Crime Train

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Introduction

- Metro wants to expand light rail service
- Perception that light rail will increase crime

Research Question

- Does the construction and presence of light rail lines influence crime rates?


Methods: Frequency Near Stations

- Data:
  - Reported crimes .csv file from the City of Portland, from most recent light rail opening to present
  - Light rail stop locations, city boundaries, and census block groups from RLIS, Metro
- Exploratory tests: hotspot, cluster/outlier, regression, dasymmetric mapping
- Compared crime rates in census block groups intersecting half-mile buffer of light rail stops to crime rates outside buffer
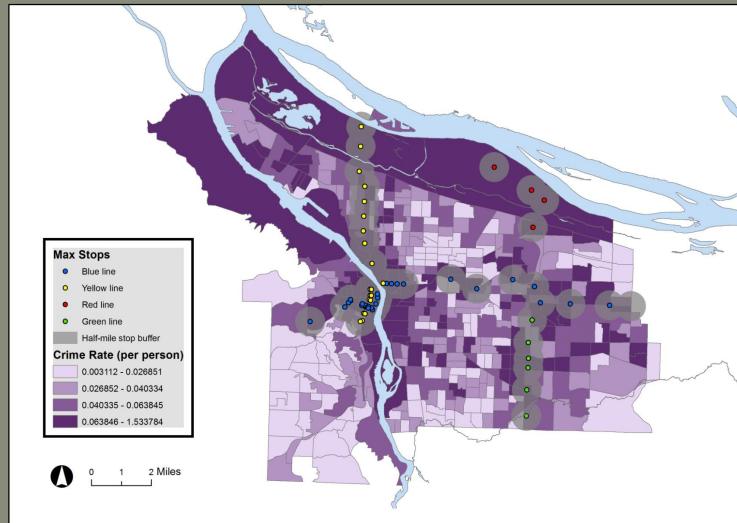
April 2009-Present Crime Events
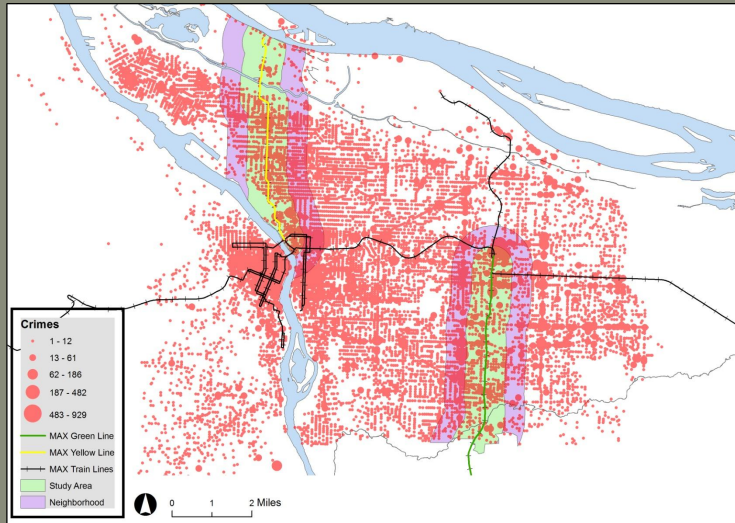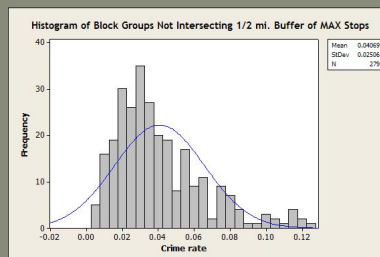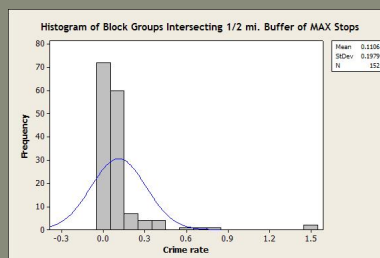

