



National Capital Area Regional Trail Count Program

Update | March 15, 2022

Transportation Planning Board Bicycle and Pedestrian
Subcommittee Meeting

Agenda

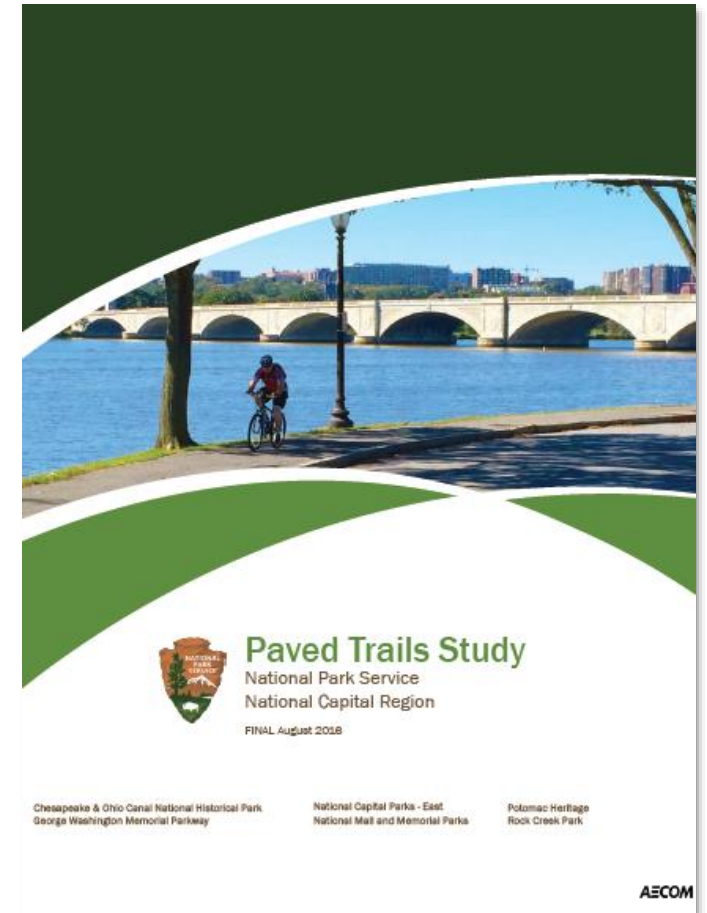


-
- Project Background
 - Project Scope
 - Recent Activities
 - Next Steps

Why We Are Here



- NPS 2016 Paved Trails Plan
- Coordinate with local jurisdictions
- Shared interest in regional trail counts and improving via coordination:
 - Consistency
 - Effectiveness
 - Sustainability
 - Resiliency



Project Overview



- **Purpose:** NPS needs to understand non-motorized travel patterns on paved, multi-use trails. To collect and analyze the data, the trails must have operational counters.
- **Objectives:**
 - Procure, install, calibrate, and maintain bicycle and pedestrian counters;
 - Provide a publicly accessible, centralized bicycle and pedestrian count dashboard;
 - Provide information on performance and use of trails via quarterly meetings and regular reporting;
 - Identify appropriate big data sources and apply data fusion modeling to combine them with automated counter data.
- The major project components of a public dashboard and data analysis don't happen without operational counters!

National Capital Area (NCA) Trail Monitoring and Analysis Program

UNC HSRC: Krista Nordback, PI, Sarah O'Brien, Co-PI;
Kristen Brookshire, and Mike Vann

Virginia Tech: Ralph Buehler (Arlington) and
Steve Hankey (Blacksburg)

