

"nViZn" Federal Statistical Data on the Web

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Contents

- Digital Government Initiative
- Earlier Work: EPA's Cumulative Exposure Project
- Graphics Production Library ---> nViZn
- Putting all together

Digital Government Initiative

- Research funded by NSF and Federal Agencies (EPA, USDA-NASS, NCI, Census, ...)
- Multiple aspects of Federal data: Visualization, Access, Security, Disclosure, ...
- DGQG: Digital Government Quality Graphics
- <http://www.diggov.org>

Earlier Work: EPA's Cumulative Exposure Project (CEP)

- Conducted by EPA's Office of Policy
- Collection of analyses, addressing multiple pollutants from multiple sites
- National analyses of
 - Air Toxics (Outdoor Concentrations)
 - Food Contaminants (Exposures)
 - Drinking Water Contaminants (Exposures)

Scope of Modeling

- 188 Hazardous Air Pollutants (HAPs) in Clean Air Act
- 148 HAPs modeled for 1990
- Modeled concentrations for each census tract in continental US ($> 60,000$)
- Includes stationary and mobile sources of air toxics emissions
- Uncertainty bounds derived from model-monitor comparisons

Web-based Access of HAP Data

■ Goals:

- Concise display
- Easy access
- Understandable to nonstatistical audience

■ Solution:

- WWW
- GPL
- Micromaps

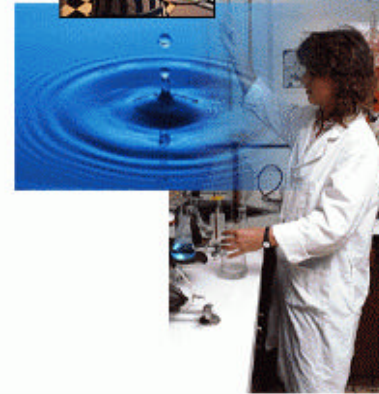
- HOME
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- ABOUT THE PROJECT
- WHAT'S NEW
- RESOURCES
- COMMUNITY-SPECIFIC STUDY
GREENPOINT/
WILLIAMSBURG



CUMULATIVE EXPOSURE

P R O J E C T

EPA's Cumulative Exposure Project (CEP) is examining how much toxic contamination Americans are exposed to cumulatively through air, food, and drinking water. The study will estimate exposure levels for different communities and demographic groups nationwide, and identify which types of communities and demographic groups appear to have the highest exposures. The Cumulative Exposure Project is being conducted by EPA's Office of Policy.



[About the Project](#)

W H A T ' S N E W ?

[Modeled 1990 air toxics concentrations are now available.](#)

[[Cumulative Exposure Project Home](#) | [EPA Home](#) | [Search](#) | [What's new](#)]

<http://www.epa.gov/CumulativeExposure/index.htm>

last updated 12/3/98

Please send comments about this page to axelrad.daniel@epa.gov

<http://www.epa.gov/CumulativeExposure>



Internet Lookup New&Cool

Bookmarks Location: <http://www.galaxy.gmu.edu/~symanzik/gpl/CEPstart/DATAstartful>

HOME

AIR

[Introduction to the 1990 Air Toxics Data](#)

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[CEP Resources: Reports, Papers, etc.](#)

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FOOD

Representation

Data Table

HAP

benzene

States

US

United States – Summary

1990 Modeled Concentration of HAP benzene in $\mu\text{g}/\text{m}^3$

▲State▼	▲Tracts▼	▲Mean▼	▲Median▼	▲Min▼	▲P25▼	▲P75▼	▲Max▼
United States	60803	2.05	1.60	0.48	0.89	2.66	78.80
Alabama	1062	1.40	1.02	0.55	0.72	1.77	14.38
Arizona	810	1.90	1.84	0.48	0.97	2.69	12.68
Arkansas	593	1.03	0.73	0.50	0.59	1.10	12.26
California	5858	2.98	2.71	0.48	1.71	4.09	14.62
Colorado	979	2.01	1.65	0.48	0.80	2.54	17.37
Connecticut	834	2.13	1.80	0.69	1.31	2.64	6.69
Delaware	175	2.86	2.49	0.74	1.16	3.82	20.61
District of Columbia	192	2.97	2.75	1.53	2.38	3.26	5.60
Florida	2448	1.60	1.42	0.49	0.92	2.09	8.71
Georgia	1470	1.48	1.10	0.55	0.77	1.94	6.56
Idaho	269	1.36	1.08	0.56	0.74	1.72	5.01
Illinois	2841	1.94	1.76	0.53	1.03	2.64	16.95
Indiana	1383	1.50	1.25	0.54	0.78	1.99	6.80
Iowa	784	0.93	0.74	0.50	0.54	1.21	4.30
Kansas	684	1.04	0.85	0.48	0.56	1.47	4.15
Kentucky	997	1.24	0.85	0.56	0.65	1.60	11.58
Louisiana	1105	2.26	1.87	0.50	0.91	3.03	35.66
Maine	384	1.07	0.74	0.49	0.61	1.01	6.55
Maryland	1151	2.29	1.94	0.54	1.24	2.76	16.88
Massachusetts	1331	1.95	1.67	0.59	1.16	2.40	21.61
Michigan	2550	1.85	1.51	0.48	0.87	2.56	18.15

