



Fresh Pond Reservation Census Program



Data Collection Summary, 2015



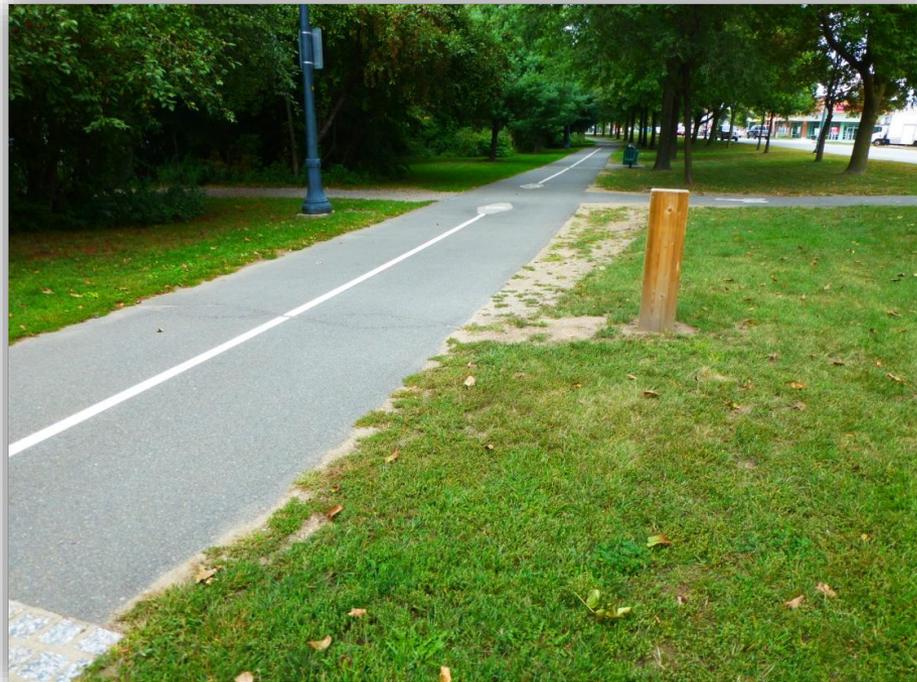
Purpose

- To *quantify and qualify users* at Fresh Pond Reservation in order to inform management.

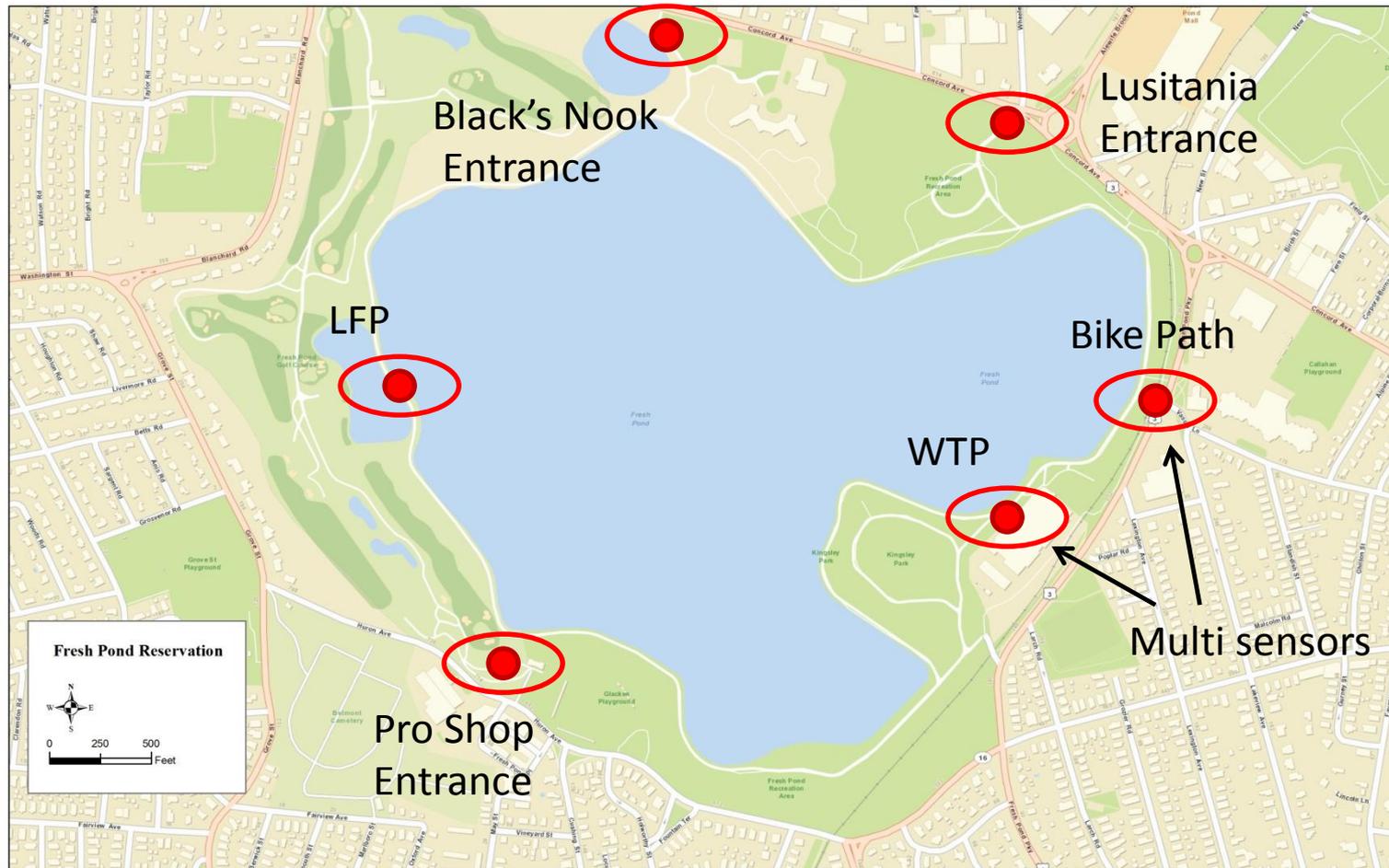


Methods

Fresh Pond users are quantified by strategically-placed EcoCounter sensors and by visual surveys conducted by staff and volunteers. EcoCounter sensors collect data in 15 minute segments available for download from an online database.



Counter Locations



Multi sensors count both pedestrians and cyclists. Other sensors count pedestrians only.



2015 Data Exclusions



BP Multi pyro sensor replaced in August

WTP Multi bike loops disconnected, counter moved and bike loops re-installed successfully to location with less interference.

Snowstorms in late January and throughout February caused snow and ice build-up on many sensors.

Exclusions, 2015

	<u>Full Snow Days</u>	<u>Partial Snow Days, time uncovered</u>	<u>Pyro sensor malfunction</u>	<u>Bike loop</u>
Pro Shop	Jan 27 Feb 2 Feb 15	Feb 16 at 7AM		
Black's Nook	Jan 27			
BPMULTI	Jan 27 Feb 2 Feb 15-16	Feb 17 at 3PM	August 1-23	
WTPMULTI	Jan 27-28 Feb 2, Feb 6-10 Feb 14-16	Jan 29 until 11AM Feb 11 at 3PM Feb 17 at 3PM		January-May no counts, Installation midway through June so data omitted as well
LUSITANIA	Jan 27-28 Feb 2-3, Feb 15-16	Jan 29 until 11AM Feb 4 until 11AM Feb 17 until 3 PM		
LFP	Jan 27-28 Feb 2- 3 Feb 8-10, Feb 15-16	Feb 4 at 11AM Feb 11 at 3PM Feb 17 at 3PM		

Data Quality Control

EcoCounter sensors downloaded weekly: checked for signs of physical damage or environmental changes. Data screened for anomalies.

