



Standards and Data Structure for Statistical Geography

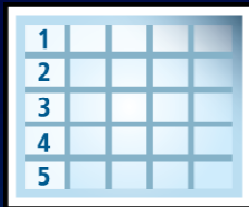
Mark Cygan, Director of Map, Chart, Data Production and SDI

Carmelle Terborgh, Team Lead, Global Affairs and UN Account Manager

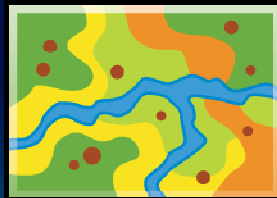


Outline

- Why link geospatial and statistical information?
- Standards
- Data Structures
- Geocoding
- Community Analyst: an opportunity



+



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Without this link...

Proportion of Poor People at County Level

County Average

10 Best Counties

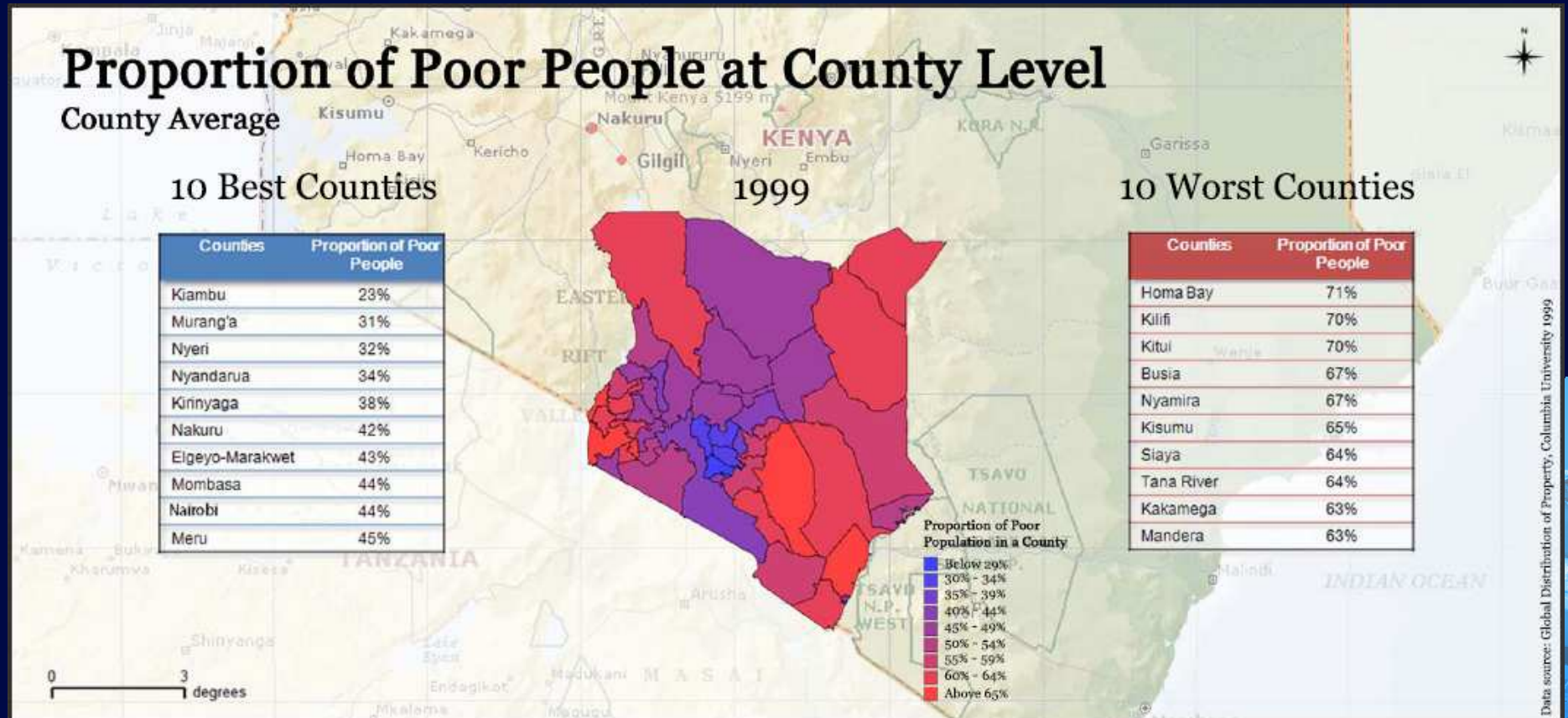
Counties	Proportion of Poor People
Kiambu	23%
Murang'a	31%
Nyeri	32%
Nyandarua	34%
Kirinyaga	38%
Nakuru	42%
Elgeyo-Marakwet	43%
Mombasa	44%
Nairobi	44%
Meru	45%

10 Worst Counties

Counties	Proportion of Poor People
Homa Bay	71%
Kilifi	70%
Kitui	70%
Busia	67%
Nyamira	67%
Kisumu	65%
Siaya	64%
Tana River	64%
Kakamega	63%
Mandera	63%

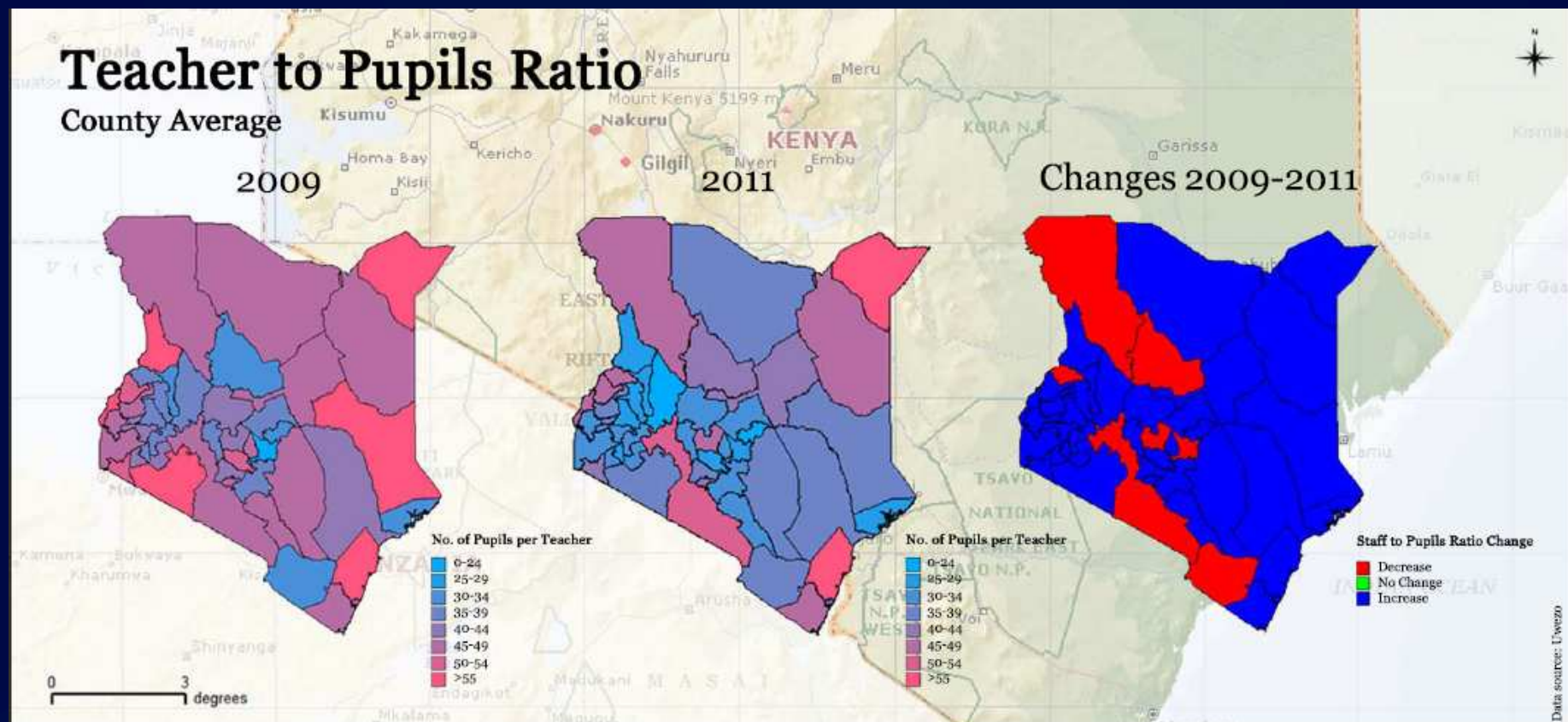
Source: World Bank Institute

With this link...



Source: World Bank Institute

Visualize change ... over time and place

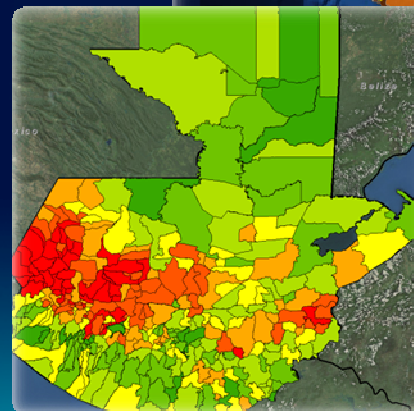
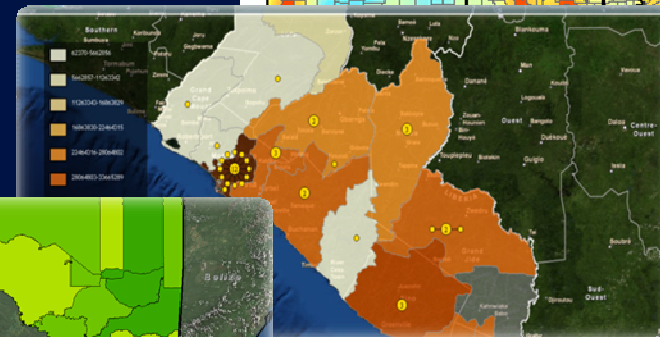
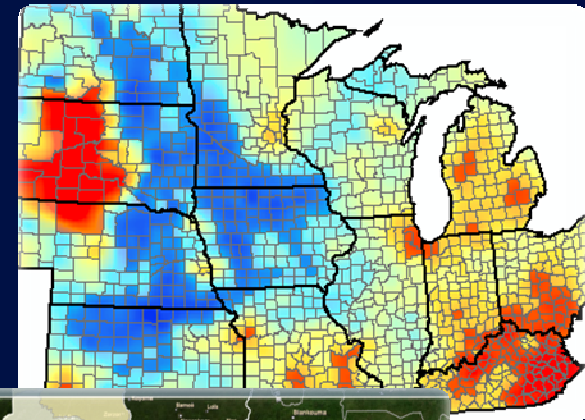


Source: World Bank Institute

Integration of statistical and geospatial information

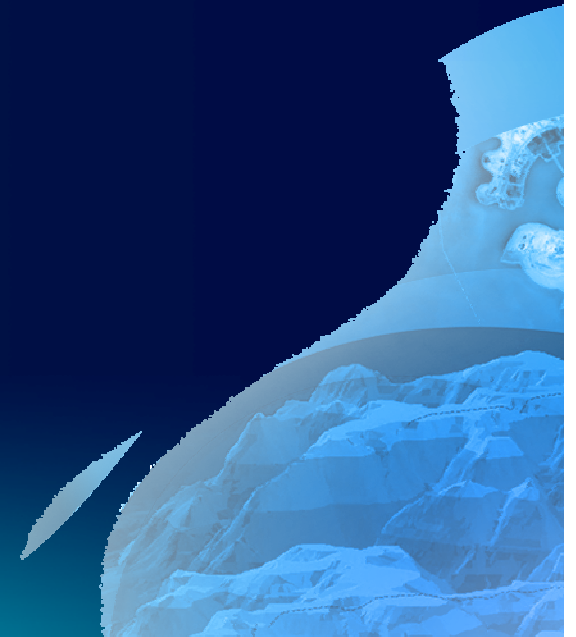
An essential need

- Humanitarian Assistance
 - Disaster Management
 - Famine/Food Security
- Sustainable Development
 - Climate Adaptation
 - Public Health
 - Economic Development
- Governance
 - Accountability
 - Transparency



