Table S1. Site ID, name, location (latitude and longitude), elevation (m), distance from Oshawa (m), distance from shore (m) for the 37 locations selected for ozone sampling in Oshawa and Toronto, Ontario. Distance from Oshawa is measured from ID 19. Sites measured in each season are marked with a Yes/No if they were sampled.

Site ID	Name	Summer	Winter	Distance from Shore (m)	Distance from Oshawa (km)	Latitude (decimal degrees)	Longitude (decimal degrees)
1	Conlin Rd.	Yes	No	11000	-	43.56886	-78.53789
2	Taunton Rd.	Yes	No	8970	-	44.55982	-78.52755
3	Rossland Rd.	Yes	No	6890	-	43.54915	-78.52283
4	Adelaide Ave.	Yes	No	5550	-	43.54219	-78.51983
5	Olive Ave.	Yes	No	3790	-	43.5332	-78.51578
6	Bloor St.	Yes	No	2840	-	43.52839	-78.51364
7	Wentworth St.	Yes	No	1860	-	43.52462	-78.5073
8	Harbour Rd.	No	Yes	873	-	43.52114	-78.50085
9	Trail Entrance	Yes	Yes	636	-	43.52038	-78.49937
10	Valley Dr.	Yes	Yes	426	-	43.5192	-78.49809
11	Lakeview Park Ave.	Yes	Yes	306	-	43.51936	-78.49749
12	Lakeview Park Parking Lot	No	Yes	195	-	43.51899	-78.49688
13	Lakeview Park Beach	Yes	Yes	42	-	43.51872	-78.49555
14	Lakeview Park Lighthouse	Yes	No	-134	-	43.51859	-78.49339
15	Lakeview Park Gazebo	Yes	Yes	19	-	43.51649	-78.49834
16	Lakewoods Park Lookout	Yes	Yes	10	-	43.51478	-78.49907
17	Birchcliffe Bus Stop	Yes	Yes	443	-	43.51724	-78.50054
18	Lakeview Park Rocks	No	Yes	-34	-	43.51776	-78.49581
19	Oshawa GO	Yes	No	1950	0	43.87084	-78.88526
20	Whitby GO	Yes	No	1560	4.34	43.86487	-78.93833
21	Ajax GO	Yes	No	3540	12.8	43.84845	-79.04103
22	Pickering GO	Yes	No	2040	16.7	43.83184	-79.08418
23	Rouge Hill GO	Yes	No	70	22.1	43.78027	-79.13064
24	UTSC	Yes	No	3640	25.9	43.78438	-79.18383
25	Bloor St.	Yes	No	3580	-	43.6685	-79.39418
26	College St.	Yes	No	2560	-	43.65998	-79.39089
27	Queen St.	Yes	No	1520	-	43.6511	-79.3869

28	King St	Yes	No	1120	-	43.64755	-79.3849
29	Front St.	Yes	Yes	820	-	43.6452	-79.38229
30	Bremner Blvd..	Yes	Yes	548	-	43.64314	-79.38111
31	Lakeshore Blvd	Yes	Yes	437	-	43.64196	-79.38095
32	Harbour St.	Yes	Yes	328	-	43.64073	-79.38071
33	Queen's Quay	Yes	Yes	224	-	43.64006	-79.38048
34	Waterfront East Middle	No	Yes	100	-	43.63885	-79.38016
35	Waterfront East	Yes	Yes	15	-	43.63817	-79.37971
36	Waterfront West	Yes	Yes	20	-	43.63781	-79.38352
37	Ann Tindal Park	Yes	Yes	106	-	43.63858	-79.38405

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Table S2. Ozone mixing ratio (ppb) measured March 7th, 2023, next to Ontario air quality monitoring station Toronto Downtown (station ID 31129). Toronto Downtown Station at 5:00 PM recorded 41 ppb and falls within 1 standard deviations of measured mean.

Time	Ozone (ppb)
5:10 PM	43
5:11 PM	41
5:12 PM	42
5:13 PM	41
5:14 PM	39
5:15 PM	41
5:16 PM	39
5:17 PM	42
5:18 PM	39
5:19 PM	39
Mean	40.6
SD	1.4

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Table S3. Ozone mixing ratio (ppb) measured July 19th, 2023, next to Ontario air quality monitoring station Oshawa (station ID 45027). Oshawa Station at 4:00 PM recorded 33 ppb and falls within 1 standard deviations of measured mean.

