



Sarah Butler, Tommy Franzen, & Hannah Prather
GIS II Project

+ Recent Research



Why do urban residents plant trees?

- Aesthetics and Recent Home Sale (Summit & McPherson, 1998)
- Number of single detached dwellings, Immigration status, Income, House age, and Female employment (Greene et al. 2010)



+ Research Question

In Portland Oregon:

- *Why do residents participate in tree planting programs **and** what are the barriers to participation?*



+ Data and Data Sources

- Tree planting survey data (Friends of Trees & City of Portland)
- 10m DEM (RLIS 2009)
- Tree canopy cover (City of Portland)
- 2000 Census Block Data (U.S. Census Bureau)
- Taxlots (RLIS 2009)
- Crime (RLIS 2009)
- Roads (Civicapps.org)
- Parks (Civicapps.org)

+ Study Area



+ Methods

We aim to further improve upon these studies and additionally incorporate:

- Detailed household-level data
- Demographic data at the census-block level
- Creation of binary logistic model regression model in SPSS

+ Data Analysis– ArcMap

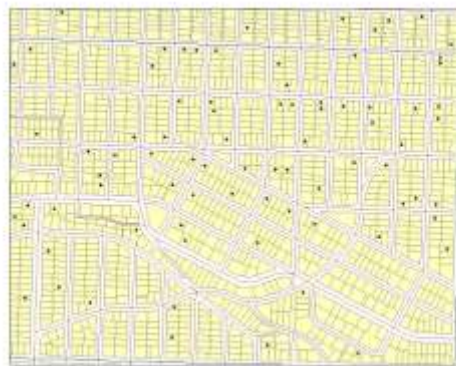


Distance to major roads

Distance to parks



+ Data Analysis - ArcMap



Tax lot data and street azimuth



Portland Canopy Cover Raster



Data Analysis - ArcMap



Rater canopy cover

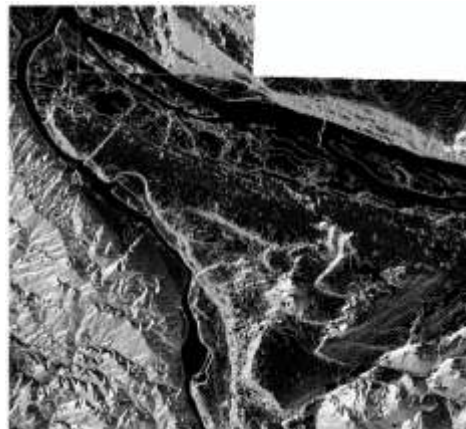
+ Data Analysis - ArcMap

CAR. DWG	amount
0.22	0
0.42	36.30290
0.32	18.83255
0.24	0
0.18	22.20000
0.12	23.24412
0.08	0
0.11	47.73087
0.47	27.87183
2	14.83628
0.04	28.88480
0.06	16.43428
0.02	7.79448
0.18	22.20000
0.03	548.89088
0.22	44.13448
0	310.61127
0	7.21488
0.75	0
0.08	37.87400
0.08	28.56000
0.48	0
0.08	354.80754
0.48	40.81450
0.01	244.55854
0.38	25.87375
0.1	0
0.08	128.96100
0.38	0
0	24.44328
0.73	0
0.28	14.74254
0.1	18.74280
0.12	289.74282
0.38	128.96100



Convert to polygon, intersect and dissolve

- + Aspect: 10m DEM



+ Results:

Significant Variables:

- Year since last sale
- Total value of house
- Number of frontage trees on property
- Average age of census block
- Aspect
- Azimuth of streets

Expected Participation:

- Recent sale of property
- Higher home value
- Fewer trees on property frontage
- Younger average age per census block
- N, S, W facing tax lots

