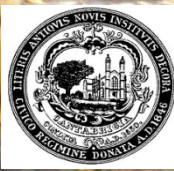# Fresh Pond Reservation Census Program

Data Collection Summary, 2014

Purpose

- To *quantify users* at Fresh Pond Reservation in order to inform management. Sensors at reservation entrances, the bike path, and perimeter road give an idea of user distribution throughout the day.

- Multi sensors *differentiate users* as bike or pedestrian, providing valuable data for planning infrastructure, events, and avoiding potential conflict.

Methods

Fresh Pond users are quantified by strategically placed people-counting sensors, and surveys conducted by staff and volunteers

Staff and Volunteer Surveys: Census Information Collected

Surveys

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

Unattended Eco-Counters

- Direction
- Count of living things > 3ft tall

Multi Counters
- Bike
- Pedestrian
- Direction

Sample Survey

Users/Direction

Each row is a unique observed event

Groupings are counted in one row

Tallies at bottom

Information entered into spreadsheet for analysis

Summary Survey Data

- 14 survey-hours conducted during 2014
  - 4.5 hours at LFP
  - 7.5 hours at WTP
  - 1 hour at Pro Shop
  - 1 hour at Lusitania

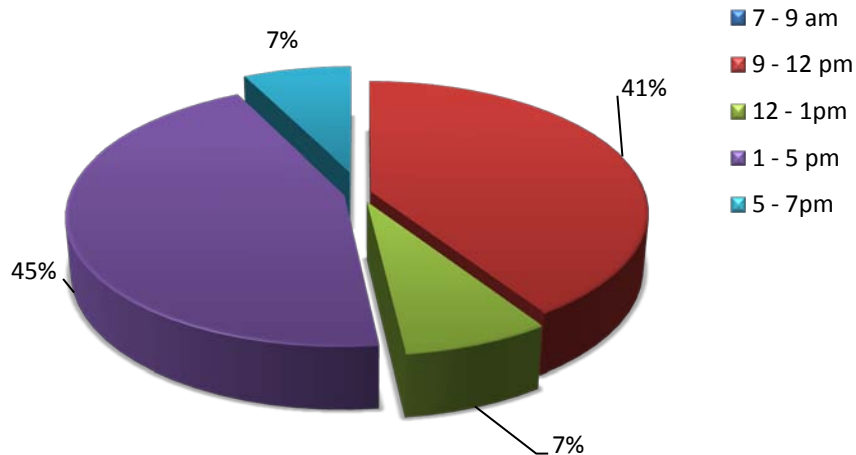*Black's Nook and Bike Path counters not surveyed. Goal is to expand census to all counters in 2015

- 143.91 survey-hours conducted in total (2011-2014)
  - 61.16hours at LFP
  - 80.75 hours at WTP
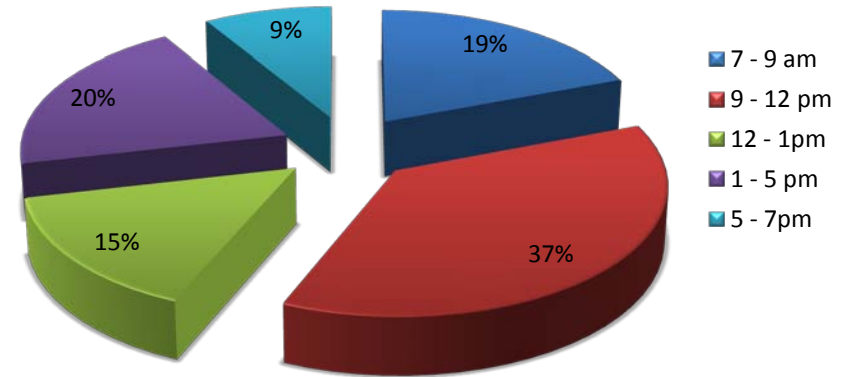 - 1 hour at Pro Shop
  - 1 hour at Lusitania

Survey Data Results
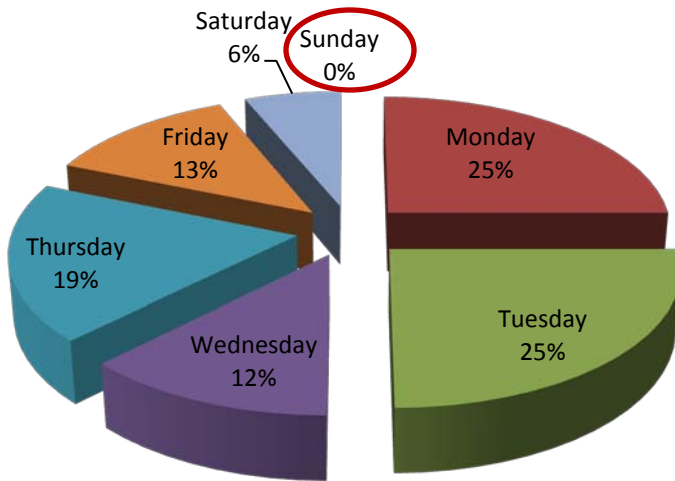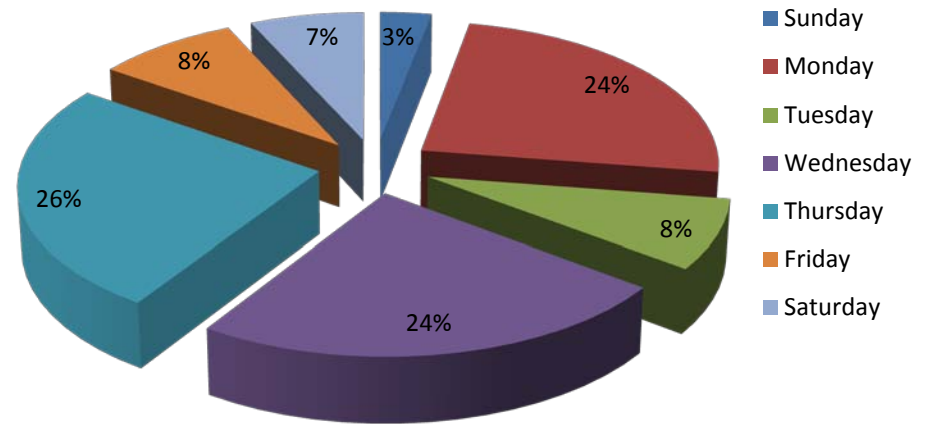
2014 Ecocounter Census Time Window of Surveys

- 7 - 9 am
- 9 - 12 pm
- 12 - 1pm
- 1 - 5 pm
- 5 - 7pm

Census Survey Times, 2011-2014

- 7 - 9 am
- 9 - 12 pm
- 12 - 1pm
- 1 - 5 pm
- 5 - 7pm

	7 - 9 am	9 - 12 pm	12 - 1pm	1 - 5 pm	5 - 7pm	Total Hrs
2011	25.75	26.08	17.58	16	4	89.41
2012	1.5	5	2.5	4	4.75	17.75
2013	1	16	0.5	3.25	3	23.75
2014	0	6.5	1	5.5	1	14

Survey Data Results

2014 Eco Counter Census Surveys by Day

Census Survey Days, 2011-2014
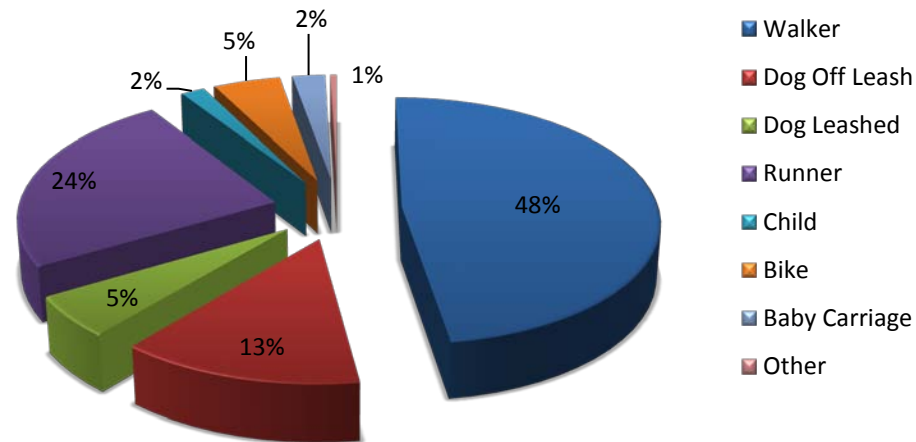
Survey Data Results

