Bike Friendly Portland:
An Assessment of Bike-ability by Neighborhood

Chase Ballew
Henrich Biorn
Corinna Kimball-Brown
Chris Smitherman

Introduction

- Portland has been ranked among the most bike friendly cities in the U.S. and the world (Bicycling.com)

- What makes a place bike friendly?
  - Infrastructure (and safety)
  - Services

- Are these factors good predictors of actual bike ridership?

- Is the whole city equally bike friendly?

Bike-ability Variables

- Infrastructure
    1. Bike routes and lanes
    2. Bike parking
    3. Traffic calming devices
        (represents traffic and safety)

- Services
    4. Grocery stores
    5. Bike shops
    6. Coffee shops
        (proxy for neighborhood retail)

Services

- Which services are important?

    Nationally in 2009, of all trips by all means for all purposes
    - About **18%** were to and from work
    - **25.1%** of all non-work trips were for shopping (17.3% for goods such as groceries).
    - **34.4%** were social/recreational

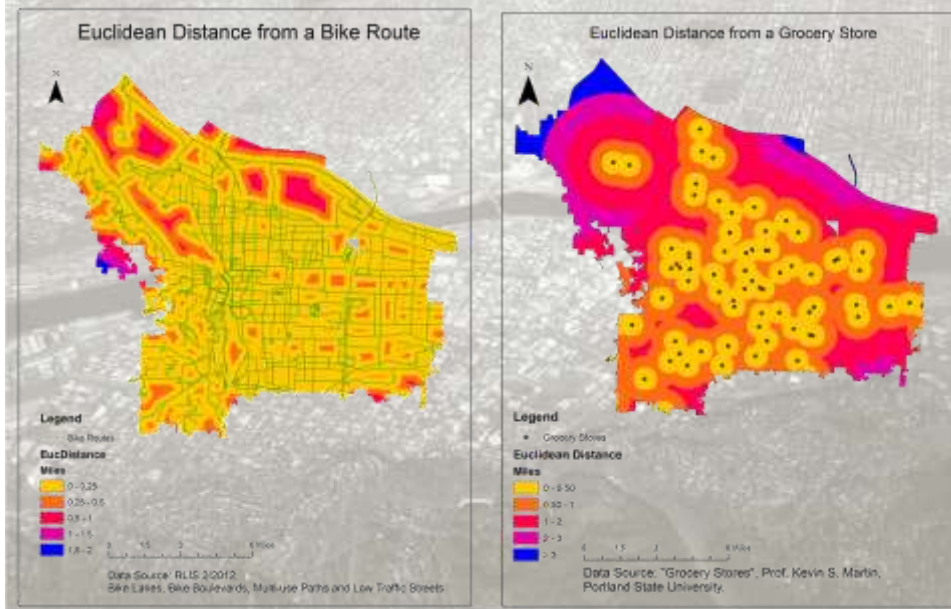- What is a bikeable distance to services?
    - **The 20 minute neighborhood** - Portland Bureau of Planning and Sustainability goal
    - At 10 mph a cyclist could go 3.3 miles in 20 minutes.
    - 2008 study by Dill and Gliebe - median distances for non-commute trips were between 1 and 2 miles.
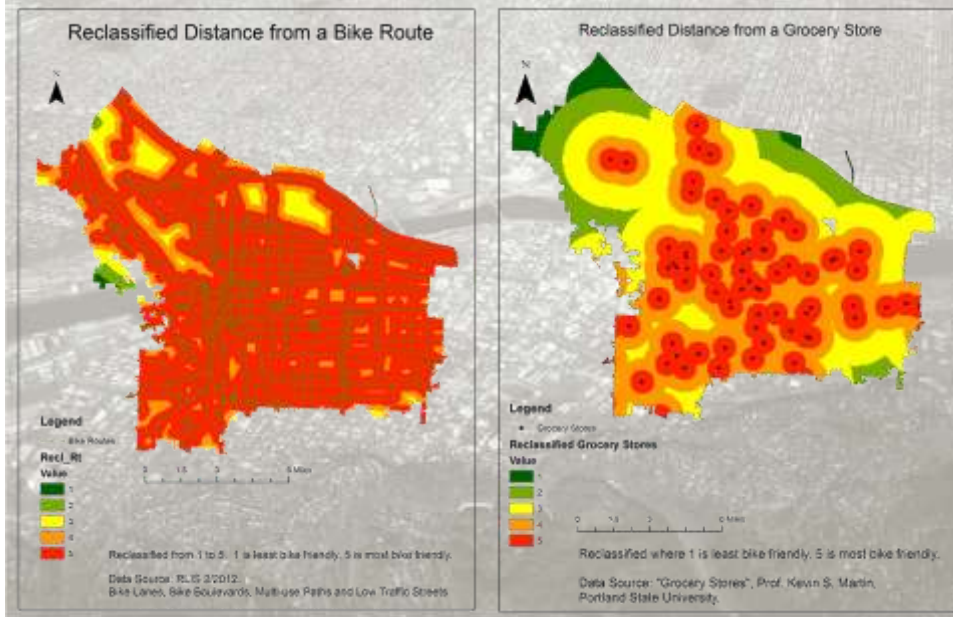
Methods

