

Introduction to GIS workshop



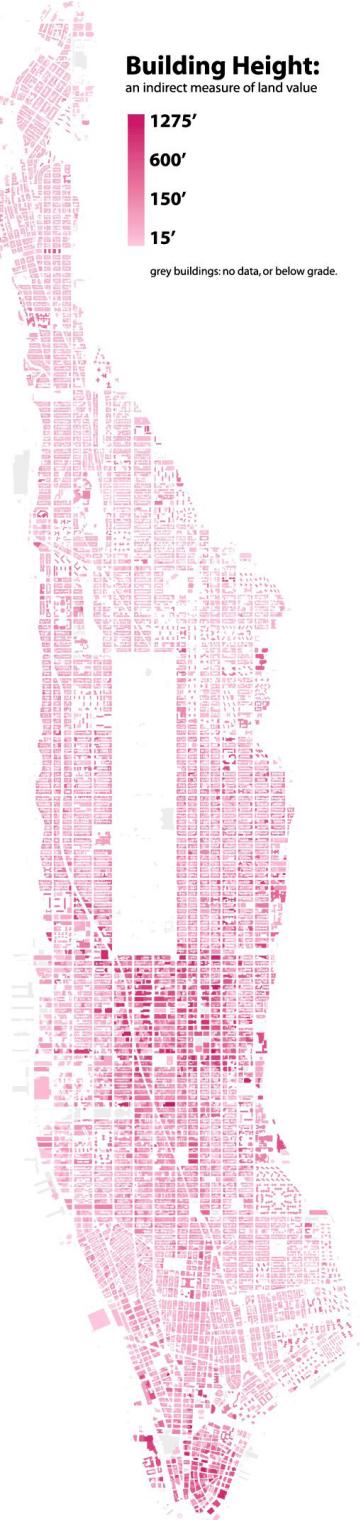
EMPIRICAL REASONING
CENTER SPRING 2017

WORKSHOP OBJECTIVES

- 1 - Understand the main uses of GIS technologies and software, how it is applied to different fields, what kind of data is used, and assumptions made about information and analysis conducted**
- 2 - Become familiar with ArcGIS software**
- 3 - Learn about the conventions of map-making, map literacy, and what makes a 'good' map**
- 4 - Learn to access, organize, and display data in ArcMap**
- 5 - Learn how to create a map in ArcMap, from importing the data to exporting a final map as an image or PDF document**

WHAT IS GIS?

Geographic Information Systems (Science)



Building Height:
an indirect measure of land value
1275'
600'
150'
15'
grey buildings: no data, or below grade.

GIS allows you to process, analyze and visualize information about the Earth's surface. GIS is utilized to know "**what is where, when**" and is used in many different fields like environmental science, economics, history, urban studies, biology, sustainable development, geology, etc. It's a flexible tool that allows you to study spatial relationships.

"Everything is related to everything else, but near things are more related than distant things."
(First rule of geography)

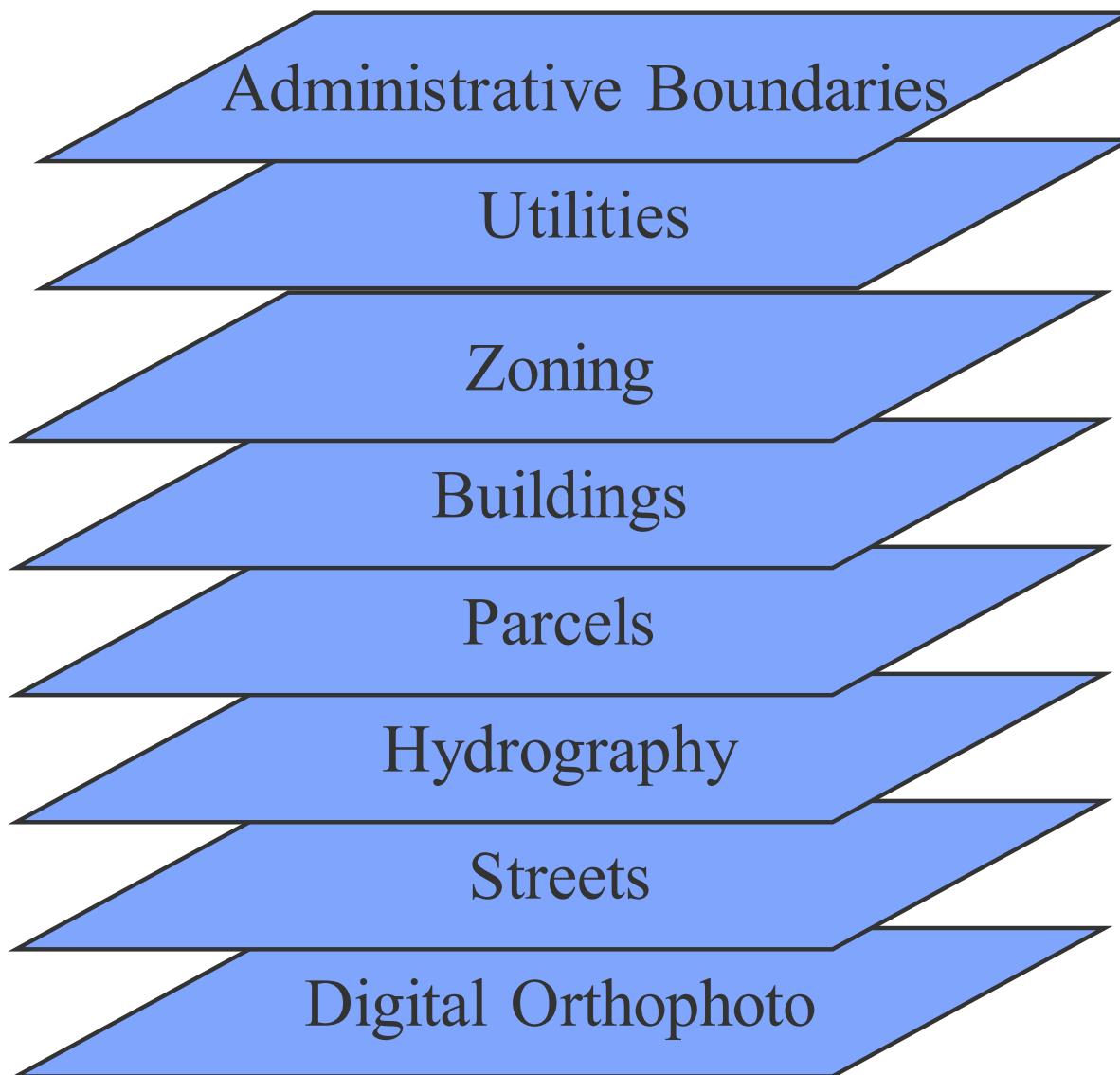
The common ground between information processing and the many fields using spatial analysis techniques. (Tomlinson, 1972)

