

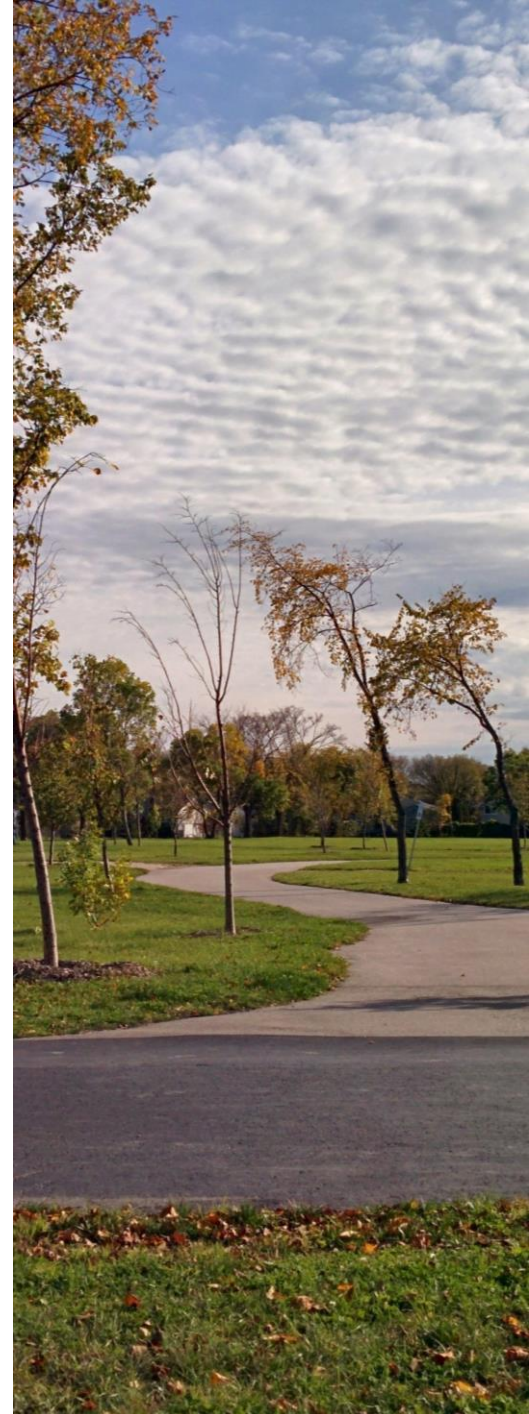
Analysis of Pedestrian Traffic on Multi-use Trails in Winnipeg



Sarah Klassen
Jeannette Montufar

Presentation Outline

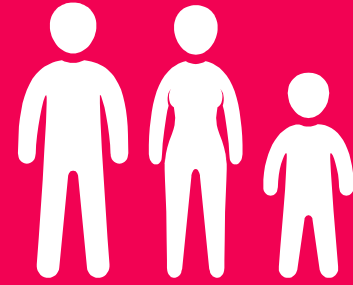
1. **Introduction**
2. **Methodology**
3. **Temporal Analysis**
4. **Weather Analysis**
5. **Conclusions**



1.

INTRODUCTION

Background, objectives, scope



Traffic Monitoring



Key questions remain on best practices for virtually all elements of monitoring.

(Hankey et al., 2014)

Objectives

1. Determine an appropriate methodology to calculate average daily pedestrian traffic from continuous counts.
2. Examine the variation of pedestrian traffic on multi-use trails in Winnipeg with respect to temporal and weather factors.

Scope

- ▷ Multi-use trails in Winnipeg, MB
- ▷ Pedestrian volumes collected between January 1, 2014 and December 31, 2014
- ▷ Seven continuous count sites

2.

METHODOLOGY

Equipment, site selection, field set-up, data retrieval

Equipment Selection

Pyro counters collect volume data for all trail users

Zelt counters collect bicycle volume data

$$\text{Total Pedestrians} = \text{Pyro Volume} - \text{Zelt Volume}$$



Site Selection

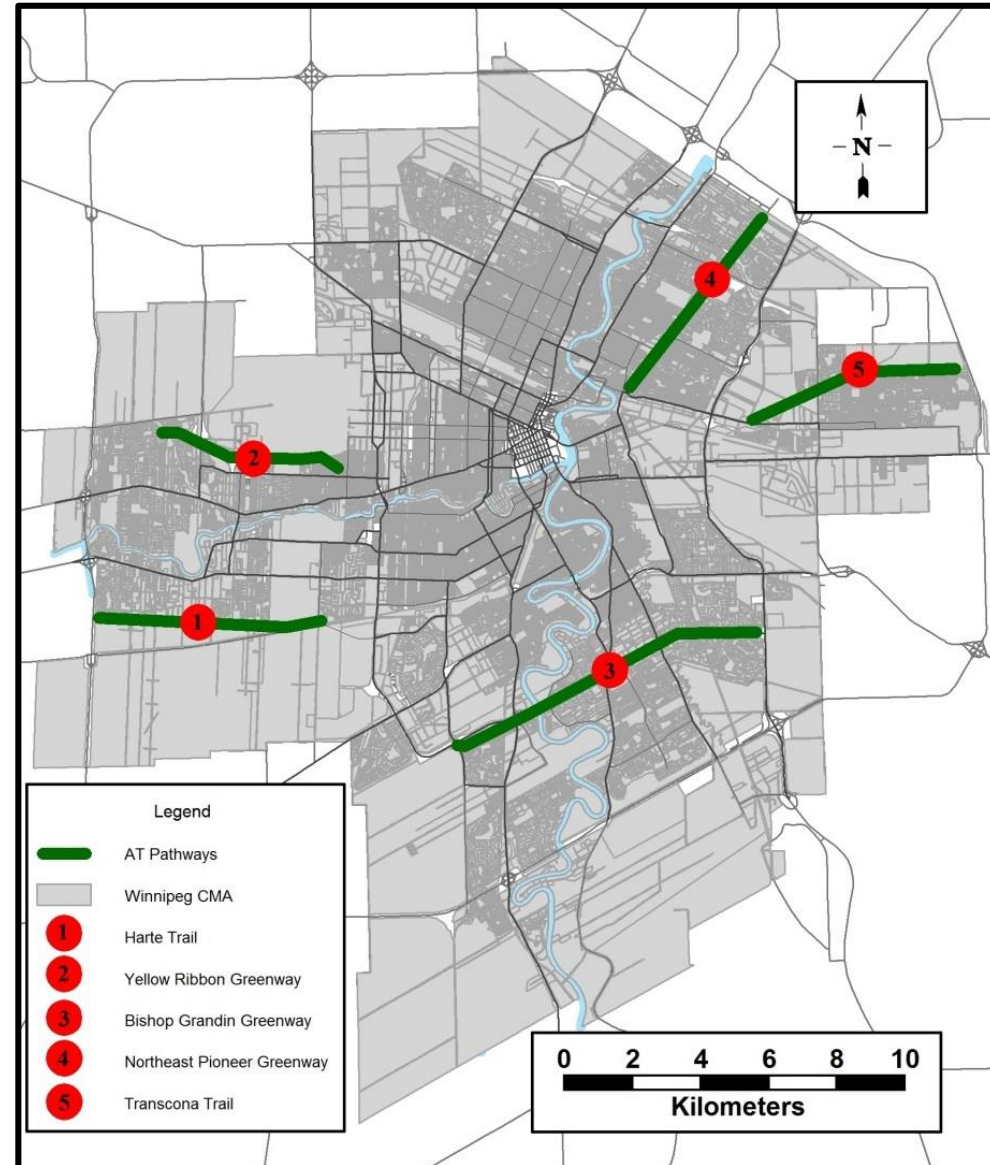
1 Harte Trail:
- two counters

2 Yellow Ribbon Greenway:
- one counter

3 Bishop Grandin Greenway:
- three counters

4 Northeast Pioneers Greenway

5 Transcona Trail:
- one counter



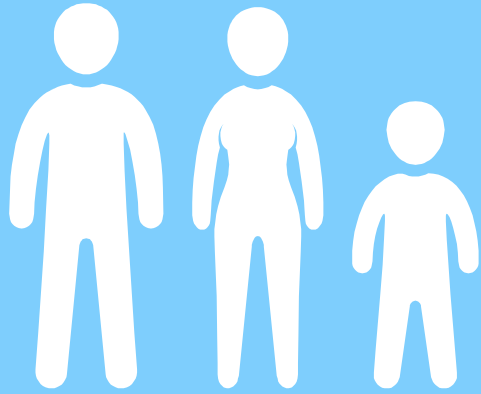
Source: Budowski (2015)

Field Installation

Pyro counters were installed on path-side fixtures such as trees, wayfinding signs and metal posts.

Zelt counters were installed below the pavement surface.





