

# Geospatial Technology for Reducing Residential Burglary\*

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\*The authors gratefully acknowledge funding through the National Institute of Justice Cooperative Agreement 2012-IJ-CX-0039.

# The challenge of residential burglary

- Residential burglary exacts emotional and financial toll
  - Sense of violation
  - Average loss in US is \$2,116 (median = \$600)
- Burglaries tend to cluster in space and time
  - Neighbors of burgled home are at greater risk
  - Risk decays over a short time period
  - Almost all research in UK
- How do we use this information to interrupt the 'near repeat' pattern?

# Prevention initiatives in UK

- Strategies for interrupting 'near repeat' burglary patterns
  - Provide the public with information about increased risk – very quickly
  - Offer burglary audits
  - Purchase dead bolts, window locks and other target hardening measures
- Positive results in several UK towns

# Translating research into practice in US

- Can providing the public with timely information about burglary risk reduce residential burglary?

# Study design

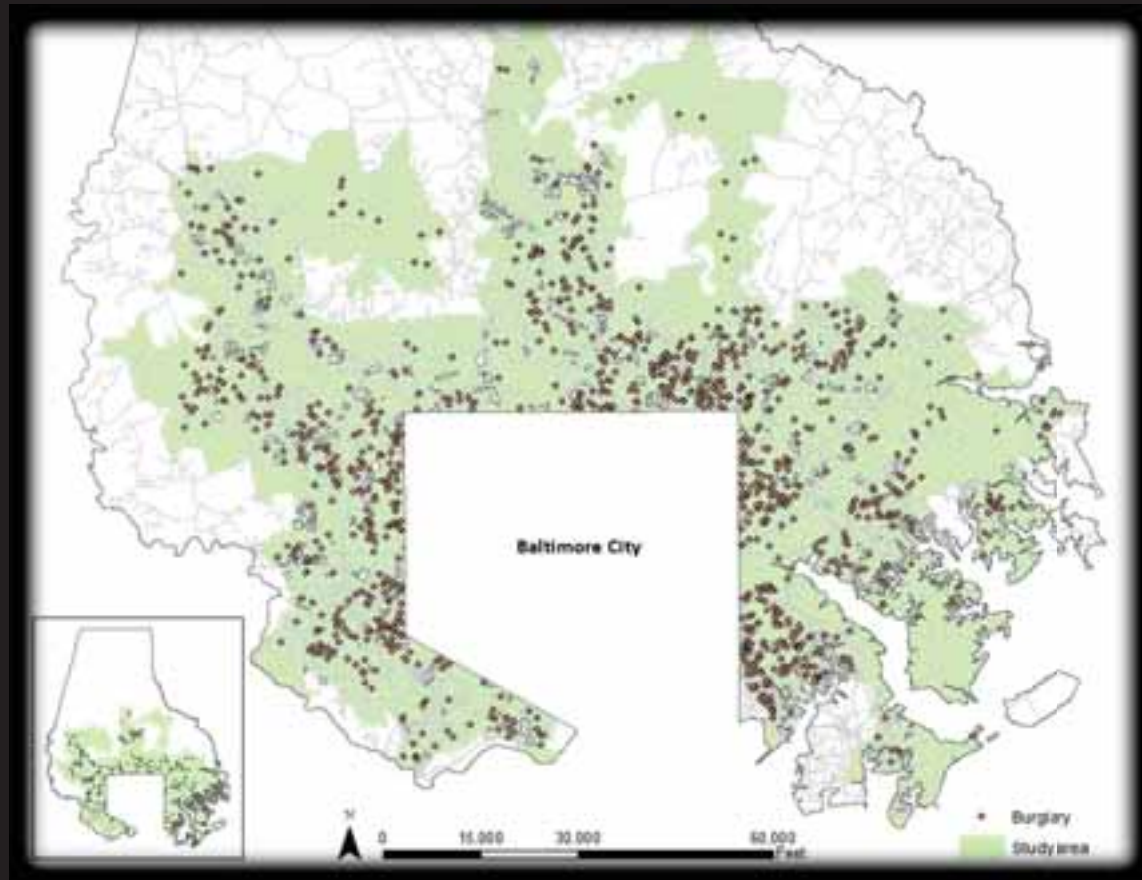
- Sites

Redlands, CA

Baltimore County, Maryland

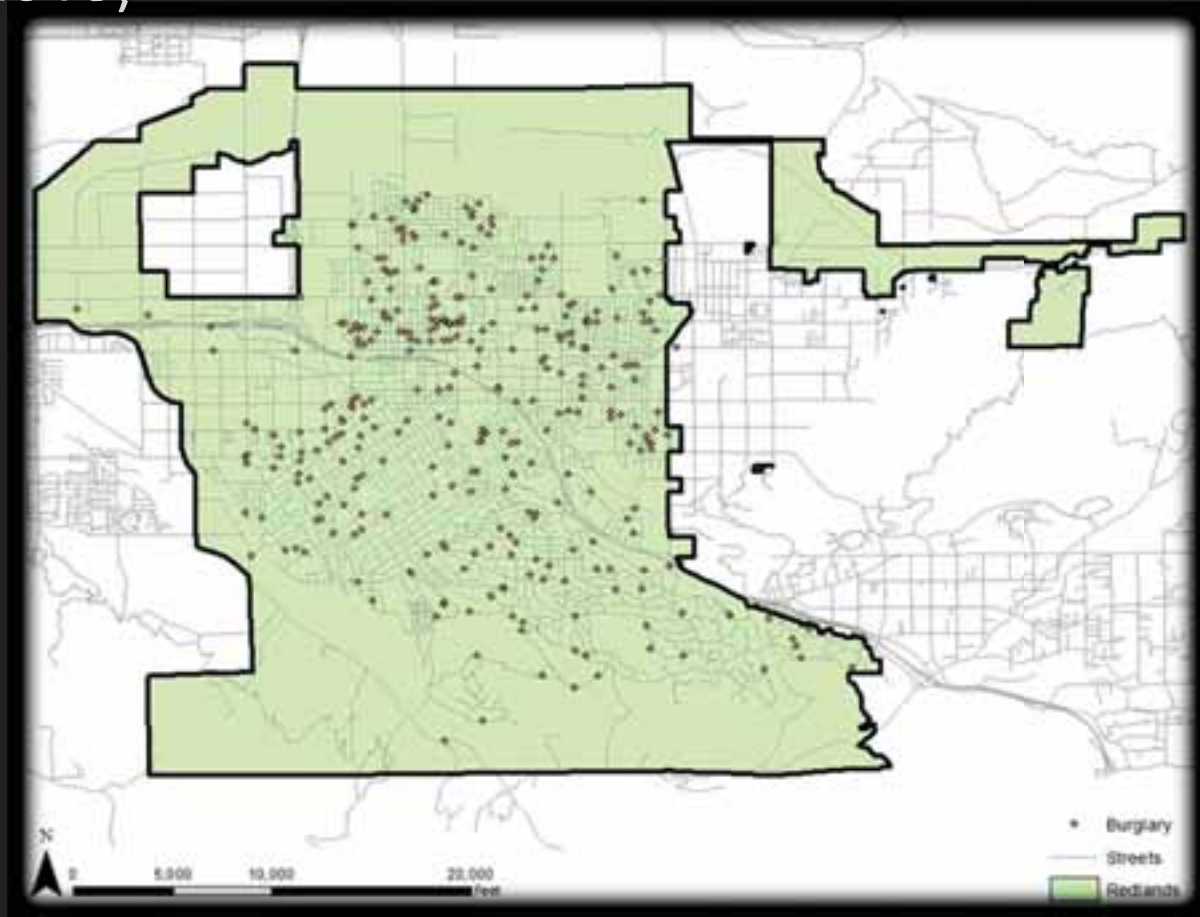
# Baltimore County Maryland

- Population - 817,455 (2012)
- Burglaries - 1,110 (2013)



# Redlands, California

- Population - 69,916 (2012)
- Burglaries - 353 (2013)



# Quantifying near repeat pattern

- Near repeat calculator
  - Over what space-time windows does a near statistically significant near repeat pattern exist?
  - Download free at <http://www.temple.edu/cj/misc/nr/download.htm>