Sensor data compared to visual survey data

- Running average error between sensor and surveys is 16% overall, 14% for 2015
- Grouped events (multiple users crossing at same time) are still being tracked as a possible source of counter underestimation



Staff and Volunteer Surveys

- Surveys are conducted as a quality control measure side-by-side with sensors
- They provide insight into the types of users

Surveys

- Pedestrians
- Dogs (on/off leash)
- Bikers
- Runners
- Children
- Direction of travel

Unattended Eco-Counters

- Direction of travel
- Count of any heat producing body >3ft tall

Multi Counters

- Direction of travel
- Bike
- Pedestrian

EcoCounter and Visual Surveys

ANNUAL RESULTS

Annual EcoCounter Highlights

Average Monthly Counts:

- In 2011: 34,000
- In 2012: 38,000
- In 2013: 36,700
- In 2014: 37,200
- In 2015: 36,100

Average Daily Counts:

- In 2011: 1,100
- In 2012: 1,100
- In 2013: 1,200
- In 2014: 1,190
- In 2015: 1,220

Adverse winter conditions in 2015 resulted in comparatively low counts. February 2015 WTP counts were 44% of February 2014 WTP counts.

Total Annual Estimate*:

- In 2011: 411,000 counts
- In 2012: 405,000 counts
- In 2013: 460,000 counts
- In 2014: 446,000 counts
- In 2015: 432,800 counts

*Annual estimate is an average of LFP & WTP only.



Summary Visual Survey Data

- 29.75 survey-hours conducted during 2015
 - 2.75 hours at LFP
 - 12 hours at WTP
 - 2 hours at Pro Shop
 - 3 hours at Lusitania
 - 4 hours at Black's Nook
 - 6 hours at BPMulti
- 171 survey-hours conducted in total (2011-2015)
 - 62 hours at LFP
 - 92 hours at WTP
 - 6 hours at BPMulti
 - 4 hours at both Lusitania and Black's Nook
 - 3 hours at Pro Shop entrance



Survey-Sensor Comparison

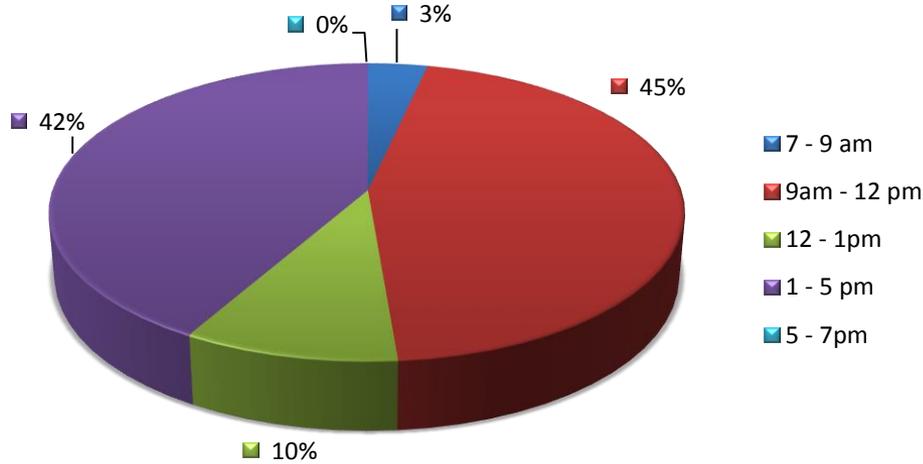
From 2011-2015, sensors *underestimated* observed survey counts **73%** of the time, and were the same as the observed counts **8%**.

In **2015**:

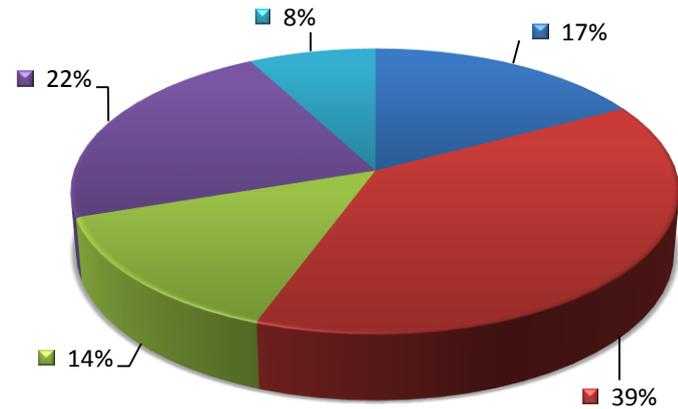
- Sensors underestimated **57%** of survey counts
- Sensors overestimated **27%** of survey counts
- The *single-highest survey discrepancy* was at Pro Shop, where snow pack made it possible for dogs to be counted. With dog observations taken into account, error dropped from **140%** to **20%** for that survey.

Survey Data Results

2015 Surveys by Time



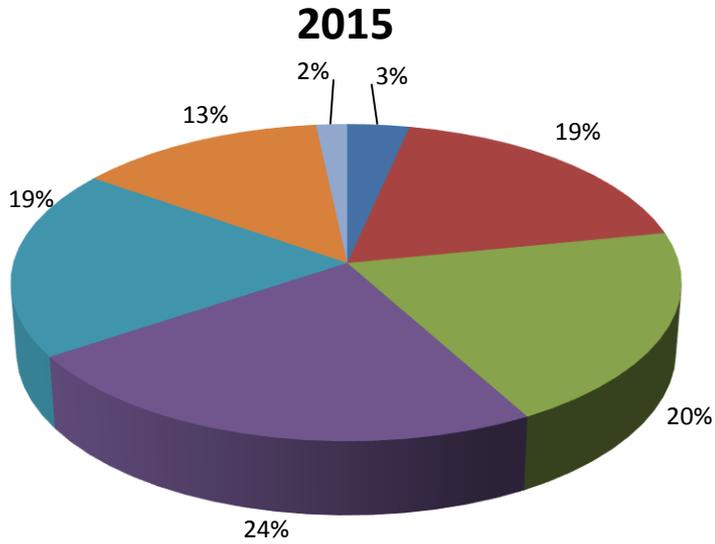
Survey Times, 2011-2015



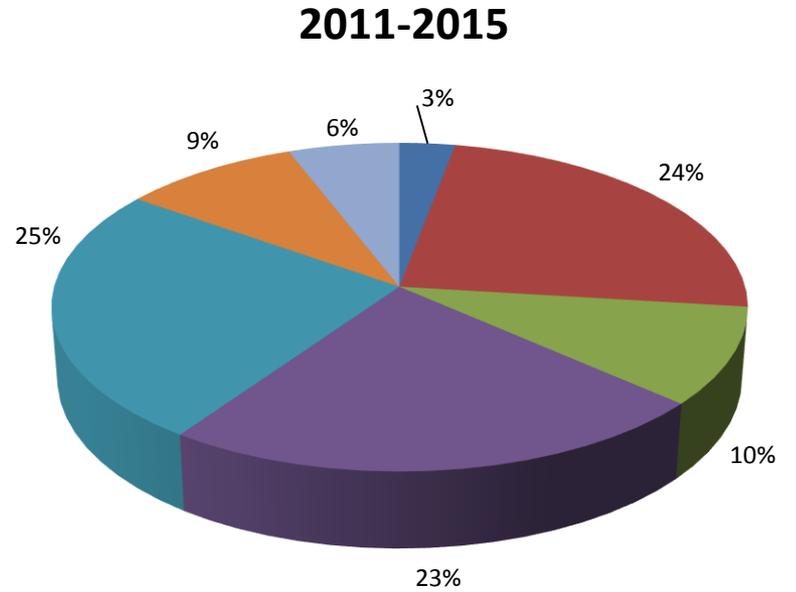
	7 - 9 am	9 - 12 pm	12 - 1pm	1 - 5 pm	5 - 7pm	7pm-8pm	Total Hours
2011	25.75	25.08	17.58	13.5	4.5	0	86.41
2012	1.5	5	2.5	4	4.75	0	17.75
2013	1	16.00	0.5	3.25	3	0	23.75
2014	0	6.50	1	5.5	1	0	14.00
2015	1	13	2.75	12	0	1	29.75
Total	29.25	65.58	24.33	38.25	13.25	1	171.66



