



Department of the Environment

Cumulative Impacts: Analysis of Updated Mapping of Census and Permit Data for Maryland

Prepared by the Maryland Department of the Environment
August 2014





Why an outside presenter?

- Formerly with the Department.
- Participated in the prior effort.
- Provide an historical perspective on updated information.
- Suggest, based on previous experience, some avenues that may be productive.
- **Not presenting State policy or approach.**

- Maps of key census variables and permit data that were previously used to attempt to identify environmental justice areas in Maryland.
- 6 variables were obtained from the 2010 Census of Population and Housing and the American Community Survey
 - Population Density
 - Percent of Families in Poverty
 - Minority Population
 - Median Household Income
 - Educational Attainment
 - Percent Renter



Permit data: All and “EJ”

- The permit information was extracted from the MDE Enterprise Environmental Management System’s TEMPO database:
- Selected Permits include the following:
 - **§ 2-404 Air Quality Permit to Construct/replace components of an existing source/ modify an existing source**, such as: crematories, medical waste incinerators, waste-to-energy plants, cement plants and coal-fired power plants
 - **§ 7-232 Permits to own, operate or maintain a controlled hazardous substance facility**
 - **§ 9-209 Permits to install, materially alter landfill systems or incinerators**
 - **§ 9-231 and §9-232 Permits for sewage sludge utilization** (storage or distribution only)
 - **§ 9-323 Permits to discharge pollutants to waters of the state**





What Products Were Prepared?

- An atlas of **statewide** maps displaying selected information by census tract was created.
- Maps for **Baltimore City** and **Prince George's** counties were also created as in the initial request.
- The list of included permits is available from MDE.



How will they be useful?

- **Help** you to make some choices:
 - Visual/geographic perspective – **starting point/screening** approach.
 - Look for **general patterns** in the data.
 - What areas are associated with variables typically related to cumulative impacts or environmental justice concerns?
 - How consistent is the association? How does the association change with scale or area?
 - What variables should be added, dropped or narrowed? Which are redundant? Narrow the field for more intensive examination.
 - Consider carefully which permits are included: numerous but not relevant permits such as a wetland permit for a pier can hide more relevant associations.
 - Next steps?

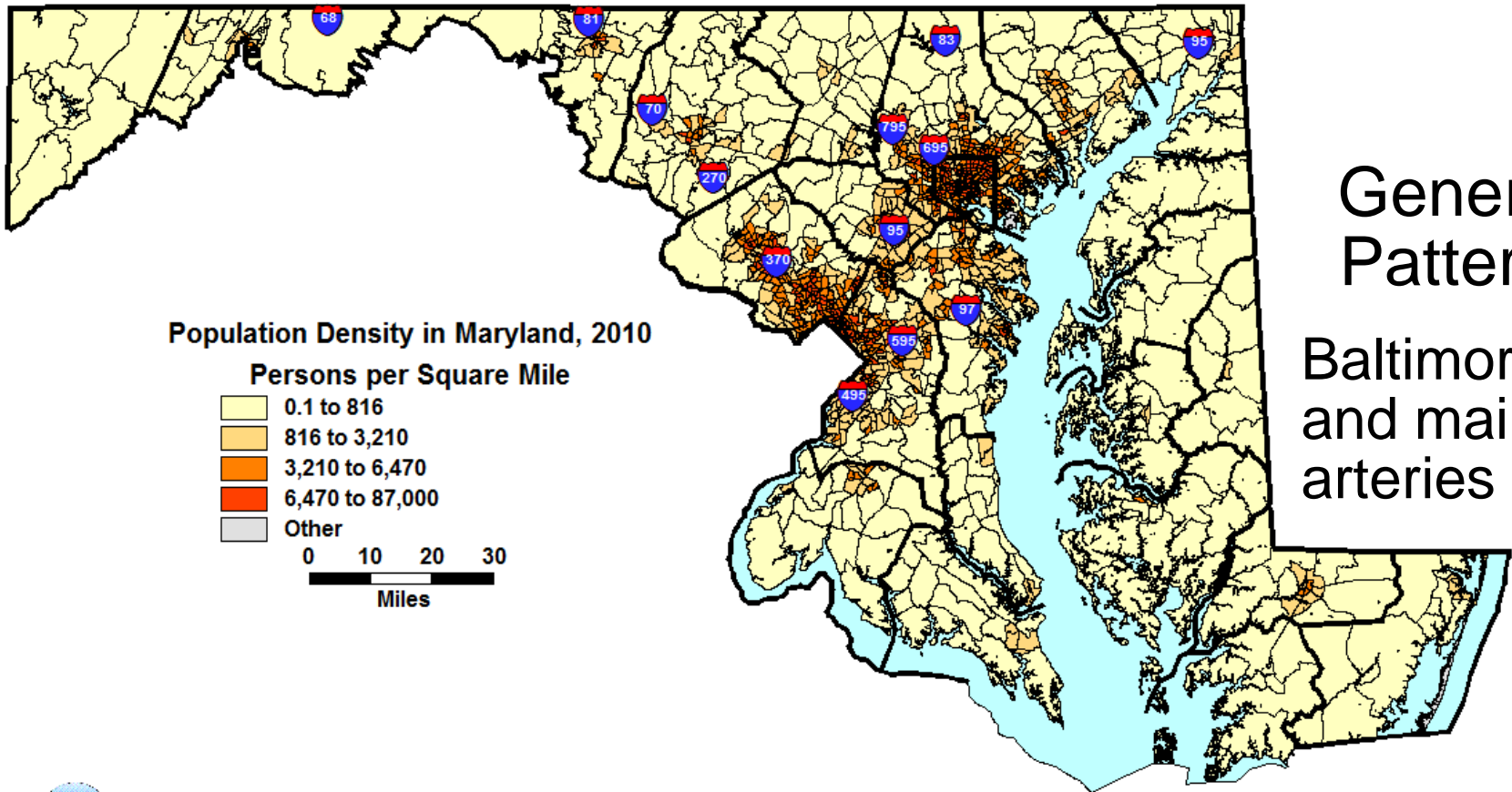
Assumptions and approach for this analysis

- Environmental justice: All communities should enjoy equally high levels of environmental protection.
- Cumulative impacts:
 - One way to begin to address environmental justice.
 - Try to understand when the combined effect of multiple discharges or emissions may have a detrimental effect, even if individually they do not.

More Assumptions

- This presentation is part of a starting point to investigate the means to identify and avoid cumulative impacts to the health and quality of life of all communities and address any inequities found.

Statewide - Population Density



General
Pattern:

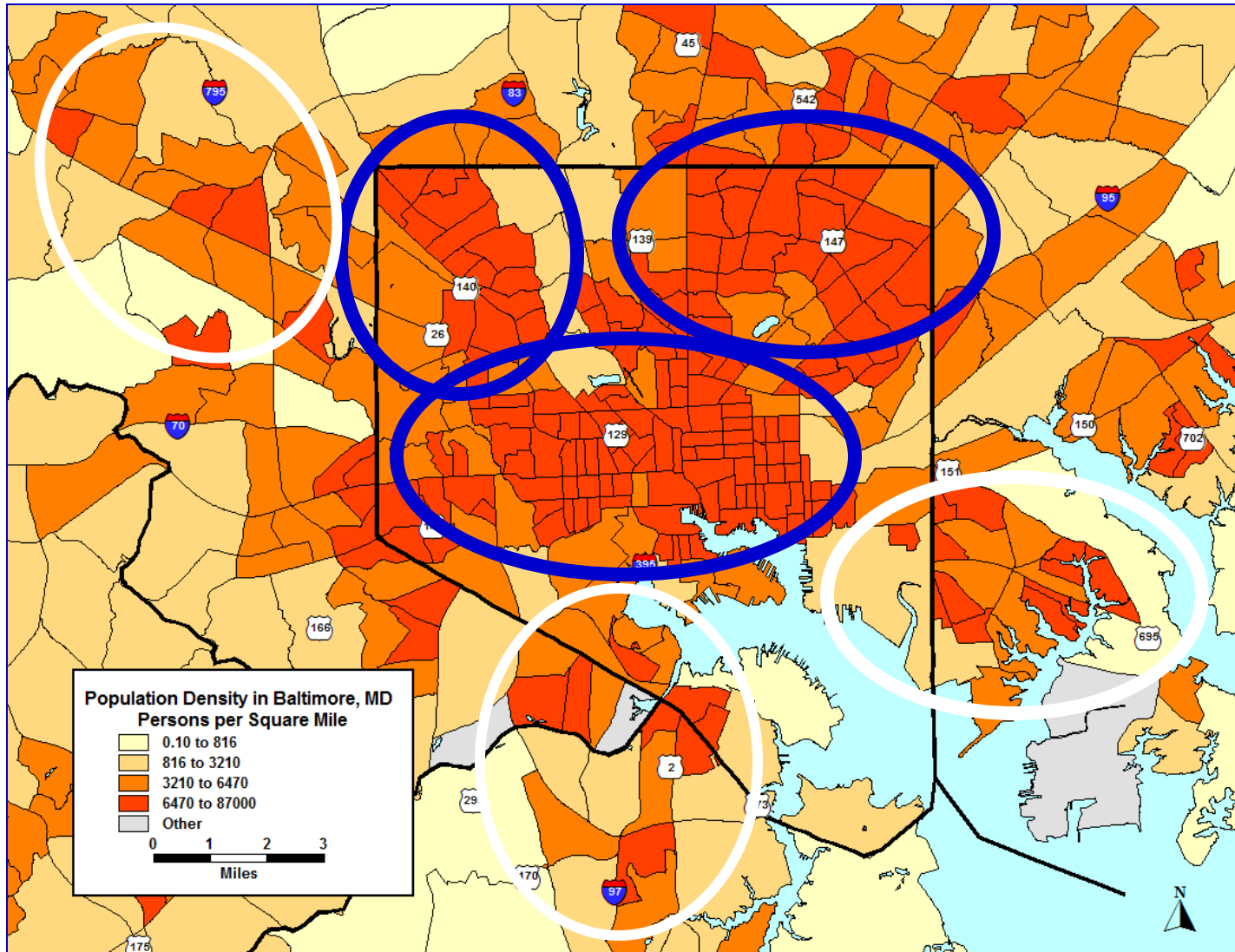
Baltimore, DC
and main
arteries



Map Prepared by the Maryland Department of the Environment
Source of Information: U.S. Census of Population and Housing, 2010
The Population Density for Maryland is 594.8 Persons per Square Mile.



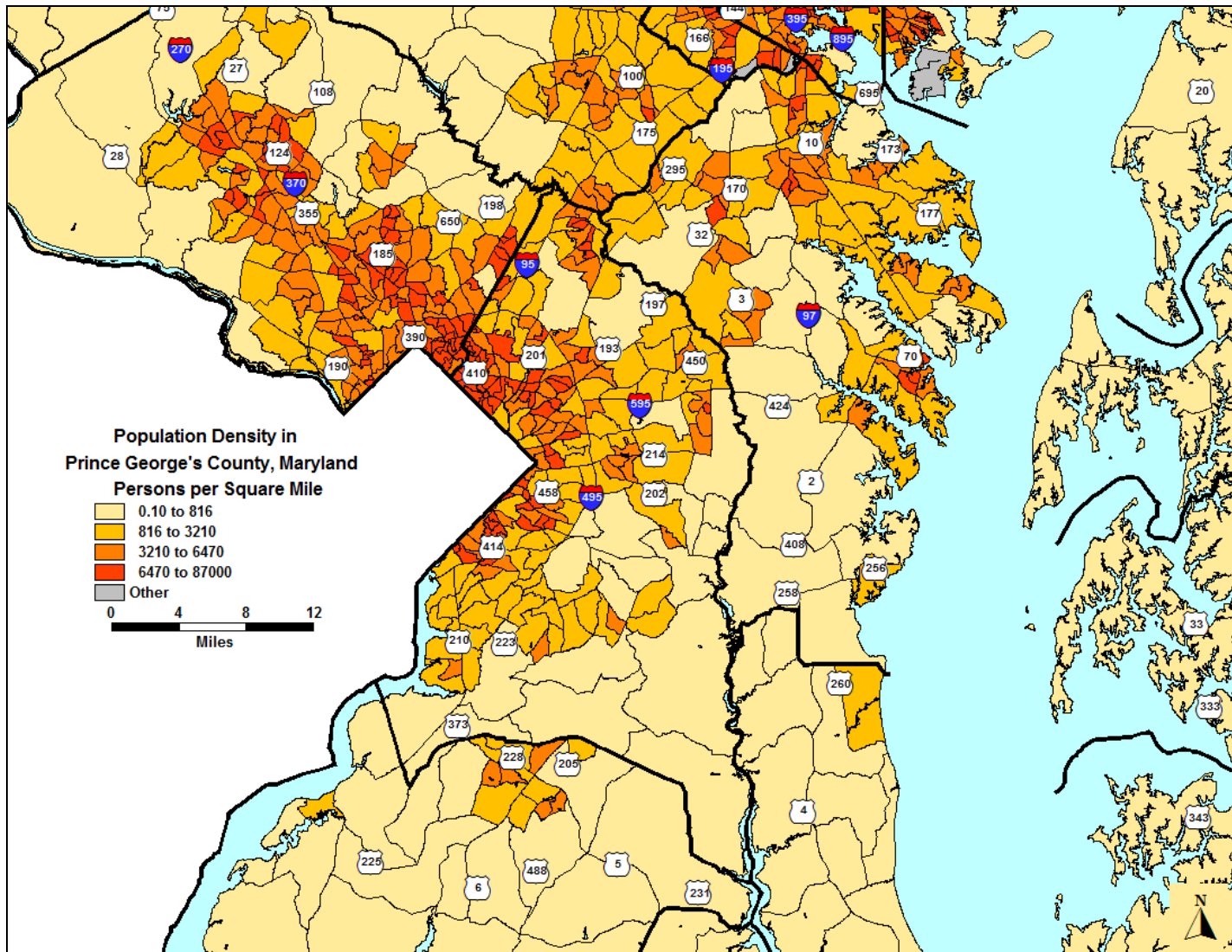
Baltimore Region – Population Density



General Pattern:

- NW
- NE
- S
- SE & NW, N-AA

Prince George's County – Population Density

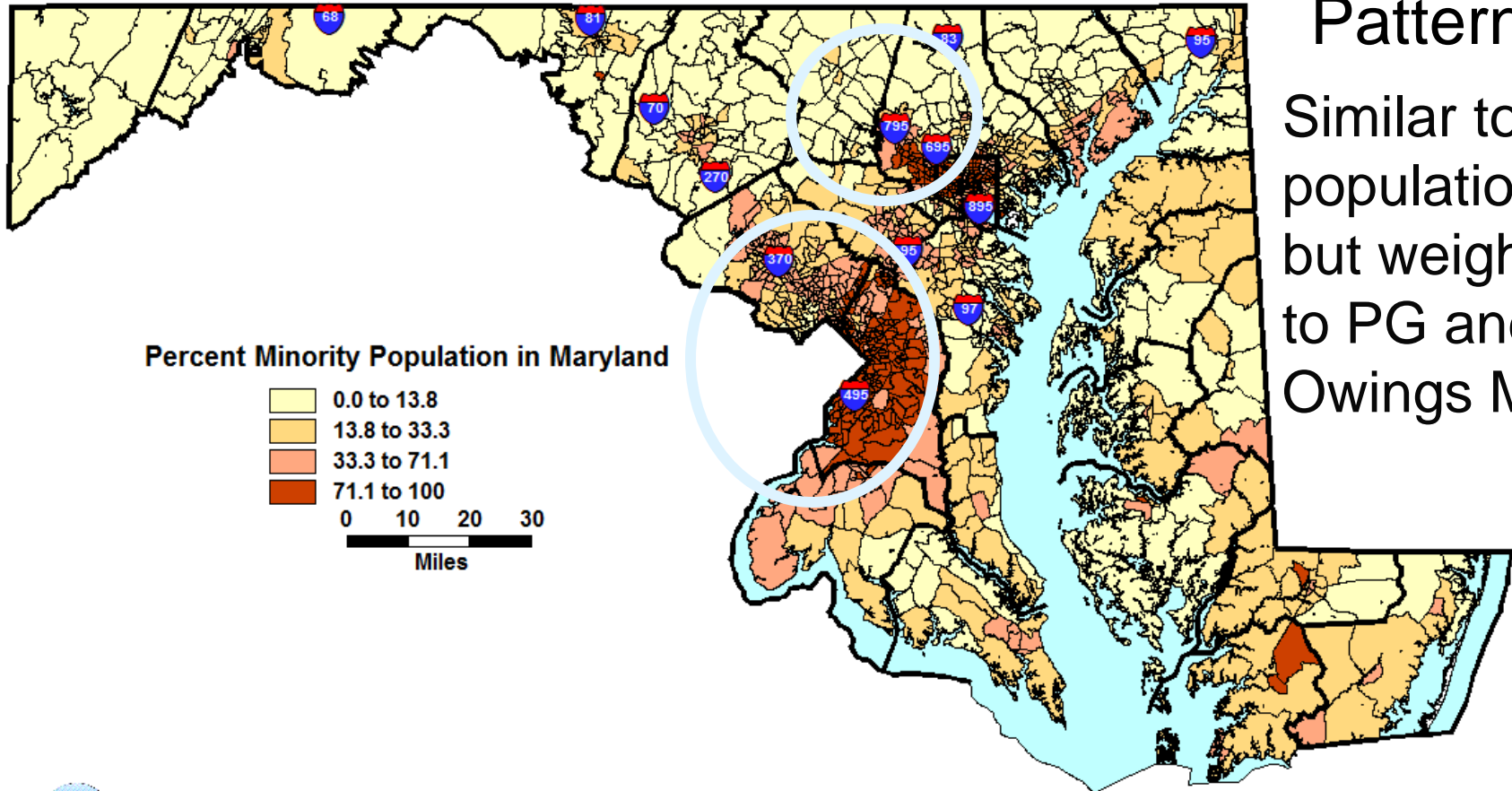


General
Pattern:
Around DC
and up I-
270 and I-
95/295

Statewide - Minority Population

General
Pattern:

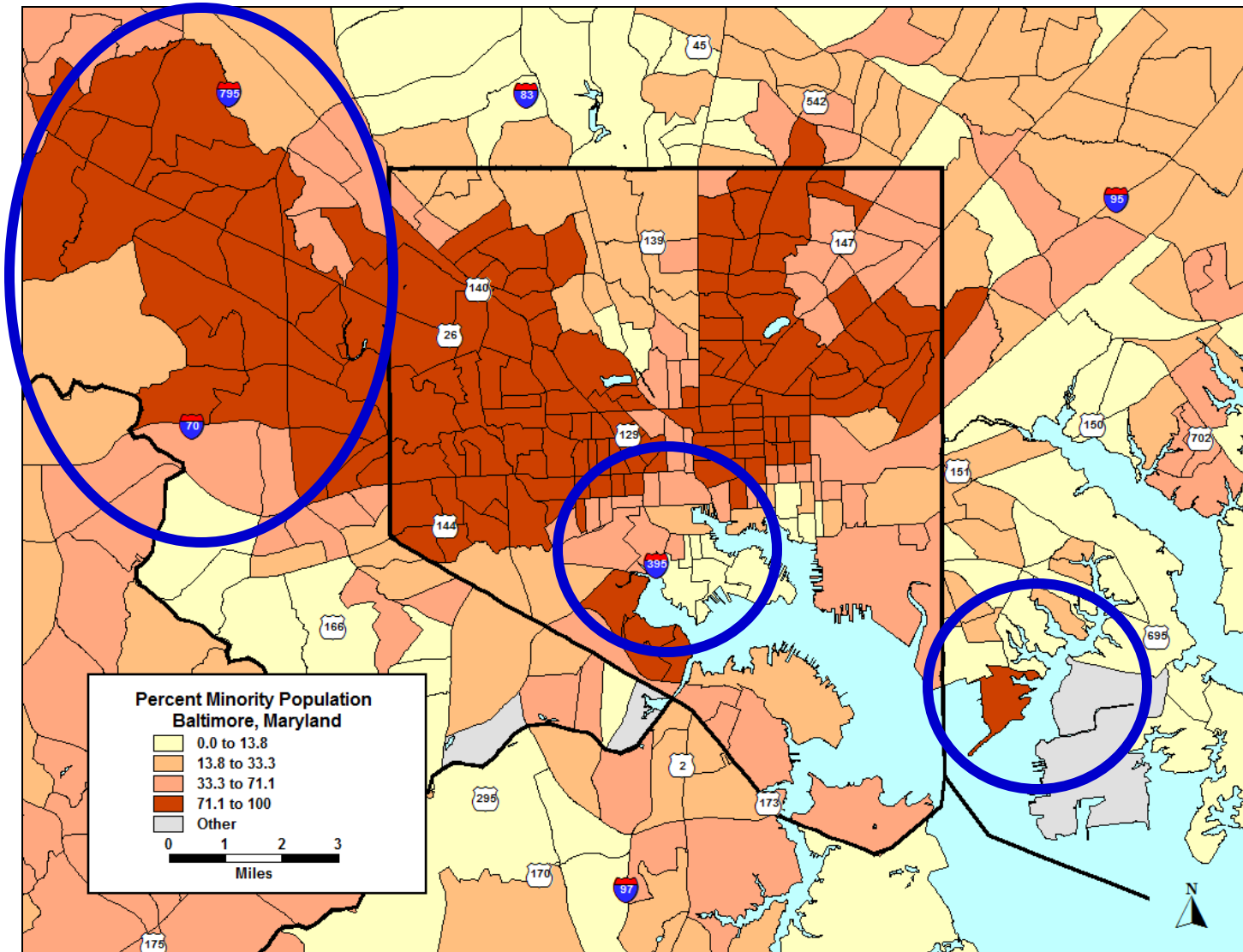
Similar to total
population,
but weighted
to PG and
Owings Mills



Map Prepared by the Maryland Department of the Environment
Source of Information: U.S. Census of Population and Housing, 2010
The Percent Minority Population for Maryland is 22.0 Percent.



Baltimore Region – Minority Population

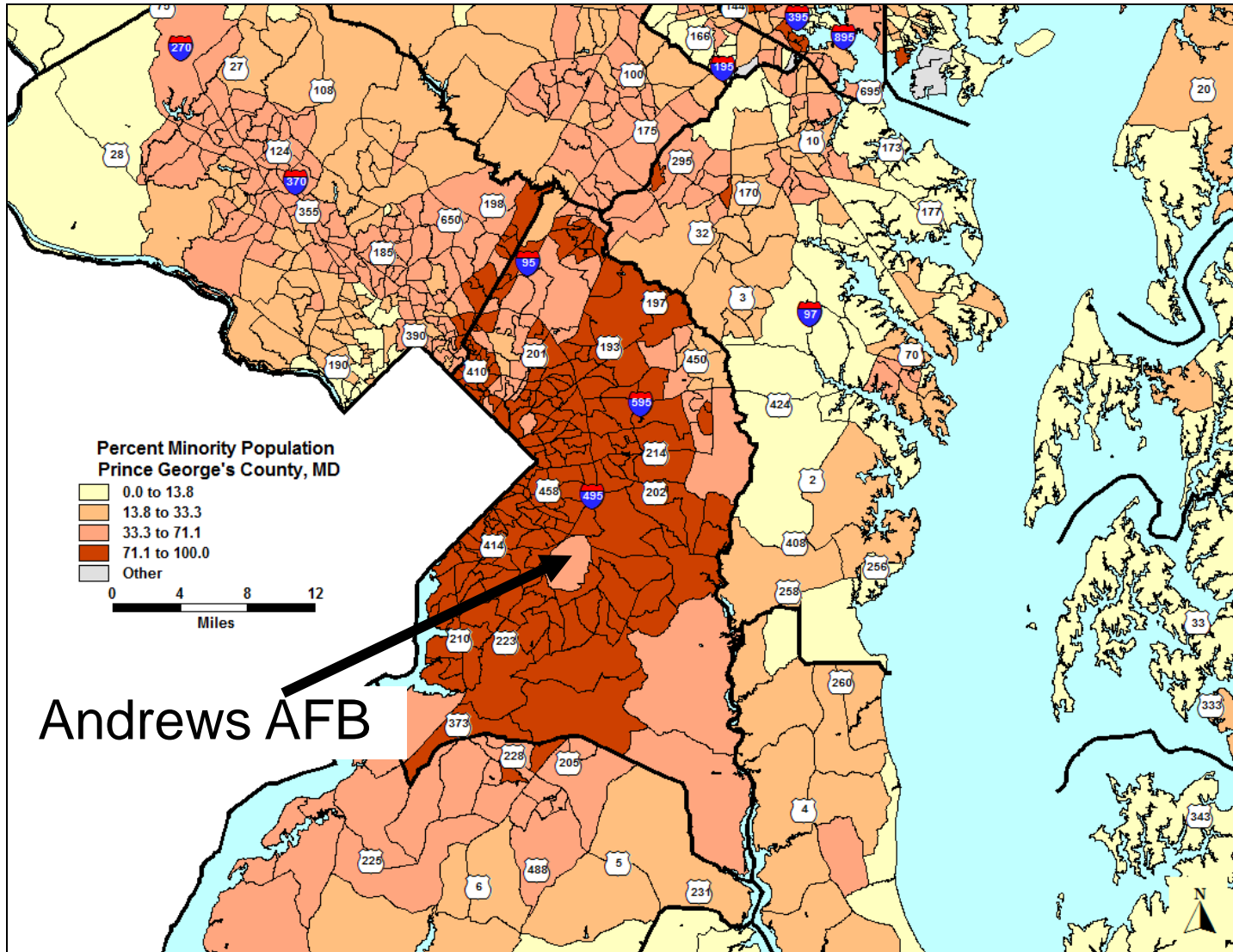


**General
Pattern:**

NW greatly
extended and
increased
compared to
total
population.

S & SE
diminished

Prince George's County - Minority Population



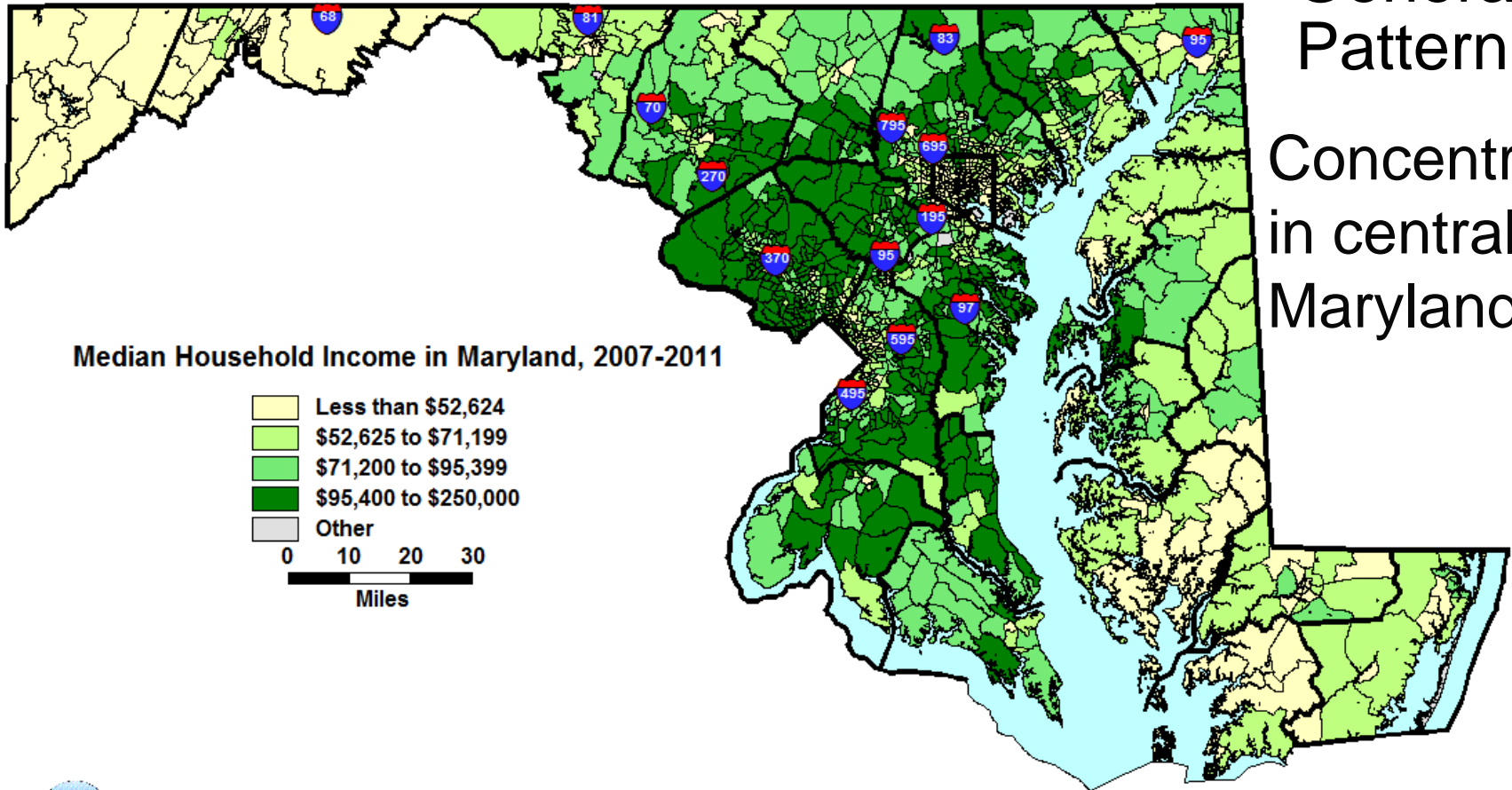
General
Pattern:

Minority
population
heavily
weighted
toward PG
County

Income

General
Pattern:

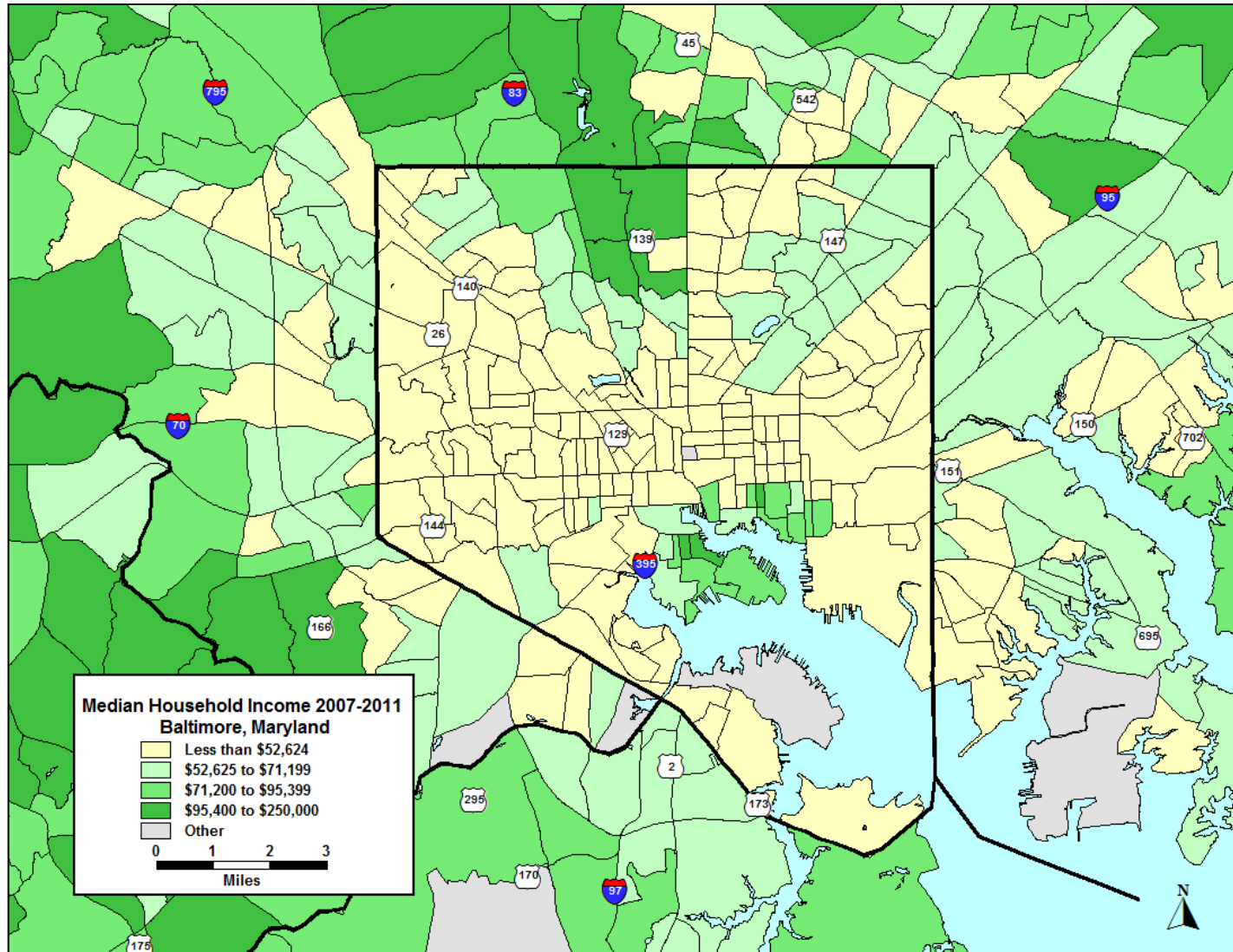
Concentrated
in central
Maryland.



Map Prepared by the Maryland Department of the Environment
Source of Information: American Community Survey 5-Year Estimates 2007 to 2011
The Median Household Income for Maryland is \$70,004 for 2011.



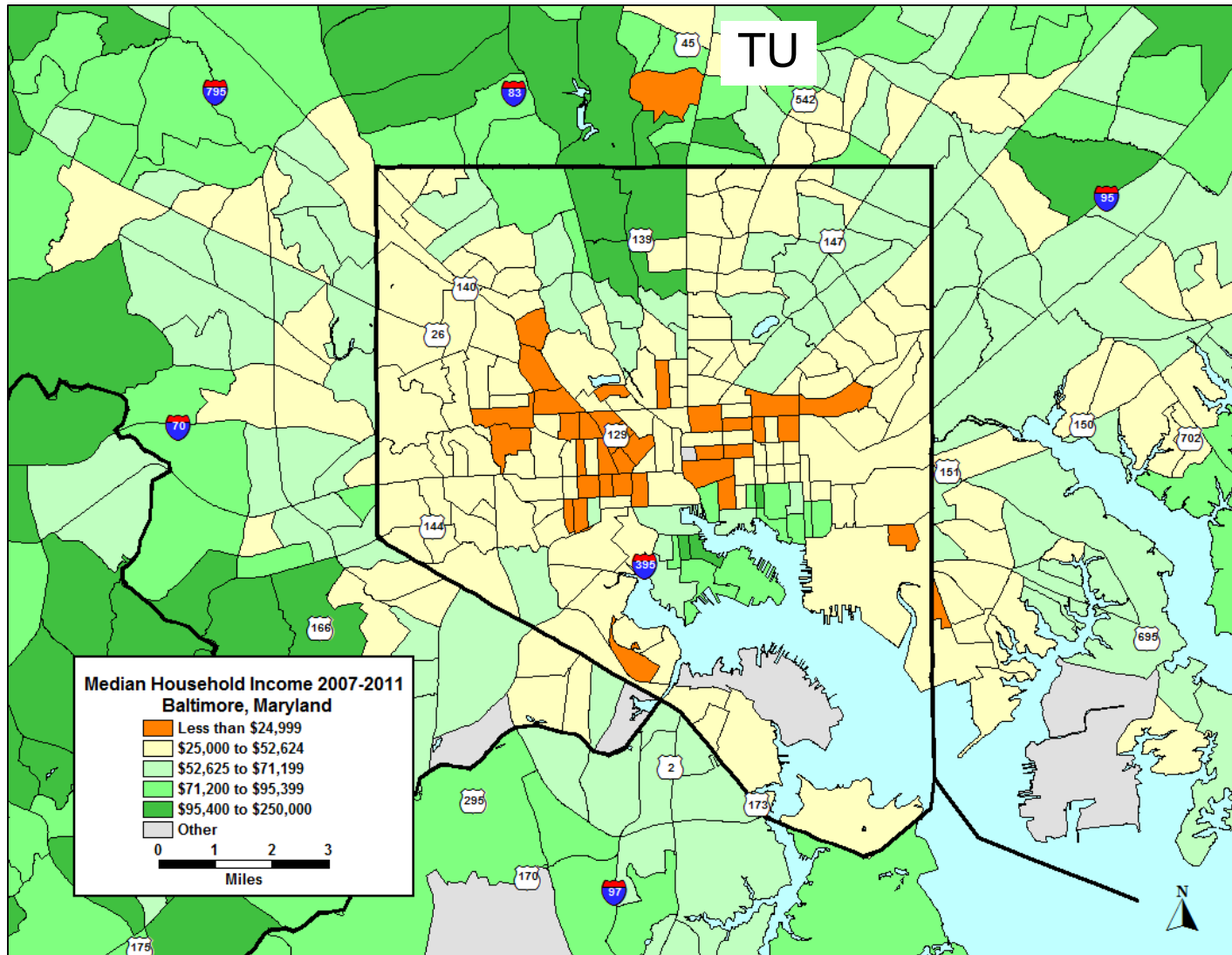
Baltimore Region – Income - Quintiles



General Pattern:

North central and around Harbor are higher income areas; not generally informative.

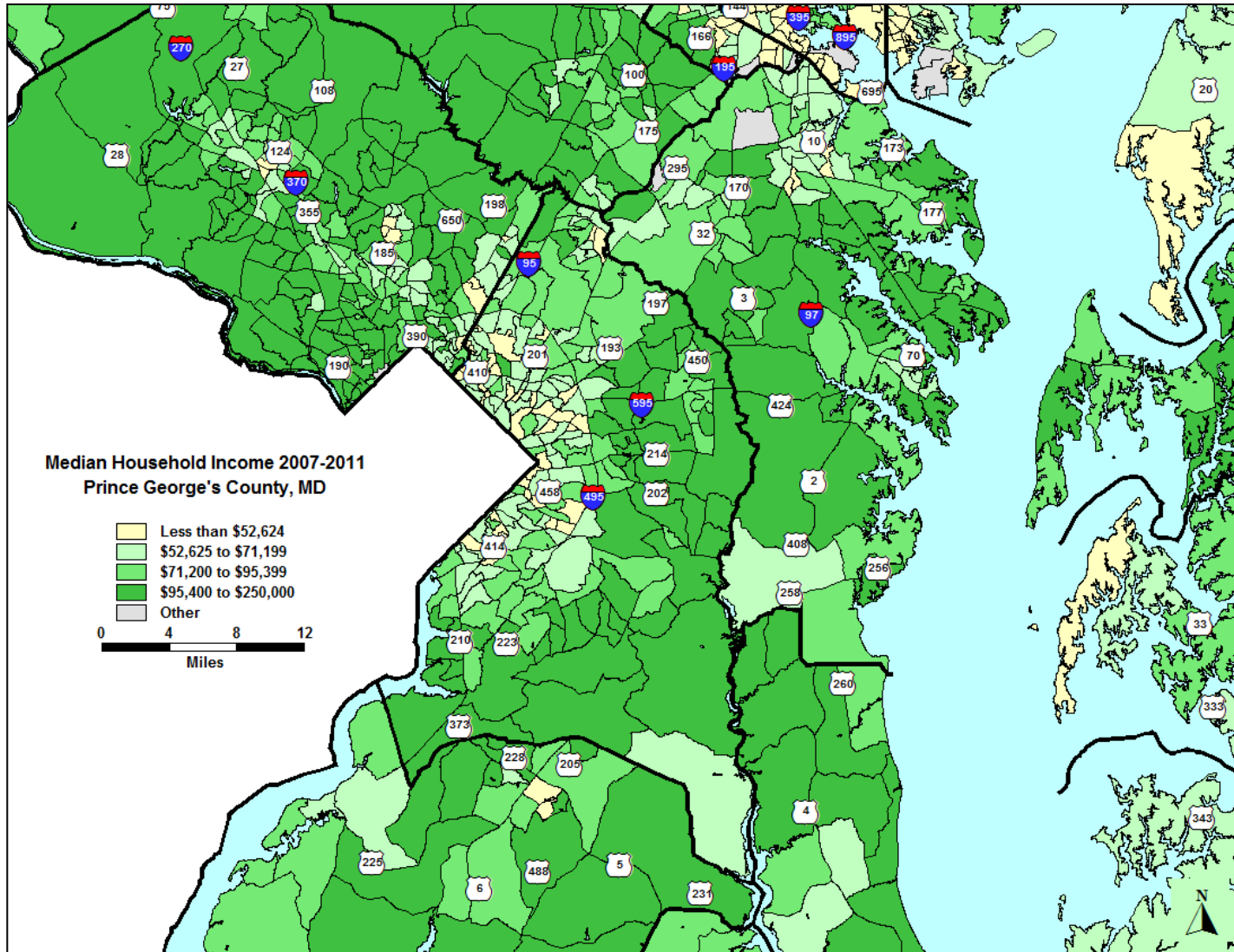
Baltimore Region – Income - Sextiles



General
Pattern:

Finer
resolution
does not
clarify
anything.

Prince George's County – Income - Quintiles

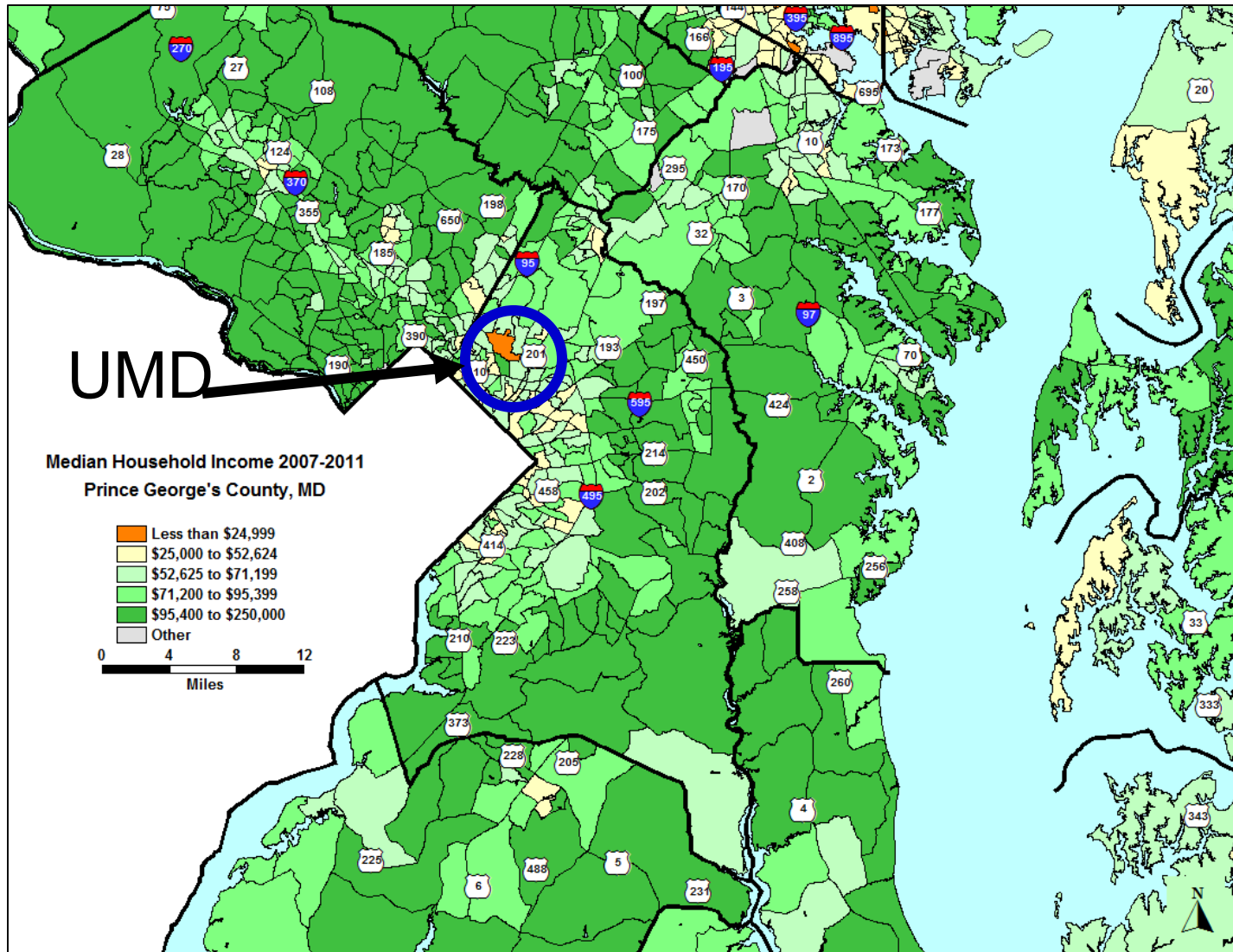


General
Pattern:

PG
income
decreases
toward
DC.