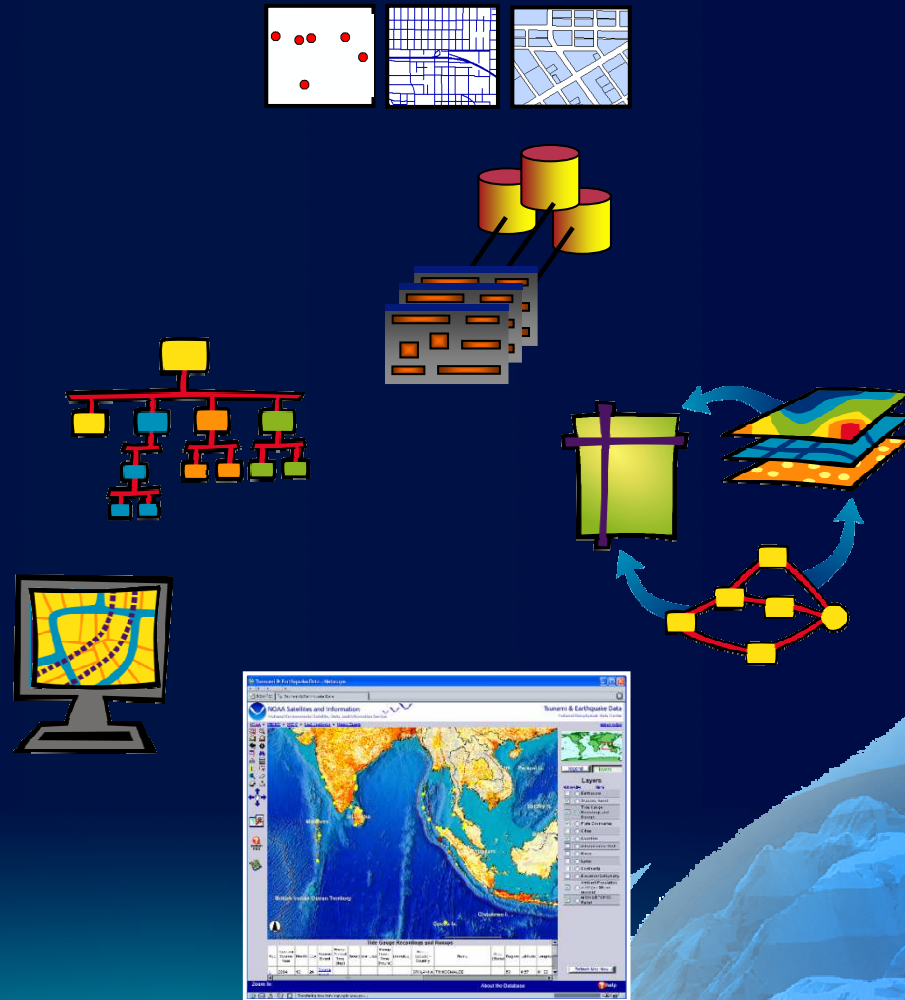
Relevant Standards

- **Statistical**
- **Information Technology**
- **Geospatial**



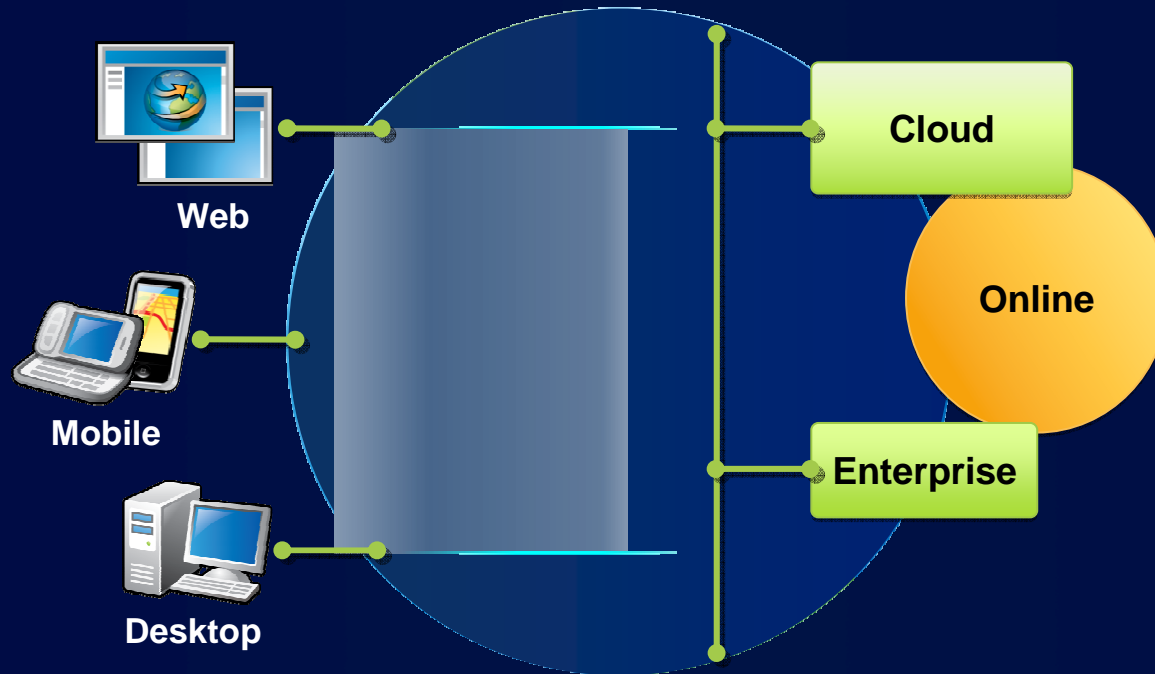
Geospatial Standardization

- Basic Geographic Structures
- Content Description
- Data Management
- Data Formats
- Visualization
- GeoWeb Services



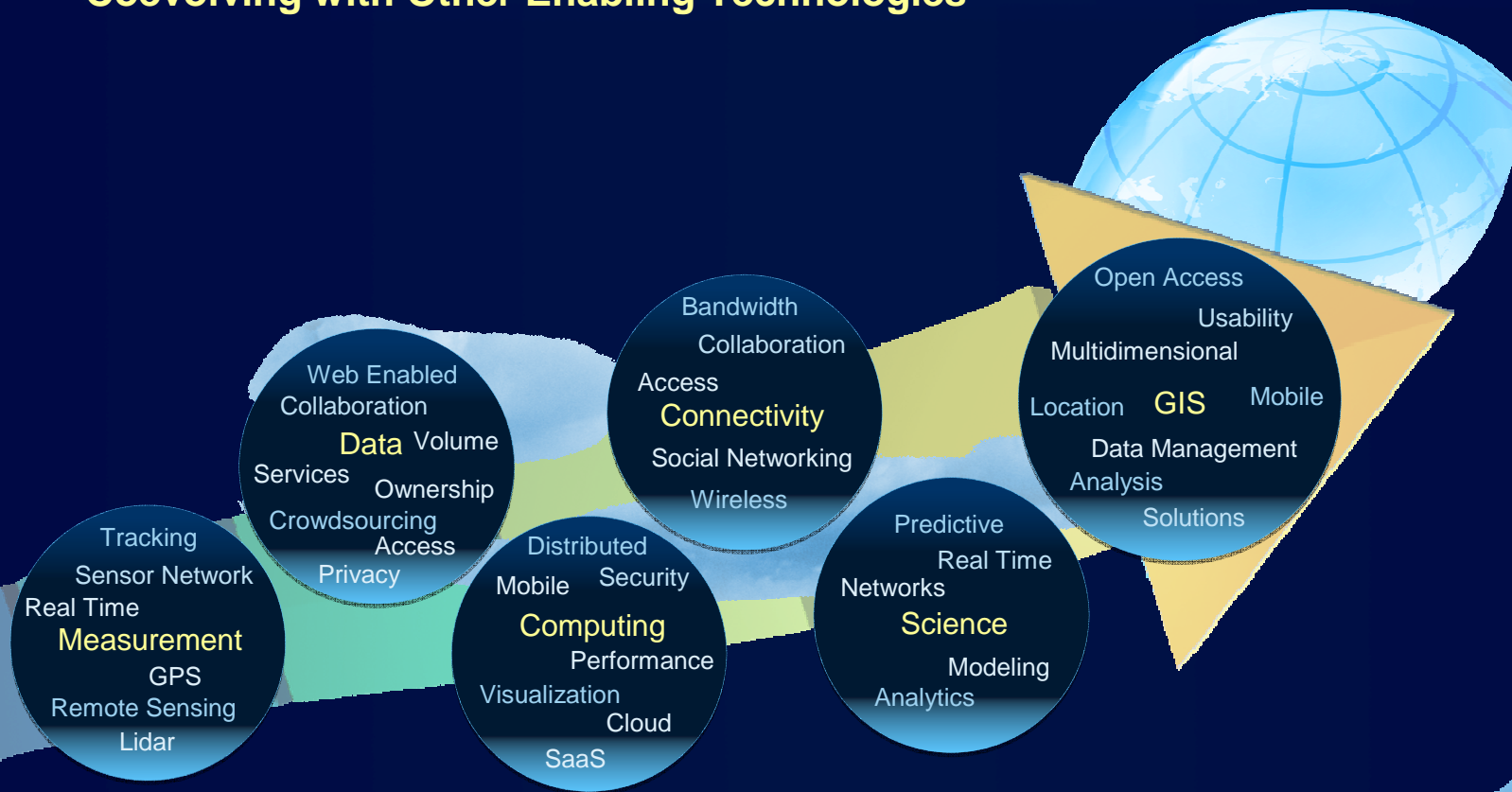
GIS

A Complete System for Geographic Information



Geospatial Technology is Changing Rapidly

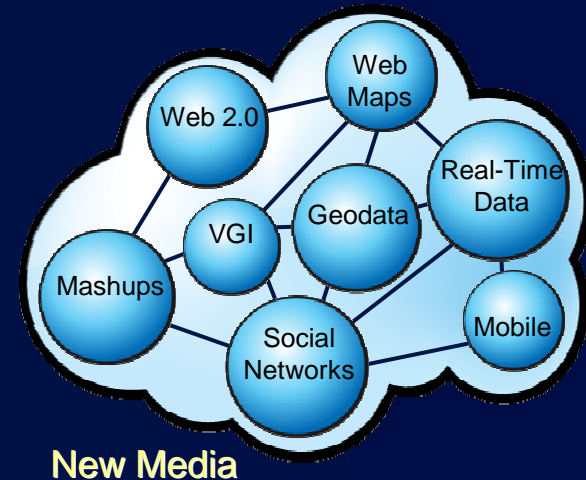
Coevolving with Other Enabling Technologies



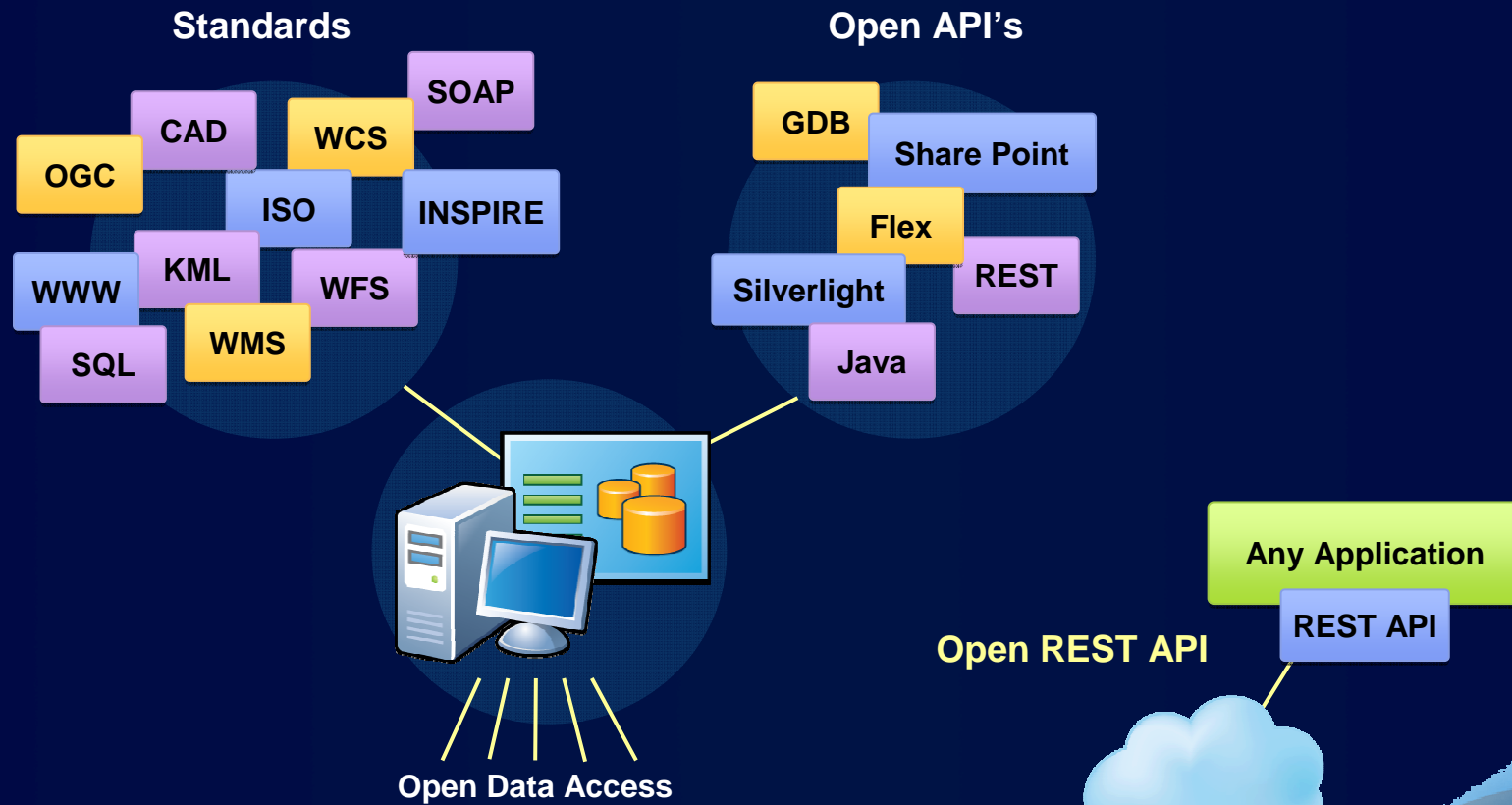
Helping Us Understand Our World

Interoperable: Standards & Specifications

- ISO
 - Metadata, Spatial Schema
- OGC
 - GML, WFS, WMS, WCS, KML ...
- Web (W3C)
 - REST, SOAP, XML ...
- Enterprise Integration
 - SOAP, XML, SQL...
- Application Content/Social Media
 - CAD, Image, PDF, GeoRSS ...



