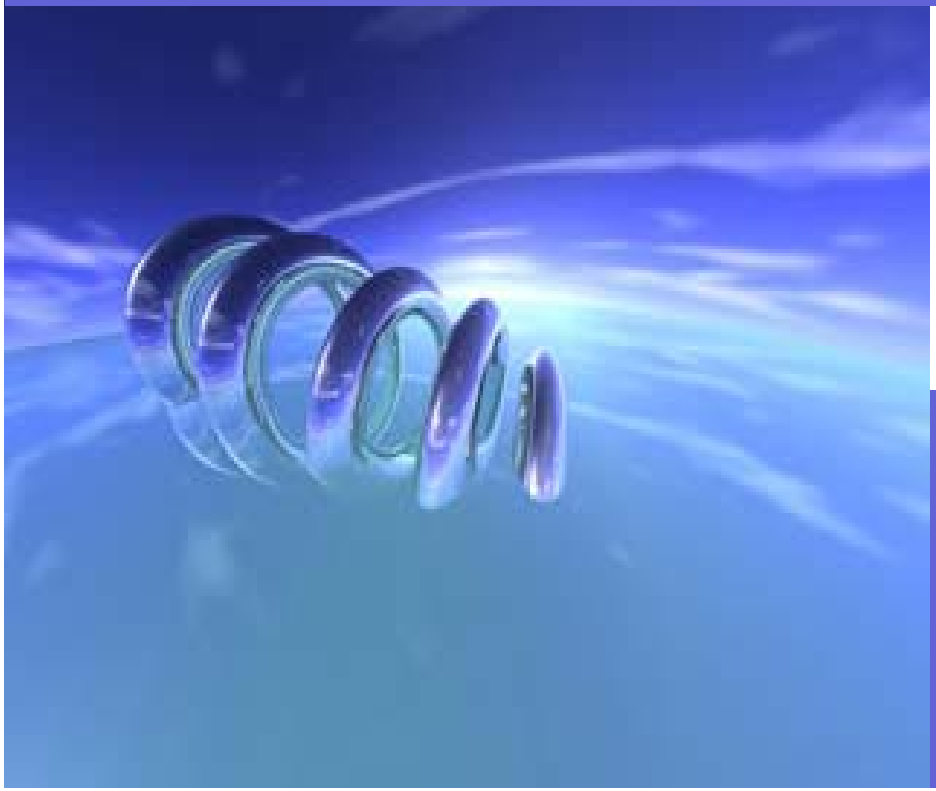
Community Health Air Pollution Information System (CHAPIS): Web-Based Mapping Tool



Beth Schwehr
Planning & Technical Support Division
California Air Resources Board
Cal/EPA
June 2003

CHAPIS: Community Health Air Pollution Information System

-- Web-Mapping Tool - Prototype June 2003 --

- **Provide Interactive Maps of Air Pollution Emission Sources**
- **Include Stationary, Mobile, & Areawide Emissions**
- **Provide Maps or Tabular Information**
- **Collaboration with CAPCOA and Districts**

NOTE: Data in Prototype are Not Real Data

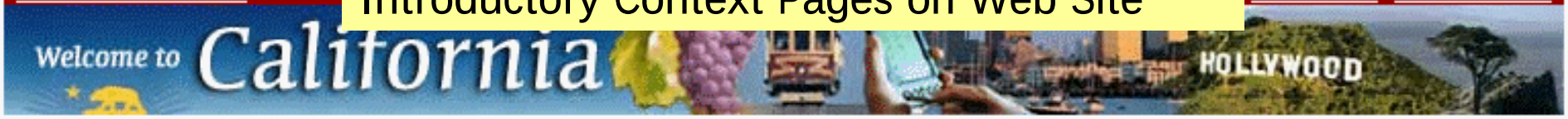
Populating Facility Data in Stages for Quality

- **Initial pollutants and facilities**
  - Criteria Pollutants for 10 ton/year facilities
  - Toxics for Refineries, Power Plants
  - HRA facilities - Metal fabrication, Chemical, Aerospace
- **On-going future additions**
  - Coordination with CAPCOA
  - Other HRA, Gas stations, Platers, Dry Cleaners
- **Initial public data release ~summer 2003**

California Home

Introductory Context Pages on Web Site

Software Contact Us



California Air Resources Board CHAPIS Community Health Air Pollution Information System

More about CHAPIS

Last Updated December 19, 2002

What are the Sources and Types of Air Pollution?

Cars and trucks (on-road mobile) are the largest sources of air pollution in California. Other sources of air pollution include trains, planes, and lawn and garden equipment (other mobile sources), refineries and power plants (stationary sources or facilities), as well as a miscellaneous category of emission sources that include consumer products like hairspray, and solvent use, such as painting (area-wide). Air pollution includes traditional smog-forming pollutants (criteria pollutants), as well as toxic air pollutants. The ARB receives information on criteria pollutants every year as part of the emission inventory, and information on toxic pollutants every four years as part of the air toxics "Hot Spots" program. One of the reasons to develop CHAPIS was the need to have more up-to-date information on toxic air pollutants than is sometimes collected through the "Hot Spots" program. To learn more about where the information comes from, click here.

What does it all mean?

Emissions from mobile sources (on-road and off-road sources) dominate the regional health impacts of air pollution, and contribute the most to the total amount of air pollution. An individual facility's contributions are usually much lower than the pollution from mobile sources. The amount of emissions is only one component affecting health; it is the exposure to those emissions that determines health effects. Exposure is the amount of pollution that someone actually breathes, rather than the total that is released from any one source. Exposure is determined by how far away the source is, the person's activity, what the toxicity of the pollutant is, and how it is released into the air and dispersed by the wind. The Air Resources Board works together with the 35 local air districts to keep track of all the various sources of air pollution in California. This initial prototype of CHAPIS contains a subset of facilities that include larger and higher priority facilities. This is an ongoing process where we will periodically make improvements and additions to the data. For a status of what is included to date, click here.

BEGIN MAP SEARCH NOW

CHAPIS Launch Page - Microsoft Internet Explorer

File Edit View Favorites History

Start by picking a region of interest:

California Home Contact Us

Welcome to California

California Air Resources Board CHAPIS Community Health Air Pollution Information System

Welcome to CHAPIS - The Community Health Air Pollution Information System Last Updated Nov. 18, 2002

The California Air Resources Board (ARB) developed CHAPIS as an Internet-based tool to provide a graphical way to look at the amounts and spatial distribution of air pollution emission sources in California. CHAPIS provides a mapping tool to analyze the spatial characteristics of California's Air Pollutant **Emission Inventory**, for emissions of **traditional criteria air pollutants** and key **toxic air pollutants**. This is a prototype, showing **selected data** from the ARB and **local Districts**, for **point source**, **mobile source**, and **dispersed source** emissions data. For online help or more information about CHAPIS, click **here**. To begin using CHAPIS, select an area of interest using the menus or map provided below.

Select an Area of Interest:

Select an area of interest using the menus below *or* use the map, and click on the county of your choice.

County: ——COUNTIES——

Air Basin: ——AIR BASINS——

Air District: ——AIR DISTRICTS——

Region: —— REGIONS ——

***Or* Enter a Zip Code:** Go To Zip

* This website is best viewed with your screen area set to **1024 x 768 px**.

Website developed by VESTRA Resources Inc. VESTRA

ARB Homepage

Internet

Start H:\Data_CHAPIS_HA... Microsoft PowerPoin... CHAPIS Launch ... SnagIt 9:23 AM

CHAPIS Launch Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

California Home

Search Site Map Links Software Contact Us

Welcome to California

California Air Resources Board

CHAPIS Community Health Air Pollution Information System

Welcome to CHAPIS - The Community Health Air Pollution Information System

Last Updated Nov. 18, 2002

The California Air Resources Board (ARB) developed CHAPIS as an Internet-based tool to provide a graphical way to look at the amounts and spatial distribution of air pollution emission sources in California. CHAPIS provides a mapping tool to analyze the spatial characteristics of California's Air Pollutant **Emission Inventory**, for emissions of **traditional criteria air pollutants** and key **toxic air pollutants**. This is a prototype, showing **selected data** from the ARB and **local Districts**, for **point source**, **mobile source**, and **dispersed source** emissions data. For online help or more information about CHAPIS, click **here**. To begin using CHAPIS, select an area of interest using the menus or map provided below.

Select an Area of Interest:

Select an area of interest using the menus below *or* use the map, and click on the county of your choice.

County: Los Angeles

Air Basin: ——AIR BASINS——

Air District: ——AIR DISTRICTS——

Region: —— REGIONS ——

***Or* Enter a Zip Code:** Go To Zip

* This website is best viewed with your screen area set to **1024 x 768 px**.

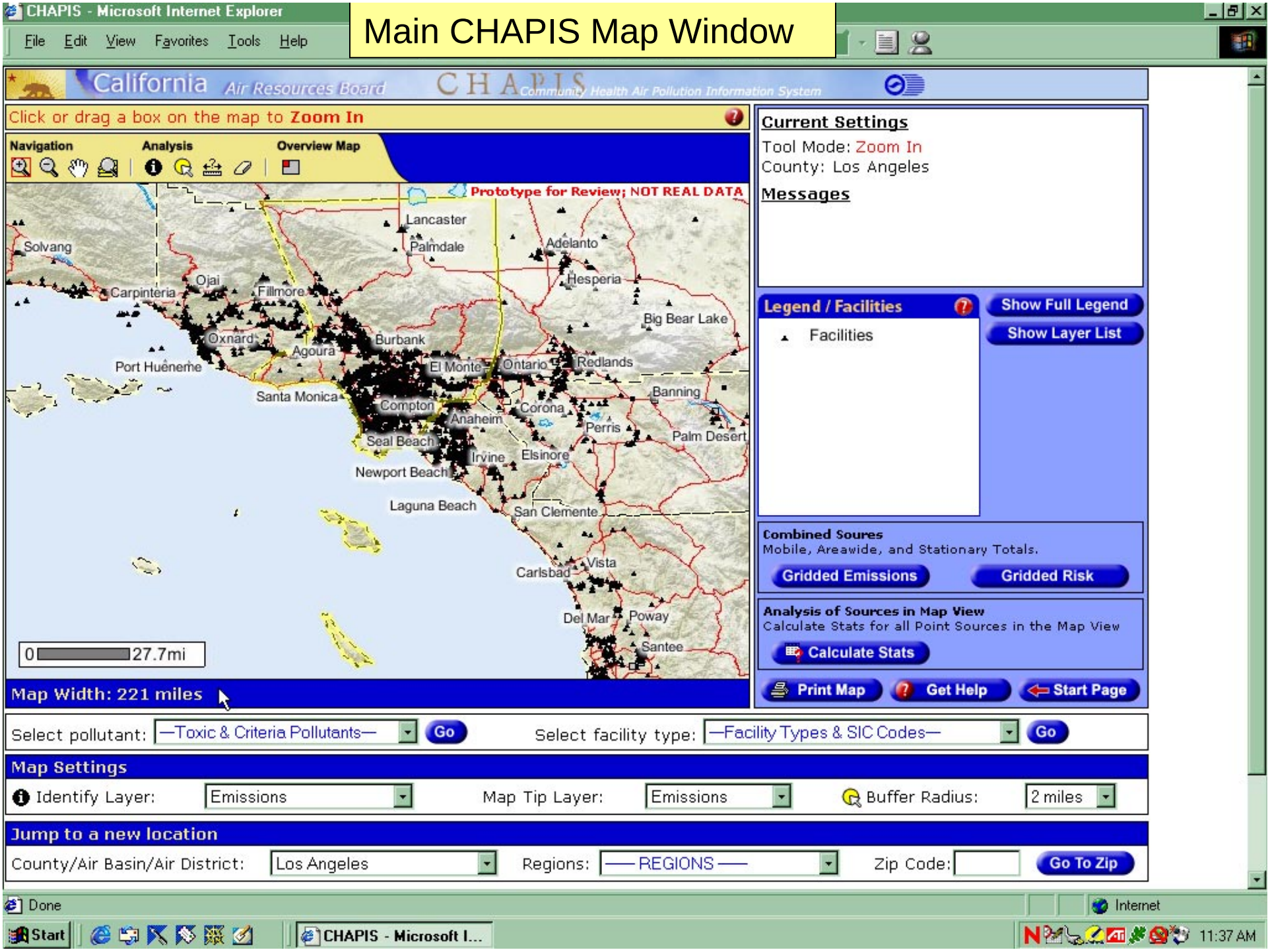
Website developed by VESTRA Resources Inc. VESTRA

