

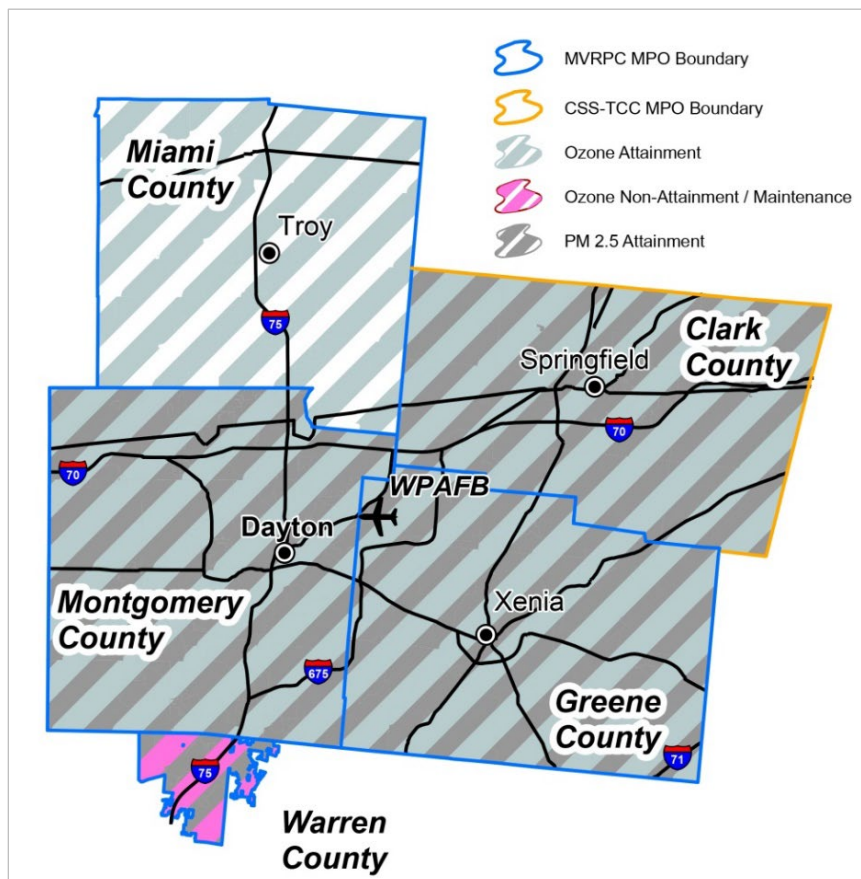
Chapter 9 Environmental Planning

9.1 Air Quality Planning

Background

MVRPC is comprised of the counties of Greene, Miami, and Montgomery as well as the cities of Franklin, Carlisle, and Springboro, and Franklin Township in northern Warren County. Warren County is located in the Cincinnati air quality Region (Cincinnati Region), with the remainder counties in the MPO located in the Dayton/Springfield air quality Region (D/S Region). The D/S Region also includes Clark County, which is represented by a different MPO, the Clark County Springfield Transportation Coordinating Committee (CCSTCC). Due to multiple air quality regions and MPOs, conformity is closely coordinated with neighboring organizations, with MVRPC being the lead agency in the D/S Region and the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) being the lead agency in the Cincinnati Region. Figure 9.1 illustrates this complex situation.

Figure 9.1 — Air Quality Standards Designations



MVRPC conducts transportation conformity in accordance with the Clean Air Act Amendments of 1990 which expanded transportation's role in contributing to national clean air goals. The 1990 amendments expanded the definition of "transportation conformity" to:

Conformity to the (air quality implementation) plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and that such activities will not (i) cause or contribute to any new violations of any standards in any area, (ii) increase the frequency or severity of any existing violation of any standard in any areas, or (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

9.2 Air Quality Standards

Ozone Standards

In April 2004, the United States Environmental Protection Agency (U.S. EPA) issued final designations regarding the 1997 8-hour ozone standard. The 1997 8-hour standard is violated when the 3-year average of the annual fourth highest daily maximum 8-hour ozone average concentration exceeds 0.08 ppm (parts per million). All four counties (Clark, Greene, Miami, and Montgomery) in the Dayton/Springfield Region (D/S Region) and Warren County in the Cincinnati Region were designated as basic non-attainment for ozone. The D/S Region was designated to attainment/maintenance for 1997 ozone in August 2007 and the Cincinnati Region was designated to attainment/maintenance for 1997 ozone in May 2010. The Cincinnati Region is also designated as maintenance for the 2008/2015 ozone standards.

On March 6, 2015, U.S. EPA published the final rule for the Implementation of the 2008 NAAQS for Ozone: State Implementation Plan Requirements, 80 FR 12264, effective April 6, 2015. The final rule revoked the 1997 ozone standard for all purposes including transportation conformity but on February 16, 2018, the U.S. Court of Appeals for the District of Columbia Circuit on the South Coast II Court Case held that transportation conformity determinations must continue to be made in those areas ("orphan areas"). As an ozone orphan area and consistent with U.S. EPA's November 29, 2018 guidance and interagency consultation, MVRPC will advance a qualitative Long Range Transportation Plan (LRTP) conformity determination for the Dayton/Springfield Region as documented in Table 9.1.

Table 9.1 — MVRPC Transportation Conformity Requirements

Requirements	Documentation
Latest planning assumptions:	<ul style="list-style-type: none"> MVRPC maintains current travel demand model socio-economic variables and highway/transit networks used to develop the MPO Transportation Plans. With the 2026 update, the 2020 Census results have been incorporated into the socio-economic variables.
Consultation:	<ul style="list-style-type: none"> Interagency consultation was conducted in January-February 2026, documentation can be found in Appendix A. Consistent with MVRPC’s Public Participation Policy, several public participation meetings were conducted throughout the update period with the final meeting being held on April 8, 2026. Chapter 11 provides a summary of the public participation efforts.
Transportation Control Measures (TCMs):	<ul style="list-style-type: none"> There are no TCMs in the Dayton/Springfield air quality Region State Implementation Plan (SIP).
Fiscal Constraint:	<ul style="list-style-type: none"> All non-exempt projects in the MVRPC region are included in the 2050 LRTP and TIP (if within the TIP years SFY 2026-2029). Costs for these projects are included in the fiscal constraint analysis for the respective documents.

Tables 9.2 and 9.3, prepared by the Ohio Kentucky Indiana Regional Council of Governments, shows that the Ohio portion of the Cincinnati non-attainment area demonstrates conformity to the 8-hour ozone standards of the State Implementation Plan (SIP). Technical details of the analysis and additional documentation can be found at:

<https://www.oki.org/wp-content/uploads/2025/04/FINAL-OKI-FY26-29TIP-4-10-2025.pdf>.

Table 9.2 — Quantitative Conformity Findings of Ozone-forming Emissions (tons per day) for the Ohio and Indiana Portion* of the 2008 Ozone Maintenance Area

Budget/Emissions	2037	2040	2050
Ohio/Indiana VOC Budget	11.01	11.01	11.01
Ohio/Indiana VOC Emissions	9.57	9.08	7.60
Ohio/Indiana NO _x Budget	9.32	9.32	9.32
Ohio/Indiana NO _x Emissions	8.10	7.39	6.00

* Includes Lawrenceburg Twp., Dearborn County in Indiana

Table 9.3 — Quantitative Conformity Findings of Ozone-forming Emissions (tons per day) for the Ohio Portion of the 2015 Ozone Maintenance Area

Budget/Emissions	2026	2035	2040	2050
Ohio VOC Budget	14.15	10.58	10.58	10.58
Ohio VOC Emissions	14.08	9.81	8.55	7.15
Ohio NO _x Budget	25.30	18.98	18.98	18.98
Ohio NO _x Emissions	19.89	8.89	6.90	5.66

Fine Particulate Standards

In December 2004, the U.S. EPA issued air quality designations regarding the 1997 fine particulate (or PM 2.5) standard. The Clark, Greene, Montgomery, and Warren Counties were designated non-attainment for the annual PM 2.5 standard. The annual standard is exceeded if the 3-year average of annual mean PM 2.5 concentrations is greater than 15 micrograms per cubic meter. The D/S Region was re-designated to attainment/maintenance for PM 2.5 on September 26, 2013 and the Cincinnati Region was designated to attainment/maintenance for PM 2.5 in 2011. In August 24, 2016, U.S. EPA published the final rule for the Implementation of the Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, 81 FR 58010, effective October 24, 2016. The final rule revokes the 1997 PM 2.5 standard for all purposes including transportation conformity.

With the revocation of the PM 2.5 standard, areas that have already been re-designated to attainment no longer have to demonstrate conformity.