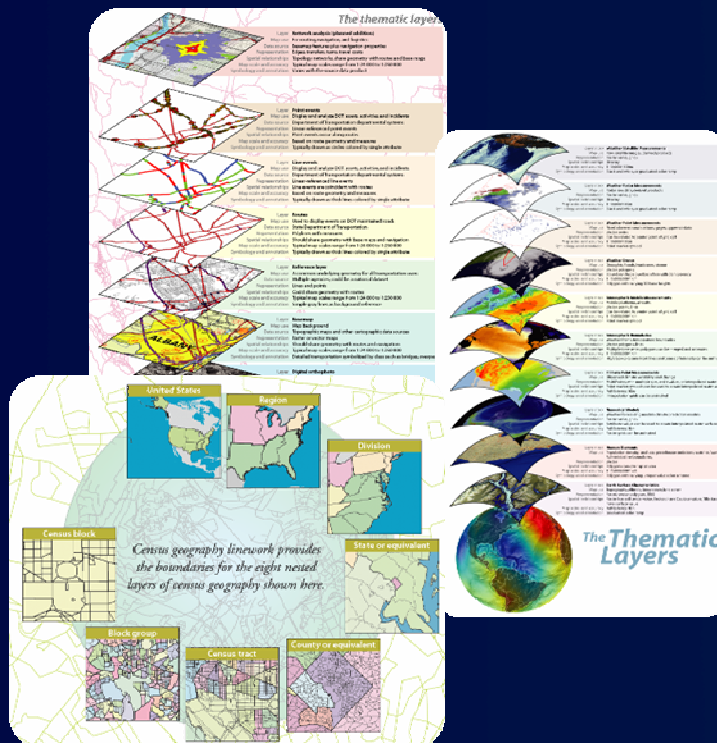
Open, Open, Open!




Esri is Publishing Our REST
Interface as an Open Standard

GIS Data Models

Collected locally, regionally, nationally, globally . . . and shared freely



Census Model from <http://support.esri.com>



Simple feature class

CensusTract

Geometry

Polygon

Contains M values

No

Contains Z values

No

Field name	Data type	Allow nulls	Default value	Domain	Prec-ision	Scale	Length	
OBJECTID	OID							
FIPSSTCO	String	Yes					5	Federal Information Processing Standards Code
TRT2000	String	Yes					6	Census Tract ID
STFID	String	Yes					11	Unique Census TractID within State
TRACTID	String	Yes					10	
SHAPE	Geometry	Yes						
CENSUS_ID_CODE	String	Yes					50	
UR	String	Yes					50	Urban/Rural Code
FS	String	Yes					50	Functional Status
ENTHSE	Integer	Yes			0			Working Housing Count
WORKING_POPULATION_COUNT	Integer	Yes			0			
LSAD	String	Yes					2	Legal/Statistical Area Description
SHAPE_Length	Double	Yes			0	0		
SHAPE_Area	Double	Yes			0	0		
CBD	String	Yes					50	Central Business District

Small, relatively permanent subdivisions of Counties

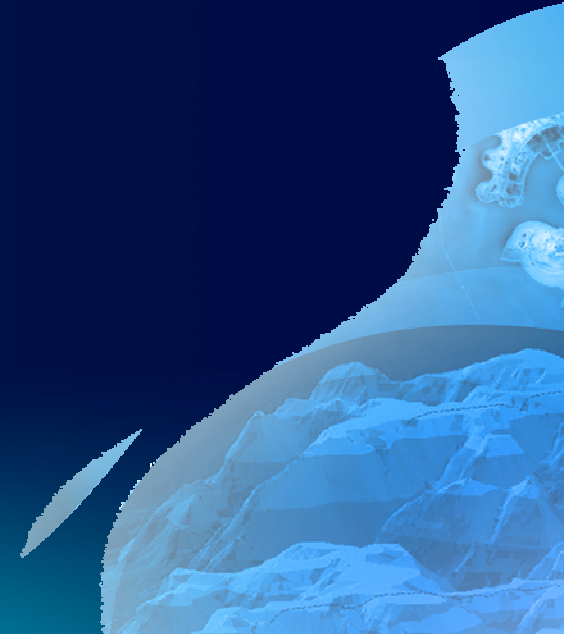
Small, relatively permanent subdivisions of Counties

Also, TrafficAnalysisZones,
CountySubdivision, ZipCodeTabulationArea

County subdivisions do not overlap

Geocoding

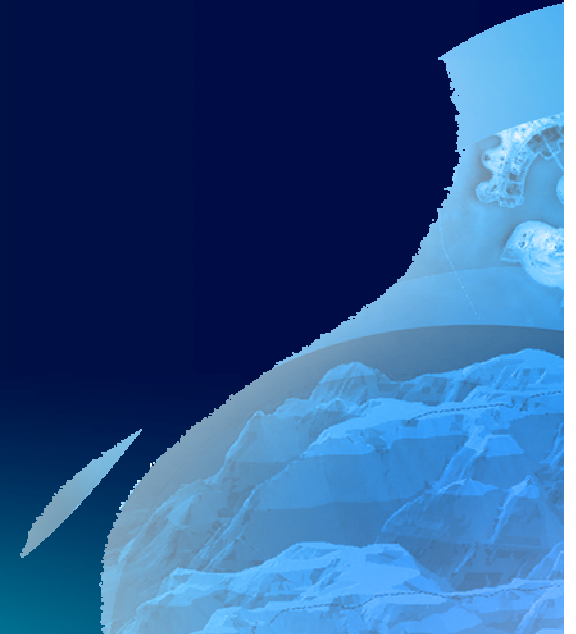
- **Addresses**
- **Situs Addressing (place, not street address)**
- **Other geographies...**
 - e.g. watershed, ecoregion, etc.
- **Administrative units**
- **Gazetteers**



Basic Definition

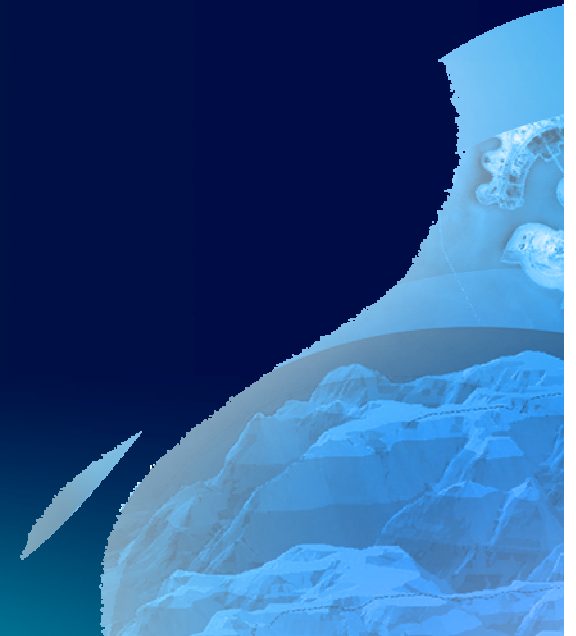
Geocode:

- To assign a street address to a location.
- A code representing the location of an object, such as an address, a census tract, a postal code, or an x,y coordinate.



Lack of Addressing...

- Revenue collection
- Foreign investment
- Regional and global economy
- **Challenges to demographic census**
- Emergency and security services



Situs Addressing: *the Challenge of Addressing in Africa*

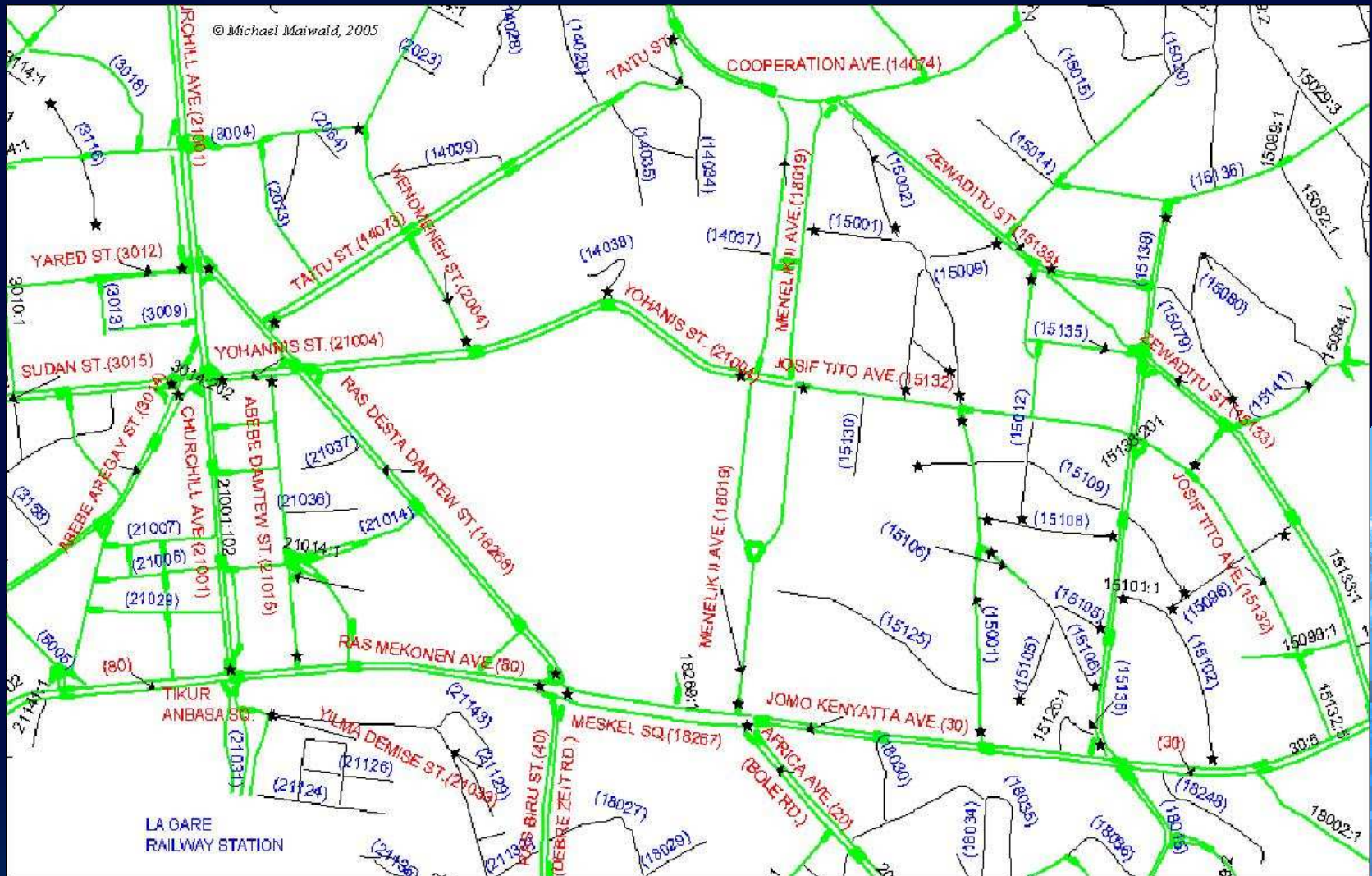
- Situs Addressing Project by UN Economic Commission for Africa
- Meeting in Addis Ababa, Ethiopia at UNECA on 23-24 April 2005



Source: UNECA report on
Situs Addressing

Progress in larger African Cities:

Example from Addis Ababa, Ethiopia



Identification of different addressing schemes

...in an African context

1. Urban – planned
2. Urban – unplanned
3. Slum/Informal
4. Rural
5. Tribal (Rural)

Figure 2. An informal settlement on the urban edge



Source: Coetzee, *Address Data Exchange in South Africa*, 2008.



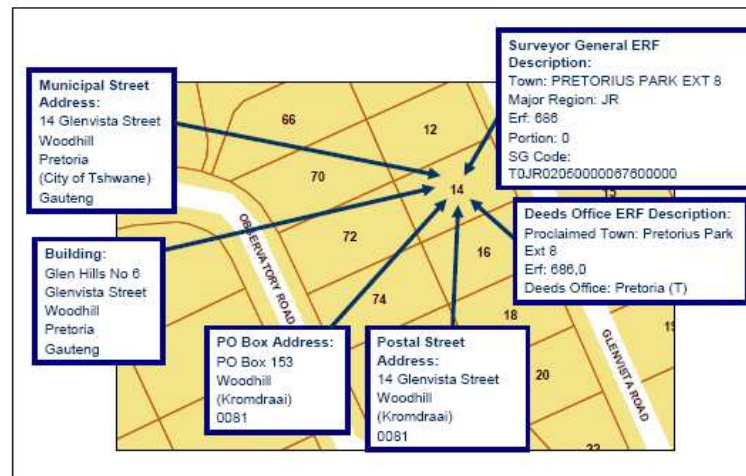
Image courtesy of AT Sistemas –
Rosario Giusti de Perez

Recognizing multiple address schemes for one location

- City
- Postal
- Deed/Cadastre
- Utilities
- Census



Figure 1. Different address-related data for the same service delivery point



Source:
Stats South Africa

Source: Coetzee, *Address Data Exchange in South Africa*, 2008.

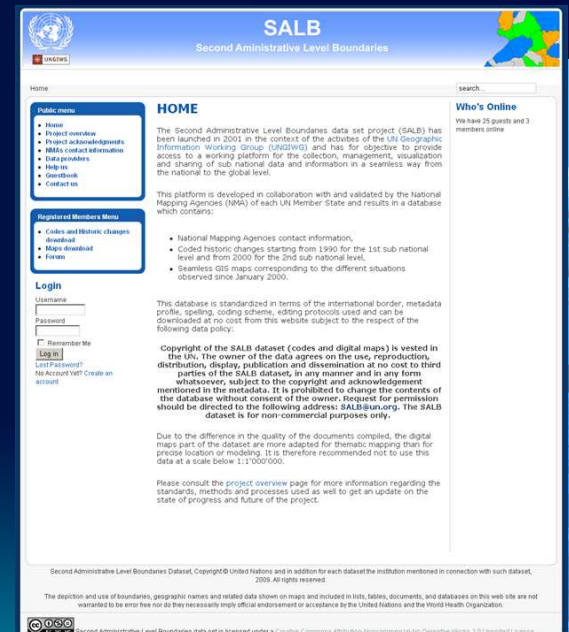
Identification of naming schemes for streets & places

- Do not name streets after dates of events
- Do not name streets/places after people, esp. politicians
- Suggestion: flora and fauna are safe bets!




