

COLUMBUS IN 1980, 2015, AND 2050

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**Summary Table S-1
Central Ohio in 1980, 2015, and 2050**

	1980	2015	2050 (low)	2050 (high)	Table
Columbus Metropolitan Statistical Area (historical and projected)					
Population	1,093,316	2,017,937	2,521,600	---	n/a
Number of counties	5	10	11	---	n/a
Land area (sq.mi.)	2,455.6	4,817.1	5,344.3	---	n/a
Population, 10-county MSA	1,325,649	2,107,937	2,278,800	2,587,600	1
Foreign-born population	28,160	138,679	298,600	452,800	2
Immigrated within last 10 years	11,297	61,746	104,500	226,400	2
Speak English less than "very well"	13,606	55,338	98,500	203,800	2
Income less than \$25,000 (in 2015-equivalent dollars)					
Number of households	128,610	173,253	186,700	285,900	4
Share of total	26.9%	22.4%	18.%	26%	4
Individuals in poverty					
Number	142,731	295,517	267,100	405,600	5
Rate	11.1%	15.1%	11%	17%	5
Persons under 18 in poverty					
Number	49,527	99,349	82,300	120,800	5
Rate	13.4%	20.8%	15%	22%	5
Franklin County homeless shelter activity					
Persons	n/a	10,278	9,000	12,700	8,9
Shelter units	n/a	325,235	331,200	571,000	8,9
Educational attainment					
No high school diploma	219,568	126,074	121,700	121,700	10,12
High school diploma or equivalent	295,147	373,494	434,700	347,800	10,12
College degree	153,254	517,296	695,500	956,300	10,12
Preschool enrollment, 3 and 4-year-olds					
Enrolled	10,550	25,476	60,300	70,000	11*
Percent of total	30.7%	45.5%	100%	100%	11*
Neighborhoods**					
Hilltop					
Population	41,404	33,310	n/a	n/a	13
Households	15,478	12,440	n/a	n/a	13
Labor force participation			n/a	n/a	13
Individual poverty rate	11.5%	33.9%	n/a	n/a	13
German Village/Schumacher Place					
Population	6,691	5,896	n/a	n/a	14
Households	3,495	3,555	n/a	n/a	14
Labor force participation	71.1%	84.9%	n/a	n/a	14
Individual poverty rate	40.2%	7.3%	n/a	n/a	14

Summary Table S-1 (continued)
Central Ohio in 1980, 2015, and 2050

	1980	2015	2050 (low)	2050 (high)	Table
Merion Village					
Population	6,893	5,061	n/a	n/a	15
Households	2,694	2,235	n/a	n/a	15
Labor force participation	60.2%	78.1%	n/a	n/a	15
Individual poverty rate	15.1%	17.9%	n/a	n/a	15
Victorian Village/Harrison West					
Population	10,516	9,902	n/a	n/a	16
Households	4,971	5,149	n/a	n/a	16
Labor force participation	61.7%	80.0%	n/a	n/a	16
Individual poverty rate	33.6%	16.2%	n/a	n/a	16
Northland					
Population	23,904	24,287	n/a	n/a	17
Households	9,307	9,646	n/a	n/a	17
Labor force participation	76.2%	65.6%	n/a	n/a	17
Individual poverty rate	4.6%	26.1%	n/a	n/a	17
The arts					
Employer arts organizations	38	89	140	225	18*
Employees	659	1,288	2,100	2,900	18*
Chronic diseases					
High blood pressure	n/a	473,761	627,900	675,000	20
High cholesterol	n/a	487,019	632,300	677,400	20
Heart disease	n/a	99,697	142,800	155,500	20
Cancer (all types)	n/a	165,913	231,600	251,100	20
Births and infant mortality					
Live births	21,096	27,222	32,000	34,200	24
Fetal deaths	147	179	190	210	24
Deaths within the first year	403	221	200	270	24
Disabilities					
With a work disability	78,434	133,862	n/a	n/a	25
Percentage	9.0%	10.4%	n/a	n/a	25
With a work disability, not in labor force	47,680	76,100	n/a	n/a	25
Percentage	5.5%	5.9%	n/a	n/a	25
All disabilities	n/a	246,837	328,000	352,900	26,27
Percentage	n/a	12.2%	13.4%	13.6%	26,27
Air pollution***					
Carbon monoxide, 8-hr 2nd highs, ppm	6.6	1.0	n/a	n/a	28
Sulfur dioxide, 99 percentile conc., ppb	173	13	n/a	n/a	28
Ozone, 8-hour, ppb	101	73	n/a	n/a	28

*Projections in text. **Current estimates are 2009-2013 averages. ***Current estimates are from 2013.

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May 15, 2015

Introduction

This study examines Central Ohio 35 years ago, in the present, and 35 years in the future across a variety of factors, including population, the share of the population that is foreign-born, income, poverty, housing security and homelessness, education and educational attainment, the evolution of selected Columbus neighborhoods, the arts and humanities, health, disabilities, and the environment. The point of the analysis is to demonstrate the significant changes that have occurred in Central Ohio over the past 35 years and to speculate over changes that could happen in the community over the coming 35 years. As will become clear, some of these speculations are on more solid footing than others, but all are uncertain. The goal is to begin a conversation rather than end it. The area of analysis is generally the current 10-county Columbus Metropolitan Statistical Area (MSA) – Delaware, Fairfield, Franklin, Hocking, Licking, Madison, Morrow, Perry, Pickaway, and Union Counties. However, the next section contrasts the delineation of the Columbus MSA in 1980 and 2015, and speculates on the configuration of this area in 2050. Several other topics, such as homelessness and pollution, focus primarily or completely on Franklin County.

The Historical, Current, and Future Columbus Metropolitan Statistical Area

MSAs are defined as one or more “central counties” and possibly one or more “outlying counties.” A primary criterion for a county’s inclusion in the MSA is that at least 25 percent of the employed labor force of the county commutes to the central counties for work. Central counties are defined on the basis of concentration of population in larger cities. Central counties of the Columbus MSA are currently Delaware, Fairfield, and Franklin. The 25 percent commuting threshold is evaluated on the basis of commuting to the central counties taken together. Morrow County is part of the MSA because of commuting to Delaware County; Hocking and Perry are included because of commuting to Fairfield County.

How might the delineation of the Columbus MSA change in coming years? The only adjacent county from which more than 11 percent of the county workforce commutes to the current central counties is Knox, with 17 percent. On the other hand, the lowest commuting rate from the outlying MSA counties is Union, with 27 percent. As Union County’s growth continues and the number of jobs increases, the share of Union County commuters to the central counties may fall below the 25 percent threshold, resulting in Union leaving the MSA – as it did between 1993 and 2003. However, Licking and Union Counties may themselves be designated central counties. The current commuting from Knox County would then increase to 23 percent – within striking distance of the 25 percent limit. Other potential outlying counties, though, increase to no more than 14 percent, so the Columbus MSA is unlikely to include more than 11 counties unless there is a significant loss of economic base in these counties. The historical, current, and projected Columbus MSA delineation, land area, and population are as follows. (The pessimistic population projection underlying the low 2050 projection and the optimistic projection underlying the high projections are discussed in the next section.)

- 1980:** Delaware, Fairfield, Franklin, Madison, and Pickaway Counties. Land area: 2,455.6 square miles; Population: 1,093,316.
- 2015:** Delaware, Fairfield, Franklin, Hocking, Licking, Madison, Morrow, Perry, Pickaway, and Union Counties. Land area: 4,817.1 square miles; Population: 2,017,937.
- 2050 low:** Delaware, Fairfield, Franklin, Hocking, Licking, Madison, Morrow, Perry, and Pickaway Counties. Land area: 4,380.4 square miles; Population: 2,367,900.
- 2050 high:** Delaware, Fairfield, Franklin, Hocking, Knox, Licking, Madison, Morrow, Perry, Pickaway, and Union Counties. Land area: 5,344.3 square miles; Population: 2,664,900.

Population

Given in Table 1 are historical and projected population totals in broad age categories. The under 15 population drives demand for elementary and secondary schools, the 15 to 64 age group is the key supplier of the labor force, and the 65 and over population drives demand for supportive services and facilities for the aged.

Table 1
Historical and Projected Population, Columbus MSA, 1980, 2015, and 2050

Year	Under 15 years	15-64 years	65 years and older	Total
1980	304,408	900,689	120,552	1,325,649
2015 projection	407,464	1,409,605	246,808	2,107,937
Change	103,056	508,916	126,256	692,288
Pct. change	34%	57%	105%	52%
2050 baseline	448,197	1,581,667	414,379	2,444,245
Change	40,733	172,062	167,571	426,308
Pct. change	10%	12%	68%	21%
2050 low	409,248	1,516,457	353,050	2,278,754
Change	1,784	106,852	106,242	260,817
Pct. change	<1%	8%	43%	13%
2050 high	484,693	1,641,318	461,548	2,587,560
Change	77,229	231,713	214,740	569,623
Pct. change	19%	16%	87%	28%

Source: Census 1980, Insight 2050, Author's projections derived from Scripps population projections to 2030.

Baseline 2050 projected population is from Insight 2050, an extension of 2040 projections by the Ohio Development Services Agency (ODSA). The high projection is from Regionomics' age-specific extension to 2050 of Scripps' projection for 2030. The 2015 projection is from Scripps rather than ODSA. The Scripps projection is more likely given the just-released 2014 total population estimates and the 2013 population estimates by age.

These projections can be inaccurate even in the near term. ODSA's 2010 projected population for the former eight-county Columbus MSA, issued in 2003, was 1,806,700. The actual population was 1,836,534, 1.7 percent higher. The actual population under 15 years was 2.1 percent higher than the projection, the population 15 to 64 years was 1.0 higher, and the actual population 65 years and older was 5.0 percent higher. The natural increase in population (births less deaths) is relatively easy to predict – although the large error in the older population suggests that ODSA may have underestimated

life expectancy. Much of the potential error arises from errors in predicting net migration (movers in less movers out), which is affected by a large array of internal and external factors, including relative job growth.

The low 2050 projection is derived by assuming that the ODSA total, under 15, and 15 to 64 projections are *overestimated* by these percentages each decade, so the Insight 2050 compounded overstatement of total population is 6.8 percent, the under 15 overstatement is 8.7 percent, and the 15 to 64 overstatement is 4.1 percent. The 65 and older projection is the remainder.

Even under the most pessimistic projection, the older population experiences double-digit growth to 2050 and becomes a much more important factor in regional population. From its 11.7 percent share in 2015, the population 65 and older grows to between 15 and 18 percent of the 2050 population, depending on the projection. In contrast, the population of children grows much more slowly than population as a whole. Given that population growth is uneven among communities and counties, excesses in schools and other youth-oriented facilities are likely to develop. Although the college-age population was not specifically projected, it may be that colleges and universities will have to put an increasing emphasis on non-traditional students – which would have positive impacts on workforce quality.

Foreign-Born Population

The significant increase in the foreign-born population over the past 30 years has changed the character of Central Ohio's population. While the share of foreign-born individuals in the region remains below average, the much greater-than-average growth of this population is bringing Central Ohio's share closer to the national average.

Table 2 on the next page shows a number of characteristics of the historical and projected foreign-born population, including the number who are naturalized citizens, the number who are recent immigrants, and the number who self-report speaking English less than very well. There are three 2050 projections. The low projection uses the smaller 2050 population projected by Insight 2050, with the current (2011-2013) percentage of the U.S. population that is foreign-born. The medium and high projections use the Scripps-based projection and a higher foreign-born share.

The foreign-born population at least doubles, and more than triples in the high projection. There are also significant increases in the number of individuals who will have difficulty with English, implying a large increase in the need for English as a Second Language programs, interpretation services, and other services to help these individuals feel at home and join the workforce. Not so easy to measure is the positive impact that this far more diverse population will have on the culture and quality of life of Central Ohio.