Portland State University: Hau Hagedorn and Tammy Lee

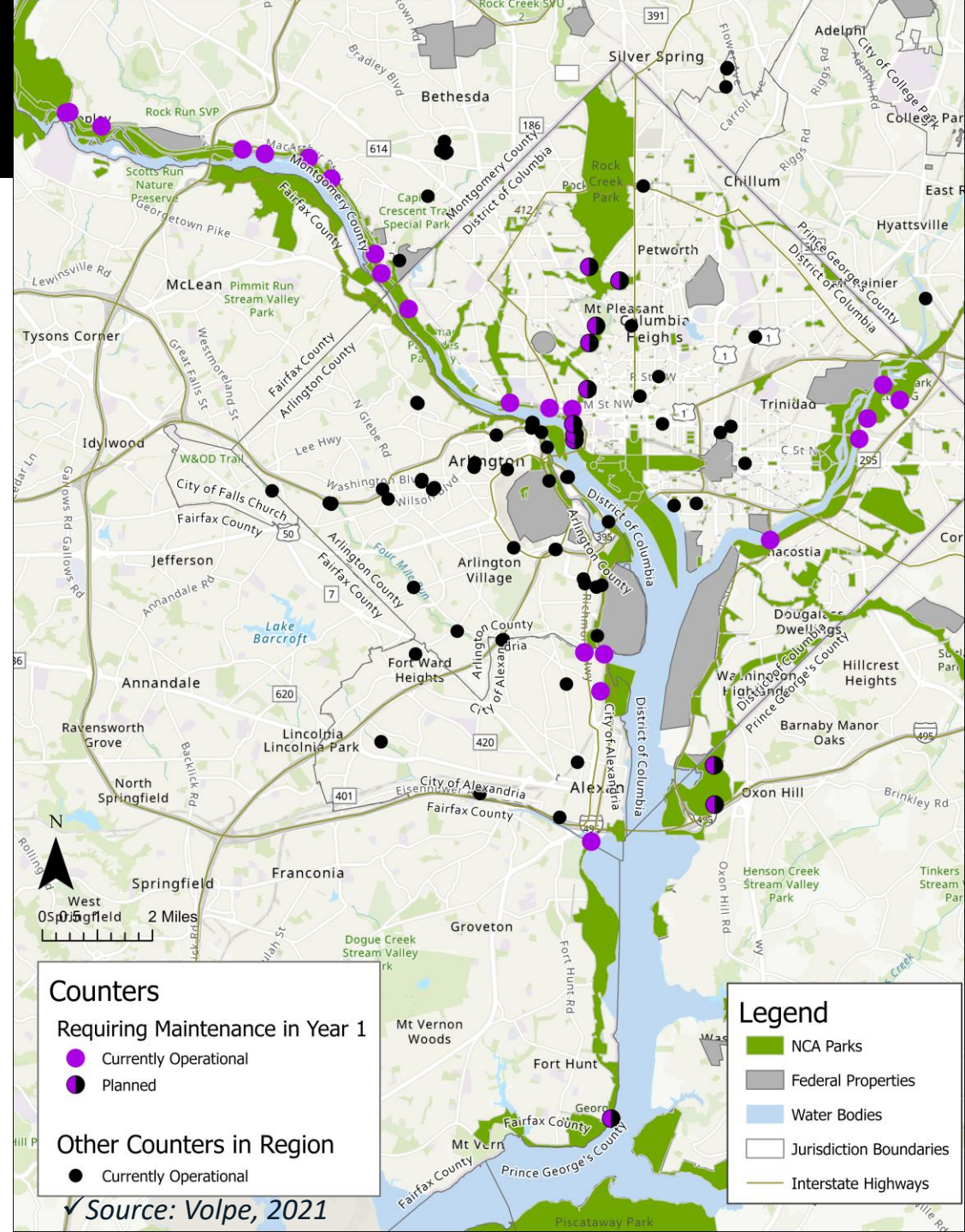


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Project Scope

- Task Area 1: Jurisdiction Coordination (UNC)
- Task Area 2: Maintenance of Automated Counters and Siting New Counters (VT and UNC and All)
- Task Area 3: Creation of Shared Regional Database and Public Dashboard and Data Monitoring (PSU and All)
- Task Area 4: Analysis and Reporting (UNC)
- Task Area 5: Explore Big Data Procurement and Analysis (VT and All)





Task Area 1: Jurisdiction Coordination (UNC)

- Monthly meetings with NPS
 - Attendance is mostly remote with 2 in-person appearances from UNC staff per year
- Quarterly meetings with NPS and partners
 - After first 3 (led by NPS) UNC will organize and attend and take notes meetings
 - Attendance is mostly remote with 2 in-person appearances from UNC staff per year
- Respond to questions from NPS and partners in a timely manner



Task Area 2: Maintenance of Automated Counters and Siting New Counters (VT & UNC)

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- Quality check data and identify problems
- Troubleshoot problems (Non-routine maintenance on up to 27 counters)
- Validate up to 27 NPS counters
- Offer site selection guidance for at least 12 counters
- Purchase and install spare parts, batteries and other needed devices
- If desired/needed: data patching and API agreement