A powerful set of tools for collecting, storing, retrieving, transforming, and displaying spatial data from the real world. (Burroughs, 1986)

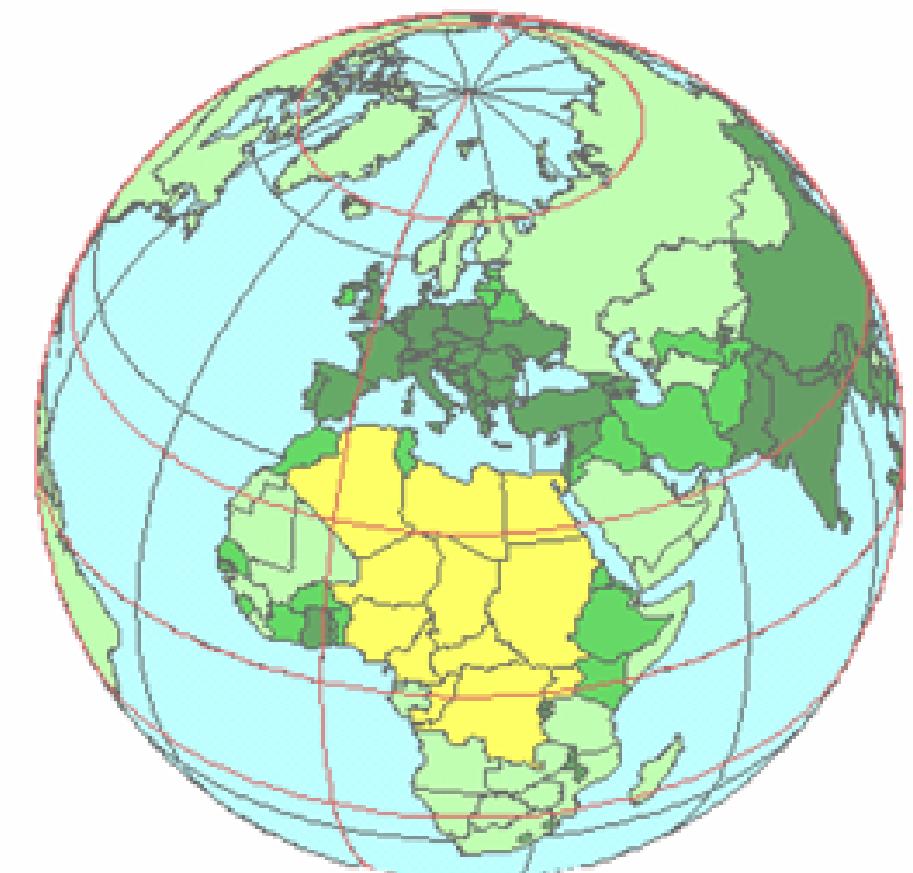
A computerised database management system for the capture, storage, retrieval, analysis and display of spatial (locationally defined) data. (NCGIA, 1987)

A decision support system involving the integration of spatially referenced data in a problem solving environment. (Cowen, 1988)

GIS MODEL



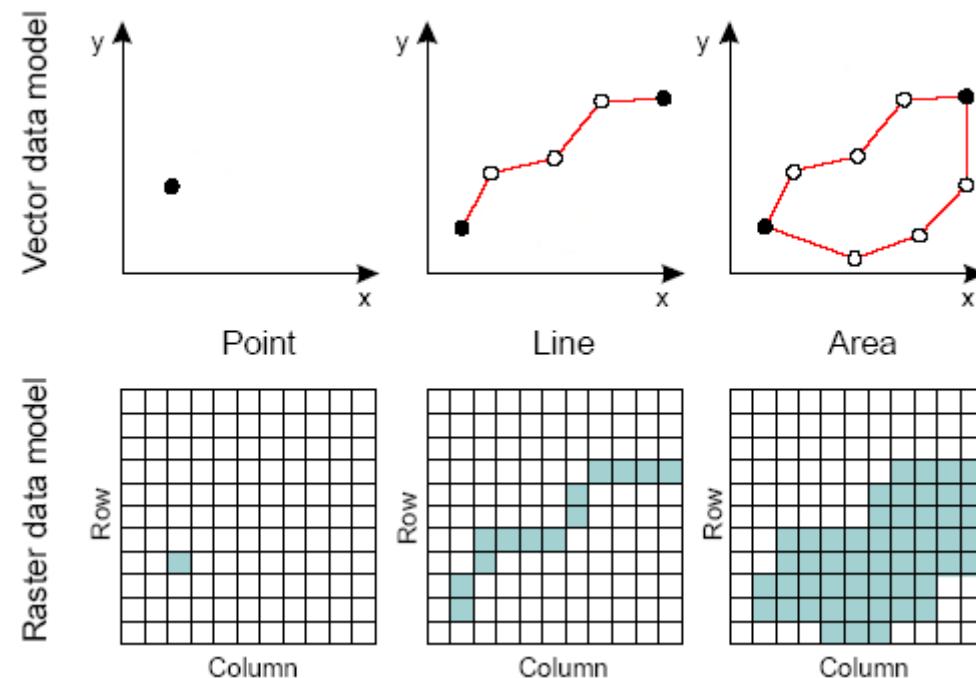
Data is organized in layers, that can be overlayed, compared, and used to represent thematic, quantitative, qualitative, narrative or conceptual information about the world.