Table 2
Historical and Projected Foreign-Born Population, 1980, 2015, and 2050

	Number	Percentage*	Growth
1980			
Foreign-born population	28,160	2.1%	---
Naturalized U.S. citizen	15,457	54.9%	---
Not a U.S. citizen	12,703	45.1%	---
Immigrated within last 10 years	11,297	40.1%	---
Persons 5 years and over			
Speak English less than "very well"	13,606	48.3%	---
2015			
Foreign-born population	138,679	6.9%	392.5%
Naturalized U.S. citizen	59,294	42.8%	283.6%
Not a U.S. citizen	79,385	57.2%	524.9%
Immigrated within last 10 years	61,746	44.5%	446.6%
Persons 5 years and over			
Speak English less than "very well"	55,338	39.9%	306.7%
2050 – baseline			
Foreign-born population	388,134	15.0%	179.9%
Naturalized U.S. citizen	135,847	35.0%	129.1%
Not a U.S. citizen	252,287	65.0%	217.8%
Immigrated within last 10 years	172,814	44.5%	179.9%
Persons 5 years and over			
Speak English less than "very well"	128,084	33.0%	131.5%
2050 – low			
Foreign-born population	298,595	12.2%	115.3%
Naturalized U.S. citizen	141,833	47.5%	139.2%
Not a U.S. citizen	156,762	52.5%	97.5%
Immigrated within last 10 years	104,508	35.0%	69.3%
Persons 5 years and over			
Speak English less than "very well"	98,536	33.0%	78.1%
2050 – high			
Foreign-born population	452,823	17.5%	226.5%
Naturalized U.S. citizen	91,349	20.2%	54.1%
Not a U.S. citizen	361,474	79.8%	355.3%
Immigrated within last 10 years	226,412	50.0%	266.7%
Persons 5 years and over			
Speak English less than "very well"	203,770	45.0%	268.2%

*Foreign-born population is percentage of total population; remaining items are percentages of foreign-born population.

Source: Census 1980, author's projections.

Income

Central Ohio's income distribution has shifted upward on an inflation-adjusted basis and per capita income has increased significantly, as shown in Table 3. The region's approximate median income increased from \$42,000 in 1980 to \$55,100 in 2011-13, a gain of 31 percent. The percentage of households with income below approximately \$25,000 fell from 26.9 percent to 22.4 percent, while the

share of households earning more than \$100,000 increased from 6.7 percent to 22.6 percent. An important caution is that the decline in low-income households may be intensified by the rising cost of housing, making it financially infeasible for some low-income individuals to form households.

Table 3
Columbus MSA Household Income, 1980 and 2011-2013 Average

Income, 1980 (inflation-adjusted ranges)			2011-2013		
Total households	477,568	100.0%	Total households	745,038	100.0%
Less than \$12,200	57,244	12.0%	Less than \$10,000	54,789	7.4%
\$12,200 to \$18,299	34,753	7.3%	\$10,000 to \$14,999	37,100	5.0%
\$18,300 to \$24,399	36,613	7.7%	\$15,000 to \$24,999	75,276	10.1%
\$24,400 to \$36,599	76,764	16.1%	\$25,000 to \$34,999	76,030	10.2%
\$36,600 to \$48,799	72,624	15.2%	\$35,000 to \$49,999	103,100	13.8%
\$48,800 to \$60,999	64,317	13.5%	\$50,000 to \$74,999	139,035	18.7%
\$61,000 to \$85,499	79,301	16.6%	\$75,000 to \$99,999	91,001	12.2%
\$85,500 to \$122,099	39,568	8.3%	\$100,000 to \$149,999	100,192	13.4%
\$122,100 or more	16,384	3.4%	\$150,000 to \$199,999	36,773	4.9%
			\$200,000 or more	31,742	4.3%

Source: Census 1980, American Community Survey Three-Year Estimates.

The inflation-adjusted increase in per capita income has been even greater than the increase in household income. Per capita income was \$23,708 in 1980 and \$43,823 in 2013, an increase of 85 percent. But this increase is partly due to the large increase in high-income individuals, which tends to pull an average such as this upward.

Several forces are likely to have an impact on the 2050 household income distribution. The aging of the population will shift a larger share of income from wages and salaries to other sources of income, primarily investment income and public assistance. Wages and salaries themselves, which are determined over the long run by labor productivity, should increase as jobs become more technology-intensive and productive. This will require workers to possess a higher level of technical skill, making continued increases in the educational attainment of the population essential. But each of these forces may result in increases in the share of both high-income and low income households, as those of working age without the capacity to learn technical skills and older individuals relying solely on public assistance are increasingly left behind.

A critical question is the number of low-income households – those with incomes below \$25,000 in 2013 dollars. (This will equate to \$58,000 in 2050 dollars, based on the long-run inflation forecasts by the Congressional Budget Office and the President’s Council of Economic Advisors.) This question is certainly related to the poverty of individuals question above, and must be derived from a projection of the total number of households. Insight 2050 does not provide household projections, only projections of housing units, which includes both occupied and vacant units. (The number of occupied housing units is equal by definition to the number of households.) The 2010 county-level housing vacancy rates from the Census are applied to the projected number of housing units from Insight 2050 to infer the total number of households and persons per household. The same persons-per-household projection is also applied to the higher projection from Scripps. The Insight 2050 projections imply 1,037,100 households in 2050 (compared to a projection of 772,200 in 2015). The Scripps-based projections imply 1,099,500 households.

How many of these households will be low-income is a matter of conjecture, and depends on policy decisions between now and then. Based on the argument above, there will almost certainly be fewer low-skill jobs available, so the key need is a coordinated, comprehensive workforce development strategy involving workforce and economic development professionals, K-12 education, and adult education and training providers. This strategy must be aligned with economic development priorities and the evolving needs of industry so that the skills of the workforce are consistent with the needs of the workplace. If such a strategy is implemented and is successful (together with similar initiatives at the state and national levels) the proportion of low-income households may well decline. Otherwise, it is likely to increase as a permanent underclass of unskilled individuals competes for an ever-declining supply of attainable jobs. In any case, the proportion of low-income households is unlikely to be the same in 2050 as it is now.

The level of uncertainty of the number of low-income households in 2050 is shown in Table 2, which includes the number of households with income less than \$25,000 in 1980 (from Table 1), and projections for 2015 and 2050. The 2015 projection is based on the number of households implied by the Scripps projections, the county-level average number persons per household in 2011-2013, and the share of low-income households for that year as shown in Table 1. The low projection is based on an 18 percent low-income rate and the lower Insight 2050-derived household projection; the high projection applies a 26 percent low-income rate to the higher Scripps-derived projections. Note that the number of low-income households is nearly 100,000 higher in the high projection than in the low one.

Table 4
Historical and Projected Number of Households with Income Less than \$25,000 (in 2015 Dollars)

	Household income less than \$25,000		Change from previous	
	Number	Share of total	Number	Percentage
1980	128,610	26.9%	---	---
2015	173,253	22.4%	44,643	34.7%
2050-Low	186,686	18.0%	13,433	7.8%
2050-High	285,876	26.0%	112,623	65.0%

Source: Census 1980, author's projections.

Poverty

As shown in Table 4 above, even as the median household income has increased 31 percent since 1980, the share of low-income households region-wide has barely budged. As a result, the poverty rate has increased and the number of Central Ohio residents in poverty has doubled. As is the case with the share of low-income households, policy decisions that respond to shifts in job skills could cause the poverty rate to increase or decrease. Not surprisingly, there is a relationship between the share of low-income households and the share of individuals in poverty, but the relationship is not straightforward. The average household will be smaller in 2050 than it is now, and the poverty threshold for smaller households is lower than for larger ones. So a rise in the number of low-income households between now and 2050 should have a smaller impact on the number of people below the poverty line. (Note however, that the defined poverty limit is far below a living income.)

The number of people in poverty in 2011-2013 totaled 66.3 percent of the people in low-income households (assuming that those households were of average size). It is assumed that 63 percent of people in low-income households in 2050 will be in poverty. Poverty rates for children and seniors are

changed proportionally to the total change from 2015, and are applied to Scripps' age-specific county population projections. The resulting poverty totals and rates are shown in Table 5, together with the historic totals for 1979 and projected totals for 2015 (applying the 2011-2013 poverty rates from the American Community Survey to the Scripps population projections).

Table 5
Historical and Projected Individual Poverty, Columbus MSA, 1979, 2015, and 2050

Year	All persons	Persons under 18	Persons 65 and older
1979			
Number	142,731	49,527	12,339
Rate	11.1%	13.4%	10.8%
2015			
Number	296,517	99,349	17,446
Rate	15.1%	20.8%	7.3%
Change	144,572	49,822	5,107
Pct. change	101.3%	100.6%	41.4%
2050 low			
Number	267,070	82,259	22,067
Rate	11.3%	15.0%	5.3%
Change	(20,233)	(14,373)	6,468
Pct. change	(7.0%)	(14.9%)	41.5%
2050 high			
Number	405,634	120,841	32,417
Rate	16.6%	22.0%	7.8%
Change	118,331	24,209	16,818
Pct. change	41.2%	25.1%	107.8%

Source: Census 1980, author's projections.

Housing Security and Homelessness

Housing security for Central Ohio residents has decreased because of a significant decrease in the number of affordable rental units in the market. Table 6 compares the distribution of units by their monthly rent in 1980 and 2011-2013. (Both 1980 and 2011-2013 rent levels are adjusted to 2013 dollars.) In 1980, more than one-third of units rented for a price less than the equivalent of \$500 monthly; those low-rent units now comprise only 11.4 percent of rental units. The number of those units has declined 44 percent – from more than 57,500 to 32,249. Households earning less than 50 percent of the county or MSA median income are eligible for housing assistance (Section 8) so most of the 22 percent of households earning less than \$25,000 would qualify. However, the demand for these units is much greater than the supply; there is a notation on the website of the Columbus Metropolitan Housing Authority that they are no longer taking applications because they currently have a waiting list long enough to absorb all available housing choice vouchers for the next 12 months.¹ Given these facts, it is no surprise that nearly 40 percent of Central Ohio households spend more than 35 percent of their income on rent.

¹ <http://www.cmhanet.com/housing-choice-voucher-program/prospective-residents/>

Table 6
Monthly Rent Distribution, 1980 and 2011-2013

	1980		2011-2013	
	Number	Percent	Number	Percent
Total occupied rental units	168,531	100.0%	284,558	100.0%
Less than \$200	7,775	4.6%	5,354	1.9%
\$200 to \$299	7,498	4.4%	6,777	2.4%
\$300 to \$499	42,259	25.1%	20,118	7.1%
\$500 to \$749	79,015	46.9%	83,392	29.3%
\$750 to \$999	20,661	12.3%	89,612	31.5%
\$1,000 to \$1,499 (\$1,000 or more in 1980)	6,670	4.0%	55,443	19.5%
\$1,500 or more	---	---	13,579	4.8%
No cash rent	4,653	2.8%	10,283	3.6%

Source: Census 1980, American Community Survey Three-Year Estimates.

The increase in the real rent levels is driven by a number of factors, including increased demand for developable land, increased regulation, and the upward shift in the income distribution. With more households in higher income brackets, there will be a greater demand for higher-value rental units. There has recently been a significant increase in these units being developed downtown and elsewhere, some with rents exceeding \$2,000 per month. As shown in Table 3, there is a far greater number of high-income households than there were in 1980. More of these households are choosing to rent, even though they could easily afford to buy. The ownership rate in Franklin County declined from 60 percent in 2007 to 54 percent in 2013 – a statistically significant decline.

Renting is becoming a matter of choice for some households rather than necessity. This is partly driven by a perception of increased risk in owner housing in the aftermath of the real estate crash. Owner housing was never a riskless asset, but it was popularly perceived as such because the broad market had never sustained the kind of declines that it suffered between 2007 and 2011, when house prices finally bottomed out with a 20.6 percent U.S. decline and a 10.6 percent decline in the Columbus MSA according to the Federal Housing Finance Agency’s House Price Index. After this experience, some households are choosing to shift the risk of housing to a landlord and invest elsewhere the money that they would have put into housing. There is no way to know whether or not preferences will shift back to ownership over the long term. In any case, development of affordable housing is often not financially feasible without the availability of low-income housing tax credits and the participation of organizations such as the Ohio Capital Corporation for Housing to help navigate the application process and regulations accompanying this support. Given the alternative of developing affordable or market-rate housing, many developers will choose market-rate.

A major result of the lack of affordable housing is homelessness and resulting strains on the shelter and transitional housing system. No reliable statistics on the Franklin County homeless population and the shelter system are available prior to 1995, but statistics since then indicate a growing need, exacerbated by the recent recession.

A direct measure of homelessness is the annual “point-in-time” measure that estimates the number of homeless in Franklin County at one point annually. The number counted in this survey has steadily increased, both in absolute terms and as a share of the county’s population. The point in time counts for 2014 are shown in Table 7.

Table 7
“Point-in-Time” Homeless Population, Franklin County, 2014

	Single persons	Persons in families	All persons
Unsheltered	233	0	233
Sheltered	793	452	1,245
In transitional housing	114	14	128
Total homeless population	1,140	466	1,606
Per 10,000 Franklin County residents	---	---	13.04

Source: “Snapshot Report 2014.” Community Shelter Board.

A second way to measure homelessness and its impact is through the total demands on the shelter system over the course of a year. These demands have also increased sharply in recent years. The most recent year for which full statistics are available from the Community Shelter Board is 2013; these are shown in Table 8. “Shelter units” is the key activity metric; it represents one individual sheltered for one night.