United States – Summary

1990 Modeled Concentration of HAP benzene in $\mu\text{g}/\text{m}^3$

▲ State ▼	▲ Tracts ▼	▲ Mean ▼	▲ Median ▼	▲ Min ▼	▲ P25 ▼	▲ P75 ▼	▲ Max ▼
District of Columbia	192	2.97	2.75	1.53	2.38	3.26	5.60
Rhode Island	235	1.92	1.77	0.82	1.22	2.44	5.93
Delaware	175	2.86	2.49	0.74	1.16	3.82	20.61
New Jersey	1938	3.30	2.82	0.71	1.80	4.33	40.98
Connecticut	834	2.13	1.80	0.69	1.31	2.64	6.69
Massachusetts	1331	1.95	1.67	0.59	1.16	2.40	21.61
South Carolina	854	1.37	1.09	0.56	0.80	1.63	6.54
Idaho	269	1.36	1.08	0.56	0.74	1.72	5.01
Tennessee	1221	1.62	1.15	0.56	0.78	2.01	28.06
Kentucky	997	1.24	0.85	0.56	0.65	1.60	11.58
Georgia	1470	1.48	1.10	0.55	0.77	1.94	6.56
Alabama	1062	1.40	1.02	0.55	0.72	1.77	14.38
Ohio	2862	1.85	1.66	0.55	1.03	2.41	18.35
Mississippi	581	1.25	0.89	0.54	0.65	1.41	17.67
Maryland	1151	2.29	1.94	0.54	1.24	2.76	16.88
Indiana	1383	1.50	1.25	0.54	0.78	1.99	6.80
Virginia	1673	1.60	1.26	0.54	0.85	2.01	78.80
West Virginia	473	1.53	0.93	0.53	0.72	1.68	16.39
Pennsylvania	3167	2.50	2.07	0.53	1.21	3.08	18.91
Illinois	2841	1.94	1.76	0.53	1.03	2.64	16.95
Vermont	181	1.07	0.66	0.52	0.61	0.82	10.96
Missouri	1248	1.58	1.18	0.51	0.63	1.93	32.22

Rhode Island – Summary

1990 Modeled Concentration of HAP benzene in $\mu\text{g}/\text{m}^3$

▲ County ▼	▲ Tracts ▼	▲ Mean ▼	▲ Median ▼	▲ Min ▼	▲ P25 ▼	▲ P75 ▼	▲ Max ▼
Bristol County	12	1.61	1.24	1.11	1.20	1.82	3.50
Kent County	36	1.46	1.33	0.94	1.17	1.79	2.56
Newport County	23	1.93	1.37	1.00	1.21	2.42	5.93
Providence County	138	2.21	2.13	0.85	1.66	2.66	4.83
Washington County	26	1.19	1.00	0.82	0.89	1.17	3.92

Tracts represents the number of census tracts in 1990 for each county.

Mean represents the arithmetic mean of all **1990 Modeled Concentrations** for each county and *Median* the median. *Min* represents the minimum **1990 Modeled Concentration** for each county, *P25* the 25th percentile, *P75* the 75th percentile, and *Max* the maximum. All concentrations are in *micrograms per cubic meter* [$\mu\text{g}/\text{m}^3$].

There are 5 counties in this state.

[[Cumulative Exposure Project Home](#) | [EPA Home](#) | [Search](#) | [What's new](#)]

The Cumulative Exposure Project – Data Table

Please send comments about this page to axelrad.daniel@epa.gov

Micromaps

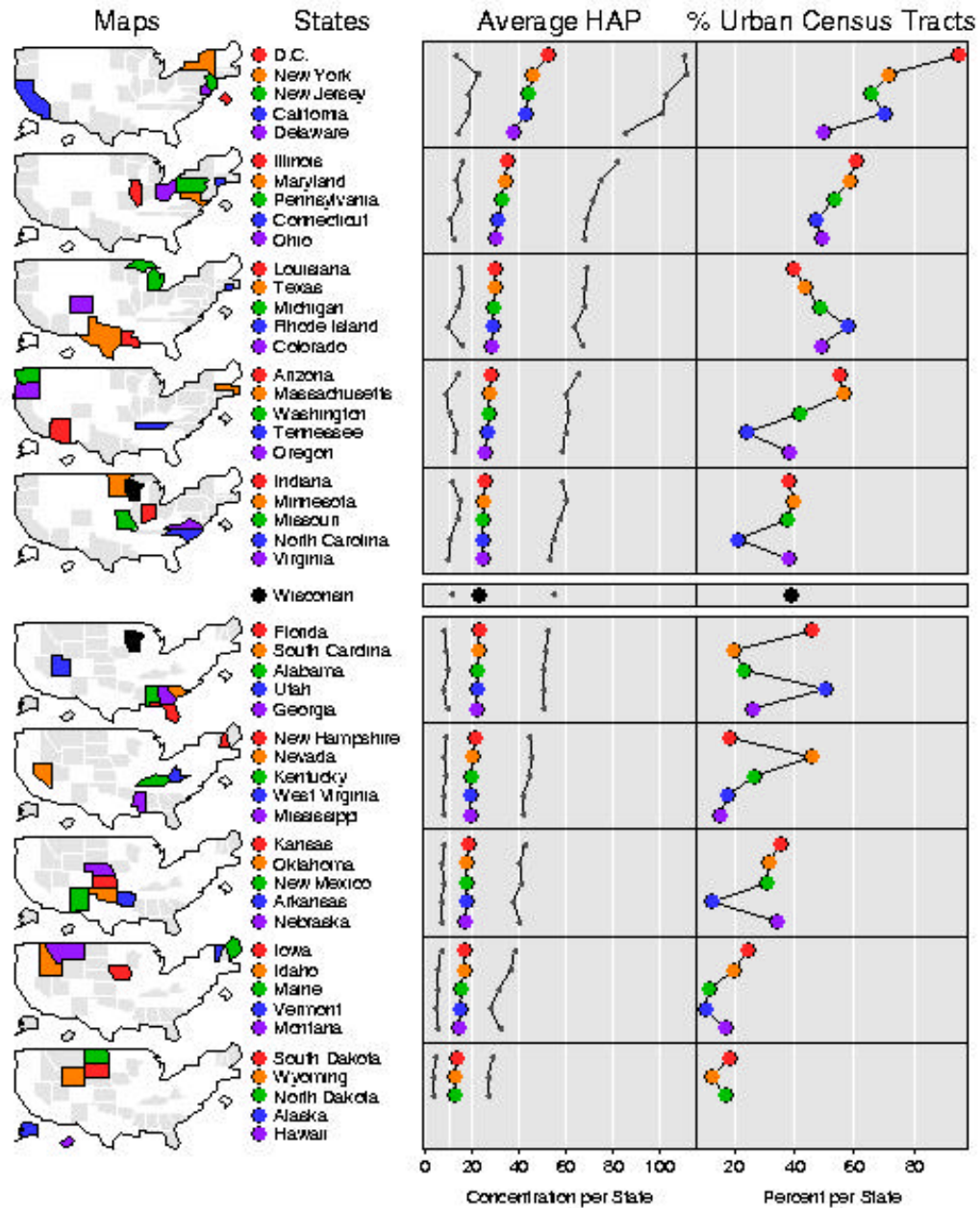
- Link of row-labeled univariate (or multivariate) statistical summaries to corresponding geographical region
- Focus on statistical display and not on maps

