

Making People Count!

An Introduction to NC's Non-Motorized Volume Data Program

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A vertical photograph on the right side of the slide. It shows the North Carolina State Capitol building with its iconic green dome and American flag on top. In the foreground, two cyclists are riding on a paved path. The scene is set outdoors with some greenery and large blue pots in the immediate foreground.

**NCAMPO
Conference
May 12, 2016**

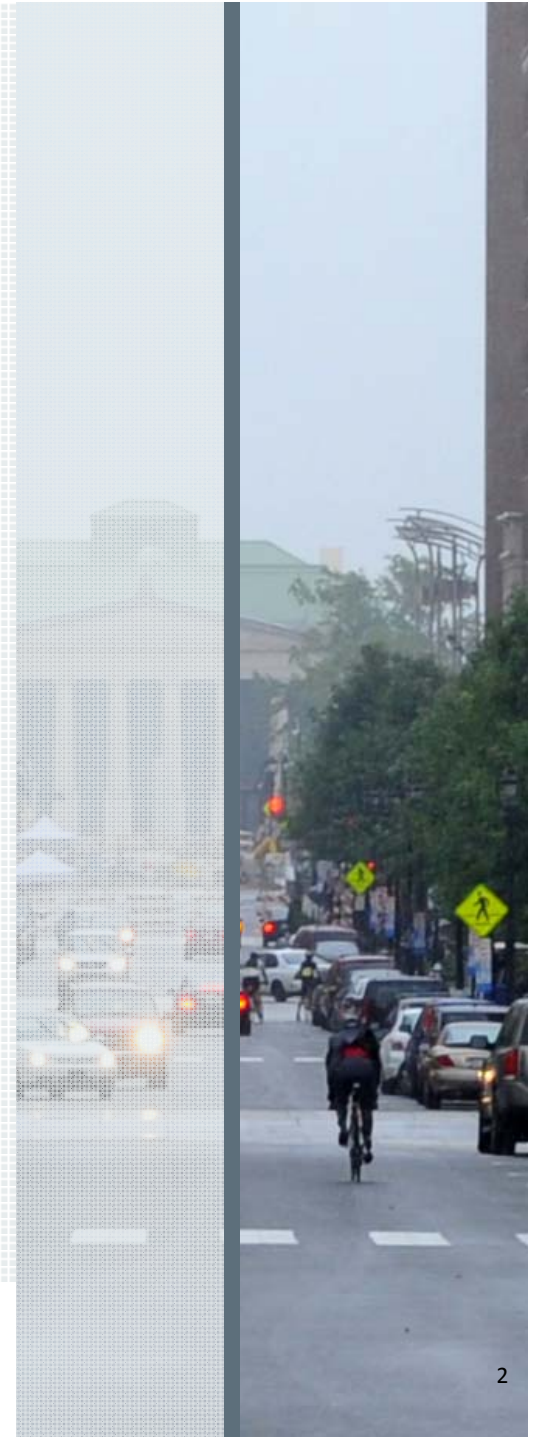
North Carolina's Non-Motorized Volume Data Program (NMVDP)

is a research project to test a bicycle and pedestrian count protocol and replicate this methodology across the state.



**NCDOT Sponsored
Research Project**

*What gets measured, gets done.
If you're not counted, you don't count!*



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Motivations behind NMVDP

Use of AADPT and AADBT estimations

- Project Prioritization and Funding
- Planning Decisions
- Complete Streets Policy Implementation
- Operations and Maintenance

Need common, consistent system to measure volume to:

- Understand current trends and model future usage
- Evaluate at different levels (site, corridor, region)
- Share data

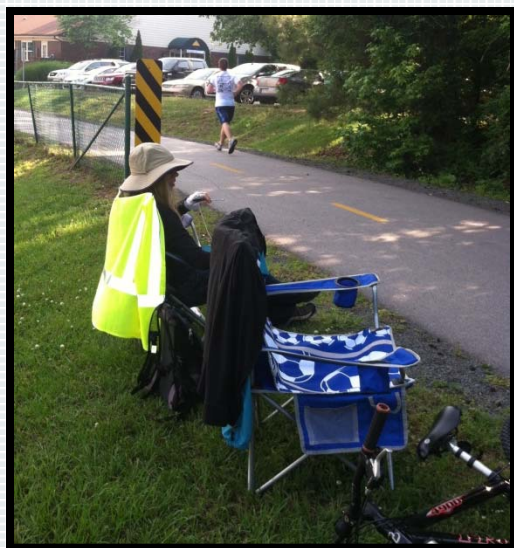
Annual Average
Daily Traffic
(AADT)

Annual Average Daily
Pedestrian Traffic
(AADPT)

Annual Average Daily
Bicycle Traffic
(AADBT)



