Review of 2017 to 2021 M-Lab data for the City of Hamilton

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Hamilton

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Acknowledgements

- This project reviewed and expanded on the work of the Regional and Rural Broadband (R2B2) Project based at the University of Guelph with previous work being graciously shared by the City of Hamilton. For more information, please see https://www.r2b2project.ca/.
- Data used in this project was obtained from the publicly available Measurement Lab (MLab) dataset. For more information, please see https://www.measurementlab.net/
- This project was funded by the City of Hamilton. For more information, please see hamilton.ca/broadband

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Objectives of this project

- Collect Measurement Lab (M-Lab) data by named communities and forward sortation areas for the City of Hamilton.
- Analyze data for download, upload, and round trip time (latency) from 2017 to 2021.
- Present summary findings through time series graphs and geospatial visuals.

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Methodology

- This report presents median (50th percentile) statistics for download speeds, upload speeds, and minimum round-trip time from M-Lab's Network Diagnostic Tool (NDT) dataset.
- Median values are used as an average value rather than the mean due to the large variance or dispersion in speed test results. Due to speed test distributions being skewed (see Worden & Hamblyn 2022, https://doi.org/10.1016/j.telpol.2021.102247), the mean value tends to be
- Download and upload speeds are measured in megabits per second (Mbps) and minimum round-trip time, otherwise known as latency or ping, is measured in milliseconds (ms).

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Methodology: Data Collection

- The data used in this project is obtained from [illegible] available NDT dataset.
- Two datasets are used for this analysis.
- 1) A query of available named communities is used from 01-01-2017 to 02-28-2022.
- 2) A query of Forward Sortation Areas which correspond to the postal codes within the boundaries of the City of Hamilton from 01-01-2017 to 02-28-2022.

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Queried named communities

ÅAncaster
ÅBinbrook
ÅCarlisle
ÅCopetown
ÅDundas
ÅFreelton*
ÅHamilton
ÅHannon
ÅJerseyville
ÅLynden
ÅMount Hope
ÅRockton*
ÅSheffield*
ÅStoney Creek
ÅTroy
ÅWaterdown

*These communities were queried but either yielded no results or too few for analysis.

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Summary statistics on communities (2021-2022*)

Named Community	Median Download (Mbps)	Median Upload (Mbps)	Median Roundtrip Time (ms)
All Hamilton Communities	17.03 (N=1,089,573)	6.93 (N=1,129,154)	21 (N=1,089,573)
Ancaster	19.14 (N=66,735)	6.73 (N=67,180)	16 (N=66,735)
Binbrook	16.96 (N=11,915)	8.10 (N=13,848)	24 (N=11,915)
Carlisle	22.44 (N=1,279)	8.29 (N=1,414)	11 (N=1,279)
Copetown	42.93 (N=494)	26.98 (N=749)	16 (N=494)
Dundas	22.26 (N=80,482)	7.99 (N=81,008)	16 (N=80,482)
Hamilton- City	16.56 (N=753,865)	6.88 (N=775,537)	23 (N=753,865)
Hannon	11.10 (N=58)	6.83 (N=56)	28 (N=58)
Jerseyville	4.49 (N=495)	3.85 (N=463)	33 (N=495)
Lynden	1.60 (N=60)	1.31 (N=47)	36 (N=60)
Mount Hope	10.13 (N=315)	6.69 (N=223)	16 (N=315)
Stoney Creek	15.83 (N=134,091)	6.01 (N=152,752)	18 (N=134,091)
Troy	5.13 (N=78)	4.02 (N=84)	129 (N=78)
Waterdown	21.43 (N=39,567)	8.02 (N=35,667)	20 (N=39,567)

*Where possible, includes data collected up to February 28th 2022.

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Summary statistics on communities (2021-2022*)

Named Community	Median Download (Mbps)	Median Upload (Mbps)	Median Roundtrip Time (ms)
All Hamilton Communities	98.53 (N=60,615)	8.41 (N=119,691)	18 (N=60,615)
Ancaster	59. 05 (N=1,827)	11.87 (N=1,813)	25 (N=1,827)
Binbrook	133.70 (N=565)	7.96 (N=3,395)	23 (N=565)
Carlisle	16.50 (N=9)	2.66 (N=7)	25 (N=9)
Copetown	8.80 (N=6)	2.50 (N=6)	30 (N=6)
Dundas	93.45 (N=5,919)	10.44 (N=6,018)	19 (N=5,919)
Hamilton- City	92.75 (N=41,417)	8.27 (N=88,744)	18 (N=41,417)
Jerseyville	3.69 (N=66)	1.68 (N=64)	34 (N=66)
Waterdown	218.31 (N=2,849)	20.45 (N=3,270)	12 (N=2,849)

Note: Only named communities with available data for the 2021-2022* period are presented.
*Where possible, includes data collected up to February 28th 2022.

