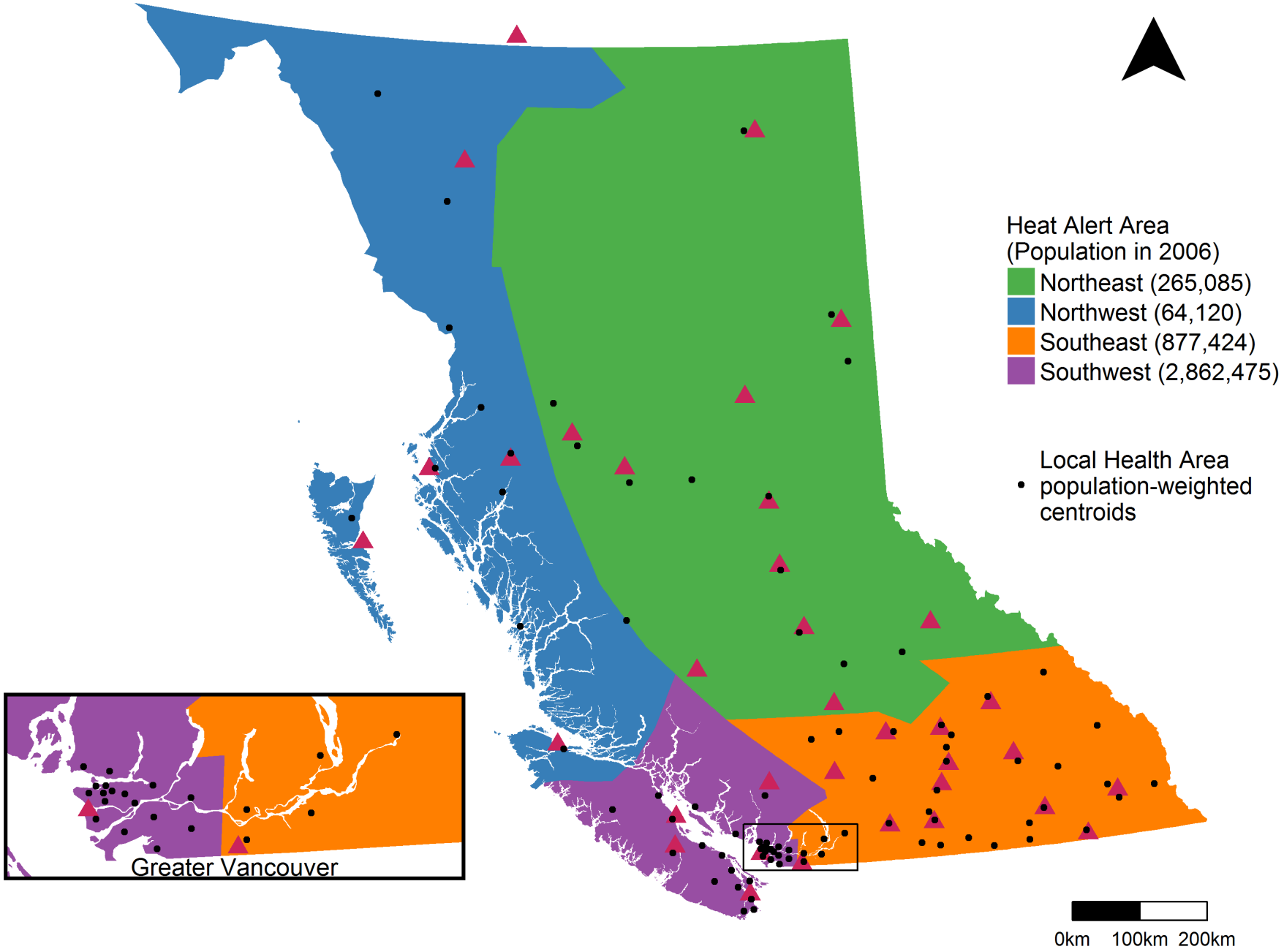
BC Centre for Disease Control

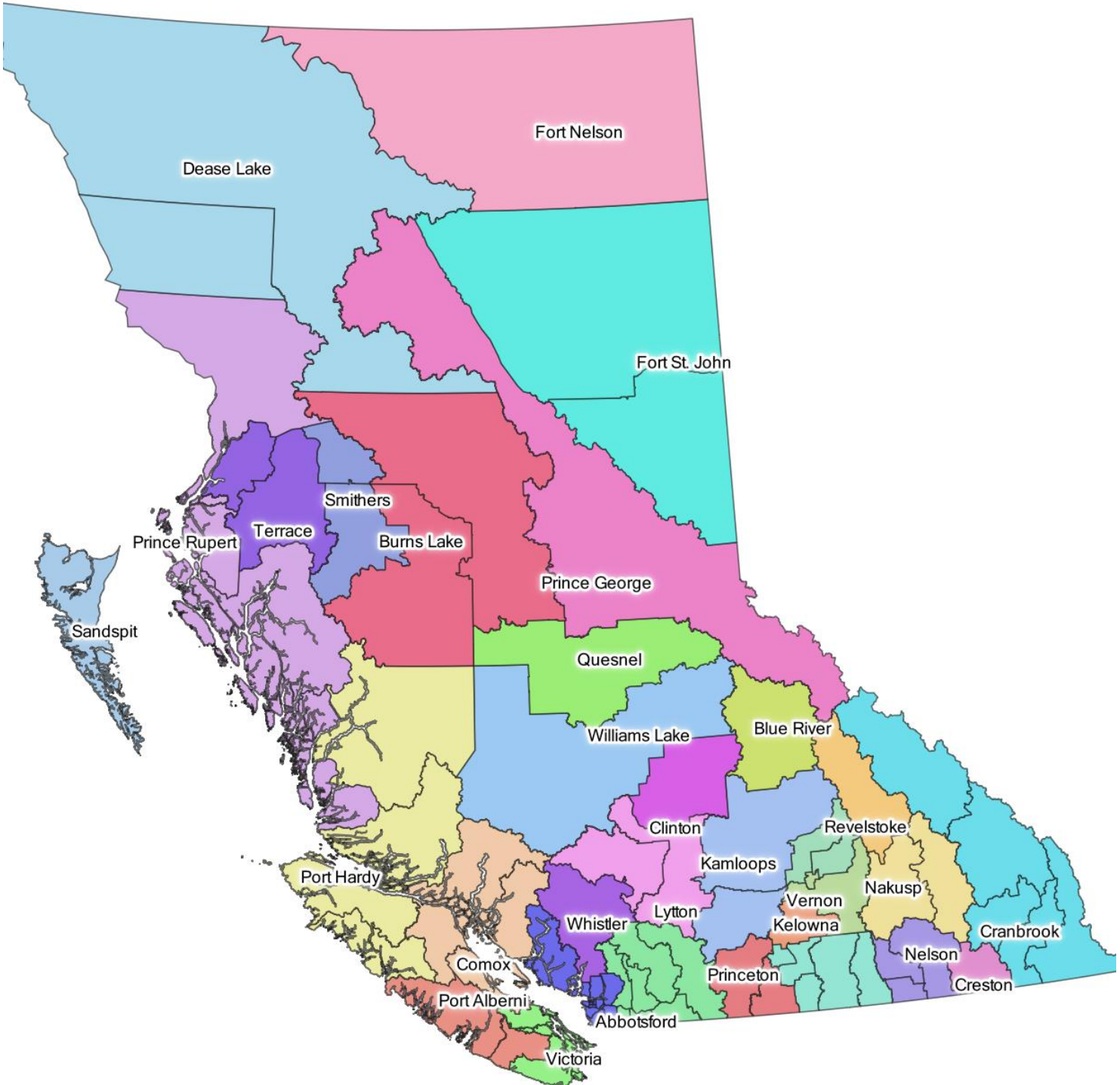
Background

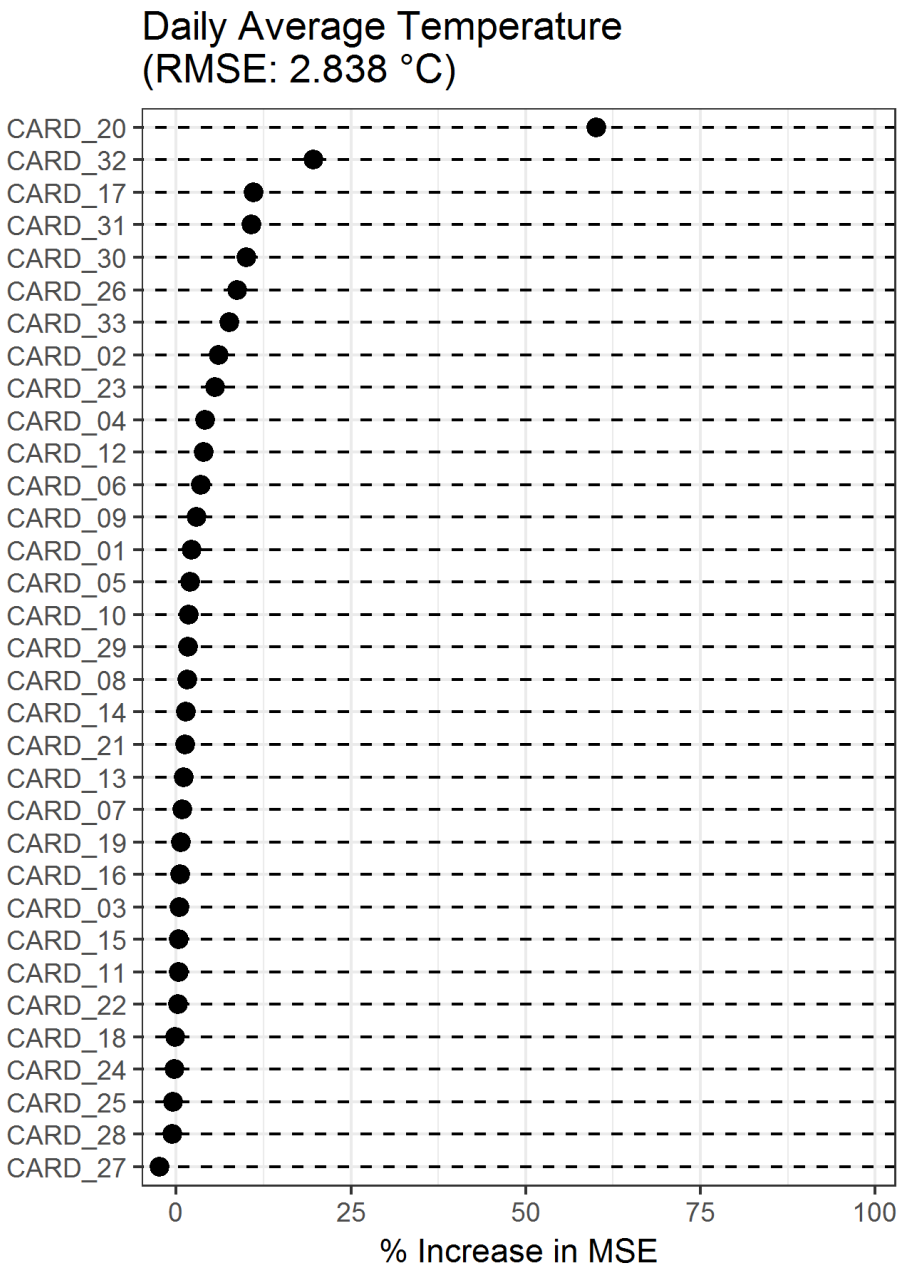
1) British Columbia has a generally temperate climate, but extreme events in 2009 and 2015
2) Until 2018 there were no heat health warning systems beyond greater Vancouver area
3) Very limited public health capacity to track heat and its impacts in some rural and remote areas
4) BCCDC to develop a provincial tool for simple communication of heat and health risk in all areas
5) Potentially accessible online to general public


