



FEMA

# Risk MAP – Allegheny County, PA Flood Information Portal

Information Resources Exchange Group (IREG) Meeting  
September 11, 2013

Cynthia McCoy  
Risk Analyst  
FEMA Region III

**RiskMAP**

Increasing Resilience Together



# Presentation Summary

- **Risk MAP Program Overview**
- **Products and Data Model**
- **Purpose and intended uses**
- **Risk MAP Flood Information Portal Overview**
- **Allegheny County, PA Flood Information Portal**
  - Legend
  - Investigator Tool
  - Find an Address
  - Data extract
  - Flood Level Profiler
  - Draw and Measure



FEMA

# Risk MAP Program

Risk MAP further enhances the maps, involves the communities during the assessment and planning stages and guides and encourages them to communicate that to their constituents.

**RiskMAP**

Increasing Resilience Together

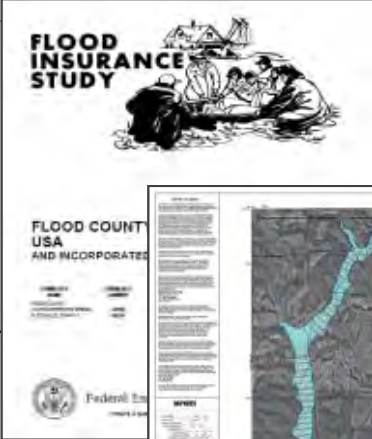
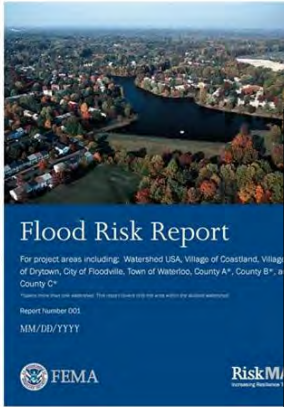
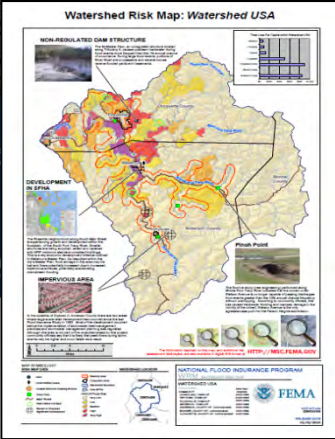


# Risk MAP Product Comparisons

## Traditional Regulatory Products

**DFIRM Database**

- Flood\_Hazard\_Data
- Political\_Boundaries
- Public\_Land\_Survey\_System
- TopoData
- Community\_Panel
- L\_Comm\_Info
- L\_MT1\_LOMC
- L\_Pan\_Revis
- L\_Pol\_FHBM
- L\_Riv\_Model
- L\_Stn\_Start
- L\_Wtr\_Nm
- S\_Bfe
- S\_DOQ\_Index
- S\_Firm\_Pan
- S\_Gen\_Struct
- S\_Label\_Id
- S\_Label\_Pt
- S\_LOMR
- S\_Perm\_Bmk
- S\_Quad
- S\_Riv\_Mrk
- S\_Trnsport\_Ar

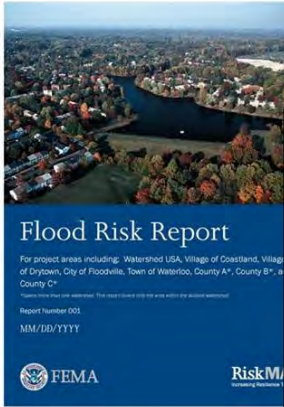
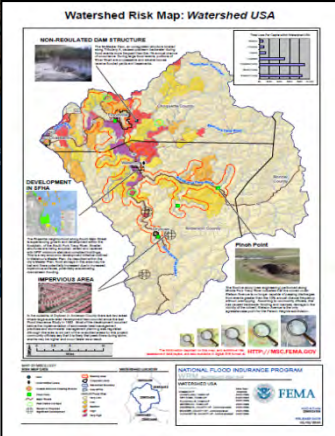




- Traditional products are regulatory and subject to statutory due-process requirements

## Non-Regulatory Products

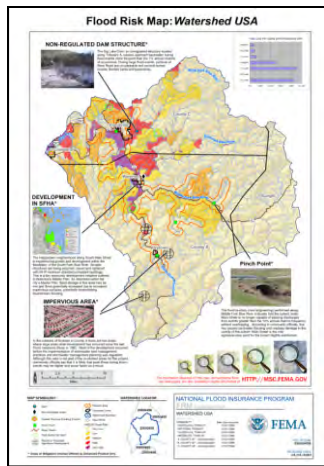
**Flood Risk Database**

- Community\_Panel\_Info
- L\_Comm\_Info
- L\_MT1\_LOMC
- L\_Pan\_Revis
- L\_Pol\_FHBM
- L\_Riv\_Model
- L\_Stn\_Start
- L\_Wtr\_Nm
- S\_Bfe
- S\_DOQ\_Index
- S\_Firm\_Pan
- S\_Gen\_Struct
- S\_Label\_Id
- S\_Label\_Pt
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- S\_Quad
- S\_Riv\_Mrk
- S\_Trnsport\_Ar

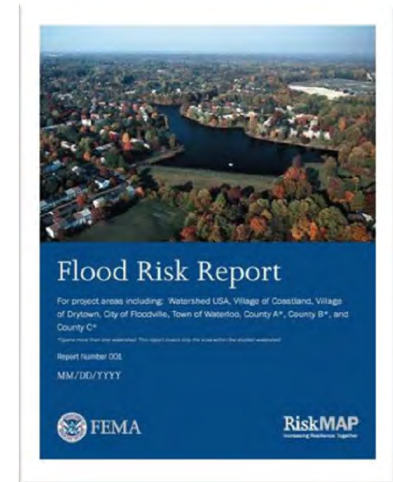
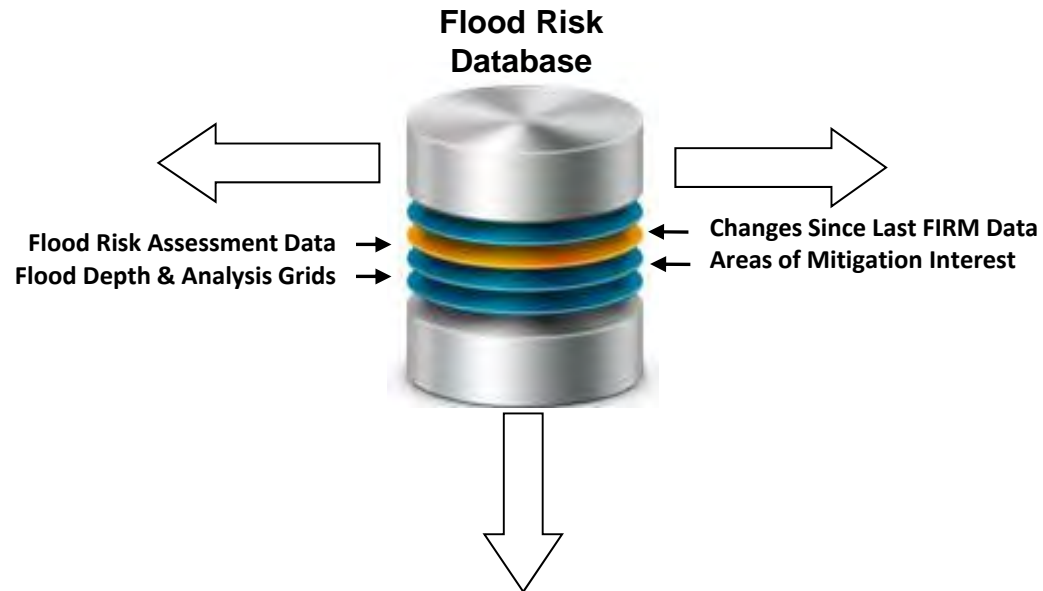



- Risk MAP products are non-regulatory and are not subject to statutory due-process requirements

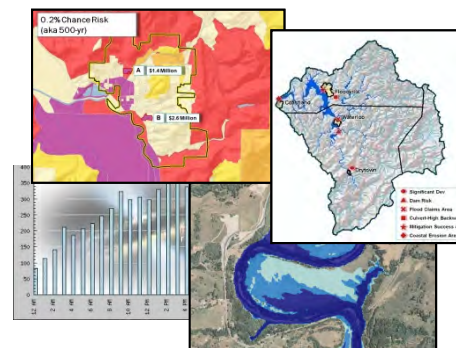
# Flood Risk Products and Data Model



Flood Risk Map



Flood Risk Report



Ad-Hoc Flood Risk Analyses

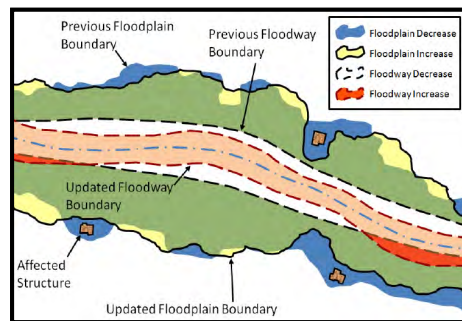
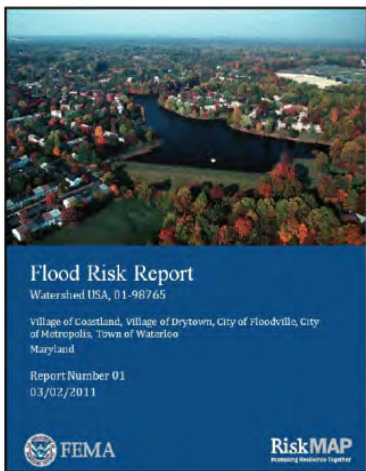
# Risk MAP Non Regulatory Products

## Flood Risk Products

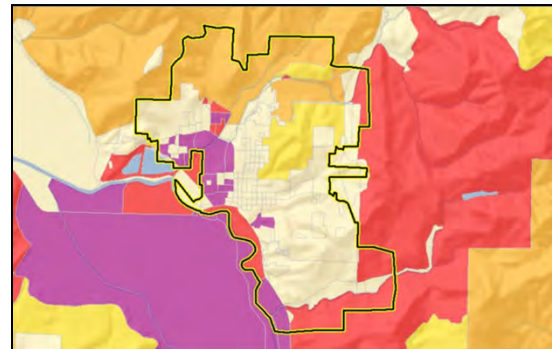
- Flood Risk Report – Summary of local flood risk
- Flood Risk Map – Utilizes Flood Risk Assessment to visually depict flood risk
- Flood Risk Database – Raw data and results from flood risk assessment

## Flood Risk Datasets

- Flood Risk Assessment – HAZUS loss estimation, identifies location
- Flood Depth and Analysis Grids – Illustrate depth and velocity of flooding
- Changes Since Last FIRM – Indicate increases and decreases in the SFHA



Changes Since Last Firm =  
Previous SFHA + Increase in SFHA –  
Decrease in SFHA



Flood Risk Assessment =  
Local Inventory Data +  
HAZUS Loss Estimation

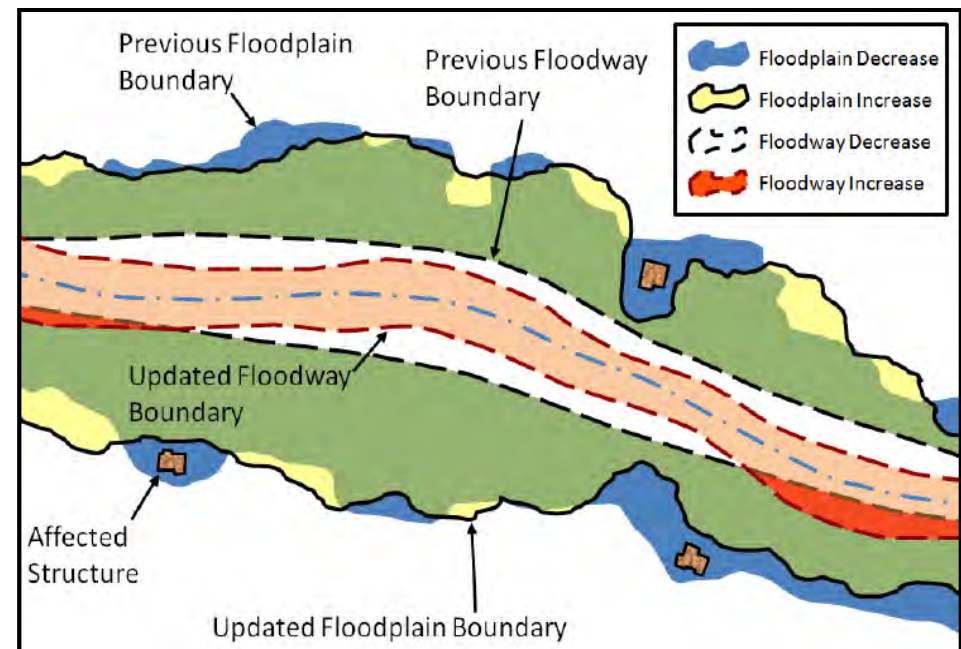


Flood Depth and Analysis Grids =  
Depth, Probability, Velocity of given  
flood event