9.3 Extreme Weather Events

Significant changes to the climate have become a global phenomenon which have been observed over the past several decades and is projected to continue into the foreseeable future. The driving characteristic of these changes are an increase in temperatures, which creates changes in weather patterns. Different parts of the globe will experience different aspects of these changes, from severe drought and wildfires in some areas to flooding due to rising tides in others. The Miami Valley has its own set of challenges, attributable to changes in climate, that are being or will be experienced.

The increased occurrence of these severe weather phenomenon is driven by a surplus concentration of water vapor and other carbon emissions (e.g. carbon dioxide and methane) in the atmosphere. These gases absorb energy, locking heat onto the Earth that would normally escape into space. As more heat is trapped, glaciers and ice caps shrink, which adds more water into the oceans, as well as increasing the amount of water evaporating into the atmosphere. In this manner, the heat-trapping effect reinforces itself. Other emissions are added by natural processes (e.g. volcanic eruption), as well as activities like farming and burning fossil fuels. Currently, fuel burnt for

transportation accounts for 28% of carbon emissions in the United States, making transportation the top source of such emissions.¹⁷

It is also important to distinguish between climate and weather; climate is a long-term average of weather over a specified area, whereas weather is a description of circumstances at a particular time. So, for example, while the climate may be getting warmer, a particular region may experience an increased number of extreme cold events. Thus, a geographic locale experiencing record or near-record low temperatures with heightened frequency (for example), does not indicate a cooling in the climate's trajectory. It may be a symptom of the planet getting warmer overall.

What is Happening in the Miami Valley?

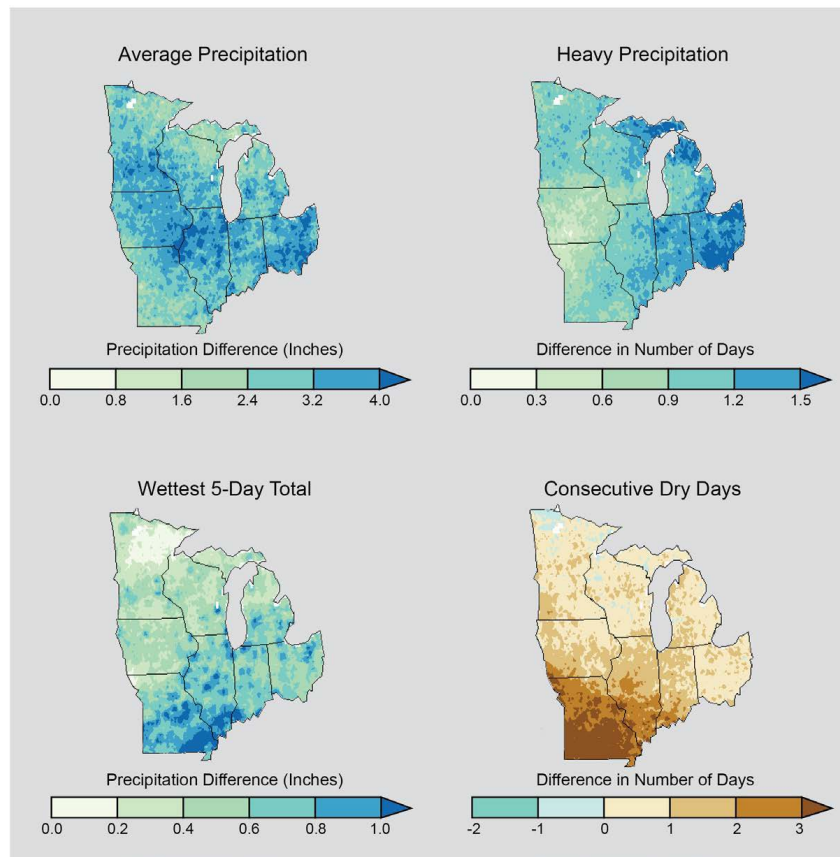
In the Miami Valley Region, we have seen a significant increase in precipitation, and models predict this trend will continue (see Figure 9.2). In fact, while more precipitation is predicted by climate models, it is also predicted to occur over fewer days of precipitation. This means more frequent flooding of roads, culverts, and bridges/bridge approaches; with each flood event having the potential to disrupt the ability to travel and the need to reroute around the flooding. In the long term, more frequent flooding can also lead to erosion of the soil which supports roads and bridges, thus shortening the lifespan of infrastructure.¹⁸ Regional bike trails, many of which are built along waterways, are also likely to be submerged more frequently and for extended periods of time.

As there become fewer (but heavier) precipitation days, there are also projected to be more dry days. While the abundance of natural water in Ohio and the Midwest (especially the Great Lakes) prevents the threat of drought on the level of more arid climates like in the Southwest, many consecutive days with little or no precipitation can cause problems. When soil is dried, it becomes less permeable, so less precipitation is needed to cause flood conditions and a heavy precipitation event will cause more flooding than usual. Thus, the issues outlined above for heavier precipitation events are exacerbated by drought. These events can further breakdown the soil's ability to absorb water in the future, snowballing damage further.¹⁸

¹⁷ EPA 2020. "Inventory on Greenhouse Gas Emissions and Sinks: 1990-2018." U.S. Environmental Protection Agency, Washington, D.C. April 2020. EPA-430-R-20-002 (2020). Sec. 2 Pg. 25

¹⁸ ODOT 2016. "Ohio DOT Infrastructure Resiliency Plan." Ohio Department of Transportation, Columbus, OH May 2016.

Figure 9.2 — Projected changes for 2041-2070, relative to the averages from 1941-1970¹⁹

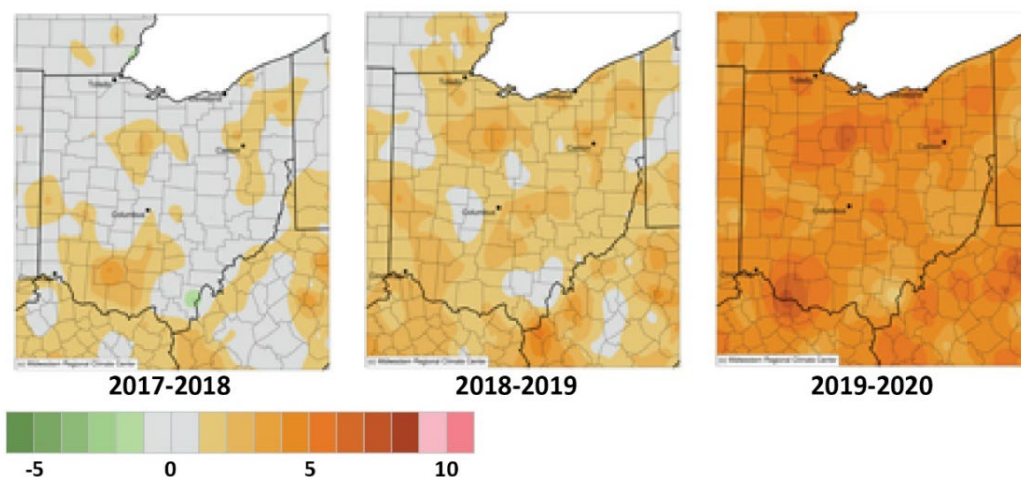


There are mixed projections concerning winter weather in the Region. The overall trend predicted by models is warmer winters, as we have seen in recent years (see Figure 9.3), but there is also evidence that the jet stream is slowing and becoming wavier as the planet warms.²⁰ A wavy jet stream would have an effect on arctic oscillation, increasing the frequency of events when the polar vortex drops south into the Midwest, as happened in early January 2014 and late January 2019. Such events bring extreme cold. Projections of warmer winters overall and increasing bouts of extreme cold are not inconsistent, but together they amount to a prediction of erratic winter temperatures, likely to produce (near-)record highs and (near-)record lows.

¹⁹ NCA 2014. "Climate Change Impacts in the United States: The Third National Climate Assessment." U.S. Global Change Research Program (USGCRP), Washington, D.C. 2014.

²⁰ NOAA 2014. "How Is the Polar Vortex Related to the Arctic Oscillation?" How is the polar vortex related to the Arctic Oscillation? National Oceanic and Atmospheric Administration (NOAA), January 20, 2014. <https://www.climate.gov/news-features/eventtracker/how-polar-vortex-related-arctic-oscillation>.