Surveys by Day

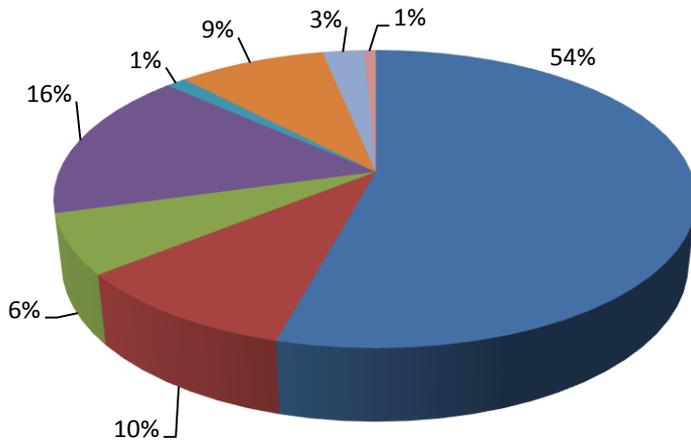


- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

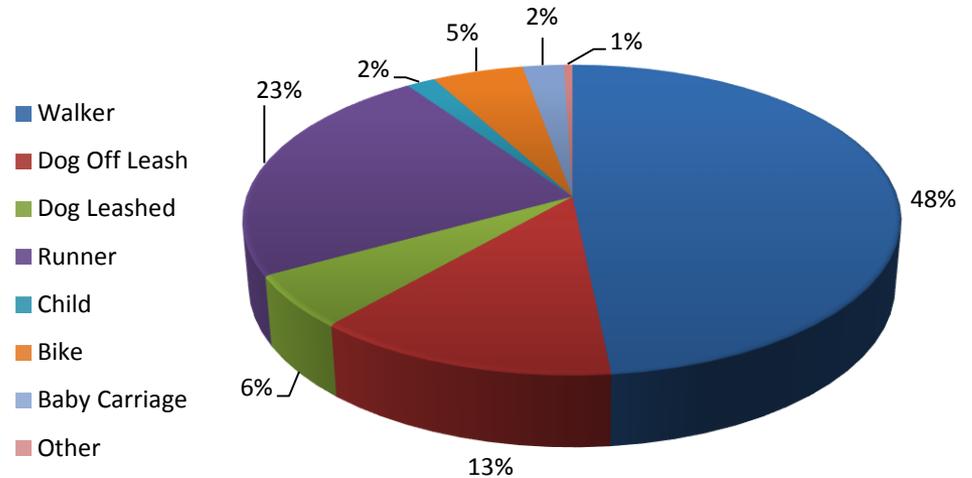


Fresh Pond Users, By Type

2015



2011-2015



Survey Results (2015)

Walker	Dog Off Leash	Dog Leashed	Runner	Child	Bike	Baby Carriage	Other
1035	190	124	309	23	169	48	13

Survey Results (2011-2015)

Walker	Dog Off Leash	Dog Leashed	Runner	Child	Bike	Baby Carriage	Other
9,500	2,569	1,081	4,601	312	1,013	462	93