Fresh Pond Users by Type
2014
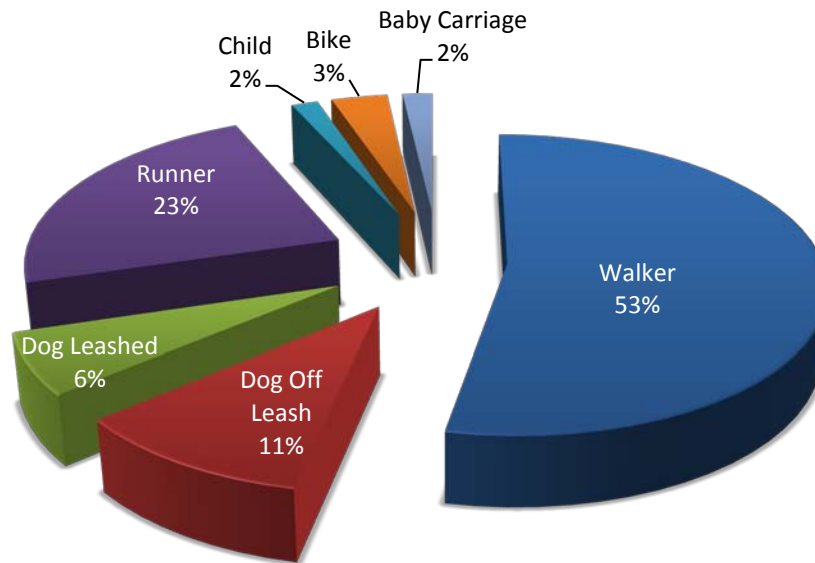
Walker	Dog Off Leash	Dog Leashed	Runner	Child	Bike	Baby Carriage	Other
1,482	148	180	640	44	94	50	0

Survey Data Results

All Users, All Surveys

Walker	Dog Off Leash	Dog Leashed	Runner	Child	Bike	Baby Carriage	Other
8,446	2,379	957	4,291	298	844	414	80