Average Daily Pedestrian Traffic

Defining the Terms

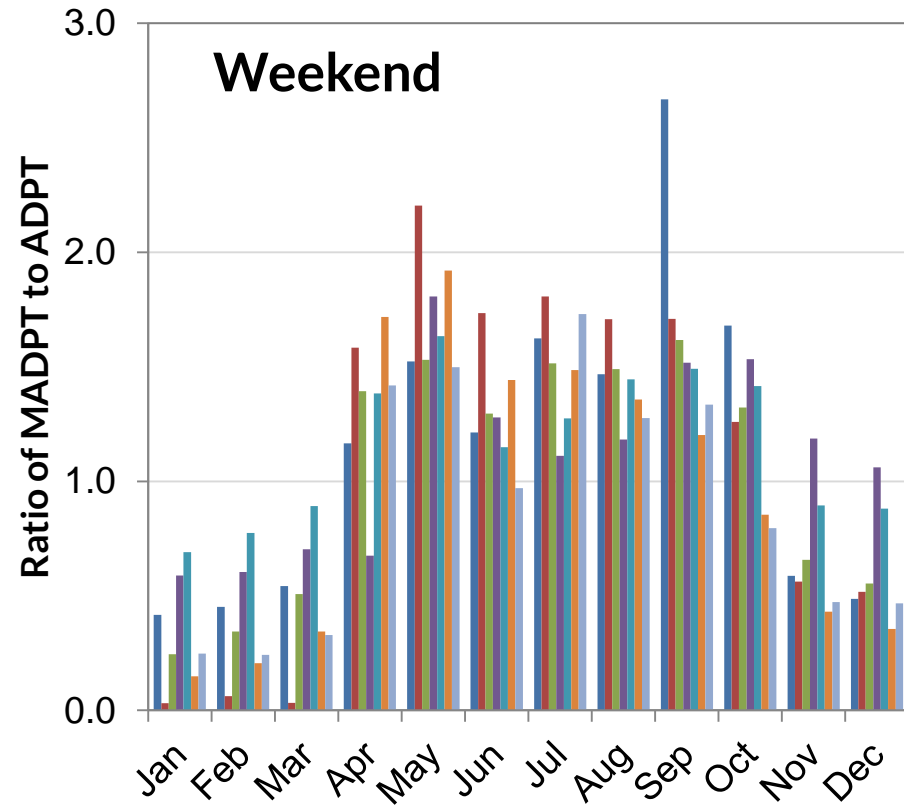
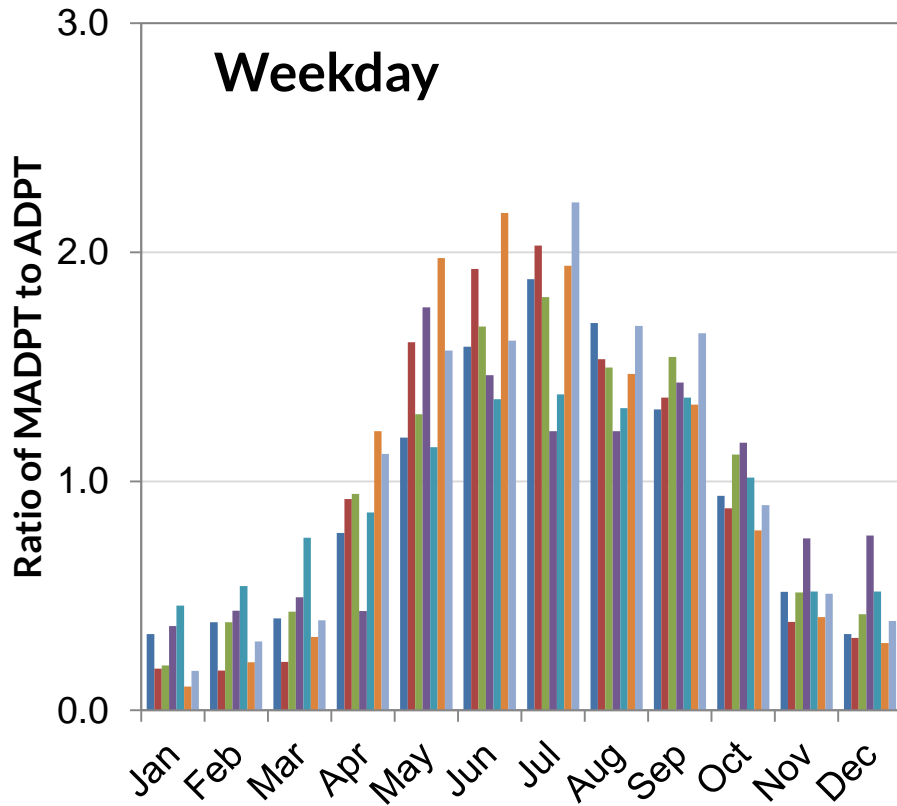
- ▷ ADPT: Average daily pedestrian traffic over one calendar year
- ▷ SADPT: Average daily pedestrian traffic between May and October
- ▷ MADPT: Average daily pedestrian traffic over one month
- ▷ DOW: Day-of-Week

3.

TEMPORAL ANALYSIS

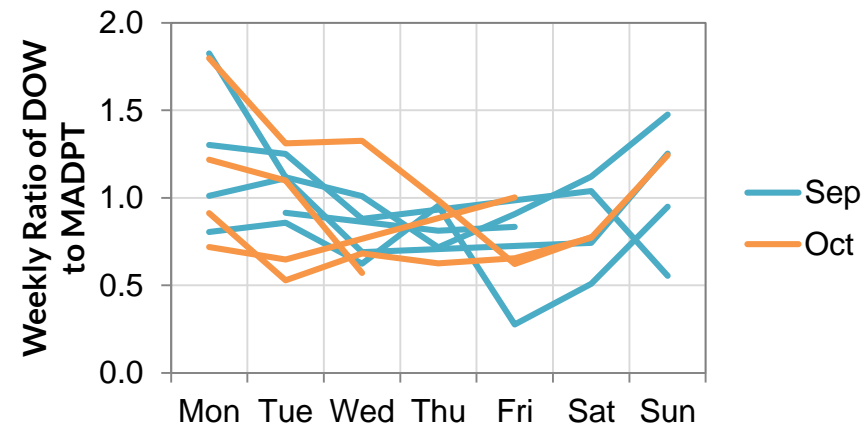
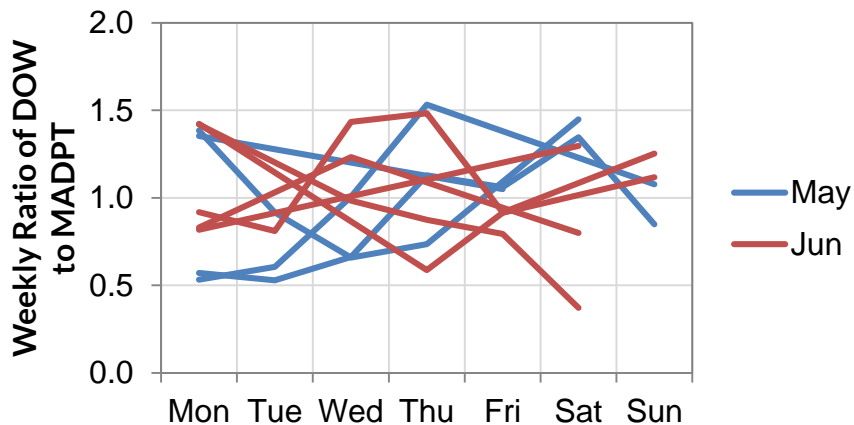
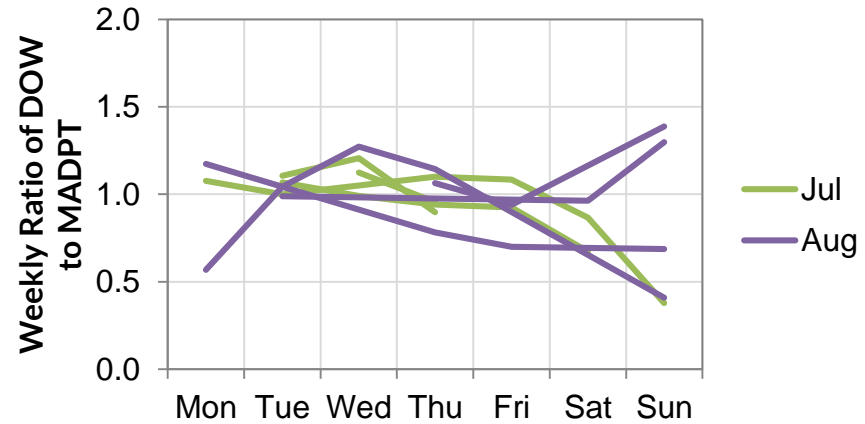
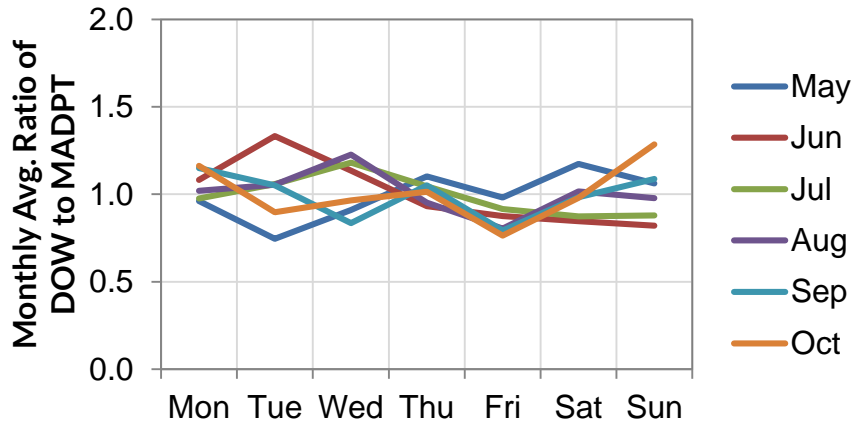
How can we connect time and pedestrian volume?

Month of the year

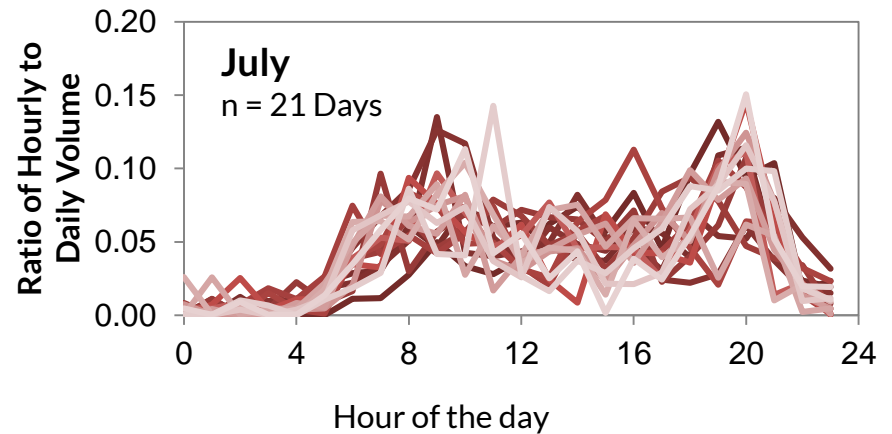
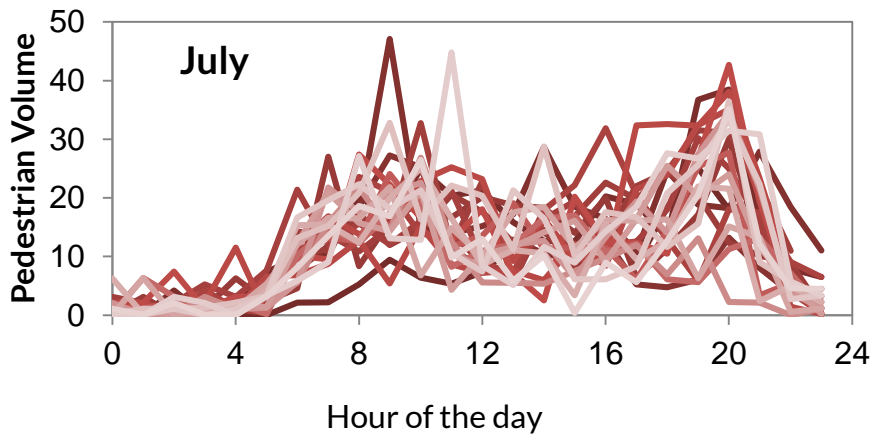
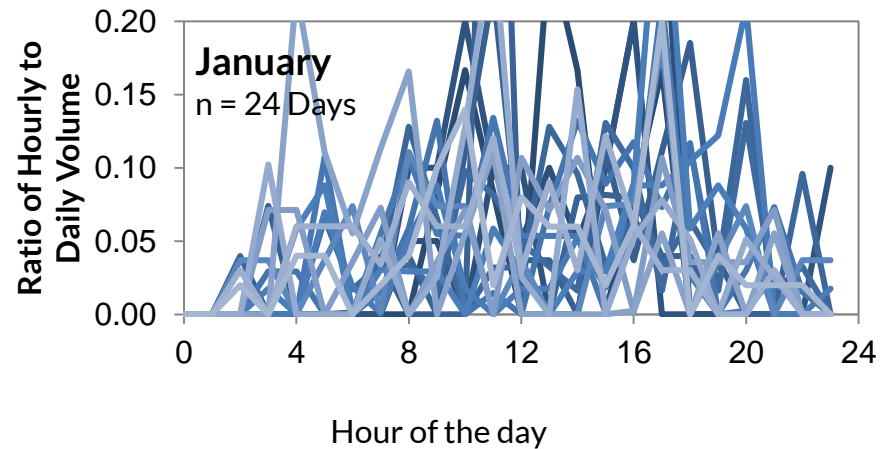
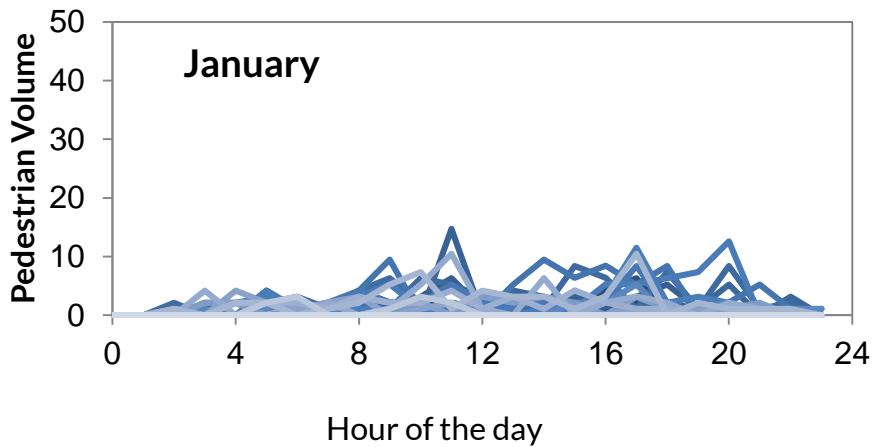


