ENVIRONMENTAL CRIMINOLOGY AND THE IMPACT OF PROBLEM BUSINESSES ON CRIME IN PORTLAND NEIGHBORHOODS

Presented by
Ryan Arnold
Hector Osuna
Allen Byrd

Environmental Criminology

Annually crime plays a large part in effecting livability and infrastructure in major cities. Research in environmental criminology has shown that the presence of some phenomena can have a secondary impact on crime rates. The geodatabase designed in this project creates a framework for research and study of spatial aspects of environmental criminology. Common variables were selected based upon recent articles in the criminal justice field and known phenomena that has been linked to crime.

Environmental Criminology

- Examples from recent studies:
  - Alcohol Sales
    - "Concentrations of both on-premise and off-premise outlets are associated with high levels of disorderly conduct" (Roman, 2008).
  - Land Use
    - "Variations in land use, like variations in housing type, are part of the fundamental fabric of neighborhoods. They shape the quality of life for residents and contribute to local reputations, house market values, and, of course, local crime rates" (McCord et al, 2007).
  - Adult Stores and Strip Clubs
    - "…we present the results of two case studies. In both instances, ambient crime rises when "off-site" adult stores open for business" (McCleary et al, 2008).
    - "When an adult entertainment business opens on an interstate highway off-ramp to a small rural village, total crime rises by 60%" (McCleary, 2008).

Design Objectives

- To build a geodatabase to test and compare research on environmental factors that contribute to crime and the location of those crimes by Portland neighborhood

Intended Applications

- To answer specific questions related to the spatial aspects of crime by investigating possible relationships with non-criminal data
- This database design facilitates this by showing relationships between relatable tables and feature classes

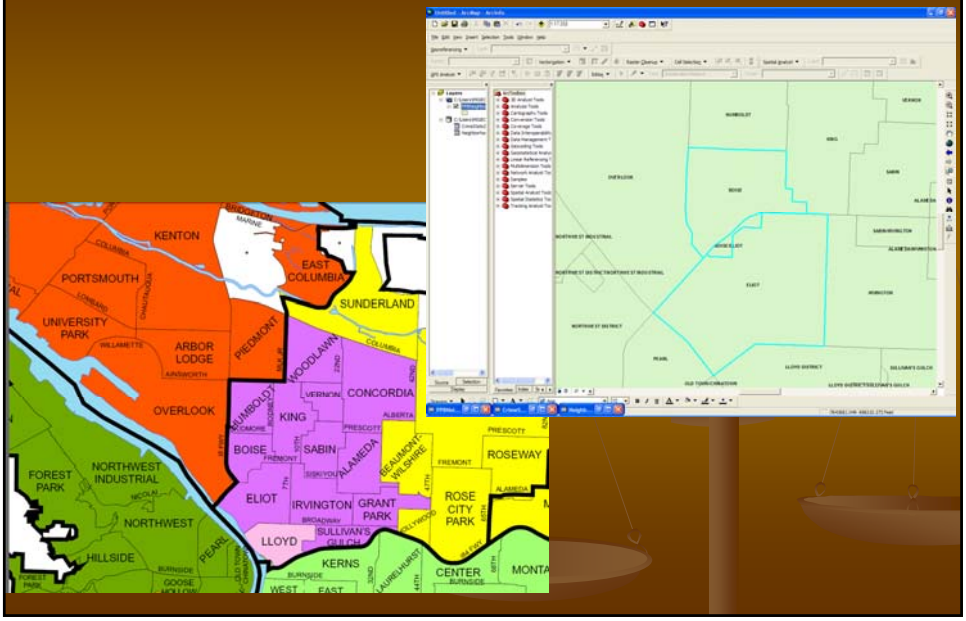
Geographic Extent

- Portland Police Bureau Patrol Areas
- Emphasis on Portland Neighborhoods
  - Unincorporated areas were not included

