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Agricultural Land Lost to Development in Ohio

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INTRODUCTION

In response to the nationwide trend of declining farmland, we conducted a study on the conversion of agricultural land to developed uses in Ohio from 2000 to 2023. Key findings include:

- Between 2000 and 2023, 585,862 acres of agricultural land in Ohio were lost.
- Development alone accounted for 440,602 acres lost, representing 75.2% of gross agricultural land losses.
- Franklin and Delaware counties experienced the highest agricultural land losses in Ohio, with 28,454 acres and 25,382 acres lost, respectively.
- The losses in these two counties contributed significantly to the Columbus MSA's total loss of 114,829 acres, the highest among all MSAs in the state.
- A large portion of this conversion occurred within 3 miles of the Columbus city boundary, indicating that urban expansion near the city's boundary played a major role in driving farmland loss.

Data Sources

The National Land Cover Database (NLCD)—developed by the Multi-Resolution Land Characteristics (MRLC) Consortium—uses high-resolution satellite imagery to classify land into specific categories based on 30-meter by 30-meter pixels. Each pixel is assigned a land cover type, such as forest, cropland, or developed land.

In this study, we examine the 2000 and 2023 NLCD Land Cover datasets using GIS to analyze the conversion of agricultural land to developed land in Ohio over the past two decades. Our primary focus is to identify where and how much agricultural land present in 2000 has been converted to development by 2023. To enhance the accuracy and reliability of our estimates, we cross-validate our results using data from the Enhanced Visualization and Analysis (EVA) tool, also developed by the MRLC.

We documented the land categories used in the data analysis process in the Appendix.

Agricultural Land Lost to Development in Ohio

According to NLCD satellite data gathered via the EVA tool, Ohio experienced a gross loss of 585,862 acres of agricultural land between 2000 and 2023, representing a 4.37% decline in the state's total agricultural land. Of the 585,862 acres lost, 75.2% were lost to development within Ohio. Figure 1 illustrates the agricultural land loss in Ohio from 2000 to 2023. In the map, gray areas represent developed land as of 2023, green areas indicate agricultural land that remained in agricultural use, and red areas highlight agricultural land that was converted to development during the 24-year period. The map reveals that the greatest agricultural land loss occurred around urban centers—particularly near major cities—suggesting that urban expansion has been a primary driver of conversion of agricultural land.

While agricultural land loss was substantial, agricultural land gain was also present, albeit in smaller numbers. This gain primarily came from land previously classified as forest, barren land, open water, and grassland, with most of the newly added agricultural land concentrated in southeastern Ohio as shown in the blue areas of Figure 2. After accounting for gain in agricultural land, the net loss was reduced to 423,539 acres, or 3.16% of Ohio's total agricultural land from 2000 to 2023.

Table 1: Agricultural land lost to development in Ohio, 2000 – 2023

State	Ag land 2000 (acres)	Ag land 2023 (acres)	Net ag land loss (acres)*	Gross ag land loss (acres)*	Ag land lost to development (acres)	Ag land lost to development (%)*
Ohio	13,401,427	12,977,888	423,539	585,862	440,602	75.2%

*Net ag land loss accounts for both land losses and gains. Gross ag land loss only accounts for ag land losses.