ARB Homepage

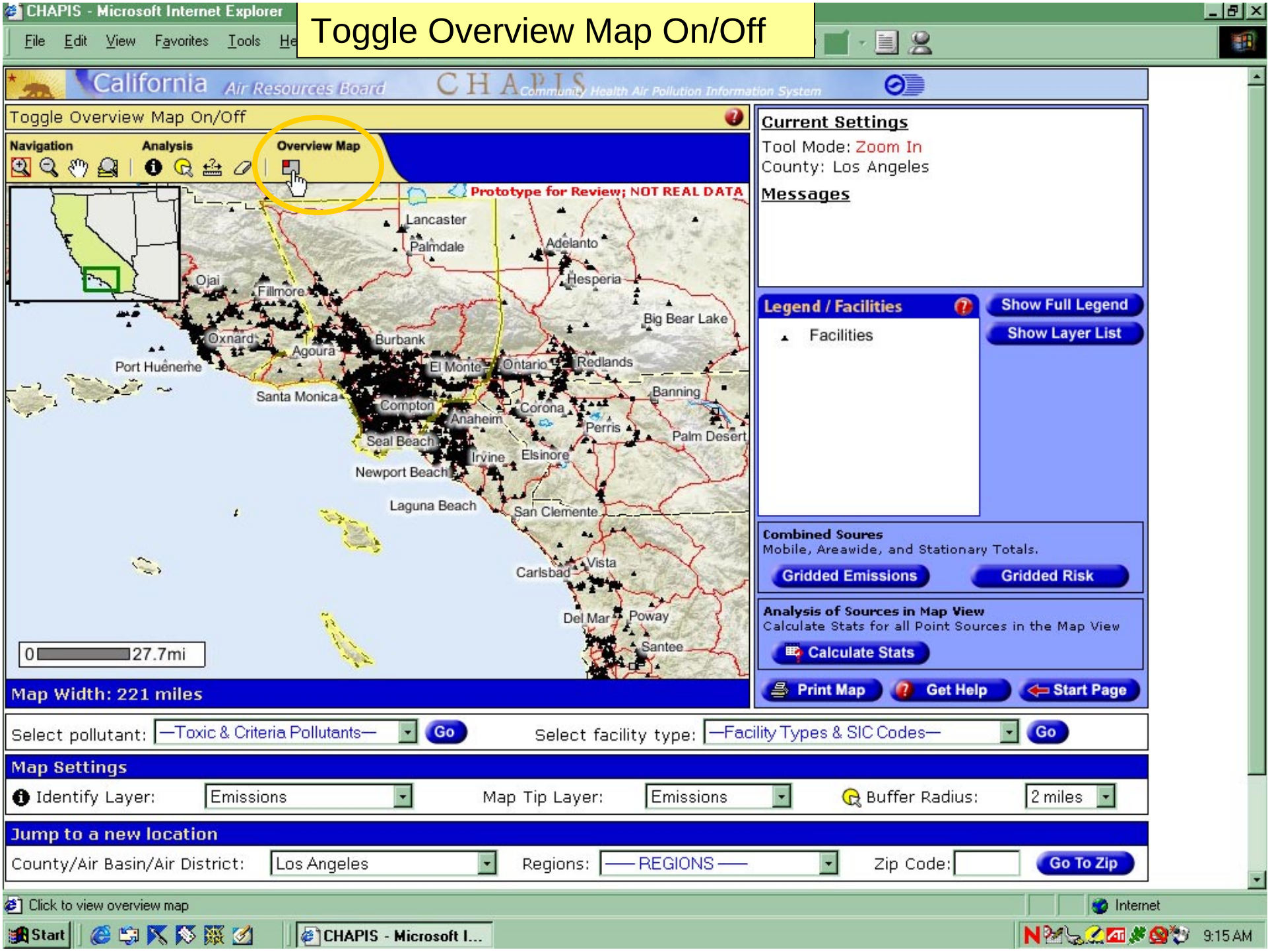
A department of the California Environmental Protection Agency