Non-Motorized Volume Counts



Manual



Short Duration

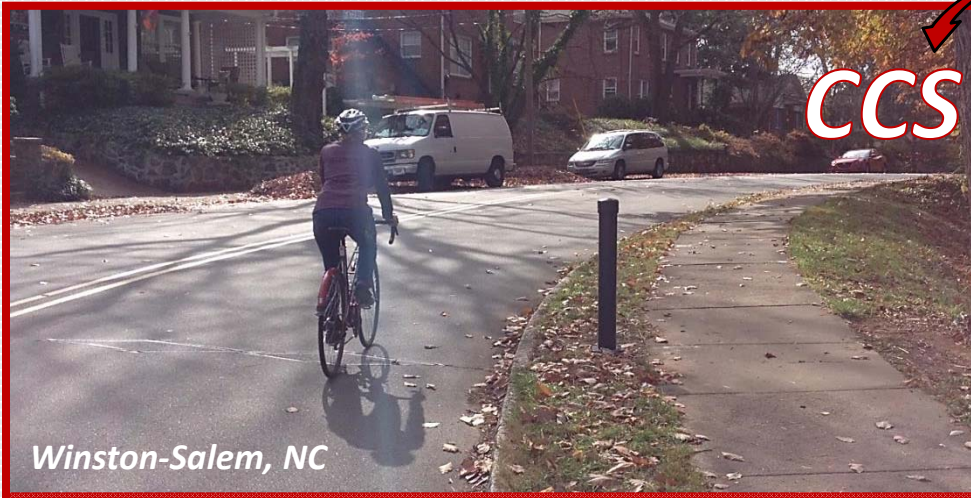


Continuous

Project/Context Specific



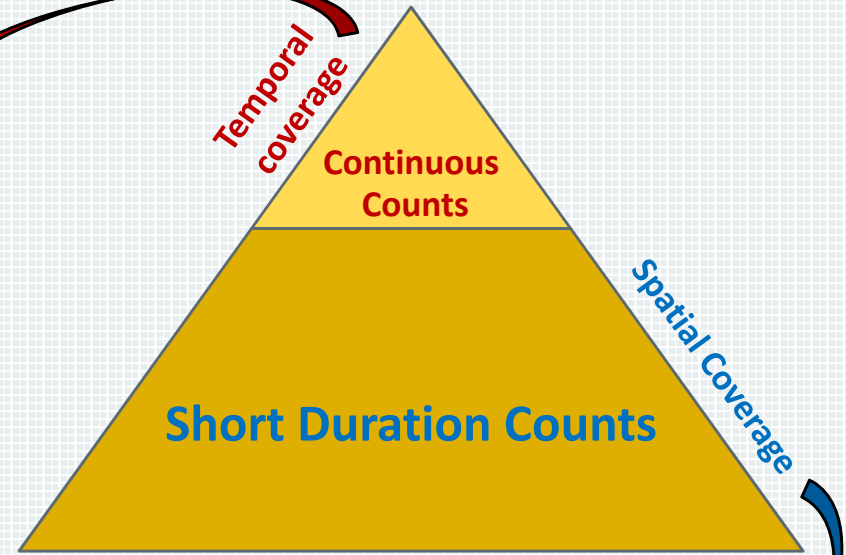
Trends/Patterns



Winston-Salem, NC

Continuous Count Stations – Permanent counting sites that provide data continuously (24 hours per day, 7 days per week).

Enough data should be collected to allow calculation of accurate adjustment factors (Time of Day, Day of Week, Monthly) to apply to **Short Duration Counts**.



Charlotte, NC



NC's "State of Practice"

- 17 agencies have or plan to conduct counts
- Most counts are short duration, manual counts
- Collected for specific projects or as part of 'add-on' to intersection turning movement study
- CCS installed independently* on trails by park/rec departments: Greensboro, Charlotte, and Chapel Hill

*(Not part of NC NMVDP)

Harrison Ave [SB]			
Out	In	Total	
8471	8772	17243	
0	1	1	
0	0	0	
8471	8773	17244	

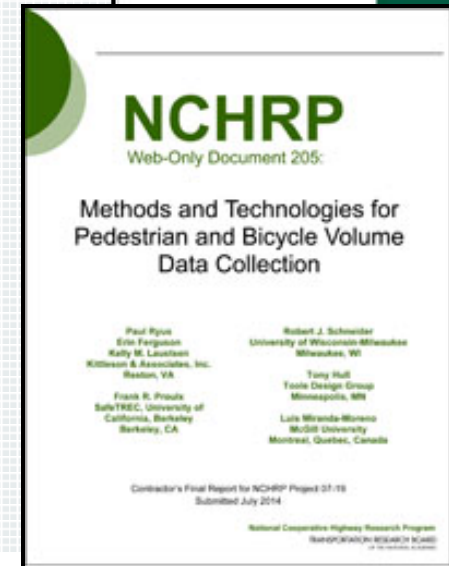
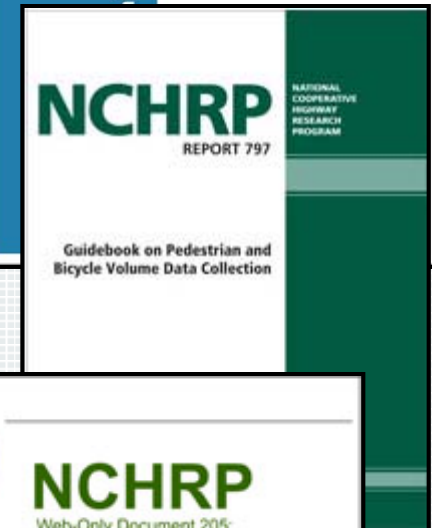
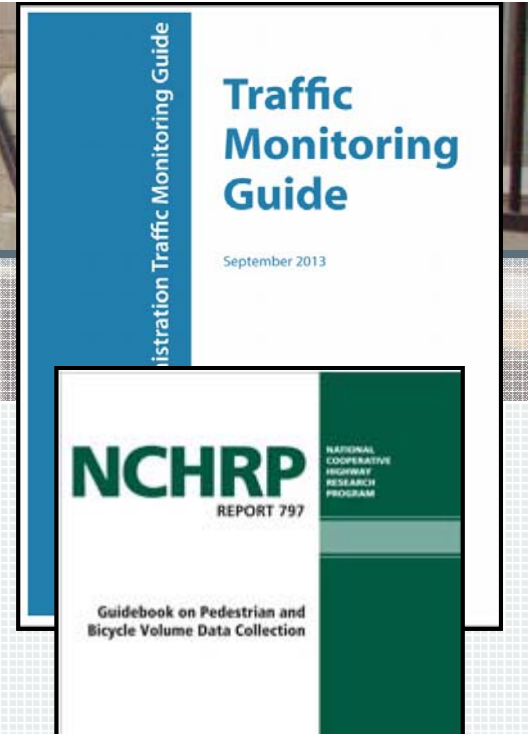
2437	4412	1923	118
0	1	0	0
0	0	0	0
2437	4413	1923	118
R	T	L	P

*Turning Movement Data Plot (PDF)
05/09/2013 6AM – 10PM
N Harrison Ave at NW Maynard Rd
Cary, NC*

