

# EOW Garbage Collection Diversion Impact – Full Year Analysis

Waste Management Planning Steering Committee

WMPSC-C 41-2021

December 13, 2021

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# **EOW Garbage Collection Impact – Full Year Analysis**

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# Overview

1. One (1)-year update on the waste diversion impact resulting from the change to every other week (EOW) garbage collection;
2. Estimate of the environmental impacts of the changes in waste diversion; and
3. Estimate the economic value of the changes in environmental impacts.

# Curbside Collected Tonnages

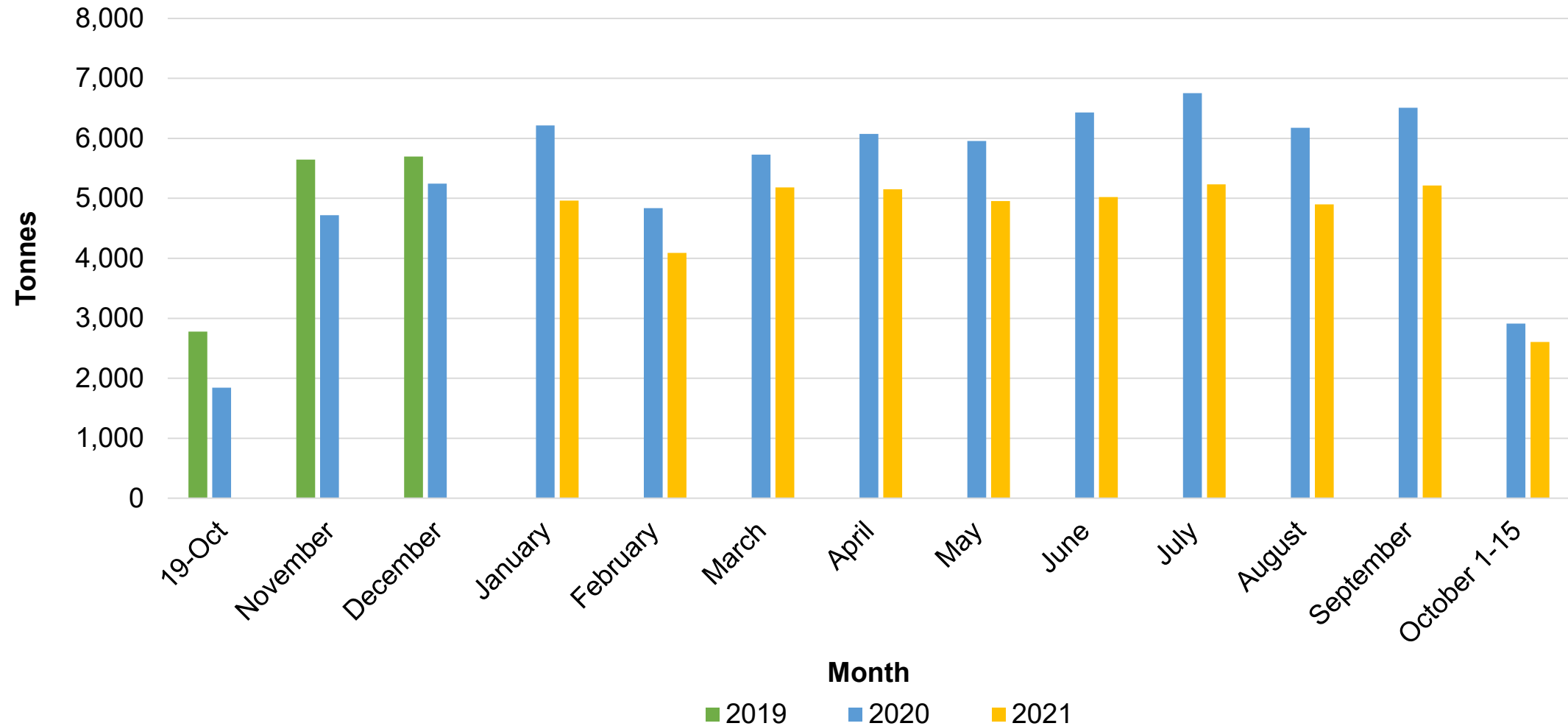
- Data pertains to all curbside collected waste from residential, multi-residential (not including front-end garbage enhanced collection), institutional, industrial and commercial properties throughout Niagara region, including those inside designated business areas (DBAs).
- Data references two time periods:
  - Before EOW – October 21, 2019 through October 16, 2020
  - After EOW – October 19, 2020 through October 15, 2021

