

Spring flooding in selected communities across Canada: Factors impacting the ability to respond to natural disasters, 2019

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Flooding can have devastating, costly and long-lasting consequences for communities. Statistics Canada has released reports on the impact of the recent spring flooding on [dwellings, farmlands and roads](#) and [businesses](#) in selected communities across Canada. This article provides additional information on the topic, by looking at the characteristics of selected communities affected by flooding, and identifying factors which may impact their ability to respond to, and recover from, natural disasters.

The ability to respond effectively in emergency situations could be affected by several factors such as housing conditions, household composition, the demographic and socio-economic characteristics of community members, employment levels, and if there are language or other barriers. One way of looking at how these factors interact and impact communities in emergency situations is through the use of deprivation and vulnerability indices, as they take into account the characteristics of the area and the people who live there.

The analysis that follows looks at the characteristics of four communities that suffered flooding in spring 2019, in order to better understand the factors that may have created challenges in responding to the floods. For more information on the deprivation index used in this study, please see the note to readers.

The Fredericton–Saint John region (Saint John River), Sainte-Marthe-sur-le-Lac (West Montréal–St. Lawrence River), the Ottawa–Gatineau region (Ottawa River Valley), and Southern Manitoba (Red River Valley) were all affected by flooding this spring. Despite facing similar circumstances, they have distinct needs and face diverse challenges when responding to natural disasters or other emergency situations.



Table 1
Proportion of dissemination areas affected by 2019 flooding, by Canadian Index of Multiple Deprivation dimension and region

	Canadian Index of Multiple Deprivation dimensions			
	Residential instability	Economic dependency	Ethno-cultural composition	Situational vulnerability
	% of dissemination areas ¹			
Fredericton–Saint John, New Brunswick (Saint John River)				
1 - least deprived	16	15	56	14
2	30	19	30	24
3	24	22	8	19
4	21	23	3	23
5 - most deprived	8	21	2	20
Sainte-Marthe-sur-le-Lac, Quebec (West Montréal–St. Lawrence River)				
1 - least deprived	11	6	13	13
2	11	34	28	25
3	34	34	23	26
4	26	19	25	25
5 - most deprived	17	8	11	11
Gatineau, Quebec (Ottawa River Valley)				
1 - least deprived	8	12	12	8
2	18	39	37	18
3	20	27	35	20
4	24	16	14	27
5 - most deprived	31	6	2	27
Ottawa, Ontario (Ottawa River Valley)				
1 - least deprived	28	17	6	39
2	11	20	17	26
3	13	20	44	19
4	11	19	30	11
5 - most deprived	37	24	4	6
Southern Manitoba (Red River Valley)				
1 - least deprived	46	43	21	11
2	21	25	21	11
3	18	14	54	14
4	14	11	4	36
5 - most deprived	0	7	0	29

1. The percentage of dissemination areas represents only those identified as most affected within each region.

Source(s): Canadian Index of Multiple Deprivation (2016), Statistics Canada.

