CAPHE PHAP-RM

6.16. EASTSIDE DETROIT

2016

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

Table of Contents

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

Tables

Figures

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

6.16 Eastside Detroit

There are several air pollution sources in Eastside Detroit that can increase pollution exposures. Eastside Detroit residents also experience a number of exposures in the social environment that can increase vulnerability to adverse health outcomes of air pollution exposures. About 240,000 people lived on Detroit's Eastside in the 2010 census. (See Section 6.14.3 below and Table 6-1).

Air quality monitoring in Eastside Detroit is described in detail in Section 4. Below we describe specific sources of air pollutants in Eastside Detroit, as well as population and community characteristics that may influence vulnerability to adverse effects of exposures

6.16.1 Point sources

Table 6-11 shows point sources of pollutants located within the boundaries of Southwest Detroit (see Figure 6-21). For each facility, the **Rank** indicates the rank order of this site in relation to others in the 7-county SE Michigan area reporting to the Michigan Air Emissions Reporting System (MAERS), with a "1" indicating the greatest number of pounds of emissions. Trends over time (2010-2014) are also shown, filtered to exclude some variations (see text in Section 4.3 for a more detailed description), as well as the **rate of change** over that same 5 year period (see text, Section 4.3).

Rank	Facility	NOx			SO2			PM2.5			PM10			VOC			CO		
		5 Year Filtered Average	Note	Annual Change (%/yr)	5 Year Filtered Average	Note	Annual Change (%/yr)	5 Year Filtered Average	Note	Annual Change (%/yr)	5 Year Filtered Average	Note	Annual Change (%/yr)	5 Year Filtered Average	Note	Annual Change (%/yr)	5 Year Filtered Average	Note	Annual Change (%/yr)
13	**Jefferson North Assembly Plant, Daimlerchrysler**	59			0			2.7	(1)	-68	24.3	(1)		587.6	(1)	21	19	(1)	-34
18	**Greater Detroit Resource Recovery Facility**	1612		-13	141			0.2			22.1	(1)	26	6.4	(1)		283		
20	**General Motors Corporation**	186	(1)	-13	302			5.1	(1)	-14	5.7	(1)	-25	233.0			74		-12
97	**Fitzgerald Finishing Company**	6		10	0		10	0.4		10	0.4		10	36.7		20	5		10

Table 6-11: Facility emissions of conventional pollutants (tons/yr) in Eastside Detroit.Shows 5-year average emissions (filtered to exclude some variations, see text in Section 4.3), and rate of change over 5 year period (see text). Excerpted from full Table 5-4.

Health Effects: Health effects associated with exposure to the pollutants in Table 3-1 include increased risk of respiratory problems (e.g., asthma exacerbations and hospitalizations, COPD, cardiovascular effects). See Health Effects Table 3-1 for a complete listing. Section 5.5.3 provides quantitative estimates of health impacts from several of these point sources for three pollutants: $PM_{2.5}$, NO_x, and SO_2.

