Pedestrian and Bicycle Count Report 2015

City of Bellevue

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Pedestrians crossing NE 4th St at 108th Ave NE

Bicyclists crossing Factoria Blvd at SE 36th St

Purpose and Overview

In order to understand the impacts of investing in bicycle and pedestrian infrastructure, a comprehensive count and understanding of such activity on a national, state, and city level is crucial. In accordance with the National Bicycle and Pedestrian Documentation Project and WSDOT's Permanent Bicycle and Pedestrian Count Program, the City of Bellevue works to provide accurate and consistent data on bicycling and walking in the city. This is a key element of achieving the goals of Bellevue's 2009 Pedestrian and Bicycle Transportation Plan, which instructs the Transportation Department to "[develop] procedures to collect data in order to measure pedestrian and bicycle usage on an ongoing basis." The data collected through these procedures is used to track Bellevue's progress towards its goal, as outlined in the 2009 plan, to increase walking and bicycling trips by 10 percent within ten years. Obtaining accurate and comprehensive data on bicycle and pedestrian activity helps to identify trends over time and implement informed, data-driven policies and infrastructure decisions. The actions taken by the City of Bellevue to collect this data are part of a broader national movement to better record non-motorized travel throughout the country and support smarter policy decisions regarding bicycle and pedestrian infrastructure.

Figure 1: Camera Count Location and Screenline (2014 Ped-Bike Count Report)

Methodology

In previous years (2009-2014), manual counts were conducted four five locations throughout the city using video capture technology. Existing traffic cameras were used and recordings were saved onto DVDs. Volunteers or staff counted pedestrians and bicyclists manually from the video recordings, which was a time consuming procedure.

Manual screen line counting is the process of counting pedestrians and bicycles that cross a pre-designated point or line on the road. A tally is made for each pedestrian and bicycle that crosses this line in either direction. The tallies represent the number of pedestrians and bicycles that have traveled that street for the given time period. The red line designates the screen line in each figure. City staff used counting forms to tally pedestrian and bicycle volumes at each site. *(see Figure 1)*

The counts were performed for two peak periods (7:00 AM - 9:00 AM and 4:00 PM - 6:00 PM) for three consecutive days in late September/ early October. In addition, the Cascade Bicycle Club performed single-day, on-site counts at four additional locations during the AM and PM peak periods.

Inductive Loop Detector (SR-520 Trail)

Infrared Sensor (-90 Trail)

In March 2015, two ZELT Inductive Loop Counters from Eco-Counter were installed by WSDOT on the I-90 and SR 520 trails. The ZELT counters are diamond shaped stranded cables installed 40mm deep under asphalt pavement, with a battery life lasting approximately 2 years. The loop is able to precisely analyze the electromagnetic signature of bicycle wheels. Data is collected in 15 minute intervals.

In addition to the ZELT counters, infrared person-counting ReCycled Posts from Eco-Counter were installed. Using a sensor with a passive-infrared, pyroelectric technology and a high-precision lens, the system counts pedestrians passing within the range of the sensor by detecting their body temperature. Data from both systems was recorded continuously and allowed for automatic data transmission to the Eco-Counter software. For this report, data was segmented by direction traveled, hour, weekday, week, month, and quarter.

The inductive loop and infrared technology is able to continuously record activity and provide a more accurate and comprehensive look at bicycle and pedestrian trends in Bellevue. Moving forward, the City of Bellevue will continue to invest in automated counter technology to record bicycle and pedestrian activity, instead of manual counts. Given that this was the first year using the new counter technology, the data collected cannot be compared to previous years.

This was the first year that this technology was used to record bicycle and pedestrian activity. The actual reporting period is April 1, 2015 to March 31, 2016.

See Figure2, Figure 3 and Figure 4 for the I-90 Trail and SR 520 Trail Eco-Counter locations.

Figure 2: Aerial View of Counter Location 1 - SR 520 Trail (approximately 360' south-east of NE 24th St)

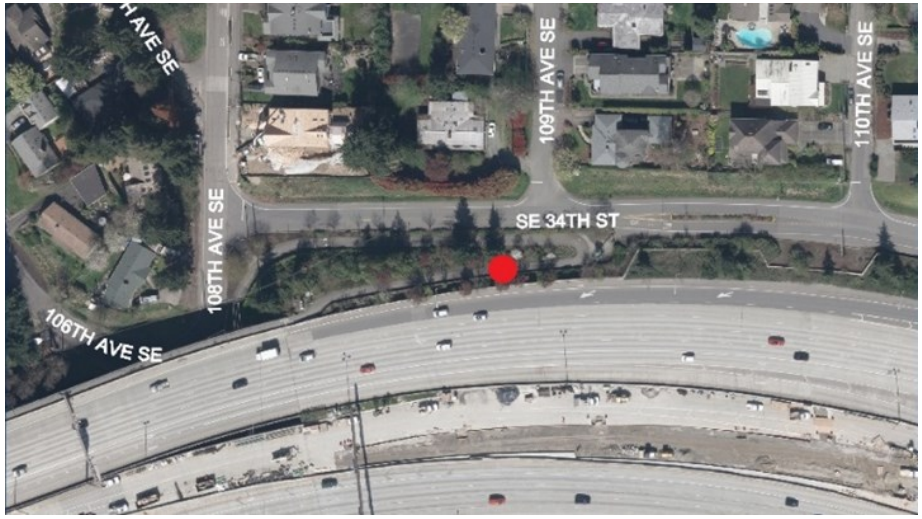

Figure 3: Aerial View of Counter Location 2 - I-90 Trail (130' southwest of SE 34th St and 109th Ave SE Intersection)