Counter Locations
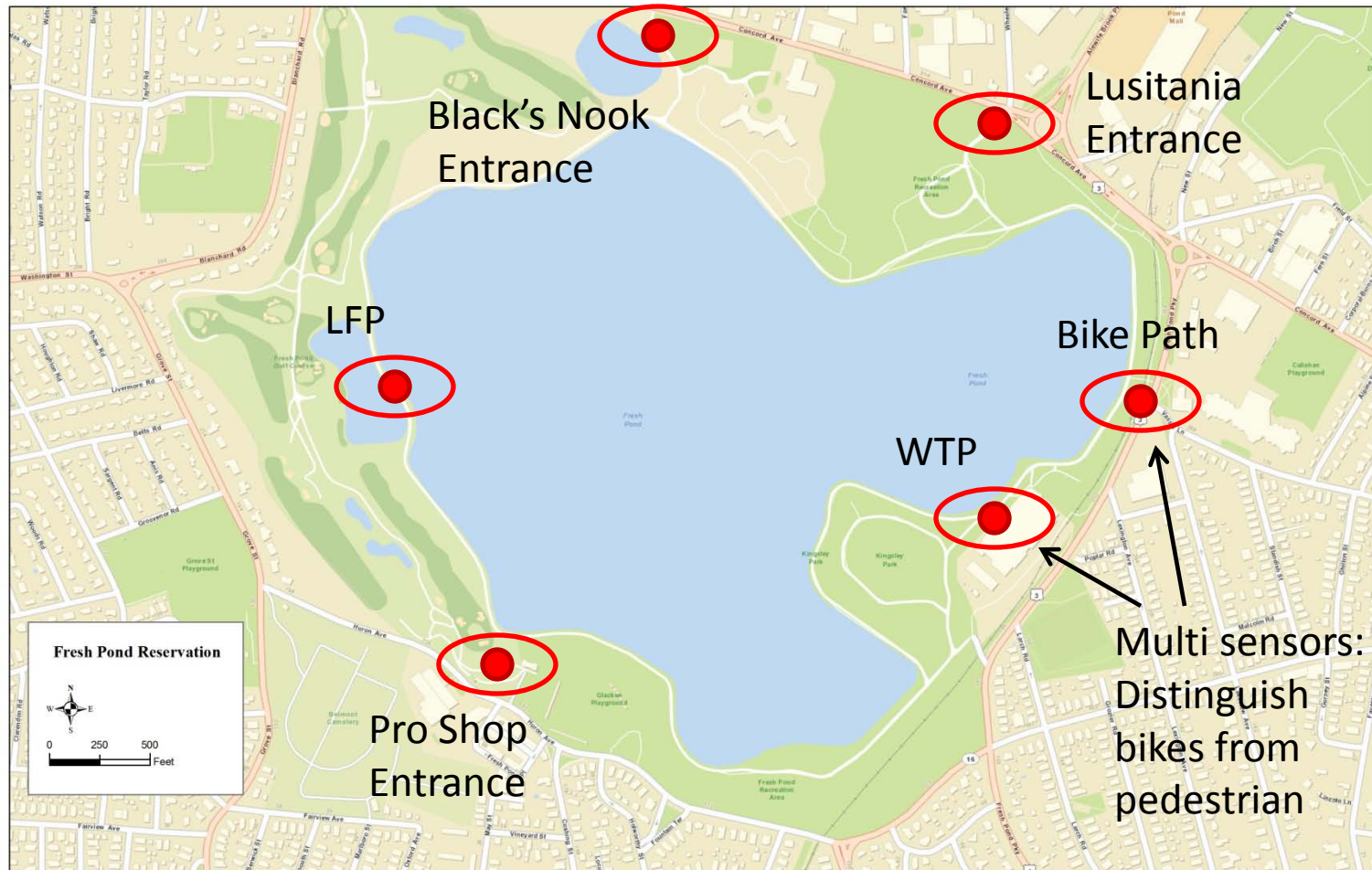
Eco-Counter Results

Perimeter Road Locations
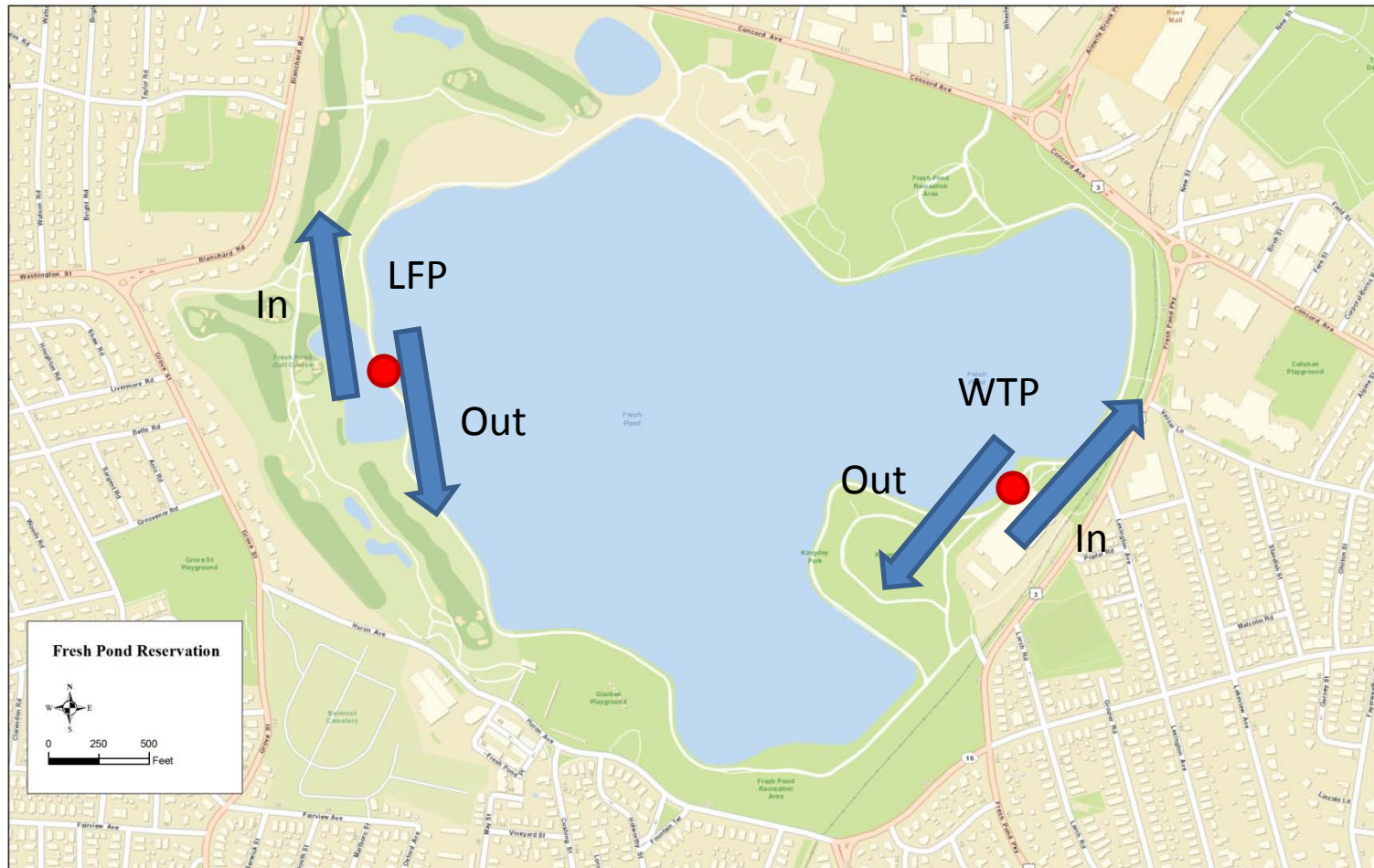
Eco-Counter Results
Entrance and Combo Sensors

Eco-Counter Results - Highlights

- In 2011 ~411,000 counts
- In 2012 ~405,000 counts

(More expected as November was a partial record)

- In 2013 ~460,000 counts
- In 2014 ~446,000 counts*

- In 2011, average monthly counts = 34,000
- In 2012, average monthly counts = 38,000
- In 2013, average monthly counts = 36,700
- In 2014 average monthly counts=37,200*

- In 2011, average daily counts = 1,100
- In 2012, average daily counts = 1,100
- In 2013, average daily counts = 1,200
- In 2014, average daily counts=1,190*

*LFP used as surrogate for WTP counts during Kingsley Park construction May-Oct
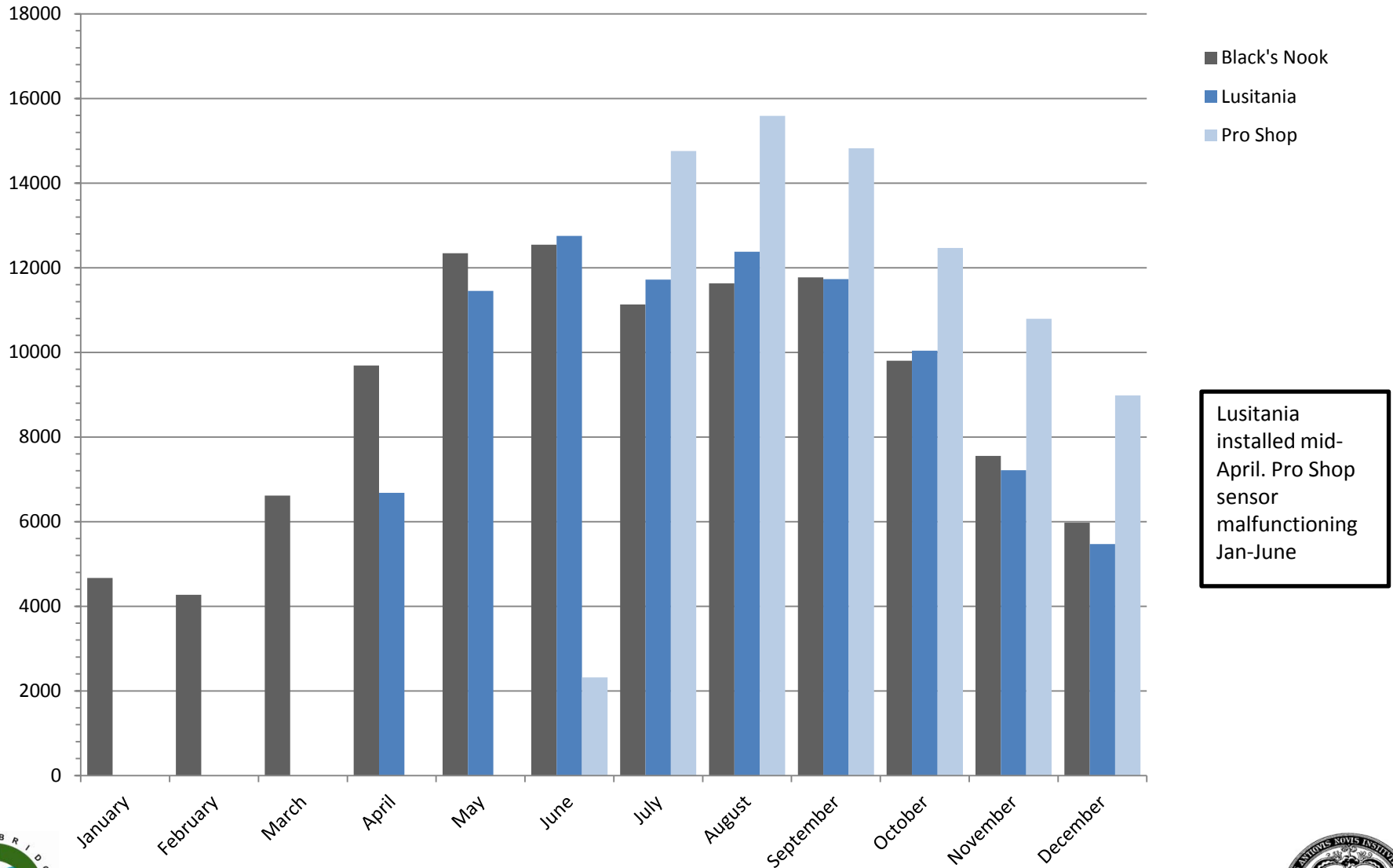
2014 Perimeter Road Sensors
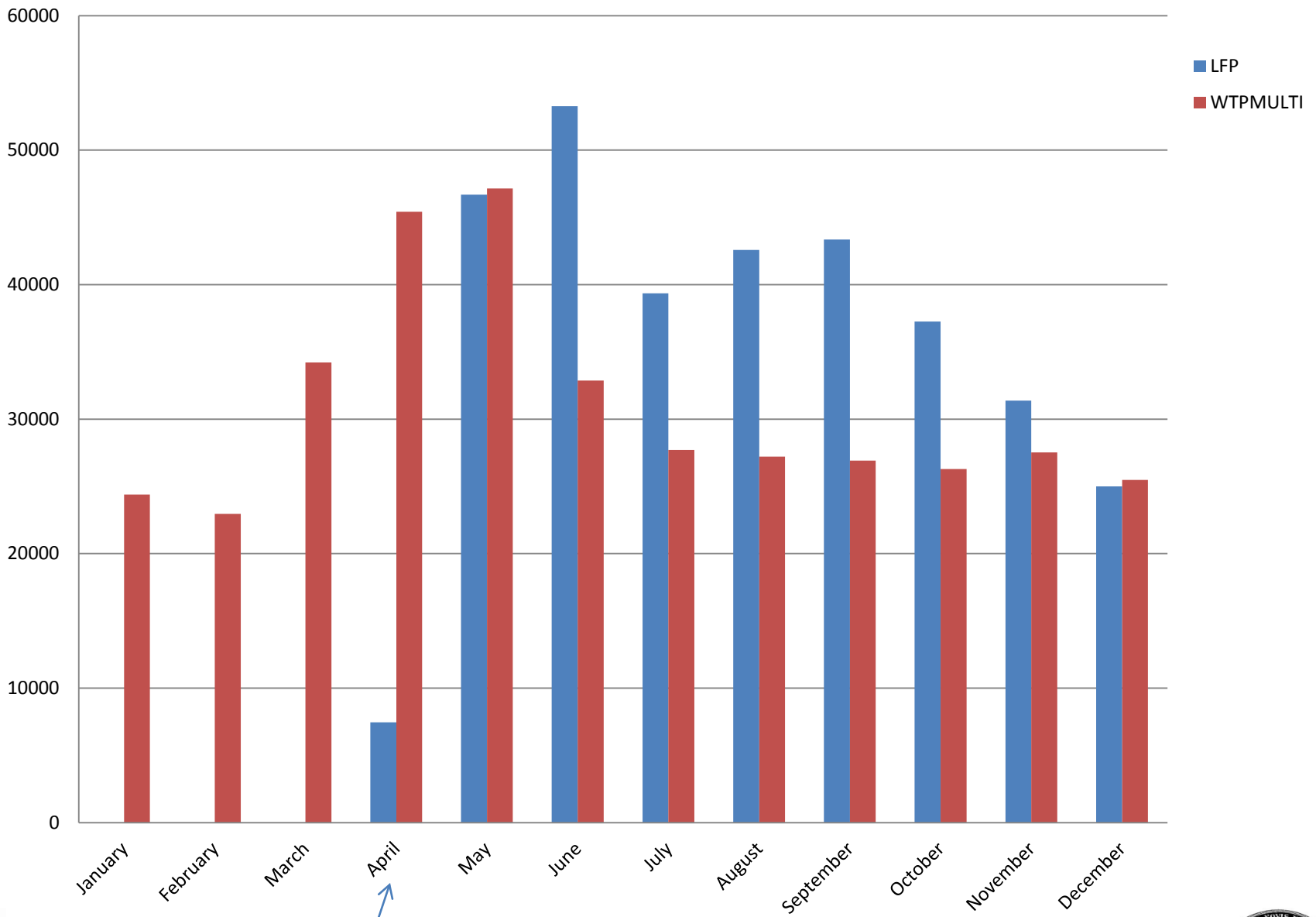
LFP Installation, partial record

