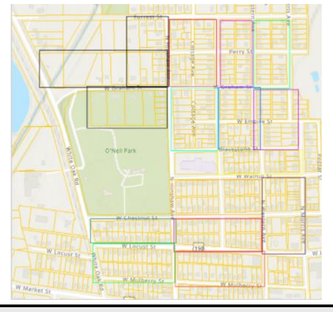
O'Neil Aquatic Center Sophomore Project

Seth Albin
Illinois Wesleyan University

What is the O'Neil Aquatic Center?

The O'Neil Aquatic Center is a large waterpark concept soon to be constructed at O'Neil park in the West Bloomington area. After working on the property value aspect of this project with fellow classmates, this poster will present the following statement to be true.

The water park will provide an enjoyable experience for everyone living in town as well as an economic increase to the City of Bloomington.



Materials and Methods

The map above shows the mapping of West Bloomington and O'Neil Park where the O'Neil Aquatic Center will be built. It is also color coded through parcels of land sorted by proximity to each other and to the park. Since I am apart of the property values group, I was able to acquire some information on housing based off of PSF (Price per Square Foot) as well as Equalized Assessed Value (EAV).

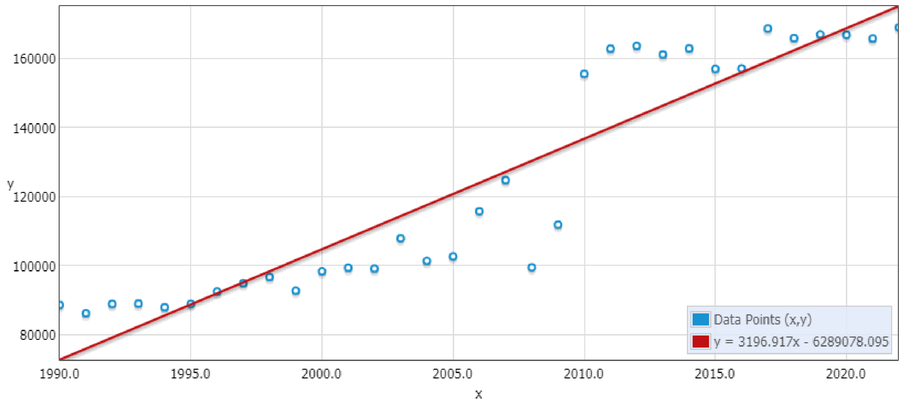
Below is an abbreviated list of EAV data:

Parcel #	Computed Acres	EAV(Equalized Assessed Value)	Property Address	Color Code
14-32-378-002	0.97	51689	1520 FORREST	
14-32-378-027	0.51	55817	1516 FORREST	
14-32-378-024	0.23	51395	1514 FORREST	
14-32-378-025	0.23	48938	1314 N HINSHAW AVE	
14-32-378-013	0.38	54407	1312 N HINSHAW AVE	
14-32-381-009	0.17	38428	1104 N HINSHAW AVE	
14-32-381-010	0.17	38888	1102 N HINSHAW AVE	
14-32-381-004	1	33039	1504 W GRAHAM	
14-32-381-003	1.52	31044	1510 W GRAHAM	
14-32-381-002	1.48	66721	1514 W GRAHAM	
14-32-462-008	0.17	43897	1308 N WESTERN AVE	
14-32-462-003	0.17	32593	1305 N LIVINGSTON	
14-32-462-009	0.17	33291	1306 N WESTERN AVE	
14-32-462-004	0.18	32752	1301 N LIVINGSTON	
14-32-462-005	0.16	42882	1305 PERRY	
14-32-463-001	0.34	16553	1311 N WESTERN AVE	
14-32-463-008	0.17	28123	1312 N MORRIS AVE	
14-32-463-007	0.17	29389	1310 N MORRIS AVE	
14-32-463-002	0.17	24508	1307 N WESTERN AVE	
14-32-463-003	0.17	22599	1308 N MORRIS AVE	
21-05-202-008	0.15	26469	1307 BLACKSTONE	
21-05-202-009	0.15	26340	1305 BLACKSTONE	
21-05-202-010	0.15	23838	1303 BLACKSTONE	
21-05-202-013	0.09	31301	1004 N WESTERN AVE	
21-05-202-014	0.12	28128	1002 N WESTERN AVE	
14-32-382-001	0.17	29121	1109 N HINSHAW AVE	
14-32-382-002	0.2	39640	1404 W GRAHAM	
14-32-382-003	0.32	45132	1107 N HINSHAW AVE	
14-32-382-004	0.29	45622	1105 N HINSHAW AVE	
14-32-382-006	0.31	44249	1103 N HINSHAW AVE	
21-05-206-001	0.13	22092	909 N LIVINGSTON ST	
21-05-206-016	0.13	26988	907 N LIVINGSTON ST	
21-05-206-008	0.13	19841	1315 W WALNUT ST	
21-05-206-017	0.13	17483	1313 W WALNUT	
21-05-206-010	0.13	28537	1311 W WALNUT	

Linear Regression

Because I am focusing more on the math aspect of this project, I decided to provide information regarding the linear regression of property values increasing near where the O'Neil Aquatic Center will be built. This graph demonstrates the economic value the O'Neil Aquatic Center obtains and will provide to West Bloomington. Linear Regression can help predict what the future outcomes of these property values will be.