# Changes Since Last FIRM

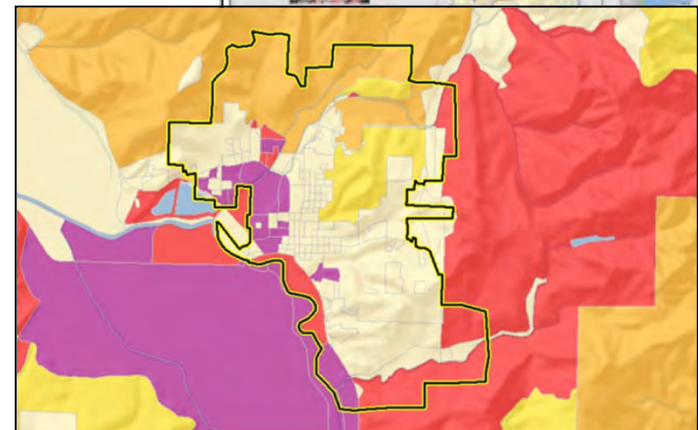
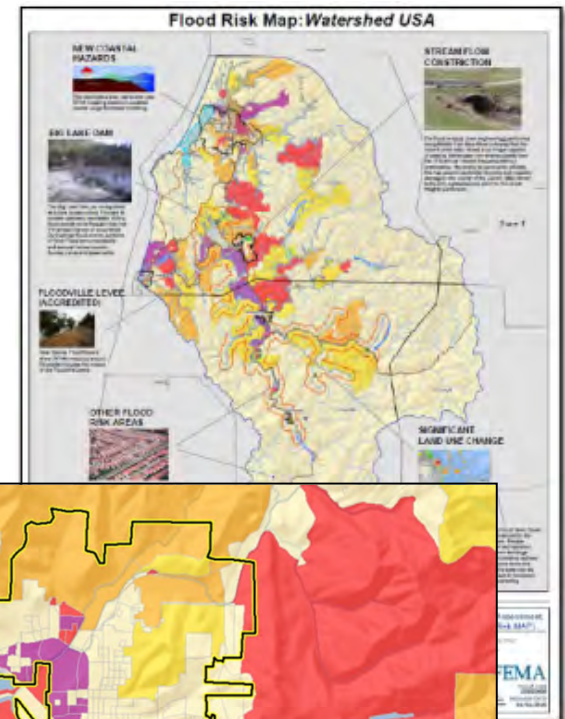
## Purpose and Intended Uses

- **Highlight changes made to the mapped Special Flood Hazard Area (SFHA) and flood zone designations since the previous FIRM.**
  - Illustrate changes to flood risk in floodplain and floodway.
  - Identify new areas requiring mitigation actions
  - Prioritize actions to reduce exposure to flood risk



# Flood Risk Assessment Purpose and Intended Uses

- **Identify Areas with Higher Relative Flood Risk:**
  - Flood prone Areas / Repetitive loss properties
  - Vulnerable populations
- **Develop a Plan to Allocate resources**
  - Identify locations with possible cost effective mitigation options
- **Inform pre-disaster planning**
  - Evaluate evacuation routes
  - Identify shelter needs

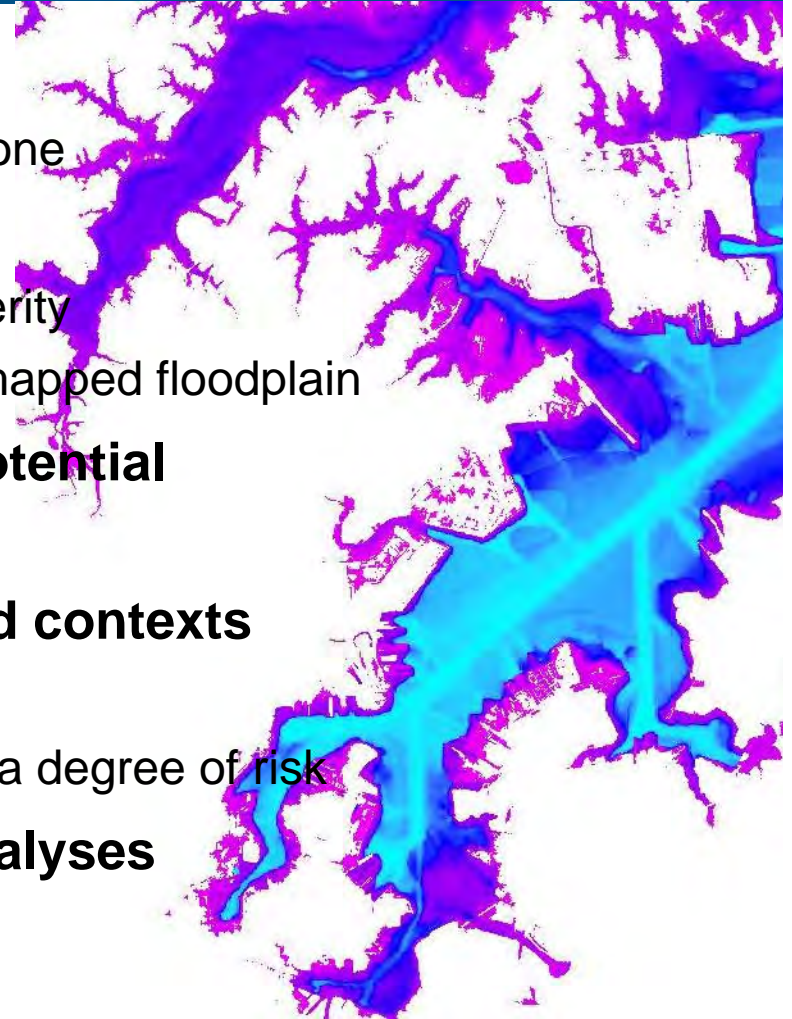




# Flood Depth & Analysis Grids

## Purpose and Intended Uses

- **Calculate flood losses**
  - For properties which intersect the flood zone
- **Communicate flood inundation**
  - Function of an event's magnitude or Severity
  - Communicate that risk varies within the mapped floodplain
- **Pre-screening for mitigation project potential**
  - BCA > 1.0 with positive 10-yr depths
- **Increase flood risk awareness in varied contexts**
  - Depth, Probability, Velocity, etc.
  - Each cell illustrates a depth of water and a degree of risk
- **Inputs to HAZUS Risk Assessment Analyses**

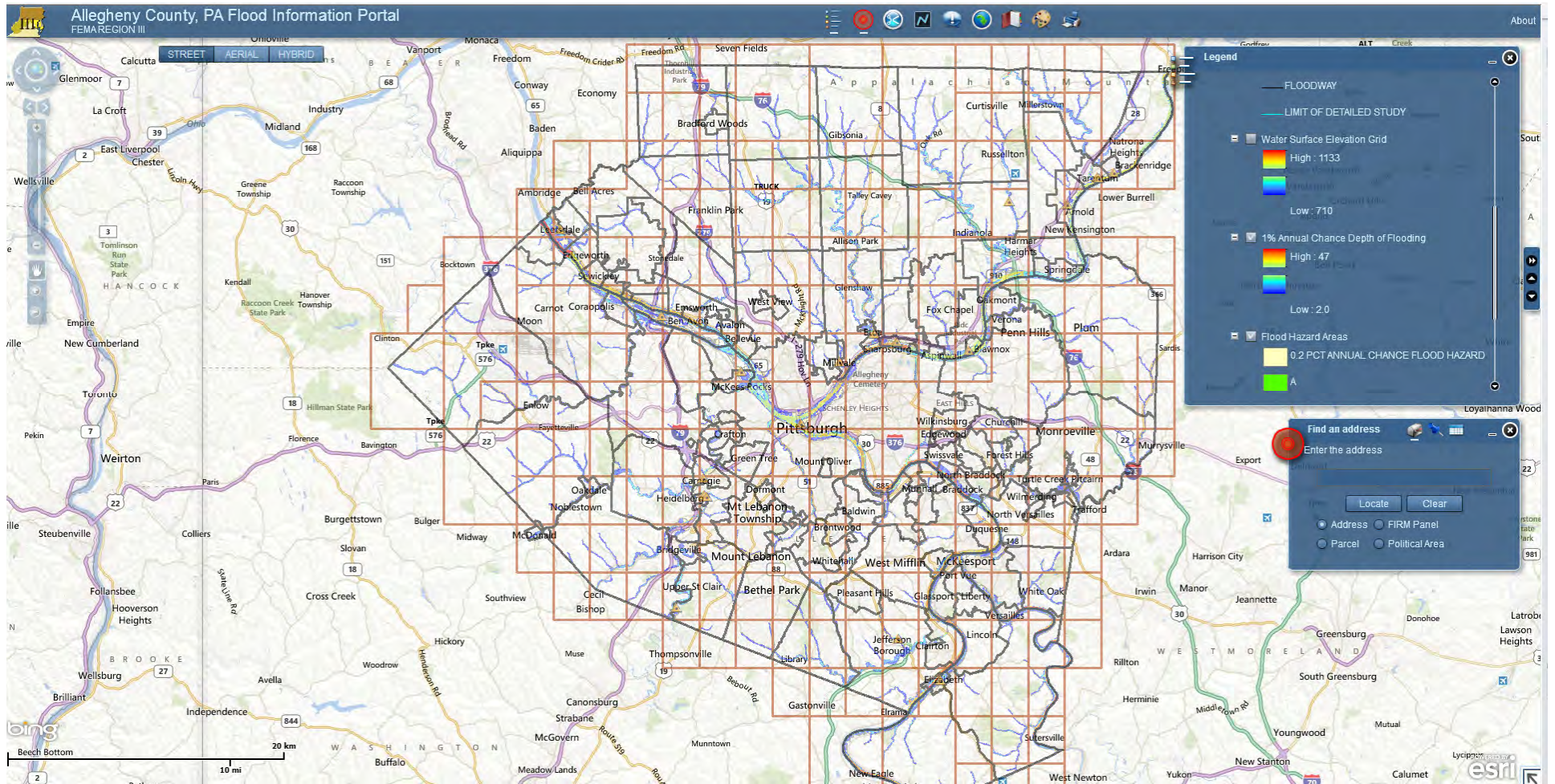


# Risk MAP – Flood Information Portals

## Site Location - <http://riskmap3.com/>

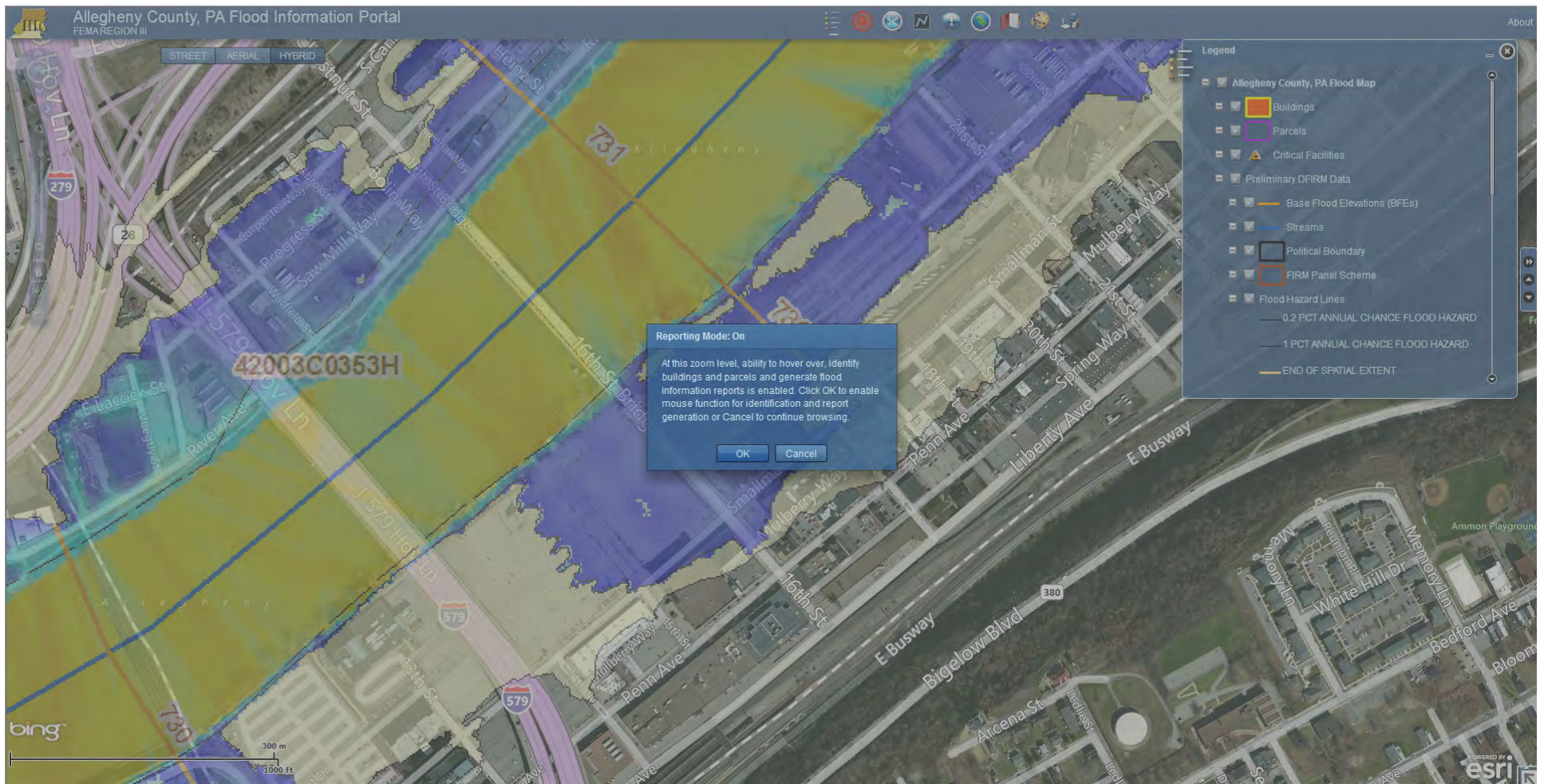
- Library of all Risk MAP flood information portals
  - Not available region-wide
- Additional Non-Regulatory product
- Online viewer for Non-Regulatory products and flood hazard data
  - Water Surface Elevation Grids,
  - Flood Depth Grids,
  - Flood Hazard Areas,
  - Base Flood Elevations,
  - Parcels,
  - Building Footprints
- Varying levels of sophistication
- Not unified

