

Mapping for Implementation and Advocacy

Suburban





Agenda

1. Introduction

Welcome, warm-up, and background

2. Challenges and Solutions

Derek Strout, RTC – Examples from across the country

3. Case Study – Regional Active Transportation Plan & Multimodal Network Analysis

Leann Chaney and Chris Jaros, Southwest Pennsylvania Commission

4. Trail Maintenance Toolkit

Pennsylvania Environmental Council

5. Action Planning

Mapping your expertise, Around the World





Geographic Information Systems as a platform

to gather, organize, analyze, understand, and communicate

Hardware Servers, computers, phones

Software Desktop GIS, SaaS, mobile apps

Data Shapefiles, spreadsheets, survey reports, imagery

Methods Data collection workflows, map creation processes

People GIS professionals, volunteers, public



Geographic Information Systems as a system of systems

to gather, organize, analyze, understand, and communicate



Record

geodatabases shapefiles spreadsheets



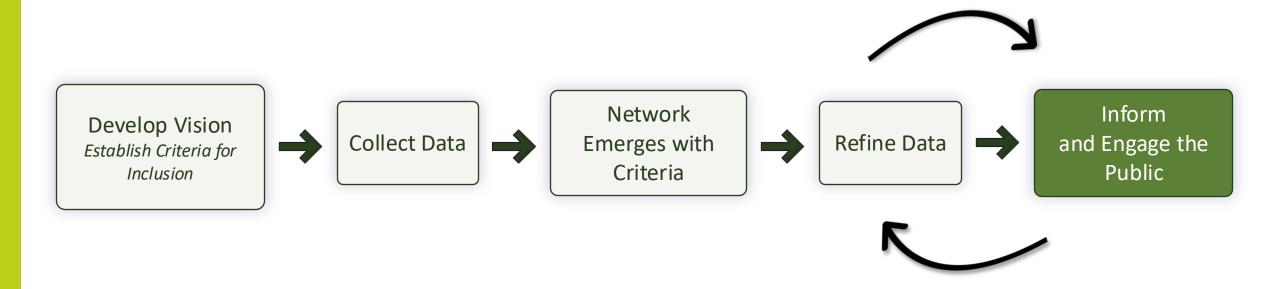
Insight

exploratory analysis geoprocessing tools reports & dashboards



Engagement

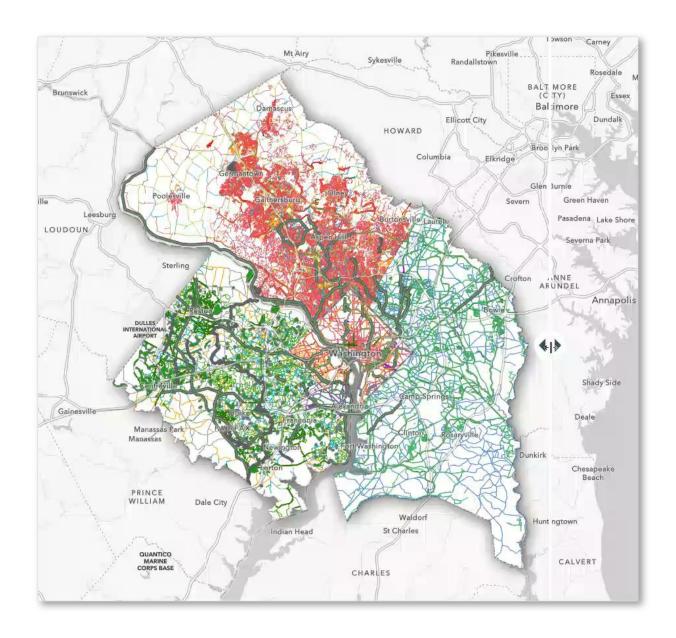
static & interactive maps geo-enabled surveys ArcGIS StoryMaps











"...a map is worth a million words."



Develop Vision

Establish Criteria for

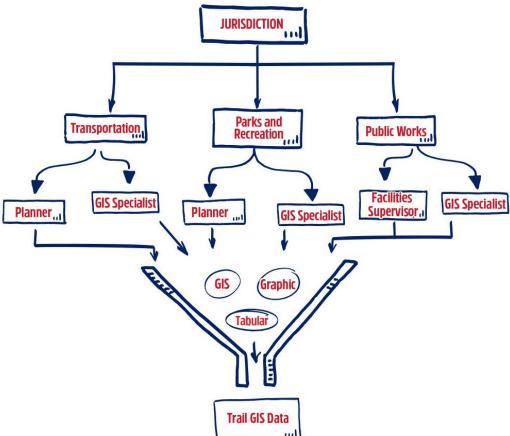
Inclusion

- Accessible to all
- Healthy and safe
- Equitably distributed
- Reliable for transportation
 - Open space access
 - World-class





Collect Data



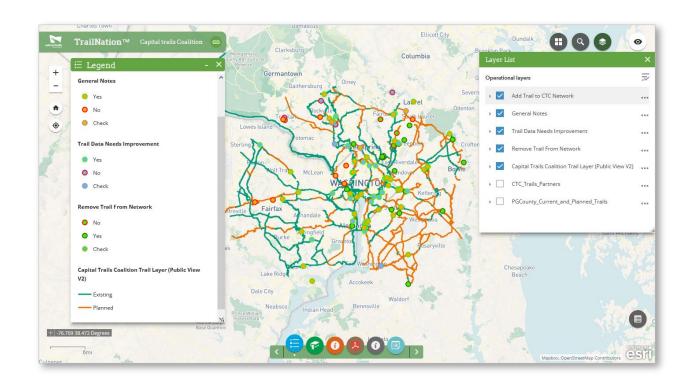




Network Emerges with Criteria

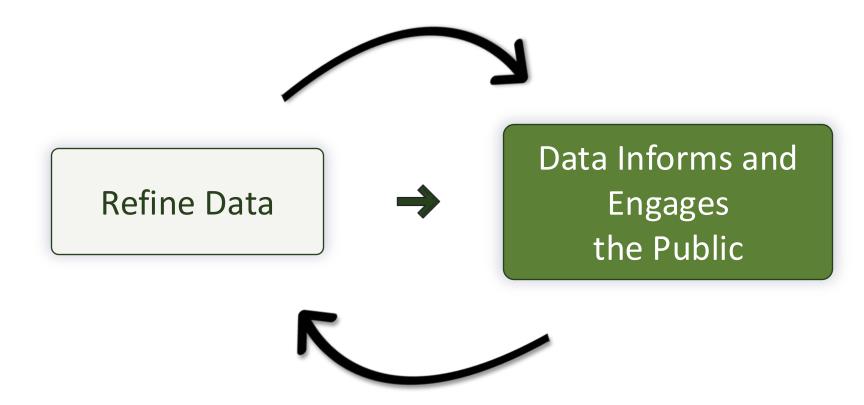


Refine Data

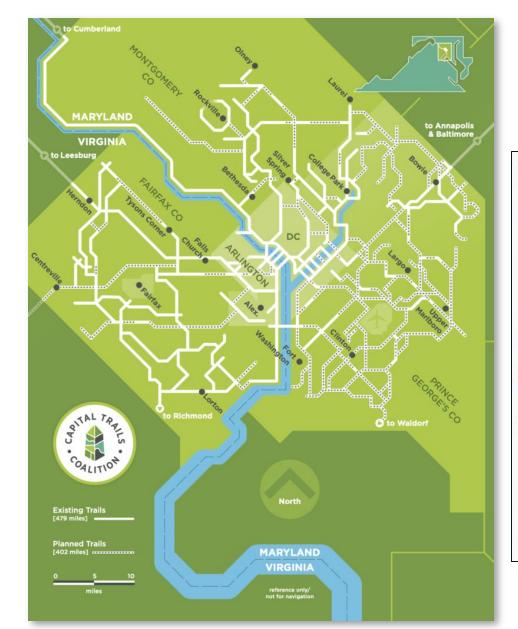












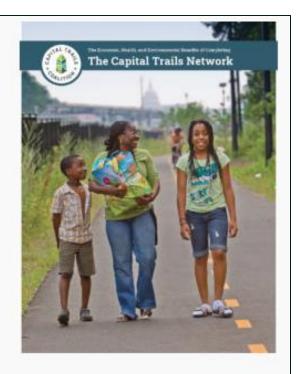


You know what's cool?