SPATIAL DATA

specifies where (location) and what kind of feature (shape)

STORED AS GEOGRAPHIC DATA EITHER IN VECTOR OR RASTER FORMAT



ATTRIBUTE DATA

specifies characteristics for that location information, like how much, when, what , etc.

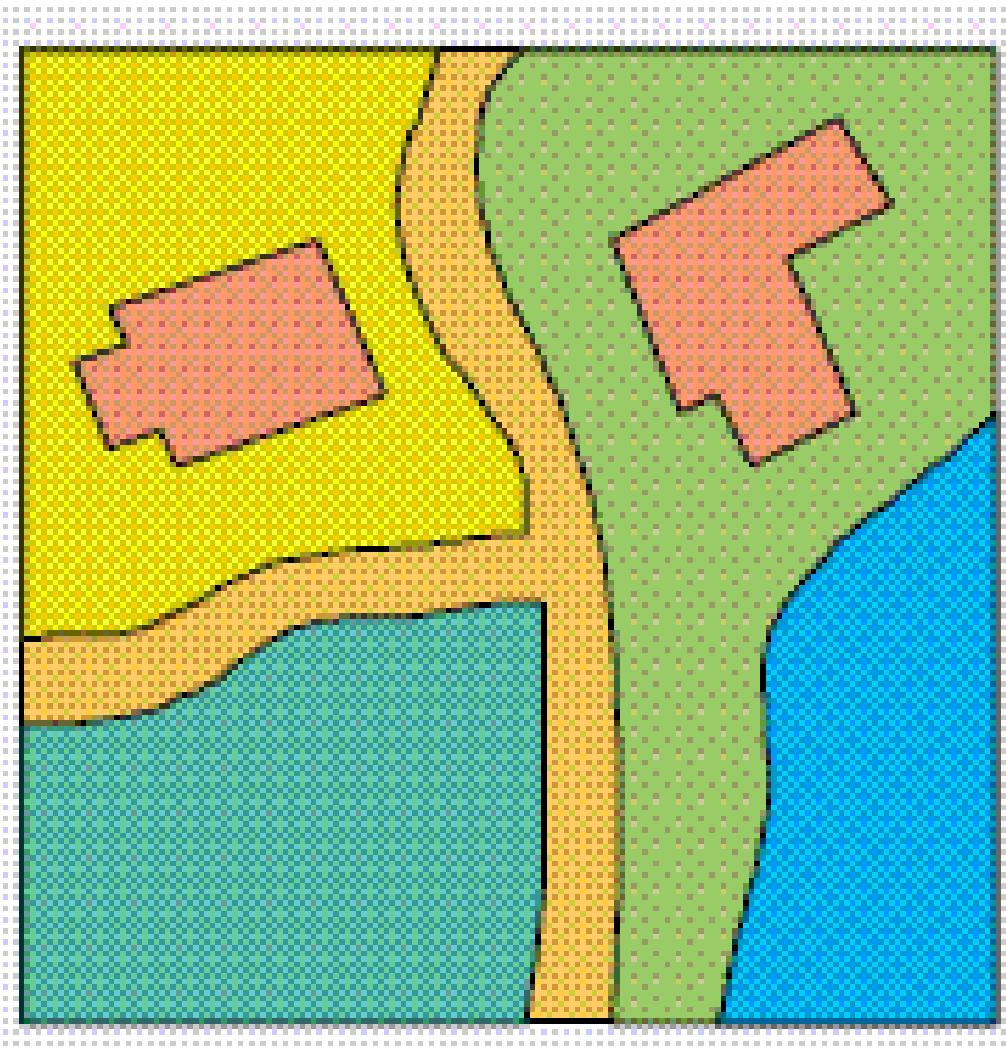
STORED AS TABULAR DATA

A screenshot of a software interface showing an attribute table for streets. The table has columns for street identifiers and coordinates (LEFTLOW, LEFTHIGH, RIGHTLOW, RIGHHIGH) and descriptive fields (STREETNAME, STREETDES).

