Analysis of the Distribution of Litter In SE Foster-Powell

07/03/11

GEOG 592

Tim McCarthy

Purpose/Reasons/Madness

Photo by: Kelly Brandt

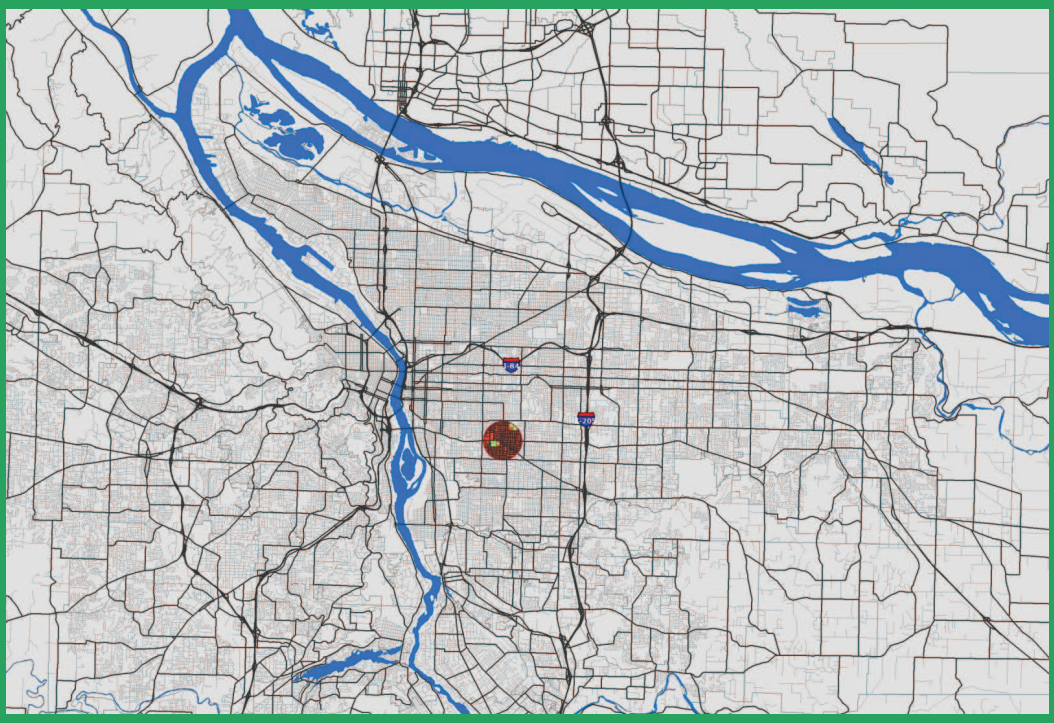
Project Goals

- Identify and record location/type/brand of litter in defined study area.
- Identify patterns of litter which might suggest causes for litter distribution.
- Determine which brand of fast food accounts for the most litter in the study area.
- Gain a great understanding of ArcGIS®, GIS methods, and spatial statstics.

Methods

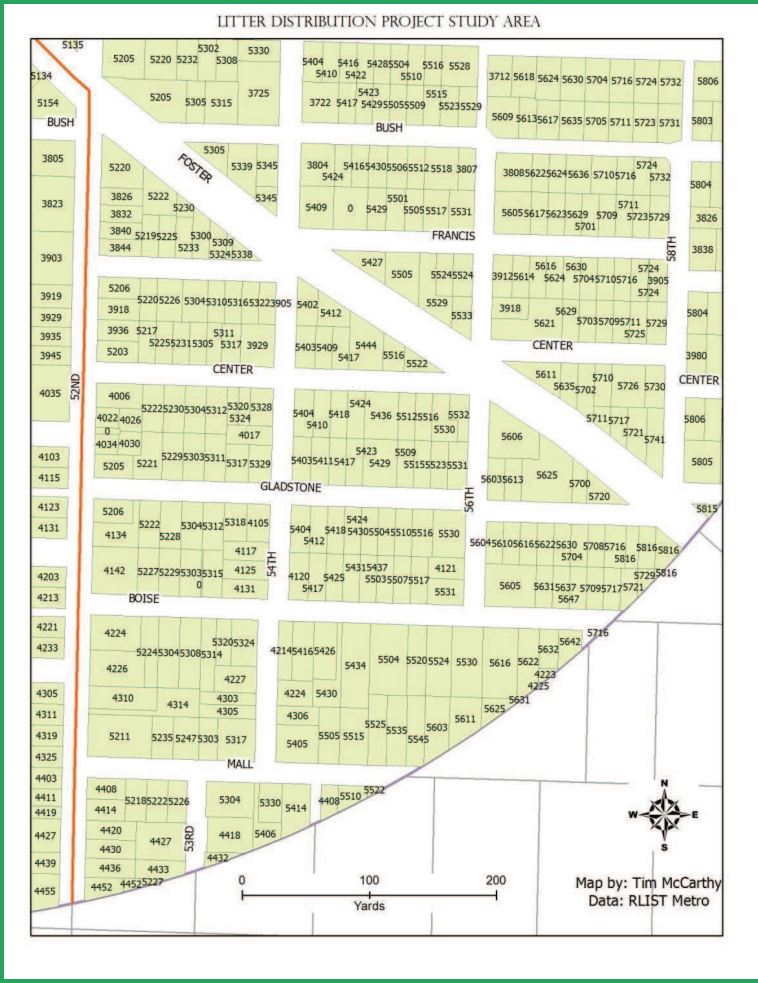
- 1. Identify Study area
- 2. Field data collection
- 3. Geocoding
- 4. Data analysis
- 5. Symbolize, format and prepare outputs
- 6. Review outputs and methods, consider improvements
- 7. Present findings

