Determining Factors for Prediction of New Concept Centers in the Metro Area

Shayna Denny, Chris Gilbert, Tyler Bayer

What is a Concept Center?

- Centers are compact, mixed-use areas of high-density housing, employment, and retail that are pedestrian-oriented and well served by public transportation and roads.

Portland

Two project goals:

- Determine and weight the factors that are relevant to the “Concept Center” idea.
- Use the resultant information to predict the placement of new concept centers.


Orenco Station


Hollywood

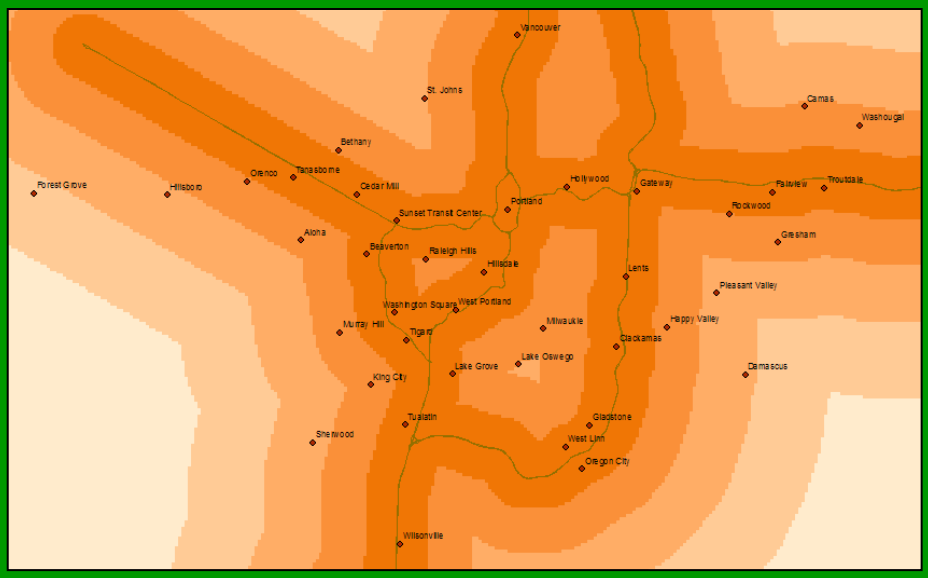

Lake Oswego

Factors chosen:

- a. Distance from Concept Center to freeway
- b. Presence of parkland near the centers
- c. Clustering pattern relative to other centers
- d. Total land value was used as the dependent variable for SPSS analysis

a. Distance to Freeways

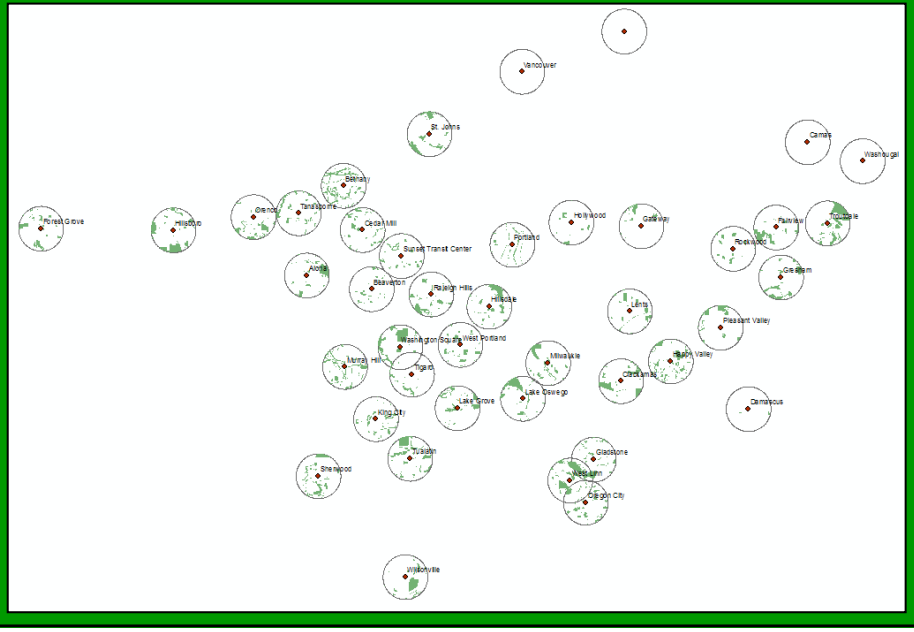
- Created points out of concept centers using “Feature to Point” tool
- Found Euclidian distance between points and freeways layer using “Near” tool
- Created a distance raster using Spatial Analyst
- Reclassified using Quantile classification (awarded higher points to closer distances)