UN Second Administrative Level Boundaries (SALB)

- www.unsalb.org
 - Link from GGIM website
- Please (!) submit for your country
- Why?
 - Support the mapping of:
 - statistics over time
 - economic, environmental, social indicators, etc.




ArcGIS.com: World Place Locator

 **ArcGIS**

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Find maps, applications and more 

World Places Locator





Geocode world places including countries, states and provinces, administrative areas, cities, landmarks, water bodies, and more.

Geocoding Service by esri (last modified: March 10, 2009)

★★★★☆ (3 ratings, 2116 views)

Sign in to rate this item.

 Facebook  Twitter

Description

The World Places Locator enables you to geocode various types of places around the world. This locator references a geodatabase of over twelve million places around the world that includes countries, states and provinces, administrative areas (e.g., counties), cities, landmarks, water bodies, and more. See [Using standard geocoding tasks](#) for the URL to use the service in ArcGIS Desktop or ArcGIS Server and to learn more about using tasks in your ArcGIS application.

The geodatabase is built primarily using the GeoNames Data that is accessible via Creative Commons Attribution 3.0 License through www.geonames.org. Esri has assembled selected records from the September 2010 GeoNames Data and appended additional attributes (e.g., description, rank, bounding coordinates, etc.) for use in this locator.

You may contribute to the future content of this locator by submitting or editing place names through GeoNames.

The locator accepts a single-line place name input (e.g., Paris, or Paris, France, or Washington, DC) and returns candidates sorted by match score and rank. This locator can be used to geocode single places or batch geocode up to 10 places per request. This locator is available at no cost for your personal or business use.

Comments (0)

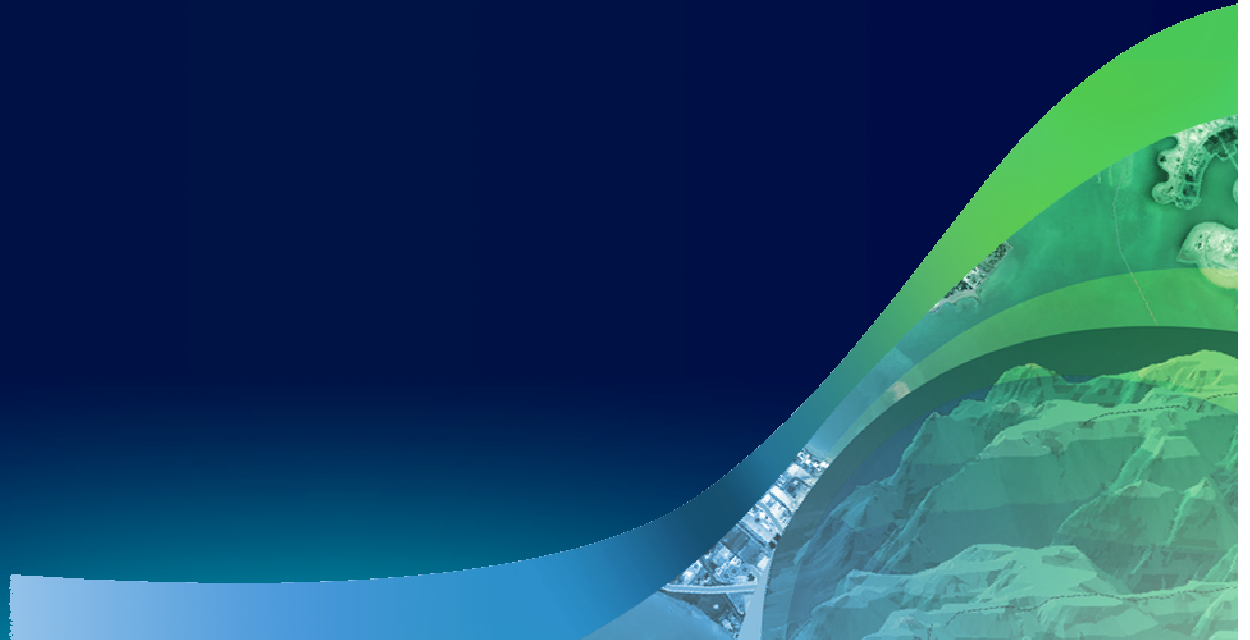
Sign in to add a comment.

International Geospatial Geocoding Conference

- December 6-7, 2011
- Redlands, CA
- Organized by University of Southern California
- <http://geocodingconference.com/>

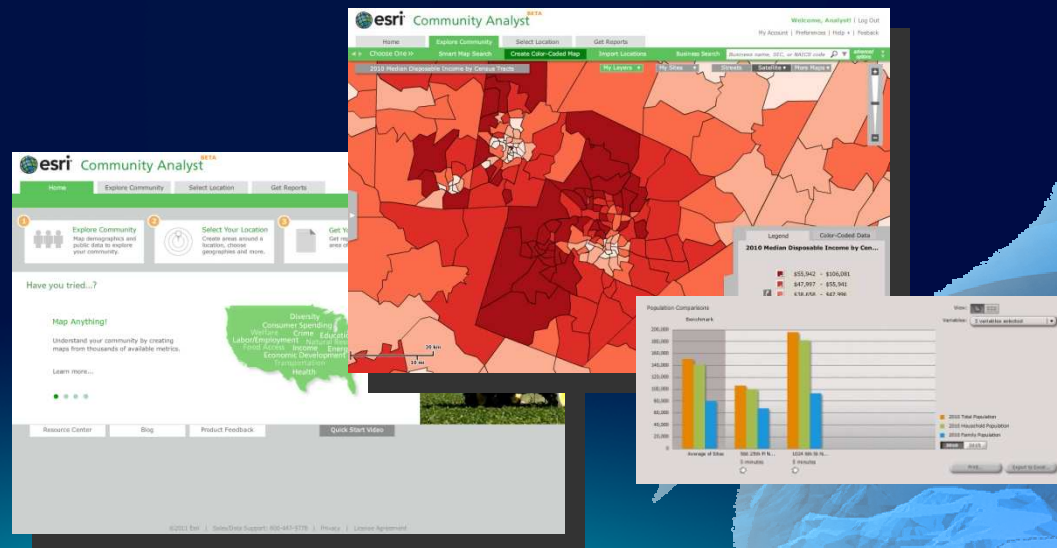


Esri Community Analyst



What is Community Analyst?

- Web application
- Lives in the cloud
- Users simply log in to use it
- Easy to use – for non-GIS professionals
- Users don't need to worry about maintaining data or software

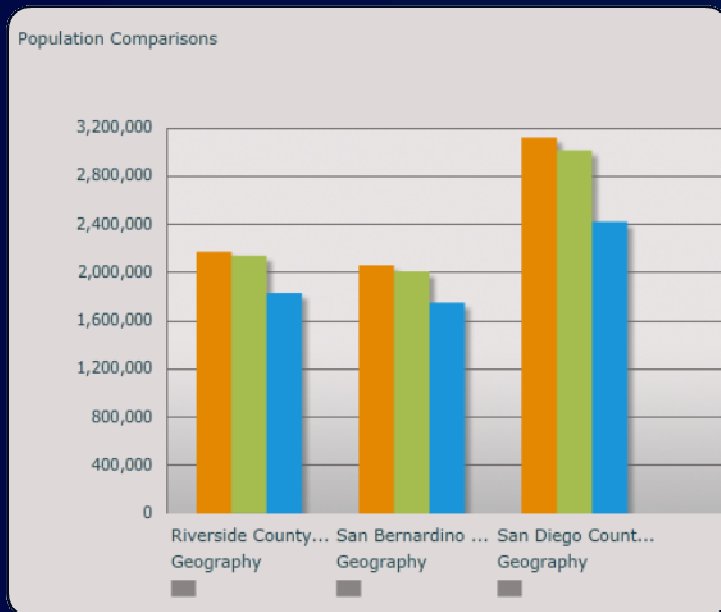


Who is it for?

- Policy-makers, analysts, and advocates
- Government agencies
- Economic development agencies
- Planners
- Advocacy groups
- NGOs & non-profits
- Health agencies
- Consultants



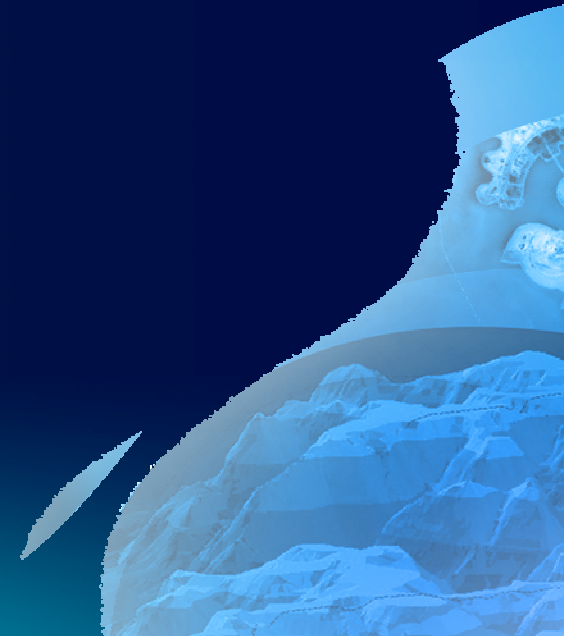
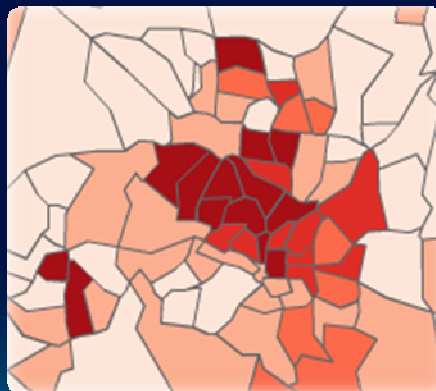
Example Uses



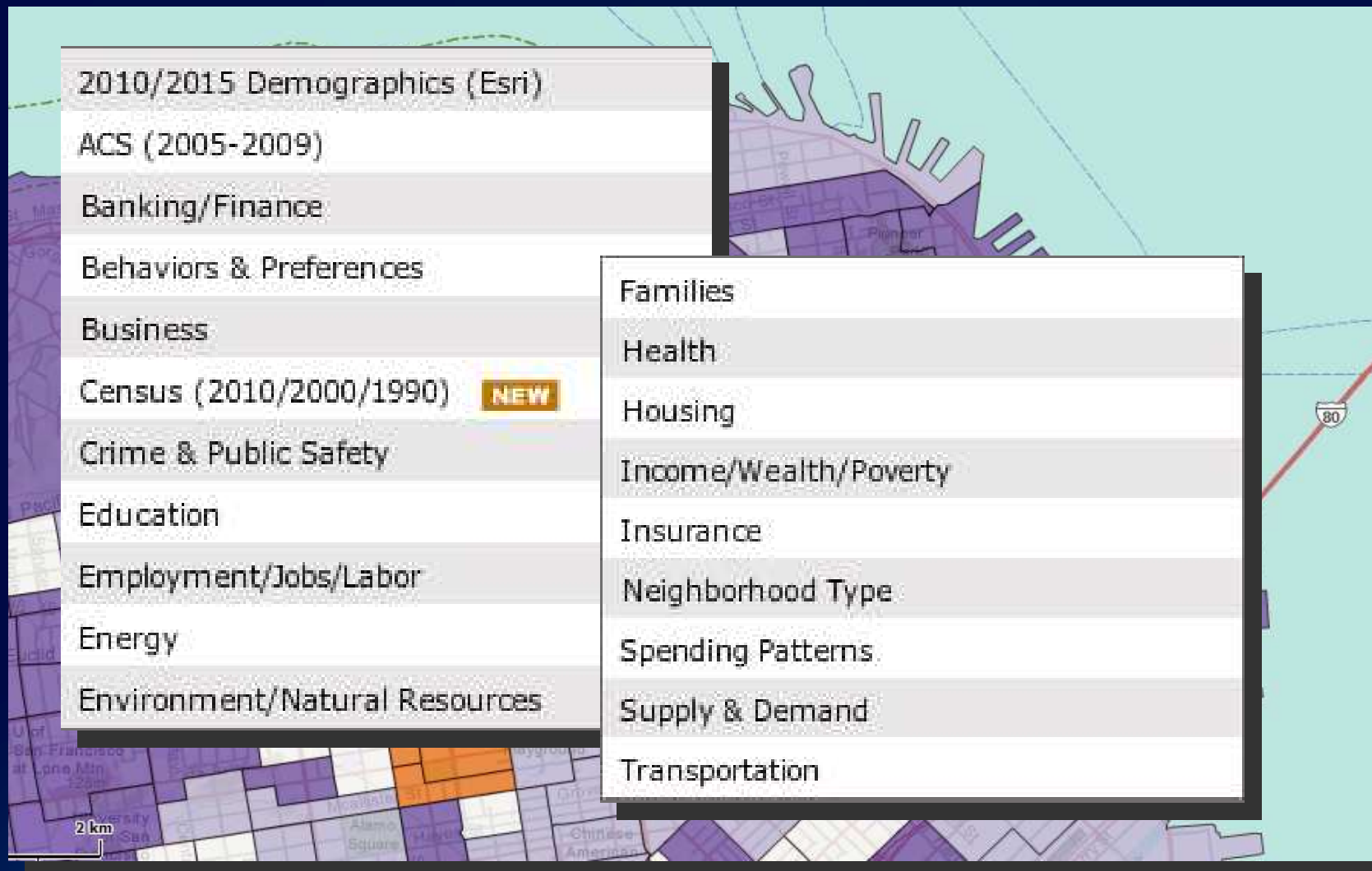
- Grant applications
- Sustainable Communities applications
- Economic development
- Comparing cities and counties
- Communicating facts
- Dissolving false perceptions
- Resource planning for the future

What can you do?

