Using LED for Emergency Management

Heath Hayward
Geographer – LEHD Program
U.S. Census Bureau

2009 LED Annual Workshop
March 5, 2009

What Makes LED Relevant?

- Timeliness of Data
- Geographic Specificity
- Free to the Public
- Available 24/7
- Convenient Data Access
  - Innovative Tools
  - VRDC Download

OnTheMap

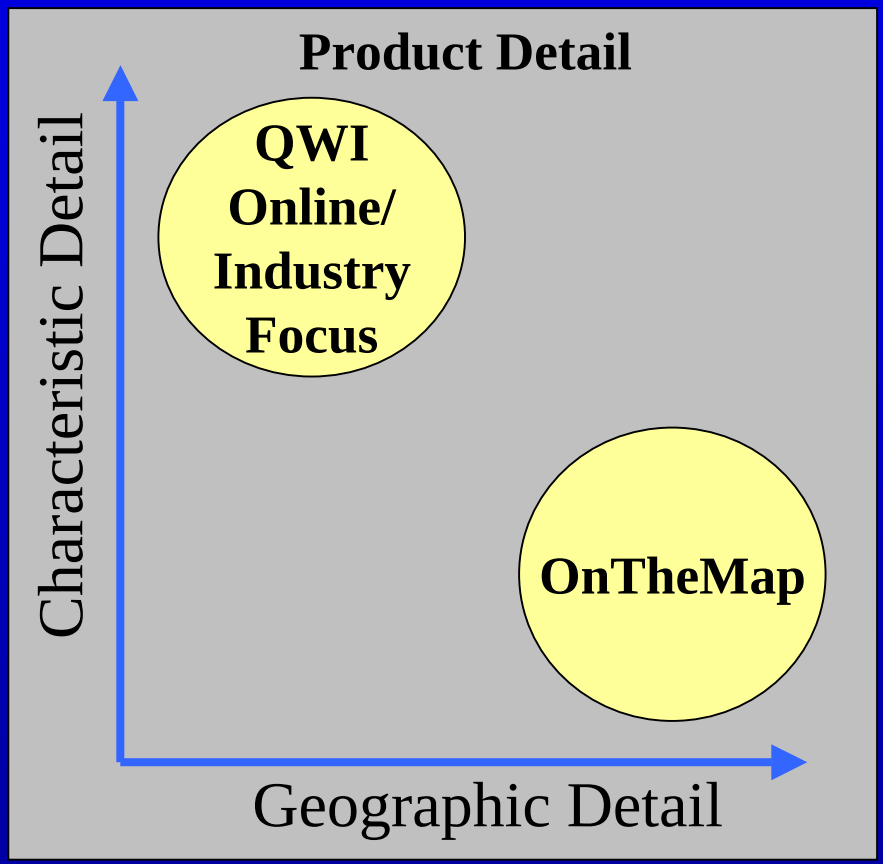
LED's online dynamic mapping and reporting tool

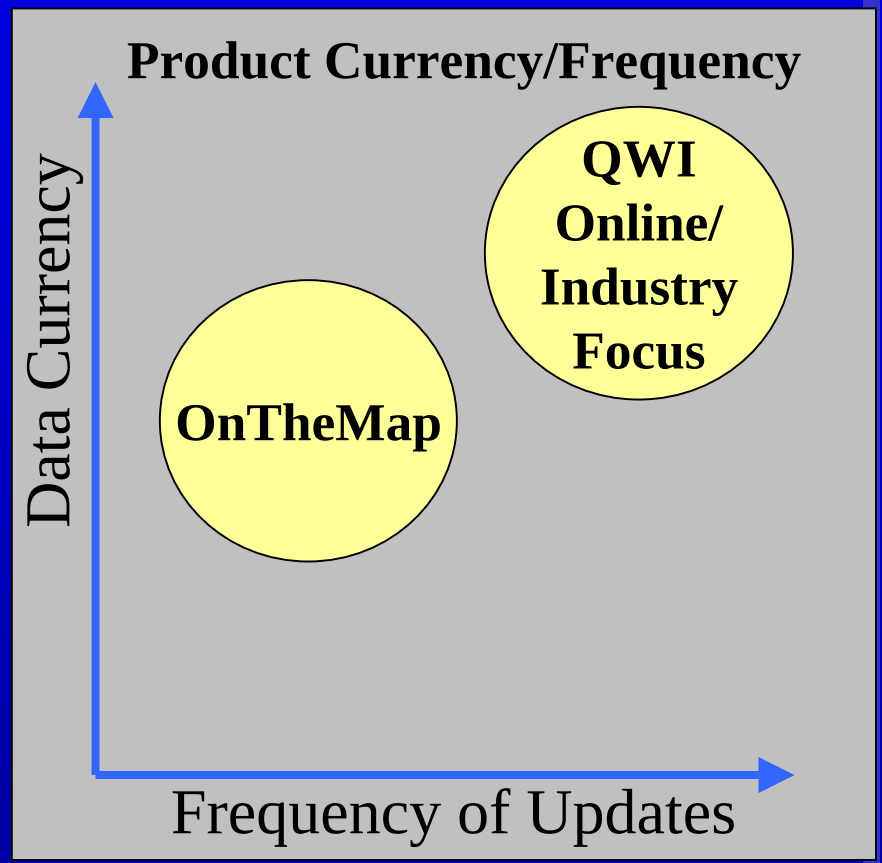
UN recognition as major U.S. statistical innovation

- ✓ Where do workers live?
- ✓ Where do residents work?
- ✓ Reports on age, earnings, and industries
- ✓ Segment an analysis by age, earnings, or industry
- ✓ 46 states online

- ✓ 2002-2006 annual data
- ✓ User-selected areas based on Census Block units
- ✓ Innovative disclosure protection

QWI and OnTheMap for Emergency Management





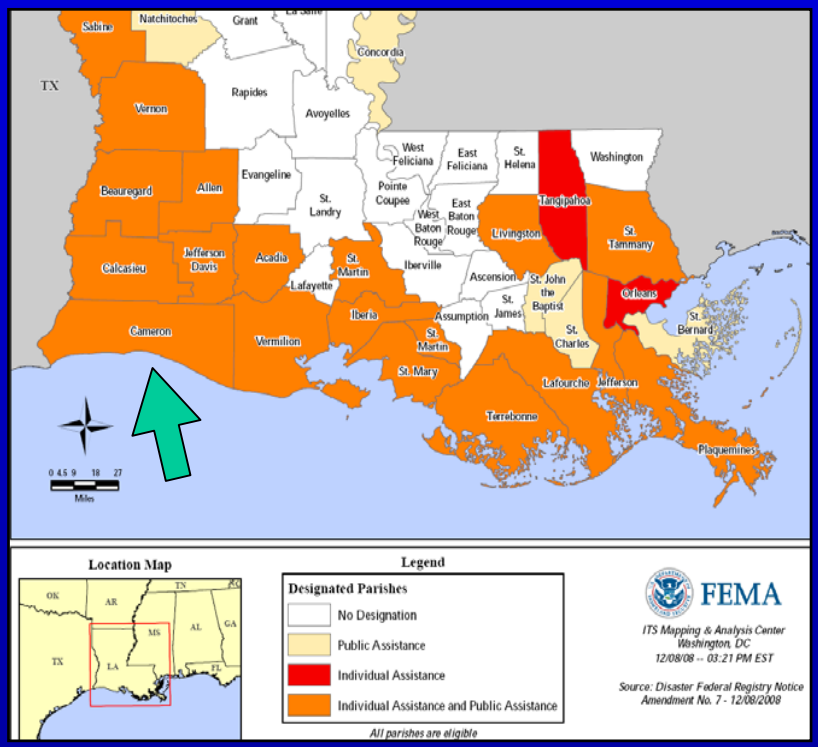
Using LED to Assess a Disaster's Impact on Workers and Jobs