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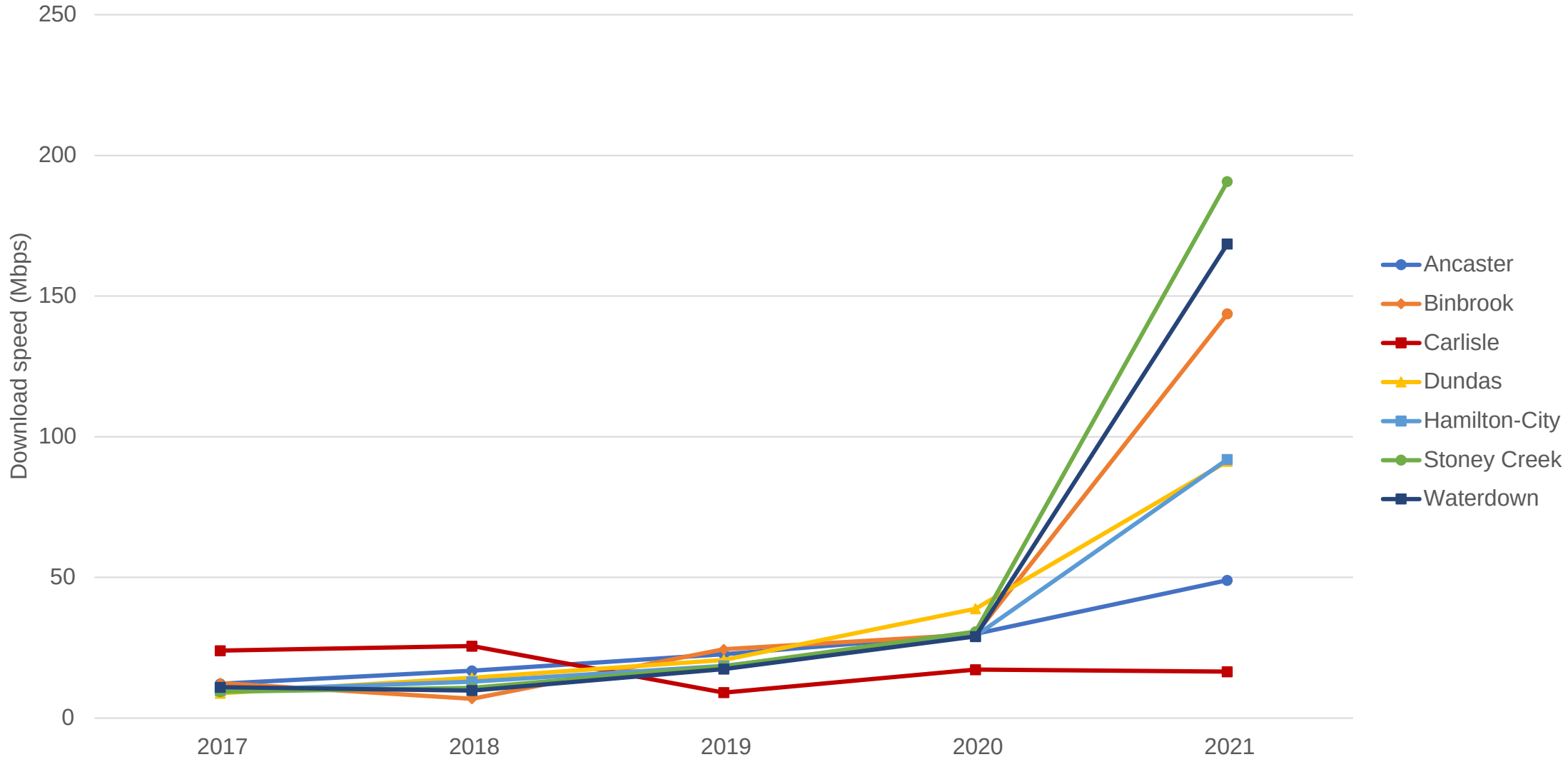
Trends in Median Download Speeds (2017-2021)



Note: Only named communities with sufficient data across all five years are included in the trend graphs.