- 881 miles of trails.
- 19,580 metric tons of CO2 emissions prevented every year.

We did the math.

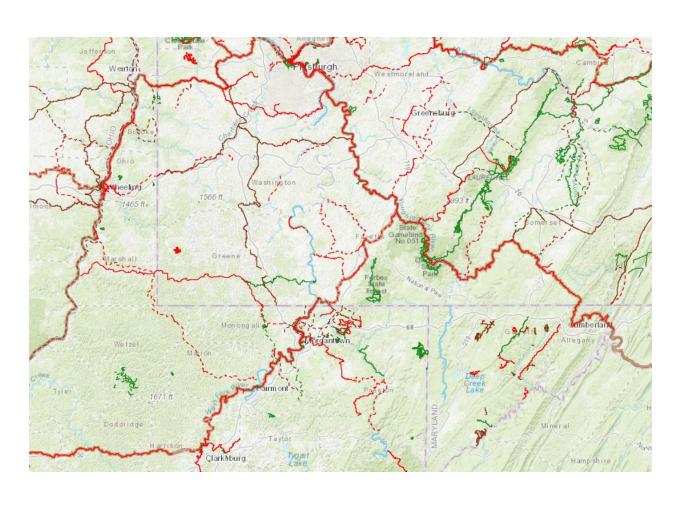
Turns out: trails are AWESOME.

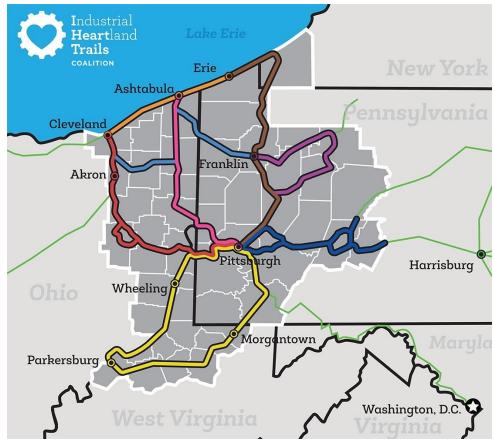


READ THE REPORT

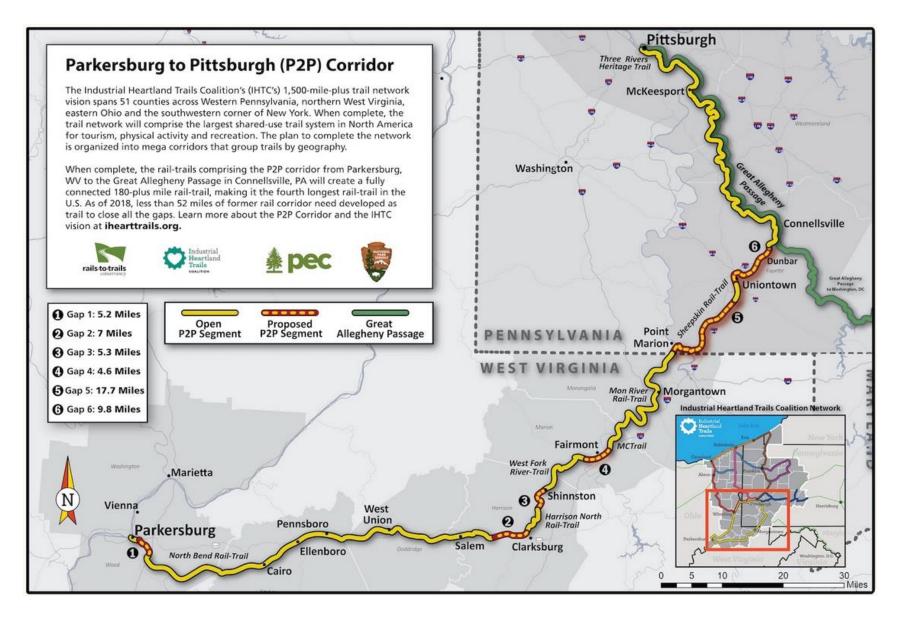


Industrial Heartland Trails Coalition













City of Fairmont Rail Trail Project



MC Trail West Fork River Trail

Cost Breakdown

A-1 - West Fork River Trail Extension Part 1

Design: \$86,665

Construction: \$712,441

A-2 - On-Street Sharrows

Design: \$2,433

Construction: \$30,418

B - West Fork River Trail Extension Part 2

Design: \$30,510

Construction: \$305,095

C - Beltline Rail Trail

Design: \$70,854

Construction: \$776,020

D - Monongahela River Pedestrian Bridge

Design: \$600,000

Construction: \$5,400,000

E - East Side Rail Trail

Design: \$230,000

Construction: \$2,207,000

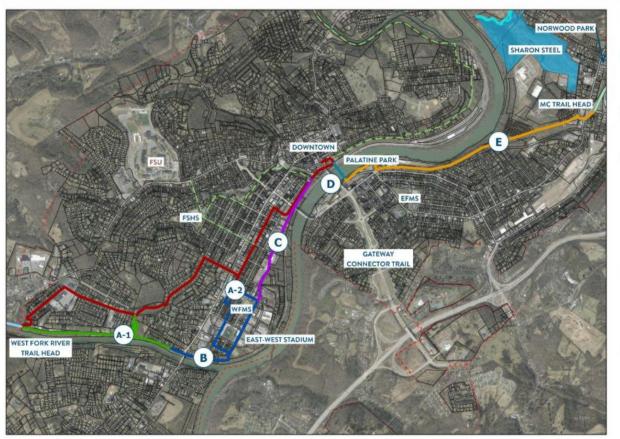
Total Design: \$1,020,462

Total Construction: \$9,430,974



City of Fairmont Rail Trail Project

Budget Source Breakdown



Trail Master Plan:

General Fund

On-Street Sharrows and Signs:

 Capital Improvement Project Funding

Video Promotion:

RTC Grant

West Fork River Acquisition:

- RTC Grant
- Fairmont EPA Assessment Grant
- WV Land Stewardship Corp EPA Assessment Grant
- TIF Project

East Side Acquisition:

- Sharon Steel Trust Funding
- TIF Project
- Local conservation groups

Design and Construction:

- TIF Project
- TAP Funding
- EPA Cleanup Grant
- Land Water Conservation Fund

Challenges & Solutions

Examples from Across the Country

- DEVELOP A GEOSPATIAL DATASET
- ANALYZE THE EMERGING NETWORK
- PROJECT PRIORITIZATION
- ADVOCACY AND STORYTELLING





Eastern Sierra, CA

- Feasibility and data-gathering study
 December 2022-April 2025
- Goal of connecting Eastern Sierra communities to each other and to existing public lands and trails
- Project managed by the Eastern Sierra Council
 of Governments conducted by Mammoth
 Lakes Trails and Public Access Foundation and
 Toole Design + Planning





Eastern Sierra, CA

DEVELOPING A GEOSPATIAL TRAIL DATASET TO SUPPORT THE VISION

- Conceptual alignment ~ 200 miles
- Network inventory process aggregated and standardized data
 - Three counties & 12 municipalities
 - Federal land managers (NFS & BLM)
 - Los Angeles Department of Water and Power





Eastern Sierra, CA

VISUALIZE **AND ANALYZE**THE EMERGING TRAIL NETWORK

- Project team focused on emerging route county by county
- Network Gap Analysis
 to find routes that you could travel
 50 miles uninterrupted to identify potential network and gaps





Eastern Sierra, CA

PROJECT PRIORITIZATION AND GAP-FILLING

- Least Cost Path Analysis relevant geospatial datasets >
- Public feedback opportunities included geo-enabled surveys and web maps
- Stakeholder working sessions with tribes, land managers and local agencies centered around exploration through interactive maps