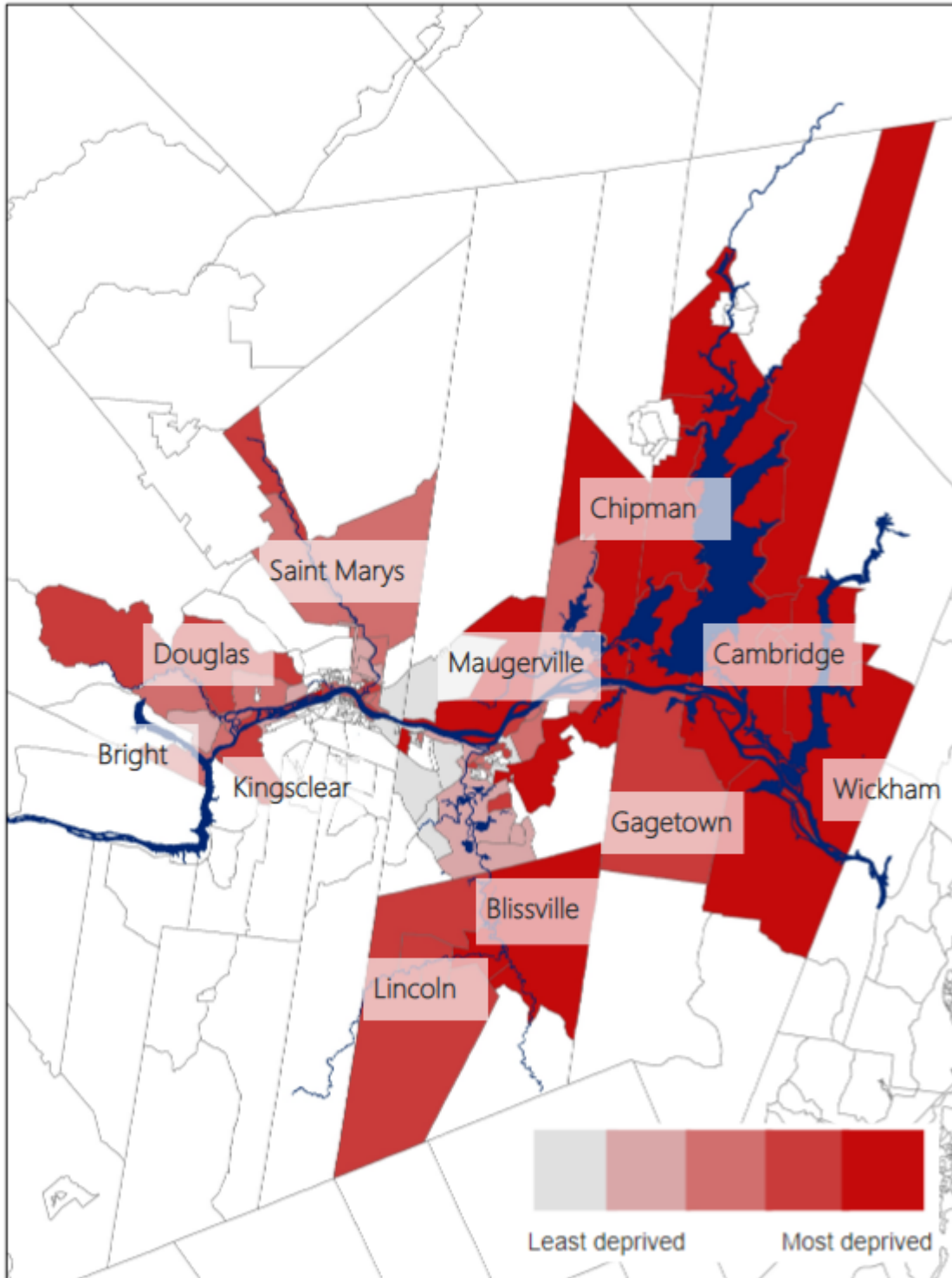
Vulnerability of flooded areas in Fredericton–Saint John (Saint John River)

The Fredericton–Saint John region in New Brunswick has relatively low levels of vulnerability as measured by the Canadian Index of Multiple Deprivation. However, economic dependency was found to be the factor which could have the greatest impact on this area when dealing with emergency situations. Areas with high levels of economic dependency have a high proportion of residents who rely on sources of income other than employment income, who do not participate in the labour force, and who are 65 years and older.

Overall, more than four in ten (44%) of the affected communities in this area had high levels of economic dependency, with 21% of dissemination areas being considered the most dependant. Though some communities affected by the flooding may be quite affluent, others are less so, which points to the need to tailor responses to events such as flooding, based on the unique needs of the community.

The map of the Fredericton–Saint John region illustrates the areas affected by the recent flooding, and their levels of economic dependency, from least to most dependant.

Map 1 – Economic dependency in flood-affected dissemination areas in Fredericton–Saint John (Saint John River)



Vulnerability of flooded areas in Sainte-Marthe-sur-le-Lac (West Montréal–St. Lawrence River)