- Explore these questions:
 1. Are we putting resources in the right place?
 2. How do we communicate why resources were allocated the way they were?
 3. How can we reach the community more effectively?

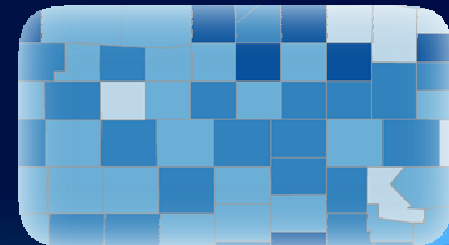
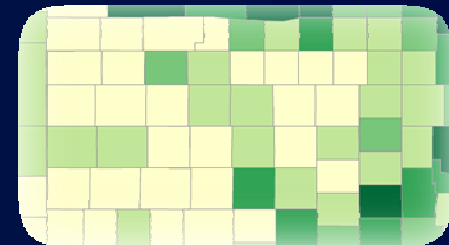
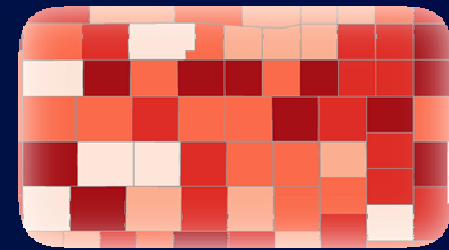


6,000+ Metrics: Current & Five-year Forecast

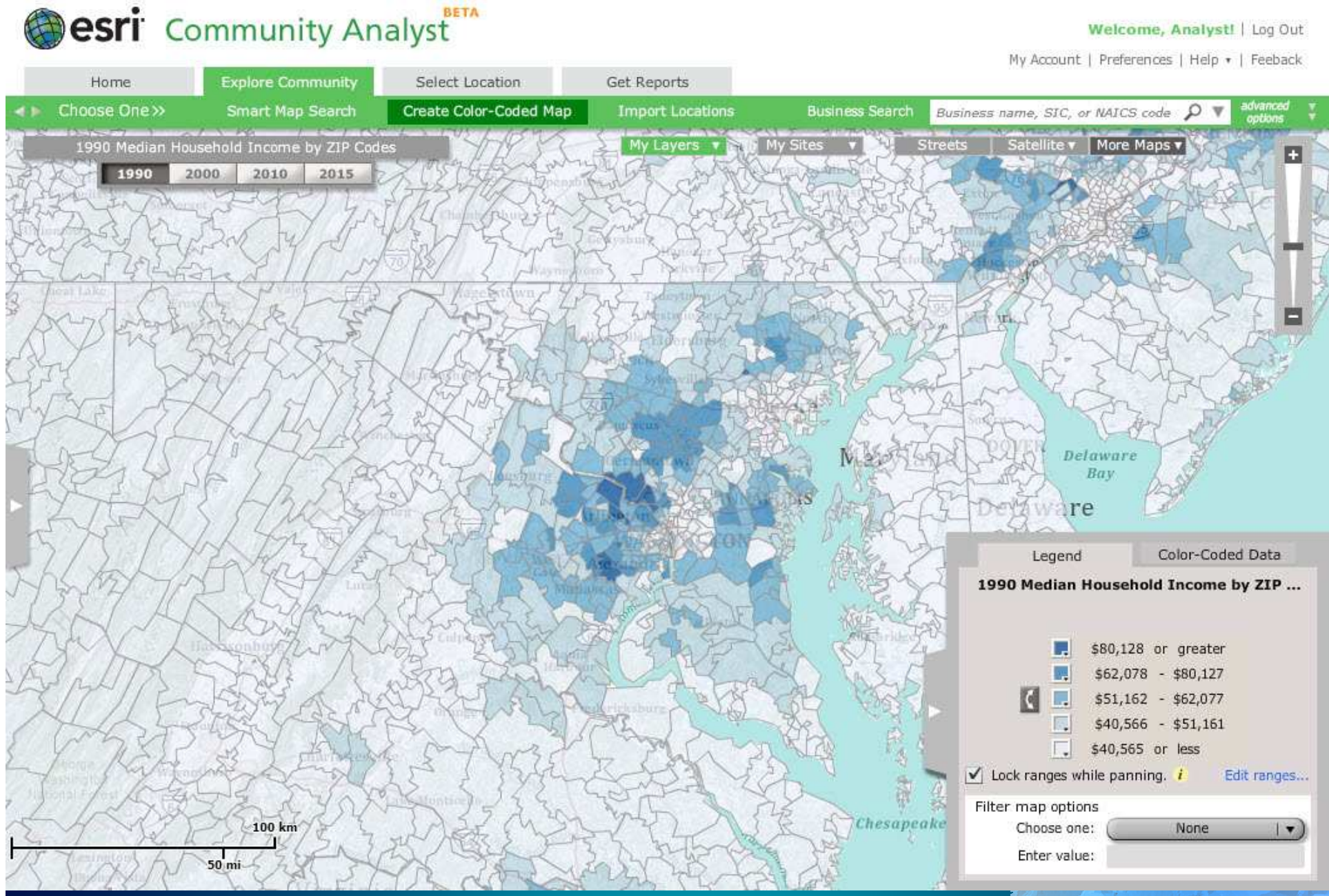


Sources of data

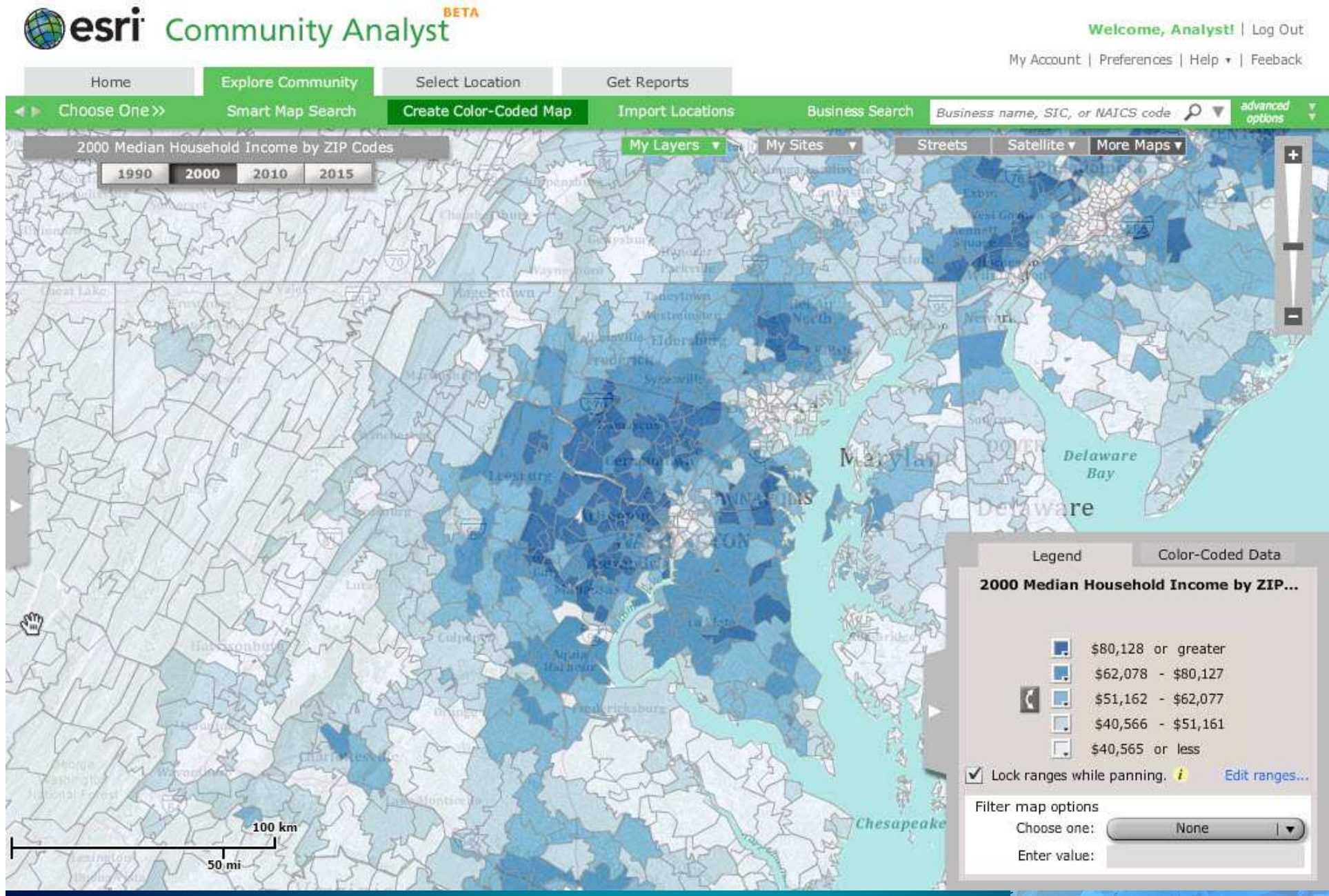
- Esri Projections
- Census (1990-2010)
- ACS (American Community Survey)
- CDC
- DHHS (CHSI)
- EPA
- USDA
- Social Security Administration
- Gfk-MRI
- Infogroup
- AGS Crime Indices
- ... and others