Start CHAPIS Launch Pag... 8:52 AM

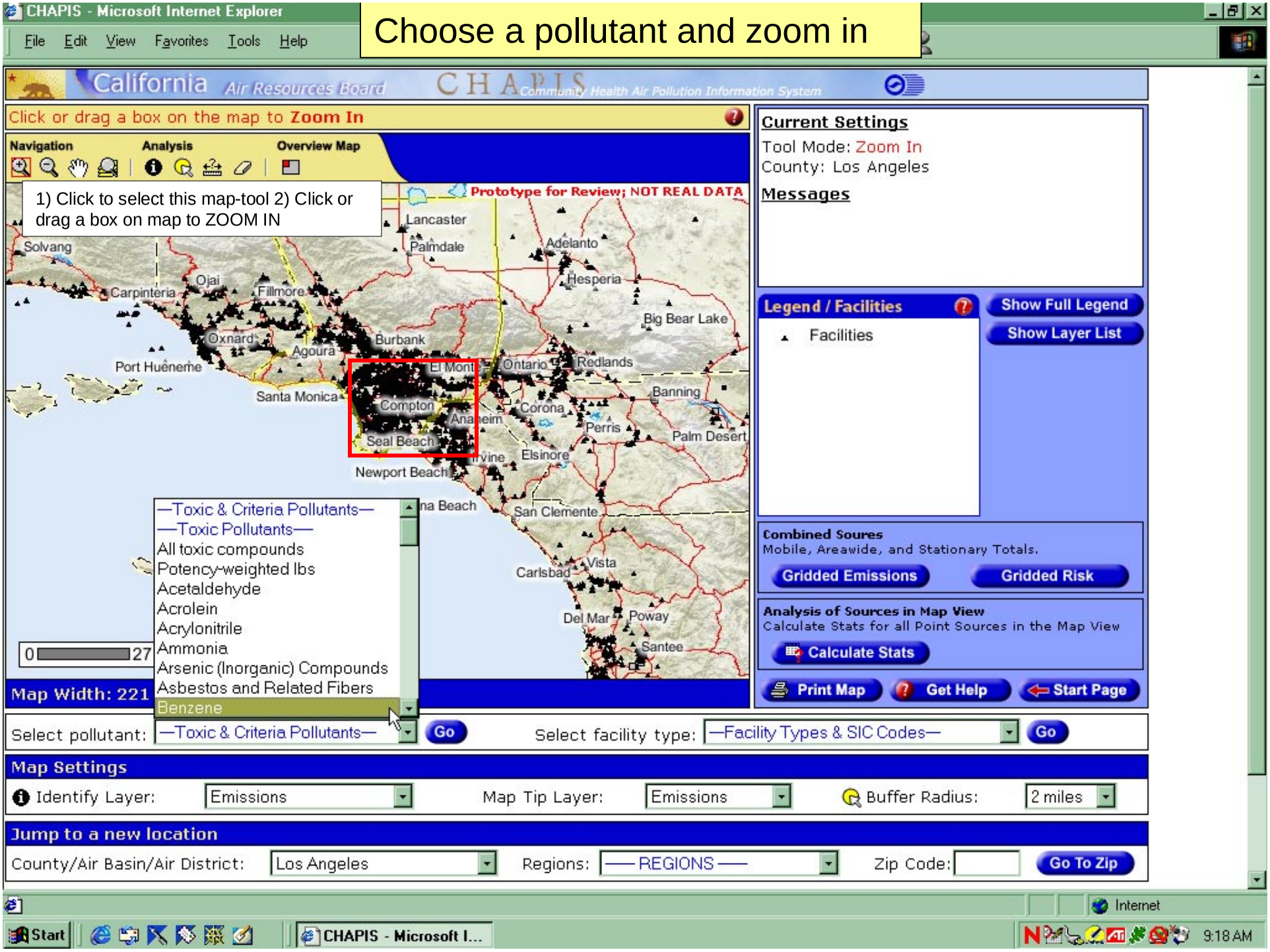
Main CHAPIS Map Window



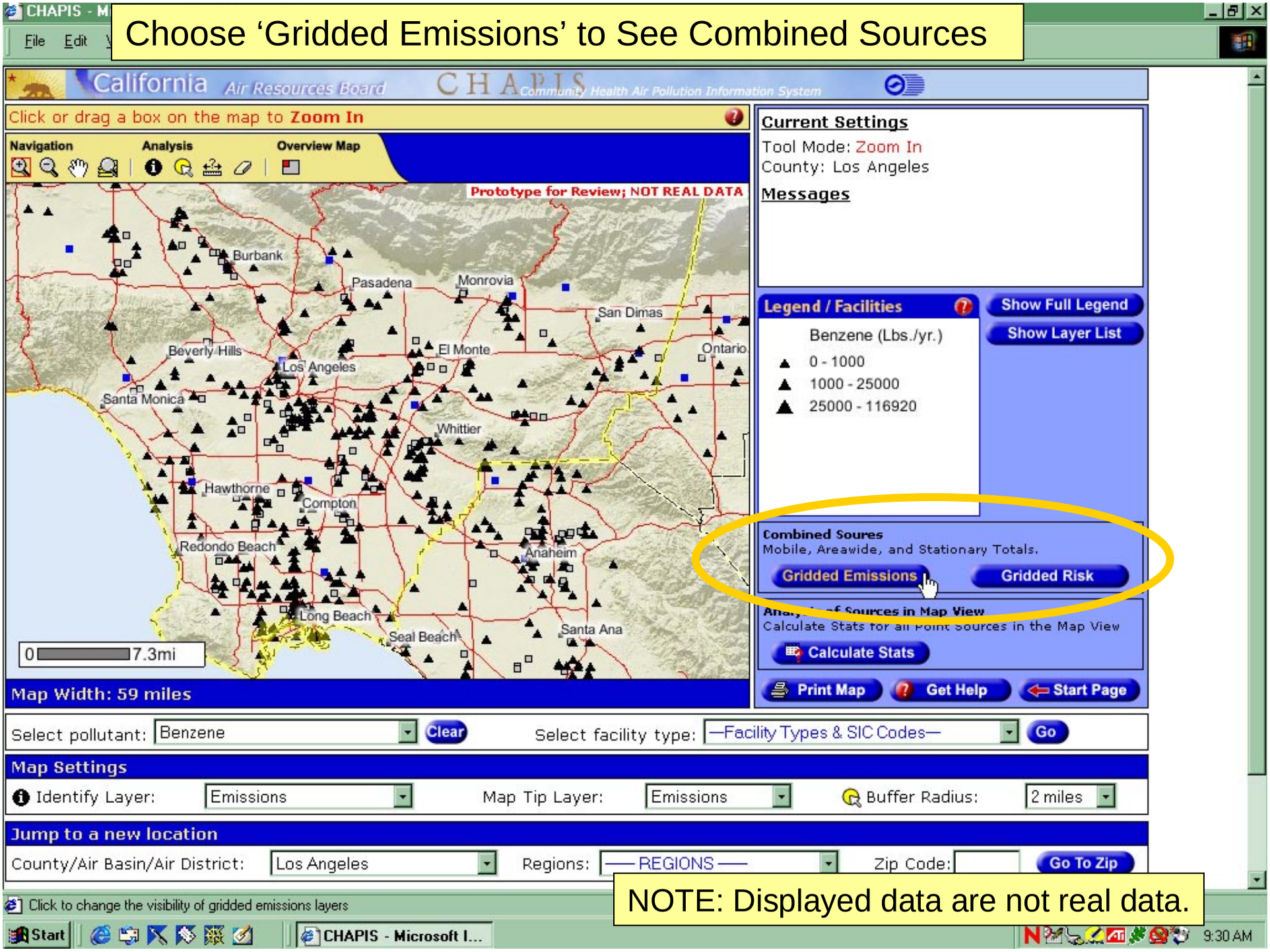
Toggle Overview Map On/Off



Choose a pollutant and zoom in

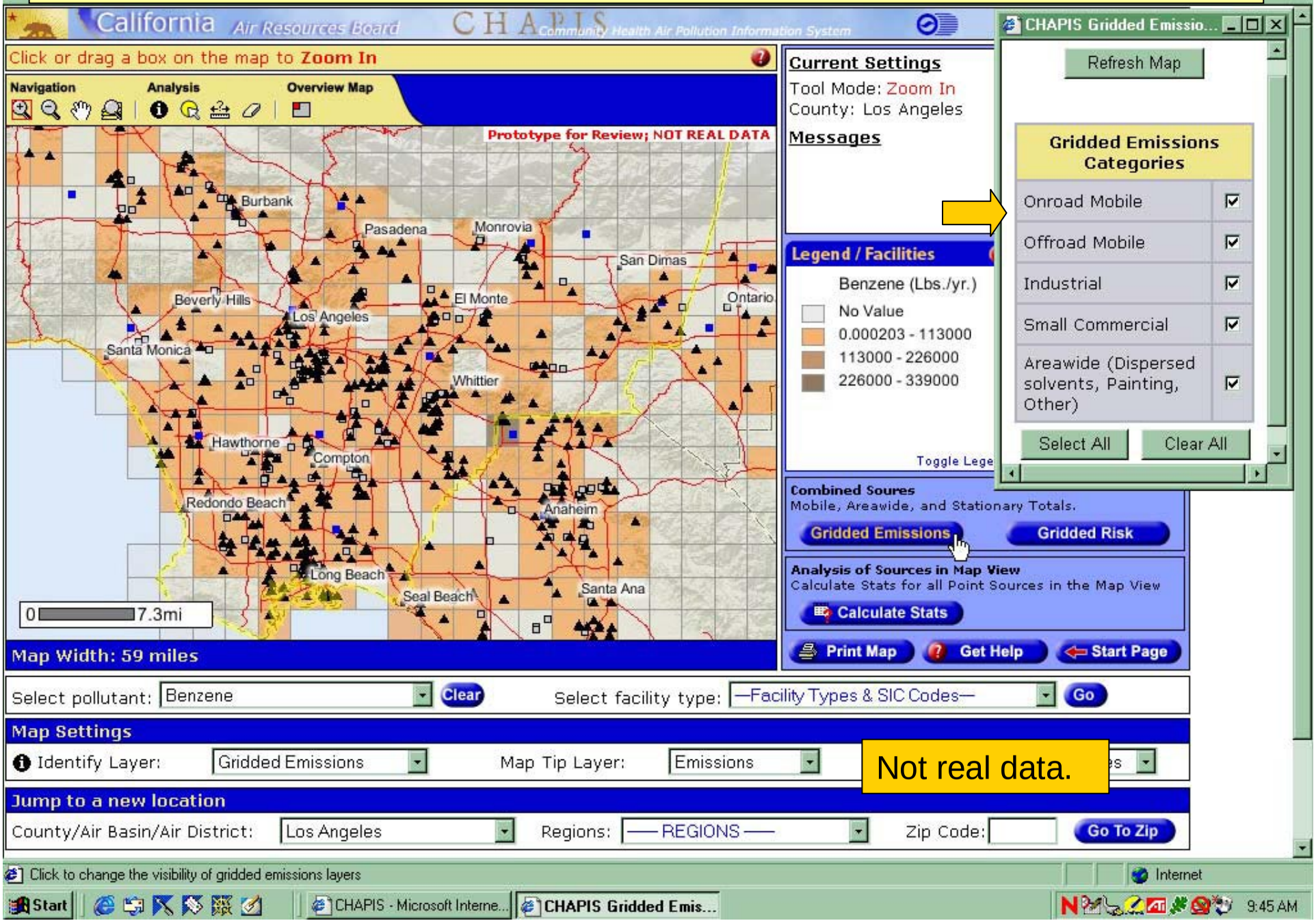


Choose ‘Gridded Emissions’ to See Combined Sources



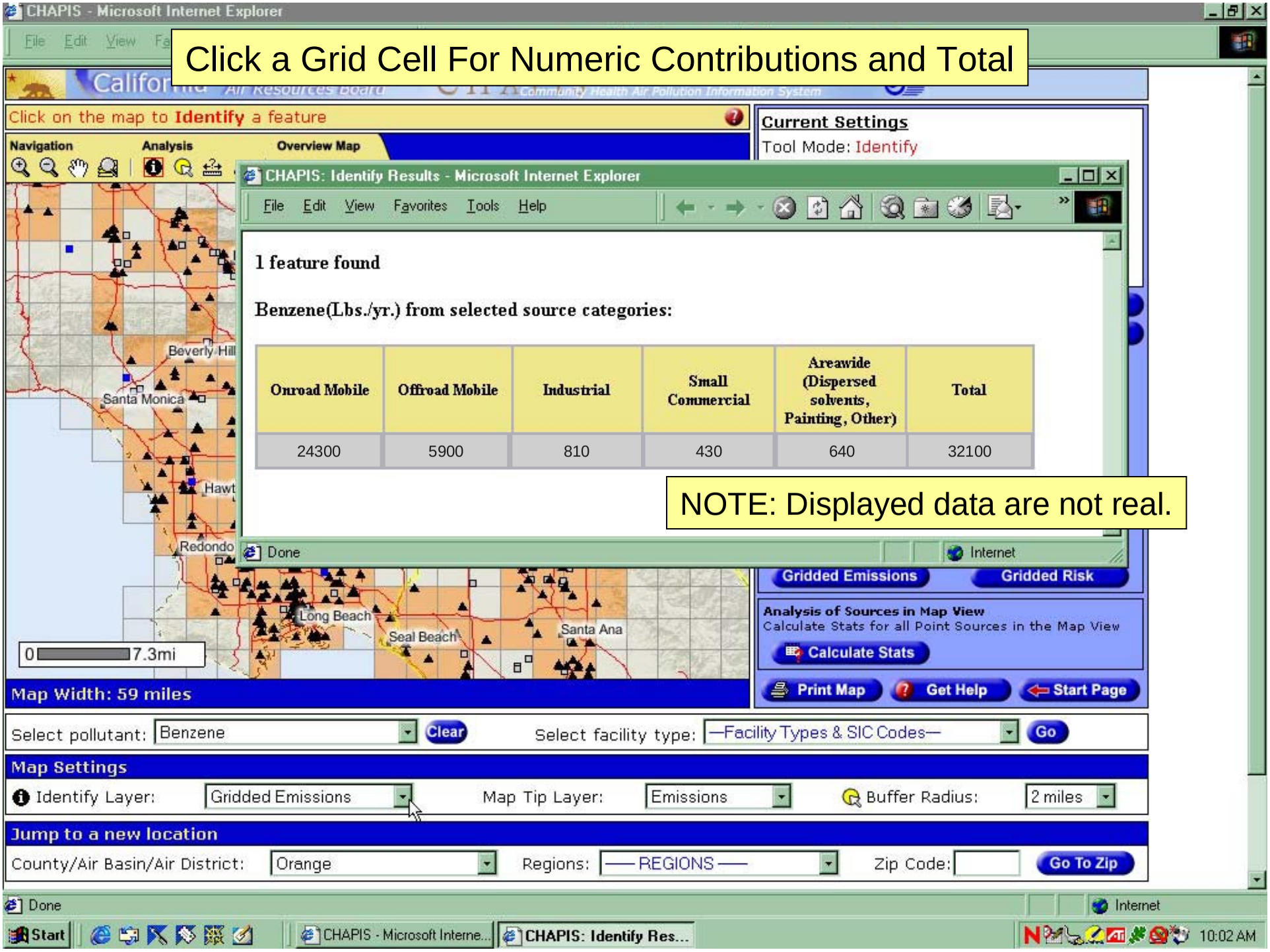
NOTE: Displayed data are not real data.

Gridded Emissions: Combines Mobile, Areawide, & Point Emissions in Cell



Not real data.

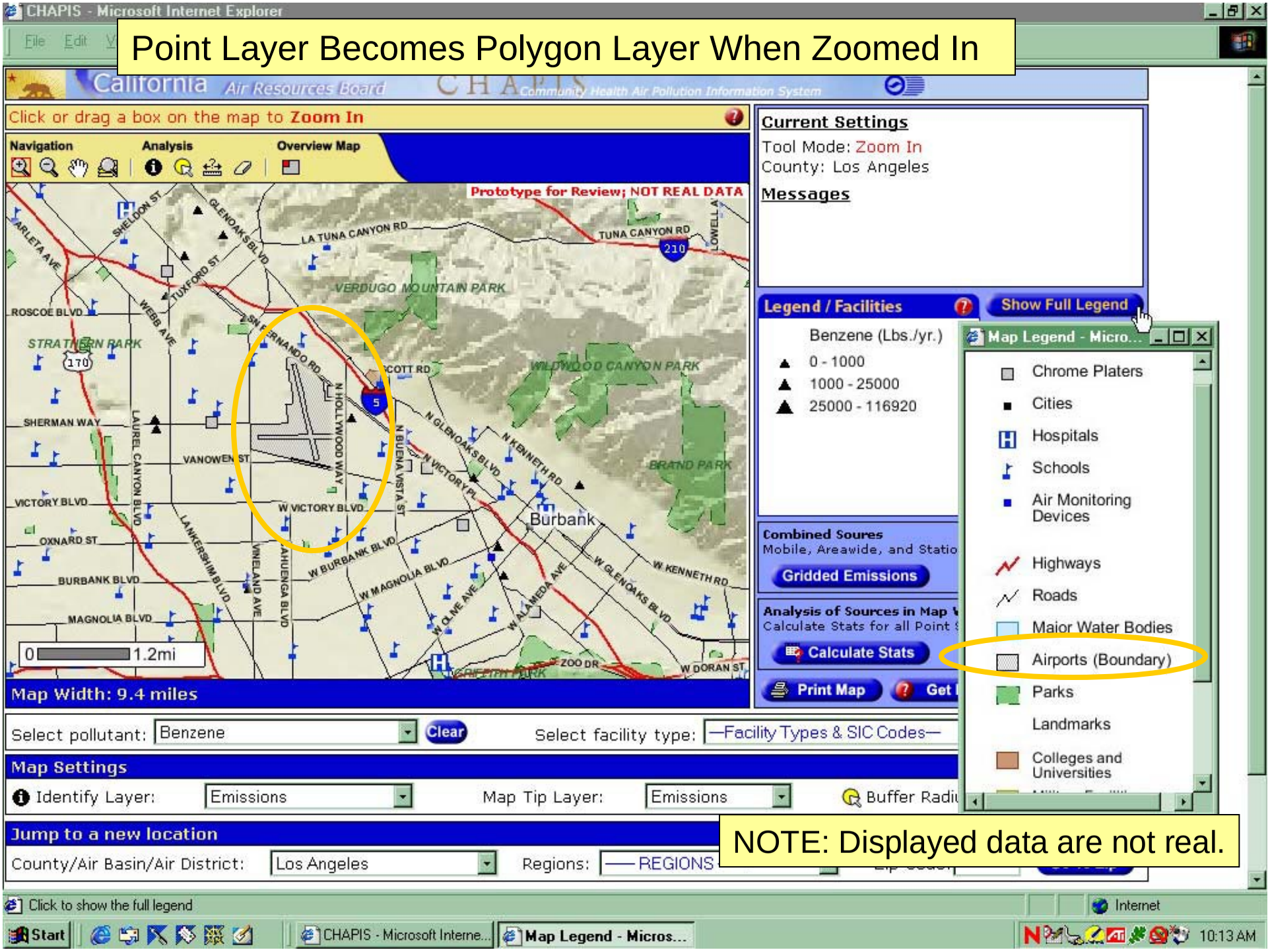
Click a Grid Cell For Numeric Contributions and Total



NOTE: Displayed data are not real.

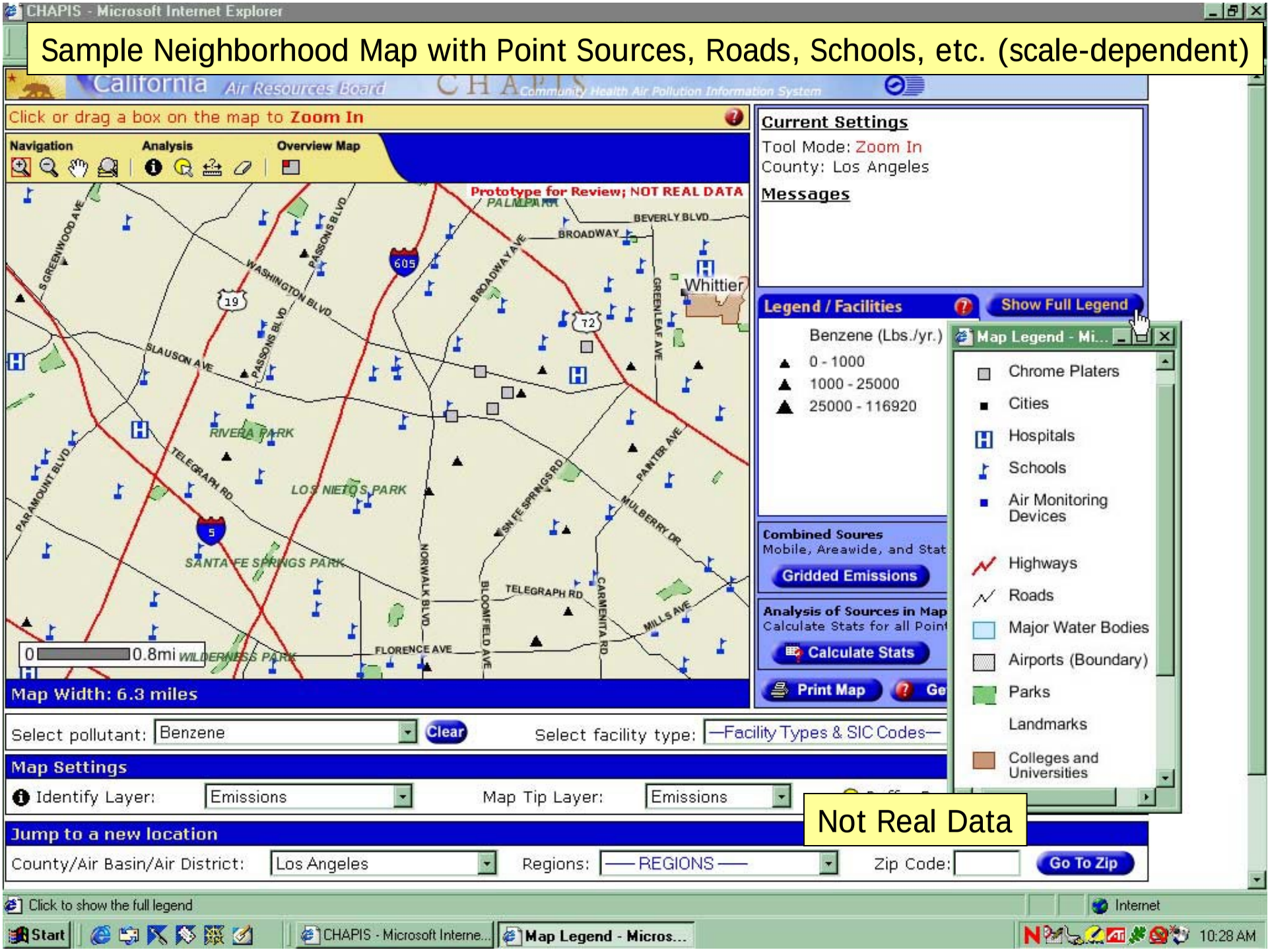
CHAPIS - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Turn off Gridded, Zoom in.
Scale-dependent Layers Appear and/or Change as Zoom In
Navigation
Analysis
Overview Map
San Fernando
Prototype for Review; NOT REAL DATA
Burbank
0 2.1mi
Map Width: 17 miles
Tool Mode: Zoom In
County: Los Angeles
Messages
Legend / Facilities
Show Full Legend
Benzene (Lbs./yr.)
0 - 1000
1000 - 25000
25000 - 116920
Map Legend - Micros...
Chrome Platers
Cities
Airports (Point)
Air Monitoring Devices
Highways
Roads
Major Water Bodies
Counties
Combined Soures
Mobile, Areawide, and Stati
Gridded Emissions
Analysis of Sources in Map
Calculate Stats for all Point
Calculate Stats
Print Map
Select pollutant: Benzene
Clear
Select facility type: —Facility Types & SIC Codes—
Go
Map Settings
Identify Layer: Emissions
Map Tip Layer: Emissions
Buffer Radius: 2 miles
Jump to a new location
County/Air Basin/Air District: Los Angeles
Regions: —— REGIONS
NOTE: Displayed data are not real.
Click to show the full legend
Internet
Start
CHAPIS - Microsoft Interne...
Map Legend - Micros...
10:11 AM

Point Layer Becomes Polygon Layer When Zoomed In



NOTE: Displayed data are not real.