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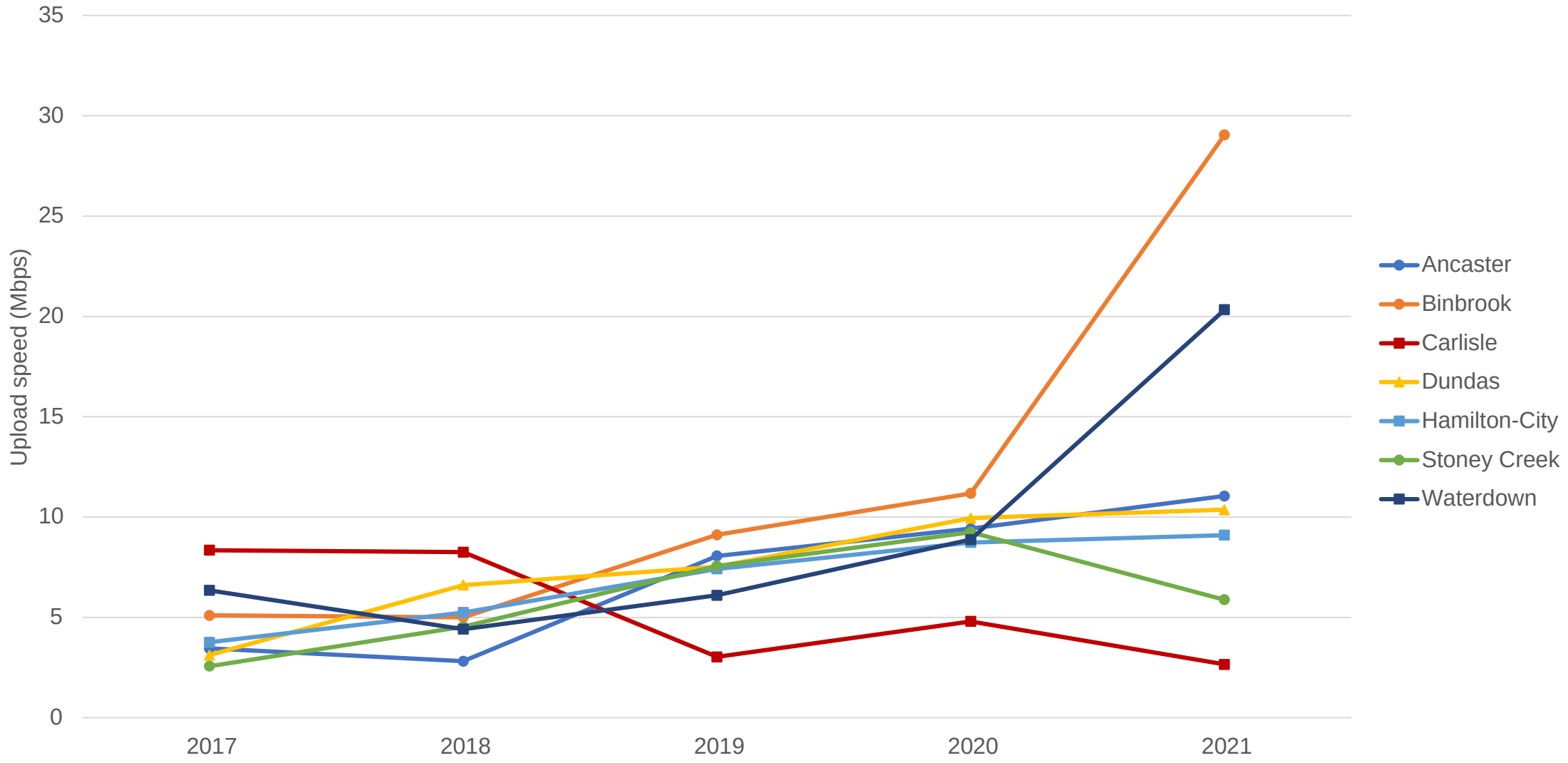
Trends in Median Upload Speeds (2017-2021)



Note: Only named communities with sufficient data across all five years are included in the trend graphs.

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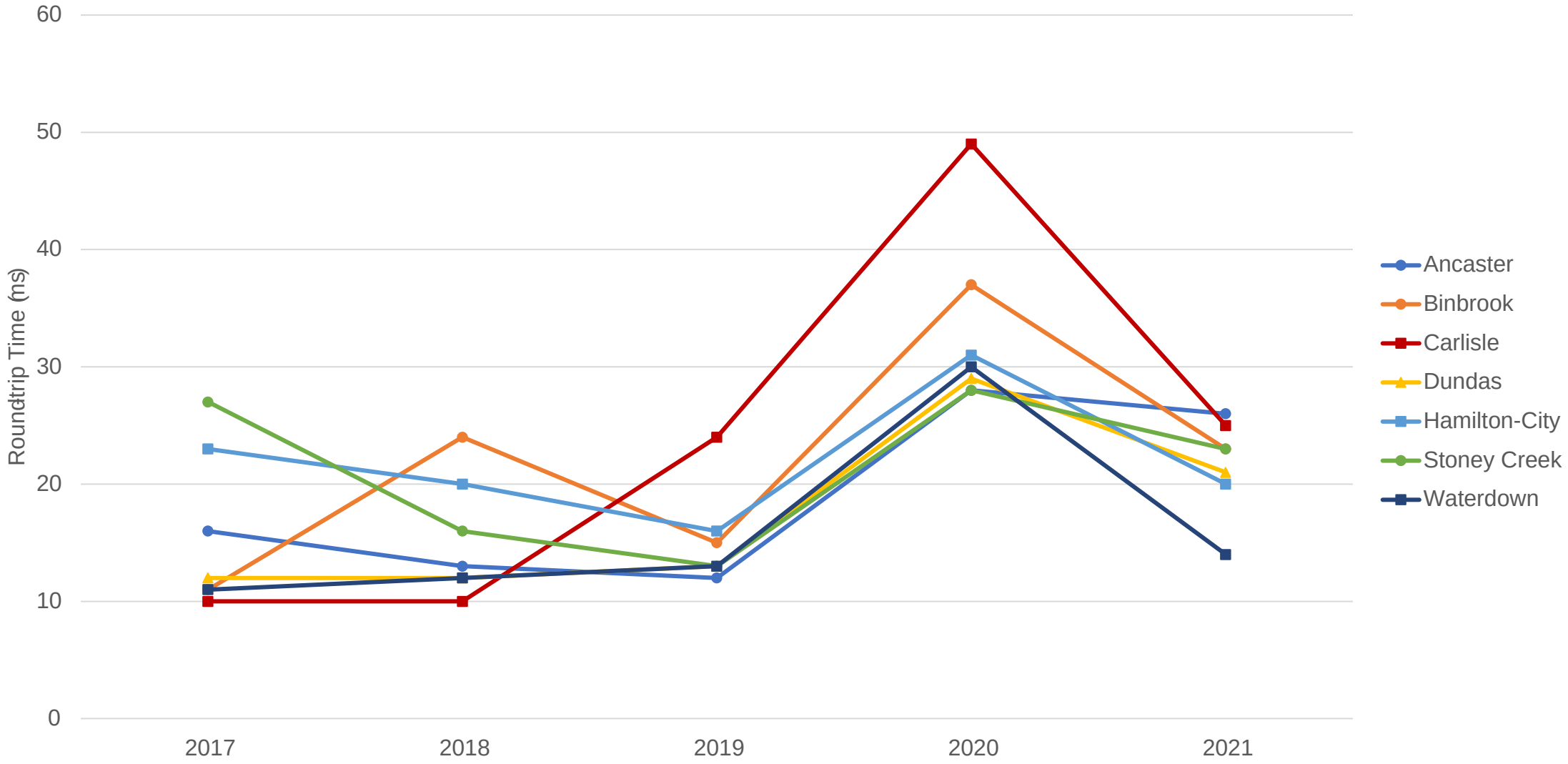
Trends in Median Round-trip Time* (2017-2021)



