

INTRODUCTION

The **MetroMosaic interactive mapping tool** provides baseline data to help communities meet the Natural Systems requirements in their comprehensive plans. Under Imagine 2050, the Metropolitan Council's regional development guide, all 181 metro communities must address natural systems in their local comprehensive plans.

This document describes each dataset included in MetroMosaic, explains how datasets were processed and combined to create the tool's summary layers, and provides guidance on using these resources for planning, analysis, and re-search. Communities are encouraged to supplement this baseline data with local information where available.

MEETING NATURAL SYSTEMS REQUIREMENTS

The Natural Systems plan element requires communities to complete seven minimum requirements. MetroMosaic provides baseline data to help complete the first four of these:

1. **Inventory existing natural systems** — Use the Existing Natural Systems layer as a starting point to map terrestrial and aquatic features in your community.
2. **Identify ecologically significant and sensitive areas** — The Ecologically Significant Areas and Ecologically Sensitive Areas layers highlight areas requiring special planning consideration.
3. **Identify commonly protected areas** — The Commonly Protected Areas layer shows lands managed with some permanency that are unlikely to be developed.
4. **Identify opportunities to protect and improve natural systems** — The Protection Opportunities and Improvement Opportunities layers surface areas where conservation investments may yield the greatest benefit.

MINIMUM REQUIREMENTS DATASETS: WHAT METROMOSAIC COMBINES

MetroMosaic includes six collated datasets that combine multiple source layers into unified views. These collated layers simplify the task of meeting minimum requirements while still allowing users to explore individual source datasets for more detailed analysis. Each collated dataset represents a spatial union of its component layers, dissolved to remove internal boundaries and intersected with municipal boundaries to facilitate community-level planning.

Existing Natural Systems

Purpose: Provides a baseline inventory of terrestrial and aquatic natural features from which the planning process begins. This layer answers the question: "What natural systems currently exist in our community?"

Component datasets:

- **Minnesota Land Cover Classification System (MLCCS)** — Classified as "Terrestrial." Cultural/cultivated features (codes beginning with 1 or 2) and open water (code 9) are excluded to focus on natural and semi-natural vegetation including forests, woodlands, shrublands, and herbaceous communities.
- **National Wetlands Inventory (NWI)** — Classified as "Aquatic." Provides Cowardin-coded wetland boundaries including emergent, forested, and scrub-shrub wetlands.
- **Lakes and Rivers** — Classified as "Aquatic." Derived from the Met Council's Master Open Water Features dataset.
- **DNR Rivers and Streams** — Classified as "Aquatic." Linear stream features are buffered by 50 feet (15.24 meters) to create polygon representations suitable for mapping.

Processing note: Component layers are grouped by system type (Terrestrial or Aquatic), spatially unioned to remove overlaps, and intersected with municipal boundaries. The resulting layer shows one polygon per system type per community

Ecologically Significant Areas

Purpose: Highlights areas with high ecological value that maintain biodiversity, provide habitat connectivity, represent high-quality native habitats, support rare or endangered species, contribute to groundwater recharge, or represent high-functioning ecological systems

Component datasets:

- **Regionally Significant Ecological Areas (RSEA) — Imagine 2050** — A landscape-scale assessment identifying intact native plant communities and wildlife habitat in the seven-county metro. Areas were updated to exclude development identified in the 2020 Generalized Land Use Inventory.
- **Priority Waters (Healthy Habitat subset)** — Waterbodies from the Met Council Priority Waters list that score 80 or higher on the Healthy Habitat metric. Rivers and streams are buffered by 50 feet.
- **DNR Native Plant Communities** — High-quality remnants of Minnesota's original native vegetation identified through the Minnesota Biological Survey, State park land cover data, Forestry native plant community data, and Wildlife Management Area land cover data.
- **Calcareous Fens** — Rare, groundwater-fed peat wetlands with special statutory protection. Point locations are buffered by 400 meters to indicate the surrounding area of hydrologic influence.
- **MBS Sites of Biodiversity Significance** — Areas assessed by the Minnesota Biological Survey containing rare species, high-quality native plant communities, or important animal aggregations.
- **State-Designated Trout Streams** — Streams legally designated under Minnesota Rules Chapter 6264. Linear features are buffered by 50 feet to create polygon representations.

Processing note: All component layers are dissolved into a single unified geometry and intersected with municipal boundaries

Ecologically Sensitive Areas

Purpose: Identifies areas particularly vulnerable to disturbance from human activities, climate change, or invasive species. Development in these areas may cause disproportionate harm to natural systems.