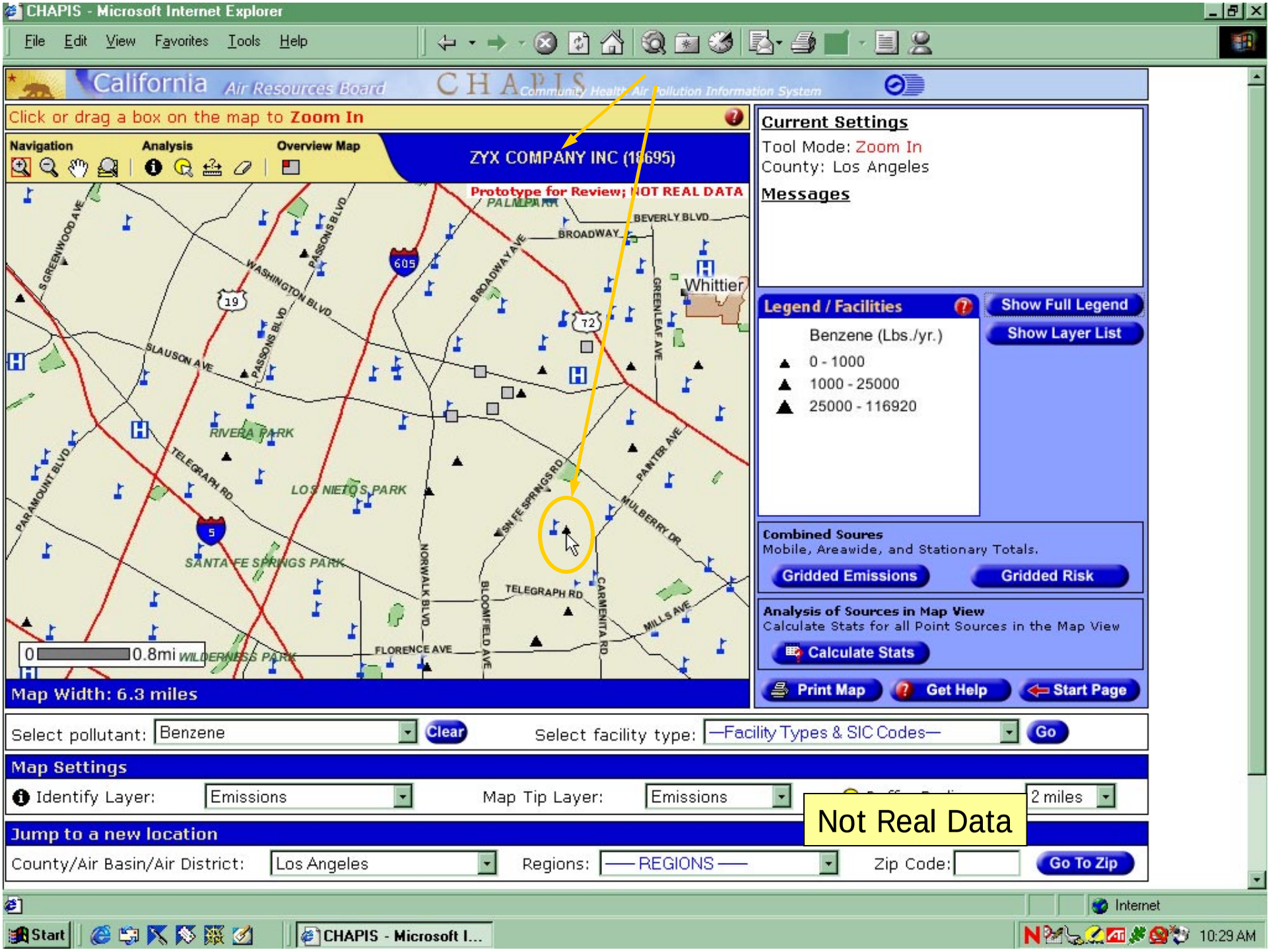
Sample Neighborhood Map with Point Sources, Roads, Schools, etc. (scale-dependent)



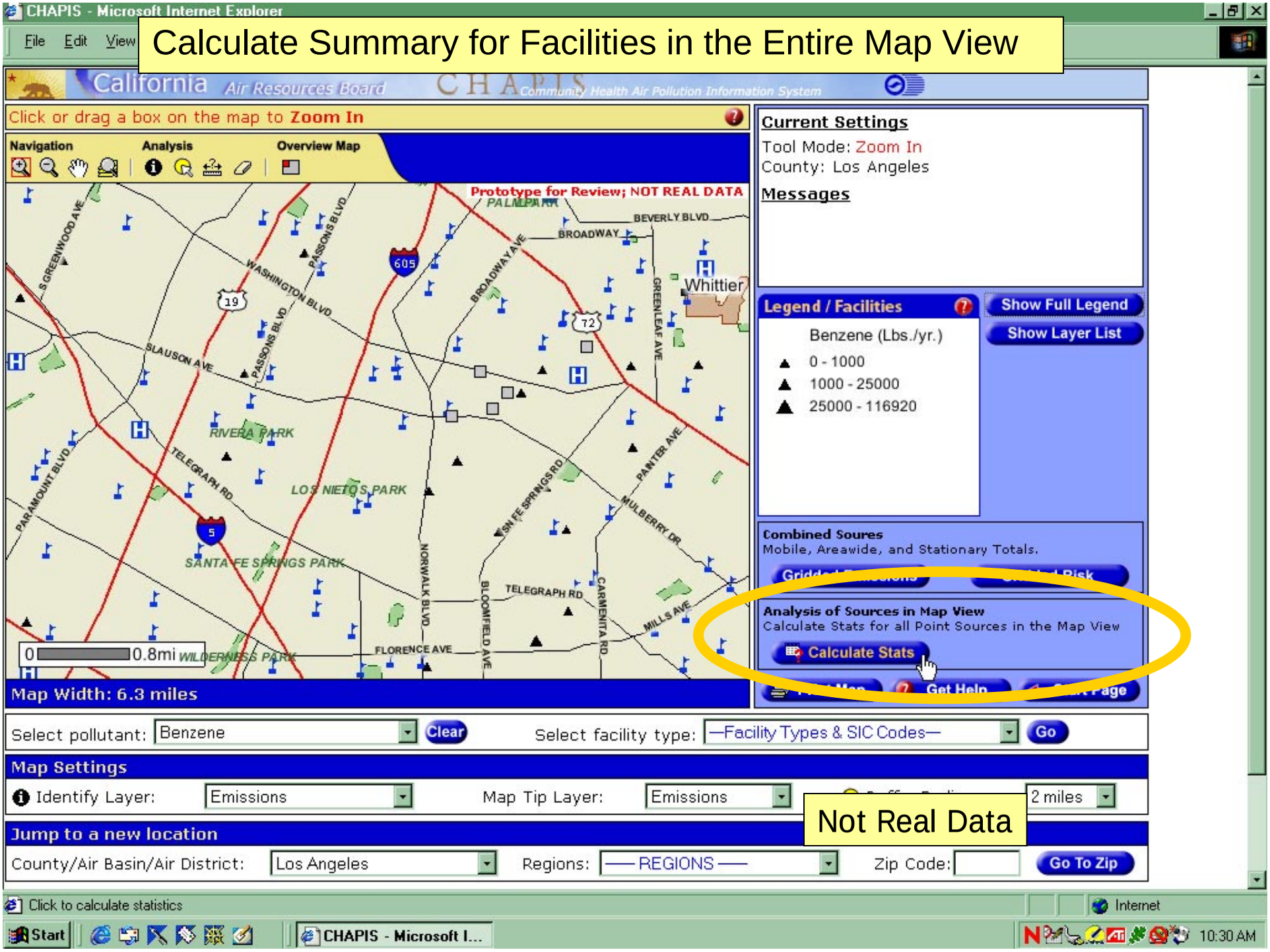
Not Real Data

Hover label tool gives facility name immediately

Not Real Data


CHAPIS - Microsoft Internet Explorer
File Edit View Favorites Tools Help
California Air Resources Board
CHAPIS Community Health Air Pollution Information System
Click or drag a box on the map to Zoom In
Navigation
Analysis
Overview Map
ZYX COMPANY INC (18695)
Prototype for Review; NOT REAL DATA
Whittier
RIVERA PARK
LOS NIETOS PARK
SANTA FE SPRINGS PARK
WILDERNESS PARK
0 0.8mi
Map Width: 6.3 miles
Current Settings
Tool Mode: Zoom In
County: Los Angeles
Messages
Legend / Facilities
Show Full Legend
Show Layer List
Benzene (Lbs./yr.)
0 - 1000
1000 - 25000
25000 - 116920
Combined Soures
Mobile, Areawide, and Stationary Totals.
Gridded Emissions
Gridded Risk
Analysis of Sources in Map View
Calculate Stats for all Point Sources in the Map View
Calculate Stats
Print Map
Get Help
Start Page
Select pollutant: Benzene
Clear
Select facility type: —Facility Types & SIC Codes—
Go
Map Settings
Identify Layer: Emissions
Map Tip Layer: Emissions
2 miles
Jump to a new location
County/Air Basin/Air District: Los Angeles
Regions: —— REGIONS ——
Zip Code:
Go To Zip
Not Real Data
Internet
Start
CHAPIS - Microsoft I...
10:29 AM

Calculate Summary for Facilities in the Entire Map View



Not Real Data

Summary List and Total for Facilities in the Map View

CHAPIS: Calculate Statistics Results - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History

22 Benzene industrial (point) emissions sources found

Maximum Value: 3700 Lbs./yr.
Average Value: 252 Lbs./yr.
Total Emissions: 5550 Lbs./yr.

Note: Data and summary statistics in this table are for point (industrial) sources only.
Use the "Gridded Emissions" option to see additional types of sources.

Facil ID	Company	Address	Benzene (Lbs./yr)	SIC Code
3240788	ABC COMPANY INC	200000 A ST SANTA FE SPRINGS, CA 90670	3700	13 - Oil and Gas Extraction
8748	XYZ COMPANY INC	300000 B ST PICO RIVERA, CA 90660	788	37 - Transportation Equipment
2289688	EFG COMPANY INC	4000000 Q ST PICO RIVERA, CA 90660	746	37 - Transportation Equipment
46500	IJK COMPANY INC	2000000 J ST SANTA FE SPRINGS, CA 90670	160	13 - Oil and Gas Extraction
24488	GGG COMPANY INC	600000 G ST SANTA FE SPRINGS, CA 93003	64.9	13 - Oil and Gas Extraction
23419	POR COMPANY INC	1000000 F ST PICO RIVERA, CA 90660	32	49 - Electric,Gas,Sanitary Services
23351	CCC COMPANY INC	400000 C ST LOS ANGELES, CA 90040	2	llied Products
19251	LMN COMPANY INC	5000000 T ST WHITTIER, CA 90601	23.5	34 - Fabricated Metal Products
18695	ZYX COMPANY INC	3000000 Z ST	6.57	32 - Stone,Clay,and Glass Products

Not real data.

http://www.arb.ca.gov/app/emsinv/facinfo/facdet.php?co_=19&ab_=SC&facid_=3240788&dis_=SC&dbyr=1996

Jump to a new location

County/Air Basin/Air District: Los Angeles Regions: —REGIONS— Zip Code: Go To Zip

Start CHAPIS - Microsoft Interne... CHAPIS: Calculate St... 4:41 PM

Link to Existing Database Query Tools for Facility Data

CHAPIS v1 (Preliminary Release b; 05/28/02) - Microsoft Internet Explorer

Facility Detail

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History

Facility Information

Facility Name :	ABC COMPANY INC.	District :	SOUTH COAST AQMD
Street :	10735 S SHOEMAKER AVE		
City :	SANTA FE SPRINGS	Zip :	90670
Contact Person :	ENVIRONMENTAL ENG	Phone :	(310) 903-2725
Facility SIC :	1311		

Mailing address

Company Name :	ABC COMPANY INC.				
Address :	10735 SOUTH SHOEMAKER AVENUE				
City :	SANTA FE SPRINGS	St :	CA	Zip :	90670

For most recent data, please contact the Air District

[Start a new query] [Prioritization & Risk]

	Pollutant	Emissions	Unit
Data from 1996	TOG	21.8	Tons/Yr
	ROG	13.9	Tons/Yr
TOXIC DATA MAY COME FROM VARIOUS YEARS			
	Ammonia	587.4	Lbs/Yr
	Benzene	3702.4	Lbs/Yr
	Naphthalene	2398.4	Lbs/Yr

Not real data.

Internet

Done

Start CHAPIS v1 (Preliminary Re... Facility Detail Selecti... 5:15 PM

Link to Reported Risk Assessment if Available

CHAPIS v1 (Preliminary Release b; 05/28/02) - Microsoft Internet Explorer

Facility Detail Ri

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History

Facility Risk Information

Facility Name : ABC COMPANY INC.

District : SOUTH COAST AQMD

Street : 10735 S SHOEMAKER AVE

City : SANTA FE SPRINGS

Zip : 90670

For most recent data, please contact the Air District

[Start a new query]

Not real data

Facility Health Risk and Score Data

Facility Prioritization Score	Inventory Year	Value	District Prioritization Threshold High	Low
Cancer	1991	182.53	10	1
Non-Cancer Chronic	1991	6.92	10	1
Non-Cancer Acute	1991	1.07	10	1

Health Risk Assessment	Inventory Year	Value	District Notification Level	District RRAP Level
Cancer Risk	1991	.79	>=10	>100
Non-Cancer Chronic Hazard Index	1991	.04	>1; lead THI >.5	>5
Non-Cancer Acute Hazard Index	1991	.01	>1; lead THI >.5	>5

Internet

Done

Internet

Start CHAPIS v1 (Preliminary Re... Facility Detail Risk S... 5:16 PM

Special Features of the Calculate Statistics Function

A. If No Pollutant Selected, Calc Stat Gives Summary for All Chemicals

59 industrial (point) emissions sources found

Pollutant	Units	Total	Average	Maximum	Cancer-Potency Weighted Pounds
Ammonia	Lbs./yr.	18400	311	7910	N/A
Arsenic (Inorganic) Compounds	Lbs./yr.	0.00667	0.000113	0.00667	136
Asbestos and Related Fibers	Lbs./yr.	0	0	0	0
Benzene	Lbs./yr.	76.8	1.3	30.6	13100
Beryllium Compounds	Lbs./yr.	0.000301	0.00000509	0.0003	4.29
1,3-Butadiene	Lbs./yr.	0	0	0	0
Cadmium Compounds	Lbs./yr.	0.00232	0.0000393	0.00227	59.2
Carbon Tetrachloride	Lbs./yr.	0	0	0	0
Carbonyl Sulfide	Lbs./yr.	0.61	0.0103	0.61	N/A
Chloroform	Lbs./yr.	26.2	0.444	26.2	846
Chromium+6 Compounds	Lbs./yr.	1.43	0.0242	0.928	1240000
1,2-Dibromoethane (EDB)	Lbs./yr.	0	0	0	0
p-Dichlorobenzene	Lbs./yr.	0	0	0	0

NOTE: Displayed data are not real.

http://www.arb.ca.gov/toxics/tac/factshts/benzene.pdf - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Close

BENZENE

Identified as a toxic air contaminant under California's air toxics program (AB 1807) in 1984.

CAS Registry Number: 71-43-2

Molecular Formula: C_6H_6

Benzene is a clear, colorless, volatile, highly flammable liquid with a characteristic sickly, sweet odor. It is chemically characterized by six carbon atoms linked in a planar symmetrical hexagon (equal C-C bond lengths) with each carbon atom attached to a hydrogen atom. The electronic structure of that geometry makes benzene unusually stable. It does react with other compounds mainly by the substitution of a hydrogen atom (U.S. EPA, 1993b). Benzene is soluble in water and miscible with alcohol, chloroform, ether, carbon disulfide, carbon tetrachloride, glacial acetic acid, acetone, and oils (Merck, 1989).