Figure 9.3 — Average daily maximum temperature change, December-February, relative to the average from 1981-2010²¹

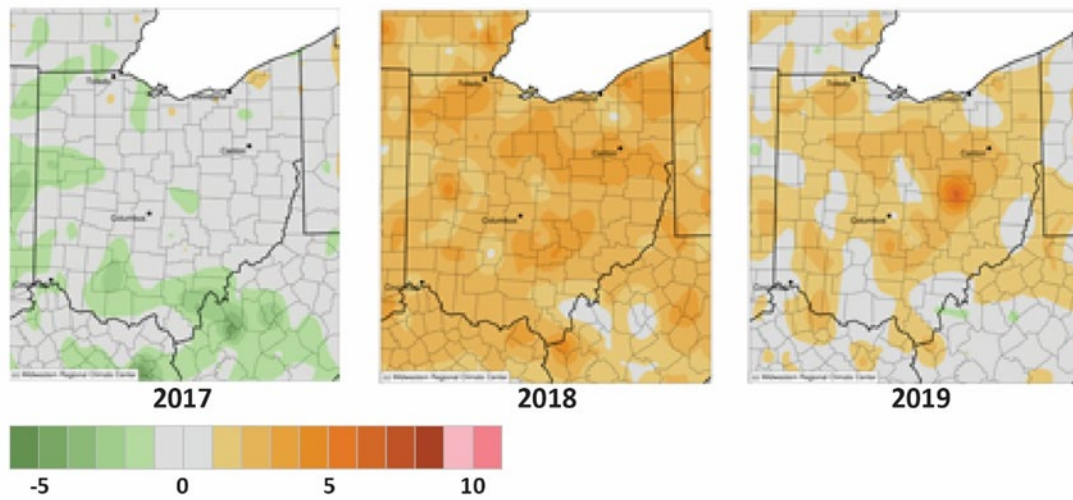


Warmer winters would indicate a decrease in snow and ice accumulation. This may increase the life of infrastructure, owing to less corrosion from salt treatment. However, a winter with more days for which the high temperature is above freezing is more likely to result in more frequent freeze-thaw cycles; this is destructive to road and bridge surfaces and creates potholes.¹⁸

Increasing average summer temperatures and extreme heat events can cause expansion of bridge joints and buckling of pavement, thus shortening the life of infrastructure. High temperatures also worsen air quality, creating a public health concern. The impact of poor air quality is especially acute for those with preexisting respiratory conditions (e.g. asthma and COPD) and older adults. Summer 2024 was the hottest on record in the northern hemisphere. In Ohio, summer 2021 and 2025 were hotter, due in large part to higher-than-average daily low temperatures. The trend of warmer summers is projected to continue.

²¹ MWRCC 2020, cli-MATE Interpolated Station Data online tool. Midwest Regional Climate Center (MRCC), Accessed May 12, 2020. <https://mrcc.illinois.edu/CLIMATE/>.

Figure 9.4 — Average daily minimum temperature change, June-August, relative to the average from 1981-2010²¹



One question of significance to the Region, due to the Memorial Day 2019 Tornado, which cannot yet be answered is whether severe changes in the climate are responsible for a recent increase in the frequency of tornados, or whether these weather patterns will result in further increases in the future. Scientists are not yet confident enough to answer these questions one way or another.²² While we must settle for now on keeping the question open, it would be prudent to plan for the worst and hope for the best, while keeping up with the latest information. MVRPC has been leading the long-term recovery effort for communities affected by the Tornado.

Mitigation and Adaptation

While changes to the climate have been occurring for decades, it is still possible to slow its rate and avoid the worst outcomes.²³ As fuel burned for transportation is one of the largest sources of carbon emissions, changes in the way people and goods are transported could significantly reduce the rate at which heat-trapping gases enter the atmosphere.¹⁹ Commuters traveling by walking, biking, and public transportation contribute significantly fewer emissions than those traveling with combustion engine automobiles. The switch to electric vehicles for both commuters and freight is another significant way to reduce emissions. Replacing long-haul trucking and air freight with rail and river transportation, when possible, can also substantially reduce emissions.

²² PNAS 2018. Ornes S. “Core Concept: How does climate change influence extreme weather? Impact attribution research seeks answers.” National Academy of Sciences of the United States of America (PNAS), 115(33), 8232–8235. August 14, 2018. <https://doi.org/10.1073/pnas.1811393115>

²³ IPCC 2014. “Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.” [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. Intergovernmental Panel on Climate Change (IPCC), Geneva, Switzerland. November 2, 2014. Pgs. 17-26

Slowing the growth rate of impervious surfaces is a more localized and immediate way to reduce damage from extreme weather events in the Region.²⁴ Maximizing the efficiency of drainage is the best way to avoid and reduce damage caused by flooding. Preserving open space & forests and utilizing pervious pavements and other infrastructure features that promote rapid drainage are strategies that can be used to mitigate the threat posed by flooding.²⁵

Developing resiliency plans for handling the fallout of major weather events and decreasing air pollution are important ways to reduce the economic, social, and health costs posed by these hazards. To assist in understanding these risks and identify actions to build resilience, MVRPC developed a Regional Resiliency Guidebook and Toolkit to support planning efforts by local communities. The tool provides data on which hazards and stressors may impact community assets, informational resources, funding opportunities, and real-life application best practices to aid in decision making.

Some examples in the Regional Resiliency Guidebook and Toolkit include using templates to establish evacuation routes to help people escape disaster areas quickly and safely, factoring such items as which areas are flood-prone at varying levels of precipitation and flood stages. While it is impossible to predict when a disaster will occur, pre-assigning responsibilities, planning communications, and deciding upon logistics for handling network breakdowns on critical arterials can make response faster and more effective. The tool's available templates help communities plan for future events.

While budgets are always thin, it is necessary to consider that many of the effects of repeated extreme weather events will require an increasingly greater allocation of funds to manage and respond. Inspections are likely to be needed more frequently with the threats of erosion from flood events and heat, tornado, or wind damage. Annual needs for salt and other ice treatments should be expected to be less predictable, including funding allocations, storage considerations, and potential issues with the supply chain. Pothole filling and resurfacing should be expected to be required more frequently, due to a greater number of freeze-thaw cycles. Using available tools to support mitigation and adaptation strategies can be an effective way to reduce the burden on annual budgets.

ODOT, U.S. DOT, Ohio EPA, the U.S. EPA, and other state and federal agencies are actively monitoring climate data and are positioned to provide guidance and assistance for encountering related challenges. Coordinating with these and other agencies and staying abreast of the latest data and opportunities is a valuable strategy for mitigating and adapting to this evolving situation. From learning best practices to being positioned to quickly apply for and receive emergency funding, it is recommended to follow any related information given and actions taken by these agencies.

²⁴ USGS 2003. "Effects of Urban Development on Floods," Fact Sheet 076-03. United States Geological Survey (USGS), Water Resources. Tacoma, WA. November, 2003.

²⁵ USGS 2012. "Strategies for Managing the Effects of Urban Development on Streams," Circular 1378. United States Geological Survey (USGS). Reston, VA. 2012. Pgs. 18-19

9.4 Environmental Mitigation in the IJA

The final metropolitan transportation planning rules state that “metropolitan transportation plans shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the metropolitan T-Plan. Discussion may focus on policies, programs, or strategies. The discussion shall be developed in consultation with Federal, State, and Tribal land management, wildlife, and regulatory agencies.”

Using guidance and databases from ODOT Environmental Services (OES) as a starting point, MVRPC analyzed the Long Range Transportation Plan projects for potential environmental impacts using GIS overlay techniques. When available, OES databases were enhanced with local or internal data sources. Mitigation techniques for various types of environmental effects are also discussed along with any applicable local mitigation resources.

