



2021 HEAT EVENTS

Extreme Heat Initial Response Guideline Activations

2021 June 24 to 2021 July 02 | 2021 July 29 to August 01 | 2021 August 10 to 15

SUMMARY REPORT

LAND ACKNOWLEDGEMENT

The lands which we today call the city of Burnaby are located on the ancestral and unceded homelands of the hə́nqəmínəm and Sk̓w̓wú7mesh speaking peoples. They have been the stewards of these lands for time immemorial.

We extend to them our humble gratitude and appreciation for the opportunity to live, work, learn and play on this shared territory.

RECOGNITION

Much time, effort, and work went into the planning and implementation of the Extreme Heat-Initial Response Guideline (EH-IRG).

The Emergency Management division of Public Safety and Community Services would like to thank the senior leadership and staff who made up the EH-IRG Functional Leads Committee and those personnel in the field who were engaged with both the public and our response partners to ensure Burnaby citizens were able to find and access relief from the effects of the extreme temperatures we experienced.

The Society to End Homelessness in Burnaby and their Extreme Weather Heat Response working group were instrumental partners to the City efforts. They liaised with and linked into their networks to distribute heat health awareness information across their channels. Their cooling location provided respite and support to vulnerable populations and complemented the City's four cooling sites and response actions. To them we extend our sincere appreciation for their efforts.

CORPORATE STRATEGIC PLAN

The City of Burnaby's Vision is to be “a world-class city committed to creating and sustaining the best quality of life for our entire community”. In Burnaby, the path to achieving our vision rests on core values as outlined in our Corporate Strategic Plan (CSP).

Through the CSP, the City articulates its core values of *Community, Integrity, Respect, Innovation* and *Passion*, which describe how we do our work, and are the principles that guide our actions and decisions.

The CSP outlines six key results areas or goals which describe the focus areas of our work, and help us prioritize our efforts and resources. These goals include:



This City's extreme heat response measures and the post-event Recommendations into Actions summarized in this report contribute to:

A Safe Community	Emergency preparedness	Enhance plans, procedures and services so that we are better prepared to respond to emergencies and are able to maintain City services
	Emergency services	Provide responsive services
A Connected Community	Partnership	Work collaboratively with businesses, educational institutions, association , other communities and governments
An Inclusive Community	Serve a diverse community	Ensure City services fully meet the needs of our dynamic community
A Healthy Community	Healthy Life	Encourage opportunities for healthy living and well-being
A Thriving Organization	Organizational culture	Ensure that our core values are reflected in our policies, programs and service delivery
	Human resources	Foster an environment of teamwork, efficiency and excellence to deliver customer service in alignment with our core values.

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EXECUTIVE SUMMARY

Heatwaves are one of the deadliest weather-related natural hazards in Canada.

Summertime heat in British Columbia is generally not thought to be an important contributor to population mortality. Our climate is predominately temperate.

The Preliminary Strategic Climate Risk Assessment for British Columbia prepared in 2019 for the Ministry of Environment and Climate Change Strategy lists Heat Wave as the 3rd highest-ranked risk (out of 15 risks assessed) facing the province overall by 2050. In the report, Heat Wave was found to be High consequence and Likely to occur with High confidence. (Ministry of Environment and Climate Change Strategy, 2019)

The heat dome and two subsequent heat waves experienced in British Columbia within a period of just over 8 weeks adversely affected a population unaccustomed and unprepared for such extreme temperatures. 815 sudden deaths of all cases and ages (B.C. Coroners Service, 2021) were reported province-wide, with 69 per cent, or 569, preliminarily attributed as heat-related deaths by the BC Coroners Service. 279 of those deaths, equaling 49 per cent, were in the Fraser Health region. (B.C. Coroners Service, 2021)

The full extent of the impact of these exceptional heat events on population health will not be known for several months and the compounding affect to wildlife and environmental health will not be understood for some time.

In the most realistic statistical analysis the Heat Dome event is estimated to be a 1 in 1,000 year event in the current climactic state and is estimated to have been 1 in 150,000 year event without anthropogenic (human-induced) climate change. (World Weather Attribution, 2021) Pacific Climate Impacts Consortium (PCIC) climatologist Faron Anslow stated in interviews with the media that this is the sort of event that can be expected more often as the climate changes. (Sun, 2021)

The City of Burnaby activated its Extreme Heat Initial Response Guideline in advance of and to coordinate the City's response activities for the three (3) extreme heat events. Numerous measures were implemented to protect public safety and provide alternatives for the public to mitigate adverse health affects caused by heat exposure.

- Cooling Sites were opened and available to all members of the public offering a cool space, seating, free water for hydration, free Wi-Fi, access to power outlets, and immediate first aid, if required.
- Corporate Communications initiated a wide-reaching communications campaign about the cooling sites which was shared via e-newsletters, on the city's website, social media

channels, and on posters and postcards placed at all city facilities and distributed by hand to vulnerable populations through outreach efforts by RCMP and to 285 multi-family buildings where residents may be a higher risk to heat exposure by Bylaw Enforcement staff.

- Burnaby RCMP assigned dedicated teams to outreach to vulnerable populations, check on well being and share both heat health information and the cooling site locations.
- The Burnaby Fire Department adjusted both fire company and dispatch staffing in response to the substantial increase in the public's need for emergency medical aid.
- The City cooperated with the Task Force to End Homelessness in Burnaby and their Extreme Weather Heat Response working group to provide a site and obtain services for their Cooling location which was set up in a shaded area of Civic Square.
- Additional services that required service enhancement, and had not been otherwise planned for in the City's extreme heat response measures, included garbage and recycling across all parks and tree shaded public gathering spots and parks patrol.

Climate change is having and will continue to have short and long-term regional impacts, including warmer summer days and nights, wetter winters and drier summers, continued sea level rise, and stronger and more frequent extreme rainfall events. (Metro Vancouver, 2016)

At the September 9, 2019 Council meeting, Council received a report and recommendations from the Environment and Social Planning Committee on the subject *Climate Change*. (City of Burnaby, Environment and Social Planning Committee, 2019) Council adopted a resolution declaring a Climate Emergency. (City of Burnaby, Office of the City Clerk, 2019) As noted in the report, while the declaration is symbolic, its adoption communicates the City's recognition of a crisis and the intent to mobilize resources. Addressing the climate emergency requires a sustained commitment over the next three decades and beyond.

Many of the Big Moves and Fast Track Actions contained within Burnaby's Climate Action Framework, introduced in March 2020, will positively influence affects and outcomes to public safety and integrate pathways to evolve the City's emergency planning efforts.

Council, staff, and partner agencies provided many thoughtful recommendations and inputs to enhance the City's response to future heat events. These recommendations included: infrastructure considerations such as multi-level drinking water fountains with misting features; enhancement of green canopies in Urban Village development to mitigate urban heat island effect; engage Social Planning and Citizen Support Services and their networks to develop a citizen support accountability network system or program or for highly vulnerable populations; and, when implemented, utilize the Mass Notification System to quickly disseminate key information to the public and external agencies including cooling sites information and actions to avoid heat-related illness.

INTRODUCTION

In an era of escalating climate change, extreme heat is the most fatal form of weather disaster. Hundreds of British Columbians lost their lives amid a series of record-setting heat waves that scientists say would not have happened if not for human-caused warming.

The greatest percentage of victims who succumb to the effects of extreme heat die alone. Long-standing inequities in housing and health care put the lowest income and most vulnerable citizens at greatest risk. (Ionescu, 2021) During periods of extreme heat, official warnings and many services provided by higher levels of government don't reach those who most need help, leaving local governments to develop and implement ad hoc supports to fill the service gaps.

The five years of 2015-2019 saw the hottest average temperatures ever recorded at a global scale, including more frequent, longer and hotter heatwaves on every inhabited continent. (Shumake-Guillemot, 2020) Our changing climate has profound implications for human health, changing patterns of infectious disease, and the exacerbation of existing health challenges. (Watts, et al., 2020)

British Columbia is already experiencing the effects of global climate change: average temperatures are increasing, and variable and extreme weather is becoming more frequent. Scientists expect these changes to accelerate and intensify in the years ahead, creating risks to society, natural resources, and ecosystems. (Ministry of Environment and Climate Change Strategy, 2019)

Previous Heat Events of Note

Two hot weather events in 2009 affected southwest British Columbia, the first from July 27 to August 03, the second August 19 to 21. During these heat events excess deaths numbered 156 and 45 respectively. Previous to those events, there had been little public health concern about significant heat-related mortality in BC. (Kosatsky, Wan, & Henderson, 2013).

Temperature records for July 13, 2014 were broken at 20 weather stations across the province. Environment and Climate Change Canada (ECCC) meteorologist Michel Gelin as said in an interview that records were broken on average by about 1.3°C. On that day, Pitt Meadows reached a daytime high of 34.0°C, where the previous record high of 32.5°C was last recorded in 1996. (The Canadian Press, 2014)

August 01 to 02, 2017 saw a ridge of high pressure situated over much of the southwestern half of the province that produced a heat wave resulting in several days where maximum temperatures records were shattered, some from as far back as 1891. (ECCC Weather British Columbia, 2017)

Extreme Heat Response Triggers

Environment and Climate Change Canada

ECCC is responsible for issuing timely weather forecasts, special weather and air quality statements, advisories, watches and warnings across Canada, including heat warnings. ECCC's national heat warning criteria incorporates regional climatology, health evidence, heat event duration, and overnight temperatures. Under this program (last updated in 2018), ECCC heat warnings are issued based on forecast high temperatures for two consecutive days and the intervening overnight lows.

Region	Heat Warning Criteria
British Columbia – Southwest – Western Metro Vancouver including the North Shore, City of Vancouver and Richmond, Howe Sound, Whistler, Sunshine Coast, Vancouver Island (except northern sections)	Issued when 2 or more consecutive days of daytime maximum temperatures are expected to reach 29°C or warmer and nighttime minimum temperatures are expected to fall to 16°C or warmer.
British Columbia – Southwest inland - Eastern Metro Vancouver including Coquitlam and Surrey, and the Fraser Valley	Issued when 2 or more consecutive days of daytime maximum temperatures are expected to reach 33°C or warmer and nighttime minimum temperatures are expected to fall to 17°C or warmer.