Physical Properties of Benzene

Synonyms: benzol; benzole; bicarburet of hydrogen; pyrobenzol; cyclohexatriene; annulene; coal naphtha; phene; phenyl hydride

Molecular Weight:	78.11
Boiling Point:	80.1 °C
Melting Point:	5.5 °C
Flash Point:	-11.1 °C (closed cup)
Vapor Pressure:	100 mm Hg at 26.1 °C
Vapor Density:	2.7 (air = 1)
Density/Specific Gravity:	0.8787 at 15/4 °C
Henry's Law Constant, water:	0.0055 atm-m^3/mole at 25 °C
Log Octanol/Water Partition Coefficient:	2.13
Conversion Factor:	1 ppm = 3.19 mg/m^3

(Howard, 1990; HSDB, 1995; Merck, 1989; Sax, 1989; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

The predominant sources of total benzene emissions in the atmosphere are gasoline fugitive emissions and gasoline motor vehicle exhaust. Mobile sources contribute 85 percent and

106% 1 of 6 8.5 x 11 in
Start CHAPIS - Microsoft Interne... CHAPIS: Calculate Statisti... http://www.arb.ca.go... 11:08 AM

CHAPIS - Microsoft Internet Explorer

CHAPIS: Calculate Statistics Results - Microsoft Internet Explorer

59 industrial (point) emissions sources found

Pollutant	Units	Total	Average	Maximum	Cancer-Potency Weighted Pounds
Ammonia	Lbs./yr.	18400	311	7910	N/A
Arsenic (Inorganic) Compounds	Lbs./yr.	0.00667	0.000113	0.00667	136
Asbestos and Related Fibers	Lbs./yr.	0	0	0	0
Benzene	Lbs./yr.	76.8	1.3	30.6	13100
Beryllium Compounds	Lbs./yr.	0.000301	0.00000509	0.0003	4.29
1,3-Butadiene	Lbs./yr.	0	0	0	0
Cadmium Compounds	Lbs./yr.	0.00232	0.0000393	0.00227	59.2
Carbon Tetrachloride	Lbs./yr.	0	0	0	0
Carbonyl Sulfide	Lbs./yr.	0.61	0.0103	0.61	N/A
Chloroform	Lbs./yr.	26.2	0.444	26.2	846
Chromium+6 Compounds	Lbs./yr.	1.43	0.0242	0.928	1240000
1,2-Dibromoethane (EDB)	Lbs./yr.	0	0	0	0
p-Dichlorobenzene	Lbs./yr.	0	0	0	0

NOTE: Displayed data are not real.

On-Line Help and Explanation of Terms

Help Home - Microsoft Internet Explorer

File Edit View Favorites Tools

Cancer Potency Weighted Pounds

Potn-Wtd Lbs = Emissions of Pollutant (in lbs) x Cancer Potency Weight Index for that Pollutant x 1700.

(The 1700 is a "normalization constant" derived using health- conservative modeling assumptions to create a "score" scale where a resultant "score" of "~10 or more" starts to be potentially important from a public health perspective).

Criteria Air Pollutant

The staff at the California Air Resources Board compiles data to create the criteria pollutant emission inventory which includes information on the emissions of reactive organic gases (ROG), oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), and particulate matter (PM10).

Dispersed Sources of Emissions (Area-wide sources)

Area-wide sources include widely dispersed sources such as the use of consumer products (hairspray, home automotive products, home cleaners, etc.) and other dispersed solvent uses, such as painting (sometimes referred to as architectural coating). Area-wide emission sources are generally estimated at a county-level of resolution, then spatially aggregated to smaller areas using spatial allocation factors that are based on a surrogate, such as the distribution of population used to allocate consumer product usage.

Emission Inventory

The California Air Resources Board has collected information on emissions from air pollution sources since 1969. This information is periodically compiled by State and local air pollution control agencies to create an emission inventory; an important building block in the development of the State's air pollution control program.

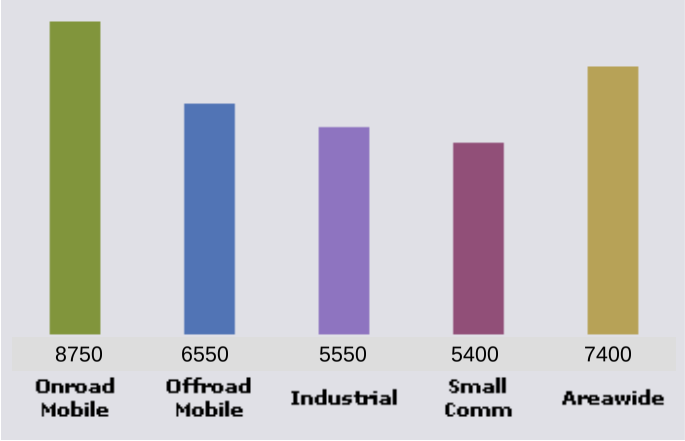
The emission inventory includes information on the emissions of criteria and toxic air pollutants. Criteria pollutants include reactive organic gases (ROG), oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), and particulate matter (PM10). Toxic data available within CHAPIS were collected in response to Assembly Bill (AB) 2588 (Connelly), the Air Toxics "Hot Spots" Information and Assessment Act. Criteria and toxic data are gathered on an ongoing basis and stored in the California Emission Inventory Development and Reporting System (CEIDARS).

Mobile Sources of Emissions

Start | CHAPIS - Microsoft Interne... | CHAPIS: Calculate Statisti... | Help Home - Microsof... | 11:09 AM

B. Developing Calculate Stat Feature for Combined Sources

Combined Sources Within Map View:



22 Benzene industrial (point) emissions sources found

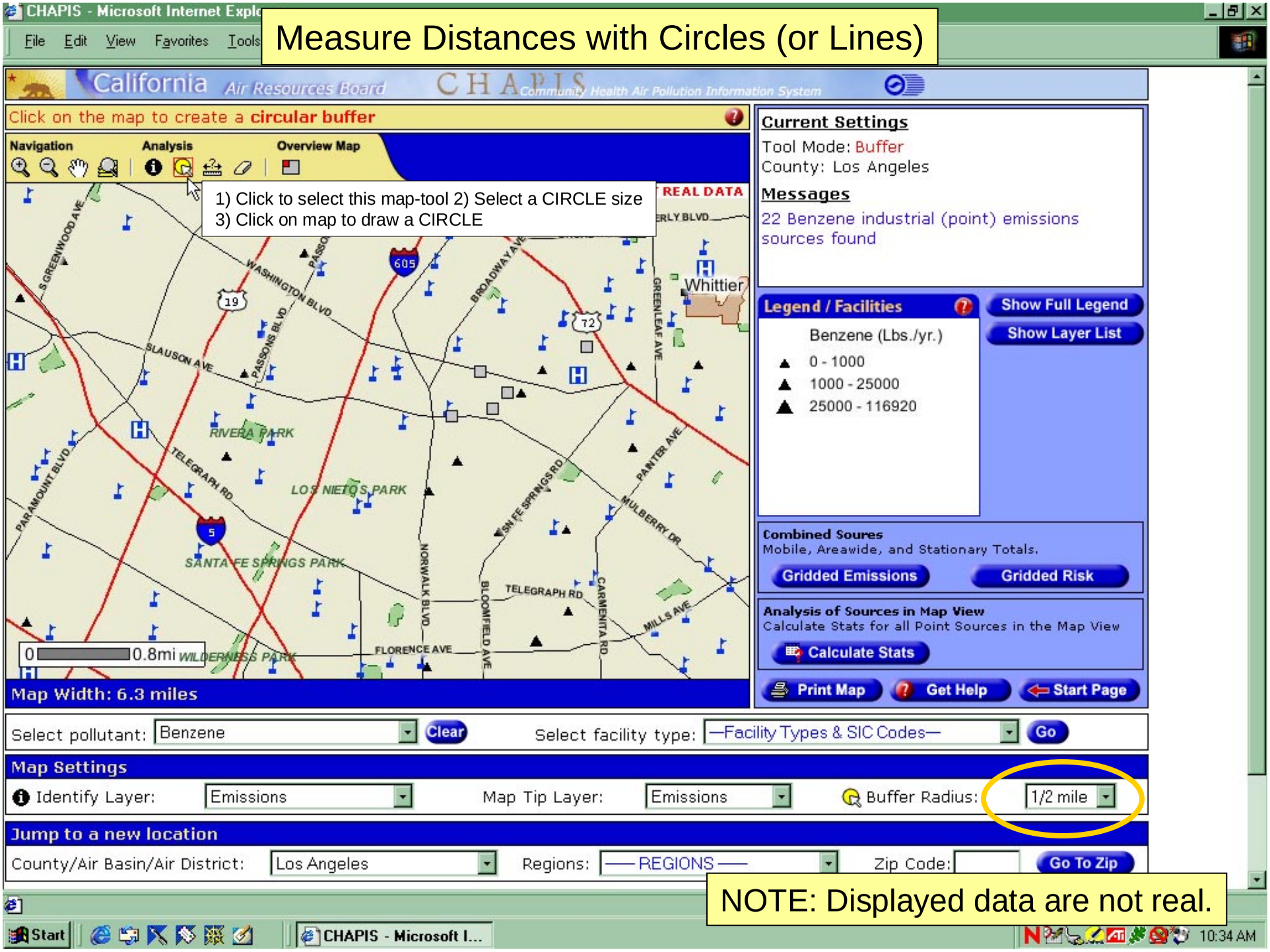
Maximum Value: 3700 Lbs./yr.
Average Value: 252 Lbs./yr.
Total Emissions: 5550 Lbs./yr.

Note: Data and summary statistics in this table are for point (industrial) sources only.

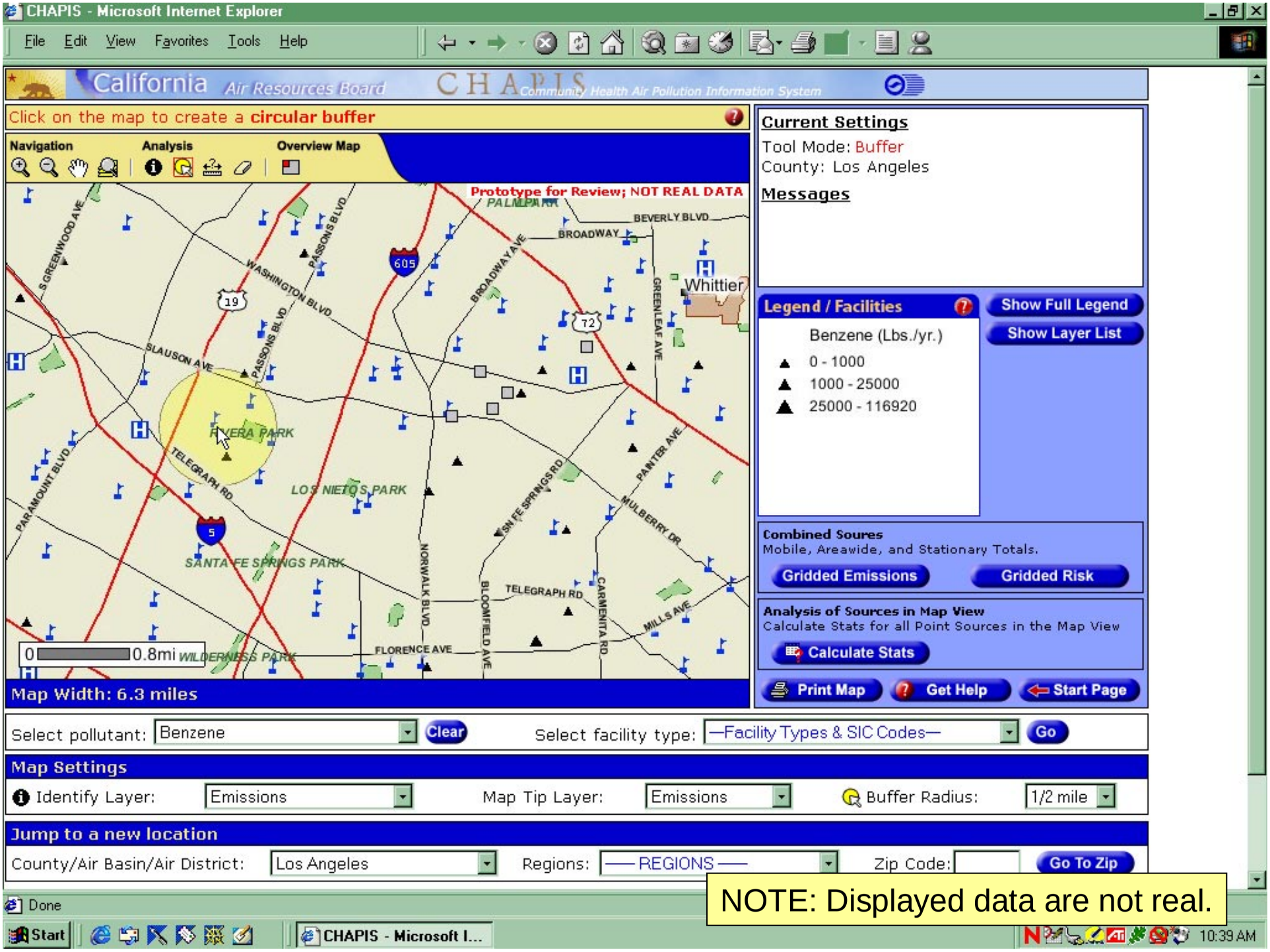
Facil ID	Company	Address	Benzene (Lbs./yr)	SIC Code
3240788	ABC COMPANY INC	200000 A ST SANTA FE SPRINGS, CA 90670	3700	13 - Oil and Gas Extraction
8748	XYZ COMPANY INC	300000 B ST PICO RIVERA, CA 90660	788	37 - Transportation Equipment
2289688	EFG COMPANY INC	4000000 Q ST PICO RIVERA, CA 90660	746	37 - Transportation Equipment
46500	IJK COMPANY INC	2000000 J ST SANTA FE SPRINGS, CA 90670		s Extraction
24488	GGG COMPANY INC	600000 G ST SANTA FE SPRINGS, CA 93003	64.9	13 - Oil and Gas Extraction

Not real data.