Heat Alert Area
(Population in 2006)
Northeast (265,085)
Northwest (64,120)
Southeast (877,424)
Southwest (2,862,475)
Local Health Area
population-weighted
centroids
Greater Vancouver
0km 100km 200km

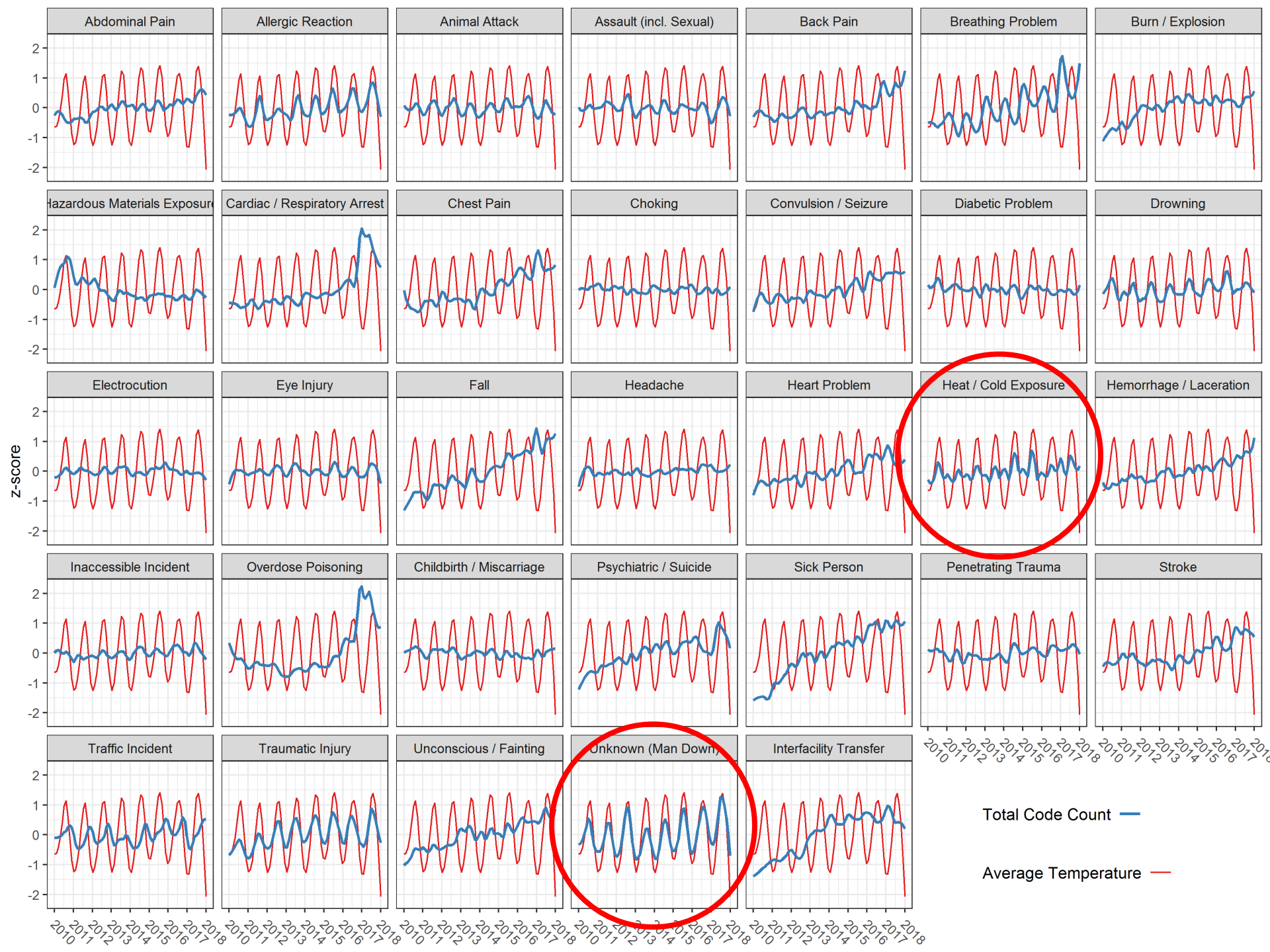
Project Objectives

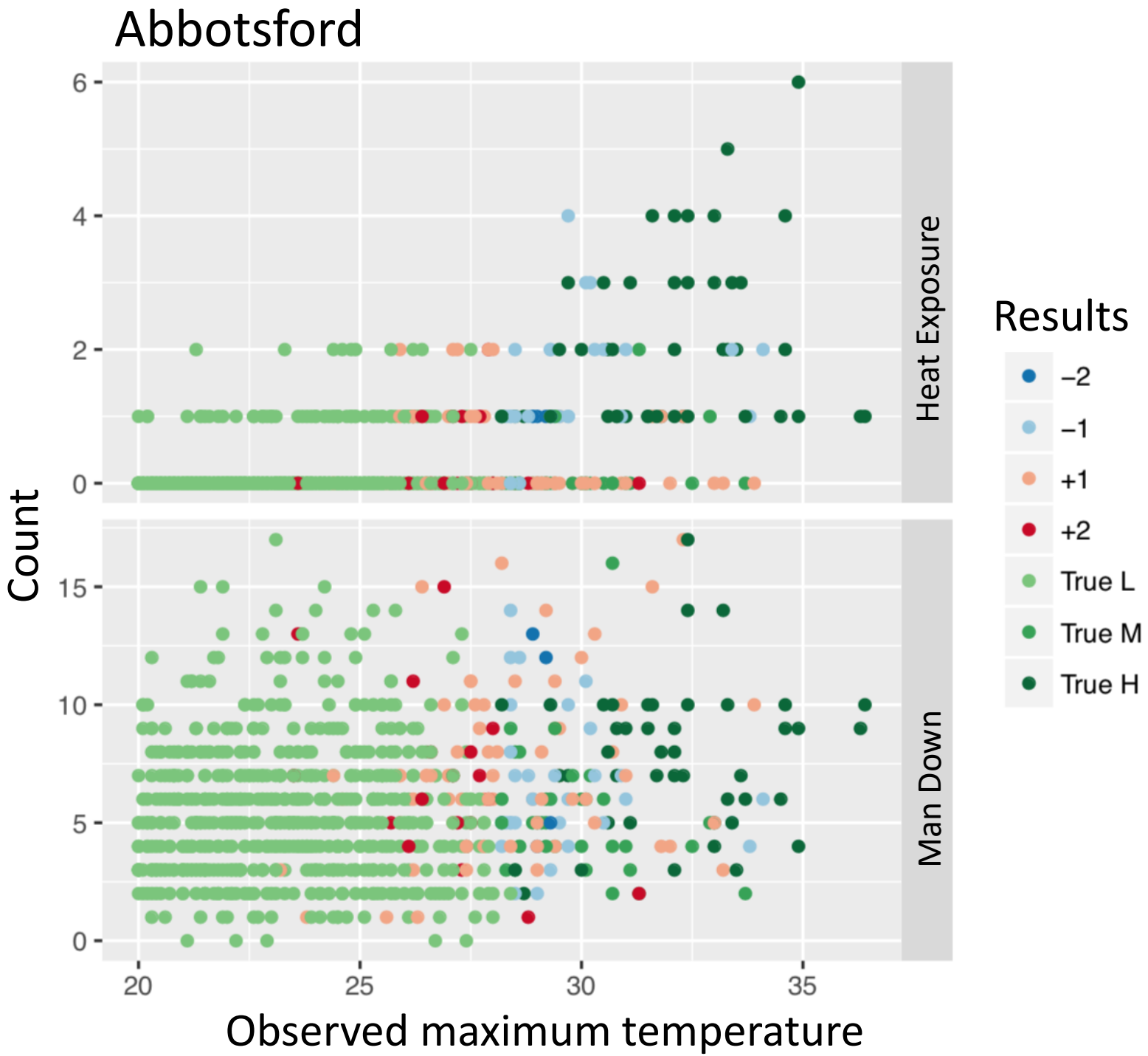
1) Identify sub-provincial regions of BC with different heat risk profiles
2) Compile historic data on temperature and health outcomes in each region
3) Use historic data to define low, moderate, and high heat health risk
4) Develop models to predict health risk in each region using temperature forecasts
5) Visualize all information on accessible and searchable online platform


Fort Nelson
Dease Lake
Fort St. John
Smithers
Terrace
Prince Rupert
Burns Lake
Prince George
Sandspit
Quesnel
Williams Lake
Blue River
Clinton
Revelstoke
Kamloops
Nakusp
Port Hardy
Vernon
Lytton
Whistler
Kelowna
Cranbrook
Nelson
Comox
Princeton
Creston
Port Alberni
Abbotsford
Victoria