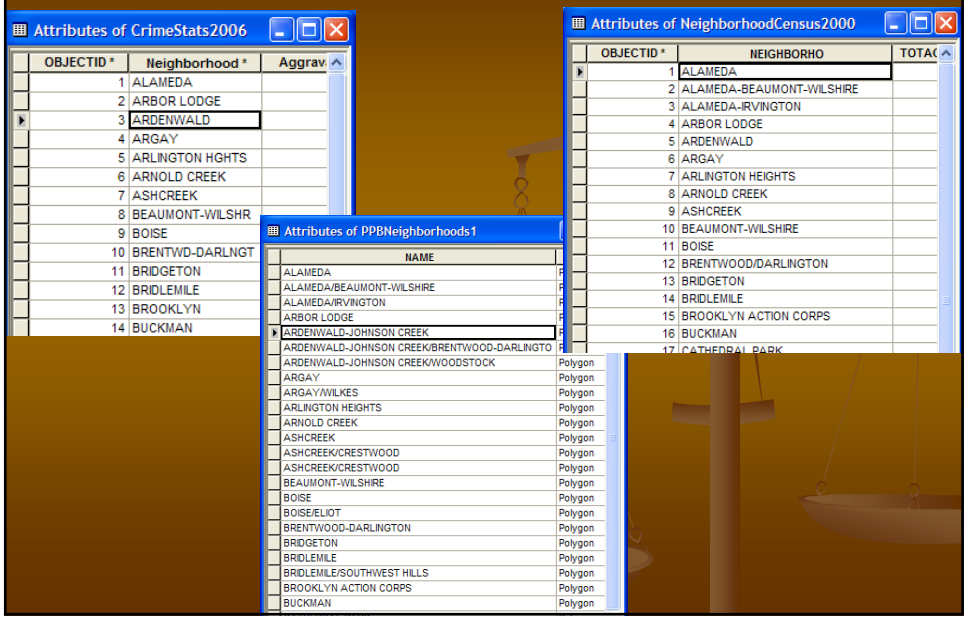
Data Layer Specifications

- Metro RLIS 2008
  - City Streets
  - City Parks
  - City Schools
  - City Zoning
- Portland Police Bureau
  - Portland Neighborhood Crime Count
  - Neighborhood Boundaries
- Office of Neighborhood Involvement
  - Neighborhood Boundaries
  - Neighborhood Census Data
- Oregon Liquor Control Commission
  - Liquor Store Locations
- Google Earth & Google Maps
  - Adult Entertainment Locations
  - Convenience Stores Locations
  - Grocery Stores Locations
  - Bars Locations
  - Check Cashing Locations
  - Pawn Shops Locations

Political Area Discrepancy



Dataset Discrepancy



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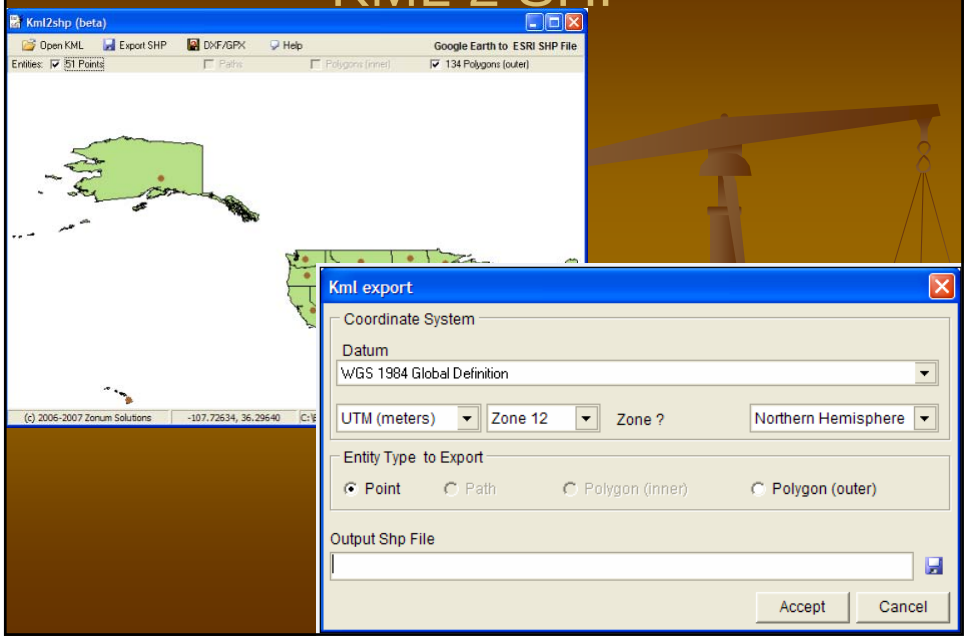
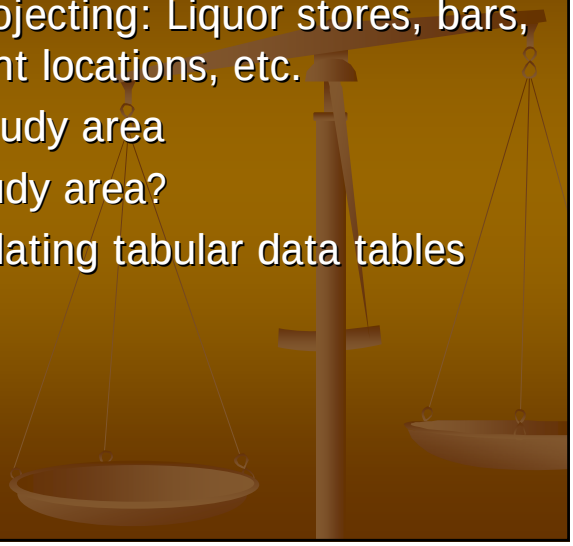