Study Area



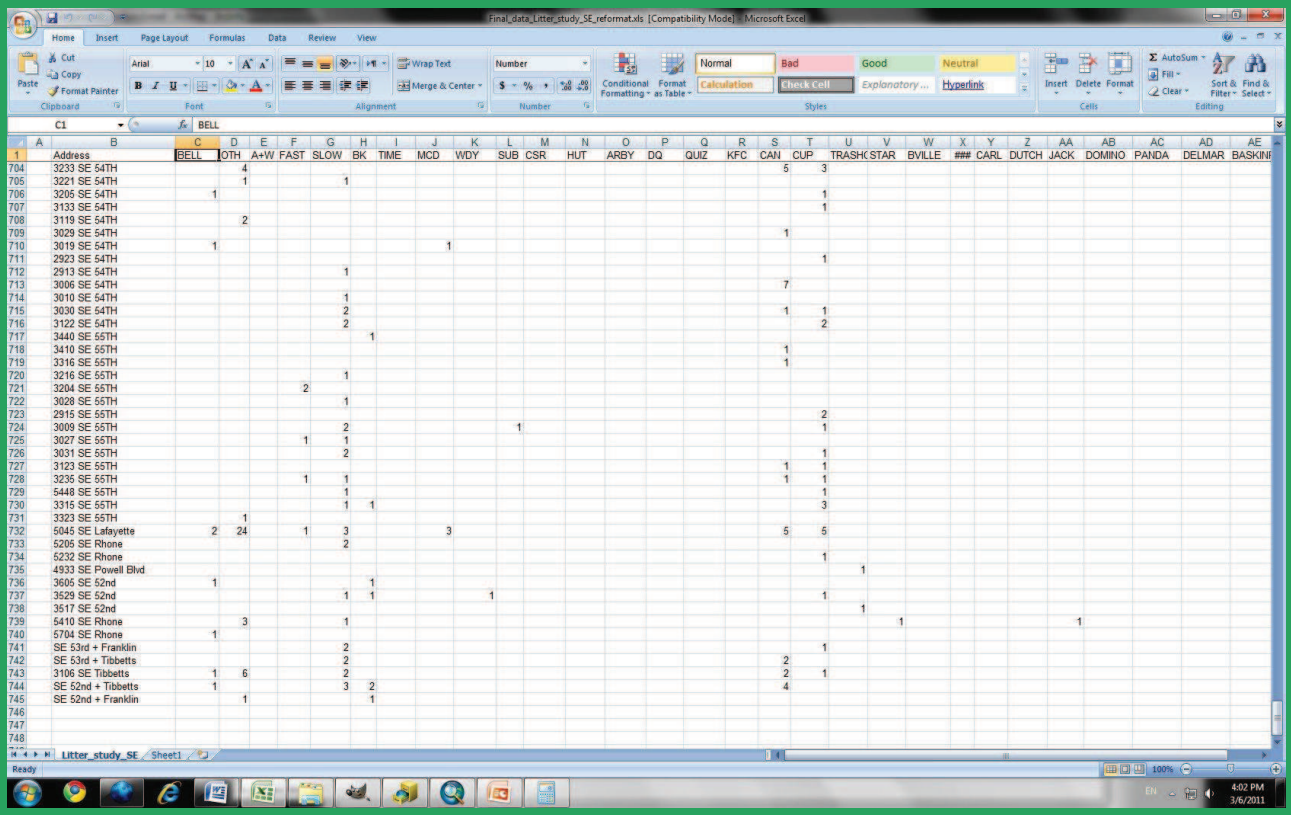
Portland, Oregon

Study Area



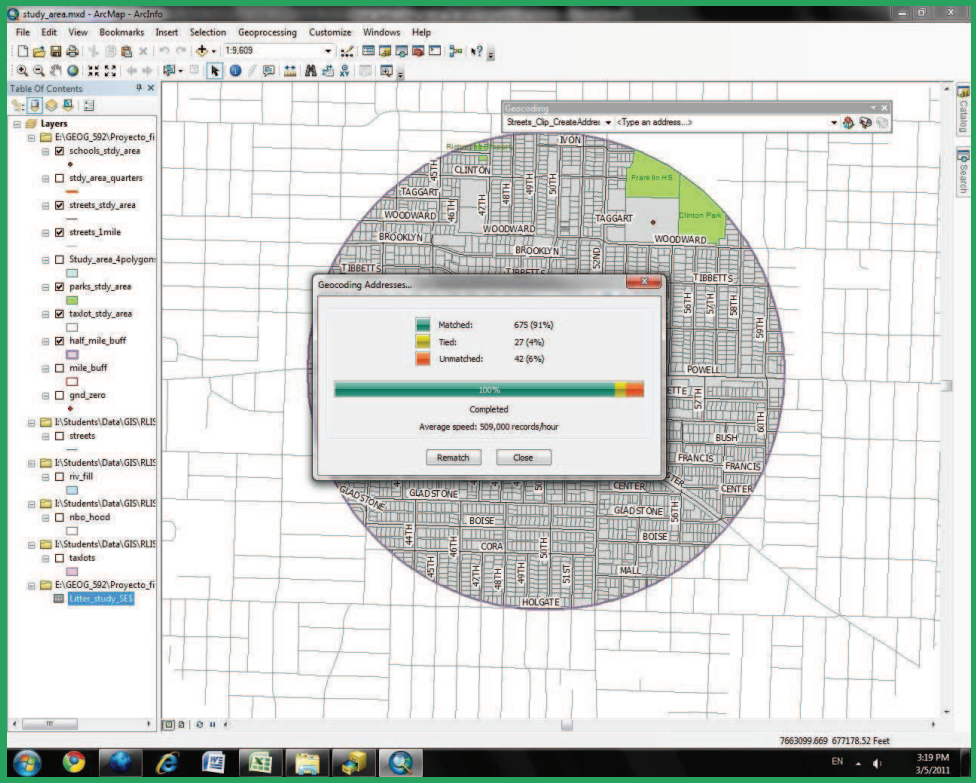
Field Data Collection

Photo by: Kelly Brandt



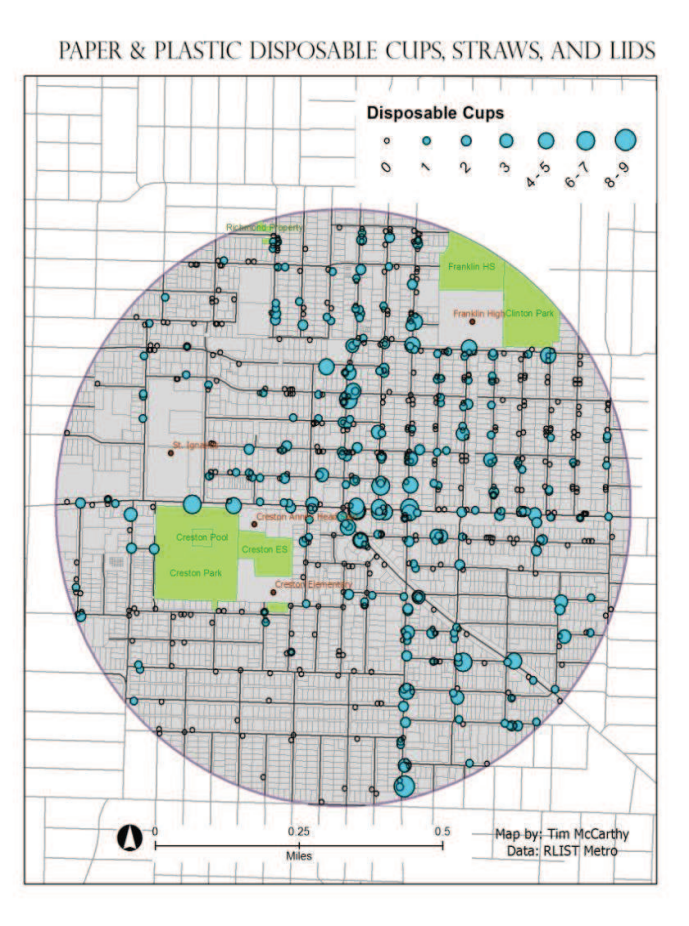
	Address	BELL	OTH	A+W	FAST	SLOW	BK	TIME	MCD	WDY	SUB	CSR	HUT	ARBY	DQ	QUIZ	KFC	CAN	CUP	TRASH	STAR	BVILLE	###	CARL	DUTCH	JACK	DOMINO	PANDA	DELMAR	BASKIN
704	3233 SE 54TH		4															5	3											
705	3221 SE 54TH		1			1																								
706	3205 SE 54TH	1																	1											
707	3133 SE 54TH																		1											
708	3119 SE 54TH		2																											
709	3029 SE 54TH																	1												
710	3019 SE 54TH	1							1																					
711	2923 SE 54TH																		1											
712	2913 SE 54TH					1																								
713	3006 SE 54TH																	7												
714	3010 SE 54TH					1																								
715	3030 SE 54TH					2												1	1											
716	3122 SE 54TH					2													2											
717	3440 SE 55TH						1																							
718	3410 SE 55TH																	1												
719	3316 SE 55TH																	1												
720	3216 SE 55TH					1																								
721	3204 SE 55TH				2																									
722	3028 SE 55TH					1																								
723	2915 SE 55TH																		2											
724	3009 SE 55TH					2					1								1											
725	3027 SE 55TH				1	1																								
726	3031 SE 55TH					2													1											
727	3123 SE 55TH																	1	1											
728	3236 SE 55TH				1	1												1	1											
729	5448 SE 55TH					1													1											
730	3315 SE 55TH					1	1												3											
731	3323 SE 55TH		1																											
732	5045 SE Lafayette	2	24		1	3			3									5	5											
733	5205 SE Rhone					2																								
734	5232 SE Rhone																		1											
735	4933 SE Powell Blvd																				1									
736	3605 SE 52nd	1					1																							
737	3529 SE 52nd					1	1				1								1											
738	3517 SE 52nd																				1									
739	5410 SE Rhone		3			1																1				1				
740	5704 SE Rhone	1																												
741	SE 53rd + Franklin					2													1											
742	SE 53rd + Tibbetts					2												2												
743	3106 SE Tibbetts	1	6			2												2	1											
744	SE 52nd + Tibbetts	1				3	2											4												
745	SE 52nd + Franklin		1				1																							
746																														
747																														
748																														