Some Examples:

- **Louisiana FEMA Disaster Areas**
- **A bridge collapse in Minneapolis**
- **Hurricanes in the Gulf Coast**
- **A tornado touches down in Missouri**
- **Wildfires in California**
- **Flooding in Iowa**

Using QWI Online: Detailed Characteristics

- Less Precise Geography → More Precise Characteristics and More Current Data
- FEMA Disaster Areas are Counties



FEMA's Ike Disaster Areas

QWI Online [NAICS]

LEHD Louisiana Industry Reports - Quarterly Workforce Indicators
Geographic Reports: County | Metro | WIA
Top Level Industry Reports: County | Metro | WIA
Back to County 23 Construction

Select	More data	NAICS code	Description
○	---	237	Heavy and Civil Engineering Construction
◉	---	2371	Utility System Construction
○	---	2372	Land Subdivision
○	---	2373	Highway, Street, and Bridge Construction
○	---	2379	Other Heavy and Civil Engineering Construction

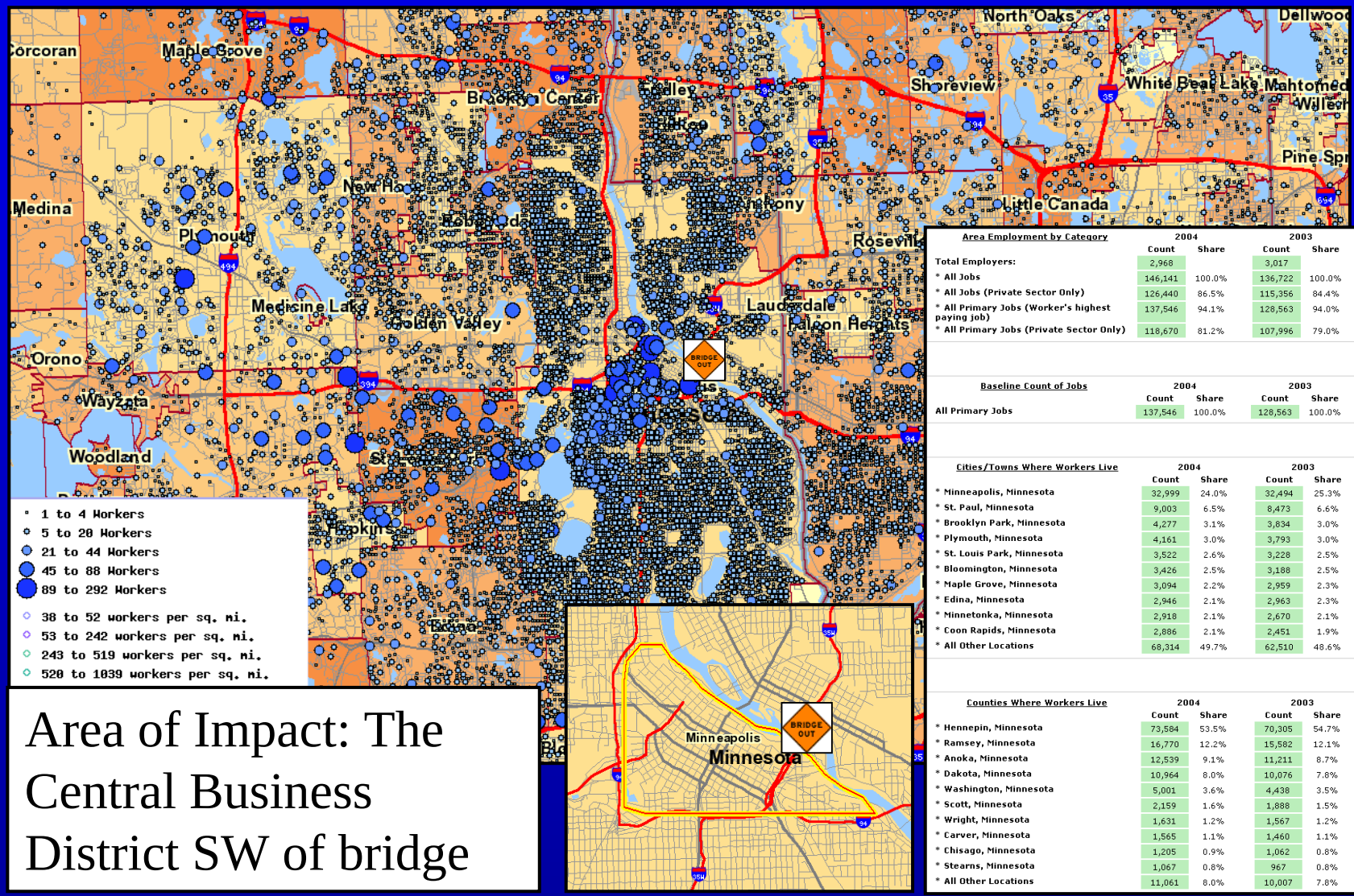
Name	Value
Year:	2008
Quarter:	Q1
AgeGroup:	14-99
Sex:	Male and Female
Ownership:	All(1-5)
County	023 Cameron

Download Dataset | Print Table

QWI Quick Facts	Utility System Construction (Q1)	Utility System Construction (Avg:Selected + 3 Prior qtrs)	All industry groups (Q1)	All industry groups (Avg:Selected + 3 Prior qtrs)
Total Employment	733	705	3,482	3,397
Net Job Flows	-170	16	-19	107
Job Creation	6	63	403	400
New Hires	149	269	953	935
Separations	334	262	1,317	1,046
Turnover	28.0%	24.1%	16.9%	16.1%
Avg Monthly Earnings	$4,422.00	$4,178.25	$5,264.00	$4,694.00
Avg New Hire Earnings	$3,521.00	$3,677.25	$4,076.00	$3,941.25