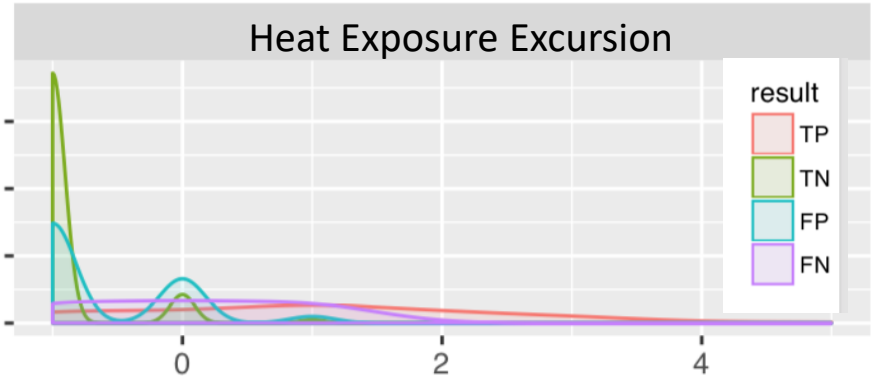


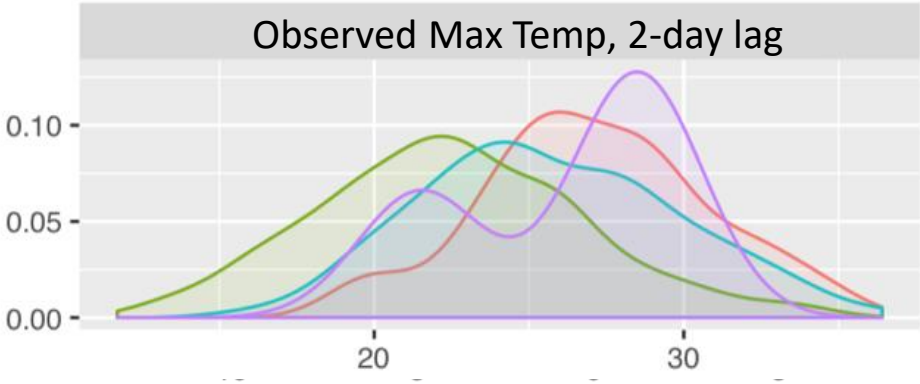
Card	Category	AvgCount	Cor
20	Heat / Cold Exposure	0.833	0.513
32	Unknown Problem (man down)	24.942	0.370
17	Falls	65.654	0.301
31	Unconscious / Fainting (Near)	47.583	0.305
30	Traumatic Injuries (Specific)	19.696	0.277
26	Sick Person (specific diagnosis)	93.323	0.305
33	Transfer / Interfacility / Palliative Care	39.216	0.154
02	Allergies (Reactions) / (Stings, Bites)	5.996	0.199
23	Overdose / Poisoning (Ingestion)	21.797	0.113
04	Assault / Sexual Assault	19.783	0.152
12	Convulsions / Seizures	15.915	0.033
06	Breathing Problems	38.569	0.086
09	Cardiac or Respiratory Arrest / Death	7.154	0.087
01	Abdominal Pain	19.838	0.049
05	Back Pain (Non-Traumatic or Non Recent Trauma)	9.021	0.047
10	Chest Pain (Non Traumatic)	40.231	0.019
29	Traffic / Transportation Incidents	40.601	-0.040
08	Carbon Monoxide / Inhalation / HAZMAT / CBRN	1.175	-0.053
14	Drowning (Near) / Diving / SCUBA Accident	0.309	0.203
21	Hemorrhage / Lacerations	20.279	0.200
13	Diabetic Problems	6.204	0.060
07	Burns (Scalds) / Explosions (Blasts)	3.443	0.135
19	Heart Problems / AICD	9.058	0.070
16	Eye Problems / Injuries	0.925	0.058
03	Animal Bites / Attacks	1.292	0.057
15	Electrocution / Lightning	0.124	0.031
11	Choking	1.763	-0.065
22	Inaccessible Incident / Other Entrapment (Non-Veh)	0.185	0.017
18	Headache	4.502	0.029
24	Pregnancy / Childbirth / Miscarriage	2.275	0.067
25	Psychiatric / Abnormal Behavior / Suicide Attempt	29.144	0.100
28	Stroke (CVA)	13.456	0.028
27	Stab / Gunshot / Penetrating Trauma	1.699	0.058