Geocoding by Address




SE FOSTER-POWELL LITTER DISTRIBUTION PROJECT
Litter counts (all litter)
1 - 4
5 - 10
11 - 18
19 - 30
31 - 46
47 - 75
76 - 112
Richmond Property
IVON
CLINTON
Franklin HS
TAGGART
Franklin High
Clinton Park
WOODWARD
BROOKLYN
TIBBETTS
KELLY
FRANKLIN
St. Ignatius
HAIG
POWELL
Creston Annex Head Start
Creston Pool
Creston ES
Creston Park
Creston Elementary
LAFAYETTE
RHONE
BUSH
FRANCIS
CENTER
FOSTER
GLADSTONE
BOISE
CORA
MALL
HOLGATE
0
250
500
Meters
Map by: Tim McCarthy
Data: RLIST Metro


SE FOSTER-POWELL LITTER DISTRIBUTION PROJECT
Litter Count (all food litter)
0
1 - 4
5 - 9
10 - 14
15 - 19
20 - 24
25 - 47
Richmond Property
IVON
CLINTON
Franklin HS
TAGGART
Franklin High
Clinton Park
WOODWARD
BROOKLYN
TIBBETTS
KELLY
FRANKLIN
St. Ignatius
HAIG
POWELL
Creston Annex Head Start
Creston Pool
Creston ES
Creston Park
Creston Elementary
LAFAYETTE
RHONE
BUSH
FRANCIS
CENTER
FOSTER
GLADSTONE
BOISE
CORA
MALL
HOLGATE
0
250
500
Meters
Map by: Tim McCarthy
Data: RLIST Metro