View Detailed Comparison Reports
For more information

Using OnTheMap: Detailed Geography



Area of Impact: The Central Business District SW of bridge

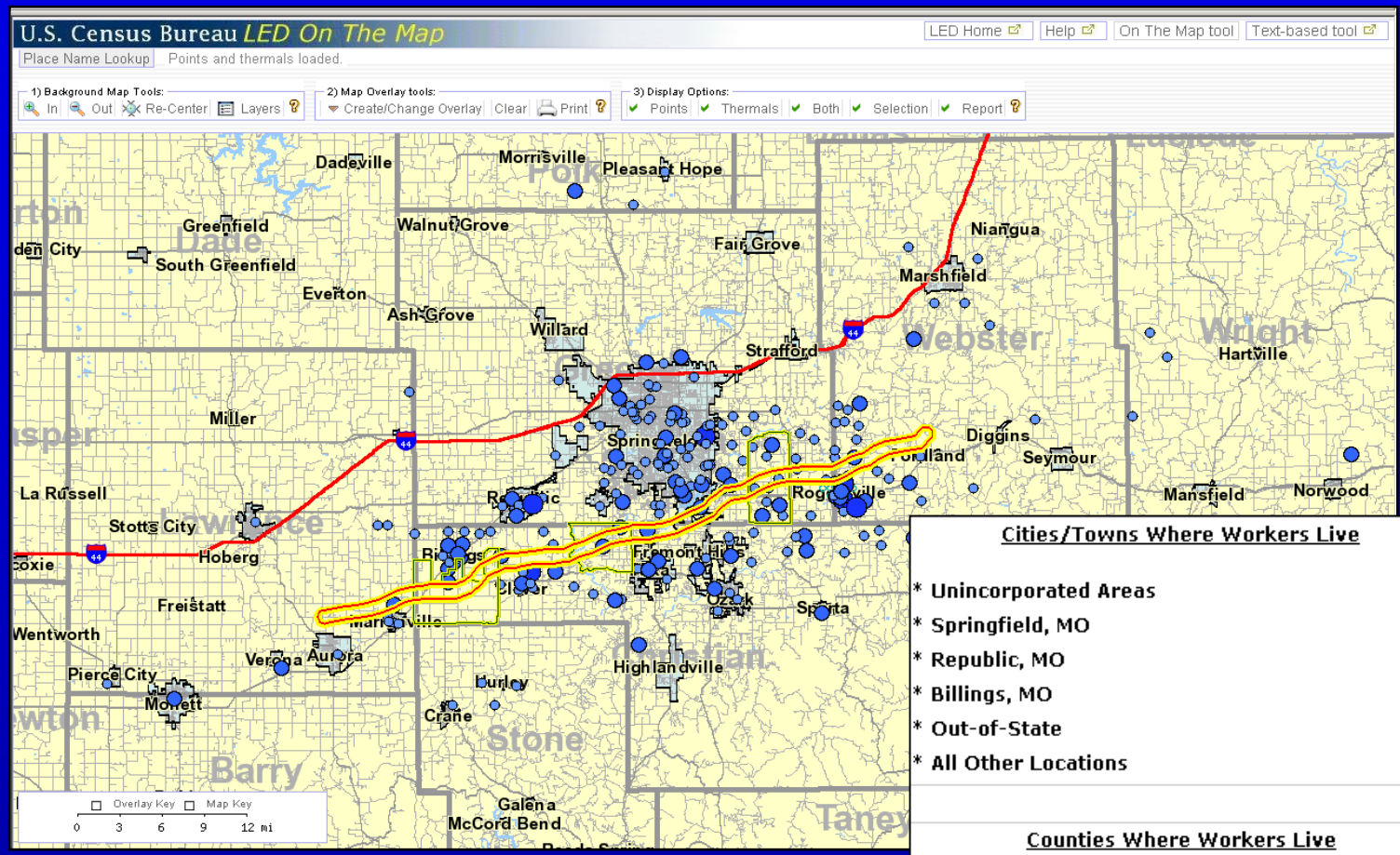
Area Employment by Category	2004 Count	2004 Share	2003 Count	2003 Share	2002 Count	2002 Share
Total Employers:	2,968		3,017		2,985	
* All Jobs	146,141	100.0%	136,722	100.0%	143,784	100.0%
* All Jobs (Private Sector Only)	126,440	86.5%	115,356	84.4%	121,794	84.7%
* All Primary Jobs (Worker's highest paying job)	137,546	94.1%	128,563	94.0%	135,068	93.9%
* All Primary Jobs (Private Sector Only)	118,670	81.2%	107,996	79.0%	114,011	79.3%

Baseline Count of Jobs	2004 Count	2004 Share	2003 Count	2003 Share	2002 Count	2002 Share
All Primary Jobs	137,546	100.0%	128,563	100.0%	135,068	100.0%

Cities/Towns Where Workers Live	2004 Count	2004 Share	2003 Count	2003 Share	2002 Count	2002 Share
* Minneapolis, Minnesota	32,999	24.0%	32,494	25.3%	34,394	25.5%
* St. Paul, Minnesota	9,003	6.5%	8,473	6.6%	9,287	6.9%
* Brooklyn Park, Minnesota	4,277	3.1%	3,834	3.0%	4,104	3.0%
* Plymouth, Minnesota	4,161	3.0%	3,793	3.0%	3,844	2.8%
* St. Louis Park, Minnesota	3,522	2.6%	3,228	2.5%	3,542	2.6%
* Bloomington, Minnesota	3,426	2.5%	3,188	2.5%	3,264	2.4%
* Maple Grove, Minnesota	3,094	2.2%	2,959	2.3%	3,072	2.3%
* Edina, Minnesota	2,946	2.1%	2,963	2.3%	2,961	2.2%
* Minnetonka, Minnesota	2,918	2.1%	2,670	2.1%	2,779	2.1%
* Coon Rapids, Minnesota	2,886	2.1%	2,451	1.9%	2,517	1.9%
* All Other Locations	68,314	49.7%	62,510	48.6%	65,304	48.6%

Counties Where Workers Live	2004 Count	2004 Share	2003 Count	2003 Share	2002 Count	2002 Share
* Hennepin, Minnesota	73,584	53.5%	70,305	54.7%	73,536	54.4%
* Ramsey, Minnesota	16,770	12.2%	15,582	12.1%	16,814	12.4%
* Anoka, Minnesota	12,539	9.1%	11,211	8.7%	11,521	8.5%
* Dakota, Minnesota	10,964	8.0%	10,076	7.8%	10,782	8.0%
* Washington, Minnesota	5,001	3.6%	4,438	3.5%	4,782	3.5%
* Scott, Minnesota	2,159	1.6%	1,888	1.5%	2,027	1.5%
* Wright, Minnesota	1,631	1.2%	1,567	1.2%	1,388	1.0%
* Carver, Minnesota	1,565	1.1%	1,460	1.1%	1,587	1.2%
* Chisago, Minnesota	1,205	0.9%	1,062	0.8%	1,036	0.8%
* Stearns, Minnesota	1,067	0.8%	967	0.8%	891	0.7%
* All Other Locations	11,061	8.0%	10,007	7.8%	10,704	7.9%