(Environment and Climate Change Canada, 2020)

Fraser Health and Vancouver Coastal Health

Beginning in 2011, the BC Centre for Disease Control (BCCDC) and medical health officers from Fraser Health (FHA) and Vancouver Coastal Health (VCH) created triggers for a regional heat health warning system. This system utilized a two-tiered approach - Heat Advisory escalating to Extreme Heat Alert - in the event of extremely high temperatures forecast and recorded at Abbotsford airport. FHA/VCH were prepared to issue these advisories/alerts to Lower Mainland municipalities. (Loewn, 2011) This early approach created some confusion by municipal advisory/alert recipients as they attempted to navigate the differences between notifications received from ECCC compared to those from the health authorities.

Beginning in 2017, the BCCDC collaborated with ECCC, Health Canada, and BC health authorities to establish the Heat Alert and Response System (HARS).

Until 2018 there had been no heat health warning systems beyond the greater Vancouver area. (Henderson, 2018)

Utilizing high-low-high alert thresholds, the HARS for Southwest BC was modified to incorporate the ECCC Heat Warning, replacing the FHA/VCH heat advisory. Extreme Heat Alerts for Southwest BC are based on the average of the current day's 14:05h temperature and the following day's forecast maximum temperature. The extreme heat alert criteria level is linked to BCCDC historical data where it is expected at least a 20% increase in mortality, or 15-25 excess deaths, in the region per day.

Once the criteria level has been reached, FHA and VCH issue an Extreme Heat Alert to the public. Health Emergency Management BC (HEMBC) forwards the Extreme Heat Alert to Emergency Management BC (EMBC) for dissemination to local government emergency planners and stakeholders in their distribution lists.

Notification Type	Issued by	Notification Criteria
Heat Warning	ECCC	Issued when 2 or more consecutive days of daytime maximum temperatures are expected to reach 29°C or warmer and nighttime minimum temperatures are expected to fall to 16°C or warmer.
Extreme Heat Alert	FHA/VCH or HEMBC through EMBC	Based on the average of the current day's 14:05h temperature and the following day's forecast maximum temperature (Tmax) of > 29°C at Vancouver Airport (YVR) or > 34°C at Abbotsford. (These averages are used to predict Tmax of >31°C at YVR and >36°C at Abbotsford)

(Heat Alert Response System – Southwest BC Region, 2019)

A letter dated May 30, 2021 was received by the Mayor's office from Dr. Emily Newhouse, Chief Medical Health Officer for Fraser Health addressed to Community Leaders. The letter recommended three actions: (i) develop and update municipal response plans for both extreme heat and wildfire smoke events; (ii) develop long-term heat and wildfire smoke adaptation strategies; and (iii) incorporate resilience to climate change related events into planning. The letter also included a Background Information and Resources section where information on extreme heat and health and who is at risk for health impacts of heat.

BCCDC developed the British Columbia Health Impacts Prediction System (BCHIPS) tool. The tool is intended for use by public health professionals and members of the public to support health protection during hot weather. The BCHIPS framework uses a model of historic daily temperatures and historic daily counts of relevant ambulance dispatches to predict the impacts of the temperature forecasts for the upcoming days. The BCHIPS interactive online mapping system (<https://dangerouspenguin.github.io/>) allows users to access the forecast temperature range reports

for the current day, following day, and subsequent two days. Reports are produced daily for 32 defined forecast areas, each consisting of Local Health Areas with similar climatic conditions.

City of Burnaby

The City's Extreme Heat Initial Responses Guideline (EH-IRG) was first drafted in 2011. The guideline is reviewed annually and updated as new information is received, when emerging best practise is revealed and appropriate for adoption, or following activation of the guideline and debrief to augment response strategies.

The EH-IRG can be activated at any time at the discretion of the Chief Administrative Officer. The decision-making trigger to activate the guideline utilizes either the forecast conditions of the ECCC Heat Warning criteria or by request of a Medical Health Officer from FHA. The lower temperature thresholds of the ECCC Heat Warning offers the City time to strategize, plan for, prepare and implement initial actions that support public safety and public health in advance of the health authority Extreme Heat Alert.

The City of Burnaby's response to extreme heat events follows the frameworks identified in the Extreme Heat – Initial Response Guideline. These frameworks offer recommended pathways to actions that may be quickly coordinated or adapted to adjust to the unique circumstances of the emergency event or needs of Burnaby citizens.

HEAT DOME – 2021 JUNE 24 TO 2021 JULY 02

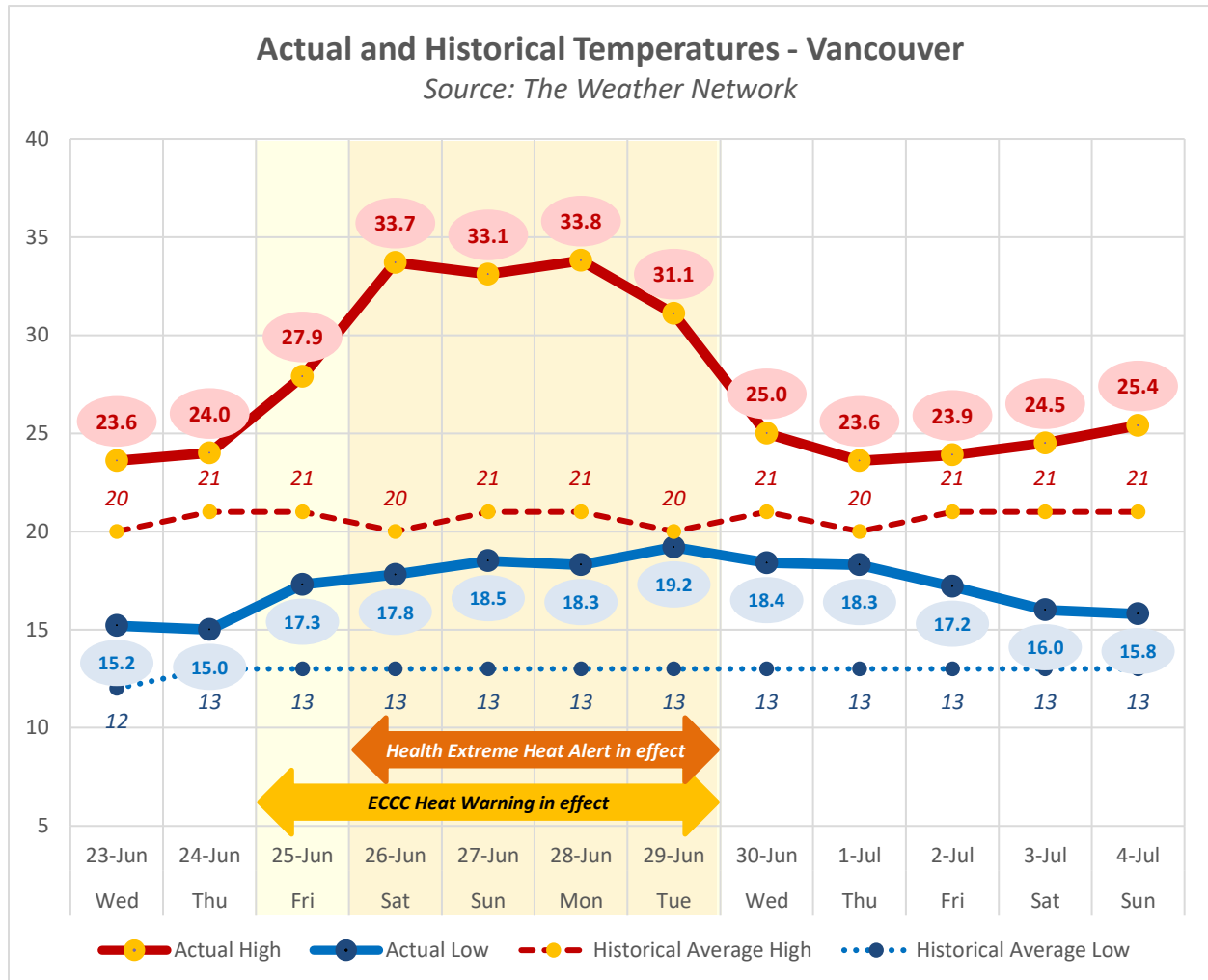


Figure 1: Vancouver Actual and Historical Temperatures - 23 June 23 - 04 July, 2021

Situation

A historic and dangerous, slow-moving strong high pressure weather anomaly, sometimes called Omega-blocking or “heat dome”, occurred in late June & early July of 2021.

The 2021 Heat Dome, also referred to as the 2021 Pacific Northwest Heat Wave, was an extreme heat event which affected a significant portion of Western North America from Northern California to British Columbia.

The exceptionally strong ridge of high pressure sat relatively still over the region forcing air downwards. As the surface air was heated, it became increasingly lighter, more compressed and

hotter because it could not escape the dome of high pressure above it. Some experts compared the situation to “pressure cooking”.

An important feature of 2021 Heat Dome is that it occurred following a very dry spring in the southern reaches of the weather pattern and the absence of evaporative cooling was deemed an important factor in the exceptional temperatures observed. However, the northern part of the region impacted experienced wet anomalies in the weeks and months preceding the heat. The anticyclonic subsidence¹ and downslope winds that were also present are thought by experts to have acted as compounding heating factors. (World Weather Attribution, 2021) Further contributing to the high temperatures that were recorded were the effects of the summer solstice - longest days of the year, shorter nights, and high sun angle.

The 2021 Heat Dome spurred 59 weather stations in BC to set records for the hottest temperatures ever recorded (many of these records were broken successively from June 27 to 29). On June 29 Lytton BC recorded a temperature of 49.6°C the highest temperature ever recorded in Canada. The village experienced a catastrophic wildfire the following day.

The temperatures during the heat dome event were so extreme that they lie far outside the range of historically observed temperatures. This challenges researchers to quantify with confidence how rare the event was.

Researchers considered the Heat Dome event to be a 1 in 1,000 year event given the current global climactic state. This represents a 1500% increase in frequency as without human-induced climate change researchers have indicated a heat event of that magnitude would have been a 1 in 150,000 year event. (World Weather Attribution, 2021) Pacific Climate Impacts Consortium (PCIC) climatologist Faron Anslow stated in interviews with the media that this is the sort of event that can be expected more often as the climate changes. (Sun, 2021)

Tyler H Tyler Hamilton, Meteorologist with the Weather Network Forecast Centre reported “Obviously, there is a climate change signal here. We are most confident about the extremes in terms of temperatures and how climate change influences these type of events.” (Hamilton, 2021)

ECCC meteorologists have noted that July 2021 was the second-warmest month on record in Vancouver of all time. The daily mean average for the month of July was 19.7°C, second only to July 1958’s average of 20.6°C. Both averages are significantly higher than the overall July daily average of approximately 18°C. (Kergin, 2021)

Observations and modeling performed by the World Weather Attribution initiative, the occurrence of a heatwave with maximum daily temperatures observed in their study area – the area bounded

¹ An area or system of high atmospheric pressure that has a characteristic pattern of air circulation, with subsiding air and horizontal divergence of the air near the surface in its central region.

of 45–52 °N, 119–123 °W – was deemed virtually impossible without human-caused climate change.