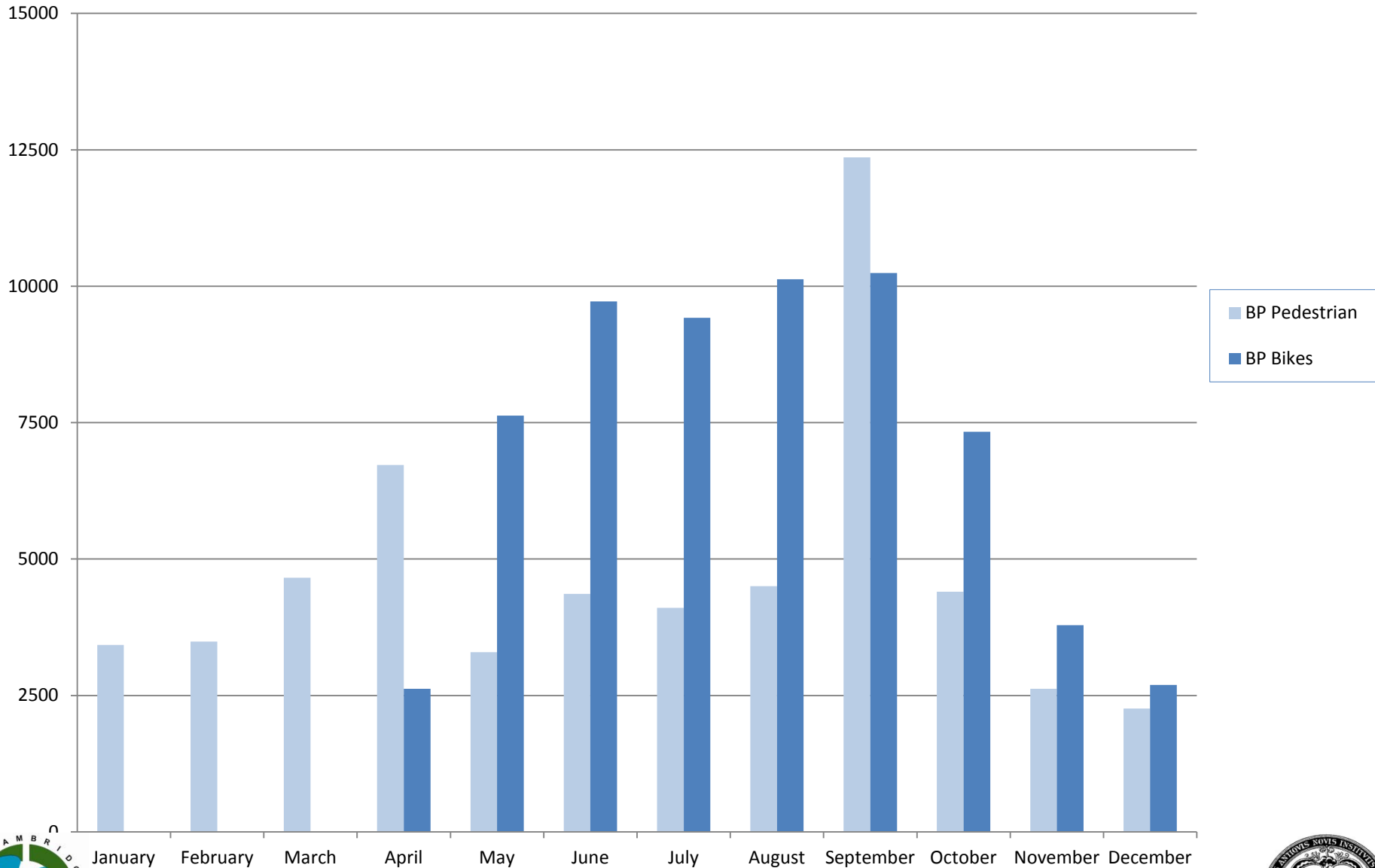# Total Monthly User Counts at Fresh Pond Reservation
2014 Entrances

