

# Weaving On the Map: How highly interactive data visualizations serve regional planning partners and community groups

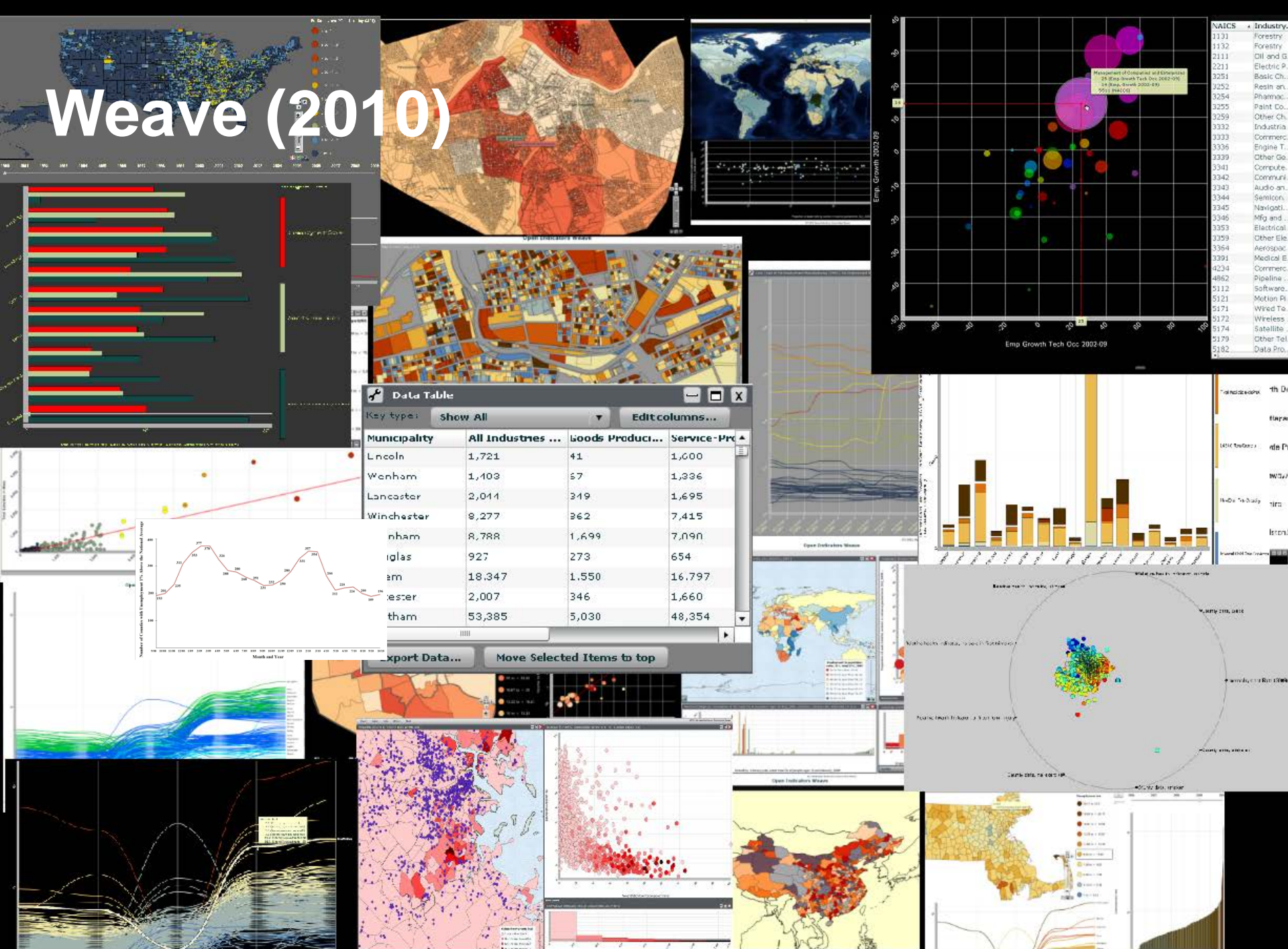
LED Partnership Workshop      June 12-13, 2013  
US Census Bureau and the Local Employment Dynamics Partnership Steering Committee



**Georges Grinstein** *Professor & Director* – Institute for Visualization and Perception Research, UMass Lowell  
**William Mass** *Associate Professor and Director* - Center for Industrial Competitiveness, UMass Lowell  
**Mike Carnathan** *Researcher* – Atlanta Regional Commission

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# Weave (2010)





Institute for Visualization and Perception Research

# Weave

## Web-based Analysis and Visualization Environment

iWeave.org

Grants from National Academy of Sciences and DataHavens to explore technologies for a web-based visualization system

Built prototype in 2007



*information visualized  
knowledge discovered  
decisions made*

# Open Indicators Consortium (OIC) Formed to fund first years of Weave

## 1. Arizona

Arizona Indicators, managed by Morrison Institute for Public Policy at ASU

## 2. Metro Atlanta/Atlanta GA

Neighborhood Nexus Partnership, Greater Atlanta Planning Commission, Emory University

## 3. Metro Boston/Boston MA

Metropolitan Area Planning Council, the Boston Indicators Project at the Boston Foundation

## 4. Metro Chicago IL

Regional Indicators Project, Chicago Metropolitan Agency for Planning

## 5. Columbus/Central OH

Community Research Partners, Mid-Ohio Regional Planning Commission

## 6. Connecticut Data Collaborative

CT Economic Resource Center & CT Data Collaborative

## 7. Kansas City MI

Mid-America Regional Council for the Kansas City Community-Wide Information Network

## 8. Massachusetts Department of Early Education and Care

## 9. Michigan Data Collaborative

The Michigan Data Collaborative, managed by the Johnson Center's Community Research Institute & Data Driven Detroit

## 10. Rhode Island

Rhode Island Department of Education, The Providence Plan

## 11. Rockford Illinois

Rockford Region Vital Signs

# More members and others

## 12. King County/Seattle WA

Public Health Department

## 13. South Florida

South Florida Regional Planning Council & Southeast Florida Regional Partnership

## 14. San Antonio

Community Information Now

## 15. Portland OR

Portland State University

## 16. Centers for Disease Control and Prevention (CDC)

## 17. Houston

- MA Dept of Higher Education
- US Dept of Labor – internal review of grant activity
- Associated Grant Makers, Community Teamworks Inc, ...
- Boston Cares, On The Rise, ...
- Veteran's Services
- ...

Many more across the world

Numerous downloads

The James L. Knight, Barr and The Boston Foundations

The Greater Lowell, Boston, New Haven and Rhode Island Community Foundations

# The Fundamental Mission:

Open Access

Open Analysis

Open Dissemination

Enable data visualization and analysis  
of any available data  
anywhere  
by anyone  
for any purpose

Under administrative and user controls

With source code and software freely available

# Today Weave Provides

- Ease of integrating multiple databases
- Support for multiply linked visualizations
- Flexibility for data exploration
- Interactive presentations
- Dissemination of results (static and interactive)
- Integrated R-Project
- All based on session history

# RockfordRegion

# VITAL SIGNS

Regional Plan for Sustainable Development

This website provides a wealth of information about the Metro's communities through a variety of topics – from arts & education to housing & transportation. We invite you to explore the region's sustainability data and work with us to create your own data visualizations and reports. The goal: to collectively make more informed decisions for our region.