Methods and Techniques

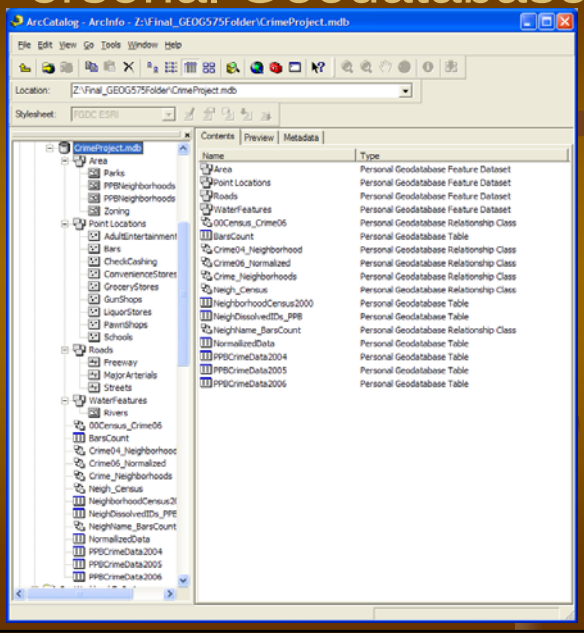
- Geocoding and Projecting: Liquor stores, bars, adult entertainment locations, etc.
- Clipping data to study area
- Joining data to study area?
- Formatting and relating tabular data tables
- Overlay analysis
- Statistical analysis



More Methods and Techniques

- ArcToolbox
- Analysis Tools
  - Extract
  - Proximity
- Data Management Tools
- Geocoding Tools
- Create Address Locator
- Geocode Adresses
- Conversion Tools
- To Raster
  - Field Calculator
  - Dasymetric Mapping
  - Raster Calculator
- SQL

Personal Geodatabase



Demonstration Application

- In 2008 Roman et al completed a study on the District of Columbia for the National Institute of Justice
  - Alcohol Outlets as Attractors of Violence and Disorder: A Closer Look at the Neighborhood Environment
- This demonstration attempts to repeat aspects of Roman's research and compare general findings to the Portland area

Key Differences In Study Areas

- Roman et al
  - Location
    - Washington D.C.
  - Area of analysis
    - Block Group
  - 2000 Population density
    - 9316 per sq mile
- Demonstration
  - Location
    - Portland
  - Area of analysis
    - Neighborhood
  - 2000 Population density
    - 9939 per sq mile

*** Levels of economic disparity and violent crime rates are much higher in Washington D.C. than Portland.**

Roman's Findings

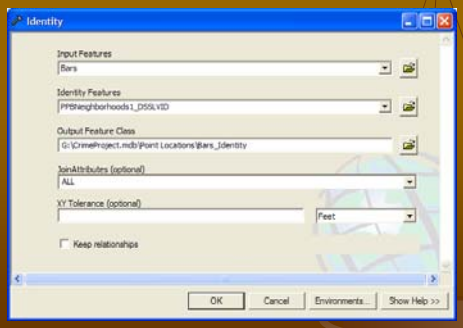
- On-premise outlets, but not off premise outlets are a significant predictor of aggravated assault
- Concentrations of both on-premise and off-premise outlets are associated with high levels of disorderly conduct
- Off-premise outlets were associated with a significant increase in domestic violence, but on-premise outlets (specifically restaurants and nightclubs) were associated with a decrease in domestic violence
  - *We did not have information on domestic violence and were unable to perform a comparison for this variable