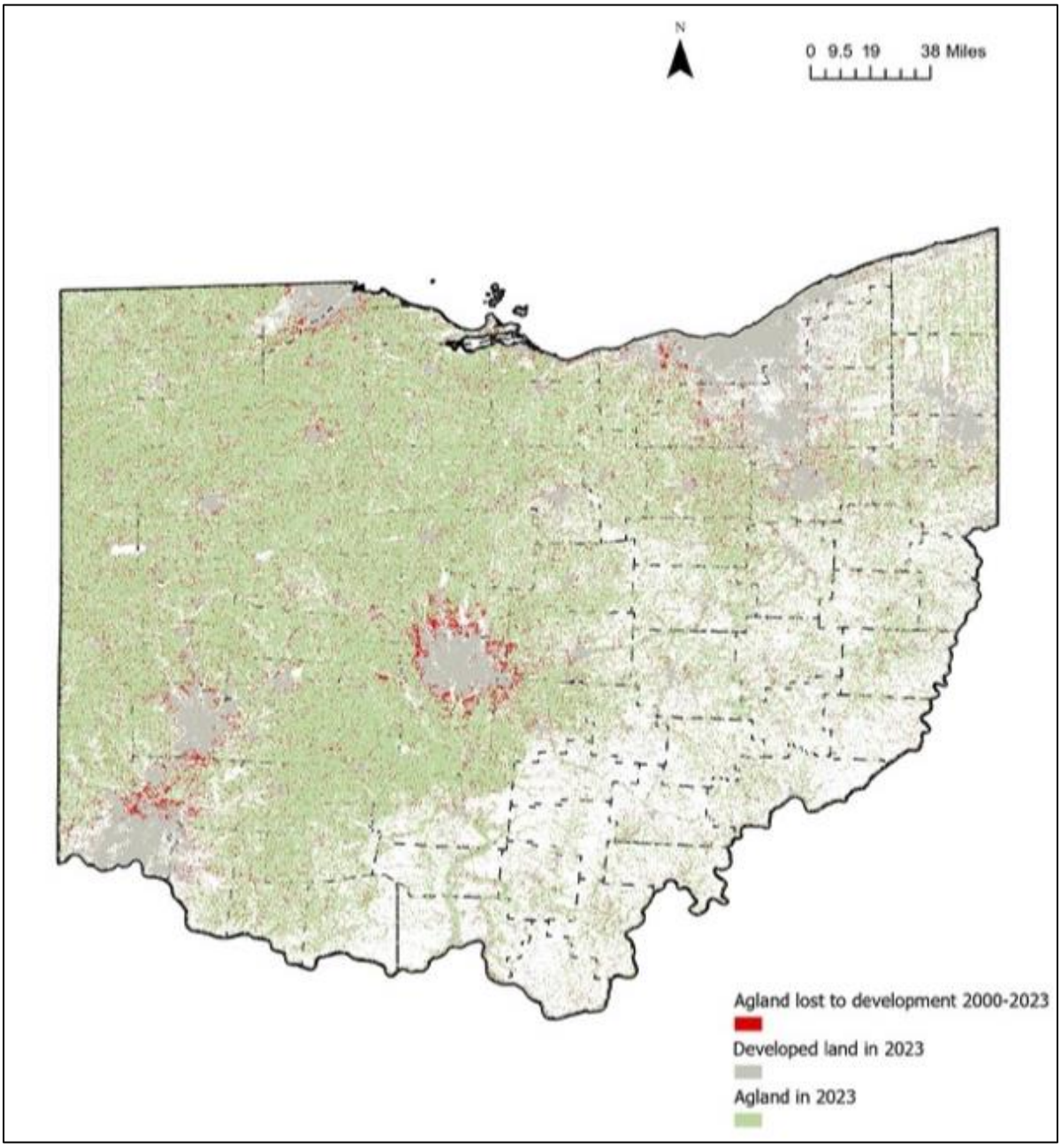

Figure 1: Agricultural land converted to development between 2000 and 2023 in Ohio