NEWS

**Announcing Training Manual for Rockford Region Vital Signs Website**

We are pleased to announce the release of the Training Manual for the Rockford Region Vital Signs Website. This website is an interactive data portal taking the pulse of the region's sustainability. It includes an...  
[»Read more](#)

[Home](#)

[About Vital Signs](#)

[SpeakUp!](#)

[Explore Topical Data](#)

[Explore Crosscut Data](#)

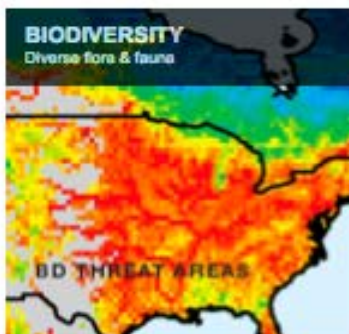
[Community Snapshots](#)

[Use the Data](#)

[Contact Us](#)

## BIODIVERSITY

Diverse flora & fauna



PUBLIC AMENITIES

## CIVIC VITALITY

Relationships, participation, & leadership

### SOCIAL NETWORKS...

Investigate how the Rock River Valley's groups, organizations and individuals work together

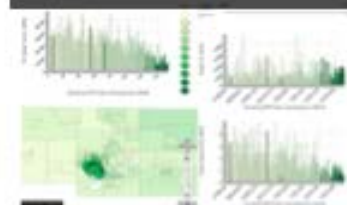
## CULTURE

Arts, ethnic heritage, & civic design



## EDUCATION

Workforce pipeline & self-sufficiency



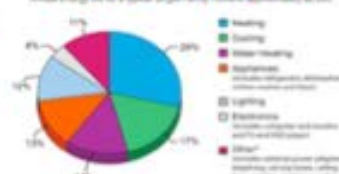
DROPOUT RATES

## ENERGY

Renewable energy & conservation

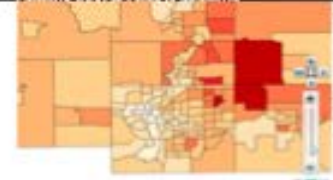
### Where Does My Money Go?

Annual Energy Bill for a typical Single Family Home is approximately \$2,000



## FOOD

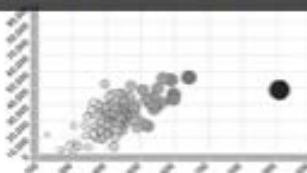
Healthy food access & systems



HOUSEHOLD MONEY SPENT ON UNHEALTHY FOOD

## HEALTH

Healthcare access & well-being



INCOME VS EXPENDITURES ON SMOKING

## HOUSING

Neighborhood well-being & public housing



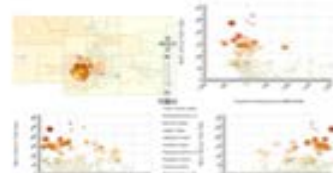
MINORITY OWNER-OCCUPIED HOUSING

## LAND

Natural resources & land use

### NATURAL RESOURCES

Study how we treat the physical land and its resources affects our sustainable futures



CRIME & EDUCATIONAL ATTAINMENT

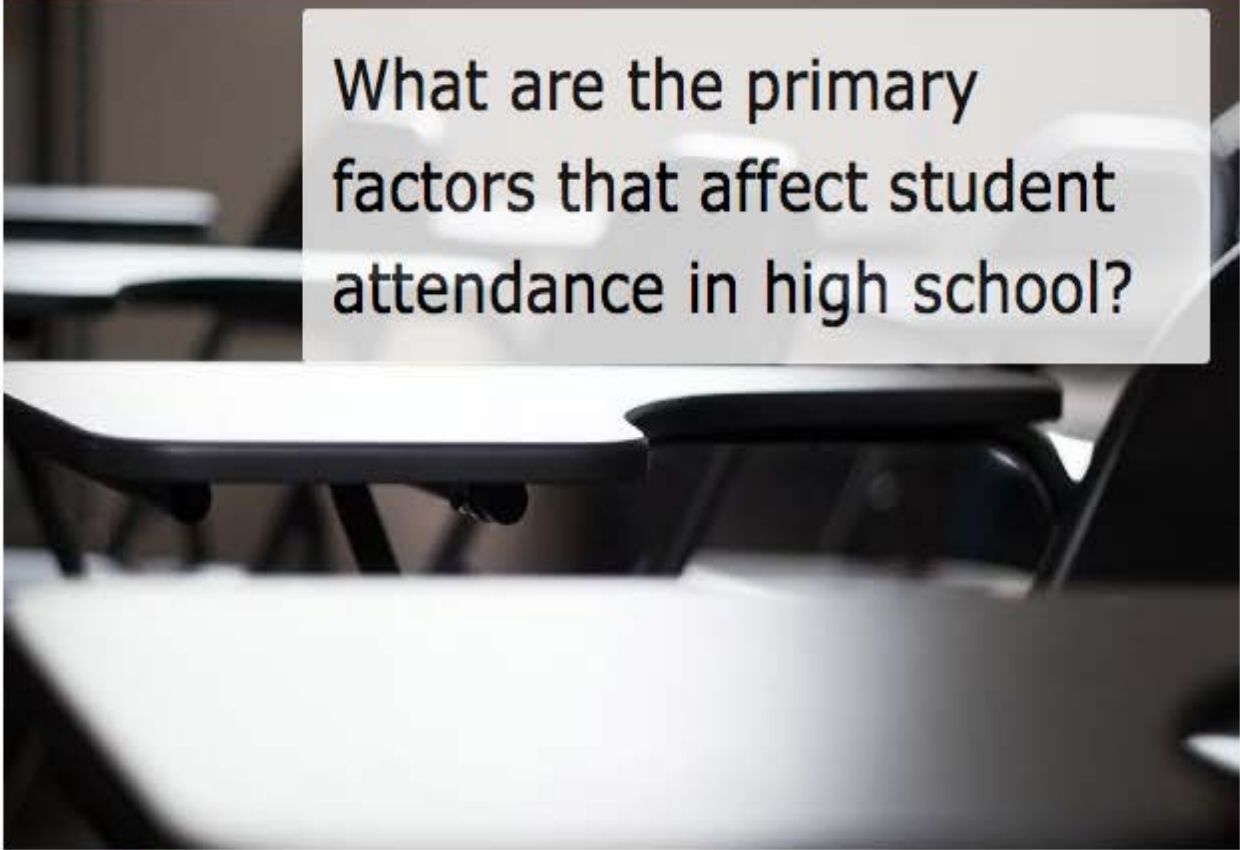
## Welcome to the Rhode Island DataHUB

A partnership among several state and local agencies and The Providence Plan, the RI DataHUB links together data from national, state, and local sources. Data are summarized and made available on this website to all who are interested in using data to analyze and improve the well being of Rhode Islanders.

Topics include:

- Demographics
- Education
- Health
- Adolescent Risk Factors
- Adolescent Protective Factors

Begin by exploring a **"Data Story"** or browsing **Reports** that interest you.



What are the primary factors that affect student attendance in high school?