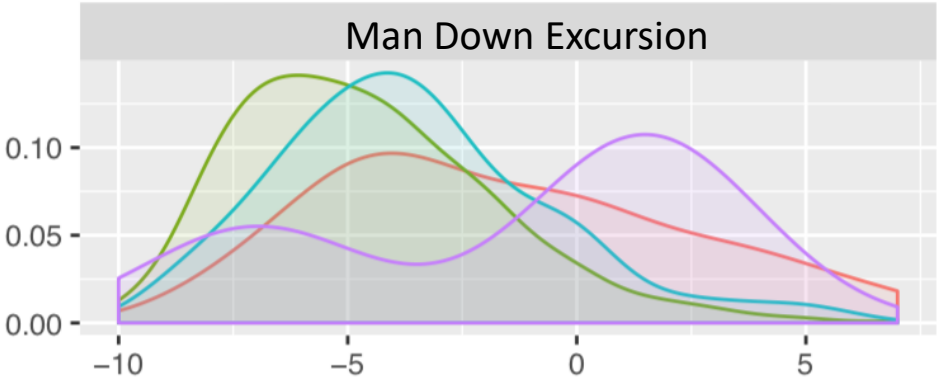

Abdominal Pain
Allergic Reaction
Animal Attack
Assault (incl. Sexual)
Back Pain
Breathing Problem
Burn / Explosion
Hazardous Materials Exposure
Cardiac / Respiratory Arrest
Chest Pain
Choking
Convulsion / Seizure
Diabetic Problem
Drowning
Electrocution
Eye Injury
Fall
Headache
Heart Problem
Heat / Cold Exposure
Hemorrhage / Laceration
Inaccessible Incident
Overdose Poisoning
Childbirth / Miscarriage
Psychiatric / Suicide
Sick Person
Penetrating Trauma
Stroke
Traffic Incident
Traumatic Injury
Unconscious / Fainting
Unknown (Man Down)
Interfacility Transfer
z-score
2
1
0
-1
-2
2010
2011
2012
2013
2014
2015
2016
2017
2018
Total Code Count
Average Temperature

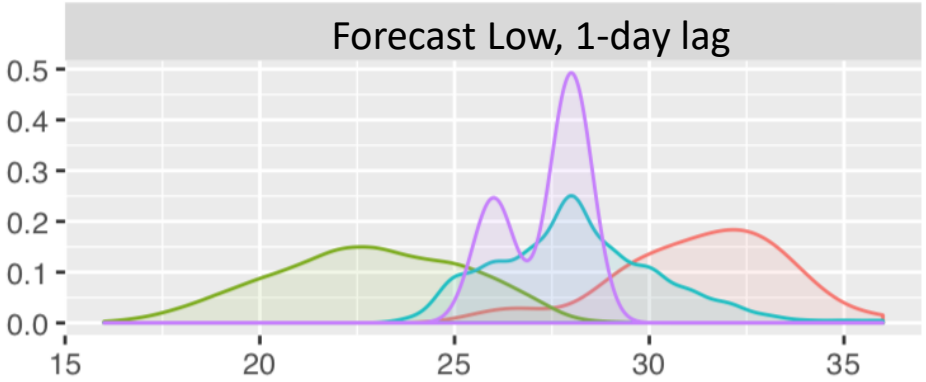

Abbotsford
Count
Observed maximum temperature
Heat Exposure
Man Down
Results
−2
−1
+1
+2
True L
True M
True H
0
2
4
6
0
5
10
15
20
25
30
35

