Appalachia United Outdoors

Trust for Public Land's (TPL's) Appalachia United Outdoors (AUO) program is an initiative that leverages outdoor recreation to boost economic development, public health, and community connection across Appalachia. TPL's geospatial team conducted a geographic information systems (GIS) analysis to use map-based data to identify communities that may benefit from investment in the outdoor recreation economy.

The goals identified through the technical advisory committee engagement were: Outdoor Risks and Resources (ORR), which address risk of losing natural resources due to flooding and wildfire risk; Economic and Community Need (ECN) to address issues related to community health and poverty; Recreation Need and Access (RNA) to identify where there is access to opportunities such as camping, hunting, and boating; the Outdoor Recreation Economy (ORE) to identify where public lands can support outdoor recreation businesses and sales; and Federal Funding Program Potential (FPP) to identify areas with resources that may be conserved using federal programs such as the Land and Water Conservation Fund and the USFS Community Forest Program. The GIS analysis led to the creation of the following municipality cluster profiles that classify similar communities together, based on the data in the model.

Municipality Cluster Profiles

This document describes the 10 community clusters identified through multivariate clustering of 4,147 municipalities in the Appalachian study area. Municipalities were split into rural (2,382) and urban (1,765) subsets before clustering, producing 5 clusters in each subset. The clustering used K-medoids with optimized seed locations across all five goal categories; a total of 38 variables covering all five AUO goal categories as well as population and land area. K-medoids is a statistical grouping method that assigns each municipality to the cluster whose center it is most similar to, measured across all variables at once.

Each cluster profile includes a label, the number of communities per state, example communities, a narrative description, and a table of mean values for the five AUO goals. The mean is the average score (1-10) for all communities in that cluster; higher values indicate either greater need or greater opportunity depending on the goal. The standard deviation indicates how internally consistent the cluster is on each goal: lower values mean the communities in that cluster are more similar to each other on that dimension.

Note on urban and rural classification: The urban and rural designations used in this analysis follow U.S. Census Bureau definitions, which classify communities based on population density and proximity to urbanized areas rather than population size alone. As a result, some communities with small populations (under 5,000) may be classified as urban if they fall within a Census-designated urban area.

Variables: 38 (Population, area, and all individual and combined class fields across ORR, ECN, RNA, ORE, and FPP). The full list of variables with sources can be found in the data description document accessed via the project's landing page.

Cluster	Label	N
Rural 1	Southern Appalachian Family Recreation Gateways	339
Rural 2	Resilience-Ready Northern Appalachian Communities	564
Rural 3	High-Potential Central Appalachian Communities	156
Rural 4	Small-Town Emerging Recreation Economies	541
Rural 5	Recreation-Active Rural Towns	781
Urban 1	Suburban Recreation Anchors	413
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Rural Clusters (2,382 municipalities)

Rural Cluster 1: Southern Appalachian Family Recreation Gateways

Communities: 339 Median population: 1,946 Median area: 3,074 acres

Number by state: AL (87), MS (40), OH (35), TN (34), NC (29), GA (28), PA (27), WV (16), KY (14), VA (13), SC (11), NY (4), MD (1)

Example communities: Lake Norman of Catawba, NC; Etowah, NC; Lincoln, AL; Hamilton, AL; Temple, GA

The largest rural communities by both average area and average population, concentrated in southern and central Appalachia. Natural hazard risk is the lowest of any rural cluster. Economic need is the highest among rural clusters (5.3), driven by lower rural capacity and the largest share of families with children. Nearby recreation opportunities exist at a moderate level and there is ample opportunity for the outdoor recreation economy to develop (3.5). LWCF and Recreational Trails Program alignment is strong.