EcoCounter

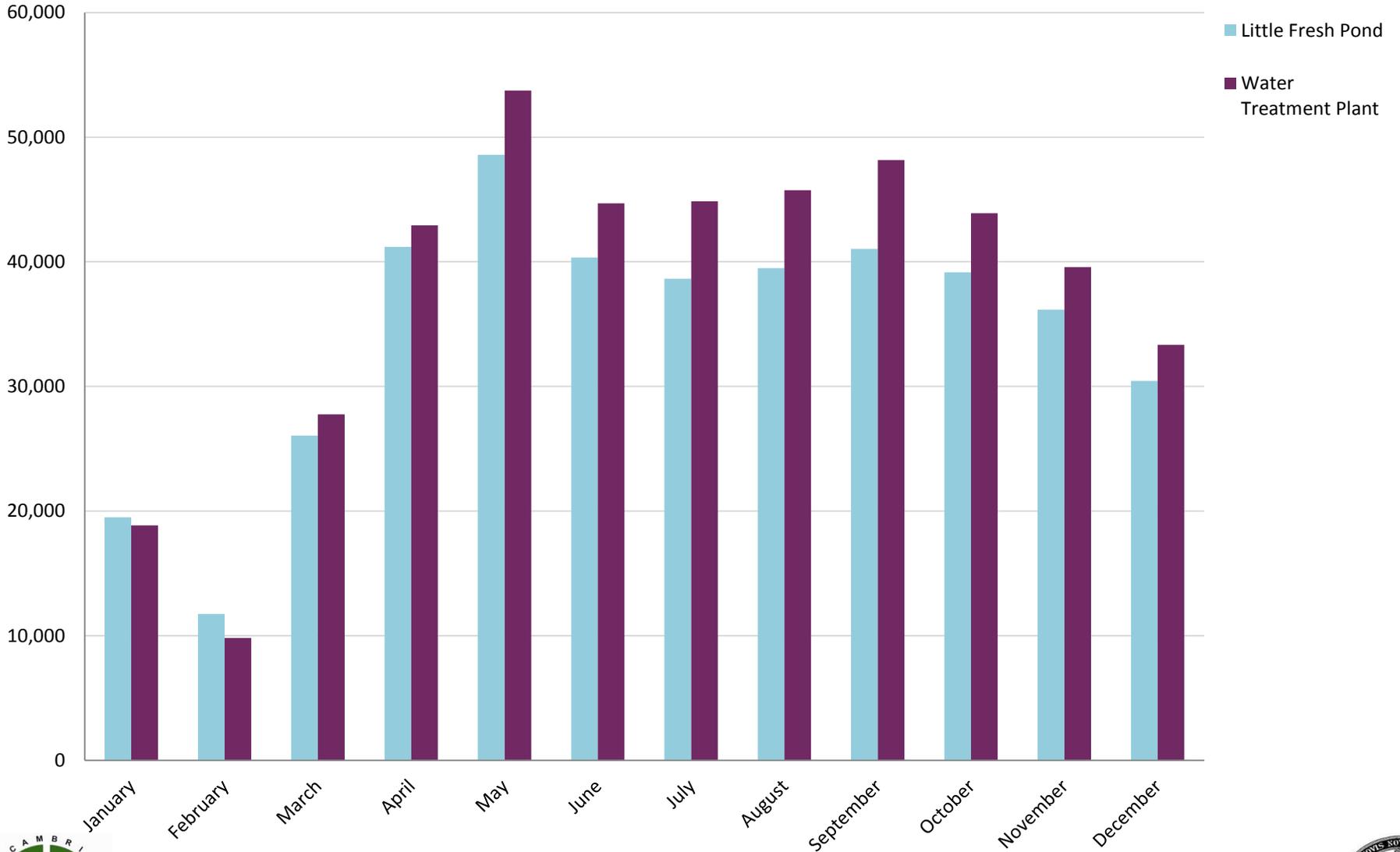
MONTHLY RESULTS

Perimeter Road EcoCounter Sensors

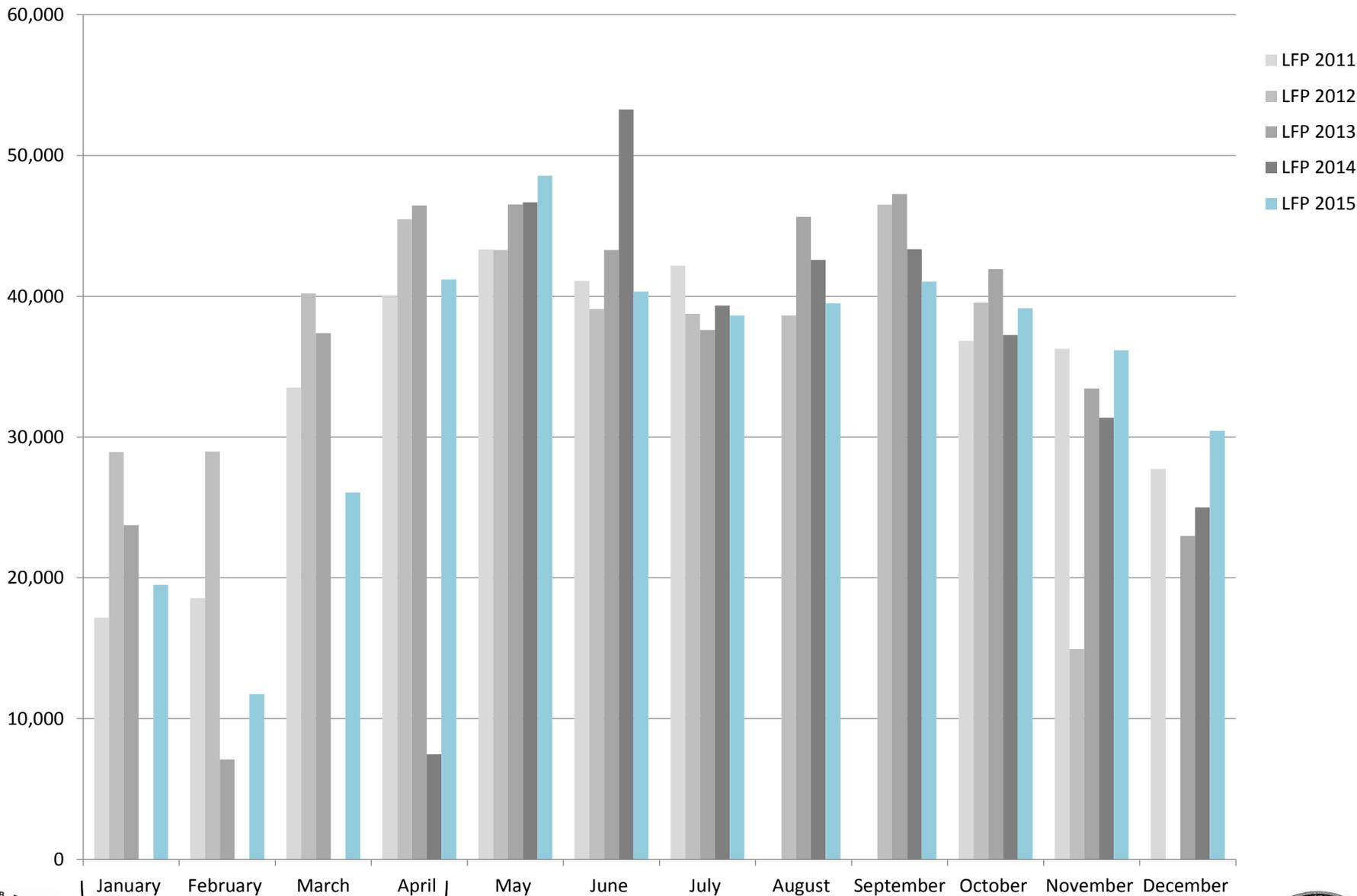


Monthly Eco-Counter Results

Perimeter Road, 2015



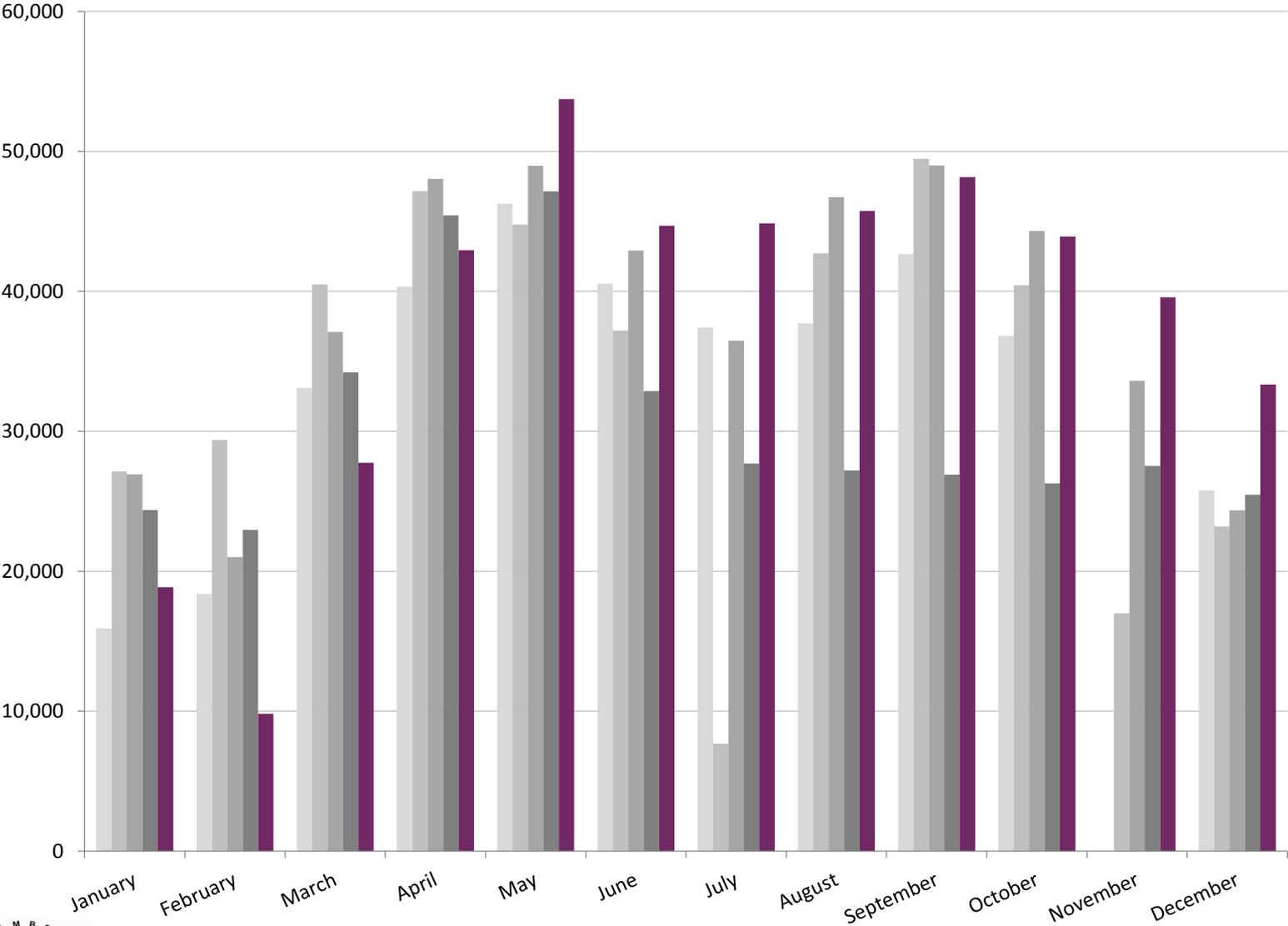
LFP Sensor, Monthly Results 2011 - 2015



*2014 Data gap January-April



WTP Sensor, Monthly Results 2011 - 2015



Notes:

Bike counts not included Jan 1-June 30, 2015.