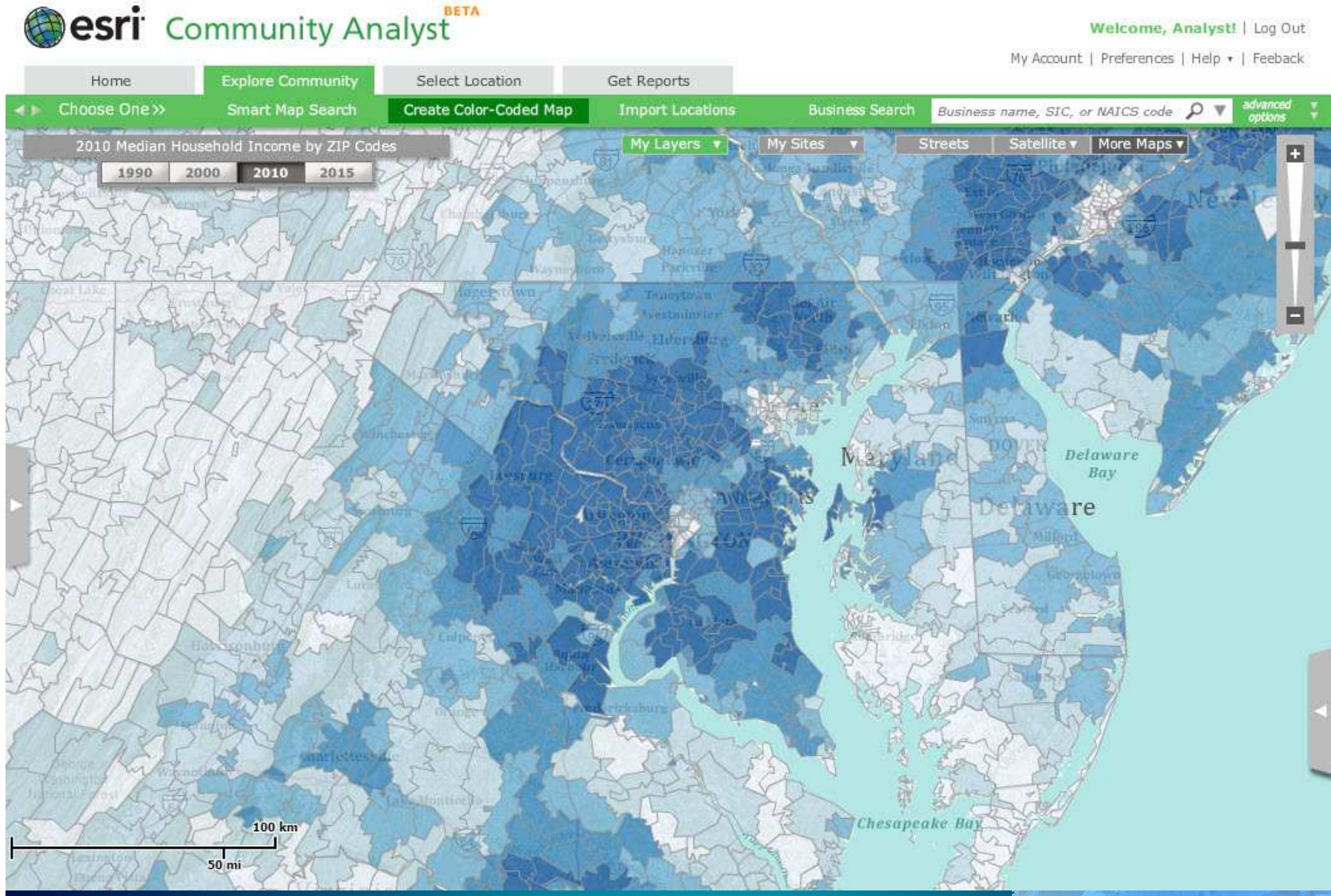
Exploration Tools: Trend Visualization



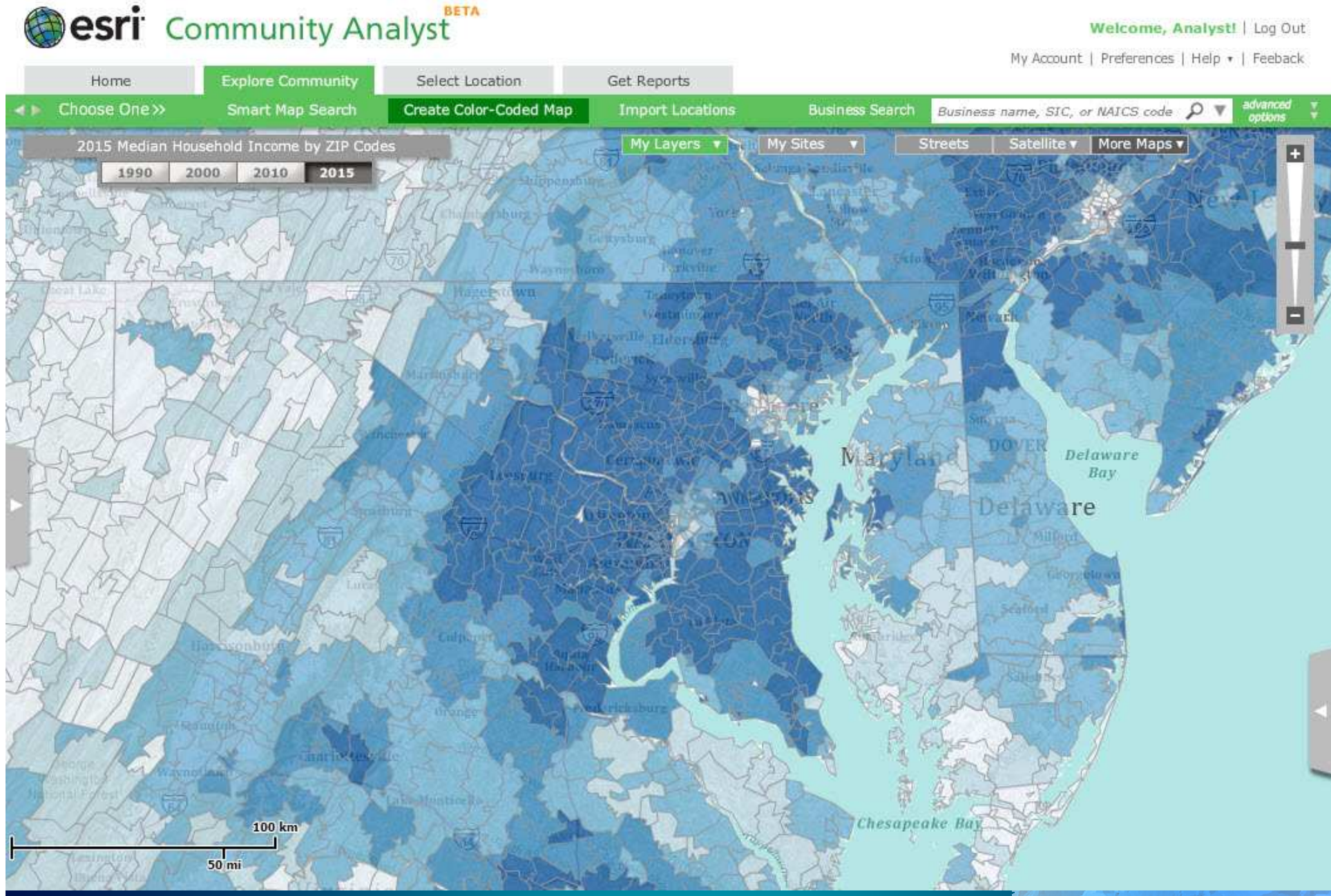
Exploration Tools: Trend Visualization



Exploration Tools: Trend Visualization






Exploration Tools: Trend Visualization



Exploration Tools: Smart Map Search

2. Select Geography: Auto Selection ⓘ ZIP Codes are currently auto-selected

3. Refine your criteria: Smart Map Search ✓ 89 out of 1588 ZIP Codes match all selected criteria.

Use	Available Variables	Minimum	Distribution	Maximum	Matches
<input checked="" type="checkbox"/>	2010 Unemployment Rate	10.4		30.8	406 (25%)
<input checked="" type="checkbox"/>	2010 Median Age	0.0		36.7	299 (18%)
<input checked="" type="checkbox"/>	2010 Median HH Income	\$0		\$57,988	834 (52%)

[Change variables...](#) [Save Criteria List](#) [My Criteria Lists](#)

Close <Back Show results on map

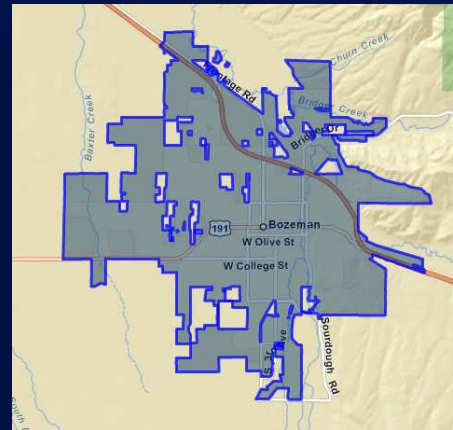


Ability to Create *Any* Area for Analysis

Hand Drawn Areas



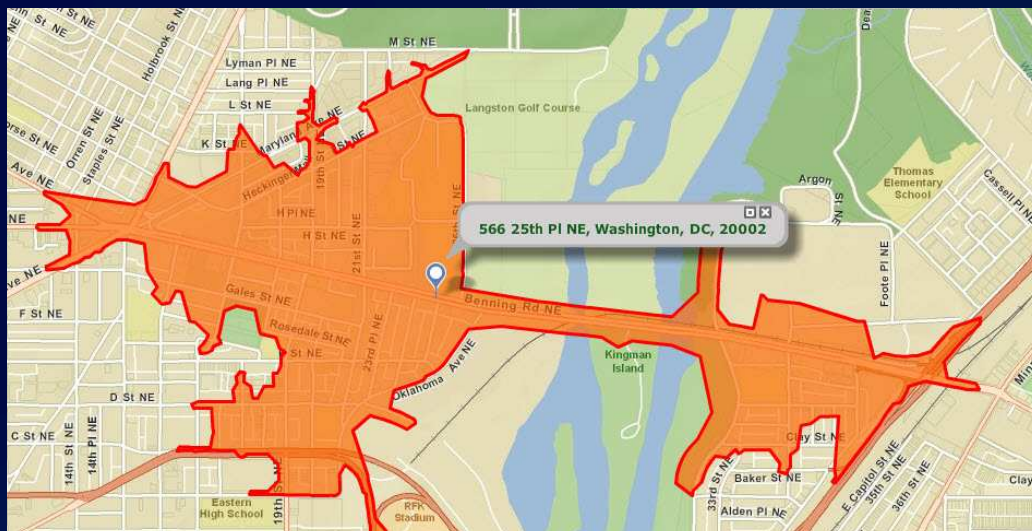
Imported Shapefiles



Ring Areas



Drive Time Areas

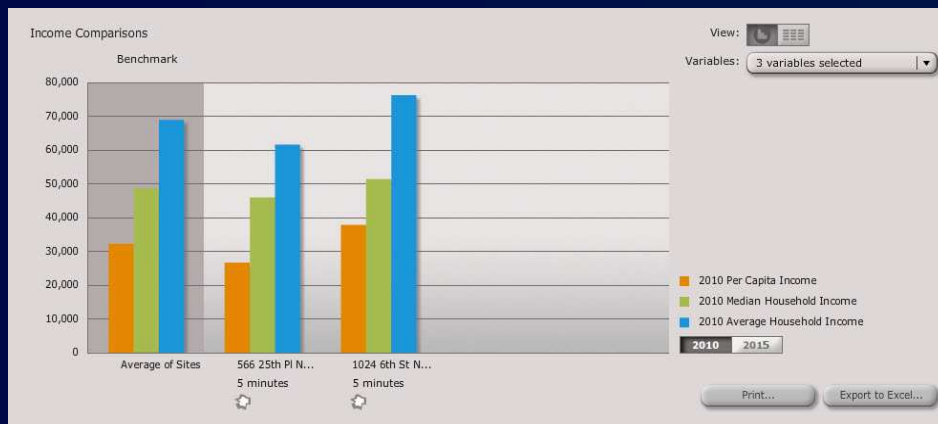


Standard Geographies

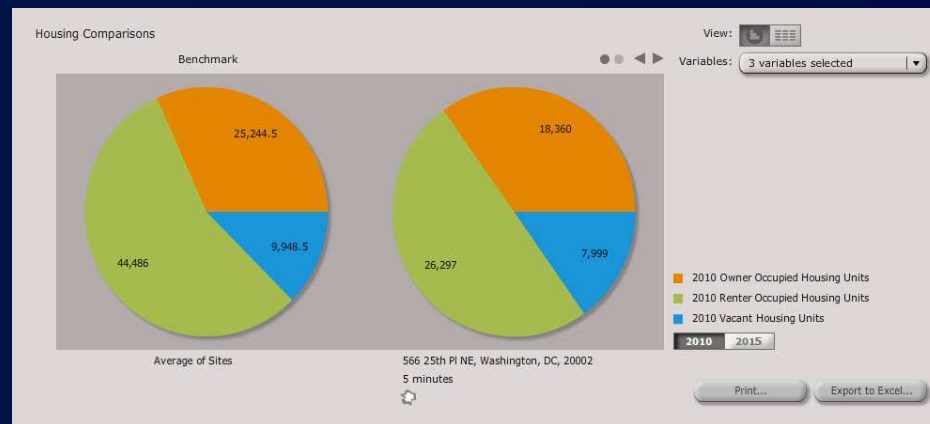


Quickly Compare

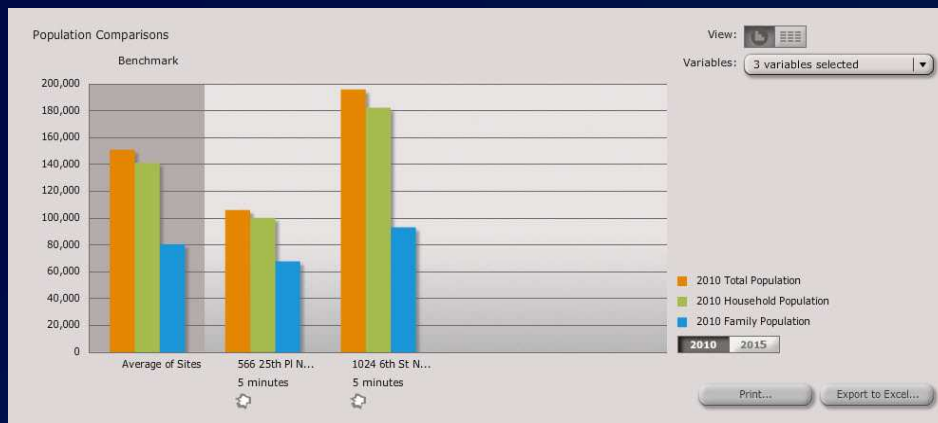
Income



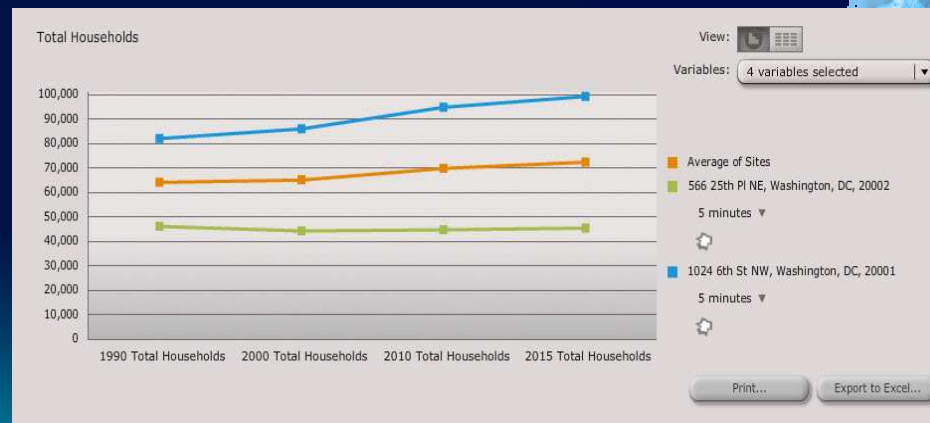
Housing



Population



Households



Reporting



Demographic and Income Profile

Proposed Location
100 S Wacker Dr, Chicago, IL 60606-4005
Ring: 1 mile radius

Sample
Latitude: 41.8805
Longitude: -87.63715

Summary		2000		2010		2015	
Population		26,162		45,534		50,151	
Households		14,855		24,338		26,808	
Families		4,534		7,223		7,843	
Average Household Size		1.56		1.66		1.68	
Owner Occupied Housing Units		6,905		12,162		13,530	
Renter Occupied Housing Units		7,950		12,176		13,278	
Median Age		34.0		35.7		35.8	
Trends: 2010 - 2015 Annual Rate		Area		State		National	
Population		1.95%		0.27%		0.76%	
Households		1.95%		0.27%		0.78%	
Families		1.66%		0.07%		0.64%	
Owner HHs		2.15%		0.32%		0.82%	
Median Household Income		4.32%		2.76%		2.36%	
		2000		2010		2015	
Households by Income		Number	Percent	Number	Percent	Number	Percent
<\$15,000		1,688	11.6%	1,912	7.9%	1,363	5.1%
\$15,000 - \$24,999		793	5.4%	801	3.3%	552	2.1%
\$25,000 - \$34,999		943	6.5%	991	4.1%	787	2.9%
\$35,000 - \$49,999		2,151	14.7%	2,271	9.3%	1,659	6.2%
\$50,000 - \$74,999		2,679	18.4%	4,834	19.9%	5,247	19.6%
\$75,000 - \$99,999		1,845	12.6%	4,178	17.2%	3,640	13.6%
\$100,000 - \$149,999		2,419	16.6%	4,487	18.4%	6,983	26.1%
\$150,000 - \$199,999		1,100	7.5%	2,481	10.2%	3,381	12.6%
\$200,000+		980	6.7%	2,379	9.8%	3,192	11.9%
Median Household Income		\$65,379		\$81,441		\$100,632	
Average Household Income		\$87,546		\$108,629		\$125,374	
Per Capita Income		\$49,927		\$60,584		\$69,932	
		2000		2010		2015	
Population by Age		Number	Percent	Number	Percent	Number	Percent
0 - 4		747	2.9%	1,459	3.2%	1,636	3.3%
5 - 9		432	1.7%	1,022	2.2%	1,184	2.4%
10 - 14		374	1.4%	877	1.9%	1,039	2.1%
15 - 19		1,093	4.2%	1,894	4.2%	1,989	4.0%
20 - 24		2,502	9.6%	4,282	9.4%	4,406	8.8%
25 - 34		8,822	33.7%	12,622	27.7%	14,108	28.1%
35 - 44		5,364	20.5%	8,051	17.7%	7,883	15.7%
45 - 54		3,573	13.7%	6,617	14.5%	7,141	14.2%
55 - 64		1,872	7.2%	4,961	10.9%	5,733	11.4%
65 - 74		879	3.4%	2,110	4.6%	3,102	6.2%
75 - 84		405	1.5%	1,150	2.5%	1,345	2.7%
85+		97	0.4%	489	1.1%	582	1.2%
		2000		2010		2015	
Race and Ethnicity		Number	Percent	Number	Percent	Number	Percent
White Alone		16,948	64.8%	27,950	61.4%	30,323	60.5%
Black Alone		5,519	21.1%	9,413	20.7%	9,661	19.3%
American Indian Alone		50	0.2%	150	0.3%	205	0.4%
Asian Alone		2,519	9.6%	4,938	10.8%	5,958	11.9%
Pacific Islander Alone		24	0.1%	60	0.1%	78	0.2%
Some Other Race Alone		523	2.0%	1,692	3.7%	2,273	4.5%
Two or More Races		579	2.2%	1,332	2.9%	1,653	3.3%
Hispanic Origin (Any Race)		1,603	6.1%	4,863	10.7%	6,532	13.0%

Data Note: Income is expressed in current dollars

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.