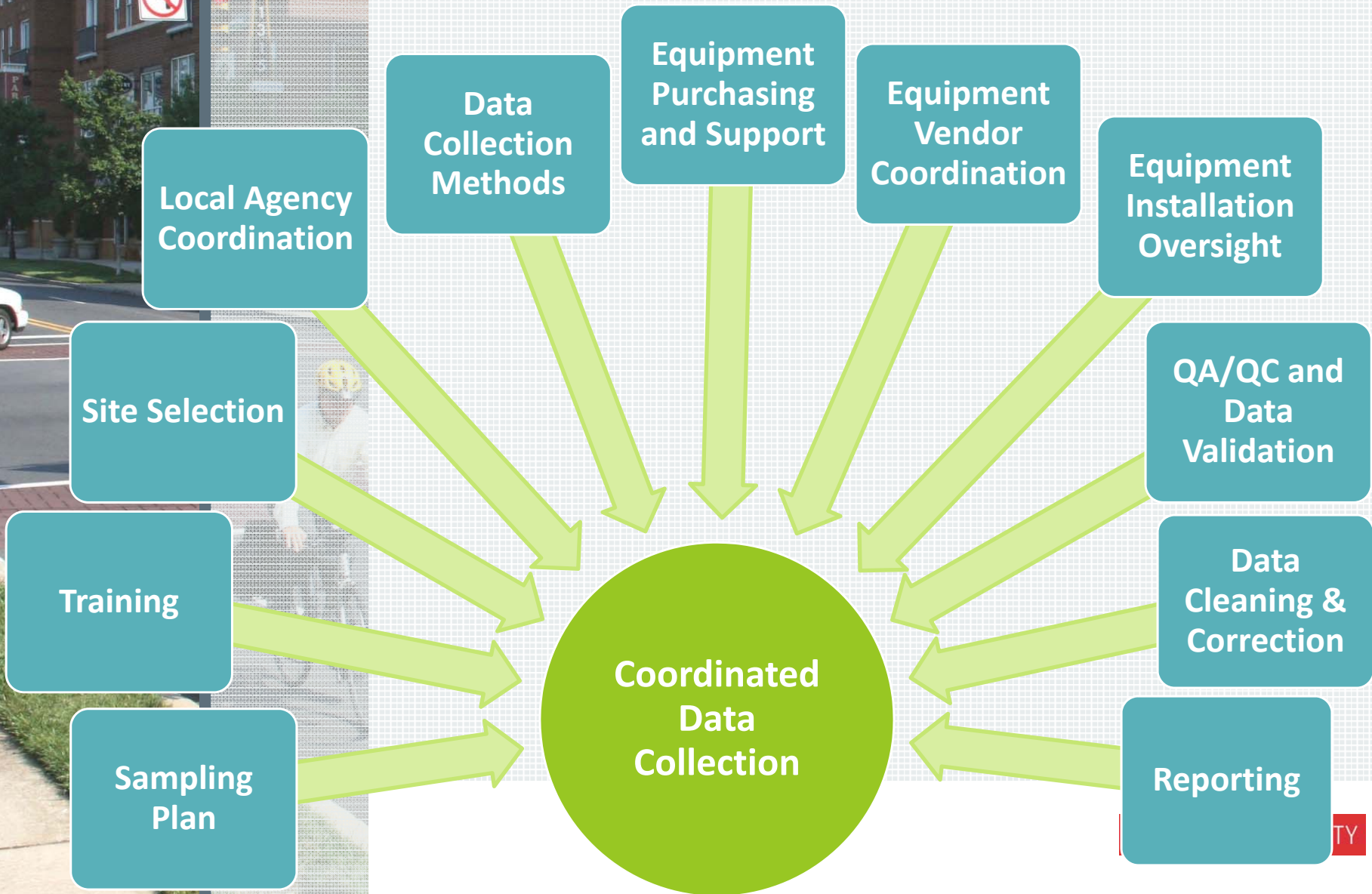


National State of Practice

- FHWA Traffic Monitoring Guide (Ch. 4)
- NCHRP Report 797 & Web Only Doc. 205
- TMG Format for bicycle and pedestrian counts
- Peers:
 - Colorado DOT
 - MnDOT
- Local/Regional Programs
 - Delaware Valley Regional Planning Commission
 - San Diego State University (SANDAG)



NON-MOTORIZED TRAFFIC MONITORING PROGRAM ELEMENTS





Local Agency Coordination

- What's In It For Agency?
 - Equipment
 - Technical assistance / Training
 - Access to **validated, cleaned** data
- What's In It For NCDOT?
 - Critical local knowledge
 - Installation assistance
 - Monitoring/maintenance assistance
 - Established relationships



*Continuous Count Station Collecting Data
Martin Luther King Blvd, Chapel Hill, NC*



*Station Installation Diagram
Martin Luther King Jr Blvd
Chapel Hill, NC*



Quality Control of the Data

- Retrieve / compile data
 - Monitor equipment
 - Perform regular checks on the data
- Conduct validation study
 - Precision and accuracy of the count



*Continuous Count Station, Brevard Greenway
Brevard, NC*

American Tobacco Trail Durham, NC

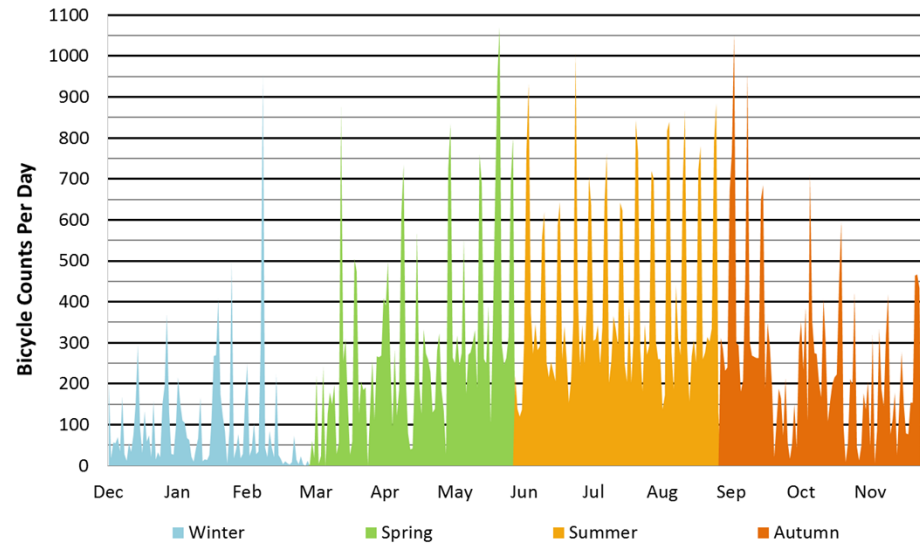
Day of Week	Bicycle Count
Sun	500
Mon	203
Tue	168
Wed	211
Thu	161
Fri	183
Sat	349
Average	249