Legend:
- Black's Nook
- Lusitania
- Pro Shop

Lusitania installed mid-April. Pro Shop sensor malfunctioning Jan-June

Total Monthly User Counts, 2014
Bike Path Multi

LFP Sensor, Monthly Results 2011 - 2014

Legend:
- LFP 2011
- LFP 2012
- LFP 2013
- LFP 2014

*Data gap January-March due to sensor malfunction: partial data for April

WTP Sensor, Monthly Results 2011 - 2014

Legend:
- WTP 2011
- WTP 2012
- WTP 2013
- WTP 2014

* WTP 2014 bike counts not included July 1-Oct 31.
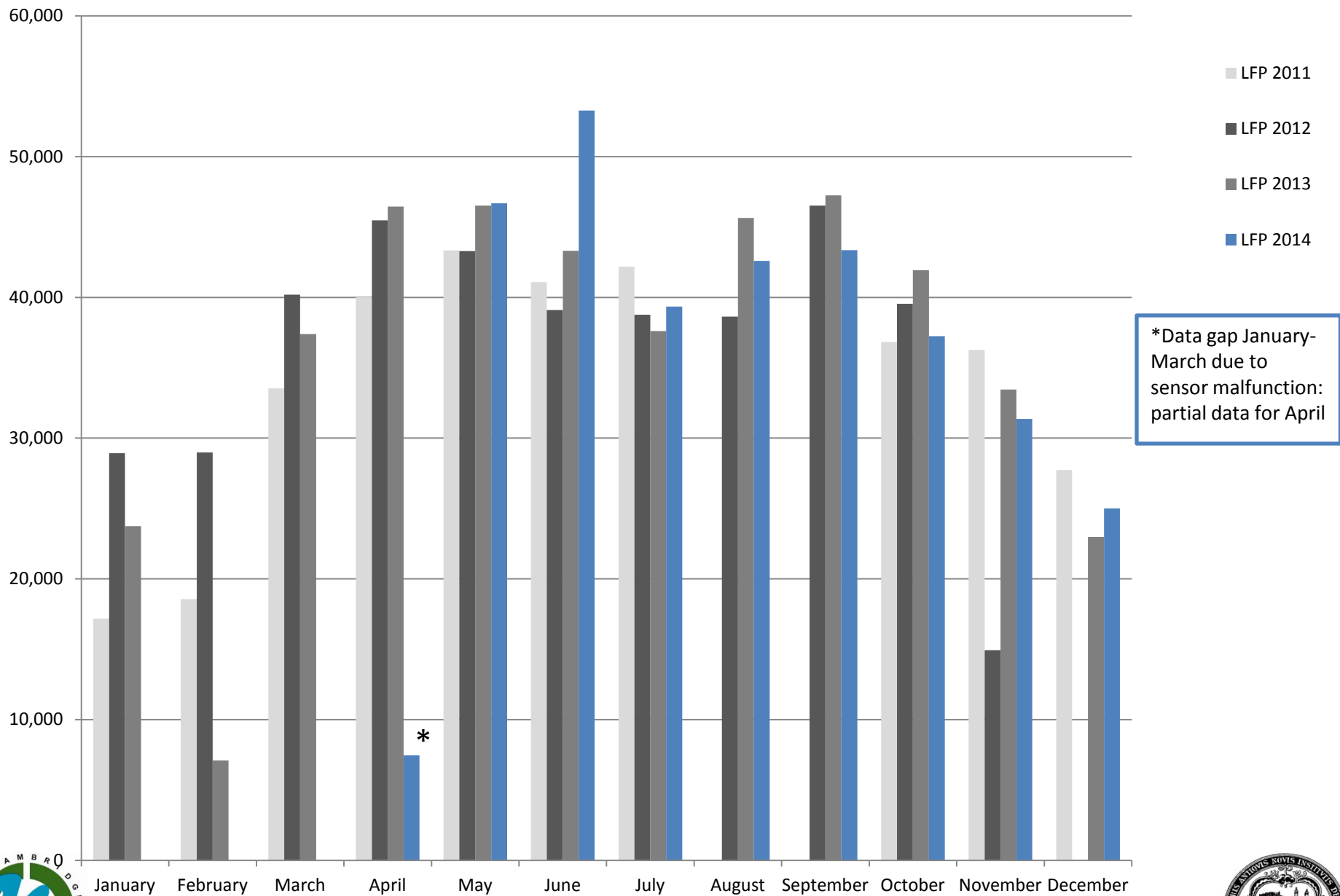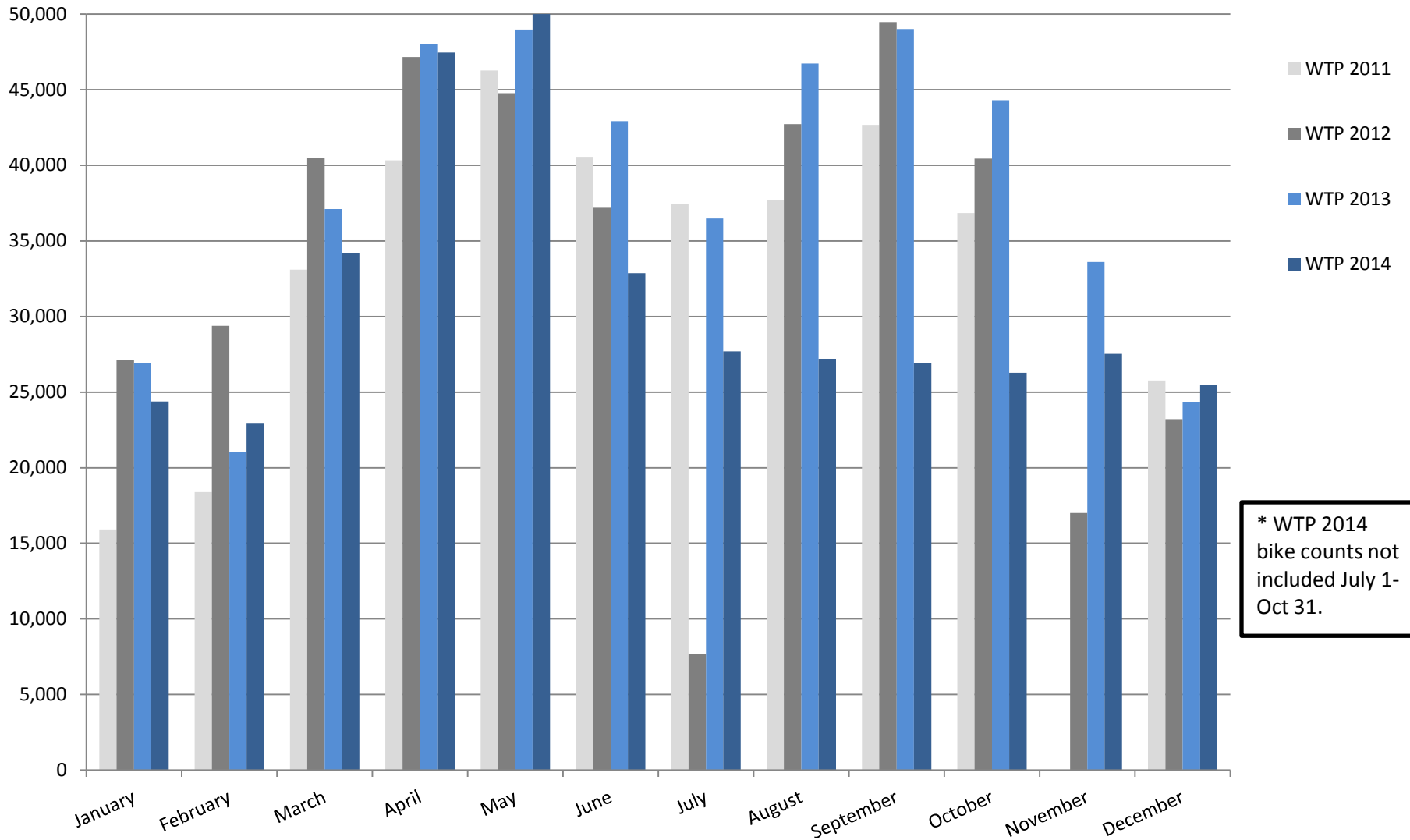
Daily Ecocounter Results