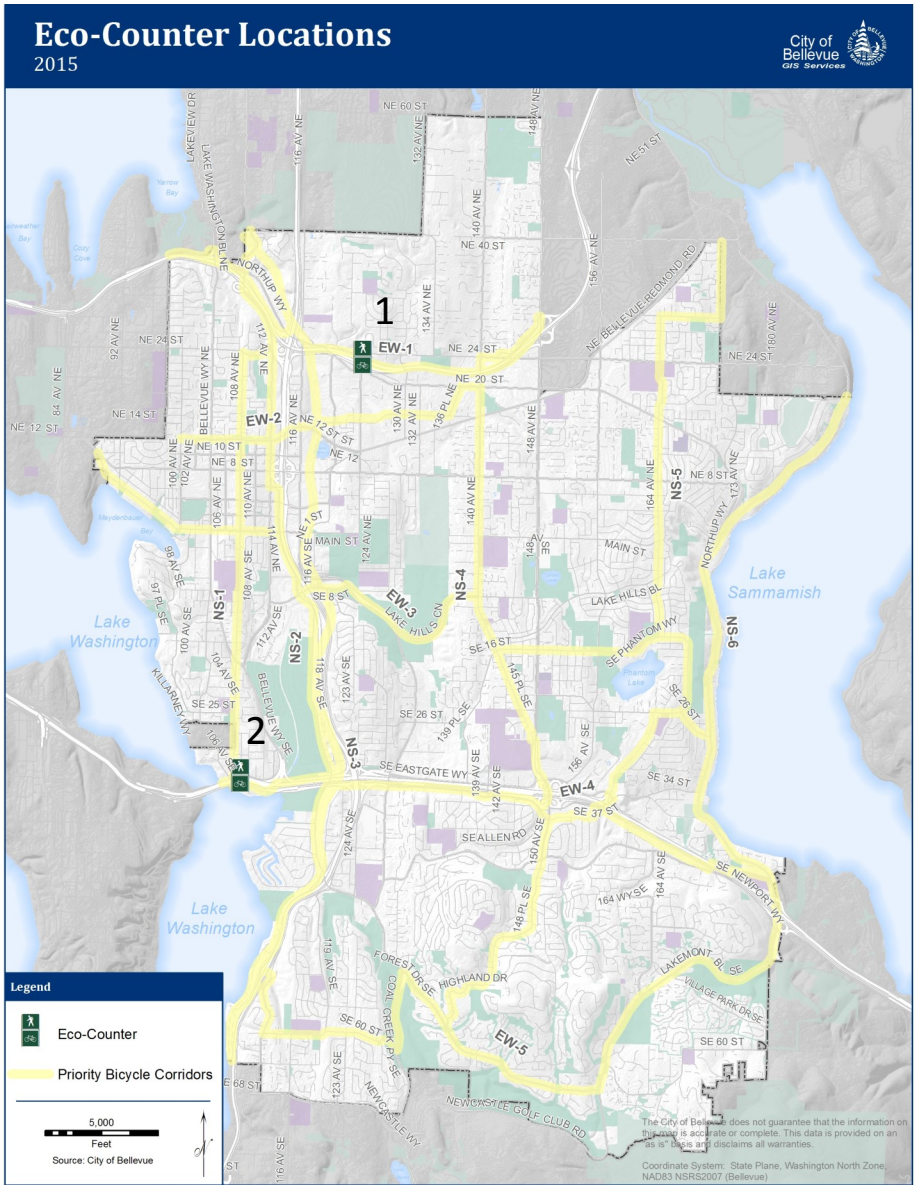

Figure 4: Counter locations Map, 2015

I-90 Trail Counter Installation

Bicyclist at the I-90 Trail Counter Location

Key Findings—I-90 Trail Counter Location

- Weekends saw consistently higher pedestrian and cyclist trail use. The weekend average bicycle volume was 705 cyclists per day, 32% higher than the weekday (M-F) average of 536 cyclists per day. The weekend average pedestrian volume was 152 pedestrians per day, 37% higher than weekday average volume of 111 pedestrians per day.
- Bicycle volumes were consistently 4-5x higher than pedestrian vol-umes.
- Bicycle activity was highest in the spring with an average of 837 cy-clists per quarter and lowest in the autumn with an average of 321 cyclists per quarter. Pedestrian activity was highest in the summer with an average of 173 pedestrians per quarter and lowest in the au-tumn with an average of 68 pedestrians per quarter.
- Bicycle activity was highest in June with an average of 900 cyclists per month and lowest in December with an average of 200 cyclists per month. Pedestrian activity was highest in July with an average of 204 pedestrians per month and lowest in December with an average of 50 pedestrians per month.
- Recorded activity typically began for the day at 4:00 AM and ended at 10:00 PM.
- Bicycle and pedestrian activity reflected similar trends during the ear-lier part of the day, while bicycle activity increased dramatically dur-ing the PM peak hours (4:00 PM - 6:00 PM) and pedestrian activity did not.
- Both pedestrian and bicycle activity increased when weather condi-tions were more favorable (higher mean temperature, lower mean wind speed, lower amounts of precipitation, and lower cloud cover.)

SR 520 Trail Counter Installation

Bicyclist at the SR 520 Trail Counter Location

Key Findings—SR 520 Trail Counter Location

- Weekdays (M-F) saw consistently higher pedestrian and cyclist trail use. The weekday average bicycle volume was 136 cyclists per day, 60% higher than the weekend average of 85 cyclists per day. The weekday average pedestrian volume was 20 pedestrians per day, 54% higher than weekend average volume of 13 pedestrians per day.
- On average, bicycle volumes during the spring and summer quarters were approximately 7x higher than pedestrian volumes. During the autumn and winter quarters, average bicycle volumes were only 5.5-6x higher than average pedestrian volumes.
- Bicycle activity was highest in the spring with an average of 181 cyclists per quarter and lowest in the autumn with an average of 72 cyclists per quarter. Pedestrian activity was highest in the spring with an average of 25 pedestrians per quarter and lowest in the autumn with an average of 12 pedestrians per quarter.
- Bicycle activity was highest in June with an average of 214 cyclists per month and lowest in December with an average of 45 cyclists per month. Pedestrian activity was highest in June with an average of 29 pedestrians per month and lowest in December with an average of 9 pedestrians per month.
- Recorded activity typically began for the day at 5:00 AM and ended between 9:00 PM – 10:00 PM.
- Bicycle activity saw noticeable increases during morning and evening peak hours (7:00 AM – 9:00 AM and 4:00 PM – 6:00 PM) while pedestrian activity was consistent throughout the day.
- Both pedestrian and bicycle activity increased when weather conditions were more favorable (higher mean temperature, lower mean wind speed, lower amounts of precipitation, and lower cloud cover.)