# Output from near repeat calculator

- Significant space-time risk thresholds
- Near repeat pattern exists

Observed over mean expected frequencies table

	0 to 7 days	8 to 14 days	15 to 21 days	22 to 28 days	29 to 35 days	More than 35 days
Same location	4.75	1.90	0.00	4.07	5.43	0.42
1 to 400 feet	<b>5.31</b>	1.55	0.87	0.97	1.38	0.77
401 to 800 feet	<b>2.16</b>	<b>1.65</b>	1.42	1.26	1.09	0.88
801 to 1200 feet	<b>2.07</b>	1.19	0.92	1.42	1.19	0.92
1201 to 1600 feet	<b>1.39</b>	1.41	1.19	0.73	1.15	0.96
1601 to 2000 feet	<b>1.45</b>	<b>1.40</b>	1.36	1.21	1.10	0.94
More than 2000 feet	1.00	1.00	1.00	1.00	1.00	<b>1.00</b>

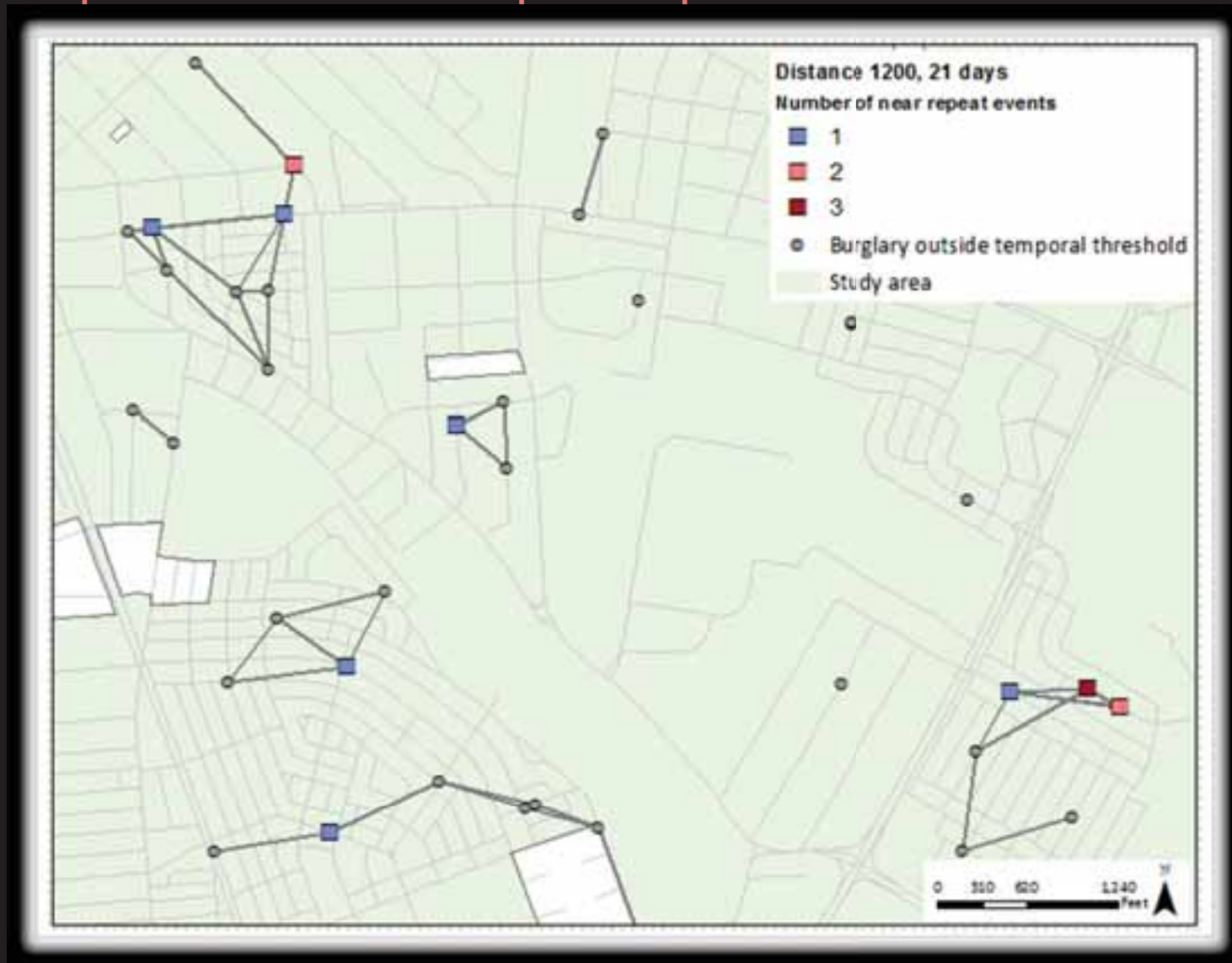
Statistical significance table

	0 to 7 days	8 to 14 days	15 to 21 days	22 to 28 days	29 to 35 days	More than 35 days
Same location	0.15	0.45	1.00	0.10	0.10	1.00
1 to 400 feet	<b>0.05</b>	0.15	0.60	0.60	0.25	1.00
401 to 800 feet	<b>0.05</b>	<b>0.05</b>	0.15	0.30	0.45	1.00
801 to 1200 feet	<b>0.05</b>	0.35	0.65	0.15	0.25	1.00
1201 to 1600 feet	<b>0.05</b>	0.10	0.25	0.95	0.25	1.00
1601 to 2000 feet	<b>0.05</b>	<b>0.05</b>	0.10	0.15	0.35	1.00
More than 2000 feet	1.00	1.00	1.00	0.95	0.95	<b>0.05</b>

# Estimating potential crime reduction

- ArcGIS 10.2 Network Analyst (OD Cost Matrix Solver)
- Identify burglaries within distance threshold (400 feet or 800 feet for example)
- Count the number of burglaries that occur within a specified temporal threshold (e.g., 7 or 14 days )
- Export the file of events within space-time threshold
- Use Excel's pivot tables to get counts
- Calculate potential crime reduction