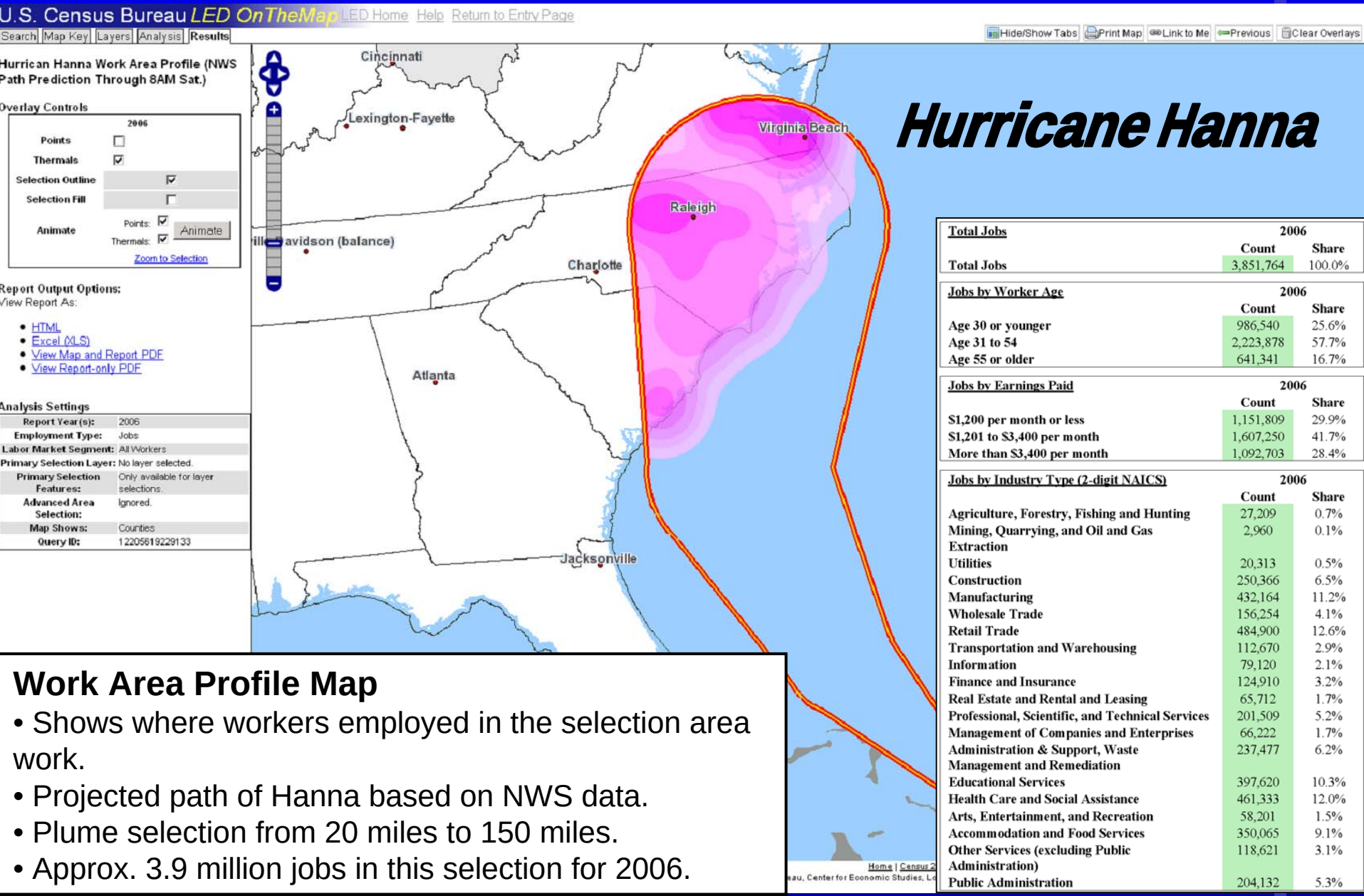
Using OnTheMap: Detailed Geography



Cities/Towns Where Workers Live	2003	
	Count	Share
* Unincorporated Areas	112	45.2%
* Springfield, MO	52	21%
* Republic, MO	14	5.6%
* Billings, MO	12	4.8%
* Out-of-State	9	3.6%
* All Other Locations	49	19.8%

Counties Where Workers Live	2003	
	Count	Share
* Greene Co., MO	97	39.1%
* Christian Co., MO	73	29.4%
* Webster Co., MO	22	8.9%
* Lawrence Co., MO	14	5.6%
* Out-of-State	9	3.6%
* All Other Locations	33	13.3%

Where do workers employed at jobs located in the path of the tornado ***live***?



Total Jobs	2006	
	Count	Share
Total Jobs	3,851,764	100.0%

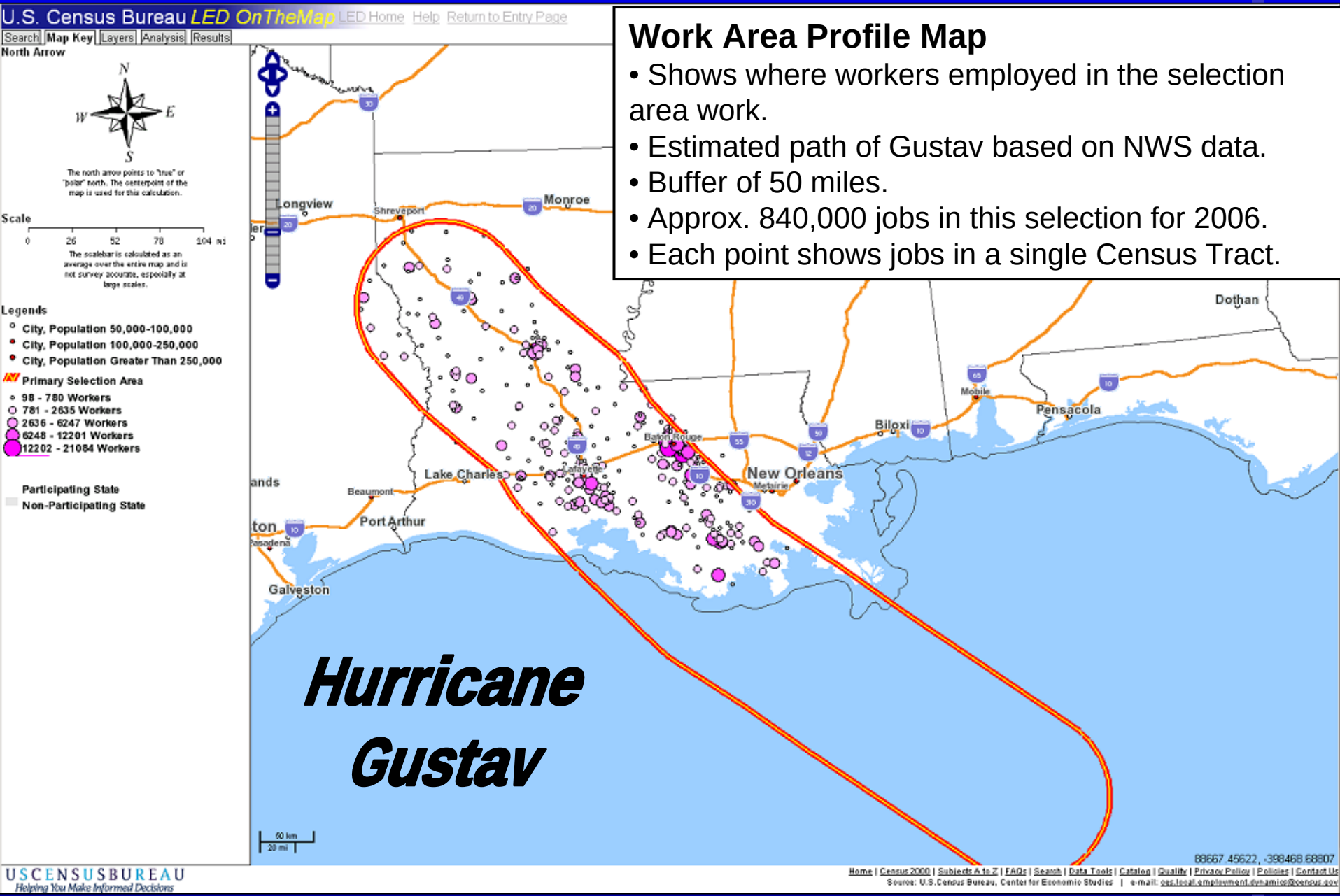
Jobs by Worker Age	2006	
	Count	Share
Age 30 or younger	986,540	25.6%
Age 31 to 54	2,223,878	57.7%
Age 55 or older	641,341	16.7%