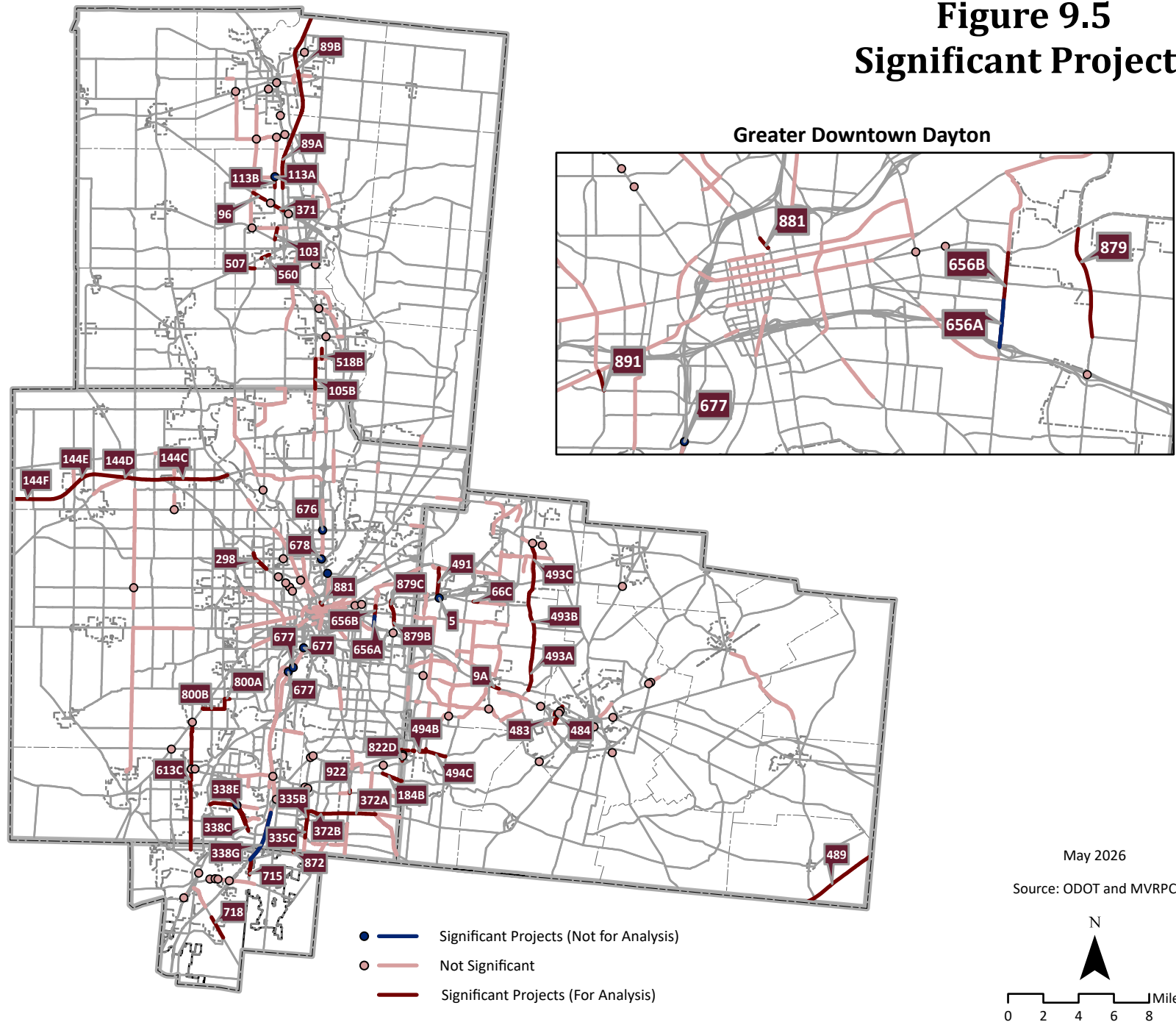
Process Overview

Identification of possible projects with impacts to environmental resources began with the congestion management projects in the 2050 Long Range Transportation Plan. These projects were classified into two categories: Significant Projects and Non-Significant Projects. Projects were classified as “Significant” if, by virtue of their implementation/construction, there was a probability of potential impacts to the Region’s natural resources. Such projects were typically capacity projects such as road widening, lane additions, and interchange addition/modification projects. Projects were classified as “Not Significant” if their implementation was unlikely to result in major impacts to the Region’s environmental resources. These projects were typically non-capacity adding intersection improvement projects such as the addition of a turn lane and/or signal coordination projects.

Based on the above classification, potential environmental impacts were only determined for the significant projects. A few of the significant projects are already included in MVRPC’s current Transportation Improvement Program (TIP) and have environmental documentation in place. These were excluded from the list of analyzed projects since their environmental effects are already well-documented. Figure 9.5 shows projects classified according to their potential environmental impact.

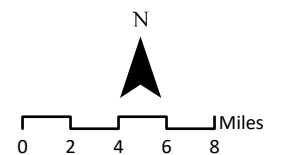
In 2025, MVRPC undertook a major effort to update old regional GIS databases with the latest available datasets for several environmental resources: cultural, historic and archaeological resources; wetlands, rivers and streams; total maximum daily load plans; threatened and endangered species habitats; superfund sites; and parklands. MVRPC staff was able to procure updated information for most of these environmental resources except threatened and endangered species habitats owing to the sensitive and confidential nature of that data. Thus, a separate map was created using GIS for each of the Region’s environmental resources except threatened and endangered species habitats, that are displayed separately by county in a matrix format.

Figure 9.5 Significant Projects



May 2026

Source: ODOT and MVRPC



The remaining significant projects were evaluated for potential environmental impacts by overlaying them on various environmental resource maps using GIS. Projects in direct conflict with the Region’s wetlands, parklands, etc... were identified as potentially affecting these environmental resources and displayed on maps, along with the plant and animal threatened and endangered species habitats by county matrices, in Figure 9.6 and Table 9.5 respectively.

Table 9.4 describes mitigation guidelines and strategies designed to address potential project impacts to environmental resources. Though not resources per se, this includes superfund sites, and those which are on the National Priorities List are described in Table 9.6 in more detail. Since the projects were evaluated for impacts at a macro level rather than determining specific impacts, the mitigation strategies encompass a menu of options to address a wide-range of potential impacts and are not project-specific. Detailed assessment of individual projects in future stages of project development may emphasize the importance of certain mitigation efforts, where needed, while rendering others redundant. It is the policy of MVRPC to require that all federally funded projects comply with applicable environmental statutes as a condition to receiving funding. The table also lists agencies with which to coordinate and consult on conservation of these resources.

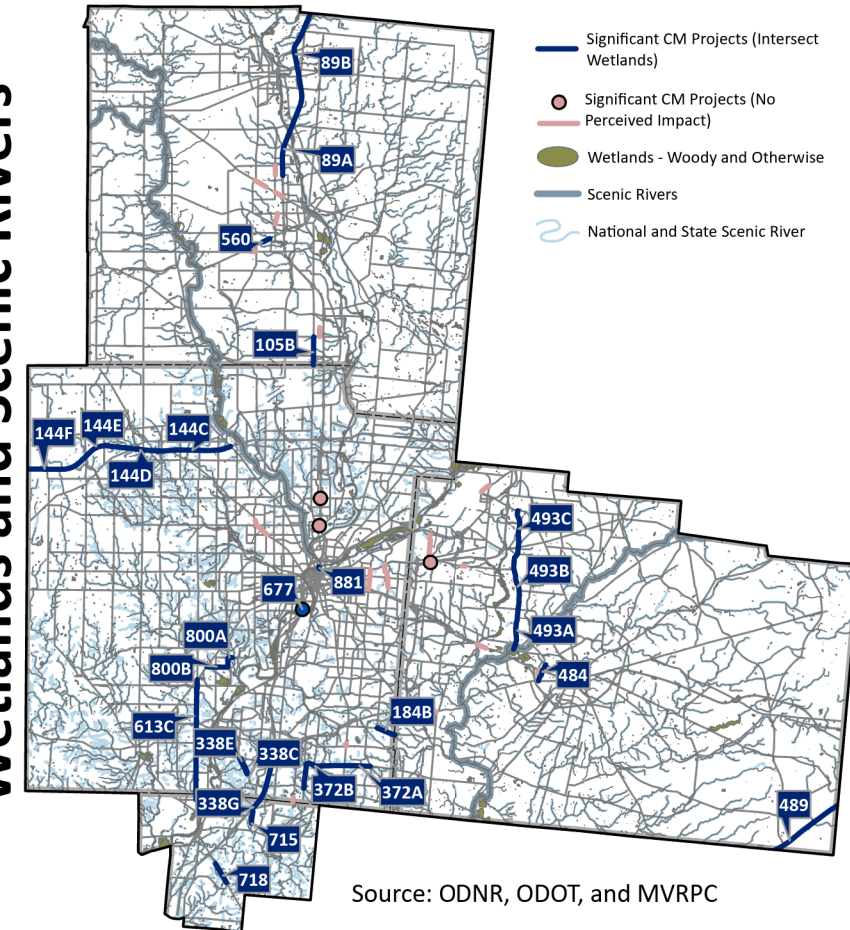
Finally, a discussion on the various locally available mitigation resources and locally functioning environmental conservation organizations is provided at the end of this section in Table 9.7. These agencies have also been added to MVRPC’s public participation list.