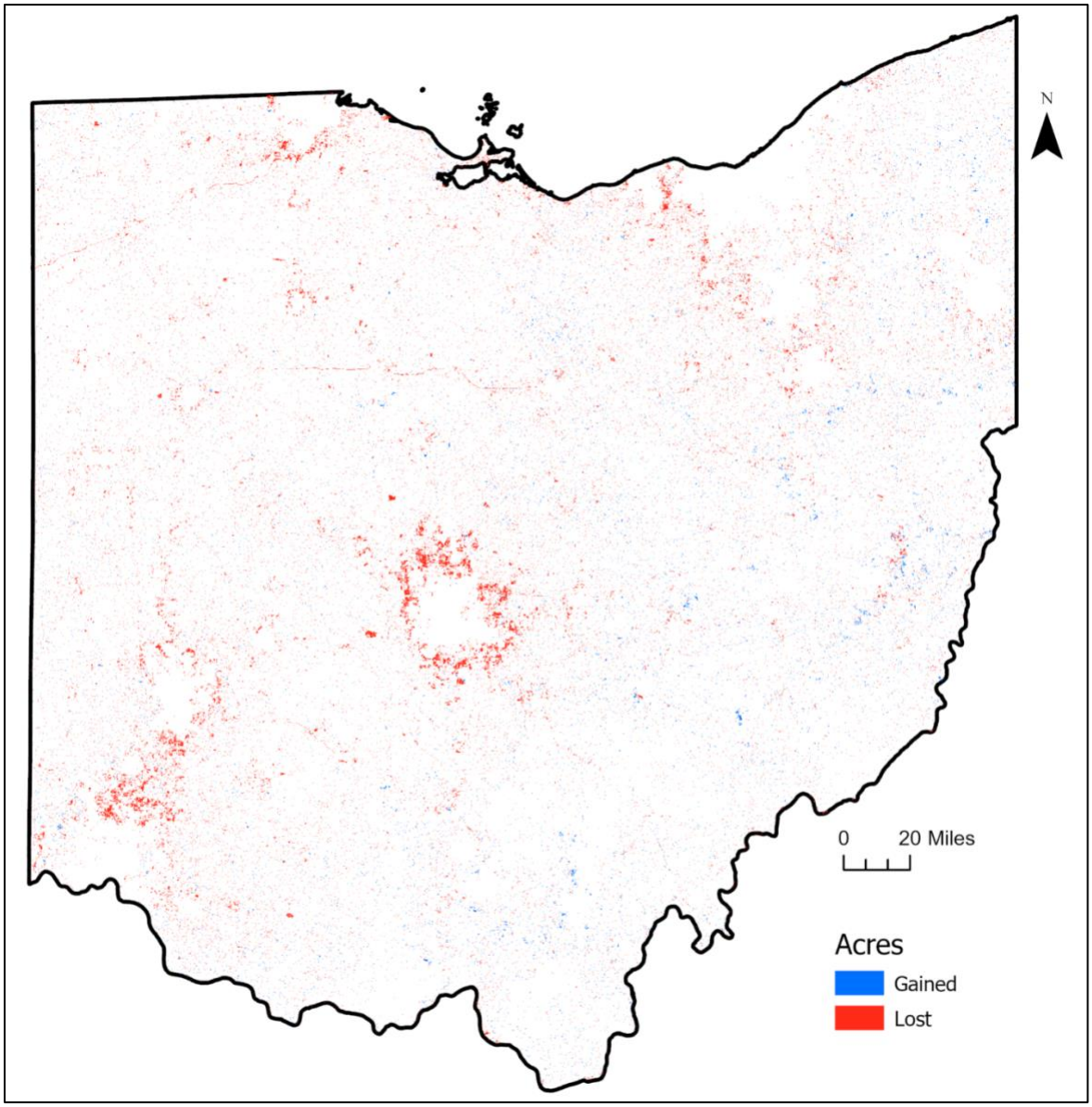

Figure 2: Gains and losses in agricultural land in Ohio, 2000 – 2023

Ohio Agricultural Land Lost to Development by Metropolitan Statistical Areas (MSAs)

The U.S. Office of Management and Budget (OMB) defines a Metropolitan Statistical Area (MSA) as a region centered around an urban core with a population of at least 50,000, characterized by strong economic and social ties between the core city and surrounding areas. In total, Ohio contains 14 MSAs, five of which extend into neighboring states such as Indiana, Kentucky, West Virginia, or Pennsylvania. For this study, we only analyze land loss within the Ohio portions of each MSA, excluding any areas that fall outside the state's borders.