■ BG1 ■ BG2 ■ BG3 ■ HT1 ■ HT2 ■ TT ■ YRG

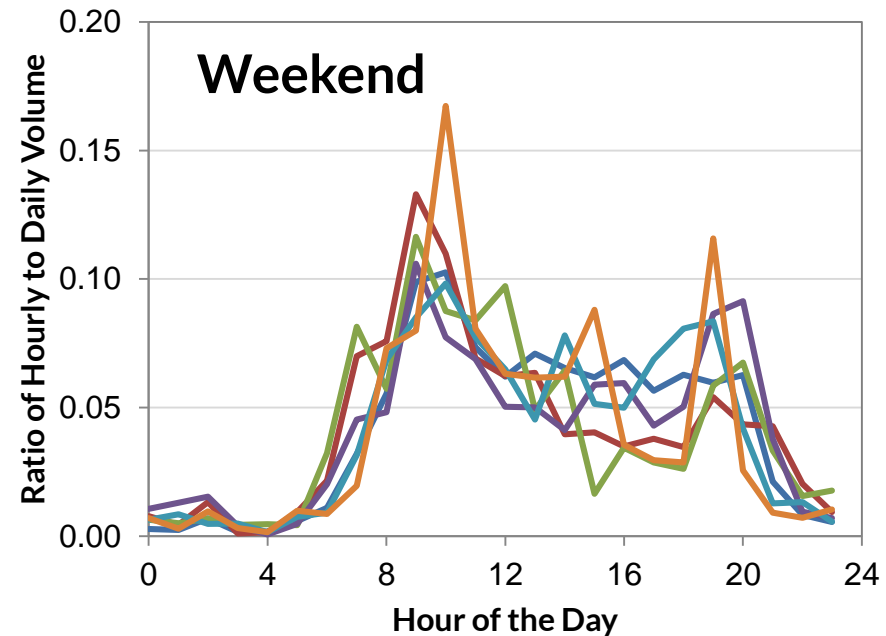
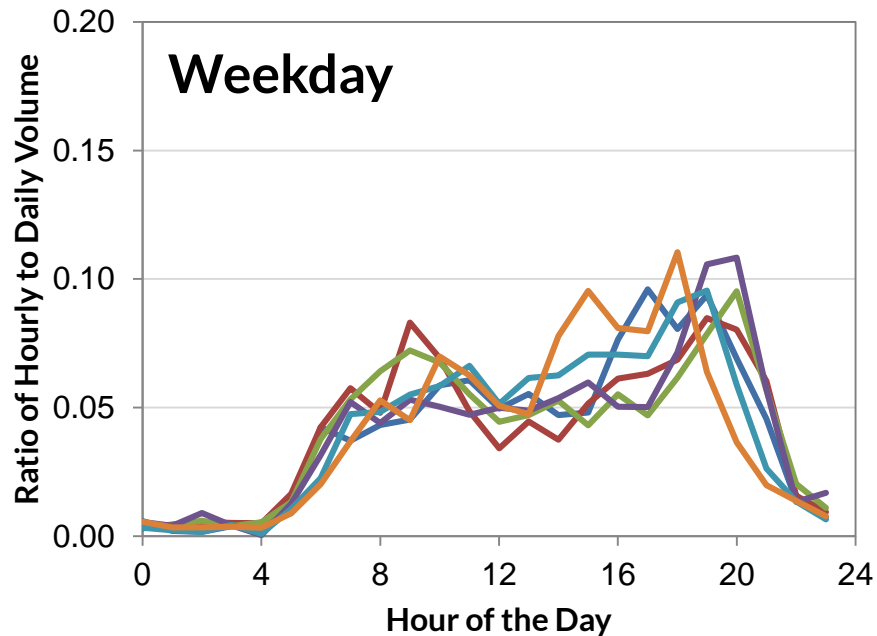
Day of the Week – BG3



Hour of the Day (BG3, Weekday)



Hour of the Day (BG3)



— May — Jun — Jul — Aug — Sep — Oct

5.

WEATHER ANALYSIS

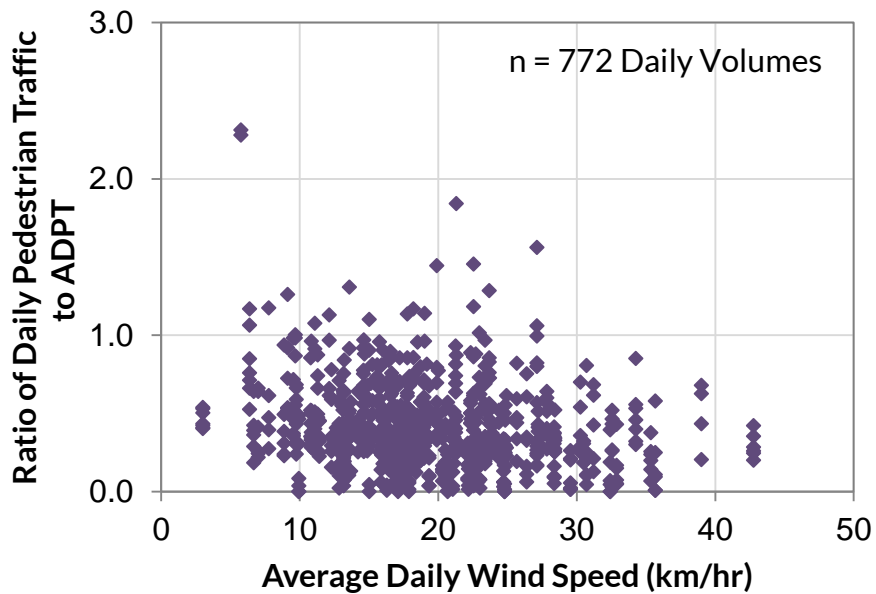
How can we connect weather and pedestrian volume?

Weather Analysis Approach

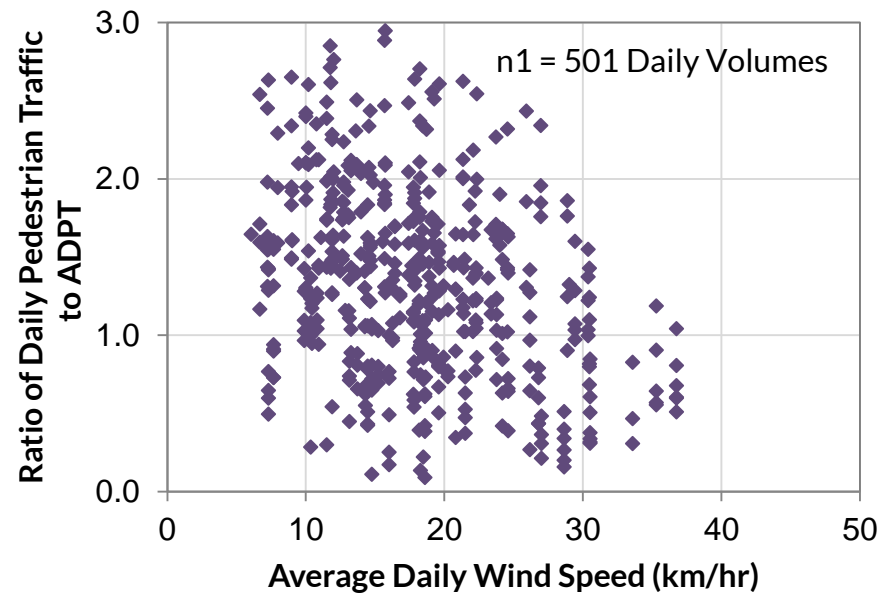
- ▷ The base unit of time is one day.
- ▷ Pedestrian volume data is aggregated from all count sites.
- ▷ Daily pedestrian volumes are expressed as a proportion of ADPT or SADPT.