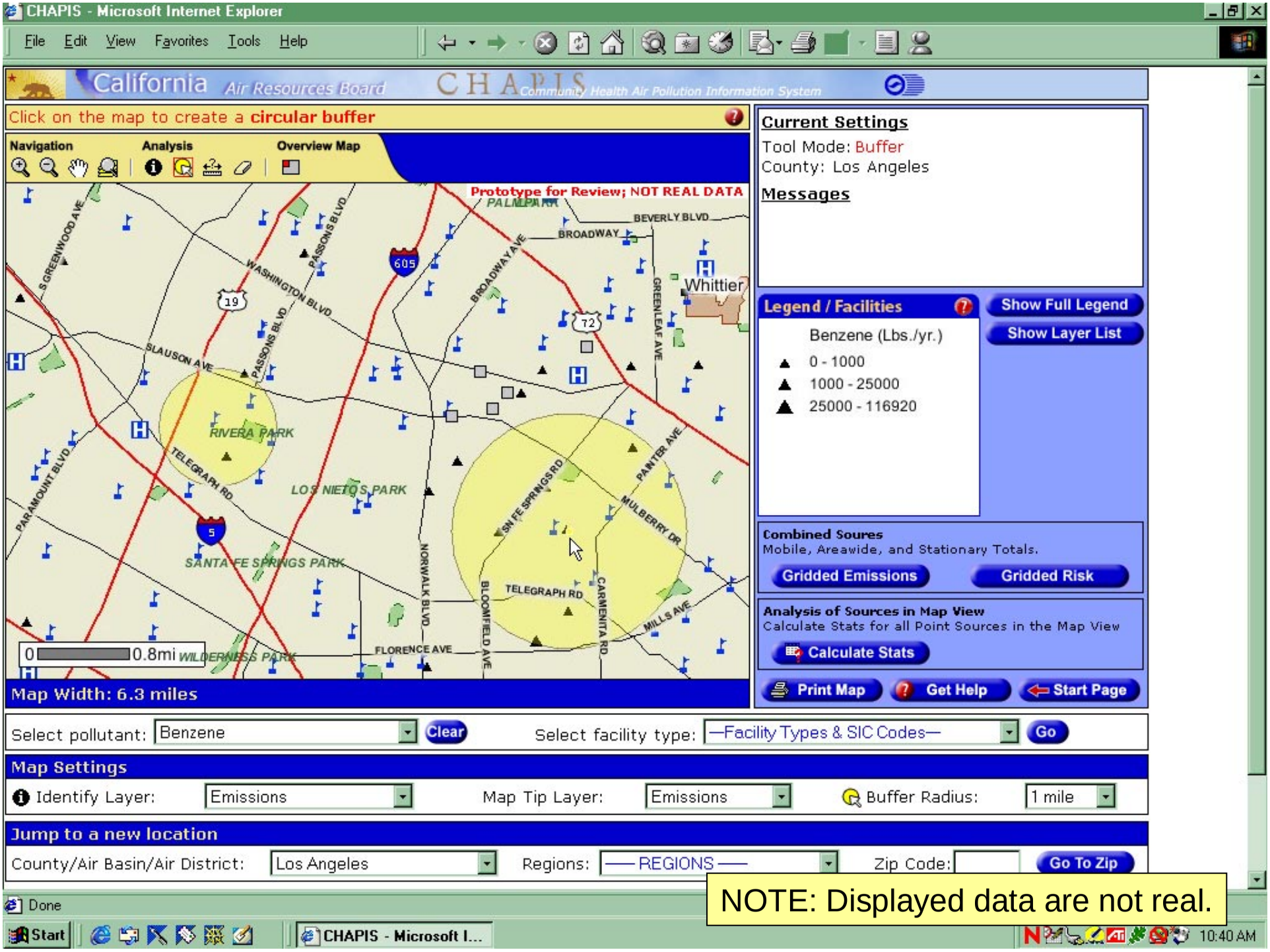
Measure Distances with Circles (or Lines)



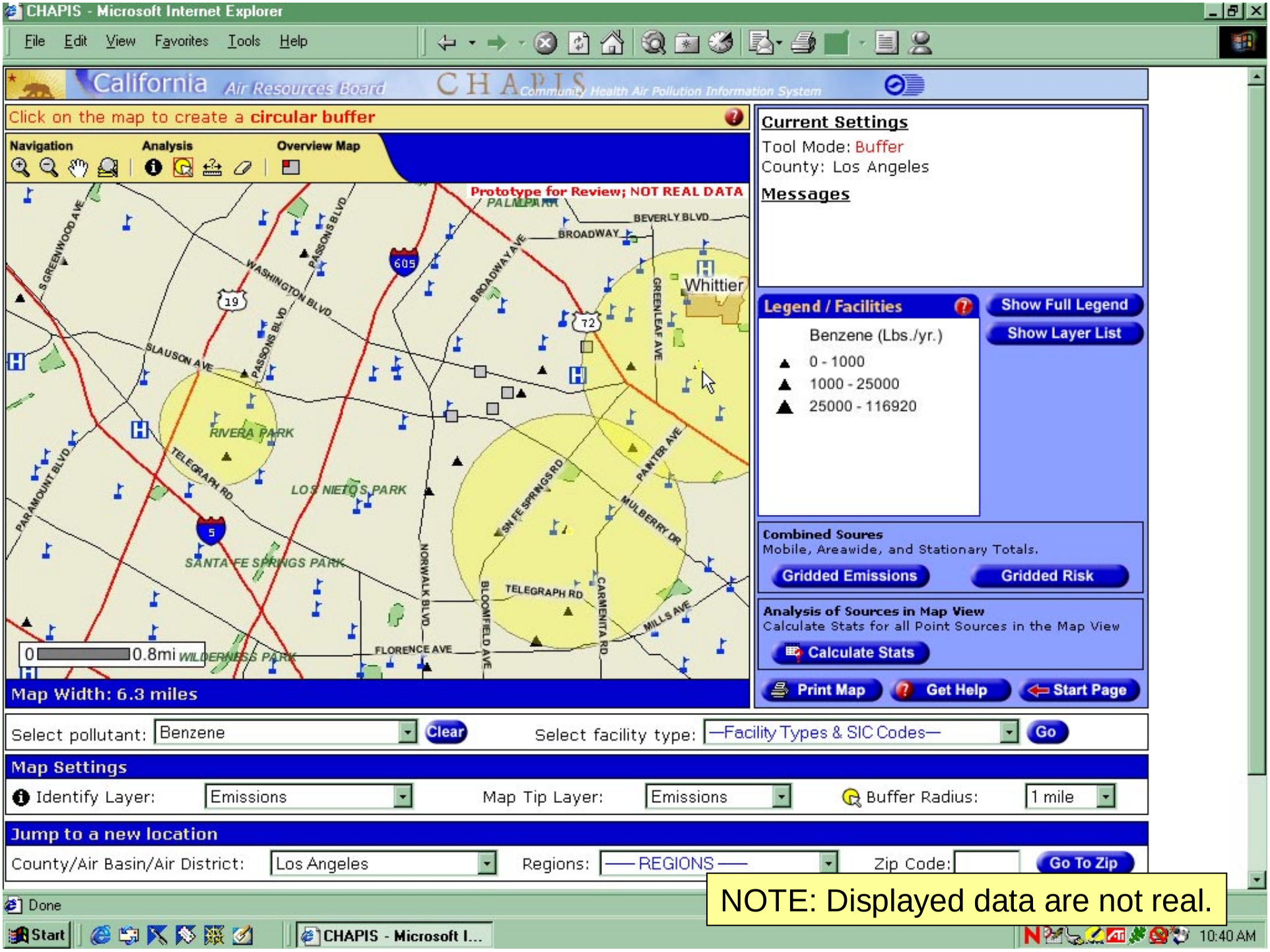
NOTE: Displayed data are not real.



NOTE: Displayed data are not real.

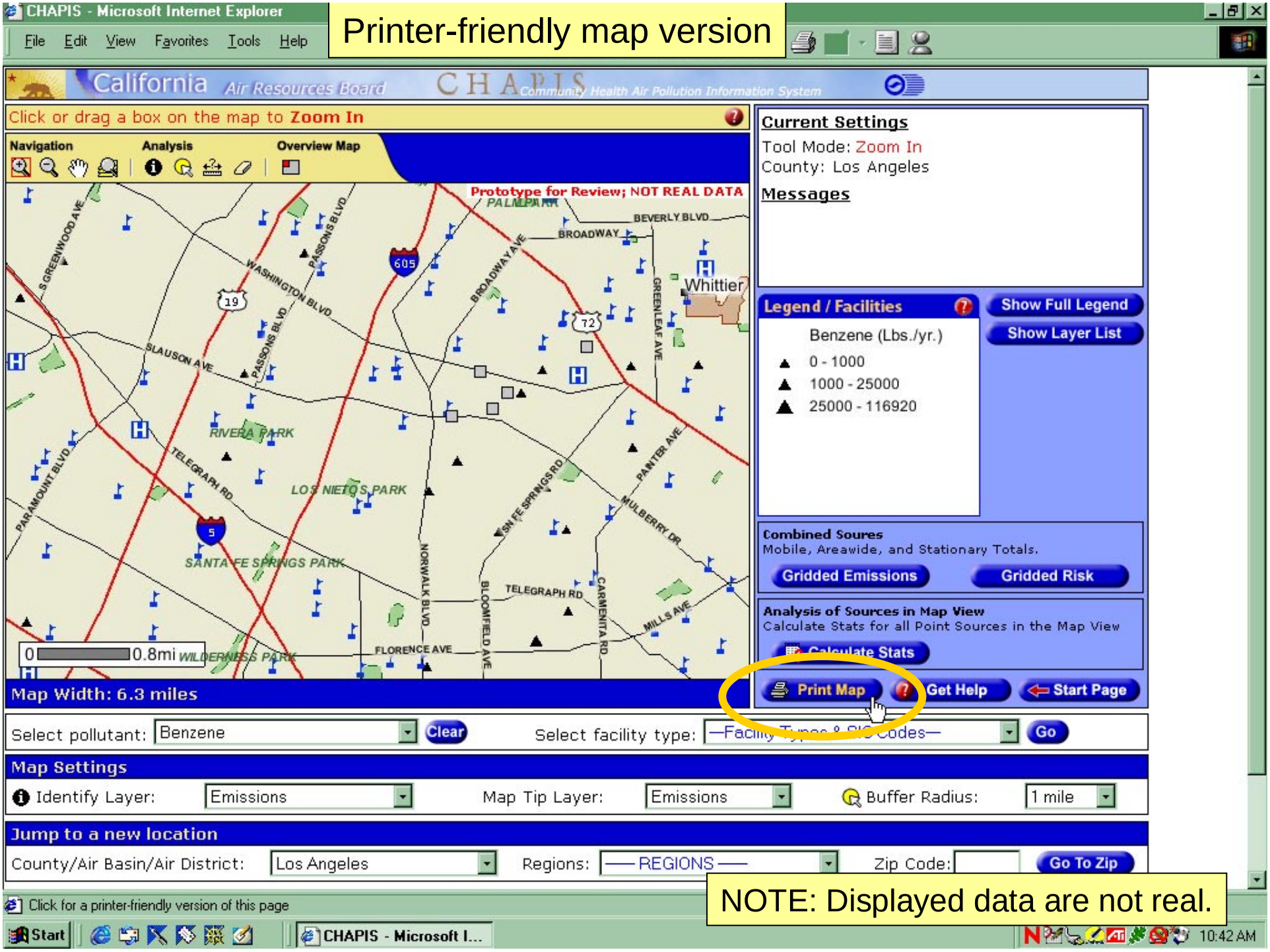


NOTE: Displayed data are not real.



NOTE: Displayed data are not real.

Printer-friendly map version



NOTE: Displayed data are not real.

Print Preview Page - Microsoft Internet Exp

File Edit View Favorites Tools Help

Printer-friendly map version

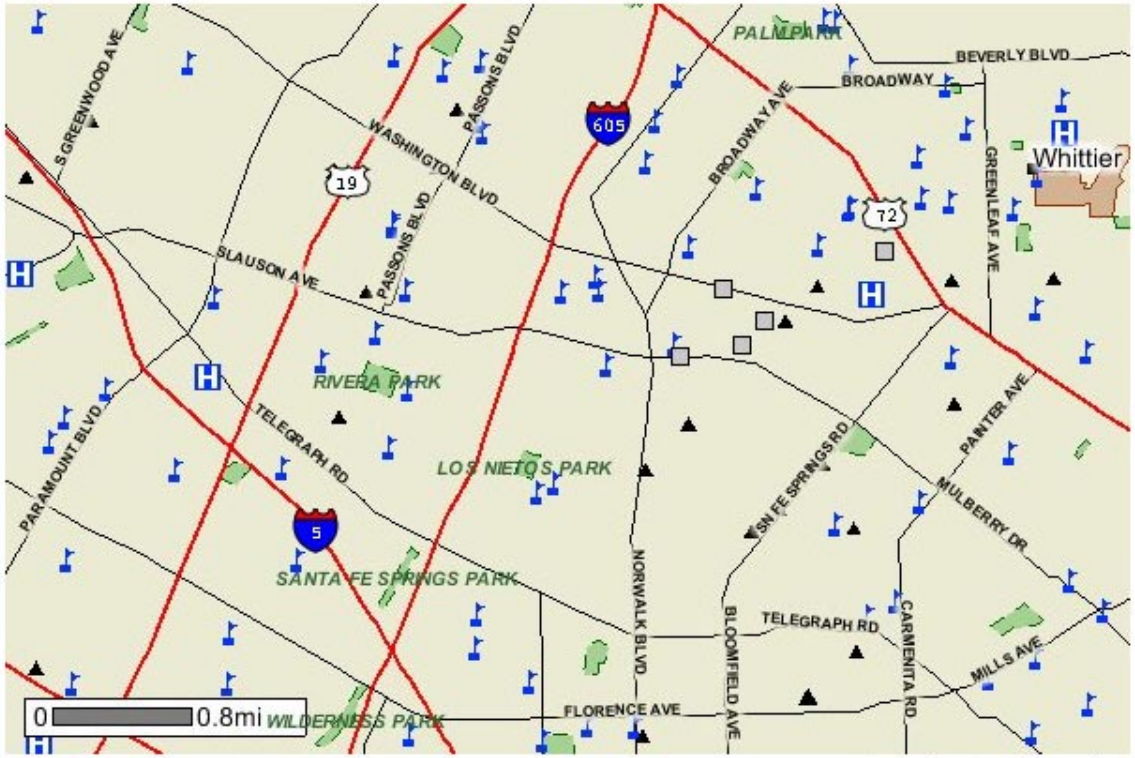
California Air Resources Board CHAPIS Community Health Air Pollution Information System

Benzene (Lbs./yr.)