Table 5. Average Bicyclist Count by Day of Week

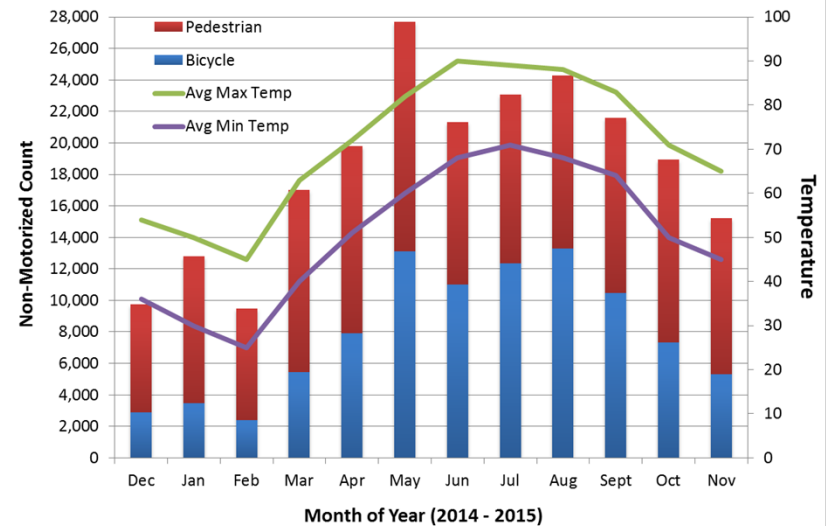
Hour	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Avg
0	1	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	1	0	1	0	0	0	0
5	0	1	0	1	0	1	0	0
6	2	3	4	4	3	3	2	3
7	8	3	4	6	4	5	9	6
8	24	8	7	8	6	7	20	12
9	35	10	8	11	7	11	33	17
10	47	15	8	15	9	16	45	23
11	53	16	9	16	11	15	47	25
12	48	14	9	14	10	14	42	22
13	51	13	9	13	11	14	39	22
14	55	13	10	13	11	14	39	23
15	55	16	11	15	12	16	40	24
16	45	17	12	17	14	18	33	23
17	32	19	19	21	15	17	22	21
18	23	31	26	28	20	16	14	23
19	14	15	17	18	14	10	10	14
20	4	5	9	6	6	3	5	5
21	1	1	1	1	1	1	3	1
22	1	1	1	1	0	1	1	1
23	1	1	1	1	0	1	2	1
Avg	21	8	7	9	7	8	17	11

Table 6. Bicyclist Patterns by Day of Week and Hour of Day

Seasonal Bicycle Activity American Tobacco Trail (I-40 Bridge), Durham, NC 12/01/2014 - 11/30/2015



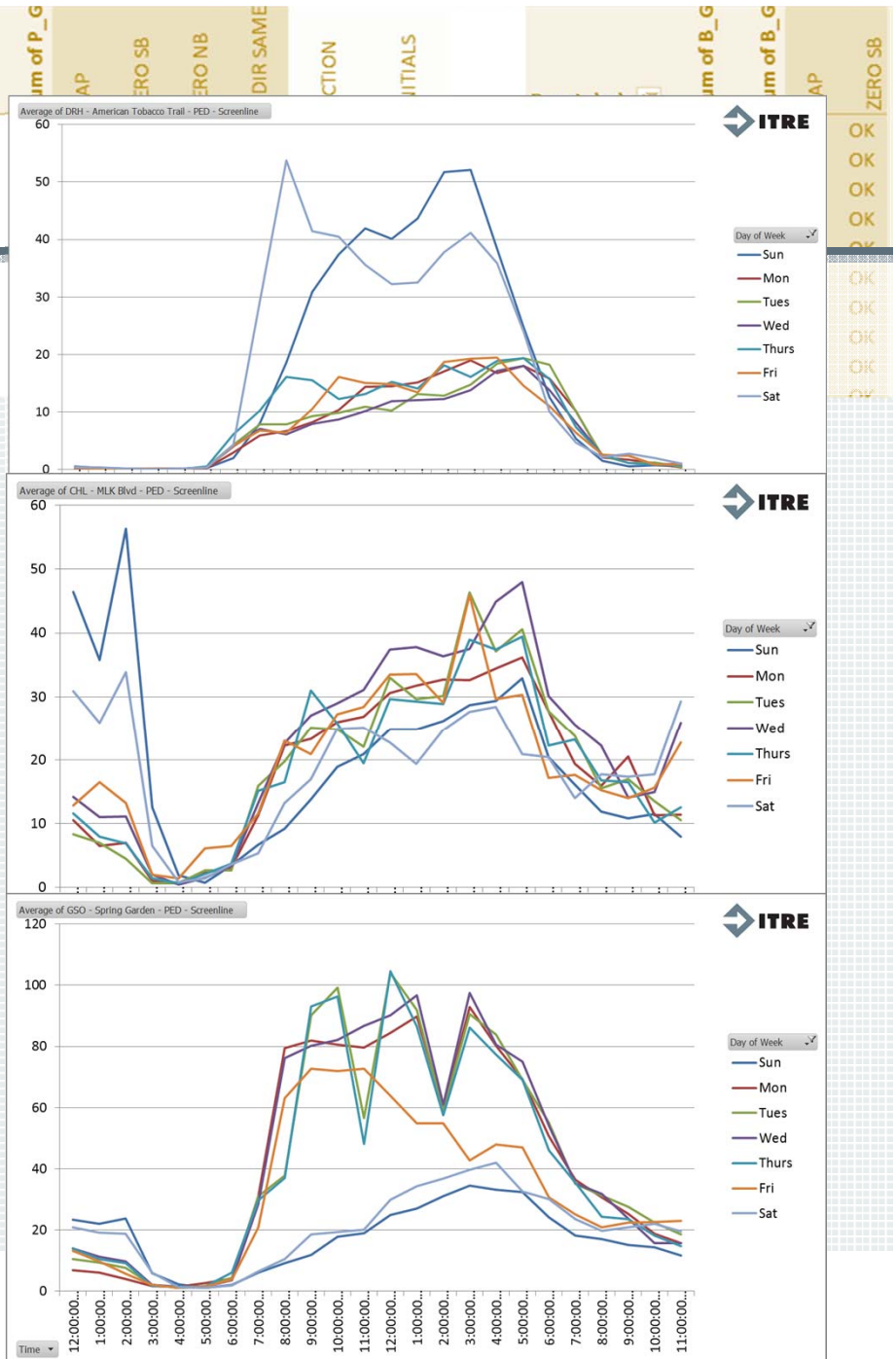
Count of Bicyclists and Pedestrians by Month American Tobacco Trail (I-40 Bridge), Durham, NC 12/01/2014 - 11/30/2015