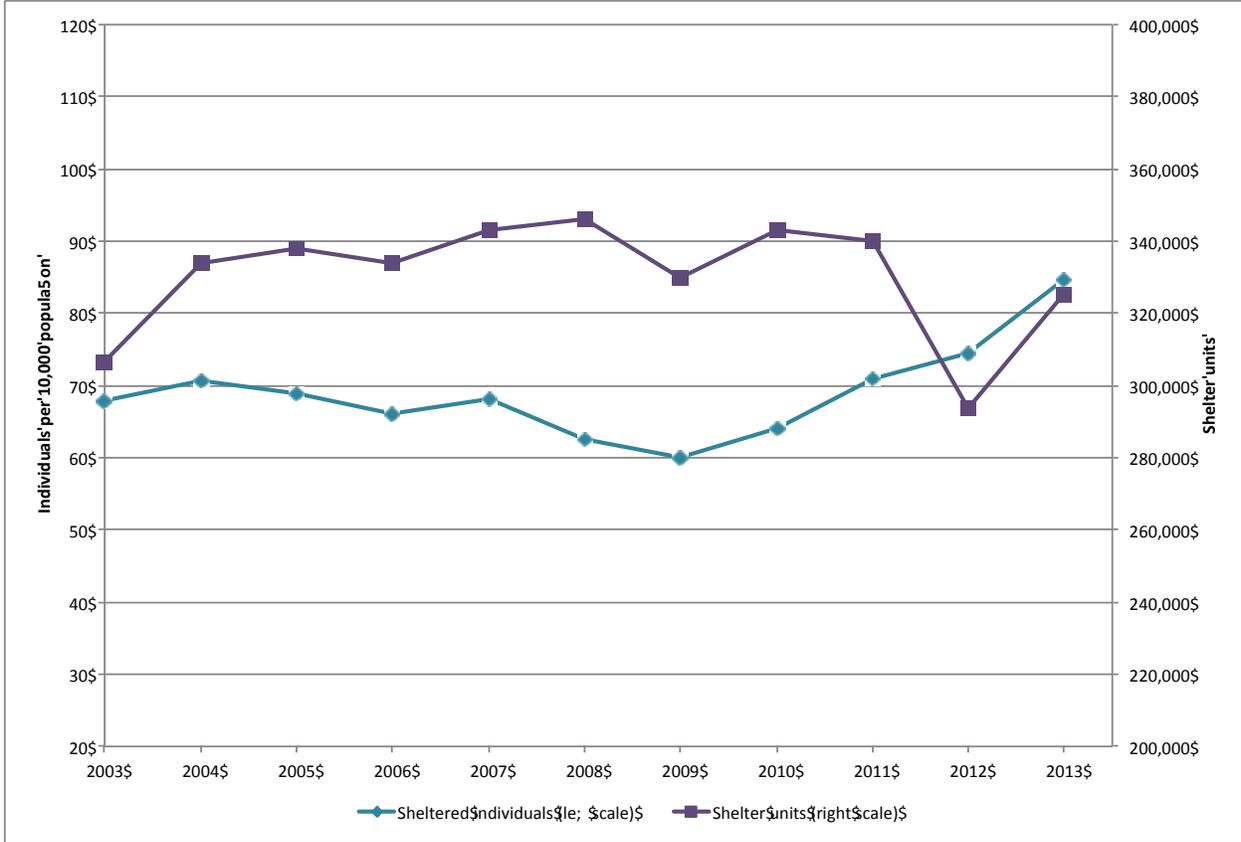
Table 8
Activity Statistics for the Franklin County Shelter System, 2013

Criterion	Activity, 2013
Families	1,481
Persons in families	4,871
Total adults	7,365
Total children	2,913
Total persons	10,278
Total shelter units	325,235
Average length of stay	31.64
Individuals per 10,000	84.67

“Snapshot Report 2014.” Community Shelter Board.

The trend in shelter clients per 10,000 and shelter units helps to put these statistics in context and suggest appropriate projections for 2015 and 2050. Figure 1 graphs these trends over the past decade. One possibly surprising feature of Figure 1 is that the relative number of individuals sheltered declined during the recession of 2007-2009 and increased subsequently as the economy recovered. In fact, the number of individuals in the system during 2013 exceeded 10,000 for the first time. This increase is explained by the fact that it often takes time to lose one’s housing and time to recover sufficiently to stabilize one’s living situation. The second noteworthy feature is that although the number of individuals in the system has increased (even more so in absolute terms) the number of shelter units has not increased. This is a result of a sharp decline in the average length of stay of families since 2010. (Single women’s and men’s length of stay has remained relatively constant.)

Figure 1
Sheltered Individuals per 10,000 Franklin County Residents and Shelter Units, 2003-2013



Source: "Snapshot Report 2014." Community Shelter Board.

Projecting these statistics to 2015 is helped by the availability of fiscal year statistics (July 1 to June 30). These fiscal year totals are projected to fiscal year 2015 assuming the same rate of growth as fiscal year 2014 and to fiscal year 2016 assuming 75 percent of that rate. These totals are then averaged to obtain calendar year totals for 2015. The projections to 2050 are based on assumptions of the number of individuals per 10,000 in the shelter system. It is assumed that the cost of housing will continue to increase in real terms so that even in the optimistic projections the population share is higher than its pre-recession average of 66. This projection assumes that 72 out of 10,000 residents are in the system and is based on the lower Insight 2050 total population projections. Average stay is assumed to be 37 days, higher than recent years but lower than the 45-day pre-recession average. The pessimistic projection assumes 85 out of 10,000 and the higher Scripps-based projections with a 45-day average length of stay. Results are shown in Table 9 on the next page. The optimistic assumption produces a shelter unit count only slightly higher than its recent level – which again is elevated by the impact of the recession. The pessimistic projection’s shelter unit total represents a 75 percent increase over the projected 2015 level.

Table 9
Projected Activity Statistics for the Franklin County Shelter System, 2050

Criterion	Low projection	High projection
Families	1,168	1,568
Persons in families	3,497	4,693
Total adults	7,201	10,338
Total children	1,752	2,351
Total persons	8,953	12,690
Total shelter units	331,248	571,041
Average length of stay	37.00	45.00
Individuals per 10,000	72.00	85.00

Source: Author's projections.

Education

The educational attainment of Central Ohio's adult population has improved significantly over the past 35 years, as shown in Table 10. In 1980, nearly 30 percent of adults 25 or older lacked a high school diploma; now, less than 10 percent do. Meanwhile, the share with a college degree has nearly doubled. Some estimation was required to derive the totals in both years. The number of adults with college degrees was not reported in the Census until 1990; only the percentage of high school graduates was reported in 1980. The number of years of schooling at each level completed by adults in 1980 and graduation rates in 1990 were used to infer 1980 college graduation rates. The primary potential misestimation is in associate degrees, which are estimated as a percentage of students completing between one and three years of college, taking into account the reported percentage of adults with associate degrees in 1990. The completion rates in the 2011-2013 American Community Survey were applied to the 2015 Scripps population projection to project 2015 attainment.

Table 10
Educational Attainment, Columbus MSA, 1980 and 2015

	1980		2015	
	Number	Percent	Number	Percent
Total, 25 and over	752,531	100.0%	1,330,328	100.0%
Less than 9th grade	95,306	12.7%	36,573	2.7%
9th to 12th grade, no diploma	124,262	16.5%	89,501	6.7%
High school diploma or equiv.	295,147	39.2%	373,494	28.1%
Some college, no degree	84,582	11.2%	261,440	19.7%
Associate degree	21,146	2.8%	92,453	6.9%
Bachelor's degree	101,076	13.4%	273,263	20.5%
Graduate/professional degree	31,013	4.1%	151,580	11.4%
Less than high school diploma	219,568	29.2%	126,074	9.5%
College degree	153,234	20.4%	517,296	38.9%

One likely contributor to this improvement in educational attainment is an increase in the share of three and four-year-olds are enrolled in school. This has increased by 15 percentage points since 1980, as Table 11 reveals. Preschool has been shown to enhance significantly children's chances of academic success in later years. As is apparent, broader availability of public preschool is the primary driver of the

increase. But as is also apparent, if the goal of universal preschool is to be fulfilled, more than 30,000 additional spaces are required now. By 2050, the Scripps-derived projections imply that there will be approximately 70,000 children in this age group, while the lower Insight 2050-based projections suggest about 60,300.

Table 11
Preschool Enrollment, Columbus MSA, 1980 and 2015

	1980		2015	
	Number	Percent	Number	Percent
Total, 3 and 4 years	34,392	100.0%	56,007	100.0%
Enrolled	10,550	30.7%	25,476	45.5%
Public school	3,229	9.4%	12,793	22.8%
Private school	7,321	21.3%	12,683	22.6%
Not enrolled	23,842	69.3%	30,531	54.5%

Source: Census 1980, author's projections.

Another positive development is a significantly smaller number of teenage dropouts. In 1980, there were 69,813 individuals aged 15, 16, and 17 in the region; 4,249 of these (6.1 percent) were not enrolled in school, including home schools. The 2011-2013 American Community Survey reports only 1,559 people in this age group not enrolled – only two percent of the total.

Increasing attention is being paid to increasing the educational attainment of adults in the region. The goal of the Central Ohio Compact is that 60 percent of adults will possess a post-secondary certificate or degree by 2025. (This highlights a shortcoming in the Census data, which measure attainment of degrees but not technical and professional certificates.) As discussed earlier, jobs are becoming increasingly demanding, making those without post-secondary credentials of some sort less employable. But on the other hand, higher education is becoming increasingly unaffordable nationwide, which limits the ability of some to attend college. Technical training and certifications can help to bridge this gap while providing a skilled workforce for key industry sectors including manufacturing, distribution, and healthcare.

Considering these conflicting forces, three alternative projections of the educational attainment of Central Ohio's population in 2050 are presented in Table 12. The low projection assumes reductions in the share of high school graduates and below resulting from universal pre-kindergarten and the diminished labor value of individuals without post-secondary education. (Some of those reporting no more than a diploma are assumed to have a post-secondary credential.) However, it is assumed that the college affordability problem is not effectively addressed, resulting in an increase in the percentage of associate degree-holders, a fairly modest increase in the share with bachelor's degrees, and a decrease in the share of those with advanced degrees. The medium projection assumes a similar reduction in the percentage of high school graduates and below, but percentages of college graduates equal to the current shares in the Minneapolis MSA. The high projection assumes that the Central Ohio Compact's efforts are successful so that 60 percent of adults hold a post-secondary credential; in this case, 55 percent with degrees and five percent with certificates. Under the most pessimistic assumption, the share of degree-holders remains essentially unchanged, but the number rises 180,000. If the optimistic assumption comes to pass, the increase is 178,000, or 85 percent. But in all cases, both the share and the absolute number of non-high school graduates declines.

Table 12
Projected Educational Attainment, Columbus MSA, 2050

	2050-Low		2050-Medium		2050-High	
	Number	Percentage	Number	Percentage	Number	Percentage
Total, 25 and over	1,738,774	100.0%	1,738,774	100.0%	1,738,774	100.0%
Less than 9 th grade	34,775	2.0%	34,775	2.0%	34,775	2.0%
9 th -12 th grade, no diploma	86,939	5.0%	86,939	5.0%	69,551	4.0%
High school diploma/equiv.	434,694	25.0%	398,179	22.9%	347,755	20.0%
Some college, no degree	486,857	28.0%	373,836	21.5%	330,367	19.0%
Associate degree	156,490	9.0%	170,400	9.8%	208,653	12.0%
Bachelor's degree	417,306	24.0%	450,342	25.9%	486,857	28.0%
Grad./professional degree	121,714	7.0%	224,302	12.9%	260,816	15.0%
Less than HS diploma	121,714	7.0%	121,714	7.0%	104,326	6.0%
College degree	695,510	40.0%	845,044	48.6%	956,326	55.0%

Neighborhoods

The general economic and demographic statistics above obscure a great deal of variability among neighborhoods, as well as the fact that the degree of neighborhood-level need shifts over time so that a neighborhood that was less needy can become more needy, and *vice versa*. Community support systems must recognize these shifting needs and have the flexibility to meet the needs where they arise.

This section spotlights five Columbus neighborhoods whose relative level of need has changed over the past 35 years. There is purposely no projection of the level of need in these neighborhoods in 2050; the point is that neighborhood demographics can change in unexpected ways as a result of shifts in demographics, changes in nearby employment centers, changes in nearby amenities, changes in traffic patterns and routes to the neighborhood, and a host of other factors.