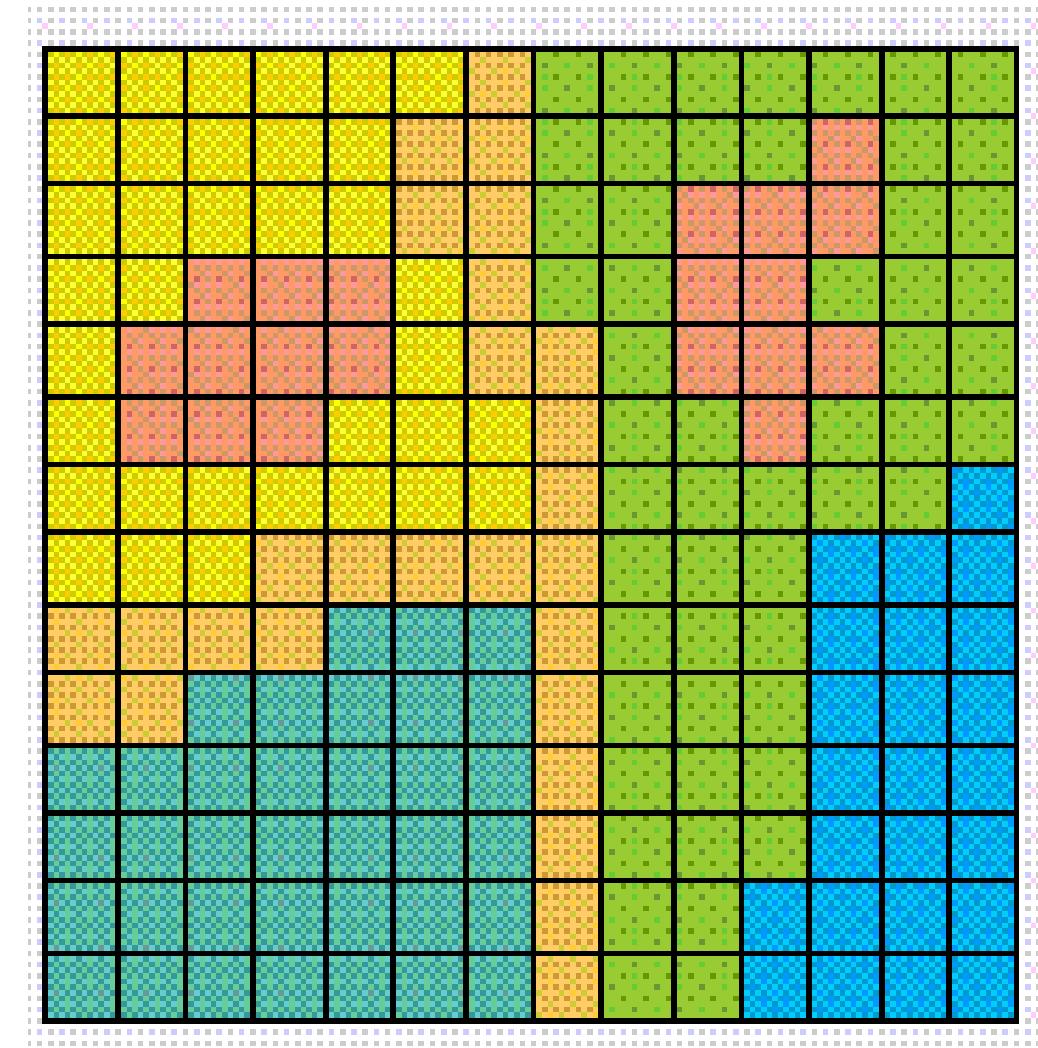
	LEFTLOW	LEFTHIGH	RIGHTLOW	RIGHHIGH	STREETNAME	STREETDES
13520	14301.00000000...	14305.00000000...	14300.00000000...	14302.00000000...	COPPER	AV
13581	14301.00000000...	14323.00000000...	14300.00000000...	14324.00000000...	STALGREN	CT
13805	14301.00000000...	14309.00000000...	14300.00000000...	14308.00000000...	MEL SMITH	DR
34181	14301.00000000...	14339.00000000...	14300.00000000...	14340.00000000...	BAUER	RD
34192	14301.00000000...	14321.00000000...	14300.00000000...	14320.00000000...	ENCANTADO	RD
34229	14301.00000000...	14321.00000000...	14300.00000000...	14320.00000000...	PIEDRAS	RD
34241	14301.00000000...	14335.00000000...	14300.00000000...	14334.00000000...	SKYLINE	RD
34255	14301.00000000...	14331.00000000...	14300.00000000...	14330.00000000...	OAKWOOD	PL
34293	14301.00000000...	14317.00000000...	14300.00000000...	14318.00000000...	ARCADIA	RD
34275	14297.00000000...	14331.00000000...	14296.00000000...	14314.00000000...	WINDSOR	PL
13153	14227.00000000...	14233.00000000...	14226.00000000...	14232.00000000...	GRAND	AV