June 14, 2010

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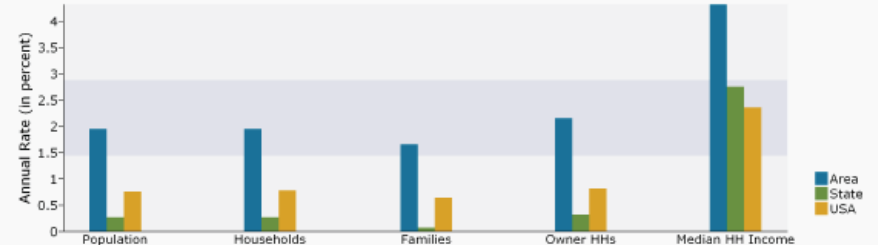


Demographic and Income Profile

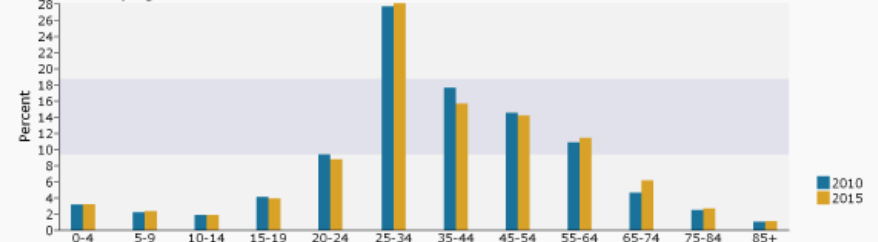
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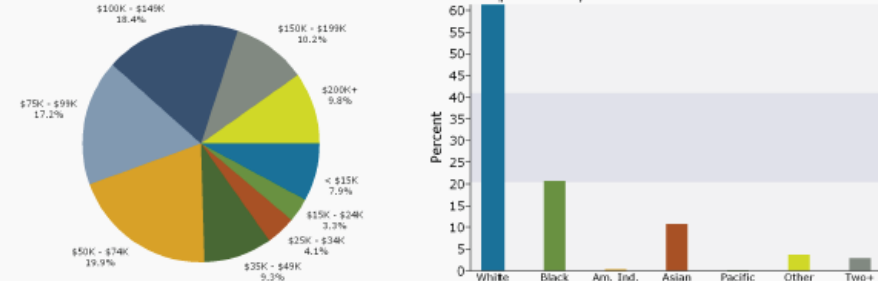
Trends 2010-2015



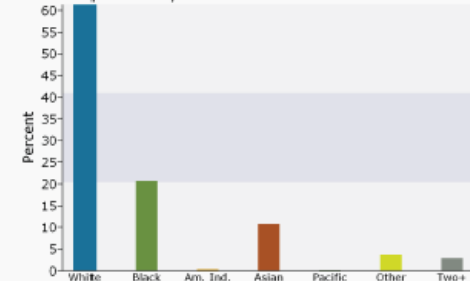
Population by Age



2010 Household Income



2010 Population by Race



2010 Percent Hispanic Origin: 10.7%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.

June 14, 2010

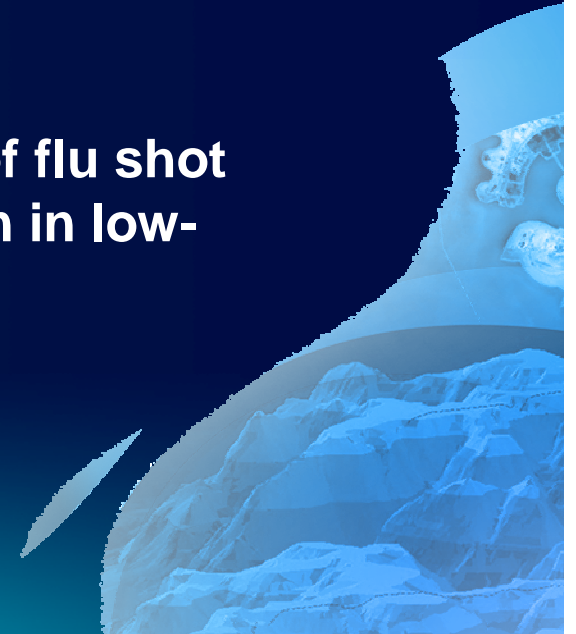
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Targeting Resources

- **Problem:**
 - Each year anywhere from 3,000 to 49,000 people die in the US each year.
 - The elderly and young children are most susceptible.
 - The CDC recommends everyone over the age of 6 months get a flu vaccine.
- Where can we allocate a limited number of flu shot clinics to serve a large number of children in low-income areas?



Use Smart Map Search to Find Target Areas



Choose your criteria and Smart Map Search will indicate matches in green.

Here's how...

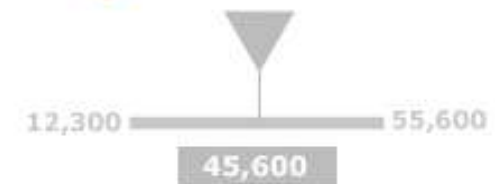
1. Select your criteria.



2. Choose your geography type.

Counties
ZIP Codes
Census Tracts
Block Groups

3. Refine your criteria.



Watch a short how-to video.



Get Started

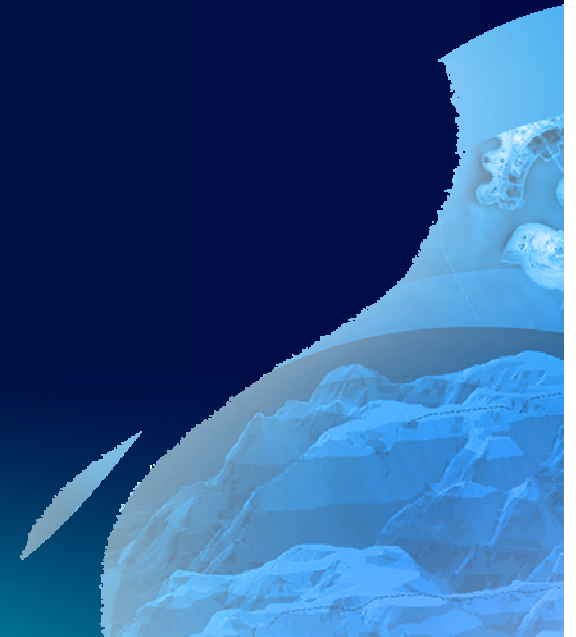
Close

☐ Skip this page in future

Find Low Income Areas with Lots of Kids

Search Variables:

- Median Household Income
- Number of Kids Age 0-4



Select Search Variables and Set Ranges

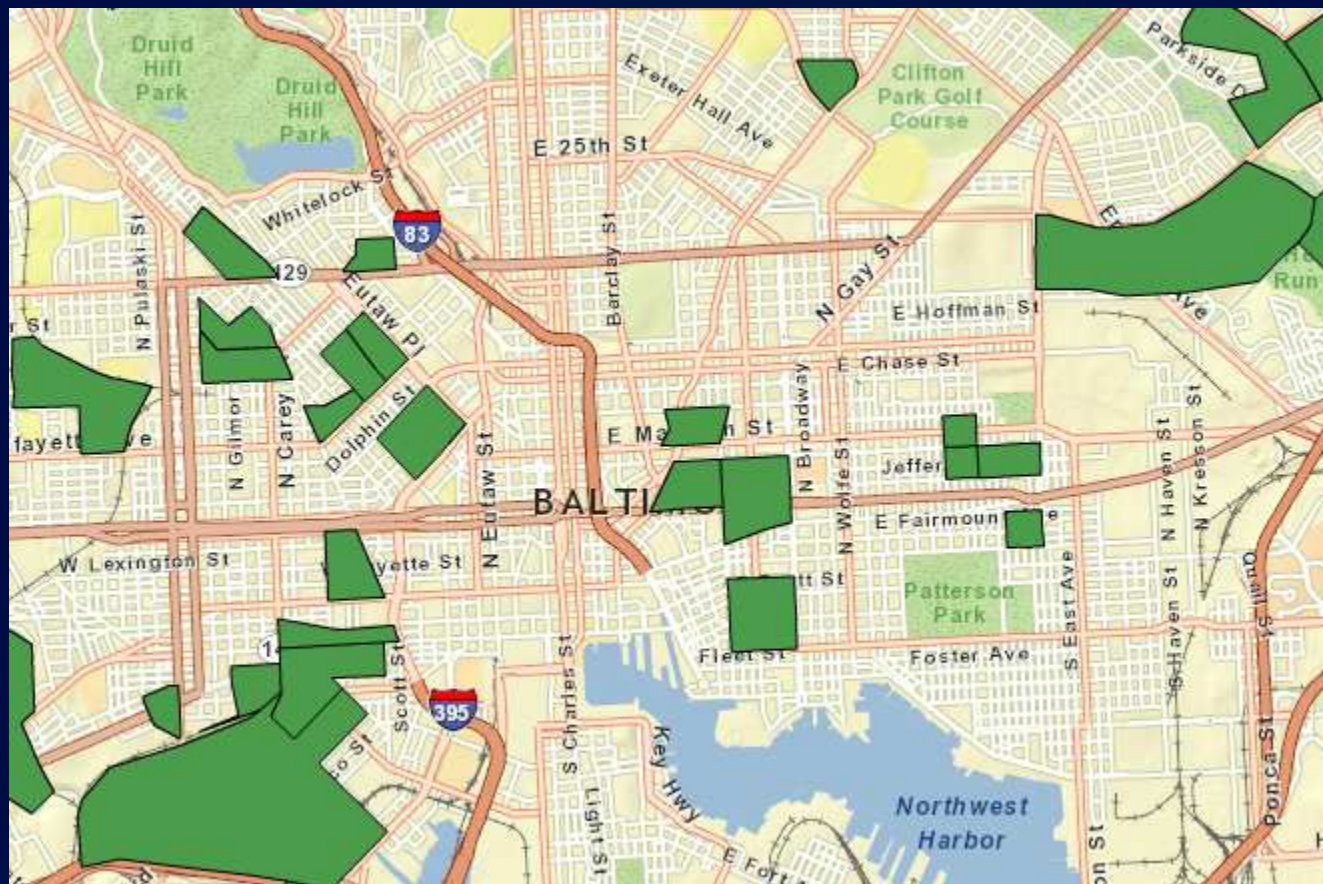
2. Select Geography: Auto Selection Block Groups are currently auto selected