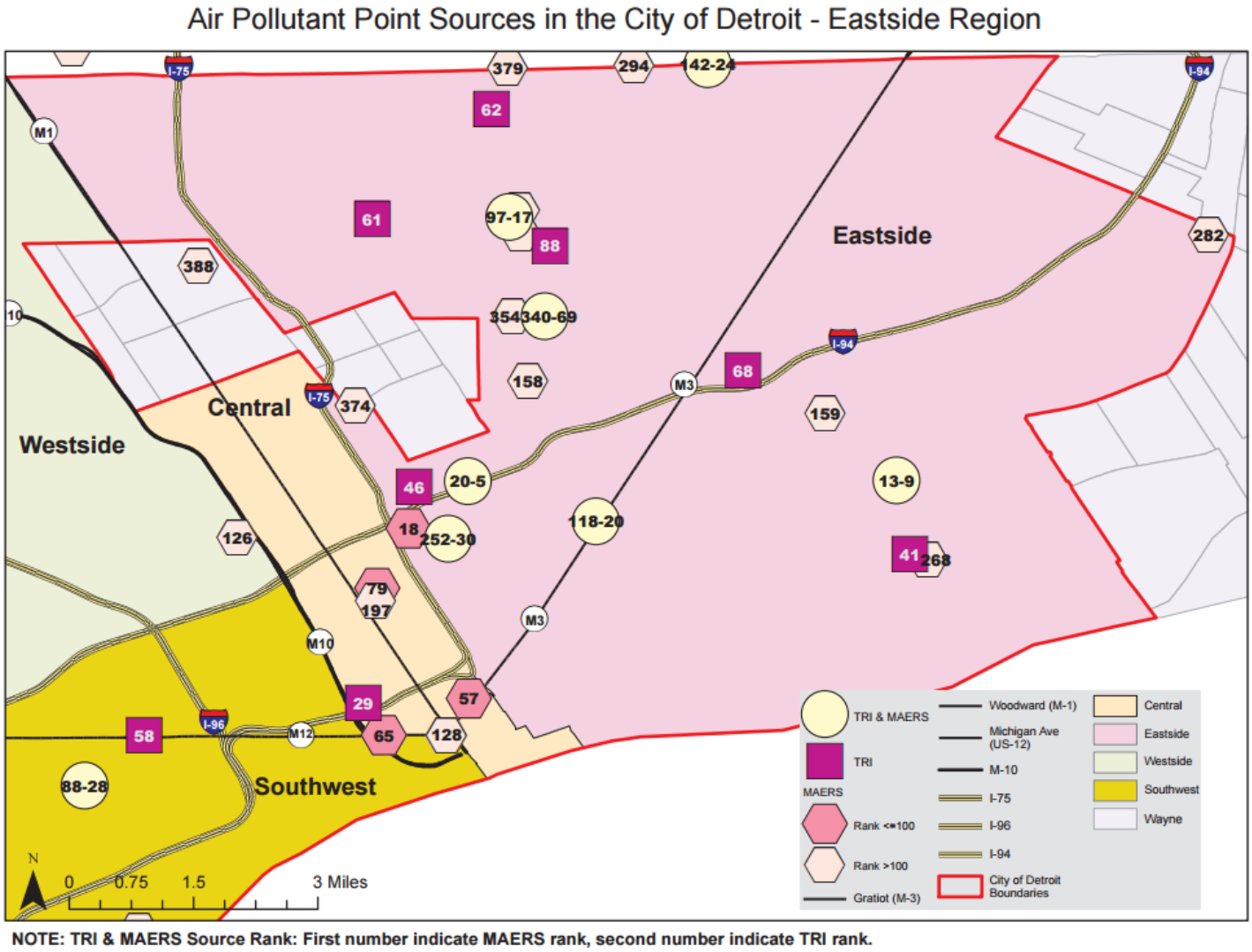
This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

Rank	Facility	Acids	VOC	Metals and Metal Compounds	Nitrogen Compounds	Sulfur Compounds	Other
5	General Motors GM VA Detroit-Hamtramck Assembly Center	52600	17381	362	0	0	3397
9	FCA US Jefferson North Assembly Plant	15	8933	236	3	0	89580
17	Fitzgerald Finishing LLC	3064	9433	0	0	0	0
20	Ajax Metal Processing Inc	268	7376	0	0	0	13595
24	3M CO-Detroit	0	1583	0	0	0	0
30	EQ Detroit Inc	1319	1220	3	1650	0	1691
41	Alco Products LLC	0	328	0	0	0	0
46	Arco Alloys Corp	0	0	250	0	0	0
61	Alpha Resins LLC	0	49	0	0	0	20
62	MT Elliot Tool & Die Manufacturing	0	0	46	0	0	0
68	PVS Technologies Inc	0	0	0	0	0	28
69	Detroit Axle Plant*	0	0	7	0	0	0
88	Cadillac Oil Co	0	3	0	2	0	0

Table 6-12: Emissions of toxics pollutants (pounds/year) by facility in Eastside Detroit by pollutant type. Average 2010-2014. In approximate rank by total TRI emissions. Excerpted from Table 5-6

Table 6-12 shows emissions of toxic air pollutants by facility located in Eastside Detroit, as reported in the Toxic Release Inventory (TRI). For each facility, pounds per year of toxics reported are shown. This table shows the rank order for each facility for SW Detroit, with "1" indicating the greatest number of pounds emitted. The full table is shown in Section 5.2.3.