# Curbside Collected Tonnages Con't

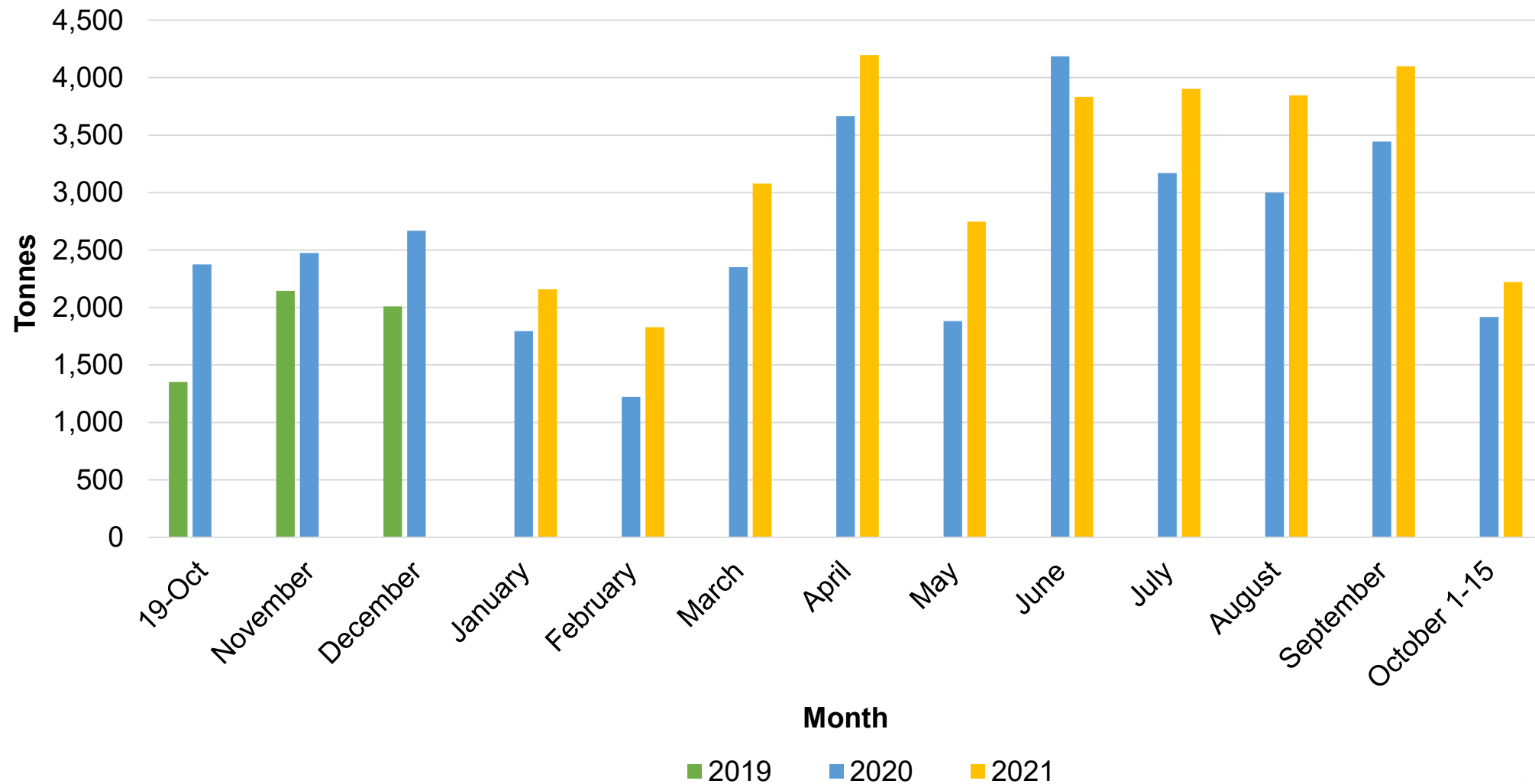
Material Stream	Before EOW (Tonnes)	After EOW (Tonnes)	Difference
Garbage	71,708	59,114	-17.6%
Organics	32,138	39,425	22.7%
Recycling	36,948	40,544	9.7%

Note: Organics does not include separate leaf and yard waste or brush collection.