Component datasets:

- **50-foot Buffer — Lakes, Rivers, and Wetlands** — Riparian zones around open water features and NWI wetlands. These transition areas filter pollutants, reduce flooding, and provide critical habitat. The 50-foot distance aligns with common shoreland buffer requirements.
- **FEMA Flood Hazard Zones** — Areas from FEMA Digital Flood Insurance Rate Maps (DFIRM) classified as “High” or “Moderate” flood risk. Includes Special Flood Hazard Areas (1% annual chance flood) and 0.2% annual chance flood zones.
- **303(d) Impaired Waters — Chloride and Nutrients** — Waterbodies on the 2024 impaired waters list where the impairment parameter includes chloride or nutrients. These pollutants are strongly influenced by land use decisions. Streams are buffered by 50 feet.

Processing note: All component layers are dissolved into a single unified geometry and intersected with municipal boundaries

Commonly Protected Areas

Purpose: Shows areas managed with some degree of permanency that are unlikely to be developed. This layer helps communities understand which natural areas already have protection status.

Component datasets:

- **RIM Reserve Conservation Easements** — Permanent easements held by the State of Minnesota under the Reinvest in Minnesota program, protecting wetland restorations, native grasslands, and riparian buffers.
- **Protected Areas Database of the US (PAD-US)** — The official USGS national inventory of protected lands including federal, state, local, and private conservation areas.
- **Generalized Land Use 2020 — Parks, Open Space, and Water** — Areas classified as “Park, Recreational, or Preserve” or “Open Water” in the Met Council's 2020 land use inventory.
- **Regional Parks** — Met Council-approved regional park units from the Parks Policy Plan.
- **Regional Trails** — Regional trail corridors, buffered by 50 feet to create polygon representations.
- **Wetland Banking Easements** — BWSR-approved wetland credit banks protected by permanent state conservation easements. Streams are buffered by 50 feet.

Protection Opportunities

Purpose: Shows significant natural areas that do not currently overlap with commonly protected areas. These represent opportunities where protection efforts could yield conservation benefits.

Methodology: This layer is derived by identifying areas from three “unprotected” Ecologically Significant Area datasets that fall outside the Commonly Protected Areas layer: (1) Unprotected Regionally Significant Ecological Areas, (2) Unprotected Native Plant Communities, and (3) Unprotected MBS Sites of Biodiversity Significance. Each unprotected layer was created by subtracting the Commonly Protected Areas geometry from the corresponding significance layer. The three unprotected layers are then spatially unioned and dissolved.

Improvement Opportunities

Purpose: Identifies areas where natural systems could be enhanced through restoration, management, or improved practices. These include degraded habitats, areas with non-native species pressure, impaired waters, and sites suitable for wetland restoration.

Component datasets:

- **50-foot Buffer — Lakes, Rivers, and Wetlands** — Areas adjacent to water features where riparian improvements (native plantings, buffer establishment) could enhance water quality and habitat.
- **Low-Quality MLCCS Areas** — Natural areas rated B, C, D, or marked as non-native (NN) in the MLCCS quality assessment (M_34X field). These ratings indicate communities that have been disturbed, altered, or experienced significant incursion of non-native species.
- **303(d) Impaired Waters — Chloride and Nutrients** — Waters failing to meet quality standards for pollutants that land use planning can address.
- **Restorable Wetlands** — Areas with 60% or higher probability of being a restorable wetland according to the Minnesota Restorable Wetland Index (RWI classes 4 and 5). The RWI uses machine learning to predict restoration potential based on hydrologic, geomorphologic, and geologic variables.

INDIVIDUAL SOURCE DATASETS

Minnesota Land Cover Classification System (MLCCS)

A comprehensive GIS-based classification of land cover integrating cultural features, non-native vegetation, and natural/semi-natural vegetation. The system uses numeric codes where the first digit indicates the general system: 1-2 for cultural, 3-8 for natural/semi-natural, and 9 for open water. In MetroMosaic, cultural and open water features are excluded to focus on natural communities.

Source: MN DNR

Data link: gisdata.mn.gov/dataset/biota-landcover-mlccs

Low-Quality MLCCS Areas

A subset of MLCCS areas marked with quality ratings of B, C, D, or designated as non-native (NN). Quality ratings assess ecological condition based on disturbance levels: “A” indicates excellent quality, while “D” indicates poor quality with significant human-induced disturbance.

Filter logic: M_34X field contains B, C, D, BC, CD, NN, or NA values

Planning use: Identifies natural areas that may benefit from restoration or management.

DNR Native Plant Communities

High-quality remnants of Minnesota’s pre-settlement vegetation identified through systematic field surveys by the Minnesota Biological Survey. These communities provide water filtration, flood moderation, carbon storage, erosion control, and other ecosystem services.