Generally
higher
than Balt.

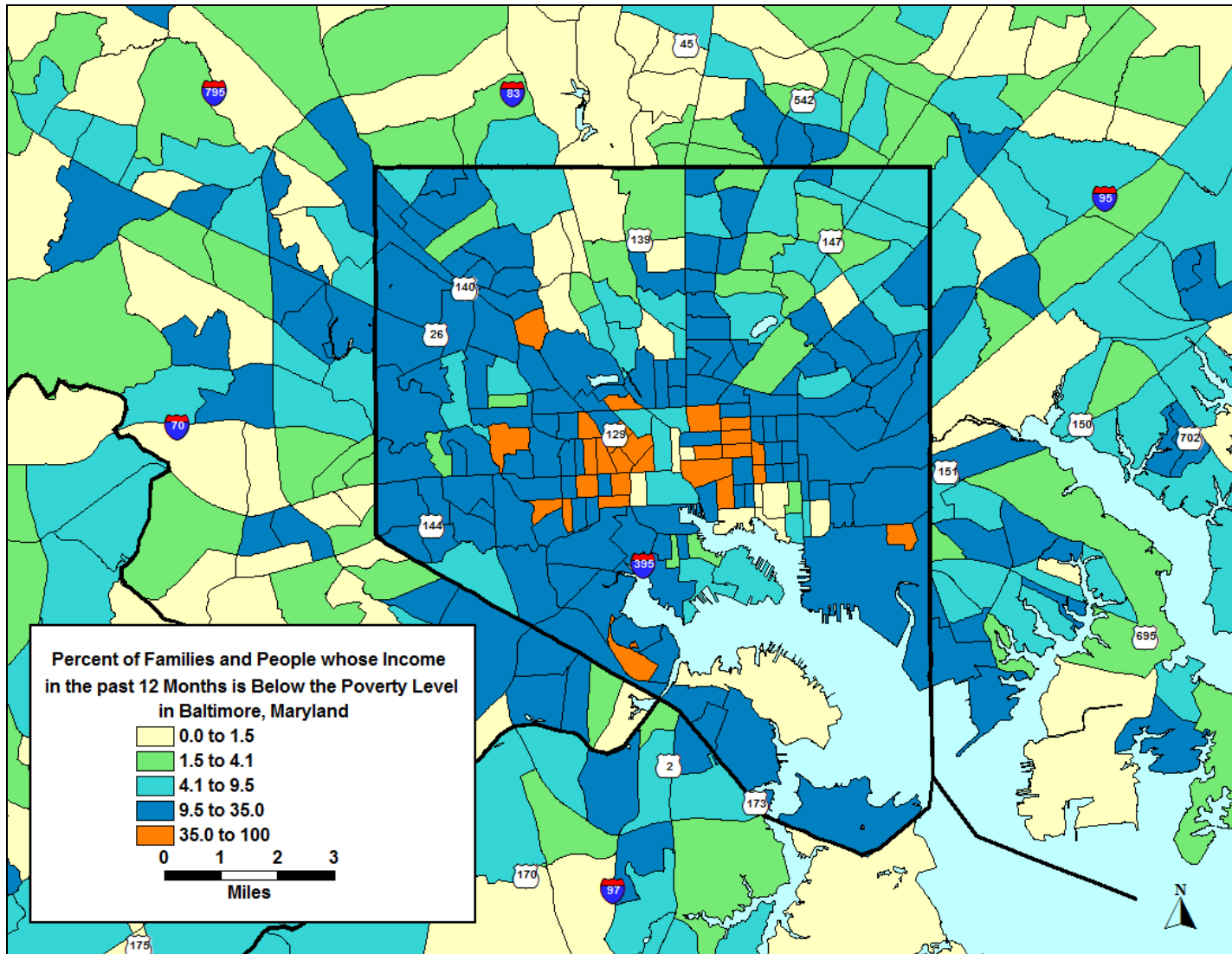
Prince George's County – Income - **Sextiles**



General
Pattern:

With
greater
precision
one area
seems to
stand
out.

Baltimore Region – Poverty - Quintiles

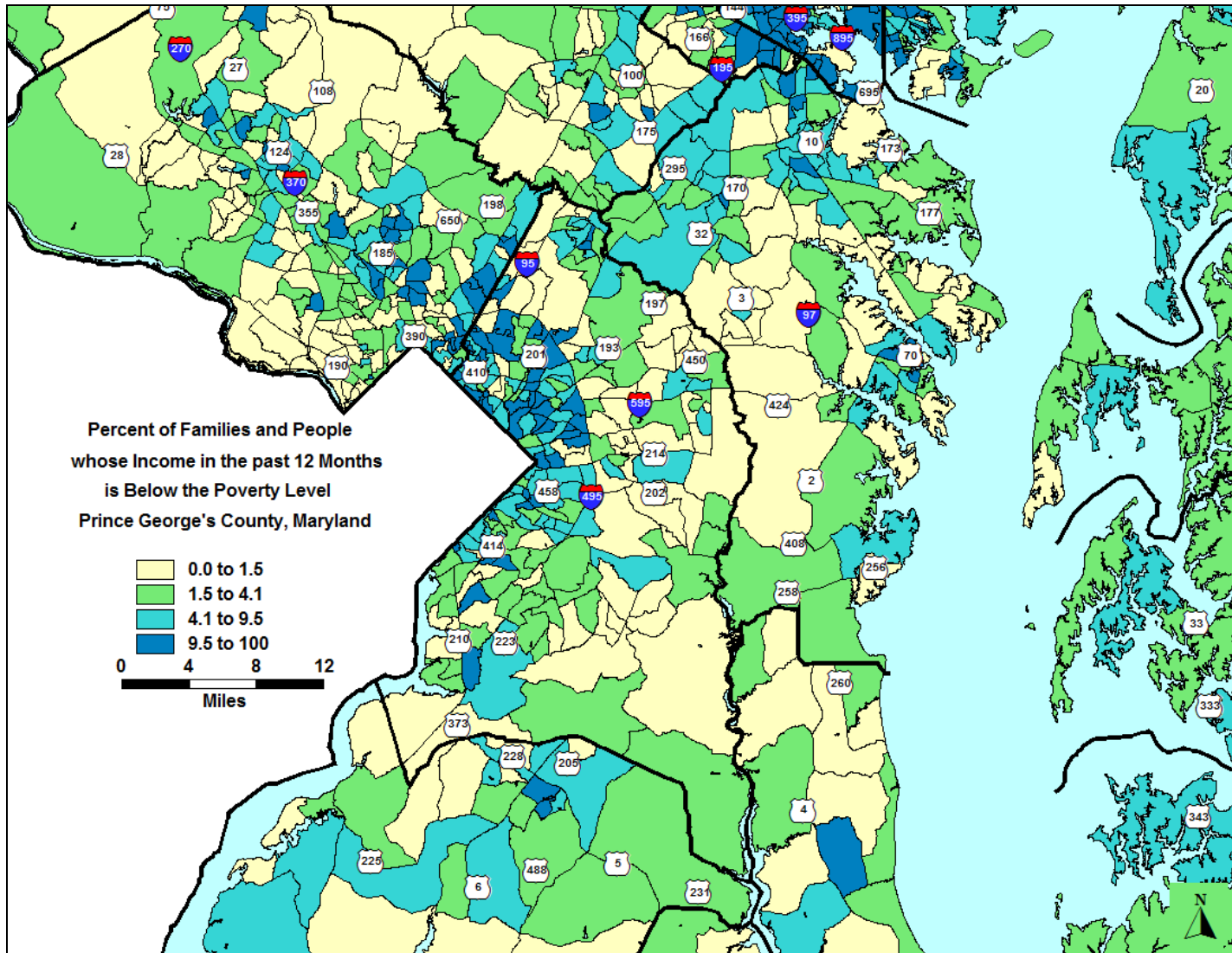


General Pattern:

Generally opposite income.

Some additional precision, but not especially informative.

Prince George's County – Poverty - Quartiles



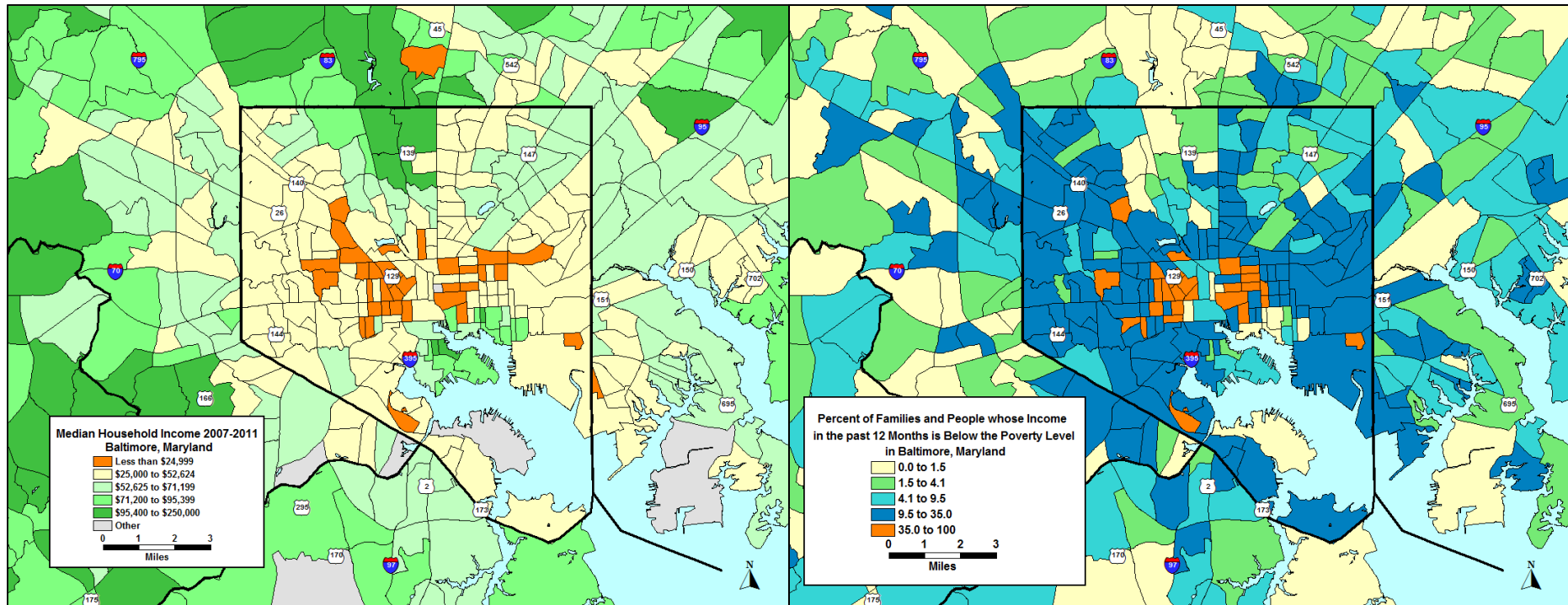
General Pattern:

Increases toward DC and North County; scattered up I-270.

Quantifying similarities

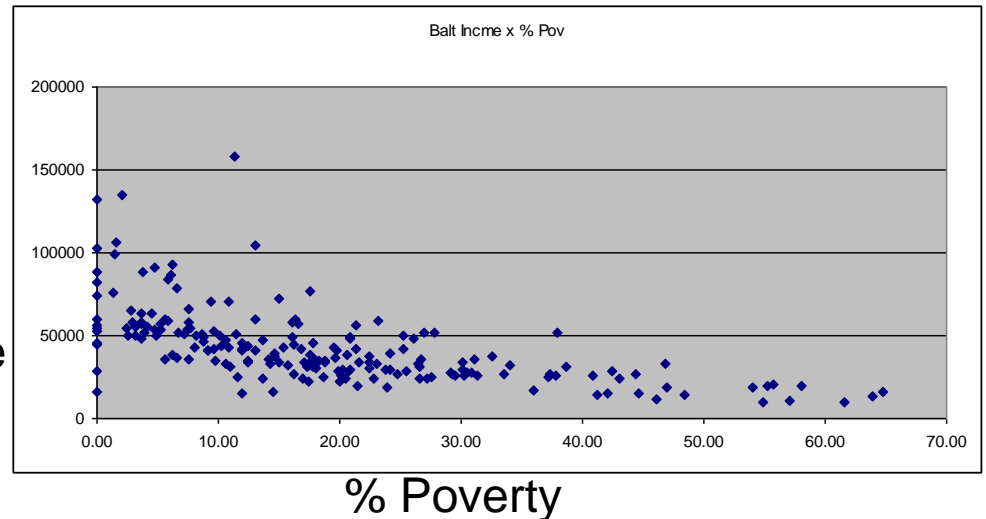
- There seems to be some similarities (or redundancy) between the variables.
- How can we quantify those similarities and make them comparable to the relationships between other variables?