Time	Ozone (ppb)
4:20 PM	34
4:21 PM	27
4:22 PM	31
4:23 PM	34
4:24 PM	34
4:25 PM	33
4:26 PM	29
4:27 PM	31
4:28 PM	28
4:29 PM	33
Mean	31.4
SD	2.5
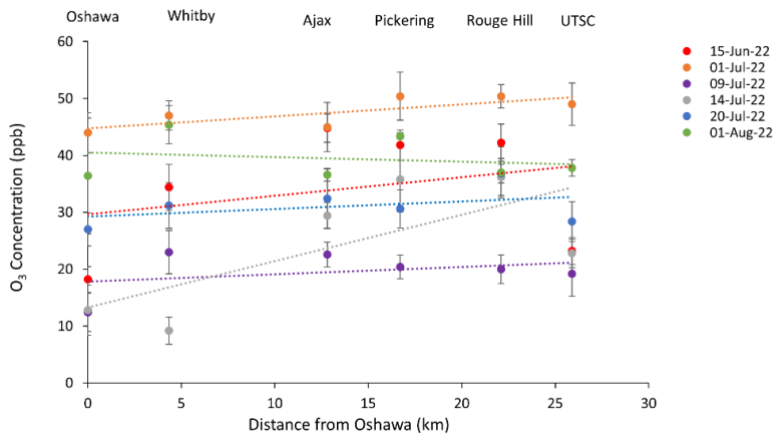
Figure S1. Ozone concentrations against distance from Oshawa GO station (ID 19) in summer 2022.
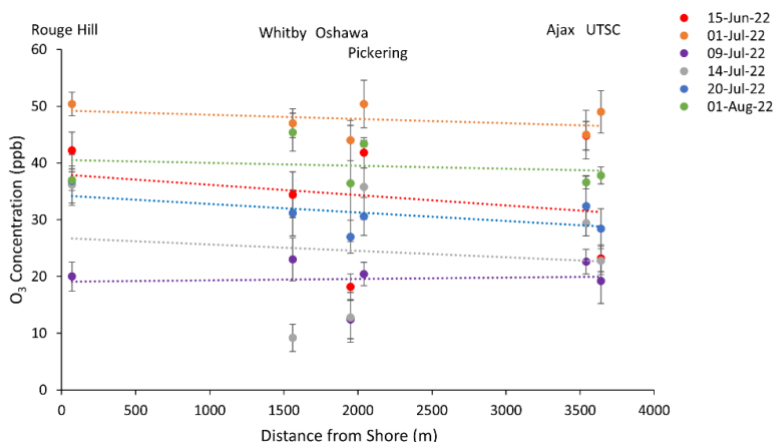
Figure S2. Ozone concentration in parallel to shore transect against distance from shore in summer 2022.

Figure S1 shows a slight increase in ozone regionally starting from Oshawa (ID 19) and moving west towards Scarborough on all days except August 1st, 2022. Oshawa typically had the lowest ozone concentration, peaking at Pickering (ID 22) and Rouge Hill (ID 23), followed up a slight decrease at the University of Toronto Scarbrough (ID 24). This was likely the influence of greater pollution emissions further west towards the Greater Toronto Area and major urban centres. The mean increase is 0.26 ± 0.28 ppb/km (1 standard deviation) and a low linear regression R^2 below 0.5 on all days except July 1st, 2022. Historical data from Ontario air quality monitoring stations in Toronto and Oshawa in summer also shows that ozone concentrations did not vary considerably between the cities (see Table S4).

Figure S2 shows that the ozone gradients can not be observed when not measured at perpendicular transects to the lakeshore. There is slight negative trend for ozone versus distance to shore observed on all days except July 9th, 2022, and mean slope of -0.91 ± 0.0007 ppb/km (1 standard deviation), which is not comparable to those observed nearshore. Linear regression R^2 was also poor.

50 **Table S4. Mean and variance of average daily O$_3$ mixing ratios (ppb) from Ontario air quality monitoring stations Oshawa (station ID 45027) and Toronto Downtown (station ID 31129) in January and July 2021. Average daily values calculated from 01:00 to 24:00 EDT of a single day. P-values determined from two-sample t-test assuming unequal variance, alpha = 0.05.**

	Average Daily Ozone July 2021		Average Daily Ozone January 2021	
	Oshawa	Toronto Downtown	Oshawa	Toronto Downtown
Mean (ppb)	23.5	26.6	26.3	20.1
Variance (ppb)	44.6	48.0	48.0	28.5
p-value	0.08		0.0002	

55 **Table S5. Mean and variance of average daily NO$_2$ mixing ratios (ppb) from Ontario air quality monitoring stations in Oshawa (station ID 45027) and Toronto Downtown (station ID 31129) in January and July 2021. Average daily values calculated from 01:00 to 24:00 EDT of a single day. P-values determined from two-sample t-test assuming unequal variance, alpha = 0.05.**

	Average Daily NO$_2$ July 2021		Average Daily NO$_2$ January 2021	
	Oshawa	Toronto Downtown	Oshawa	Toronto Downtown
Mean (ppb)	2.1	9.6	4.3	12.6
Variance (ppb)	0.5	7.5	13.6	9.3
p-value	2E-16		8E-14	

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Table S6. Rate of O_3 concentration decrease from shore in Toronto based on least-squares linear regression. Mean slope was calculated and reported with 1 standard deviation. P-values indicated.