Opportunities: Family-oriented recreation development in places with the population base to sustain it. Trail systems and LWCF-eligible projects address both the recreation development potential and the community need. Larger land areas provide room for multi-use facilities.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	3.3	2.0
	Economic and Community Need	5.3	1.5
	Recreation Need and Access	5.3	2.6
	Outdoor Recreation Economy	3.5	1.9
	Federal Funding Program Potential	4.6	2.4

Rural Cluster 2: Resilience-Ready Northern Appalachian Communities

Communities: 564 Median population: 682 Median area: 675 acres

Number by state: PA (250), NY (119), OH (72), WV (23), TN (18), VA (18), MS (13), MD (12), NC (11), KY (10), AL (8), GA (6), SC (4)

Example communities: Alfred, NY; Hemlock Farms, PA; Kane, PA; Pocono Woodland Lakes, PA; Jefferson, OH

Northern Appalachian communities dominated by Pennsylvania and New York. These places face elevated flood and wildfire risk. Economic need is low (3.5) and recreation development potential is moderate, meaning there is some opportunity for outdoor recreation economy growth. Outdoor recreation economic activity is moderate (4.2), and federal funding program alignment is limited due to population size and other factors. Small numbers of Tennessee and Virginia communities appear in this cluster because their variable profiles (elevated hazard risk, low economic need, moderate recreation access) match the Northern Appalachian pattern despite their geographic location.

Opportunities: Natural hazard resilience through outdoor recreation infrastructure. Heat adaptation facilities (such as shade structures, splash pads, or cooled trail corridors) address both the climate exposure and the health needs in these communities.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	6.2	2.2
	Economic and Community Need	3.5	1.8
	Recreation Need and Access	3.7	2.2
	Outdoor Recreation Economy	4.2	1.6

	Goal	Mean	Std Dev
	Federal Funding Program Potential	2.8	1.9

Rural Cluster 3: High-Potential Central Appalachian Communities

Communities: 156 Median population: 492 Median area: 931 acres

Number by state: KY (71), WV (30), MS (25), AL (11), TN (11), VA (7), PA (1)

Example communities: Oneida, TN; West Liberty, KY; Russell Springs, KY; Mountain City, TN; Tompkinsville, KY

The smallest and most economically distressed cluster in the study area, concentrated in Kentucky, West Virginia, and Mississippi. Economic need (8.8) is the highest of any cluster, rural or urban. Combined outdoor risks and resources are high (7.3), with strong natural resource value. Recreation development potential is also high (7.6), with nearby boating, hunting, and camping opportunities that are underserved relative to demand. Federal funding program alignment (6.4) reflects eligibility across multiple programs. These communities have the widest gap between existing economic conditions and available natural and recreation resources. Mississippi communities appear in this cluster because their economic and recreation profiles closely match those of eastern Kentucky and southern West Virginia, despite Mississippi's classification in the ARC Southern sub-region. Virginia's representation is limited to 7 communities; the Southwest Virginia coalfield communities that share this region's characteristics are split between this cluster and Rural Cluster 4 (Small-Town Emerging Recreation Economies, VA=21) based on differences in their recreation economy and federal funding scores.

Opportunities: The highest-need, highest-potential rural communities. Strong federal funding alignment paired with abundant natural resources and recreation development potential create clear pathways for investment. USDA forestry programs, LWCF, and Recreational Trails Program funding are all well-aligned.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	7.3	2.6
	Economic and Community Need	8.8	1.3
	Recreation Need and Access	7.6	2.4
	Outdoor Recreation Economy	4.5	2.2
	Federal Funding Program Potential	6.4	2.6

Rural Cluster 4: Small-Town Emerging Recreation Economies

Communities: 541 Median population: 384 Median area: 775 acres

Number by state: WV (155), PA (107), AL (94), OH (67), MD (27), VA (21), MS (20), NC (18), TN (12), SC (9), KY (6), GA (4), NY (1)

Example communities: Sierra View, PA; Warrior, AL; Kingwood, WV; Philippi, WV; Madison, WV

Spread across the central spine of Appalachia with West Virginia as the largest contributor. These places have strong recreation development potential (7.5), an active outdoor recreation economy (6.8), and the highest federal funding program alignment of any rural cluster (7.3). Nearby public lands offer boating, hunting, and camping opportunities. Forest canopy coverage is high, and alignment with USDA forestry programs is strong. Economic need is moderate (3.6).