First Steps



- Prof. Ralph Buehler's Studio Class of 16 graduate students has started on Task Area 2
 - Obtaining data
 - Quality checking data
 - Validating counters
 - Learning about data problems
 - Looking at travel patterns
- Next Steps
 - VT hourly master's students starting in January
 - PSU graduate student
 - VT PhD student for fall



VT Studio Class: Eco-Counter - Methodology

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- Magnetic key to access the device's information
 - Physical key needed to open box (if necessary)
- Android Device
 - Bluetooth connectivity
 - Eco-Counter software
- Manual validation forms
 - Pen/Clipboard
- Two hours of time
 - Planning for area conditions/weather
 - Comfortable chair
 - Snacks/water



VT Studio Class: Challenges in Validating Eco-Counters

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National Capital Area Office



- Overall a streamlined, manageable, and straightforward process
- Availability of android devices
 - Most students used iOS
- A few hiccups with double-counts of bikes



VT Studio Class: Eco-counter Validation – Data Downloads



YAH18014193

Logger

YAH18014193

System Information

Logger Type: Eco-Combo 15 min
Software Version: VLOG:06.14
Last Data Transmission: 11 hours, 42 minutes (October 13, 2021 5:00 AM)
Signal Strength: 51%

Counting Site Information

Comment:
GPS COORDINATES +38.90644 / -76.94707

92

Pedestrian

IN **23**
OUT **24**

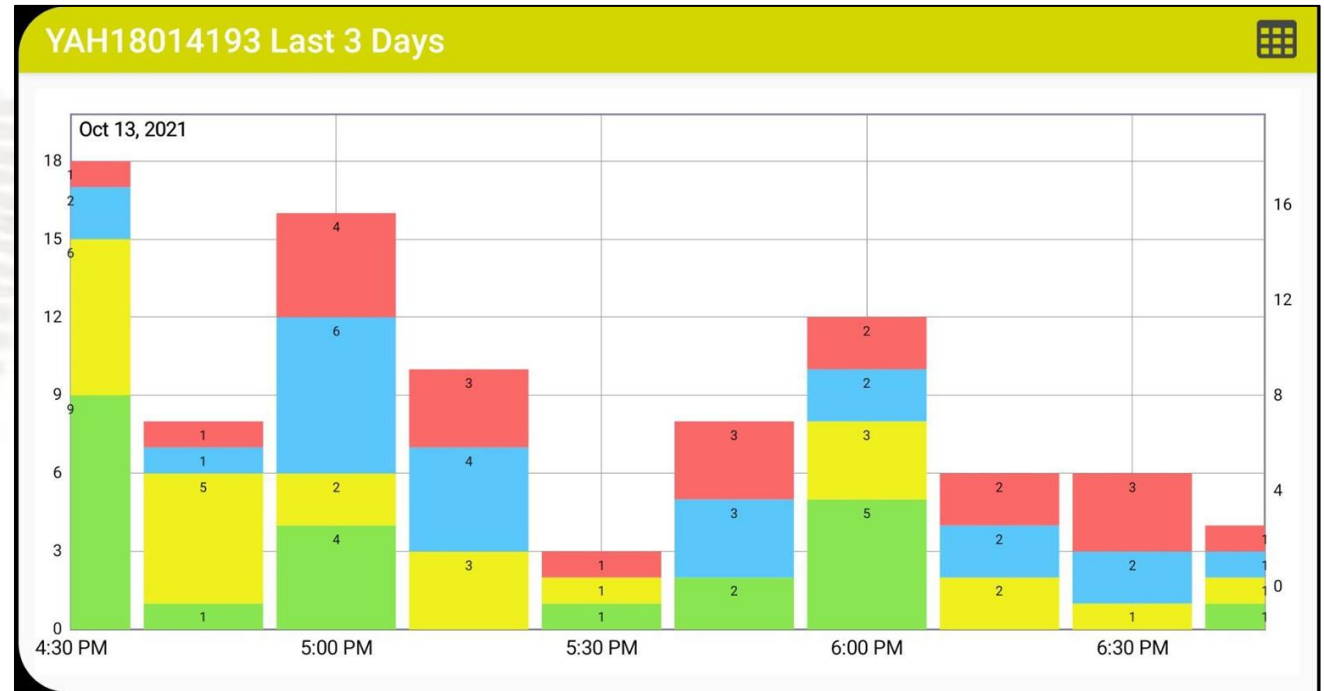
Cyclist

IN **23**
OUT **22**

Display Retrieve Upload Tools

YAH18014193 Last 3 Days

Date/Time	(1)	(2)	(3)	(4)
Oct 10, 2021 4:45 PM	0	1	4	5
Oct 10, 2021 5:00 PM	2	2	2	4