Table 9.4 — Environmental Resources for Mitigation

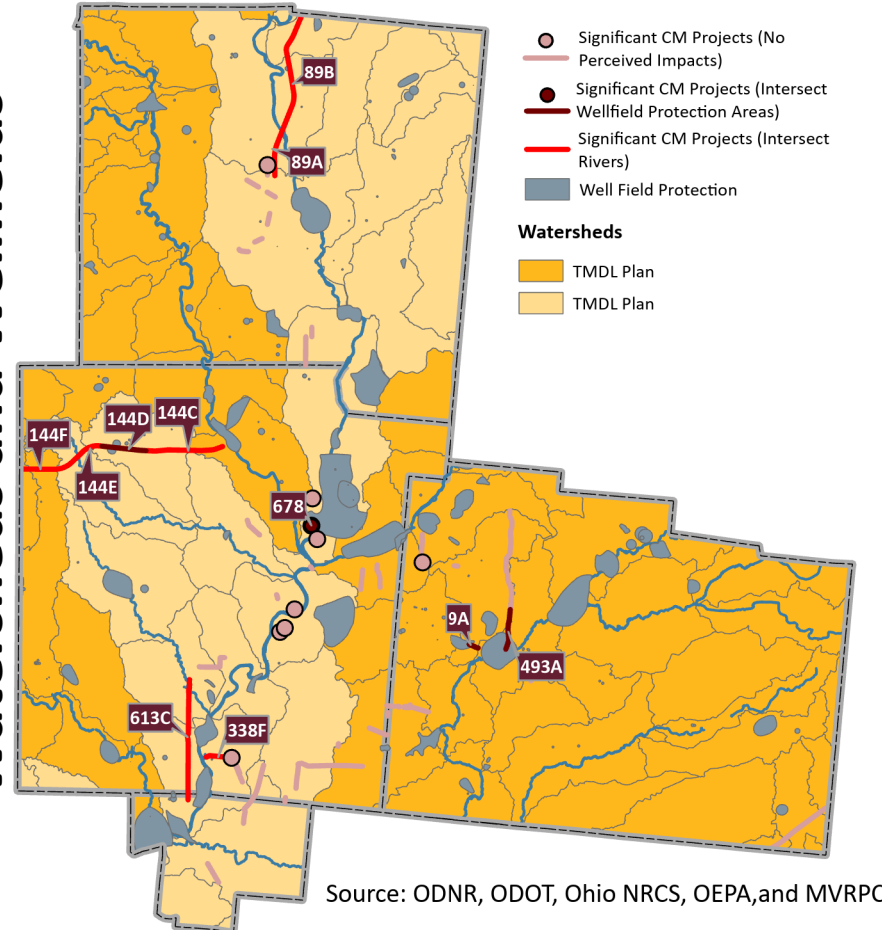
Resource	Statute	Regional Resources
Wetlands, Rivers, and Streams	<p>Wetlands: U.S. ACE mitigation guidelines are outlined in the Regulatory Guidance Letter 02-02, dated December 24, 2002. The Ohio Environmental Protection Agency has specific guidelines for wetland mitigation included in the Ohio Administrative Code 3745-1-50-54.</p> <p>Rivers & Streams: No formal rules in Ohio, but mitigation is required for unavoidable impacts. Case-by-case requirements negotiated with OEPA and U.S. ACE by the ODOT Office of Environmental Services.</p>	<p>The Region has approximately 35 square miles of wetlands. The Region contains all or part of many rivers and streams, including designated scenic rivers: the Little Miami River, the Stillwater River, and the Greenville Creek. There are also several major lakes. Much of the Region is contained in the Great Miami River Watershed. These healthy waterways provide many opportunities for water-based recreation, and habitats for fish.</p>
Threatened and Endangered Species/Fish and Wildlife	<p>The Region is bound by regulations to build and operate its roadway projects with no, or minimal, impacts to protected species and their habitats. Statutes providing and defining these regulations include: the National Environmental Policy Act, the Endangered Species Act, the Clean Water Act, and the Ohio Revised Code.</p>	<p>Land-use changes have been the most common cause for decline in species range and diversity. Contamination and degradation of natural waters has also contributed to loss of habitat. The Miami Valley has wetlands, river corridors, moist and dry woods, farmland, and prairies that serve as habitat for numerous plants and animal species. The Region is part of the largest hardwood forest in the world, and an important flyway for migrating birds.</p>
Historic, Cultural, or Archaeological Resources	<p>Historic and cultural resource reviews for all federal and state funded projects in the Region are planned and designed to comply with the National Environmental Policy Act, the National Historic Preservation Act, Section 4(f) of the Department of Transportation Act, the Ohio Revised Code, and 36 CFR Part 800 (the implementing regulations for Section 106 of the National Historic Preservation Act). All acts require that historic and cultural resources be considered during the development of all transportation projects in Ohio.</p>	<p>The Region has numerous cultural, archaeological, and National Register historic sites. As of 2024, 241 sites in the Region were listed on the National Register of Historic Places (NRHP). Additionally, 4 undisturbed archaeological sites are located throughout the area. These sites are important to our communities and heritage.</p>
Parklands	<p>Section 4(f) of the Department of Transportation Act requires that special effort be made to preserve public park and recreation lands, wildlife and waterfowl refuges, and historical sites. Section 4(f) specifies that federally-funded transportation projects requiring the use of land from a public park, recreation area, wildlife and waterfowl refuge, or land of significant historic site can only occur if there is no feasible and prudent alternative. Using Section 4(f) land requires all possible planning to minimize harm.</p>	<p>The Region has one national park, several state and local parks, and wildlife and waterfowl refuges. The parklands are subdivided into natural protection areas and recreational areas. These sites are important to our communities for their promotion of healthy active lifestyles, connection to natural environments and preservation.</p>
Hazardous Materials	<p>The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and its Superfund Amendments and Reauthorization Act (SARA) amendment establish national policy and procedures for identifying and cleaning up sites found to be contaminated with hazardous substances. The Acts created the Hazard Ranking System (HRS), which determines the likely level of threat to human health and the environment upon initial investigation. High-ranking projects are eligible to be placed on the National Priority List, which enables application for environmental clean-up funds.</p> <p>CERCLA is important to the highway planning process primarily in the acquisition of right-of-way. Accepting financial liability for contaminated property may adversely affect the financial feasibility of a project. Additionally, significant need for clean-up may cause project delays.</p>	<p>Eleven sites in the Region are on the NPL. Another 63 sites, though not currently on the NPL, are potentially contaminated sites and sources of concern. Table 9.4 provides a summary of the NPL sites, HRS scores, and stage of cleanup. Additionally, a brief summary of each site is provided.</p>

Coordination and Consultation	Mitigation
<p>The ODOT Office of Environmental Services in cooperation with ODOT Districts, the ODOT-Office of Real Estate, the ODOT-Office of Aerial Engineering, and project consultants coordinate to develop all stream and wetland mitigation projects.</p>	<p>Mitigation needs are determined, and an analysis is performed to develop mitigation opportunities. A plan of action is developed in coordination with resource and regulatory agencies, along with a report. The report is submitted with permit applications, with revisions before permit approval. Conservation easements are procured. Funding is received and credits obtained. Construction plans are developed and carried out with monitoring and post-construction monitoring by ODOT.</p>
<p>The Fish and Wildlife Coordination Act (16 U.S.C. 661-666) requires coordination among (1) the agency proposing the highway project, (2) the U.S. Fish and Wildlife Service of the Department of the Interior, and (3) the state agency responsible for protecting wildlife resources whenever the waters of any stream or other water body are proposed to be impounded, diverted, or otherwise modified.</p>	<p>A Habitat Conservation Plan, as required by the Endangered Species Act, may include:</p> <ul style="list-style-type: none"> • Preserving habitat through an acquisition or a conservation easement; • Enhancing or restoring degraded or former habitat; • Creating new habitat; • Establishing buffer areas around existing habitat; • Modifying land-use practices; and • Restricting access to habitat.
<p>Consultation with various entities, including the Federal Highway Administration (FHWA), the State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), city historic preservation offices, local public officials, local organizations, and the public, is required during the project development process.</p>	<p>A mitigation plan is developed with stakeholders (e.g. ODOT, SHPO, FHWA, local officials, organizations, and the public) through the Section 106 Memorandum of Agreement (MOA) consultation process. Measures vary depending on the projected impact and may include aesthetic treatments, avoidance, archaeological data recovery, salvage/re-use of historic materials, and other methods. Measures must be completed and accounted for with SHPO and FHWA.</p>
<p>Project sponsors, ODOT, and officials with jurisdiction over Section 4(f) resources closely coordinate throughout the project development process to minimize harm or mitigate impacts on protected resources. Long-range planning should account for well-known Section 4(f) resources throughout the Region that would pose a significant loss if affected. It is, however, premature to analyze individual projects' Section 4(f) impacts this early in the process.</p>	<p>The cost of mitigation should be a reasonable public expenditure in light of the severity of the impact on the Section 4(f) resource in accordance with federal requirements. Mitigation for common Section 4(f) resource impacts may be:</p> <ul style="list-style-type: none"> • Improving access or expansion/pavement of parking area; • Landscape or screening of resource; • Installation of beautification enhancements such as park benches, trash receptacles, signage, etc.; • Maintenance of traffic accommodation or rerouting of traffic; • Minimizing construction noise or limiting construction to specific times; • Direct compensation for improvements to on-site resources; and • Design refinements.
<p>The U.S. EPA provides guidelines and Hazard Ranking System scores. There is an eight-stage process:</p> <ol style="list-style-type: none"> 1) New listing 2) Remedial assessment not begun 3) Remedial assessment not begun with removal 4) Study Underway 5) Remedy Selected 6) Designing Underway 7) Construction Underway 8) Construction Complete <p>Note that, in many cases, "construction complete" does not mean cleanup is complete. There may be ongoing actions required once the infrastructure is in place.</p>	<p>If any initial studies or preliminary environmental evaluations identify known or potentially hazardous waste sources, alternatives to avoid the site must be explored. If the site cannot be avoided, an assessment including sampling and possibly a characterization of the problem should be conducted. When a hazardous waste site is identified, the type of regulatory actions it is subject to and any environmental databases or lists that it appears on along with regulatory identification numbers should be specified. In addition:</p> <ul style="list-style-type: none"> • Environmental site assessment screenings (and any other required assessments) will be conducted on a project-by-project basis; and • Unavoidable encroachment on an identified hazardous site will be mitigated according to all applicable federal, state, and local requirements.