Anomalies of the highest daily maximum temperature in degrees Celsius for 2021
with study area denoted by the black box

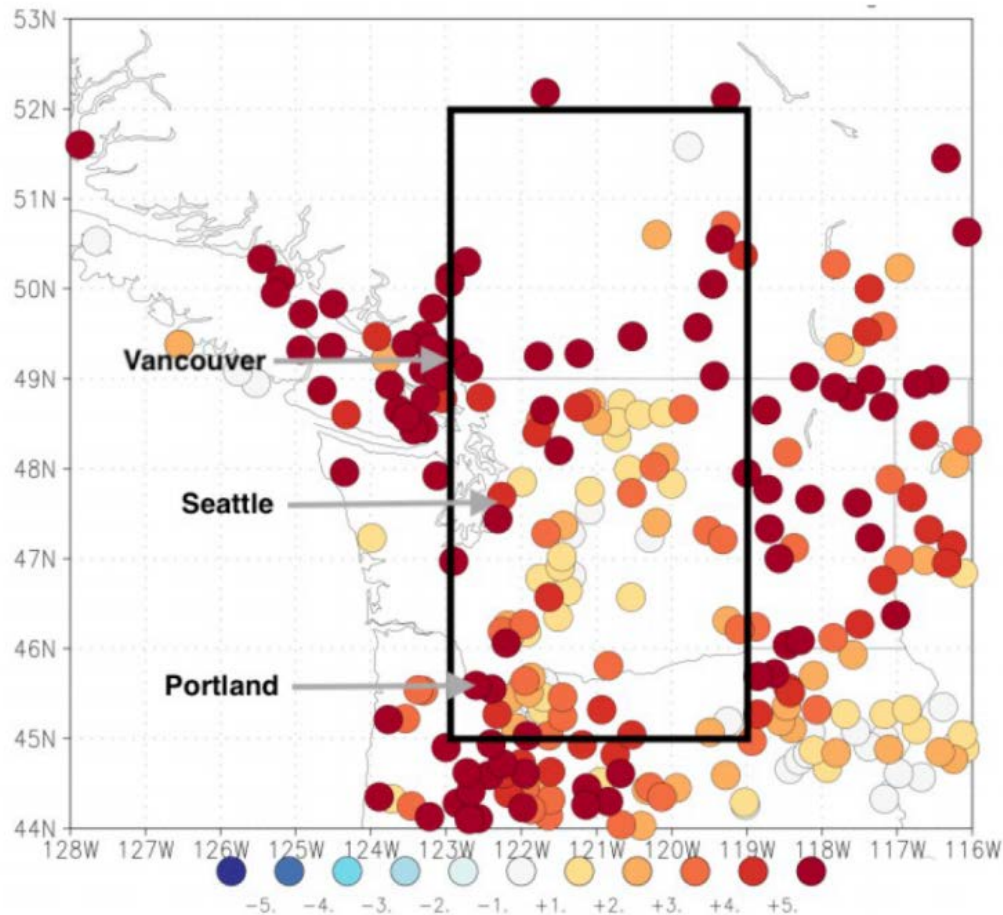


Figure 2: Maximum daily temperature anomalies recorded during heat dome

Figure 2 presents the anomalies of the highest daily maximum temperature in degrees Celsius for 2021, relative to the entire record available in the Global Historical Climatology Network Daily dataset. The black box in the figure indicates the bounds of the World Weather Attribution initiative study area.

9-1-1 Call Capacity

E-Comm 9-1-1 is responsible for answering 99 per cent of 9-1-1 calls made throughout B.C. E-Comm does not provide dispatch services for BC Emergency Health Services (BCEHS); rather, callers requesting an ambulance will be transferred by the E-Comm call taker to the BCEHS

dispatch centre. According to E-Comm’s website, the E-Comm call taker will remain on the line with the caller until the agency [the caller has requested] answers. (E-Comm Emergency Communications for British Columbia Incorporated, 2021).

BCEHS paramedics in Metro Vancouver reported they were overwhelmed with calls. When BCEHS call volumes are overwhelmed - as they were during the Heat Dome event - with calls in the automated hold queue, E-Comm call takers are also on hold for BCEHS, reducing the available call takers to answer other incoming 9-1-1 calls.

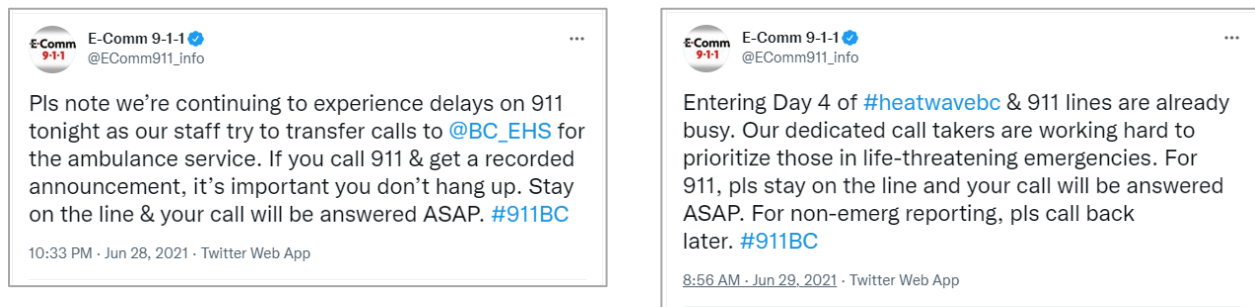


Figure 3: E-Comm 9-1-1 Tweets issued during Heat Dome event regarding calls on hold

When E-Comm 9-1-1 call takers are unable to answer incoming 9-1-1 calls, calls are picked up by an automated hold queueing system. The end result is a cycle of calls holding: 9-1-1 calls holding; BCEHS calls holding; and, E-Comm partner non-emergency calls holding.

The Vancouver Sun reported that internal BCEHS documents support the admission that health officials were unprepared for the scope and severity of the heat wave event.

Following the event the Honorable Adrian Dix, Minister of Health committed to reforms to BCEHS and working “to find solutions” to the additional challenges caused by climate change.

Burnaby Fire Department Service Augmentation

The heat dome created conditions requiring a substantial increase in the public’s need for emergency medical aid. The heightened demand for service strained the capacity of emergency service and emergency dispatching and exceeded the available resources across the Metro Vancouver region.

The Burnaby Fire Department (BFD) observed a significant increase in high acuity cardiac emergencies and sudden deaths attributed to heat. Citizen access to emergency services was impacted by:

- the inability to connect with 9-1-1 operators and extended wait time within the 9-1-1 telecommunications systems;

- the delays in 9-1-1 and BCEHS call-transferring of emergency events to BFD dispatch; and,
- the prioritization of BFD responses by BCEHS dispatchers based on available BC Ambulance Service (BCAS) response resources.

During the height of the heat dome event, emergency services across the region were engaged in providing critical medical care. This stretched service capacity impacting the remaining resources available for fire responses. A consequence of this region-wide reduced fire response capacity was that support through mutual aid - the assistance of one municipality's fire department to help an adjacent municipality to meet its atypical service demand - was not available. This required each of the fire departments across heat-affected regions to be self-sufficient.

BFD was able to nimbly and quickly augment standard platoon staffing with call-out fire companies to increase the department's ability to provide service. With this countermeasure, BFD was able to ensure adequate response capability for fire events occurring within Burnaby. The Fire Dispatch staff compliment was augmented from two (2) to three (3) members and additional fire companies were called in to manage and respond to the substantial increase in calls for emergency medical aid.

Spike in Fatalities

FHA and VCH morbidity forecasting dramatically underestimated how many people could die during the heat dome. In their 2019 Heat Alert Response System – Southwest BC Region criteria, FHA and VCH's Extreme Heat Alert criteria level is linked to at least a 20% increase in mortality, or 15-25 excess deaths in the Southwest BC Region per day. (Heat Alert Response System – Southwest BC Region, 2019)

In the Fraser Health region, the model used to estimate mortality increase estimated 60 deaths compared to the BCCDC average of 50. 815 sudden deaths province-wide were reported – nearly four times the average number for this period in recent years – with 569 preliminarily attributed as heat-related deaths. 49% of those deaths were in the FHA region, a 363% increase over the modelled estimate. (B.C. Coroners Service, 2021)

In a letter dated July 02, 2021, Dr. Jatinder Baidwan, Chief Medical Officer for BC Coroners Service, asked medical practitioners not to issue death certificates in cases where they believe the recent heat wave was a contributing factor.

The coroner's service will review each case and issue a certificate of death "if appropriate." Heat-related deaths were to be classified as accidental "exposure to excessive natural heat." And death certificates for accidental deaths can only be issued by coroners. (Baidwan, 2021)

Chief Coroner Lisa Lapointe said in a statement issued July 05 “All deaths reported are currently being investigated to establish cause and manner of death.” (Palmer, 2021)

Response Measures and Actions

June 22, 2021

The City received a “Yellow Weather Notification” mid-day from ECCC’s Pacific Storm Prediction Centre advising that a ridge of high pressure was forecast to strengthen over BC late in the week with the highest temperatures and freezing levels of the season expected by the weekend and into the following week. The notification forecast temperatures to soar across all regions of the entire province (mid-20s to mid-30s for much of the coast) including southern Yukon. (Environment and Climate Change Canada, 2021)

The City’s Emergency Management Coordinator forwarded the Yellow Weather Notification to the Director Public Safety & Community Services, Director Parks Recreation and Cultural Services, Director Corporate Services and Manager Risk, Insurance and Claims, with the recommendation to prepare for extreme heat conditions as per the EH-IRG, begin planning activities for cooling centres including considerations for vulnerable populations like seniors, low-income families, homeless and precariously housed individuals, and initiate drafting information for sharing with established networks and the public about where to find information regarding what to do to keep cool and the signs and symptoms of heat-related illness to watch for.