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.



NOTE: TRI & MAERS Source Rank: First number indicate MAERS rank, second number indicate TRI rank.

Figure 6-20: Air pollutant sources in Eastside Detroit.

Figure 6-20 maps locations of facilities that are point sources of air pollutants located in or immediately adjacent to Eastside Detroit. Symbols indicate facilities that emit conventional air pollutants reported in the Michigan Air Emissions Reporting System (MAERS) and air toxics reported in the Toxic Release Inventory (TRI), as described in the legend. Numbers indicated for each facility reflect its ranking in the listing of MAERS emissions (Table 5-6) and the listing of toxic emissions (Table 5-7).

Eastside residents are potentially exposed to emissions from the Jefferson North Assembly Plant and the General Motors Assembly plants, each of which report sizable emissions of VOCs and acids. Sizable emissions of NOx are reported from the Greater Detroit Resource Recovery Facility, also located on Detroit's Eastside. Fitzgerald Finishing and Ajax Processing report substantial emissions of VOCs and acids. Sources outside of Eastside Detroit are also exposed to emissions occurring elsewhere in the region, as depicted in Figure 5.5.3.

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

6.16.2 Mobile sources

Mobile sources such as cars and trucks emit NO_x, $PM_{2.5}$, VOCs, CO, diesel exhaust, and other pollutants. Emissions from mobile sources occur both when a vehicle is driving or idling, and while refueling. Larger trucks produce a greater amount of emissions than small vehicles. Heavy duty diesel vehicles are large emitters of $PM_{2.5}$ and other pollutants. The NO_x emitted by vehicle traffic (and other sources) can combine with VOC emissions from vehicles (and other sources) to produce ground-level ozone, another pollutant which can be harmful to human health.

Main Sources: There are two major highways running through the Eastside neighborhood, I-75 (Chrysler Freeway) and I-94, as well as several less trafficked highways. According to the Michigan Department of Transportation (MDOT), the sections of I-75 and I-94 highways within the Eastside neighborhood have average daily vehicle counts of over 100,000 cars per day. These two freeways also experience heavy commercial (e.g., trucks and buses) traffic, with daily counts of commercial traffic over 6,000 for I-94 and over 10,000 for I-75.[1] Emissions from commercial truck traffic, which can include particulate matter from burned diesel fuel, can be particularly harmful to human health and are of particular concern. These large vehicles produce most of the on-road mobile source emissions of $PM_{2.5}$ (see Section 5.3). The average daily total vehicle traffic and daily truck traffic volume on major roadways in Eastside Detroit is shown in Table 6-13.

Highway	2013 Average Daily Vehicle Traffic (cars/day)[2]	2013 Average Daily Truck Volume (trucks/day)[3]
I-75/I-375 (Chrysler Fwy)	133,000 - 176,800	10,500 - 11,600
I-94	110,200-154,800	6,600 - 6,700
M-53 (Van Dyke St)	9,600 - 18,500	1,400 - 1,700
M-3 (Gratiot Ave)	12,300 - 31,700	620 - 1,200
M-102 (8 Mile Rd)	40,300 - 61,100	870 - 2,200

Table 6-13: Average Daily Vehicle Traffic and Average Daily Truck Volume, Eastside Detroit

Health Effects: Substantial health effects have been demonstrated for people who live, work, or go to school near major freeways. In particular, those who live within about 150 meters (about 500 feet) of roadways with high volumes of traffic, and in particular, diesel truck traffic, experience increased risk of respiratory and

[1] MDOT (Michigan Department of Transportation). 2014. MDOT Traffic Volumes. Available: http://mdot.maps.arcgis.com/apps/Viewer/index.html?appid=18a4b2f2ba3b4e079e935f8835862c73 [Accessed 17 March 15].