History of Micromaps

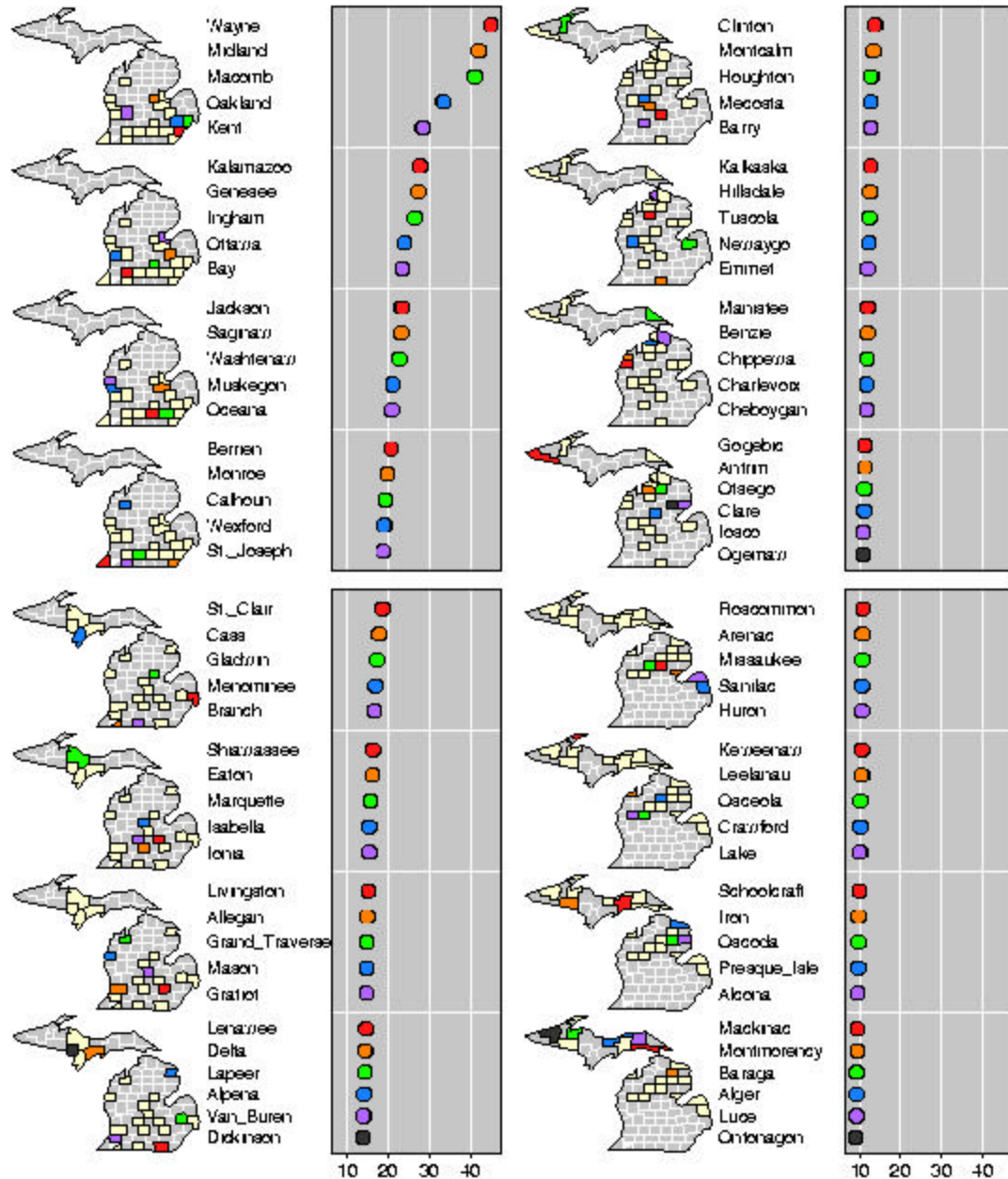
- First presented at 1995 American Statistical Association's annual meeting (Olsen, Carr, Courbois, Pierson)
- Main references:
 - Carr, Pierson (1996) Emphasizing Statistical Summaries ...with Micromaps, SCSG*, Vol.7, No.3
 - Carr, Olsen, Courbois, Pierson, Carr (1998) Linked Micromap Plots ..., SCSG, Vol. 9, No.1

*Statistical Computing & Statistical Graphics Newsletter:
<http://cm.bell-labs.com/cm/ms/who/cocteau/newsletter/index.html>

Hazardous Air Pollutants (HAPs) 1990 Annual Average Per State



Michigan - Modeled 1990 Air Toxics Concentrations



Death of the CEP

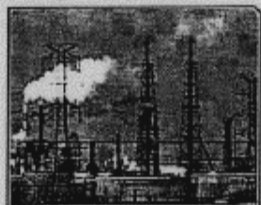
NATIONAL

[← back to NEWS](#)

Is House Paint Killing Us?

