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Peak Pedaling: Has Portland Bicycling reached the Top of the Logistic Curve?

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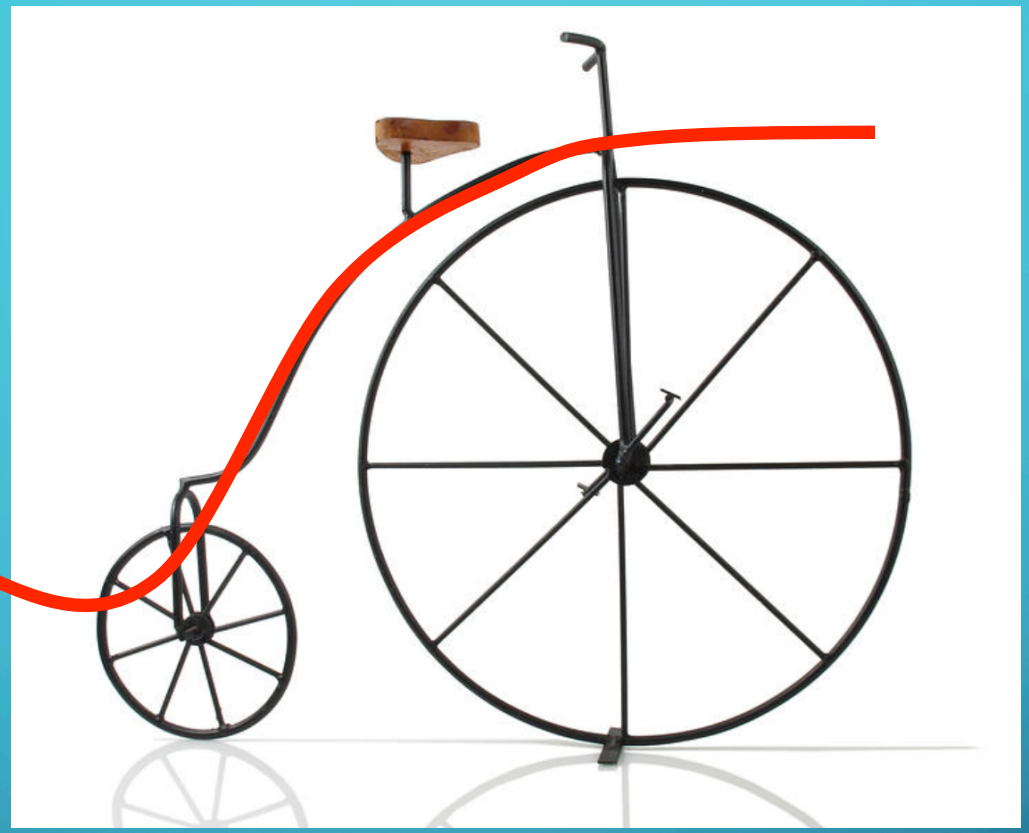


PEAK PEDDLING:

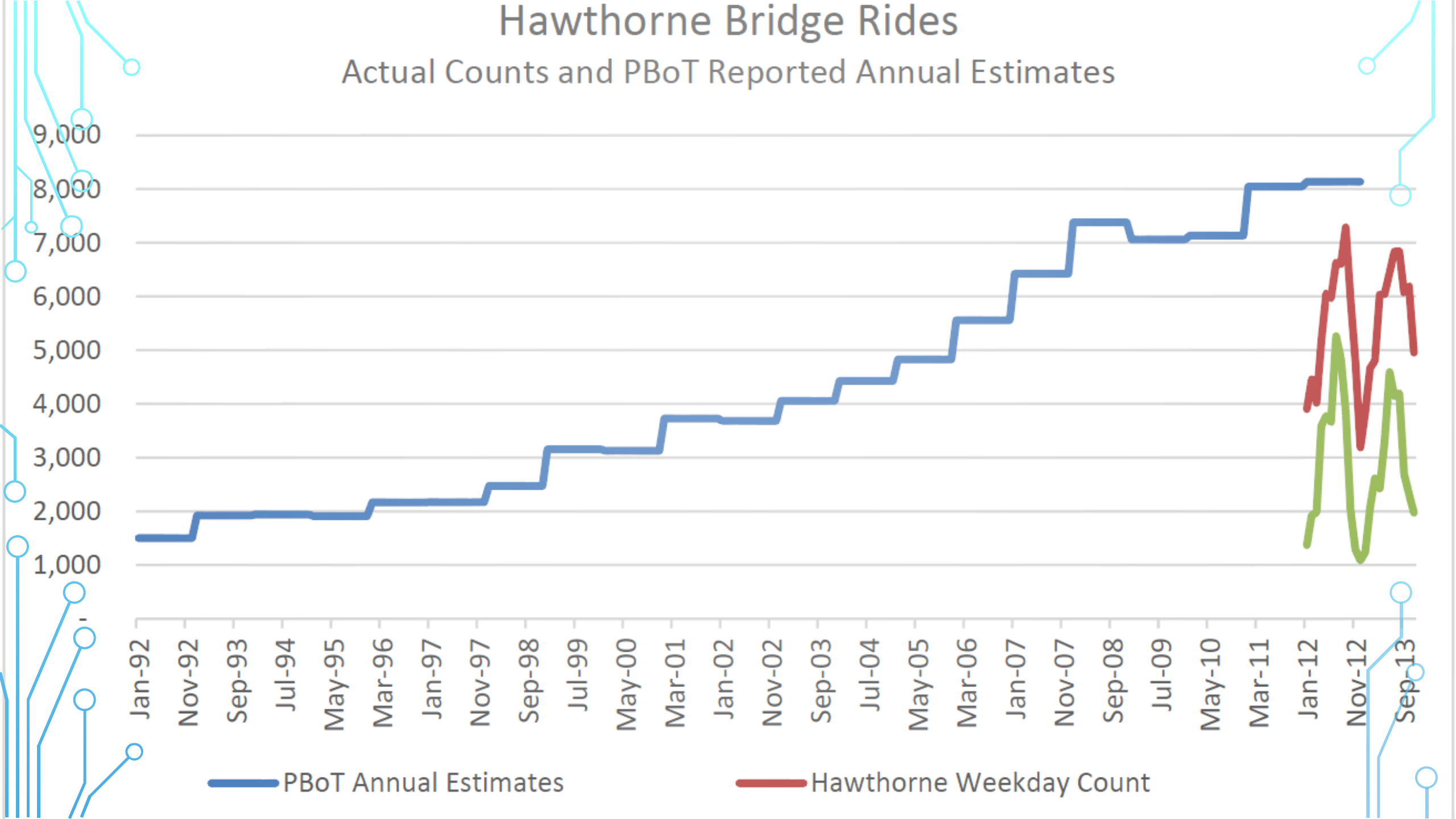
HAS PORTLAND BICYCLING REACHED THE TOP OF THE LOGISTIC CURVE?