Analysis—I-90 Trail Counter Location

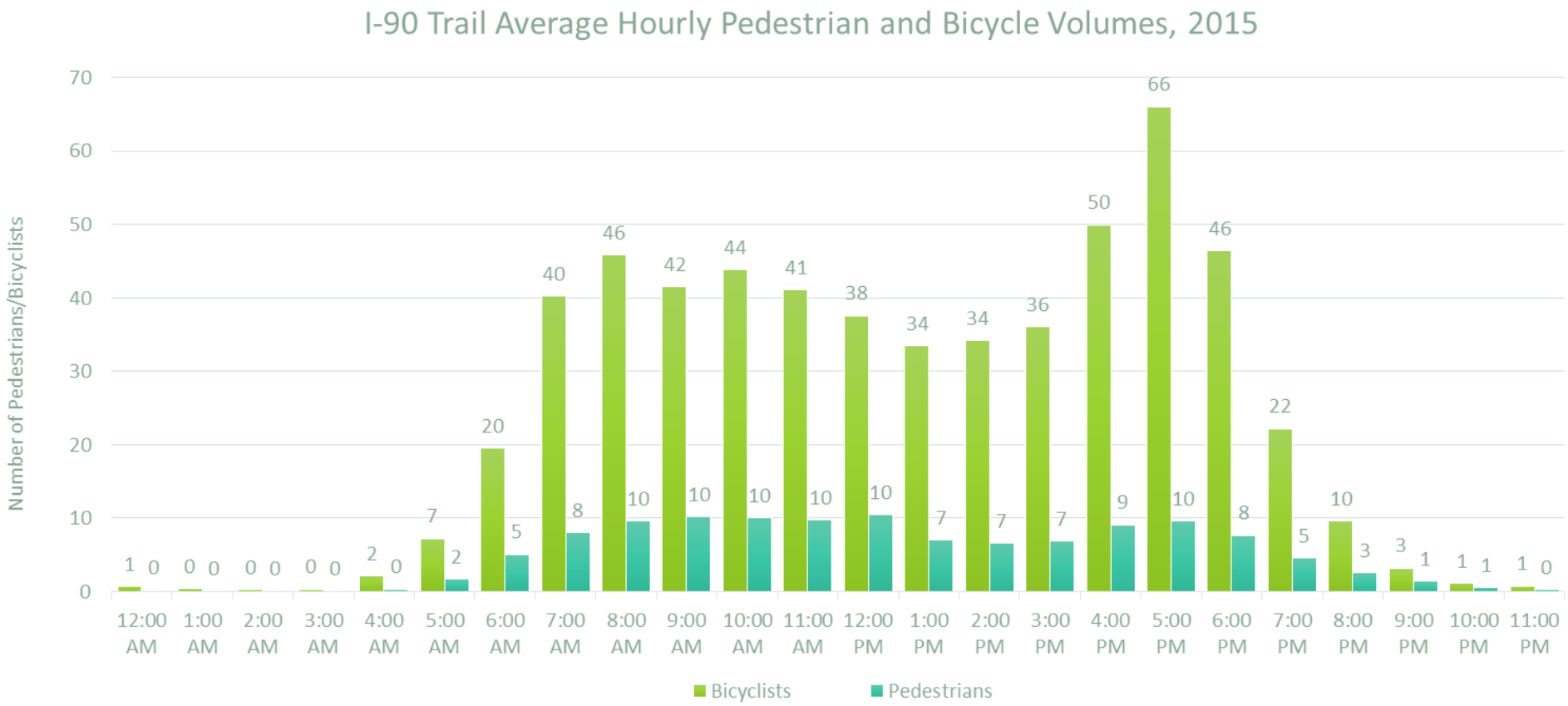

Figure 5: I-90 Trail Average Hourly Pedestrian and Bicycle Volumes, 2015

This data indicates that the average daytime hourly bicycle volume was approximately 5x the average daytime hourly pedestrian volume (*Figure 5*). The average daytime hourly pedestrian volume was 8 pedestrians per hour and the average daytime hourly bicycle volume was 41 cyclists per hour. It is likely that this trail is used by more cyclists than pedestrians because of the length of the trail and its accessibility to major destinations. For average bicycle volumes, 88.42% of bicycle activity occurred between 7:00 AM – 7:00 PM. 14.75% of activity occurred during morning peak hours and 19.86% occurred during evening peak hours. For average pedestrian volumes, 85.91% of pedestrian activity occurred between 7:00 AM – 7:00 PM. 14.45% of activity occurred during morning peak hours and 15.33% of activity occurred during evening peak hours. Compared to average pedestrian activity, a greater percentage of average bicycle activity occurred between 7:00 AM - 7:00 PM, mostly within the evening peak hours.

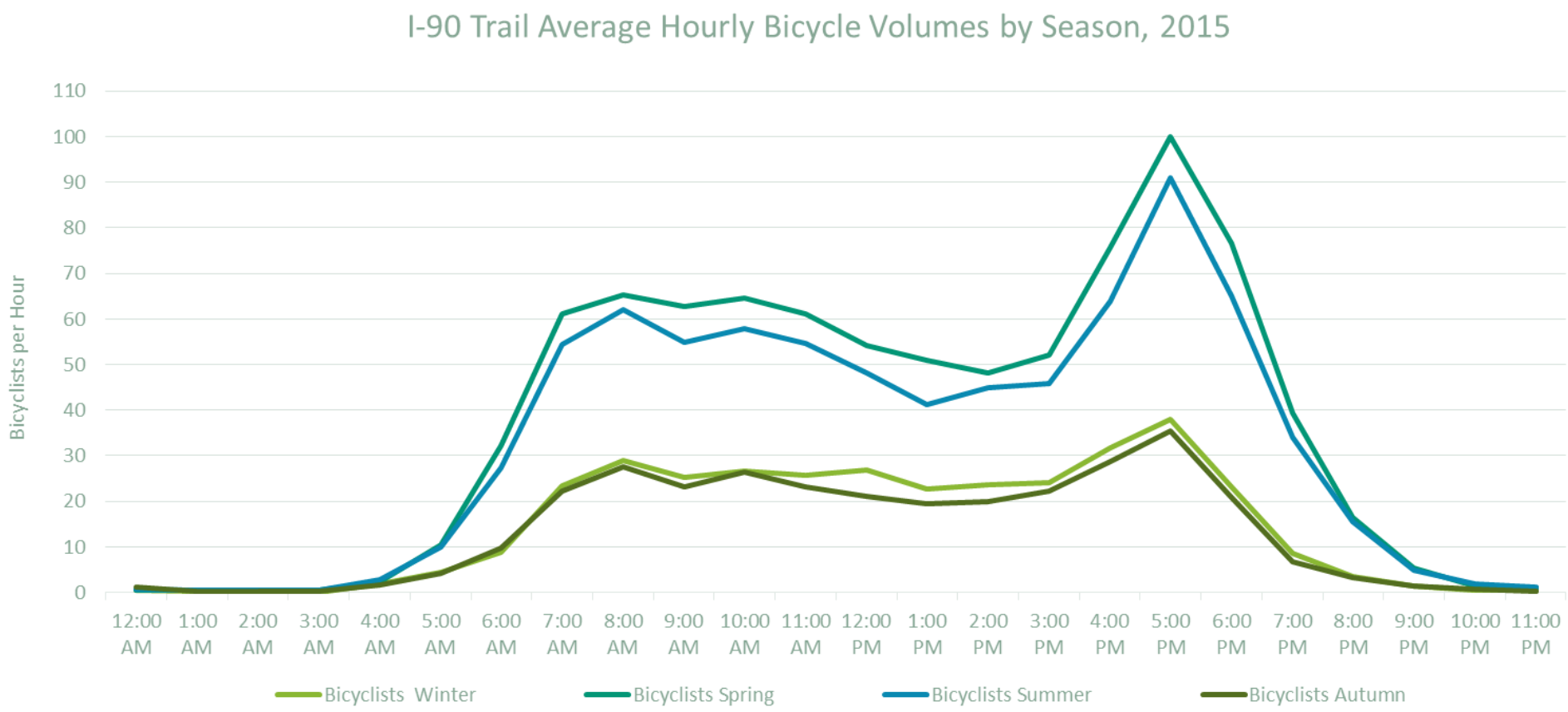

Figure 6: I-90 Trail Average Hourly Bicycle Volumes by Season, 2015

The data indicates that spring saw the highest average bicycle volumes with an average of 62 cyclists per hour between 7:00 AM - 7:00 PM and autumn saw the lowest with an average of 23 cyclists per hour between 7:00 AM - 7:00 PM (*Figure 6*). Average bicycle activity followed similar patterns throughout the day in all seasons. The most activity was consistently seen between 4:00 PM - 6:00 PM, representing 19.86% of total average bicycle activity.