	Summer			Winter	
Date	Slope (ppb/m)	R^2	Date	Slope (ppb/m)	R^2
26-Jul-22	-0.0166	0.478	02-Dec-22	-0.0301**	0.910
29-Jul-22	-0.0162 *	0.740	10-Dec-22	-0.0003	0.00013
02-Aug-22	-0.0086	0.204	19-Dec-22	-0.0113 *	0.443
06-Aug-22	-0.0104	0.425	19-Jan-23	-0.0133 *	0.773
13-Aug-22	-0.0290 *	0.595	26-Jan-23	-0.0159 *	0.443
16-Aug-22	-0.0118	0.436	02-Feb-23	-0.0083	0.298
			14-Feb-23	-0.0216 *	0.762
Mean	-0.0154 ± 0.0067		Mean	-0.0167 ± 0.0073 [a]	

[a] data from 10-Dec-22 was removed due to low R^2

* $p < 0.05$

** $p < 0.001$

Table S7. Rate of O_3 concentration decrease from shore in Oshawa based on least-squares linear regression. Mean slope was calculated and reported with 1 standard deviation. P-values indicated.

	Summer			Winter	
Date	Slope (ppb/m)	R^2	Date	Slope (ppb/m)	R^2
10-Jun-22	-0.0158	0.347	04-Dec-22	-0.0195 **	0.882
21-Jun-22	-0.0270	0.448	08-Dec-22	-0.0064 *	0.409
03-Jul-22	-0.0153	0.247	29-Dec-22	-0.0076 *	0.543
08-Jul-22	-0.0325	0.571	07-Jan-23	-0.0075	0.349
10-Jul-22	-0.0287 *	0.688	20-Jan-23	-0.0079 *	0.718
22-Jul-22	-0.0340	0.278	27-Jan-23	-0.0060 *	0.799
23-Jul-22	-0.0115 *	0.705	20-Feb-23	-0.0017	0.381
Mean	-0.0235 ± 0.0085		Mean	-0.00809 ± 0.00506	