Oct 10, 2021 5:15 PM	0	1	4	1
Oct 10, 2021 5:30 PM	1	0	2	5
Oct 10, 2021 5:45 PM	6	3	3	1
Oct 10, 2021 6:00 PM	2	1	2	0
Oct 10, 2021 6:15 PM	2	1	1	3
Oct 10, 2021 6:30 PM	0	1	0	1
Oct 10, 2021 6:45 PM	0	0	1	1
Oct 10, 2021 7:00 PM	0	0	0	0
Oct 10, 2021 7:15 PM	0	0	0	0
Oct 10, 2021 7:30 PM	0	1	0	2
Oct 10, 2021 7:45 PM	1	0	0	0
Oct 10, 2021 8:00 PM	0	0	0	0
Oct 10, 2021 8:15 PM	0	0	0	0
Oct 10, 2021 8:30 PM	0	0	0	0
Oct 10, 2021 8:45 PM	0	0	0	0
Oct 10, 2021 9:00 PM	0	0	0	0
Oct 10, 2021 9:15 PM	0	0	0	0
Oct 10, 2021 9:30 PM	0	0	0	0
Oct 10, 2021 9:45 PM	0	0	0	0
Oct 10, 2021 10:00 PM	0	0	0	0
Oct 10, 2021 10:15 PM	0	0	0	0
Oct 10, 2021 10:30 PM	0	0	0	0
Oct 10, 2021 10:45 PM	0	0	0	0
Oct 10, 2021 11:00 PM	0	0	0	0
Oct 10, 2021 11:15 PM	0	0	0	0
Oct 10, 2021 11:30 PM	0	0	0	0
Oct 10, 2021 11:45 PM	0	0	0	0
Oct 11, 2021 12:00 AM	0	0	0	0
Oct 11, 2021 12:15 AM	0	0	0	0
Oct 11, 2021 12:30 AM	0	0	0	0
Oct 11, 2021 12:45 AM	0	0	0	0
Oct 11, 2021 1:00 AM	0	0	0	0
Oct 11, 2021 1:15 AM	0	0	0	0
Oct 11, 2021 1:30 AM	0	0	0	0
Oct 11, 2021 1:45 AM	0	0	0	0
Oct 11, 2021 2:00 AM	0	0	0	0
Oct 11, 2021 2:15 AM	0	0	0	0
Oct 11, 2021 2:30 AM	0	0	0	0
Oct 11, 2021 2:45 AM	0	0	0	0
Oct 11, 2021 3:00 AM	0	0	0	0



VT Studio Class: TRAFx Validation – Methodology



- Manual count of TrafX counters will utilize video recordings in 2-3 hour increments to fulfill 8 hour tests.
- Materials:
 - GoPro camera
 - 512GB microSD card
 - extra GoPro batteries
 - disconnect box
 - steel cable ties (or screws)
 - weatherproof combination lock



VT Studio Class: TRAFx Validation – Methodology

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VT Studio Class: Challenges/Limitations in Validating TRAFx Counters