Re-routed foot traffic due to Kingsley Park construction in 2014 led to lower counts

- WTP 2011
- WTP 2012
- WTP 2013
- WTP 2014
- WTP 2015

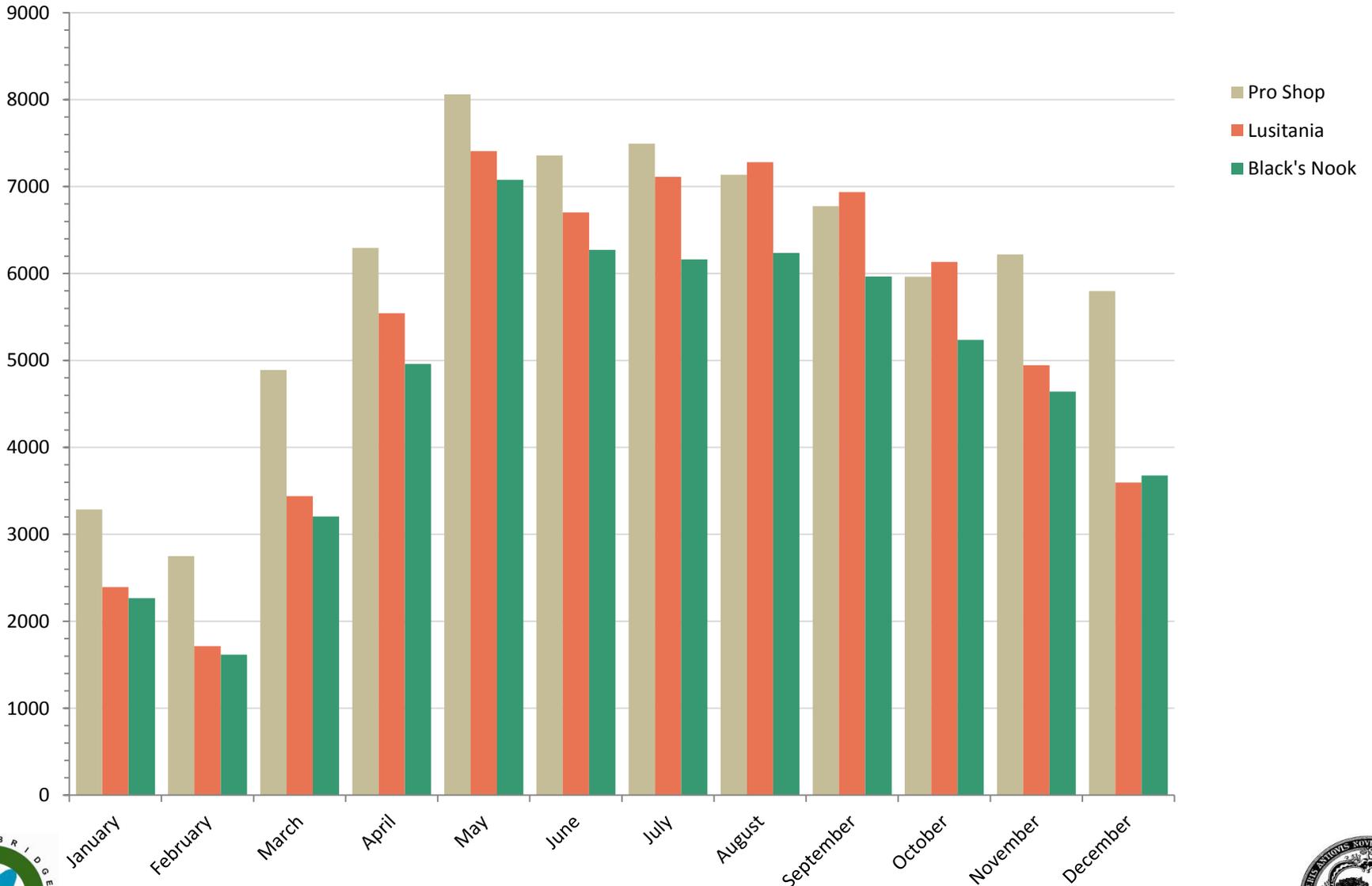


Entrance and Bike Path Eco-Counter Sensors



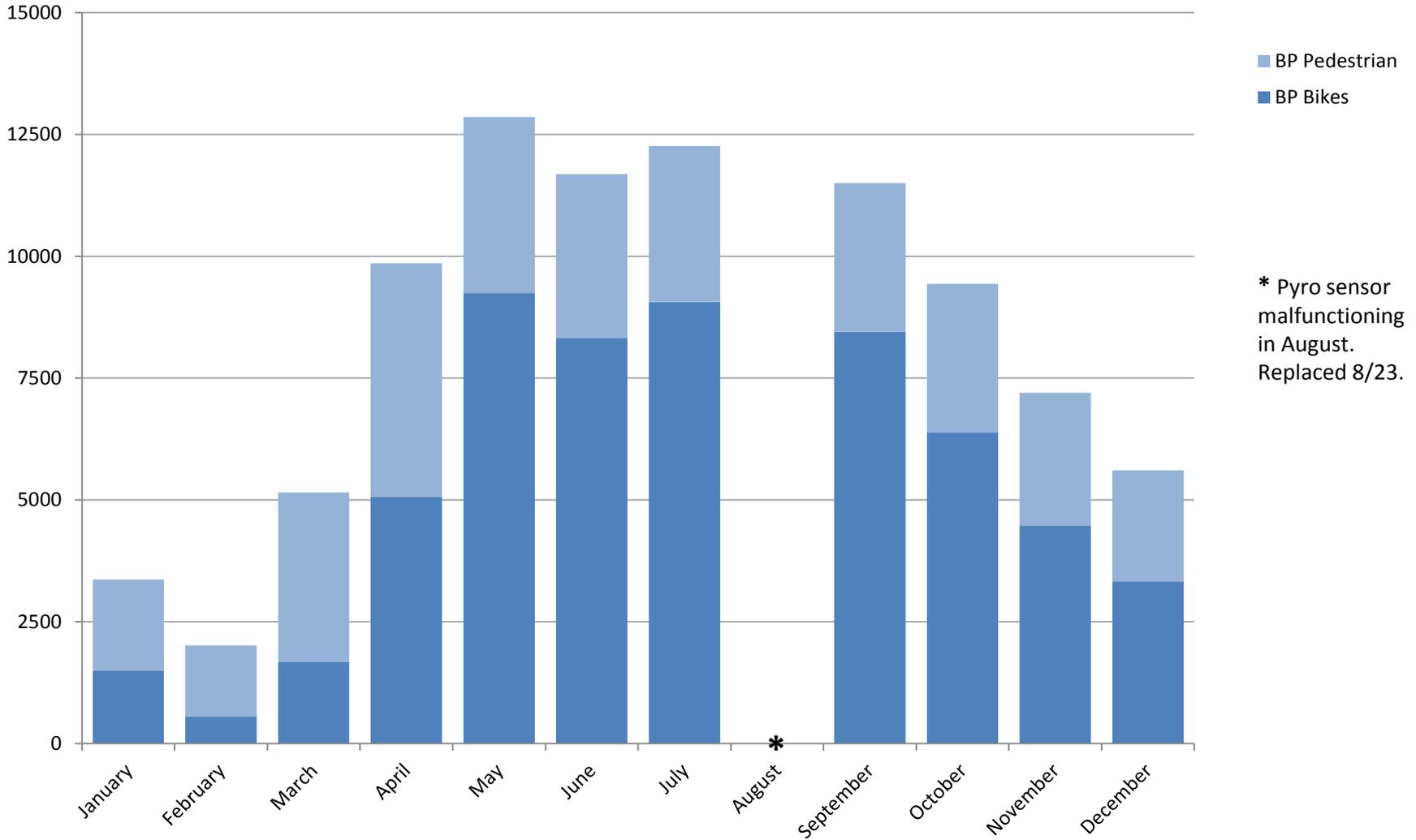
Total Monthly User Counts at Fresh Pond Reservation