# Allegheny County, PA – Flood Information Portal



# Allegheny County, PA – Flood Information Portal

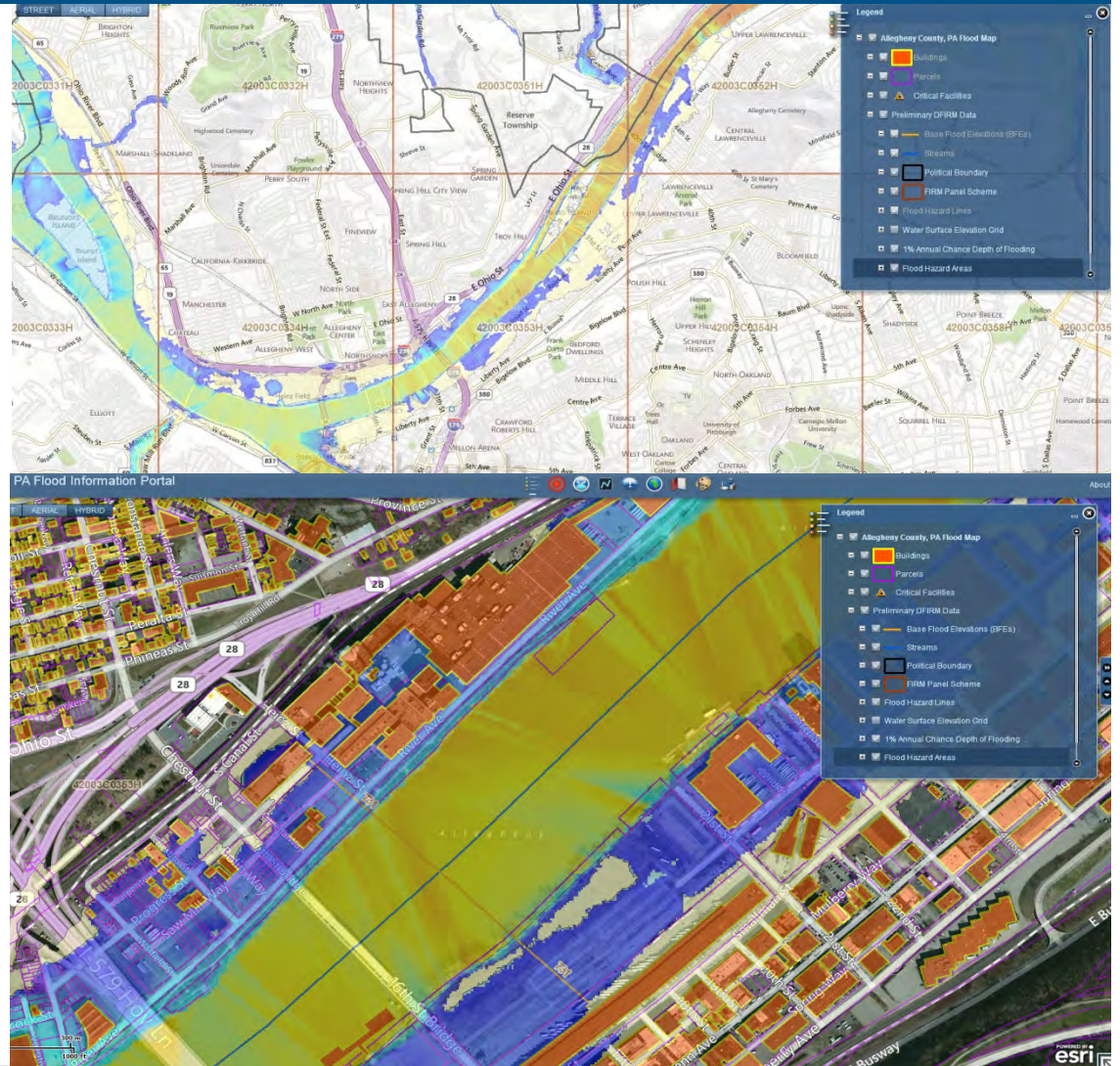
- Analytical capabilities increase when zooming in



# Allegheny County, PA – Flood Information Portal

## Legend

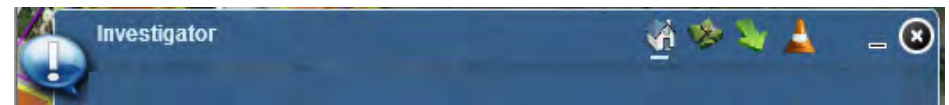
- Building Footprints
- Parcel lines
- Critical Facilities
- Base Flood Elevations (BFE)
- Streamline
- Political boundaries
- FIRM Panel Schema
- Flood Hazard Lines
  - .2% flood extent
  - 1% flood extent
  - Floodway
- Water Surface Elevation
- Flood Depth grid
- Flood Hazard Areas
  - Regulatory Flood Zones



# Allegheny County, PA – Flood Information Portal

## Investigator tool

- Analyze Flood Hazard Data Associated with **Buildings**, **Parcels** and **Points**
- **Hover over a specific building or parcel**
  - Reveal basic flood hazard information
- **Click on a building or parcel**
  - Reveal the site location/address, and compare flood hazard data to the effective and preliminary FIRM
- **Print Reports**



# Allegheny County, PA – Flood Information Portal

## Find an Address

- Locate a site by a specific address, XY Coordinates, FIRM Panel number, Parcel ID or Political area  
Use: 2517 Railroad St, Pittsburgh, PA 15222
- **Utilize the Investigator tool to analyze the flood hazard of that location**



# Allegheny County, PA – Flood Information Portal

## Data Extract

- Extract and download data
- **Select the area you want to extract data**
- **Identify the layers to extract**
- **Select the file format**
  - File Geodatabase (.gdb)
  - Shapefile (.shp)
  - AutoCAD (.dxf)
  - AutoCAD (.dwg)
  - Bentley Microstation (V8, .dgn)
  - **Raster Formats** – Esri GRID, File Geodatabase, ERDAS Imagine (.img), Tif, Gif, Jpg.





# Allegheny County, PA – Flood Information Portal

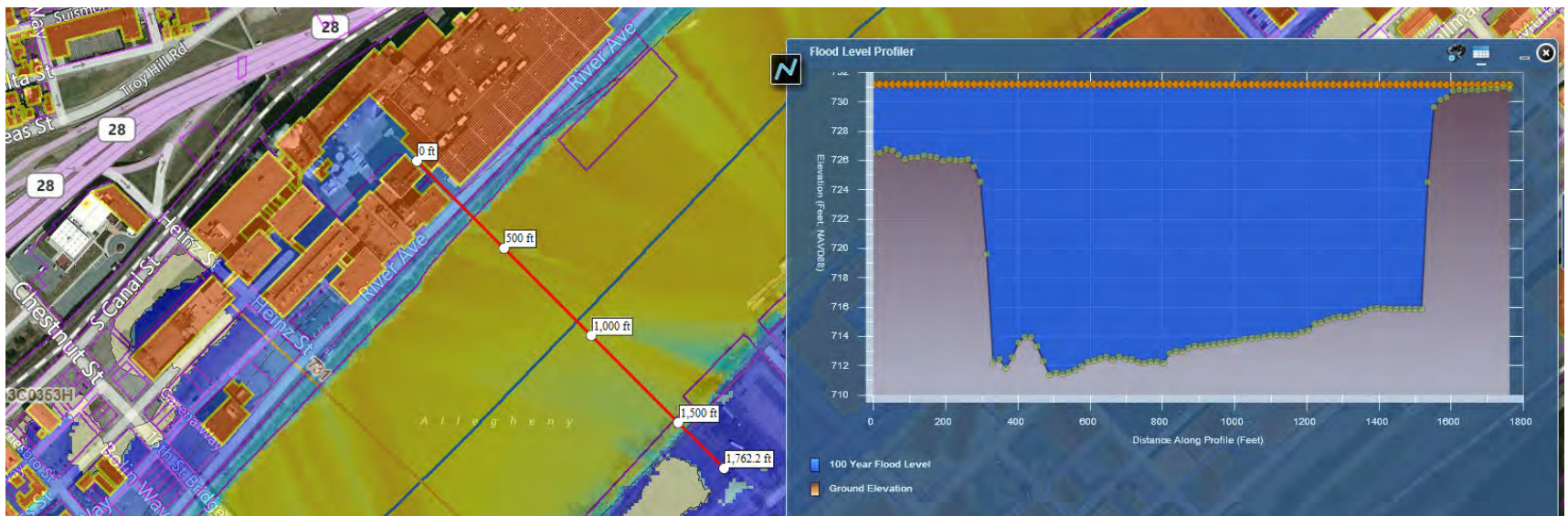
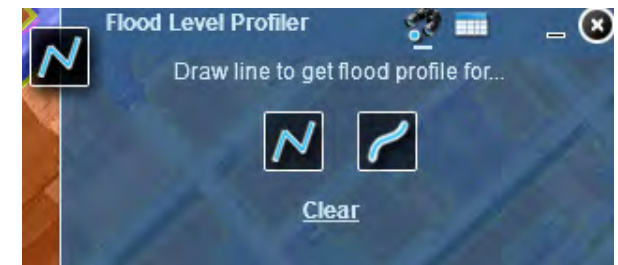
## Flood Level Profiler

- Draw a line across the flood boundary
  - Generate a Flood Profile for the 1% (100 year) chance flood level and ground elevation
  - Data provided is approximate and should not be used for analytical purposes

### DISCLAIMER

Ground surface elevations within open water bodies presented in the Flood Level Profiler plot, are approximate and should not be used for analytical purposes. The ground surface elevations presented outside open water bodies are based on the topographic data used in the current flood study.

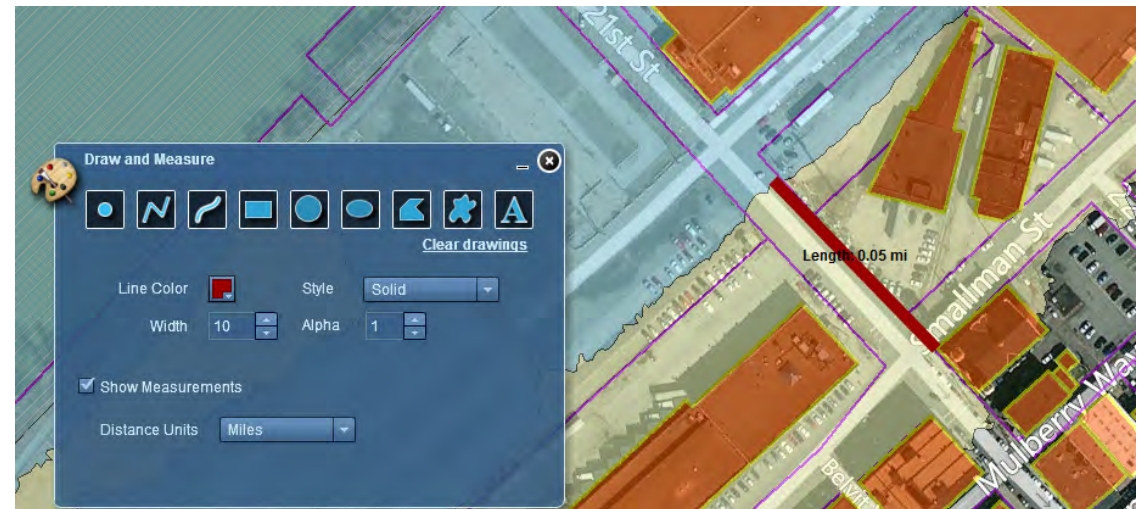
OK



# Allegheny County, PA – Flood Information Portal

## Draw and Measure

- Use a variety of shapes and tools
  - Highlight areas of interest
  - Measure distance/area
  - Define unit of measure



Questions???