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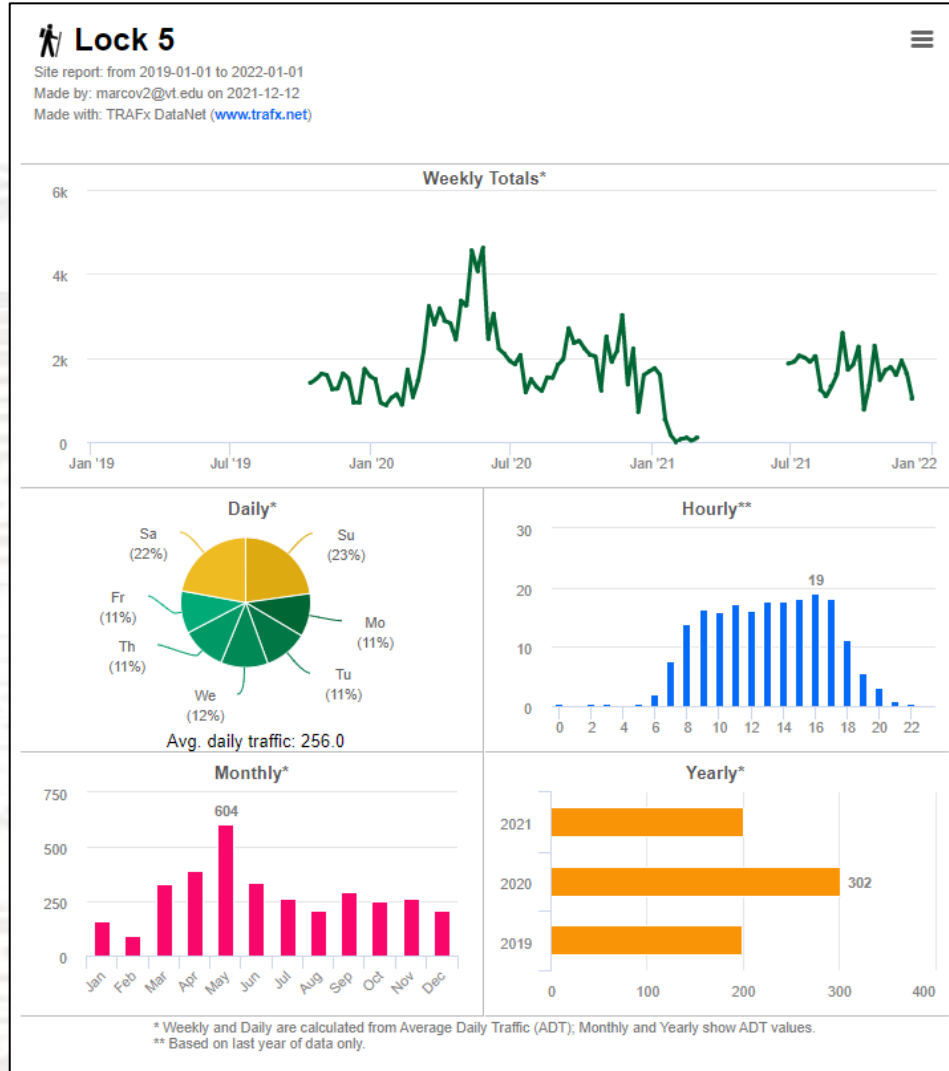


- Locating the physical counters (Glen Echo not found)
- Lack of **validation tool** similar to the Eco-Counter
- 8-hour **time** commitment for manual counts
- Access to **devices** such as cameras, software and dock
- Need to develop an **improvised validation process**
 - Limitations in memory, battery life, and file transfer/storage
 - Video recording in public places is a challenge
 - 8-hour time commitment



VT Studio Class: TRAFx Validation Data Downloads

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VT Studio Class: Findings: Eco Counter vs. TRAFx Validations



Eco-Counter

- Higher up-front cost; Lower long-term cost (costs saved include decrease maintenance, decrease labor, decrease inaccuracies)
- More involved with installation process, less portable
- Offers versatile usage (trails and street traffic)
- Offers count bins (intervals) as short as 15-min and as long as yearly
- Offers specific user and traffic insight: pedestrian vs. bicyclists, directional flow
- Offers simultaneous side by side trail comparisons (can select multiple trails at a time to compare)
- Intuitive and accessible user interface
- Easy to read and understand data given