Baltimore Income x % Poverty



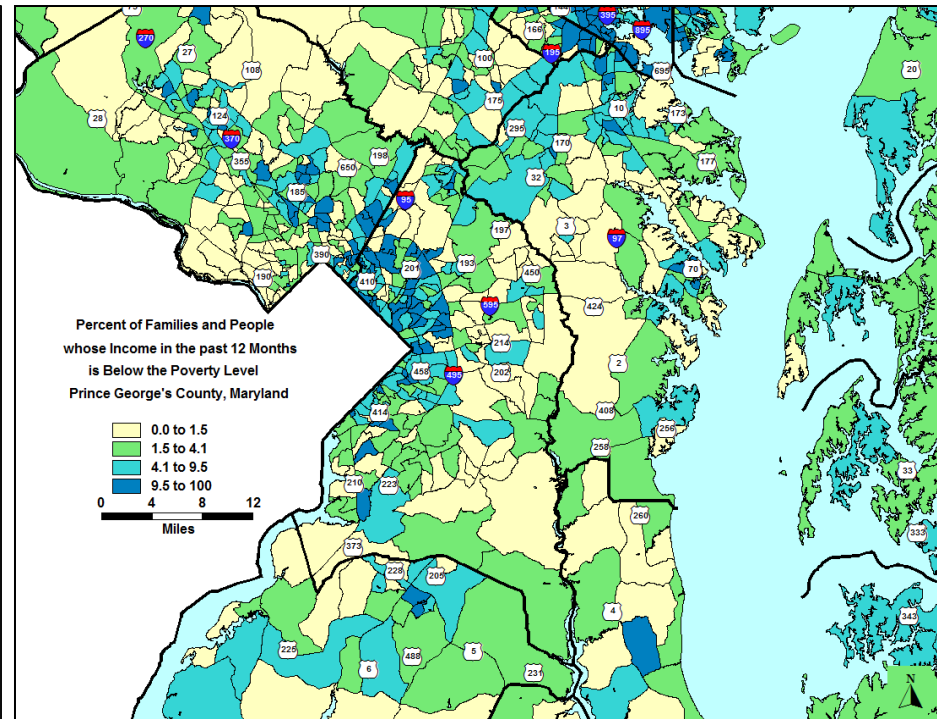
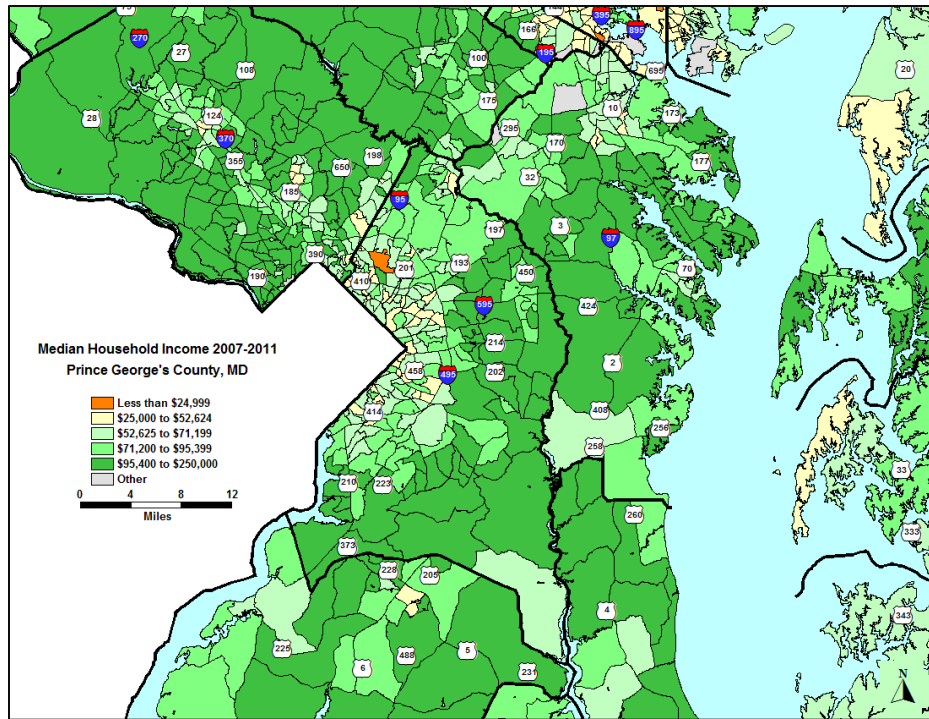
Corr -0.61

Income

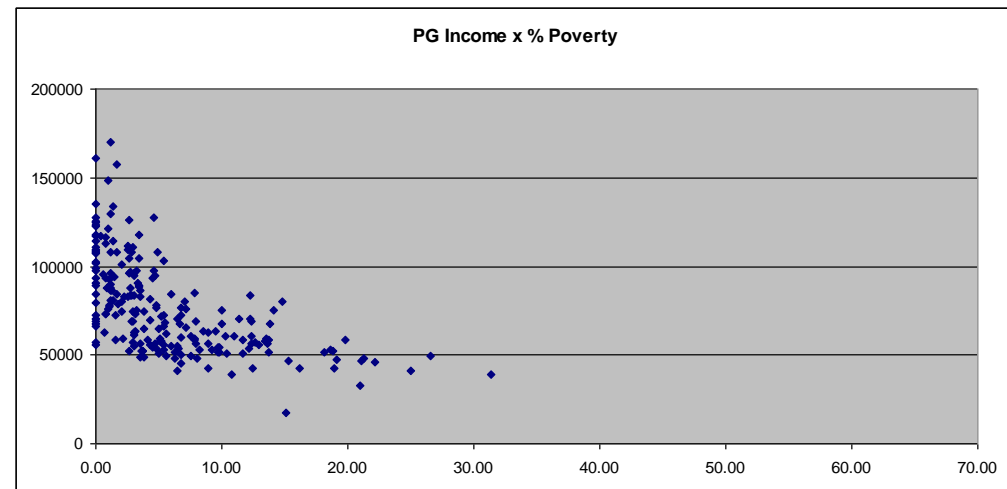




PG Income x % Poverty



Corr = -0.60

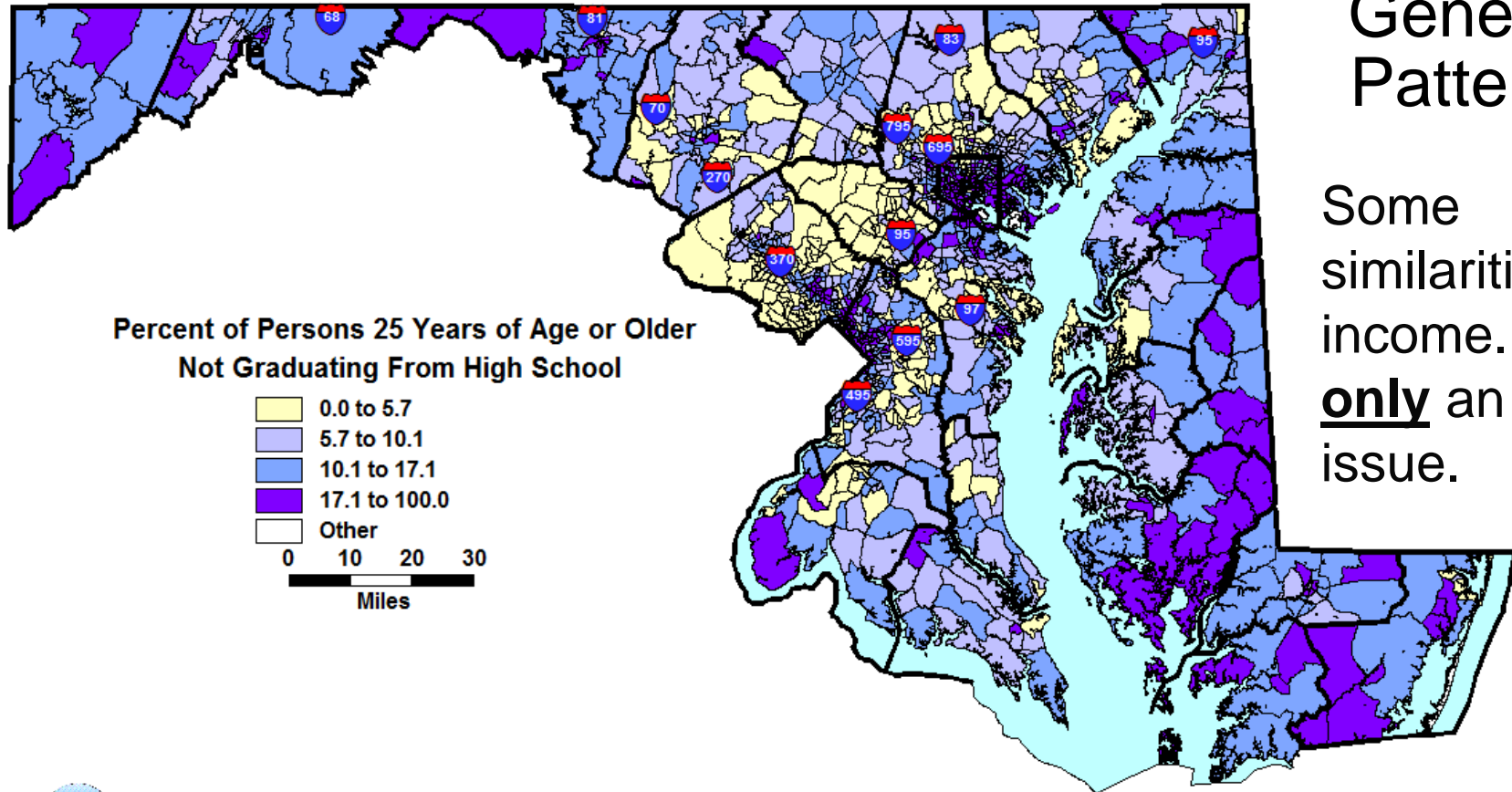


Correlations between other variables

- Income x
 - Total Population: 0.20
 - % Renter Occupied Housing: -0.63
 - % without HS degree: -0.63
 - % Poverty: -0.58
 - % Minority population: -0.34

- The variables we are reviewing may have different implications in different areas.
- Relative vs absolute values have different implications.
- Generalizations may be difficult and area-specific analysis may be necessary.
- Preliminary assumptions about cumulative impacts may need to be demonstrated in specific areas, and may not be generally applicable.

Educational Attainment



General
Pattern:

Some
similarities to
income. Not
only an urban
issue.



Map Prepared by the Maryland Department of the Environment
Source of Information: American Community Survey 5-Year Estimates 2007 to 2011
The Percent of Persons 25+ Not Receiving a High School Degree is 12.5 Percent.

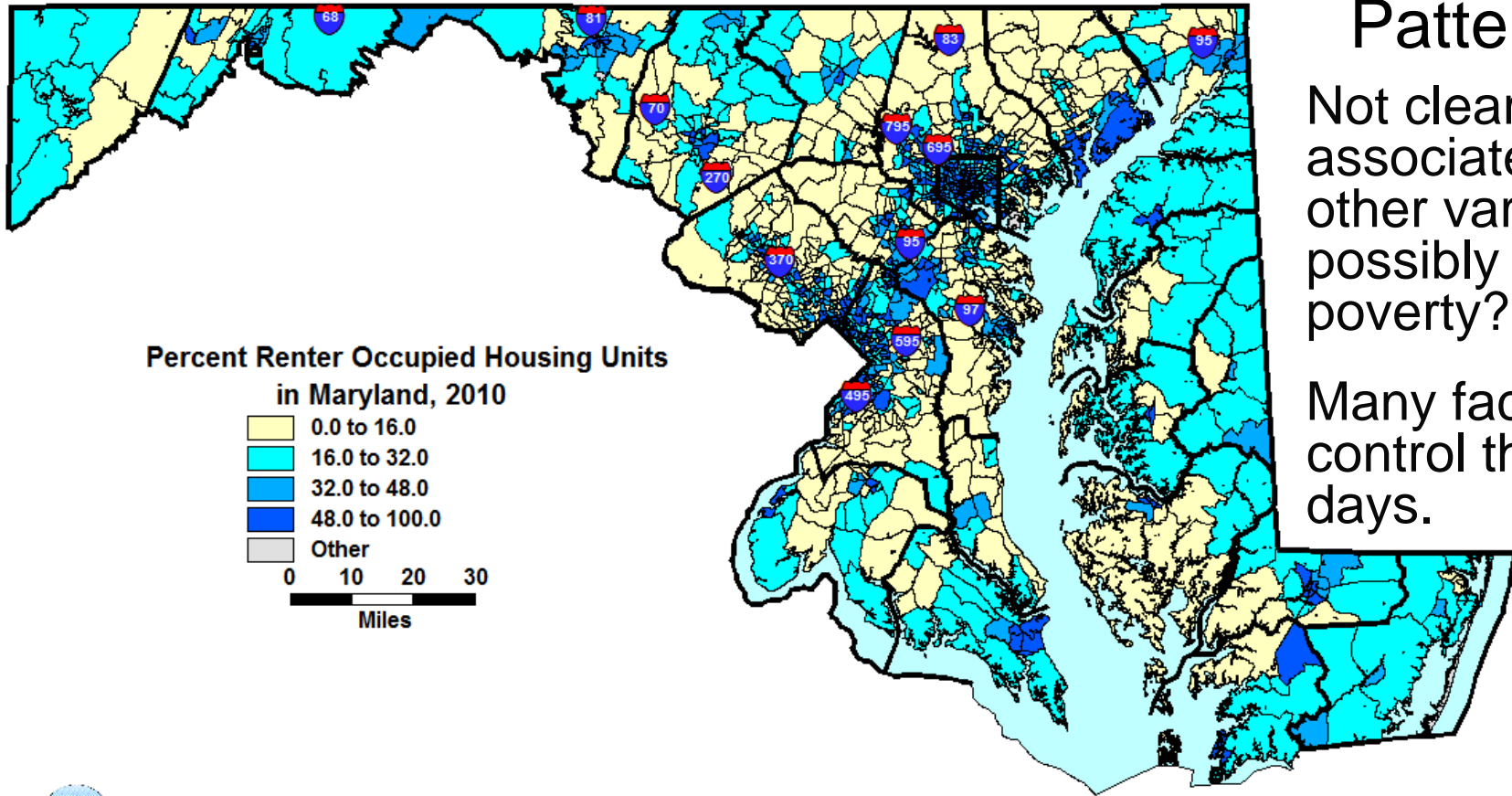


Lack of Home Ownership

General
Pattern:

Not clearly
associated with
other variables;
possibly
poverty?

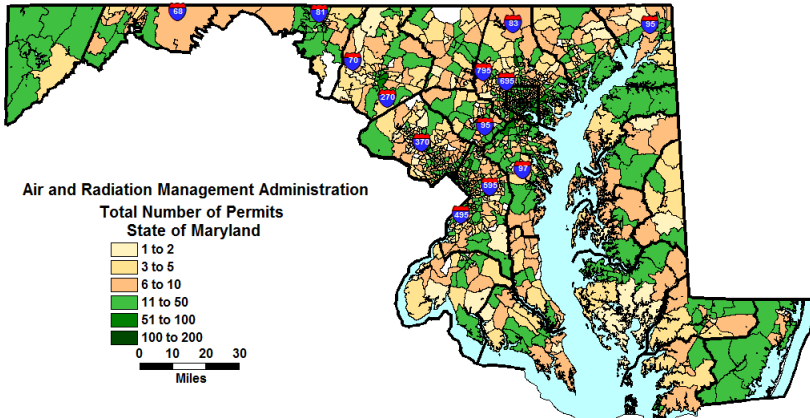
Many factors
control these
days.