Children  
and Youth  
Cabinet  
(HS)



# Boston Trees with Stamen Map



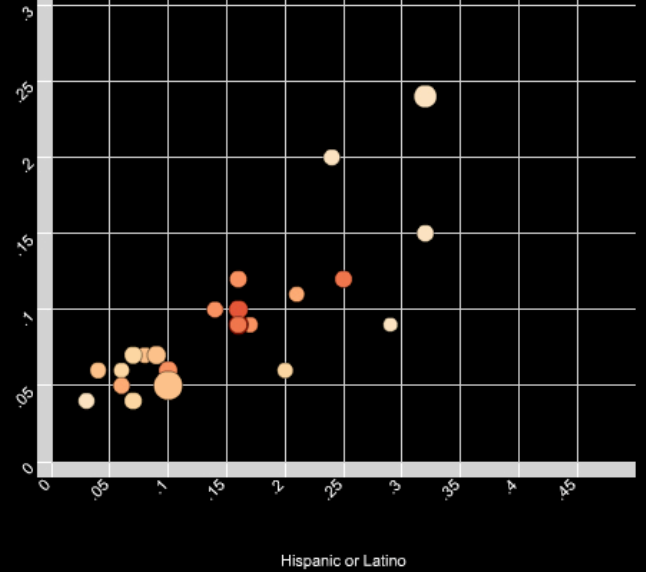
# Foreclosures in Lowell



Foreclosure (2008)

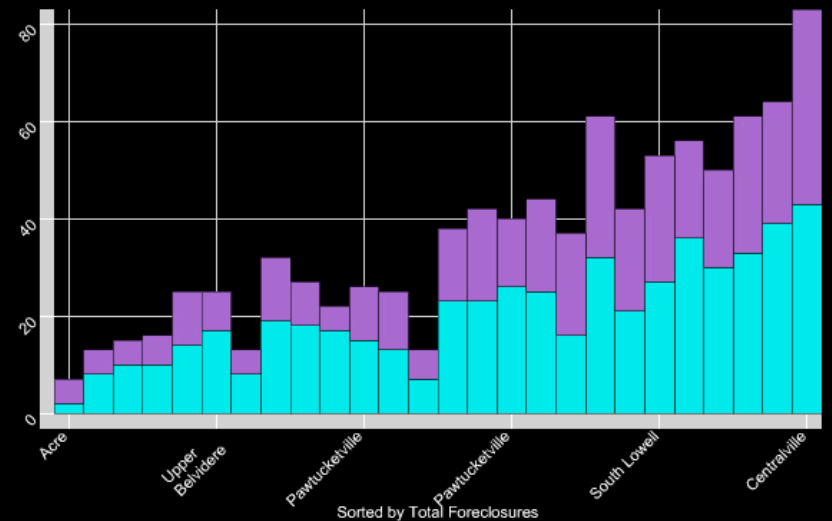
- 36 to 40
- 32 to < 36
- 28 to < 32
- 24 to < 28
- 20 to < 24
- 16 to < 20
- 12 to < 16
- 8 to < 12
- 4 to < 8
- 0 to < 4

Income to Poverty Level\_Under 150



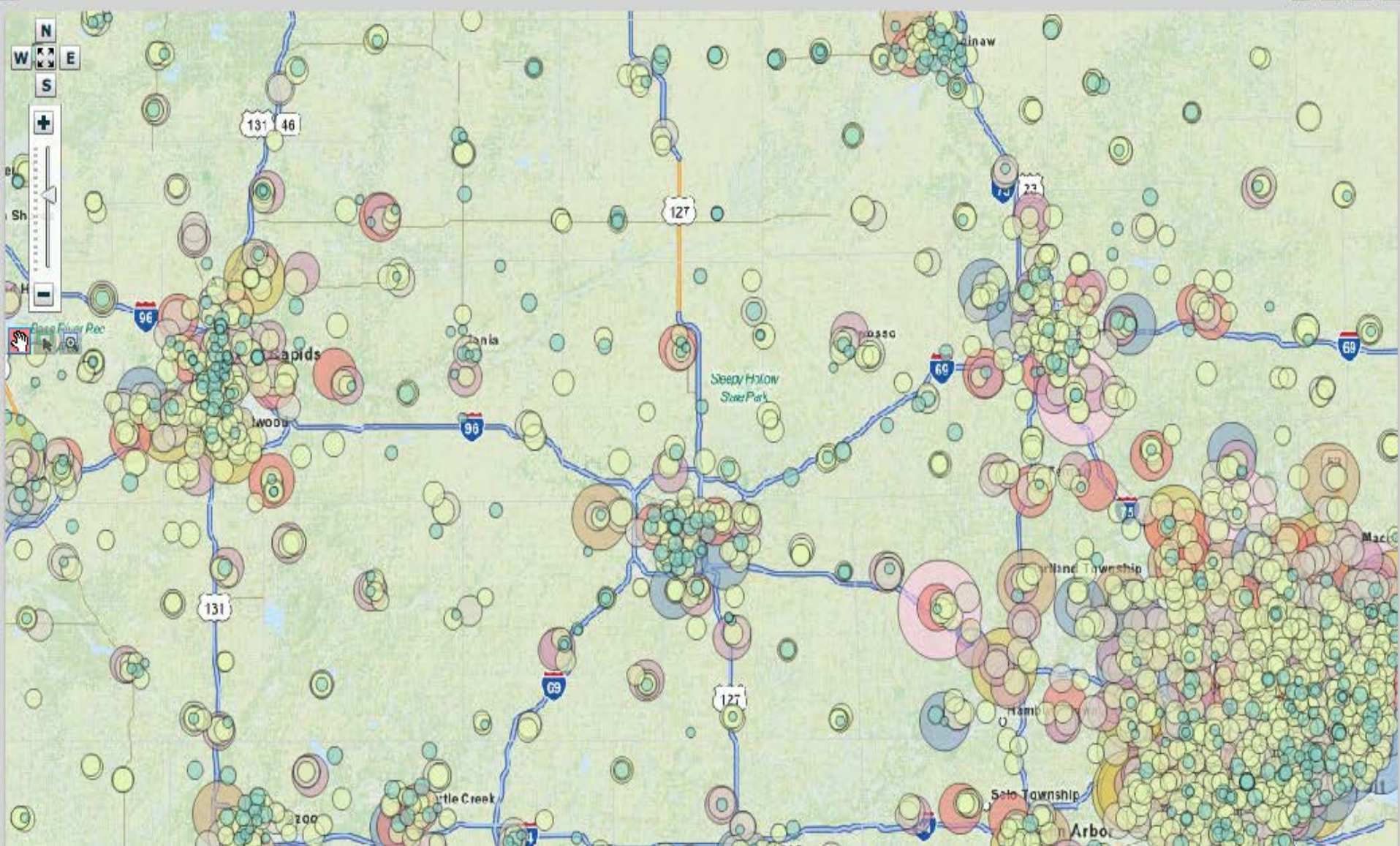
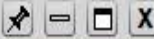
Census tract	Neighborhood	Foreclosure ...	ORDNO (2008)	Total Forecl...	Total ORDNO	For
311600	Upper Highlands	13	10	34	83	16
310300	Centralville	40	42	116	189	42
311000	Acre	5	8	11	15	21
311400	Upper Highlands	12	15	39	69	114
311900	Back Central	5	8	20	39	17
312502	Upper Belvidere	6	6	21	55	10
312300	South Lowell	19	22	52	102	18
312400	Lower Belvidere	5	2	20	35	23
312000	Back Central	19	19	58	82	12
312501	Upper Belvidere	8	13	30	63	25
311300	Upper Highlands	15	24	48	83	34
312100	South Lowell	21	18	60	95	16
310500	Pawtucketville	9	16	35	67	25
311100	Acre	5	8	31	44	.4
310700	Acre	29	23	66	118	36
311200	Lower Highlands	21	22	67	93	24
310100	Downtown	6	7	45	31	65