Wind and Pedestrian Volume

Temperature < 0°C

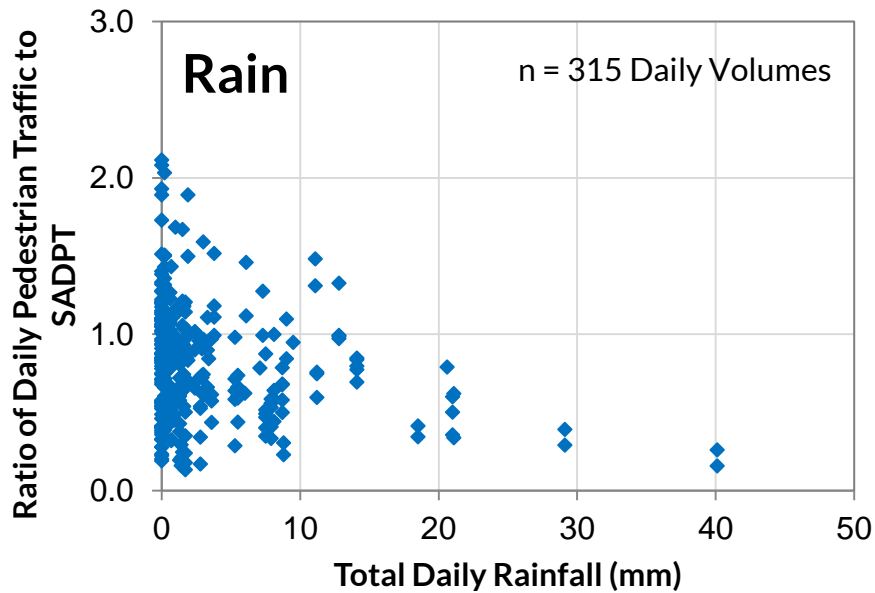


Temperature > 0°C

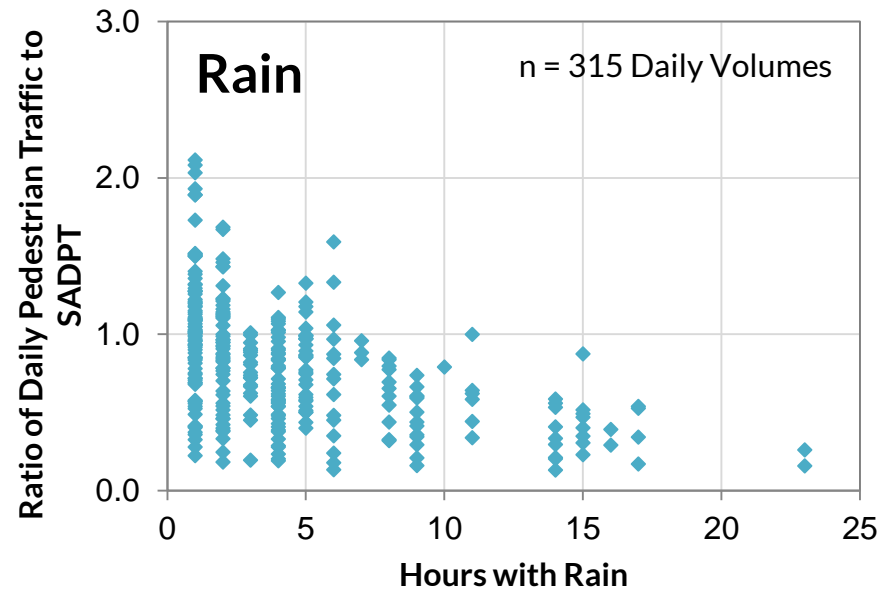


Rain and Pedestrian Volume

Precipitation Volume

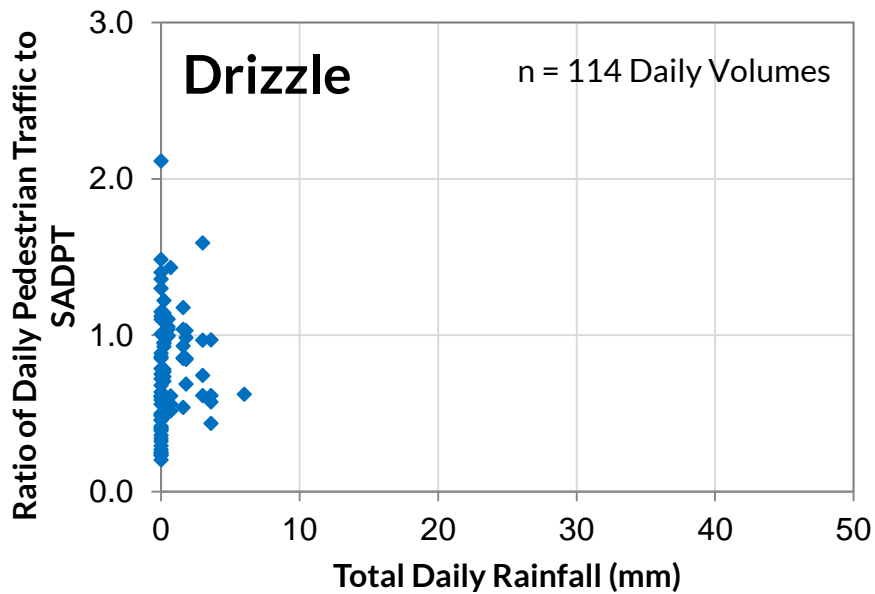


Precipitation Duration

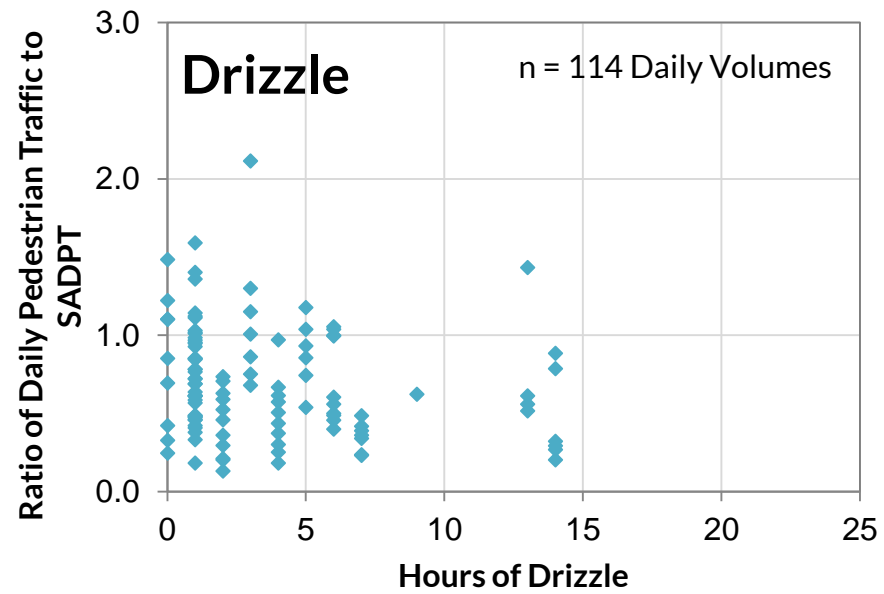


Drizzle and Pedestrian Volume

Precipitation Volume

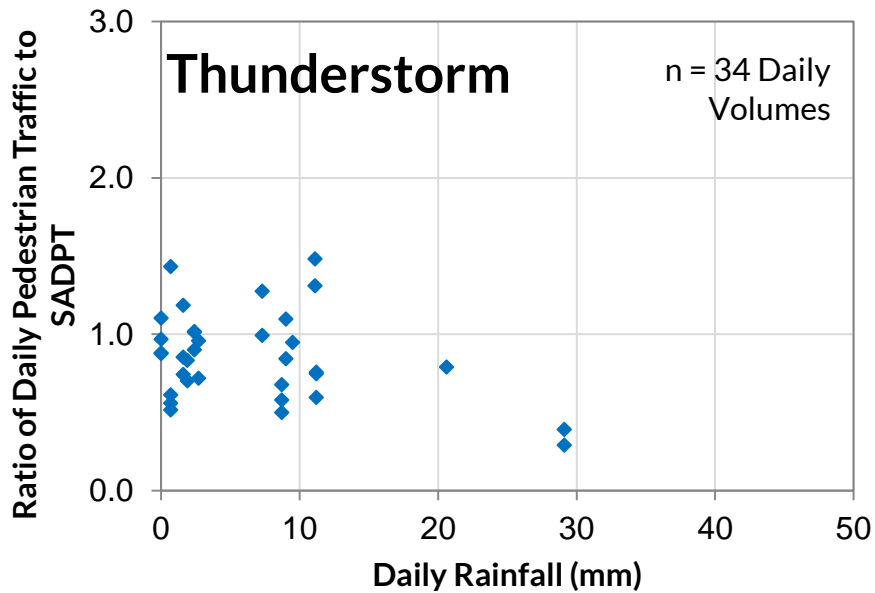


Precipitation Duration

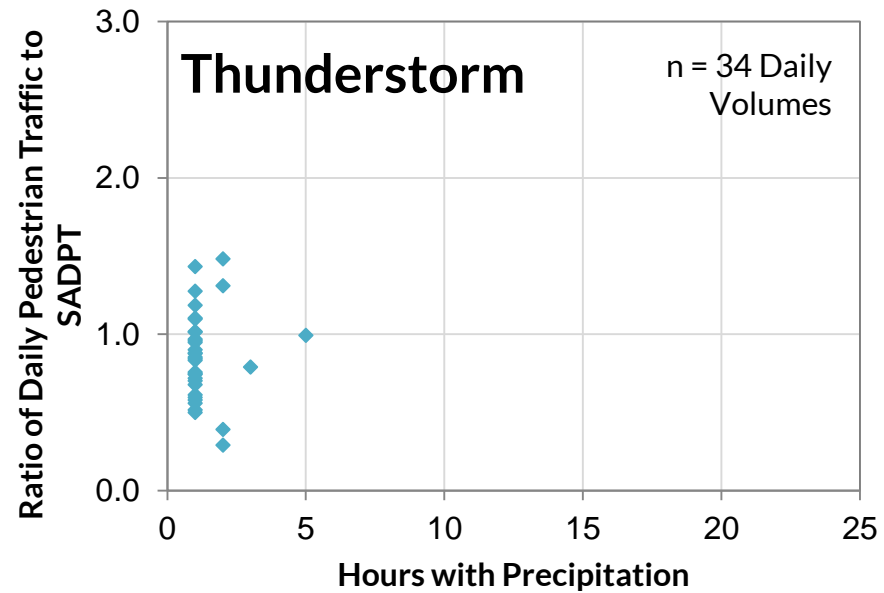


Thunderstorms and Pedestrian Volume

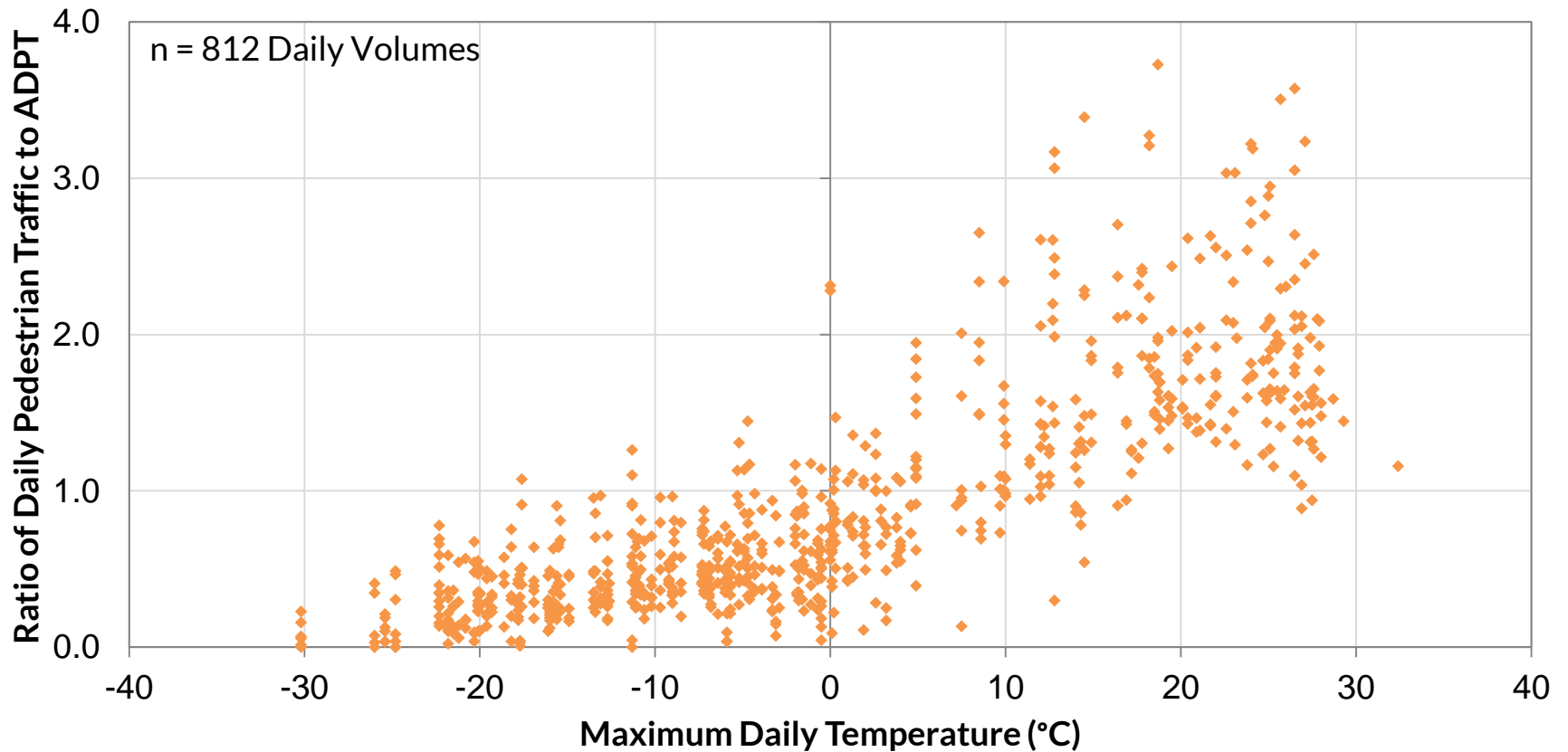
Precipitation Volume



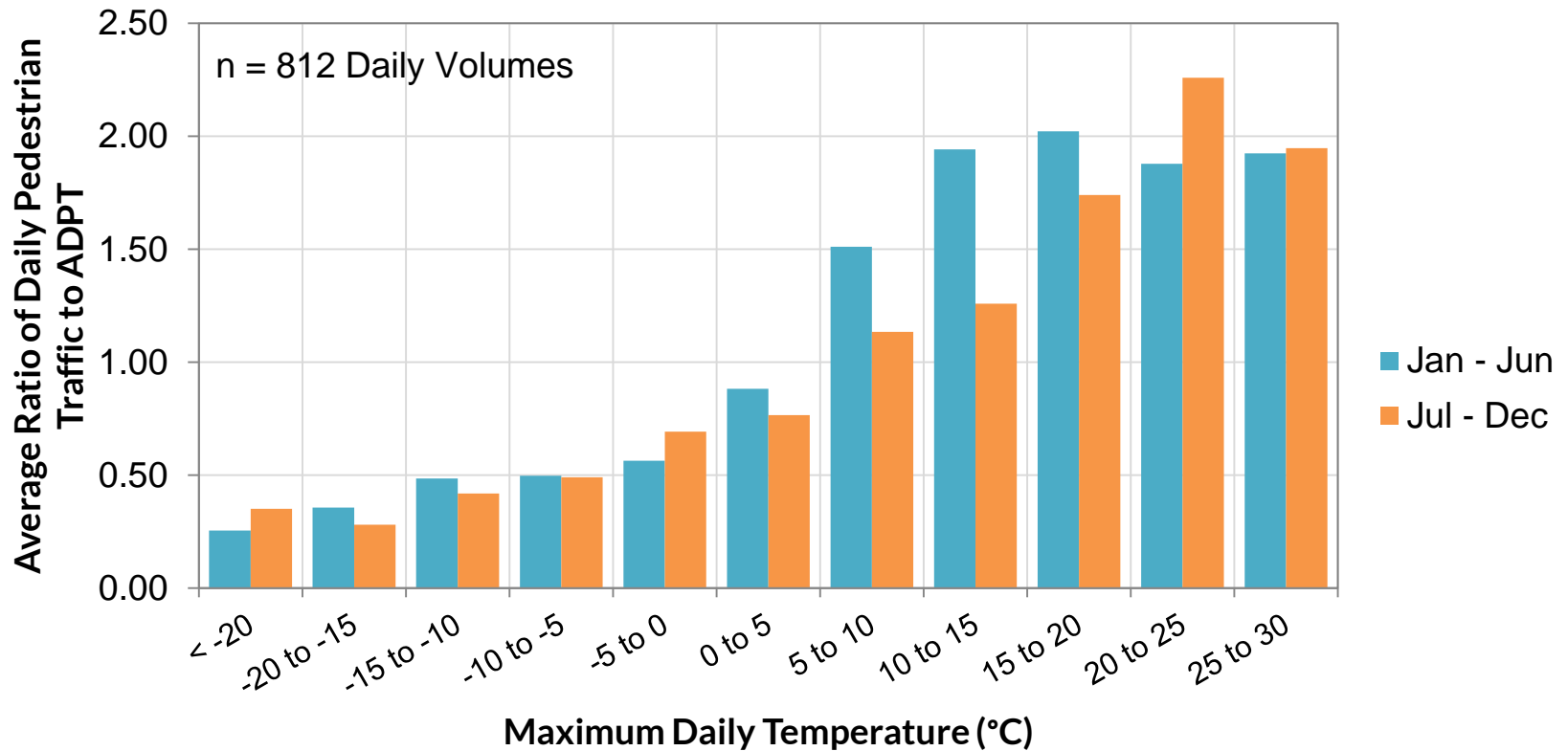
Precipitation Duration



Temperature and Pedestrian Volume



Temperature and Pedestrian Volume



6.

CONCLUSIONS

Temporal Factors



Month of Year

How does pedestrian volume vary by month of the year?

- Pedestrian volumes are lower in winter months and higher in summer months



Day of Week

How does pedestrian volume vary by day of the week?

- High variability in day-of-week pedestrian volume patterns
- Day-of-week may not be as appropriate for inclusion in pedestrian traffic analysis as it is for motor vehicle traffic



Hour of Day

How does pedestrian volume vary by hour of the day?

- Time-of-day patterns are consistent
- Weekend and weekday time-of-day patterns are distinct
- Time-of-day patterns are not clear in winter

Weather Factors



Precipitation

- Volume of rain had a negative relationship with pedestrian volume
- Duration of rain had a negative relationship with pedestrian volume



Wind

- High variability in pedestrian volumes at different average daily wind speeds
- Other variables influence the relationship between wind and pedestrian volume.



Temperature

- There is a positive, non-linear relationship between temperature and pedestrian volume.
- Other variables, such as time of year, affect the relationship

Acknowledgements

Special thanks to all the people who contributed to this research:

- ▷ Dr. Jeannette Montufar
- ▷ City of Winnipeg
- ▷ Examining Committee
- ▷ UMTIG Colleagues

Thanks also to all the people who made and released these awesome resources for free:

- ▷ Presentation template by [SlidesCarnival](#)

Thanks!

Any questions?