Opportunities: Strong opportunities for investment in outdoor recreation infrastructure and planning. Recreation development potential and economic momentum are already present. Federal funding alignment is strong across multiple programs, particularly USDA forestry and Recreational Trails Program.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	5.8	2.2
	Economic and Community Need	3.6	1.5
	Recreation Need and Access	7.5	1.9
	Outdoor Recreation Economy	6.8	2.0
	Federal Funding Program Potential	7.3	2.1

Rural Cluster 5: Recreation-Active Rural Towns

Communities: 781 Median population: 216 Median area: 461 acres

Number by state: PA (356), OH (75), TN (54), WV (54), VA (49), AL (43), GA (42), MD (40), NC (32), NY (13), SC (12), MS (7), KY (4)

Example communities: Spring City, TN; Burnsville, NC; Whitwell, TN; Benton, TN; Bryson City, NC

The largest cluster by far. These places have the lowest economic need (2.8), the lowest recreation development potential (3.5), and the lowest federal funding program alignment (3.2) of any rural cluster. Many already participate in the outdoor recreation economy (7.6, the highest of all rural clusters). Outdoor risks and resources are elevated (6.9), including flood and wildfire risk. Health indicators are favorable and poverty rates are very low.

Opportunities: Previously demonstrated investment in recreation given existing economic activity and low unmet need for outdoor recreation access and economic revitalization. Natural hazard adaptation remains an opportunity. These communities could serve as models or partners for less-developed neighboring places.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	6.9	2.3
	Economic and Community Need	2.8	1.5
	Recreation Need and Access	3.5	2.1
	Outdoor Recreation Economy	7.6	1.6
	Federal Funding Program Potential	3.2	2.0

Urban Clusters (1,765 municipalities)

Urban Cluster 1: Suburban Recreation Anchors

Communities: 413 Median population: 770 Median area: 468 acres

Number by state: PA (350), WV (17), OH (15), SC (8), MD (5), AL (4), NY (4), GA (3), TN (3), VA (2), NC (1), KY (1)

Example communities: Cheat Lake, WV; Forest Hills, PA; Brookhaven, WV; McMurray, PA; Louisville, TN

Small suburban and exurban communities concentrated in Pennsylvania (85%). The strongest outdoor recreation economy of any urban cluster (7.0), with high business counts, sales, and employment. Economic need is the lowest of any cluster in the study area (1.9). Flood and wildfire risk are moderate. Recreation development potential nearby is moderate (4.8).

Opportunities: These communities already have outdoor recreation economies. Investment supports expansion and resilience. Aging-friendly trail design and accessible recreation facilities match the demographic profile.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	4.9	2.3
	Economic and Community Need	1.9	1.1
	Recreation Need and Access	4.8	2.5
	Outdoor Recreation Economy	7.0	2.1
	Federal Funding Program Potential	5.8	2.6

Urban Cluster 2: Resilient Regional Hubs

Communities: 391 Median population: 1,922 Median area: 1,463 acres

Number by state: OH (63), PA (58), TN (52), WV (36), NY (35), GA (33), NC (25), AL (24), KY (23), VA (20), SC (14), MS (4), MD (4)

Example communities: Calhoun, GA; Beckley, WV; Seymour, TN; Somerset, KY; Ironton, OH

Mid-sized communities distributed broadly across the study area with no single state dominating. Moderate values across all five goal categories. Economic need (5.3) and outdoor risks and resources (4.9) are moderate. The outdoor recreation economy is moderate (4.1). The geographic diversity of this cluster means investment strategies need to be locally adapted rather than following a single template.