# Example of near repeat patterns



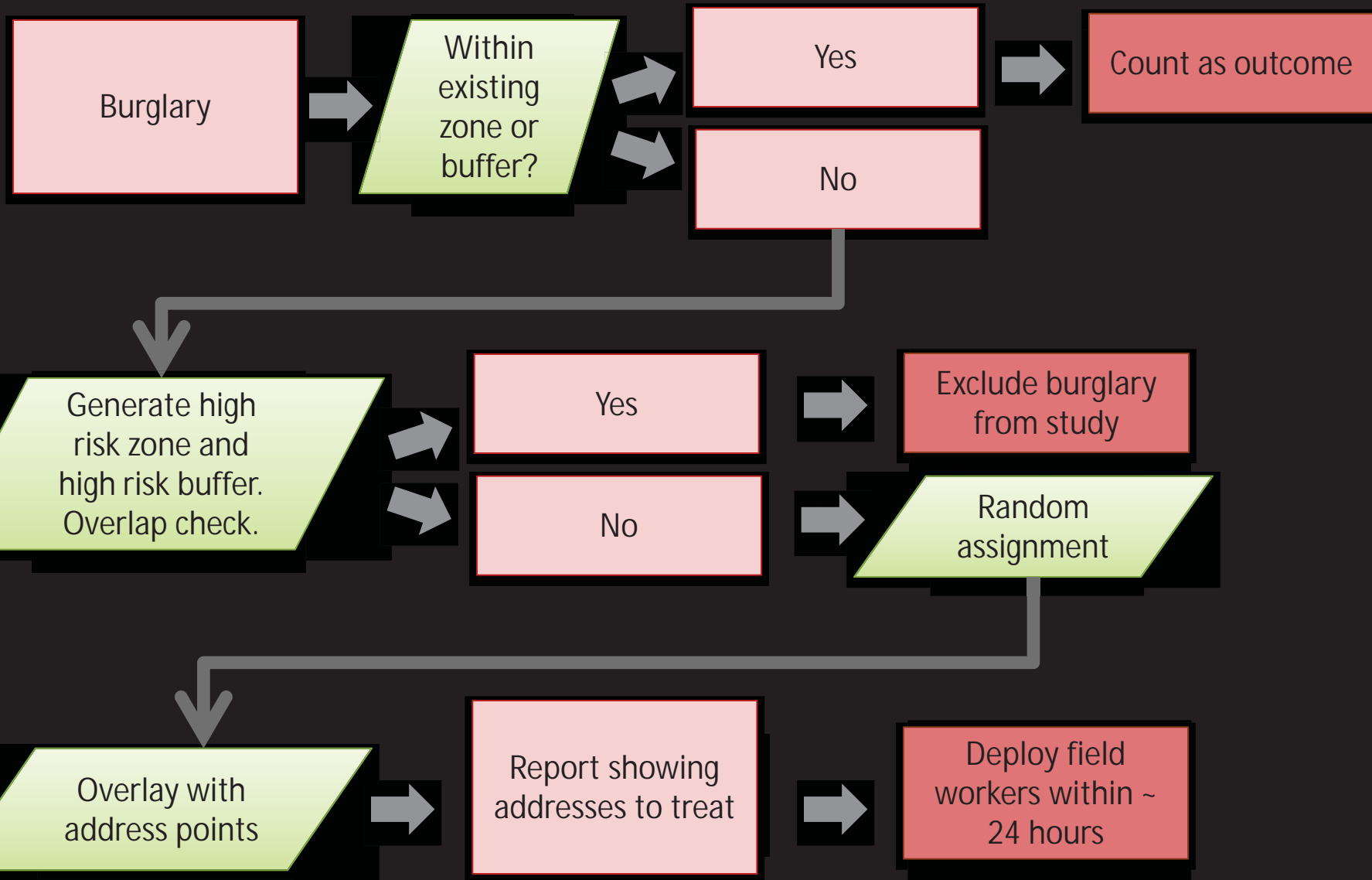
# Randomized control trial design

- Random assignment of burglaries as they occur
  - 131 treatment
  - 131 control
- Generate high risk zones and buffers to test for displacement

# Creating and tracking burglaries in the high risk zones

- High risk zone
  - Measure outward from burglary along street network to high risk distance threshold
- High risk buffer
  - Measure outward from burglary along street network to high risk buffer distance threshold
- Tracking via a software program
  - Open source will be available from [Azavea.com](http://Azavea.com) (still under construction)

# Automated tool to track events



# Treatment

- Raise awareness of risk
- Deliver information via uniform personnel
- Tools
  - Script to follow
  - Hang tag to leave
  - Offer of security audit
  - Ask for information

**DOOR KNOB HOLE**  
IMAGEDTEXT  
IN THIS  
AREA  
WILL BE CUT-OFF

**You may be at Risk!**

There has recently been a burglary near your home. Research shows that there is an increased risk of additional burglaries occurring within a short time and distance of the first crime.

**Burglary Prevention Tips**

Residential burglary is one of the most frequently reported crimes. It is also one of the most preventable. Locking your windows and doors, installing high security deadbolt locks, and establishing good security lighting are the easiest and most cost-effective ways to deter burglary. Listed below are recommendations that will assist in "target hardening" your home against burglary.

- Arrange landscaping to allow for "natural surveillance" of your property. Avoid blocking windows and entrance doors from the view of pedestrians, neighbors, and police.
- Sliding glass doors tend to be an easy point of entry. Special tools and force are available to prevent the lifting and prying of the active door.