Source: MN DNR

Regulatory relevance: Native plant communities with state conservation rankings of S1, S2, or S3 receive protection under Minnesota Rules 8420.0515 (WCA rare natural communities provision).

Data link: gisdata.mn.gov/dataset/biota-dnr-native-plant-comm

Lakes and Rivers

Open water features derived from the Met Council's Master Open Water Features dataset. Provides baseline mapping of lakes and rivers for planning purposes.

Source: Met Council Environmental Services

Data link: gisdata.mn.gov/dataset/us-mn-state-metc-water-lakes-rivers

DNR Rivers and Streams

Detailed line work for rivers and streams from the DNR Hydrography Dataset. Understanding stream locations and flow direction is important for assessing potential impacts of land use activities on surface waters and downstream resources.

- **Processing note:** Linear features are buffered by 50 feet (15.24 m) to create polygon representations.
- **Data link:** mnatlas.org/resources/rivers-streams

National Wetlands Inventory (NWI)

A comprehensive GIS-based classification of land cover integrating cultural features, non-native vegetation, and natural/semi-natural vegetation. The system uses numeric codes where the first digit indicates the general system: 1-2 for cultural, 3-8 for natural/semi-natural, and 9 for open water. In MetroMosaic, cultural and open water features are excluded to focus on natural communities.

Source: Primary reference for wetland presence during project review under the Minnesota Wetland Conservation Act (MN Stat. 103G.222-103G.2372). Note: Field delineation is required for regulatory decisions.

Data link: gisdata.mn.gov/dataset/water-nat-wetlands-inv-2009-2014

Restorable Wetlands

The Minnesota Restorable Wetland Index (RWI) predicts locations of existing and restorable wetlands using machine learning models applied to hydrological, geomorphological, and geological variables. MetroMosaic includes only high-probability areas (classes 4 and 5, representing 60-100% probability).

Source: Natural Resources Research Institute (NRRI) and MN DNR

Data link: conservancy.umn.edu/items/62ae7eb9-73a7-419a-9218-2fa1514380da

Calcareous Fens

Rare, groundwater-fed peat wetlands among Minnesota's most protected natural features. Calcareous fens may not be filled, drained, or otherwise degraded under state law. Any groundwater withdrawal near a fen requires DNR approval.

Regulatory relevance: Protected under MN Stat. 103G.223 and MN Rule 8420.0935, subpart 2. DNR (not local government) is the regulatory authority.

Processing note: Point locations are buffered by 400 meters to indicate the area of hydrologic influence.

Data link: gisdata.mn.gov/dataset/biota-nhis-calcareous-fens

Regionally Significant Ecological Areas (RSEA) — Imagine 2050

A landscape-scale assessment identifying ecologically significant terrestrial and wetland areas in the seven-county metro. Updated for Imagine 2050 to exclude developed areas identified in the 2020 Generalized Land Use Inventory.

Regulatory relevance: Protected under MN Stat. 103G.223 and MN Rule 8420.0935, subpart 2. DNR (not local government) is the regulatory authority.

Source: Met Council Community Development, MN DNR

Regulatory Relevance: Supports requirements under MN Stat. 473.859 (comprehensive plan content) and MN Stat. 473.145 (regional system plans).

Data link: gisdata.mn.gov/dataset/us-mn-state-metc-plan-img2050-significantecoareas

MBS Sites of Biodiversity Significance

Areas assessed by the Minnesota Biological Survey based on the presence of rare species populations, native plant community quality, and landscape context. Sites receive significance ranks (Outstanding, High, Moderate, or Below) to guide conservation priorities.

Source: MN DNR MBS unit

Regulatory relevance: Natural Heritage Review using MBS data is required for projects needing Environmental Assessment Worksheets under MN Stat. 116D and Minnesota Rules Chapter 4410.

Data link: gisdata.mn.gov/dataset/biota-mcbs-sites-of-biodiversity

State-Designated Trout Streams

Streams legally designated under Minnesota Rules Chapter 6264 as trout streams or trout stream tributaries. Designation triggers heightened review for nearby development to protect coldwater habitat.

- **Processing note:** Linear features are buffered by 50 feet to create polygon representations.
- **Data link:** gisdata.mn.gov/dataset/env-trout-stream-designations

Priority Waters — Healthy Habitat Subset

Waterbodies from the Met Council Priority Waters list that score 80 or higher on the Healthy Habitat metric, indicating waters with significant habitat value that warrant protection.