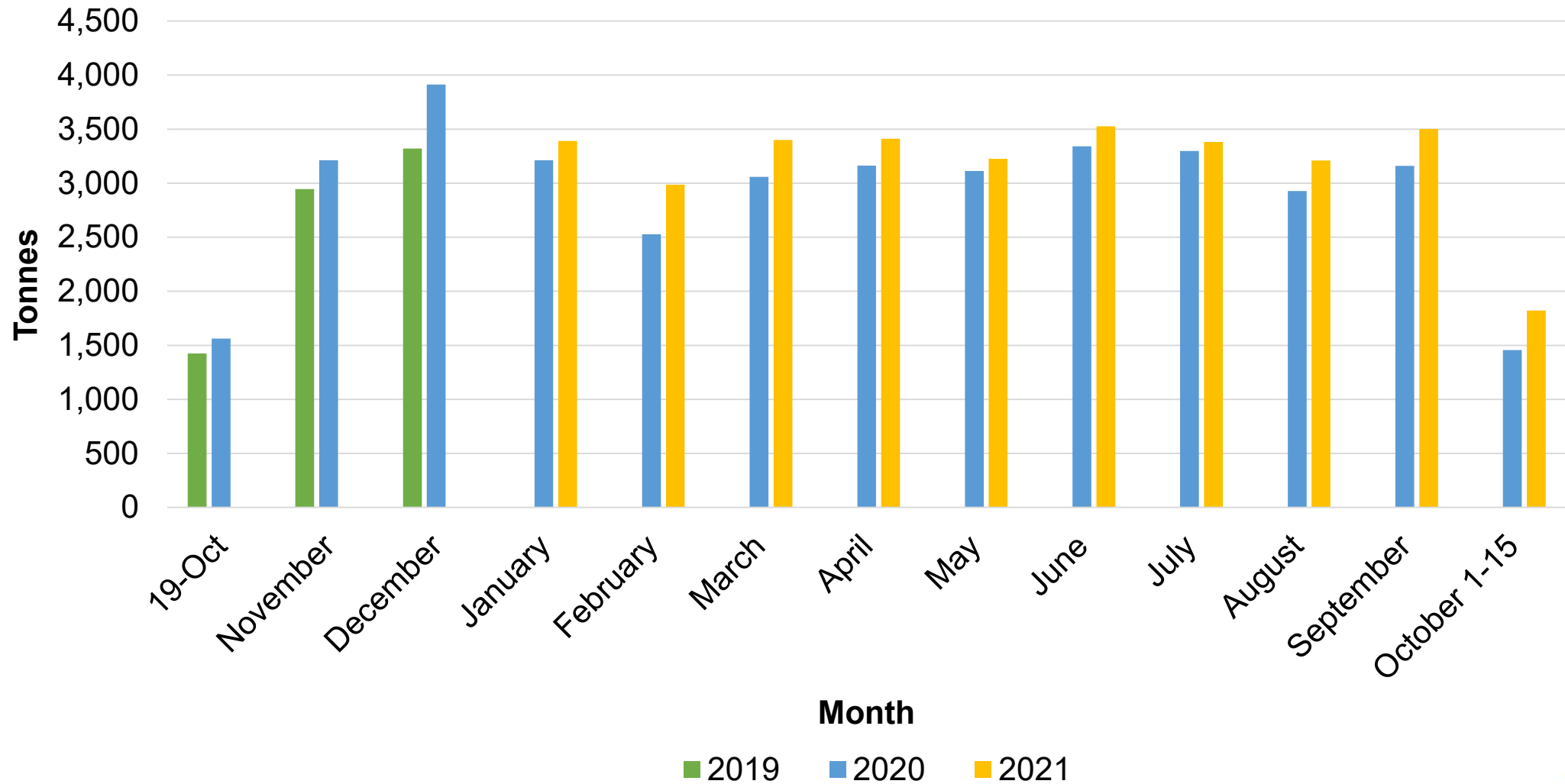
# Curbside Garbage Tonnages



# Curbside Organics Tonnages



# Curbside Recycling Tonnages





# Waste Diversion Analysis

- As part of the EOW garbage analysis, the Region completed a waste composition study and environmental benefits analysis to further review the impact of EOW garbage collection.
- The waste composition study results (WMPSC-C 34-2021) show the 2020-2021 four (4)-season average curbside waste diversion rate is 60 per cent, an increase of 14.3 percentage points from the 2015-2016 diversion rate of 45.7 per cent.