ORDNO (2007), Foreclosure (2008)



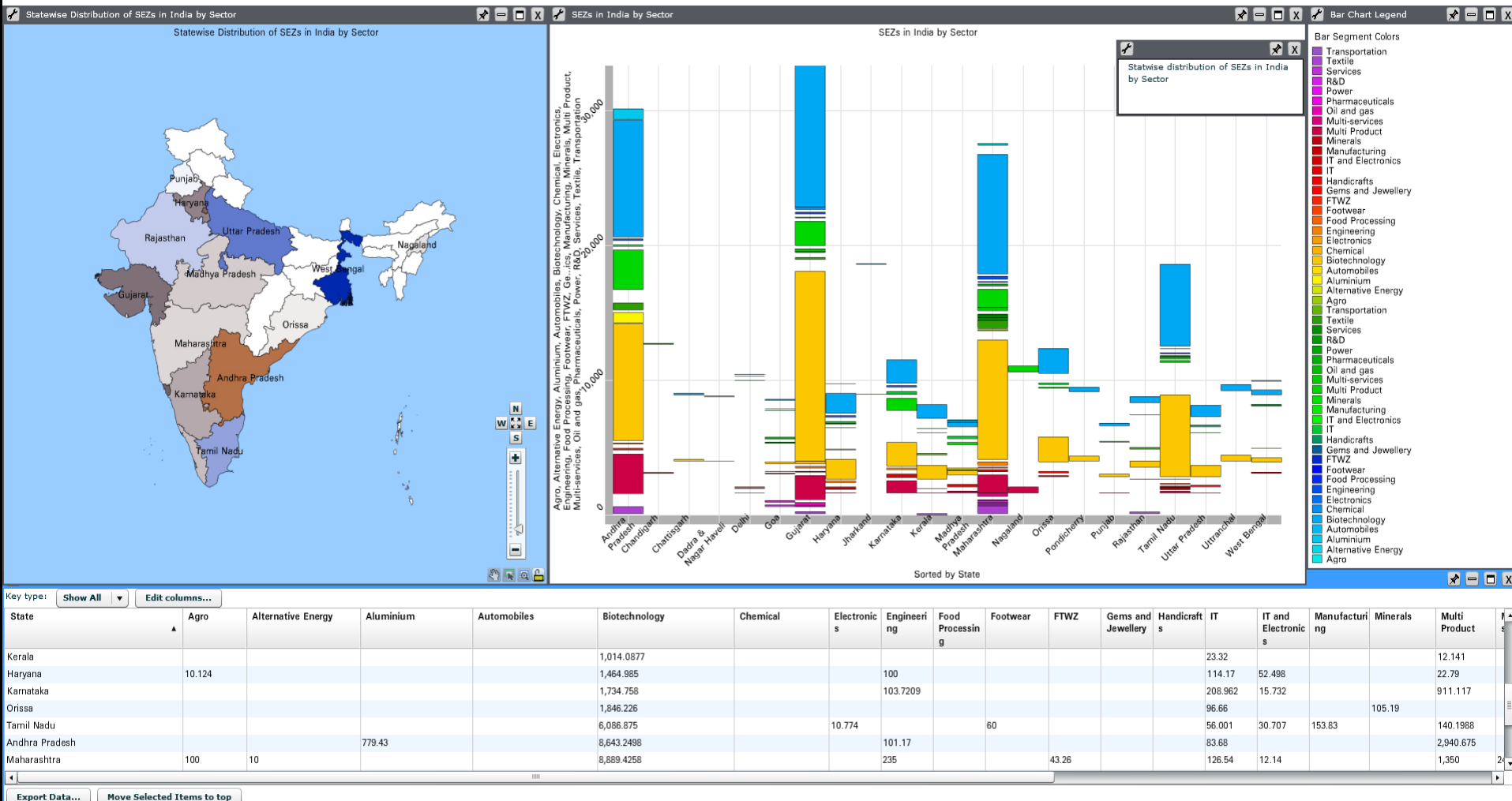
# Grand Rapids

Map of Enrolled11



# Weave: India Free Zones

## Open Indicators Weave





Institute for Visualization and Perception Research

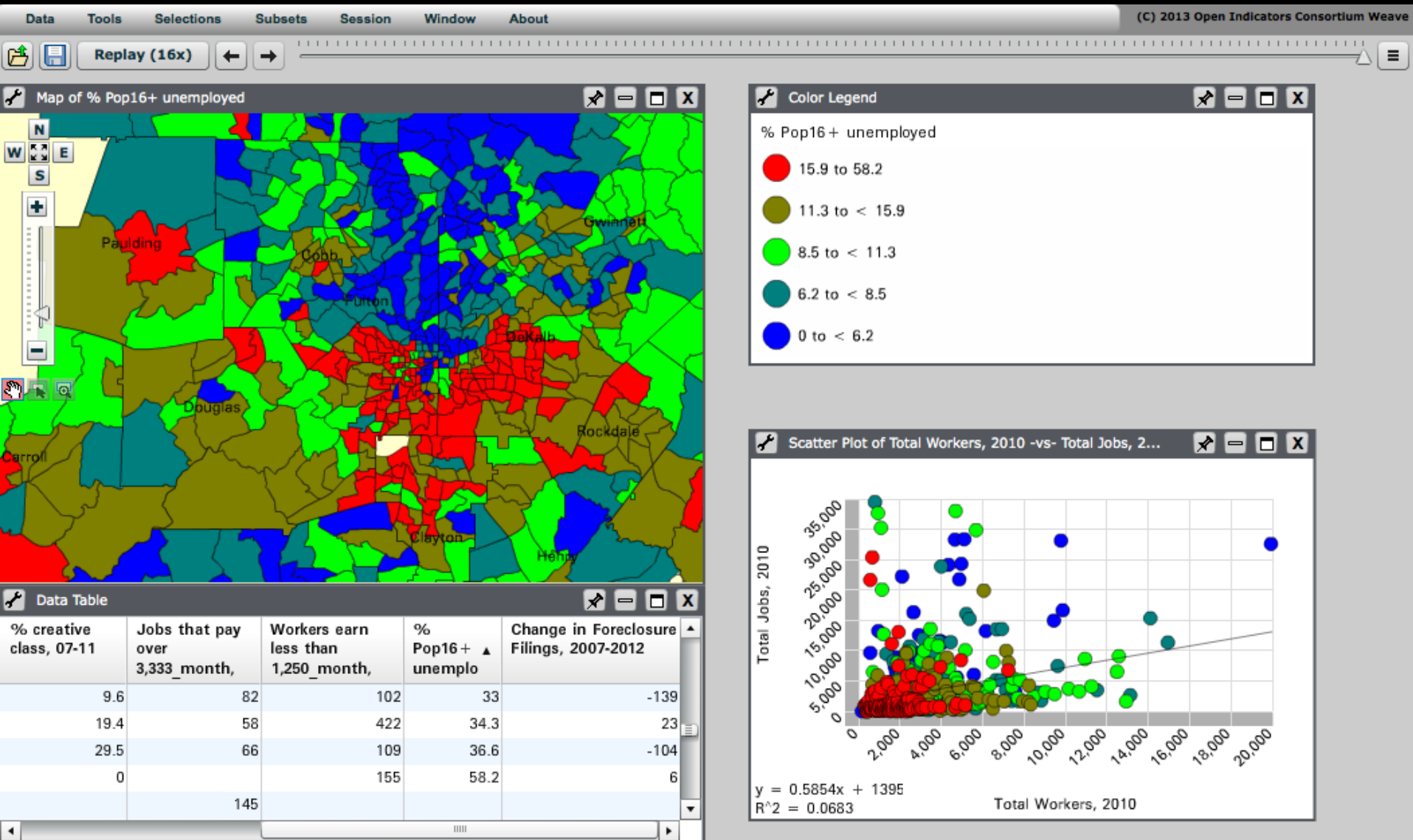
# Atlanta Regional Commission Neighborhood Nexus