[2] MDOT (Michigan Department of Transportation). 2014. MDOT Traffic Volumes. Available: http://mdot.maps.arcgis.com/apps/Viewer/index.html?appid=18a4b2f2ba3b4e079e935f8835862c73 [Accessed 17 March 15].

[3] MDOT (Michigan Department of Transportation). 2014. MDOT Traffic Volumes. Available: http://mdot.maps.arcgis.com/apps/Viewer/index.html?appid=18a4b2f2ba3b4e079e935f8835862c73 [Accessed 17 March 15].

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

cardiovascular health effects. Health impacts from on-road traffic are quantified in Section 5.5.4. Also see Health Effects Table 3-1. Approximately 69,000 (about 10%) of Detroit's population lives within 150 meters of such heavily trafficked roadways.

Vehicles and the related infrastructure (e.g., fuel distribution facilities) are among the largest emitters of NO_x and VOCs in the urban area. In summer, the NO_x emitted by vehicles and other sources combines with VOC emissions from vehicles and other sources to produce ground-level ozone (O_3), another pollutant which is harmful to health. Currently, O_3 levels in Detroit are very close to the new (2015) National Ambient Air Quality Standard for O_3. Section 4.3 provides further information on O_3 trends in Detroit.

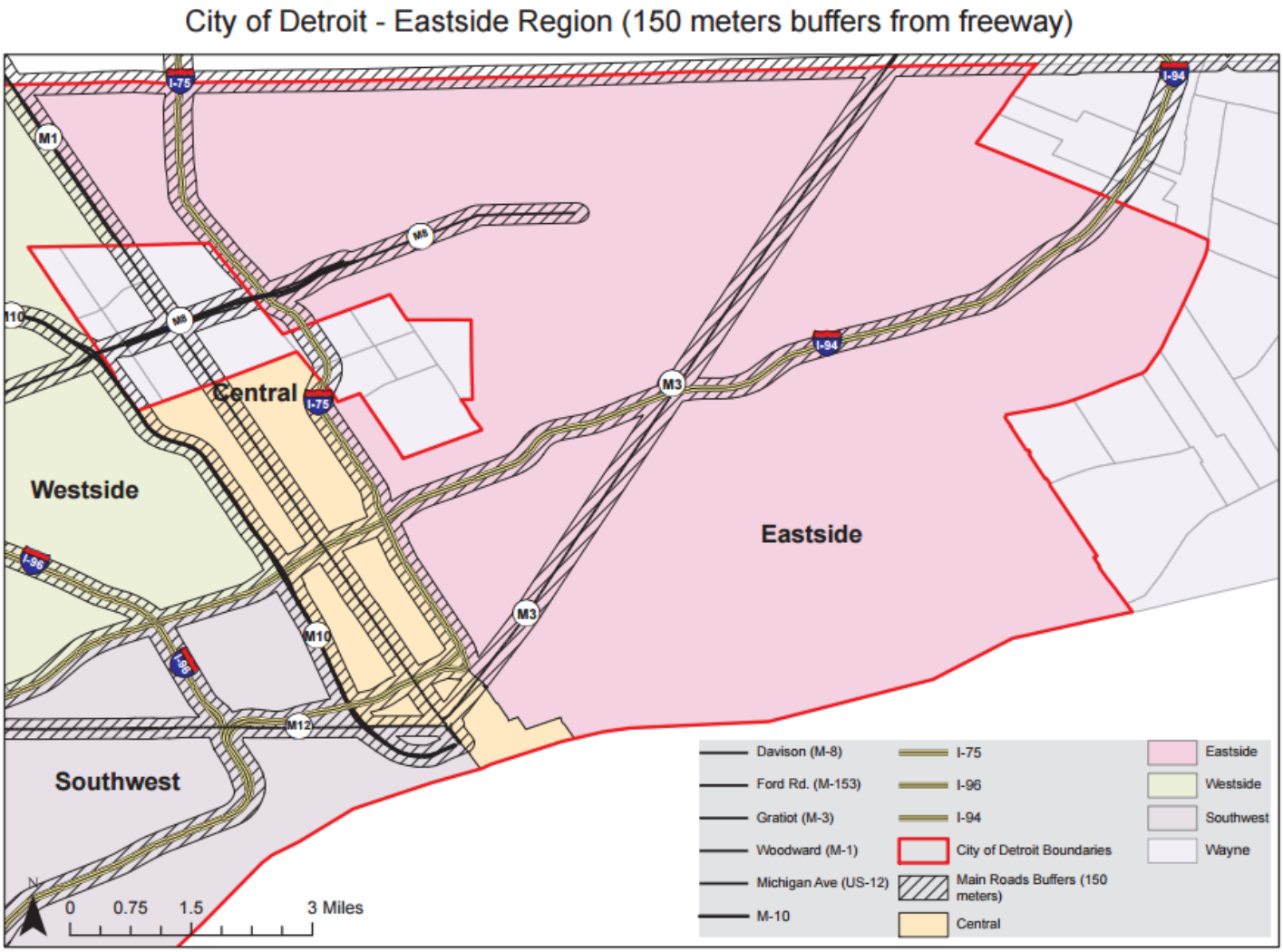


Figure 6-21: 150 meter roadway buffers in Eastside Detroit.

6.16.3 Vulnerability