Wetlands and Scenic Rivers



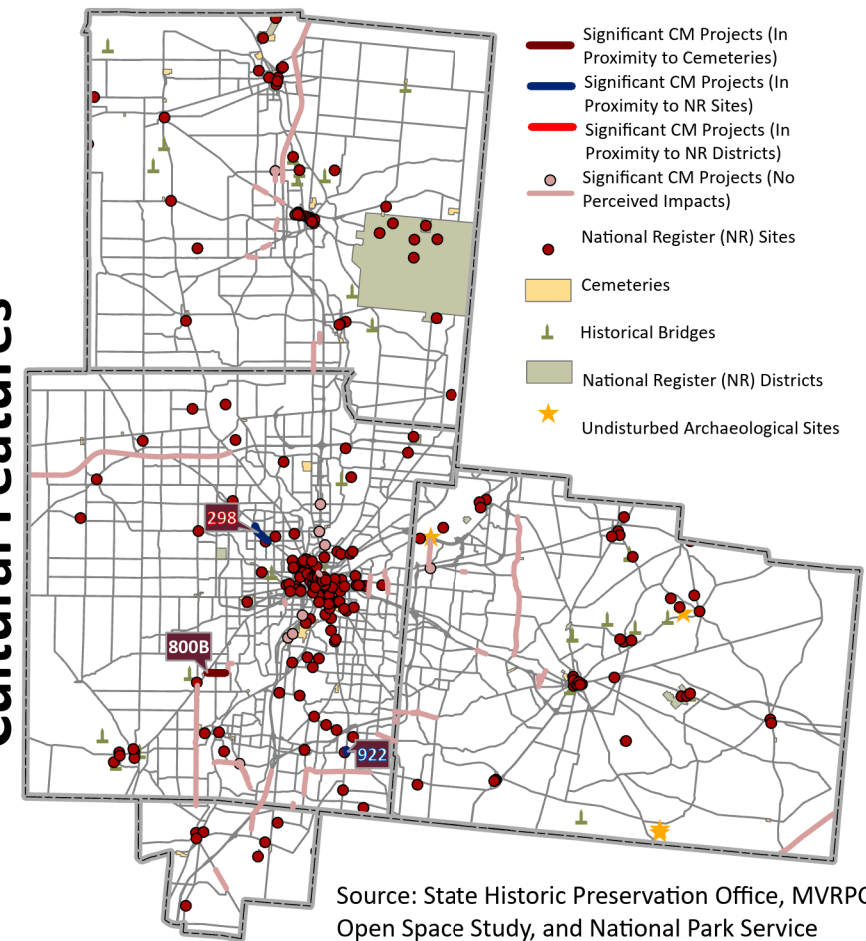
Watersheds and Wellfields



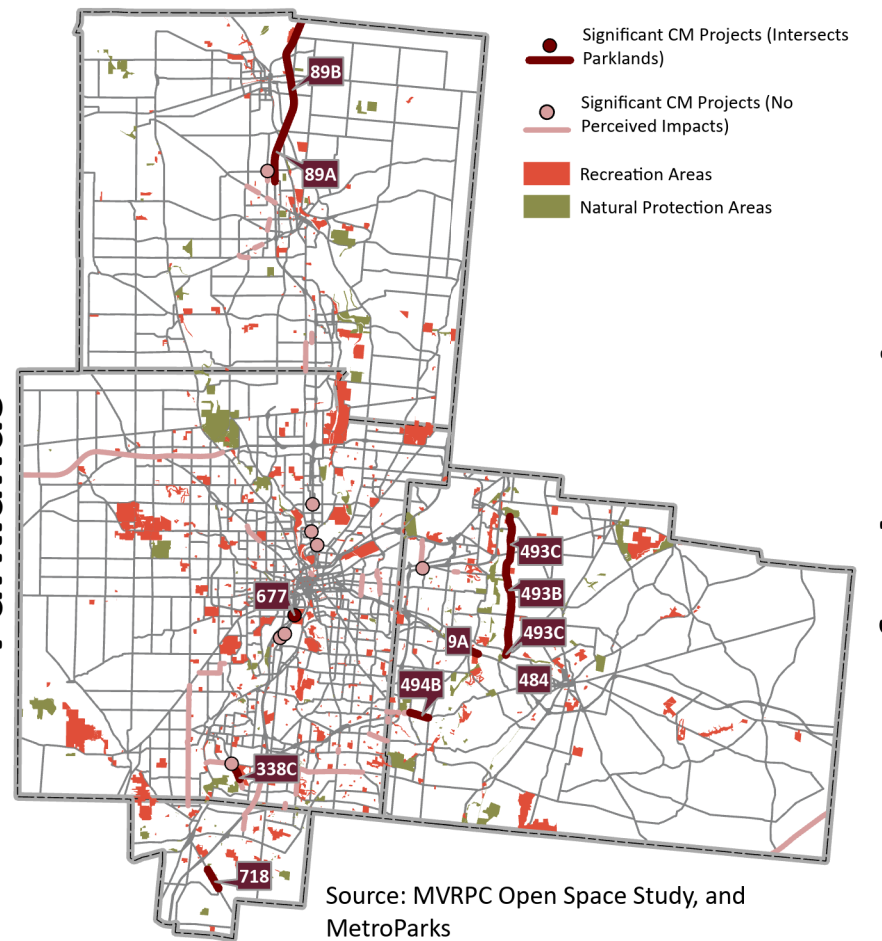
Endangered Species

See Table 9.5 for Endangered Species Matrices

Cultural Features



Parklands



Superfund Locations

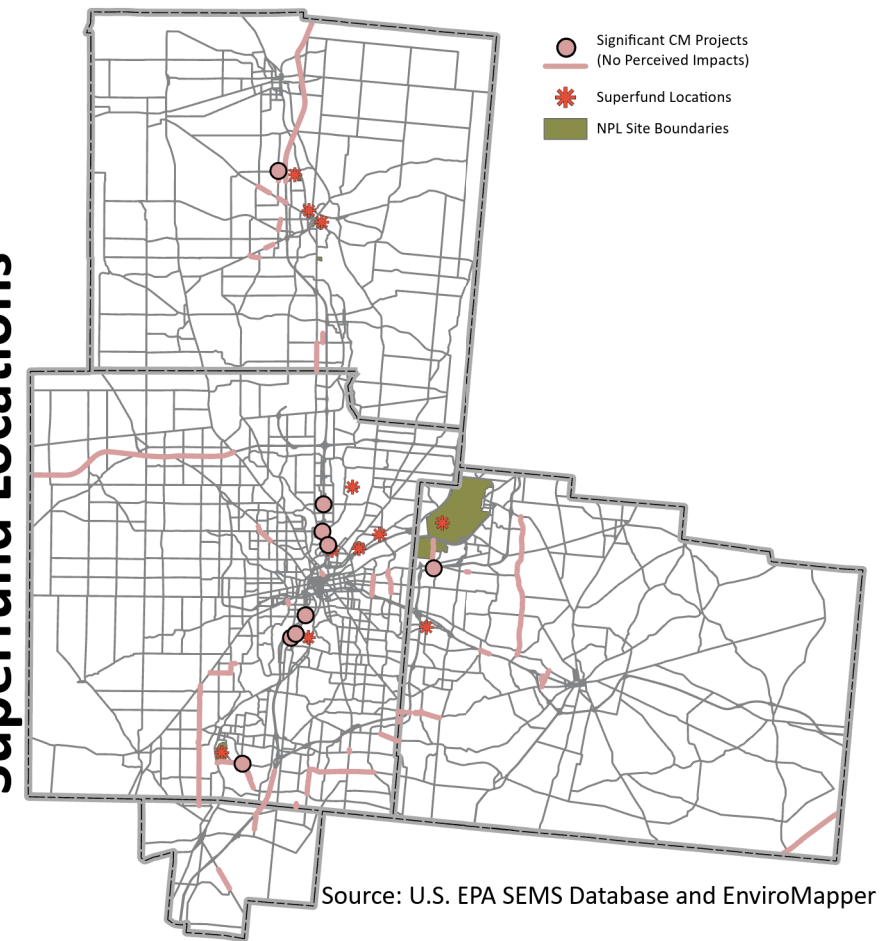


Figure 9.6 Environmental Mitigation Analysis

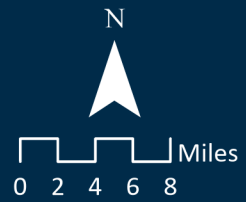


Table 9.5 — Environmental Mitigation Analysis – Endangered Species Matrices

Ohio Status	Category	Common Name	Species	Greene	Miami	Montgomery	Warren	
Endangered	Plant	Slender Sedge	Carex lasiocarpa	X				
	Plant	Ear-leaved-foxglove	Agalinis auriculata	X				
	Plant	False Melic	Schizachne purpurascens	x				
	Plant	Plains Muhlenbergia	Muhlenbergia cuspidata	X		X		
	Plant	Green Star Sedge	Carex viridistellata	X				
	Plant	Bent Spike-rush	Eleocharis geniculata	X				
	Plant	Ashy Sunflower	Helianthus mollis		X			
	Plant	Long Tail Moss	Anomodon viticulosus			X		
Threatened	Plant	Twisted Teeth Moss	Barbula indica			X		
	Plant	Dwarf Bulrush	Lipocarpa micrantha			X		
	Plant	Flat-leaved Bladderwort	Utricularia intermedia		X			
	Plant	Harebell	Campanula rotundifolia		X			
	Plant	Midwest Spike-moss	Selaginella eclipses	X				
	Plant	Red Baneberry	Actaea rubra	X				
	Plant	Rock Serviceberry	Amelanchier sanguinea		X			
	Plant	Royal Catchfly	Silene regia	X				
	Plant	Seaside Arrow-grass	Triglochin maritimum	X	X			
	Plant	Canada Milk-vetch	Astragalus canadensis				X	
	Plant	Carolina Whitlow-grass	Draba reptans			X		
	Plant	Soft-leaved Arrow-wood	Viburnum molle			X		
	Plant	Sprengel's Sedge	Carex sprengelii		X			
	Plant	Wall-rue	Asplenium ruta-muraria	X				
	Plant	Limestone Savory	Calamintha arkansana	X				
	Plant	Yellow Sedge	Carex flava	X				
	Plant	Tennessee Bladder Fern	Cystopteris tennesseensis	X				
	Plant	Northern Adder's-tongue	Ophioglossum pusillum	X				
	Plant	Harebell	Campanula rotundifolia		X			
	Plant	Baxter's Violet	Viola baxteri		X			
	Plant	Small Fringed Gentian	Gentianopsis virgata			X		
	Plant	Burhead	Echinodorus berteroi				X	
	Plant	Buckbean	Menyanthes trifoliata				X	
	Plant	Wood's-hellebore	Melanthium woodii		X	X		
	Endangered	Fish	Iowa Darter	Etheostoma exile		X		
		Fish	Bigeye Shiner	Notropis boops				X
		Fish	Tonguetied minnow	Exoglossum laurae	X			
		Reptile	Smooth Greensnake	Opheodrys vernalis	X			
Reptile		Eastern Massasauga	Sistrurus catenatus	X				
Mollusk		Snuffbox	Epioblasma triquetra		X	X	X	
Mollusk		Rayed Bean	Villos fabalis			X	X	
Mollusk		Washboard	Megalonaia nervosa				X	
Moth		Beer's Noctuid	Papaipema beeriana	X				
Dragonfly		Skillet Clubtail	Gomphurus ventricosus			X		
Dragonfly		Slender Baskettail	Epithea costalis			X		
Dragonfly		Golden-winged Skimmer	Libellula auripennis			X		
Bird		Lark Sparrow	Chondestes grammacus	X			X	
Bird		Northern Harrier	Circus hudsonius			X		
Bird		Loggerhead Shrike	Lanius ludovicianus				X	
Bird		Upland Sandpiper	Bartramia longicauda	X		X		
Threatened		Bird	Yellow-crowned Night-heron	Nyctanassa violacea			X	
		Bird	Sandhill Crane	Antigone canadensis		X		X
	Bird	Least Bittern	Ixobrychus exilis	X			X	
	Damselfly	Paiute Dancer	Argia alberta	X		X		
	Dragonfly	Jade Clubtail	Argomphus designates		X			
	Dragonfly	Plains Clubtail	Gomphus externus			X		
	Fish	American Eel	Anguilla rostrata				X	
	Fish	Mountain Madtom	Noturus eleutherus				X	
	Fish	Paddlefish	Polydon spathula				X	
	Mollusk	Slippershell Muisel	Alasmidonta viridis	X		X	X	
	Damselfly	Seepage Dancer	Argia bipunctulata	X		X		
	Reptile	Kirtland's Snake	Clonophis kirtlandii	X		X	X	
	Reptile	Spotted Turtle	Clemmys guttata	X			X	

Source: Ohio Department of Natural Resources – Division of Wildlife

Table 9.6 — Superfund Sites on Final NPL

Site Name and Location	HRS Score	Stage of Clean-up	Description
Lammers Barrel Factory, Greene County	69.33	Remedial Action Underway	According to former employees, Lammers Barrel Factory sold and reclaimed all types of solvents. Any inventories of chemicals handled at the facility were reportedly destroyed in a fire. Sampling analysis identified an area of ground water contamination along the northern end of the Valleywood subdivision, located southeast of the facility.
Wright-Patterson Air Force Base, Montgomery/Greene Counties	57.85	Construction Completed	Past Air Force activities in support of operational missions have resulted in the creation of several unlined waste disposal areas throughout the base. More than 791 tons of waste have been disposed on the Base, including solvents, contaminated thinners, degreasing sludges, tetraethyllead sludge, and miscellaneous hazardous chemicals. In 1985, the Base and OEPA found 1,1,1-trichloroethane, tetrachloroethylene, trichloroethylene, 1,2-dichloroethane, and manganese in on-base wells.