- *Industry May Not Be The Only Polluter*
- *Toxins Lurk In House Paint And Lawn Mowers*
- *But Some Question Validity Of Data*

UNION COUNTY, New Jersey
Saturday, February 20, 1999 - 08:44 PM ET



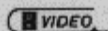
CBS

(CBS) Breathing can be hazardous to your health. A groundbreaking study by the Environmental Protection Agency has found that virtually every American is inhaling unsafe levels of chemicals,

reports CBS News Correspondent Jeffrey Kofman.

The study looked beyond high-profile pollution problems like lead and carbon monoxide, testing for 148 toxins that haven't been examined closely before. It found unsafe levels of at least eight cancer-causing chemicals virtually everywhere in America.

"It's almost: We found the problem, and it's us."
Robert Shinn,
New Jersey environmental commissioner

 VIDEO
CBS News
Correspondent
Jeffrey Kofman
Reports

Living On Earth TOP STORY

EPA Air Pollution Study Put On Hold

Air Date: Week of January 22, 1999

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CURWOOD: This is Living on Earth. I'm Steve Curwood. The results of a groundbreaking new Federal study of air pollution might have been available at the click of a button. But they're not, because of objections from the nation's mayors. The Environmental Protection Agency's Cumulative Exposure Project is looking at airborne toxic chemicals. So far it has found that at least 8 of these chemicals are present at dangerous levels in every neighborhood in the continental US. The EPA was ready to post the city-by-city results on their Web site last month, but it decided not to, after the Conference of Mayors questioned the findings, saying they were based on untested models and old data. Scott Allen covers the environment for the Boston Globe. He says the report's conclusions are disturbing.

ALLEN: If you are living anywhere in the United States and taking a breath as we speak, you're getting at least an 8 in a million lifetime cancer risk of exposure from what you're breathing. That may not sound like a whole lot, but when you multiply it over a city's population, a couple million people living in a city or 5 million people in a state, it adds up to hundreds and thousands of cancers spread across a lot of people. And you have to also consider that there are some places, in fact about 10% of the United States, has got a significantly higher risk of cancer from the toxic chemicals in the air. Their risk is at least one in 10,000. And that means in any small town in America, practically, 1 or 2 people are getting cancer from breathing the air. Not any special pollution, but just the regular everyday air.

CBS, 2/20/1999



NPR, 1/22/99

LOOKING FOR A NEW CAR? 

The Inquirer **STAFF WRITER** February 21, 1999

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- Opinion
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- Real Estate
- Home & Design
- Health & Science
- Arts & Entertainment
- LifeStyle
- Sunday Review
- Sunday Magazine

Metro

 FLAIN TEXT for printing  EMAIL the story

Study finds air in N.J. heavy with pollutants

The federal report found potentially carcinogenic levels over much of the state.

By Maureen Graham
INQUIRER STAFF WRITER

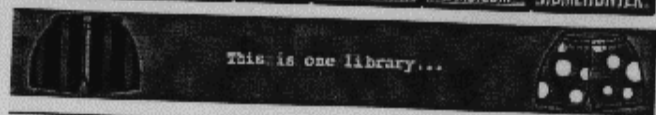
Two dozen air pollutants in levels high enough to increase cancer risks have been found in New Jersey's air, according to a federal study completed last year.

The study by the U.S. Environmental Protection Agency lists 24 cancer-causing air pollutants at levels that "exceed cancer benchmarks" in some parts of the state and nine at excessive levels in every county.

The federal report, based on 1990 data, was given to the N.J. Department of Environmental Protection earlier this year but has not yet been released to the public, according to two internal DEP memos obtained by The Inquirer.

PHILADELPHIA NEWS

CHARLOTTE.COM THAT'S RACIN' YELLOW PAGES JUST.GO. JOBHUNTER. CARS.COM HOMEHUNTER.



charlotte.com

The Charlotte Observer

Posted at 10:40 p.m. EST Monday, January 18, 1999

The Carolinas' #1 Realty Company

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- Observer Forum

BUSINESS

Is every breath we take risky?

Toxic chemicals cover America, EPA study says

By SCOTT ALLEN
Boston Globe

Americans increase their risk of cancer practically every time they draw a breath, according to a groundbreaking federal project that finds there is almost no place to escape toxic chemicals in the air.

The Environmental Protection Agency found that virtually every American inhaled slightly unsafe levels of at least eight chemicals. Twenty million faced at least a 1-in-10,000 lifetime risk of getting cancer as a result in 1990, the most recent data available for the agency's Cumulative Exposure Project.