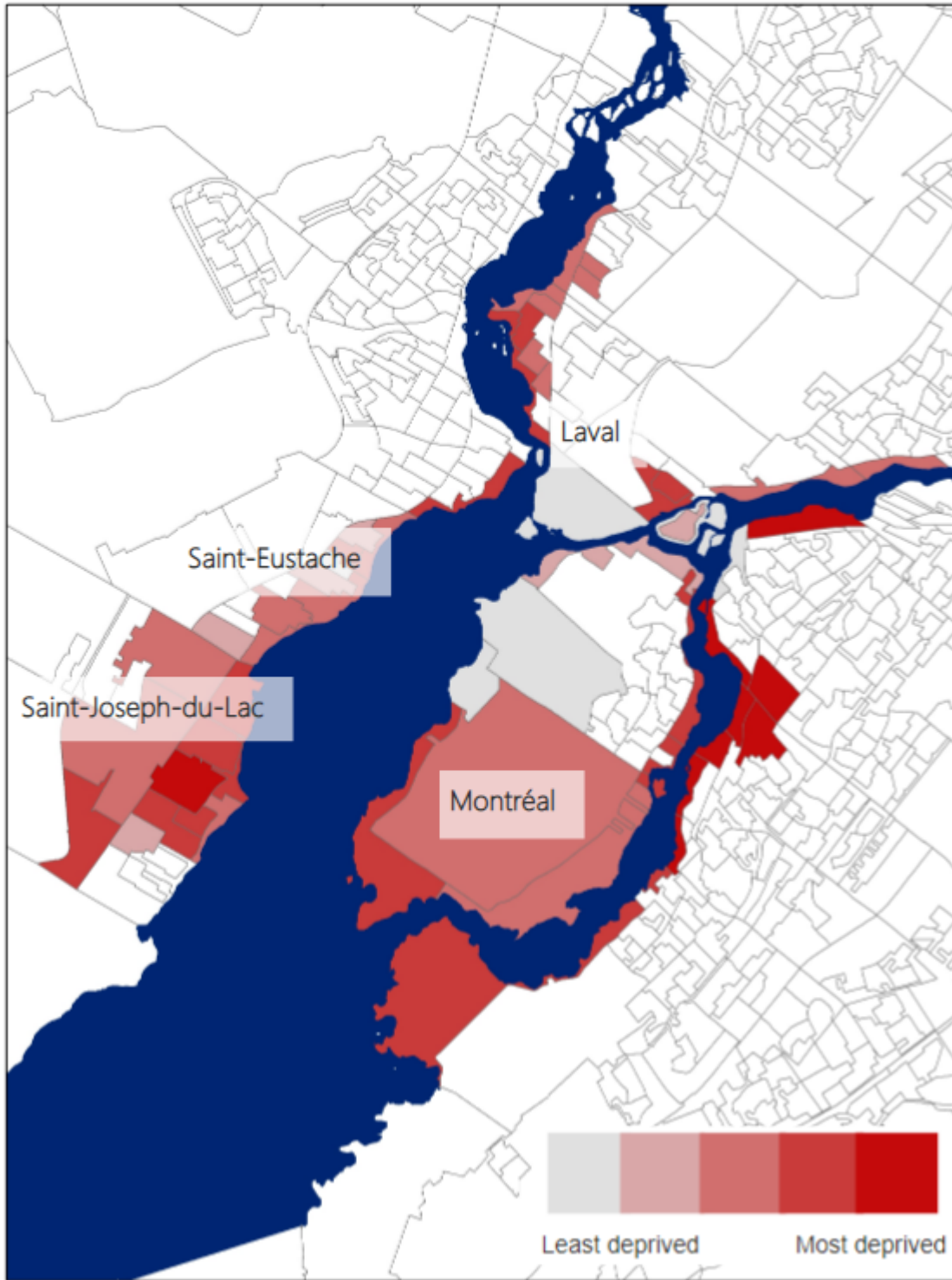
In contrast to the Fredericton-Saint John region, the Sainte-Marthe-sur-le-Lac area did not experience high levels of economic dependency.

The affected communities in the Sainte-Marthe-sur-le-Lac area experienced high levels of residential instability, meaning that these communities see substantial fluctuations of neighbourhood inhabitants over time and that a high proportion of dwellings are rented rather than owned. In addition, there is a high proportion of individuals who live alone in these areas. These characteristics point to a potential lack of social support which may impede the ability to respond effectively to natural disasters.

Overall, 43% of the affected dissemination areas in this region were found to be impacted by residential instability. As such, some of the residents in these areas may lack social support and community attachments, and may require a higher level of attention in order to respond to and recover from disasters such as floods.

Map 2 indicates the areas in Sainte-Marthe-sur-le-Lac that were affected by the spring flooding and shows the level of residential instability for each, from least to most impacted.

Map 2 – Residential instability in flood-affected dissemination areas in Sainte-Marthe-sur-le-Lac, Quebec (West Montréal–St. Lawrence River)



Vulnerability of flooded areas in Ottawa–Gatineau (Ottawa River Valley)

Similar to the Sainte-Marthe-sur-le-Lac area, the Ottawa–Gatineau region affected by flooding also experienced high levels of residential instability, which indicates frequent resident turnover and a high proportion of people living alone.