Map Prepared by the Maryland Department of the Environment
Source of Information: U.S. Census of Population and Housing, 2010
The Percent Renter Occupied Housing Units for Maryland is 29.5 Percent.

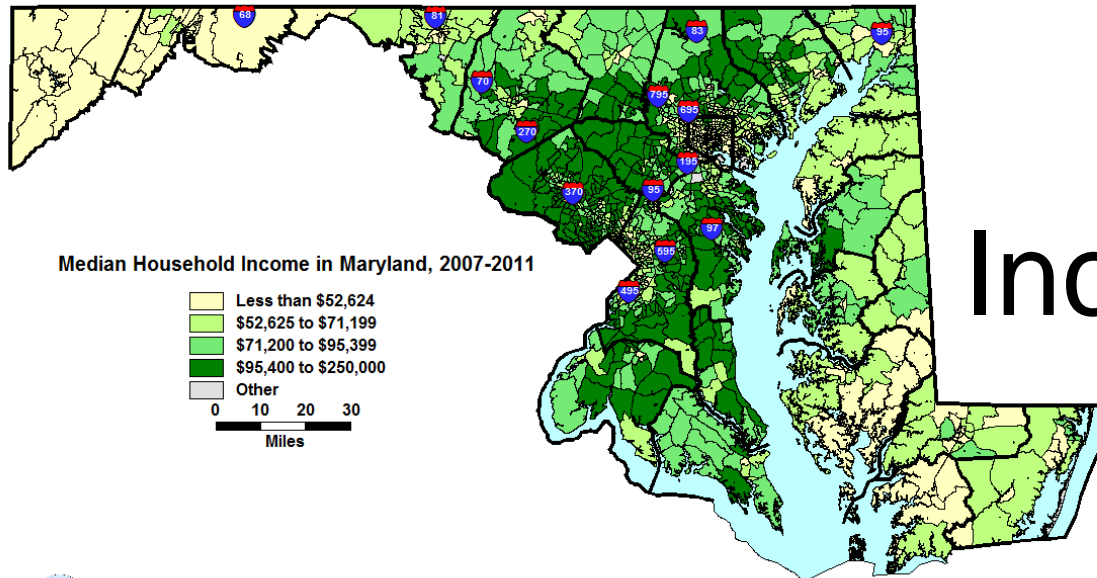
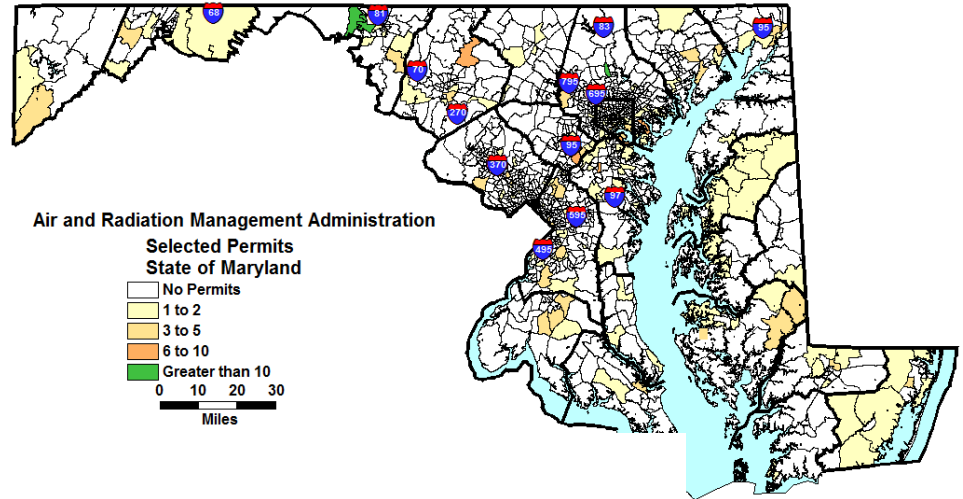


Total ARMA



Map Prepared by the Maryland D
MDE Source of Information: MDE Ente

EJ ARMA

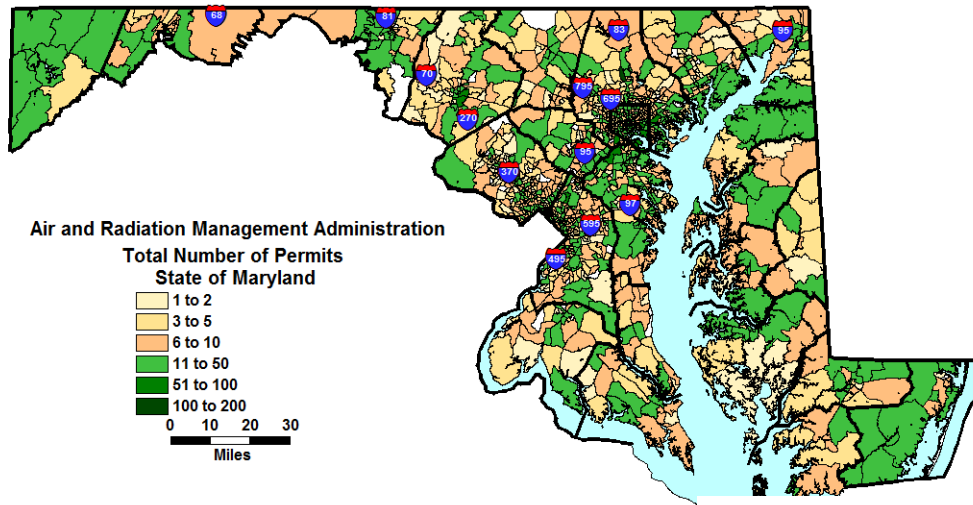


Map Prepared by the Maryland Department of the Environment
Source of Information: American Community Survey 5-Year Estimates 2007 to 2011
The Median Household Income for Maryland is \$70,004 for 2011.

Income



ARMA Permit Data



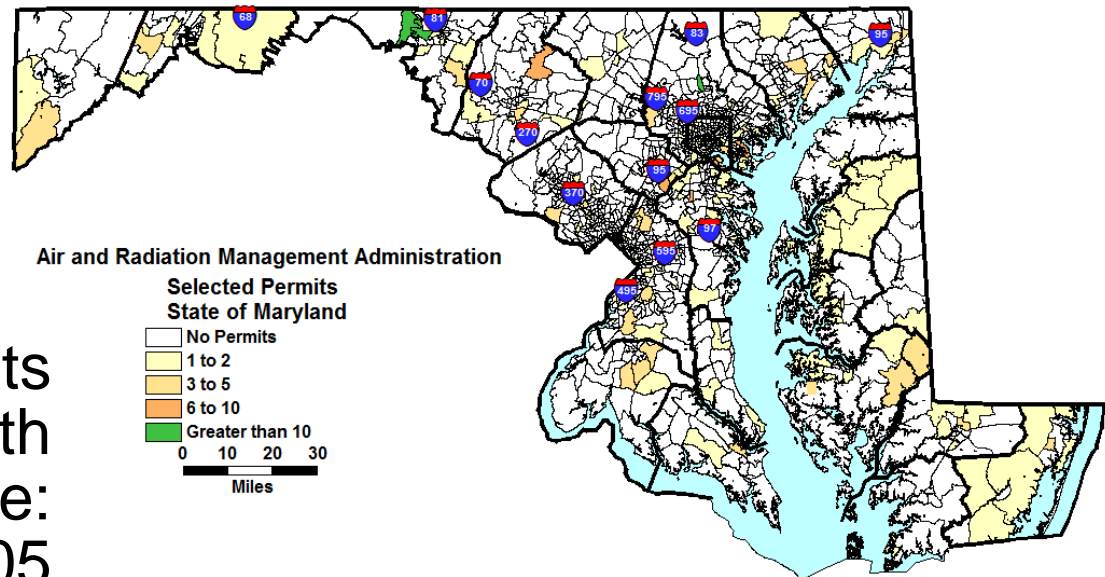
Total Permits
Correlation with
income:
 $= -0.14$

General
Pattern:
Widely
distributed.

Map Prepared by the Maryland Department of the Environment
MDE Source of Information: MDE Enterprise Environmental Management System

Selected Permits

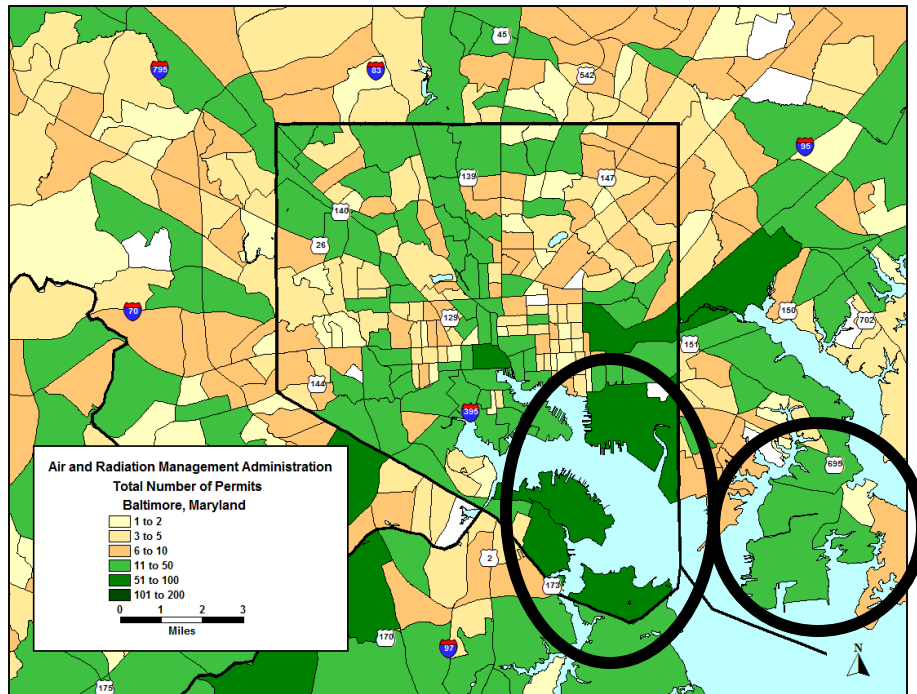
Total Permits
Correlation with
income:
 $= -0.05$



Map Prepared by the Maryland Department of the Environment
MDE Source of Information: MDE Enterprise Environmental Management System

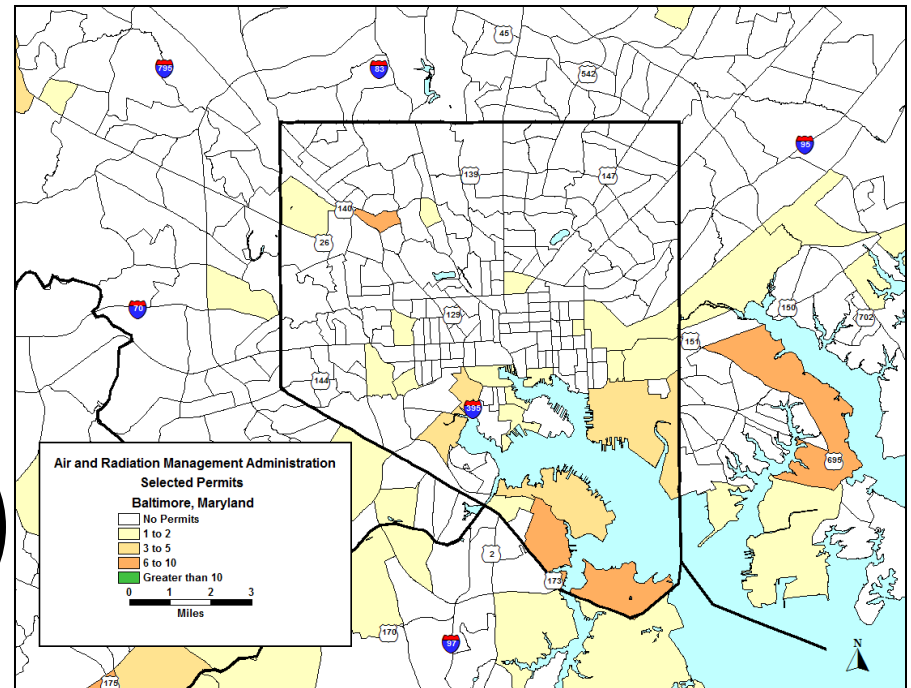


Baltimore Region – ARMA Permit Data



Total

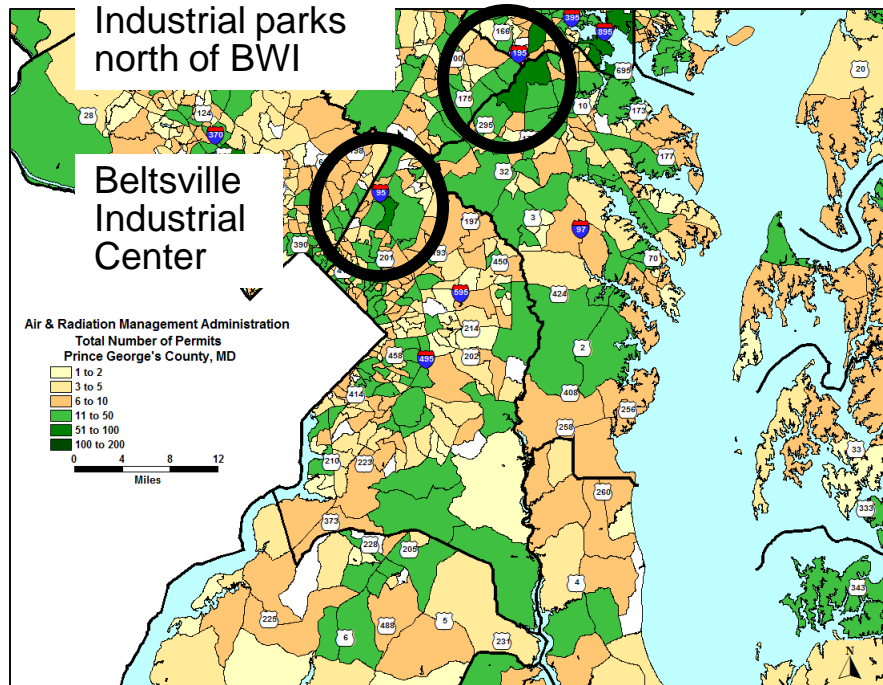
General
Pattern:



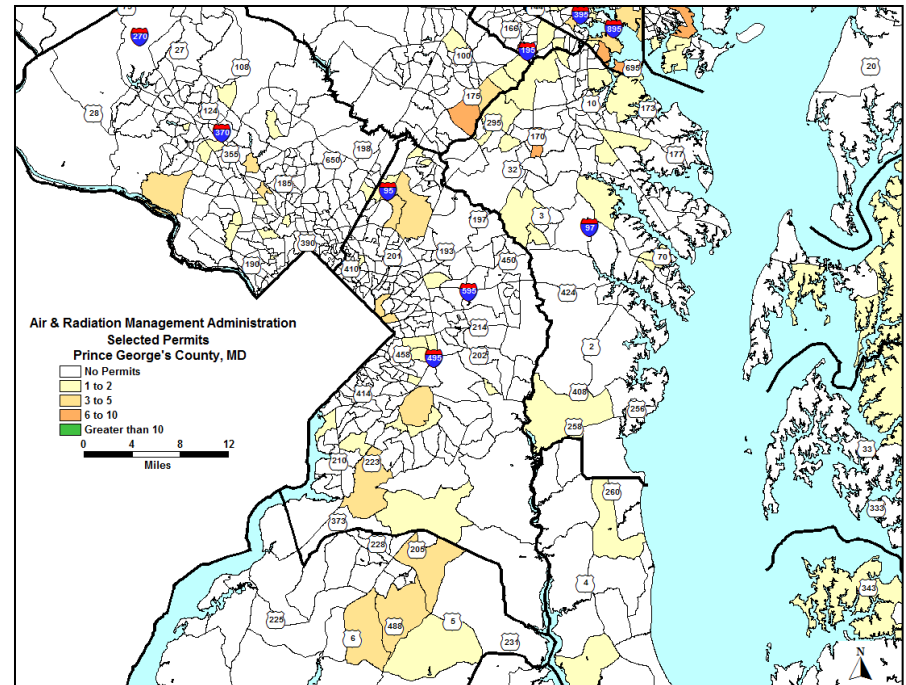
Selected

Some of these areas are
associated with higher
incomes.