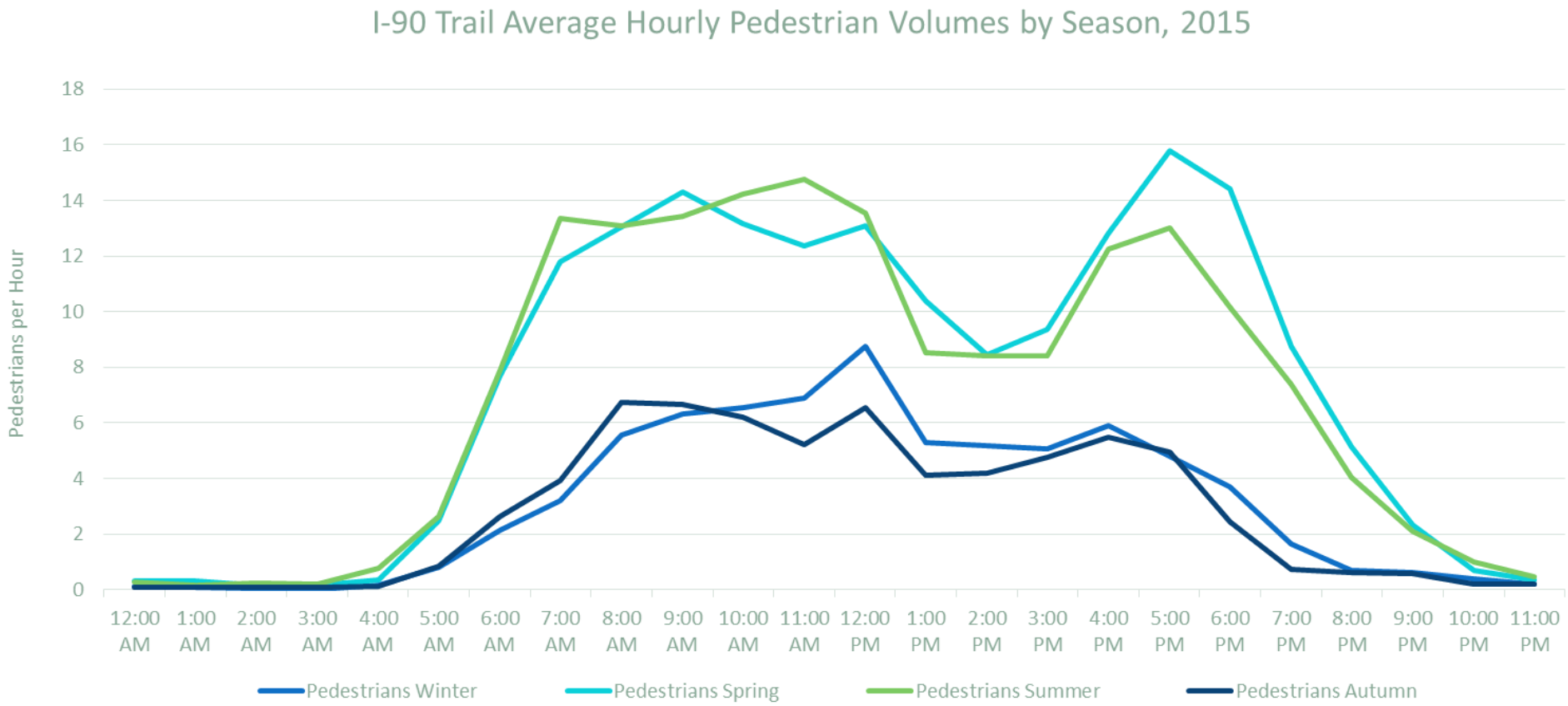

Figure 7: I-90 Trail Average Hourly Pedestrian Volumes by Season, 2015

Average pedestrian volumes saw more variation between seasons than average bicycle volumes (*Figure 7*). Activity in the late morning (9:00 AM - 12:00 PM) was highest during the summer with an average of 15 pedestrians per hour at 11:00 AM, while activity in the evening (4:00 PM - 7:00 PM) was highest during the spring with an average of 16 pedestrians per hour at 5:00 PM.

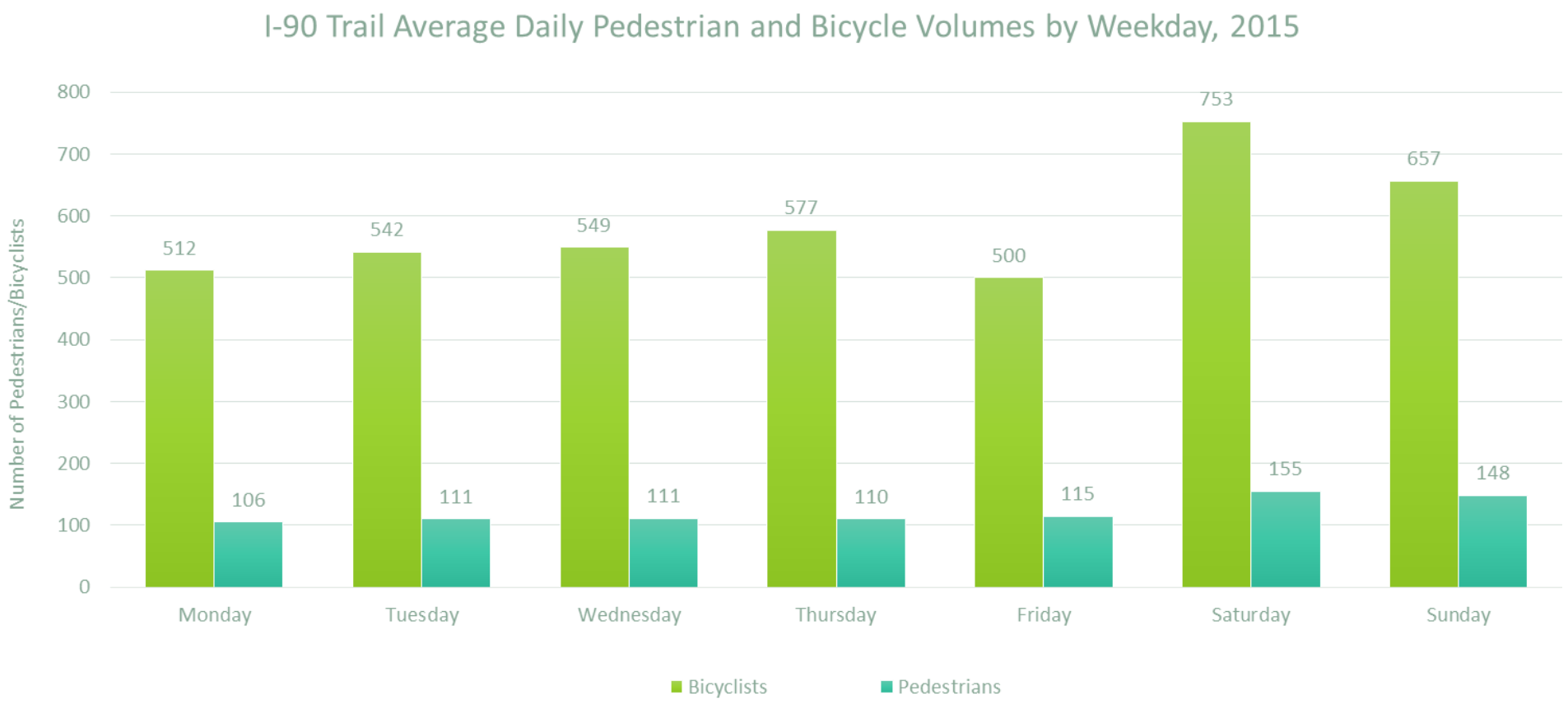

Figure 8: I-90 Trail Average Daily Pedestrian and Bicycle Volumes by Weekday, 2015

The data indicates that average bicycle volumes were approximately 5x higher than average pedestrian volumes, reflecting a constant trend across all days of the week (*Figure 8*). Saturdays were the most popular days for trail use, with an average of 753 cyclists per day and 155 pedestrians per day. Fridays had the lowest average bicycle volume at an average of 500 cyclists per day. Mondays had the lowest average pedestrian volume at an average of 106 pedestrians per day.