Results: Hotspots
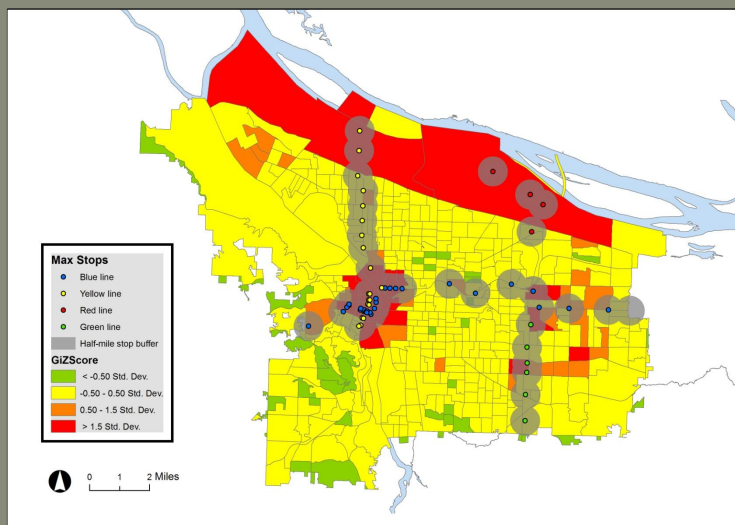
Results: Block Group Crime Rates

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- Half-mile buffer around stations

- Performed Mann-Whitney test
  - Median crime rate of block groups intersecting buffer is statistically higher than those not intersecting buffer (by approx. 0.02)

Methods: Pattern Change

- Data:
  - Reported crimes from City of Portland, months of April from 2004-2010
- New light rail stops
  - Yellow line, opened May 2005
  - Green line, opened September 2009
- Kernel density mapping
  - Half-mile kernel
- Crime rate comparison between study area, neighborhood, and city

Study Areas and Light Rail Lines
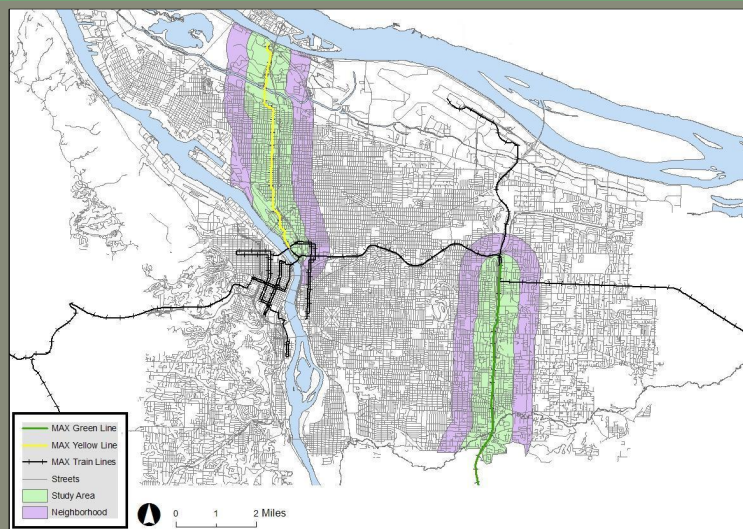
Results: Pattern Change YELLOW LINE
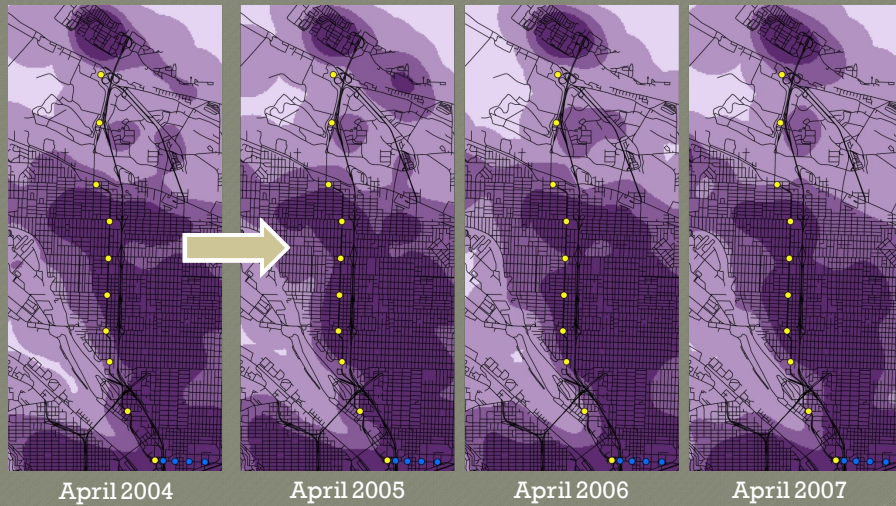