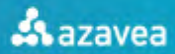
# FEMA

**Contact:**

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215-931-5530



# SUMMER *of* MAPS





# advanced spatial analysis on the web

- UI/UX Design
- Web/Mobile
- Data Science
- HPC
- R&D



**Certified**



**Corporation**<sup>™</sup>

**bcorporation.net**

Work on stuff that matters

- Civic / Social Apps

Research-Driven

- 10% Research Program
- Academic Collaborations

Give more than you get

- Summer of Maps
- Pro Bono program
- Donate share of profits
- Open source/open data

# SUMMER *of* MAPS



- 2 stage application
- Data science/analysis
- Curated projects
- \$5,000 Stipends for Fellows
- Pro bono work for Non profits
- National Organizations
- Based in Philadelphia

## Process





- Non-profits
- Students -> Professionals
- State-of-the-Art
- New relationships
- Social mission

## Objectives



4 non-profits

2 students

Lots of positive feedback

## Outcomes – Year 1



- 6 non-profits
- 3 students
- 2 sponsors
- 3 Mentors
- Demand for more

## Outcomes – Year 2



# SUMMER *of* MAPS



®

**ESRI**



TRI-CO  
DIGITAL  
HUMANITIES

Bryn Mawr College // Haverford College // Swarthmore College

Sponsors: Year 2



**Fellows:  
Year 2**

**Lena - Bryn Mawr College**

**Tyler - Clark Univ**

**Julia - Haverford College**

# SUMMER of MAPS



**SUNLIGHT  
FOUNDATION**



**dvaeyc**

The voice of early childhood education

**BICYCLE  
COALITION**



**OF GREATER  
PHILADELPHIA**



**TEXAS TREES  
FOUNDATION**

CREATING HEALTHY COMMUNITIES



**COALITION AGAINST  
HUNGER**



# Organizations – Year 2



- Mentoring capacity
- Funding
- Space

## Barriers to Scalability



- DataKind
- Data Science for Social Good

## Similar Programs



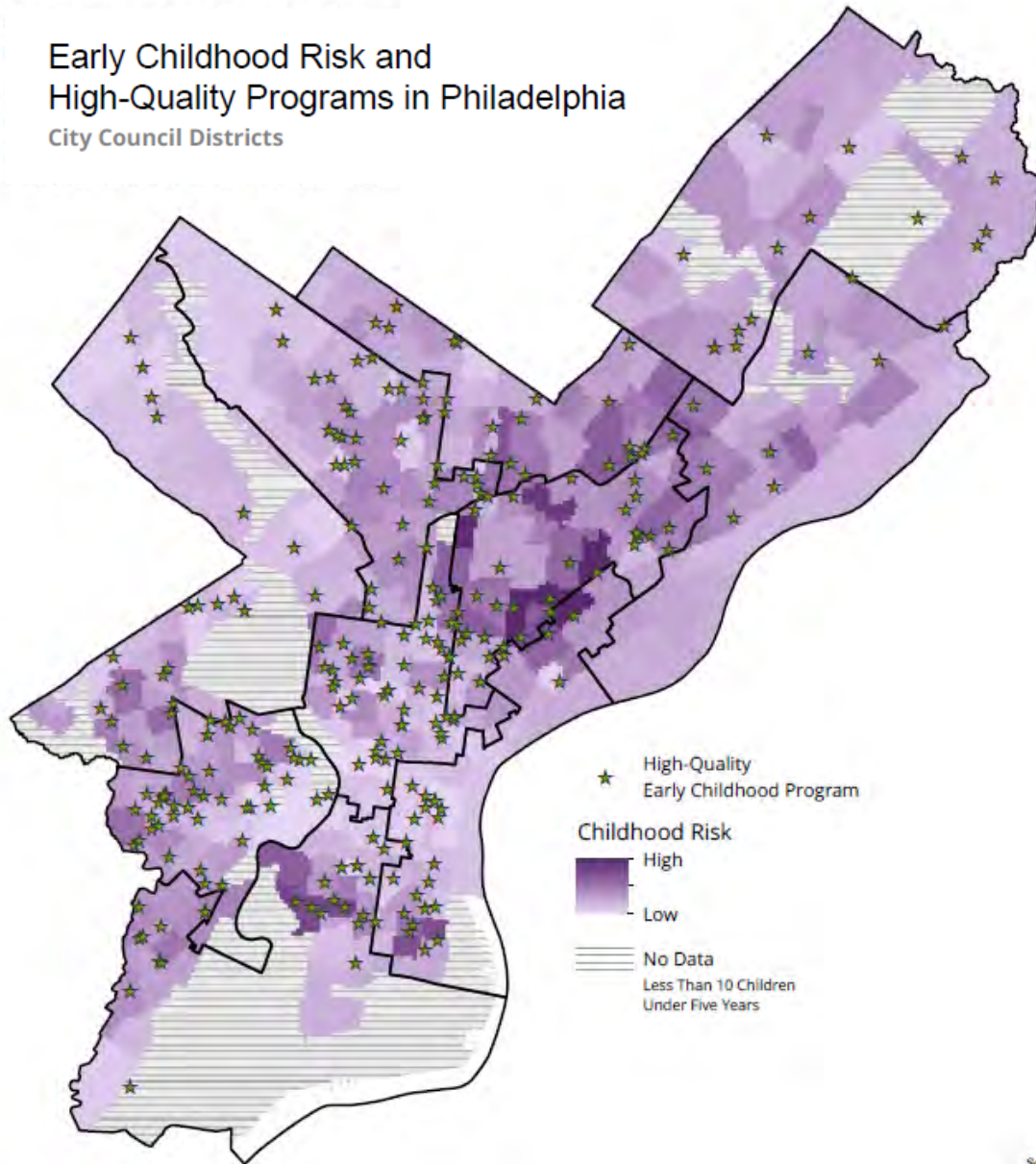


- Form student teams
- Extend to software teams
- Bring in part-time mentors

## Scaling

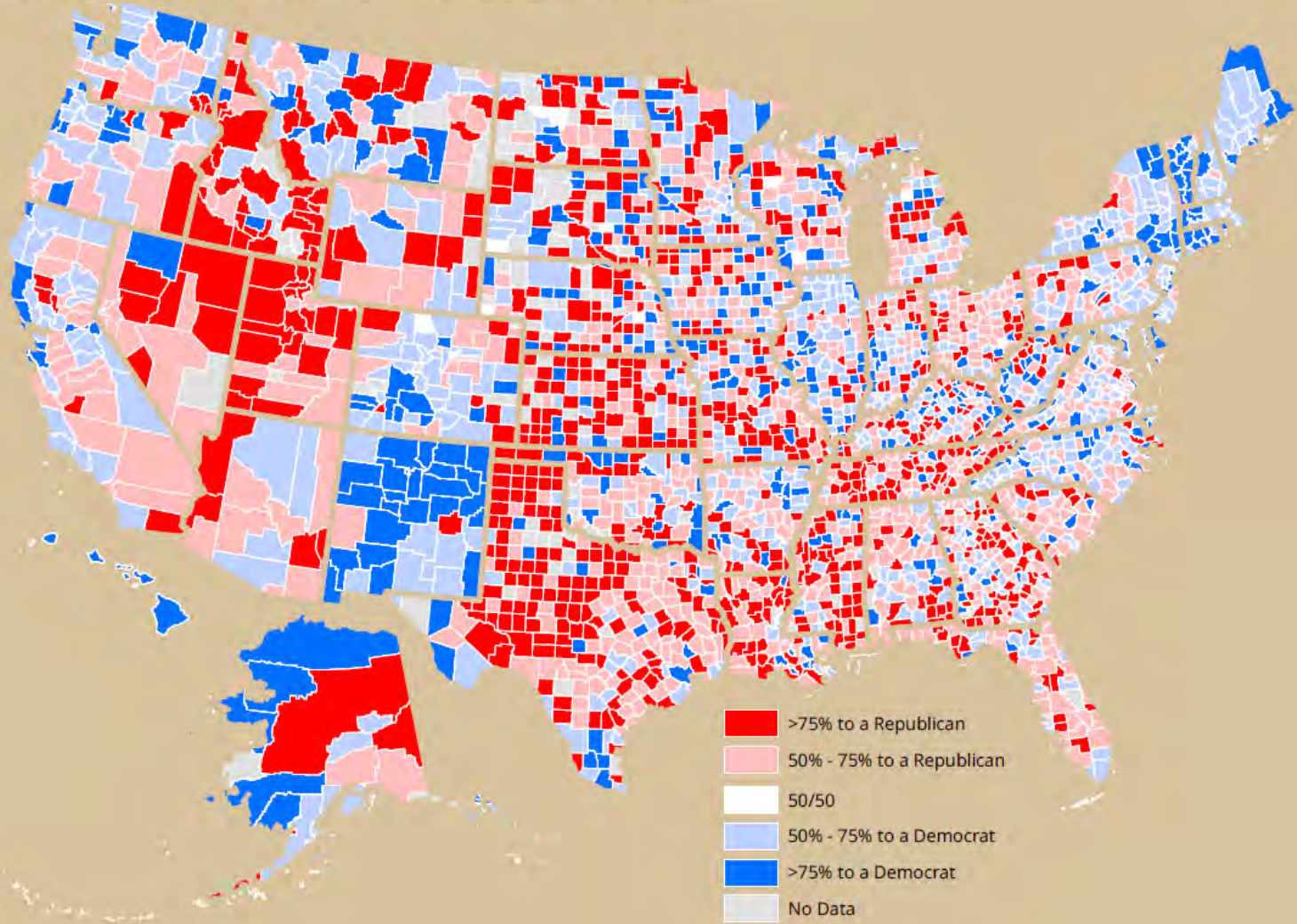
# Early Childhood Risk and High-Quality Programs in Philadelphia

City Council Districts



Sources:

# Percentage of Total Contribution Dollars from Individuals to Presidential Candidates by Party, 2008 by County

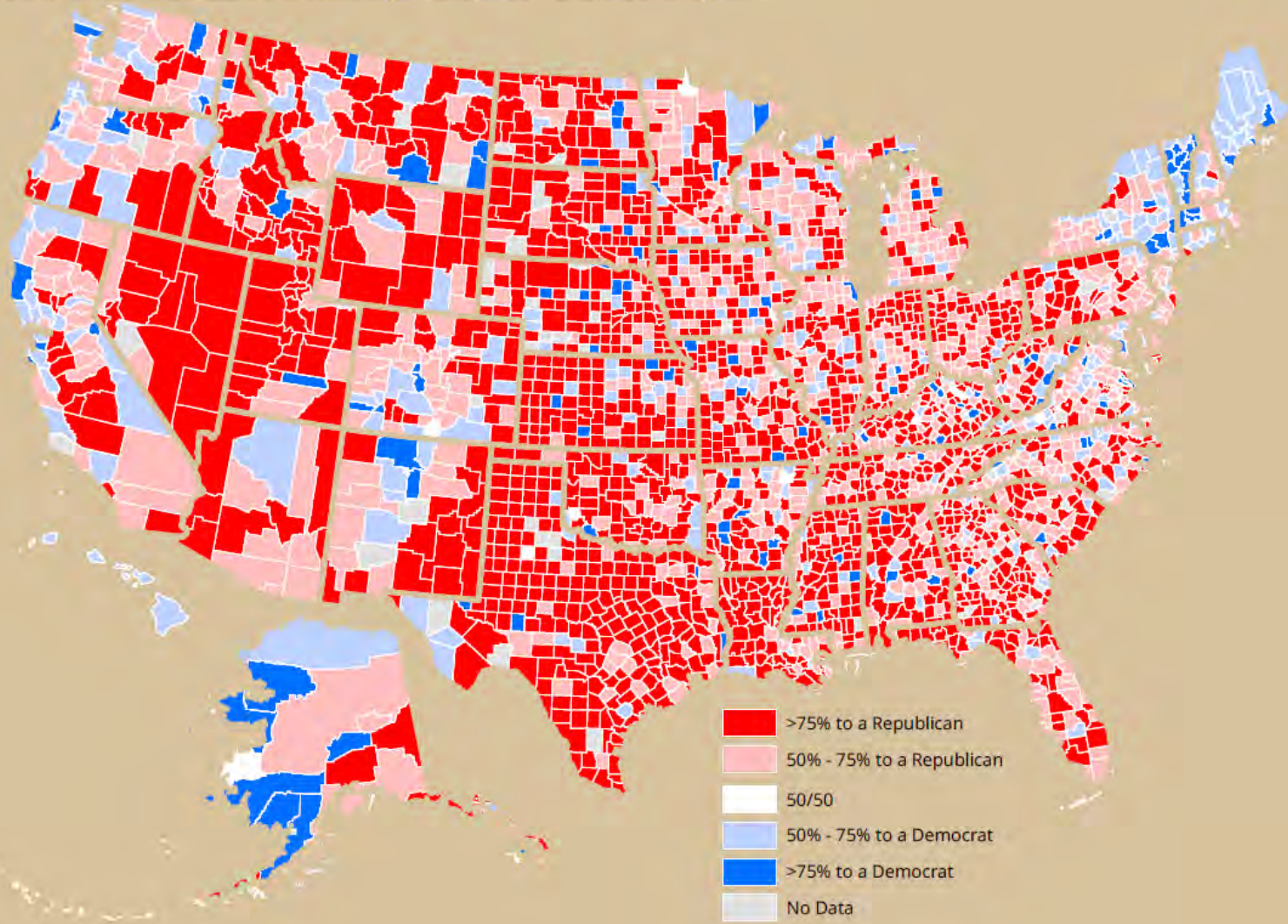


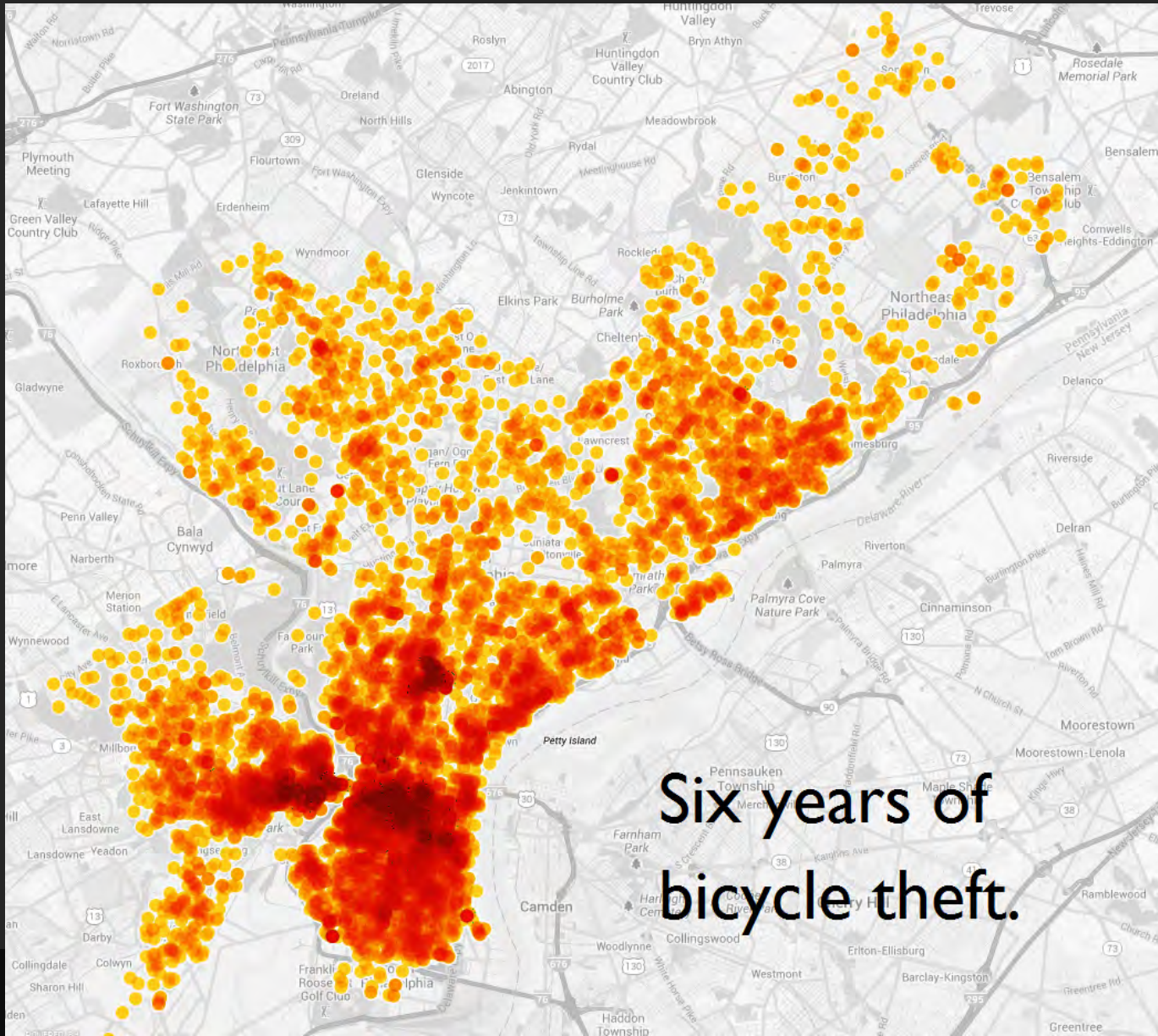
SUNLIGHT  
FOUNDATION

azavea

SUMMER of MAPS

# Percentage of Total Contribution Dollars from Individuals to Presidential Candidates by Party, 2012 by County





Six years of  
bicycle theft.

**BICYCLE  
COALITION**

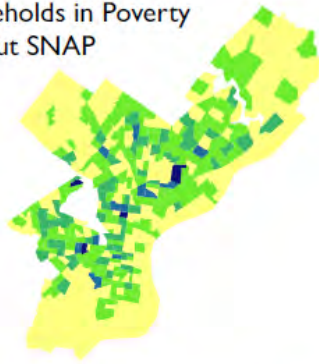


**OF GREATER  
PHILADELPHIA**

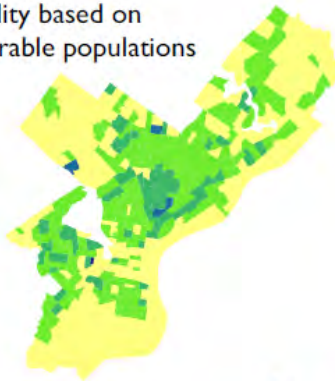


azavea  
**SUMMER of MAPS**

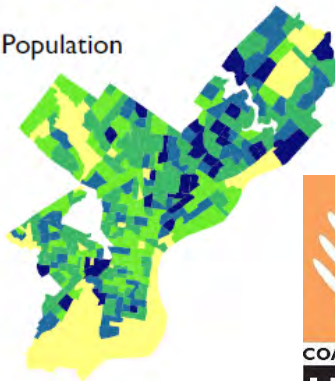
Households in Poverty without SNAP



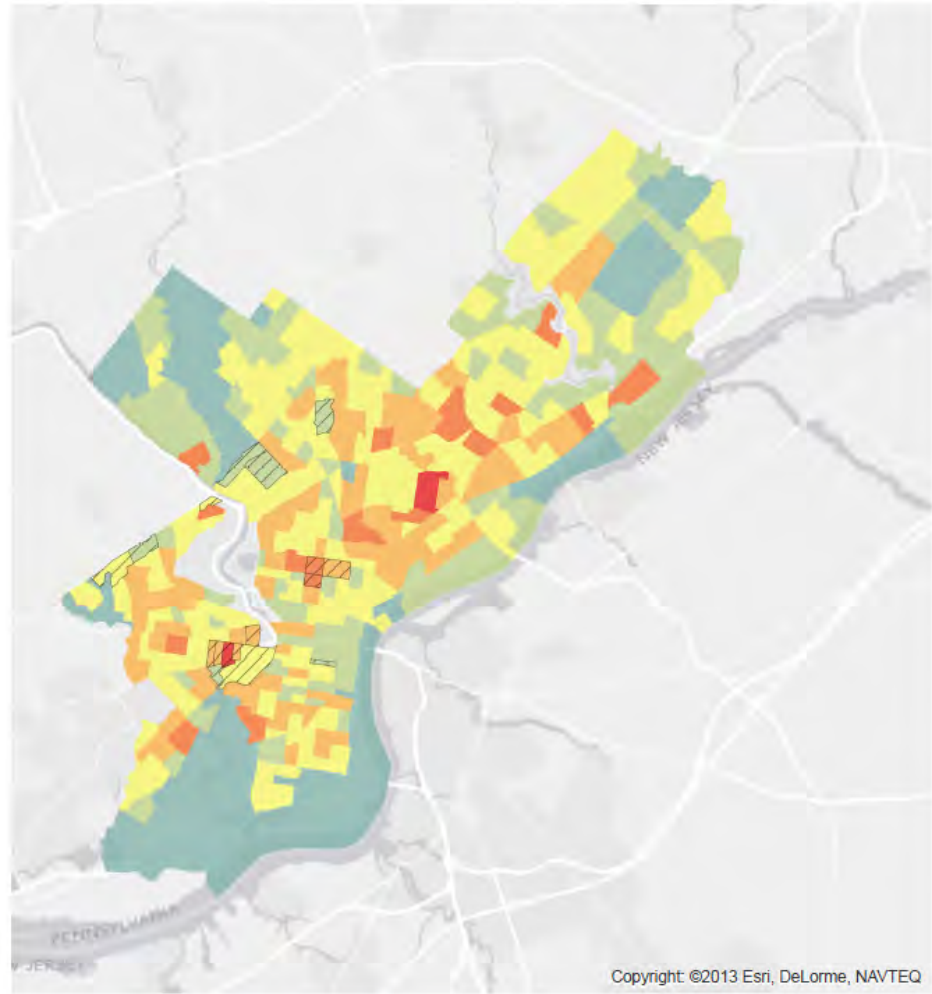
Eligibility based on vulnerable populations