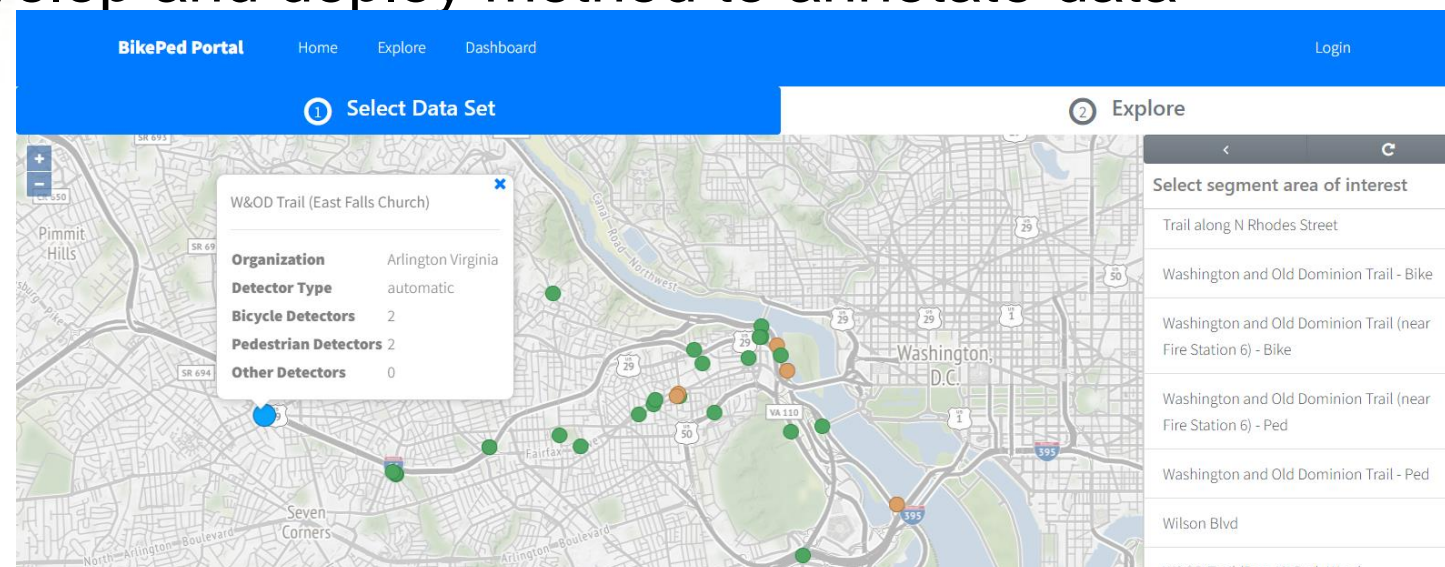
TRAFx

- Lower up-front cost; Higher long-term costs (additional labor for maintenance, data validation and analysis)
- Easy installation and portability
- Good for trail traffic (note: it can only be used for trail traffic)
- ONLY offers 1-hour bins
- ONLY offers total counts with no specifications for user or direction flow
- Can only view one trail at a time (extra steps involved in accessing trail data, charts), must download separately to see comparisons
- Cumbersome, clunky interface
- Labor intensive

Task Area 3: Creation of Shared Regional Database and Public Dashboard and Data Monitoring (PSU & UNC & All)



- PSU BikePed Portal (bikeped.trec.pdx.edu) Year 1 & 2
 - Data load (about 25 TRAFx and 35 Eco-Counter detectors)
 - Maintenance and Support
 - Maintain data in database
 - Train and support users
 - Allow access to raw/clean data
 - Enhancements (Year 2): Develop and deploy method to annotate data
- UNC/VT/Partners
 - Use QC function to flag data
 - Data cleaning



BikePed Portal

bikeped.trec.pdx.edu

⑩ Data management system that facilitates the collection, archiving, and sharing of non-motorized traffic counts

✦ Store different types of data formats and transforms in a user friendly format

- TrafX, EcoCounter, manual counts, turning movement counts
- Short duration, permanent

✦ User access and permissions

- allows for coordination among state & regional agencies
- no firewall

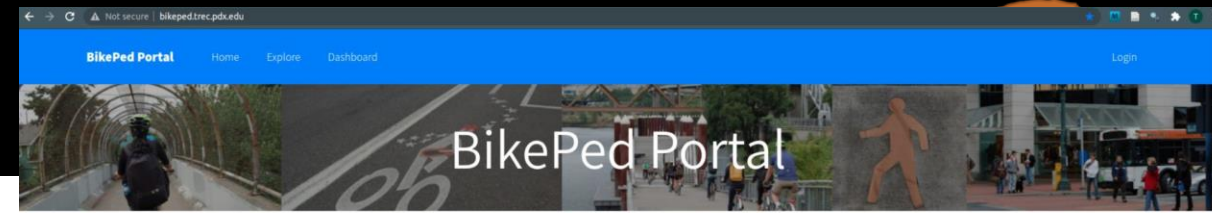
⑩ Metadata:

✦ facility type

✦ functional classification

✦ speed limit

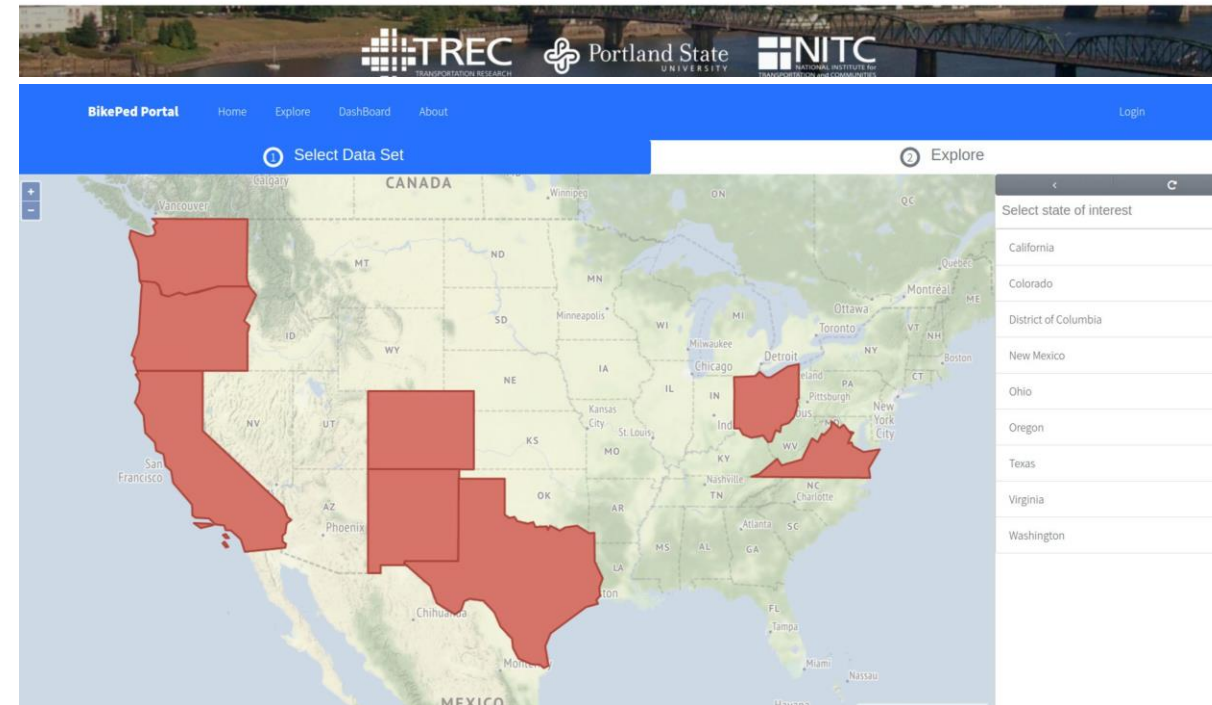
✦ any many other attributes



Leading the national non-motorized count data archive, BikePed Portal provides a centralized standard non-motorized count database for public agencies, researchers, educators, and other curious members of the public.

BikePed Portal was established in 2015, by researchers at Portland State University through a pooled fund grant administered by the National Institute for Transportation and Communities (NITC). Other project partners include the Federal Highway Administration, Oregon Department of Transportation, Metro, Lane Council of Governments, Central Lane MPD, Bend MPD, Mid Willamette Valley Council of Governments, Rogue Valley Council of Governments, City of Boulder, City of Austin, Cycle Oregon, and Oregon Community Foundation. The archive includes automated and manual counts from across the country and supports screenline and turning movement counts. The archive allows users to view and download data.

BikePed Portal is currently supported by the Transportation Research and Education Center (TREC) at PSU and its partners. If you're interested in using BikePed Portal for archiving bicycle and pedestrian counts for your community, please contact us at bikepedportal@pdx.edu.

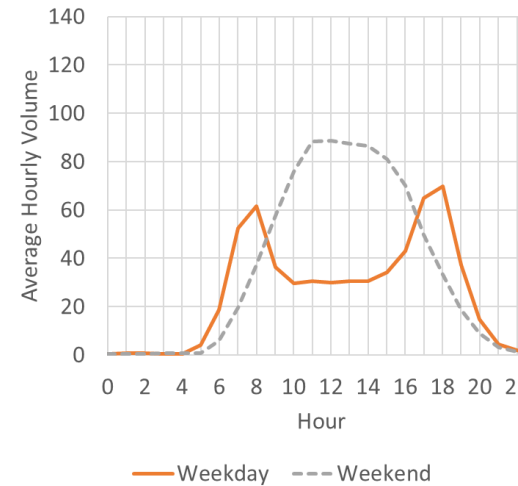


Task Area 4: Analysis and Reporting (UNC)