Philadelphia Inquirer, 2/21/99

Charlotte Observer, 1/18/99

Graphics Production Library (GPL)

- JAVA-based tool for creation and modification of statistical graphics on the Web
- Follows guidelines of modern statistical graphics
- Developers: Dan Rope, Dan Carr
- Main reference: Carr, Valliant, Rope (1996): Plot Interpretation and Information Webs..., SCSG*, Vol. 7, No. 2

*Statistical Computing & Statistical Graphics Newsletter:
<http://cm.bell-labs.com/cm/ms/who/cocteau/newsletter/index.html>

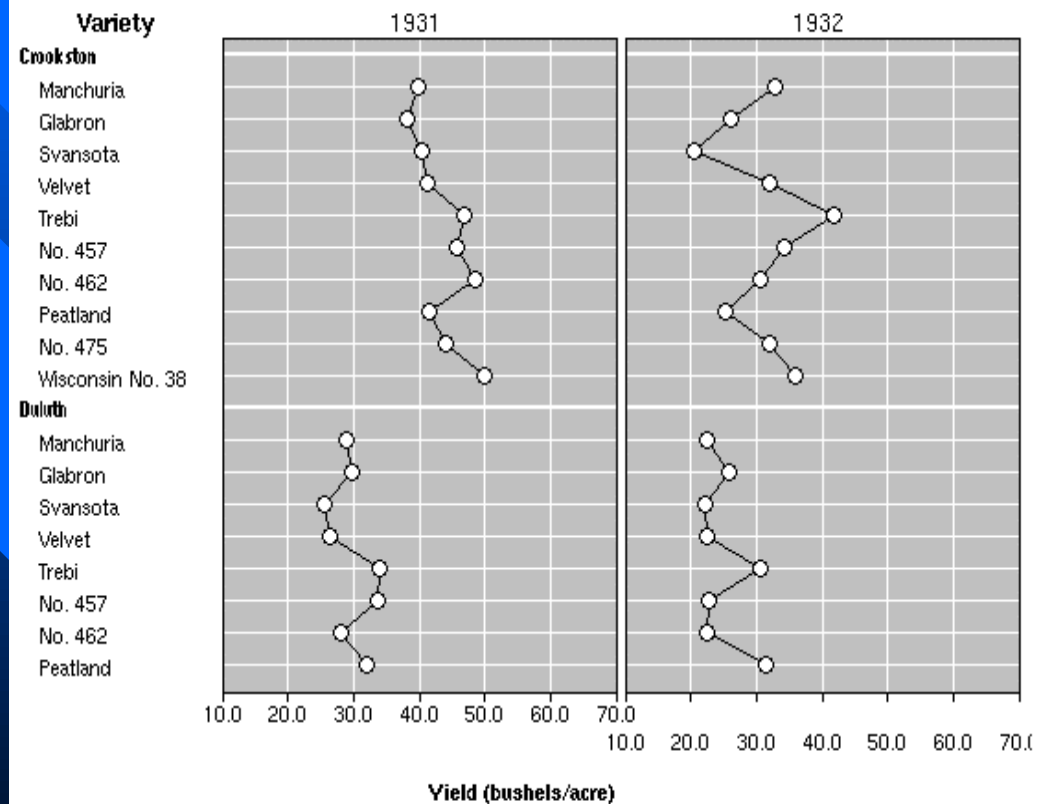
GPL Examples

- WWW:
http://www.monumental.com/dan_rope/gpl/
- WWW mirror site:
<http://www.math.usu.edu/~symanzik/gpl/data/>

[Sample Applets](#) | [Barley](#) | [TRI Release](#) | [Unemployment](#) | [CPI](#)

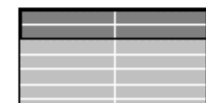
The Barley Data

From Visualizing Data by W.S. Cleveland



Show Data

Pan And Zoom



nViZn

- Follow-up to the GPL
- JAVA-based software development kit (SDK) for the creation and modification of interactive statistical graphics applications (tables, charts, micromaps, ...)
- WWW: <http://www.illumitek.com>
- Related book “The Grammar of Graphics” by Leland Wilkinson

nViZn Features

- Follows guidelines of modern statistical graphics with analytics completed within the SDK
- Interactive abilities include dynamic data filtering, brushing/linking, mouse roll-overs, pan-and-zoom, drill-down, 3-D rotation, and animation

nViZn Examples

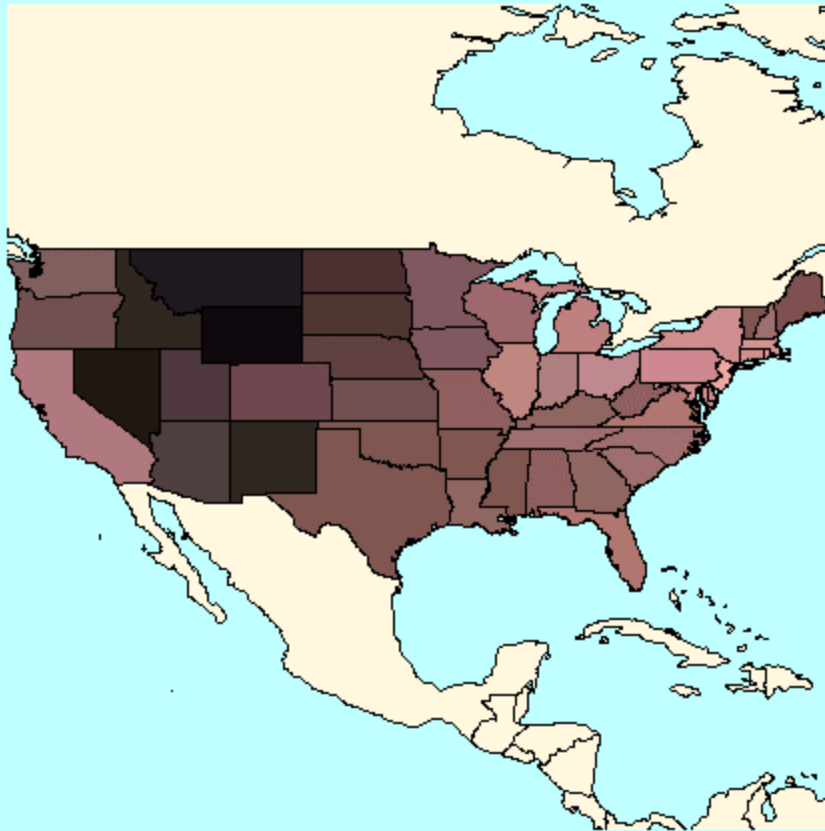
Current Work

- Hierarchical clickable micromaps and tables for the display of Federal statistical data
 - Micromaps and tables under nViZn
 - Clickable maps and tables
 - Hierarchy of maps and tables
 - Selection of variables