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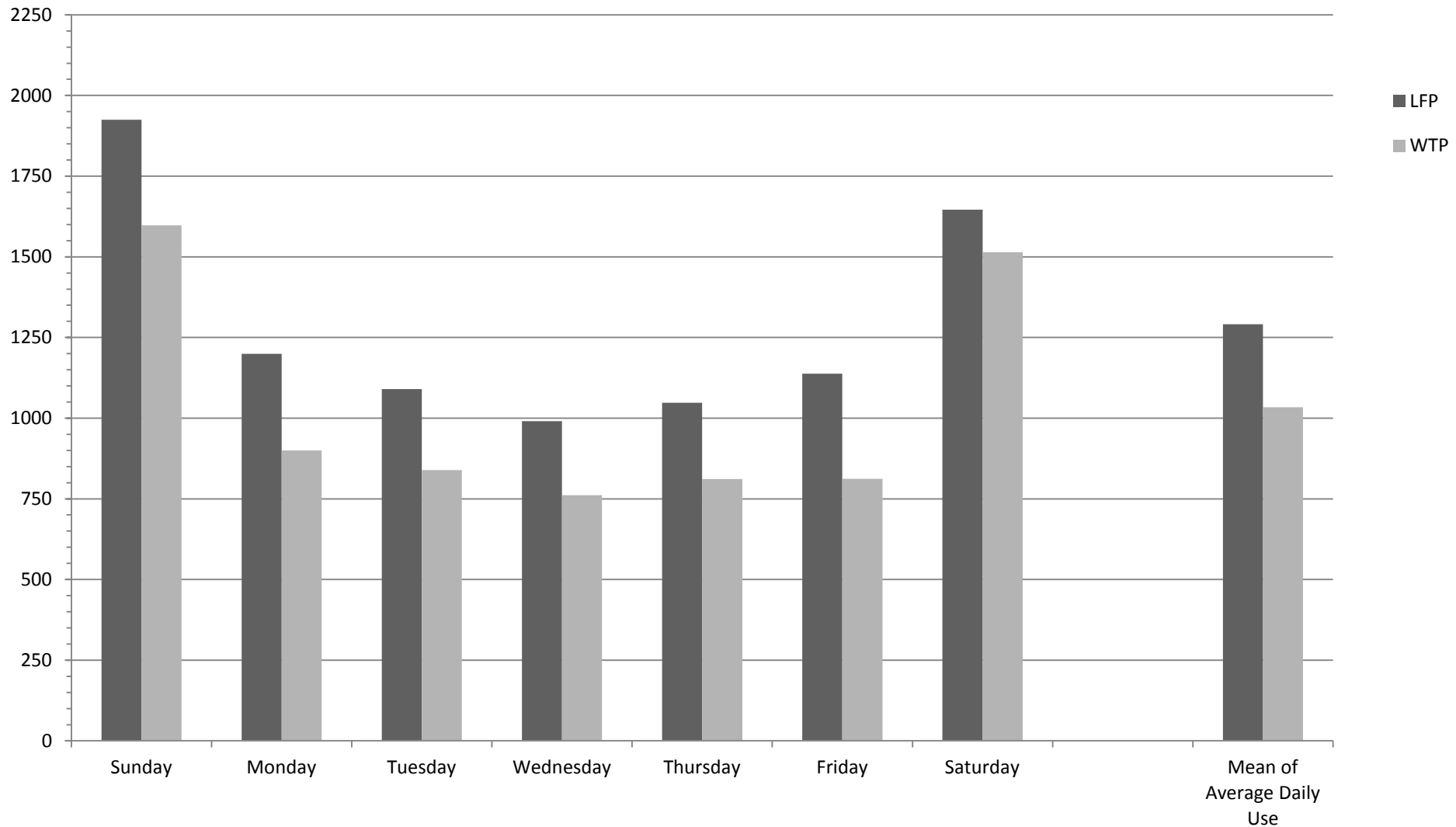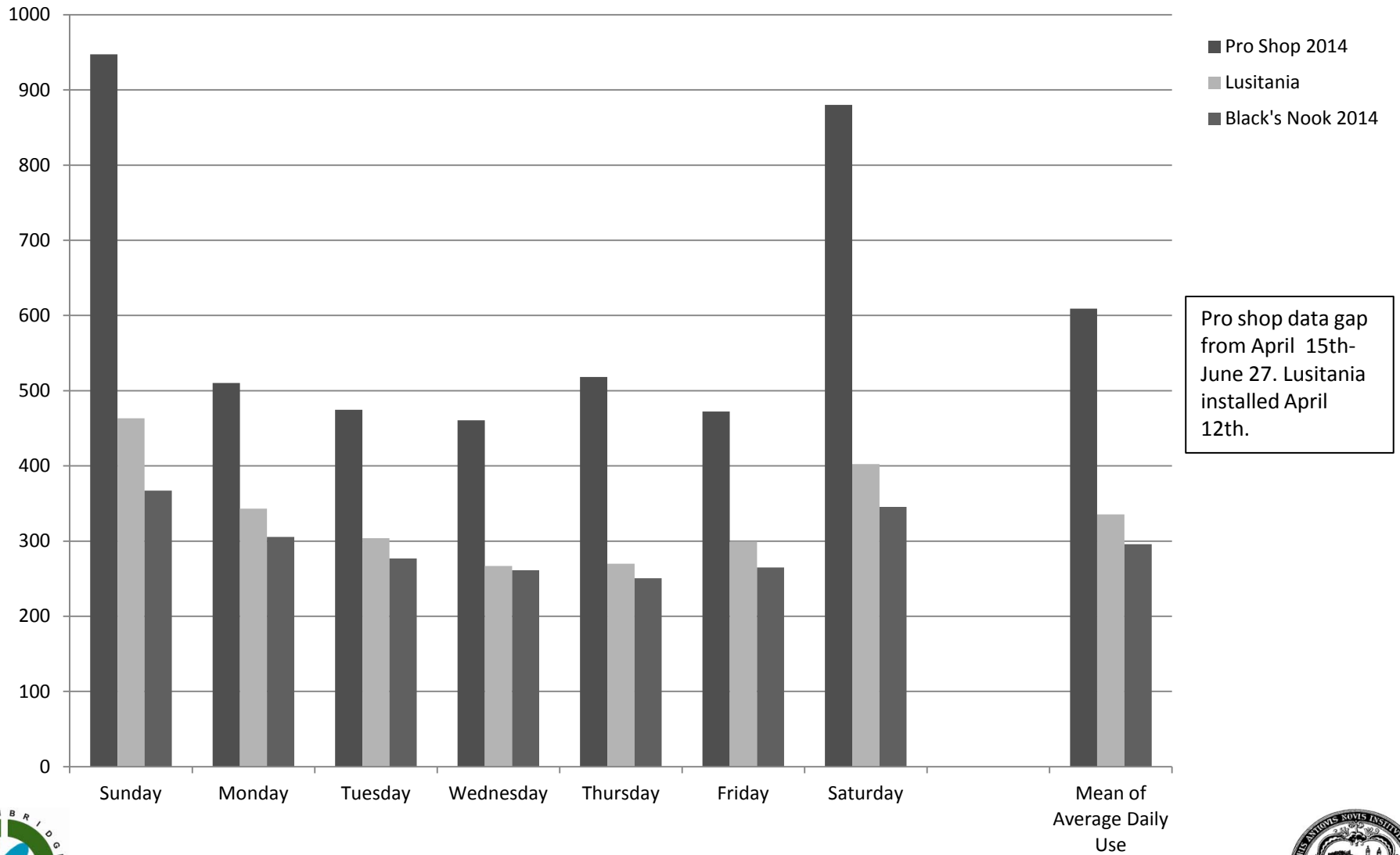
- All sensors had highest counts on weekends, with Sunday as the most popular day
- Weekly usage trends do not change much regardless of location or year

**Eco-Counter Average Daily Counts
Perimeter Road Sensors, 2014**

Eco-Counter Average Daily Counts
Entrances 2014

Legend:
- Pro Shop 2014
- Lusitania
- Black's Nook 2014

Pro shop data gap from April 15th-June 27. Lusitania installed April 12th.