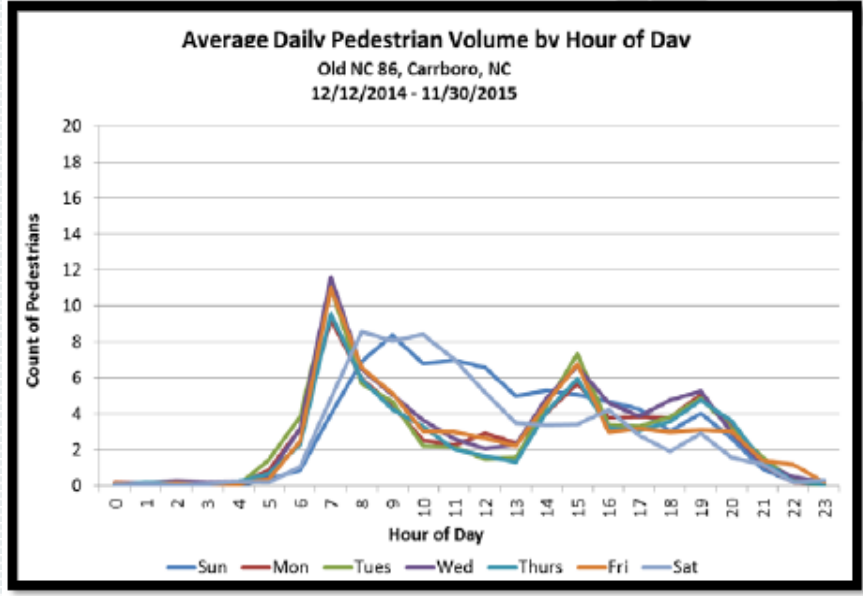
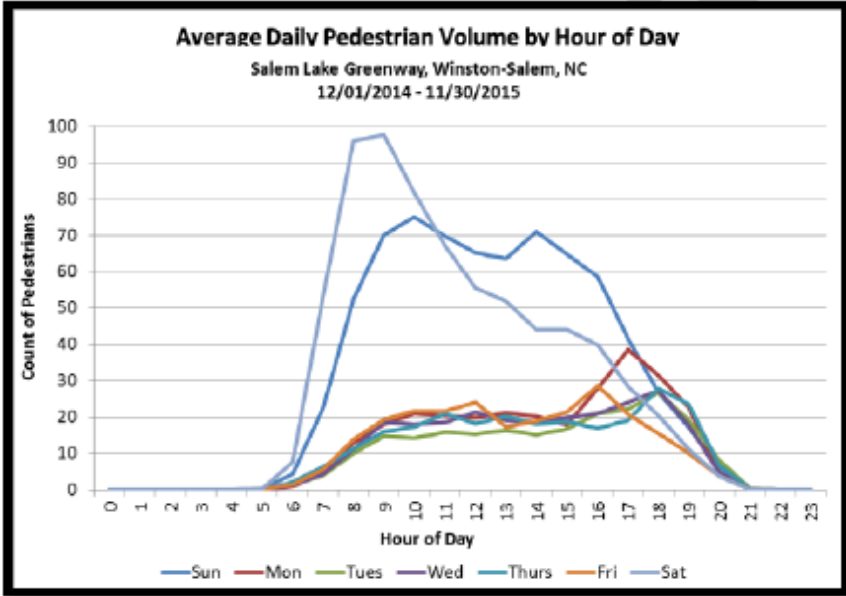
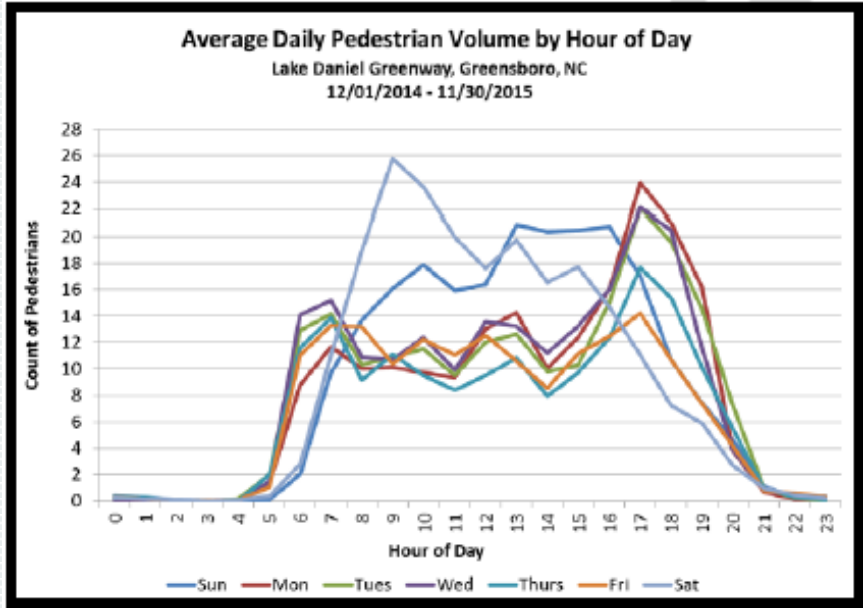
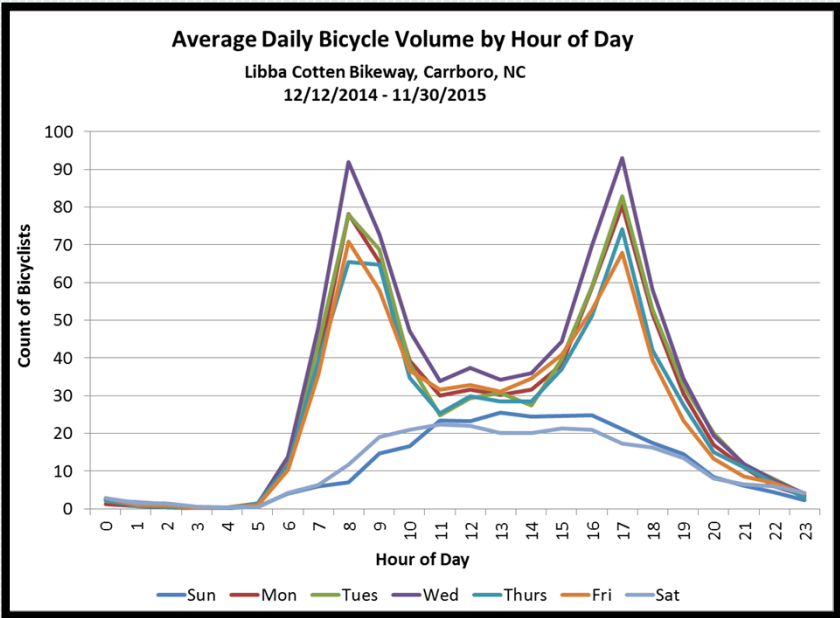


1	Row Labels	Sum of P_G	Sum of P_G	GAP	ZERO SB	ZERO NB	P DIR SAME	ACTION	INITIALS	Row Labels	Sum of P_G
98	2014_12_22	70	73	OK	OK	OK	OK	VALID		2014_12_22	52
99	2014_12_23	72	70	OK	OK	OK	OK	VALID		2014_12_23	40
100	2014_12_24	57	55	OK	OK	OK	OK	VALID		2014_12_24	20
101	2014_12_25	64	64	OK	OK	OK	OK	VALID		2014_12_25	21
102	2014_12_26	59	59	OK	OK	OK	OK	VALID		2014_12_26	25
103	2014_12_27	82	100	OK	OK	OK	OK	VALID		2014_12_27	43
104	2014_12_28	65	70	OK	OK	OK	OK	VALID		2014_12_28	35
105	2014_12_29	63	63	OK	OK	OK	OK	VALID		2014_12_29	29
106	2014_12_30	66	66	OK	OK	OK	OK	VALID		2014_12_30	39
107	2014_12_31	65	62	OK	OK	OK	OK	VALID		2014_12_31	45