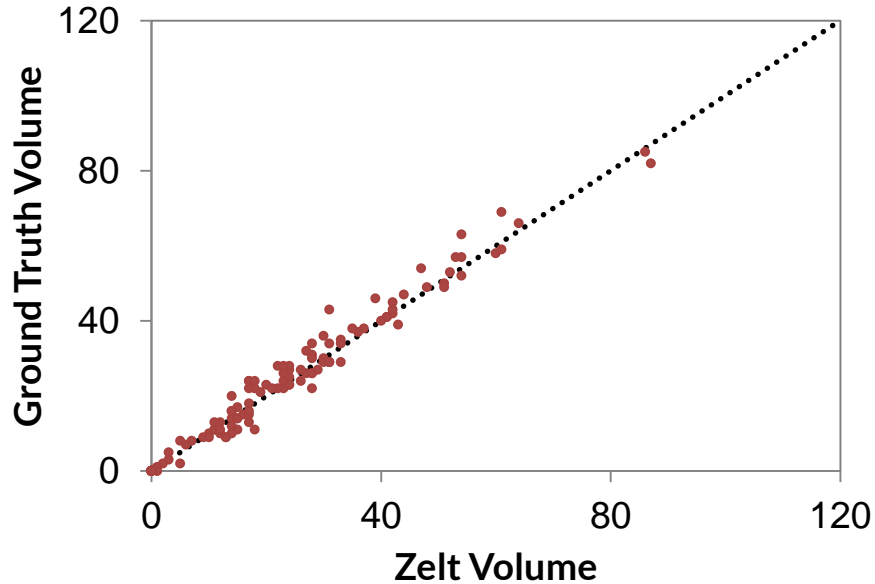
Calibration

Zelt Counters

Mean Error: 0.00

R^2 : 0.9772

Correction Factor: n/a

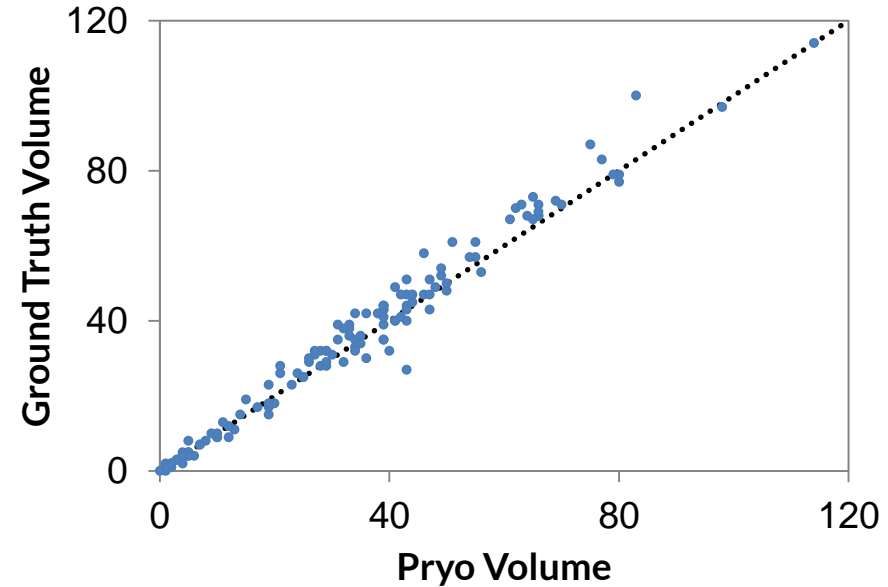


Pyro Counters

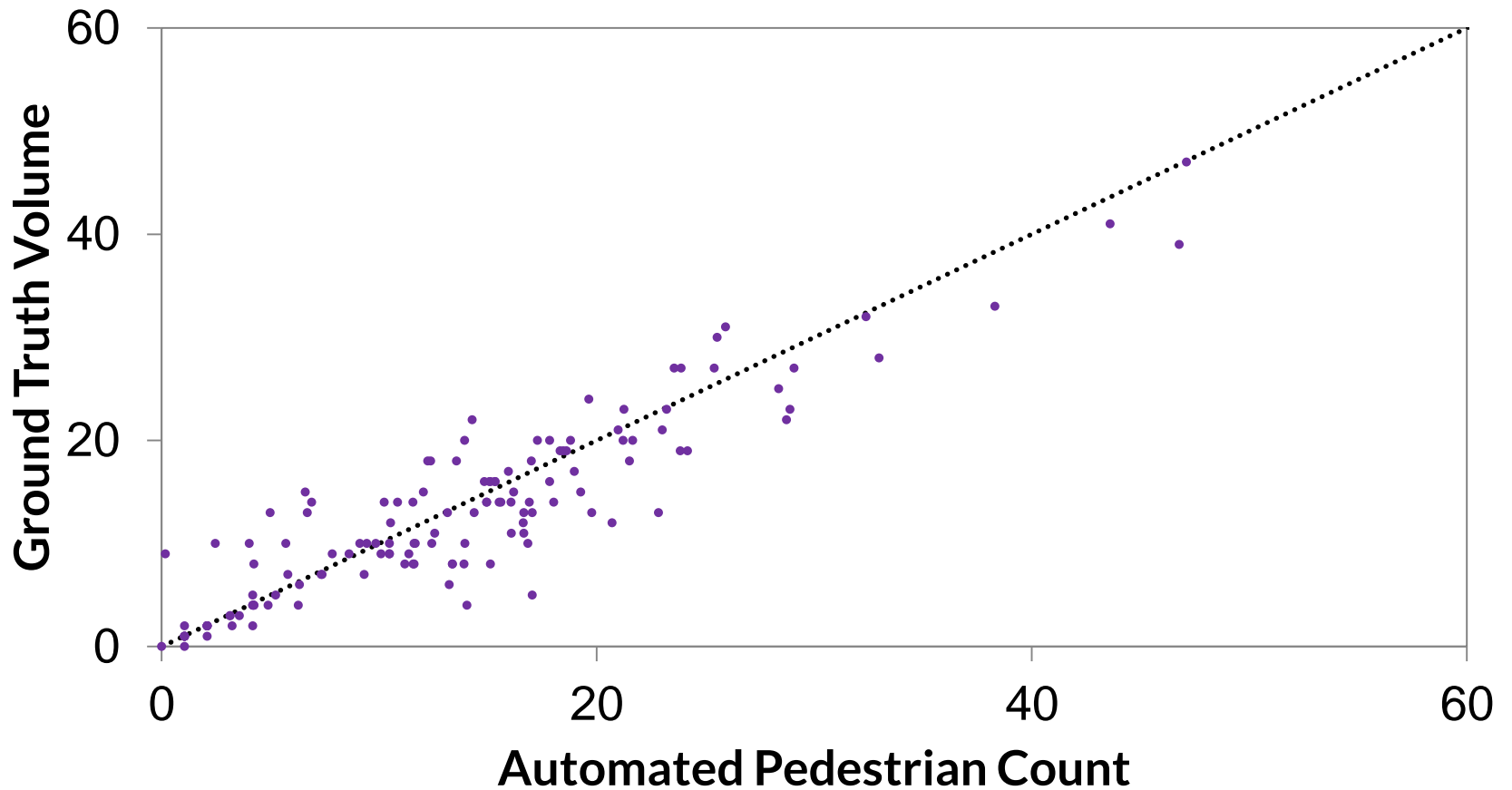
Mean Error: -0.01

R^2 : 0.9768

Correction Factor: 1.0472

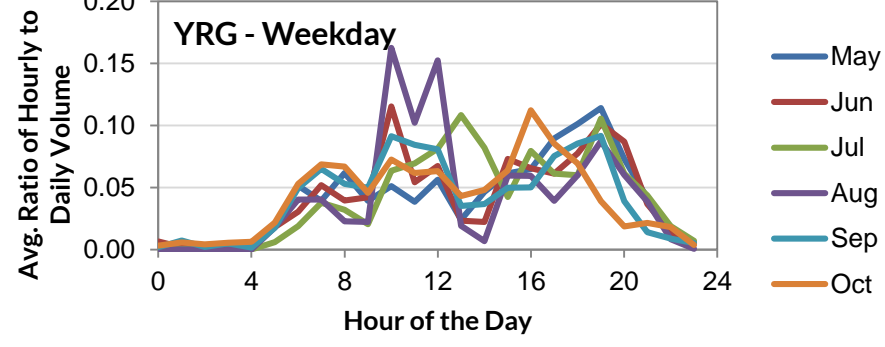
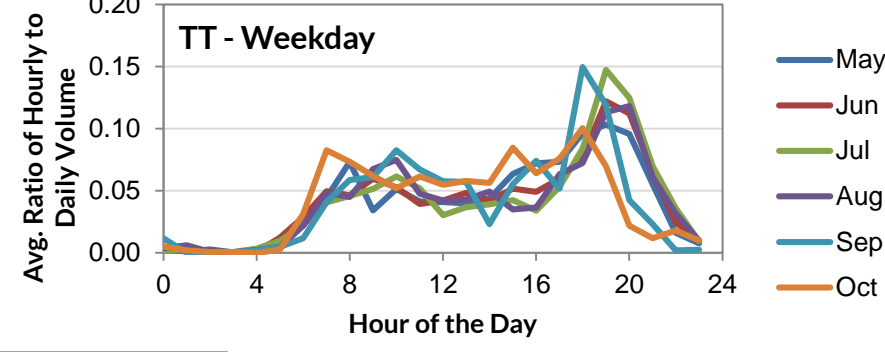
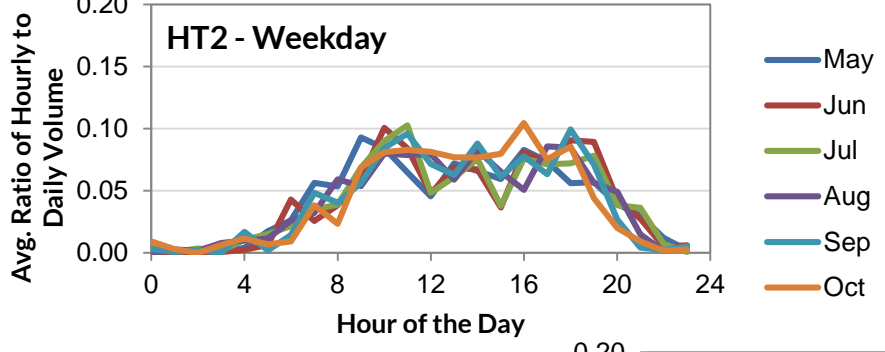
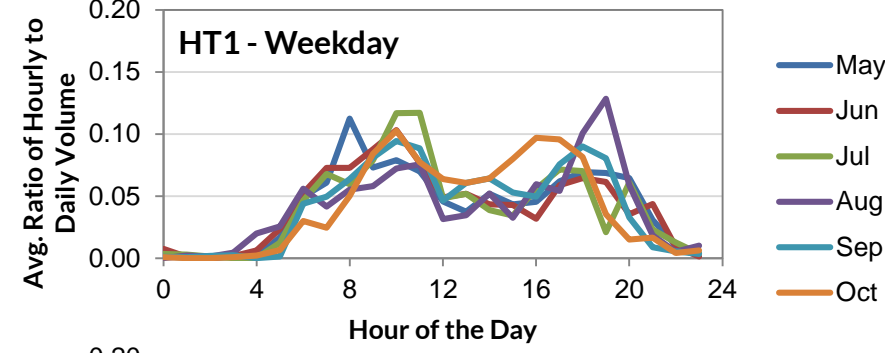
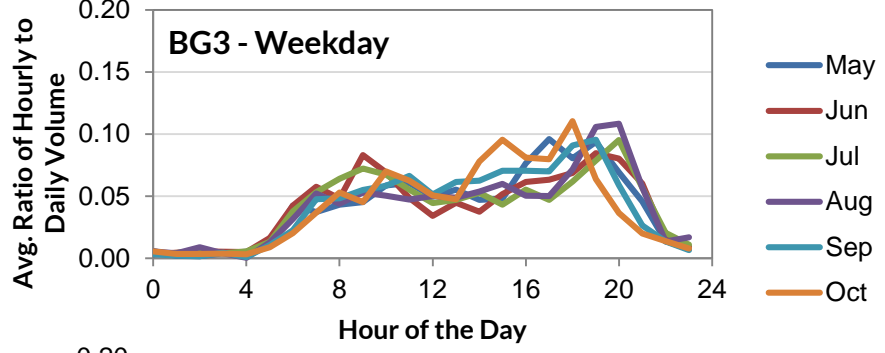
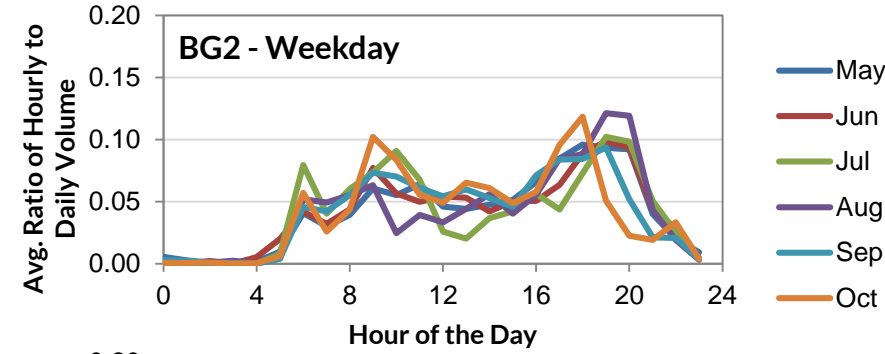
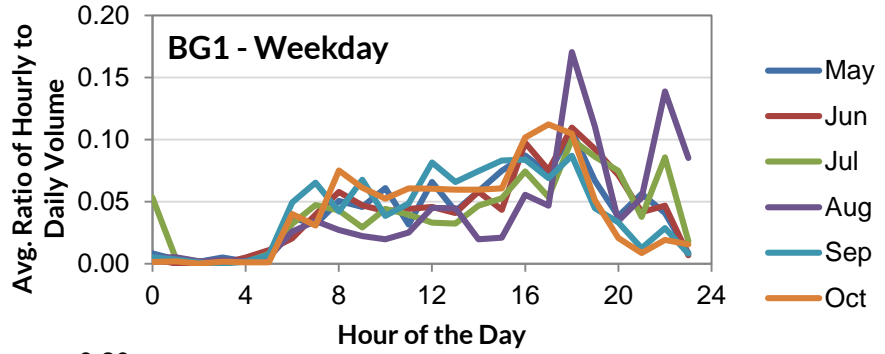