Eastern Sierra, CA

ADVOCACY AND STORYTELLING

- Detailed, multi-scale alignment maps at the center of all stakeholder engagement events
- Feasibility report published as an ArcGIS StoryMap with static and interactive maps
- Towns to Trails was selected as one of eight regional projects recommended by the Sustainable Recreation & Tourism Initiative for implementation





Portland, ME

- MPO: Portland Area Comprehensive Transportation System (PACTS)
 - 18 cities and towns in southern Maine, serving a population of ~ 300,000
- PACTS Regional Trail Plan kicked off in Oct 2024
- Builds upon several other active transportation studies and plans with a goal of expanding transportation choices from Connect 2045

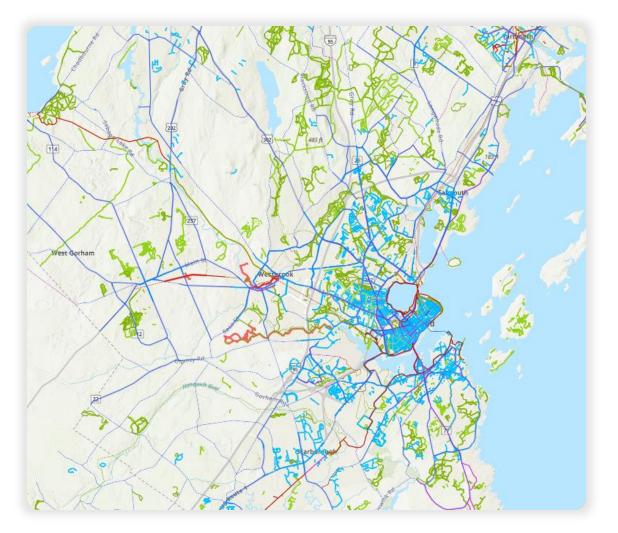




Portland, ME

DEVELOPING A GEOSPATIAL TRAIL DATASET TO SUPPORT THE VISION

- Greater Portland Council of Governments
 (GPCOG) maintains an Open Data Hub which
 includes a comprehensive active transportation
 dataset of bicycle and pedestrian paths
- Existing and planned routes are routinely collected and updated from member municipalities and local partners like **Portland** Trails

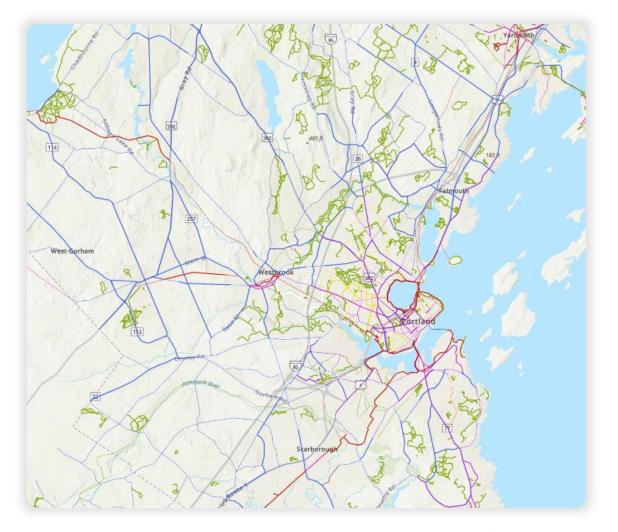




Portland, ME

VISUALIZE AND ANALYZE THE EMERGING TRAIL NETWORK

- Builds upon decades of established trail network planning and development
- Emerging network assessed against demographic, economic, and environmental datasets for highest impact
- Informed and refined by multiple rounds of public engagement

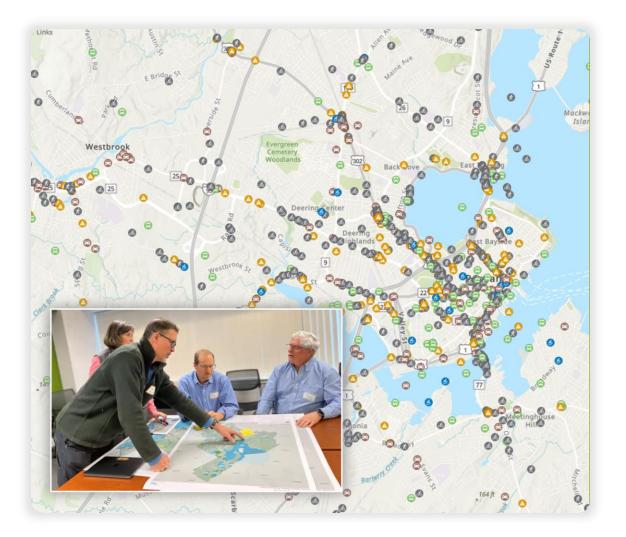




Portland, ME

PROJECT PRIORITIZATION AND GAP-FILLING

- Interactive trail network map viewer provided all project partners a common operating picture to identify existing gaps
- Two rounds of public surveys included static and interactive maps for comment, including opportunity to comment on initial highest scoring priority gaps
- PACTS Executive Board endorsed the plan's priority project list in August 2025





Portland, ME

ADVOCACY AND STORYTELLING

- 50+ AT gaps spanning 100 miles across
 15 of the 18 PACTS communities
- ArcGIS StoryMap of the Regional Trail Plan allows the public to explore interactive maps and access additional project info
- PACTS Policy Board voted to adopt the Regional Trail Plan on October 23, 2025!

The Regional Trail Plan

A plan to connect communities via trails and paths throughout the PACTS Region.

PACTS April 18, 2024





Austin, TX

- One of family of plans serving 990,000 residents
- Each plan relies on and leverages power of GIS
- Urban Trails Plan a key component of the city's ambitious goal of 50-50 mode-share by 2039, where 50% of all trips to be made by walking, biking, transit, and carpool and 50% by driving alone











Austin, TX

DEVELOPING A GEOSPATIAL TRAIL DATASET TO SUPPORT THE VISION

- Datasets used in the 2023 Urban Trails Plan have been developed over decades
- Austin's multi-use trail network defined and developed by many city departments and contractors
- Field work conducted by city staff and consultants to assess corridor feasibility, identify alternative routes, and collect location information and photographs

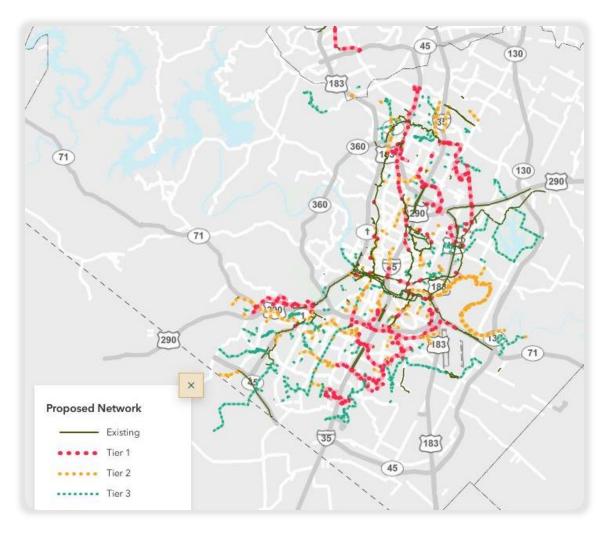




Austin, TX

VISUALIZE AND ANALYZE THE EMERGING TRAIL NETWORK

- Trail alignments updated with city programs like Safe Routes to School and Vision Zero
- In coordination with partners including nonprofits and private developers
- Segment inclusion influenced by deep community engagement, assisted by feedback collected through static and interactive maps