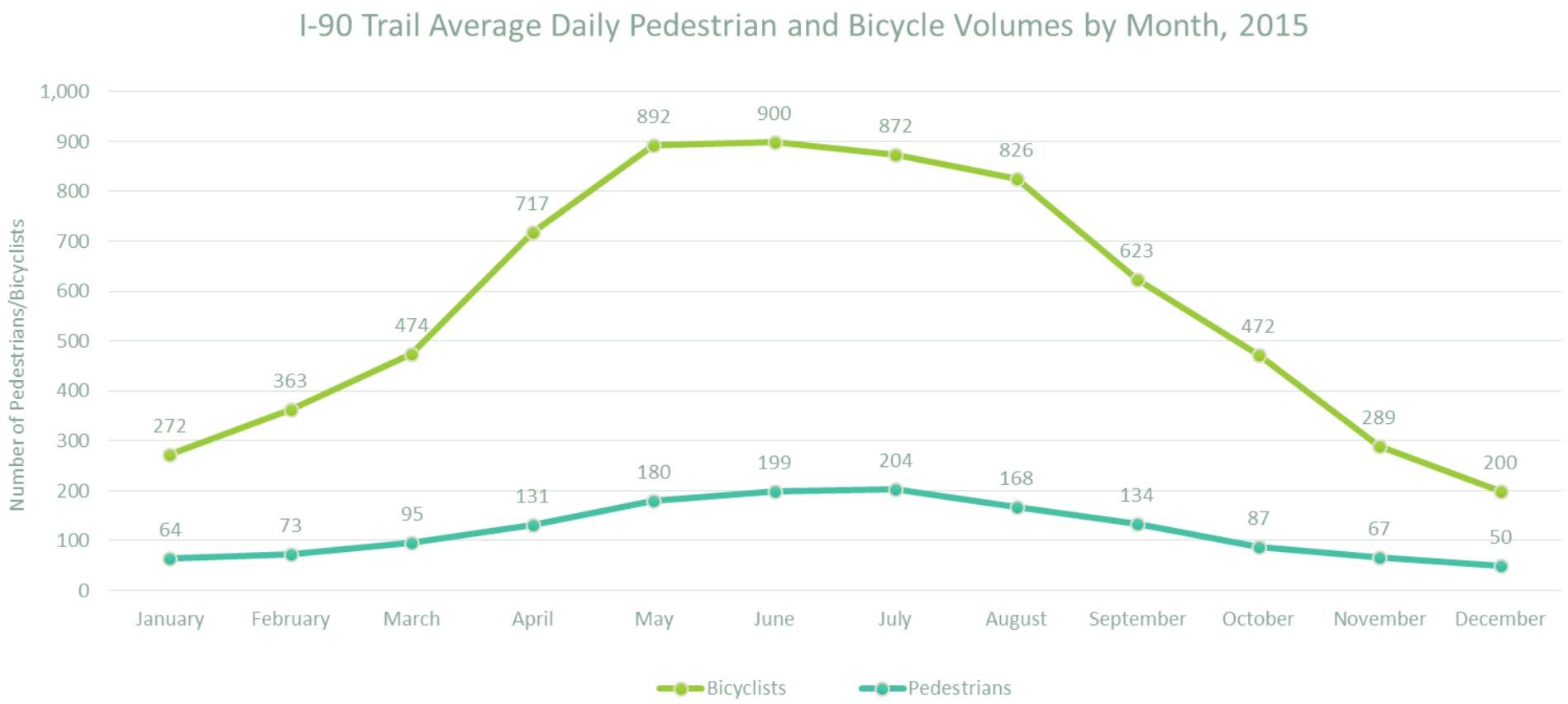

Figure 9: I-90 Trail Average Daily Pedestrian and Bicycle Volumes by Month, 2015

The data indicates that May – August see the most trail usage (*Figure 9*). June had the highest average bicycle volume at an average of 900 cyclists per day and July had the highest average pedestrian volume at an average of 204 pedestrians per day, compared to the yearly averages of 575 cyclists per day and 121 pedestrians per day. December had the lowest average bicycle and pedestrian volumes with averages of 200 cyclists per day and 50 pedestrians per day.

Analysis—SR 520 Trail Counter Location

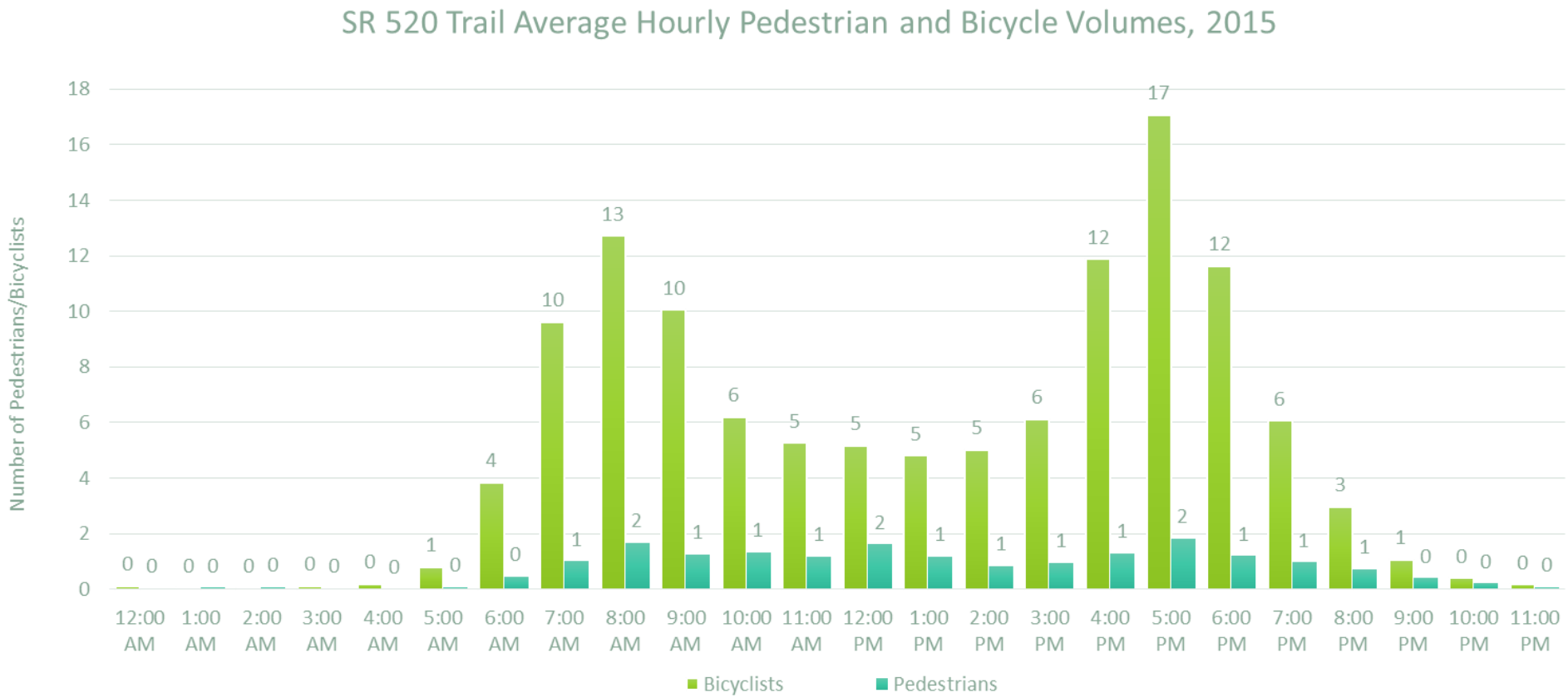

Figure 10: SR 520 Trail Average Hourly Pedestrian and Bicycle Volumes, 2015

The data indicates that average bicycle volumes were 9x higher than average pedestrian volumes during the daytime hours (7:00 AM – 7:00 PM) (*Figure 10*). While the average bicycle volumes reflect a clear increase during morning peak (7:00 AM - 9:00 AM) and evening peak (4:00 PM - 6:00 PM) times, the average pedestrian volumes remain consistent and are far less in volume in comparison.

For average bicycle volumes, 87.06% of bicycle activity occurred between 7:00 AM – 7:00 PM. 18.42% of activity occurred during morning peak hours and 23.88% occurred during evening peak hours. For average pedestrian volumes, 83.61% of pedestrian activity occurred between 7:00 AM – 7:00 PM. 14.53% of activity occurred during morning peak hours and 17.02% of activity occurred during evening peak hours. Comparing average bicycle and pedestrian volumes, a greater percentage of pedestrian activity occurred during the midday hours.