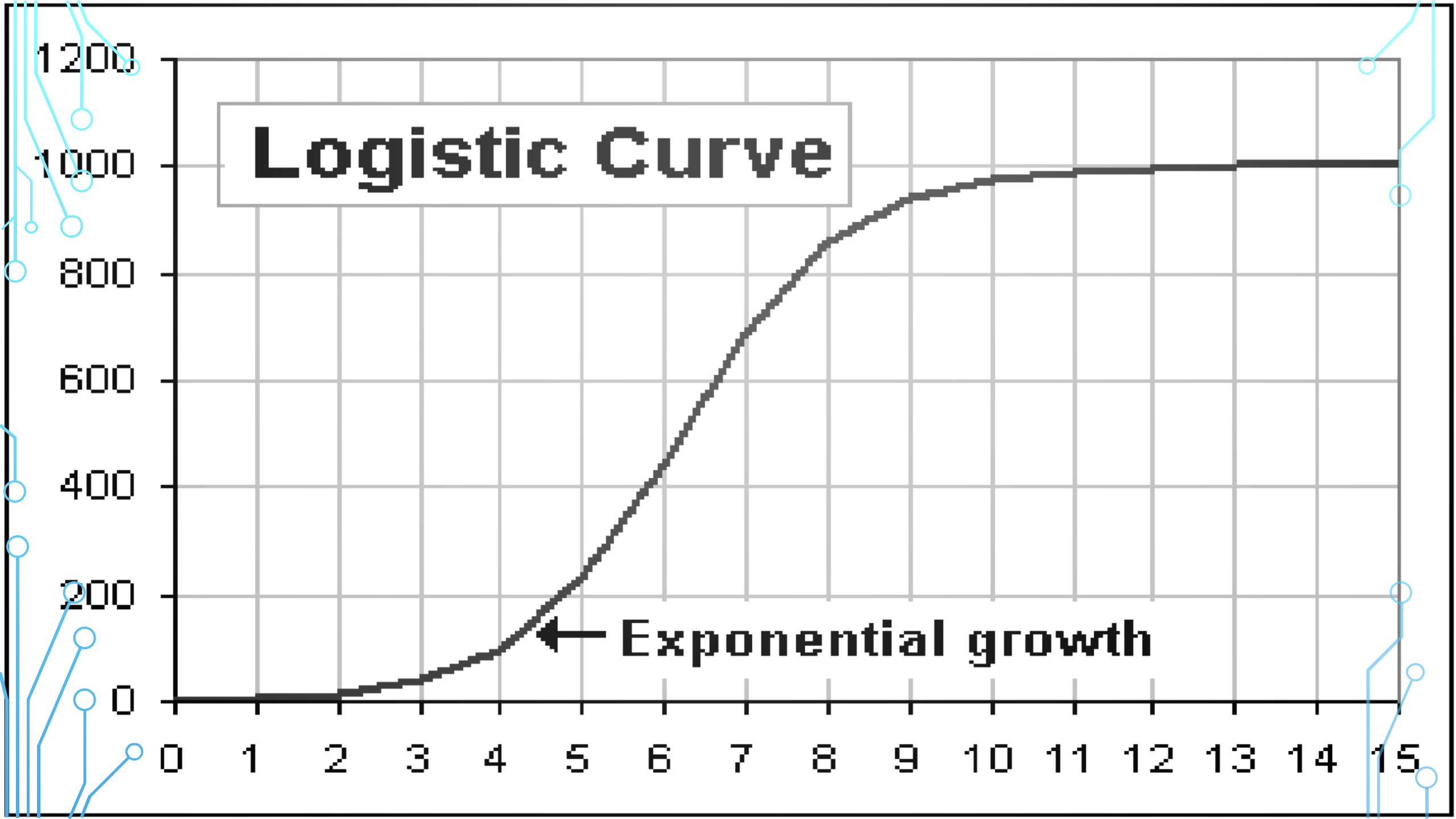
DECEMBER 6, 2013

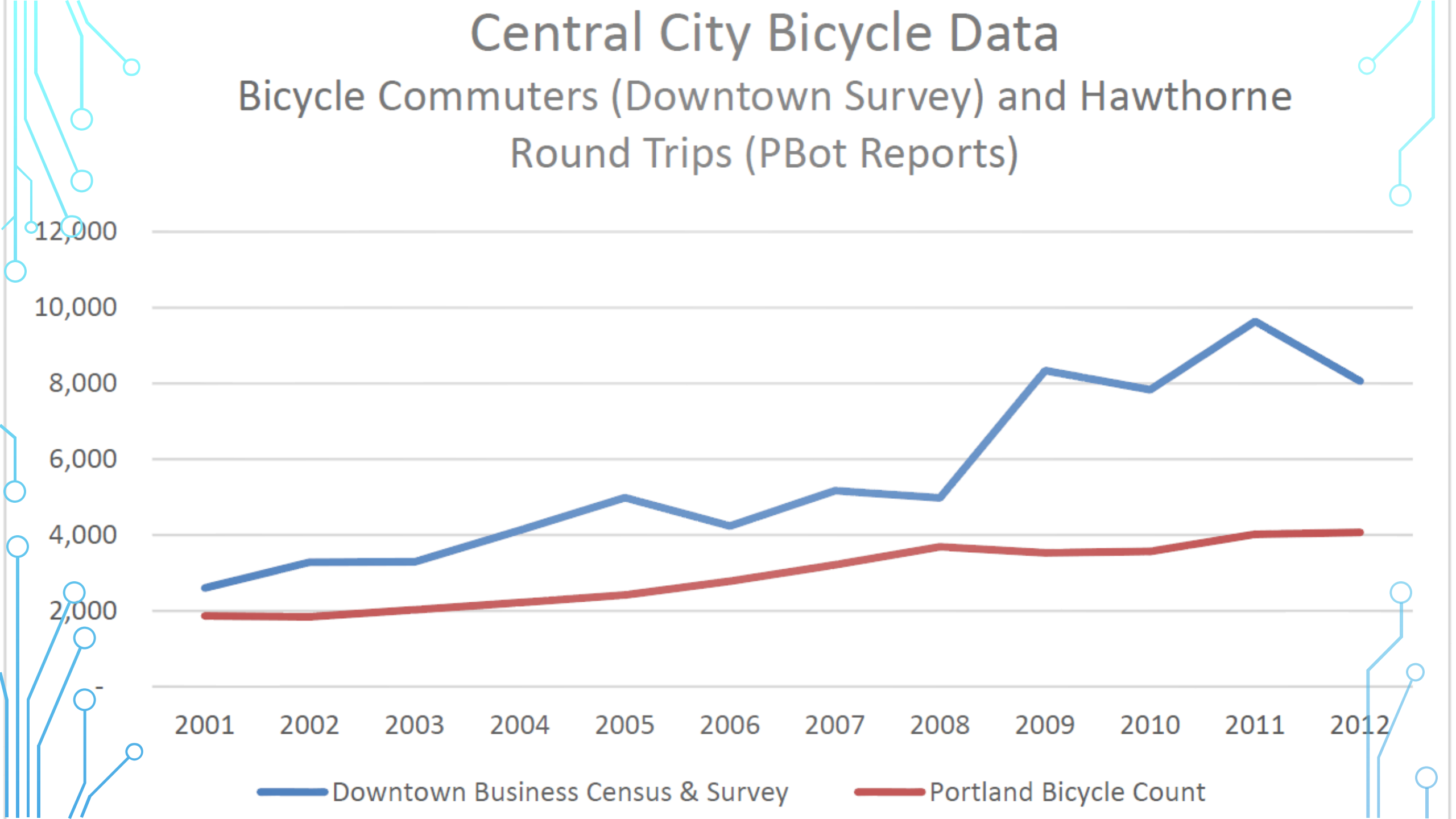
ROBERT MCCULLOUGH

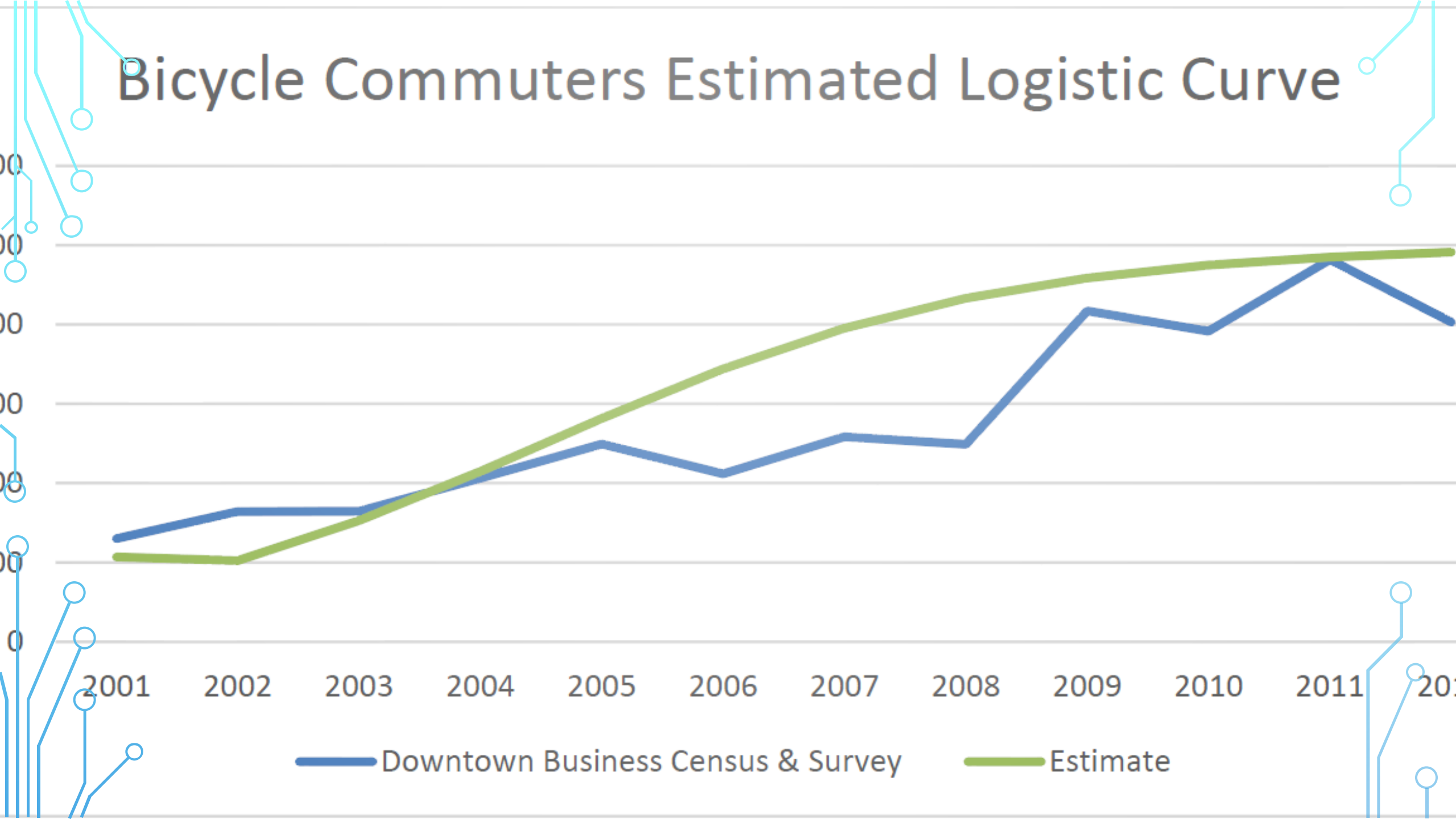
PEAK PEDDLING

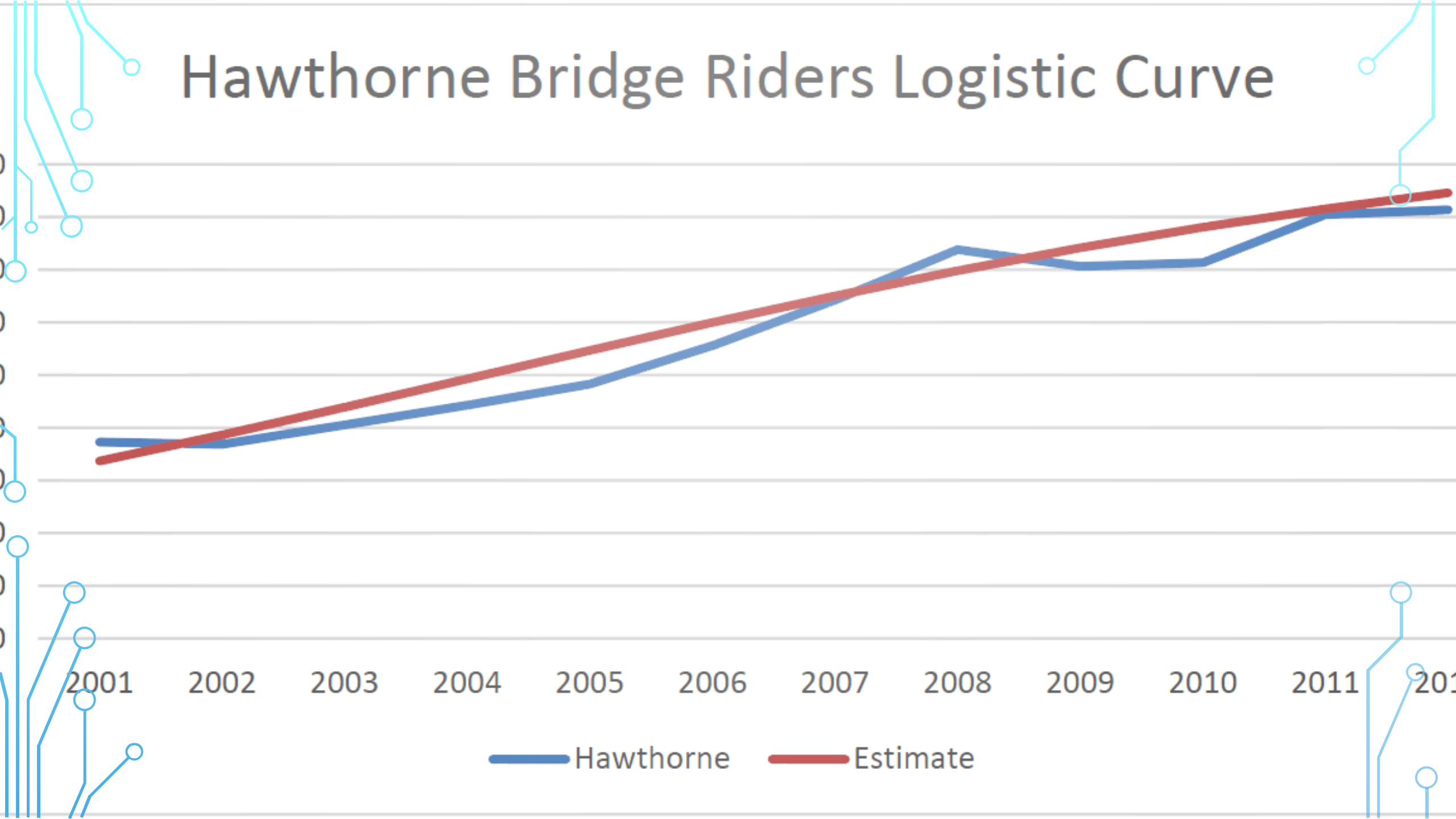
- There is increasing evidence that the growth of central city bicycle commuting is leveling off
- The best data is the Hawthorne Bridge counter – which allows us to reject growth in commuting at 99% significance since August 8, 2012
- Weather/weekend/sunset variables are highly significant
- The policy implication is that the easy work is over and the hard work – real planning – is just beginning