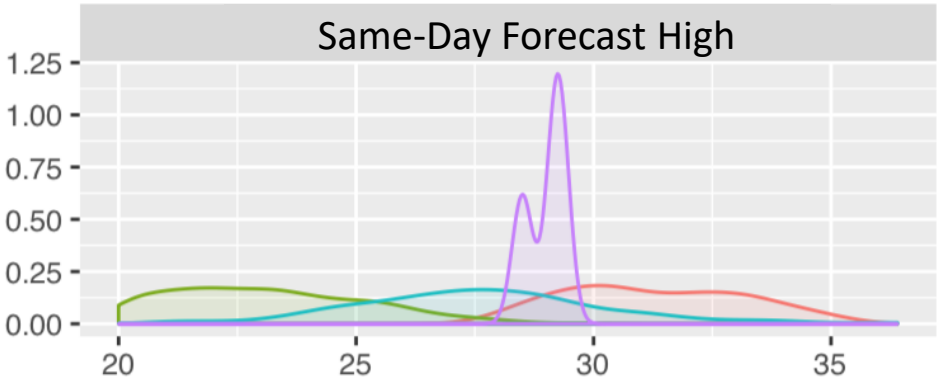
Abbotsford

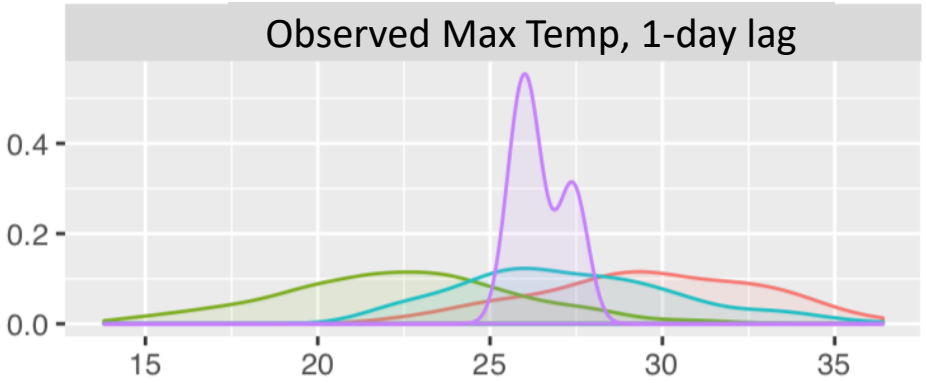

Heat Exposure Excursion
result
TP
TN
FP
FN
3
2
1
0
0
2
4


Observed Max Temp, 2-day lag
0.10
0.05
0.00
20
30

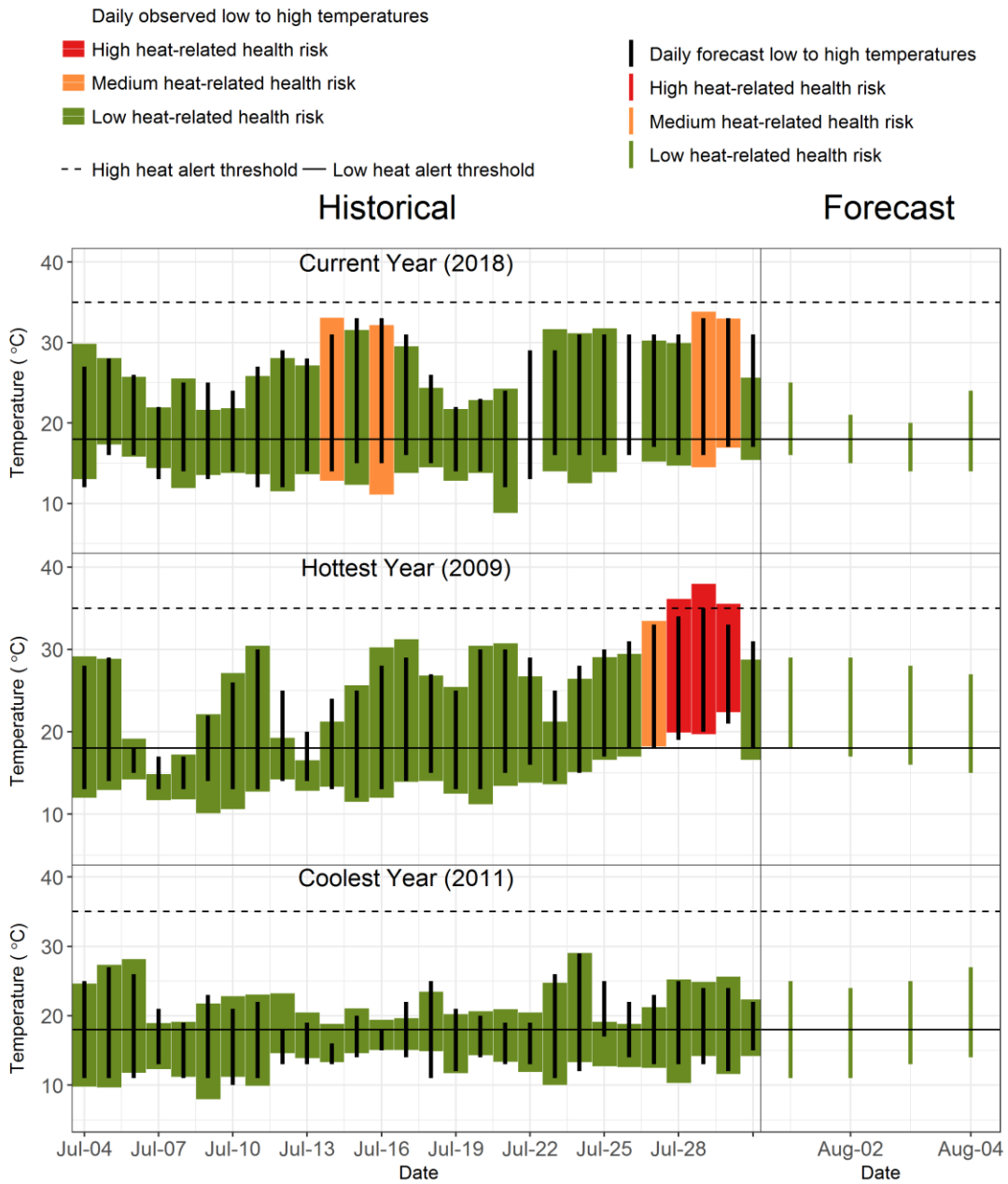

Man Down Excursion
0.10
0.05
0.00
−10
−5
0
5

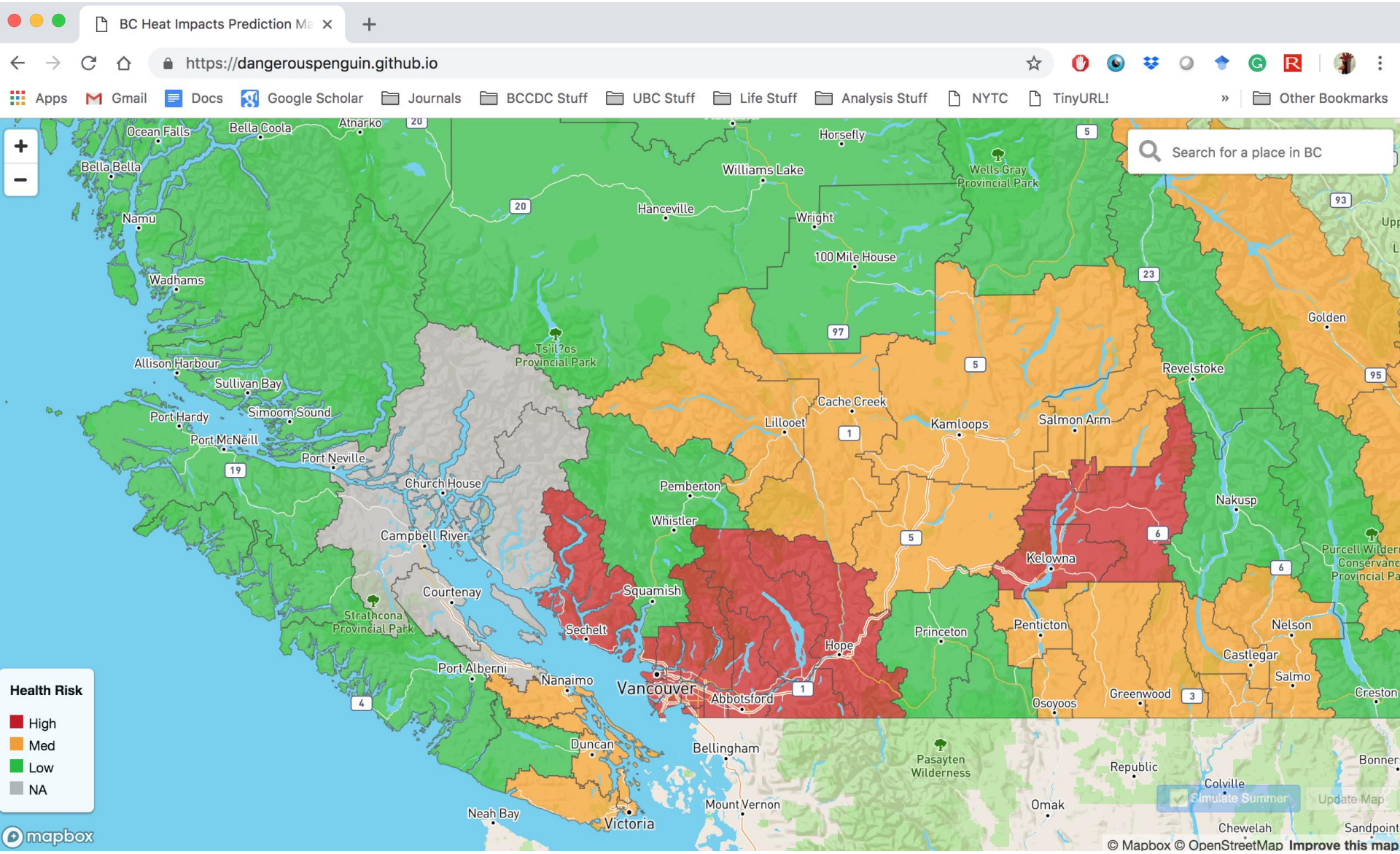

Forecast Low, 1-day lag
0.5
0.4
0.3
0.2
0.1
0.0
15
20
25
30
35


Same-Day Forecast High
1.25
1.00
0.75
0.50
0.25
0.00
20
25
30
35


Observed Max Temp, 1-day lag
0.4
0.2
0.0
15
20
25
30
35

BC Heat Impacts Prediction System
Abbotsford
Update for Aug 1, 2018




BC Heat Impacts Prediction Ma
https://dangerouspenguin.github.io
Apps
Gmail
Docs
Google Scholar
Journals
BCCDC Stuff
UBC Stuff
Life Stuff
Analysis Stuff
NYTC
TinyURL!
Other Bookmarks
Search for a place in BC
Health Risk
High
Med
Low
NA
Simulate Summer
Update Map
mapbox
© Mapbox © OpenStreetMap Improve this map
Ocean Falls
Bella Coola
Atnarko
Bella Bella
Namu
Wadhams
Allison Harbour
Sullivan Bay
Simoom Sound
Port Hardy
Port McNeill
Port Neville
Church House
Campbell River
Courtenay
Strathcona Provincial Park
Port Alberni
Nanaimo
Duncan
Neah Bay
Victoria
Vancouver
Bellingham
Mount Vernon
Pasayten Wilderness
Abbotsford
Sechelt
Squamish
Whistler
Pemberton
Hope
Ts'il?os Provincial Park
Horsefly
Williams Lake
Hanceville
Wright
100 Mile House
Cache Creek
Lillooet
Kamloops
Wells Gray Provincial Park
Revelstoke