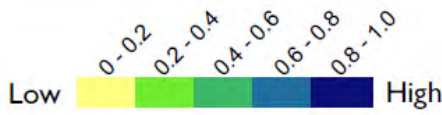
Total Population



# Hunger Coalition Eligibility and Vulnerability Index

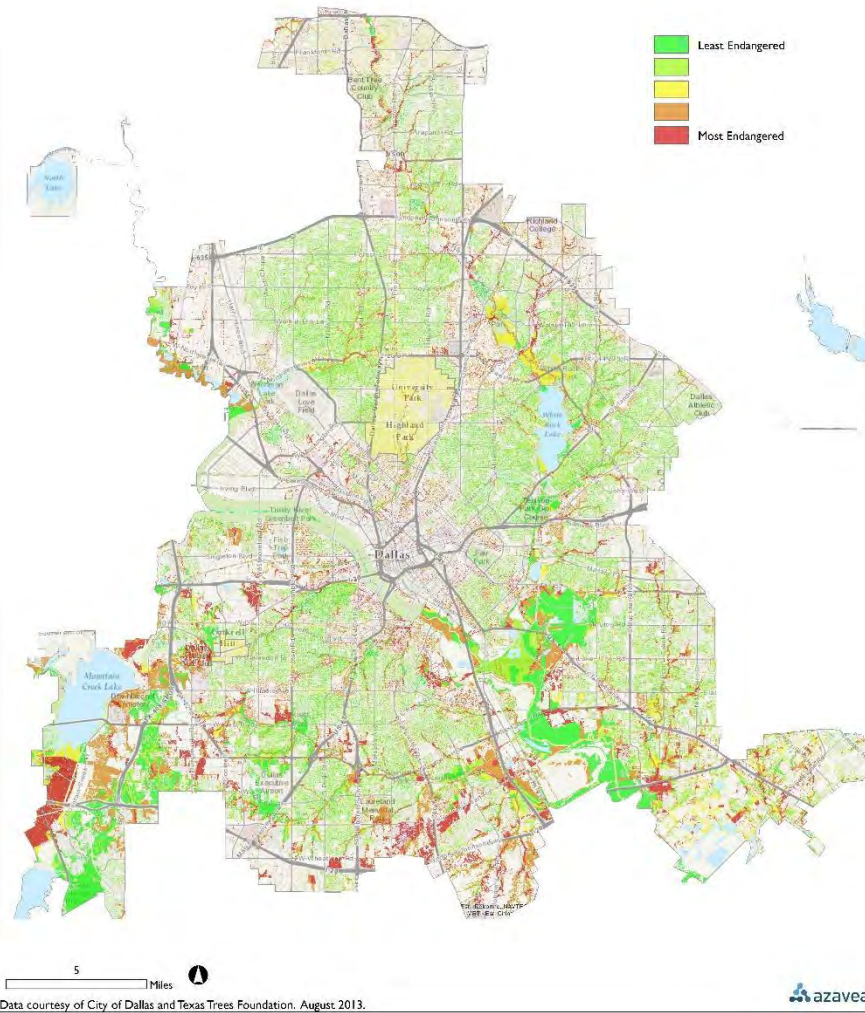


Copyright: ©2013 Esri, DeLorme, NAVTEQ

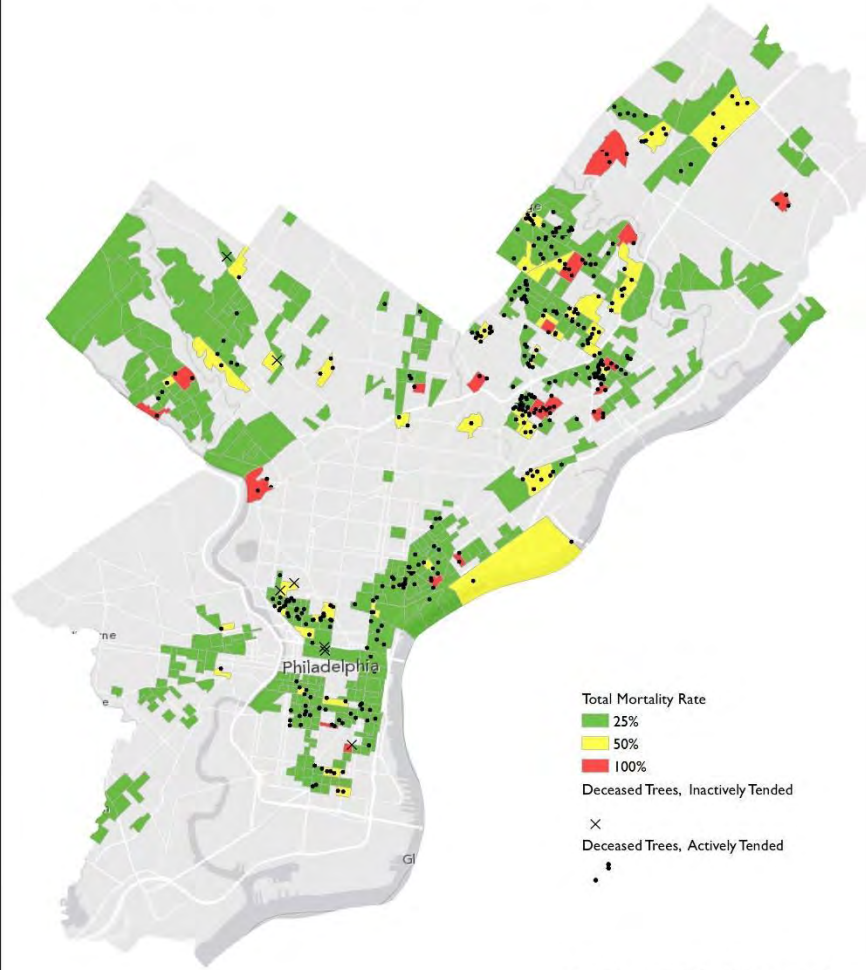


 > 1/3 University students

# Tree Canopy Preservation Sites



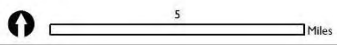
# Tree Mortality by Census Tract



Total Mortality Rate  
25%  
50%  
100%

Deceased Trees, Inactively Tended  
x  
Deceased Trees, Actively Tended  
•

Data courtesy of the U.S. Census Bureau  
& the Pennsylvania Horticultural Society.  
August 2013.







# EV Planning and Readiness in Southeastern Pennsylvania

Robert Graff

Manager, Office of Energy and Climate Change Initiatives  
Delaware Valley Regional Planning Commission  
Philadelphia, PA

Information  
Resource  
Exchange  
Group

September 11, 2013

# DVRPC Region

(Project Area Highlighted)



# DVRPC EV Activities

## U.S. DOE-Funded Electric Vehicle Infrastructure Planning in the Five Counties of SE PA

- Partners with DVRPC:
  - PECO Energy
  - GPCC
  - City of Philadelphia
- Completed June 2013

## “Jump start” analysis, funded by PECO Energy

- Analysis of Key Infrastructure Issues

## The EV Project – also DOE Funded

- Served on Steering Committee
- Provided information on our work
- We learned from their experience

## Key regional-level question about EVs

- How are they different from other cars?
- What do local governments need to know?
- Where will EV owners live?
- Where, other than home, might they want to charge?
- Where can EVs replace ICE vehicles?
- How will EVs affect the electric distribution grid?

# Developing an “EV Ownership Potential” Score

Based on discussions with researchers in California, as well as with managers at Nissan and Chevrolet, we based EV ownership potential primarily on income and hybrid ownership.

## Primary Factors

Income:	60%
Hybrids	25%

## Secondary factors

Home Ownership	6%
Dwelling Type	6%
Education	3%

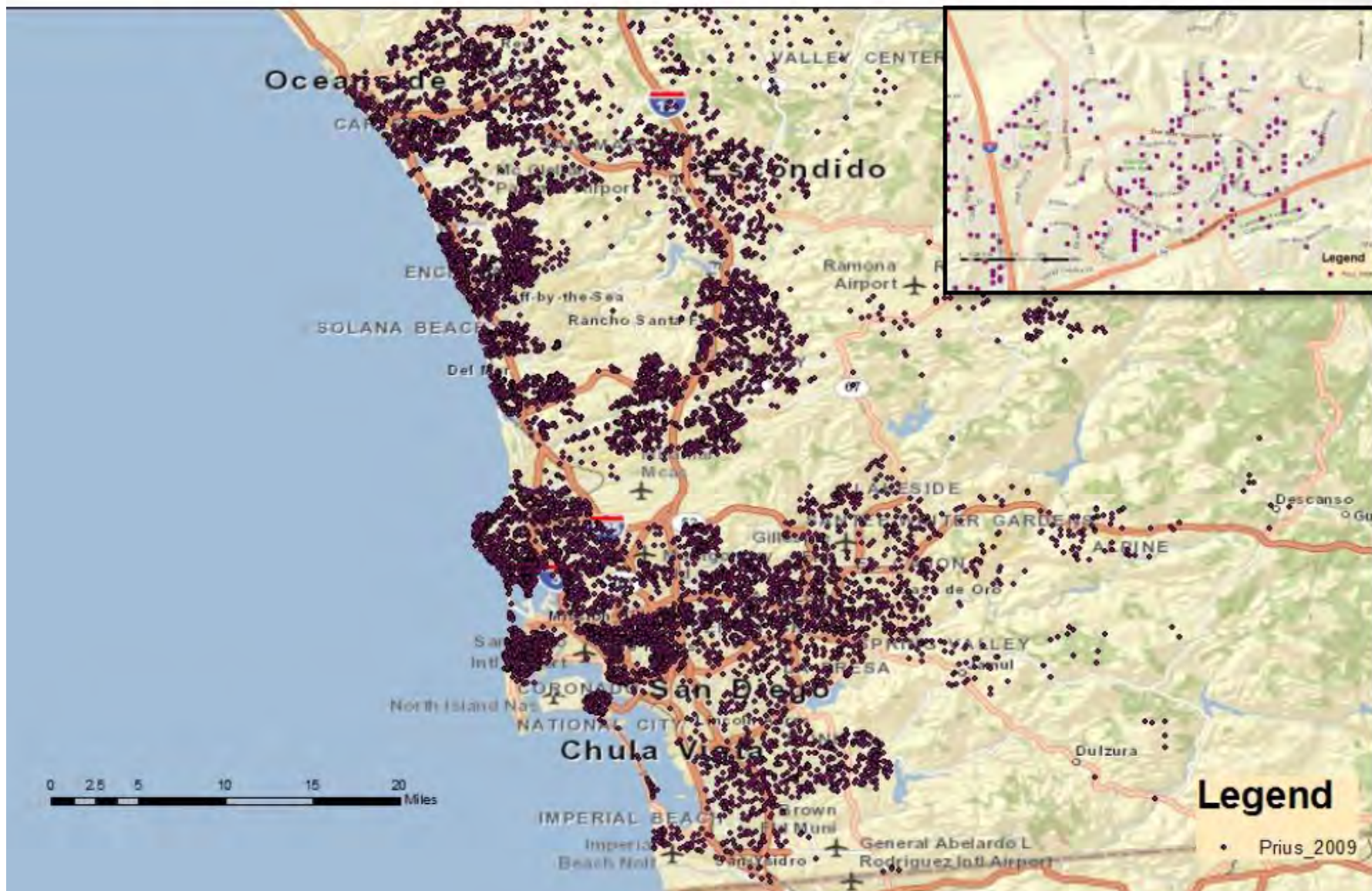
This information was combined with national and regional EV sales forecasts to predict number and distribution of vehicles.

## Data Sources:

2,225,595 passenger cars registered in 5 counties  
US Census – American Community Survey

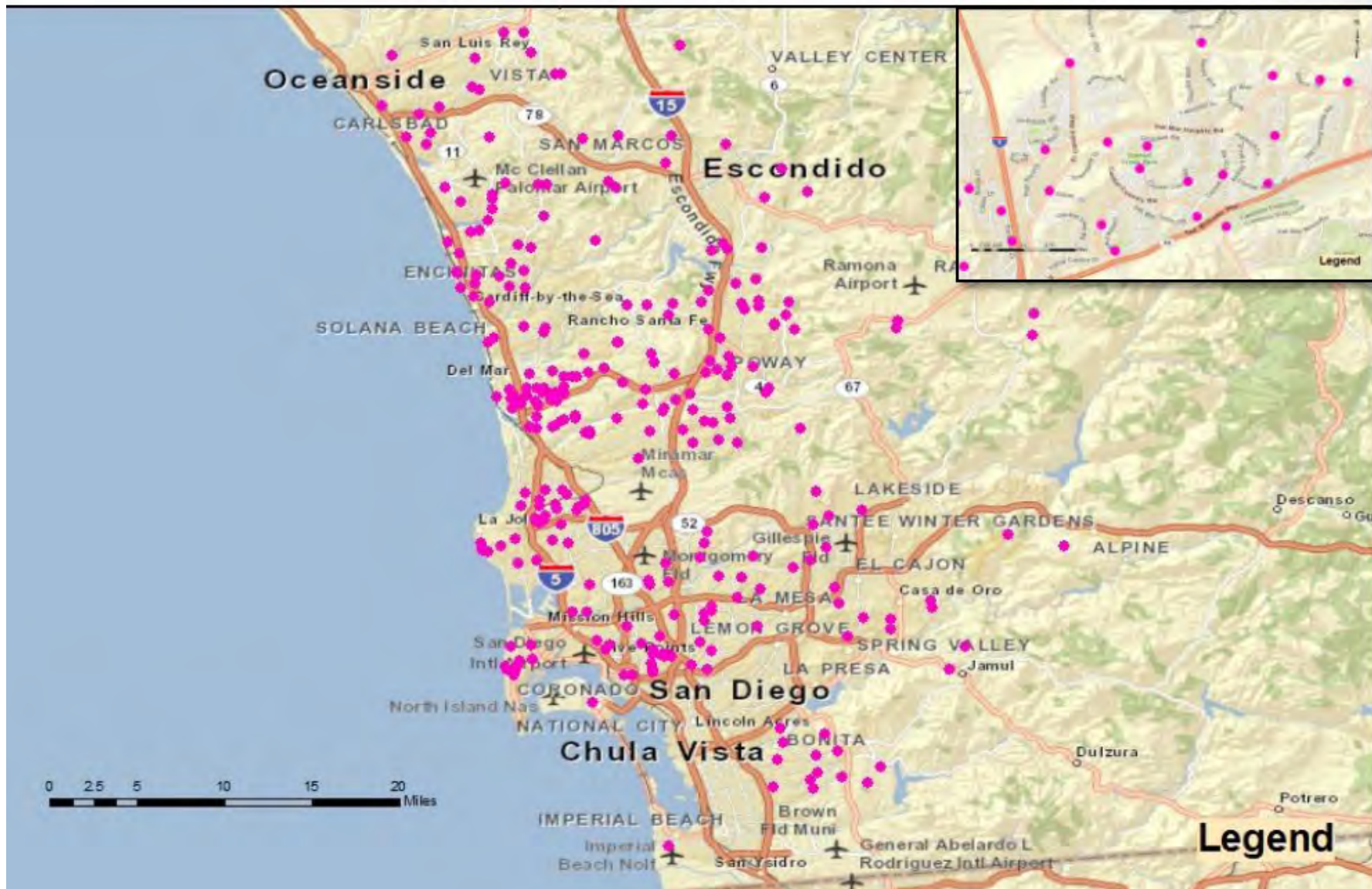
From: Plug-In Vehicles in the San-Diego Region: A Spatial Analysis of the Demand for Plug-In Vehicles, Gil Tal, et al., UC Davis PH&EVRC of ITS

# Hybrid Ownership Distribution



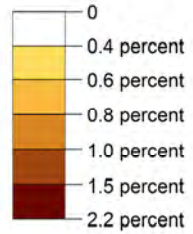
From: Plug-In Vehicles in the San-Diego Region: A Spatial Analysis of the Demand for Plug-In Vehicles, Gil Tal, et al., UC Davis PH&EVRC of ITS