- The door frame is often referred to as the door joint, and it is inherently weak. In most cases, the frame is the weakest component of an exterior door assembly. For added security, anchor the strike plate to the framing of the home by using 3" long wood screws.
- Illuminate the exterior of your home at night. Position lights to avoid plants, bushes, and blind spots. Consider motion sensors, lighting timers, or photo sensor lights.
- Consider installing and using an alarm or surveillance system.
- When you are away from home for an extended period of time, do not cancel mail and newspaper delivery. Instead, have a trusted neighbor or relative collect it for you. Use timers to turn on radios, televisions, and lights at different times.
- Call 911 to report suspicious persons, vehicles, or things out of the ordinary.

**If you are the Victim of a Burglary**

- Notify the police by calling 9-1-1.
- Preserve evidence by not touching or cleaning anything until the police have arrived.

**Other Resources**

- Subscribe to Watch Baltimore County to receive crime alerts about wanted criminals, missing persons, criminal arrests, and other cases: [www.baltimorecounty.gov/Subscribe/Watch.html](http://www.baltimorecounty.gov/Subscribe/Watch.html)
  - Receive information about crime occurring in your neighborhood: [www.crimealerts.com](http://www.crimealerts.com)

**POLICE**

A partnership between the Baltimore County Police Department, The Police Foundation, and Council Education

**IRONMOUNTAIN**

# Analysis

- Compare burglaries in the treatment zones and control zones
- Examine the buffers to quantify displacement or diffusion of benefits



## Status and outlook

- Target start date August 1, 2014
- Anticipate treatment will run about six months to a year
  - Limited resources for treatment extend time
- Conduct citizen survey
  - Did information translate into action?
- Report results within two months of end of experiment

# Thanks!

- Questions?????

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