Jobs by Earnings Paid	2006	
	Count	Share
$1,200 per month or less	1,151,809	29.9%
$1,201 to $3,400 per month	1,607,250	41.7%
More than $3,400 per month	1,092,703	28.4%

Jobs by Industry Type (2-digit NAICS)	2006	
	Count	Share
Agriculture, Forestry, Fishing and Hunting	27,209	0.7%
Mining, Quarrying, and Oil and Gas Extraction	2,960	0.1%
Utilities	20,313	0.5%
Construction	250,366	6.5%
Manufacturing	432,164	11.2%
Wholesale Trade	156,254	4.1%
Retail Trade	484,900	12.6%
Transportation and Warehousing	112,670	2.9%
Information	79,120	2.1%
Finance and Insurance	124,910	3.2%
Real Estate and Rental and Leasing	65,712	1.7%
Professional, Scientific, and Technical Services	201,509	5.2%
Management of Companies and Enterprises	66,222	1.7%
Administration & Support, Waste Management and Remediation	237,477	6.2%
Educational Services	397,620	10.3%
Health Care and Social Assistance	461,333	12.0%
Arts, Entertainment, and Recreation	58,201	1.5%
Accommodation and Food Services	350,065	9.1%
Other Services (excluding Public Administration)	118,621	3.1%
Public Administration	204,132	5.3%

Work Area Profile Map

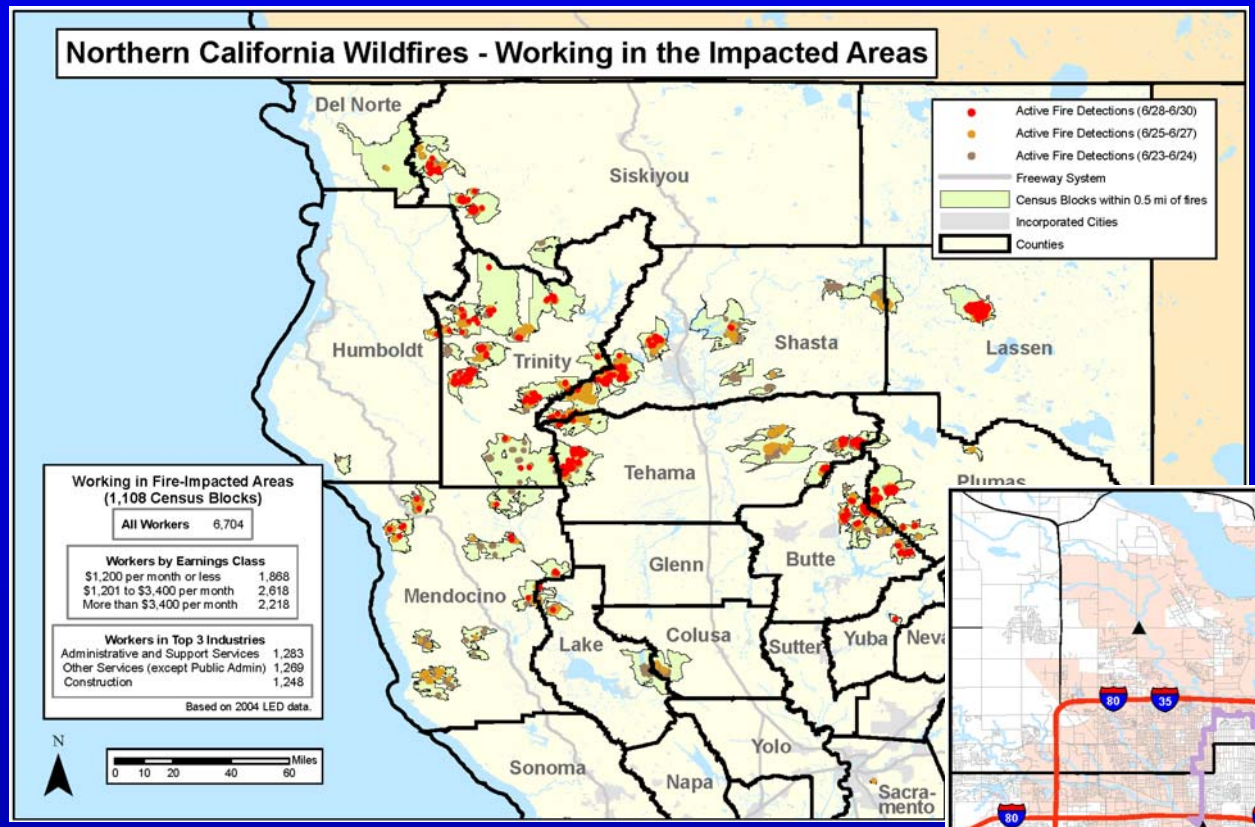
- Shows where workers employed in the selection area work.
- Projected path of Hanna based on NWS data.
- Plume selection from 20 miles to 150 miles.
- Approx. 3.9 million jobs in this selection for 2006.