# Plug-In Vehicle Distribution

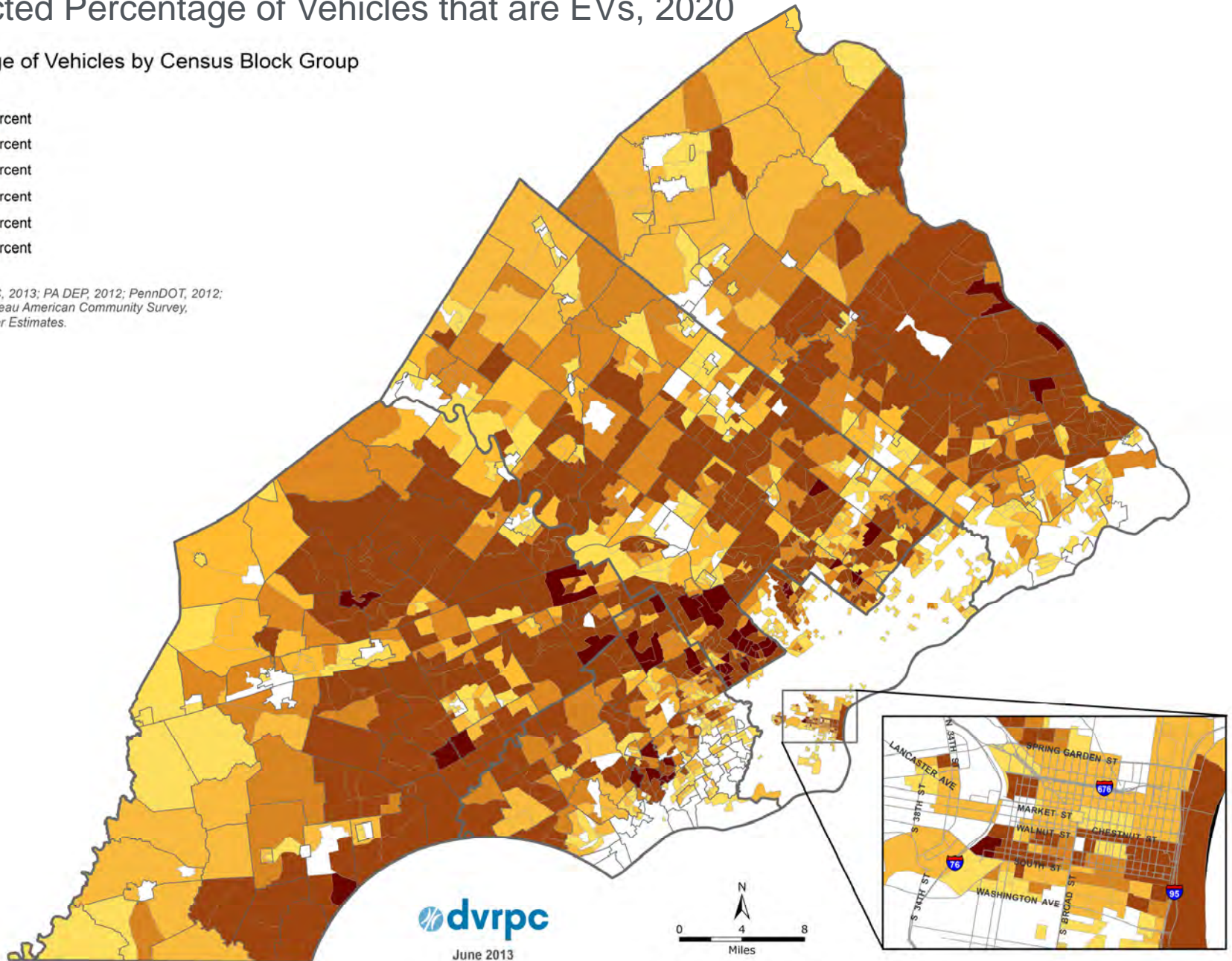


# Projected Percentage of Vehicles that are EVs, 2020

Percentage of Vehicles by Census Block Group



Sources: DVRPC, 2013; PA DEP, 2012; PennDOT, 2012; U.S. Census Bureau American Community Survey, 2006-2010 5-Year Estimates.



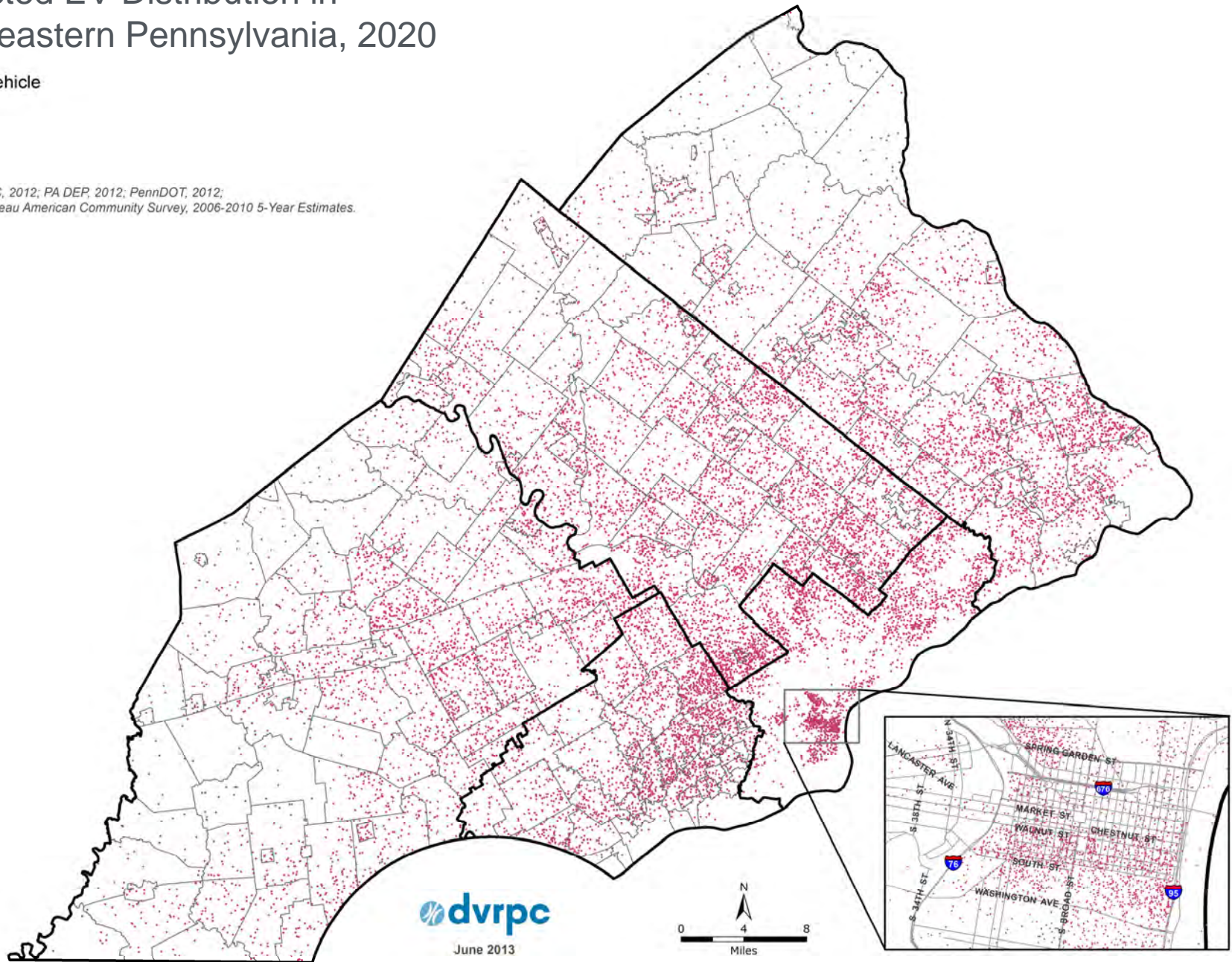
June 2013



# Projected EV Distribution in Southeastern Pennsylvania, 2020

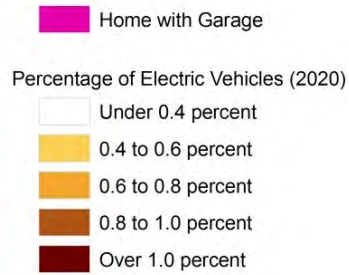
1 Dot = 1 Vehicle

Sources: DVRPC, 2012; PA DEP, 2012; PennDOT, 2012;  
U.S. Census Bureau American Community Survey, 2006-2010 5-Year Estimates.

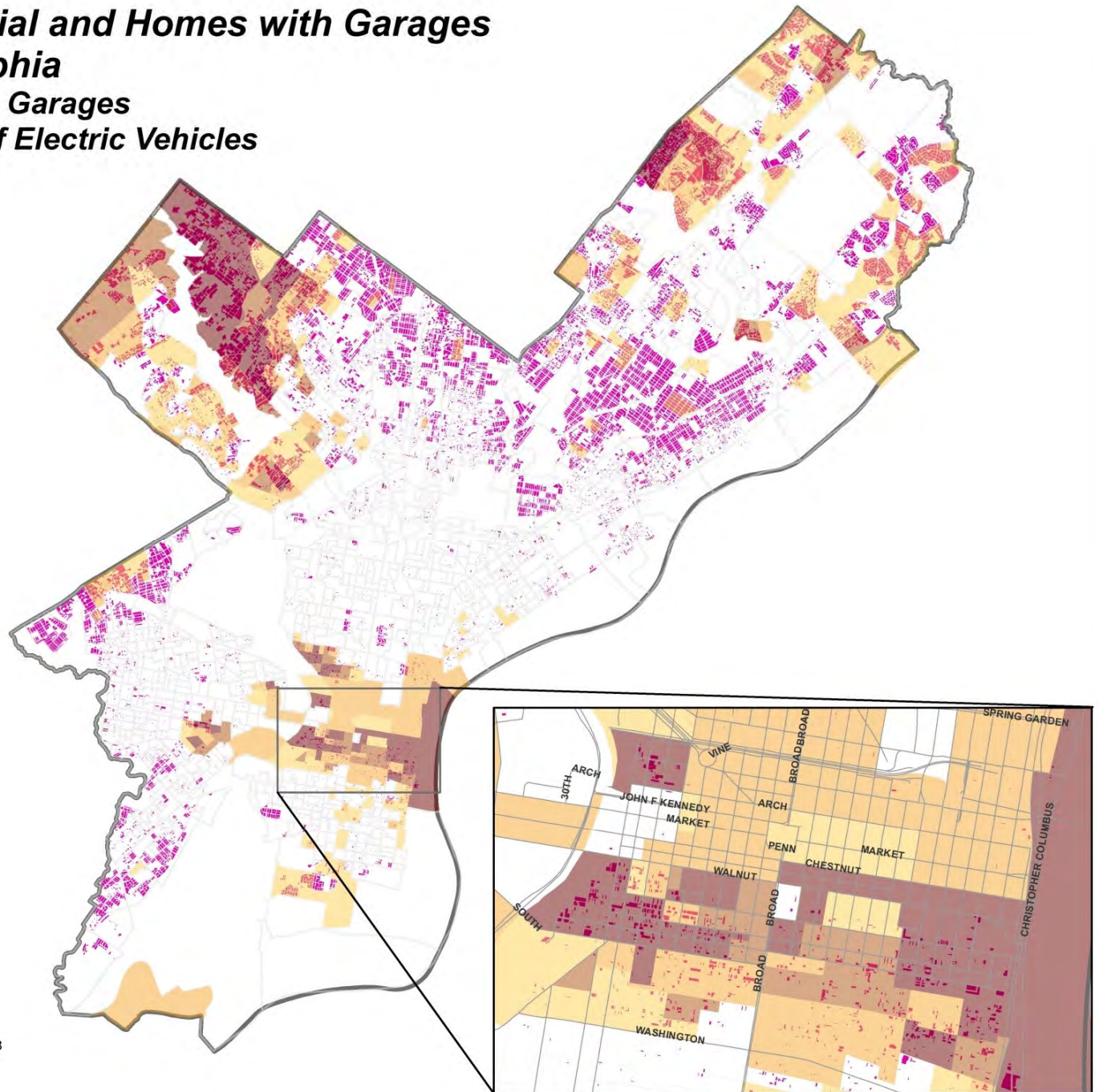


# Electric Vehicle Potential and Homes with Garages in the City of Philadelphia

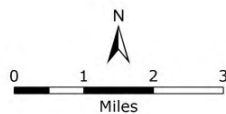
## Homes in Philadelphia with Garages and Potential Percentage of Electric Vehicles by Census Block Group



Sources: DVRPC, 2012; PA DEP, 2012; PennDOT, 2012; U.S. Census Bureau American Community Survey, 2006-2010 5-Year Estimates.