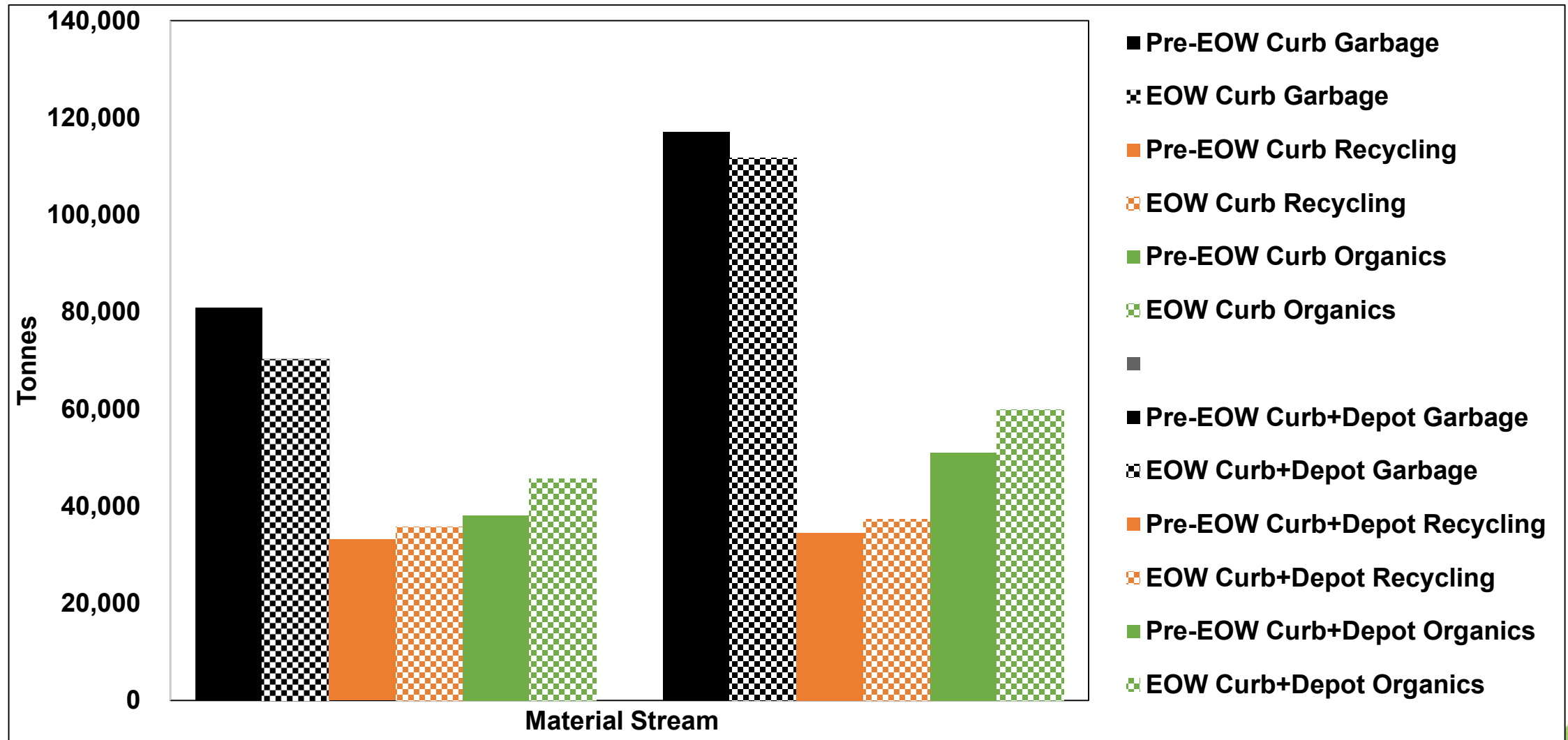
# Environmental Benefits Analysis

- Niagara Region retained Sound Resource Management Group, Inc. (SRMG) to evaluate and quantify the environmental benefits over the first year following the Region's switch to EOW curbside garbage collection.
- The report completed by SRMG, can be found in Appendix 1 of WMPSC-C 41-2021.