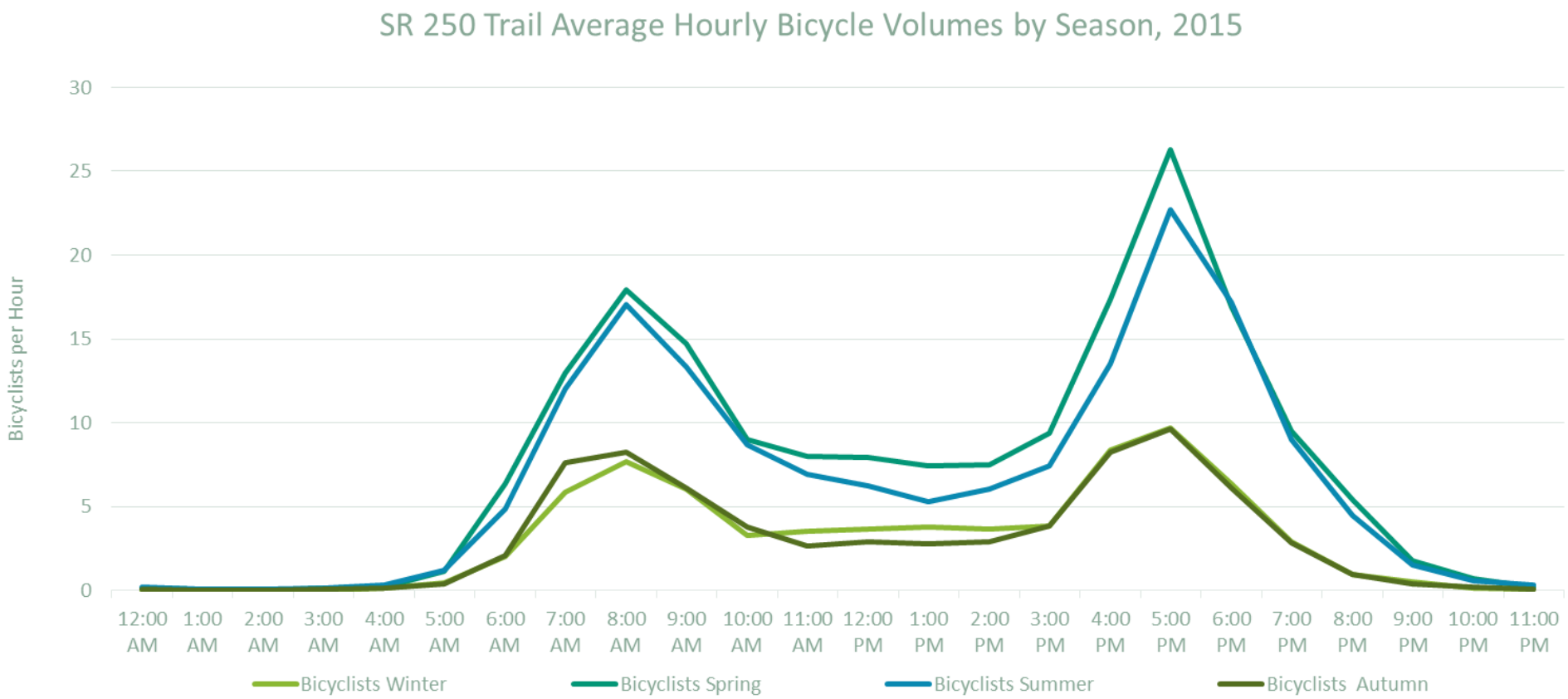

Figure 11: SR 250 Trail Average Hourly Bicycle Volumes by Season, 2015

The data indicates that spring saw the highest average bicycle volumes and autumn/winter saw the lowest (*Figure 11*). Average bicycle activity followed similar patterns throughout the day in all seasons. The most activity was consistently seen between 4:00 PM - 6:00 PM, representing 23.88% of total average bicycle activity.

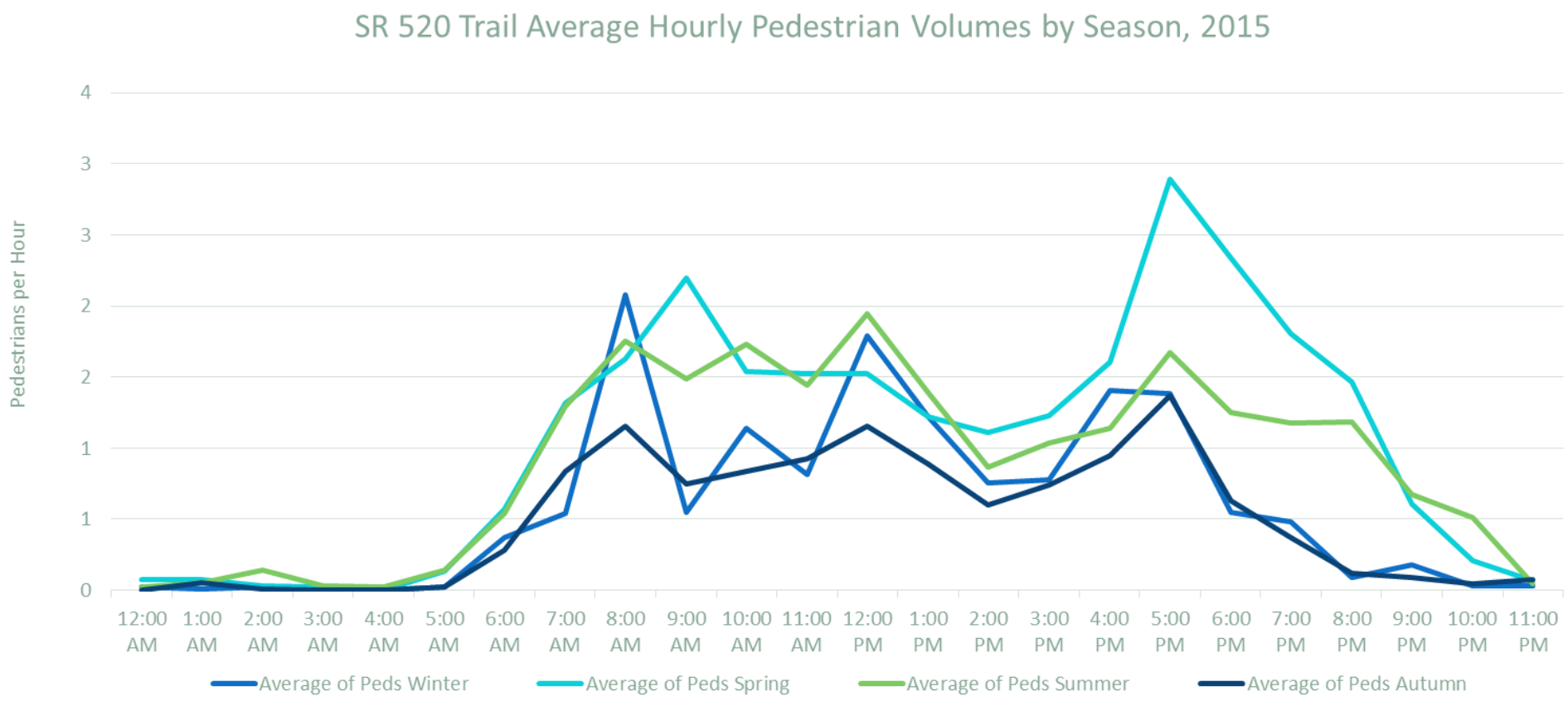

Figure 12: SR 520 Trail Average Hourly Pedestrian Volumes by Season, 2015

Average pedestrian volumes saw more variation between seasons than average bicycle volumes (*Figure 12*). Given that the recorded pedestrian activity was so minimal (averages of less than 3 pedestrians per hour), it is difficult to come to any conclusions based off of the data recorded.