March, 2013



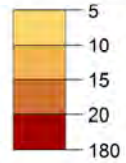
# Evaluation of “Away from Home” Charging

- Density of employment
  - Roadways with greatest average daily travel
  - High volume interchanges
  - Major destinations
- 
- Data from various sources, including MPO GIS data

# Areas with Highest Potential for Public and Workplace Charging

Based on High Volume Interchanges and Roads, Employment Density, and Major Destinations

Employment per Acre  
(within DVRPC Employment Centers)



High Volume Interchange: 1 Mile Buffer

Roadway with Daily Volume 30,000+

EV Charging Station Planned

Airport

Hospital

Major Business Park

Major Shopping Center

Casino

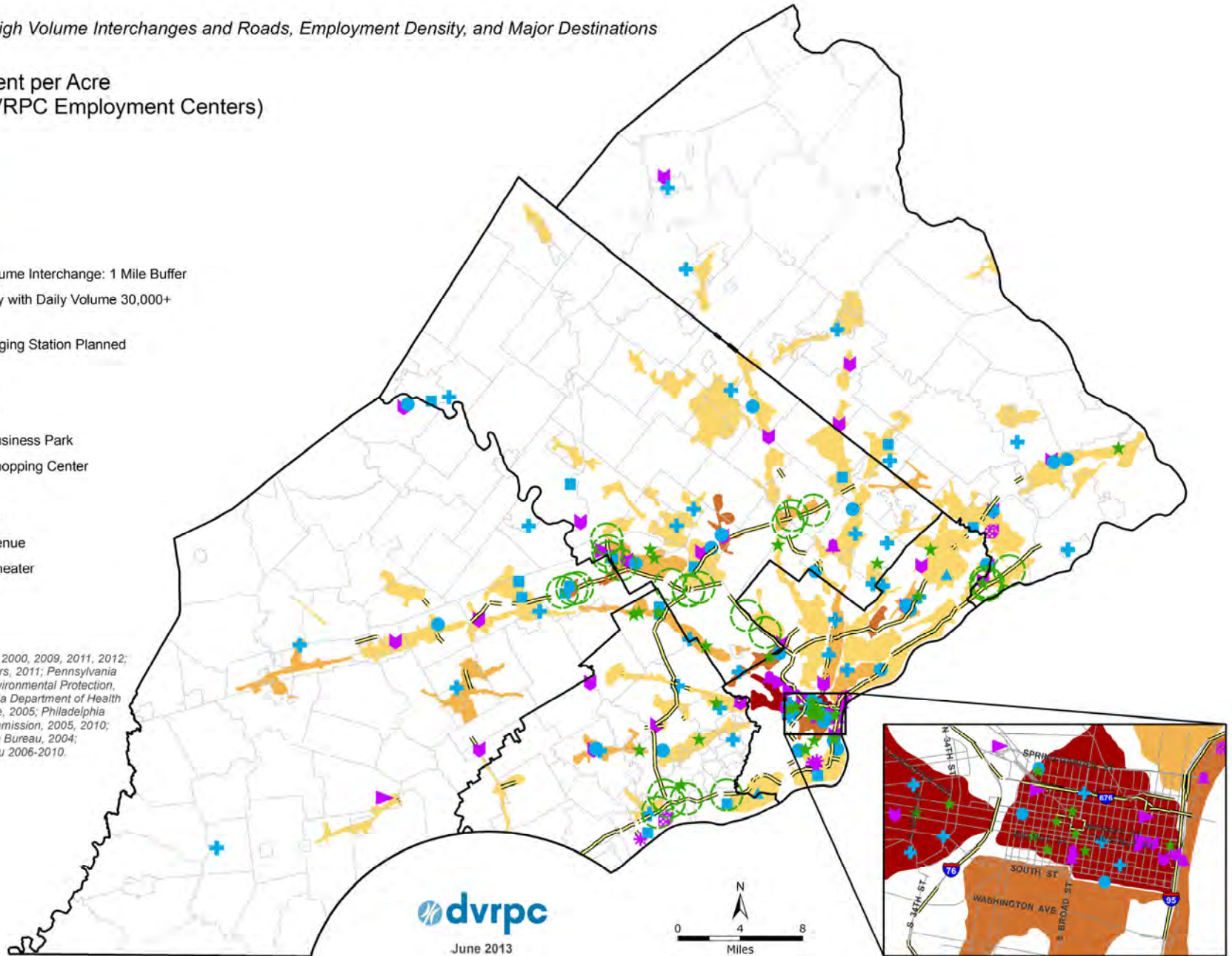
Museum

Music Venue

Movie Theater

Stadium

Sources: DVRPC, 2000, 2009, 2011, 2012; FAA, 2009; Hoovers, 2011; Pennsylvania Department of Environmental Protection, 2012; Pennsylvania Department of Health and Public Welfare, 2005; Philadelphia City Planning Commission, 2005, 2010; National Research Bureau, 2004; US Census Bureau 2006-2010.

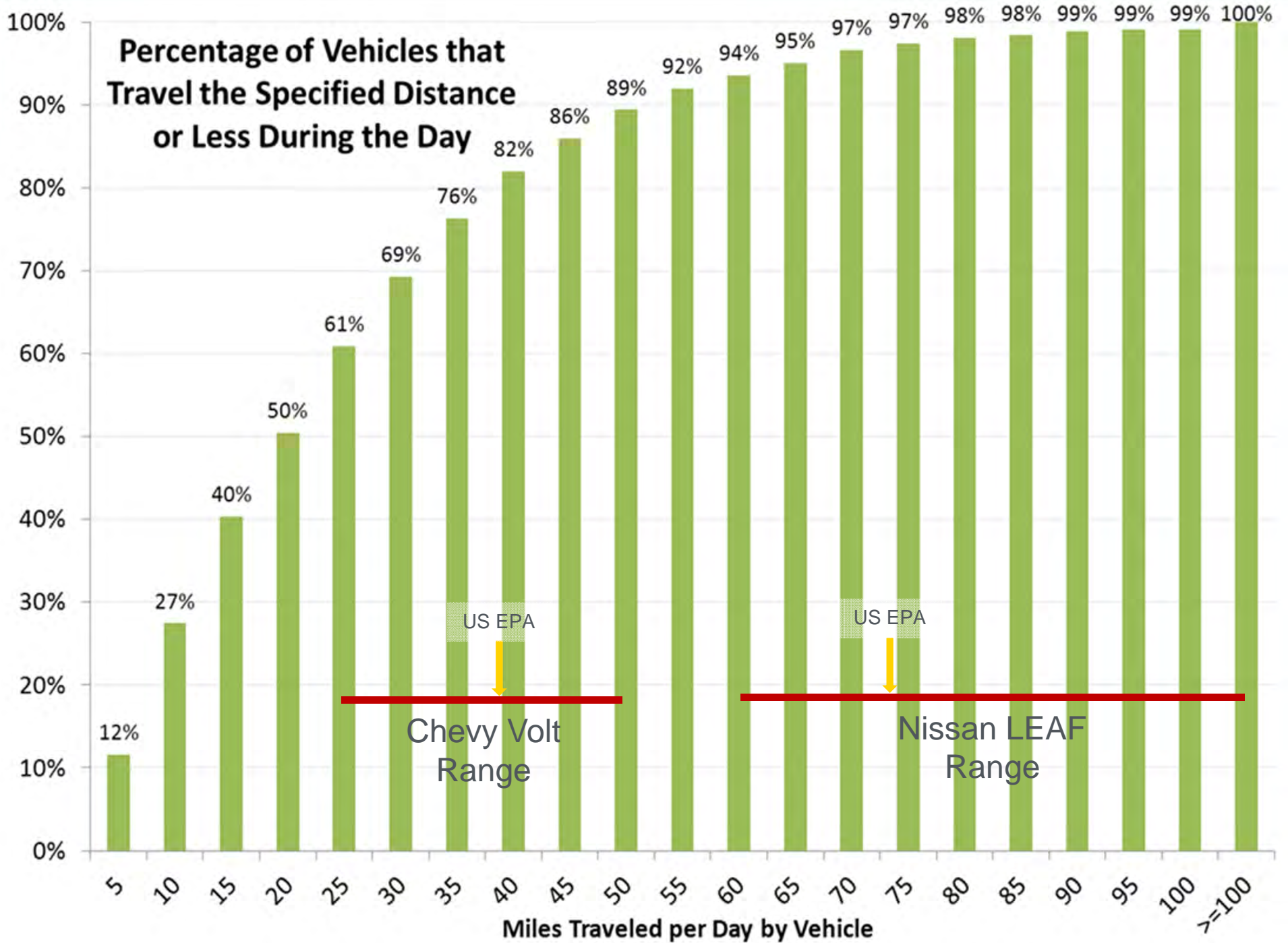


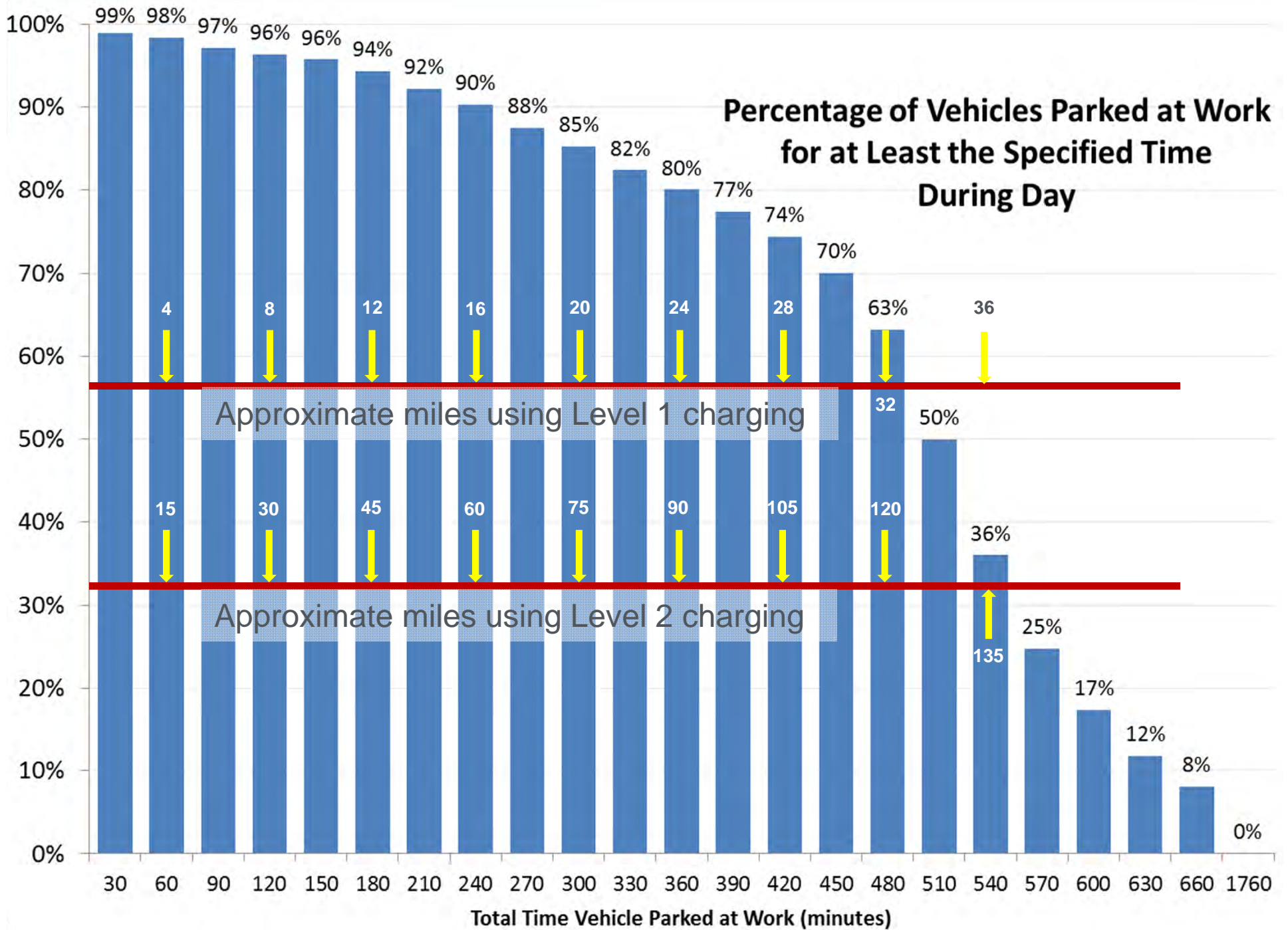
June 2013



# Driving and parking habits

- DVRPC Household Survey – 2588 vehicles in 5 counties
- Based on a 24 hour diary and follow-up phone interview with households.
- From 2000 – New survey in the field right now
- Provides data on each trip taken for all modes.





# Combination of Distance and Time Parked

## Combinations of Distance Traveled and Time Parked in SE PA

Distance Traveled (miles)	40 or less	40 or less	70 or less	70 or less
Time Parked at Work (hours)	4 or more	6 or more	4 or more	6 or more
Portion of vehicles meeting both criteria	71%	64%	88%	78%

## Conclusions:

- Many vehicles in the region can readily be replaced by EVs.
- Many Volt (and other PHEV/EREV) users can get by with only Level 1 at home charging.
- Many LEAF (and other AEV) users can likely get by with only Level 2 at home charging (no work charging).
- Most at work charging need can be met by Level 1, both for PHEV/EREV users and AEV users.



## Overall lessons for MPOs

- Analysis of vehicle registration data and demographic information can identify likely locations of EV owners.
- Traffic and employment data, together with key venue locations can identify the most promising locations for away from home charging, both workplace and “opportunity” charging.
- Household travel surveys can help gauge the prospects for EVs and the relative need for Level 1 vs. Level 2 workplace charging.

# EV Planning and Readiness in Southeastern Pennsylvania



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