- 0 - 1000
- 1000 - 25000
- 25000 - 116920

- Chrome Platers
- Cities
- Hospitals
- Schools
- Air Monitoring Devices
- Highways
- Roads
- Major Water Bodies
- Airports (Boundary)
- Parks
- Landmarks
- Colleges and Universities
- Military Facilities
- Sports Facilities
- Theme Parks
- Counties

My CHAPIS Map Title



County: Los Angeles

Selected Pollutant: Benzene

Data Source: ARB/PTSD

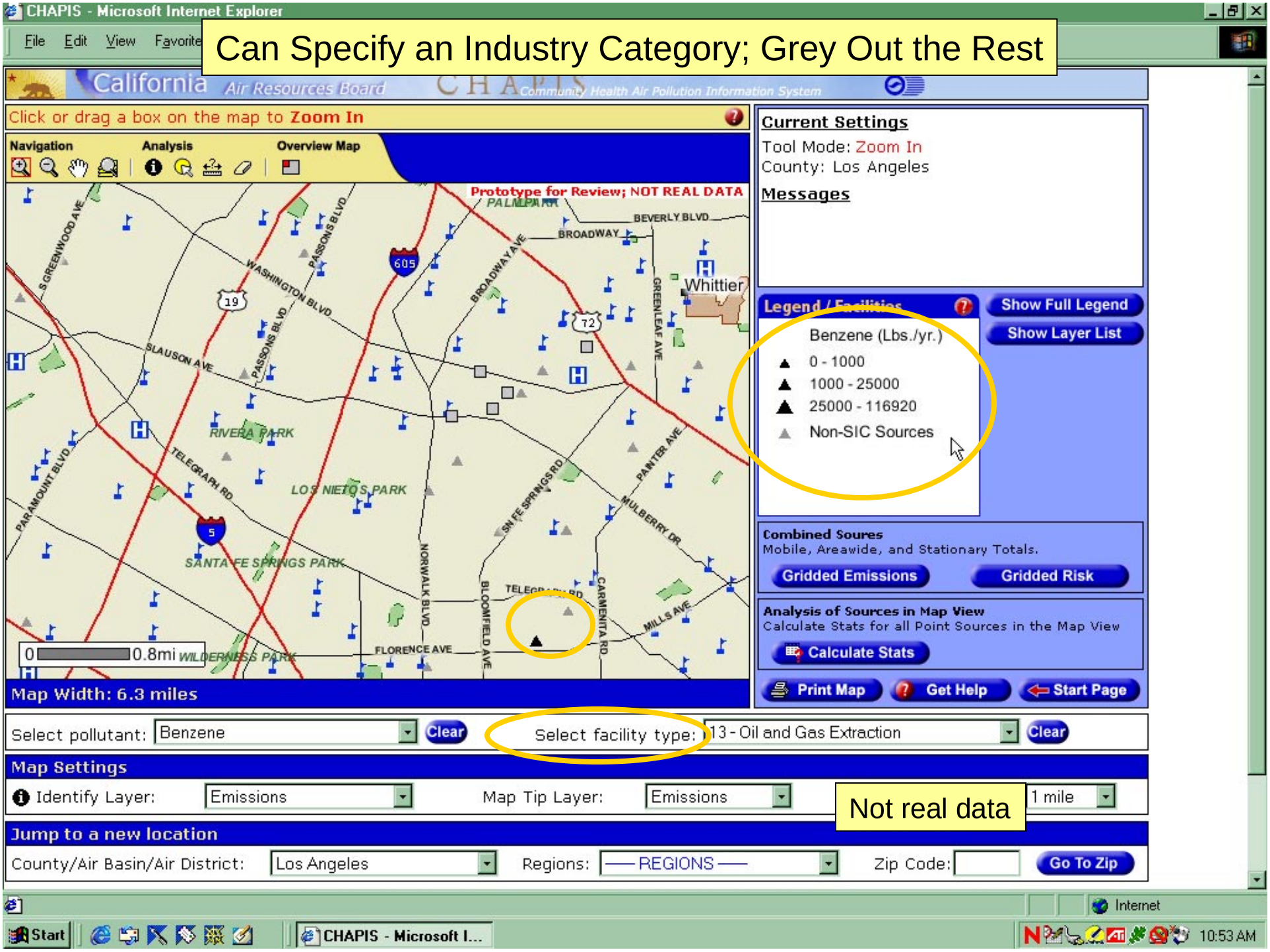
Print Date: 4/15/2003 10:19

NOTE: Displayed data are not real.

Done

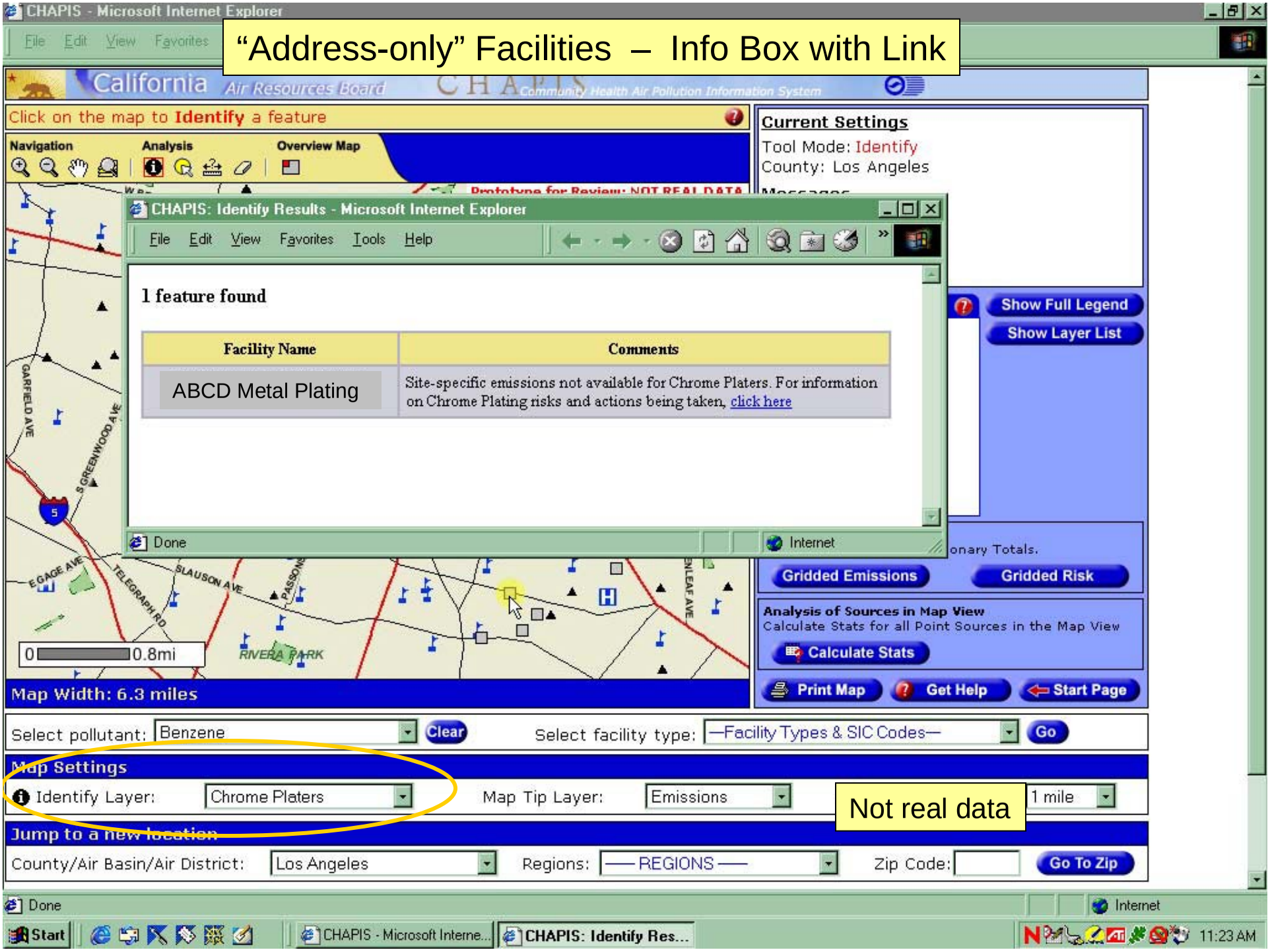
Start CHAPIS - Microsoft Interne... Print Preview Page - ... 10:44 AM