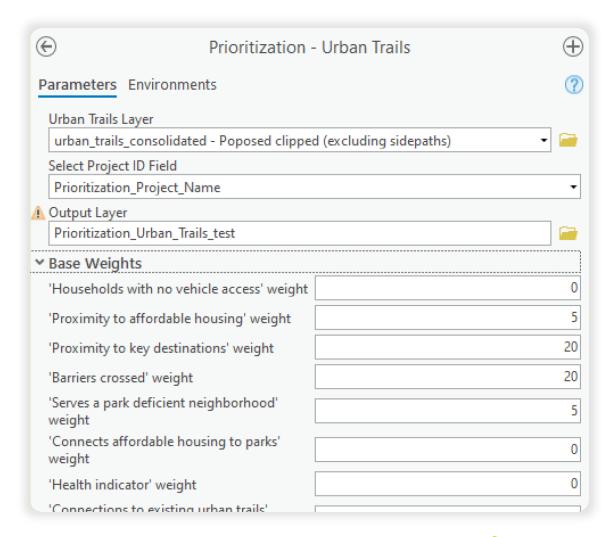




Austin, TX

PROJECT PRIORITIZATION AND GAP-FILLING

- City staff use a suite of GIS tools developed by Toole Design for initial prioritization scoring
- Hundreds of proposed urban trail segments are assessed against dozens of weighted geographic datasets to provide a score for each segment
- 2023 Urban Trails Plan identified:
 - **68 miles** of existing trails
 - **221 miles** of Tier 1, 2, 3 trails

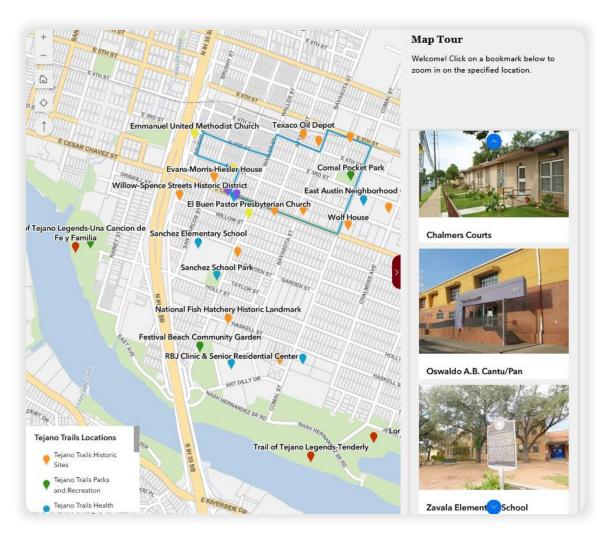




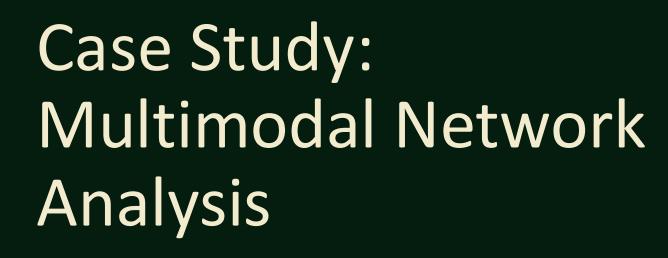
Austin, TX

ADVOCACY AND STORYTELLING

- The Urban Trails Program provides public interactive map of current trail segment development status
- Maps of proposed network highlight work being done to develop a system that matches needs and concerns of residents
- Austin Parks & Recreation Department ArcGIS
 StoryMap highlights the
 Austin Tejano Trails during
 Hispanic Heritage Month







Leann Chaney and Chris Jaros Southwest Pennsylvania Commission

TrailNation Summit 2025

Mapping for Connected Mobility

SPC's Regional Active Transportation Plan

Leann Chaney, AICP | Senior Active Transportation Planner

Chris Jaros I Data Analyst



Regional Context

About SPC

We are the Federally-designated:

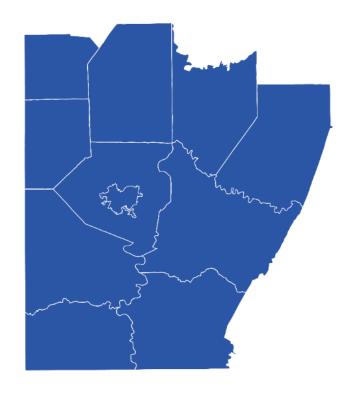
- Metropolitan Planning Organization + Local Development District
- Economic Development District

We Have:

- 50 Staff members
- 67 Commissioners
- 6,668 Bridges
- Over 25,000 linear miles of roadways
- Dozens of tunnels

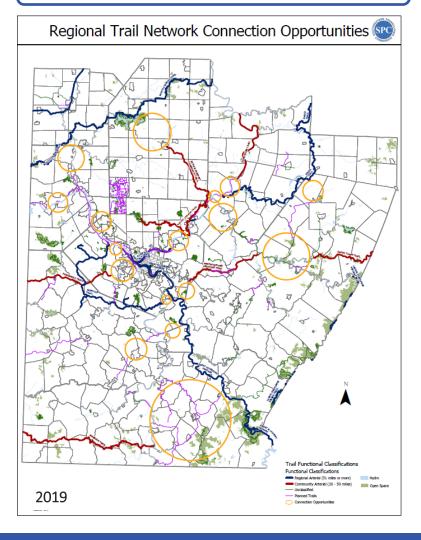
We Serve:

- 10 Counties and the City of Pittsburgh
- Over 7,100 square miles
- 2.57 million people
- 548 municipalities
- 10 Transit agencies
- 3 PennDOT Districts

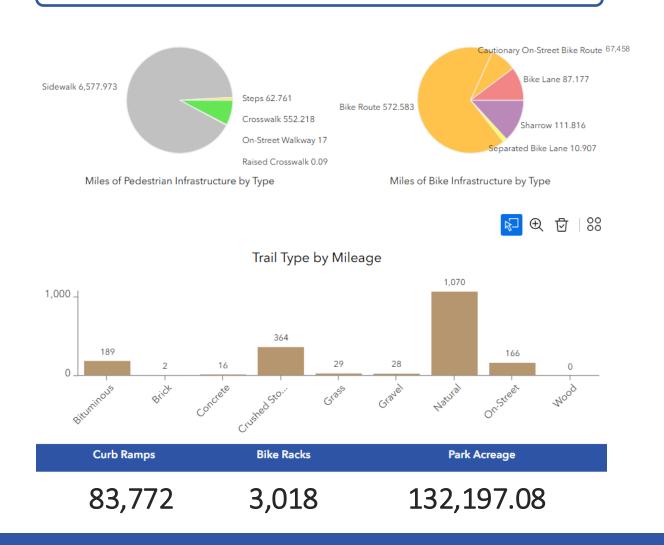


Regional Active Transportation Network

Identify gaps and opportunities



Collect and integrate data, keep maps current



Plan Summary

2025 Active Transportation Plan Update

- Builds on the goals and objectives established in the 2019 ATP.
- Advances the vision, policy goals, and objectives outlined in SmartMoves for a Changing Region.
- Complements SPC's Complete Streets Policy.



2025 Active Transportation Plan Update Southwestern Pennsylvania

https://storymaps.arcgis.com/stories/b82de3f8eb1e4495965f0af1b28a58be

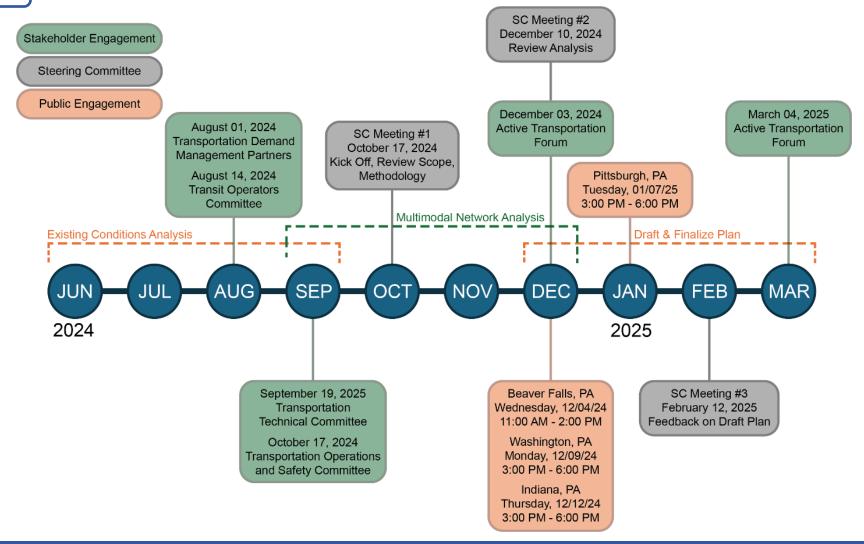
Plan Features

- Public-facing StoryMap
- Web-based tools + resources
- Multimodal network analysis + map