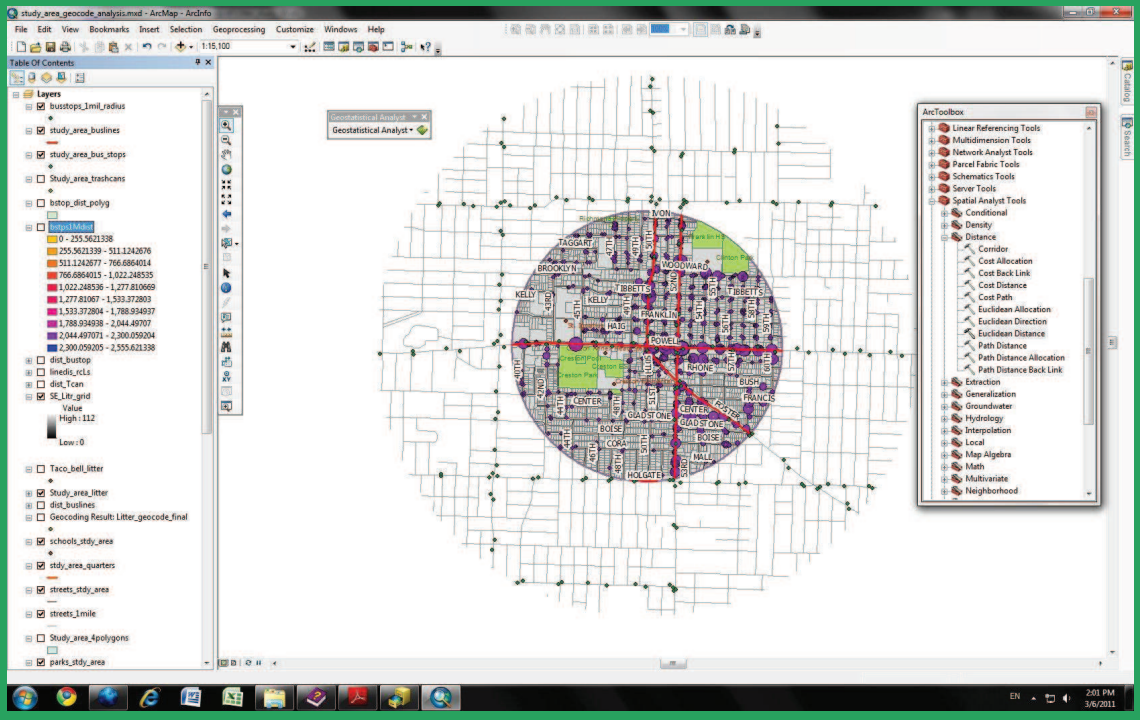

PAPER & PLASTIC DISPOSABLE CUPS, STRAWS, AND LIDS
Disposable Cups
0
1
2
3
4-5
6-7
8-9
Richmond Property
Franklin HS
Franklin High
Clinton Park
St. Ignatius
Creston Annex Head Start
Creston Pool
Creston ES
Creston Park
Creston Elementary
0
0.25
0.5
Miles
Map by: Tim McCarthy
Data: RLIST Metro

13

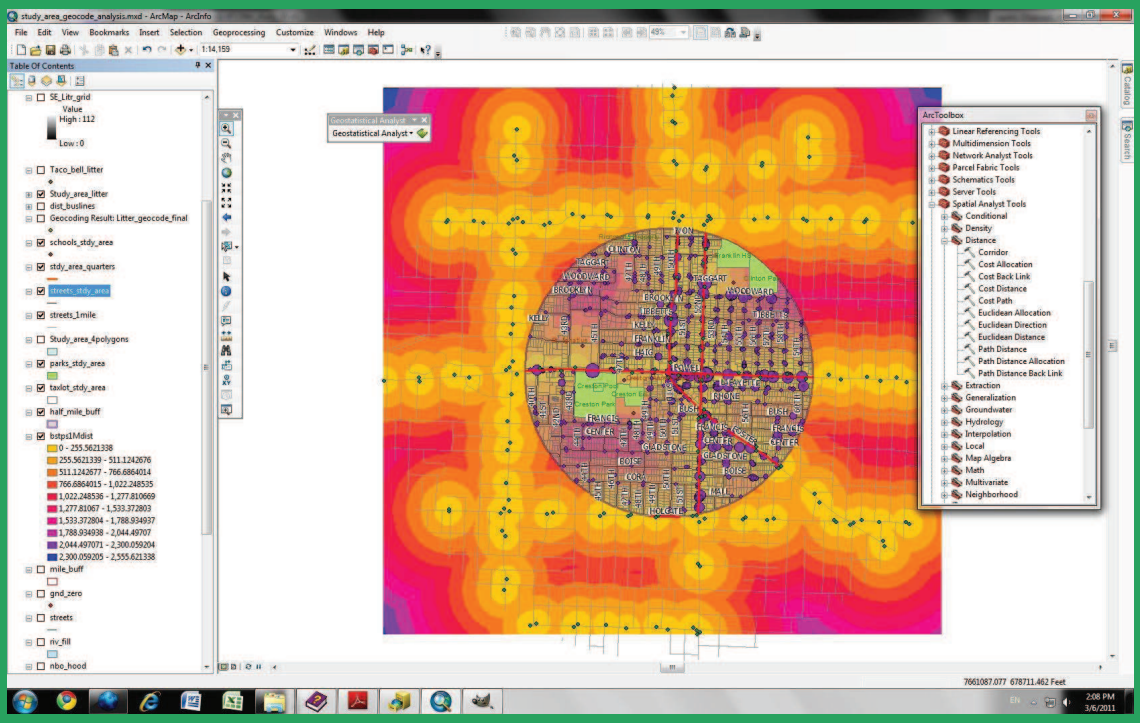

SE FOSTER-POWELL LITTER DISTRIBUTION PROJECT
Litter Counts (Taco Bell)
1
2-3
4-5
6-8
9-14
IVON
Richmond Property
CLINTON
TAGGART
WOODWARD
BROOKLYN
TIBBETTS
KELLY
FRANKLIN
St. Ignatius
HAIG
POWELL
Creston Annex Head Start
Creston Pool
Creston ES
Creston Park
Creston Elementary
RHONE
LAFAYETTE
BUSH
FRANCIS
CENTER
FOSTER
GLADSTONE
BOISE
CORA
MALL
HOLGATE
Franklin HS
Franklin High
Clinton Park
0
250
500
Meters
Map by: Tim McCarthy
Data: RLIST Metro