Property values either decrease in cities/towns due to lack of job opportunities and population growth, or they increase as a result of a growing economy and population. In this case with West Bloomington, the prices of homes have slightly increased over time, thus creating a better opportunity for the O'Neil Aquatic Center to thrive.



Linear Regression scatter plot created by Seth Albin using GoodCalculators.com
Displayed as Median amount in the US Dollar Over 30 Years
Data within scatter plot provided by RedFin Bloomington Housing Market, USA.com Bloomington, IL Housing, NeighborWho.com, ArcMAP

Regression Data				
x	y	xy	x^2	y^2
1990	88637	176387630.000	3960100.000	7856517769.000
1991	86243	171709813.000	3964081.000	7437855049.000
1992	88939	177166488.000	3968064.000	7910145721.000
1993	89040	177456720.000	3972049.000	7928121600.000
1994	87949	175370306.000	3976036.000	7735026601.000
1995	88949	177453255.000	3980025.000	7911924601.000
1996	92526	184681896.000	3984016.000	8561060676.000
1997	94947	189609159.000	3988009.000	9014932809.000
1998	96738	193282524.000	3992004.000	9358240644.000
1999	92747	185401253.000	3996001.000	8602006009.000
2000	98345	196690000.000	4000000.000	9671739025.000
2001	99378	198855378.000	4004001.000	9875986884.000
2002	99129	198456258.000	4008004.000	9826558641.000
2003	107897	216117691.000	4012009.000	11641762609.000
2004	101366	203137464.000	4016016.000	10275065956.000
2005	102647	205807235.000	4020025.000	10536406609.000
2006	115737	232168422.000	4024036.000	13395053169.000
2007	124738	250349166.000	4028049.000	15559568644.000
2008	99500	199796000.000	4032064.000	9900250000.000
2009	111849	224704641.000	4036081.000	12510198801.000
2010	155500	312555000.000	4040100.000	24180250000.000
2011	162800	327390800.000	4044121.000	26503840000.000
2012	163600	329163200.000	4048144.000	26764960000.000
2013	161100	324294300.000	4052169.000	25953210000.000
2014	162848	327975872.000	4056196.000	26519471104.000
2015	156949	316252235.000	4060225.000	24632988601.000
2016	157040	316592640.000	4064256.000	24661561600.000
2017	168633	340132761.000	4068289.000	28437088689.000
2018	165848	334681264.000	4072324.000	27505559104.000
2019	166900	336971100.000	4076361.000	27855610000.000
2020	166800	336936000.000	4080400.000	27822240000.000
2021	165700	334879700.000	4084441.000	27456490000.000
2022	168945	341606790.000	4088484.000	28542413025.000
$\sum x_i$ = 66198.000	$\sum y_i$ = 4089964.000	$\sum x_i y_i$ = 8214032961.000	$\sum x_i^2$ = 132796180.000	$\sum y_i^2$ = 542344103940.000

Conclusion

Linear Regression Calculator – Results	
Sample Size (n):	33
Mean x:	2006
Mean y:	123938.303
Slope (m):	3196.917
Intercept (b):	-6289078.095
Regression Equation:	y = 3196.917x - 6289078.095
Correlation Coefficient (r):	0.929

Results from the Linear Regression Scatter Plot

The sample mean for x,

$\bar{x} = \sum x_i / n$
$\bar{x} = 66198 / 33$
$\bar{x} = 2006$

The sample mean for y,
$\bar{y} = \sum y_i / n$
$\bar{y} = 4089964 / 33$
$\bar{y} = 123938.303$

The slope m,

$m = (n*\sum x_i y_i - (\sum x_i)*(\sum y_i)) / (n*\sum x_i^2 - (\sum x_i)^2)$
$m = (33*8214032961 - (66198)*(4089964)) / (33*132796180 - (66198)^2)$
$m = 3196.917$

The intercept b,

$b = (\sum y_i - m*(\sum x_i)) / n$
$b = (4089964 - 3196.917*66198) / 33$
$b = -6289078.095$

The regression line equation,

$y = mx + b$
$y = 3196.917x - 6289078.095$

The sample correlation coefficient r,

$r = (n*\sum x_i y_i - (\sum x_i)(\sum y_i)) / \text{Sqrt}([\ n*\sum x_i^2 - (\sum x_i)^2\ ]*[\ n*\sum y_i^2 - (\sum y_i)^2\ ])$
$r = (33*8214032961 - 66198*4089964) / \text{Sqrt}([\ 33*132796180 - (66198)^2\ ]*[\ 33*542344103940 - (4089964)^2\ ])$
$r = 0.929$

Explanation work of Results

An Example from the scatter plot:

As of 2010-2014, median price of a house in Bloomington is $162,500, which has grown by 39.48% since 2000. As the years go on, property values in all of Bloomington have increased. This is a result of rising job opportunities and growing businesses in the area. An example shown on the graph in recent years is in February 2022, Bloomington home prices were up 3.2% compared to last year, selling for a median price of $168K.

The growth rate for the price of a house in Bloomington is higher than the state average rate of 34.33%. This just shows that there is an increase in property value in Bloomington, IL. This is a pro to the adding of the O'Neil Aquatic Center in West Bloomington.

With every new business there is a risk of success, but with the ever-growing property values surrounding the construction sight seem promising.