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### British Columbia's forest fires, 2018

by Jennie Wang and Katharine Strong

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# British Columbia's forest fires, 2018

by Jennie Wang and Katharine Strong

Back-to-back record fire seasons in British Columbia have increased attention on the impacts of forest fires, especially given predictions that the frequency and severity of forest fires in Canada will increase (Natural Resources Canada, 2018).

In 2018, British Columbia experienced its worst fire season on record with 2,115 fires and 1.35 million hectares burned (British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development [B.C. FLNRORD], BC Wildfire Service, 2019a). It surpassed 2017's fire season—previously the largest burned area—in which over 1.22 million ha were burned. Fires in British Columbia accounted for about 60% of the total burned area in Canada in 2018, compared to an average of 7% over the 1990 to 2018 period (National Forestry Database [NFD], 2019).<sup>1</sup>

The largest fires occurred in the Stikine Region, Kitimat-Stikine Regional District, Bulkley-Nechako Regional District and the Cariboo Regional District (Map 1). Several other large fires occurred around the province, including fires in the Peace River Regional District, Northern Rockies Regional District, Okanagan-Similkameen Regional District and the Central Kootenay Regional District.

Fires play an important role in forest health, diversity and renewal. However, they emit greenhouse gases (Chart 1), pose risks to human health and safety, and can cause significant economic impacts and disruptions. An estimated \$615 million was spent on fire management and suppression operations in 2018 (B.C. FLNRORD, n.d.). Additional costs can be associated with evacuations and property losses; however, estimates of property losses are not yet available (NFD, 2019).

Smoke from the fires in British Columbia, as well as fires from the United States, contributed to the poor air quality measured in many parts of the province throughout the summer (Map 2). All air quality measuring stations had at least one day where Air Quality Health Index (AQHI) observations reached 7 or higher, which is considered a high health risk (Environment and Climate Change Canada, 2018 and 2015). Stations with the most days where the AQHI reached 7 or higher include Prince George (32 days), Castlegar (30 days) and Quesnel (26 days), Williams Lake (20 days), Fort St. John (18 days), Central Okanagan (18 days) and South Okanagan (18 days).

High AQHI ratings trigger warnings that people should consider reducing or should reduce strenuous outdoor activities. Children, the elderly and those with heart and breathing problems or other health issues are most at risk of adverse effects of air pollution and are advised to reduce or avoid outdoor physical exertion at these times. In 2016, 15% of British Columbians were children under 15 years of age, while 2% were age 85 and older (Table 1). Almost three-quarters of British Columbians 15 years of age or older reported that they participated in outdoor activities, such as hiking or backpacking, wildlife viewing, tent camping, canoeing or kayaking, mountain biking, and others in 2016 (Statistics Canada, 2018a). This percentage dropped to 57% for those who rated their own health level as fair or poor.

Industries that may experience impacts related to fires and poor air quality include construction, tourism, agriculture and forestry, among others. For example, workers in the construction industry, which accounted for more than 8% of British Columbia's labour force in 2016 (Statistics Canada, 2018b), may experience health symptoms if working outdoors when air quality is poor. Tourism, which contributed 2.9% of the province's GDP in 2014 and 5.1% of employment (Statistics Canada, 2018c), can be affected when residents, as well as tourists from other provinces or countries alter travel plans in the province. For example, regional tourist associations have estimated significant economic impacts of the 2017 wildfires on tourism, including cancellations due to smoke, road closures, evacuation alerts and orders, (Peak Solutions Consulting, 2018; Larose Research and Strategy, 2018).