| April 2004 | April 2005 | April 2006 | April 2007 |

MAX Yellow Line (May 1, 2004)

Year	Study Area Crime Rate per sq. mi.	Neighborhood Crime Rate per sq. mi.	City Crime Rate per sq. mi.	Difference between Study Area and Neighborhood rates	Difference between Study Area and City rates
2010	50	54	31	-4	19
2009	43	51	30	-8	13
2008	50	60	34	-10	16
2007	54	68	42	-14	12
2006	52	67	39	-15	14
2005	58	69	44	-11	14
2004	53	61	42	-8	11

- Crime rate continues to be lower near the line than in the neighborhood
- Crime continues to be higher near the line than in the city at large

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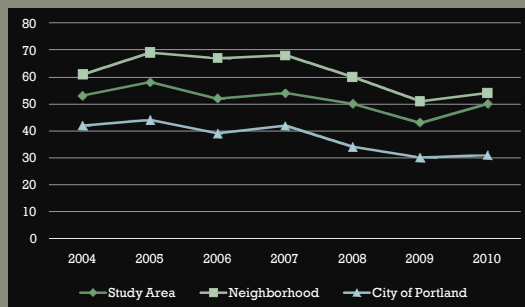
Results: Pattern Change GREEN LINE

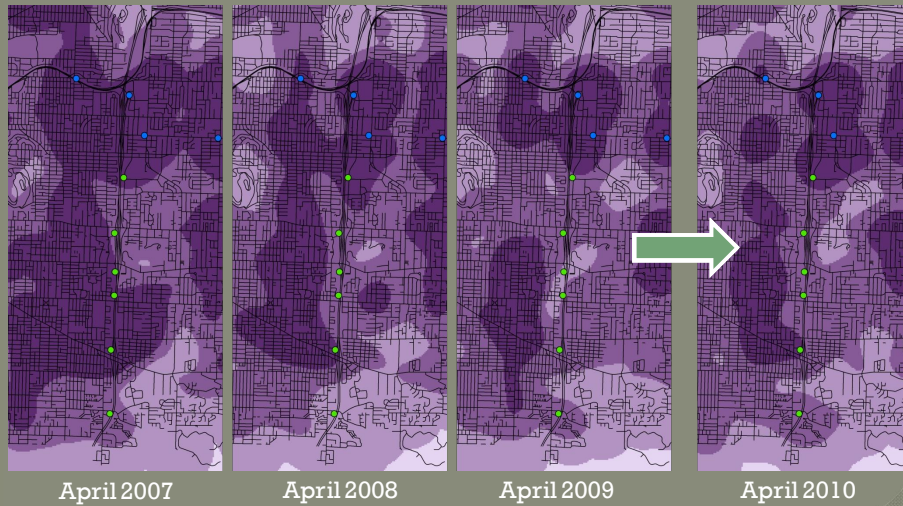| April 2007 | April 2008 | April 2009 | April 2010 |

MAX Green Line (September 12, 2009)