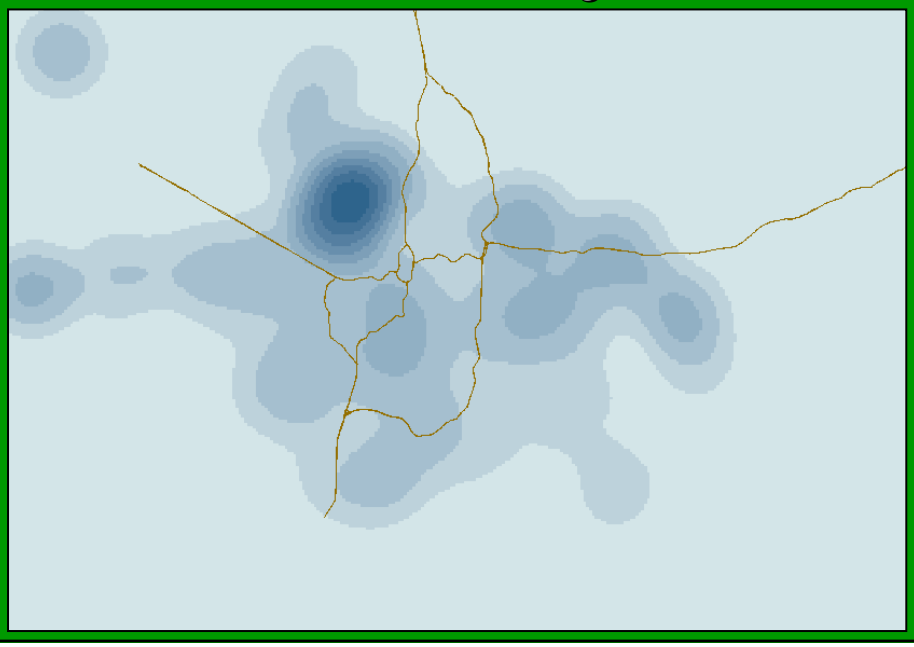
b. Percentage of Parkland

- Created 1 mile buffer around all concept points
- Found total area of parkland within each Concept Buffer using “Identity” tool
- Converted park features to points and created a kernel density map using the area of the original park polygons