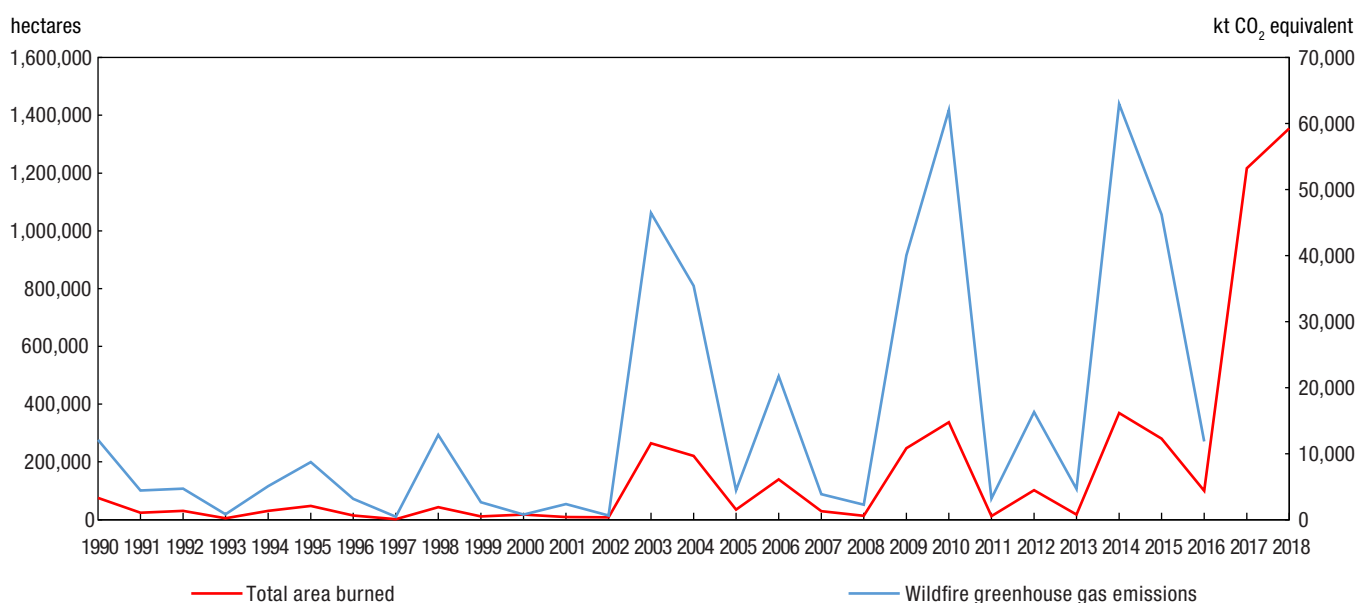
Farms including buildings, crops and livestock, can be at risk from fires, and fires can also affect Crown rangeland for cattle. In 2016, over 56,000 cattle and calves were located just in the Bulkley-Nechako Regional District (Statistics Canada, 2017a), which had among the largest burned areas in 2018. Meanwhile grapes, of which

1. For additional forest statistics and analysis, see Statistics Canada, 2018, [Forests in Canada](#), Catalogue no. 16-201-X (accessed March 30, 2019).

close to 86% of the provincial acreage is grown in the Okanagan-Similkameen Regional District and the Central Okanagan Regional District (Statistics Canada, 2017b), can be affected by close proximity to fire and smoke, causing wine to develop unpleasant burnt flavours, a phenomenon known as 'smoke taint' (Kennison et al., 2009).

The forest sector is affected through loss of valuable timber when trees suffer burn damage (B.C. FLNRORD, 2018a). Severe fires and salvage operations can also negatively affect forest ecosystems and as well as downstream communities as a result of increased risk of soil erosion and flooding (B.C. FLNRORD, 2018b). Forest fires can also affect other regulating services such as nutrient cycling, carbon sequestration and local climate regulation, as well as cultural services such as recreation and aesthetic appreciation.