June 23, 2021

ECCC upgraded the Yellow Weather Notification to a Heat Warning effective June 25 for a duration of 5 days (Friday to Tuesday). The threat included daytime highs ranging from 29°C to 37°C combined with overnight lows of 18 - 20 °C. It further warned that humidex values during the period would reach the high 30's to low 40's range, increasing the potential for heat-related illnesses. The Heat Warning also noted that “Environment Canada and local medical health officers expect an increase in health and safety risks from heat and are advising the public to take precautions.”

June 24, 2021

The Director Public Safety and Community Services convened a meeting of the Emergency Planning Committee and departmental EH-IRG Functional Leads. A brief was provided by Bobby Sekhon, ECCC weather service meteorologist at which he stated that temperatures in Burnaby over the weekend of June 25 to 27 were forecast to reach daytime highs of 36°C and overnight lows of 20°C.

As the City's EH-IRG Activation criteria is based on the ECCC Heat Warning, activation of the guideline was recommended and confirmed by the City Manager. The EH-IRG was activated at 4:18pm. Response measures as outlined in the EH-IRG were confirmed, the roles and responsibilities of various departments were reviewed and verified, and the communications strategy established.

Three locations were identified and confirmed as cooling sites. Location decision making included complex considerations including: operating hours; accessible to and welcoming of all members of the public; reachable by pedestrians, transit, or vehicle; availability of Wi-Fi, washrooms, water, seating, etc.; limiting disruption to current programming at the facilities already constrained by COVID-19 restrictions; and, facility staff and security staff availability. Occupational Health and Safety developed a Safety Plan for each cooling site.

The EH-IRG planning group also received a request from the Society to End Homelessness in Burnaby (the Society) and their Extreme Weather Heat Response (EWHR) committee requesting supports to provide a location where they could establish a cooling site for those experiencing homelessness. The EH-IRG planning group welcomed the opportunity to cooperate with the Society and support the needs of the more vulnerable. In consultation with the Society and their EWHR lead, the south-east corner of Civic Square was selected due to its ease of access, tree canopies providing shade, availability of free Wi-Fi from the Burnaby Public Library (BPL) Bob Prittie Metrotown library, and access to water spigots (to connect portable misting apparatus), among its many features. To support the Society's EWHR's efforts, the City arranged for portable chemical toilets for the site and supplemented garbage and recycling services.

June 25, 2021

Mid-morning, local government representatives received an email from EMBC which forwarded an email from HEMBC advising of the potential for an Extreme Heat Warning to be issued by Fraser Health.

The City's three cooling sites - BPL McGill Branch, BPL Bob Prittie Metrotown Branch, and Edmonds Community Centre - were opened and available to the public from 10:00am – 7:00pm. The initial operating period was Saturday, June 26 to Wednesday, June 30, with the option to extend as required. Portable toilets were delivered to the cooling site locations and tables and chairs were provided from facility supply or Facilities Management resources. The cooling sites were staffed by facility staff for site supervision and access to first aid, if needed, and were complemented by City Security Officers.

Corporate Communications lead a comprehensive communications strategy included information sharing via the city's website, social media channels and poster and postcard campaign. The city's information echoed the health authority information contained in the heat warning and included

specific information on the City's three cooling sites. Communications were also provided to City staff and outdoor program volunteers on the heat health information and the three cooling site locations

RCMP engaged a dedicated outreach team to perform wellness checks of vulnerable people and shared the cooling site locations with them.

At 7:00pm, FHA/VCH escalated the ECCC Heat Warning to an Extreme Heat Alert. As per the HARS for Southwest BC, the alert was disseminated to local government representatives via HEMBC through EMBC's stakeholder distribution lists. In the email, the health authorities noted this was the first time an extreme heat alert was being issued in our region. The Extreme Heat Alert was also communicated to the media through an Information Bulletin; however, it was not communicated that the level of warning and danger was unprecedented. (Lower Mainland Medical Health Officers for Fraser Health and Vancouver Coastal Health, 2021)

June 26 to June 29, 2021

The three City cooling sites maintained operational hours of 10:00am – 7:00pm. The sites were well attended by those seeking relief from the heat.

June 30, 2021

A meeting of the Emergency Planning committee and EH-IRG Functional Leads was called to review the weather forecast for the next 3-day period, review the status of the implemented measures and communications plan, and ascertain the public's feedback to the City's response activities. Consensus of the meeting participants was to continue the cooling site operations until Friday, July 02 and may be extended again, were forecast high temperatures to continue.

July 01 to 02, 2021

Temperatures for Thursday, July 01 and Friday, July 02 were cooler than those seen at the peak of the heat dome. The cooling sites were demobilized at 7:00pm, Friday, July 02 and citizens continuing to seek refuge from overly warm residences were redirected to the common areas of the four libraries and shaded park areas. This was communicated to the public on the City's website, by social media posts and through updated posters at facilities.

The decision to formally deactivate EH-IRG, was deemed unnecessary on July 02 as the threat of extreme temperatures had passed.

Cooling Site Attendance

Over the course of the heat dome, the three cooling sites welcomed 771. (See Table 1). The visitor demographic included all ages, with seniors, adults and youth being the highest users. The average

visitor stay varied from 30 to 105 minutes. Highest attendance was during the hottest days of June 25 to 29 and peak times were between 5:00 – 7:00pm. 2,060 bottles of water were made available to the public.

Cooling site users expressed appreciation for the City’s efforts and were thankful for having access to the cool air oases, available seating and water for rehydration.

	McGill Library	Edmonds Centre	Metrotown Library	TOTALS
Total number of patron visits	364	100	307	771
Demographics	Seniors, adults and youth	Seniors, adults and youth	Seniors, families, Adults and Youth	
Average length of stay (min)	45	30	105	> 60 min
Bottles of water available	524	720	816	2,060

Table 1: Heat Dome Cooling Site Statistics

Cost Eligibility and Recovery

Most of the costs related to the City’s response for this heat event, with the exception of BFD’s incremental costs, were captured in two event-specific internal orders. Costs included cooling site staff time, water, and printed materials. Incremental staffing costs of BFD and RCMP were accounted for in their existing cost centre accounts.

A Response Claim Submission to EMBC is being submitted is to recover the eligible incremental costs incurred by the city for this event.

Lessons Learned into Actions

A post-event debrief was conducted July 13, 2021 to confirm the EH-IRG activation triggers, celebrate response successes achieved, assess effectiveness of the public safety heat response strategies, determine areas of the City’s response measures that could be enhanced and adopted immediately, and identify opportunities to turn lessons-into-actions for future heat events. Debrief attendees deemed the overall response a success. They shared perspectives on challenges and identified many solutions for quick start actions, medium-term initiatives and long term strategies. (See the section Recommendations into Actions)

Response Achievements

The EH-IRG was seen as an effective planning framework. The teamwork of the Emergency Planning Committee and EH-IRG Functional Leads was exemplified in the City's response to the heat dome event with all members of the planning group actively engaged in the discussions and decision making. The planning group ensured that initiatives and response measures were completed within the extremely short timelines presented, and staff rapidly enacted response measures to answer EH-IRG prime directive of ensuring public safety.

Staff from across the City - BPL, Parks, Recreation and Cultural Services, Public Safety & Community Services - modified operations and adjusted schedules to set-up and staff the cooling sites. Some facilities modified operating hours to ensure the cooling site hosted at their facility was open and accessible.

BFD recognized a change to the volume of incoming calls from E-Comm 9-1-1, and immediately implemented elements of their Rapid Service Expansion protocols. This included calling in overtime dispatchers and overtime fire companies to manage calls for and response to emergency medical incidents.

RCMP communication to Line Officers and the swift coordination of outreach teams positively facilitated awareness and supported the needs of the public.

Corporate Communications and Corporate Marketing expeditiously created materials and key messages. The communications strategies and materials were found to be effective in communicating cooling site locations and how the City was supporting public safety.

Response measure considerations of washrooms, tables, chairs, electronic outlets, Wi-Fi at cooling sites provided additional value to users, and the proximity of the cooling sites to public facilities and outdoor spaces increased visibility of the sites and aided those partaking in outdoor activities and requiring cooling and rehydration to find the sites.

Quick Start Actions and Early Adoption Response Measures

Short turn-around solutions that could be rapidly adapted into the EH-IRG allowed immediate enhancement of the EH-IRG, making it ready for the next extreme heat event. These included:

- Identify one facility as a cooling site for each of Burnaby's four quadrants.
- Establish key messaging script templates and message placeholders to be utilized annually as necessary.
- Develop a process to disseminate cooling site location(s), hours, and services provided to E-Comm 9-1-1, Vancouver 3-1-1, and neighbouring municipalities (cities of Vancouver, Coquitlam, New Westminster, Port Moody), for awareness and informational purposes.

The update to the EH-IRG was completed July 15, 2021.

Council Delegation by the Society to End Homelessness in Burnaby

At the July 26, 2021 Council meeting, Council received a presentation by the Society to End Homelessness in Burnaby from Executive Director Carol-Ann Flanagan on their Extreme Weather Heat Plan.

Ms. Flanagan offered Council an overview of the Society's Extreme Weather Heat Response Plan (EWHR), including its purpose, target audience, response measures, and the need for the measures. Council learned that homeless people cope with unusual heat with minimal protection, often have limited access to drinking water, and may face exclusion due to stigma from cooling off in air conditioned spaces such as malls and other publicly accessible facilities.

She shared that the Society had reached out to the community, seeking locations; however, they had not been successful in locating an appropriate site.

Ms. Flanagan requested that the City allow use of a portion of a park large enough to accommodate awnings, and provide washroom and parking facilities. The Society's EWHR includes setting up cooling centres in all four quadrants of the City. It was also requested that the City assist in the well-being of the most vulnerable community members.