Ohio's 14 MSAs accounted for 81% of the state's agricultural land loss to development over the past two decades. Among them, the Columbus MSA contained the largest amount of agricultural land, totaling 1.65 million acres in 2023 (see Table 2). The next two largest MSAs by agricultural acreage in 2023 were the Toledo MSA with 679,853 acres and the Cincinnati MSA with 530,874 acres.

In terms of conversion, the Columbus MSA experienced the largest loss of agricultural land to development, with 99,075 acres converted between 2000 and 2023 (see Table 2 and Figure 3). The Cincinnati MSA and Cleveland MSA followed, losing 53,771

acres and 37,681 acres, respectively.

When looking at the percentage of agricultural land converted to development, some of the highest percentages were observed in the Cleveland (87.23%), Cincinnati (87.15%), and Columbus (86.28%) MSAs—the same three MSAs that also saw the largest losses of agricultural land by total acreage lost. The highest percentage observed overall was in the Akron MSA, with 87.94% of its agricultural land lost to development (see Table 2 and Figure 2).

Table 2: Agricultural land lost to development for Ohio MSAs, 2000 – 2023

MSA	Ag land 2000 (acres)	Ag land 2023 (acres)	Net ag land loss (acres)*	Gross ag land loss (acres)*	Ag land lost to development (acres)	Ag land lost to development (%)*
Columbus, OH	1,758,106	1,652,512	105,594	114,829	99,075	86.28%
Cincinnati, OH-KY-IN**	584,691	530,874	53,817	61,702	53,771	87.15%
Cleveland, OH	513,203	478,854	34,349	43,200	37,681	87.23%
Dayton-Kettering-Beavercreek, OH	486,726	460,819	25,907	28,531	24,021	84.19%
Toledo, OH	709,702	679,853	29,849	32,173	22,894	71.16%
Canton-Massillon, OH	247,552	237,920	9,632	16,262	12,616	77.58%
Akron, OH	130,496	120,576	9,920	13,920	12,241	87.94%
Youngstown-Warren-Boardman, OH-PA**	218,496	212,941	5,555	17,728	9,309	52.51%
Springfield, OH	176,493	170,579	5,914	11,398	5,265	46.19%
Mansfield, OH	169,210	165,318	3,892	10,298	5,198	50.48%
Lima, OH	188,563	182,957	5,606	9,498	4,781	50.34%
Wheeling, WV-OH**	104,358	103,315	1,043	8,102	3,856	47.59%
Weirton-Steubenville, WV-OH**	59,891	59,654	237	2,771	1,692	61.05%
Huntington-Ashland, WV-KY-OH**	28,102	27,654	448	2,067	1,571	76.01%

*Net ag land loss accounts for both land losses and gains. Gross ag land loss only accounts for ag land losses.
**For MSAs spanning multiple states, only the land loss in the Ohio portion of the MSA is shown.