**Chart 1**  
**Fire area and greenhouse gas emissions, British Columbia, 1990 to 2018**

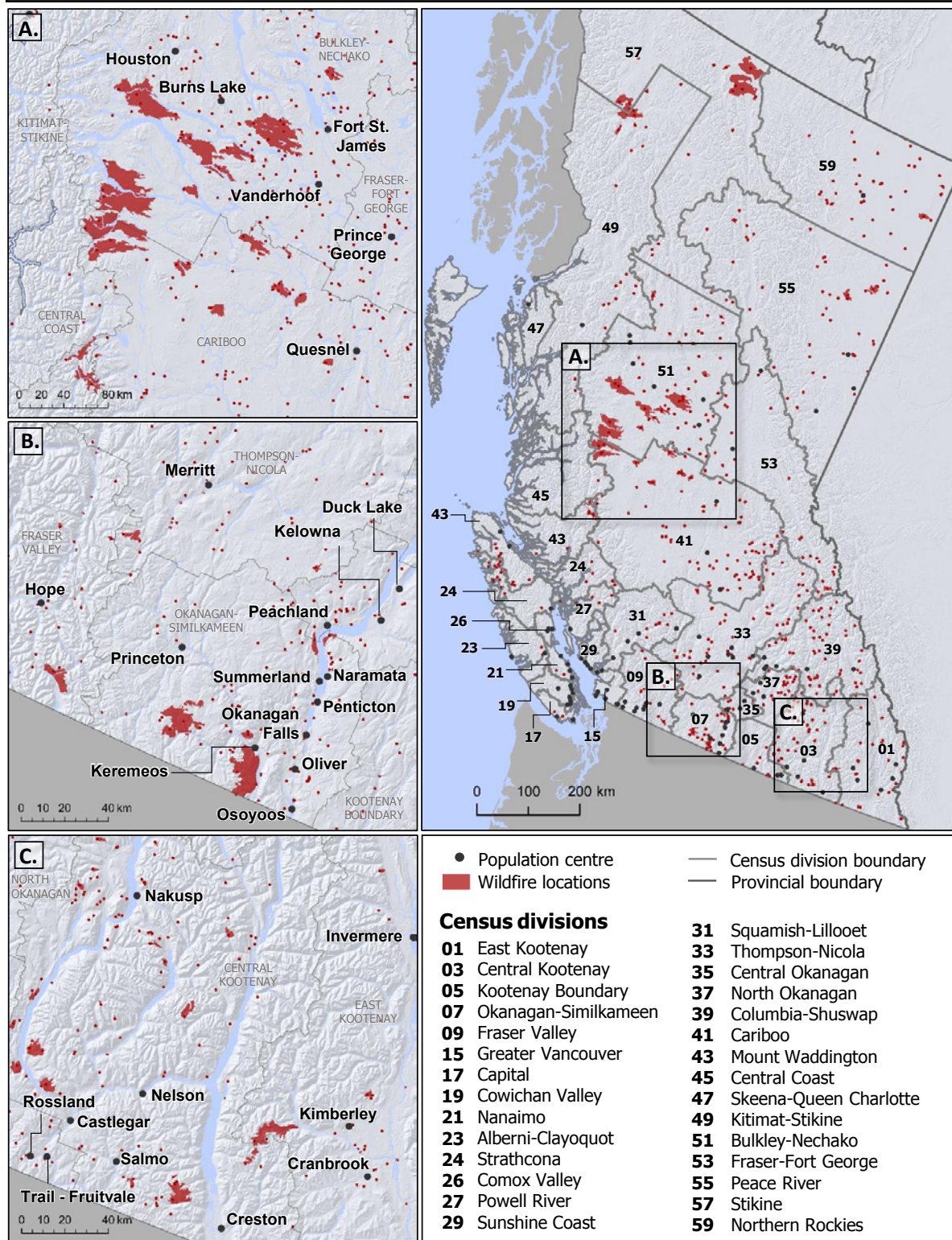


**Note:** The provincial greenhouse gas emission estimates are not yet available for 2017 and 2018.

**Sources:** National Forestry Database, 2019, Forest area burned and number of forest fires, [www.nfdp.cfm.org/en/data/fires.php](http://www.nfdp.cfm.org/en/data/fires.php) (accessed April 16, 2019); British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development, BC Wildfire Service, 2019, "Fire Incident Locations – Historical," *British Columbia Data Catalogue*, <https://catalogue.data.gov.bc.ca/dataset/fire-incident-locations-historical> (accessed May 6, 2019); British Columbia, 2018, *Provincial Greenhouse Gas Emissions Inventory*, <https://www2.gov.bc.ca/gov/content/environment/climate-change/data/provincial-inventory> (accessed April 1, 2019).