Arising from discussion, the delegation's presentation was referred to staff. (City of Burnaby, Office of the City Clerk, 2021)

HEAT WAVE #1 – 2021 JULY 29 TO AUGUST 01

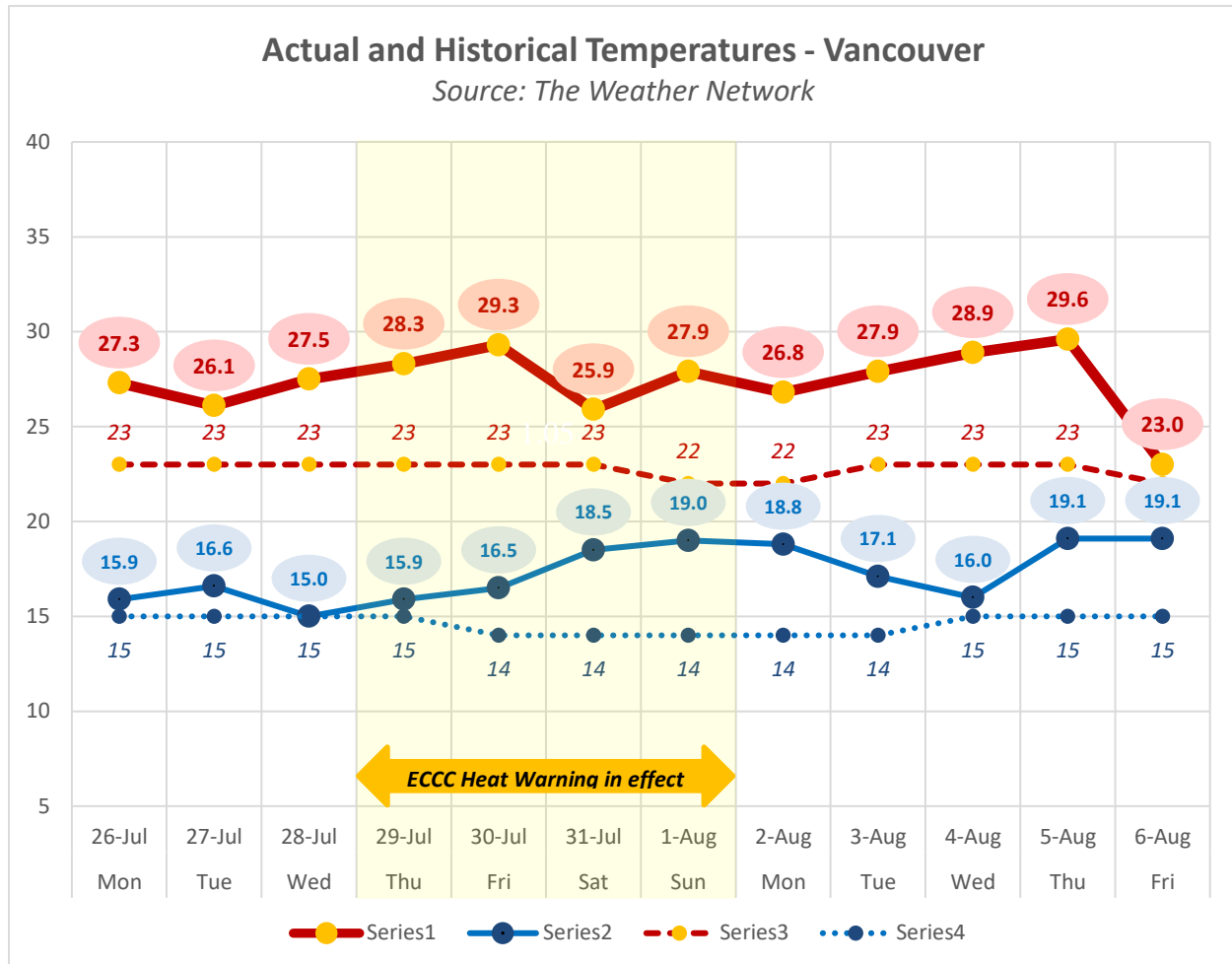


Figure 4: Vancouver Actual and Historical Temperatures - 26 July 23 - 06 August, 2021

Situation

The second heatwave of the 2021 summer season resulted from a building ridge of high pressure that brought increasing temperatures to the province's south coast. Thursday to Saturday were the hottest days during the heat wave, which was followed by a gradual cool-down on from Sunday to Monday.

This heat wave was not nearly as intense as the heat dome event, but still brought temperatures many degrees above normal. The unseasonable conditions were deemed hazardous to humans and animals alike, making the biome in some areas virtually uninhabitable for some species. Water

temperatures in many water bodies were running several degrees above the safe level for salmon, causing lesions and heat-related injuries that are now endangering populations of the fish.

At the time of this heat wave, the BC south coast had gone 40 days without measureable precipitation and hot temperatures continued to sap the ground of moisture, reinforcing the already significant drought conditions in many areas.

Response Measures and Activities

July 27, 2021

ECCC issued a Heat Warning at 23:35hrs for the Metro Vancouver area including the cities of Vancouver, Burnaby and New Westminster. The period of the warning was Thursday, July 29 to Sunday, August 01 inclusive.

The warning indicated that the threat included day time highs near 30°C combined with overnight lows in the mid to upper teens resulting from a building ridge of high pressure.

July 28, 2021

The Director Public Safety and Community Services convened a meeting of the Emergency Planning Committee and EH-IRG Functional Leads.

The forecast temperatures of the ECCC Heat Warning met the EH-IRG criteria for activation and the decision to activate the EH-IRG was made at 2:12 pm.

The July 26 Council delegation presentation by the Society to End Homelessness in Burnaby was raised. The planning group learned that the Society was seeking a single site for this heat event and had already been in contact with staff from Social Planning, had met with City representatives from Parks Operations and selected the grassed and shaded area at the southeast corner of Civic Square, near McKay Avenue and Central Boulevard. It was confirmed by the Social Planning that the Society was prepared to set-up the site as early as the next day and that the pop-up cooling site would be operated and staffed by the Society. The City supported the Society's efforts by provisioning temporary chemical toilets for the location.

The communication strategy was consistent with that of the heat dome event, with the already created templates, key messaging and printed materials requiring only minor modifications to revise the cooling site locations. As done for the heat dome event, the communications to the public included utilizing the City's e-newsletter, website, social media posts, and posters at City facilities. Burnaby RCMP outreach teams were again provided information postcards to handout during their wellness checks. The communications campaign was expanded to include emails sent

from various departments to established networks, service partner organizations, and other supporting agencies.

A supplemental outreach and poster campaign was undertaken by Public Safety & Community Services Bylaw Enforcement staff. Four teams of two placed cooling site posters at 285 multi-family residential buildings that had been identified in which residents may have increased risk potential for heat-related illness.

Four city operated facilities were confirmed as cooling site locations. This has been a Quick Start Action and Early Adoption Response Measure identified following the heat dome event. The primary locations selected were Eileen Dailly Leisure Pool and Fitness Centre, Cameron Recreation Complex, Edmonds Community Centre, and Bonsor Recreation Complex. The relaxing restrictions of the Provincial Health Officer Orders related to COVID-19 allowed the city to make use of the common lobby areas of these facilities. To ensure sufficient capacity, if demand for the cooling sites exceed the remaining COVID-19 facility occupancy limits, the four Burnaby Public Library branches were ready and able to stand up as supplemental and overflow sites.

July 29 to August 01, 2021

Cooling site operational hours were 10:00am -7:00pm, consistent with those established for the heat dome event. The sites were inclusive, barrier free, and welcoming to any and all individuals seeking relief from the heat. Cooling Sites services included free access to water, wall outlets for charging personal devices, washrooms, as well as showers for the nominal fee of \$1.00.

The cooling sites utilized the common lobby areas of each facility. This ensured protection from the high temperatures in air conditioned space, staff available to observe visitors for signs of heat-related illness, and first aid trained staff to quickly triage basic care.

BFD augmented staffing levels consistent with the expected increase in emergency calls for medical incidents related to extreme heat. Two overtime call-in emergency dispatching personnel and two overtime call-in fire companies as medical response teams supplemented the existing fire department platoons for the operational period of July 29 to August 01.

These incremental costs were considered by EMBC as eligible response costs under the Emergency Program Act, Compensation and Disaster Financial Assistance Regulation. Through the established and standard provincial process, an Expenditure Authorization Form (EAF) was used to request, verify and approve eligibility of the specific emergency response costs.

Similar to the heat dome event, RCMP assigned outreach teams to perform wellness checks of vulnerable people and share the cooling site locations with them.

Cooling Site Attendance

This heat event saw fewer patrons utilizing the cooling sites, at only 152 visitors (See Table 2)

	Eileen Dailly	Cameron	Edmonds	Bonsor	
Total number of patron visits	35	19	64	34	152
Demographics	Adults, seniors, families	Not Recorded	Seniors, families, youth	Families	
Average length of stay (min)	15	35	20	25	< 25 min
Bottles of water available	264	264	384	360	1,272

Table 2: Heat Wave #1 Cooling Site Statistics

Visitor demographics included all age groups, with seniors, families and youth the highest users. The typical length of stay was shorter than the previous event at 25 minutes on average. Peak periods and longest stays were between the hours of 5:00 – 7:00pm.

It was noted by cooling site personnel that many patrons stopped on their way into or out of the facility to take advantage of the complimentary bottles of water. 1,272 bottles were made available, a reduction of 38% compared to the previous heat event.

Society to End Homelessness in Burnaby Pop-Up Cooling Site

On July 30, 2021, the Society issued an Extreme Weather Heat Response ALERT in accordance to their Extreme Weather Heat Response plan. The alert was in place from July 30 - August 4.

An open-air pop-up cooling site was located in a treed and shaded area of Civic Square at the south-east corner of the park. Run entirely by volunteers, it complemented the City's four indoor cooling sites and offered a cool and shaded spot for people seeking refuge from the heat. Free water, food, juices, clothing, sunscreen, hand sanitizer, hygiene, and harm reduction supplies were available, all of which were donated. The cooling site also featured a misting station (enjoyed by the young and young at heart), Wi-Fi, cooling cloths and individual cooling fans/misters for loan. Resource information on COVID-19 clinics, housing and service agencies was also available.

The pop-up cooling site saw 308 visitors over the 6 days opened. (See Table 3) The peak time of visits was 2:00-4:30 pm with people staying longer on the hottest days. The site was well attended by individuals experiencing homelessness. (O'Shannacery, Report - Extreme Weather Heat Response July 30-August 4, 2021 – 6-day heat wave, 2021)

Days open	Visitors	% homeless (approximate)	Harm Reduction	Health Intervention	Other Intervention
Six (6)	308	36%	118	2	14

Table 3: Heat Wave #1 EWHR Pop-up Cooling Site Statistics

Other Supports

EMBC and GeoBC supported local government information sharing by way of a GIS-based Heat Wave and Cooling Centre Data Portal. The intent of the portal, launched July 30, was to allow local government and First Nations partners in the Metro Vancouver region to view the locations and open/closed status of other communities cooling centre locations and other cooling features (pools, spray parks, drinking water fountains, etc.) and to add and edit records related to their community.

Cost Eligibility and Recovery

The cost of the City's response for this heat event was captured in an event-specific internal order. Costs included cooling site staff time, water, printed materials and BFD incremental staffing costs.