Multi-criteria Assessment

1. Euclidean Distance
2. Reclassify
3. Weighted Overlay
4. Inverse Distance Weighted Surfaces
5. Zonal Statistics

Methods: Euclidean Distance

Methods: Reclassify
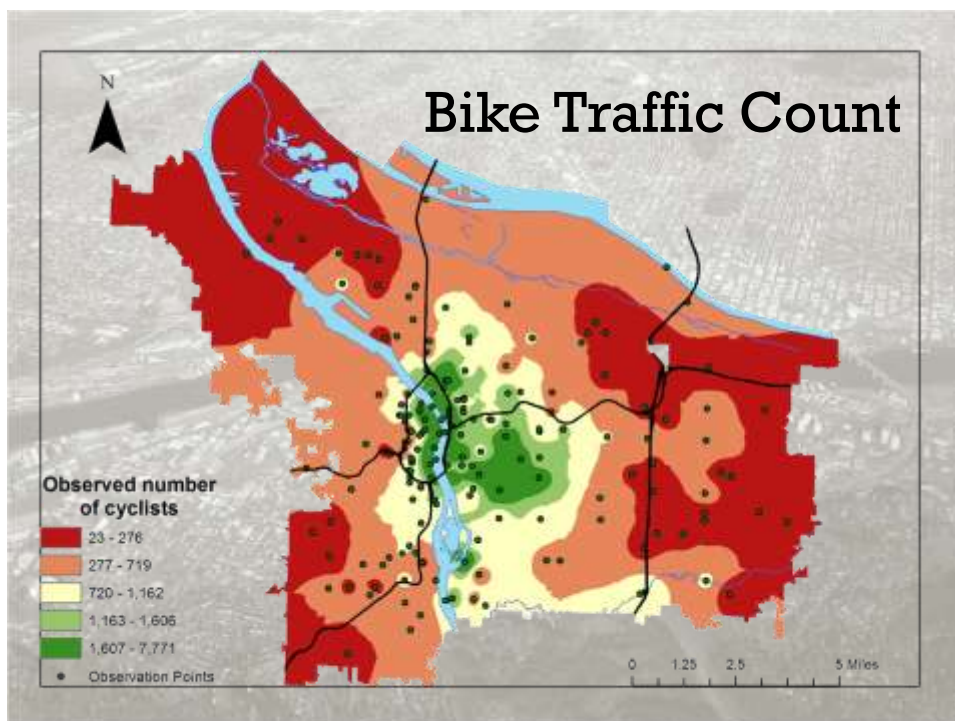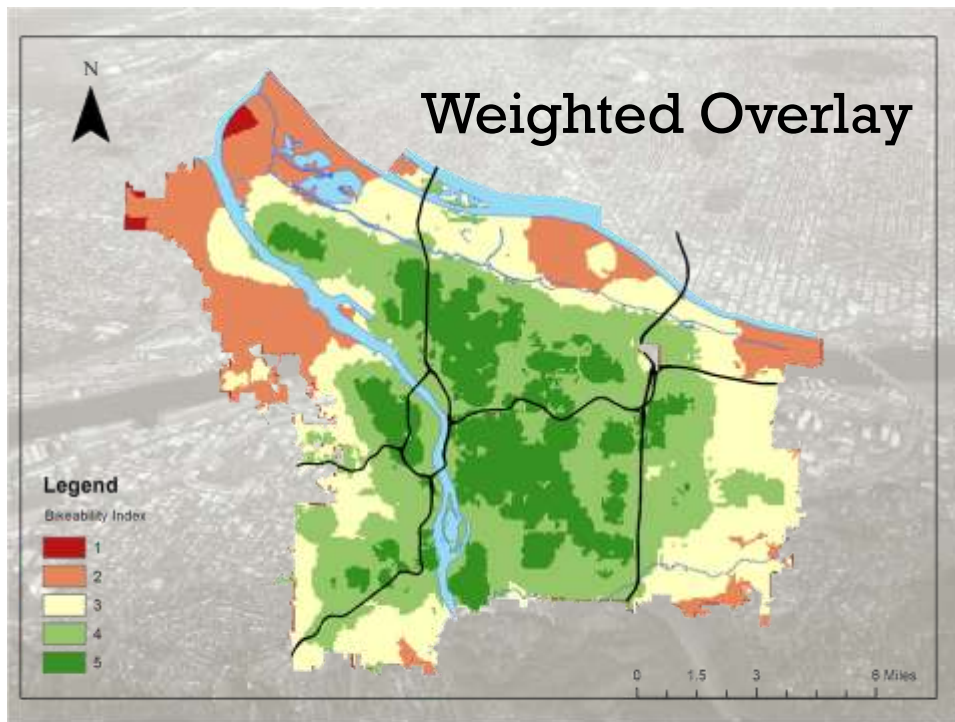