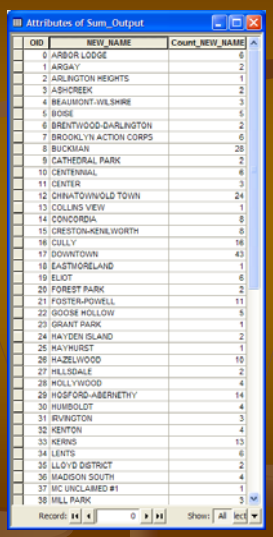
Methodology

- Location counts were collected by neighborhood for
  - On-premise alcohol outlets
    - Bars and pubs (473)
  - Off-premise alcohol outlets
    - Grocery, convenience and liquor stores (310)
  - Violent and alcohol related crimes
    - Homicide, aggravated assault, rape, robbery, and simple assault
    - DUII, drug crimes, liquor law violations, disorderly conduct, and weapon violations

Demonstration Application

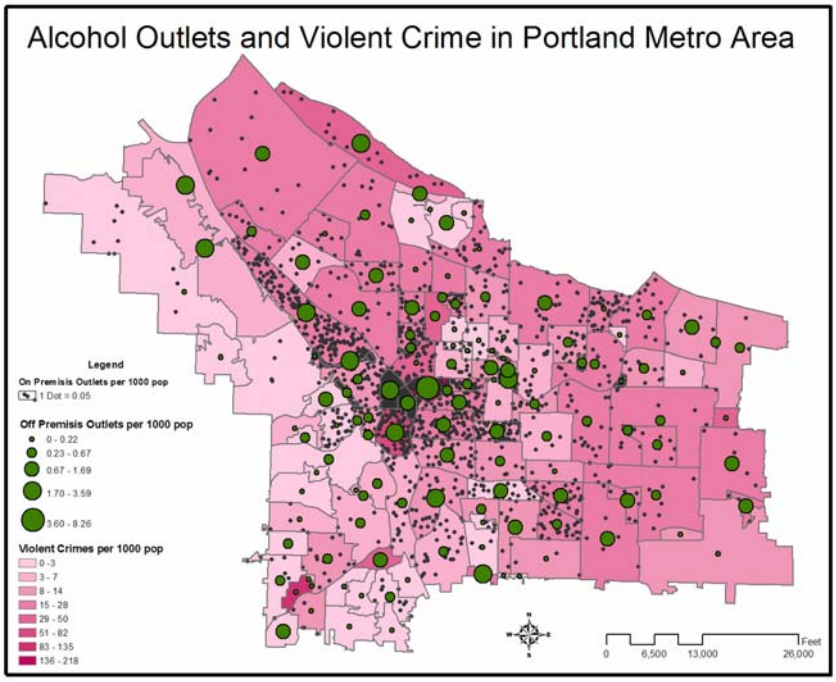
- Identity tool
- Summarize table





Methodology

- Data was normalized using 2000 Census population data for each neighborhood
- Crime and store counts were divided by the population of the neighborhood and multiplied by 1000
  - Ex. (Crime / Population) * 1000 = number of crime incidents or alcohol outlet locations per 1000 residents, for each neighborhood



Methodology

- Spearman's Rho was then used to generate bivariate correlation coefficients for each crime type (SPSS)
  - Pearon's R was not used because the level of 'skewness' was high for the data

Spearman's Rho

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Results

Table 1. Spearman's Correlations

	Homicide	Aggravated Assault	Rape	Robbery	Drugs	Simple Assault	Weapon	Disorderly Conduct	DUII	Liquor Laws
On-Premises Outlets	0.037	.340**	.381**	.423**	.527**	.445**	.403**	.398**	.407**	.471**
Off-Premises Outlets	0	.294**	0.104	.417**	.272**	.303**	0.188	.319**	.362**	.433**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A coefficient value of +.1 is considered a small correlation, +.3 is a medium correlation, and +.5 and above is a large correlation (Green and Salkind, 2004)

- Comparison of findings
  - Roman found that on-premises, but not off-premises outlets were significant predictor of aggravated assault
    - We found that both were significant
  - Roman determined that concentrations of both on-premise and off-premise outlets are associated with high levels of disorderly conduct
    - Our results were in agreement
  - We found additional significance
    - On-premises outlets had a significant correlation between all crimes tested, with the exception of homicide
    - Off-premises outlets had a significant correlation between most crimes tested, with the exception of homicide, rape, and weapons offenses

Limitations and Quality Statements

- Complete crime data was only available through 2006
- Census data is limited to the year 2000
- Crime incident point location data is not available to the general public
  - Annual crime counts by neighborhood was used
- Unincorporated areas are not included in this study
  - Patrolled by Multnomah County Sherriff's Dept., crime data is unavailable
- Some neighborhood acreage from ONI data did not match with PPB. This may have been due to different methods of measurement or the inclusion of river area by ONI
- Crime data entry error for Crestwood and Creston-Kenilworth, data was reversed and needs to be revised

Works Cited

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