**Pennsylvania: 1990 Modeled Benzene Concentrations
Upper Half**

	Minimum	Mean	Maximum	Quartile1	Median	Quartile3
Philadelphia	2.79	5.75	15.9	4.19	5.16	6.44
Delaware	1.98	3.76	18.91	2.69	3.21	4.13
York	0.94	2.96	12.07	1.23	1.72	3.9
Dauphin	0.92	2.79	6.17	1.54	2.63	3.61
Lancaster	0.91	2.68	10.38	1.26	1.92	3.39
Allegheny	1.18	2.68	8.74	2.01	2.58	3.07
Montgomery	1.24	2.45	4.24	2.0	2.43	2.86
Cumberland	0.87	2.42	7.4	1.12	2.33	2.74
Centre	0.64	2.4	9.82	0.72	1.31	3.56
Beaver	1.0	2.09	4.63	1.19	1.81	2.79
Bucks	1.14	2.08	14.34	1.74	2.01	2.22
Berks	0.88	2.07	5.71	1.22	1.96	2.73
Lehigh	0.82	2.03	4.4	1.42	1.94	2.51
Lycoming	0.6	1.93	5.92	0.75	1.03	2.91
Chester	0.96	1.91	5.66	1.34	1.77	2.11
Lebanon	1.01	1.86	3.4	1.21	1.44	2.46
Blair	0.72	1.86	4.39	0.97	1.81	2.45
Northumberland	0.79	1.75	3.02	0.88	1.82	2.79
Franklin	0.76	1.75	3.71	0.93	1.06	3.12
Westmoreland	0.72	1.73	4.87	1.08	1.49	2.21
Luzerne	0.7	1.69	4.06	0.98	1.59	2.31
Northampton	0.94	1.68	2.9	1.3	1.65	1.98
Mifflin	0.75	1.67	3.96	0.81	0.9	2.78
Washington	0.74	1.63	4.47	1.01	1.2	2.29
Butler	0.71	1.57	4.8	0.96	1.09	1.83
Mercer	0.68	1.52	2.55	0.87	1.35	2.17
Columbia	0.7	1.52	3.64	0.8	0.96	2.12
Cambria	0.69	1.51	4.07	0.79	1.14	2.13
Lawrence	0.83	1.46	2.71	0.96	1.3	1.86
Lackawanna	0.77	1.42	2.08	1.14	1.44	1.68
Schuylkill	0.76	1.4	3.36	0.87	1.04	1.79
Adams	0.8	1.36	3.95	0.95	1.01	1.43
Union	0.7	1.35	3.94	0.8	0.84	1.26
Venango	0.61	1.31	3.86	0.69	0.86	1.57

Hazardous Air Pollutants



LEAD

0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02

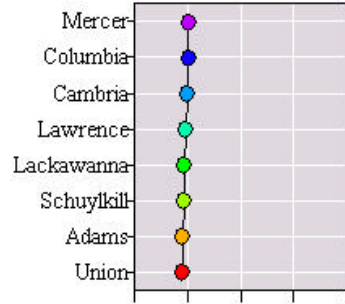
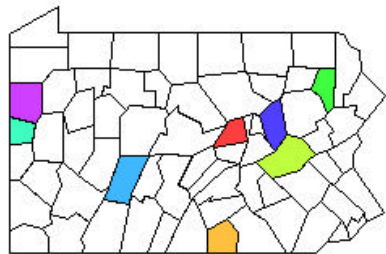
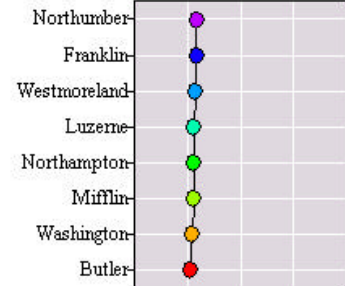
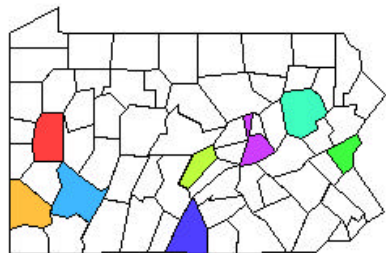
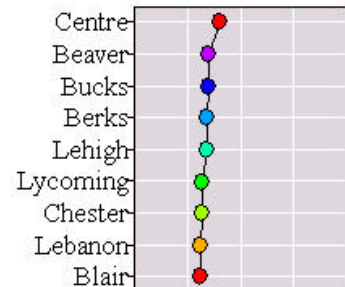
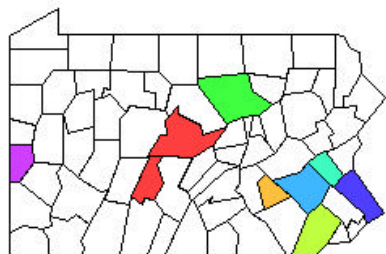
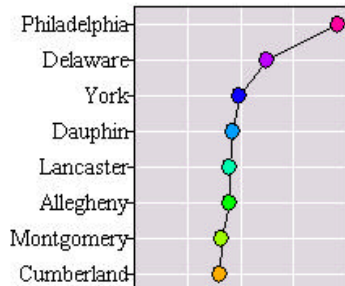
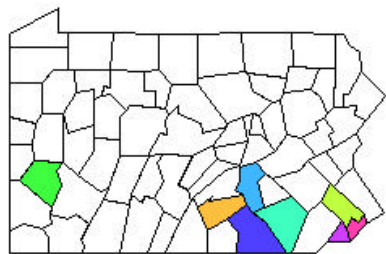
- Root
 - Africa
 - Antartic
 - Asia
 - Central America
 - Europe
 - North America
 - United States
 - Continental US
 - New England
 - Mid Atlantic
 - Great Lakes
 - Plains
 - Southeast
 - South
 - Mountain
 - Pacific
 - Greater US
 - Canada
 - Greenland
 - Pacific
 - South America
 - Ussr