Miami County Incinerator, Miami County	57.84	Construction Completed	A combination of poor geologic location and environmentally unsound disposal practices resulted in significant contamination to one of the most productive and valuable aquifers in Ohio. All landfilling operations stopped in 1978, and the site now serves as a transfer station for wastes that are disposed of elsewhere.
North Sanitary Landfill, Montgomery County	50	Remedial Action Underway	Several industrial facilities are located adjacent to the property. Industrial and municipal wastes from the Dayton area were used to fill unlined gravel pits that were created by former mining operations. These pits contained water that may have entered the sand and gravel aquifer that the pits intersect.
Behr Dayton Thermal System, Montgomery County	50	Remedy Selected	The site hosts a manufacturer of parts and sub-assemblies of HVAC equipment for auto manufacturers. Industrial solvent cleaners were used in the site manufacturing processes. The solvent cleaners included TCE, tetrachloroethene, 1,1,1-trichloroethane and sulphuric acid. Such compounds have been reported in shallow ground water beneath the Behr facility. Ground water has been contaminated above USEPA's Safe Drinking Water Act's maximum contaminant level (MCL) for TCE. Also, TCE vapors have migrated into residential homes and commercial businesses above a safe indoor air level.
East Troy Contaminated Aquifer, Miami County	50	Remedy Selected	Two ground water plumes on the site are contaminated at various levels with VOCs, including cis-1, 2-dichloroethene (cis-1, 2-DCE), tetrachloroethene (PCE), and trichloroethene (TCE). The State of Ohio currently has an agreement in place to address a source area for one of the plumes. There is no source control on the second plume. The State and USEPA are working to find a comprehensive solution to address both plumes, any additional source areas, and potential issues related to vapor intrusion.
Sanitary Landfill Co., Montgomery County	35.57	Construction Completed	The landfill reportedly accepted municipal wastes and various types of industrial wastes, including solvents. The landfill is located above gravel deposits. Wells supplying drinking water are drilled into an aquifer which may be connected to the gravel deposits, according to a U.S. Geological Survey study. Thus, there is a potential for contamination of public water wells.
Mound Plant (USDOE), Montgomery County	34.61	Construction Completed	The Mound operates to support U.S. weapons and energy programs. The major waste areas include a landfill in which solvents, paints, and photoprocessing and plating bath solutions were deposited; several leach beds used to dispose of solutions containing radionuclides and/or explosive/pyrotechnic materials; and an area in which a solution contaminated with plutonium was spilled.
Powell Road Landfill, Montgomery County	31.62	Construction Completed	Wastes were dumped on the site, including strontium chromate and benzidine. The wastes are toxic, persistent, flammable, and highly volatile. There is no evidence of the landfill being lined, and some containers are leaking. Groundwater nearby supplies private wells and the surface water is used for recreational purposes.
West Troy Contaminated Aquifer, Miami County	50	Remedy Selected	VOCs have been detected in two of the five wells in the field, from a yet-unidentified source. Contaminants found in untreated well water include tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (DCE) and 1,1,1-trichloroethane (TCA). PCE amounts were found to exceed the federal maximum contaminant level. A groundwater plume has been identified heading toward the field. Further investigation is needed to identify the source of VOC contamination and define the precise extent of the plume.
Valley Pike VOCs, Montgomery County	50	Study Underway	A mixed industrial and residential site, VOCs were found in groundwater, including tetrachloroethylene (PCE) and trichloroethylene (TCE). Residents have been impacted by vapor intrusion caused by the contaminated groundwater plume. Approximately 400,000 residents are impacted from the drinking water coming from the well fields. However, the site's residents' drinking water is not impacted by the site's conditions. The site remains as an active business.