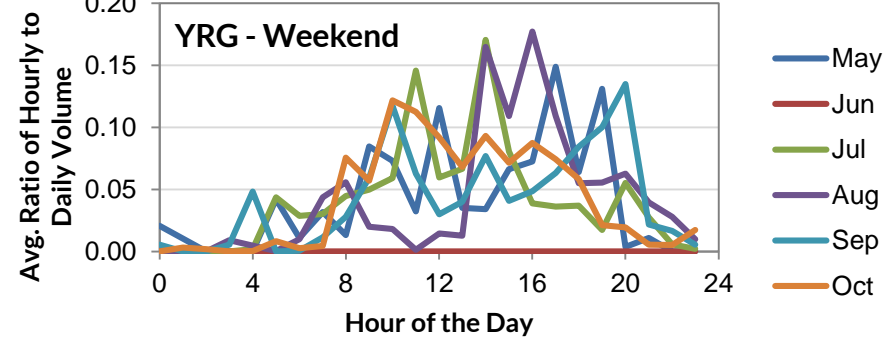
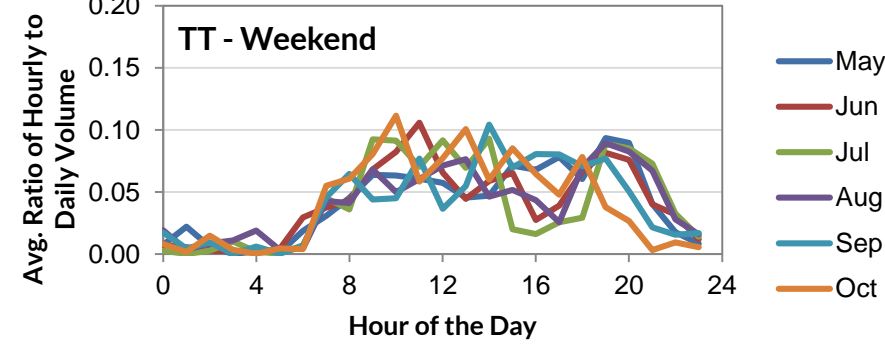
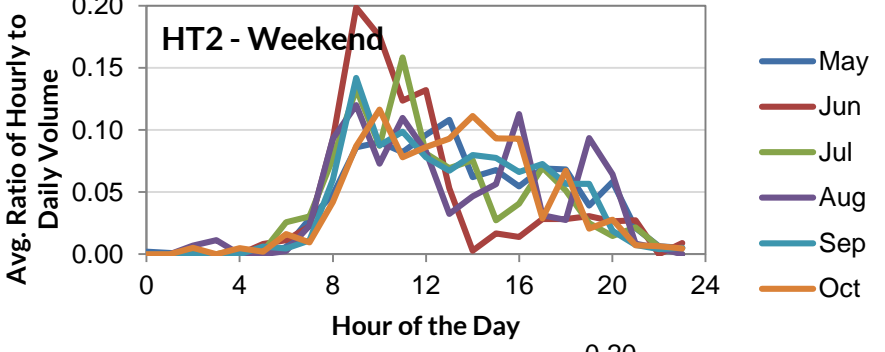
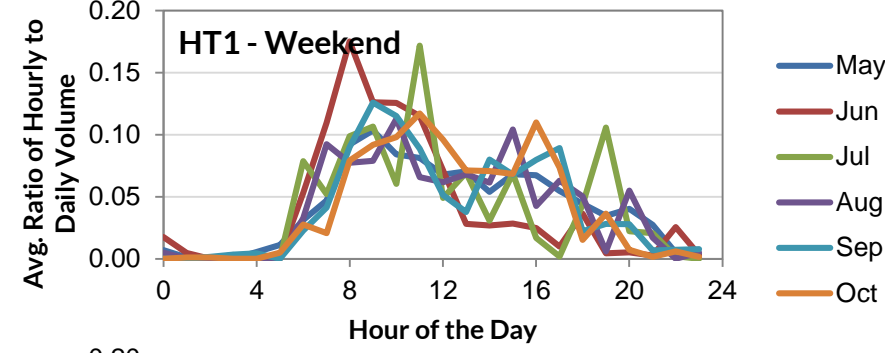
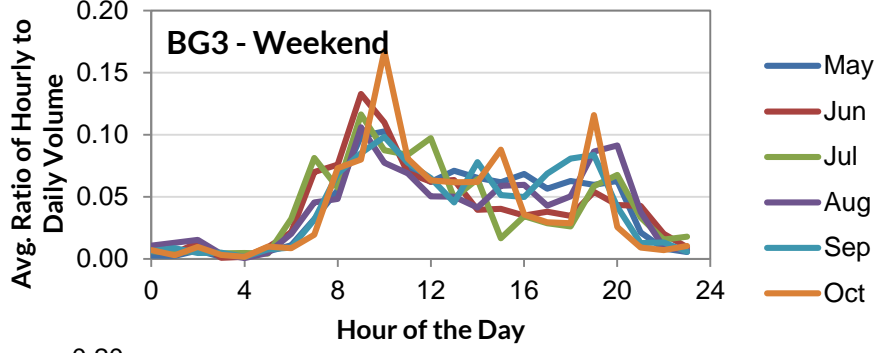
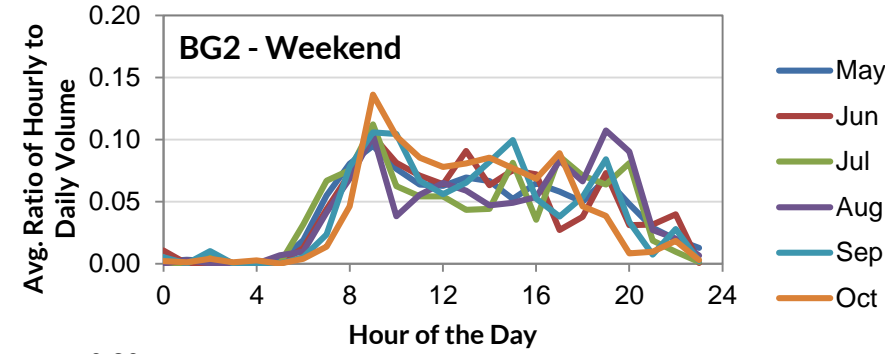
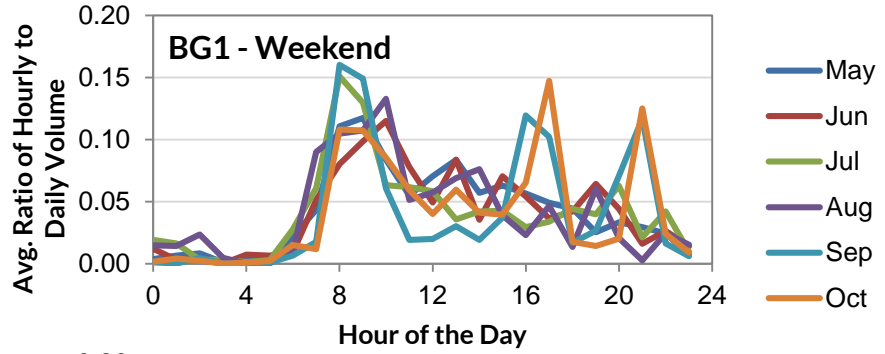
Calibration - Pedestrians



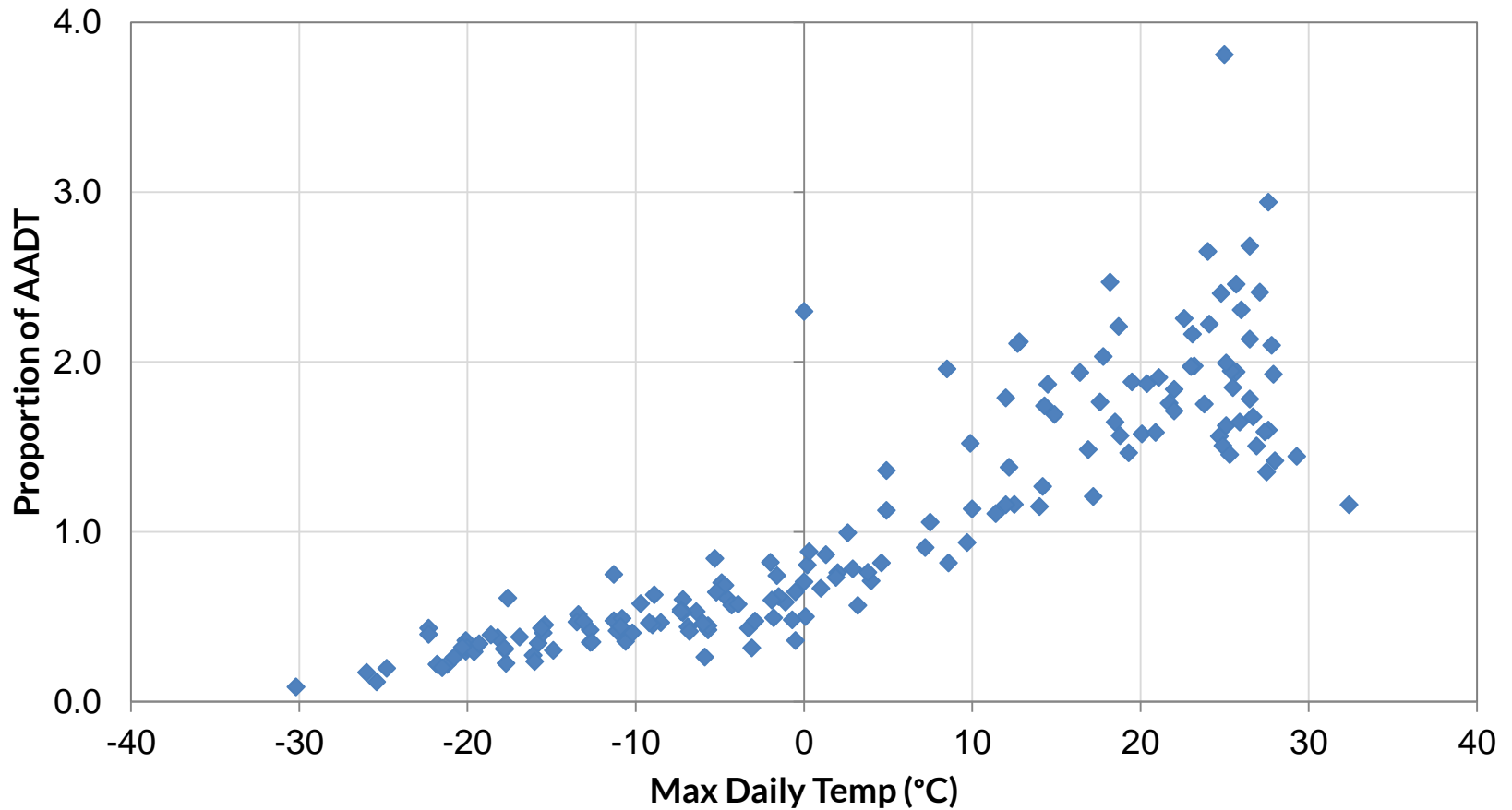
Average Daily Pedestrian Traffic

| | BG1 | BG2 | BG3 | HT1 | HT2 | TT | YRG |
|--------------|------------|------------|------------|------------|------------|-----------|------------|
| ADPT | 141 | 142 | 151 | 133 | 120 | 154 | 142 |
| SADPT | 212 | 229 | 223 | 184 | 156 | 238 | 214 |