2015 Entrances



Total Monthly User Counts, 2015

Bike Path Multi



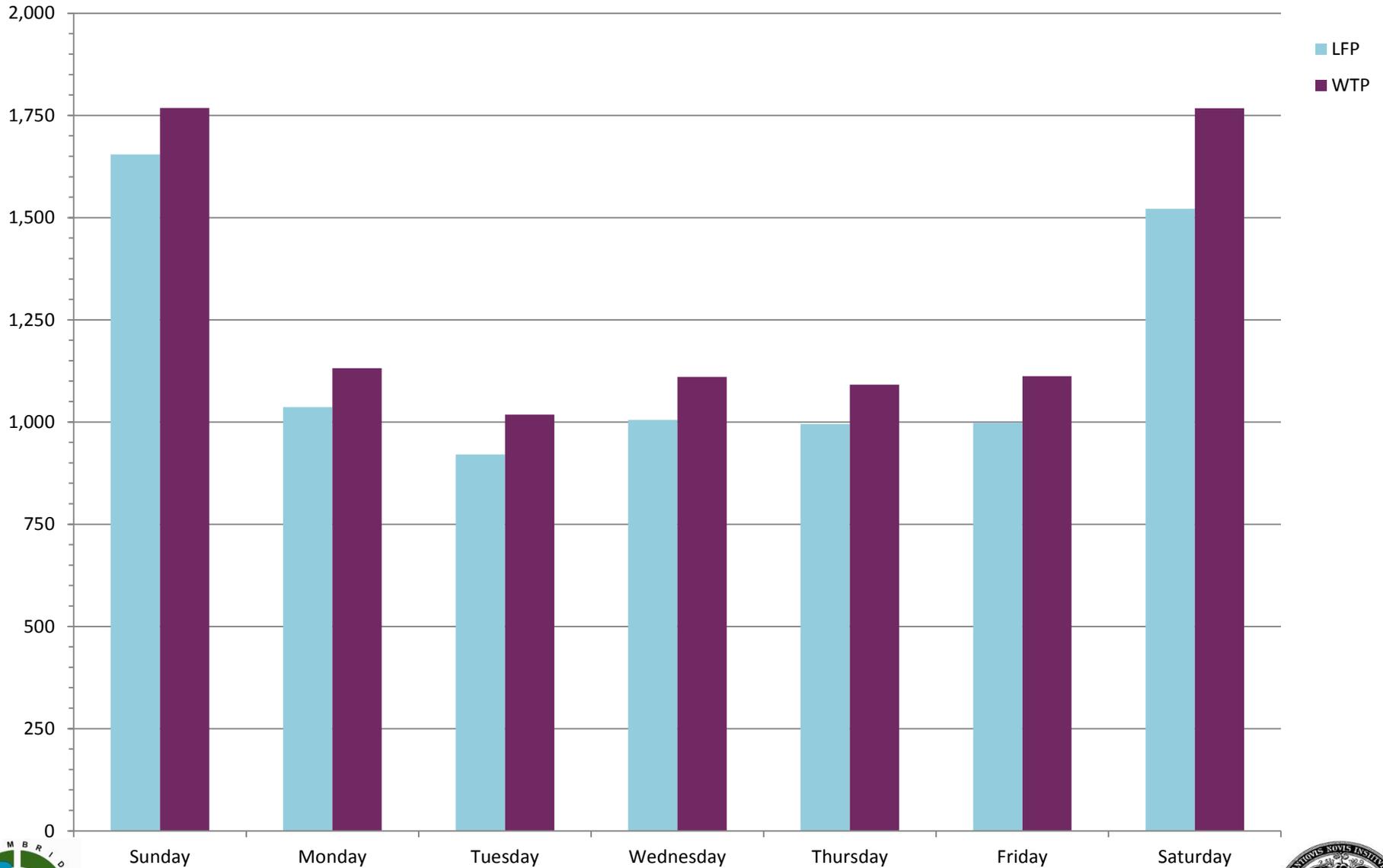
Monthly Summary

- Spring, summer, and fall had the highest usership rates
- May was the busiest month
- Counts at *LFP* and *WTP* were lower than the historical average during the months of January, February, and March. This is likely due to historically high snowfall in 2015.