TYPES OF DATA

SPATIAL DATA

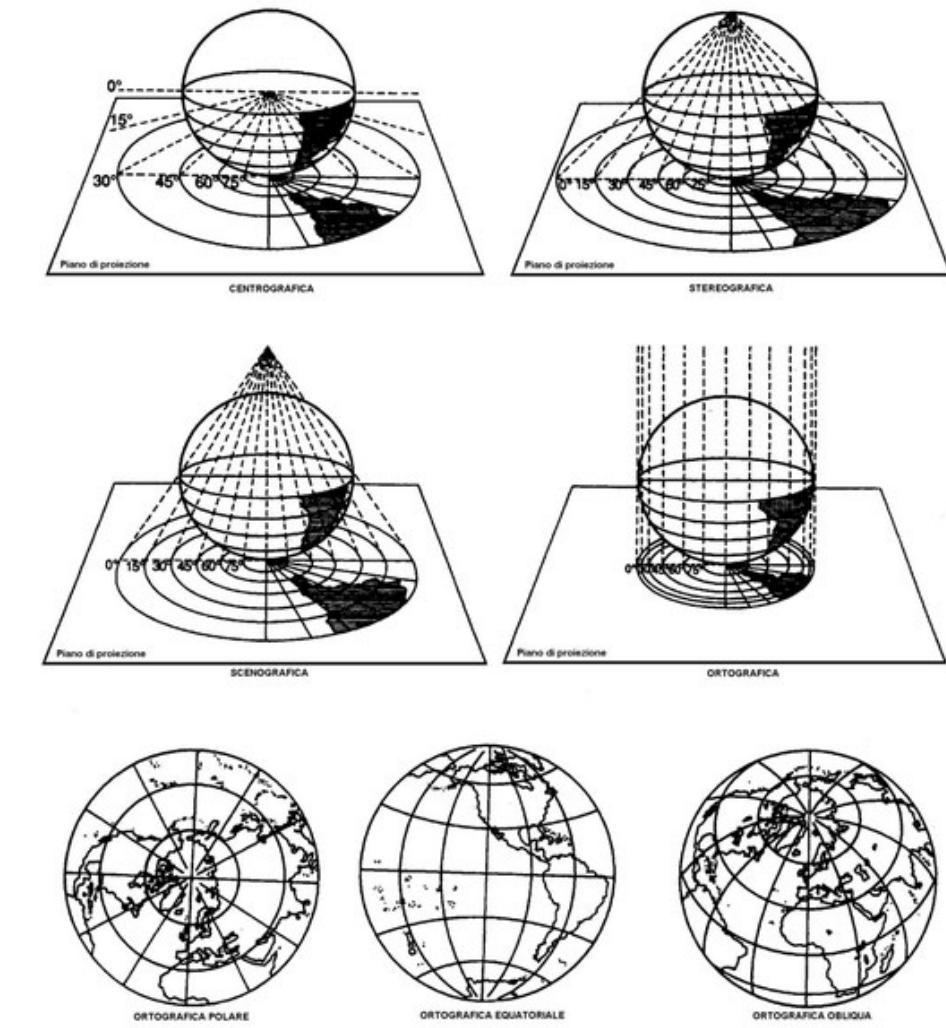
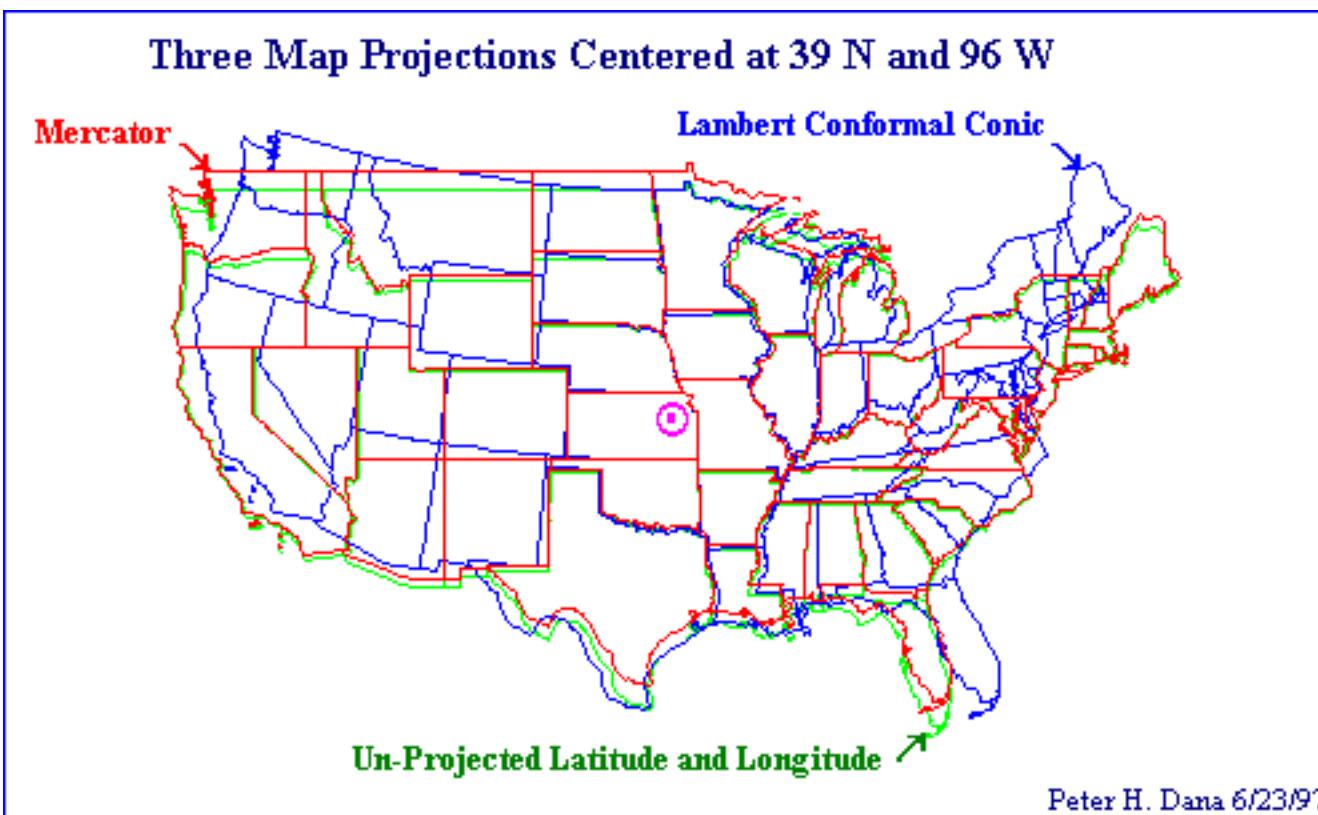