Note: Only named communities with sufficient data across all five years are included in the trend graphs.
*The round-trip time variable presented is M[l· ō Ω ă ά a ƛ y˝ ƛ Y˝ dz Y˝ w ¢ ¢ é Ø l· NJ ƛ l· ō f Ŝ ø K ƛ Ŏ K ng NJ Ŝ Ŧ f Ŝ Ŏ ű ă ű ķ S [illegible] f the speed test.

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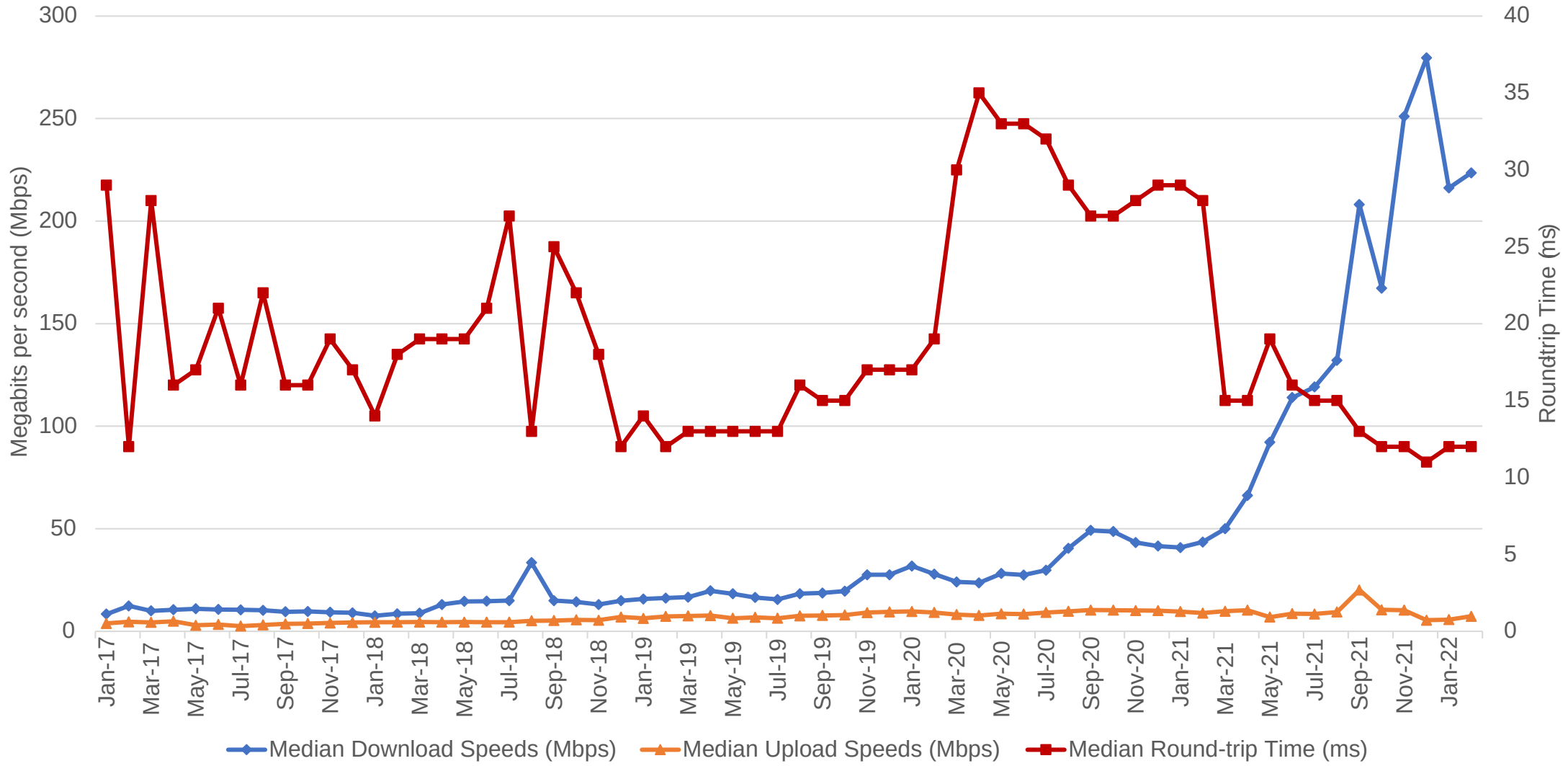
Trends in Monthly Quality of Service (January 2017 to February 202



Note: Download and upload speeds are plotted on the left axis while round-trip time is plotted on the right axis.