Salmon Arm
Golden
Nakusp
Kelowna
Princeton
Penticton
Osoyoos
Greenwood
Castlegar
Nelson
Salmo
Creston
Omak
Republic
Colville
Chewelah
Sandpoint
Bonner


BC Heat Impacts Prediction Ma
https://dangerouspenguin.github.io
Apps
Gmail
Docs
Google Scholar
Journals
BCCDC Stuff
UBC Stuff
Life Stuff
Analysis Stuff
NYTC
TinyURL!
Other Bookmarks
Abbotsford Forecast Region
Current Year (2018)
Forecast
Temperature (°C)
Hottest Year (2009)
Coldest Year (2011)
Date
Temperature Range
Observed
Forecast
Health Risk
High
Low
Medium
No Data
Health Risk
High
Med
Low
NA
Strathcona Provincial Park
Sechelt
Princeton
Penticton
Nelson
Salmo
Creston
Bonners Ferry
Sandpoint
Libby
Spokane
Wallace
Saint Maries
Moscow
Lewiston
Orofino
Grangeville
Enterprise
Nez Perce National Forest
Simulate Summer
Update Map
Council
Newport
Albany
Madras
mapbox
© Mapbox © OpenStreetMap Improve this map

Project Accomplishments

1) 32 heat health regions identified and placed on searchable online map
2) Automatic download of daily data on temperature observations and forecasts
3) Development of reasonably good model to predict health impacts of forecast temperatures
4) Simple visualization of observed and forecast temperatures and health risk
5) Tool looks the same for all populations, regardless of size

Thanks!

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Project Team

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