As described in Section 6, some communities or individuals may be more vulnerable to the adverse effects of exposure to air pollutants because they are exposed to higher pollutant concentrations, or because they are more adversely affected by exposure than others. Low income communities and communities of color are

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.

disproportionately likely to be exposed to high levels of air pollutants. Existing health conditions, low levels of some nutrients in the diet, young age, older age, and poor housing condition can increase the severity of health effects from exposure to air pollutants. As shown in Table 6-1, exposures to diesel PM, and respiratory risk associated with air pollution on Eastside Detroit that are lower than the Detroit City average but higher than the Tri-County average, and air pollution-associated cancer risk is lower than the City or the Tri-County area.

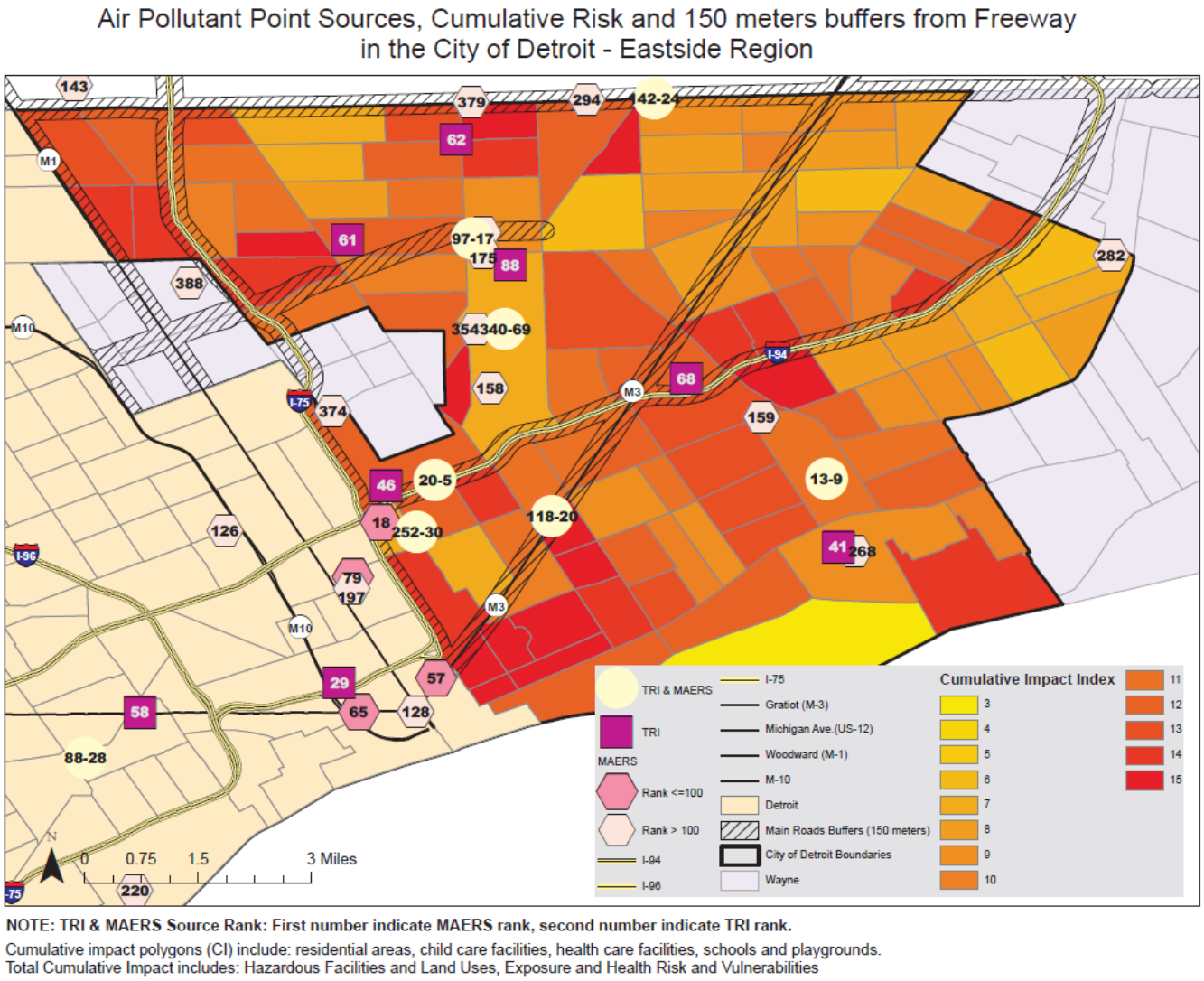
Eastside Detroit has proportions of children under age 5 and adults over age 60 that are comparable to the City as a whole. The proportion non-Hispanic Black (88%) is slightly higher than the city (83%) and substantially greater than the Tri-County Area (31%). Similarly, the proportion with less than a high school education, below poverty, and renters are comparable to those for Detroit, but larger than for the Tri-County area. See Figures 6-5 and 6-10 for maps showing the Cumulative Vulnerability Index for census tracts in the Tri-County Area and Detroit, respectively.