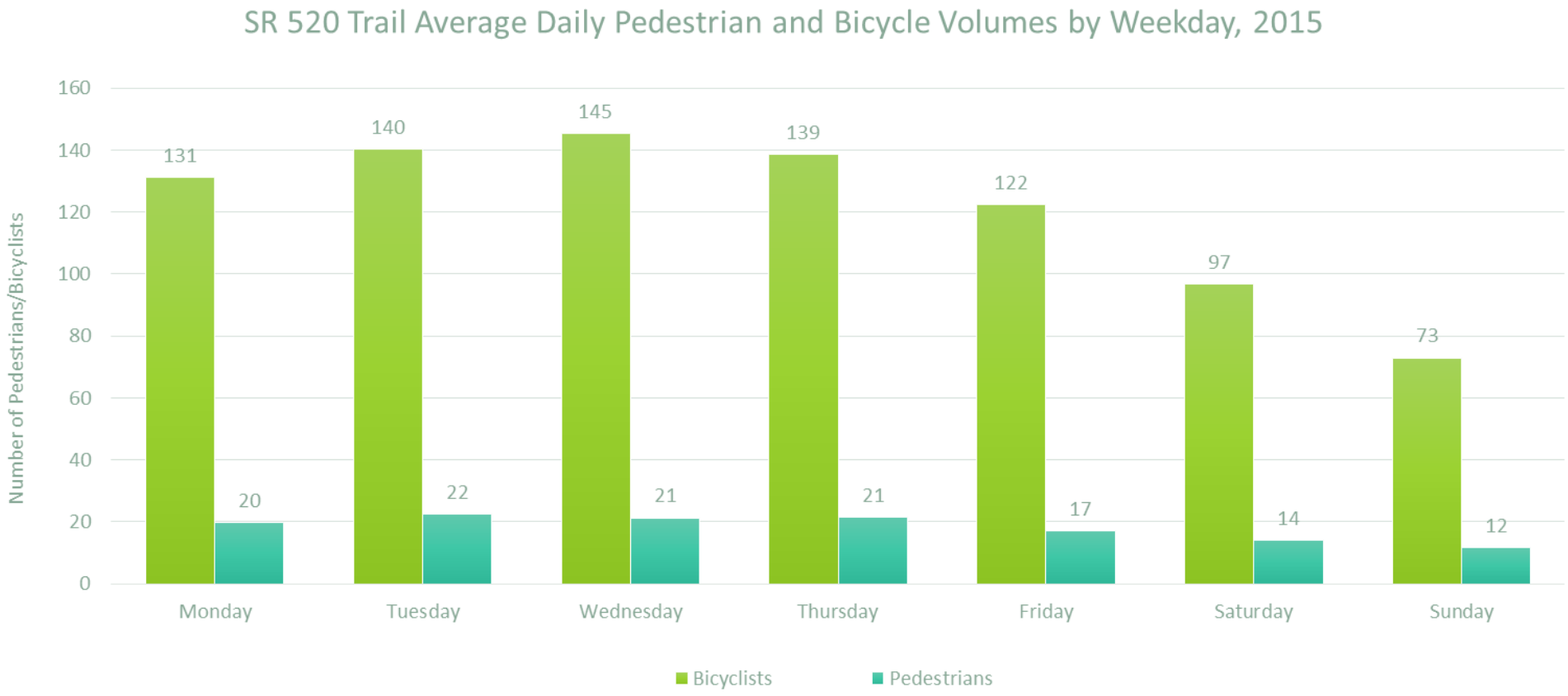

Figure 13: SR 520 Trail Average Daily Pedestrian and Bicycle Volumes by Weekday, 2015

Throughout the year, average bicycle and pedestrian volumes were higher during the week (Monday – Friday) than the weekends (Saturday – Sunday) (*Figure 13*). During the spring and summer, the difference in volume between cyclists and pedestrians was greater than compared to the difference during the winter and autumn. Wednesday had the highest average bicycle volume at an average of 145 cyclists per day. Tuesday had the highest average pedestrian volume at an average of 22 volumes per day.

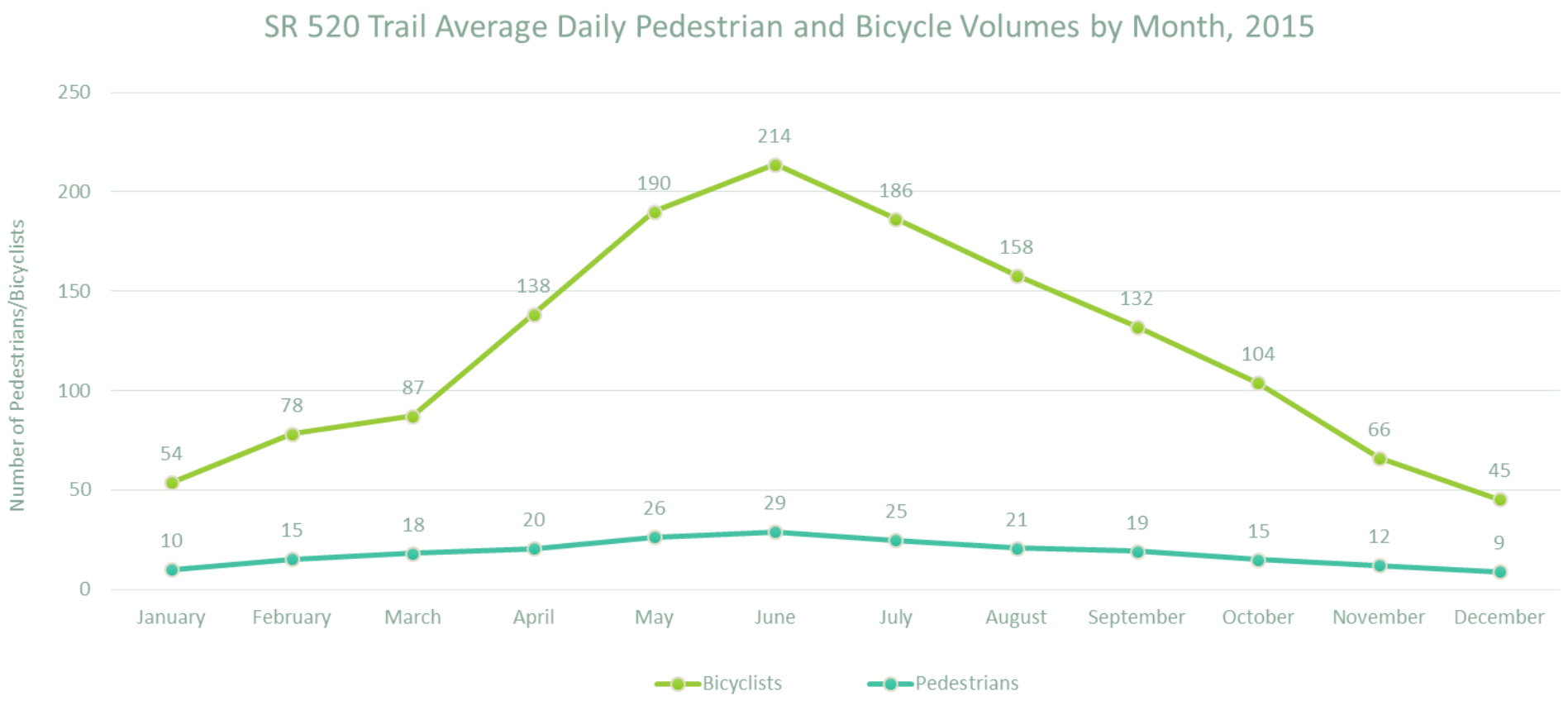

Figure 14: SR 520 Trail Average Daily Pedestrian and Bicycle Volumes by Month, 2015

June had the highest average volumes for both pedestrians and cyclists, with an average of 214 cyclists per day and 29 pedestrians per day (*Figure 14*). December had the lowest average volumes with an average of 45 cyclists per day and 9 pedestrians per day. Bicycle activity saw a much greater increase during the summer months compared to pedestrian activity. The total average bicycle volume for the year was nearly 7x higher than the total average pedestrian volume.