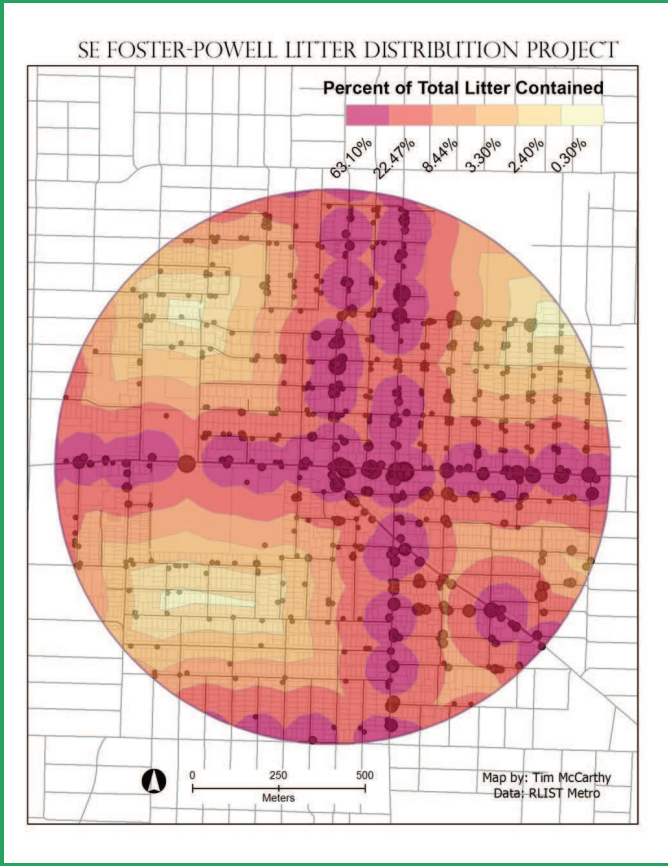
14

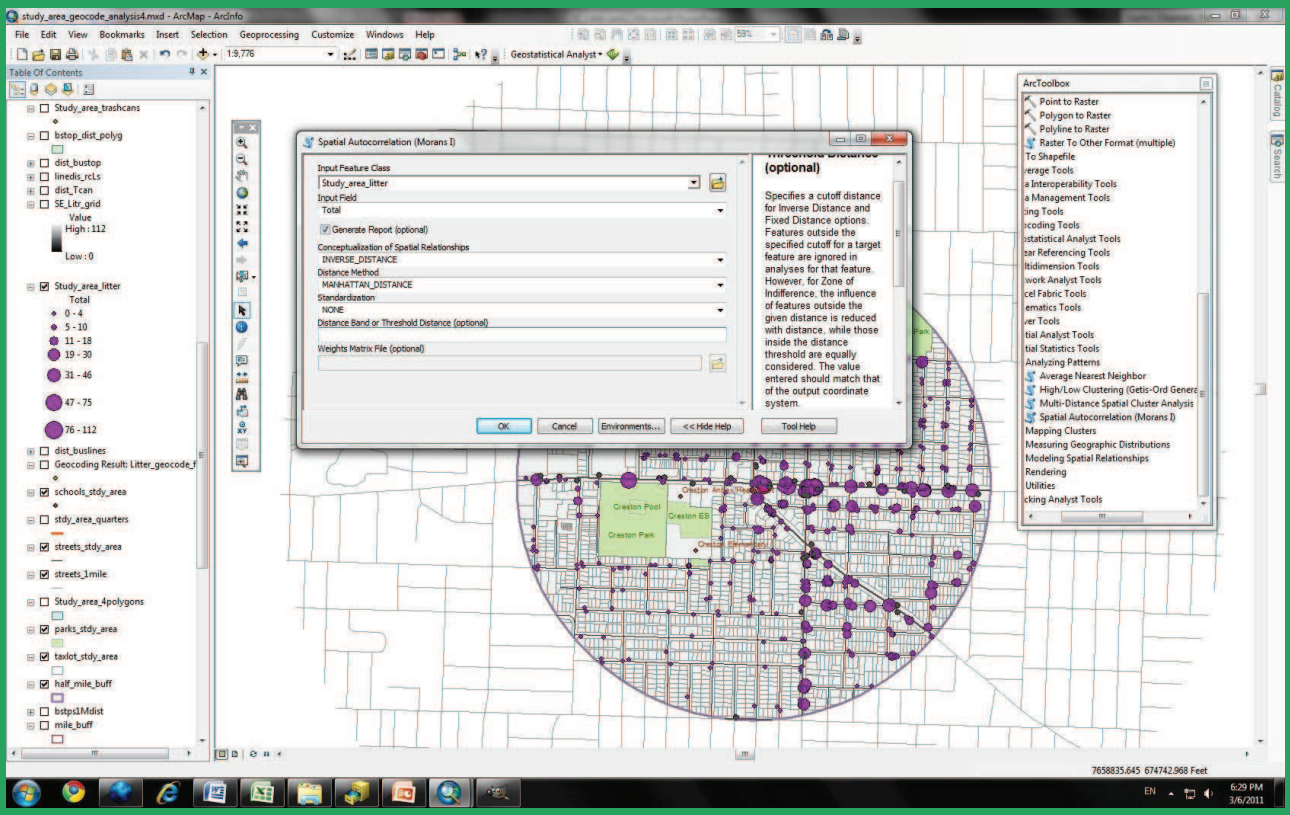
Euclidean Distance from Bus stops



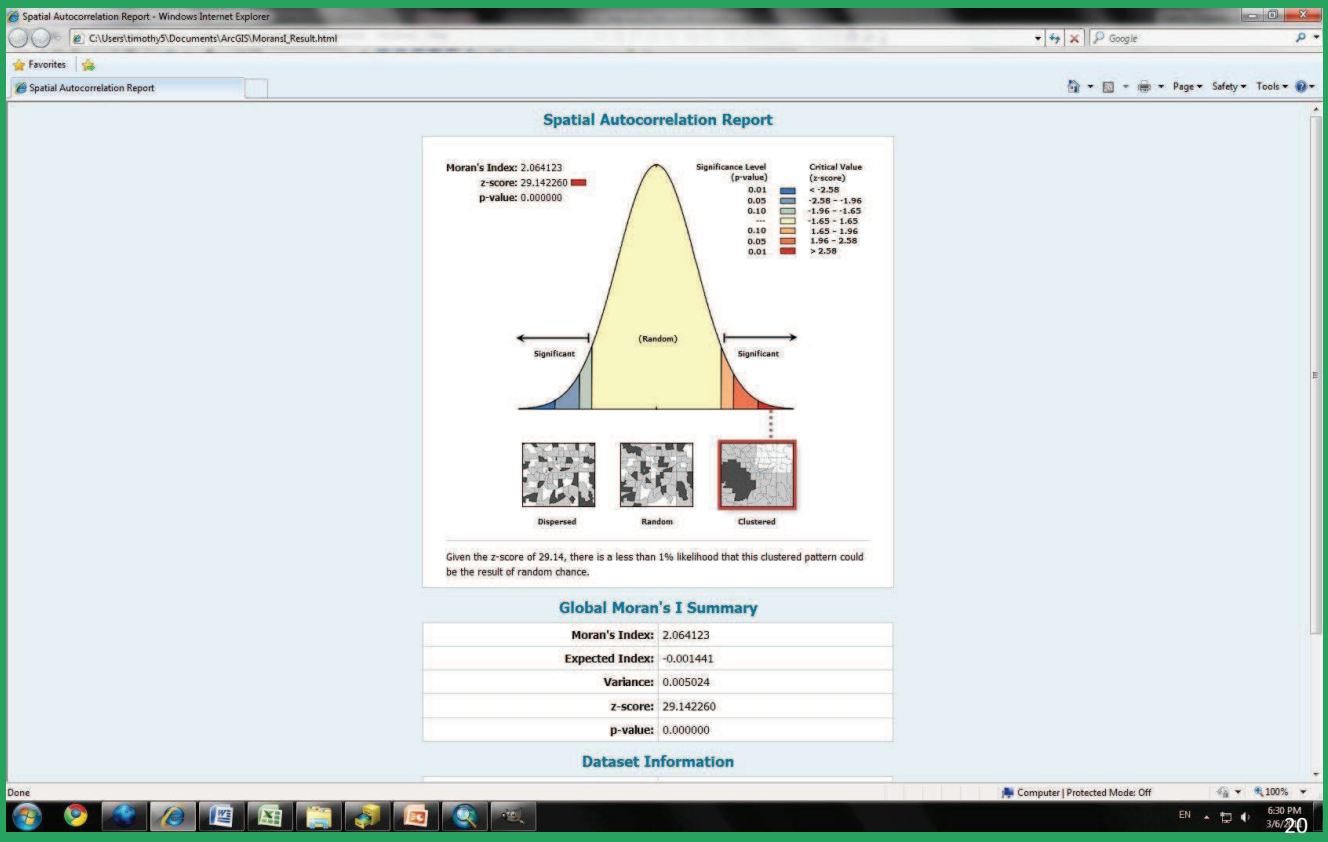
Euclidean Distance from Bus stops



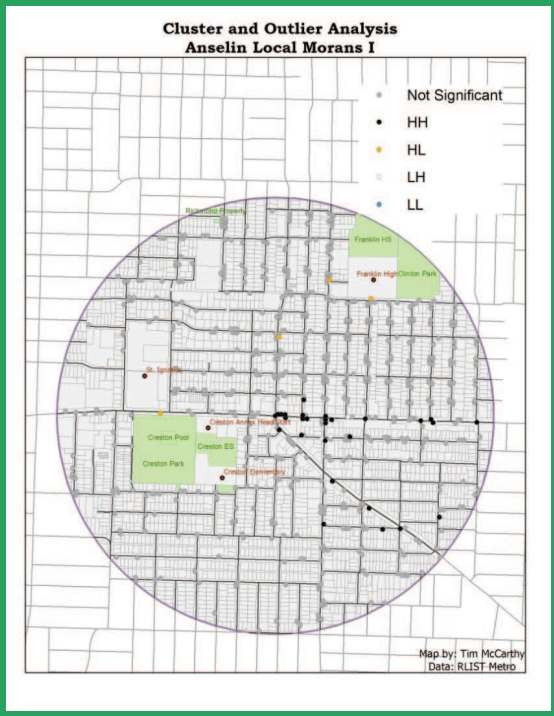




Moran's I for litter Totals

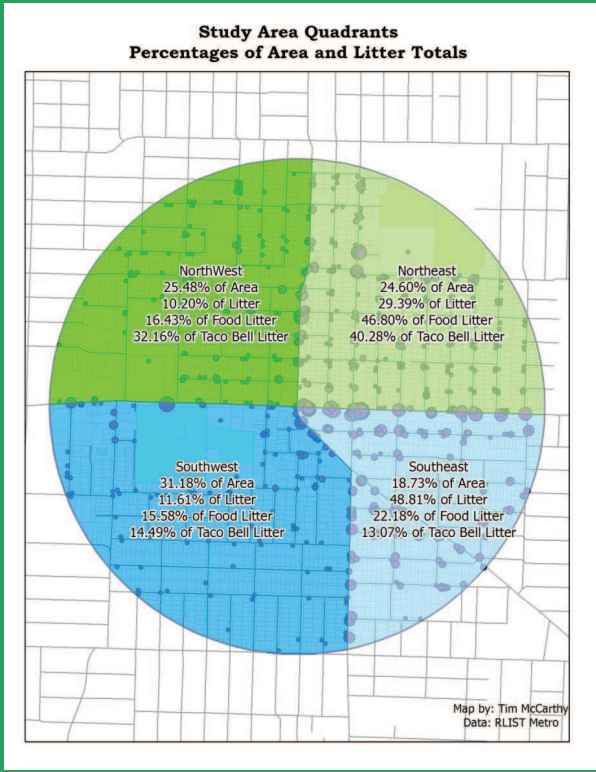


Cluster Outlier Analysis



For Litter Totals

Results



Results

2030 pieces of “other”, or non-food litter

695 Cups (paper, plastic, lids, straws…soda, water and coffee)

460 pieces of “SLOW”-non-fast food litter

282 cans/bottles

278 pieces of Taco Bell litter

200 pieces of “FAST”-unidentifiable/unbranded fast food litter.

127 pieces of Burger King Litter

48 pieces of MacDonald’s litter

Every other brand of litter was <15

Conclusions

- Litter is highly clustered and spatially autocorrelated.
- Litter amounts decreased substantially with increased distance from bus stops.
- Litter was found in the study area that was from Fast Food Restaurants outside of the study area.
- Certain landscape features and elements act as catchment areas for high concentrations of litter (directly observed during data collection).
- Wind is also a factor in the movement of litter (directly observed during data collection).
- Disposable cups are a significant litter problem.
- Taco Bell contributed the greatest amount of identifiable brand litter in this study.

Learnings

- Field Data Collection
- Geocoding
- Spatial patterns of litter
- Time management
- GIS tools, methods, and geo statistics

Next Steps

- Franklin High School students are still suspected as being part of the distribution of litter in this study area. This project would like to repeat a litter survey in this study area in late July, when the students have not been in class, and have not has as large an influence on the study area.
- Public trashcans were undercounted in the field data collection, and need to be included in a future version.

¡Muchas Gracias!

I sincerely appreciate the help of the PCC student volunteers and Christina Friedle. Without their help this data would not have been collected, and this project would not have been possible.

Thank you!

¿Hay preguntas?

Photo by: Kelly Brandt