6.16.4 Cumulative Risk

Figure 6-22 shows the cumulative risk scores for residents of Eastside Detroit, mapped along with point and mobile air pollutant sources. This score is the sum of three indices assessing proximity of population to hazardous land uses (e.g., railyards, freeways), exposure to air pollutants and associated health risks (e.g., diesel PM, respiratory risk, cancer risk), and vulnerabilities (e.g., percent below poverty, percent children under age 5). Briefly, these are calculated by rank ordering census tracts in the Tri-County area by each indicator, and constructing quintiles with 1=low and 5=high exposure or vulnerability. The sum of the risk and vulnerability scores creates a cumulative risk score ranging from 3 (lowest cumulative risk) to 15 (highest cumulative risk).[4] A majority of census tracts in Eastside Detroit fall into the mid-to- upper ranges of risk (oranges and reds) when ranked against all census tracts in the Tri County Area Figure 6-6.

[4] Schulz, A.J., Mentz, G.B., Sampson, N, Ward, M., Anderson, R., deMajo, R., Israel, B.A., Lewis, T.C., Wilkins, D. 2016. RACE AND THE DISTRIBUTION OF SOCIAL AND PHYSICAL ENVIRONMENTAL RISK: *A Case Example from the Detroit Metropolitan Area. DuBois Review. In Press.*

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.



NOTE: TRI & MAERS Source Rank: First number indicate MAERS rank, second number indicate TRI rank.

Cumulative impact polygons (CI) include: residential areas, child care facilities, health care facilities, schools and playgrounds.
Total Cumulative Impact includes: Hazardous Facilities and Land Uses, Exposure and Health Risk and Vulnerabilities

Figure 6-22: Cumulative risk index, 150 meter roadway buffers, and pollutant sources in Eastside Detroit

This work is made possible by National Institute of Health and Environmental Sciences, RO1ES022616, and the Fred A. and Barbara M. Erb Family Foundation. Additional support was provided by the Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD), #P30ES017885.