3. Refine your criteria: Smart Map Search 63 out of 1021 Block Groups match all selected criteria.

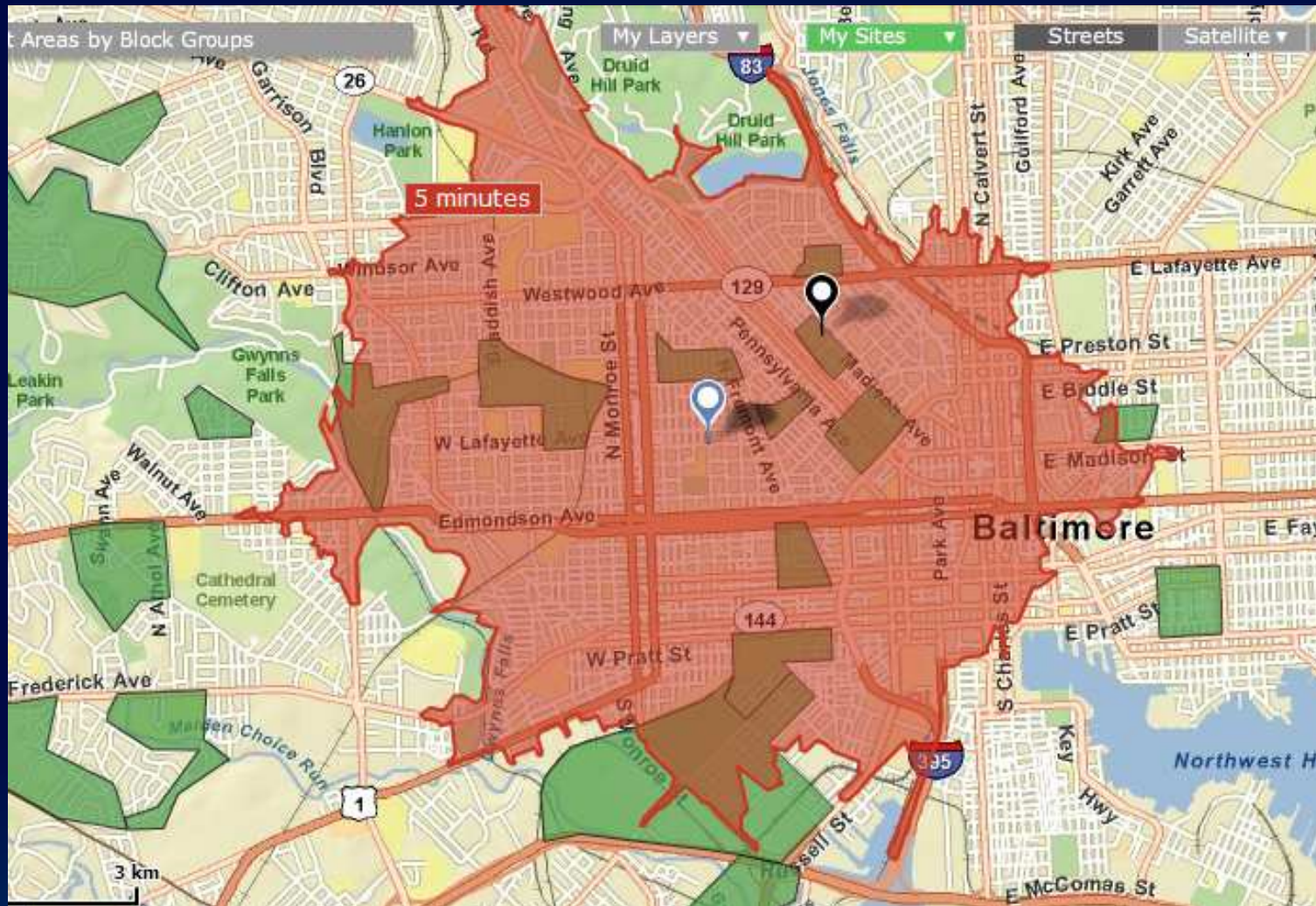
Use	Available Variables	Minimum	Distribution	Maximum	Matches
<input checked="" type="checkbox"/>	2010 Median HH Income	<input type="text" value="\$0"/>		<input type="text" value="\$40,000"/>	448 (43%)
<input checked="" type="checkbox"/>	2010 Total Population 0-4 <small># %</small>	<input type="text" value="100"/>		<input type="text" value="602"/>	177 (17%)

[Change variables...](#) [Save Criteria List](#) [My Criteria Lists](#)

End Target Areas - In Green



Select a Flu Shot Clinic Location



Examine the Surrounding Population



Tapestry Segmentation Area Profile

Ranked by Households

JOHNSTON SQUARE ELEM SCHOOL
1101 VALLEY ST
Drive Time: 5 minutes

Latitude: 39.302847
Longitude: -76.604873

Top Twenty Tapestry Segments

Tapestry segment descriptions can be found at <http://www.esri.com/library/whitepapers/pdfs/community-tapestry.pdf>

Rank	Tapestry Segment	Households		U.S. Households		Index
		Percent	Cumulative Percent	Percent	Cumulative Percent	
1	54. Urban Rows	36.3%	36.3%	0.3%	0.3%	10501
2	27. Metro Renters	14.3%	50.6%	1.4%	1.7%	1050
3	64. City Commons	13.1%	63.7%	0.7%	2.4%	1935
4	65. Social Security Set	9.8%	73.5%	0.6%	3.0%	1508
5	55. College Towns	4.6%	78.1%	0.8%	3.8%	566
	Subtotal	78.1%		3.8%		

Know How to Reach the Population

54 Urban Rows



Segment Code.....54
Segment Name *Urban Rows*
LifeMode Summary GroupL3 *Metropolis*
Urbanization Summary Group ...U2 *Principal Urban Centers II*

Demographic

The *Urban Rows* population of approximately 1.1 million people, the smallest of all the Tapestry segments, is still shrinking due to urban renewal programs. With a median age of 33.4 years, this market is slightly younger than the national level. Household types are mainly a family mix of married couples, single-parent families, and other families. Grandparents are caregivers in many households; many homes are multigenerational. Nearly 7 in 10 residents are black, and 2 in 10 are white. Ten percent of the population is Hispanic.

Socioeconomic

The median household income for this market is \$33,596; the median net worth is \$21,888. Some households supplement their wage and salary income with Supplemental Security Income or public assistance. Nearly half of the employed residents work in white-collar occupations. Approximately 20 percent of the employed residents work in the health care industry; 10 percent have local government jobs. At 20 percent, unemployment is more than double the U.S. rate.

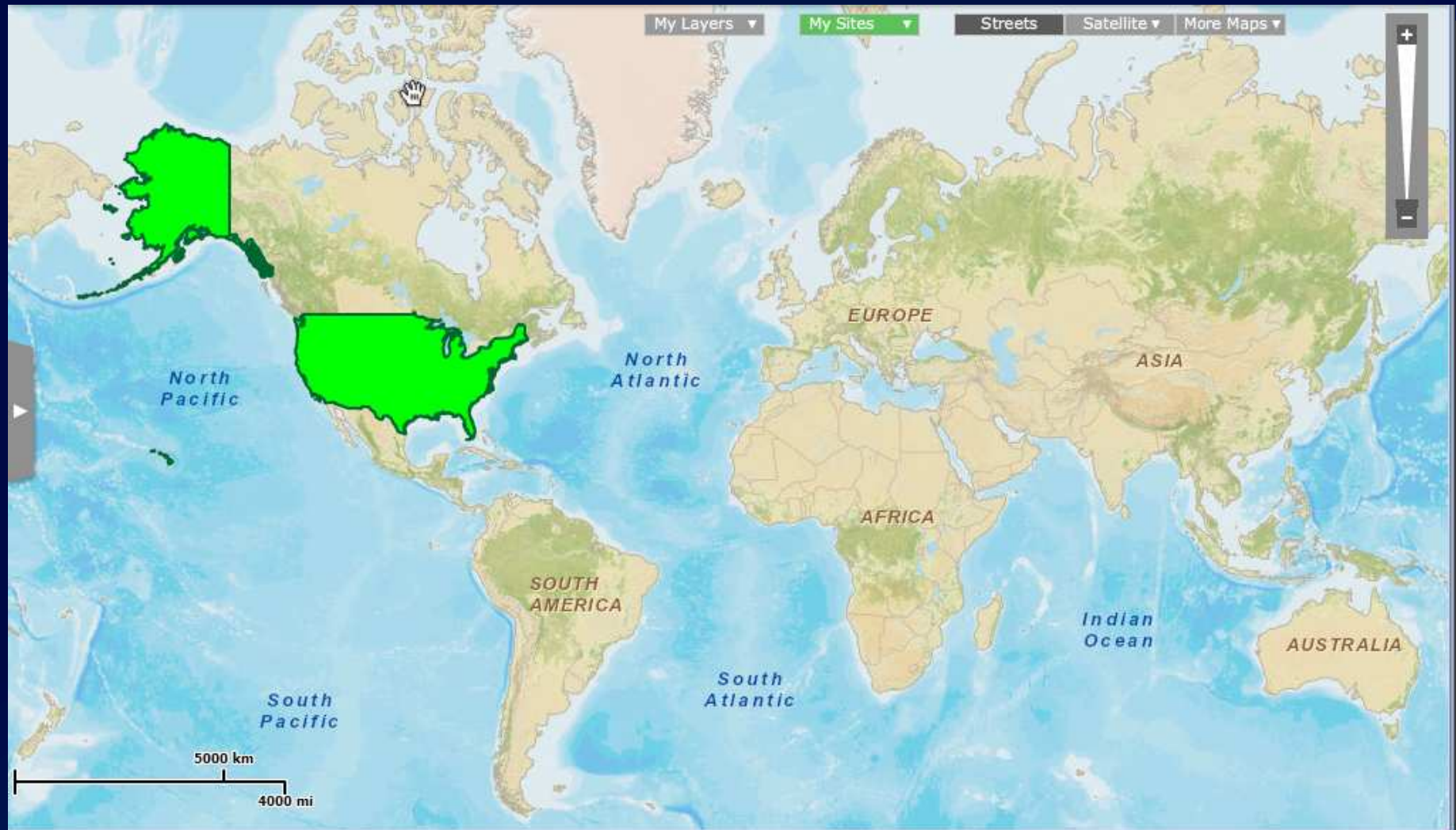
Preferences

“Little access to the Internet at home. Go online at the library or at school.”

“Get their news from the radio.”

...saxons, and sports programs. Music is a big part of their...

United States today, but Going Global



Global Solution

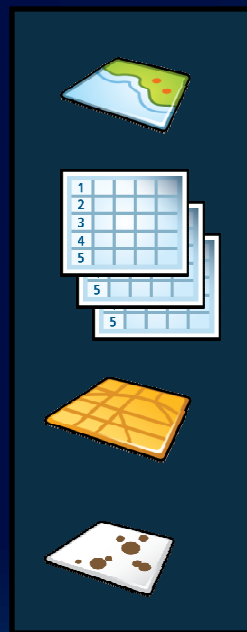
Esri Community Analyst

Basemaps
(ArcGIS Online)

Statistical Data
& Reports

Street Network
for Drive Times

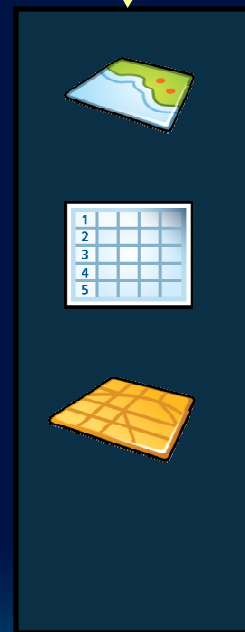
POI Data



USA
Canada



Europe



...



..



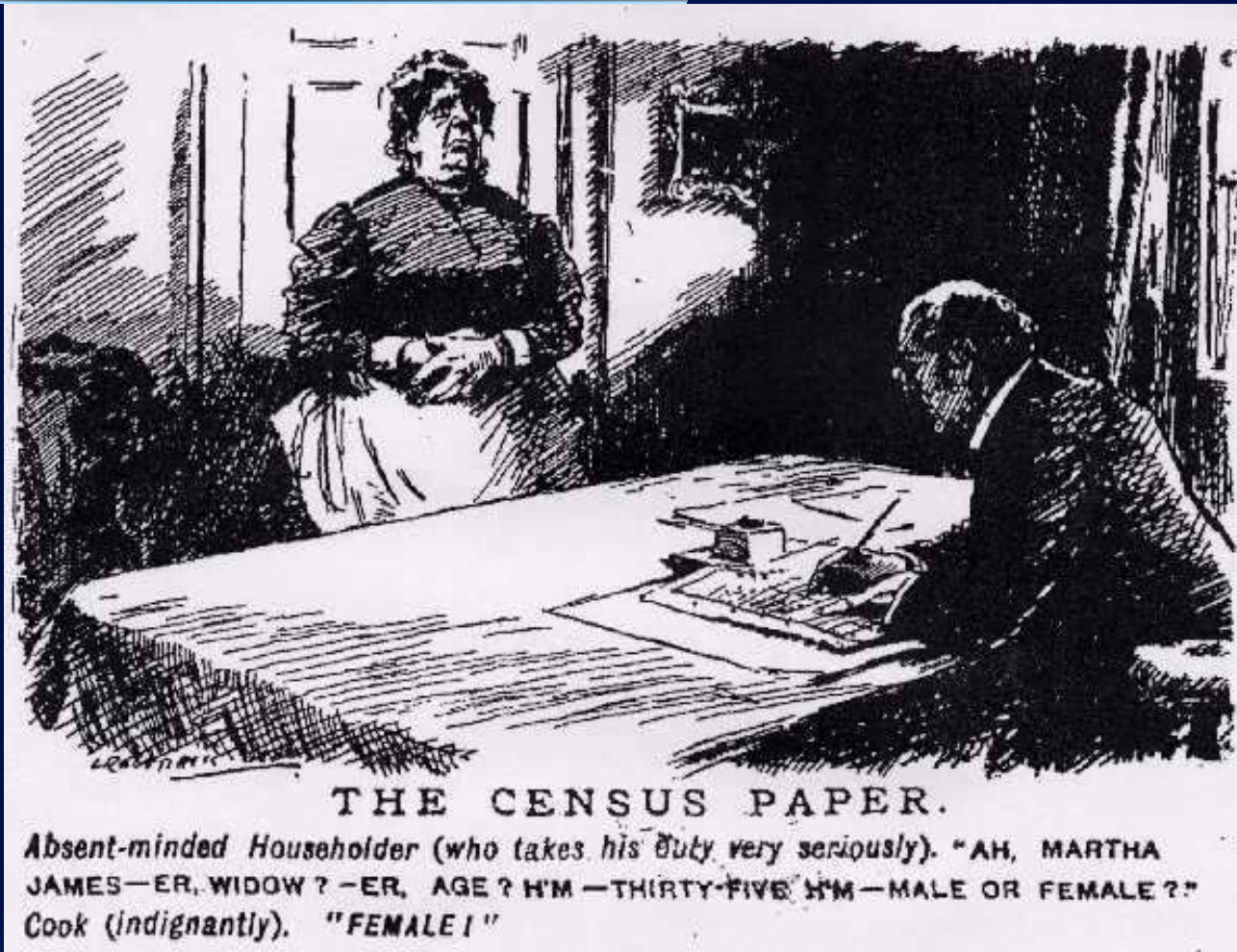
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GIS Day—November 16, 2011

Increasing Spatial Literacy



Census Humor...



*The 1891 Census in the UK
Cartoon from "Punch", nineteenth century*