Prince George's County – ARMA Permit Data



Total

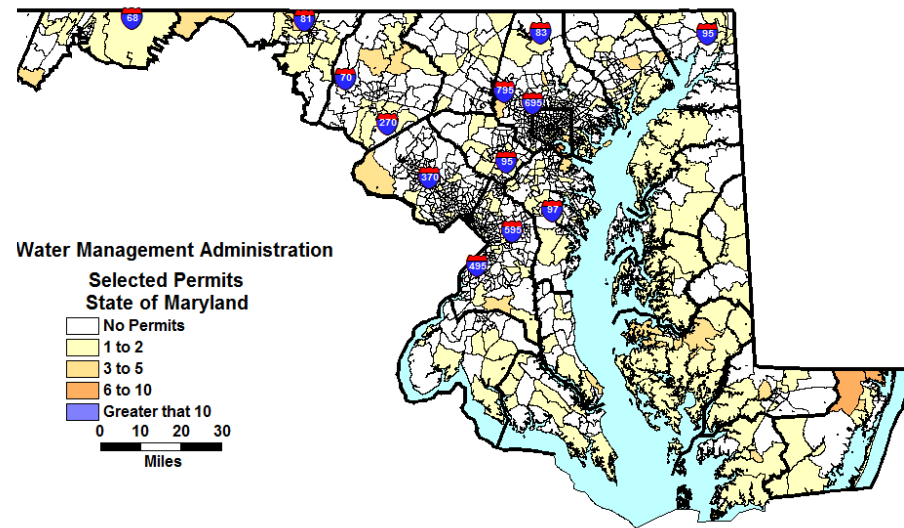
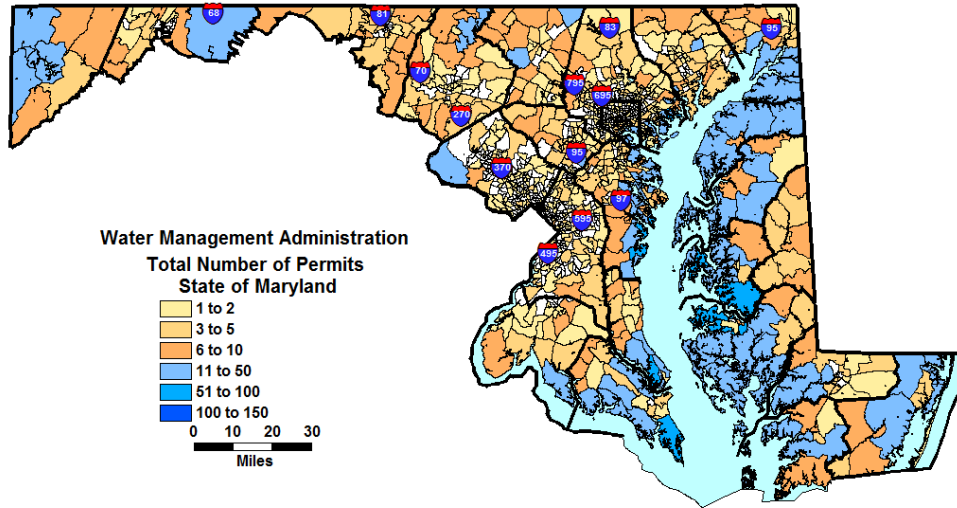


Selected

General
Pattern:

Why so many permits
in these two areas?

Water Management Permit Data



Map Prepared by the Maryland Department of the Environment
MDE Source of Information: MDE Enterprise Environmental Management System



Map Prepared by the Maryland Department of the Environment
Source of Information: MDE Enterprise Environmental Management System



Total

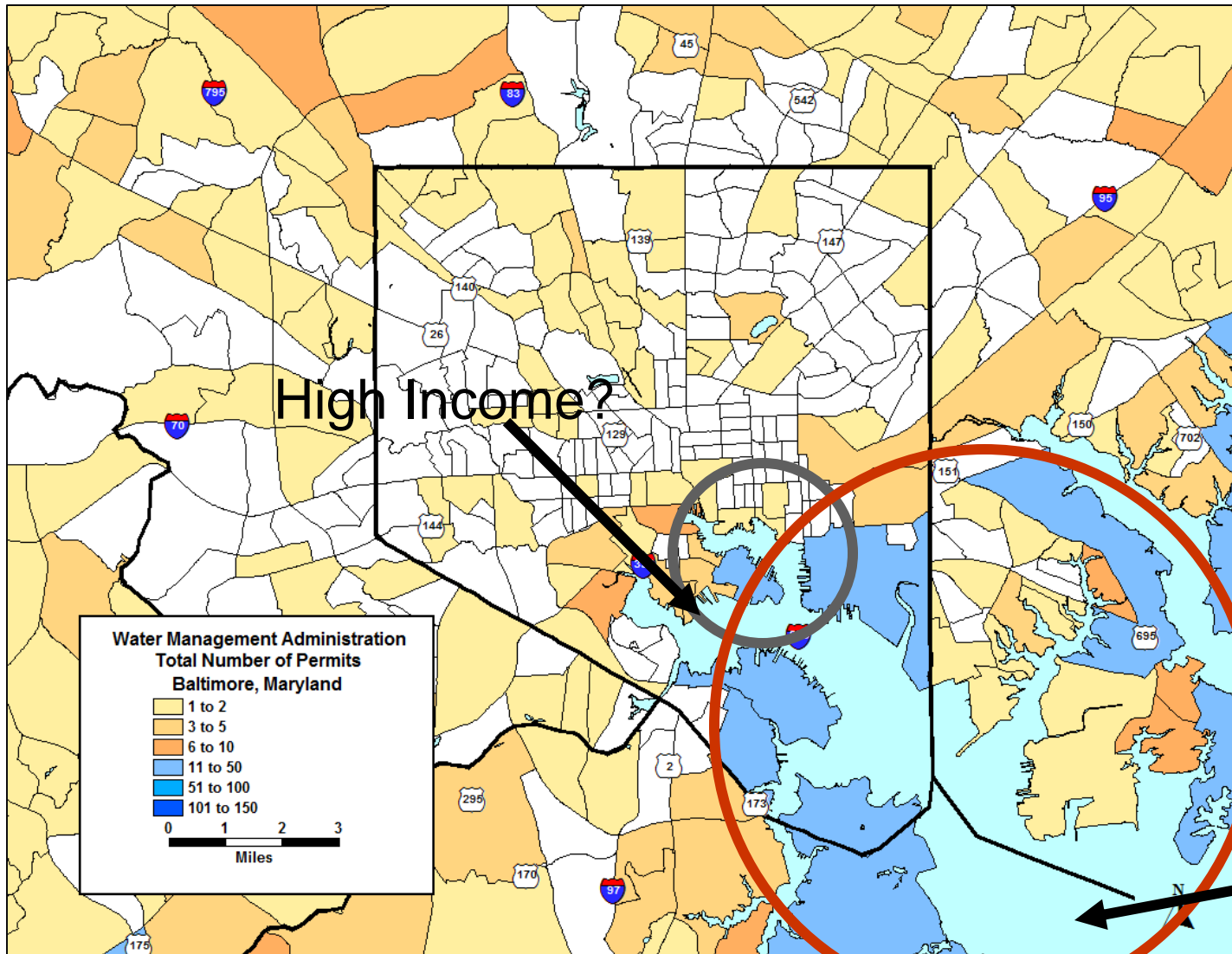
Selected

General
Pattern:

Is distribution more a function of more
smaller plants (discharges), or
proximity to water, than related to
cumulative impacts?



Baltimore Region – Water Management Permit Data



General
Pattern:

This is a
relatively
high
income
area.

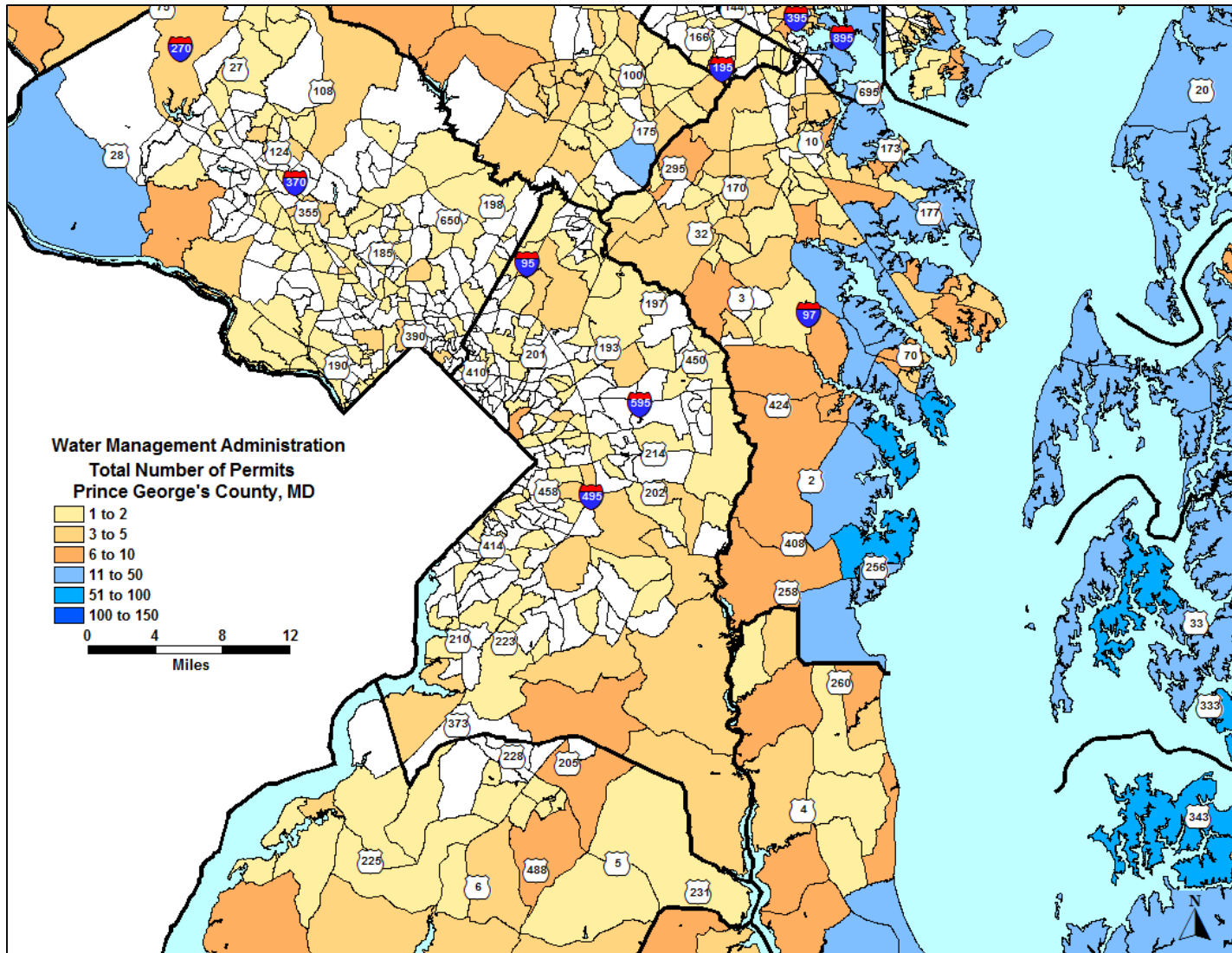
Low to
moderate
income,
poverty and
education.



Low to moderate income, poverty and education.