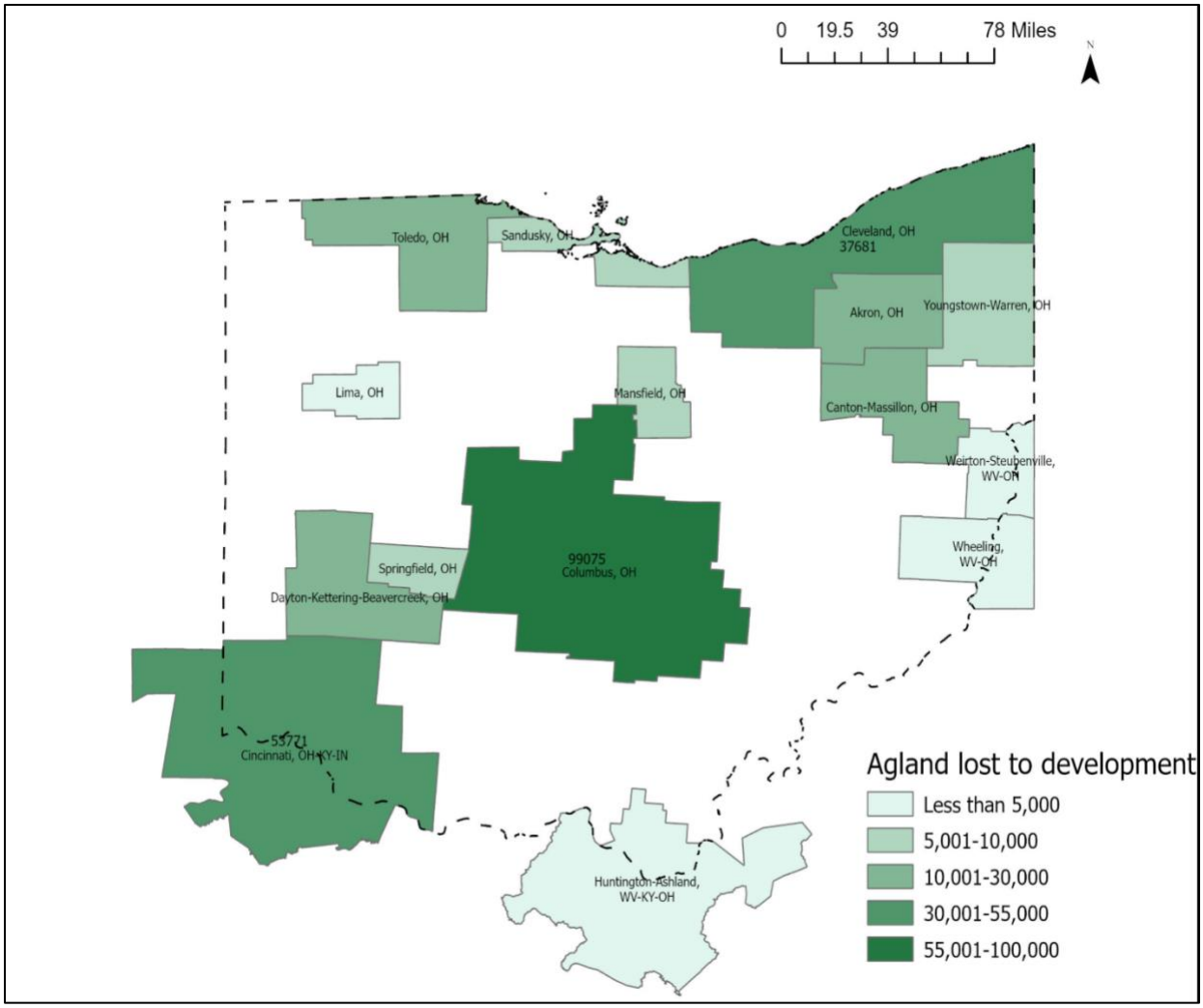

Figure 3: Agricultural land lost to development by MSA (in acres), 2000 – 2023

Ohio Agricultural Land Lost to Development by County

Agricultural land loss to development in Ohio is heavily concentrated in a few counties. As shown in Table 3 and Figure 4, the top 10 counties account for a disproportionate share of total agricultural land conversion. Out of Ohio's 88 counties, these top 10 counties account for 30% of all agricultural land lost and 36% of the agricultural land lost specifically to development.

Franklin and Delaware Counties not only had the highest overall agricultural land losses in Ohio but also had most of those losses due to development. Franklin County lost 26,555 acres of agricultural land to development, which was 93.3% of its total agricultural land loss of 28,454 acres. Delaware County followed closely, with 22,921 acres of its 25,382-acre loss (about 90.3%) attributed to development. Together, these two counties—both within the Columbus MSA—contributed significantly to the MSA's agricultural land loss of 114,829 acres.

Overall, the top three counties—Franklin, Delaware, and Warren—accounted for 15.8% of all agricultural land lost to development in Ohio between 2000 and 2023. Notably, all ten counties with the most agricultural land loss to development each lost at least 10,000 acres during this period, and at least 80% of agricultural land was lost to development.