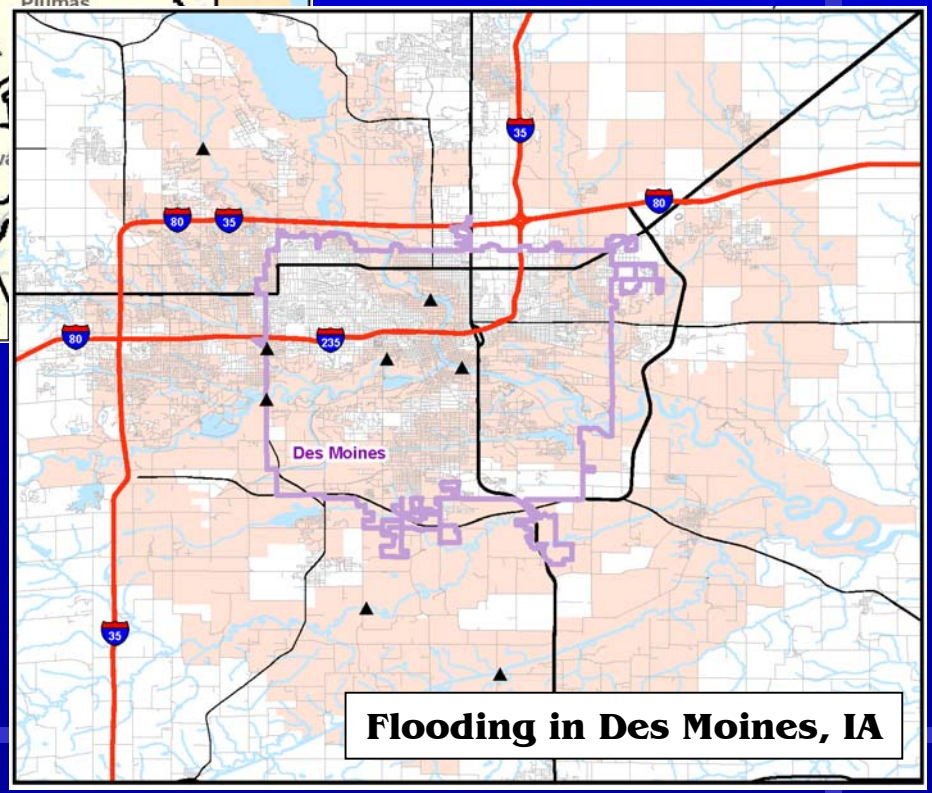
Work Area Profile Map

- Shows where workers employed in the selection area work.
- Estimated path of Gustav based on NWS data.
- Buffer of 50 miles.
- Approx. 840,000 jobs in this selection for 2006.
- Each point shows jobs in a single Census Tract.

Using OnTheMap's Raw Data from VRDC



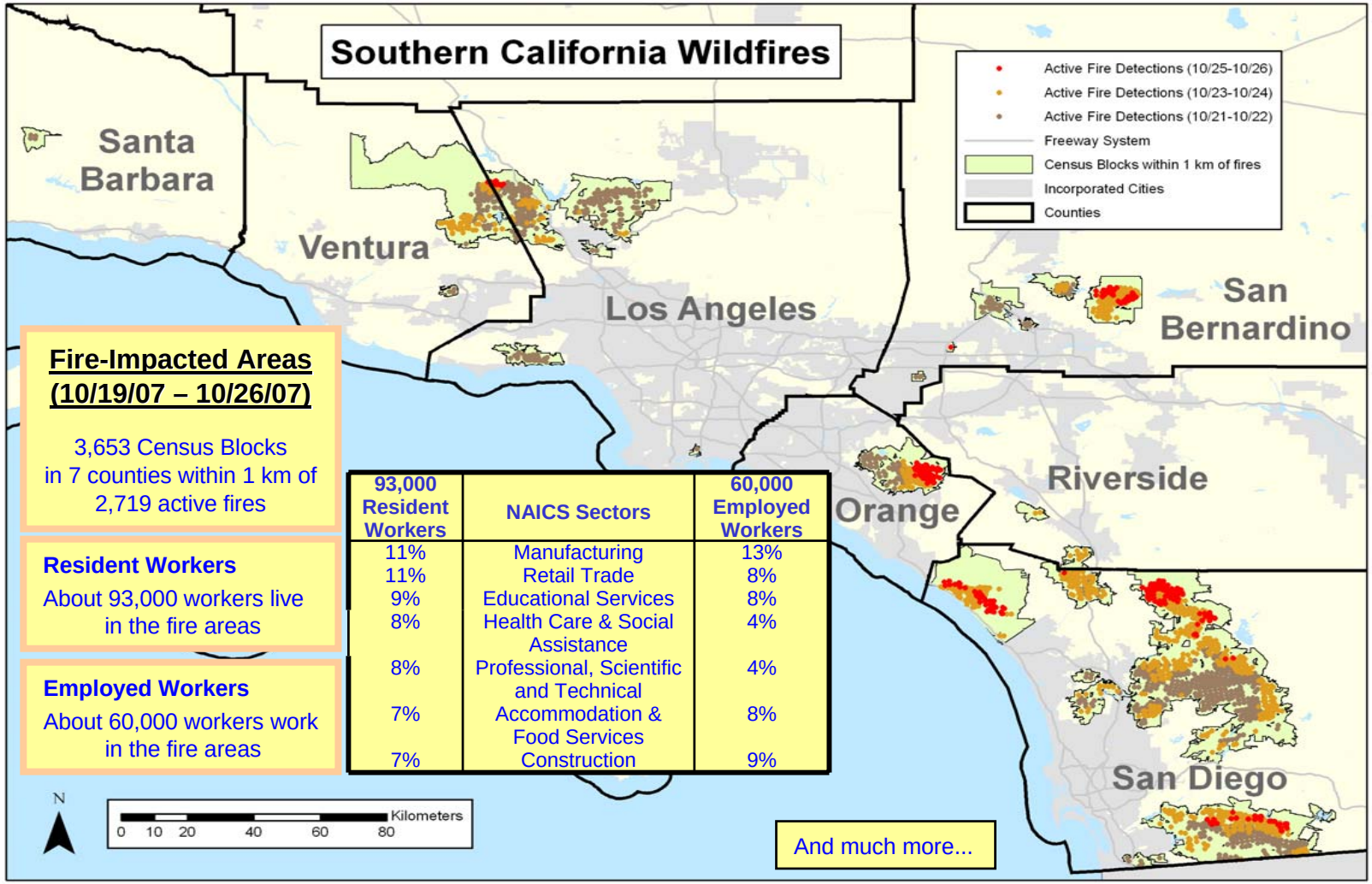
How do you analyze non-contiguous areas together?