Year	Study Area Crime Rate per sq. mi.	Neighborhood Crime Rate per sq. mi.	City Crime Rate per sq. mi.	Difference between Study Area and Neighborhood rates	Difference between Study Area and City rates
2010	42	54	31	-12	11
2009	47	53	30	-6	17
2008	61	63	34	-2	27
2007	85	86	42	-1	43
2006	66	75	39	-9	27
2005	74	85	44	-11	30
2004	77	78	42	-1	35

- After line opened, crime dropped to its lowest level in the period

- Area around the line always has a lower rate than its neighborhood

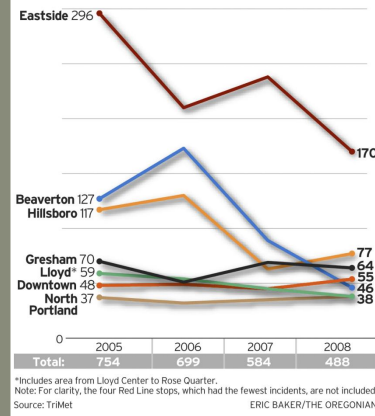- Area always has a much higher rate than the city, but is trending lower
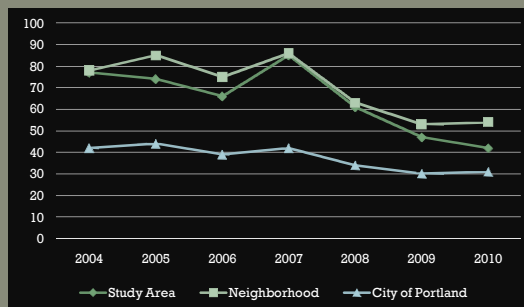
Conclusions

- Correlation, not causation
  - Crime rates tend to be higher than the city average in larger light rail neighborhoods
  - But these rates drop immediately next to the yellow and green lines
  - Crime patterns do not change noticeably after installation
  - TriMet has doubled the number of transit police
  - 40% drop in crime since 2008

"We've done some studies and basically, we've learned that if crime is already in your area, you have crime, light rail doesn't bring crime; it's already there or not."

- Lynn Rust, Assistant Deputy Project Director of the CRC

MAX crime stats
Crime has dropped on the MAX system for three years in a row, despite ridership increases in the same period.

Eastside 296

170

Beaverton 127
Hillsboro 117

77
64
Gresham 70
Lloyd* 59
55
Downtown 48
46
North 37
38
Portland

0
2005 2006 2007 2008

Total:	754	699	584	488

*Includes area from Lloyd Center to Rose Quarter.
Note: For clarity, the four Red Line stops, which had the fewest incidents, are not included.
Source: TriMet   ERIC BAKER/THE OREGONIAN

Limitations

- Crime statistics only represent the worst criminals; those who get caught
- Crime statistics can be inflated by over-patrolling
- Crimes aren't the same: murder is more severe than car theft
- Used only April data from every year
- More extensive data from the past and future would help validate conclusions

References and Resources

- "TriMet Boosts Security, Reports Drop in Crime"
  http://www.kptv.com/traffic/23031313/detail.html

- "MAX Crime Drops for Second Year, Challenging Perceptions"
  http://www.oregonlive.com/news/index.ssf/2009/09/max_crime_drops_for_second_ye
  a.html

- "Cities Take a Second Look at Light Rail, Anti-MAX Cities Reconsider Views"
  http://www.thetribonline.net/news/print_story.php?story_id=10965

- "Signs of the Time: Westside Vancouver Business Owners Display Their Feelings About
  Light Rail" http://www.vbjusa.com/stories/2008-01-11/signs_of_the_time.html

- Data from Civic Apps for Greater Portland (http://civicapps.org/datasets) Metro's RLIS
  database

- City of Portland Oregon, Bureau of Technology Services

- Steve Beedle, City of Portland Police Data Research Supervisor

- Philip Holmstrand, City of Portland Lead Web Developer, Corporate GIS Team

- Images from the Oregonian, Paws and Claws blog, Microsoft

Any Questions?