## Building support for Transportation project funding Equity priorities

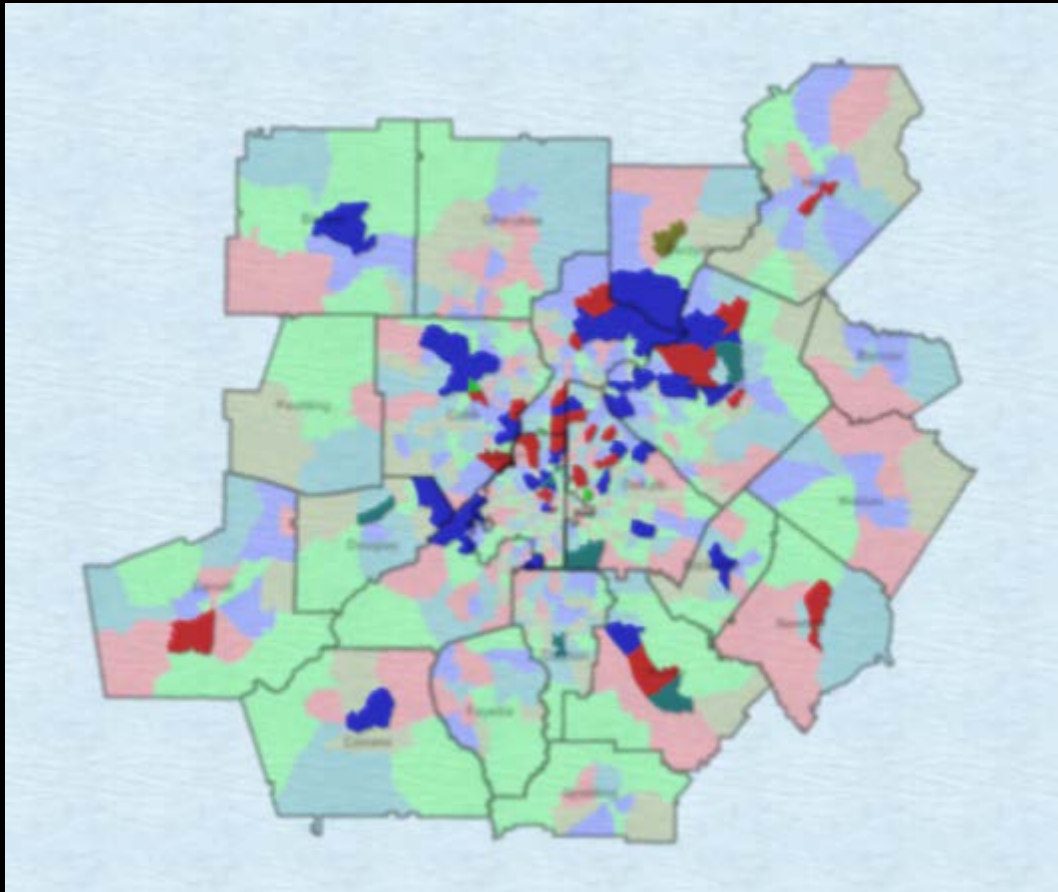


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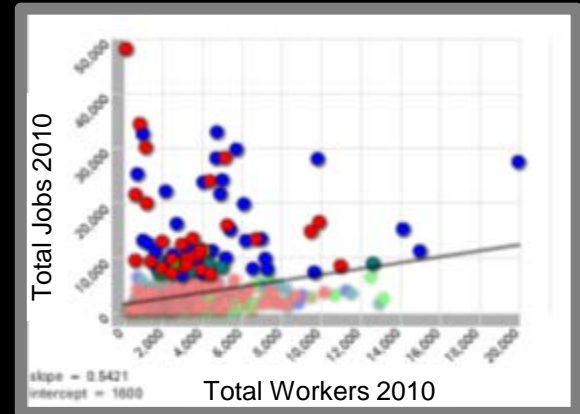
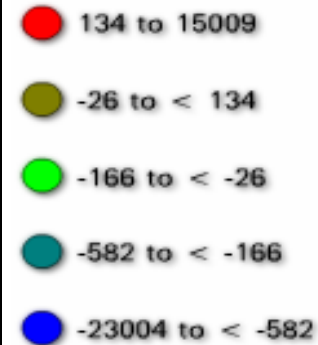
# Atlanta Regional Commission LED