Map 1

## Forest fires and population centres in British Columbia, 2018

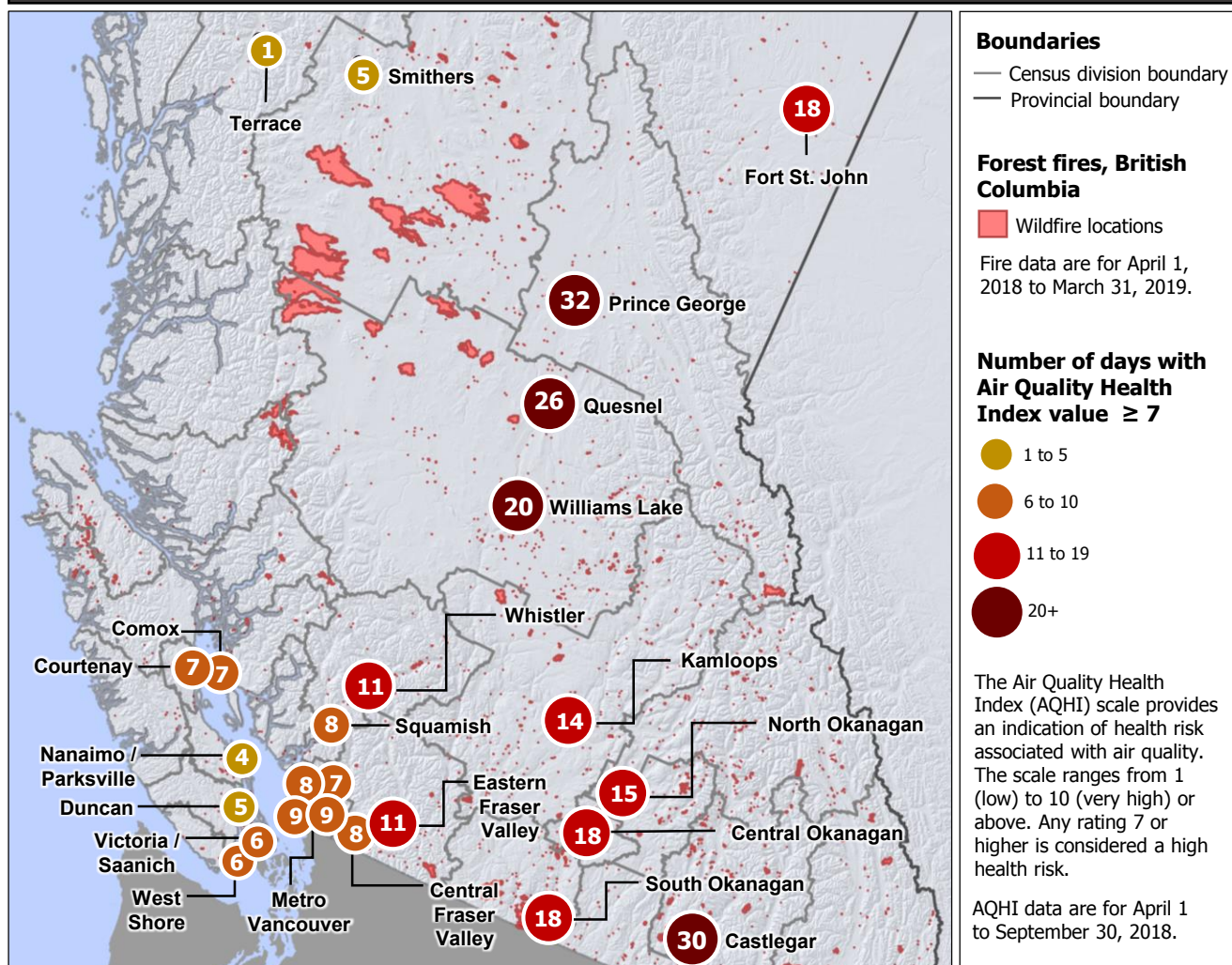


**Notes:** Fire data are for April 1, 2018 to March 31, 2019. Wildfires smaller than 0.01 hectares are represented by points.