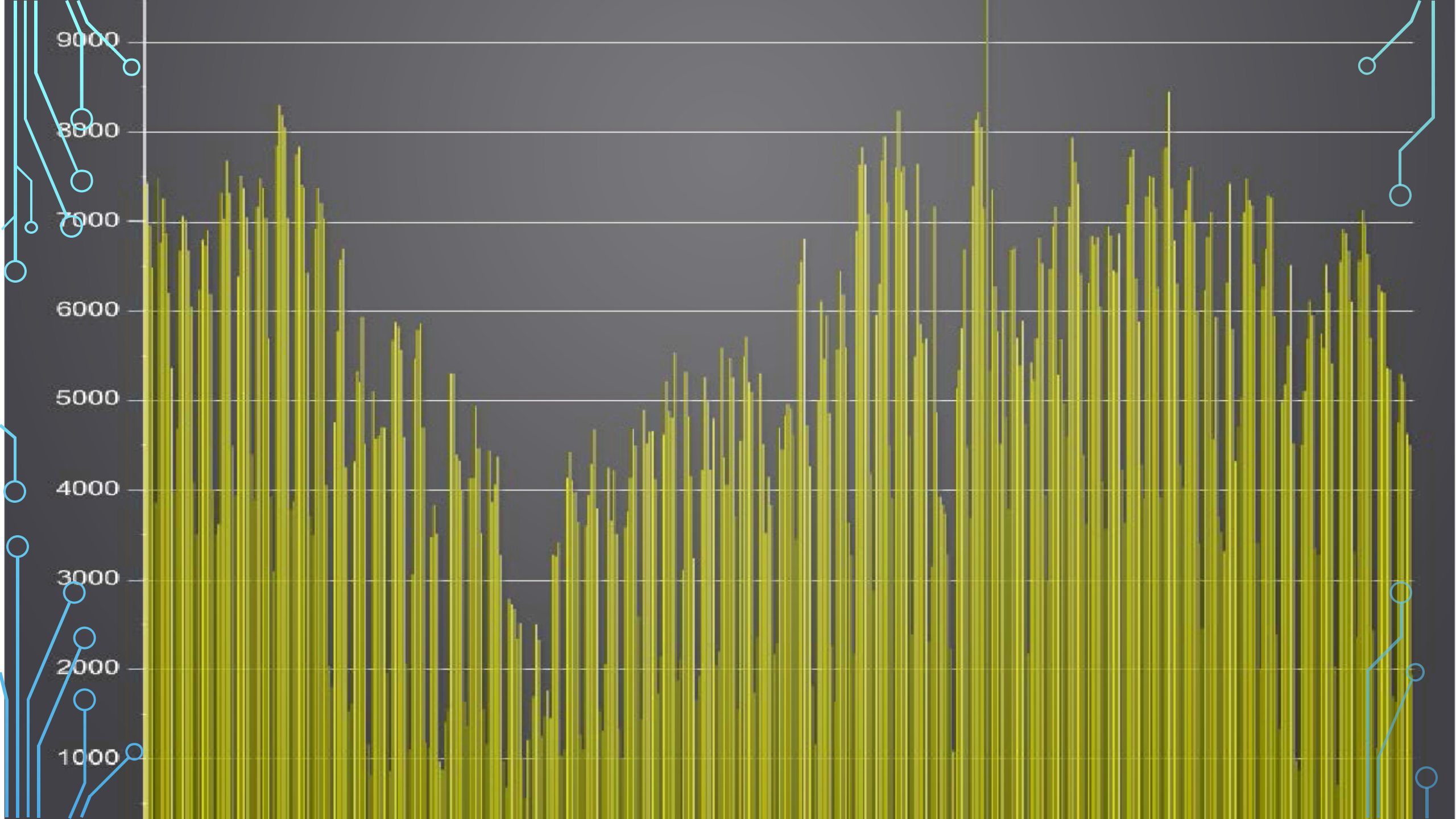

Hawthorne Bridge Rides
Actual Counts and PBoT Reported Annual Estimates
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
Jan-92
Nov-92
Sep-93
Jul-94
May-95
Mar-96
Jan-97
Nov-97
Sep-98
Jul-99
May-00
Mar-01
Jan-02
Nov-02
Sep-03
Jul-04
May-05
Mar-06
Jan-07
Nov-07
Sep-08
Jul-09
May-10
Mar-11
Jan-12
Nov-12
Sep-13
PBoT Annual Estimates
Hawthorne Weekday Count


Logistic Curve
1200
1000
800
600
400
200
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Exponential growth


Central City Bicycle Data
Bicycle Commuters (Downtown Survey) and Hawthorne Round Trips (PBot Reports)
12,000
10,000
8,000
6,000
4,000
2,000
-
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Downtown Business Census & Survey
Portland Bicycle Count


Bicycle Commuters Estimated Logistic Curve
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Downtown Business Census & Survey
Estimate


Hawthorne Bridge Riders Logistic Curve
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Hawthorne
Estimate