# Concentration of Job-Rich Areas

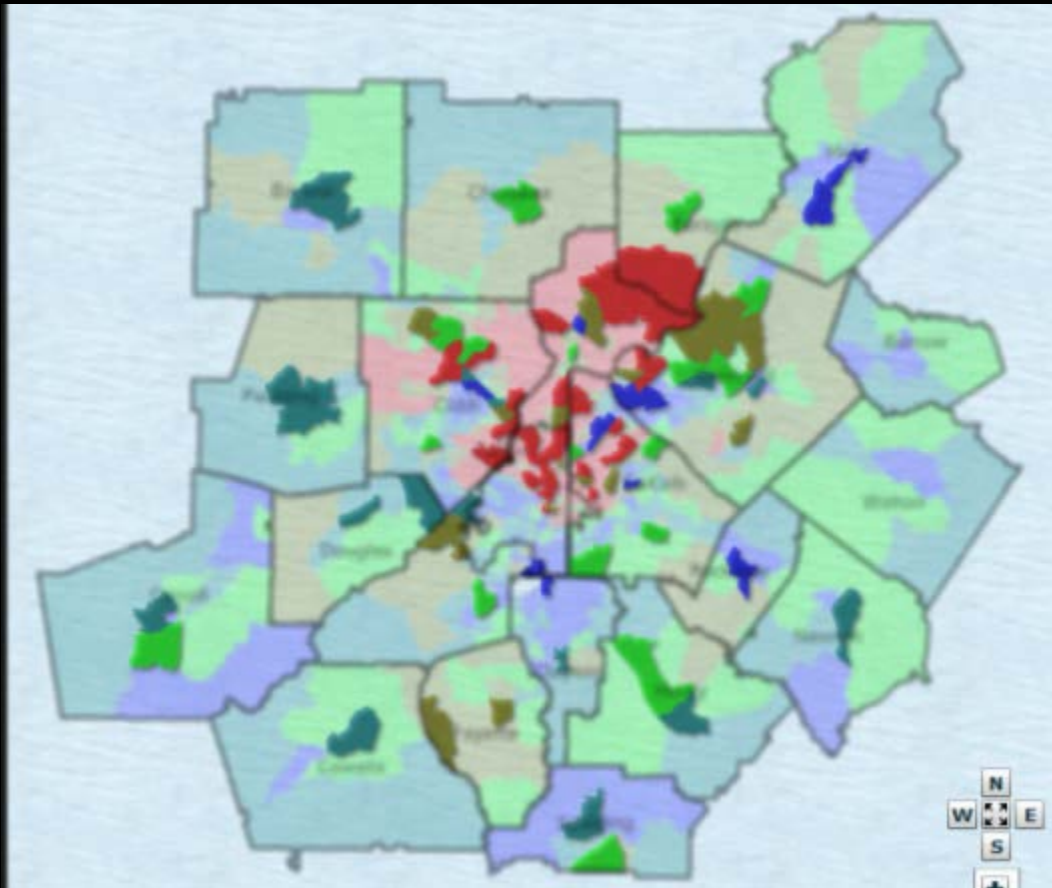


Change: Total Jobs, 2007-2010



Tracts with the highest concentration of jobs ( $>8,000/\text{tract}$ ) for 2007-2010  
Areas in red have gained jobs  
Areas in blue have lost jobs between

# Areas With Highest Paying Jobs



% creative class, 07-11

51.7 to 86.9

39.2 to < 51.7

31.4 to < 39.2

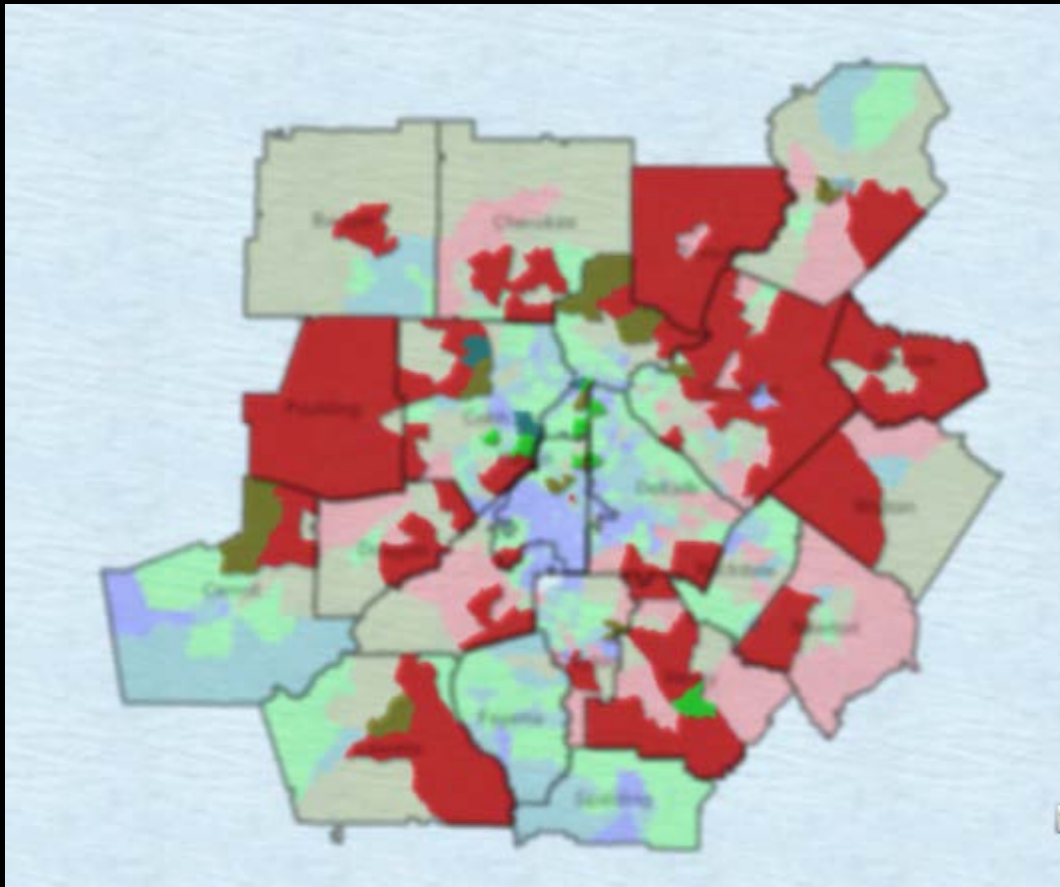
23.8 to < 31.4

0 to < 23.8

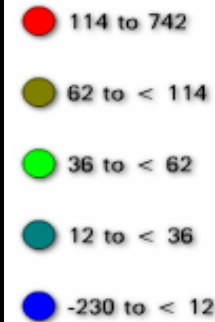


Areas with the highest paying jobs in metro Atlanta  
Selected tracts shown have  $\geq 900$  jobs that pay  $\geq \$3,333$  per month  
Areas in red have highest % of creative class jobs  
(arts, entertainment, management, ...)