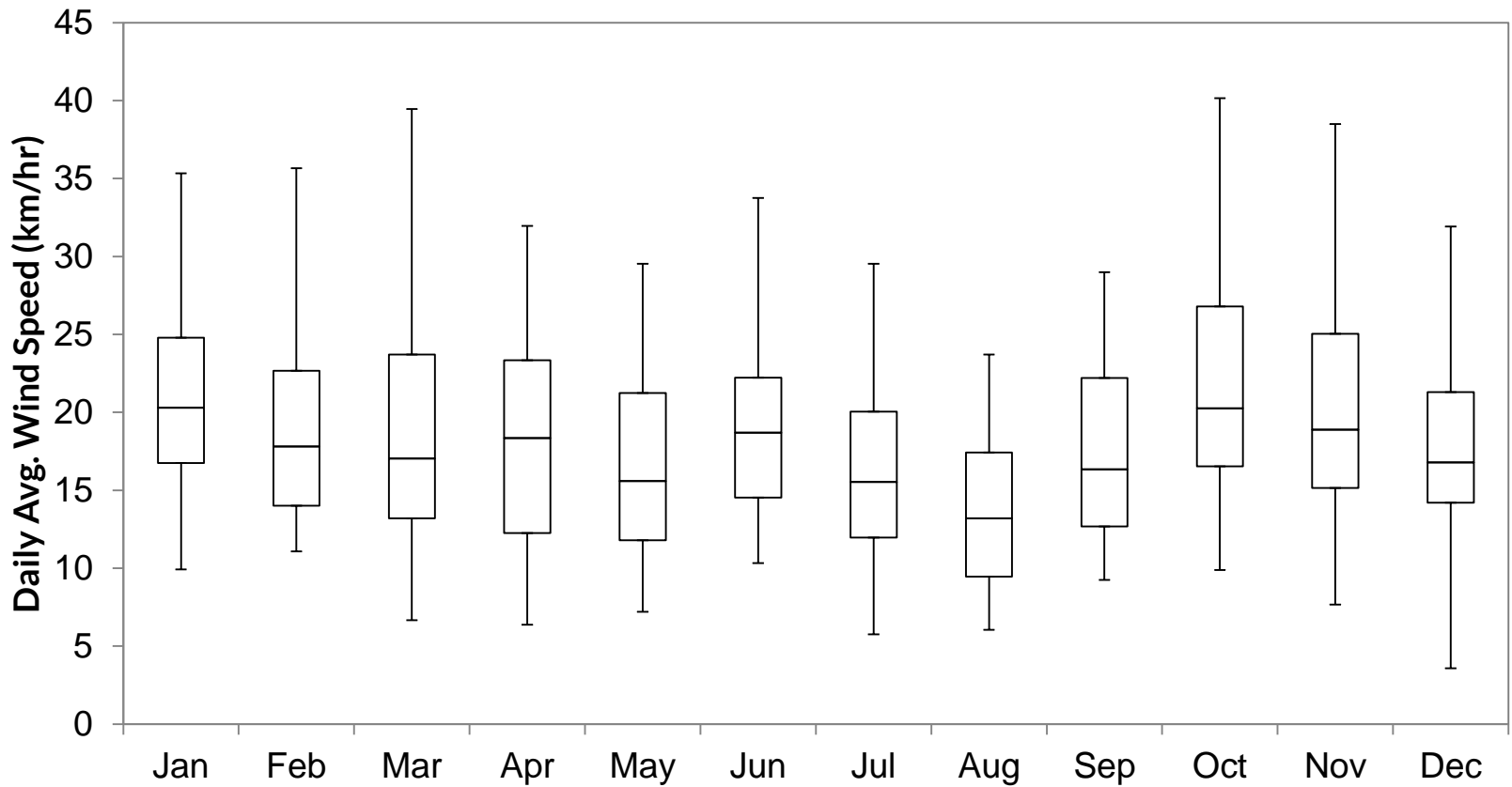




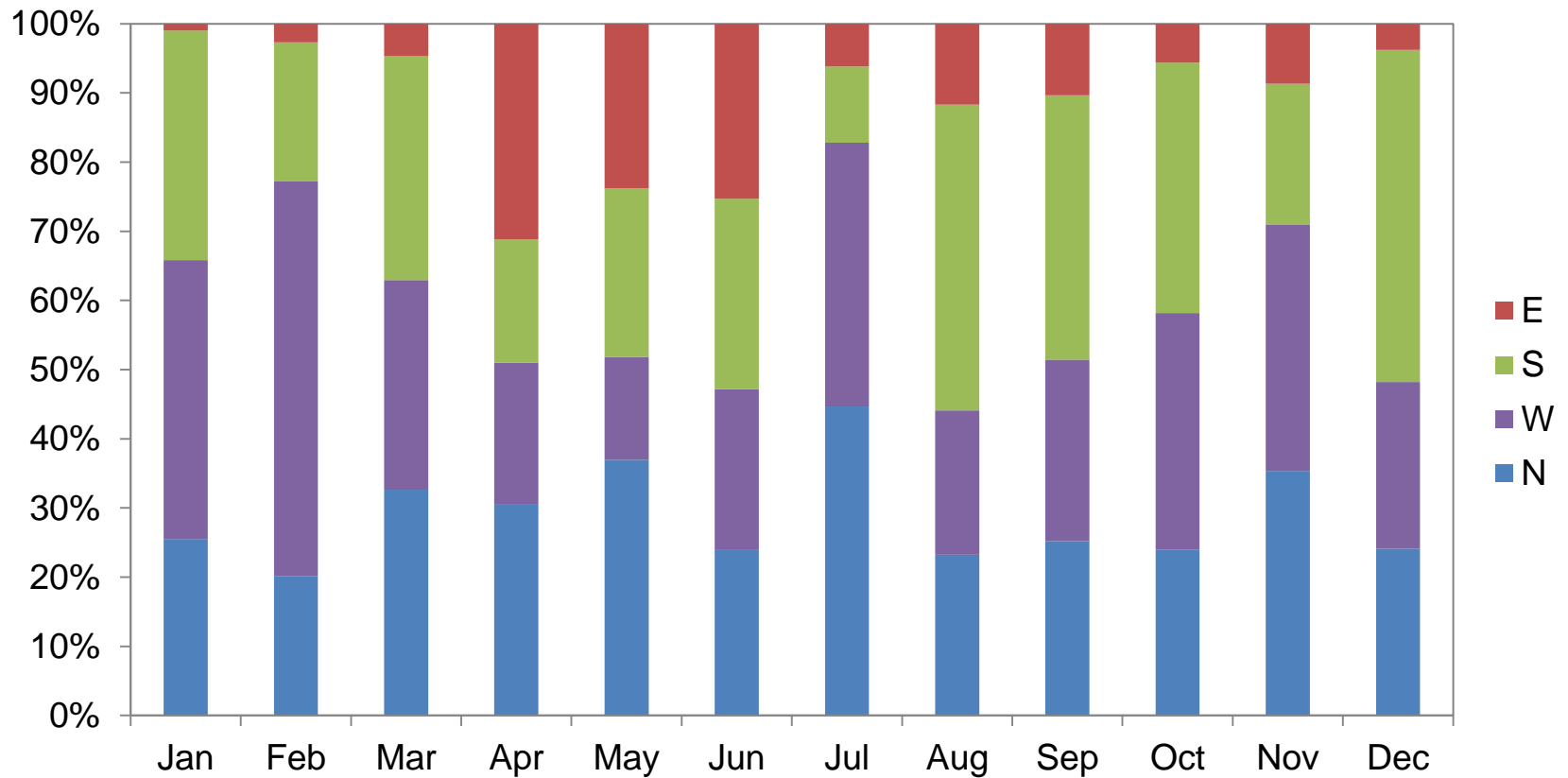
Temperature – All Sites



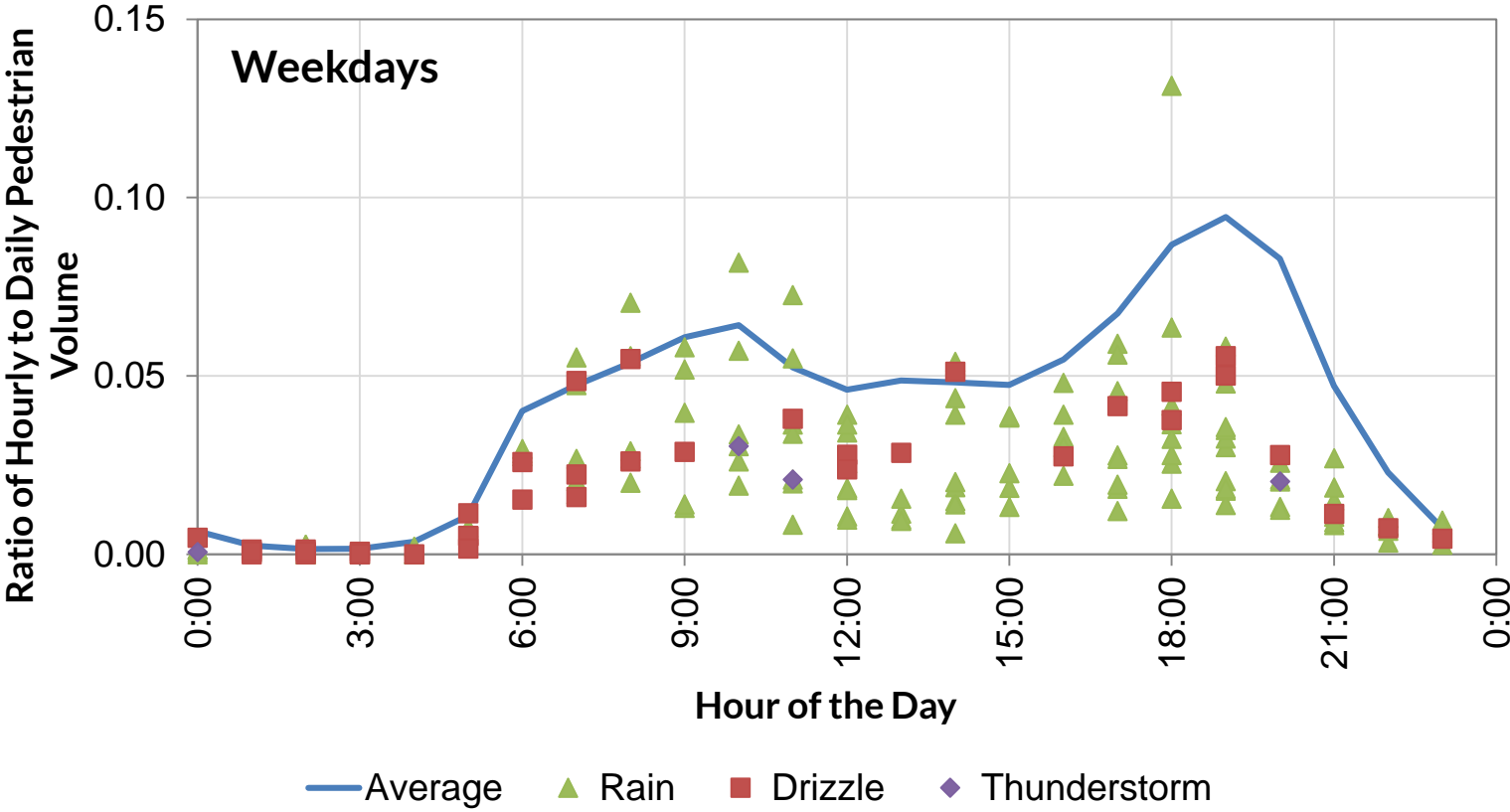
Wind Speed by Month



Wind Direction by Month



Hourly Rain



Snow and Pedestrian Volume