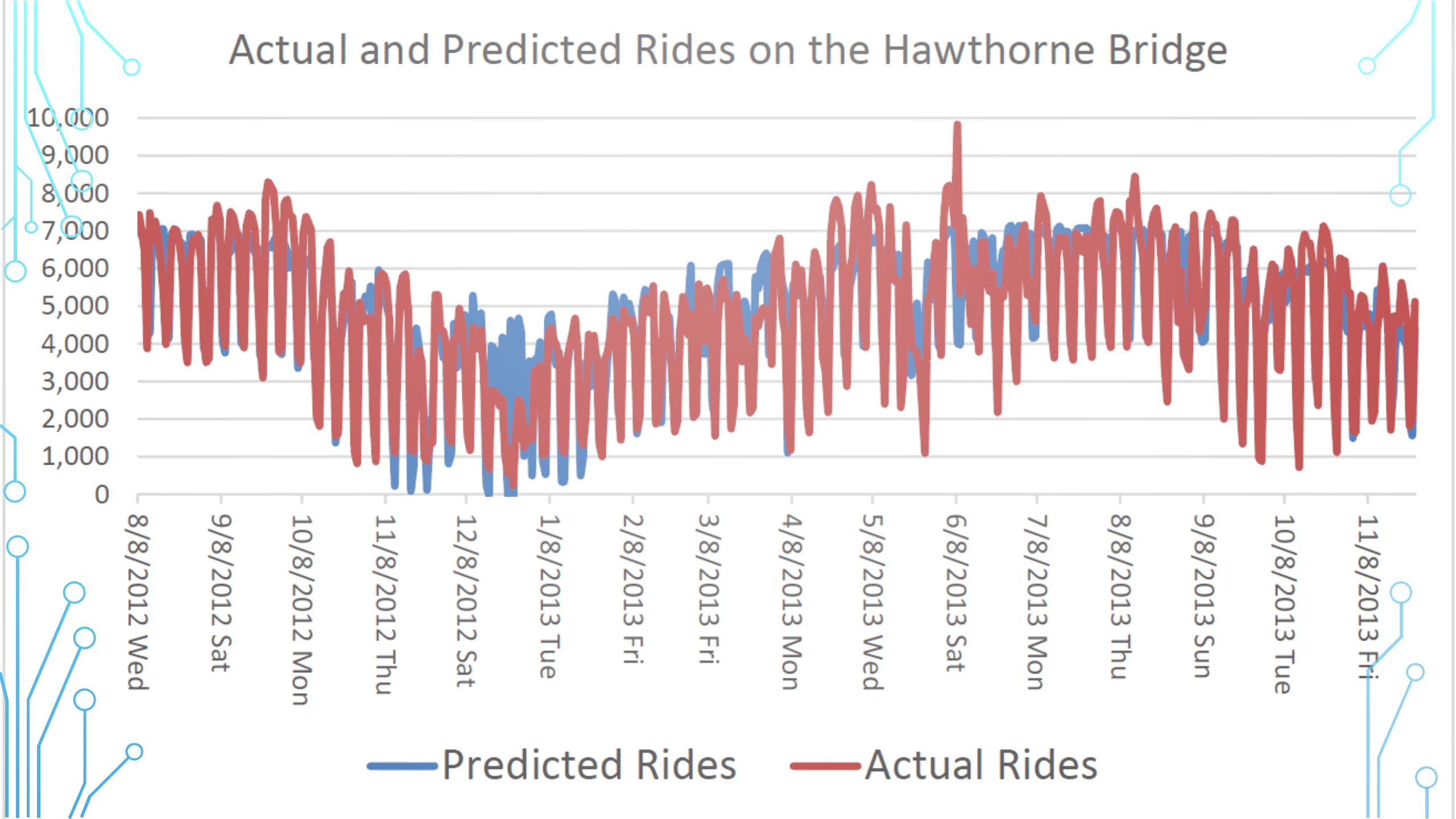

9000
8000
7000
6000
5000
4000
3000
2000
1000

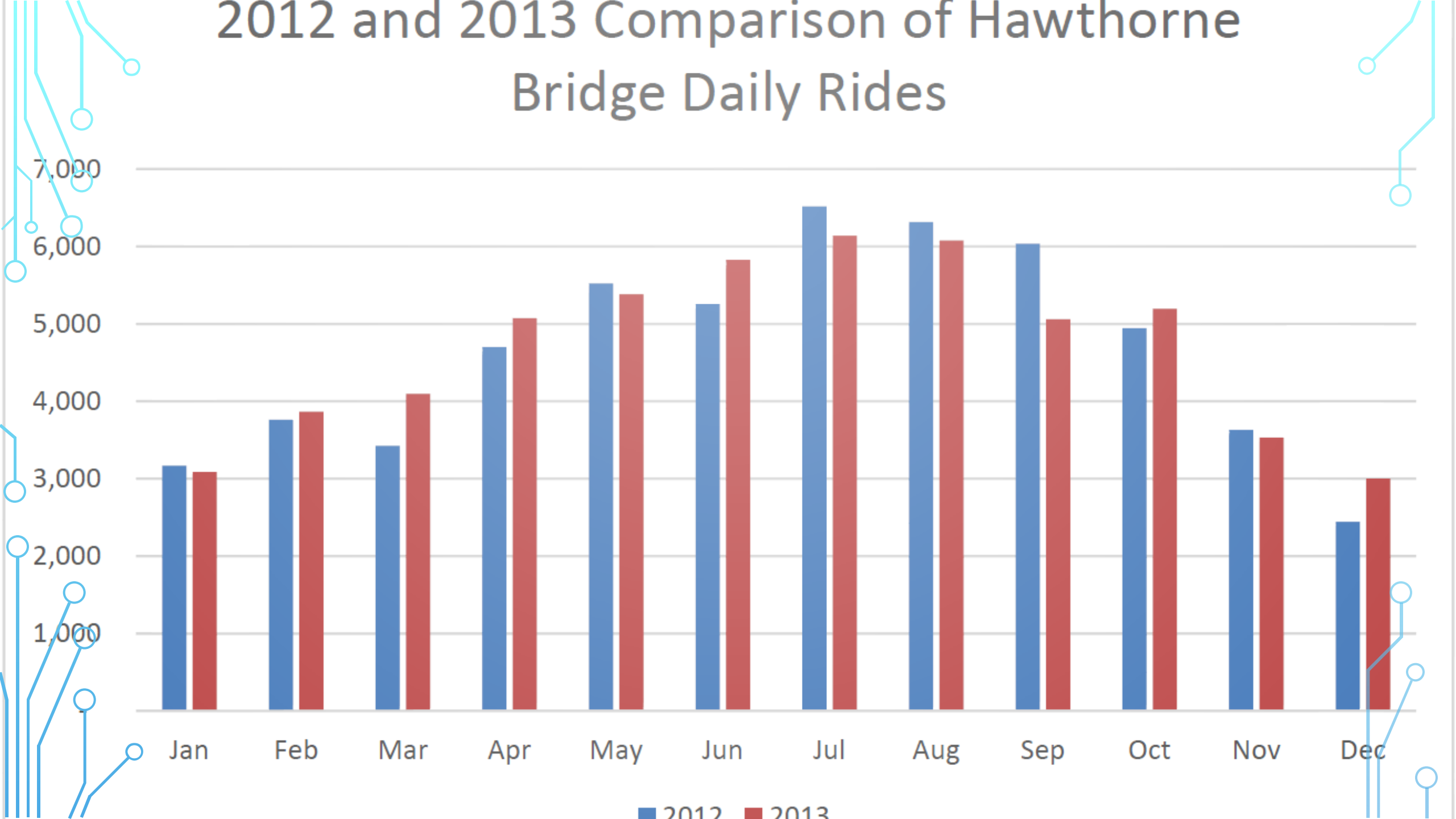
Regression Statistics	
Multiple R	0.906105222
R Square	0.821026672
Adjusted R Square	0.817562673
Standard Error	850.5686947
Observations	475