# Environmental Benefits Analysis - Details

- Compares tonnages for year prior to EOW implementation to tonnages for weeks 2 through 53 of EOW garbage collection to adjust for weekly garbage collection prior to EOW week 1.
- Organics tonnages include leaf & yard wastes and brush.
- Tonnages for recycling and organics are adjusted down to exclude contaminants in recycling and organics collections, as well as processing residues. Garbage tonnages are adjusted up to include these recycling and organics contaminants and processing residues.
- SRMG used its proprietary MEBCalc (measuring environmental benefits calculator) tool to estimate environmental impacts of changes in annual garbage, recycling and organics tonnages following implementation of EOW garbage collection.

# Annual Curbside & Curbside + Depot Tonnes



# Nine Environmental Impacts Assessed

- Climate Change from anthropogenic GHG emissions
- Human Health Respiratory disease and death from particulates
- Human Health Toxicity (other than from respiratory particulates or carcinogenic substances)
- Human Health Carcinogenicity from anthropogenic compounds
- Eutrophication of soil or water from anthropogenic mineral nutrients
- Acidification from anthropogenic acidifying compounds
- Stratospheric Ozone Depletion from anthropogenic compounds
- Ground Level Smog Formation from anthropogenic chemical releases

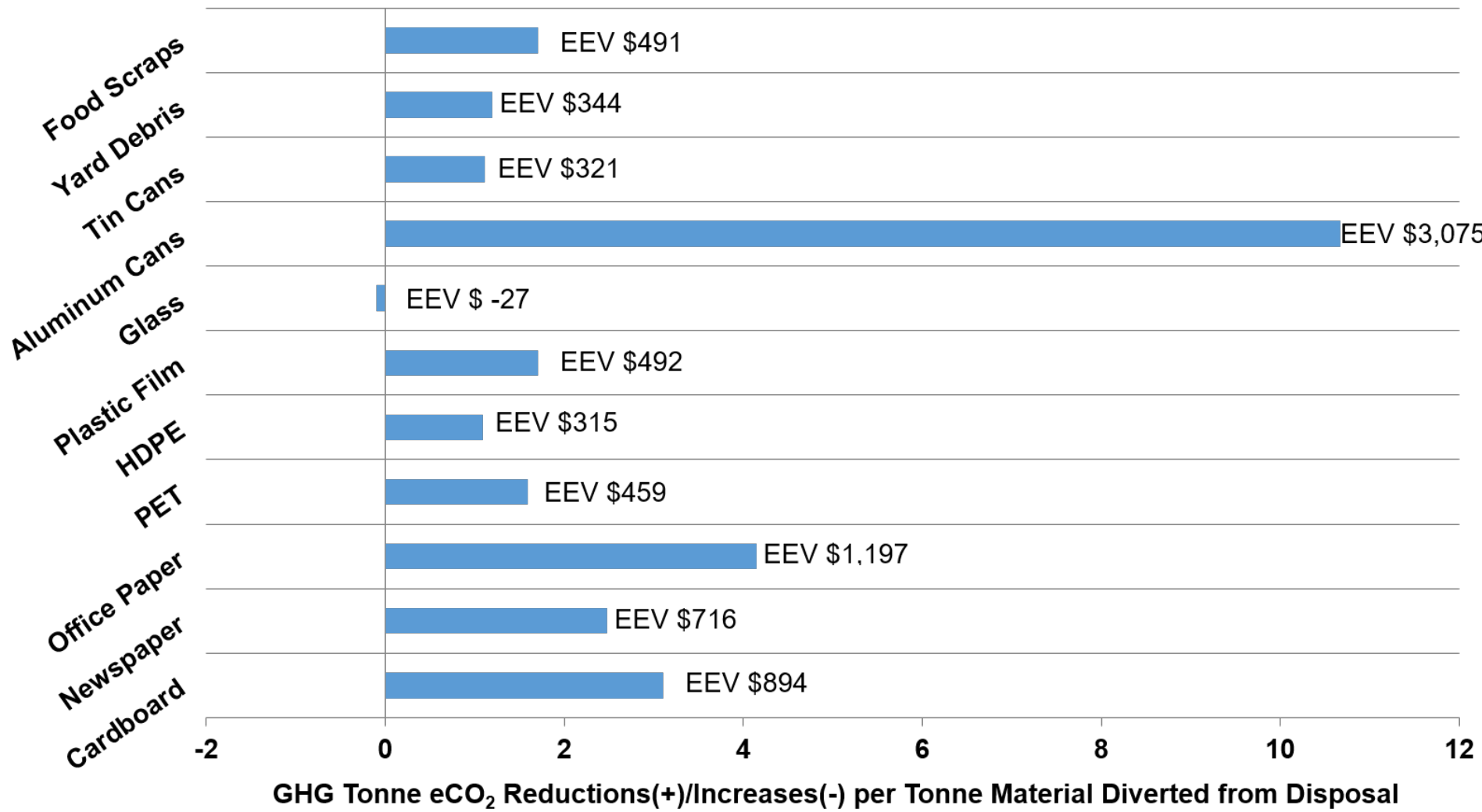
# Annual EOW Environmental Pollution Benefits