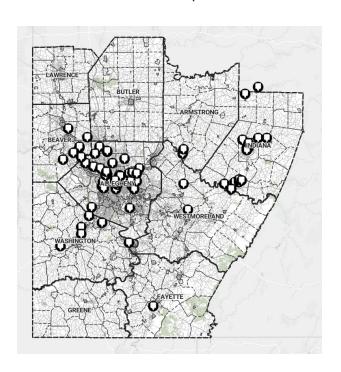
Community Engagement

Engage stakeholders



Listening Sessions + Online Survey

- Online survey
- Four listening Sessions
 - Feedback reflected in comment map





Vision + Goals

Define the vision

The ATP advances the Regional Vision identified in <u>SPC's Long Range Transportation Plan</u> (LRTP), <u>SmartMoves for a Changing Region</u>, which is: "A world class, safe, and well-maintained integrated transportation system that provides mobility for all".

Safety Improve safety for all roadway users.

Connectivity

Connect active
transportation facilities
across the region to create a
complete multimodal
transportation system
consisting of low-stress
streets, bicycle and
pedestrian infrastructure
and trails.

Comfort

Plan and design accessible, low-stress bicycle and pedestrian facilities that accommodate people of all ages and abilities.

Sustainability

Support and enhance environmental sustainability and improve public health.

Implementation Focus Areas

Support advocacy and funding

Regional Trail Coordination

Establish a formal entity responsible for the planning, development and funding of trails at the regional level, to include coordination with railroads companies where applicable.

Sidewalk Maintenance and Repairs

Expand technical assistance to help local governments address sidewalk maintenance and repair issues, where the responsibility lies with property owners, by sharing relevant data, case studies, and funding strategies.

Funding

Continue to provide resources, tools, and technical assistance to help local governments access funding for active transportation initiatives.

Model Policy Development

Draft model policy language for the policy priorities listed in the Policy Toolkit.

Plan Resources

Active Transportation Design Toolkit

Multimodal Main Streets

Description

- Due to the region's topography and historical development patterns, many communities in Southwestern Pennsylvania are built around dense, walkable business districts that are adjacent to or include high-volume roadways.
- The multimodal safety measures in this section can be applied individually or combined to increase safety and comfort along main streets.

Application

 Traditional downtowns and modern main streets surrounded by commercial land uses.

Design Guidance

 Designing a multimodal main street involves applying multiple design treatments consistently along the entire corridor to accommodate all users, including people walking, biking, driving, and taking transit. The specific combination of treatments will vary based on the street's role within a town's multimodal network.

Local Example

- As an example, 7th Avenue in Beaver Falls features a combination of treatments that create a multimodal main street, including:
 - Sidewalk Zones
 - Bike Lanes
 - Back in Angled Parking
 - Curb Extensions



7th Avenue in Beaver Falls, PA (Source: SPC)

Southwestern Pennsylvania Commission

Active Transportation Design Toolkit

3/1/2025 16

Active Transportation Design Toolkit

Rural Town Gateway

Purpose

- Rural town gateways mark the transition from high-speed, two-lane rural roads into more populated or developed areas.
- At the transition from rural roads to town centers, traffic calming measures like curb extensions and chicanes help reduce vehicle speeds and alert drivers to increased multimodal activity.

Application

 This strategy is appropriate for rural roads approaching more populated or developed areas, where a clear visual and physical transition is needed to alert drivers to changing travel conditions.

Design Guidance

- Narrow travel lanes to reduce travel speeds.
- Install speed limit signs and advanced warning signage for crosswalks.
- Consider reducing the number of travel lanes through town and installing turn lanes.
- Transition the shoulder to a sidewalk and/or bike lane.
- Install a gateway treatment such as a roundabout, chicanes, or curb extensions.

Considerations

- Continue traffic calming treatments into and throughout town.
- Consider including public art and wayfinding signage to enhance sense of place.



Bentleyville Interchange, Washington County

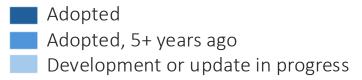
Southwestern Pennsylvania Commission

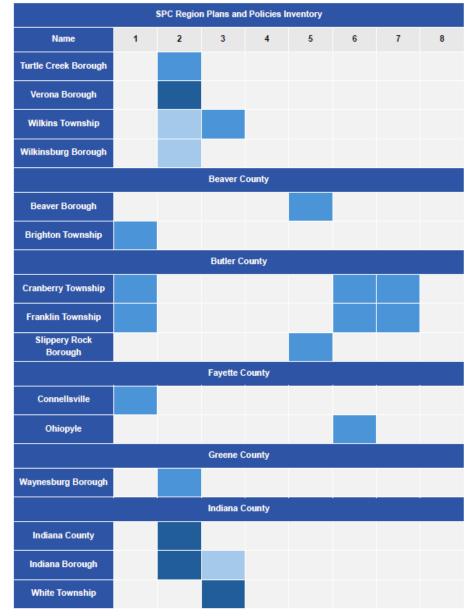
Active Transportation Design Toolkit

3/1/2025 27

Multimodal Plans and Policies Inventory

- 1. Bicycle and/or Pedestrian Plan
- 2. Active Transportation Plan
- 3. Complete Streets Policy
- 4. Vision Zero Plan
- 5. Bicycle Parking Ordinance
- 6. Design Standards Promoting Safety & Accessibility
- 7. Curbside Management Policy
- 8. Construction Zone Policy





Multimodal Network Analyses

A series of analyses were conducted to assess the experience of getting around the SPC region by walking, biking, and using transit. These analyses measure multimodal connectivity, ease, and comfort.

Multimodal Network Analysis

Pedestrian

- Where can people comfortably walk to jobs, transit, businesses, and schools?
- Where can people walk to the trail network?
- Where is it safe and comfortable to walk to access public transit?
- Where do critical gaps exist in the pedestrian network?

Bicyclist

- Where can people comfortably bike to jobs, transit, businesses, and schools?
- Where can people bike to the trail network?
- Where is it safe and comfortable to bike to access public transit?
- Where do critical gaps exist in the bike network?





How to use this analysis: Prioritize Signal Improvements

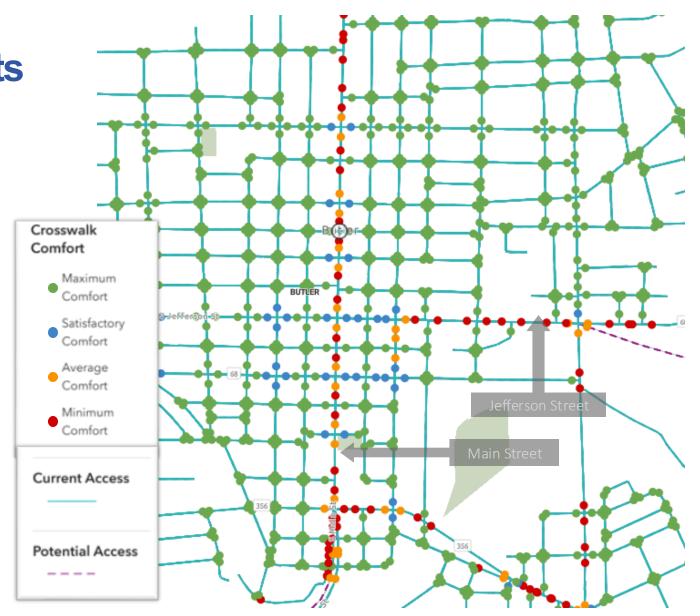
Example: Main Street and Jefferson Street (Butler, PA)