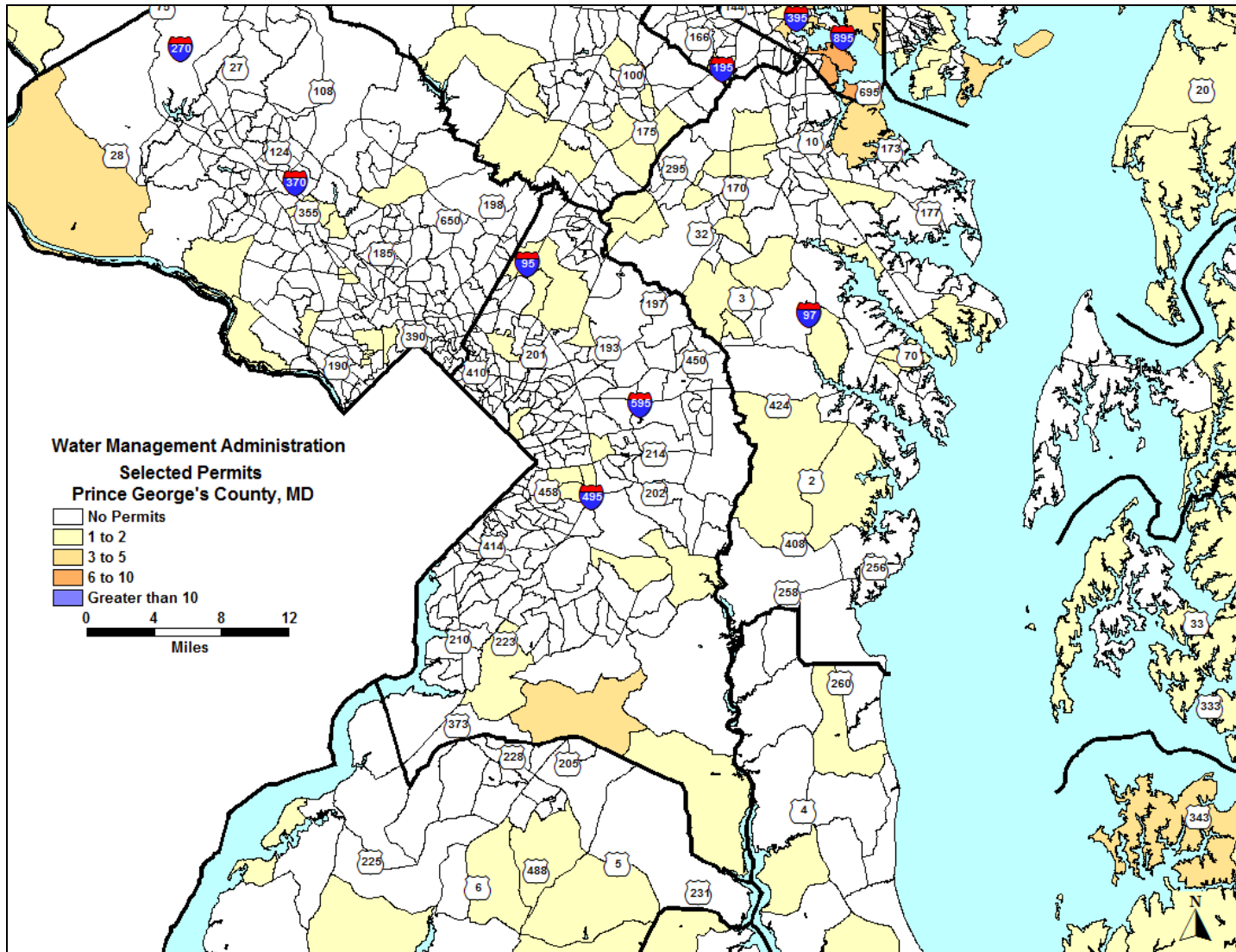
Prince George's County – Water Management Permit Data



**General
Pattern:**

Higher
concentration
of permits
adjacent to
water bodies.

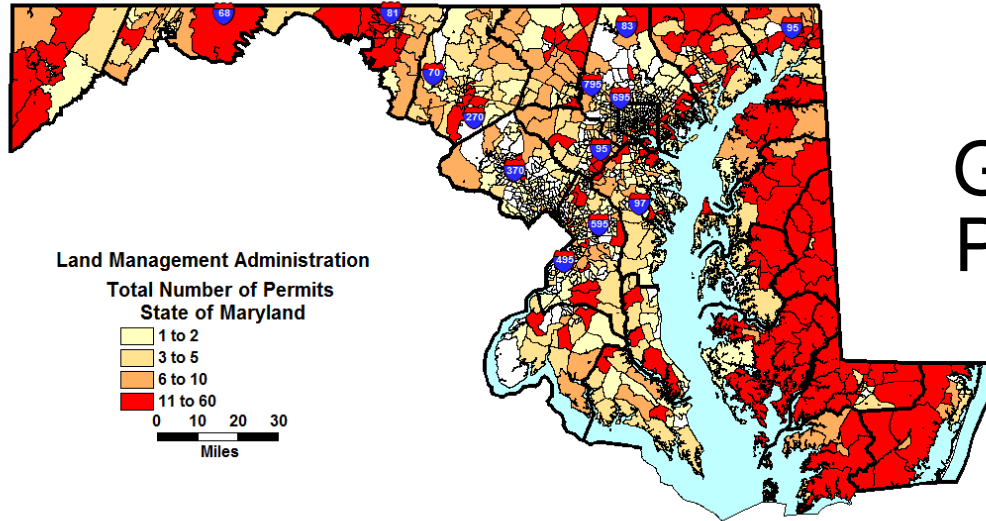
Prince George's County – Water Mgmt Selected Permits



**General
Pattern:**

Higher
concentration
of permits
adjacent to
water bodies.

Land Management Permit Data



General
Pattern:

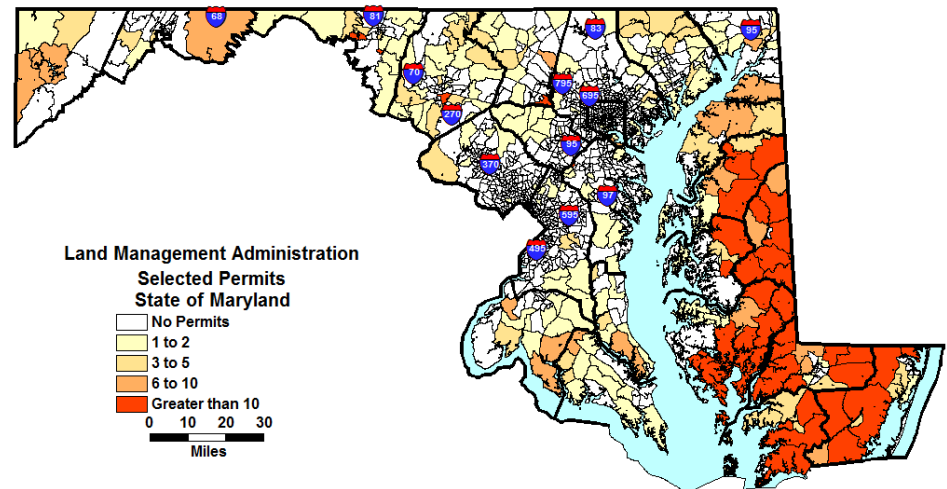
Sludge and
CAFOs?

Map Prepared by the Maryland Department of the Environment
Source of Information: MDE Enterprise Environmental Management System

Total



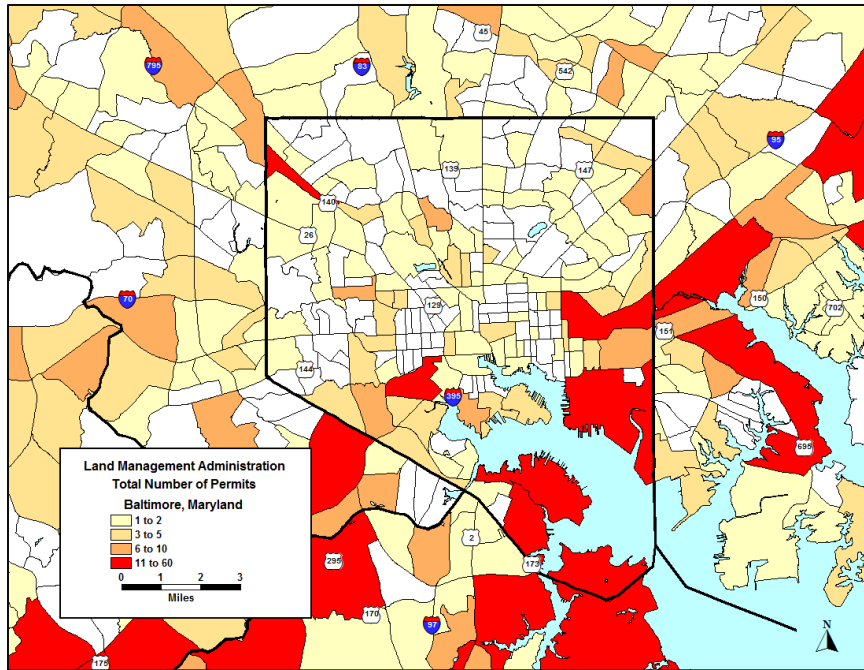
Selected



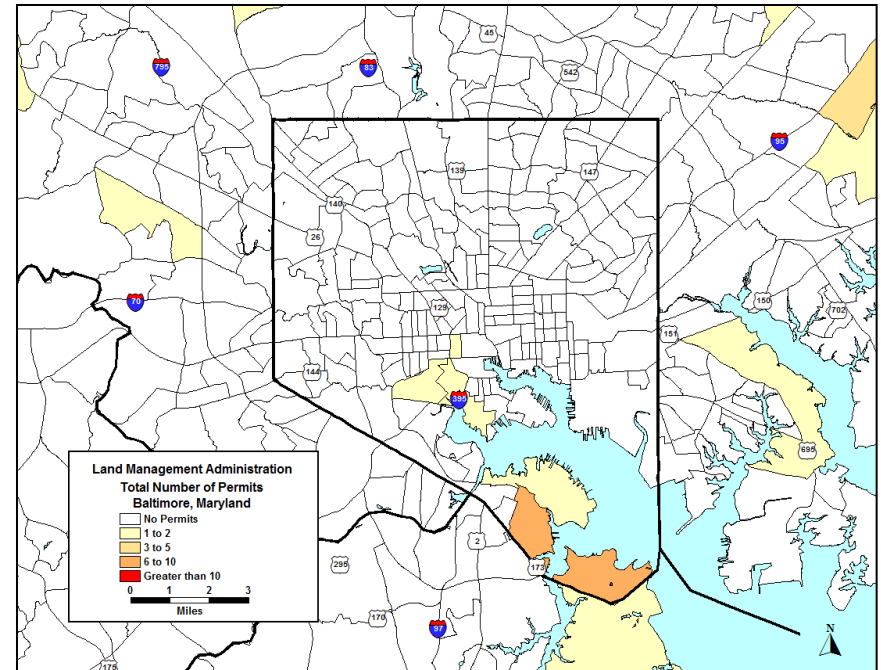
Map Prepared by the Maryland Department of the Environment
Source of Information: MDE Enterprise Environmental Management System



Baltimore Region – Land Management Permits



Total

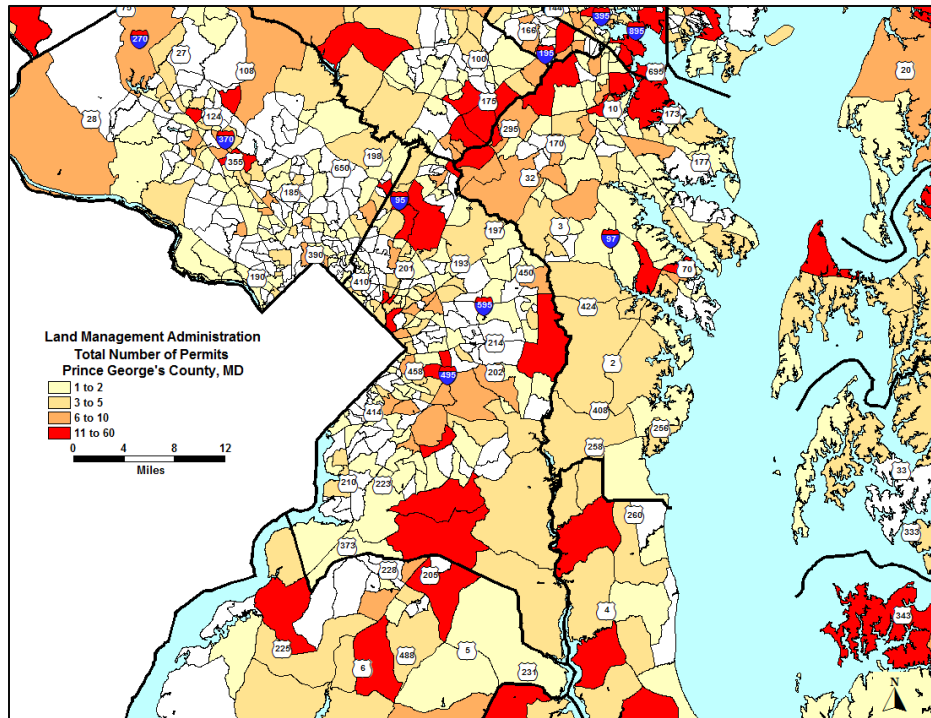


Selected

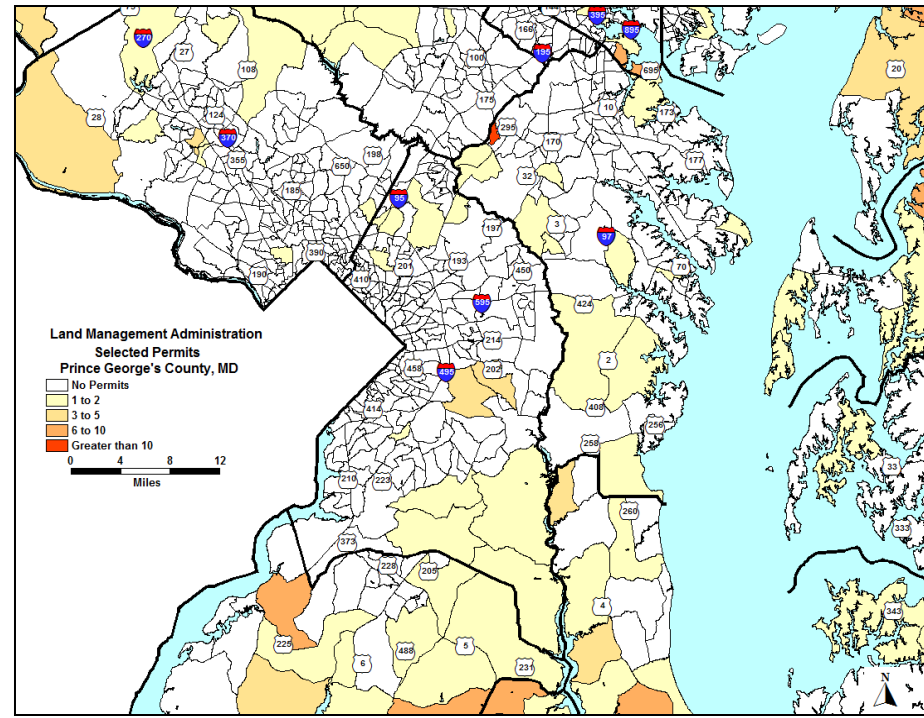
General
Pattern:

VCP/Brownfield sites?

Prince George's County – Land Management Permits



Total



Selected

Brownfields and CAFOs?

Questions Raised

- What factors are most indicative of the potential for the cumulative impacts of permitted discharges to impact health or quality of life?
- Are the factors presented on this first review the best we can do or should other factors should be included?
- Are communities of color or low income a basis for initiating a cumulative impacts analysis or are other factors such as proximity to shipping or industrial infrastructure more indicative of impact potential?
- Could occupation be a better indicator of risk than income or ethnicity (e.g., asbestos, agriculture)?

Questions Raised

- Is the number of permits relevant, or should the workgroup look at what substances are permitted for release?
- Would an approach based on the combined impact of substances or risk with a similar mode of action (e.g., carcinogenic combustion products, VOCs, suspended particulates, agricultural pesticides) be more practical than a permit-based approach?
- How do you set a threshold for action?

Questions\Issues\Discussion



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