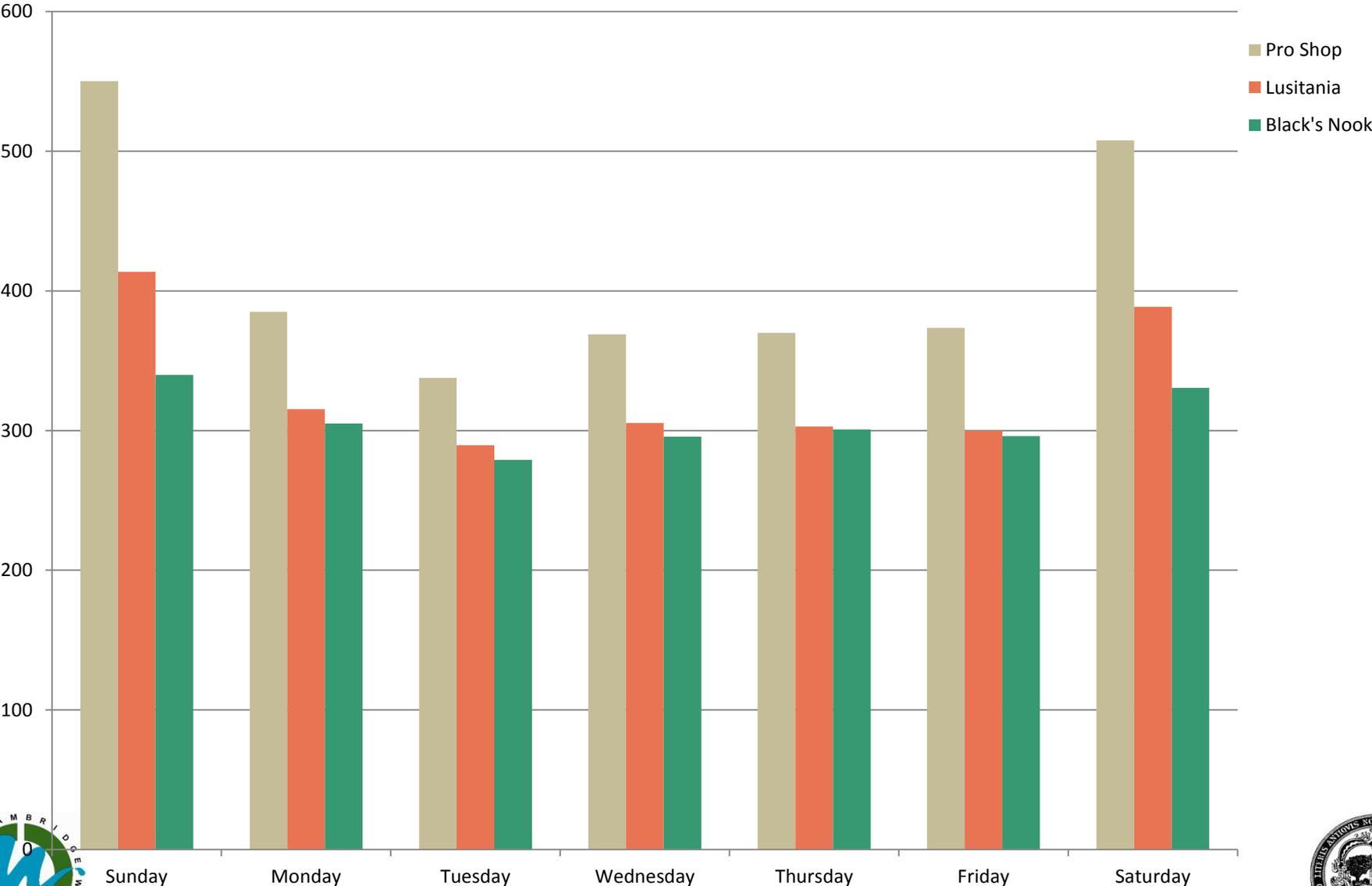
EcoCounter

DAILY RESULTS

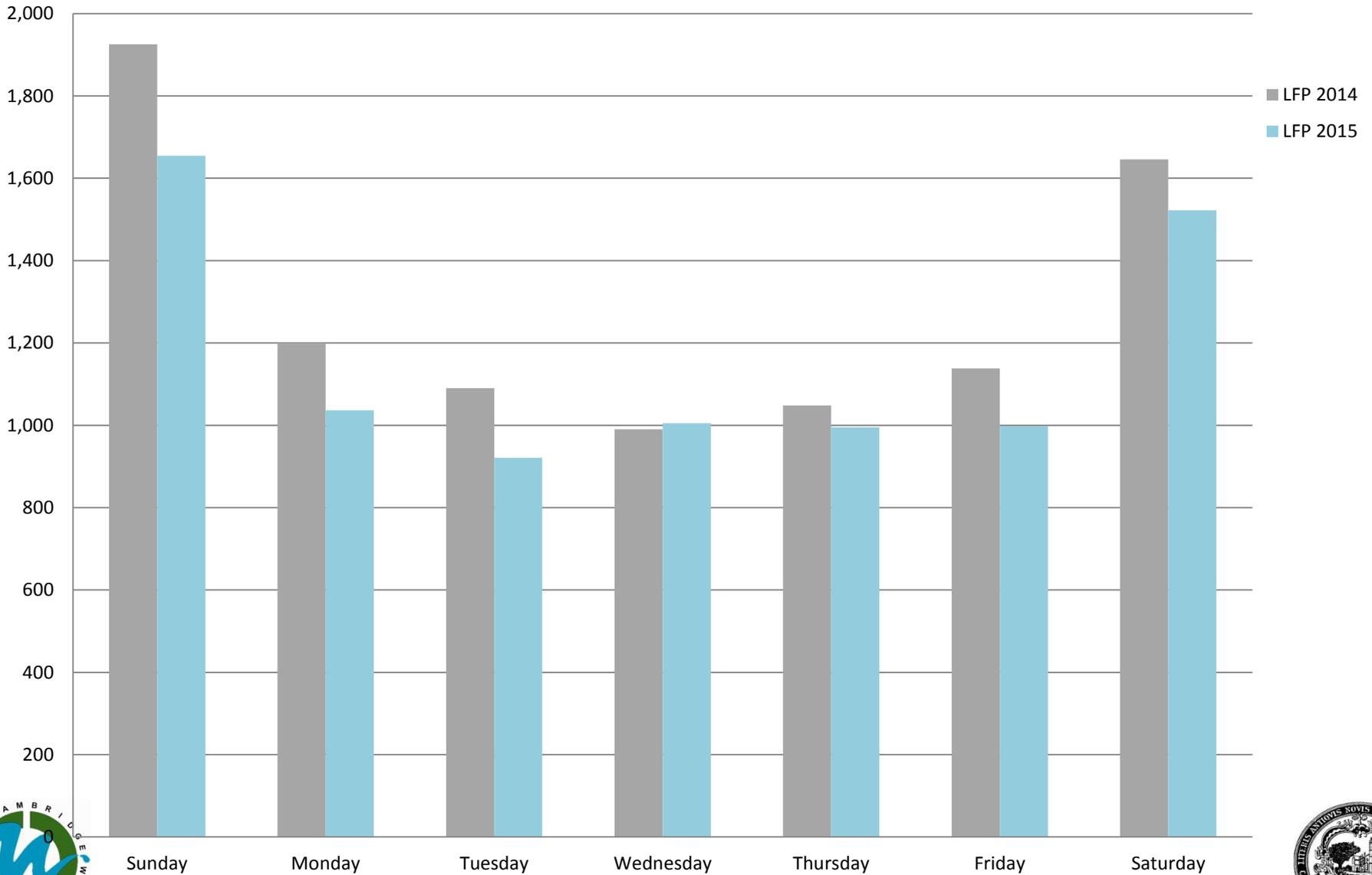
Eco-Counter Average Daily Counts Perimeter Road Sensors, 2015



Eco-Counter Average Daily Counts Entrances 2015



Eco Counter Average Daily Counts Little Fresh Pond 2014, 2015



Daily Summary

Sensors displayed trends in daily usage that might be expected for an urban green space:

- All sensors had highest counts on weekends, with Sunday as the most popular day
- Weekly usage trends do not change much regardless of location or year