EMBC deemed the heat wave situation an eligible event under the Emergency Program Act, Compensation and Disaster Financial Assistance Regulation. Supports and some response cost recovery were made available to Indigenous Communities and Local Governments through the Act by way of the established cost authorization and eligibility processes.

Not all costs incurred by the City are deemed eligible for recovery from the Province. Costs specified by Emergency Management BC that would meet eligibility criteria included:

- a) Reimbursements limited to incremental costs, such as:
 - Overtime costs to open a civic facility that would otherwise not be open.
 - Water for use/distribution within the facility.
 - Transportation to and from cooling centers in communities where no scheduled public or reasonable transportation exists (subject to prior approval by EMBC).
- b) Community activities specifically requested by the Health Authority to provide assistance to respond to the impacts of the heat wave (subject to prior approval by EMBC).
- c) Incremental costs to support fire service responding to increased heat related calls (subject to prior approval by EMBC).

To guarantee eligibility of cost recovery related to BFD's staffing augmentation, the City submitted an Expenditure Authorization Form (EAF) to the Provincial Regional Emergency Operations Centre, Southwest (SWE PREOC) for approval. Costs totalling \$21,864.48 were approved by the SWE PREOC on August 11, 2021.

A Response Claim Submission to EMBC is being submitted to recover the eligible incremental costs incurred by the city for this event.

Lessons Learned into Actions

The meeting to debrief for this heat wave was conducted August 09, 2021. Debrief participants were provided a copy of the After Action Report (AAR) for the heat dome event to guide their engagement and to aid in the identification of improvement opportunities not already noted in the heat dome AAR.

Debrief attendees deemed the City's actions response a success and identified some additional medium-term initiatives and long term strategies that could be leveraged from the two heat events. (See the section Recommendations into Actions)

Response Achievements

The engaged cooperation of the Emergency Planning Committee and EH-IRG Functional Leads and staff implementing and managing the response measures demonstrated a continued commitment to public safety and was again noted as a key element to the success of City's response to the heat wave.

BFD implemented their staffing modification pre-plan in anticipation of increased calls for emergency response to medical incidents. By advanced planning, the Department ensured adequate capacity for all calls for service directed to them.

RCMP outreach teams again completed wellness checks and hand-to-hand distribution of cooling site locations postcards to vulnerable populations.

Parks, Recreation and Cultural Services facilities hosting the cooling sites modified operations to welcome any and all patrons to the cooling sites. Some facilities altered operating hours to ensure the cooling site was open and accessible, and staff adjusted personal schedules to accommodate the revised facility hours.

Quick Start Actions and Early Adoption Response Measures

Early Adoption Response Measures identified during the heat dome event had been adapted into the EH-IRG. No further Quick Start enhancements were identified.

HEAT WAVE #2 – 2021 AUGUST 11 TO 15

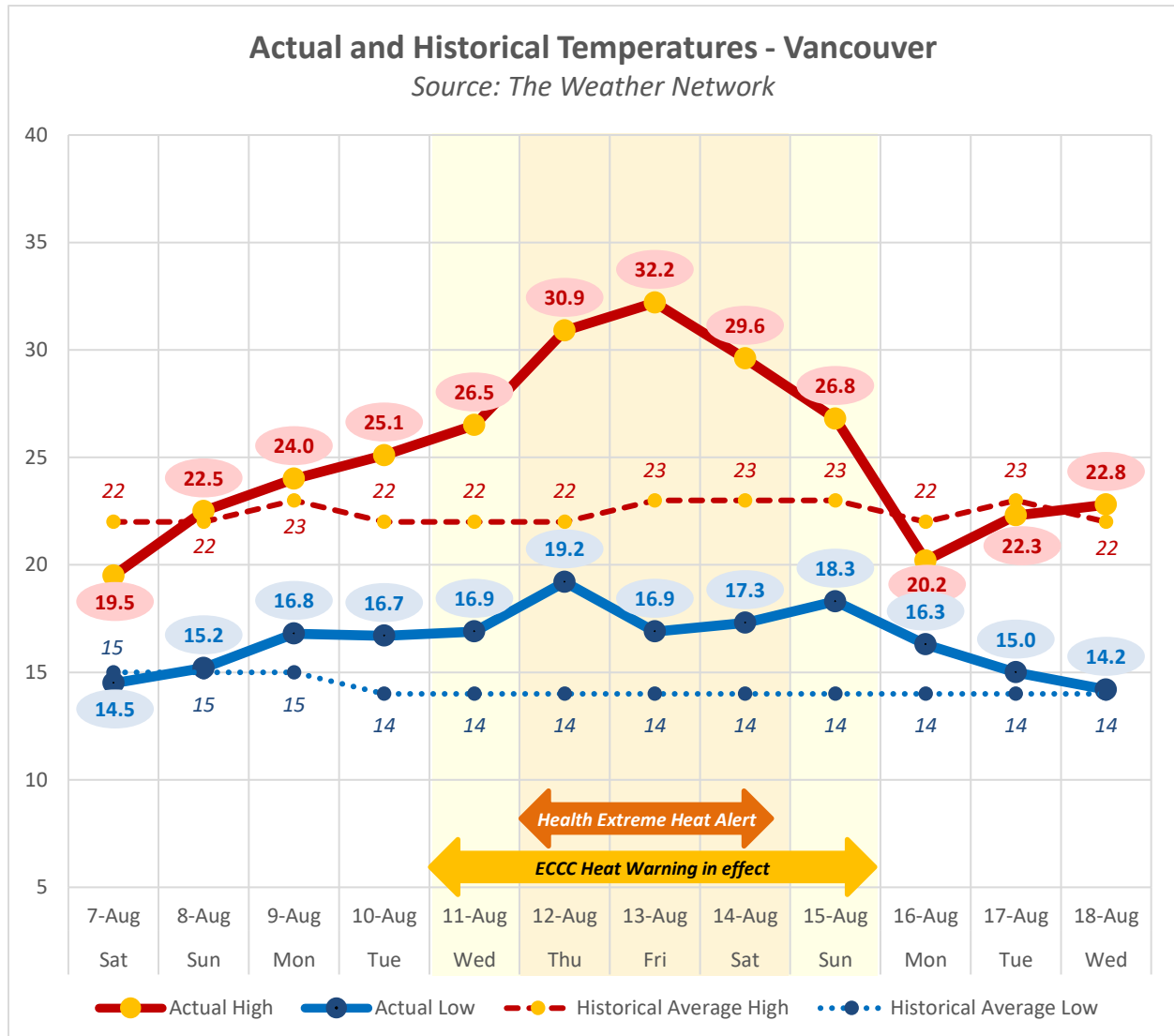


Figure 5: Vancouver Actual and Historical Temperatures - 07 August - 18 August, 2021

Situation

The summer's third heat wave was the result of another Pacific high pressure ridge that brought increasing temperatures to the province's south coast with elevated overnight temperatures offering little relief at night.

Daily temperature records continued to be broken during this heat event. ECCC staff noted that 3-4 times as many highest minimum temperature records were broken during this heat event.

August 06, 2021

EMBC facilitated a coordination call for First Nations and local government emergency management stakeholders. ECCC shared information on the Special Weather Statement they had issued late the previous evening regarding the next incoming and strengthening ridge of high pressure ridge and expected high temperatures.

Emergency Management staff shared the weather prediction information with Social Planning so that they could proactively forward the information, as a courtesy, to the Society to End Homelessness in Burnaby's EWHR group.

Mid-afternoon, ECCC issued a Yellow Weather Notification indicating that temperatures were forecast to climb into the high 20s and low-30s for coastal BC, and reach the mid-30s for the southern interior, overnight temperatures would remain elevated, dropping only to the high-teens overnight, and the peak heat was forecast between Thursday and Friday with potential to extend into the weekend.

August 09, 2021

The Director Public Safety & Community Services had already convened a meeting of the Emergency Planning Committee and EH-IRG Function Leads to debrief on the previous heat event (Heat Wave #1). Time during this meeting was utilized to discuss preparations and response measures to be implemented for the coming heat event.

The decision to activate the City's EH-IRG, for the third time, was made, with the activation coming into effect August 10, 2021

August 10, 2021

ECCC issued a Heat Warning for Metro Vancouver and Fraser Valley. The warning noted that the strong ridge of high pressure was developing and was expected to reach maximum strength Thursday-Friday resulting in very hot temperatures. The duration of this heat wave was forecast to last at least three days, with elevated low temperatures offering little relief at night. For the period the Heat Warning said Thursday to Sunday daytime high temperatures would range between 34-38°C degrees with overnight lows dropping to only 17-20°C. Humidex values were expected to reach the high 30's to possibly the low 40's.

EMBC distributed to their stakeholder lists notice that this heat event had been deemed an eligible event under the Emergency Program Act, Compensation and Disaster Financial Assistance Regulation. Supports and response cost recovery made available to Indigenous Communities and Local Governments would be the same as for Heat wave #1.

City cooling sites were opened once again welcoming any individual seeking relief from the heat. Cooling site operational hours were 11:00am -7:00pm. Consistent with what had been offered for the previous heat event, cooling sites were located inside the facilities utilizing the common lobby area of each facility and included free access to water, wall outlets for charging personal devices, washrooms, and \$1.00 showers.

August 11, 2021

BFD again amplified staffing levels as done for the Heat Wave #1. Two (2) overtime call-in emergency dispatching personnel and two (2) overtime call-in fire companies as medical response teams supplemented the scheduled fire department platoons for the August 11 - 14 operational periods.

RCMP once again assigned outreach teams to perform wellness checks of vulnerable people and share the cooling site locations with them.

August 13, 2021

An Extreme Heat Warning was issued by local Health Authorities and an Emergency Information Bulletin was shared through Health Authority distribution networks and further disseminated to local government and First Nations via EMBC's stakeholder distribution lists.

ECCC issued a Special Air Quality Statement in response to reduced air quality and smoke in the Metro Vancouver and Fraser Valley regions from the aggressive wildfires in BC's interior, Washington, Oregon and California. The smoke, although reducing daytime temperatures, was not having the same affect to overnight lows.

Mindful that the forecast weather conditions included high overnight temperatures, City cooling site hours were extended to 9:00 pm for August 13 (Friday) and August 14 (Saturday).

August 15, 2021

ECCC ended both the Heat Warning and Special Air Quality Statement.

Substantial increase in usage was observed at the City's cooling sites at the peak of this heat event. In an effort to sustain continued service to the community, the cooling sites remained open August 15, with operations terminating at 9:00pm.