FACTS AND CONCERNS

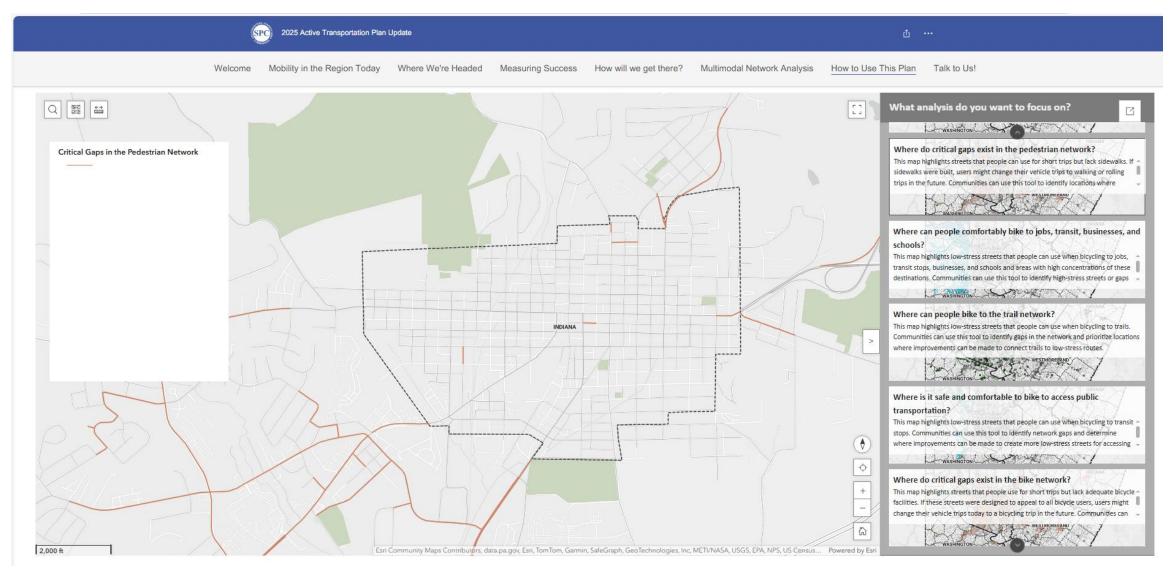
- Main Street and Jefferson Street are surrounded by a dense grid of walkable streets and low stress intersections.
- Signalized intersections along Jefferson and Main present higher stress levels due to wide roadways, high traffic volumes, and a lack of crossing improvements.

POTENTIAL SOLUTION

- Stress could be reduced by installing:
 - Pedestrian Crossing Islands
 - Leading Pedestrian Intervals
 - Curb extensions
- Toolkit: Multimodal Main Streets



Multimodal Network Analysis - Map



Thanks for listening!

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Trail Maintenance Toolkit

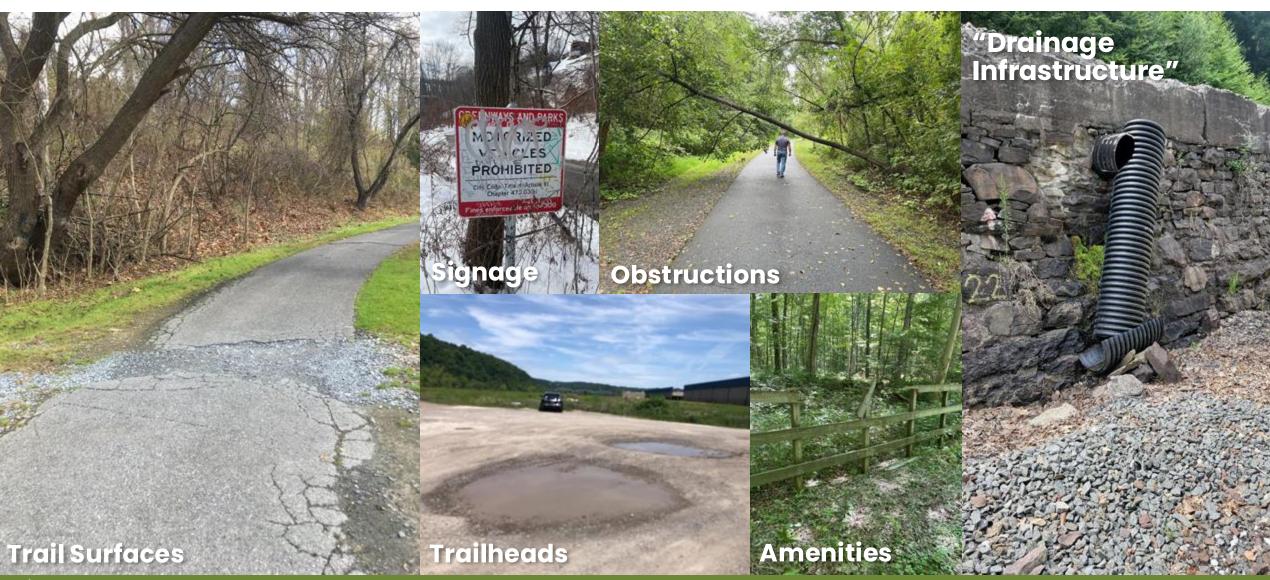
Pennsylvania Environmental Council

Cracks in the Foundation: Prioritizing Trail Maintenance



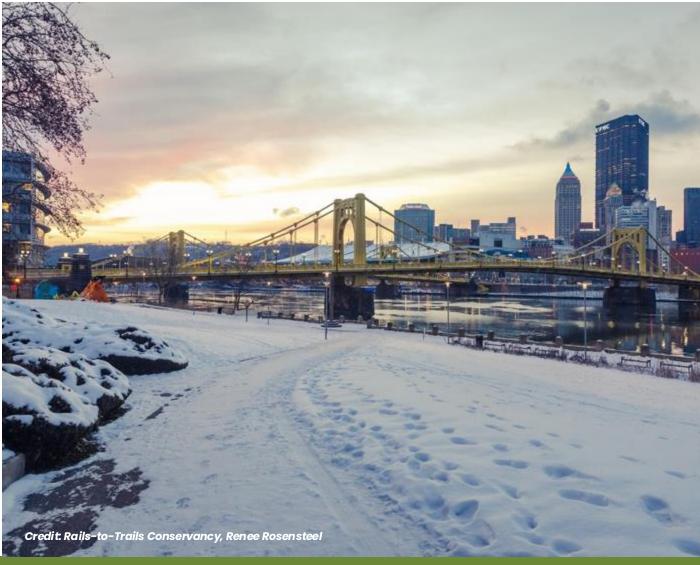


Common Operational & Maintenance Issues



The PEC Approach

- PEC has developed a full portfolio of trail sustainability work:
 - The Trail Maintenance Assessment Guide & Trail Maintenance Field Guide
 - The Trail Maintenance Toolkit (TMT)
 Field Maps phone app & webmap
 - TRAILS (Training Regional Advocates, Investing in Long-term Sustainability)
 being piloted in Southwest PA 2025-2026