The neighborhoods considered are all in or near the central city of Columbus, although suburban areas have seen much more dramatic population growth and demographic change. Further, hunger and poverty is a growing problem in areas such as Westerville, Worthington, and Dublin.² The problem with analyzing newer suburban areas is that as these areas grow, census tracts (the geography used to collect demographic and economic statistics) change in ways that make the 1980 area incomparable to the current area. Older neighborhoods' tracts are much more stable, other than occasional splitting or combining of tracts.

The neighborhoods included in the analysis are the Hilltop, German Village/Schumacher Place, Merion Village, Victorian Village/Harrison West, and Northland. For each neighborhood is reported:

- Total population, and the population less than 18 years, 18 to 64 years (i.e., prime working-age population).
- The number of households (which is equal by definition to the number of occupied dwelling units); the number of families (two or more related individuals living together); the number of nonfamily households; and the number of those nonfamily households that consist of one person living alone.

² See, for example, Lori Kurtzman. "Poverty in Suburbs? You Bet." *The Columbus Dispatch*, 20 May 2013, pg. 1A.

- Educational attainment. Recall that the number of years in school, not educational attainment, was reported in the 1980 Census, and those totals were used to approximate 1980 educational attainment at the regional level. The census tract statistics are less complete, omitting a count of those completing five or more years of school, reporting only completion of four or more years. The share of these individuals assumed to have graduate degrees was set to replicate the Franklin County allocation in the regional statistics, and this share was used for all census tracts. Still, the allocation is somewhat less reliable than that at the regional level.
- Labor force participation (the percentage of individuals 16 years and older who are either employed or actively looking for work) and the unemployment rate.
- The percentage of households earning less than \$10,000 in 1980 – which translates roughly to \$25,000 in 2013 dollars – and less than \$25,000 in 2009-2013; the average household income in 2013 dollars; and the percentage of individuals in poverty.

Many of the regional statistics for 2015 are based on three-year averages (for 2011 through 2013) obtained from the American Community Survey. Census tract statistics, however, are only available as a five-year average, 2009 through 2013, which includes 18 months of the recession and the following months during which the unemployment rate remained high. As shown earlier, the poverty rate remains high, but the unemployment rate has fallen significantly in recent years. No attempt is made to update these neighborhood statistics to 2015 because there is no basis for doing so. The characteristics of the neighborhoods are considerably different from those of either Franklin County or the city of Columbus, so it is not likely that they have changed proportionally to the city or the county in the succeeding years. Assuming such would be likely to yield incorrect and misleading results. Each neighborhood's table includes a comparison to the same data for Franklin County in 1980 and 2009-2013. This will show the extent to which the neighborhood's characteristics differ from the average. The difference may have changed in the following years, but probably not more than incrementally.

Household income is measured by the average (mean) income. This is less than optimal. Because income distributions tend to include a relatively few households with income much higher than most, the mean is pulled upward and overstates the income of the typical household. This typical household's income is measured by the median – the point at which half of households have lower income and half have higher income. The neighborhood median cannot be calculated, however, because combining medians across census tracts to obtain a neighborhood median would require identical income distributions. This requirement is unlikely to be satisfied. However, the point is less the level of average income than its comparison to the Franklin County average and the averages of other neighborhoods.

The Hilltop. Although the City's Hilltop planning area extends to the southwestern Outerbelt, the area considered in this analysis is the smaller central portion of the Hilltop – north of Clime, Briggs, Eakin, and Stimmel Roads, and generally east of Wilson Road. The economic and demographic details for the Hilltop are in Table 13 on the next page. The Hilltop has lost both population and households. Recall that losing households is equivalent to losing occupied dwellings, so this significant loss is signaling an increase in vacant, abandoned, and eventually demolished housing. Consistent with the countywide trend, there is a shift from family households to nonfamilies. Educational attainment was below average in 1980 and it remains so: 76 percent of Hilltop adults surveyed during 2009 through 2013 had at least a high school diploma versus 90 percent of adults countywide. College degree-holders were 17 percent of the neighborhood's residents, but 43 percent of county residents. This lack of educational attainment is hurting neighborhood residents to a much greater extent than 35 years ago. Average household income was 13 percent below the countywide average in 1980 but 40 percent below average in 2009-2013. The poverty rate has tripled from a rate below the county average in 1980 to one well

above average today. This is a neighborhood similar to others in the region. It subsisted 35 years ago on jobs in nearby factories that offered numerous unskilled and semiskilled jobs. Now that those factories have mostly closed, opportunities for stable employment have diminished.

Table 13
Economic and Demographic Characteristics of the Hilltop and Franklin County, 1980 and 2009-13

	Hilltop			Franklin County		
	1980	2009-13	Change	1980	2009-13	Change
Total population	41,404	33,310	-19.5%	869,132	1,181,824	36.0%
Younger than age 18	11,684	8,883	-24.0%	236,015	282,456	19.7%
Age 18 to 64	24,810	21,067	-15.1%	557,885	807,633	44.8%
Age 65 and older	4,910	3,360	-31.6%	75,232	91,736	21.9%
Households	15,478	12,440	-19.6%	322,817	468,295	45.1%
Families	11,251	7,631	-32.2%	218,777	273,033	24.8%
Nonfamilies	4,227	4,809	13.8%	104,040	195,262	87.7%
Living alone	3,600	3,746	4.1%	83,780	153,143	82.8%
Persons per household	2.68	2.67	-0.3%	2.61	2.47	-5.3%
Persons per family	3.19	3.54	10.8%	3.20	3.28	2.4%
No high school diploma	38.2%	24.0%		27.0%	10.3%	
High school diploma	44.3%	38.3%		35.9%	25.7%	
Some college, no degree	9.1%	20.3%		12.7%	21.0%	
Associate degree	2.3%	5.5%		3.2%	6.7%	
Bachelor's degree	4.7%	9.1%		16.1%	23.4%	
Graduate degree	1.5%	2.8%		5.1%	13.0%	
Labor force participation	62.4%	58.2%		65.3%	69.4%	
Unemployment rate	6.3%	14.9%		5.6%	8.7%	
Percentage of households less than \$25,000 income*	29.3%	37.9%		27.4%	24.3%	
Average income	\$42,746	\$41,713	-2.4%	\$49,261	\$69,197	40.5%
Individual poverty rate	11.5%	33.9%		12.3%	18.1%	

*In 2013-equivalent dollars.

Source: Census 1980 and American Community Survey Five-Year Estimates.

German Village/Schumacher Place. The characteristics of German Village/Schumacher Place are summarized in Table 14. This is a neighborhood that has transformed over the past 35 years. Despite the loss in population, the number of households has slightly increased. This is echoed in the average household size, which has declined to one-third less than the Franklin County average. More than half of neighborhood households are individuals living alone. Educational attainment was above average in 1980, with 35 percent of adults holding a degree, a rate that doubled to 70 percent by 2009-2013. The decline in young people and seniors was offset by an increase in working-age adults, which contributed to an increase in the labor force participation rate. Unemployment in the neighborhood averaged only 3.2 percent in 2009-2013, compared to a county average of 8.7 percent. Average income was below that of the county in 1980 with a poverty rate more than three times average. Average income had increased 2.5 times by 2009-2013, and the poverty rate had declined to 40 percent of the county average. Clearly, this is a neighborhood that has undergone classic gentrification, with lower-income households being replaced by those with higher incomes.

Table 14
Economic and Demographic Characteristics of German Village/Schumacher Place and Franklin County,
1980 and 2009-13

	German Village/Schumacher Place			Franklin County		
	1980	2009-13	Change	1980	2009-13	Change
Total population	6,691	5,896	-11.9%	869,132	1,181,824	36.0%
Younger than age 18	1,049	248	-76.3%	236,015	282,456	19.7%
Age 18 to 64	4,828	5,164	7.0%	557,885	807,633	44.8%
Age 65 and older	814	484	-40.6%	75,232	91,736	21.9%
Households	3,495	3,555	1.7%	322,817	468,295	45.1%
Families	1,419	995	-29.9%	218,777	273,033	24.8%
Nonfamilies	2,076	2,560	23.3%	104,040	195,262	87.7%
Living alone	1,640	1,873	14.2%	83,780	153,143	82.8%
Persons per household	1.89	1.66	-12.4%	2.61	2.47	-5.3%
Persons per family	2.80	2.44	-13.0%	3.20	3.28	2.4%
No high school diploma	30.3%	2.4%		27.0%	10.3%	
High school diploma	23.4%	12.7%		35.9%	25.7%	
Some college, no degree	10.8%	11.3%		12.7%	21.0%	
Associate degree	2.7%	3.7%		3.2%	6.7%	
Bachelor's degree	24.9%	38.1%		16.1%	23.4%	
Graduate degree	7.9%	27.7%		5.1%	13.0%	
Labor force participation	71.1%	84.9%		65.3%	69.4%	
Unemployment rate	6.0%	3.2%		5.6%	8.7%	
Percentage of households less than \$25,000 income*	33.6%	18.6%		27.4%	24.3%	
Average income	\$40,185	\$102,512	155.1%	\$49,261	\$69,197	40.5%
Individual poverty rate	40.2%	7.3%		12.3%	18.1%	

*In 2013-equivalent dollars.

Source: Census 1980 and American Community Survey Five-Year Estimates.

Merion Village. Characteristics of Merion Village are shown in Table 15. There has been a significant decline in population and households; the population decline has been greater than in the Hilltop, but the household decline has been somewhat less. However, educational attainment has improved as in German Village/Schumacher Place, although to a lesser extent. Around 10 percent of adults had college degrees 35 years ago – less than half the county average – a share that has increased to half. The unemployment rate also shifted from above average in 1980 to below average in 2009-13. Average income has doubled to a level greater than the county's. Paradoxically, though, the neighborhood's poverty rate is slightly higher than in 1980. Apparently, Merion Village continues to accommodate individuals with diverse income levels even as higher-income households move in.

Table 15
Economic and Demographic Characteristics of Merion Village and Franklin County, 1980 and 2009-13

	Merion Village			Franklin County		
	1980	2009-13	Change	1980	2009-13	Change
Total population	6,893	5,061	-26.6%	869,132	1,181,824	36.0%
Younger than age 18	1,857	617	-66.8%	236,015	282,456	19.7%
Age 18 to 64	4,212	3,970	-5.7%	557,885	807,633	44.8%
Age 65 and older	824	474	-42.4%	75,232	91,736	21.9%
Households	2,694	2,235	-17.0%	322,817	468,295	45.1%
Families	1,769	971	-45.1%	218,777	273,033	24.8%
Nonfamilies	925	1,264	36.6%	104,040	195,262	87.7%
Living alone	747	745	-0.3%	83,780	153,143	82.8%
Persons per household	2.55	2.26	-11.6%	2.61	2.47	-5.3%
Persons per family	3.19	3.23	1.4%	3.20	3.28	2.4%
No high school diploma	50.1%	13.6%		27.0%	10.3%	
High school diploma	33.5%	19.2%		35.9%	25.7%	
Some college, no degree	6.8%	16.7%		12.7%	21.0%	
Associate degree	1.7%	4.4%		3.2%	6.7%	
Bachelor's degree	6.1%	29.4%		16.1%	23.4%	
Graduate degree	1.9%	15.5%		5.1%	13.0%	
Labor force participation	60.2%	78.1%		65.3%	69.4%	
Unemployment rate	6.7%	6.4%		5.6%	8.7%	
Percentage of households less than \$25,000 income*	36.1%	19.7%		27.4%	24.3%	
Average income	\$37,875	\$75,711	99.9%	\$49,261	\$69,197	40.5%
Individual poverty rate	15.1%	17.9%		12.3%	18.1%	

*In 2013-equivalent dollars.

Source: Census 1980 and American Community Survey Five-Year Estimates.

Victorian Village/Harrison West. The summary for Victorian Village/Harrison West is shown in Table 16. The overall population decline has been relatively mild, thanks to a gain of 1,000 in the 18 to 64-year age group. There are slightly more households than there were in 1980 – thanks in part to the redevelopment of the 18-acre AC Humko factory site south of Third Avenue and surrounding area – but here as elsewhere, there has been a significant shift from families to nonfamilies. There has also been a substantial improvement in educational attainment. This was far lower than average in 1980, with 40 percent of neighborhood residents holding no high school diploma. By 2009-2013, this had declined to two percent. College degrees increased from 30 percent to 75 percent, with fully one-quarter of adults holding an advanced degree. Because of this shift and because of the increase in residents in their prime working years, labor force participation has soared from 62 percent to 80 percent. The unemployment rate in 1980 was a far higher-than-average 8.3 percent and in 2009-2013 was a far lower-than-average 5.7 percent. Average income has increased 177 percent after inflation and is now higher than the county average. The poverty rate has been halved. Victorian Village/Harrison West is another neighborhood that has gentrified, with a share of low-income households that has declined considerably more since 1980 than even German Village.