* $p < 0.05$

** $p < 0.001$
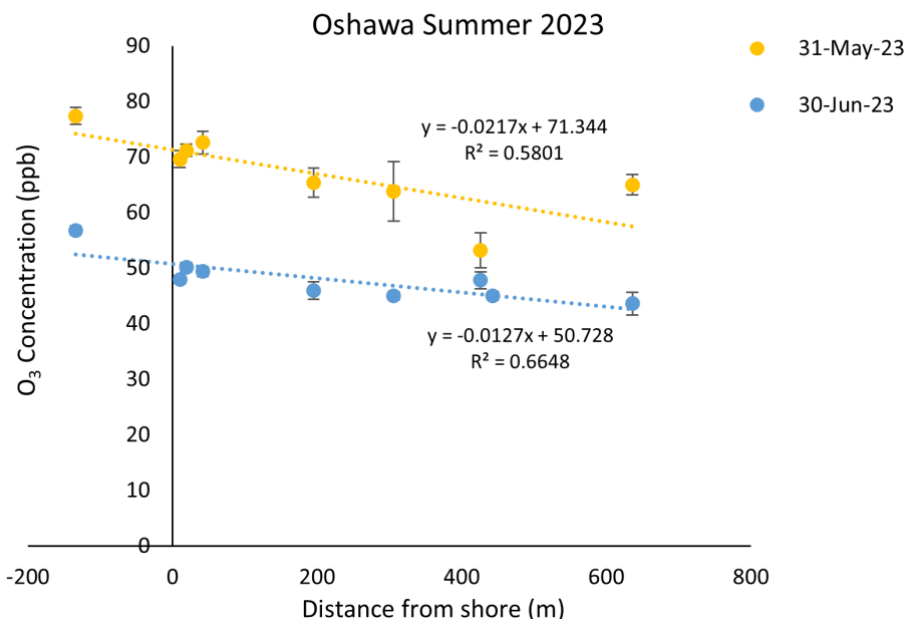
Figure S3. Scatter plot of average O$_3$ (ppb) to distance from the shore of Lake Ontario (m) with linear regression within 1 km measured in Oshawa summer 2023. Error bars represent ± 1 standard deviation from the mean of five consecutive 1 min measurements. Linear regression p-value for both days < 0.05.
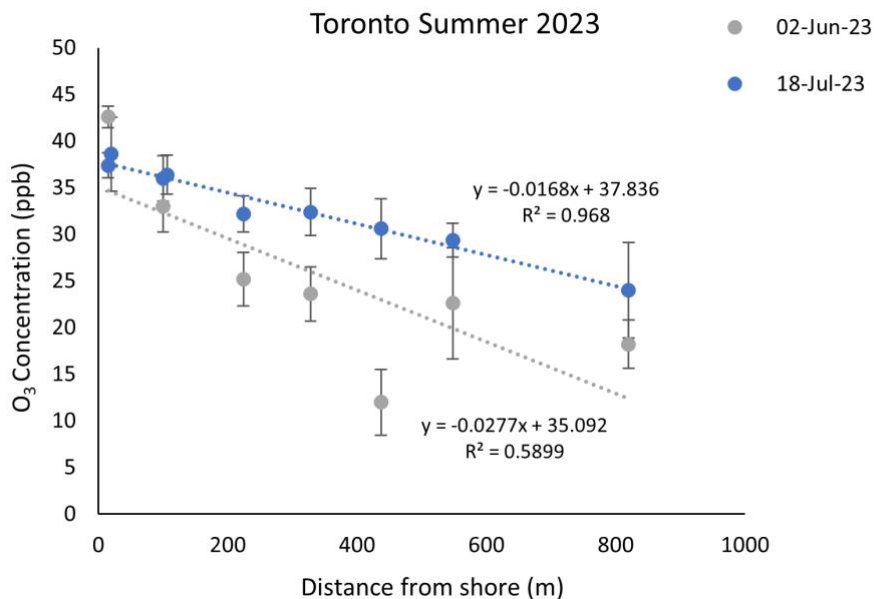
Figure S4. Scatter plot of average O$_3$ (ppb) to distance from the shore of Lake Ontario (m) with linear regression within 1 km measured in Toronto summer 2023. Error bars represent ± 1 standard deviation from the mean of five consecutive 1 min measurements. Linear regression p-value for both days < 0.05, July 18th, 2023 < 0.001.
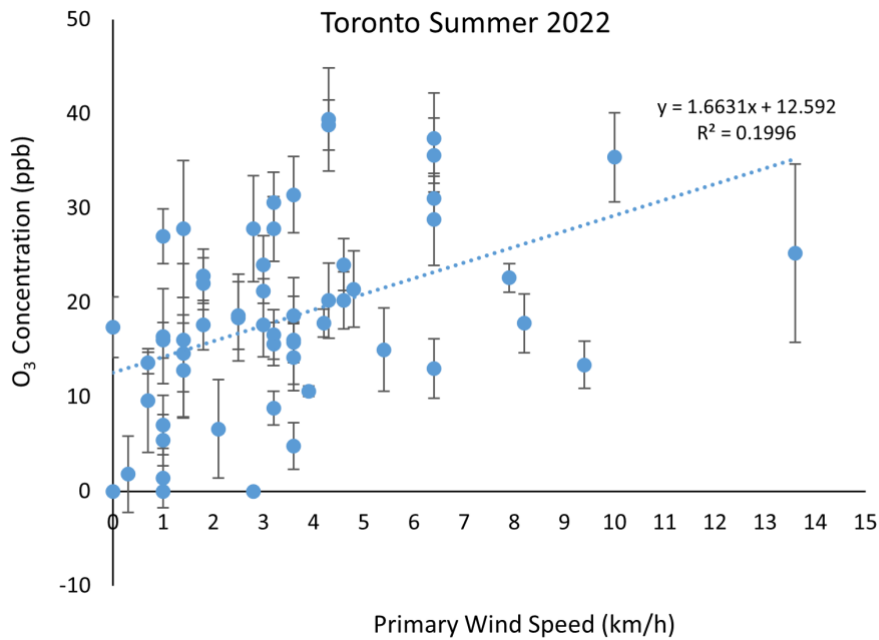
Figure S5. Scatter plot of average O$_3$ (ppb) to wind speed (km/h) measured in Toronto summer 2022 using data from all sampling days. Error bars for ozone represent ± 1 standard deviation from the mean of five consecutive 1 min measurements. Linear regression p-value < 0.001.

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