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Queried forward sortation areas

Å L0P
Å L0R
Å L3M
Å L7P
Å L7S
Å L7T
Å L8B
Å L8E
Å L8G
Å L8H
Å L8J
Å L8K
Å L8L
Å L8M
Å L8N
Å L8P
Å L8R
Å L8S
Å L8T
Å L8V
Å L8W
Å L9A
Å L9B
Å L9C
Å L9G
Å L9H
Å L9K
Å N0A
Å N0B
Å N0E
Å N1R
Å N3L
Å N3R
Å N3T
Å N3W

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Download Speeds from 2017 to 2021 by Forward Sortation Areas

- In the next five slides, maps are presented for download speeds at the Forward Sortation Area level with Ward Boundaries for reference.
- The N values represent the total number of observations in the dataset over all queried forward sortation areas. Therefore, the N values represent a higher number of observations than those specifically belonging within the City of Hamilton.

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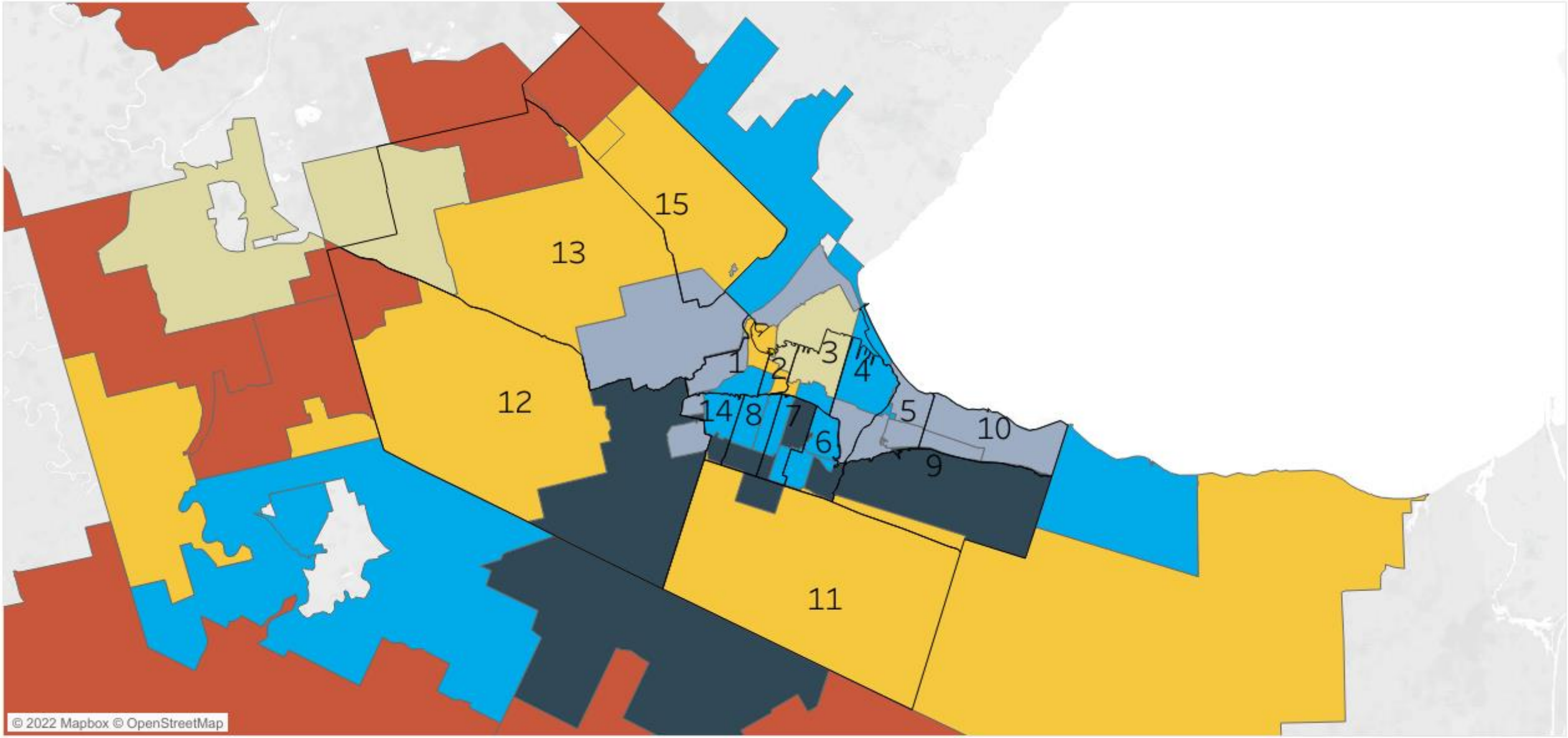
Median Download Speeds by Forward Sortation Area with Ward Boundaries, 2021 (N=827,464)



Median Download Speeds (Source: M-Lab Network Diagnostic Tool)

10 to 20 Mbps | 20 to 30 Mbps | 30 to 40 Mbps | 40 to 50 Mbps | 50 to 60 Mbps | 60 to 70 Mbps