Table 16
Economic and Demographic Characteristics of Victorian Village/Harrison West and Franklin County,
1980 and 2009-13

	Victorian Village/Harrison West			Franklin County		
	1980	2009-13	Change	1980	2009-13	Change
Total population	10,516	9,902	-5.8%	869,132	1,181,824	36.0%
Younger than age 18	1,939	585	-69.8%	236,015	282,456	19.7%
Age 18 to 64	7,537	8,596	14.1%	557,885	807,633	44.8%
Age 65 and older	1,040	721	-30.7%	75,232	91,736	21.9%
Households	4,971	5,149	3.6%	322,817	468,295	45.1%
Families	1,885	1,358	-28.0%	218,777	273,033	24.8%
Nonfamilies	3,086	3,791	22.8%	104,040	195,262	87.7%
Living alone	2,281	2,376	4.2%	83,780	153,143	82.8%
Persons per household	2.03	1.88	-7.2%	2.61	2.47	-5.3%
Persons per family	3.05	2.74	-10.1%	3.20	3.28	2.4%
No high school diploma	40.5%	2.2%		27.0%	10.3%	
High school diploma	19.0%	7.9%		35.9%	25.7%	
Some college, no degree	10.4%	15.3%		12.7%	21.0%	
Associate degree	2.6%	3.8%		3.2%	6.7%	
Bachelor's degree	21.0%	44.0%		16.1%	23.4%	
Graduate degree	6.6%	26.8%		5.1%	13.0%	
Labor force participation	61.7%	80.0%		65.3%	69.4%	
Unemployment rate	8.3%	5.7%		5.6%	8.7%	
Percentage of households less than \$25,000 income*	52.0%	22.6%		27.4%	24.3%	
Average income	\$28,027	\$77,617	176.9%	\$49,261	\$69,197	40.5%
Individual poverty rate	33.6%	16.2%		12.3%	18.1%	

*In 2013-equivalent dollars.

Source: Census 1980 and American Community Survey Five-Year Estimates.

Northland. Northland is defined here as the area between I-71 and Cleveland Avenue, north of Morse Road and south of Dublin-Granville Road. Characteristics are tabulated in Table 17. Population has increased slightly, with the senior population increasing by nearly 150 percent. The number of households has also increased slightly, with the familiar shift away from family households. The educational attainment statistics have remained relatively stable, with the current share of adults holding at least a high school diploma unchanged from 1980 and close to the 2009-2013 county average. However, the labor force participation rate has declined, the neighborhood unemployment rate is more than a percentage point above the county average, after-inflation income has fallen, and the poverty rate has more than doubled. This is a neighborhood in need of an array of services that were not required 35 years ago: services for seniors, workforce services, and services for the poor. Another characteristic that is not shown in Table 17 is that 16 percent of Northland residents are foreign-born, compared to 9.4 percent countywide. About half of these immigrants (2,000) were born in Africa. This also may suggest the need for targeted services for this population.

Table 17
Economic and Demographic Characteristics of Northland and Franklin County, 1980 and 2009-13

	Northland			Franklin County		
	1980	2009-13	Change	1980	2009-13	Change
Total population	23,904	24,287	1.6%	869,132	1,181,824	36.0%
Younger than age 18	6,119	6,528	6.7%	236,015	282,456	19.7%
Age 18 to 64	16,633	14,921	-10.3%	557,885	807,633	44.8%
Age 65 and older	1,152	2,838	146.3%	75,232	91,736	21.9%
Households	9,307	9,646	3.6%	322,817	468,295	45.1%
Families	6,204	5,905	-4.8%	218,777	273,033	24.8%
Nonfamilies	3,103	3,741	20.6%	104,040	195,262	87.7%
Living alone	2,387	3,280	37.4%	83,780	153,143	82.8%
Persons per household	2.54	2.49	-2.1%	2.61	2.47	-5.3%
Persons per family	3.14	3.33	5.9%	3.20	3.28	2.4%
No high school diploma	13.3%	12.5%		27.0%	10.3%	
High school diploma	38.8%	31.4%		35.9%	25.7%	
Some college, no degree	18.1%	23.8%		12.7%	21.0%	
Associate degree	4.5%	8.5%		3.2%	6.7%	
Bachelor's degree	19.2%	18.4%		16.1%	23.4%	
Graduate degree	6.1%	5.4%		5.1%	13.0%	
Labor force participation	76.2%	65.6%		65.3%	69.4%	
Unemployment rate	4.2%	9.9%		5.6%	8.7%	
Percentage of households less than \$25,000 income*	15.7%	36.7%		27.4%	24.3%	
Average income	\$52,867	\$46,975	-11.1%	\$49,261	\$69,197	40.5%
Individual poverty rate	17	26.1%		12.3%	18.1%	

*In 2013-equivalent dollars.

Source: Census 1980 and American Community Survey Five-Year Estimates.

The Arts and Humanities

Arts organizations have grown in size and become more dispersed throughout the region during the past 35 years. Table 18 compares the number and size of independent arts establishments with paid employment in 1980 and 2012 (the most recent data available) as reported in the Census Bureau's *County Business Patterns*. This listing does not include volunteer organizations or the volunteers of organizations with employment. However, because of the limitation to arts organizations with employees, the focus here is on more substantial establishments. Potential inconsistencies are also created by a change in the classification scheme: the Standard Industry Classification (SIC) system in 1980 and the North American Industry Classification System (NAICS) in 2012. These totals include only private-sector employment and organizations. They are thus understated because they omit the employment of arts organizations affiliated with The Ohio State University – including the Wexner Center – and other government-affiliated arts organizations.

Table 18
Employer Arts Establishments, Columbus MSA, 1980 and 2012

	Employment*	Establishments	Employment					
			1-4	5-9	10-19	20-49	50-99	100-249
1980								
Franklin	659	38	21	7	4	2	2	2
Total	659	38	21	7	4	2	2	2
2012								
Delaware	31	11	9	1	1	0	0	0
Fairfield	17	5	3	2	0	0	0	0
Franklin	1,191	59	43	5	2	2	2	5
Hocking	1	1	1	0	0	0	0	0
Licking	43	8	7	0	0	1	0	0
Madison	2	2	2	0	0	0	0	0
Morrow	0	0	0	0	0	0	0	0
Perry	0	0	0	0	0	0	0	0
Pickaway	1	1	1	0	0	0	0	0
Union	2	2	2	0	0	0	0	0
Total	1,288	89	68	8	3	3	2	5

*Estimated.

Source: U.S. Census Bureau, *County Business Patterns*, 1980 and 2012.

As Table 18 shows, the number of organizations was more than double its 1980 level in 2012, and employment nearly doubled. In contrast to 1980, when the only listed organizations were in Franklin County, all counties except Morrow and Perry are now home to at least one organization. The bulk of employment and the vast majority of organizations remain in Columbus, however; many of these are regional organizations that attract their audiences from the region and beyond. The access to the large audience helps broaden the diversity of program offerings and enhances the stability of the organizations themselves. At the same time, access to the arts at a community level makes them readily available to children and others who will develop a lifetime appreciation.

A second way to assess the changes in the Central Ohio arts community is to compare Ohio Arts Council grant funding in 1980 with that today. Statistics for the former year are gathered from the OAC's *1980-1981 Biennial Report*, while the 2014 statistics are gathered from the online grants database. Table 19 shows not only the growth of arts organizations in the region, but also their ability to travel successfully through the grant process. Also, the public support for arts organizations is obviously an important factor in their survival.

Table 19
Ohio Arts Council Grants, Columbus MSA Arts Organizations, 1980 and 2014

	1980		2014	
	Number	Amount*	Number	Amount
Delaware	12	\$ 90,105	5	\$ 38,519
Fairfield	4	12,689	3	45,343
Franklin	109	1,110,262	74	1,263,375
Hocking	0	0	2	5,266
Licking	8	33,370	7	74,085
Madison	1	12,201	0	0
Morrow	0	0	0	0
Perry	0	0	0	0
Pickaway	0	0	0	0
Union	1	366	0	0
Total	135	\$ 1,258,992	91	\$ 1,426,588

*Inflated to 2014 dollars using the Gross Domestic Product Implicit Price Deflator, U.S. Bureau of Economic Analysis.

Comparing Tables 18 and 19 shows that public support has failed to keep pace with the growth in the number and geographical dispersion of arts organizations in Central Ohio. The number of grants declined from 135 in 1980 to 91 in 2014. On an inflation-adjusted basis, total grant funding received in the region was only 13.3 percent higher in 2014 than in 1980. The share of Columbus MSA grant funding going to organizations in Franklin County was essentially unchanged: 88.2 percent in 1980, 88.6 percent in 2014. One positive finding is a large increase in the number of arts organizations receiving general operating support. There were only four such grants in 1980: to the Columbus Association for the Performing Arts, the Columbus Museum of Art, the Columbus Symphony Orchestra, and the Greater Columbus Arts Council. In 2014, however, 50 Central Ohio arts organizations received these grants.³

The increase in the number of high-income individuals documented above has doubtless been positive for the development of the arts in Central Ohio; the donations of some of these individuals have helped to fill the gap left by the fairly weak growth of public support. If the trend continues, the arts should continue to benefit. One way to project this growth to 2050 is to relate it to population. The 659 employees of arts organizations in 1980 represented five employees per 10,000 residents, while the 1,288 employees in 2012 represented 7.5 employees per 10,000. This increase is a function of the increasing wealth of the region, as well as the ability of the organizations to attract patrons from outside of the region. At the same time, the bulk of the growth in organizations has been in those employing fewer than five, causing the average number of employees per establishment to fall from 17.3 to 14.5. This likely reflects the emergence of organizations serving increasingly plentiful niche markets.

Assuming that the number of employees increases to 10 per 10,000 in 2050 and the number of employees per establishment declines to 12, the 2.44 million baseline population projection in 2050 implies 2,400 arts employees and 200 arts establishments in that year – the baseline projection. However, if public support is stagnant or declining in the face of other funding priorities and private support fails to fill the gap effectively, the increase in employees will be less and the ability of small organizations to emerge will be diminished. Assuming that the employment concentration increases

³ The operating support grants to CAPA, the Museum of Art, the Symphony, and GCAC in 1980 totaled \$445,645 in inflated dollars. The 2014 total was \$513,654, an increase of 15.3 percent.

only to 8.5 per 10,000 and the average employment remains at 14.5, employment increases only to 2,100 and organizations increase to 143.

An alternative – more optimistic – way of projecting growth of arts organizations in Central Ohio is to base that projection on the employment and number of organizations in MSAs with current population of about 2.4 to 2.5 million and strong arts communities. MSAs selected for this comparison include Baltimore, Pittsburgh, Portland, and Saint Louis. The average arts employment in these regions is 2,900. Average employment is 10.1 in Portland, 13 in St. Louis, 13.7 in Baltimore, but 20.1 in Pittsburgh – including one organization with employment greater than 1,000. Assuming 13 employees per establishment, the strengthening Central Ohio arts community will give rise to 225 organizations employing those 2,900 arts professionals.

Health

The health of Central Ohioans now and in the future is an important factor underlying quality of life, financial stability, and worker productivity. A comparison between 1980 and 2015 generally cannot be drawn, however. The Ohio Department of Health produced a brief analysis titled, “Chronic Disease Prevalence Data” in 1987. This used chronic disease incidence in hospital records from the early 1980s to infer 1985 rates of diseases including cancer, emphysema, high blood pressure, stroke, and arthritis. These rates could be matched with 1980 population totals to infer rates of disease in that year. The problem is that many individuals suffering from chronic diseases are not hospitalized, so this analysis would significantly understate the prevalence of these diseases.

The Department of Health currently conducts an annual telephone survey, the Behavioral Risk Factor Surveillance System, which collects data on many chronic health conditions. Most conditions are measured only for those 18 years and older; an exception is childhood asthma. The incidence rates reported in the results of this survey can be matched to the Scripps 2015 population projections to estimate disease rates for the Columbus MSA.

The report includes detailed demographic information of those suffering from chronic conditions statewide and rates for the overall population in Franklin County and a region including most of the other MSA counties. Of these rates, the only one that is significantly different from the statewide average is the rate of childhood asthma in Franklin County: 6.1 percent of all children vs. 14.3 percent in the other Central Ohio counties and 14.4 percent statewide. Accordingly, the statewide rates by age are used to calculate disease incidence for all conditions except childhood asthma. Here, the statewide age-specific rates are adjusted for the difference in the Franklin County rate, with the unadjusted statewide rates used to estimate childhood asthma incidence rates in other counties.