+ Data Analysis- SPSS

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a						
yr_snc_sal	.100	.007	179.905	1	.000	1.106
Avg_age	.017	.008	4.052	1	.044	1.017
TOTALVAL	.000	.000	3.875	1	.049	1.000
NO_trees	-.082	.043	3.694	1	.055	.921
cat_aspect			11.484	8	.176	
cat_aspect(1)	-.500	.207	5.831	1	.016	.607
cat_aspect(2)	-.302	.183	2.742	1	.098	.739
cat_aspect(3)	-.364	.192	3.575	1	.059	.695
cat_aspect(4)	-.254	.215	1.395	1	.238	.775
cat_aspect(5)	-.731	.286	6.519	1	.011	.482
cat_aspect(6)	-.220	.224	.968	1	.325	.802
cat_aspect(7)	-.497	.213	5.452	1	.020	.608
cat_aspect(8)	-.208	.236	.776	1	.378	.812
st_az_cat			.770	2	.681	
st_az_cat(1)	.047	.100	.223	1	.637	1.048
st_az_cat(2)	.166	.197	.708	1	.400	1.181
Constant	-1.206	.370	10.626	1	.001	.299

a. Variable(s) entered on step 1: yr_snc_sal, Avg_age, TOTALVAL, NO_trees, cat_aspect, st_az_cat.

+ Data Analysis - SPSS

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2550.838 ^a	.107	.143

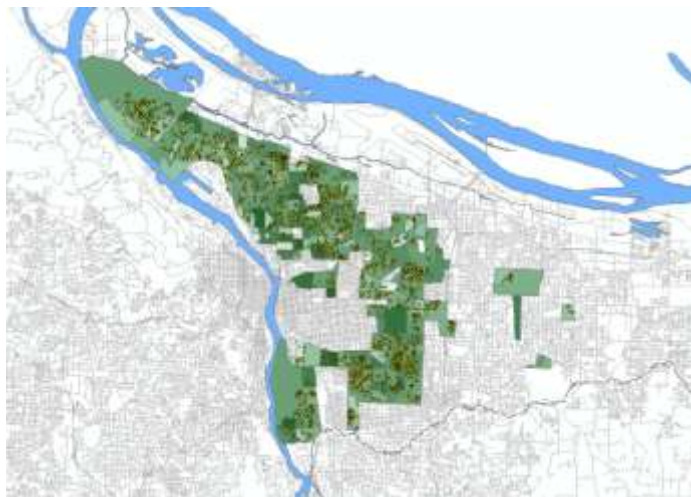
a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table^a

		Predicted		
		answer3		Percentage Correct
		1	2	
Step 1	answer3 1	779	270	74.3
	2	424	534	55.7
	Overall Percentage			65.4

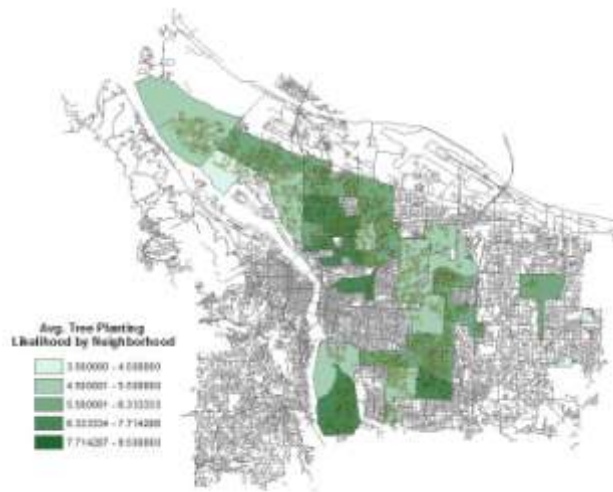
a. The cut value is .500

+ Results...



Tree planting likelihood by tax lot

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Tree planting likelihood by neighborhood

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Tree planting likelihood by neighborhood