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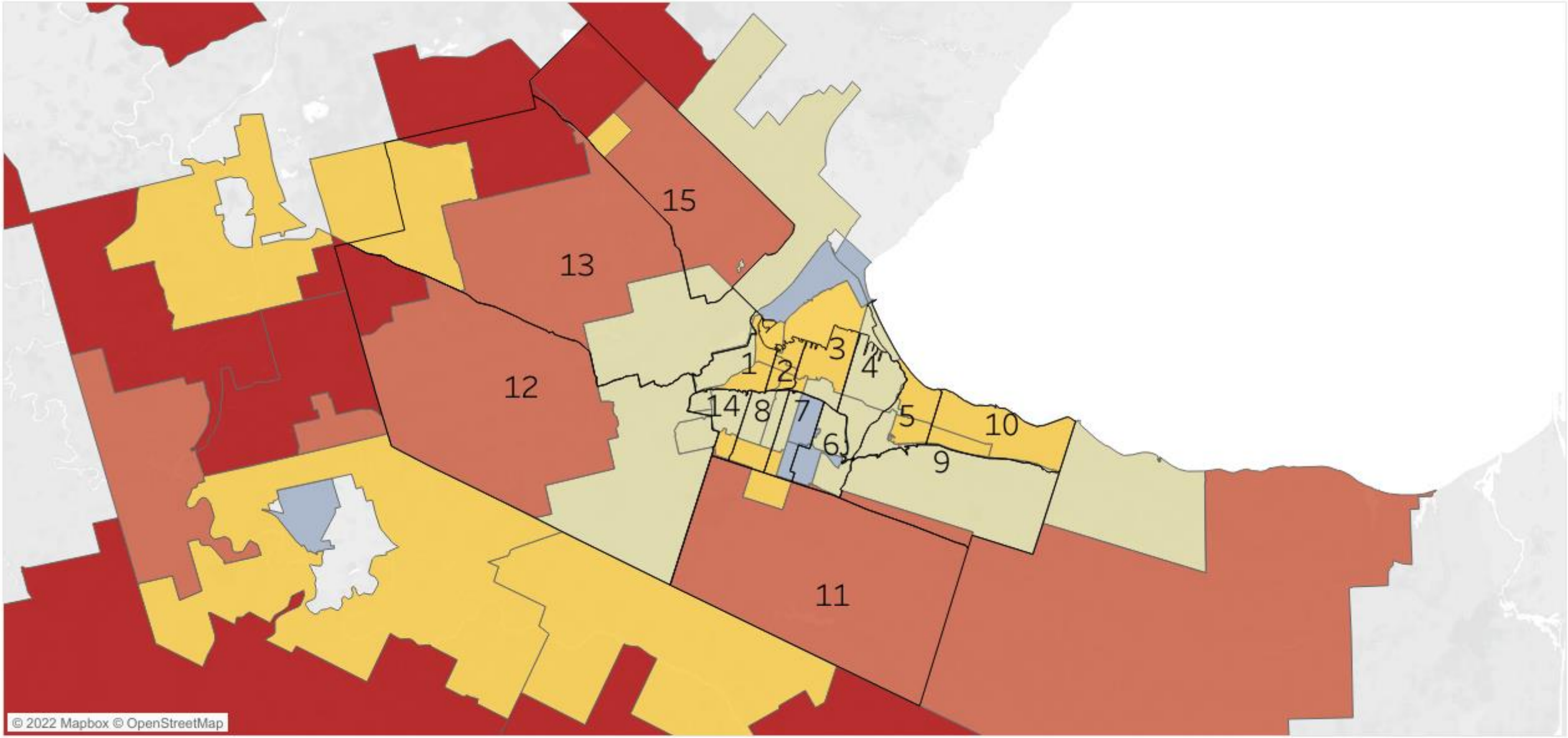
Median Download Speeds by Forward Sortation Area with Ward Boundaries, 2020 (N=793,525)



Median Download Speeds (Source: M-Lab Network Diagnostic Tool)

Less than 10 Mbps | 10 to 20 Mbps | 20 to 30 Mbps | 30 to 40 Mbps | 40 to 50 Mbps