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	9	1543265669	171473963.2	237.017	1.6085E-167
Residual	465	336412203.5	723467.1043		
Total	474	1879677872			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 99.0%*	*Upper 99.0%*
Intercept	-4485.912351	981.2884652	-4.57145122	6.2E-06	-6414.221434	-2557.603268	-7023.959528	-1947.865174
tMean	241.6707571	34.01531478	7.104763211	4.6E-12	174.8279858	308.5135284	153.6920671	329.649447
tMean^2	-1.547911846	0.296146393	-5.22684687	2.6E-07	-2.12986282	-0.96596087	-2.313877759	-0.781945932
prcp	-4132.568877	413.6067696	-9.991540712	2E-21	-4945.338739	-3319.799015	-5202.33942	-3062.798335
prcp^2	1876.885004	347.4556641	5.401797115	1.1E-07	1194.107272	2559.662737	978.2105586	2775.55945
windAvg	10.67386753	32.36677682	0.329778513	0.74172	-52.9293969	74.27713196	-73.04097213	94.38870719
windAvg^2	-1.953650582	2.381714859	-0.82027056	0.41248	-6.633907773	2.72660661	-8.113821508	4.206520345
Holiday	-2815.487404	85.55667399	-32.90786414	2E-123	-2983.613004	-2647.361804	-3036.774908	-2594.1999
Sunset	104.9790662	41.42179937	2.534391742	0.01159	23.58196967	186.3761628	-2.156077677	212.1142101


Actual and Predicted Rides on the Hawthorne Bridge
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
8/8/2012 Wed
9/8/2012 Sat
10/8/2012 Mon
11/8/2012 Thu
12/8/2012 Sat
1/8/2013 Tue
2/8/2013 Fri
3/8/2013 Fri
4/8/2013 Mon
5/8/2013 Wed
6/8/2013 Sat
7/8/2013 Mon
8/8/2013 Thu
9/8/2013 Sun
10/8/2013 Tue
11/8/2013 Fri
Predicted Rides
Actual Rides


2012 and 2013 Comparison of Hawthorne Bridge Daily Rides
7,000
6,000
5,000
4,000
3,000
2,000
1,000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2012
2013

2011 ACS Regression

Regression Statistics	
Multiple R	0.669288
R Square	0.447947
Adjusted R Square	0.426714
Standard Error	93.06704
Observations	136

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	5	913652.7	182730.5	21.09693	2.12E-15
Residual	130	1125992	8661.475		
Total	135	2039644			

	Coefficient	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 99.0%*	*Upper 99.0*
Intercept	466.9251	72.87187	6.407481	2.49E-09	322.7568	611.0934	276.4251	657.425
Average of miles_to_CBD	-29.01972	4.10137	-7.07561	8.27E-11	-37.13379	-20.90564	-39.74142	-18.2980
Average of mean_slope	-5.702735	1.413051	-4.03576	9.24E-05	-8.498287	-2.907183	-9.3967	-2.00876
Age	-6.328541	1.945711	-3.25256	0.001457	-10.1779	-2.479185	-11.41497	-1.24210
linearfeet of "Bike Boulevard"*	0.009085	0.003131	2.901924	0.004358	0.002891	0.015279	0.000901	0.01726
linearfeet of "Low Traffic Through Street"*	0.005362	0.0015	3.575325	0.000492	0.002395	0.008329	0.001441	0.00928