Choose Variable

LEAD

Pennsylvania: Upper Half

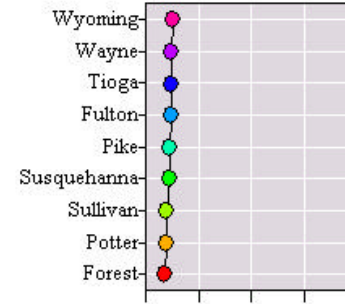
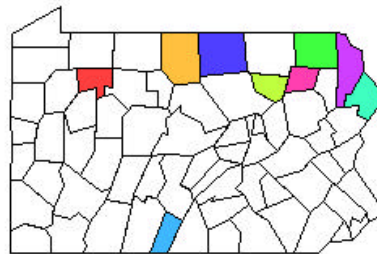
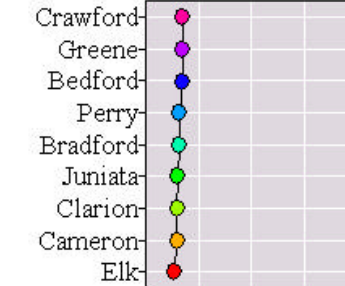
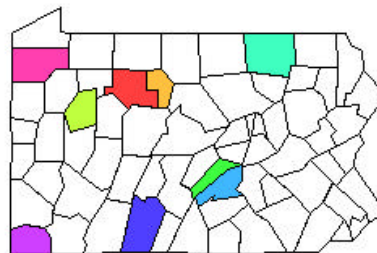
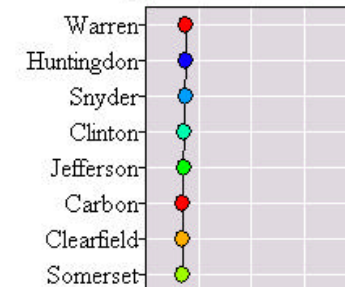
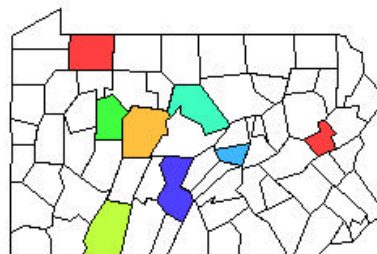
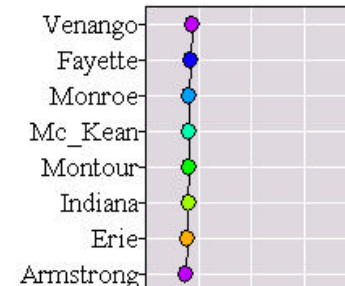
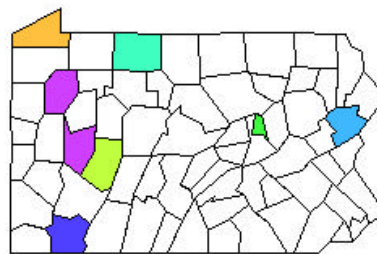
1990 Modeled Benzene Concentrations



0 1.5 3 4.5 6

Pennsylvania: Lower Half

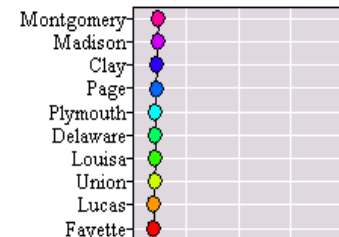
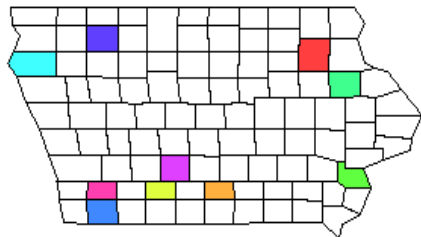
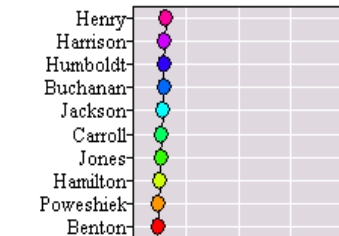
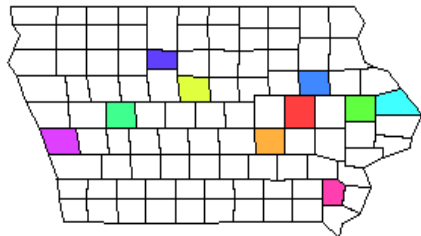
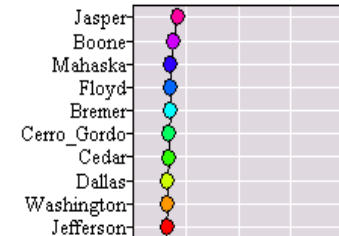
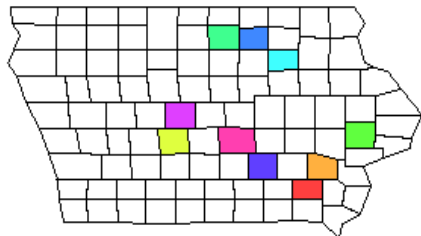
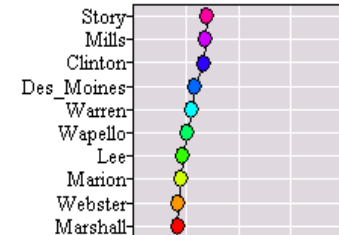
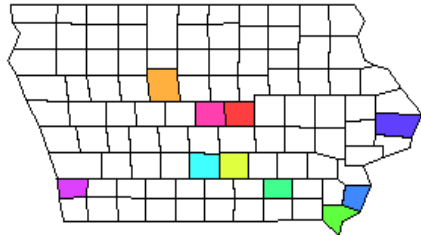
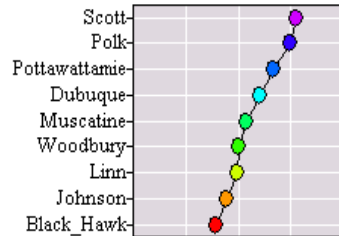
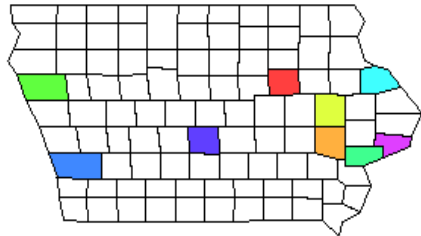
1990 Modeled Benzene Concentrations