VECTOR



RASTER

PROJECTIONS &



COORDINATES SYSTEMS

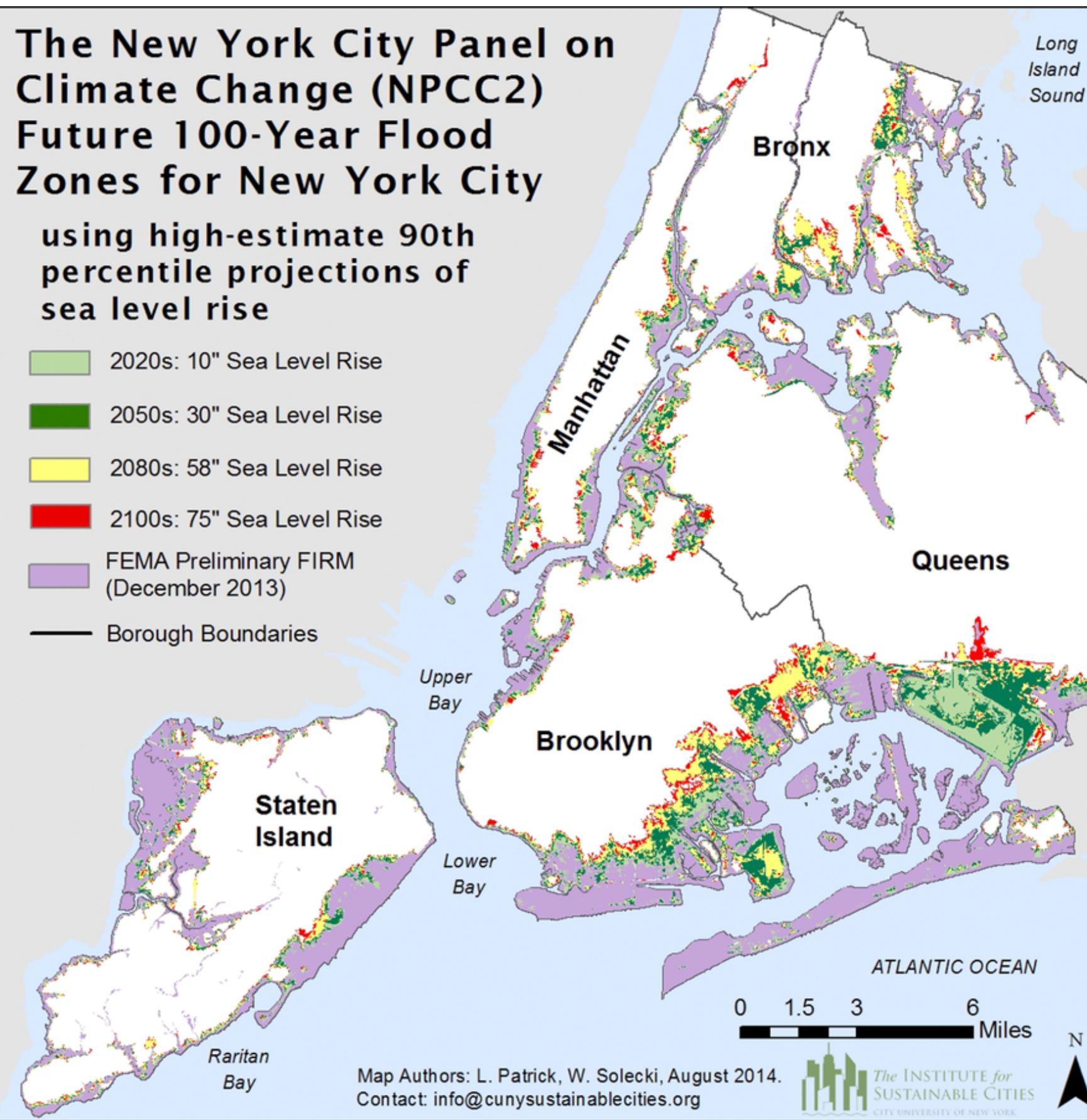
Population Trend Bad Harmony Map



The New York City Panel on Climate Change (NPCC2) Future 100-Year Flood Zones for New York City

using high-estimate 90th percentile projections of sea level rise

- [Light Green Box] 2020s: 10" Sea Level Rise
- [Dark Green Box] 2050s: 30" Sea Level Rise
- [Yellow Box] 2080s: 58" Sea Level Rise
- [Red Box] 2100s: 75" Sea Level Rise
- [Purple Box] FEMA Preliminary FIRM (December 2013)
- Borough Boundaries