Pollution Environmental Impact	Pollution Indicator Substance	Pollution Decrease/(Increase) (Tonne indicator Substance) - Curbside Only	Pollution Decrease/(Increase) (Tonne indicator Substance) - Curbside and Depot
Climate Change	eCO <sub>2</sub>	18,413.92	10,725.08
Human Health - Respiratory	ePM <sub>2.5</sub>	4.73	1.14
Human Health – Non-Carcinogenic	eT	1,366.97	(1,514.32)
Human Health – Carcinogenic	eB	8.39	(10.84)
Eutrophication	eN	93.39	56.56
Acidification	eSO <sub>2</sub>	29.88	(8.48)
Ecosystems Toxicity	e2,4-D	0.04	(0.17)
Ozone Depletion	eCFC-11	0.05	0.03
Smog Formation	eO <sub>3</sub>	348.67	(142.89)

# Estimated Environmental Economic Value for Environmental Impact Reductions (2021 CDN\$)

- Climate Change - \$289 per tonne eCO<sub>2</sub>
- Human Health Respiratory Effects - \$824,336 per tonne ePM<sub>2.5</sub>
- Human Health Toxicity Effects - \$466 per tonne eT
- Human Health Carcinogenicity Effects - \$3,328 per tonne eB
- Waterways Eutrophication - \$33,901 per tonne eN
- Acidification - \$559 per tonne SO<sub>2</sub>
- Stratospheric Ozone Depletion - \$77,246 per tonne CFC-11
- Ground Level Smog Formation - \$332 per tonne O<sub>3</sub>