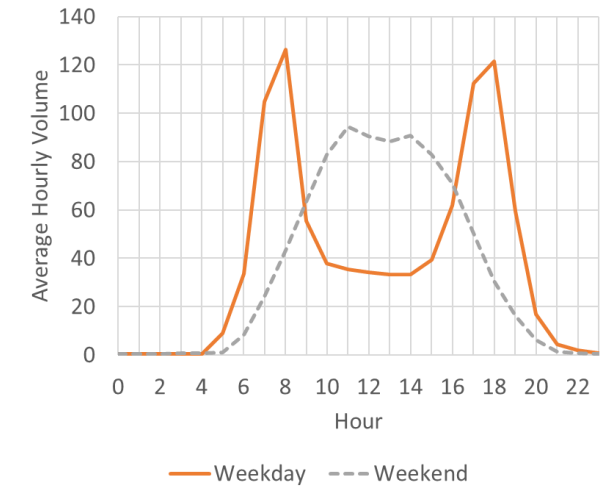


- Quarterly reports
 - QC activities & correction factors
 - Basic analysis of count data by mode and location
- Annual Analysis of Count data
 - Basic analysis of count data by mode and trail/region
 - AADNT, AADBT and AADPT
 - Peak volumes
 - Graphs and charts of data
 - Grouping by travel pattern

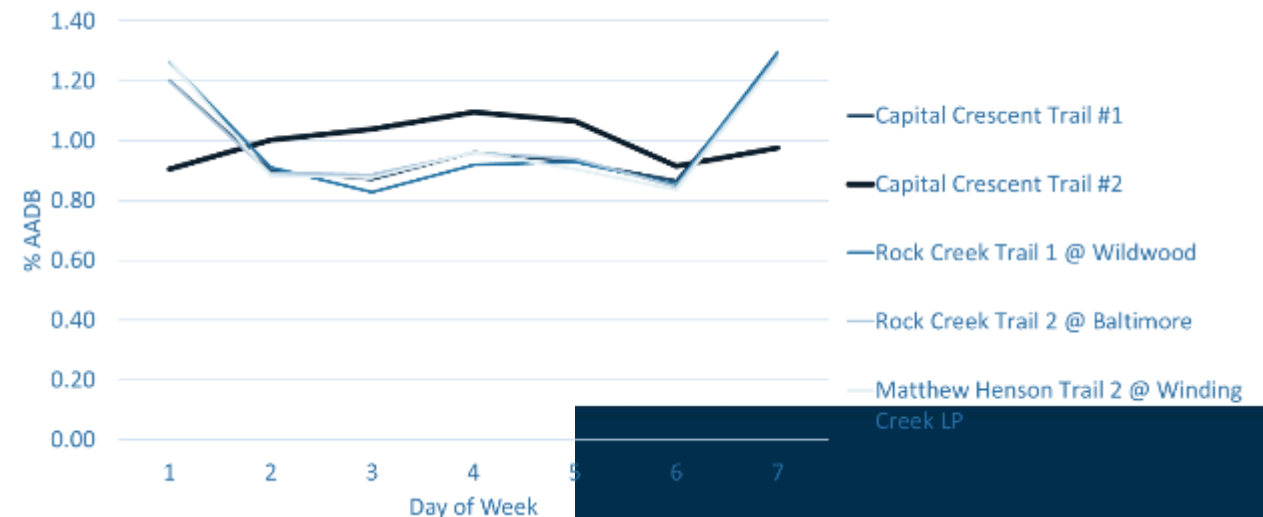
CCT1 2018 Hourly Bicycle Pattern



CCT2 2018 Hourly Bicycle Pattern



2018 Weekly Bicycle Travel Patterns



Task Area 5: Explore Big Data Procurement and Analysis (VT & All)



- No work in Year 1
- In Year 2 (VT PhD student activities):
 - Review Big Data sources
 - Identify data sources of interest
 - Recommend data sources
- Potential for continued work in future years
- Learning from [NITC Bike Data Fusions Study](#) led by PSU



Next Steps



-
- Hold individual meetings with stakeholder jurisdictions to discuss future participation
 - Reporting
 - Loading data into Bike Ped Portal
 - Validation of Anacostia River Trail Counters
 - Recruit PhD student
 - Convene next quarterly meeting: May 2022
 - Topic: 'A la Carte' service menu per counter



Questions?