Table 3: Agricultural land lost to development in Ohio (top ten counties), 2000 – 2023

County	Ag land 2000 (acres)	Ag land 2023 (acres)	Net ag land loss (acres)*	Gross ag land loss (acres)*	Ag land lost to development (acres)	Ag land lost to development (%)*
Franklin	103,027	75,072	27,955	28,454	26,555	93.3%
Delaware	180,326	155,955	24,371	25,382	22,921	90.3%
Warren	131,597	111,072	20,525	21,600	20,262	93.7%
Butler	144.781	126.912	17,869	19,552	18,040	92.3%
Licking	230,515	216,749	13,766	16,730	14,173	84.7%
Lorain	144,090	130,522	13,568	14,842	12,828	86.4%
Medina	129,146	116,781	12,365	13,805	12,771	92.5%
Montgomery	122,362	111,622	10,740	11,840	10,555	89.4%
Fairfield	200,499	185,638	14,861	11,674	10,502	90.0%
Wood	313,747	302,304	11,443	11,974	10,310	86.1%

*Net ag land loss accounts for both land losses and gains. Gross ag land loss only accounts for ag land losses.

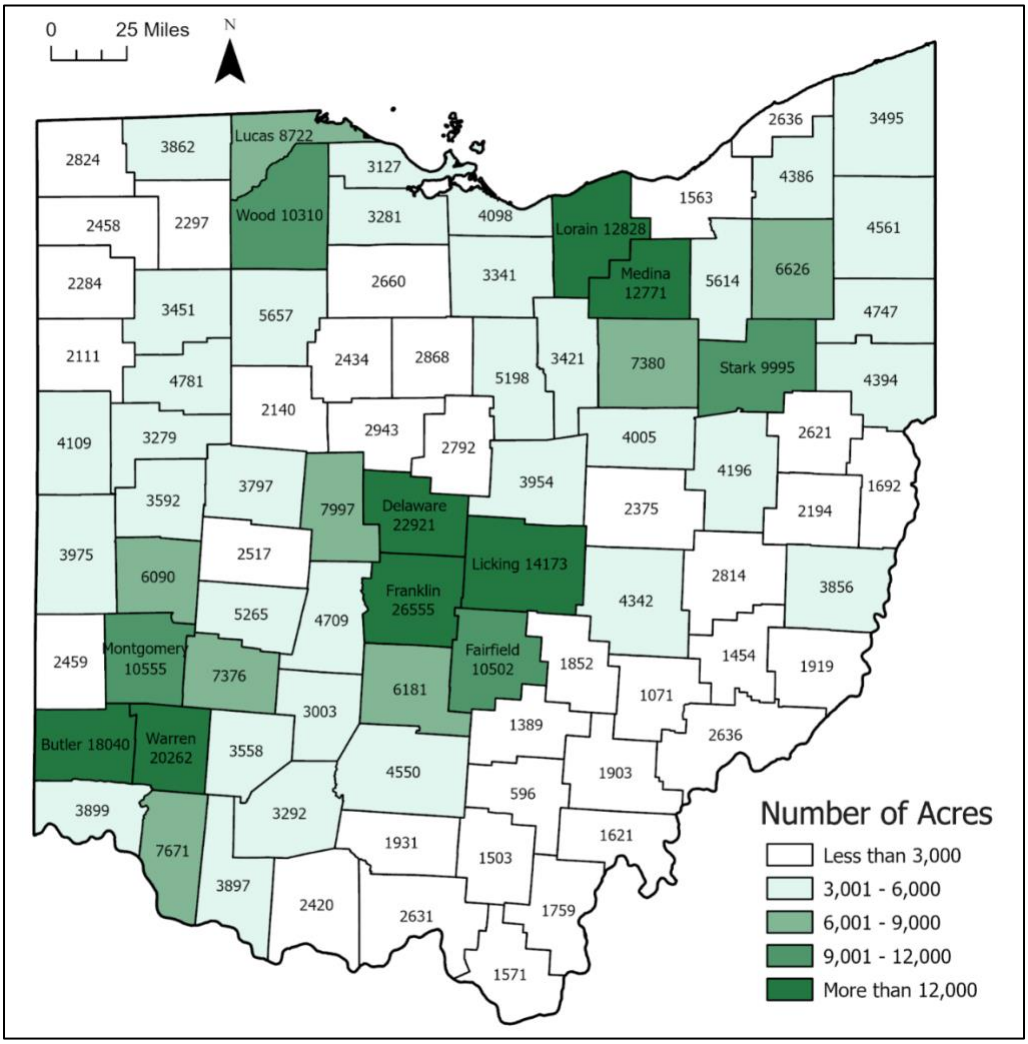

Figure 4: Agricultural land lost to development by county (in acres), 2000 – 2023

Agricultural Land Lost to Development by City

To better understand the relationship between urban expansion and farmland loss, we analyzed agricultural land conversion in and around Ohio's three largest cities: Columbus, Cincinnati, and Cleveland. Table 4 summarizes agricultural land loss to development within city boundaries and within a 1–3 miles of each city boundary. Figure 5 provides a detailed visual of the agricultural land loss for the City of Columbus.

The City of Columbus experienced the most significant agricultural land loss near its boundary, with 36,879 acres converted to development within 3 miles of the city boundary between 2000 and 2023, as shown in Table 4. Agricultural land conversion was substantial within the 1-, 2-, and 3-mile buffers around the city boundary, with the greatest losses occurring within 1 mile of the city boundary. Although Cincinnati and Cleveland exhibit a similar pattern of agricultural land loss near their city boundaries, the amount of land loss was significantly smaller compared to that of the City of Columbus. These trends collectively highlight that urban growth at city boundaries is a key driver of agricultural land conversion in Ohio.

Table 4: Agricultural land lost to development within and next to city boundaries, 2000 – 2023

MSA	City	Ag land lost within city boundary	Ag land lost within 1 mile of city boundary	Ag land lost within 2 miles of city boundary	Ag land lost within 3 miles of city boundary
Columbus, OH	Columbus	9,229	20,322	29,318	36,879
Cincinnati, OH-KY-IN	Cincinnati	109	224	414	717
Cleveland, OH	Cleveland	50	73	97	154