Eco Counter Average Daily Counts
Little Fresh Pond 2013, 2014

Legend: LFP 2013, LFP 2014
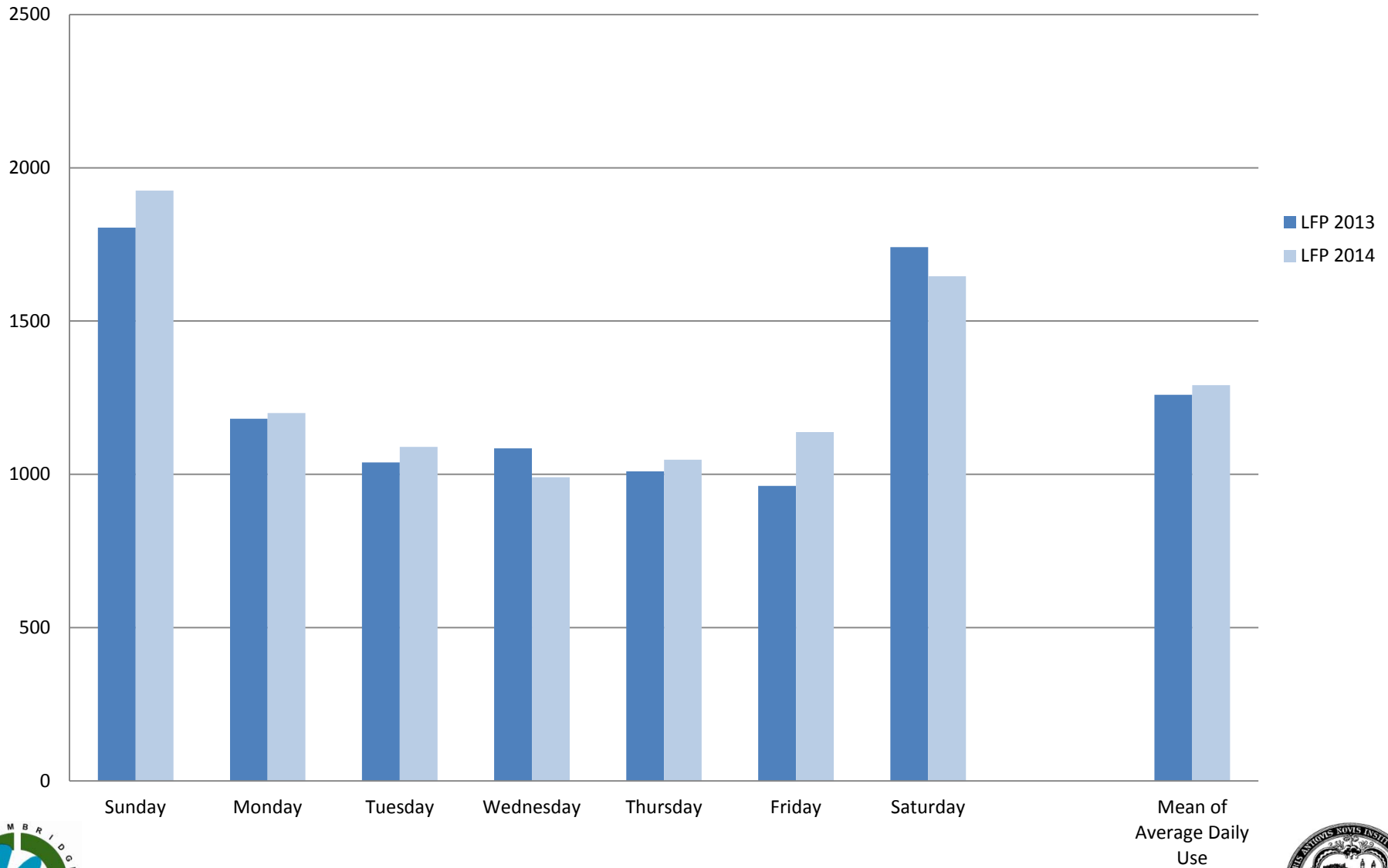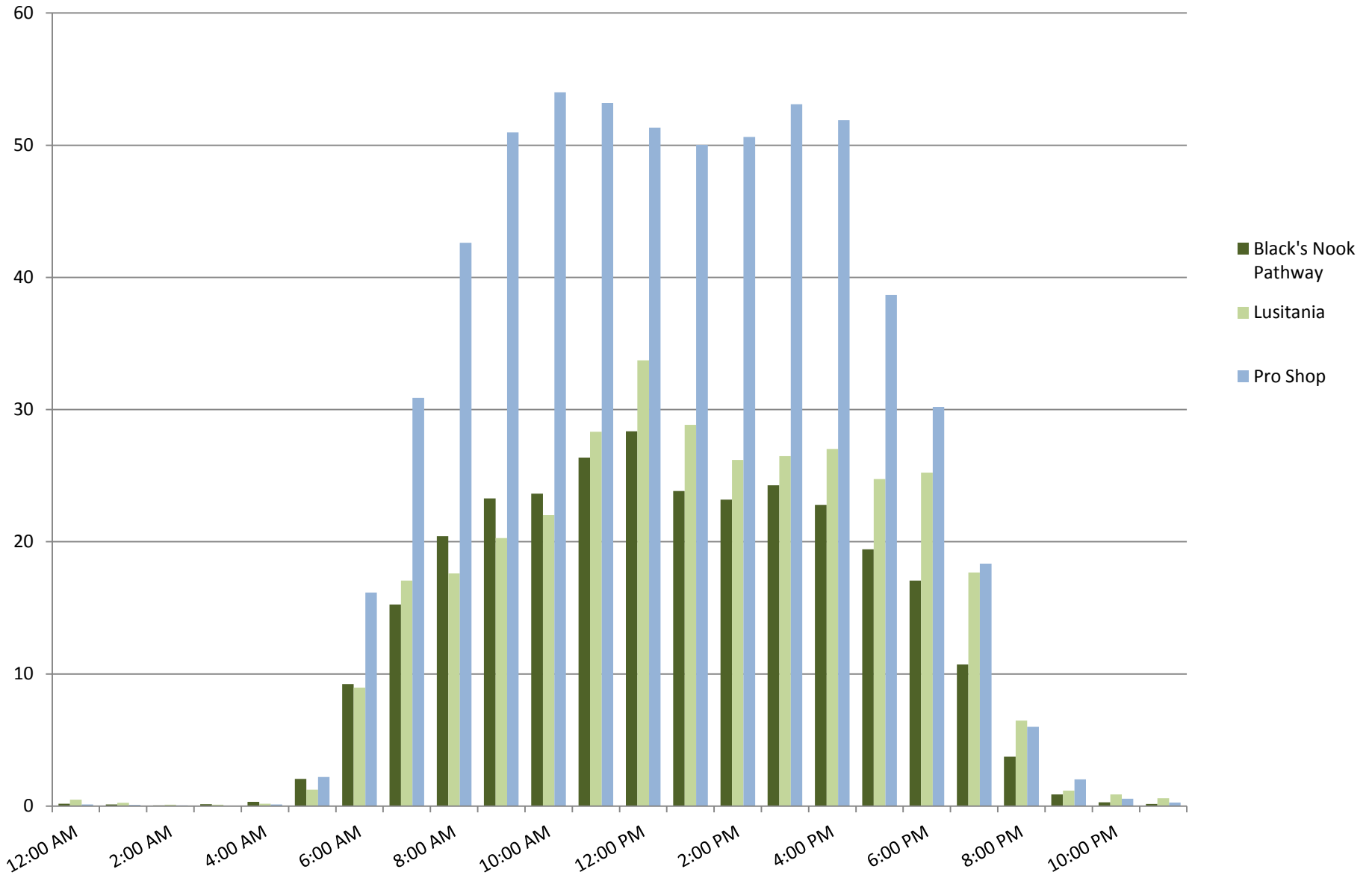
Hourly Ecocounter Results

- *Lusitania* and *Black's Nook* Entrances peak users 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