# Areas With High Volume of Lowest Paid Workers

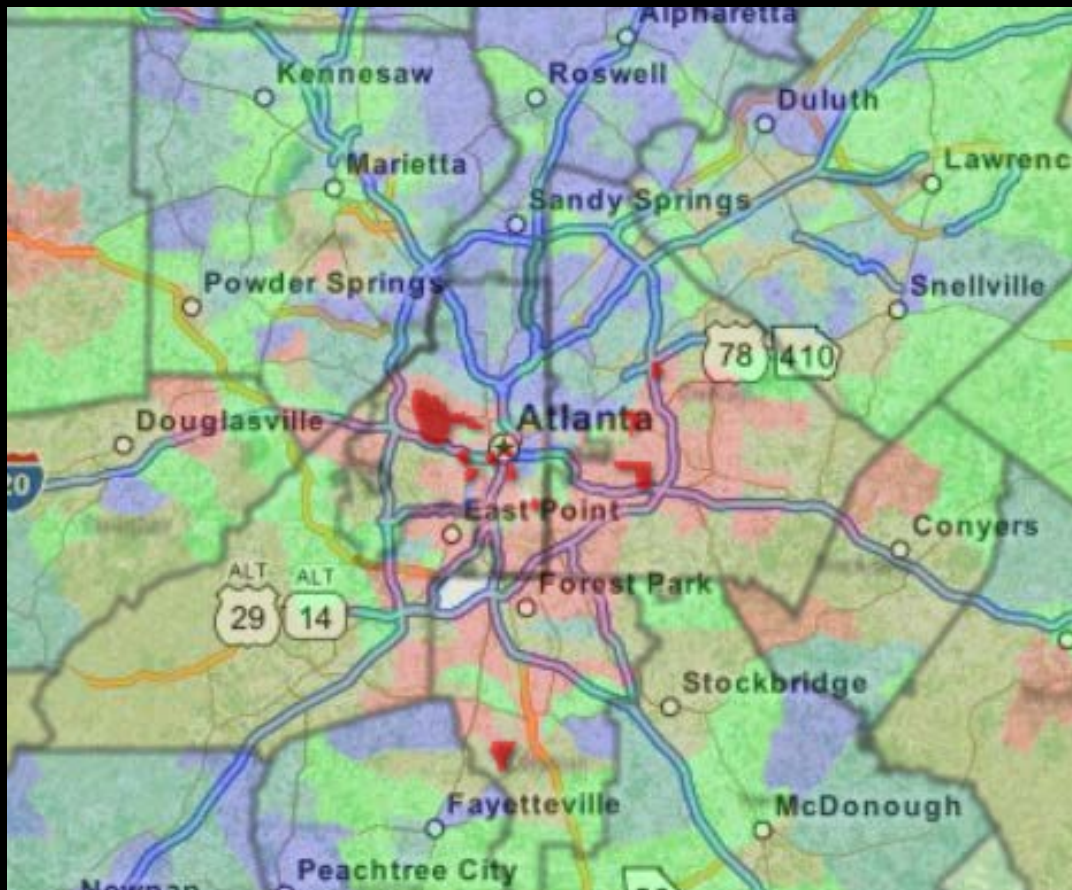


Change in Foreclosure Filings, 2007-2012



Areas where residents are paid < \$1,250 per month  
Selected tracts shown have > 1,000 people each paid < than \$15,000 a year.  
Areas in red have greater increases in foreclosures  
(ranging 114 to 742 filings between 2007-2012)

# Areas With 25% Unemployment (UE) or Greater



% Pop16+ unemployed

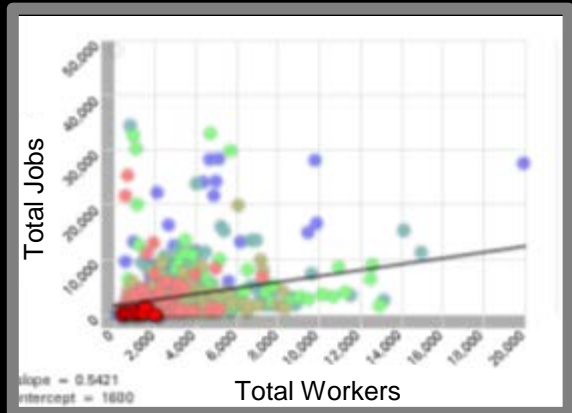
● 51.7 to 86.9

● 39.2 to < 51.7

● 31.4 to < 39.2

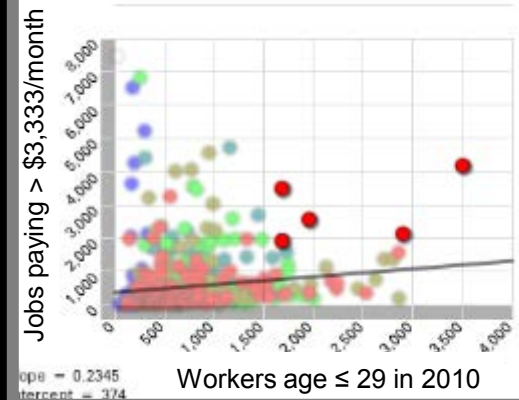
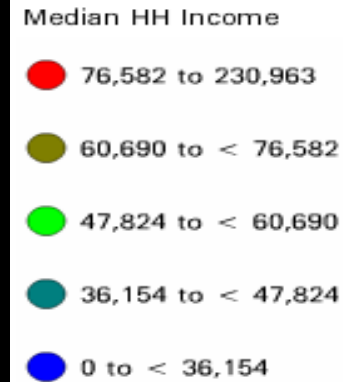
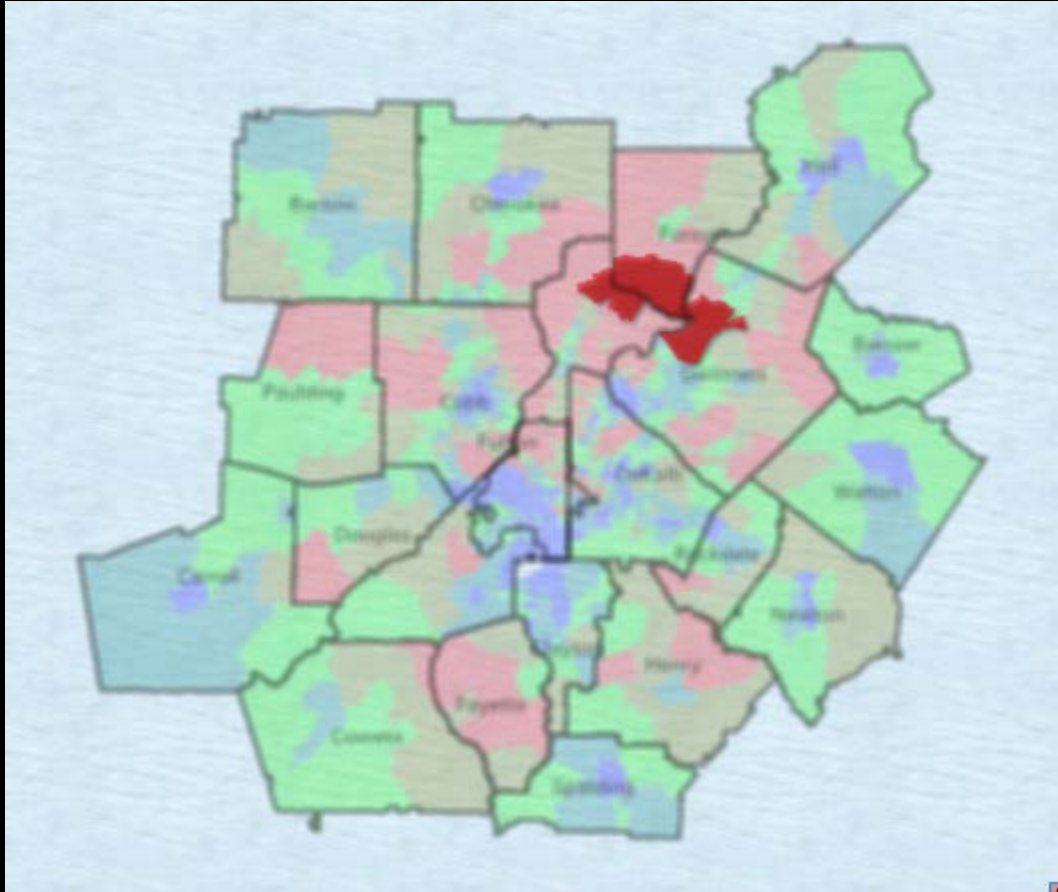
● 23.8 to < 31.4