Source: Met Council Water Resources Management

Processing note: Rivers and streams are buffered by 50 feet. Lakes are included as polygons.

Data link: gisdata.mn.gov/dataset/us-mn-state-metc-water-priority-waters

WATER QUALITY AND FLOOD HAZARDS

FEMA Flood Hazard Zones

Digital Flood Insurance Rate Maps (DFIRM) showing Special Flood Hazard Areas. MetroMosaic includes areas classified as “High” or “Moderate” flood risk, including the 1% annual chance (100-year) and 0.2% annual chance (500-year) flood zones.

Regulatory relevance: Triggers local floodplain ordinances, FEMA insurance requirements, and Minnesota Rules 6120.5000-6120.6200 (state floodplain standards).

Data link: gisdata.mn.gov/dataset/water-dnr-fema-dfirm

303 (d) Impaired Waters - Chloride and Nutrients

Waterbodies from the 2024 impaired waters list where the impairment is related to chloride or nutrients—pollutants that are strongly influenced by land use decisions and can be addressed through comprehensive planning.

Processing note: Streams are buffered by 50 feet. Includes impaired lakes, streams, and wetlands within the metro area.

Regulatory Relevance: Clean Water Act Section 303(d); MN Stat. Chapter 114D (Clean Water Legacy Act); MN Rules Chapter 7050 (water quality standards).

Data link: gisdata.mn.gov/dataset/env-impaired-water-2024

Protected Areas Database of the US (PAD-US)

The official USGS national inventory of terrestrial and marine protected areas dedicated to biodiversity preservation and other natural, recreational, and cultural uses. Includes federal, state, local, and private protected lands.

Source: USGS

Note: Some site names may be out of date. For authoritative information on specific parcels, contact the managing agency.

Data link: maps.usgs.gov/padusdataexplorer

RIM Reserve Conservation Easements

Permanent easements held by the State of Minnesota under the Reinvest in Minnesota program (MN Stat. 103F.515). Easements protect wetland restorations, native grassland habitat, riparian buffers, and wellhead protection areas on private land.

Source: MN Board of Water and Soil Resources (BWSR)

Data link: gisdata.mn.gov/dataset/bdry-bwsr-rim-cons-easements

Wetland Banking Sites

BWSR-approved wetland credit banks protected by permanent state conservation easements. When projects cannot avoid wetland impacts, developers may purchase credits from approved banks as part of the Wetland Conservation Act sequencing requirements.

Regulatory relevance: PMN Stat. 103G.2242 (wetland banking); MN Rules Chapter 8420 (Wetland Conservation).

Processing note: Point locations are buffered by 400 meters to indicate the area of hydrologic influence.

Data link: gisdata.mn.gov/dataset/bdry-wetland-banking-easements

Generalized Land Use 2020 — Parks, Open Space, and Water

Areas classified as “Park, Recreational, or Preserve” or “Open Water” in the Met Council’s 2020 Generalized Land Use Inventory. This data will be updated in late 2025/early 2026. **Regulatory relevance:** Protected under MN Stat. 103G.223 and MN Rule 8420.0935, subpart 2. DNR (not local government) is the regulatory authority.

Source: Met Council Community Development

Data Link: gisdata.mn.gov/dataset/us-mn-state-metc-plan-generl-Induse2020

Regional Parks

Met Council-approved regional park and park reserve boundaries from the Parks Policy Plan. The Regional Parks System includes 66 units managed by ten implementing agencies.

Regulatory relevance: MN Stat. 473.147 (Regional Parks Policy Plan); MN Stat. 473.351 (regional parks funding). Local comprehensive plans must show regional parks and ensure compatibility with adjacent development.

Data link: gisdata.mn.gov/dataset/us-mn-state-metc-plan-parks-ppp-adminboundaries

Regional Trails

Regional trail corridors from the Parks Policy Plan, including existing trails, planned corridors, and search corridors. Many trails utilize former railroad corridors, utility easements, or river/creek corridors.

Processing note: Linear features are buffered by 50 feet to create polygon representations.

Regulatory Relevance: MN Stat. 473.147 (Regional Parks Policy Plan). Local plans must show regional trails for comprehensive plan conformance.

Data link: gisdata.mn.gov/dataset/us-mn-state-metc-plan-parks-ppp-regionaltrails

ADDITIONAL RESOURCES

- **Local Planning Handbook:** handbook.metrocouncil.org
- **Minnesota Geospatial Commons:** gisdata.mn.gov
- **Minnesota Conservation Explorer:** mce.dnr.state.mn.us
- **Growing Shade Tool:** metrocouncil.org/growingshade
- **Contact your [Sector Representative](#)** for planning assistance

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