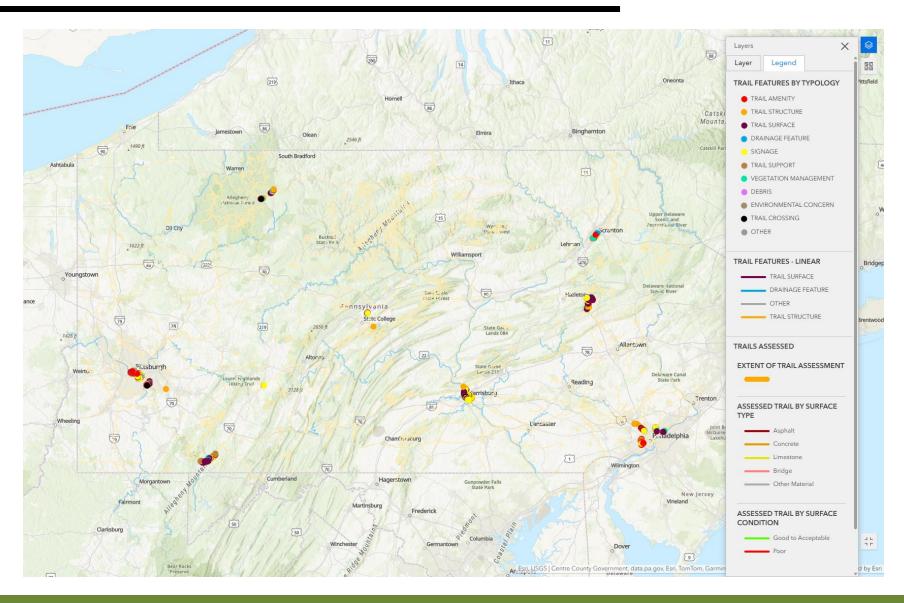
Trail Assessments Completed to Date

We have completed more than 15 assessments of 250+ miles of trail in PA:

- Southeast, NEPA Trails, Central PA, Southwest PA
- PA Wilds
- Statewide, Long-Distance Trails

Three primary issues affecting trail sustainability:

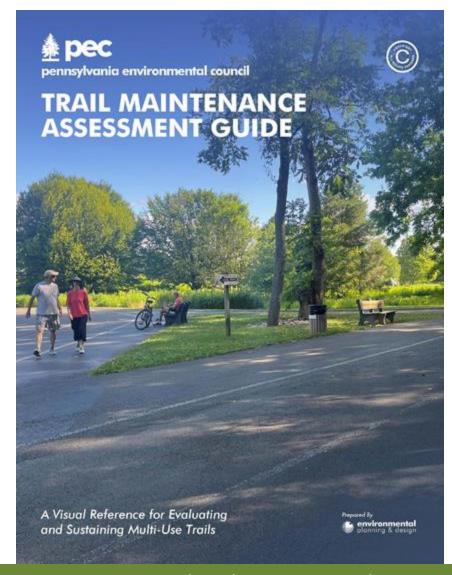
- Water
- Increased user volumes
- Life cycle of materials



PEC's Trail Maintenance Assessment Guide

- First-of-its-kind compendium:
 - The "state of our trails"
 - Common operational & sustainability issues

 - A proactive approach to maintenance
 Defining a rating & prioritization system
 The importance of trail assessments, & tools to conduct them
- PEC's Trail Maintenance Field Guide:
 - Slimmed down, pocket-sized version of the Assessment Guide
 - For use in the field alongside the Trail Maintenance Toolkit



Importance of Trail Assessments

- "Regular trail assessments are like a report card for your trail: they tell you what's working, and what's not"
- Benefits of conducting regular trail assessments:
 - Reducing wear & tear on your trail & its amenities
 - Preventing damage
 - Minimizing or eliminating the need for unexpected detours or closures
 - Avoiding loss of economic benefits
 - Tempering negative public perceptions or publicity
 - Discovering minor flaws / issues before they become major





Ranking & Prioritizing Trail Maintenance Needs

"Picture Book"

- Basic tenets of trail sustainability and maintenance guidelines
- Real world examples to help diagnose and rate common issues in the field, plus tips on how to address / prevent them
 - Dovetails with the Trail Maintenance Toolkit
- Diagrams outlining underlying causes

TRAIL MAINTENANCE ASSESSMENT GUIDE

3.3.1 Trail Surfaces: Crushed Gravel

EXISTING CONDITIONS RATING SCALE: EXAMPLES FOR CONTEXT

1 LIKE NEW

Freshly groomed trail, with neatly defined edges, a consistent width, and an evenly compacted, level surface, all while still effectively directing runoff to the sides of the trail.



9 GOOI

Groomed trail surface with consistent width and little to no grassy incursions. Some debris collecting along the lesser-used middle and edge areas of the trail.



3 ACCEPTABLE

Trail surface in ridable but not optimal condition in early spring, with much of the fines surface eroded or washed away and pitted areas beginning to form.



A POOF

Ponding on trail surface beginning to result in rutting and depressions, though the trail surface has yet to deteriorate to the point of large puddles and potholes. Nearly all crushed stone has been washed away.



ISSUE NEEDS FURTHER EVALUATION

Downspout from the neighboring building has been allowed to discharge directly on the trail, resulting in ponding on the trail surface where it meets the boardwalk. The problem will continue to worsen until addressed.



3.3.1 Trail Surfaces: Crushed Gravel

ILLUSTRATED ISSUES OF COMMON PROBLEMS



- A Rutting or "washboarding" of the trail results from inadequate compaction. This could be exasperated by heavy use during wet conditions, leaving impact scars which subsequently dry. This surface can be uncomfortable or even tricky for some coulders.
- B Erosion of trail shoulder has created a pronounced drop-off between the gravel and adjacent grassy bank.



PART 3: TRAIL SUSTAINABILITY GUID

A If grass or other vegetation is allowed to grow in the median, the riding surface will be reduced and will lead to increased impact along the edges causing additional problems like drainage issues and rutting.



- A Tree roots create tripping hazards and cause trail surface damage. Roots can also be exposed by erosion of the crushed gravel over time.
- B Small trees close to the trail will encroach further and cause problems if not addressed. New vegetation should be cleared on a regular basis to prevent overcrowding of the trail corridor.



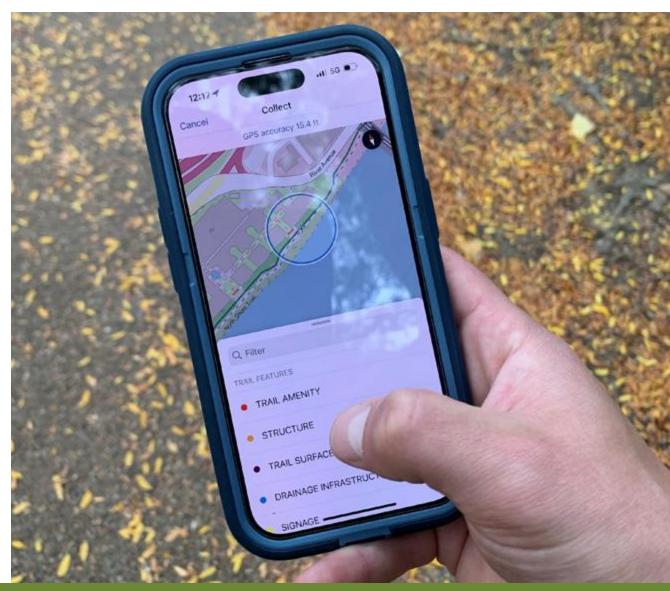
An example of poor drainage with standing water pooling on the trail surface resulting in muddy conditions. A natural clay subgrade may be hindering water filtration, and insufficient cross-slope is allowing water to collect in dips and voids. This section will require regrading to restore proper drainage off the trail corridor and into the adjacent swale.

50

The Trail Maintenance Toolkit (TMT)

Phone app and webmap

- Phone app: collect, rank, and geolocate information in the field using a smartphone and the Field Maps app from ESRI
- Webmap: review, analyze, and catalog information collected in the field, export lists and create reports



The Trail Maintenance Toolkit (TMT)





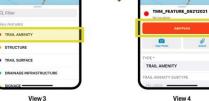


The Trail Maintenance Toolkit (TMT)

Phone App

- Accurately drop points and lines on or offline using GPS
- Take photos and attach files to points in the field
- Dropdowns for different categories and subcategories of issues based on the Trail Maintenance Assessment Guide

TMM_FEATURE_0621202









The Collect tool allows users to place trail features on the Trail Webmap. Tap the appropriate item for the type of trail feature you would like to record on the map. This will reveal a set of trail feature subtypes.

Action: Tap "Trail Amenity" button.

Once the trail feature type is selected, record the geographic coordinates to the Trail Webmap by selecting the "Add Point" button. Once the operation has been completed, a symbol and a dataset is added to the Trail Webmap. If a point was accidentally recorded or you wish to adjust the location, select the recently added point on the Trail Webmap and then hit "Edit" or "Delete" to modify or remove the recorded point

Action: Tap "Add Point" button.