Source: U.S. EPA SEMS Database <https://cumulis.epa.gov/supercpad/cursites/srchsites.cfm>

Stormwater Mitigation

The FAST Act of 2015 added a factor for MPOs to consider strategies to reduce or mitigate stormwater impacts of surface transportation. Storm water discharges are generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during rainfall and snow events. Storm water often contains pollutants in quantities that could adversely affect water quality. In Ohio, OEPA implements the federal stormwater program to ensure compliance with the Clean Water Act and National Pollutant Discharge Elimination System (NPDES) requirements.

Construction sites, including transportation improvements, impact Ohio's waters by adding pollutants, especially sediment, to rainwater running off of construction sites during construction as well as making long-term land use changes that alter the hydrology and pollutant loading of local streams. If a project disturbs one or more acres of ground, the project sponsor must get a permit to discharge stormwater from the site and control stormwater discharges through the use of Best Management Practices (BMPs). Typically, projects are screened during the environmental process and if they exceed the acreage limit, BMPs are included in the construction plans. ODOT's Location and Design Manual has information on acceptable BPM methods.

There are two storm water permit application options for construction activities in Ohio. The first is to submit an individual NPDES permit application and the second is to file a Notice of Intent (NOI) form requesting coverage under a general permit. The general permit process is usually easier and faster than the individual permit process. MVRPC requires that all project sponsors comply with applicable federal and state requirements as a condition of receiving funding.

Regional Mitigation and Consultation Resources

The main purpose of various conservation organizations in the Region is to monitor and protect regional land including natural resources and historical properties. Close partnerships with individuals, businesses, and local jurisdictions are a key component for these organizations to achieve their conservation goals. A brief description of each organization in the Region is provided in Table 9.7.

Table 9.7 — Environmental Conservation Organizations in the Region

Responsible Organization	Type of Conservation Organization	Description
Three Valley Conservation Trust	<i>Land Trust</i>	The Three Valley Conservation Trust actively seeks to protect agricultural land, forested lands, wildlife areas, wetlands and other scenic or natural lands. The Trust protects streams in Butler, Preble, Montgomery and Darke counties in Ohio, and very small parts of Wayne, Franklin, and Union counties in SE Indiana.
Miami Conservancy District	<i>Flood Protection</i>	The Miami Conservancy District established its Groundwater Preservation Program in 1997 to develop and maintain an ongoing watershed-wide technical program to help protect and manage the area's aquifer and groundwater resources. Over the years, the organization has branched out to meet the Region's water needs. MCD has been actively involved for many years in promoting recreation along the Region's rivers and streams as well as being a key partner in projects like downtown Dayton's RiverScape, by bringing together state and federal funds to leverage local dollars.

Responsible Organization	Type of Conservation Organization	Description
Tecumseh Land Trust	<i>Land Trust</i>	The Trust’s purpose is to preserve agricultural land, open space, and historic structures in voluntary cooperation with landowners and their heirs, and to educate the public about methods of private land conservation. The Trust currently has about 38,000 acres of farmland on 240 properties in Clark and Greene counties under protective conservation easements.
Ohio Chapter of the U.S. Department of Agriculture	<i>Government Agency</i>	Natural Resources Conservation Service (NRCS) assists owners of Ohio's private land with conserving their soil, water, and other natural resources. NRCS partners with the Miami Valley Conservancy District to conserve local soil and water. Several environmental conservation and mitigation programs are offered by NRCS in partnership with local agencies. These include EQIP – Environmental Quality Incentives Program, SWCA – Soil and Water Conservation Assistance, WHIP – Wildlife Habitat Incentives Program, and the WRP – Wetlands Reserve Program.
B-W Greenway Community (B-WGC) Land Trust	<i>Land Trust</i>	B-WGC’s purpose is to educate the public about the value of wetlands and the importance of connecting the Beavercreek and Wenrick Wetlands with a greenway; to promote sustainable use of land within B-WGC while balancing human and wildlife needs; and to protect, preserve, and steward open space for farming, recreation, habitat, and watershed management.
Beavercreek Wetlands Association	<i>Land Trust</i>	BCWA helps protect the wetland ecosystems in the Beaver Creek watershed in Greene County through partnerships, community networks, and public education.
Ohio Chapter of the Worldwide Conservation Organization	<i>Nature Conservancy</i>	The Nature Conservancy works to protect large landscapes made up of plants, animals, and natural communities all over Ohio including the Miami Valley Region.
Little Miami, Inc.	<i>Watershed / Land Trust</i>	Little Miami, Inc. (LMI) was founded in 1967 as a 501(c)(3) nonprofit organization dedicated to the restoration and protection of the Little Miami Wild & Scenic River. The organization owns over 120 nature preserves along the Little Miami and several tributaries, restoring 100 miles of river, planted 55,000 trees, and 220 acres of prairie planted.
Dayton History	<i>Historical Preservation</i>	This regional organization collects, preserves, interprets, presents and promotes the Region’s assets, stories and experiences. The organization also maintains “Preservation Watch List” for the Region’s historical assets.
Preservation Dayton, Inc.	<i>Historical Preservation</i>	Preservation Dayton actively promotes the work of preservation, protection and enhancement, and historically sympathetic revitalization of the Dayton, Ohio community through advocacy and a variety of other creative methods.
Greene County Parks and Trails	<i>Parks and Recreation</i>	The County is the home of 1801 acres of green space held in public interest in 27 parks and recreation sites (though it owns 33. It manages 62 miles of paved, multiuse trails connecting to over 340 miles of regional trails as well as 36 miles of river trails and more than 24 miles of hiking trails.
Five Rivers MetroParks	<i>Parks and Recreation</i>	The Five Rivers MetroParks (FRMP) district is a nationally recognized park system composed of natural area parks, gardens, sensitive river corridors, urban parks, and a network of recreational trails. Its key mission is to protect rapidly disappearing open space and natural areas in the Miami Valley.
Miami County Park District	<i>Parks</i>	The County offers beautiful farmland, the Great Miami River, and charming parks. The Miami County Park District has 16 parks and recreation sites. The mission of the District is to acquire and manage outstanding natural resources for the purpose of preservation, conservation, education, and passive leisure activities for the people of Miami County. The District continues to strive to excel in the areas of environmental education, bikeway development, and land acquisition.
Greene Soil & Water Conservation District	<i>Water Conservation</i>	The Greene Soil and Water Conservation District provides urban and rural water quality and erosion control technical assistance, conservation education for all ages, land use planning, forestry and wildlife management, drainage information and design, and maps, including soil, flood plains, and aerial.
National Aviation Heritage Alliance	<i>Historical Preservation</i>	The National Aviation Heritage Alliance is an organization that seeks to conserve, interpret, develop, and promote the historic resources of the National Aviation Heritage Area. Its vision is to make the Dayton region the recognized global center of aviation heritage and premier destination for aviation heritage tourism, sustaining the legacy of the Wright brothers. The Alliance comprises of an eight-county area in SW Ohio (Montgomery, Greene, Miami, Clark, Warren, Champaign, Shelby, and Auglaize counties).

Source: MVRPC