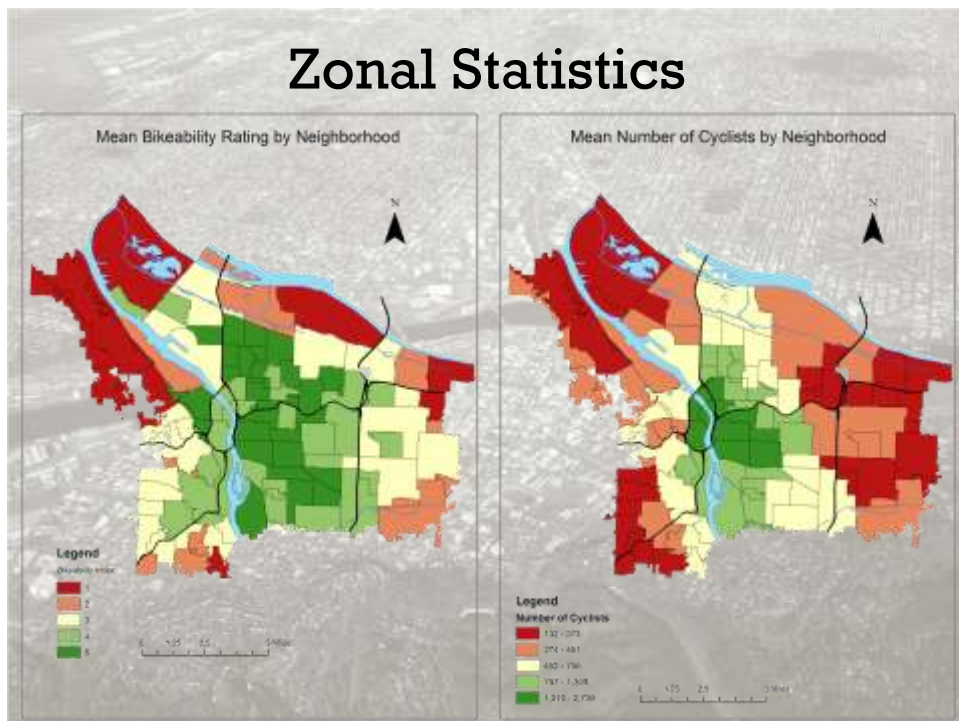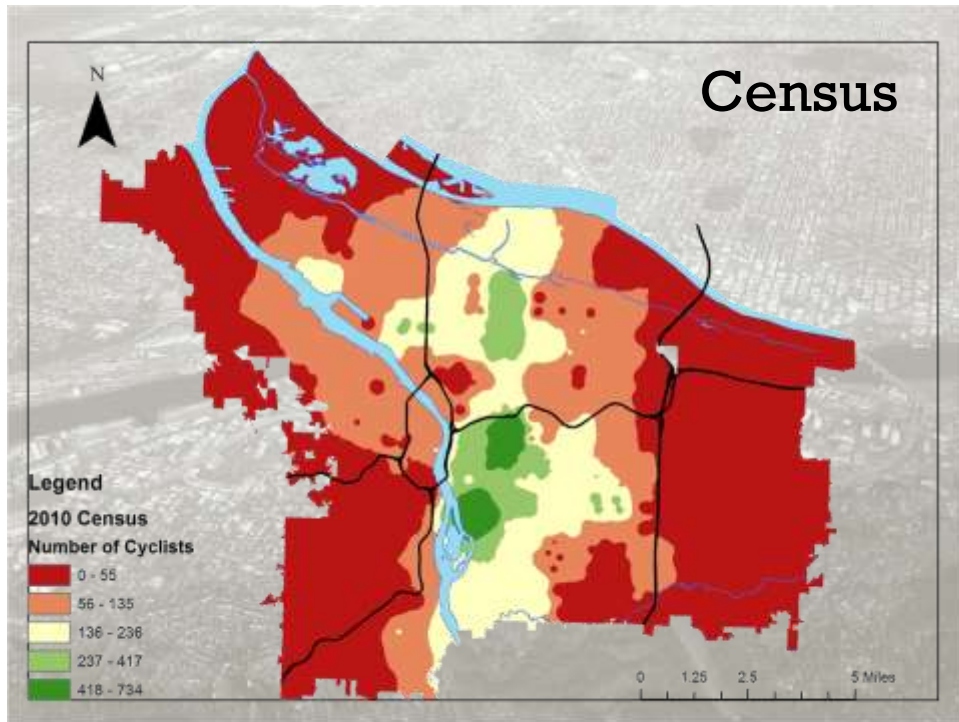

Reclassified Distance from a Bike Route

Legend

Bike Routes

Recl_Rt
Value

Reclassified from 1 to 5. 1 is least bike friendly. 5 is most bike friendly.