Analyze Data

- Derive adjustment factors from continuous count data
- Derive expansion factors from sampling plan for each site type
- Develop AADT numbers
 - Apply adjustment factors
 - Apply error correction factors
 - Extrapolate observed counts for short-duration site AADTs
- Explain any statistical uncertainties

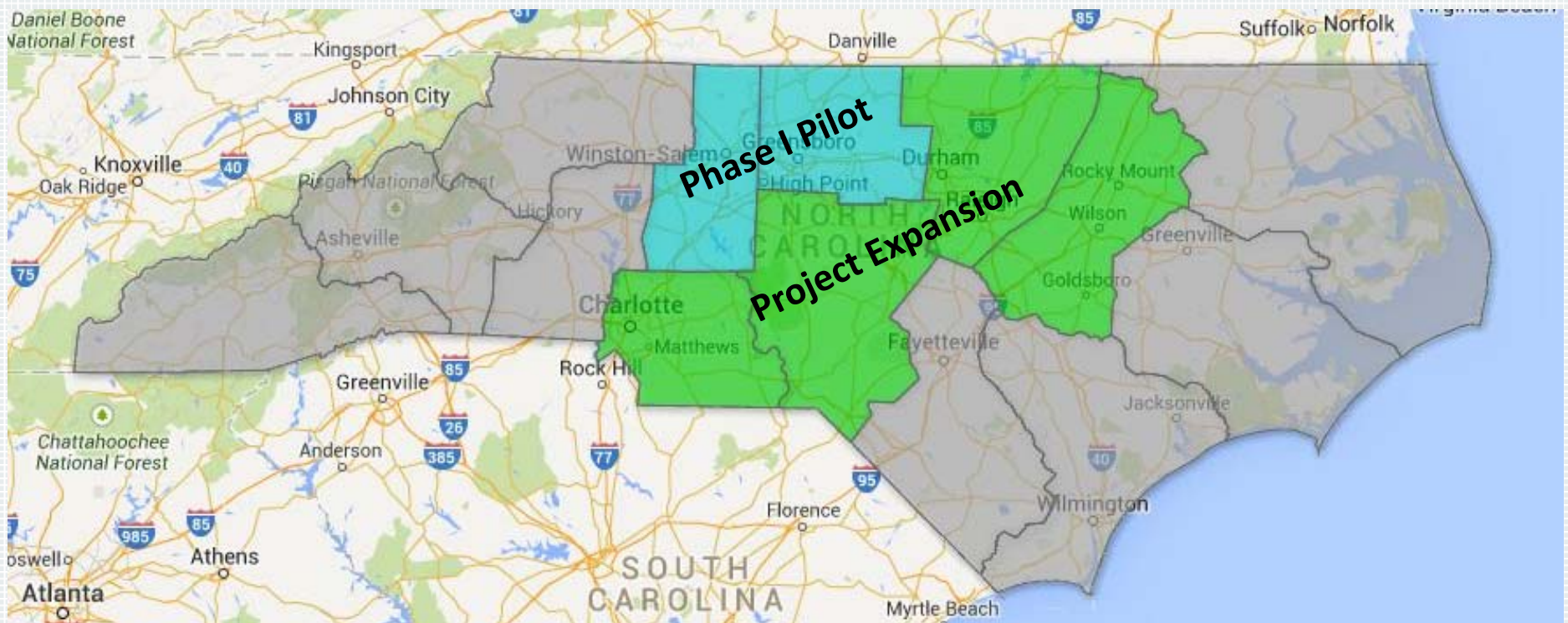




More Patterns!



Project Expansion



2014 Phase I Pilot: NCDOT Division 7 and 9

2015 Phase II Project Expansion: NCDOT Divisions 4, 5, 8 and 10



Additional NMVDP Stations

2015 – 2018: Economic Impact of Shared Use Paths Research Project

- Trail user surveys and count sampling
- Opportunity to understand seasonality, expand CCS program
- Provide extrapolation figures for economic, health, and transportation