0 1.5 3 4.5 6

Iowa: Upper Half

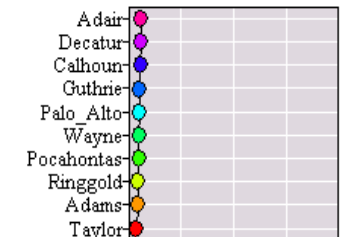
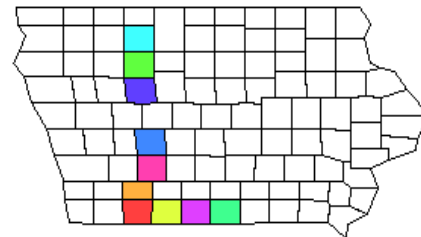
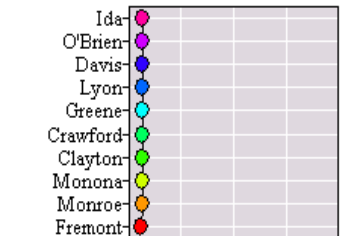
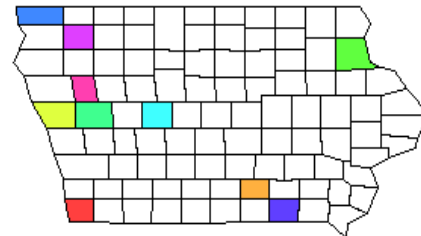
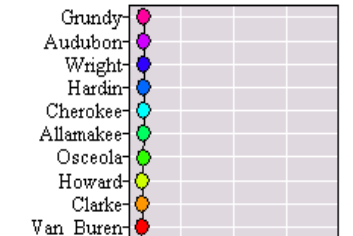
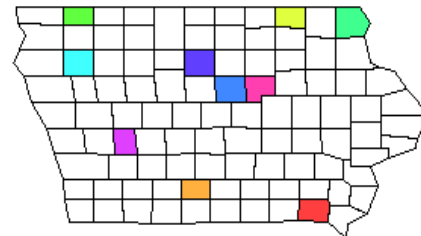
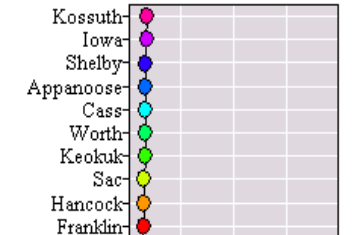
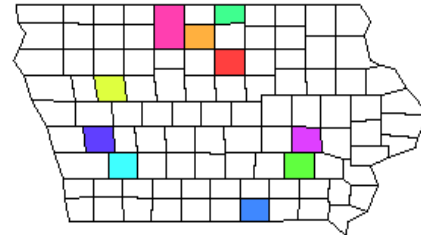
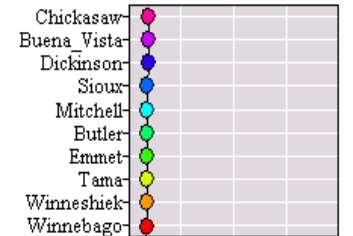
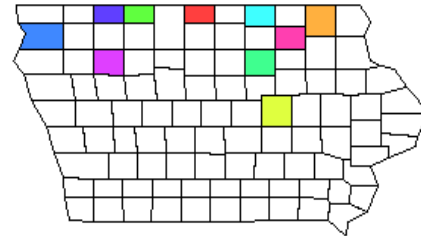
1990 Modeled
Lead
Concentrations



0 0.15 0.3 0.45 0.6

Iowa: Lower Half

1990 Modeled
Lead
Concentrations



0 0.15 0.3 0.45 0.6

Working Experiences with nViZn

- Little documentation available
- JAVA knowledge required
- Sensitive to browsers and plugins

Future of nViZn

- New version recently released
- Training courses offered by Illumitek
- Good communication with users
- Might become a very useful tool to deliver interactive statistical graphics on the Web
- Huge potential for use with Federal statistical data

Future Work

- Finish sample implementation
- Use current data from NCI, USDA-NASS, EPA, ...
- Design issues: micromaps side-by-side or scrollable?
- Usability study: how do non-statisticians understand these displays?

QUESTIONS ?