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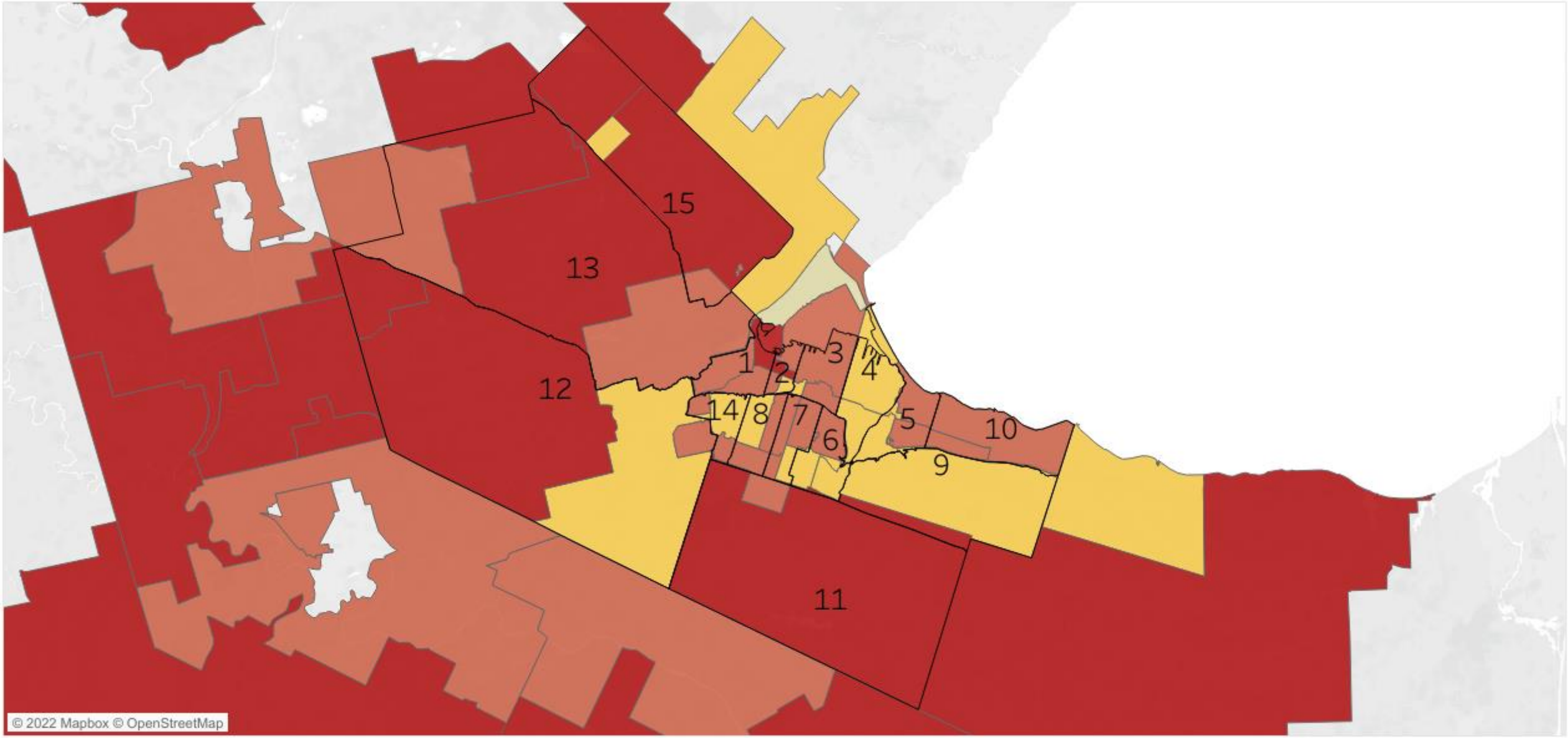
Median Download Speeds by Forward Sortation Area with Ward Boundaries, 2019 (N=502,993)



Median Download Speeds (Source: M-Lab Network Diagnostic Tool)

Less than 10 Mbps | 10 to 20 Mbps | 20 to 30 Mbps | 30 to 40 Mbps

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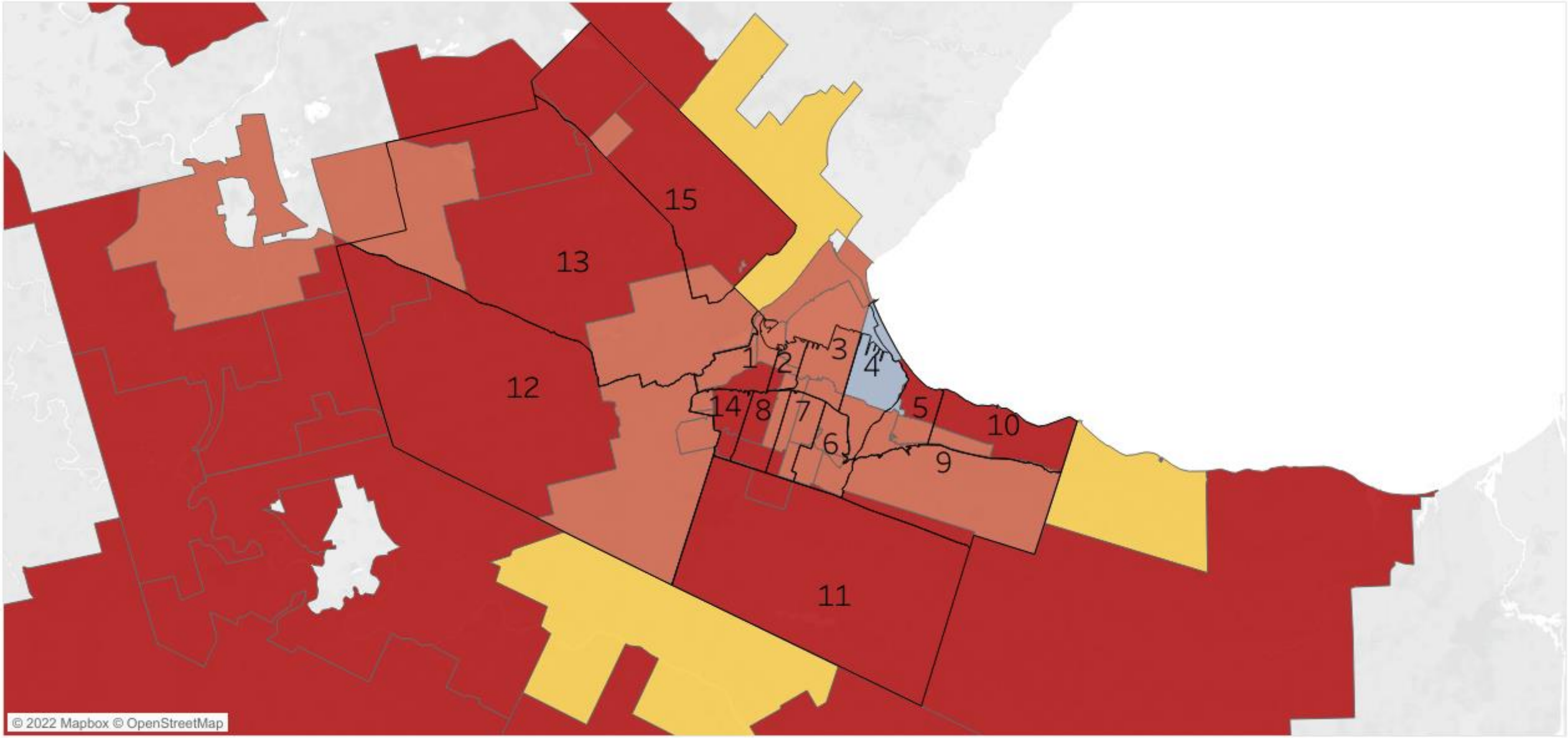
Median Download Speeds by Forward Sortation Area with Ward Boundaries, 2018 (N=395,095)