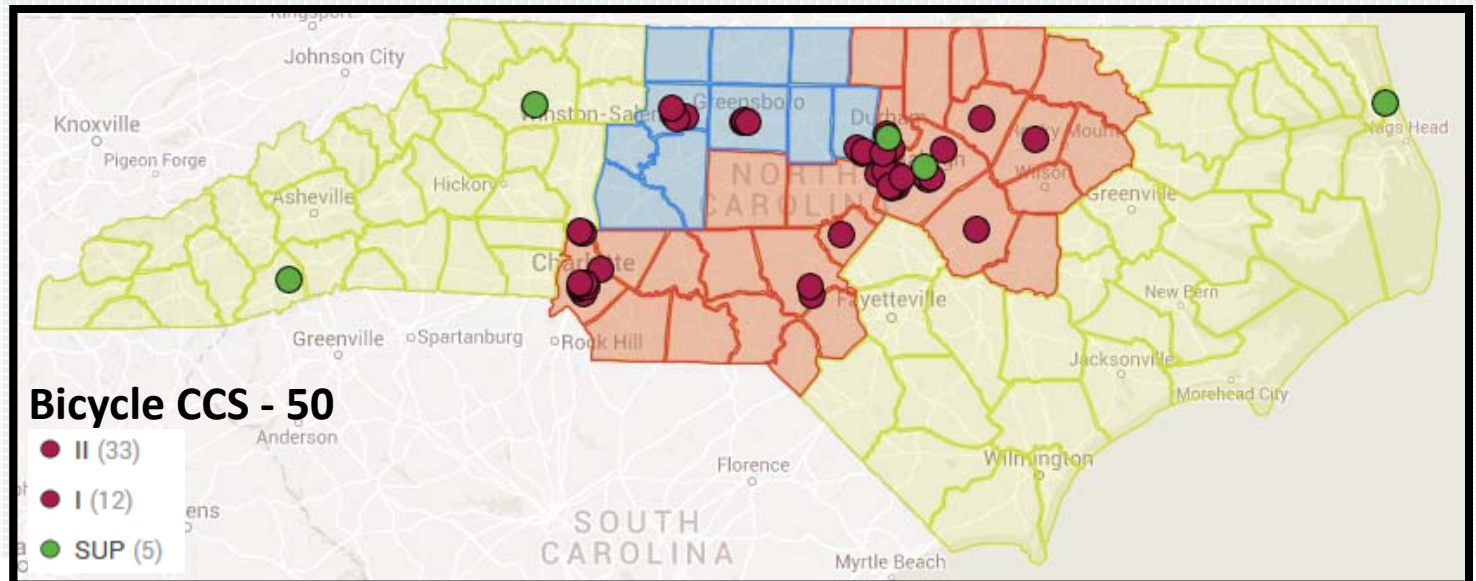
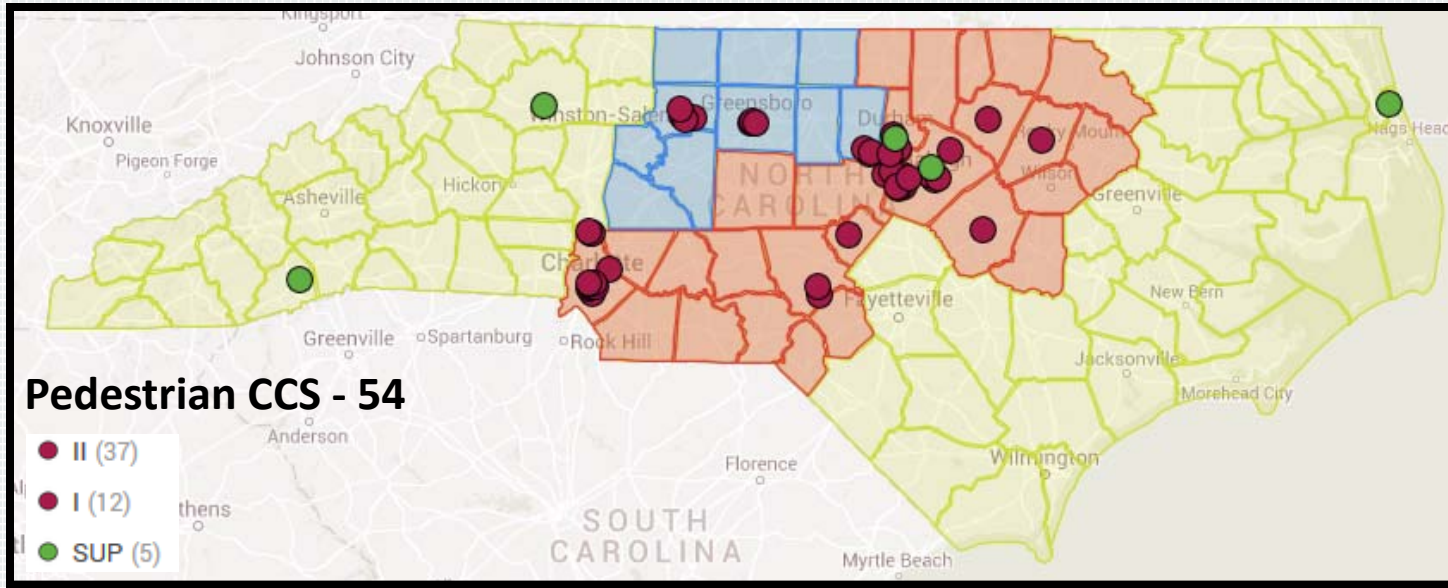
Locations:

- Brevard Greenway – Brevard, NC
- Crabtree Creek Greenway – Raleigh, NC
- Duck Trail – Duck, NC
- Yadkin River Greenway – North Wilkesboro, NC
- American Tobacco Trail – Downtown Durham, NC

Learn more!

Session 3 on Thursday (1:30-3PM) with Sarah O'Brien (ITRE) and Matt Hayes (Alta)

ANTICIPATED NMVDP CONTINUOUS COUNT STATIONS (LATE 2016)





Elements of a Volume Data Program

It's more than just counting!

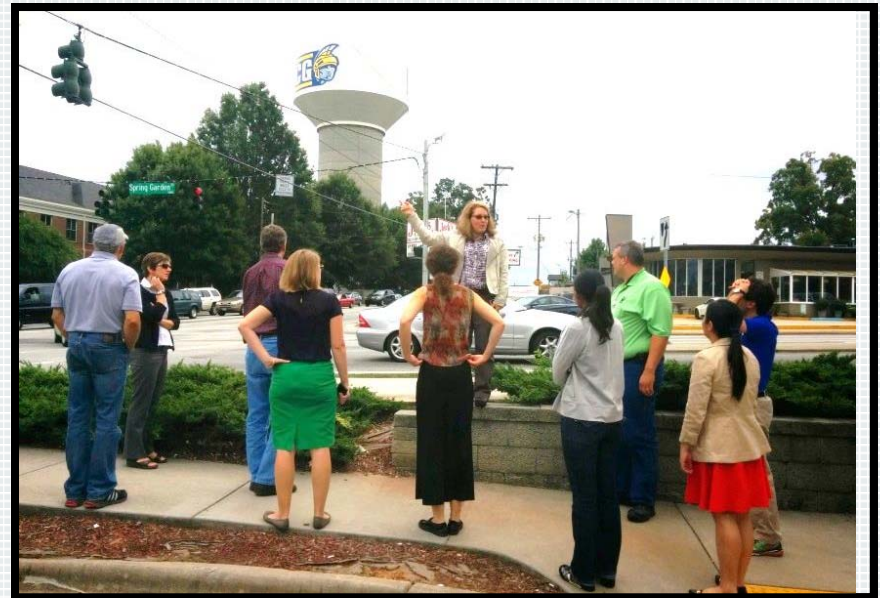
1. Geospatial sampling
2. Site selection methods
3. Data collection methods
4. Equipment procurement
5. Equipment installation
6. Equipment validation
7. Development of adjustment factors
8. Technical support
9. Maintenance troubleshooting
10. Coordination with short duration count vendors
11. Coordination of state and local agency partners
12. Standardization of data inputs
13. Quality assurance and quality control checks on data
14. Data management and reporting
15. Data analysis
16. Development of annualized statistics