The EH-IRG was deemed deactivated when the cooling sites closed.

Cooling Site Attendance

This heat event saw increased usage at all four cooling sites with 637 patrons seeking relief from the heat. (See Table 4)

	Eileen Dailly	Cameron	Edmonds	Bonsor	TOTAL
Total number of patron visits	136	124	271	106	637
Demographics	Adults, seniors, families	Not Recorded	Adults, seniors, families, youth	Families	
Average length of stay (min)	15	35	20	25	< 25 min
Bottles of water available	468	108	720	432	1728

Table 4: Heat Wave #2 Cooling Site Statistics

Visitor demographics included all age groups, with seniors, families and youth the highest users.

The typical length of stay was shorter than the previous event at just under 25 minutes on average. Peak periods and longest stays were between the hours of 5:00 – 7:00pm.

As previously experienced for Heat Wave #1, patrons would stop on their way into or out of the facility to take advantage of the complimentary bottles of water. 1,728 bottles were made available to the public.

Society to End Homelessness in Burnaby Pop-Up Cooling Site

On August 10, 2021, the Society issued an Extreme Weather Heat Response Alert in accordance to their EWHR plan.

The City supported the Society's open-air pop-up cooling site through allotting the use of the south-east corner Civic Square for their site. Free water, food, juices, sunscreen, hand sanitizer, hygiene, and harm reduction supplies were available.

The pop-up cooling site saw 308 visitors over the 4 days opened. (See Table 5) Data provided in the report prepared by the Society's EWHR Lead demonstrated that the site was well attended by individuals experiencing homelessness. (O'Shannacery, Report – Extreme Weather Heat Response August 11 – 14, 2021 – 4-day heat wave, 2021)

Days open	Visitors	% homeless (approximate)	Harm Reduction	Health Intervention	Other Intervention
Six (6)	308	36%	118	2	14

Table 5: Heat Wave #2 EWHR Pop-up Cooling Site Statistics

Cost Eligibility and Recovery

The cost of the City's response for this heat event was captured in an event-specific internal order and included cooling site staff time, water, printed materials and BFD's incremental staffing costs.

EMBC deemed the heat wave an eligible event under the Emergency Program Act, Compensation and Disaster Financial Assistance Regulation. Costs specified by Emergency Management BC that would meet eligibility criteria were consistent with those identified for Heat Wave #1:

The City submitted a new EAF to the SWE PREOC for approval of costs totalling \$21,864.48

A Response Claim Submission to EMBC is being submitted is to recover the eligible incremental costs incurred by the city for this event.

Lessons Learned into Actions

A debrief to this heat event was conducted via email. The debrief participants were provided a summary of the previously identified recommendations and were asked to offer any additional comments or new opportunities that arose during this heat response.

Response Achievements

As this has been the third heat response, the only comment received was recognition of the cooling site staff, who were once again willing to adapt schedules in an effort to promote safety and health security of the public.

Quick Start Actions and Early Adoption Response Measures

No additional Early Adoption Response Measures were identified. Social Planning and Citizen Support Services staff reflected on future collaborative planning opportunities with the Emergency Management division and offered additional medium and long-term strategies that would benefit future heat responses.

POST-INCIDENT DEBRIEFS

The debriefing process is a pathway of the 360-degree continuous improvement cycle utilized by Emergency Management.



The purpose of the debriefing process is to ascertain “what went well” and if there are any areas that could be enhanced, through review of feedback from as many different perspectives as possible. The end result is an After Action Report (AAR) which outlines successes and recommended areas where planning frameworks and response guidelines could be enhanced.

Assessment tool

A debrief was conducted following each of the three extreme heat events. The tool used for the three debriefs was the Emergency Management division’s standard Opportunity Assessment. The assessment uses plain language categories - Keep, Get, Lose, Avoid, and Luck - to collect feedback. It highlights successes, identifies Quick Start Actions and Early Adoption Response Measures and informs medium-term initiatives and long-term strategies which, when combined, creates a roadmap for the city and stakeholders to navigate future engagement and planning.

Quick Start Actions and Early Adoption Response Measures that were identified were immediately adapted into the EH-IRG.

Successes

It is important to recognize what worked well and why, and ascertain if there is something that can be learned, replicated, or inspire successful outcomes in other response actions and goals. By including a focus on what was accomplished, rather than merely list what requires change, success-oriented mindsets are stimulated.

General

- Strong participation from EH-IRG Functional Lead meeting attendees
- Engaged teamwork between all city of Burnaby departments involved
- Exceptionally hard working staff in field
- Effective use of EH-IRG and city of Burnaby resources to enact EH-IRG response measures

Communication and Information Sharing

- Problem solving and task oriented communication between EH-IRG Functional Lead committee departments
- Effective RCMP forecasting and communication to Line Officers
- Positive Block Watch & Burnaby neighbourhood outreach engagement: aim to check on friends & family
- Effective Community Response Team communications
- Corporate communications strategies including postcard distribution and messaging to check on community members
- Daily summaries of Cooling Facility statistics broken down by location and number of visitors exceedingly useful for current and future EH-IRG strategies.
- Hand-to-hand delivery of postcards and flyers allowed for increased optics, engagement with the City, and in-person wellness checks
- Interim status update briefings allowed for situational awareness, feedback and improved the ability to adjust response measures as needed,
- Post-event debriefs and After Action Reports allowed for planning group engagement and ensured planning process improvement cycle.

Inter-Agency/Inter-Departmental Coordination

- Strong inter-departmental (internal) working relationships were demonstrated
- Beneficial RCMP engagement and information sharing with EH-IRG Functional Lead departments

Resource Management and Coordination

- Good use of resources to answer EH-IRG prime directive to provide relief from heat through Cooling Facilities and water
- Visitors were free to stay at Cooling Facilities for as long as needed
- Good practice to create different IO sets for costs related to operating Cooling Facilities

Facilities, Equipment, Tools and Technology

- Equipment provided at Cooling Facilities were utilized by visitors (washrooms, tables, chairs, electronic outlets, Wi-Fi)
- Metrotown Library parkade Cooling Facility location was spacious, stayed cool and accommodated large numbers of visitors as needed
- Cooling Facility proximity to outdoor space increased facility visibility and aided those partaking in outdoor activities who were in need of hydration
- Proximate libraries established as Heat Dome Cooling Facilities set aside COVID-19 protocols and welcomed the public as secondary cooling locations

Recommendations into Actions

A recommendation without follow up action renders it meaningless. In the detailed AAR prepared for each of the heat events, additional columns, “Action by” and “Target Completion Dates”, are provided in the Recommendations to Actions matrix. These provide a mechanism for tracking departmental engagement, milestone monitors that improvements are enacted upon, and ensures lessons learned do not have to be re-learned during future events.

1. Maintain EH-IRG prime directives as serving basic human needs.	Quick Start COMPLETED
2. Establish interim policies that communicate response Internal Order established for capturing all response-related costs in order to avoid staff posting costs to home cost centre or other internal orders unrelated to response activities.	Quick Start COMPLETED
3. Early engagement with RCMP communications and Community Policing regarding cooling locations for ensure enhanced police patrols.	Quick Start COMPLETED
4. EH-IRG Functional Lead Committee key contacts list for distribution to all city parties.	Quick Start *REPEATABLE
5. Develop a process to disseminate Cooling Site location(s), hours, and services provided to E-Comm 9-1-1, Vancouver 3-1-1, and neighbouring municipalities (Vancouver, Coquitlam, New Westminster, Port Moody), for awareness and informational purposes.	Quick Start *REPEATABLE

6. Determine and communicate details from EMBC and/or PREOC (if activated) regarding Task Number eligibility and period of eligibility.	Quick Start COMPETED
7. Include in Cooling Site locations that have = the following capabilities:: <ul style="list-style-type: none"> • Accessibility to power outlets by patrons • Free Wi-Fi for public use. 	Quick Start COMPETED
8. Prepare worker Safety Plans that ensure sufficient worker care to prevent staff from feeling isolated at location of Cooling Site.	Quick Start COMPETED
9. Host and facilitate extreme heat “information sessions” for the public (one in each quadrant) prior to the summer with panel participants that include representation from Council, Public Safety & Community Services, Citizen Support Services, Social Planning, Parks, Recreation & Cultural Services, Fraser Health Authority, BCCDC, and others, as appropriate.	Quick Start SPRING 2022 <i>*REPEATABLE*</i>
10. Develop a more detailed air quality response strategy, outside of wildfire smoke to EH-IRG i.e. ground level ozone, etc. (See also #4 for alternate recommendation)	Medium-term
11. Develop a specific Poor Air Quality Response Guideline independent of the EH-IRG (See also #3 for alternate recommendation).	Long-term
12. Prepare external and internal messaging on signs of heat exhaustion and heat stroke. <i>See footnote 2 for decision from Emergency Planning Committee.</i>	NOT ACTIONED
13. Utilize communication strategies to avoid creating inflated expectations of services at Cooling Facility.	Medium-term
14. Establish key messaging script templates/placeholder re: Cooling Sites to be utilized annually as necessary.	Medium-term
15. RCMP to develop workflow/checklist for handing out flyers & conduct of outreach and patrols.	Medium-term
16. Create a citizen support accountability system/support program or network for highly vulnerable populations (elderly, isolated, new immigrants, homeless, etc.) Program suggestion may include a ‘buddy system’ for neighbor check-in and assistance.	Long-term
17. Translate the posters and postcards translated into other languages.	Medium-term <i>*REPEATABLE</i>

² Heat health materials have been developed by the Health Authorities and published via numerous verified health sources, i.e. Fraser Health, HealthLink, and BCCDC. The public will be referred to these sources in any City of Burnaby heat health communications.