With no long-term trend information available, these 2013 rates are also used to project totals for 2050; low and high estimates are produced by using the pessimistic ODSA-based Insight 2050 projections and the optimistic Scripps-based projections. While these estimates assume that the *incidence* of disease will not change, the *impact* of disease is likely to change significantly as new treatments and means of managing disease are developed.

The results of this analysis are shown in Table 20. Every condition shows a double-digit increase over the next 35 years. Particularly large increases are projected in heart disease (56 percent), skin cancer (53 percent), other cancers and stroke (50 percent each), and kidney disease and diabetes (48 percent

each). On the other hand, childhood asthma is expected to increase at most only 11 percent given the modest increase projected for the population younger than 18 years.

Table 20
Chronic Diseases and Conditions in the Columbus MSA, 2015 and 2050

Disease/condition	2015	2050 low	2050 high
Total population 18 and older	1,530,079	1,892,814	2,010,053
High blood pressure	473,761	627,865	674,993
High cholesterol	487,019	632,346	677,402
Heart disease	99,697	142,816	155,504
Stroke	50,902	70,607	76,486
Adult asthma	222,491	269,982	285,669
Childhood asthma	50,352	54,117	56,031
Skin cancer	74,351	105,033	114,113
Other cancer	91,562	126,553	137,011
Arthritis	422,131	560,711	603,032
Kidney disease	32,745	44,877	48,518
Diabetes	142,394	195,258	211,119
Prediabetes	106,323	134,587	143,525
Chronic obstructive pulmonary disease	119,557	156,205	167,517
Depression	312,253	378,986	401,022
Poor mental health	188,366	225,856	238,432

Source: Author's projections.

Although detailed, consistent data on disease incidence are not available for 1980, the Ohio Department of Health does consistently provide the leading causes of death at a county level; the most recent figures available are for 2010. Table 21 shows for 1980 and 2010 the number of deaths by cause for 1980 and 2010 together with local and statewide rates of death per 100,000.

Table 21
Leading Causes of Death in the Columbus MSA, 1980 and 2010

Cause of death	Number	Rate per 100,000	
		MSA	Ohio
1980			
Heart disease	3,957	298.5	363.0
Cancer	2,248	169.6	196.1
Stroke	997	75.2	76.2
Accidents	525	39.6	41.0
Chronic obstructive pulmonary disease	383	28.9	27.2
2010			
Cancer	3,227	185.6	187.3
Heart disease	3,018	179.3	191.7
Chronic obstructive pulmonary disease	920	57.1	50.4
Accidents	785	43.5	41.6
Stroke	746	46.1	42.4
Alzheimer's disease	436	28.7	29.7

As Table 21 shows, heart disease and cancer have remained the leading causes of death in the Columbus MSA. Heart disease was the leading killer statewide in both years, although cancer edged out heart disease in the MSA in 2010. Stroke fell from third place to fifth with far lower death rates, while chronic obstructive pulmonary disease (COPD) jumped from fifth to third and its death rate nearly doubled. Alzheimer’s disease is a new entry in the 2010 ranking; it did not appear even in the statewide top-10 ranking in 1980. Nor does it appear in the list of chronic conditions in Table 20: Alzheimer’s can only be definitively diagnosed after death. (However, it is likely one of the conditions included in “poor mental health” in Table 20.

Another condition that does not appear in the 1980 data is Acquired Immune Deficiency Syndrome (AIDS). The first reported cases of the disease were noted in the Centers for Disease Control’s June 5, 1981, *Weekly Report*, while a brief article in the July 3 *New York Times* began, “Doctors in New York and California have diagnosed among homosexual men 41 cases of a rare and often rapidly fatal form of cancer. Eight of the victims died less than 24 months after the diagnosis was made.”⁴ Table 22 presents summary statistics on HIV/AIDS in the Columbus MSA drawn from the Ohio Department of Health’s HIV/AIDS Surveillance Data. Note that there are two levels of diagnosis: carrying HIV, the virus that causes AIDS, or having the array of symptoms that signals the disease itself.

Table 22
HIV/AIDS Summary Statistics, Columbus MSA

Characteristic	Number
Diagnoses	
2013	
HIV only	215
HIV only, AIDS developed by June 30, 2014	47
AIDS	25
Total	287
Cumulative total since 1981	4,141
Living with HIV/AIDS	
Total as of December 31, 2013	4,643
Deaths	
2009-2013	285
2013	53
Cumulative total since 1981	2,497

Source: Ohio Department of Health, “HIV/AIDS Surveillance Epidemiologic Report for Ohio, 2014,” 10 November 2014.

The advances made in understanding and treating HIV/AIDS over the past 35 years have changed this from a near-certain death sentence to a chronic condition that requires active management but allows one to live a normal life. A welcome finding in Table 22 is that most diagnoses are being made relatively early, while treatment is most effective. This does mean that the number of people living with HIV/AIDS will continue to increase; indeed, at least some of those diagnosed in 2013 will likely still be alive in 2050.

⁴ Lawrence K. Altman. “Rare Cancer Seen in 41 Homosexuals.” *The New York Times*, 3 July 1981.

A primary driver of the growth of the population suffering from chronic conditions shown in Table 20 is the aging of the population discussed earlier. Most of the conditions shown in Table 20 become far more common as individuals age – especially high blood pressure, affecting 63 percent of those 65 and older; arthritis, affecting 57 percent; and high cholesterol, affecting 55 percent. Exceptions include asthma, depression, and mental health challenges, which are somewhat less common among the elderly than among younger age groups. As will be discussed below, older individuals often also face mobility and other independent living challenges that must be addressed in addition to the chronic conditions.

Table 23
Chronic Diseases and Conditions in Total and Among the Elderly, 2050 High Projections

Disease/condition	Total	65 and older	Share of total
High blood pressure	674,993	291,237	43.1%
High cholesterol	677,402	252,928	37.3%
Heart disease	155,504	99,233	63.8%
Stroke	76,486	42,462	55.5%
Adult asthma	285,669	48,463	17.0%
Skin cancer	114,113	68,771	60.3%
Other cancer	137,011	74,771	54.6%
Arthritis	603,032	264,006	43.8%
Kidney disease	48,518	25,385	52.3%
Diabetes	211,119	110,772	52.5%
Prediabetes	143,525	42,924	29.9%
Chronic obstructive pulmonary disease	167,517	65,540	39.1%
Depression	401,022	68,309	17.0%
Poor mental health	238,432	31,385	13.2%

A particular area of concern in health is fetal and infant mortality. The higher-than-average rate of infant mortality in Franklin County has attracted the community’s attention with the formation of the Greater Columbus Infant Mortality Task Force and the expansion and targeting of programs working with women and their babies with help from a \$4 million federal grant.⁵ Reported statistics include premature birth, fetal death, neonatal death (death within the first 28 days after birth), and infant death (death after 28 days but within one year of birth). Premature births are currently reported on the basis of gestation period, but in 1980 births were defined as premature if the infant weighed less than 5.5 pounds. Current statistics, however, also report the number of newborns with birth weight less than 2,500 grams (5.51 pounds) so a consistent basis of comparison exists.

Table 24 shows historical birth and infant death data for 1980 and projections for 2015 and 2050. Births were projected for 2015 by applying age and county-specific birth rates for 2013 to the 2015 county population projections by age from Scripps. These rates were calculated annually from 2006 through 2013; these are the number of births per 1,000 people without regard to age. The analysis shows that, consistent with national trends, birth rates fell in the 2007-2009 recession and have only partially recovered. It is not clear whether these rates will return to their pre-recession levels. A lower estimate of 2050 births is projected using the 2013 rate, and a higher number is obtained by using the 2013 rate.

⁵ Misti Crane. “Federal Grant: More Help Coming for City Babies.” *The Columbus Dispatch*, 6 December 2014, pg. 1A.

Both of the resulting projected overall rates are lower than the corresponding historical rates because the share of women in child-bearing years is lower.

Table 24
Historical and Projected Births and Infant Deaths, Columbus MSA and Franklin County,
1980, 2015, and 2050

	Columbus MSA		Franklin County	
	Number	Rate	Number	Rate
Live births				
1980	21,096	15.9	14,020	16.1
2015	27,222	13.8	18,726	15.3
2050 – low	31,975	13.1	19,871	14.2
2050 – high	34,179	14.0	21,104	15.1
Low birth weight				
1980	1,460	6.9	1,040	7.4
2015	2,253	8.1	1,680	9.0
2050 – low	2,159	6.9	1,474	7.4
2050 – high	2,860	8.1	1,931	9.0
Fetal death				
1980	147	6.9	99	7.1
2015	179	6.4	126	6.7
2050 – low	185	5.8	123	6.2
2050 – high	214	6.3	141	6.7
Neonatal death				
1980	160	7.6	116	8.3
2015	154	5.8	106	5.7
2050 – low	142	4.4	93	4.7
2050 – high	187	5.5	120	5.7
Infant death				
1980	243	11.5	169	12.1
2015	66	2.5	44	2.3
2050 – low	60	1.9	37	1.8
2050 – high	81	2.4	50	2.3
Total deaths within first year (excluding fetal deaths)				
1980	403	19.1	285	20.4
2015	221	8.2	150	8.0
2050 – low	202	6.3	130	6.5
2050 – high	268	7.8	169	8.0

"The base data were provided by the Ohio Department of Health. The Department specifically disclaims responsibility for any analyses, interpretations or conclusions."

Source: Ohio Department of Health, Vital Statistics, 1980; author's projections.

Table 24 presents estimates and projections both for the Columbus MSA and for Franklin County because of the interest in infant death rates in the county. The comparison shows that despite the fact that Franklin County death rates are higher than the national average, both they and MSA rates have declined dramatically over the past 35 years. For every 1,000 babies born in 1980 in Central Ohio, 19 died within their first year of life, but fewer than half as many babies born in 2015 will die during the

first year. Only the fetal death rate has not markedly declined, and the incidence of low birth weights has increased. This implies that the healthcare system is doing a far better job of mitigating the risks arising from these low birth weights than was true 35 years ago.

Infant deaths in 2050 are projected by applying optimistic assumptions to the low estimate of total births to yield a smaller number of deaths and pessimistic assumptions to the high birth estimate to yield a larger number of deaths. The incidence of low birth weights is based on the 2014 rate in both cases, though, because of the small decline in this rate historically. The pessimistic rates assume that the 2050 rates will be equal to the 2010 fetal death rate and the 2012 neonatal and infant death rates. The optimistic rates are assumed to be 0.5 per thousand lower for fetal and infant deaths and one per thousand lower for neonatal deaths. The result is between 387 and 482 deaths either before birth or within the first year – each one a tragedy for the family involved.

A point that applies to all the analysis in this study, but one that is particularly important here, is that while present conditions can give us insight into the future, there is always the possibility of a new and disruptive factor causing a significant change. No one predicting conditions in 2015 from 1980 would have predicted the onset of AIDS and its devastating impact. Similarly, there may be disruptive factors in the future that will impact the health of Central Ohioans in unpredictable ways. Antibiotic-resistant superbugs may gain a much greater foothold, or a new and virulent disease may arise. On the other hand, the research currently underway that uses viruses to treat cancer may significantly reduce the impact of that disease.

Disabilities

As is true of many of the other measures reported in this paper, the reporting of disability has become more complete over the years as the attention paid to the needs of those with intellectual and behavioral challenges has increased. The only information on persons with disabilities in the 1980 Census was the number of individuals age 16 to 64 with a work disability and whether or not that disability prevented the individual from participating in the labor force. This limited information cannot be replicated exactly for 2015. While considerably more information is available in the American Community Survey, including specific disabilities for all ages, the information is presented for ages 18 to 64 rather than 16 to 64, and there is no indication in the recent data as there was in 1980 whether the disability prevented the individual from working.

The data for 1980 and data projected for 2015 from percentages in the 2011-2013 American Community Survey and the Scripps population projections are shown in Table 25. (Note that the indented categories are subsets of the category above.) A troubling finding is that the percentage of people in their prime working years with disabilities not participating in the labor force is actually slightly higher than its level in 1980. This despite the enhanced ability of technology to help people with challenges function in the workforce, as well as the provisions of the Americans with Disabilities Act requiring reasonable accommodations. Part of this could be the broader definition of disability in the recent data, but if the new technology had been living up to its promise, one might still expect to see some improvement.

Table 25
Working-Age Individuals with Disabilities in and out of the Labor Force, 1980 and 2015

	1980		2015	
	Number	Percentage	Number	Percentage
Total, 16 to 64 years*	867,070	100.0%	1,283,271	100.0%
With a work disability**	78,434	9.0%	133,862	10.4%
Not in labor force	47,680	5.5%	76,100	5.9%
Prevented from working	39,816	4.6%	n/a	n/a

*18 to 64 years in 2015. **With a disability of any type in 2015.