Training and Resources

- Informational Webinar
 - Introduction to the program
- 1-Day Workshop
 - Audience: bike/ped coordinators, planners, greenway/parks and recreation managers, engineers, transportation professionals
 - Detailed information on programmatic elements

itre.ncsu.edu/focus/bike-ped/



*Pilot Project Training , Site Selection Field Visit
Greensboro, NC*



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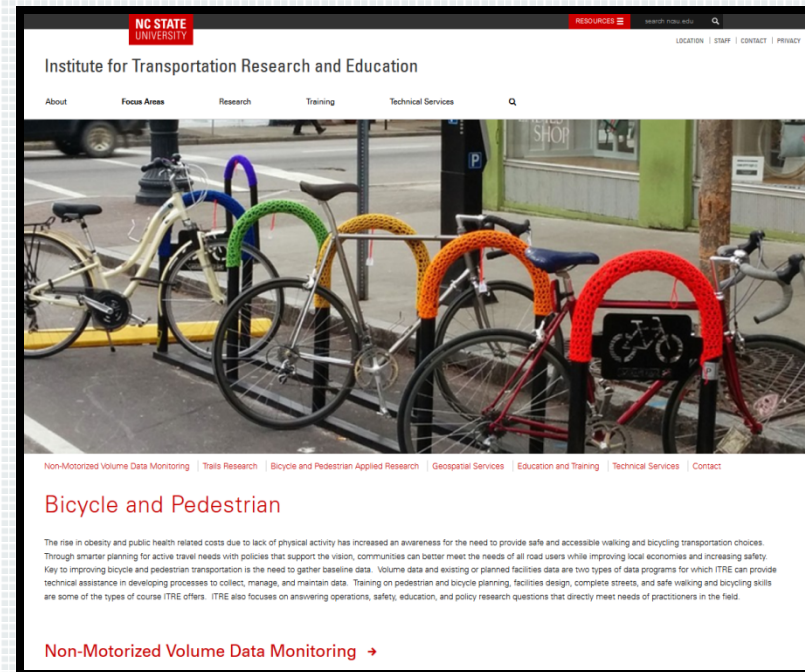


Training and Resources

■ NMVDP Program Website

- Phase I – Count Station Overview and Data Summary
- Phase I - CCS Data Download
- Detailed Project Report (coming soon!)
- Site Selection Paper
- Program Level QAQC Processes
- CCS Installation Video / Photos

itre.ncsu.edu/focus/bike-ped/



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Institute for Transportation Research and Education

About Focus Areas Research Training Technical Services

NC Non-Motorized Volume Data Program

About

Establishing a bicycle and pedestrian count program will assist the NCDOT in evaluating facility usage over time, inform the project prioritization process and provide quantifiable evidence to support non-motorized facility inclusion through the Complete Streets process, improving municipal and regional planning for active travel. In turn, these data can be fed into tools to measure existing trends and model future increases in non-motorized trips at site-, corridor-, and regional-levels.

Phase I Pilot Project

The pilot phase of the NC Non-Motorized Volume Data Program was conducted in the geographic region which comprises NCDOT Divisions 7 and 9 to test a bicycle and pedestrian count protocol and replicate the methodology across the state. Continuous Count Stations to monitor bicyclist and pedestrian travel for Phase I went live in late 2014. Twelve Phase I stations were set up to monitor both bicycle and pedestrian traffic for a total of twenty-four continuous count data streams which are still active. These stations cover a mix of sites across different land uses, travel patterns, and volume groups. Detailed technical information can be found in the Phase I Final Report and Appendices.

The following programmatic elements were piloted (i.e. the Triad region) to select, install and provide quality data for the twelve stations:

- > Agency Coordination
- > Pre - Installation (Site Selection and Procurement)
- > Equipment Set Up (Installation and Onboarding)
- > Equipment Validation
- > Data Handling (QA/QC Checks, Cleaning, and Correcting)
- > Equipment Maintenance
- > Data Reporting

Phase II Expansion

Phase II of the project started in 2015 with expansion to NCDOT Divisions 4, 5, 8, and 10. Over 50 stations, or 110 data streams to monitor bicyclist traffic and pedestrian traffic are anticipated to be live by the end of 2016, making North Carolina's NMVDP one of the largest non-motorized monitoring programs in the United States.

Continuous Count Station Overview and Data Summary [10.83 MB]

Download Data [3]

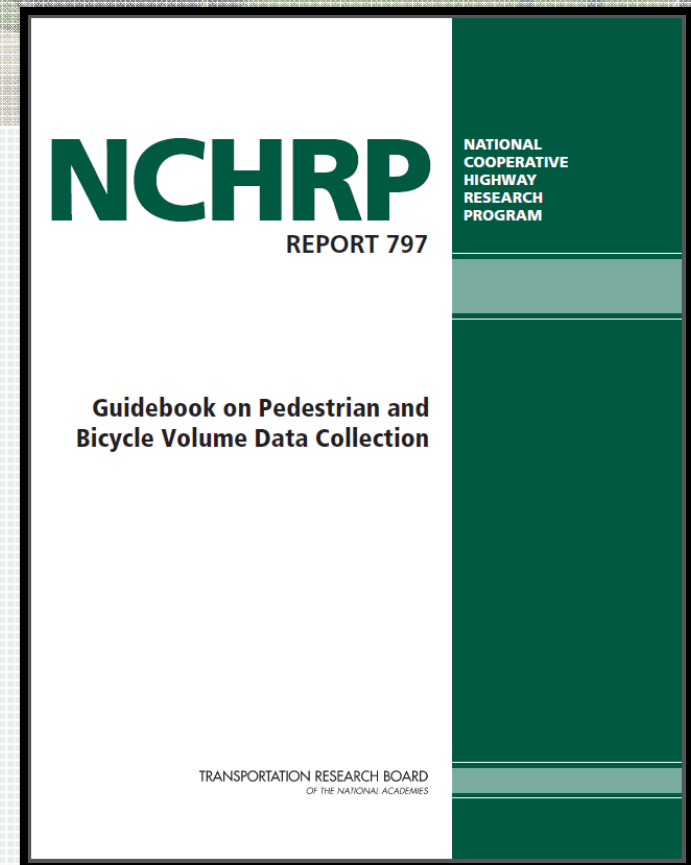
Making People Count! An Introduction to NC's Non-Motorized Volume Data Program [3.97 MB]

Development of QA/QC Processes for BikePed Data [2.47 MB]



What You Can Do!

- Consider:
 - Installing a CCS to collect bicycle and/or pedestrian counts
 - Validating equipment and performing QA/QC on data
- Share data using TMG data format
- When collecting SDC Counts:
 - 7 consecutive days, 24/7 is recommended best practice
 - Count when volumes are expected to be high (spring, fall) and avoid bad weather
 - Use digital format, keep good metadata



**Become familiar with the
NCHRP 797 Guidebook**



What will you use the data for?

- Inventory statistics
- Route planning / Connectivity analysis
- Project planning and development
- Inter-agency coordination
- Project selection/prioritization
- Determining unmet need
- School siting
- Access to recreation amenities
- Relate spatial datasets (eg. crash data)
- Development of goals/benchmarks
- Data gaps/deficiencies
- Compare assets
- Facilities Maintenance
- Research
- Funding
- Promote physical activity

Thank You!

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