18. Once procured and implemented, utilize the Mass Notification System to quickly disseminate key information to the public and external agencies.	Medium-term
19. Engage Climate Action and Energy Division in EH-IRG Functional Lead Committee.	Medium-term
20. Coordinate with other private facilities to establish arrangements for utilizing their facilities as cooling and clean air spaces. Locations could include: churches, mosques, temples; cultural halls; school gymnasiums, including post-secondary; banquet halls; unoccupied retail spaces/store fronts; and, amenity rooms in multi-family or high-rise complexes.	Medium-term
21. Pending data from the BC Coroners Service, identify and set-up additional cooling locations in areas where there was a high incidence of death	Medium-term
22. Coordinate with TransLink or other private bus charter companies for buses (preferably air conditioned) as mobile Cooling Locations in areas where there was a high incidence of death <i>See footnote 3 for supplemental information from TransLink in response to this recommendation.</i>	DEFERRED
23. Ensure Functional Lead staff scheduling mitigates or eliminates concurrent vacation periods for essential planning staff.	Medium-term <i>*REPEATABLE</i>
24. Establish minimum staffing level plans at all Cooling Facilities for adequate coverage and supports in case of emergency at the facility	Medium-term
25. Consider alternate uniforms for Security staff assigned to Cooling Site. Alternate uniforms could include use of casual dress as visitors can find uniformed security intimidating. <i>Exception: RCMP members</i>	Medium-term
26. Explore establishment of alternate and dedicated public transportation options to Cooling Sites <i>See footnote 3 for supplemental information from TransLink in response to this recommendation.</i>	Medium-term
27. Develop recording matrices for detailed supply usage records (consumption drawdown on supplies consumed).	Medium-term

³ TransLink representatives informed staff following the heat dome event that TransLink busses must be running in order for air conditioning systems to be work. Buses not operating their engines are not air conditioned and would provide little to no relief during periods of extreme heat. TransLink also advised that they do not have surplus availability of busses during regular operations. The number of buses held for emergency stand-by are minimal and their diversion for use as cooling locations would inhibit the company's ability to rapidly deploy these stand-by buses for breakdowns or other unforeseen disruption to system services.

28. Explore the use of fire hydrants as a water supply for drinking water and/or misting. <i>See footnote 4 for supplemental information from BFD.</i>	DEFERRED
29. Establish site-specific Cooling Facility Operational Guidelines that include: key information for quick orientation; recommended staffing levels; recommended equipment and supplies; recommended site set-up (schematics); and, reporting forms or templates	Medium-term

⁴ The Fire Department has cautioned that the connection of drinking water fountains and misting station to fire hydrants could result in fire suppression delays imposed by firefighters having to disconnect fountain/misting apparatus from a fire hydrant. These potential delays could have severe consequences to both the safety of responding firefighter and members of public.

DISCUSSION SUPPLEMENT

Moves toward Climate Adaptation

Canada

As part of Canada's climate plan, the Prime Minister assigned the Minister of Public Safety and Emergency Preparedness to "... work with the Minister of Environment and Climate Change, the Minister of Natural Resources and the Minister of Infrastructure and Communities, and with the support of the Special Representative for the Prairies, to develop a national climate change adaptation strategy and invest in reducing the impact of climate-related disasters to make communities safer and more resilient." (Trudeau, 2021) Of interest to the City is how increasing heat health strategies are included in these national frameworks.

The Federation of Canadian Municipalities (FCM) outlines opportunities for integrating climate resiliency through updating or developing service delivery planning. Their resource "The Integrating Climate Considerations: Service delivery planning" offers a variety of tools to guide local governments incorporate climate adaptation strategies with a vision of climate resilience into day-to-day municipal operation, not just through community planning or major infrastructure planning. (Federation of Canadian Municipalities, 2021)

Burnaby

The City anticipates that climate change will influence cross-discipline service delivery and is positioned to take a collaborative and integrated approach to evaluate existing and future service delivery, day-to-day operations, and maintenance and replacement of infrastructure, and future development with climate change in mind.

At the September 9, 2019 Council meeting, Council made a resolution declaring a Climate Emergency. (City of Burnaby, Office of the City Clerk, 2019) In declaring a Climate Emergency, Council recognized that the dangers posed by the climate crisis warrant strong and urgent action. This clearly communicates recognition of a crisis and the intent to mobilize resources.

At the July 06, 2020 Council meeting, Council received a report from Environment Committee and adopted the Climate Action Framework presented in the report. The Framework's intent to ensure that climate action continues to progress within the City across all sectors. (City of Burnaby, Office of the City Clerk, 2020)

Opportunities to enhance strategies, to enhance the City's commitment to protect public health, appear in throughout the Climate Action Framework. These include:

Big Move 2: Resilient Neighbourhoods	New development strategies that include public realm improvements to increase cooling including trees, greenspace and green infrastructure. A co-benefit of Resilient Neighbourhoods is promoting public health and climate adaptation such as enhancing the availability of clean and cool indoor air.
Big Move 3: Healthy Ecosystems	Burnaby tree canopy cover target and greenspaces enhancements will provide summer cooling to all neighbourhoods, mitigating the urban heat island effect. A co-benefit of Healthy Ecosystems is supporting public health through enriched natural environment ecosystems that improve air quality and support a healthy city by providing shaded public spaces for respite during summer heat events.
Big Move 6: ZE Buildings - Net Zero New	Replacing older buildings with zero-emissions new buildings during redevelopment reduces the building sector's contribution to community carbon emission. A co-benefit realized through the integration of heat pumps in zero-emissions buildings is providing summer cooling and, through some models, filtration for clean air, including during poor air quality events.
Big Move 7: ZE Buildings - Retrofits for Net Zero	This Big Move requires the City adopt a city-wide Retrofit Strategy to define measures to reduce energy consumption in buildings while transitioning to zero-emission energy sources and technologies. A key opportunity is presented through refurbishment of replacement of heating and hot water systems, which generally have shorter lifespans than building envelopes. Similar to Big Mover 6, a co-benefit realized through the introduction of heat pumps to replace existing heating and hot water systems would provide improved summer cooling and, through some models, filtration for clean air, including during poor air quality events.

Mass Notification System

Emergencies place unique demands on communication processes. Hazardous events can impact telecommunications systems, disrupting communications exactly when they are needed most.

A mass emergency notification system is a collection of methods that facilitate the dissemination or broadcast of messages to residents to inform/alert them of an impending or existing emergency. Effective systems use a number of overlapping communication tools to deliver consistent information so that if one method fails another is likely to succeed.

Residents are increasingly more dependent on mobile devices for information and communication. Because of the public’s growing reliance on the internet and cell phone technologies, an additional and alternate methods for communicating critical information is essential.

Under the Emergency Program Act, the City has a statutory duty to notify persons who may be harmed or who may suffer loss as a result of an emergency or impending disaster.

Status of Burnaby’s Mass Notification System Project

The Community Safety Plan identified Mass Notification System as an initiative under the Emergency Management priority. Work on the project began in early 2020, but was suspended from March to November, 2020 due to the City’s response to the COVID-19 pandemic situation.

The project’s success is founded on the methodology adopted: an interdisciplinary, phased approach which will include engagement and input from the public.

The approach is divided into the six (6) phases (shown in Figure 6) . It is designed to ensure maximum benefits are realized from the system, such as:

- integration of the notification system with existing city technological infrastructure and applications;
- appropriate and efficient new business processes are developed and existing practises are updated;

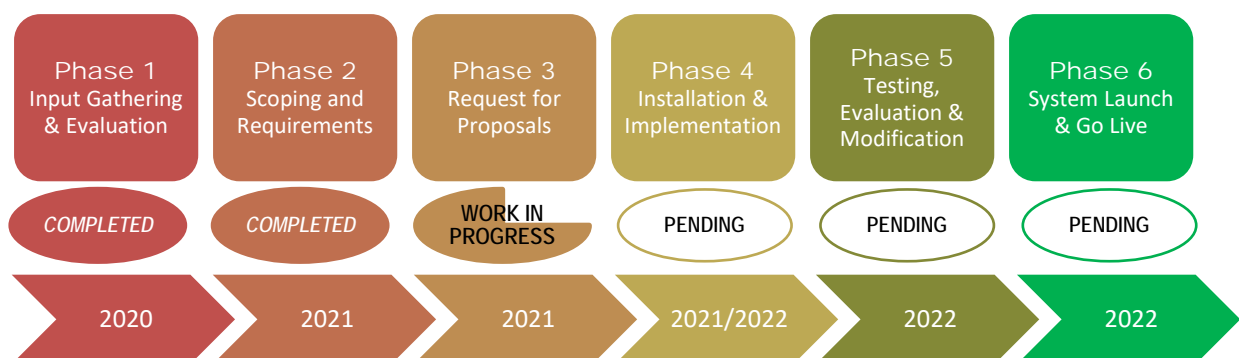


Figure 6: Mass Notification System Project Approach and Status

- budget allocation is optimized for system acquisition and implementation while mindful of long-term application maintenance and operating costs; and,
- the system addresses and is applicable and appropriate to the identified, intended and anticipated needs for public alerting into the future.

A Request for Proposal (RFP) closed in June, 2021. Review of the proposals has been completed. Shortlisted proponents will provide the evaluation team a demonstration of their system will successful proposal and contract negotiations to be completed by mid-Fall.

The three heat events demonstrated that future messaging and public communications will be improved through utilization of the mass notification system.

Mass Notification System Lessons from Neighbouring Communities

ECCC Special Air Quality Statements, Special Weather Statements, and Heat Warning alerts were pushed out to mobile devices through established alerting methodologies, such as the WeatherCan app and the Weather Network app. These alerts are also received by mass notification system providers who may/will also share the alerts with registered system users.

The unprecedented triad of extreme heat events resulted in an exponential increase in frequency of ECCC alerts during heat dome and heat waves. Alert fatigue was a common frustration reported by the end users of mass notification systems utilized by neighbouring municipalities. Users complained about the inordinate volume of alerts received, indicated they were unsubscribing from to the community's notification service, or deleting the mobile app. More often than not, the frustration was resolved with coaching the end user on the app's settings & preferences.

ABBREVIATIONS AND ACRONYMS

AAR	After Action Report
BCAS	BC Ambulance Service
BCCDC	BC Centre for Disease Control
BCEHS	BC Emergency Health Services
BCHIPS	British Columbia Health Impacts Prediction System
BFD	Burnaby Fire Department
BPL	Burnaby Public Library
COVID-19	Coronavirus disease 2019, also known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)
CSP	Corporate Strategic Plan
EAF	Expenditure Authorization Form
ECCC	Environment and Climate Change Canada
EH-IRG	Extreme Heat Initial Response Guideline
EMBC	Emergency Management BC
EWHR	Extreme Weather Heat Response
FCM	Federation of Canadian Municipalities
FHA	Fraser Health Authority
HARS	Heat Alert and Response System
HEMBC	Health Emergency Management BC
MNS	Mass Notification System
PCIC	Pacific Climate Impacts Consortium
RCMP	Royal Canadian Mounted Police
RFP	Request for Proposal
SWE PREOC	Provincial Regional Emergency Operations Centre, Southwest Region
VCH	Vancouver Coastal Health
ZE Buildings	Zero Energy Buildings

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