**Source:** British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD), BC Wildfire Service, 2019, "Fire Incident Locations – Historical" and "Fire Perimeters – Historical," *British Columbia Data Catalogue*, <https://catalogue.data.gov.bc.ca/dataset/fire-incident-locations-historical> and <https://catalogue.data.gov.bc.ca/dataset/fire-perimeters-historical> (accessed May 6, 2019).

Map 2

## Forest fires and number of days with **high health risk** resulting from poor air quality



**Note:** Wildfires smaller than 0.01 hectares are represented by points.

**Sources:** British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development, BC Wildfire Service (FLNRORD), 2019, "Fire Incident Locations – Historical" and "Fire Perimeters – Historical," *British Columbia Data Catalogue*, <https://catalogue.data.gov.bc.ca/dataset/fire-incident-locations-historical> and <https://catalogue.data.gov.bc.ca/dataset/fire-perimeters-historical> (accessed May 6, 2019); Environment and Climate Change Canada, 2018, "Air Quality Health Index Forecast," *Open Government*, <https://open.canada.ca/data/en/dataset/a563e47d-6eb9-4f7f-933c-222ae49fe57f> (accessed October 9, 2018).

**Table 1**  
**Number of fires, total area burned and population and age groupings, by census division, British Columbia**

| Code | Census divisions       | 2018 Fire season |                   | Age groupings, 2016 Census |         |          |              |              |
|------|------------------------|------------------|-------------------|----------------------------|---------|----------|--------------|--------------|
|      |                        | Total fires      | Total area burned | Total population           | 0 to 14 | 15 to 64 | 65 and older | 85 and older |
|      |                        | number           | hectares          | number                     | percent |          |              |              |
| 59   | British Columbia       | 2,115            | 1,354,300         | 4,648,055                  | 14.9    | 66.9     | 18.3         | 2.3          |
| 5901 | East Kootenay          | 97               | 23,316            | 60,440                     | 15.9    | 64.5     | 19.6         | 2.1          |
| 5903 | Central Kootenay       | 138              | 28,616            | 59,520                     | 14.1    | 62.4     | 23.5         | 2.6          |
| 5905 | Kootenay Boundary      | 58               | 1,046             | 31,445                     | 13.7    | 60.9     | 25.4         | 3.1          |
| 5907 | Okanagan-Similkameen   | 94               | 38,405            | 83,025                     | 11.5    | 57.4     | 31.0         | 4.4          |
| 5909 | Fraser Valley          | 51               | 7,285             | 295,935                    | 18.1    | 63.9     | 18.0         | 2.4          |
| 5915 | Greater Vancouver      | 5                | 16                | 2,463,430                  | 14.7    | 69.6     | 15.7         | 2.1          |
| 5917 | Capital                | 8                | 86                | 383,360                    | 13.0    | 65.3     | 21.7         | 3.3          |
| 5919 | Cowichan Valley        | 11               | 7                 | 83,735                     | 14.7    | 61.3     | 24.0         | 2.8          |
| 5921 | Nanaimo                | 22               | 209               | 155,700                    | 12.8    | 60.1     | 27.0         | 3.4          |
| 5923 | Alberni-Clayoquot      | 9                | 43                | 30,980                     | 15.3    | 62.9     | 21.8         | 2.4          |
| 5924 | Strathcona             | 68               | 9,697             | 44,675                     | 15.0    | 63.2     | 21.8         | 2.0          |
| 5926 | Comox Valley           | 9                | 1                 | 66,530                     | 13.8    | 60.5     | 25.6         | 3.0          |
| 5927 | Powell River           | 9                | 89                | 20,070                     | 12.7    | 59.6     | 27.7         | 3.1          |
| 5929 | Sunshine Coast         | 7                | 0                 | 29,970                     | 11.8    | 58.6     | 29.6         | 3.4          |
| 5931 | Squamish-Lillooet      | 45               | 1,392             | 42,665                     | 17.3    | 72.1     | 10.6         | 0.9          |
| 5933 | Thompson-Nicola        | 231              | 16,872            | 132,665                    | 15.0    | 64.9     | 20.1         | 2.2          |
| 5935 | Central Okanagan       | 34               | 1,849             | 194,880                    | 14.2    | 64.5     | 21.4         | 3.0          |
| 5937 | North Okanagan         | 62               | 3,650             | 84,355                     | 14.5    | 61.2     | 24.3         | 3.1          |
| 5939 | Columbia-Shuswap       | 193              | 4,676             | 51,370                     | 13.7    | 61.9     | 24.4         | 2.7          |
| 5941 | Cariboo                | 306              | 204,699           | 61,990                     | 15.4    | 63.8     | 20.8         | 1.9          |
| 5943 | Mount Waddington       | 69               | 33,392            | 11,035                     | 18.1    | 65.7     | 16.2         | 0.9          |
| 5945 | Central Coast          | 7                | 1                 | 3,320                      | 20.3    | 64.6     | 15.1         | 1.2          |
| 5947 | Skeena-Queen Charlotte | 4                | 7                 | 18,135                     | 18.1    | 67.1     | 14.8         | 1.4          |
| 5949 | Kitimat-Stikine        | 63               | 146,202           | 37,365                     | 18.5    | 66.6     | 14.9         | 1.3          |
| 5951 | Bulkley-Nechako        | 201              | 454,798           | 37,900                     | 19.2    | 65.9     | 14.9         | 1.5          |
| 5953 | Fraser-Fort George     | 106              | 13,900            | 94,510                     | 17.4    | 68.3     | 14.3         | 1.3          |
| 5955 | Peace River            | 99               | 58,270            | 62,940                     | 21.3    | 68.4     | 10.3         | 1.0          |
| 5957 | Stikine                | 25               | 272,560           | 740                        | 12.8    | 66.2     | 20.3         | 0.7          |
| 5959 | Northern Rockies       | 84               | 33,216            | 5,395                      | 20.9    | 72.1     | 7.0          | 0.4          |