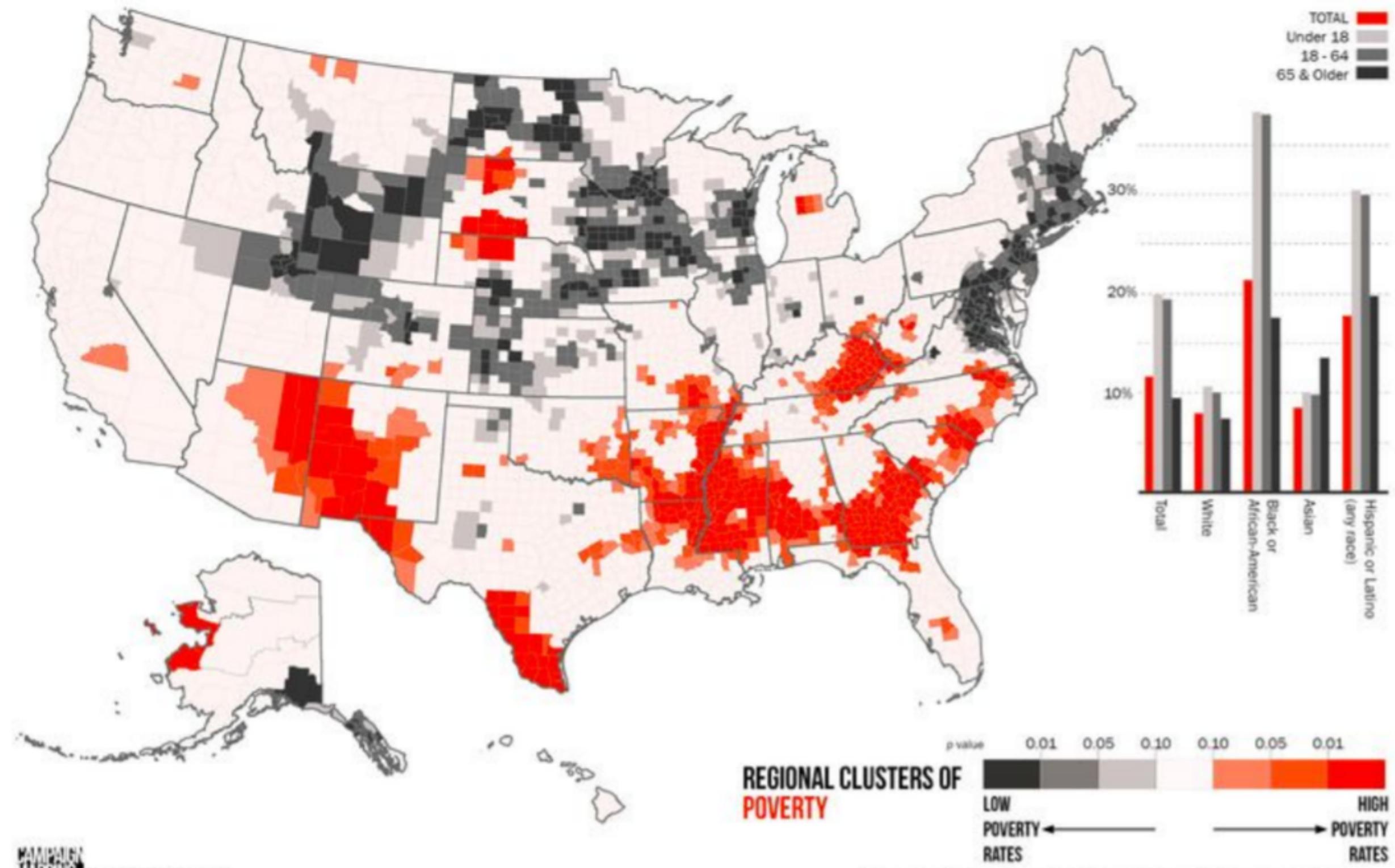


Map Authors: L. Patrick, W. Solecki, August 2014.
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PATTERNS OF POVERTY

REGIONAL CLUSTERS,
RACE, & AGE

NATIONWIDE:
POVERTY RATES
BY RACE & AGE

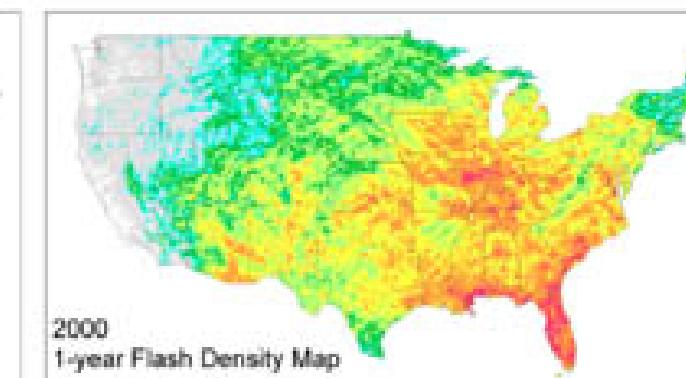
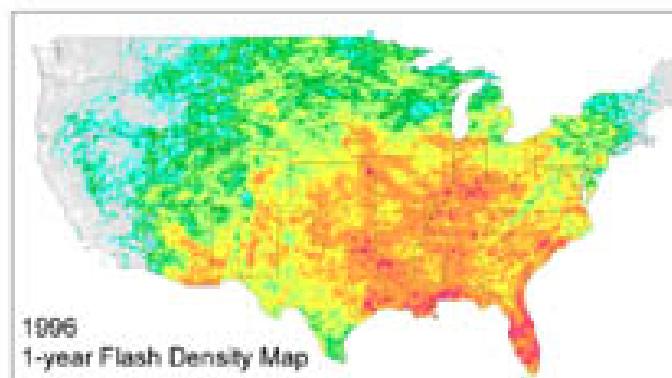
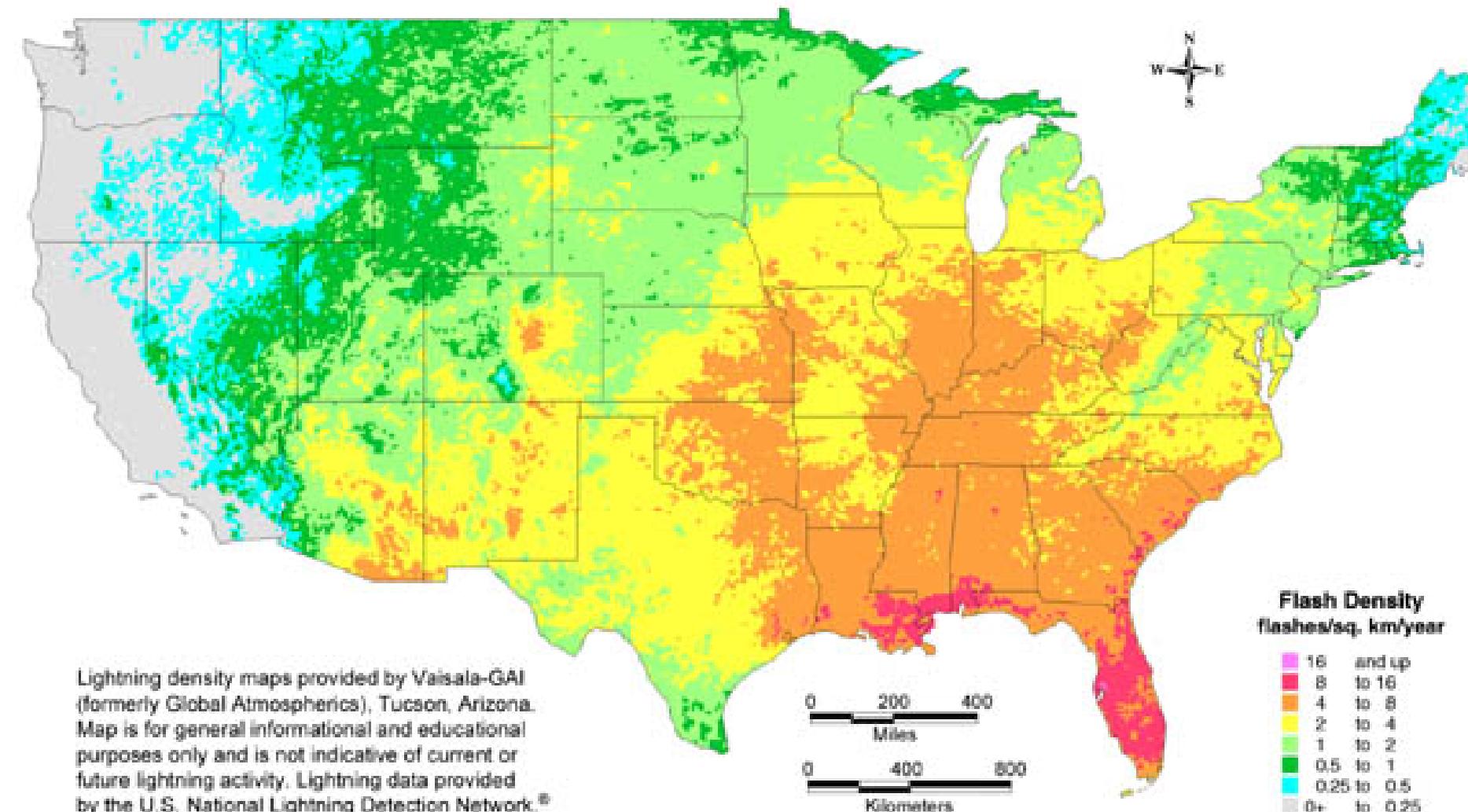