Source: Census 1980, author's projections.

The American Community Survey offers detailed information on types of disabilities in all age groups in addition to workforce-focused measures. These details from the 2011-2013 three-year estimates, projected to 2015, are presented in Table 26. Note that the number and percentages of individuals with difficulties sum to more than the total or 100 percent because individuals can have multiple conditions. The key points here are that more than one-third of individuals 65 years and older have at least one difficulty, and that more than 86,000 adults have challenges hindering their ability to live independently.

Table 26
Columbus MSA Residents with Disabilities, 2015 Projections

	Under 5	5-17	18-64	65 and older	Total
Number					
Total population	140,018	347,840	1,283,271	246,808	2,017,937
With a disability	1,208	21,319	133,861	90,449	246,837
With a hearing difficulty	846	2,522	26,085	36,442	65,895
With a vision difficulty	925	1,947	21,471	15,419	39,762
With a cognitive difficulty	---	17,023	60,911	24,498	102,432
With an ambulatory difficulty	---	2,227	66,457	59,763	128,447
With a self-care difficulty	---	3,494	23,440	22,357	49,291
With an independent living difficulty	---	---	46,144	40,383	86,527
Percentage					
With a disability	0.9%	6.1%	10.4%	36.6%	12.2%
With a hearing difficulty	0.6%	0.7%	2.0%	14.8%	3.3%
With a vision difficulty	0.7%	0.6%	1.7%	6.2%	2.0%
With a cognitive difficulty	---	4.9%	4.7%	9.9%	5.1%
With an ambulatory difficulty	---	0.6%	5.2%	24.2%	6.4%
With a self-care difficulty	---	1.0%	1.8%	9.1%	2.4%
With an independent living difficulty	---	---	3.6%	16.4%	4.3%

Source: Author's projections.

Along with its population projections, Scripps also provides projections of the number of individuals with disabilities to 2030. These are less detailed than those provided by the American Community Survey, but generally do not project a significant change in the percentage of people with challenges. Taking this cue and noting the lack of significant change in the available rate from 1980 to 2015, the 2050 projections are based on the same percentages as those for 2015, except for the independent living difficulty totals in the low projection. Here it is assumed that technology and innovations in healthcare will enable at least some individuals who cannot live independently now to do so, and that the number

with an independent living difficulty is 10 percent less than what the 2011-2013 percentages would imply.

The 2050 projections are shown in Table 27 below. The low projections are based on the Insight 2050 projections; the high projections are derived from the Scripps-based totals. Even though the age-specific proportions of individuals with disabilities are not assumed to change, the overall percentage of individuals with disabilities in the population is projected to increase because of the increasing share of elderly individuals. The low projections imply a 13.4 percent share of the overall populations, while the high projections imply 13.6 percent. Even in the optimistic projections, the number of Central Ohio residents with a disability increases by one-third – more than 80,000 – while the number with an independent living difficulty increases by more than 20,000. The Scripps-based projections result in 353,000 individuals in the region with a disability, 129,000 of whom will have independent living challenges. However, the impact of these disabilities may be less than currently, thanks again to technology and innovations in healthcare. Still, as the region makes plans to accommodate its population growth over the next 35 years, it will be important to consider the needs of these residents.

Table 27
Columbus MSA Residents with Disabilities, 2050 Projections

	Under 5	5-17	18-64	65 and older	Total
Low projections					
Total population	150,665	400,766	1,478,434	414,379	2,444,245
With a disability	1,234	24,402	152,094	150,264	327,994
With a hearing difficulty	855	2,922	29,816	60,604	94,197
With a vision difficulty	950	2,221	24,457	25,170	52,798
With a cognitive difficulty		19,414	69,120	40,650	129,184
With an ambulatory difficulty		2,572	75,313	99,139	177,024
With a self-care difficulty		3,972	26,595	37,185	67,752
With an independent living difficulty			47,344	60,317	107,661
High projections					
Total population	175,172	402,335	1,548,504	461,548	2,587,560
With a disability	1,461	24,713	160,037	166,654	352,865
With a hearing difficulty	1,016	2,936	31,175	67,326	102,453
With a vision difficulty	1,124	2,225	25,706	27,804	56,859
With a cognitive difficulty		19,714	72,954	44,886	137,554
With an ambulatory difficulty		2,579	79,307	109,925	191,811
With a self-care difficulty		4,009	28,049	41,219	73,277
With an independent living difficulty			55,320	74,085	129,405

Source: Author's projections.

The Environment

Two aspects of the environment are discussed in this section: air pollution and water pollution. By most measures, Central Ohio's water and air are much cleaner than they were in 1980 and may be cleaner still in 2050.

Air Pollution. The Ohio Environmental Protection Agency (EPA) uses standards of the U.S. EPA to track a number of different types of air pollution. Most of these measures have shown marked improvement

over the past 35 years. Table 28 displays these measures in Franklin County, their values in 1980 (where available) and 2013, the current U.S. EPA standard for the pollutant, and the most recent year in which that standard was exceeded. (Note that some standards have been tightened over time, so that may not have been considered a violation of the standard at the time.)

Table 28
Franklin County Air Pollution Measures, 1980 and 2013, Current Standard, and the Most Recent Violation of the Current Standard

Pollutant	1980	2013	Standard	Last violation
Carbon monoxide, 1-hr 2nd highs, ppm	10.0	1.6	35.0	n/a
Carbon monoxide, 8-hr 2nd highs, ppm	6.6	1.0	9.0	1978
Sulfur dioxide, 99 percentile conc., ppb	173	13	75	1994*
Nitrogen dioxide, 98 pctile.conc.,1-hr, ppb	n/a	39	100	n/a
Ozone, 8-hour, ppb	101	73	75	2013
Particulate matter (PM _{2.5}), µg/m ³	n/a	10.2	12.0	2010

*2010 through 2012 data are missing.

Source: Ohio EPA, Division of Air Pollution Control, 30-Year Trend Database, April 2011; "Ohio Air Quality, 2013," October 2014.

Carbon monoxide (CO) is produced by the incomplete burning of fossil fuels, primarily by vehicles. CO reduces the oxygen-carrying capacity of the blood, affecting brain function. The national standards for CO are: (1) no more than 35 parts per million (ppm) during any one-hour period, which is not to be exceeded more than once per year; and (2) an eight-hour average concentration of nine ppm which is not to be exceeded more than once per year.⁶ As shown in Table 28, Franklin County's CO levels are well within the maximum standards. The eight-hour standard was last exceeded in 1978, and the one-hour standard has never been exceeded in data going back to 1972. Figure 2 on the next page graphs the eight-hour CO values since 1980. Despite some variation, there was a decline of 85 percent from 1980 through 2013, and 88 percent from its 1982 peak.

Sulfur dioxide (SO₂) is produced mainly through burning of high-sulfur coal. When it comes into contact with water, SO₂ produces sulfuric acid and sulfates, which produce acid rain and are lung irritants. The standard is a maximum of 75 parts per billion (ppb), which is not to be exceeded at any time.⁷ Although the past few years of data prior to 2013 are missing from the EPA monitoring data, the decline in SO₂ over the past 35 years has been even greater than that in CO – 92 percent. The 1980 level of 173 ppb was itself a significant decline from its 1972 level of 400 ppb.

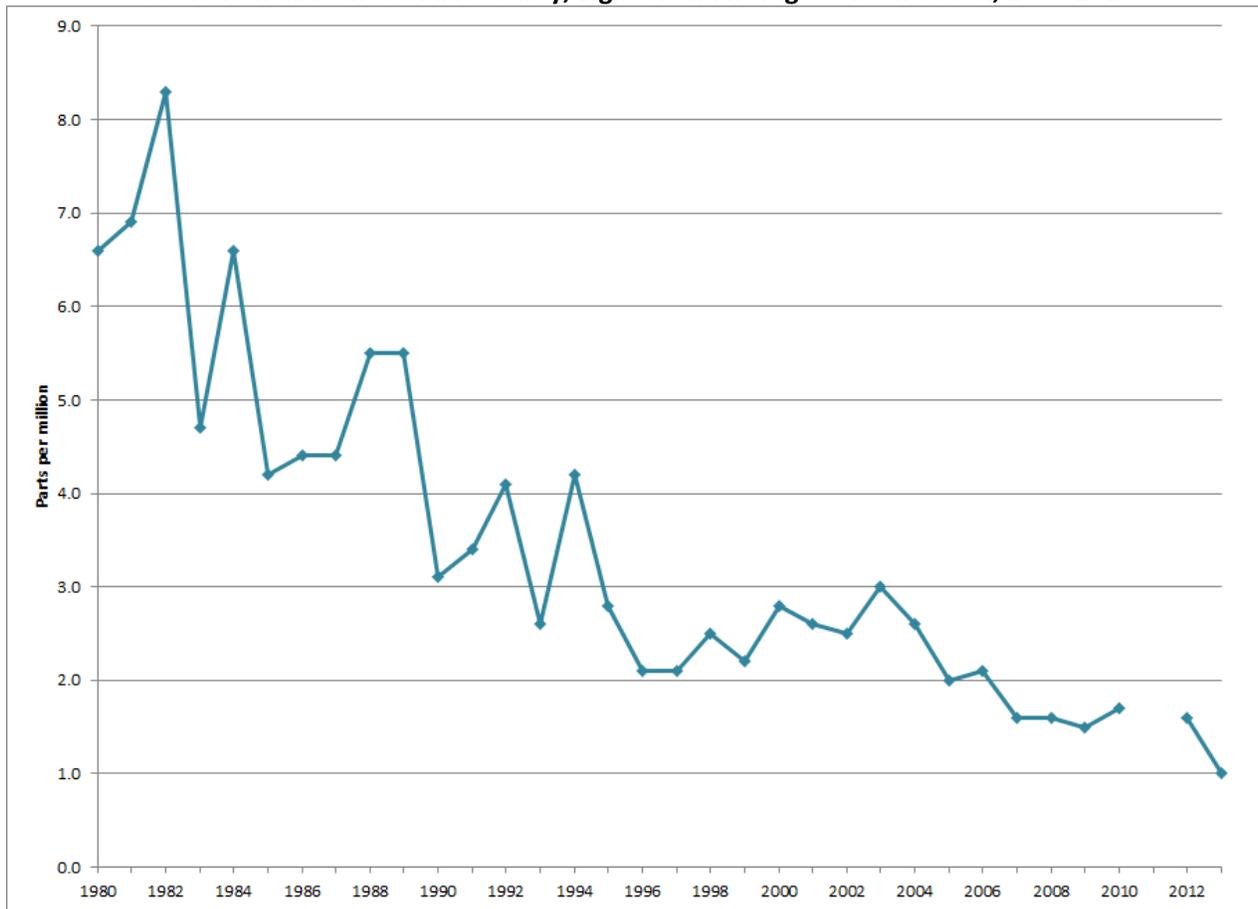
Nitrogen dioxide (NO₂) is produced by internal combustion vehicles and certain chemical processes. A new standard was released by the U.S. EPA in February 2010: a three-year average of the 98th percentile of one-hour values must not exceed 100 ppb. This measure for Franklin County was first available in 2013; its value of 39 was well within the EPA standard.⁸

⁶ "Ohio Air Quality 2013," pg. 75.

⁷ "Ohio Air Quality 2013," pp. 68-69.

⁸ "Ohio Air Quality 2013," pg. 73.