Parks Within a Buffer

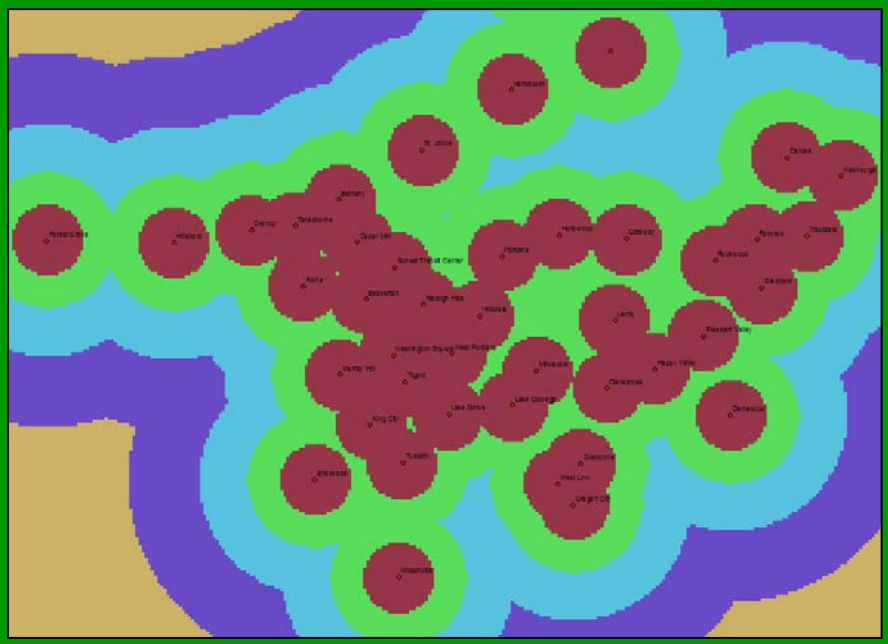


Park Kerneling



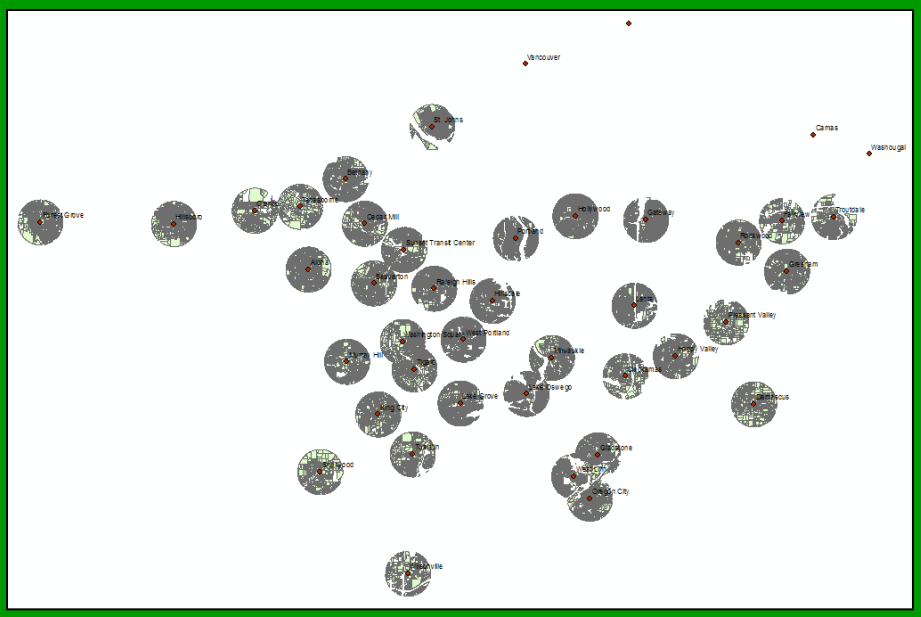
c. Clustering

- Determined clustering pattern using the "Average Nearest Neighbor" tool from the Spatial Statistics Toolbox
- Results:
  - Dispersed pattern
  - Z-score: 4.06
  - Expected mean distance: 1.32 miles
  - Critical value: 2.58
- Created raster with Near tool and reclassified using Quantile classification (awarded higher points to farther distances)



d. Total land value

- We clipped tax-lot data to our Concept Buffers
- Exported tax-lot clip layer to Excel
- Summed land value by individual Concept Center
- This gave us a total land value for each Concept Buffer



Variables

Independent Variables

-Area of Parkland

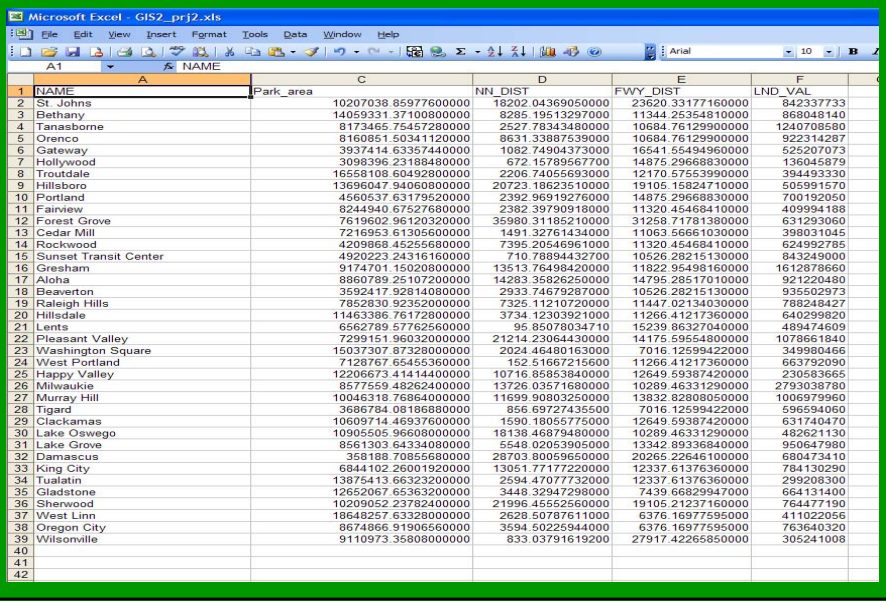
-Distance to Nearest Concept Center

-Distance to Nearest Freeway

Dependent Variable

-Land Value

Results input to SPSS:



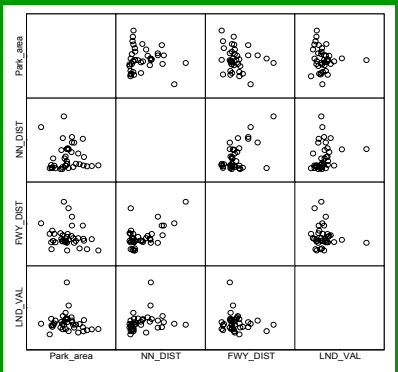
Microsoft Excel - GIS2_prj2.xls

File Edit View Insert Format Tools Data Window Help

A1 NAME

	A	C	D	E	F
1	NAME	Park_area	NN_DIST	FWY_DIST	LND_VAL
2	St. Johns	10207038.85977600000	18202.04369050000	23620.33177160000	842337733
3	Bethany	14059331.37100800000	8285.19513297000	11344.25354810000	868048140
4	Tanasborne	8173465.75457280000	2527.78343480000	10684.76129900000	1240708580
5	Orenco	8160851.50341120000	8631.33887539000	10684.76129900000	922314287
6	Gateway	3937414.63357440000	1082.74904373000	16541.55494960000	525207073
7	Hollywood	3098396.23188480000	672.15789567700	14875.29668830000	136045879
8	Troutdale	16558108.60492800000	2206.74055693000	12170.57553990000	394493330
9	Hillsboro	13696047.94060800000	20723.18623510000	19105.15824710000	505991570
10	Portland	4560537.63179520000	2392.96919276000	14875.29668830000	700192050
11	Fairview	8244940.67527680000	2382.39790918000	11320.45468410000	409994188
12	Forest Grove	7619602.96120320000	35980.31185210000	31258.71781380000	631293060
13	Cedar Mill	7216953.61305600000	1491.32761434000	11063.56661030000	398031045
14	Rockwood	4209868.45255680000	7395.20546961000	11320.45468410000	624992785
15	Sunset Transit Center	4920223.24316160000	710.78894432700	10526.28215130000	843249000
16	Gresham	9174701.15020800000	13513.76498420000	11822.95498160000	1612878660
17	Aloha	8860789.25107200000	14283.35826250000	14795.28517010000	921220480
18	Beaverton	3592417.92814080000	2933.74679287000	10526.28215130000	935502973
19	Raleigh Hills	7852830.92352000000	7325.11210720000	11447.02134030000	788248427
20	Hillsdale	11463386.76172800000	3734.12303921000	11266.41217360000	640299820
21	Lents	6562789.57762560000	95.85078034710	15239.86327040000	489474609
22	Pleasant Valley	7299151.96032000000	21214.23064430000	14175.59554800000	1078661840
23	Washington Square	15037307.87328000000	2024.46480163000	7016.12599422000	349980466
24	West Portland	7128767.65455360000	152.51667215600	11266.41217360000	663792090
25	Happy Valley	12206673.41414400000	10716.85853840000	12649.59387420000	230583665
26	Milwaukie	8577559.48262400000	13726.03571680000	10289.46331290000	2793038780
27	Murray Hill	10046318.76864000000	11699.90803250000	13832.82808050000	1006979960
28	Tigard	3686784.08186880000	856.69727435500	7016.12599422000	596594060
29	Clackamas	10609714.46937600000	1590.18055775000	12649.59387420000	631740470
30	Lake Oswego	10905505.96608000000	18138.46879480000	10289.46331290000	482621130
31	Lake Grove	8561303.64334080000	5548.02053905000	13342.89336840000	950647980
32	Damascus	358188.70855680000	28703.80059650000	20265.22646100000	680473410
33	King City	6844102.26001920000	13051.77177220000	12337.61376360000	784130290
34	Tualatin	13875413.66323200000	2594.47077732000	12337.61376360000	299208300
35	Gladstone	12652067.65363200000	3448.32947298000	7439.66829947000	664131400
36	Sherwood	10209052.23782400000	21996.45552560000	19105.21237160000	764477190
37	West Linn	18648257.63328000000	2628.50787611000	6376.16977595000	411022056
38	Oregon City	8674866.91906560000	3594.50225944000	6376.16977595000	763640320
39	Wilsonville	9110973.35808000000	833.03791619200	27917.42265850000	305241008
40					
41					
42					

Multivariate Regression Output



Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.435[a]	.189	.118	423795345

a. Predictors: (Constant), FWY_DIST, Park_area, NN_DIST

Coefficients[a]