ID	Name	Value	Max Value
1	Neighborhood 1	3.5	3.5
2	Neighborhood 2	4.0	4.0
3	Neighborhood 3	4.5	4.5
4	Neighborhood 4	5.0	5.0
5	Neighborhood 5	5.5	5.5
6	Neighborhood 6	6.0	6.0
7	Neighborhood 7	6.5	6.5
8	Neighborhood 8	7.0	7.0
9	Neighborhood 9	7.5	7.5
10	Neighborhood 10	8.0	8.0
11	Neighborhood 11	8.5	8.5
12	Neighborhood 12	9.0	9.0
13	Neighborhood 13	9.5	9.5
14	Neighborhood 14	10.0	10.0
15	Neighborhood 15	10.5	10.5
16	Neighborhood 16	11.0	11.0
17	Neighborhood 17	11.5	11.5
18	Neighborhood 18	12.0	12.0
19	Neighborhood 19	12.5	12.5
20	Neighborhood 20	13.0	13.0
21	Neighborhood 21	13.5	13.5
22	Neighborhood 22	14.0	14.0
23	Neighborhood 23	14.5	14.5
24	Neighborhood 24	15.0	15.0
25	Neighborhood 25	15.5	15.5
26	Neighborhood 26	16.0	16.0
27	Neighborhood 27	16.5	16.5
28	Neighborhood 28	17.0	17.0
29	Neighborhood 29	17.5	17.5
30	Neighborhood 30	18.0	18.0
31	Neighborhood 31	18.5	18.5
32	Neighborhood 32	19.0	19.0
33	Neighborhood 33	19.5	19.5
34	Neighborhood 34	20.0	20.0
35	Neighborhood 35	20.5	20.5
36	Neighborhood 36	21.0	21.0
37	Neighborhood 37	21.5	21.5
38	Neighborhood 38	22.0	22.0
39	Neighborhood 39	22.5	22.5
40	Neighborhood 40	23.0	23.0
41	Neighborhood 41	23.5	23.5
42	Neighborhood 42	24.0	24.0
43	Neighborhood 43	24.5	24.5
44	Neighborhood 44	25.0	25.0
45	Neighborhood 45	25.5	25.5
46	Neighborhood 46	26.0	26.0
47	Neighborhood 47	26.5	26.5
48	Neighborhood 48	27.0	27.0
49	Neighborhood 49	27.5	27.5
50	Neighborhood 50	28.0	28.0
51	Neighborhood 51	28.5	28.5
52	Neighborhood 52	29.0	29.0
53	Neighborhood 53	29.5	29.5
54	Neighborhood 54	30.0	30.0
55	Neighborhood 55	30.5	30.5
56	Neighborhood 56	31.0	31.0
57	Neighborhood 57	31.5	31.5
58	Neighborhood 58	32.0	32.0
59	Neighborhood 59	32.5	32.5
60	Neighborhood 60	33.0	33.0
61	Neighborhood 61	33.5	33.5
62	Neighborhood 62	34.0	34.0
63	Neighborhood 63	34.5	34.5
64	Neighborhood 64	35.0	35.0
65	Neighborhood 65	35.5	35.5
66	Neighborhood 66	36.0	36.0
67	Neighborhood 67	36.5	36.5
68	Neighborhood 68	37.0	37.0
69	Neighborhood 69	37.5	37.5
70	Neighborhood 70	38.0	38.0
71	Neighborhood 71	38.5	38.5
72	Neighborhood 72	39.0	39.0
73	Neighborhood 73	39.5	39.5
74	Neighborhood 74	40.0	40.0
75	Neighborhood 75	40.5	40.5
76	Neighborhood 76	41.0	41.0
77	Neighborhood 77	41.5	41.5
78	Neighborhood 78	42.0	42.0
79	Neighborhood 79	42.5	42.5
80	Neighborhood 80	43.0	43.0
81	Neighborhood 81	43.5	43.5
82	Neighborhood 82	44.0	44.0
83	Neighborhood 83	44.5	44.5
84	Neighborhood 84	45.0	45.0
85	Neighborhood 85	45.5	45.5
86	Neighborhood 86	46.0	46.0
87	Neighborhood 87	46.5	46.5
88	Neighborhood 88	47.0	47.0
89	Neighborhood 89	47.5	47.5
90	Neighborhood 90	48.0	48.0
91	Neighborhood 91	48.5	48.5
92	Neighborhood 92	49.0	49.0
93	Neighborhood 93	49.5	49.5
94	Neighborhood 94	50.0	50.0
95	Neighborhood 95	50.5	50.5
96	Neighborhood 96	51.0	51.0
97	Neighborhood 97	51.5	51.5
98	Neighborhood 98	52.0	52.0
99	Neighborhood 99	52.5	52.5
100	Neighborhood 100	53.0	53.0

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+ Next Steps...

- Improve model by considering additional variables
- Apply the model to the entire Portland/Metro area