Average Hourly Usage, 2014
Entrances

Average Hourly Usage, 2014

Legend: LFP, WTP

*WTP Multi bike counts excluded July 1-Oct 31.
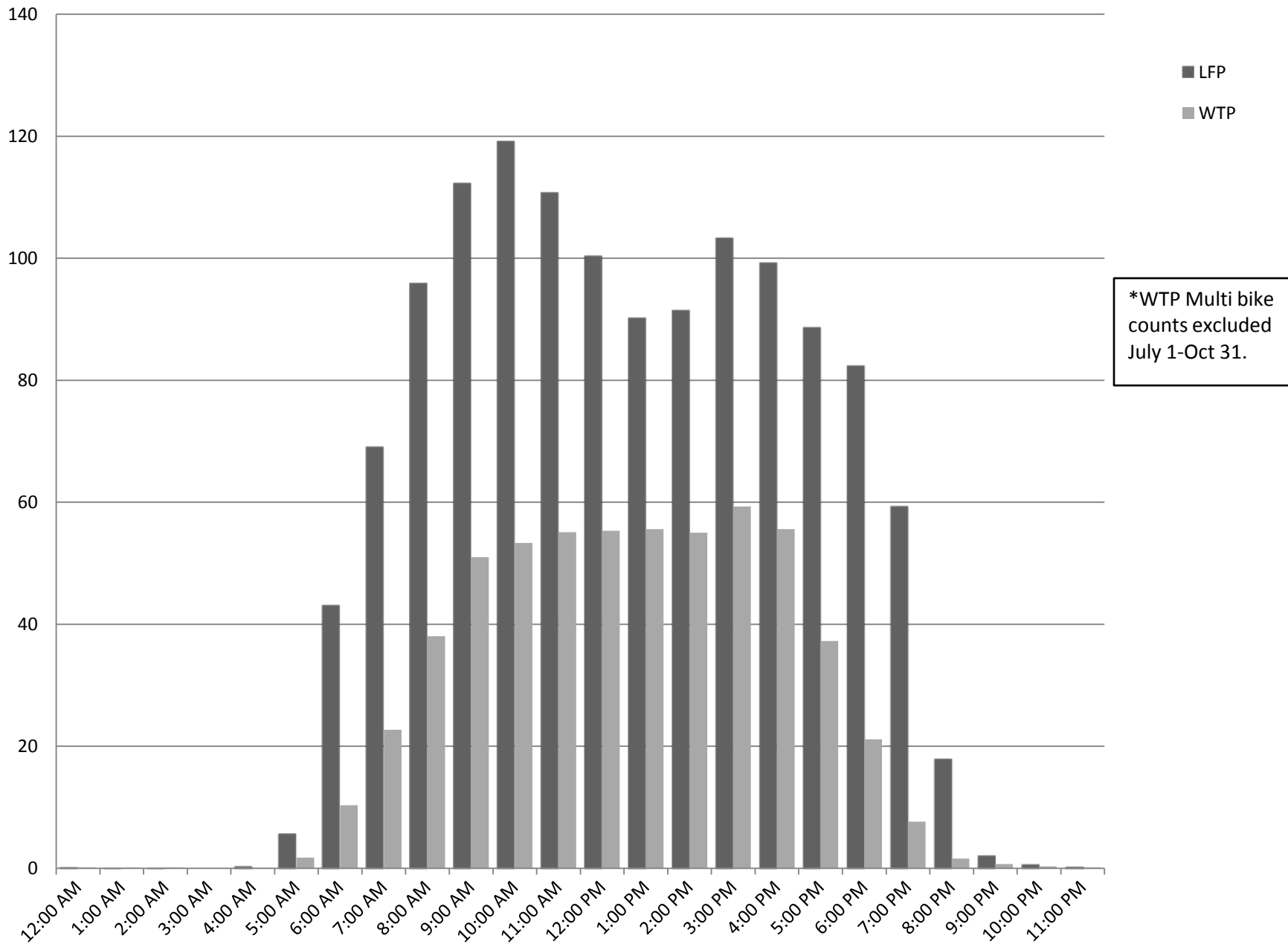
Average Hourly Cyclists, 2014

Legend:
- Bike Path
- WTP Multi

Both data sets start 4/16/2014 when bike loops were installed. **WTP bike counts only until June 30th**

Data Quality Control

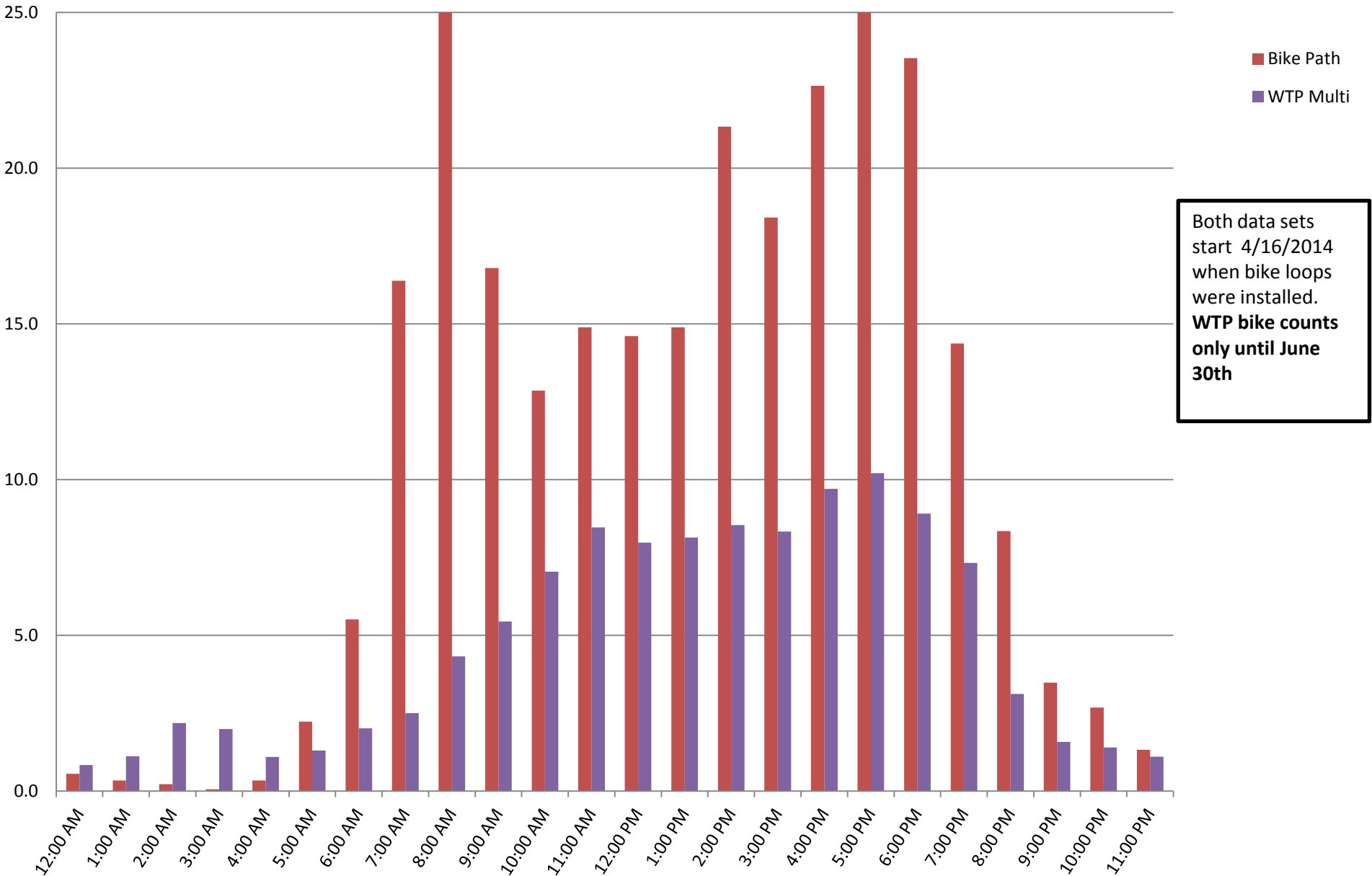Sensors downloaded weekly: checked for signs of physical damage or environmental changes and data screened for anomalies

Sensor data compared to survey data
- Running average error between sensor and surveys is 17% overall, 22% for 2014.
- Grouped events (multiple users crossing at same time) tracked as possible source of counter underestimation

Survey Comparison Results

From 2011-2014, sensors *underestimated* observed survey counts 77% of the time, and were the same as the observed counts 6%.

In *2014:*

- Sensors underestimated only 52% of survey counts
- 43% of survey counts were overestimated
- The greatest source of over counting was from LFP sensor

Date	Time	Site	Measured (EcoCounter)	Observed	Observed - Measured	% Error	# Grouped Events	Adjusted % Error	Best % Error
1/15/2014	2:45 - 3:45 PM	WTP	131	164	33	20.12	24	6.43	6.43
1/15/2014	2:45 - 3:45 PM	WTP IN (R)	66	81	15	18.52	8	9.59	9.59
1/15/2014	2:45 - 3:45 PM	WTP OUT (L)	65	83	18	21.69	16	2.99	2.99

Eco-Counter Limitations

•LFP sensor failed January 2014 (replaced by sensor mid-April)

•Eco-Multi counter bike loops installed improperly, only counting pedestrian usage, no bike counts; reinstalled correctly 4/16/14

•WTP counter not correctly registering "OUT" counts from 2/16-3/21/14, total counts unaffected

• WTP Multi bike counts malfunctioning as of July, issue still not resolved, however loops disconnected October 31, counter is counting bikes with pedestrians.

Future Projects

- Track long term trends
- Conduct more user surveys, focusing on data gaps such as weekends and early mornings (commute times)
- Use information to focus Shared Use implementation plans
- Design web page or other display for public to interact with data