CampaignMapping.com
@CampaignMapping
Office MG. 2015-2016

data sources: US Census Bureau. 2013 American Community Survey 5-year estimates &
Historical Poverty Tables.



5-year Flash Density Map — U.S.
(1996–2000)



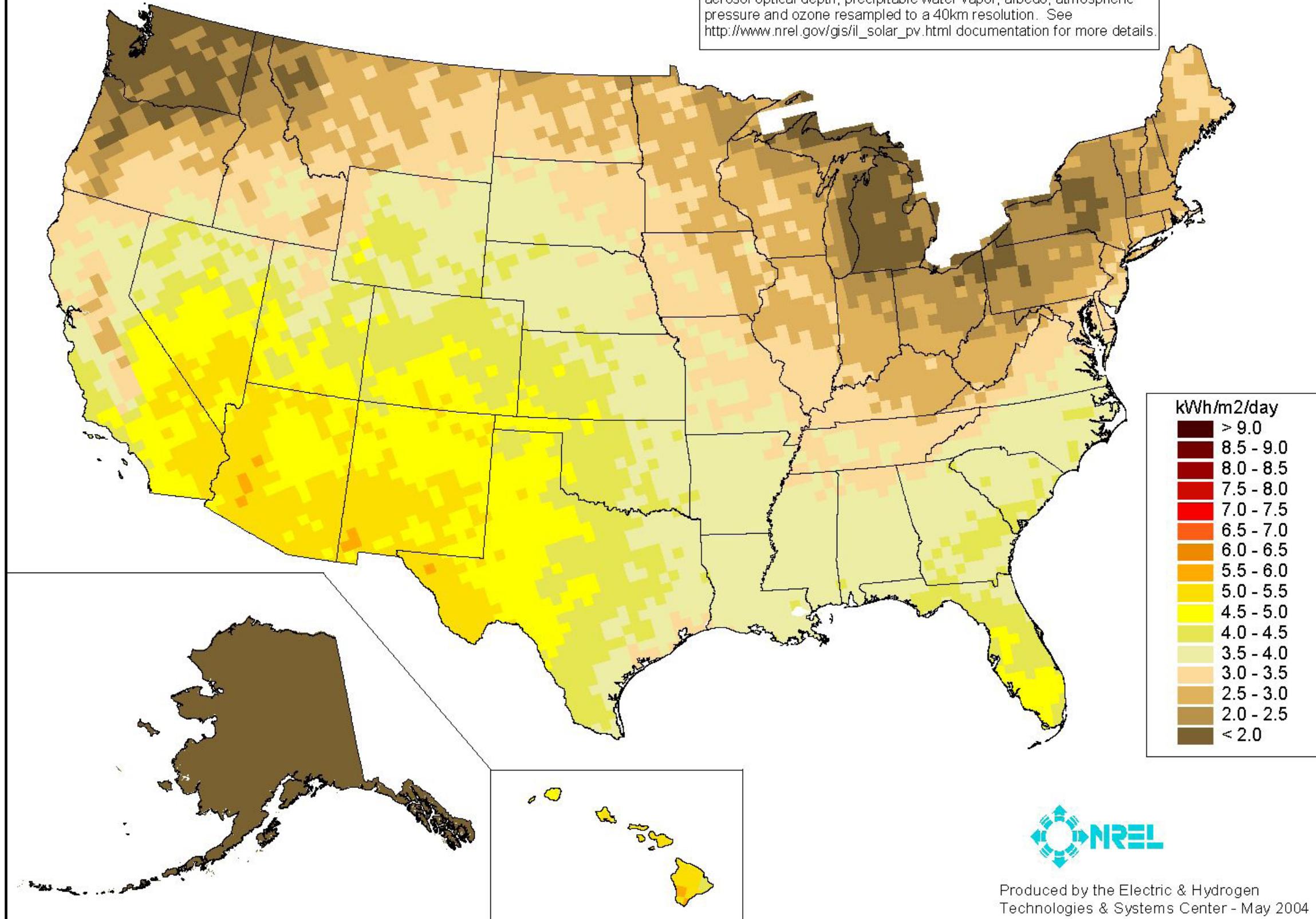
The 5-year Flash Density Map shows the average amount of lightning recorded in 1996–2000. The average amount of lightning that occurs in any given area varies significantly from year to year, as shown in the annual maps for 1996 and 2000.

5-year US Flash Density - www.vaisala.com/us

PV Solar Radiation (Flat Plate, Facing South, Latitude Tilt)

December

Model estimates of monthly average daily total radiation using inputs derived from satellite and/or surface observations of cloud cover, aerosol optical depth, precipitable water vapor, albedo, atmospheric pressure and ozone resampled to a 40km resolution. See http://www.nrel.gov/gis/il_solar_pv.html documentation for more details.



MAP ELEMENTS

TITLE - DESCRIPTIVE
DATA SOURCE

CLEAR LEGEND - WITH EXPLANATION

SCALE BAR - IN UNITS THAT MAKE SENSE

NORTH ARROW - AT AN APPROPRIATE SIZE

PROPERLY PROJECTED MAP

ANY NECESSARY LABELS

**NOW , LET ' S MAKE
A MAP !**