Flooding in Des Moines, IA

- TIGER/Line Shapefiles
- Raw OnTheMap Data (VRDC)
- Disaster Reference Data
- GIS Software
- Statistical Software

Using OnTheMap's Raw Data from VRDC



Fire-Impacted Areas (10/19/07 – 10/26/07)

3,653 Census Blocks in 7 counties within 1 km of 2,719 active fires

Resident Workers

About 93,000 workers live in the fire areas

Employed Workers

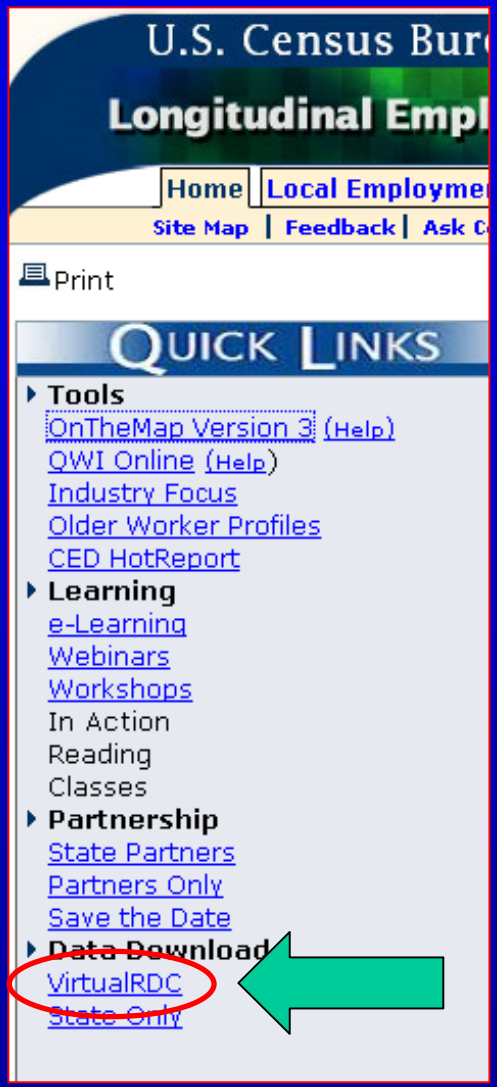
About 60,000 workers work in the fire areas

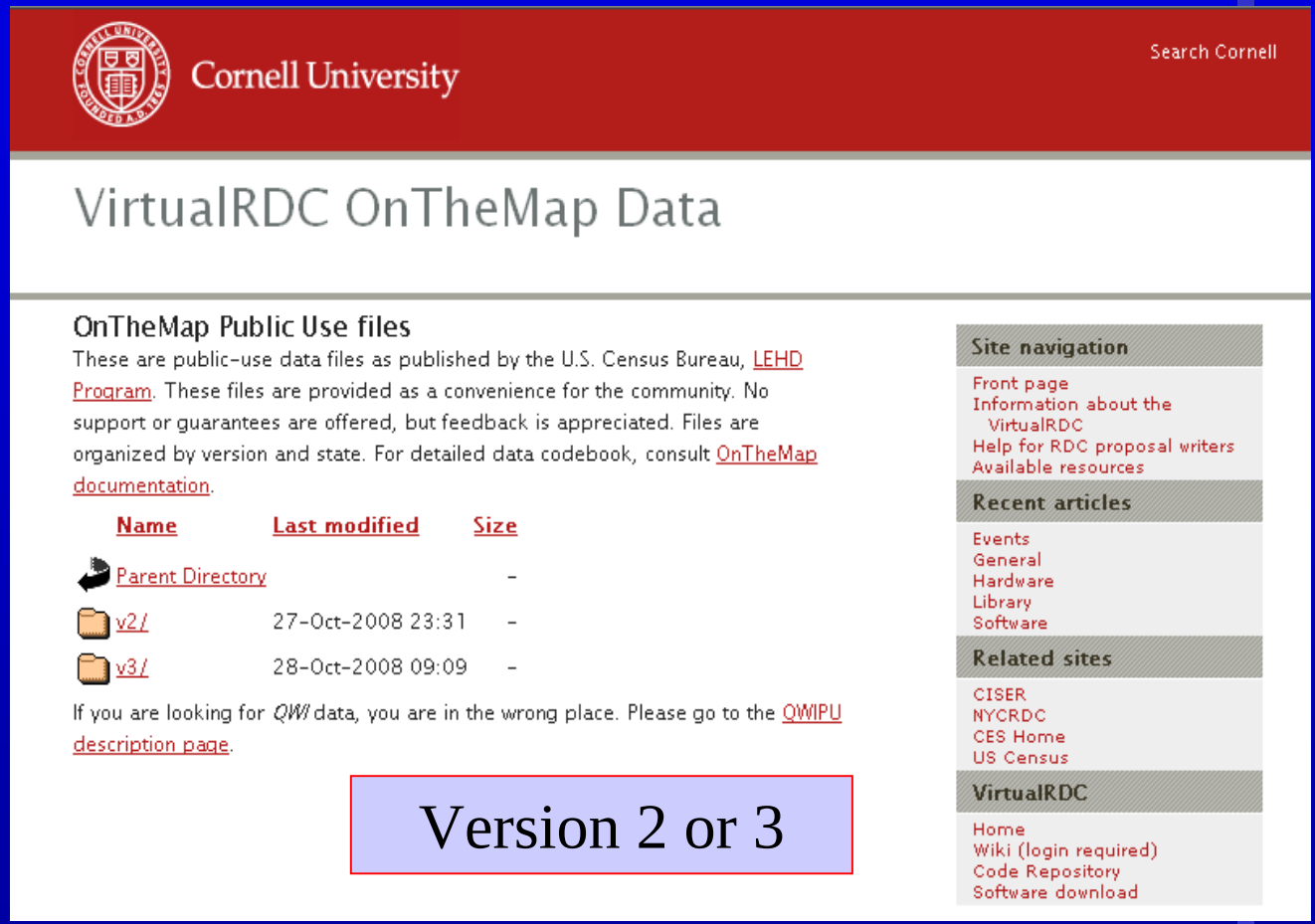
93,000 Resident Workers	NAICS Sectors	60,000 Employed Workers
11%	Manufacturing	13%
11%	Retail Trade	8%
9%	Educational Services	8%
8%	Health Care & Social Assistance	4%
8%	Professional, Scientific and Technical	4%
7%	Accommodation & Food Services	8%
7%	Construction	9%

And much more...

Sources: Local Employment Dynamics, U.S. Census Bureau, 2007. <http://lehd.did.census.gov>
USDA Forest Service, Remote Sensing Application Center, 2007. <http://activefiremaps.fs.fed.us>