# GHG Reductions & EEVs for Diverted Materials

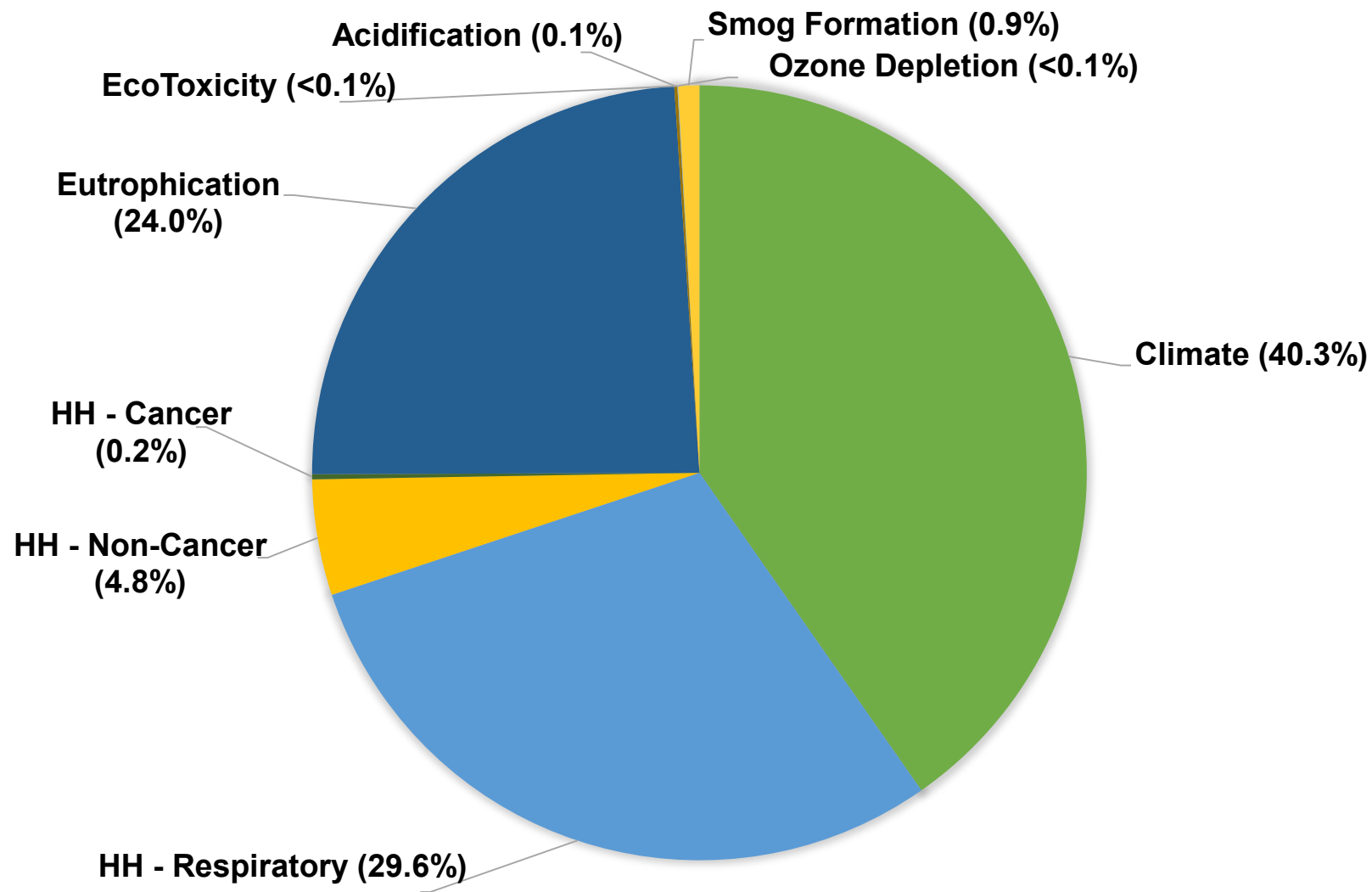




# Environmental Economic Value (EEV) of EOW

Environmental Impact	Pollution Indicator Substance	Midpoint Economic Cost of Pollution per tonne (CDN \$)	Curbside Only - Pollution Decreases	Curbside Only - Value of Decreases (CDN \$)	Curbside Only – Per Cent of Total Benefit
Climate Change	eCO <sub>2</sub>	\$288.35	18,413.92	\$5,309,772	40.3%
Human Health - Respiratory	ePM <sub>2.5</sub>	\$824,335.45	4.73	\$3,902,718	29.6%
Human Health – Non-Carcinogenic	eT	\$465.81	1,366.97	\$636,746	4.8%
Human Health – Carcinogenic	eB	\$3,328.67	8.39	\$27,913	0.2%
Eutrophication	eN	\$33,900.36	93.39	\$3,165,898	24.0%
Acidification	eSO <sub>2</sub>	\$558.97	29.88	\$16,701	0.1%
Ecosystems Toxicity	e2,4-D	\$5,681.36	0.04	\$250	<0.1%
Ozone Depletion	eCFC-11	\$77,246.25	0.05	\$3,611	<0.1%
Smog Formation	eO <sub>3</sub>	\$332.05	348.67	\$116,010	0.9%
Overall Total Benefit	N/A	N/A	N/A	\$13,179,620	100.0%

# Environmental Impact Shares of Total EEV



# Questions?