Figure 2
Carbon Monoxide in Franklin County, Eight-Hour Average Concentration, 1980-2013

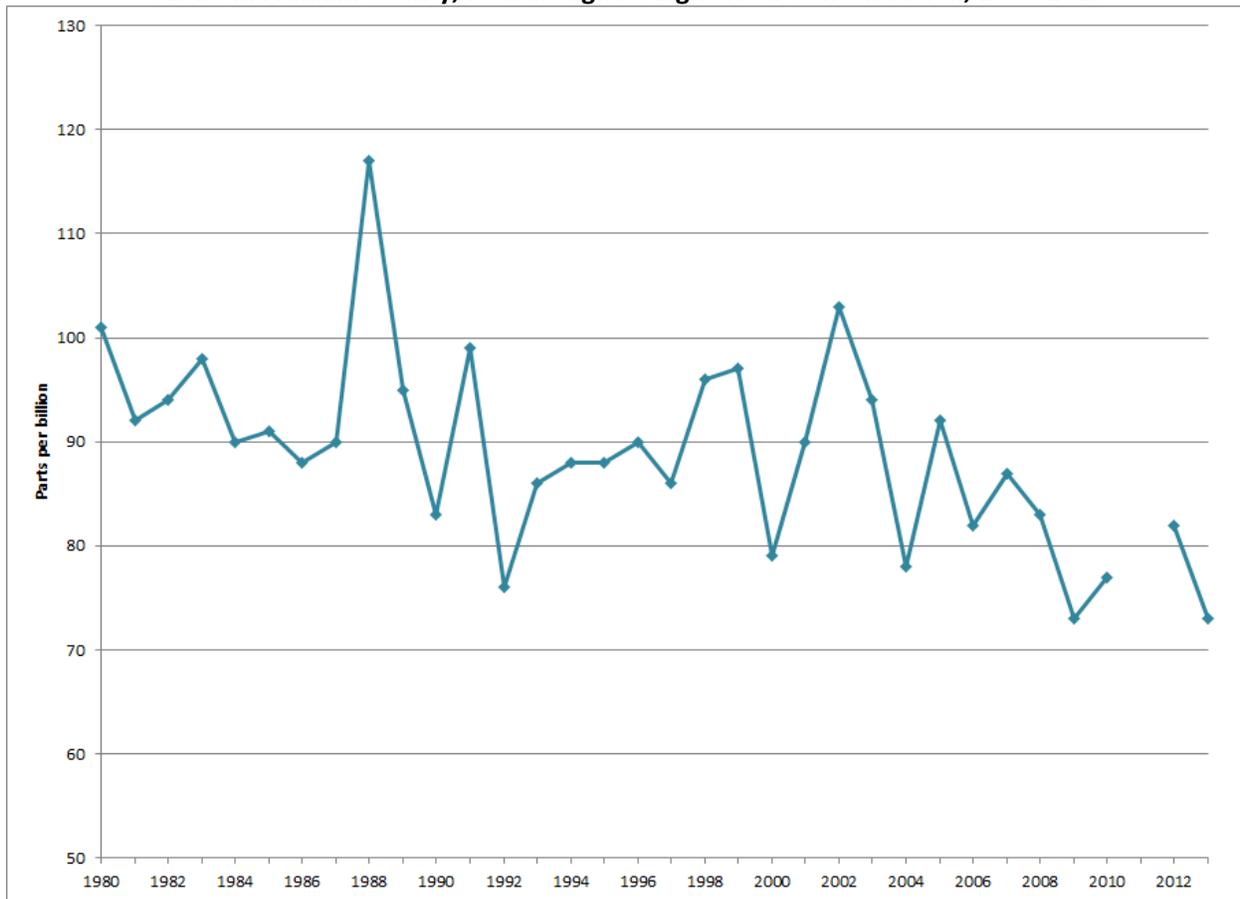


Source: Ohio EPA, Division of Air Pollution Control, 30-Year Trend Database, April 2011; "Ohio Air Quality, 2012," October 2013; "Ohio Air Quality, 2013," October 2014.

Ozone (O₃) is not directly released into the air from specific sources; rather, it is produced when sunlight reacts with nitrogen oxides and organic compounds in the air. These are produced from a variety of sources including internal combustion engine emissions and evaporation of gasoline, solvents, paints, and other coatings. Ozone is the primary chemical component of smog. The current standard, enacted in May 2008, is a three-year average of the fourth-highest eight-hour averages at each monitoring site in the county. This cannot exceed 75 ppb. Ozone causes eye, nose, and throat irritation, reduces resistance to respiratory infections, aggravates preexisting asthma and heart and lung conditions, and damages plants.⁹ Although the 2013 value of 73 is within the standard, the three-year average is not. Ozone is the pollutant that poses the greatest problem for Franklin County. As Figure 3 on the next page illustrates, there has been only a slight downward trend in the average ozone level over time. The level is also highly volatile because the production of ozone is weather-dependent: levels are highest in the summer, and are increased when the weather is hot and dry.

⁹ "Ohio Air Quality 2013," pp. 77-78.

Figure 3
Ozone in Franklin County, Fourth-Highest Eight-Hour Concentration, 1980-2013



Source: Ohio EPA, Division of Air Pollution Control, 30-Year Trend Database, April 2011; “Ohio Air Quality, 2012,” October 2013; “Ohio Air Quality, 2013,” October 2014.

Suspended particulates can be either liquid or solid. They include ash, oil aerosols, and dust from plowing, construction, or roadways. Although larger particles generally do not stay suspended in the air, those smaller than 10 microns in diameter can penetrate the larynx and damage the respiratory system, those smaller than six microns can penetrate the bronchial passages, and those smaller than one micron can enter the lungs. The impact depends on the particle: some are themselves toxic; others interfere with the lungs’ self-cleansing mechanism. Given the greater danger of smaller particles, the previous 10-micron particle sampling has been replaced by monitors that sample 2.5-micron particles (PM_{2.5}). These began sampling in 1999. The current standard is a three-year average of no more than 12 micrograms per cubic meter of air.¹⁰ As Figure 4 illustrates, there has been a substantial decline in particulate pollution in Franklin County over the last 14 years, amounting to a total decline of 42 percent. The county first met the standard in 2012.

¹⁰ “Ohio Air Quality 2013,” pp. 51-58.

Figure 4
Particulate Matter (PM_{2.5}) Pollution in Franklin County, 1999-2013



Source: Ohio EPA, Division of Air Pollution Control, 30-Year Trend Database, April 2011; “Ohio Air Quality, 2012,” October 2013; “Ohio Air Quality, 2013,” October 2014.

There is no way to predict values of these pollutants in 2050 – let alone possible changes to the EPA standards that could affect attainment. However, the above paragraphs clearly indicate that the internal combustion engine is responsible for a large part of many of these pollutants. The continuing shift to fuel cell and electric vehicles and increasing availability and acceptance of mass transit could partly or completely offset the impacts of the greater transportation needs of the increasing population. The increased density predicted in Insight 2050 could reduce the average vehicle miles as well. However, this increased density and activity could increase particulates, as would a continuing growth of manufacturing and distribution activity in the region. Ozone may increase as well if climate change causes hotter, drier weather. So pollution of some types may continue to improve while that of other types – particularly ozone – may worsen.

Water Pollution. Water pollution analysis focuses on watersheds, with the Middle Scioto, Olentangy, and Big Walnut sub-basins the primary focus for Franklin County. The 1980 analysis was completely qualitative and presented in the Ohio EPA report, *Ohio 1980 Water Quality Inventory: Report to Congress, Section 305(B)*, published in April 1980.

This report characterized the Middle Scioto quality as good between Mill Creek (southern Delaware County) and the Olentangy confluence. Abundant fish populations were supported. Although nutrient

levels from fertilizer runoff were high, but the high flushing rates of the reservoirs kept algae blooms under control.¹¹ However, the quality of the following 50 miles of the Scioto was poor. Despite the presence of several wastewater treatment facilities, urban and industrial pollution exceeded the ability of the river to absorb the pollutants. The report concluded, “However, the diversion of upstream flow for public water supplies may be the single most important factor preventing the attainment of 1983 clean water goals in portions of the Scioto River.”¹²

The water quality of the Olentangy in 1980 was characterized as “variable.” High concentrations of fecal coliforms were noted, although these were traced to the Worthington Hills Wastewater Treatment Plant, a facility that closed in April 1979 when the area was tied into the Columbus sewer system. However, numerous sewer overflows from combined storm and sanitary sewers further downstream affected water quality in heavy rains.¹³

The water quality of Big Walnut Creek was good north of Columbus, but like the Olentangy, the middle and lower portions of the creek were affected by pollution from Columbus. The study called for further analysis to assess the extent of pollution of both Big Walnut and Alum Creeks in Columbus.¹⁴

The problem of overflows from combined sewers led to two Ohio EPA consent decrees – legal settlements preventing lawsuits – with the City of Columbus in 2002 and 2004. The 2004 settlement required a redesigned system separating the sanitary and storm sewers to be in place by July 1, 2025.¹⁵ This work is currently underway, but a new focus of the program is to reduce storm runoff in environmentally responsible ways, including rain gardens, permeable pavements, and retrofitting structures’ gutters and downspouts rather than digging massive tunnels.¹⁶ This will reduce not only the burden on the sewer system, but also the oil and dirt running into the rivers from streets and parking lots.

In 2012, the Ohio EPA issued an updated report on the water quality of the Scioto River based on field analyses undertaken in 2010.¹⁷ The report’s conclusion was that water quality in Central Ohio rivers continued to be a problem. Only 58 percent of sampled sites in the Middle Scioto sub-basin were in full attainment of the U.S. EPA’s warm water habitat aquatic life use designation, with the continuing combined sewer outflows and the Jackson Pike Wastewater Treatment Plant leading to high nutrient levels through and south of Columbus. The Scioto’s tributaries were negatively impacted by runoff from surrounding farms, urbanization, and home sewage treatment systems. Of the tested tributary sites, 48 percent were in full attainment, 22 percent in partial attainment, and 30 percent in non-attainment. Recreational use of 26 of 28 tested sites was negatively impacted by the presence of *E. coli* bacteria.

Several numerical measures are currently used to evaluate water quality. The Index of Biotic Integrity (IBI) and the Modified Index of Well-Being (MIwb) measure water quality and fish community health by assessing the diversity of aquatic life and the presence or absence of pollution-intolerant aquatic life.

¹¹ *Ohio 1980 Water Quality Inventory*, pg. IV-112.

¹² *Ohio 1980 Water Quality Inventory*, pg. IV-112.

¹³ *Ohio 1980 Water Quality Inventory*, pg. IV-120.

¹⁴ *Ohio 1980 Water Quality Inventory*, pg. IV-110.

¹⁵ Suzanne Hoholik. “City Says Sewer Fixes Could Cost \$1.5 Billion.” *The Columbus Dispatch*, 18 May 2004, pg. 1A.

¹⁶ Will Drabold. “Ideas Grow to Reduce City Sewer Overflows.” *The Columbus Dispatch*, 10 March 2014, pg. 1A.

¹⁷ Ohio Environmental Protection Agency. *Biological and Water Quality Survey of the Middle Scioto River and Select Tributaries*, 2010. 21 November 2012.

The Invertebrate Community Index (ICI) assesses the populations of benthic macroinvertebrate species (insects and other animals without a backbone that live on the bottom of water bodies – e.g., flatworms, leeches, crayfish, clams, and mussels). Table 29 lists these measures for monitoring sites on the Scioto and its tributaries, generally in 2010 and 2011. The lack of quantitative data in 1980 makes comparisons between water quality then and in the early 2010s difficult. (The measures in Table 29 were developed later than 1980.) However, the observation that the water quality of the Scioto through Columbus was “poor” in 1980 suggests that perhaps the river is cleaner now than it was then. Indeed, as the metrics in Table 29 make clear, the problem is less the Scioto itself than the smaller tributaries flowing into it. These feeder streams seem not to have a significantly detrimental impact on the river.

As with air pollution, arriving at definitive conclusions regarding water quality in 2050 is difficult. The problem of the combined sewer outflows will be solved by then; the implementation schedule for Blueprint is 10 years. Offsetting these positive developments is the increase in population, population density, development, and stresses on the land and the rivers that drain it. It is unclear whether the net effect on water quality in 2050 will be positive or negative.

Table 29
Selected River Quality Scores in Franklin and Southern Delaware County, 2010-2011

Attainment	IBI rating	IBI score	MIwb rating	MIwb score	ICI rating	ICI score
North Fork Indian Run at Hyland Croy Rd						
Non	Fair	32	n/a	n/a	Low fair	n/a
North Fork Indian Run at Coffman Road, Dublin						
Partial	Marg.good	36	n/a	n/a	Low fair	n/a
Scioto River north of Dublin at I-270						
Full	Exceptional	52	Exceptional	10.65	Good	38
Hayden Run at Hayden Run Road						
Non	Poor	24	n/a	n/a	Fair	n/a
Scioto River at Town Street						
Full	Fair	34	Marg.good	8.40	Poor	10
Scioto River at Greenlawn Avenue						
Partial	Exceptional	48	Exceptional	11.75	Fair	28
Scioto River at Frank Road						
Full	Very good	47	Exceptional	10.83	Good	36
Scioto River 0.7 miles downstream from Jackson Pike Wastewater Treatment Plant						
Partial	Very good	49	Exceptional	10.83	Fair	22
Olentangy River downstream from Mt. Air behind shopping center						
Full	Exceptional	50	Exceptional	9.90	Exceptional	50
Alum Creek at I-670/Airport Drive						
Partial	Good	40	Exceptional	9.69	Fair	n/a
Alum Creek at Nelson Park						
Partial	Very good	48	Very good	9.26	n/a	n/a
Alum Creek west of Fair Avenue at south end of Wolfe Park						
Partial	Good	40	Exceptional	9.82	Fair	n/a

Source: Ohio EPA, Water Quality Summary, 2014 Integrated Report (map tool).

<http://wwwapp.epa.ohio.gov/gis/mapportal/IR2014.html>.