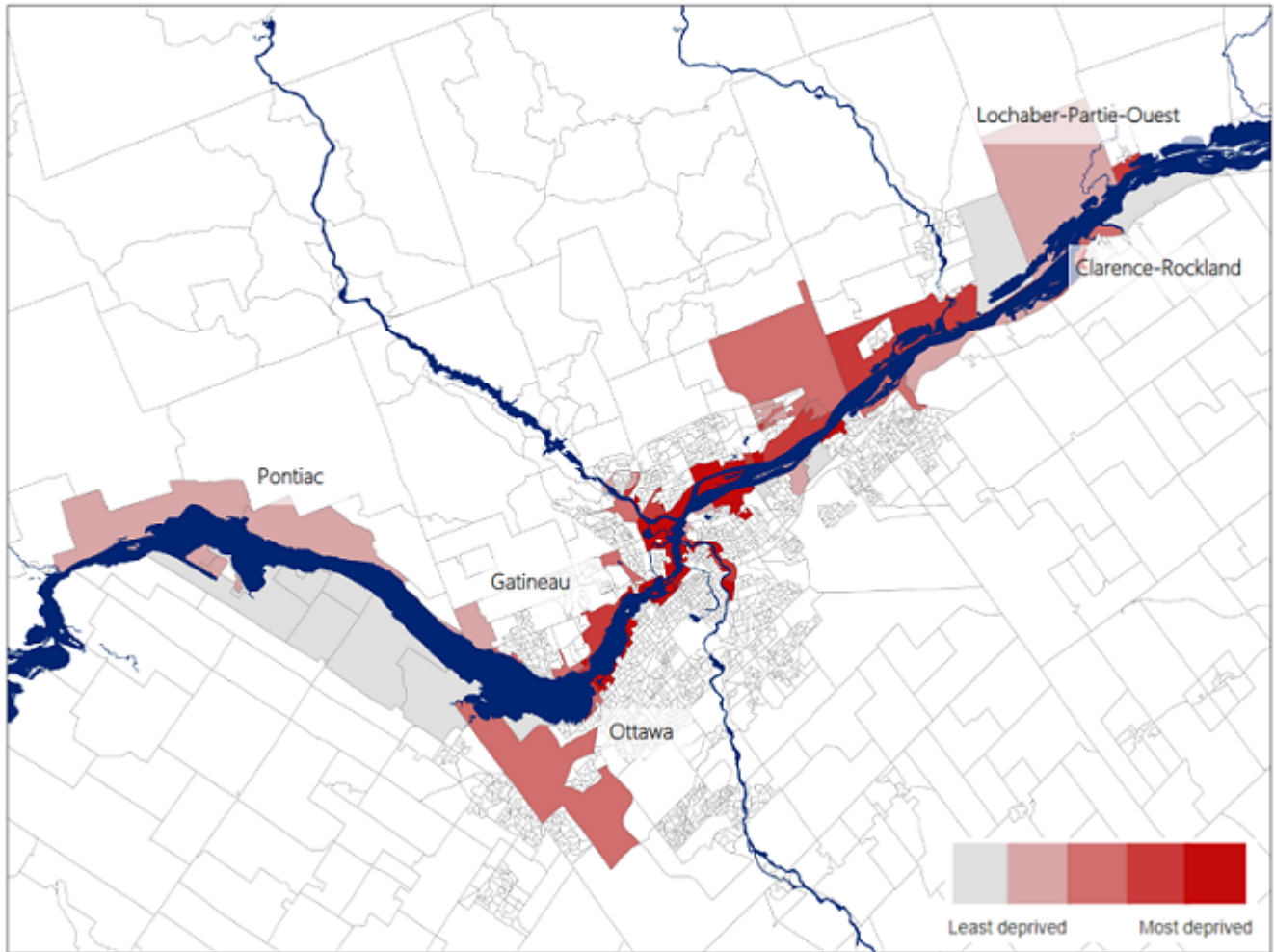
Close to half (48%) of the flooded areas in Ottawa—the Ontario side of the Ottawa River Valley—experienced high levels of residential instability, with 37% of flooded areas being among the most impacted.