Opportunities: Broad-based economic and recreation investment across a dispersed set of communities. Disaster resilience through outdoor recreation infrastructure. Locally adapted strategies are needed given the geographic diversity.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	4.9	2.3
	Economic and Community Need	5.3	1.7
	Recreation Need and Access	4.0	2.4
	Outdoor Recreation Economy	4.1	1.9
	Federal Funding Program Potential	4.0	2.2

Urban Cluster 3: Large City Recreation Catalysts

Communities: 378 Median population: 8,870 Median area: 5,726 acres

Number by state: AL (79), SC (53), NC (49), GA (40), TN (36), WV (25), OH (19), KY (14), VA (14), PA (14), MD (13), MS (11), NY (11)

Example communities: Pittsburgh, PA; Winston-Salem, NC; Huntsville, AL; Birmingham, AL; Knoxville, TN

The region's major cities. Highest economic need (6.5) and highest recreation development potential (7.2) of any urban cluster, particularly for park walk access and hunting. The outdoor recreation economy is the weakest (2.1). Federal funding alignment is the strongest overall (7.1), with strong Recreational Trails Program alignment. Very low unemployment combined with high labor non-participation is consistent with discouraged-worker dynamics where residents have left the formal labor force.

Opportunities: The highest-impact investment targets in the urban set. Large populations, economic need, abundant nearby recreation resources, and strong federal funding alignment. Outdoor recreation economy development could address workforce disengagement directly. Trail systems and park access projects serve the most people per dollar invested.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	2.7	2.0
	Economic and Community Need	6.5	1.4
	Recreation Need and Access	7.2	2.3
	Outdoor Recreation Economy	2.1	1.3
	Federal Funding Program Potential	7.1	2.2

Urban Cluster 4: Industrial Legacy Northern Cities

Communities: 378 Median population: 5,216 Median area: 1,512 acres

Number by state: PA (280), OH (41), NY (20), TN (13), VA (7), WV (7), GA (4), AL (3), KY (3)

Example communities: Erie, PA; Youngstown, OH; Binghamton, NY; Wilkes-Barre, PA; Altoona, PA

Pennsylvania's cities and large boroughs account for 74% of this cluster. Natural hazard risk is the lowest of any cluster (1.9). Economic need is moderate (4.5). Recreation development potential is low (3.2), and the outdoor recreation economy is low (2.8), meaning there is high opportunity for outdoor recreation economy growth. Federal funding program alignment is moderate (5.2).

Opportunities: Brownfield-to-recreation conversion and heat adaptation in cities with large populations. Disability-accessible and family-oriented outdoor spaces address the demographic profile. Each project reaches a large population base.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	1.9	1.2
	Economic and Community Need	4.5	2.2
	Recreation Need and Access	3.2	2.0
	Outdoor Recreation Economy	2.8	1.8
	Federal Funding Program Potential	5.2	2.4

Urban Cluster 5: Mountain Recreation Gateways

Communities: 205 Median population: 723 Median area: 717 acres

Number by state: WV (75), NC (25), AL (21), TN (18), MD (18), VA (17), KY (14), OH (6), GA (5), PA (3), MS (1), SC (1), NY (1)

Example communities: Cullowhee, NC; Pigeon Forge, TN; Mount Olive, AL; Oliver Springs, TN; Lake Junaluska, NC

Mountain communities in central and southern Appalachia that already function as recreation entry points. Highest combined outdoor risks and resources of the urban clusters (7.1), driven by high scores for resilient lands, biodiversity, and forest canopy. The second-strongest outdoor recreation economy among urban clusters (6.2) based on sales, employment, and number of businesses. Federal funding alignment is the highest of any urban cluster (7.1), with particular strength in USDA forestry programs. Community health need and FEMA disaster spending reflect the combined challenge of health access and natural hazard exposure in mountain settings. The median population of this cluster is 723, reflecting that Census urban classification is based on density and proximity to urbanized areas, not population size alone.

Opportunities: Building on existing recreation momentum in places with strong conservation value and the highest federal funding alignment of any urban cluster. Trail, boating, and hunting access development leverages the nearby natural resources that define these communities.

Goal category profile:

	Goal	Mean	Std Dev
	Outdoor Risks and Resources	7.1	2.2
	Economic and Community Need	5.1	1.7
	Recreation Need and Access	7.0	2.3
	Outdoor Recreation Economy	6.2	2.0
	Federal Funding Program Potential	7.1	2.3