When adding a point to your Trail Webmap, you can also attach a photograph, plan, sketch, or other type of digital file. Note that if a photograph is added to the recorded point, that particular image will not be incorporated into your mobile device's photo album or camera roll. Rather, the image is integrated into the Trail Webmap and stored within the GIS database itself These images can be separated, exported, and added back into your camera roll through a separate action

Action: Take a photo and select "Use Photo" or "Retake" as appropriate.

Select the trail feature subtype. "Bike rack" has been chosen for this example

Action: Tap "Trail Amenity Subtype."

View 7

Then, select the appropriate condition rating. Part 3 of this Guide provides a series of visual examples of '1' through '5' ratings for various trail features.

Action: Tap "Condition."

When appropriate, you can record any observed source of a problem or issue related to a recorded trail feature. The selections are pre-programmed to simplify data entry. If you do not feel any of the selections are applicable for this particular recorded point, then select "Other" to add a written note

Action: Tap "Observed Source of Problem."

This view depicts the "Note" box where you can type in unique information about the recorded point. Up to 256 characters can be entered into the box. You can also use the Note box to add information or context beyond the general maintenance conditions you have selected. For instance, if you recorded the condition of the bike rack as '4' (Poor) because of vandalism, you could further elaborate in the Note box about the specific part that needs to be repaired or replaced, or to otherwise indicate a priority level beyond the

Action: Type in the note, comment, or message



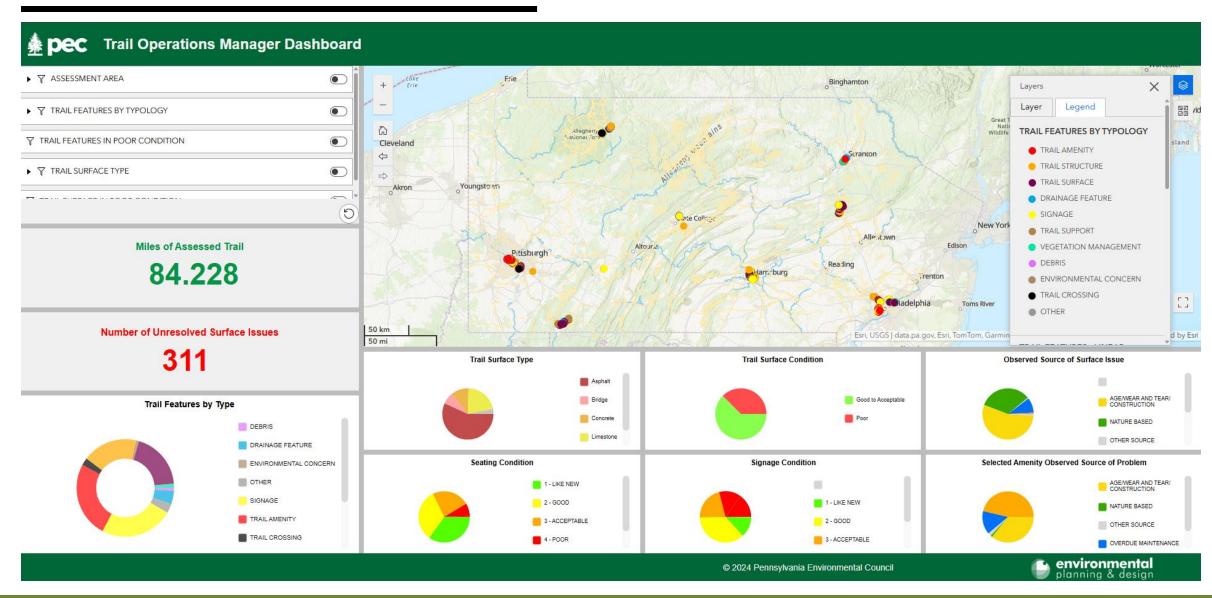
APPENDIX B: TRAIL MAINTENANCE TOOLKI

View 9

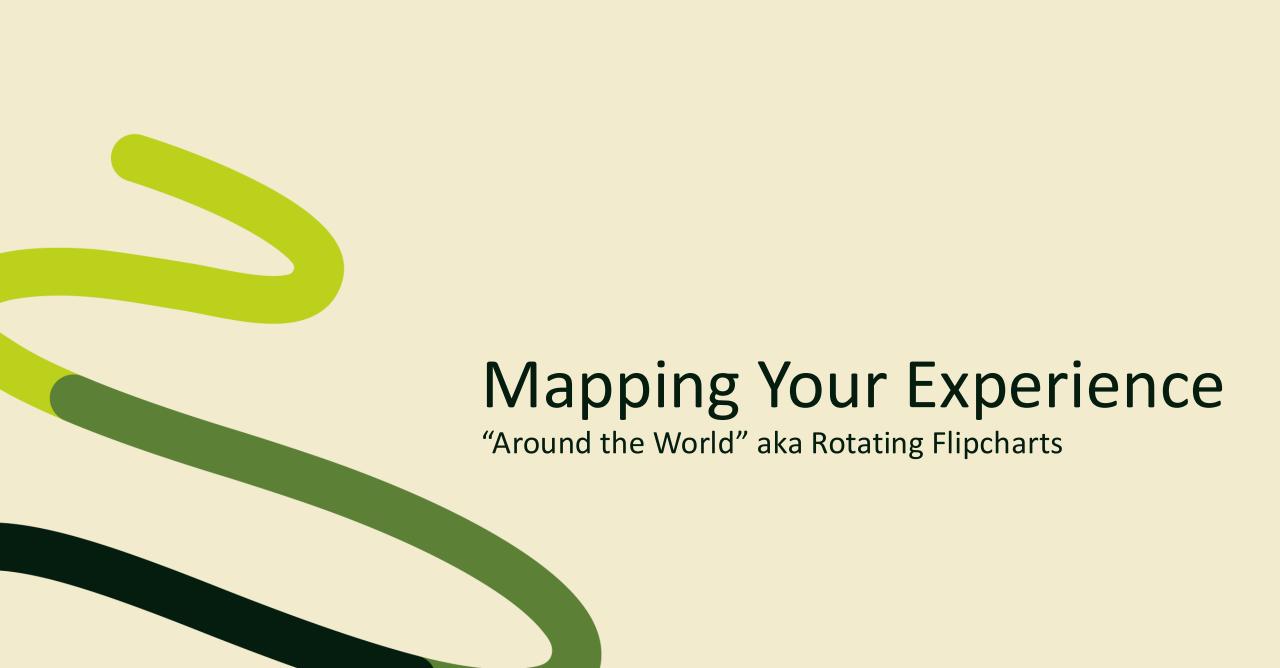
BB-10



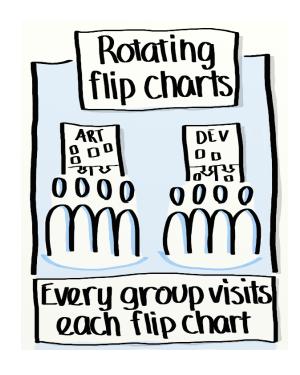
The TMT Dashboard







Action Planning: Mapping Your Experience



Small group breakout

Rotate to different charts

We will reconvene at the end!



1

2

3

4

GEOSPATIAL DATASET TO SUPPORT VISION

We now have access to so much data! What data are you collecting and consulting to support your trail network?

What gaps exist in current data, how can community partners or field work help fill them?

PROJECT PRIORITIZATION AND GAP FILLING

Which geospatial criteria are being used to prioritize trail projects in your network?

How are you approaching equitable development in any project prioritization efforts?

ANALYZING & VISUALIZING THE TRAIL NETWORK

What data are you using to help make the case for the trail(s) in your area?

Imagine showing a mayor or funder a single map. What would you want them to understand right away?

ADVOCACY AND STORYTELLING

What personal or community stories could be paired with maps?

How might the same trail network be presented differently on a map depending on the audience?



Reach Out!

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