Gatineau, on the Quebec side of the Ottawa River Valley, was similarly affected by spring flooding and is also characterized by high levels of residential instability. Over half (55%) of the affected dissemination areas in Gatineau experienced high levels of residential instability, with nearly one out of three (31%) being considered among the most impacted.

The flood-affected areas in Gatineau, like those in Ottawa, could potentially be affected by a lack of social support due to the high mobility of neighbourhood inhabitants and thus may not be as resilient as other areas that have more established neighbourhood ties.

Map 3 illustrates those areas in Ottawa–Gatineau (Ottawa River Valley) affected by the recent flooding and shows the level of residential instability among each community, from least to most. It further illustrates the heterogeneity of the areas affected by flooding. While there are many affluent areas that were affected by the floods, there are also many areas which could be considered economically disadvantaged.

Map 3 – Residential instability in flood-affected dissemination areas in Ottawa–Gatineau (Ottawa River Valley)



Vulnerability of flooded areas in Southern Manitoba (Red River Valley)

Unlike some of the other regions affected by flooding, the Red River Valley region in Southern Manitoba is most impacted by situational vulnerability. High levels of situational vulnerability indicate that there are many dwellings in the community which require major repairs, even prior to the floods. Further, there is a high proportion of residents without a high-school diploma and residents who identify as Indigenous persons in these communities.

Overall, close to two-thirds (65%) of the affected dissemination areas in the Red River Valley had high levels of situational vulnerability, with 29% being considered the most vulnerable.

The high degree of situational vulnerability in the region could be further exacerbated by flooding, as the number of dwellings in this area that require substantial renovations could increase significantly as a result of water damage.

The map below illustrates the Southern Manitoba regions affected by spring flooding, and how vulnerable each area is, from least to most.

Map 4 – Situational vulnerability in flood-affected dissemination areas in Southern Manitoba (Red River Valley)