Data Source: RLIS 2/2012.
Bike Lanes, Bike Boulevards, Multi-use Paths and Low Traffic Streets

Reclassified Distance from a Grocery Store

Legend

Grocery Stores

Reclassified Grocery Stores
Value

Reclassified where 1 is least bike friendly. 5 is most bike friendly.

Data Source: "Grocery Stores", Prof. Kevin S. Martin,
Portland State University.

Methods: Weighted Overlay

Weights:
(based on Bikability study by MURP graduate Nathan McNeil and personal experience)

Biking route:	18% (very important)
Proximity to grocery stores:	18% (very important)
Traffic:	18% (very important)
Proximity to bike shops:	16% (important)
Proximity to coffeeshops:	16% (important)
Bike parking:	14% (fairly important)

Weighted Overlay

Legend
Bikeability Index
1
2
3
4
5

Bike Traffic Count

Observed number
of cyclists
23 - 276
277 - 719
720 - 1,162
1,163 - 1,606
1,607 - 7,771
• Observation Points

Census

Zonal Statistics

Conclusion

Outer Portland vs. Inner Portland

The overall pattern of higher bike-ability in inner Portland and lower bike-ability in outer Portland is consistent with the pattern of observed cyclists.

The infrastructure for cyclists is fairly evenly distributed, while services are more concentrated in the inner city.

Overall the predicted area of higher bike-ability was greater than the area with high number of observed cyclists, indicating that there are important factors that were not included.

Neighborhood-oriented vs. commute-oriented

This analysis was intended to be neighborhood-oriented, using neighborhood amenities like coffee shops and grocery stores as variables.

However, the observation data is commute-oriented, focused on major through routes and the journey-to-work. This may partially explain the discrepancy between prediction and observation.

Conclusion

Missing variables

- *Topography* -- Southwest Portland is predicted to be bike-able but has few observed cyclists. Since this area is very hilly, it is possible the topography discourages.
- *Distance from Central City* – Outer-east Portland was predicted to be more bike-able but has few observed cyclists. Since this area is farther from downtown, it is possible the distance discourages cyclists.
- *Street connectivity* – Both SW and Outer East have poor street connectivity, with many dead ends and cul-de-sacs. This forces cyclists onto higher-traffic arterials and introduces out-of-direction travel, possibly discouraging cyclists.

Data Sources

Dataset	Decription	Source	URL
Bicycle Count Report	Bicycle traffic counts at selected locations around Portland.	Portland Bureau of Transportation February 2012	http://www.portlandonline.com/transportation/index.cfm?c=44671&a=386265
Bicycle Network	Bike routes and lanes	RLIS (Feb. 2012)	http://www.oregonmetro.gov/index.cfm/go/by.web/id=509
Bicycle Parking	Designated bike parking	Civic Apps	http://www.civicapps.org/datasets/bicycle-parking
Grocery Stores	Location of grocery stores in Porland	Prof. Kevin S. Martin, PSU	
Bicycle Shops in Portland	Location of bicycle shops in Portland		http://www.portlandonline.com/transportation /index.cfm?a=71973&c=34812
Coffee Shops	Location of coffee shops in Portland	Dillon Mahmoudi, PSU	
Traffic Calming Devices	Location of traffic calming devices	Civic Apps	http://civicapps.org/datasets/traffic-calming-devices)
Portland Neighborhood Boundaries		RLIS (February 2012)	http://www.oregonmetro.gov/index.cfm/go/by.web/id=509
Streets 2010	Streets of Portland	City of Portland	http://www.portlandonline.com/bts/index.cfm?a=268487&c=51259
Journey to Work	Mode of travel for workers over 16	U.S. Census Bureau (2010)	

McNeil, Nathan. *Bikeability and the twenty minute neighborhood: How infrastructure and destinations influence bicycle accessibility*. http://www.ibpi.usp.pdx.edu/neighborhoods.php

2009 National Household Transportation survey (U.S. Department of Transportation, Federal Highway Administration, 2009 National Household Travel Survey. URL: http://nhts.ornl.gov.)