**Sources:** British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development, BC Wildfire Service, 2019, "Fire Incident Locations – Historical," *British Columbia Data Catalogue*, <https://catalogue.data.gov.bc.ca/dataset/fire-incident-locations-historical> (accessed May 6, 2019); Statistics Canada, 2017, *Age and sex highlight tables, 2016 Census*, Catalogue no. 98-402-X2016002, Ottawa, <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hltfst/as/index-eng.cfm> (accessed February 26, 2019).

## Note to readers

This article presents socio-economic information related to the 2018 forest fires in British Columbia, including costs associated with fire suppression and potential impacts of these fires on human health, recreation, as well as other industries.

Thematic maps display the location of the 2018 forest fires, the location of population centres, as well as the number of days during the fire season that the air quality health index (AQHI) was rated 7 or higher.

Fire statistics on the number of fires and area burned were taken from the BC Wildfire Service and the National Forestry Database (B.C. FLNRORD, 2019a; National Forestry Database, 2019). Fire perimeters, sizes and locations for the maps were taken from the BC Wildfire Service (B.C. FLNRORD, 2019a,b). These data cover the 2018 fire season from April 1, 2018 to March 31, 2019.

AQHI observations at stations in British Columbia for the fire season (April to September 2018), were taken from data files produced by Environment and Climate Change Canada (2018). The AQHI is calculated based on the relative risks of a combination of common air pollutants known to harm human health, including ground-level ozone, particulate matter and nitrogen dioxide.

AQHI values of 1 to 3 are considered low health risk. Values of 4 to 6 are considered moderate health risk. Values of 7 to 10 are considered high health risk and values above 10 are considered very high health risk.

The AQHI also provides health messages for the various levels of the AQHI. It recommends that at risk populations including children, the elderly and those with heart or breathing problems reduce strenuous outdoor activities when the AQHI is rated high risk and that they avoid these activities when it is rated very high risk. It recommends that the general public consider reducing or rescheduling activities when the AQHI is rated high risk and that they reduce these activities when it is rated very high risk, particularly if they experience symptoms such as coughing and throat irritation (Environment and Climate Change Canada, 2015).

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