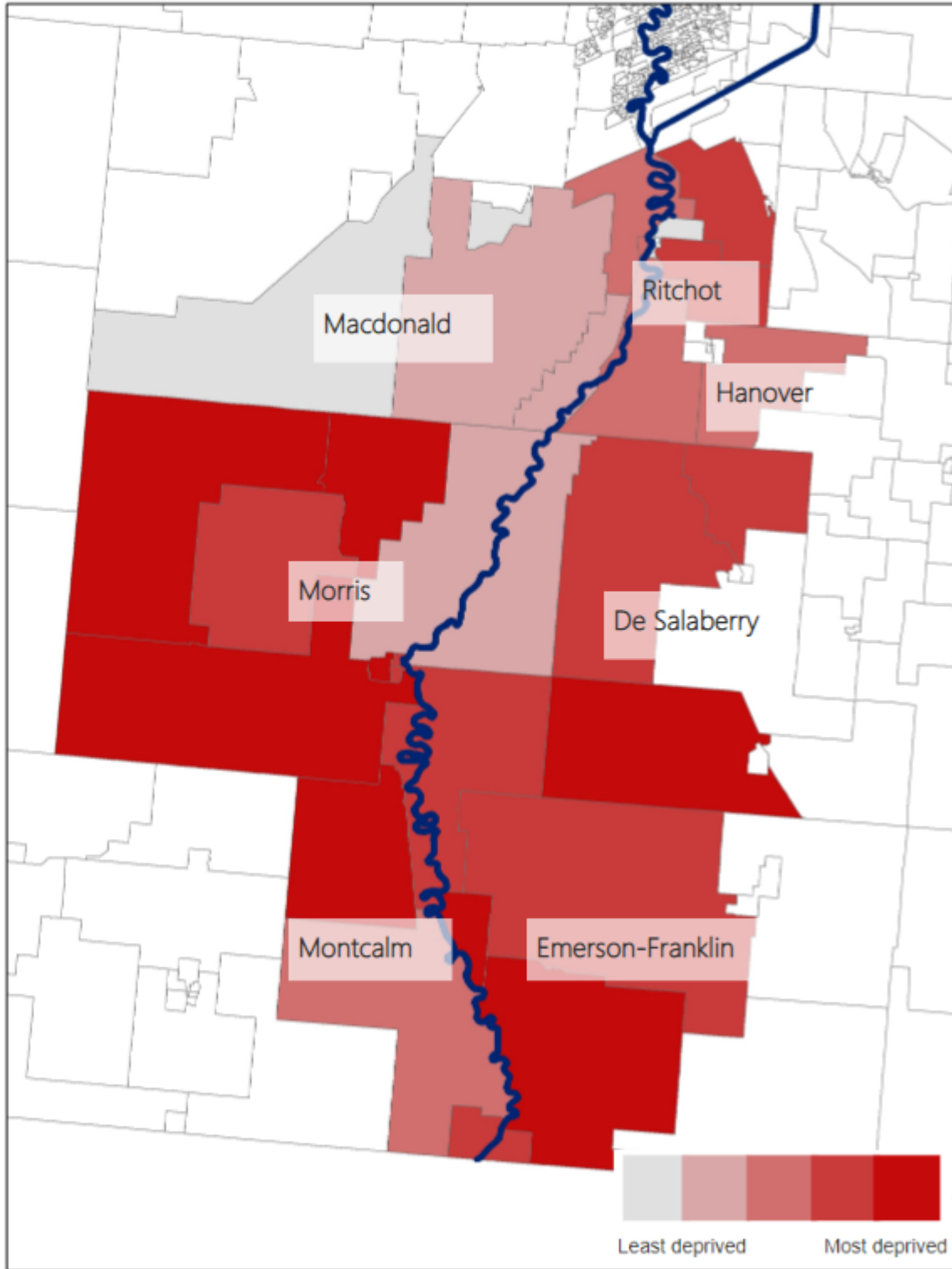


Table 2
Spring 2019 flooding, selected data by affected region

	Dissemination areas ¹	Dwellings ²	Population ²
Fredericton–Saint John, New Brunswick (Saint John River)	87	26,870	50,425
Sainte-Marthe-sur-le-Lac, Quebec (West Montréal–St. Lawrence River)	53	18,413	38,349
Gatineau, Quebec (Ottawa River Valley)	51	20,385	39,233
Ottawa, Ontario (Ottawa River Valley)	54	24,617	37,705
Southern Manitoba (Red River Valley)	28	6,693	16,293

1. Dissemination area (DA) counts represent only those identified as most affected within each region.

2. Dwelling and population counts refer to the total number of dwellings and total population in the affected DAs.

Source(s): Canadian Index of Multiple Deprivation (2016), Statistics Canada.

Note to readers

The Canadian Index of Multiple Deprivation is an area-based index of deprivation, which allows for the comparison of communities across the country on four dimensions of deprivation and marginalization, including: residential instability, economic dependency, ethno-cultural composition and situational vulnerability. For each dimension, ordered scores are assigned, where 1 represents the least deprived and 5 represents the most deprived.

Residential instability speaks to the tendency of neighbourhood inhabitants to fluctuate over time, taking into consideration both housing and family characteristics including the proportion of the population who have moved in the past five years, of persons living alone, and of rental units.

Economic dependency indicates a reliance on sources of income other than employment income, and measures concepts such as the proportion of the population aged 65 and older and the dependency ratio of the population (which refers to the population aged 0-14 and population aged 65 and older divided by the population aged 15-64).

Ethno-cultural composition refers to the make-up of immigrant populations, and takes into consideration factors such as the proportion of population who are recent immigrants, who self-identify as a member of a visible minority and have no knowledge of either official language (a form of linguistic isolation).

Situational vulnerability looks at variations in socio-demographic conditions in the areas of housing and education, and measures concepts such as the proportion of the population aged 25 to 64 without a high-school diploma, the proportion of the population who identify as Indigenous and the proportion of dwellings needing major repairs.

The analysis in this study was done at the level of dissemination area (DA). A DA is a small, relatively stable geographic unit composed of one or more adjacent dissemination blocks where populations generally range from 400 to 700 persons. DAs cover all of Canada, and they are the smallest standard geographic area for which all census data are disseminated.

The geographies examined in this article correspond to the selected geographies of the two previous releases that focused on the issue of flooding. This study was based on 273 DAs that were directly affected or in reasonable proximity to four areas of the country that experienced substantial surface flooding in spring 2019. Approximately 25% of the dwellings in the combined four areas were either affected by the flooding, or very close to the flood-zone.

The [Canadian Index of Multiple Deprivation](#) and a [user guide](#) for the index are available.

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; STATCAN.infostats-infostats.STATCAN@canada.ca) or Media Relations (613-951-4636; STATCAN.mediahotline-ligneinfomedias.STATCAN@canada.ca).