Bicyclist at the I-90 Trail Counter Location

Bicyclist at the SR 520 Trail Counter Location

Conclusions

Average bicycle and pedestrian activity on the I-90 Trail demonstrated inverse behavior than average activity on the 520 Trail. Bicycle and pedestrian activity on the I-90 Trail was highest on the weekends. Bicycle and pedestrian activity on the 520 Trail was highest during the middle of the week (Tuesday—Thursday) and was lowest on weekends. Bicycle activity increases significantly during the PM peak (4:00 PM - 6:00 PM) for both trails, while pedestrian activity is more consistent throughout the day. For both the I-90 and 520 trails, bicycle activity was considerably higher than pedestrian activity overall. This was especially true for the 520 Trail, which had very minimal pedestrian activity with an average of less than 3 pedestrians per hour and less than 25 pedestrians per day. Due to the length of the trails and their access to major destinations, they are more appealing and suitable for cyclists rather than pedestrians. As to be expected, more favorable weather conditions correlated with higher rates of bicycle and pedestrian activity. It can be concluded that more pedestrians and cyclists are using the trails during the summer months, due to the more favorable weather and time off from work and school. The busiest days on the I-90 Trail were Friday, September 18th with 566 pedestrians and Saturday, August 1 with 1832 cyclists. This large volume of cyclists was likely due to Seafair occurring that day. The busiest days on the 520 Trail were Wednesday, April 29th with 59 pedestrians and Friday, May 15th with 333 cyclists.

It is important to note that the 520 Trail is currently under construction and will not be fully completed until 2017 (*Figure 15*). During the time that this data was recorded, the trail only extended from 108th Ave NE in Bellevue to Evergreen Point Rd in Medina, with an extension to the west end of the 520 floating bridge opened in Summer 2016. Once the trail extends to the Seattle/Montlake area, it can be expected that bicycle and pedestrian activity will increase and reflect different trends.

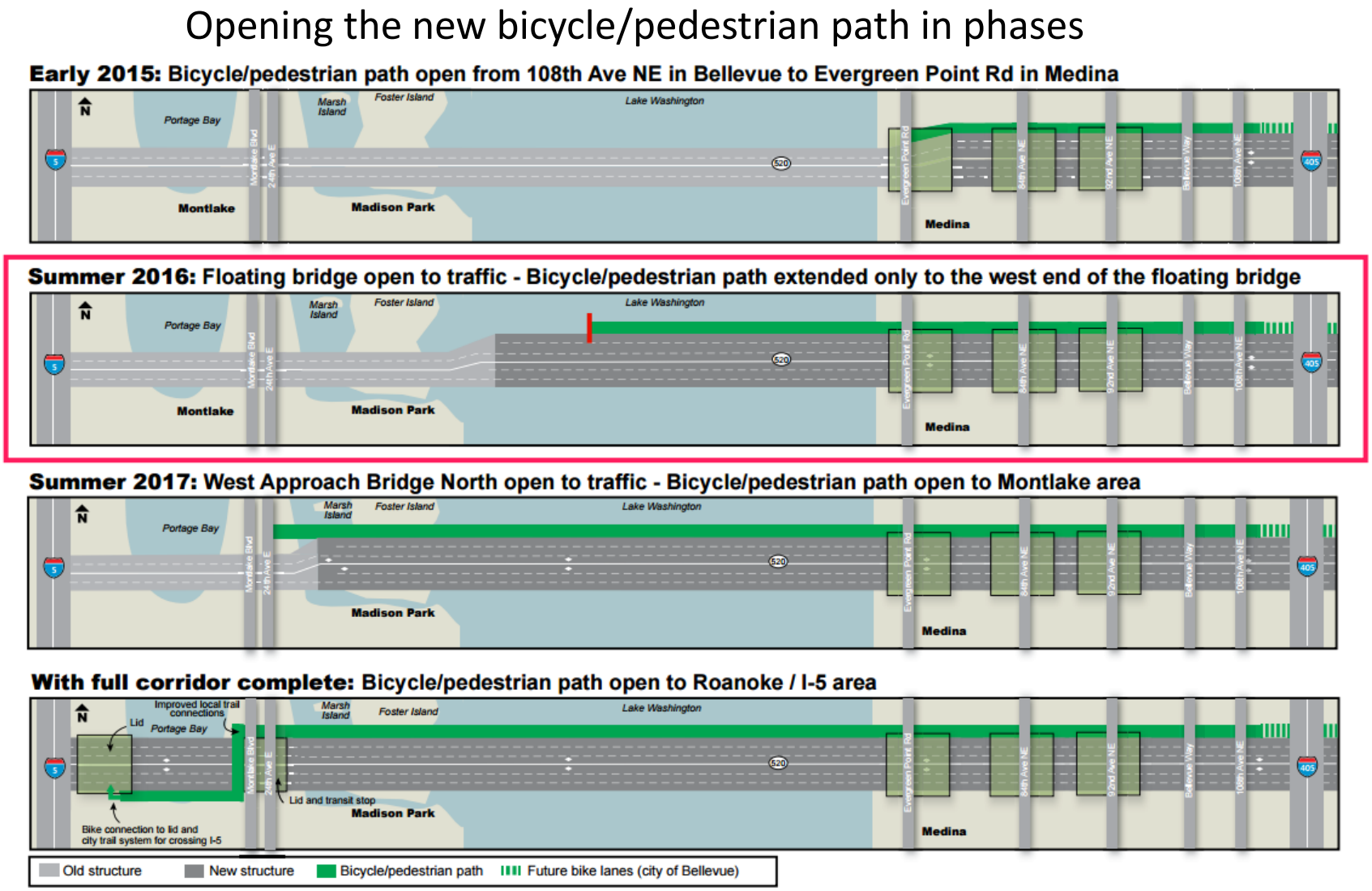

Figure 15: SR 520 Trail Construction Timeline, source: WSDOT

Bike lane inductive loop
145th Pl SE and SE 24th St intersection, southbound

Bike lane inductive loop
SE Eastgate Way and 160th Ave SE intersection, westbound

Next Steps

In coming years, the City of Bellevue will continue using the ZELT Inductive Loop Counters and Infrared Posts to record bicycle and pedestrian activity. In addition to the counters installed on the I-90 and SR 520 trails, Bellevue is hoping to install more counters throughout the city, especially along the Priority Bicycle Corridors and other key locations.

On-street bicycle counters are in the process of being installed and are already recording data to be used in next year's report. For these counters, a new methodology must be developed as some cyclists will ride on sidewalks or in general purpose lanes instead of in the bike lanes.

The data collected this year from the I-90 and 520 Trail counters will provide a baseline for comparison with next year's data and beyond. The City of Bellevue intends on using the data collected to further inform their policy and infrastructure decisions. The counters installed throughout Bellevue contribute to a greater project by the Washington State Department of Transportation to record and analyze bicycle and pedestrian activity throughout the state of Washington.