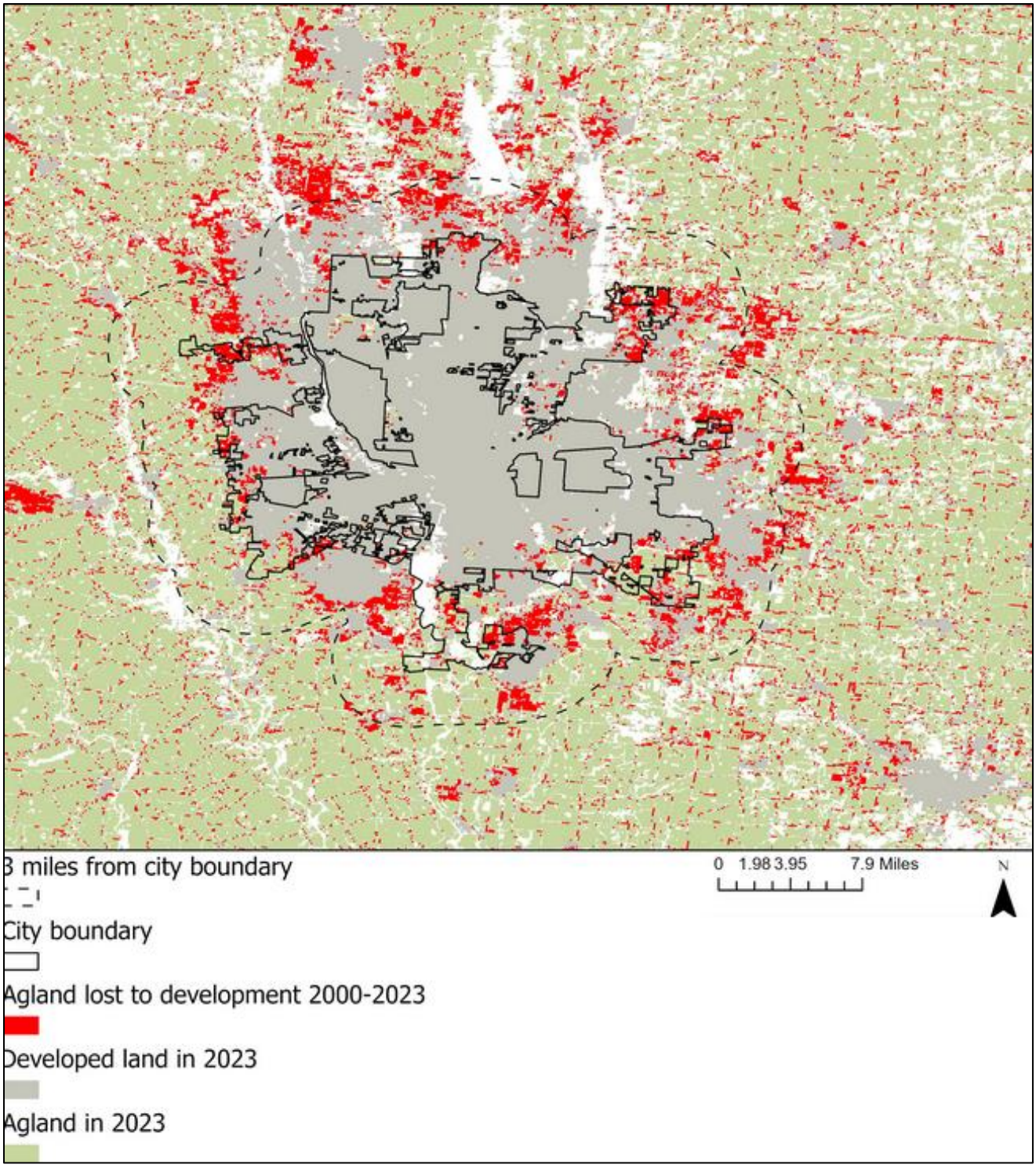

Figure 5: Agricultural land lost to development within and next to the city boundary for Columbus, 2000 – 2023

Appendix

In the National Land Cover Database (NLCD), agricultural land is defined as areas classified as either cultivated cropland or pasture/hay. To be considered agricultural land per the NLCD, more than 20% of the visible land cover in a given observation must be made up of one of the following:

1. Cultivated cropland, including fields used for growing annual crops such as corn and soybeans, as well as perennial crops like orchards and vineyards. This category also covers land that is actively tilled.
2. Pasture/hay areas which are typically planted with grasses, legumes, or mixtures of both and are used for livestock grazing or for producing hay or seed, generally following a perennial cycle.

Developed land is divided into four levels based on the amount of impervious surfaces (such as pavement or buildings):

1. Developed, Open Space – Dominated by vegetation like lawns or fields with less than 20% of impervious surfaces. These areas often include parks, large-lot housing, golf courses, and green buffers.
2. Developed, Low Intensity – Characterized by 20%–49% impervious surfaces, typically found in areas with single-family residential housing mixed with vegetation.
3. Developed, Medium Intensity – Includes areas where 50%–79% of the surface is impervious. These are usually more densely packed residential zones.
4. Developed, High Intensity – Land contains 80% or more impervious surfaces and are associated with dense urban, commercial, or industrial land uses such as apartment complexes, business districts, and factories.

For more detailed definitions and classification guidance, see the NLCD's official National Land Cover Database Class Legend and Description | Multi-Resolution Land Characteristics (MRLC) Consortium.

References

Multi-Resolution Land Characteristics Consortium. (2023). *National Land Cover Database class legend and description*. Retrieved from NLCD 2021 Land Cover (CONUS) | Multi-Resolution Land Characteristics (MRLC) Consortium

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