



APPENDIX D

GIS Needs Assessment Methodology





GIS Assessment Methodology

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The Geographic Information Systems (GIS) Analyses provided a spatial assessment of gaps as part of the PROST Master Plan needs and gaps assessment. The Missoula authoritative parks GIS layer and inventory was the basis for land classifications.

Network Analysis

Many of the analyses the ArcGIS Network Analyst extension to evaluate how people move through Missoula to access parks and conservation lands.

The steps to create the network analysis maps are as follows:

- Identify access points to parks and conservation lands.
- Establish distance or travel time thresholds for each analysis.
- Analyze real-world travel paths along the street and trail network to determine the catchment area for each park included in the analysis.
- Consider barriers. Natural barriers such as rivers, creeks, railroads and Interstate 90 only where there are bridges, overcrossings, or undercrossings. Therefore, Network Analyst factors these barriers in.
- Add Brooks Street/Highway 93S and portions of West Broadway as additional barriers that pedestrians and bicyclists are assumed not to cross due to the auto orientation of these streets.
- Depict the “park sheds,” the service area for each site included in the analysis.
- Show other publicly owned park land parcels (County, state, federal) for reference.
- Identify school sites for reference.

Placetypes and Street Types

Since the 10-minute walk analyses are focused on walkability for residents, the 10-minute walk maps were overlaid on Missoula’s proposed future land use map and future street type maps, as of November 2024.

Equity Mapping

Completed as part of the Our Missoula Growth Policy Update, the *Equity in Land Use Report* (August 2023) included specific map-based equity analyses developed specifically for Missoula. For the PROST Plan’s equity analysis, these same maps are used as overlays to assess whether there are equity gaps for consistency in planning.

- **Income.** The income map, Figure 10 from the *Equity in Land Use Report*, uses 2020 ACS 5-year data to show Missoula’s median household income by census tract. Income levels are grouped into

quintiles, with two quintiles depicting areas where median household income (MHI) is below Missoula's MHI and three where MHI is above the citywide MHI.

- **Communities of Color.** Figure 12 from the *Equity in Land Use Report* shows the percentage of the population in each Census tract that identifies as a community of color (households classified by the US Census as African American, Hispanic, and Latino (non-white), Asian American/Pacific Islander, and American Indian/Alaska Native). This map depicts five quintiles, three where the percentage of communities of color is less than the City's median percentage and two where the percentage is higher than the City's median percentage.
 - Note: Acres per 1,000 residents were determined by dividing the current acreage of all publicly accessible City parkland by the current population of Missoula, then multiplying by 1,000
- **American Indian/Alaska Native.** Figure 14 showing Missoula's population share of those that identify as American Indian/Alaska Native. Like the communities of color map, this map depicts five quintiles, three where the percentage of American Indian/Alaska Native is less than the City's median percentage and two where the percentage is higher than the City's median percentage.

There are other demographics of concern when considering equity, including as people with disabilities or specific age groups. These groups are considered in other analyses.

Using GIS to Evaluate 10-Minute Walk Access

The 10-Minute Walk Campaign was launched in 2017 by the Trust for Public Land (TPL), Urban Land Institute and National Recreation and Park Association. Across the US, 300+ mayors – including Missoula's – have committed to the vision that everyone in U.S. cities should have access to a quality park within a 10-minute walk of their home. The 10-minute walk has become a nationally accepted metric for close-to-home park access.

The PROST Master Plan adopts the 10-minute walk/roll as a performance metric. During the PROST planning process, two methods were considered: by time and by distance. A series of time-based maps used GIS capabilities to estimate how far a typical person can walk in 10 minutes. A series of distance-based maps used distance to approximate the 10-minute walk. TPL uses ½-mile to approximate the 10-minute walk, and ¼ mile approximates a 5-minute walk and is used by some cities as the service standard for higher density areas.

During the planning process, Missoula moved forward with the time-based approach. This is the approach adopted in the PROST Plan.

The analyses completed are summarized below.

- **The Walkable Access by Time** map shows areas within a 10-minute walk of an existing access to an existing regional, community, neighborhood, pocket, or special use park, which all should contain neighborhood-serving park amenities. Linear parks are not considered in this analysis because they typically contain a trail but no other amenities in Missoula's current inventory.
- The **Walkable Access by Time with Proposed Land Use** overlays the service areas on the land use map.

Using GIS to Evaluate Access to Nature

Network Analyst was also used to evaluate access to nature.

- The **Nature Access** analysis looked at 1-mile access to nature parks, which includes Conservation Lands classifications Park Preserves, Public Natural Areas and Urban Parkland with Special Resources Present. The analysis factors in the same barriers as the 10-minute walk analysis.
- The Conservation Lands classifications are updated in the PROST Master Plan. In the future, this analysis should look at Park Preserves, Community Natural Areas and Neighborhood Natural Areas.



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Documentation of Layers and Processes Used

Scenario	Road Network Used	Parks Used	Park Access Points Used	What to Solve For	Direction	Distance/ Time Parameters	Out Parameters	Notes
Nature Parks Only Access	County base	City Only	"Select for 'Nature' only In database ParkType = 'Public Natural Area', 'Park Preserve', 'Urban w/SRP'"	Driving Distance	Towards parks	1 mile (1.6 km)	Standard Precision Dissolve Rings	The driving distance network service areas shown on this map were solved for access points for all City owned Park Types (ParkType attribute) tagged as Public Natural Area, Park Preserve, and Urban w/SRP . Driving distance towards the park access points were solved for 0.5 and 1 miles only. Additional barriers included in this analysis: Highway 93S/Brooks Street and West Broadway.
Walkable Access (by time)	County base	City Only	Selected parks only In database ParkType = 'Community', 'Neighborhood', 'Pocket', 'Special Use', 'Regional'	Walking Time	Towards parks	10 minutes by foot	Standard Precision Dissolve Rings	The walking time network service areas shown on this map were solved for access points for all city owned Part Types (ParkType attribute) tagged as Community, Neighborhood, Pocket, Special Use, and Regional . Walking time towards the park access points were solved for 10 minutes only. Additional barriers included in this analysis: Highway 93S/Brooks Street and West Broadway.