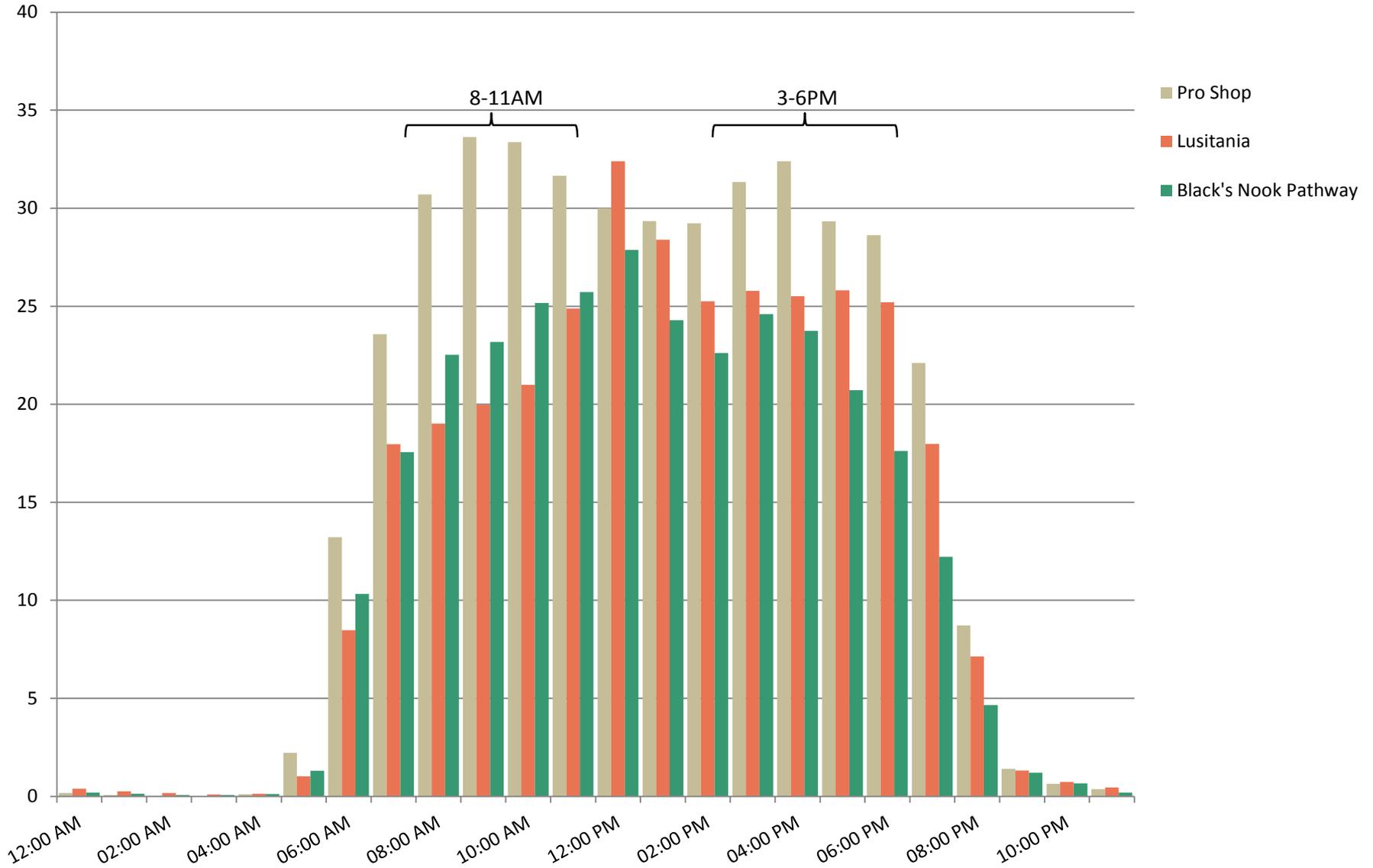
EcoCounter

HOURLY RESULTS

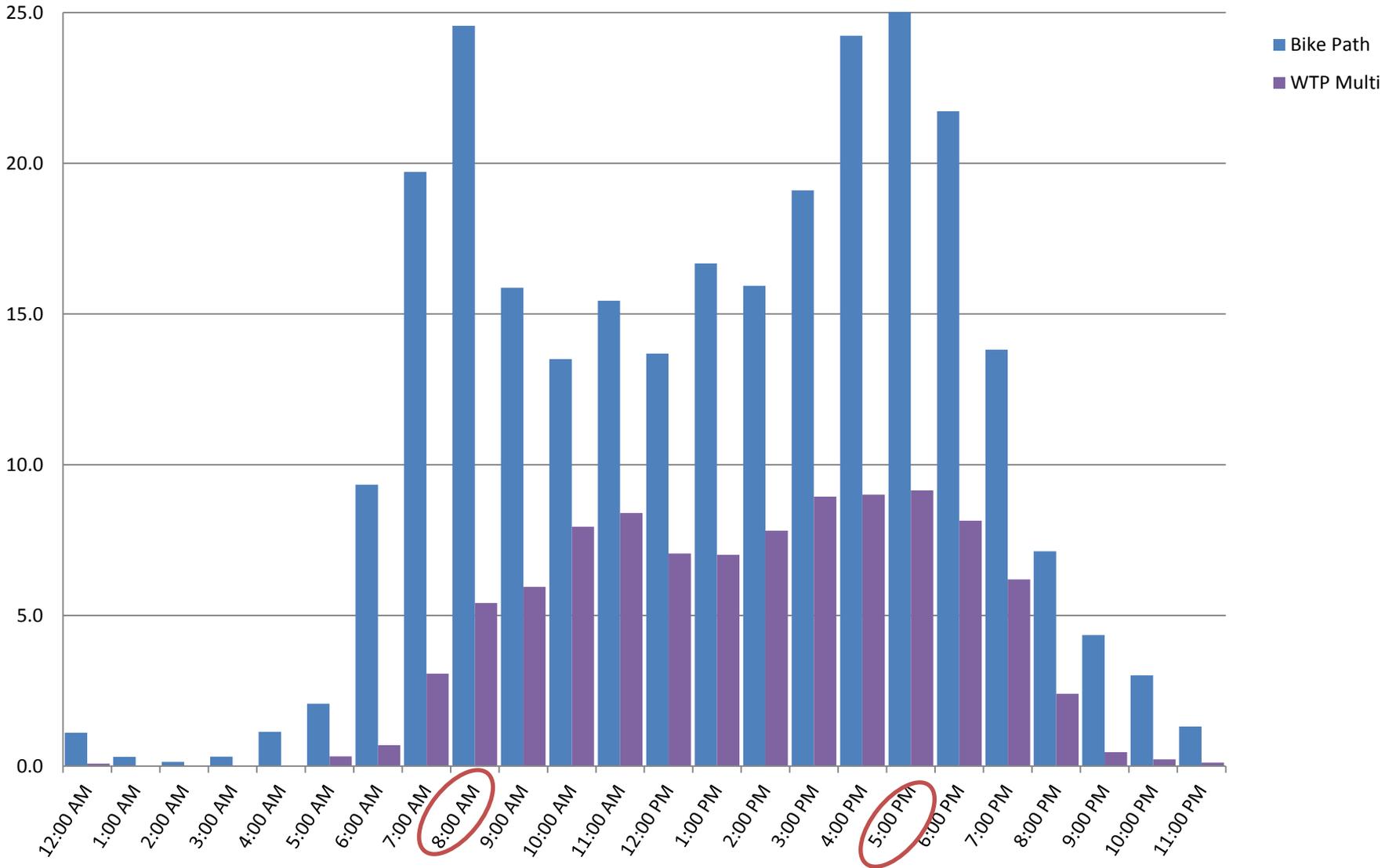
Hourly Summary

- *Lusitania* and *Black's Nook* Entrances had peak usership during lunch time hours
- *Pro Shop* entrance sees same mid-morning and mid-afternoon peak times as *LFP*
- *Bike Path* peaks were tightly centered around commute times
- *Perimeter Rd* sensors had a bimodal distribution: peaking at around 10AM and 4PM with a lull in between.

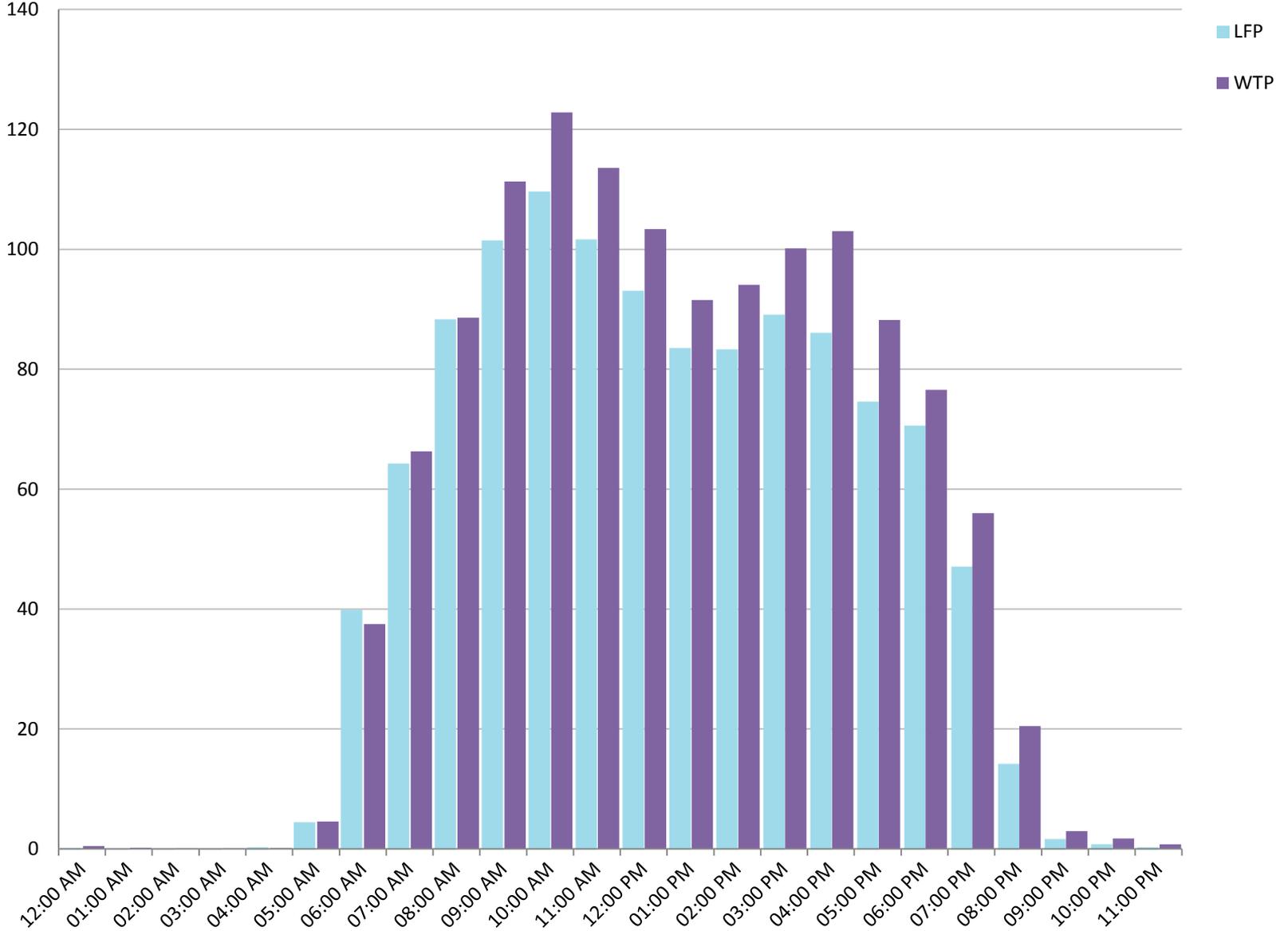
Average Hourly Usage, 2015 Entrances



Average Hourly Cyclists, BP and WTP 2015



Perimeter Rd Average Hourly Usage, 2015



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Census Program

Anyone who visits the Fresh Pond Reservation knows that it's a busy place. Every day, hundreds of people visit the reservation to complete the loop around the pond, bike, wander throughout the paths and nooks, socialize, and enjoy the urban wild. In 2010, Watershed Division staff members developed the Fresh Pond Reservation Census Program to better quantify the number of visitors and to determine the many different user types. For more information on the sensors, [click here to visit their website](#).

Check out our numbers from last year in the [Fresh Pond Census Annual Report 2014](#)



<https://www.cambridgema.gov/Water/Programs/censusprogram>

Future Goals



- Track long term trends
- Conduct more user surveys
- Use data to inform Shared Use
- Determine neighborhood housing development impacts on Fresh Pond Reservation