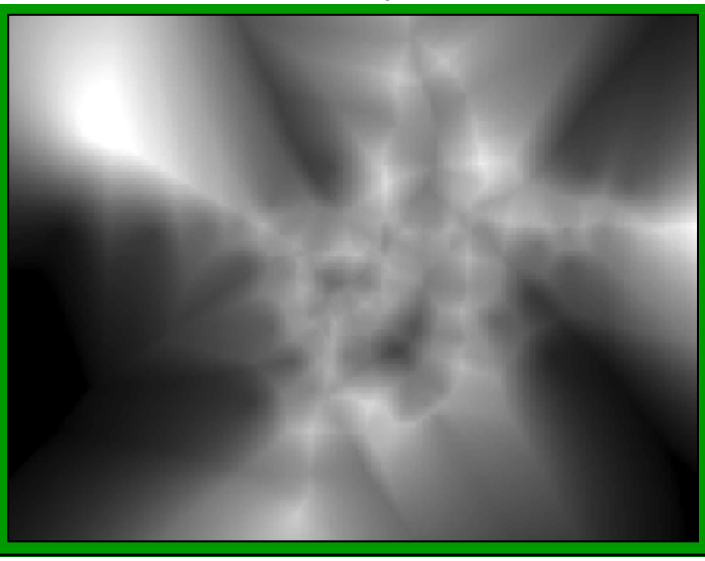
Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.2E+09	2.7E+08		4.367	.000
	Park_area	-20.903	18.034	-.183	-1.159	.254
	NN_DIST	24211.282	9624.216	.473	2.516	.017
	FWY_DIST	-35527.7	16018.471	-.424	-2.218	.033

a. Dependent Variable: LND_VAL

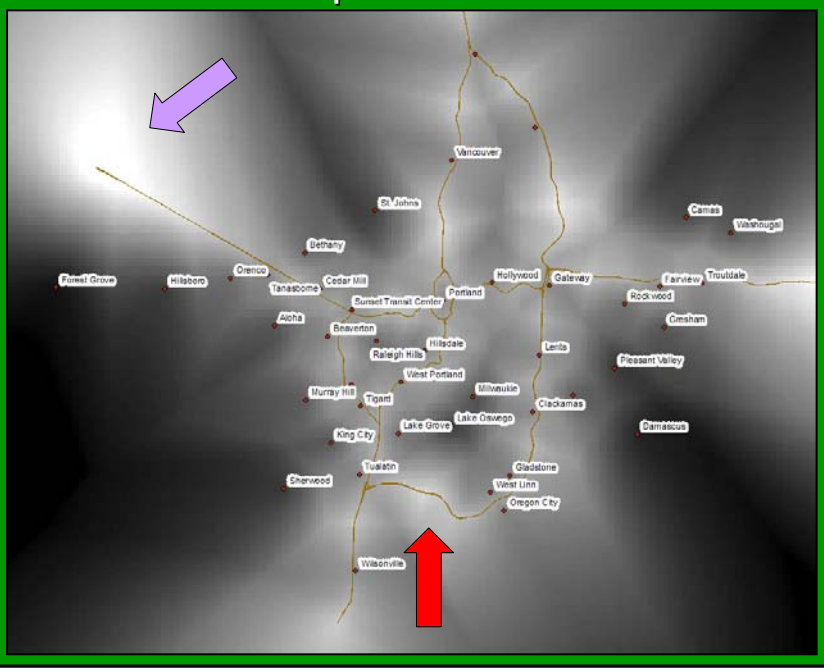
$$\hat{Y}=1.2E+09 + -20.903X_{i} + 24211.282X_{ii} + -35527.7X_{iii}$$

ArcMap Raster Calculator

$$\hat{Y}= .0000000012 – (20.903)[parks\_krnl] + 24211.282[pt\_dist] – (35527.7)[fwy\_dist]$$



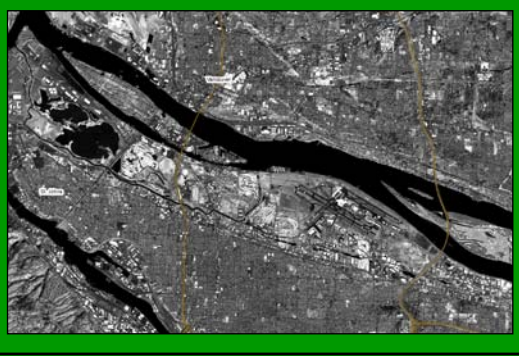
Results: New Concept Center Areas



Discounted Areas

These areas had pleasing results on the map.

However, local knowledge proves they are poor locations.



Limitations and Considerations

- Arbitrarily chose factors
- 1 mile buffers were not always representative of immediate neighborhood (St. Johns)
- Total tax-lot values were not precise
- Variables did not correlate
- Final map does not take into account land cover or terrain

Sources:

- LandSat Image – Earth Science Data Interface Website
- Metro
  - RLIS (February 2008)
  - Concept Center - www.oregonmetro.gov

THANK YOU!