Median Download Speeds (Source: M-Lab Network Diagnostic Tool)

Less than 10 Mbps | 10 to 20 Mbps | 20 to 30 Mbps | 40 to 50 Mbps

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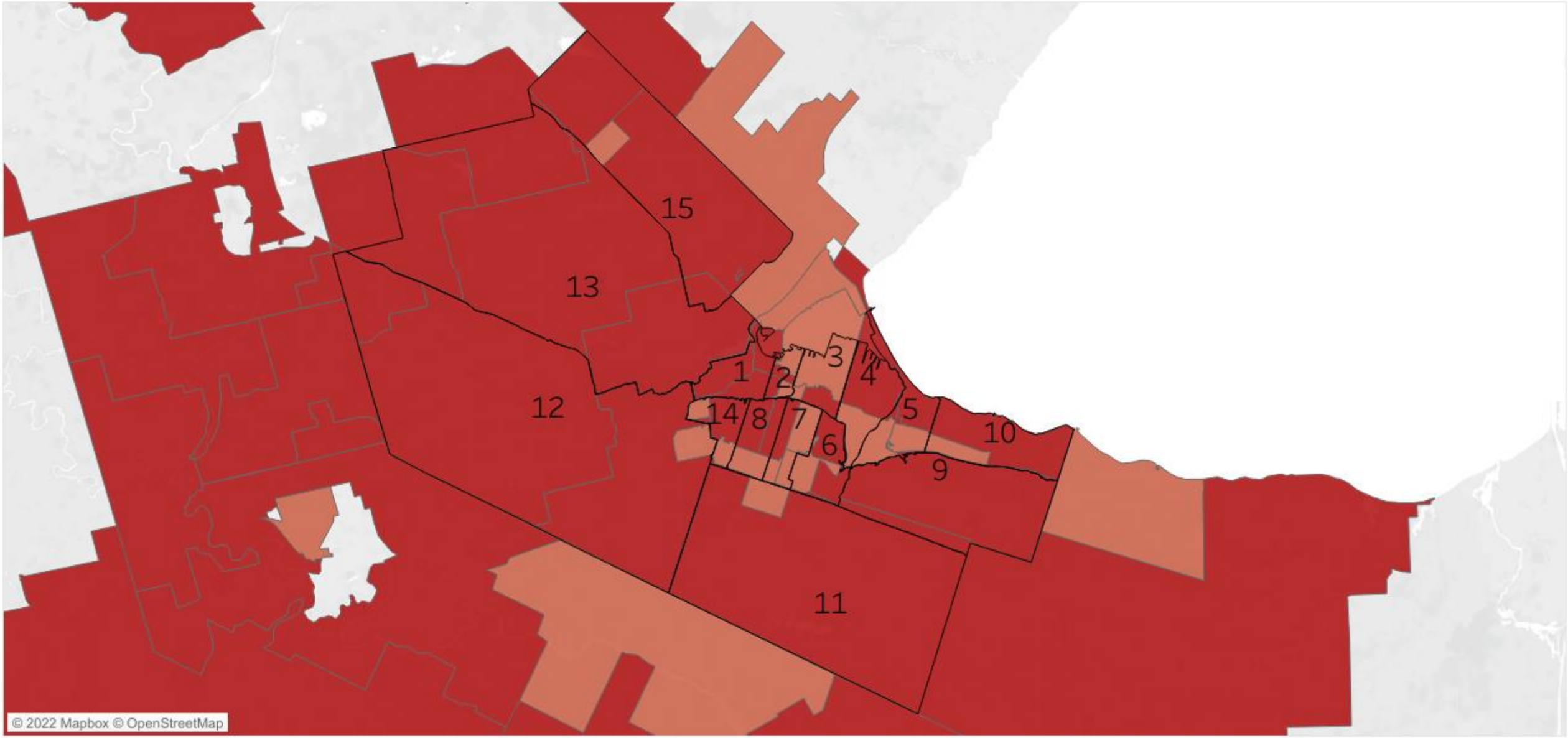
Median Download Speeds by Forward Sortation Area with Ward Boundaries, 2017 (N=250,933)



Median Download Speeds (Source: M-Lab Network Diagnostic Tool)

Less than 10 M.. 10 to 20 Mbps

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Upload Speeds from 2017 to 2021 by Forward Sortation Areas

- In the next five slides, maps are presented for upload speeds at the Forward Sortation Area level with Ward Boundaries for reference.
- The N values represent the total number of observations in the dataset over all queried forward sortation areas. Therefore, the N values represent a higher number of observations than those specifically belonging within the City of Hamilton.

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Median Upload Speeds by Forward Sortation Area with Ward Boundaries, 2021 (N=779,560)

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