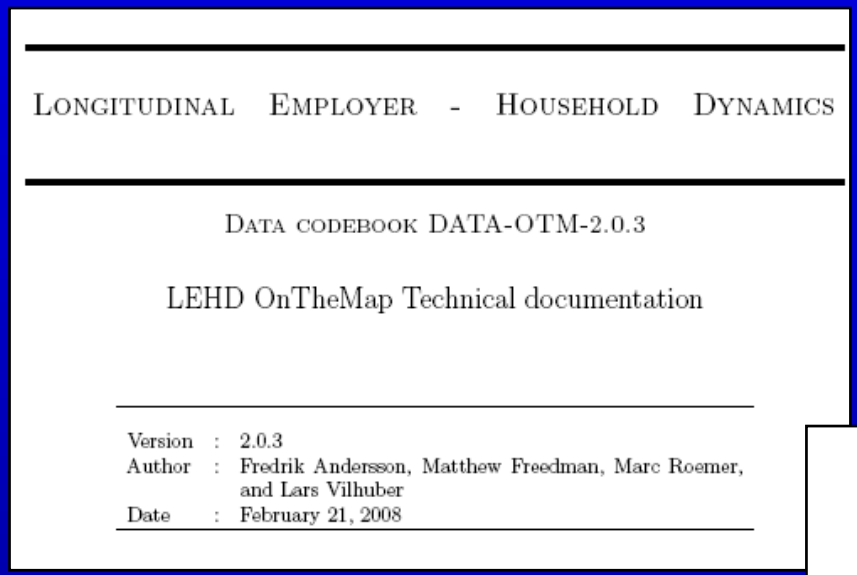
Virtual RDC for Data Downloads





Download OTM Data

VRDC OnTheMap
Technical Documentation



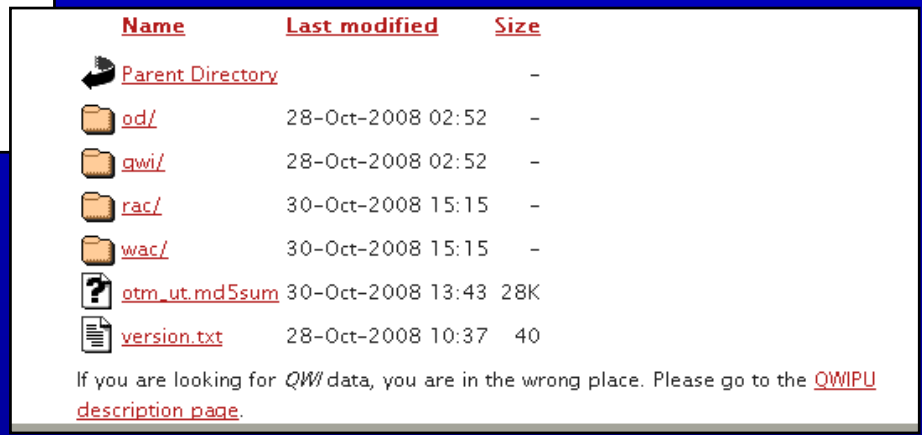
LONGITUDINAL EMPLOYER - HOUSEHOLD DYNAMICS

DATA CODEBOOK DATA-OTM-2.0.3

LEHD OnTheMap Technical documentation

Version : 2.0.3
Author : Fredrik Andersson, Matthew Freedman, Marc Roemer, and Lars Vilhuber
Date : February 21, 2008

- OD Origin-Destination Matrix
- QWI Quarterly Workforce Indicators
- RAC Residence Area Characteristics
- WAC Workplace Area Characteristics



Name	Last modified	Size
Parent Directory		-
od/	28-Oct-2008 02:52	-
qwi/	28-Oct-2008 02:52	-
rac/	30-Oct-2008 15:15	-
wac/	30-Oct-2008 15:15	-
otm_ut.md5sum	30-Oct-2008 13:43	28K
version.txt	28-Oct-2008 10:37	40

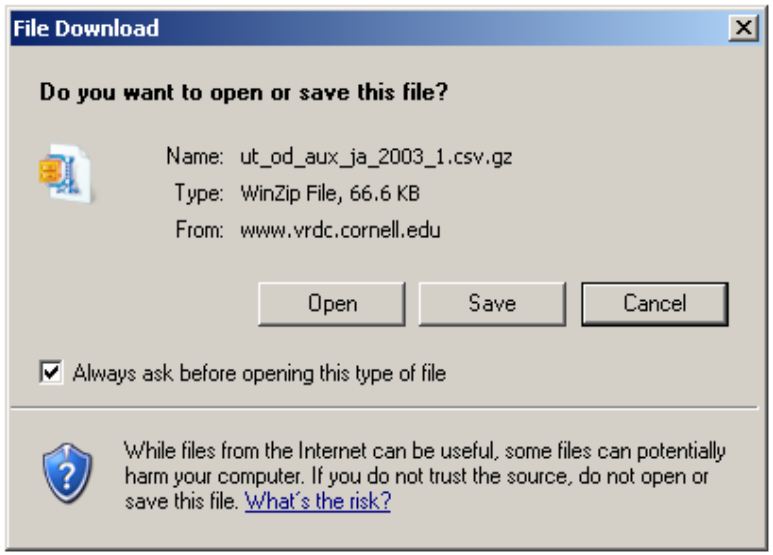
If you are looking for *QWI* data, you are in the wrong place. Please go to the QWIPU description page.

Download OTM Data

Index of /onthemap/data/v3/ut/od

Name	Last modified	Size
Parent Directory		-
ut_od_aux_ja_2002_1.csv.gz	08-Oct-2008 18:12	75K
ut_od_aux_ja_2003_1.csv.gz	08-Oct-2008 19:08	67K
ut_od_aux_ja_2004_1.csv.gz	08-Oct-2008 20:06	67K
ut_od_aux_ja_2005_1.csv.gz	08-Oct-2008 21:06	78K
ut_od_aux_ja_2006_1.csv.gz	08-Oct-2008 22:06	89K
ut_od_aux_jp_2002_1.csv.gz	08-Oct-2008 18:12	69K
ut_od_aux_jp_2003_1.csv.gz	08-Oct-2008 19:08	61K
ut_od_aux_jp_2004_1.csv.gz	08-Oct-2008 20:07	62K
ut_od_aux_jp_2005_1.csv.gz	08-Oct-2008 21:06	72K
ut_od_aux_jp_2006_1.csv.gz	08-Oct-2008 22:06	81K
ut_od_aux_pa_2002_1.csv.gz	08-Oct-2008 18:12	68K
ut_od_aux_pa_2003_1.csv.gz	08-Oct-2008 19:08	59K
ut_od_aux_pa_2004_1.csv.gz	08-Oct-2008 20:07	60K
ut_od_aux_pa_2005_1.csv.gz	08-Oct-2008 21:06	70K
ut_od_aux_pa_2006_1.csv.gz	08-Oct-2008 22:06	80K
ut_od_aux_pp_2002_1.csv.gz	08-Oct-2008 18:12	63K

Size matters—make sure your software can handle thousands of rows of data



Emergency Management and OnTheMap Version 4

- Greater interoperability with other analytical and data visualization software
- 46+ states online
- Additional years of data – 2002-2008
- Released in December of this year

Conclusions

- LED data can be applied in preparing disaster readiness plans AND disaster recovery plans
- Best used in combination with disaster-specific data (FEMA, USGS, NOAA) and ***local knowledge***
- Utility of LED will continue to grow with expanded data coverage and development of new variables
- We are not emergency planners, so feedback and insight from professionals in the field is crucial both in terms of:
  - Design of the LED tools (OnTheMap and QWI Online)
  - Content of the LED Dataset (useful new variables)

Contact Us

Comments/Suggestions

CES.local.employment.dynamics@census.gov

Patrick.Hayward@census.gov

Local Employment Dynamics

http://lehd.did.census.gov

Census Data and Emergency Preparedness

http://www.census.gov/Press-Release/www/emergencies/index.html

Join the Listservs

Lehd-onthemap@lists.census.gov

Lehd-general@lists.census.gov