● 0 to < 23.8



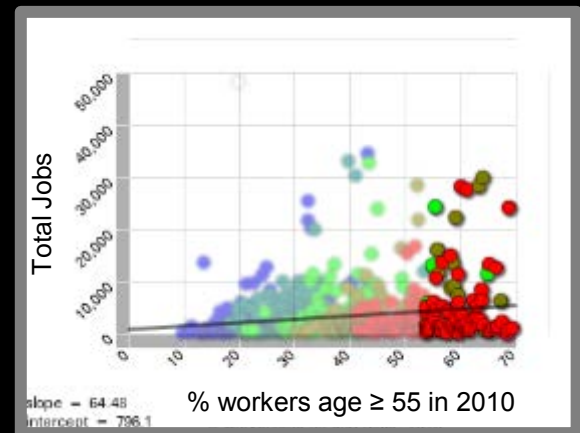
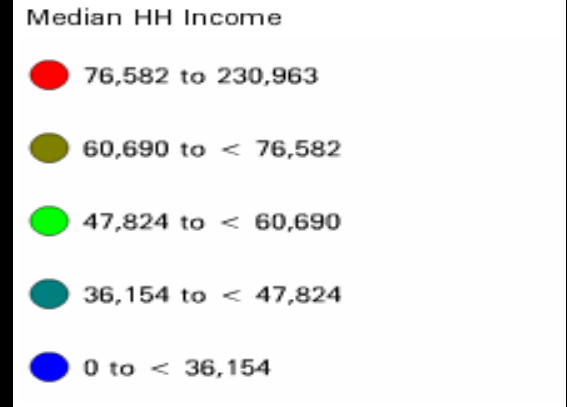
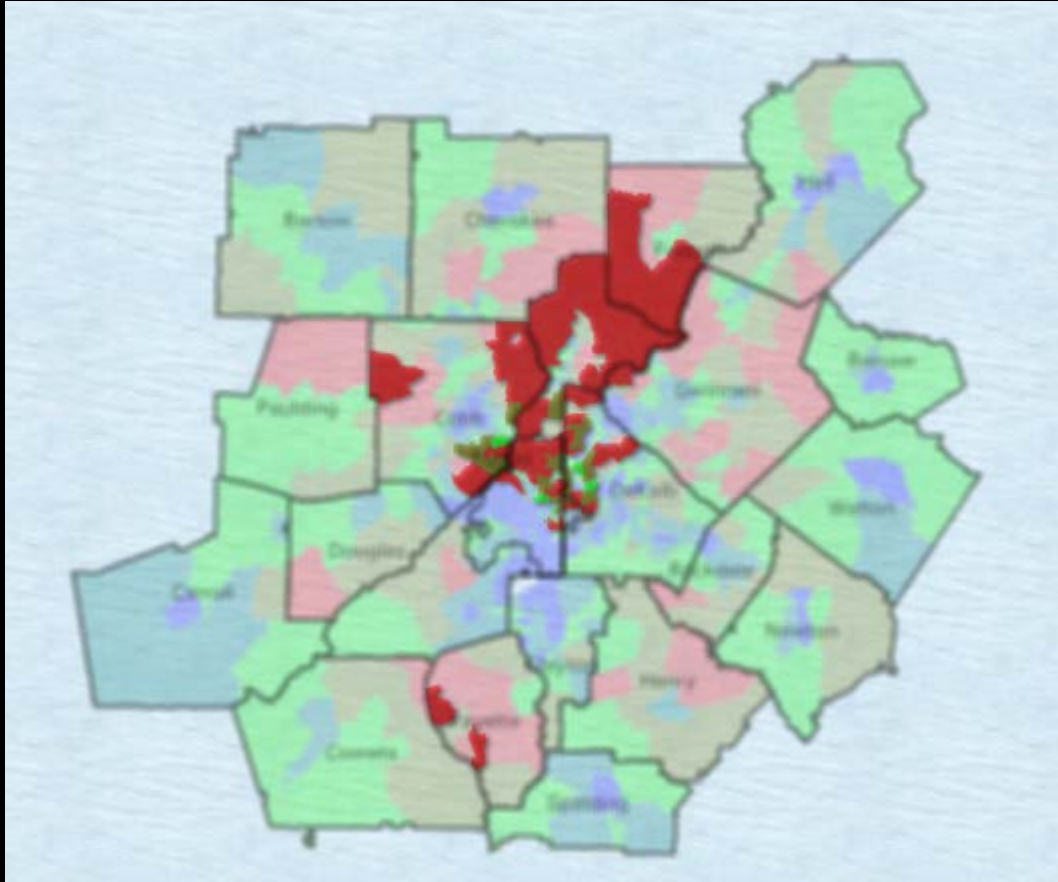
The distribution of unemployment rates around the City of Atlanta  
The selected areas are UE rates  $\geq 25\%$   
Total jobs in these areas are often  $< 500$  per tract

# Youngest Workers, Highest Paid Jobs



Workers age  $\leq 29$  living in connection to jobs paying  $\geq \$3,333.00$  per month  
Highest concentration of young, high paid workers live in the Alpharetta-John's Creek-Peachtree Corners area  
The highlighted red areas indicate a household income of \$84,000-\$120,000

# Concentration of Workforce Age 55 and Older



Connection between relative concentration of workers age  $\geq 55$ , the number of jobs available, and median household income  
Tracts where  $\geq 55\%$  of the workers are age 55+ have the highest household income in the metro area

# Advantages of Sessioning

Basis for collaboration

Saved session for review later of analytic tool selection and Weave instance production

Resource for technical assistance and/or training

Production of annotated, narrated, animated reports (still evolving)

Locally available for user community to experiment and modify— later exportable and reviewable

Parameterized to produce updated or individuated reports (Boston metro over 101 cities/towns)

Archived and replayable years later

# LED Applications - county level

## Weave additional features (some in progress)

- Analytical capabilities (R, Stata; SAS)

- InfoMap for linked visualizations and IR

- Scalability to deal with browser memory limits

- Scalability to deal with large data sets

- ADA compliance

- Automatic report generation

# Version 1.0 Release (2012)

- Multiple visualizations in web browser (a full system)
- Highly interactive
  - necessary expectations: 20s download, 1s interaction
- Client and host APIs
  - Browser and CMS agnostic, equation and R-script editor
- Cutting-edge hardcopy and dynamic reports
- Metadata support (Dublin Core)
- R-Project, Weka, OpenMap, Geoserver
- Administrative control over layout, content, interactions
- All based on session state/history

# Features Under Development 2.0 – 4.0

- **Session history API**

for personalization, save multiple states and preferences, web analytics

- **Collaborative visual tools**

to enable joint analysis and visualization from multiple sites

to provide support and training

- **InfoMaps**

Linked documents, text and data

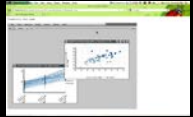

- **Analyst Workstation (in browser)**

Computation (R, Weka, Stata, SAS) + InfoMaps + Large Data

- **ADA Compliance and automatic reports**

- **Mobile devices including Apple**

- **Large and Streaming Data**

- <http://www.OICWeave.org> [OIC](#)
- [Obesity](#)
- [Lowell Foreclosures](#) [Lowell Food Project](#) [Lowell Gangs](#)
- [Boston MAPC](#) [Boston Trees](#)
- [RI Datahub](#) [Rockford Illinois Vital Signs](#)
- [CT Data](#)
- [Grand Rapids](#) [Breast Cancer Incidence Rate/County](#)
- [Atlanta](#) [Breast Cancer Incidence/State/Scatter](#)
- [Portland Pulse](#) [Hmong Density](#)
- [Alzheimer Heatmap](#)
- [BFRSS 1](#) [BFRSS 2](#)  
- [International Health Indicators/The China Study](#) [ADA](#)
- [Open Street Map](#) [iPad demo](#)
- [Logical Zoom](#) [InfoMaps](#) [Educational Attainment](#)

Questions?