Can Specify an Industry Category; Grey Out the Rest

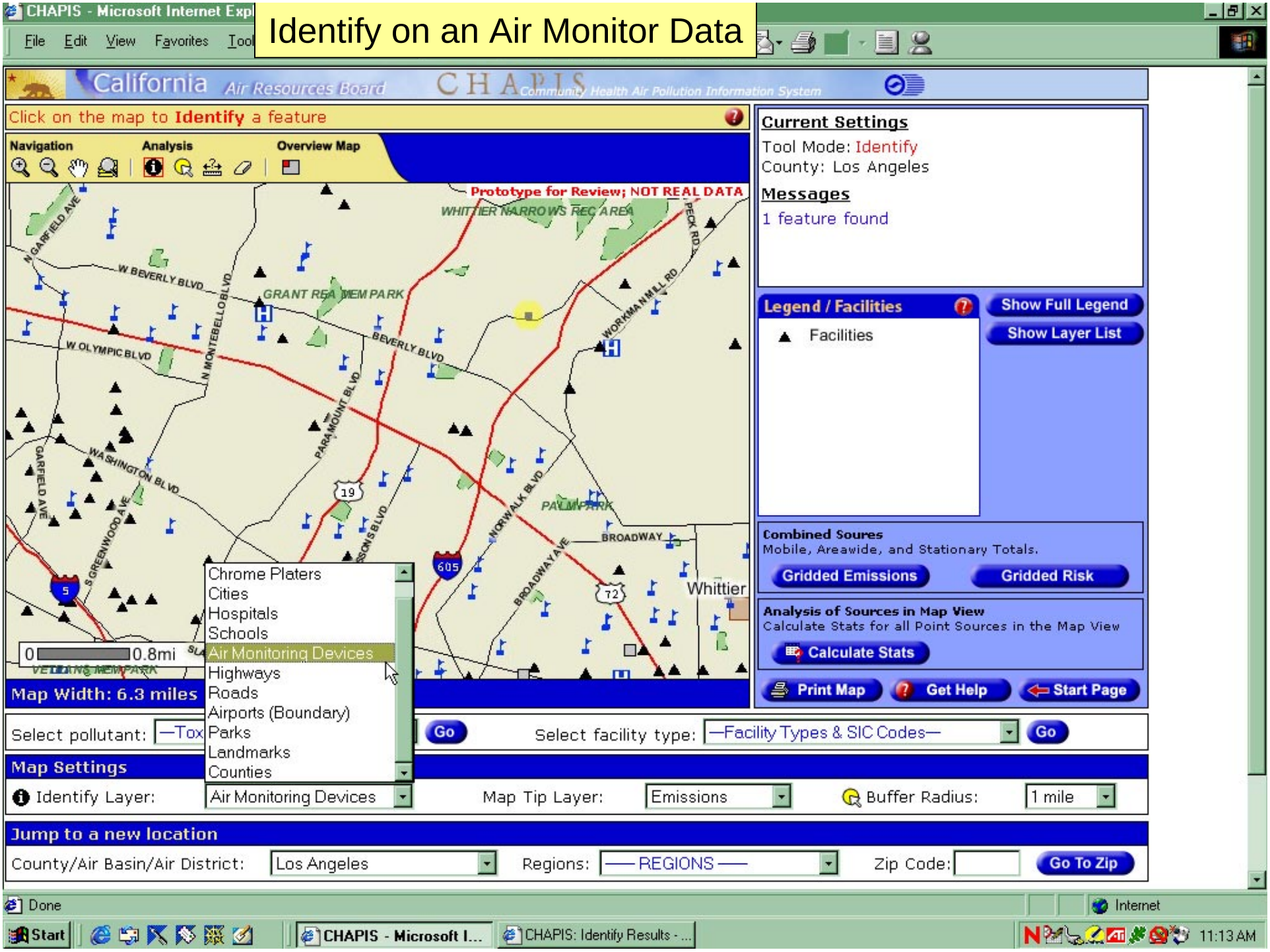


Not real data

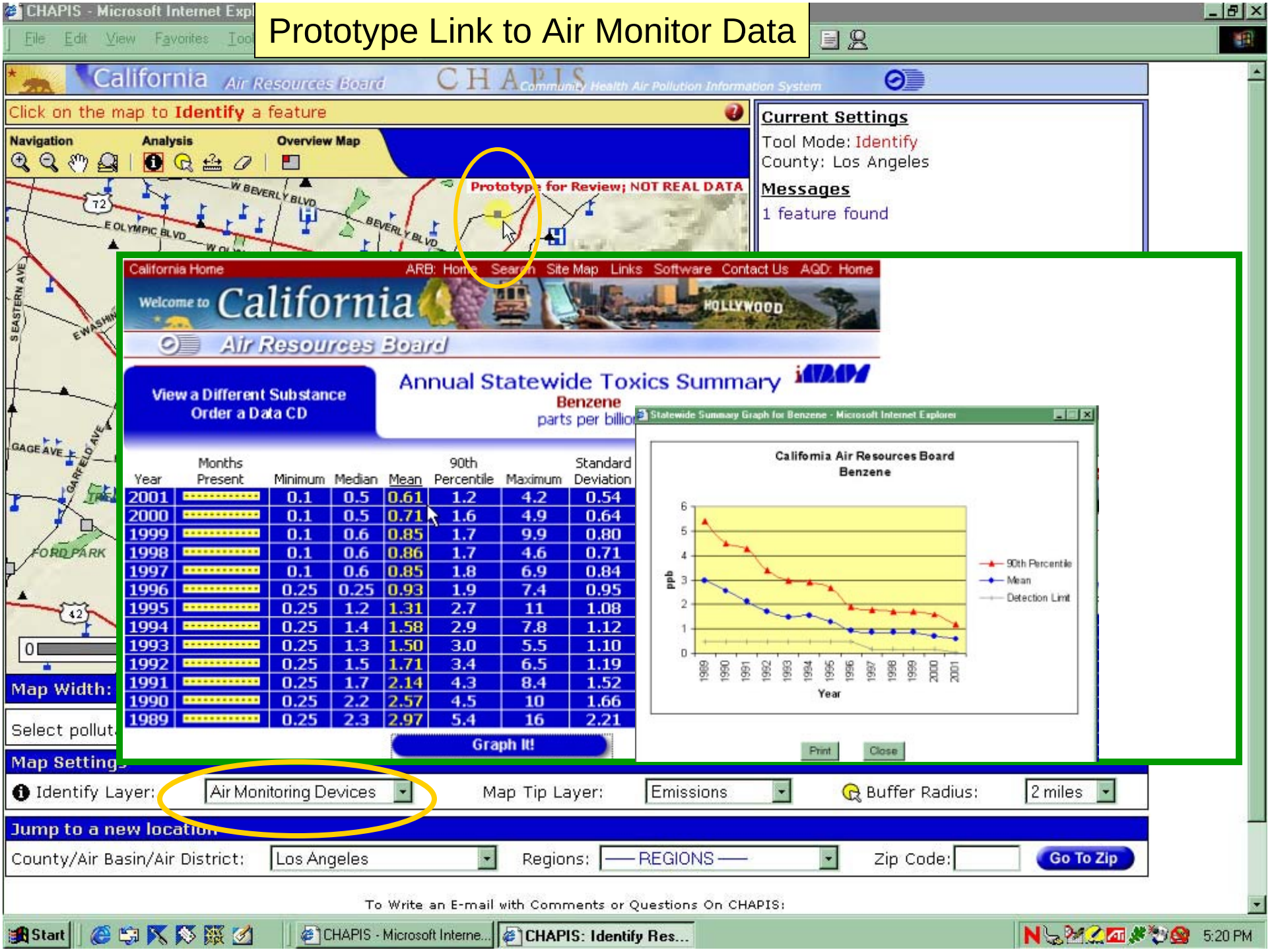
“Address-only” Facilities – Info Box with Link



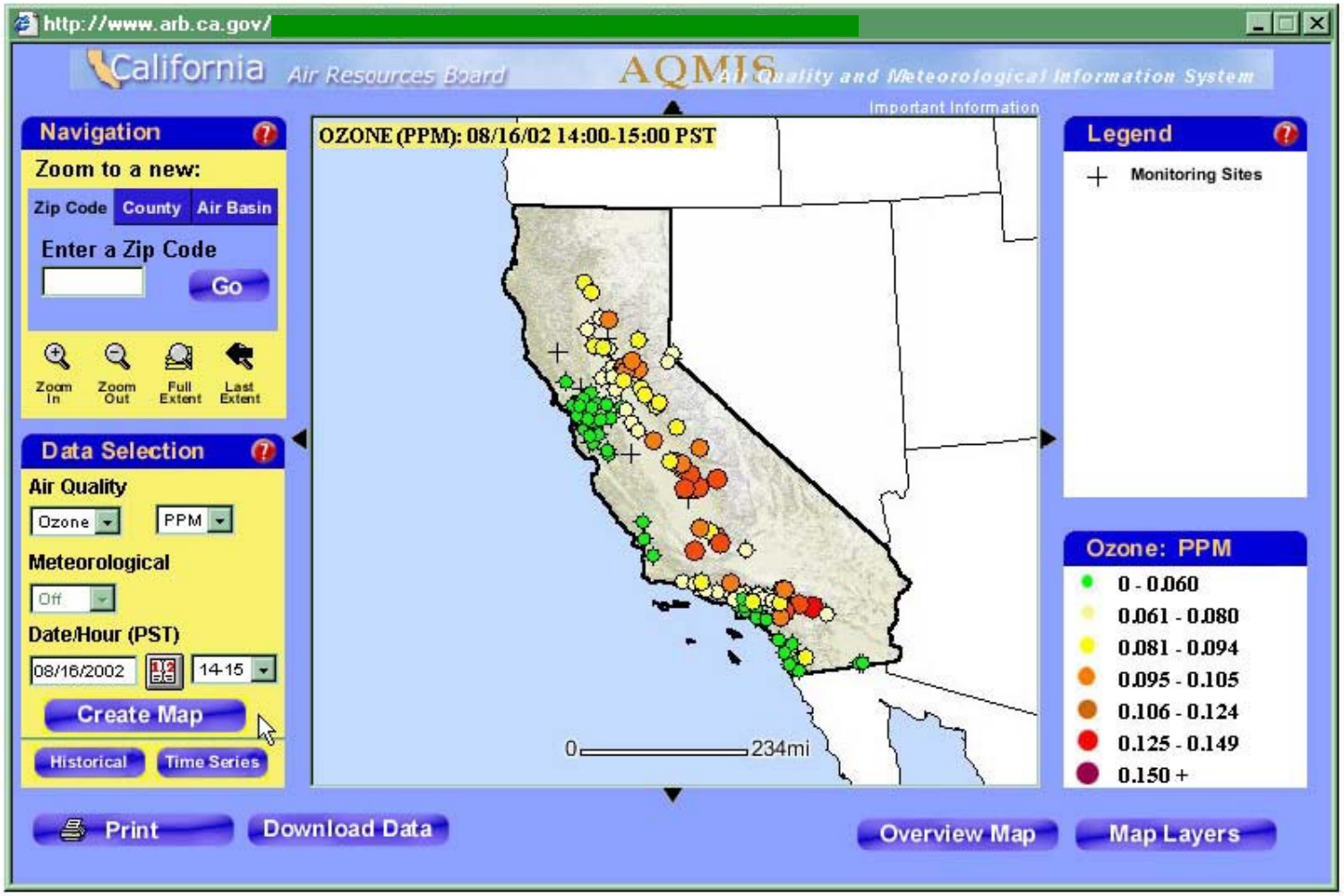
Identify on an Air Monitor Data



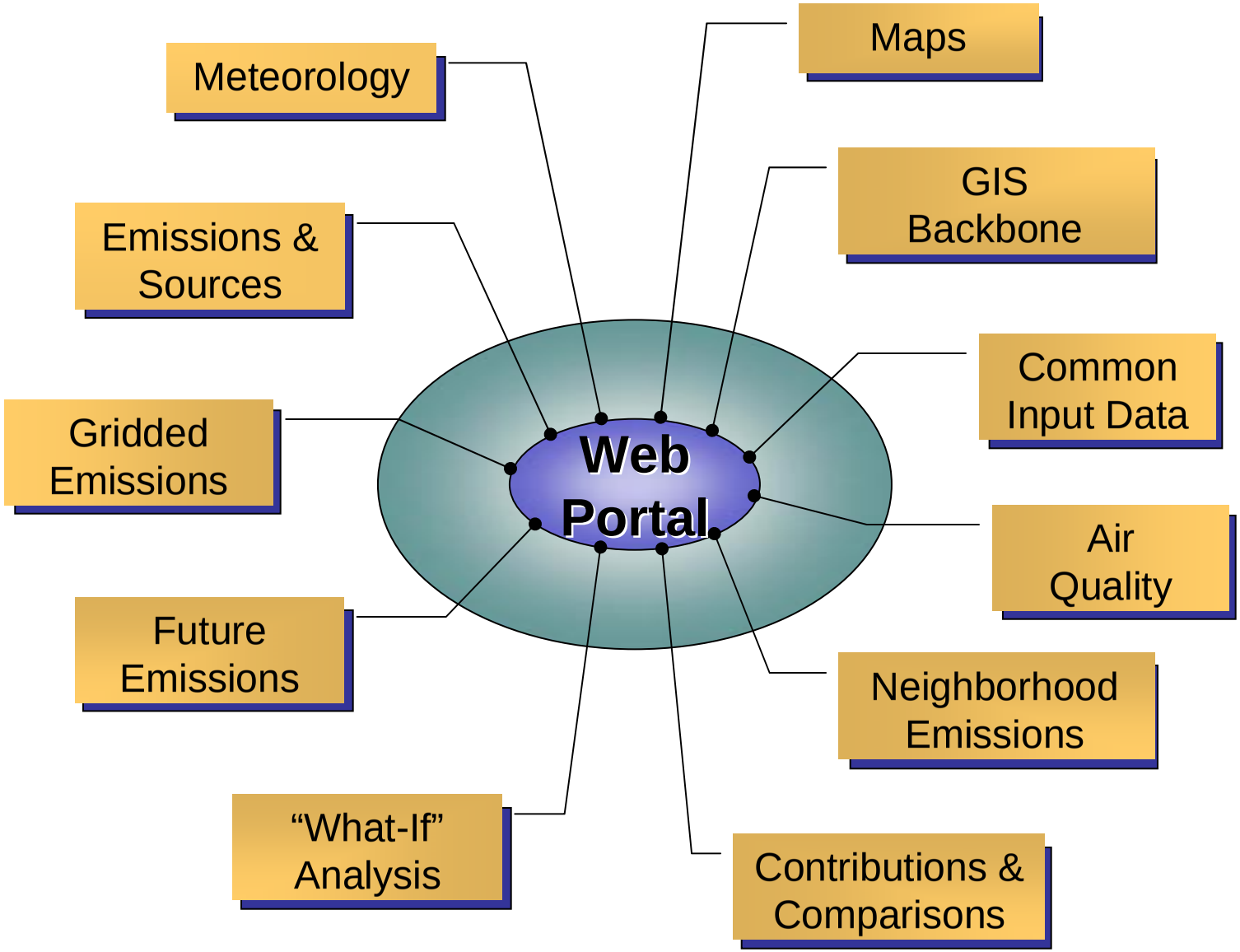
Prototype Link to Air Monitor Data



Future Link to AQMIS: Real-Time Air Monitoring Data Map

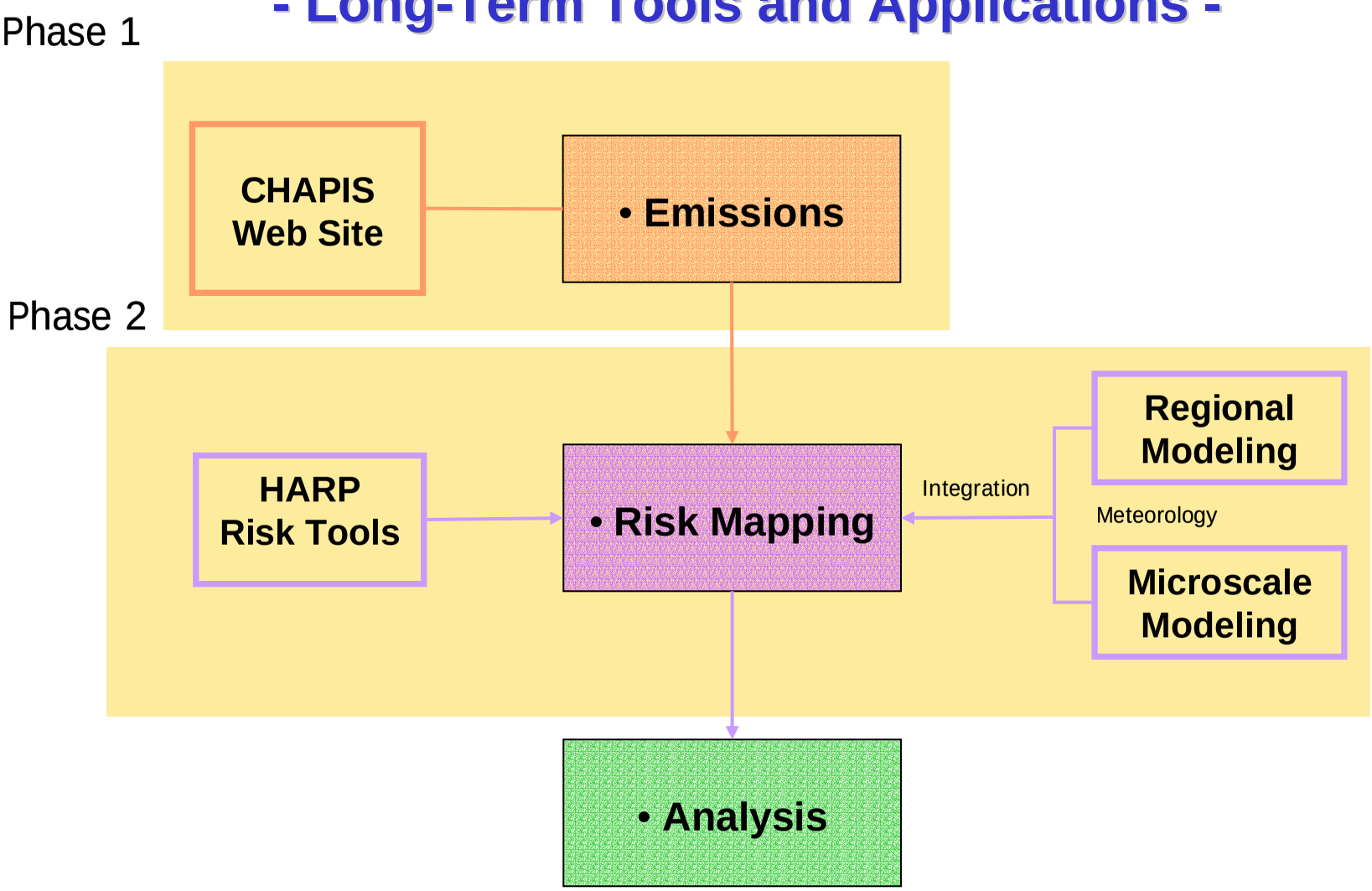


Vision - Air Analysis Site Capabilities



Air Pollution Impact Assessment

- Long-Term Tools and Applications -



*** CHAPIS: Community Health Air Pollution Information System (web-mapping tool)**

*** HARP: HotSpots Analysis and Reporting Program (emissions + dispersion + risk modules)**

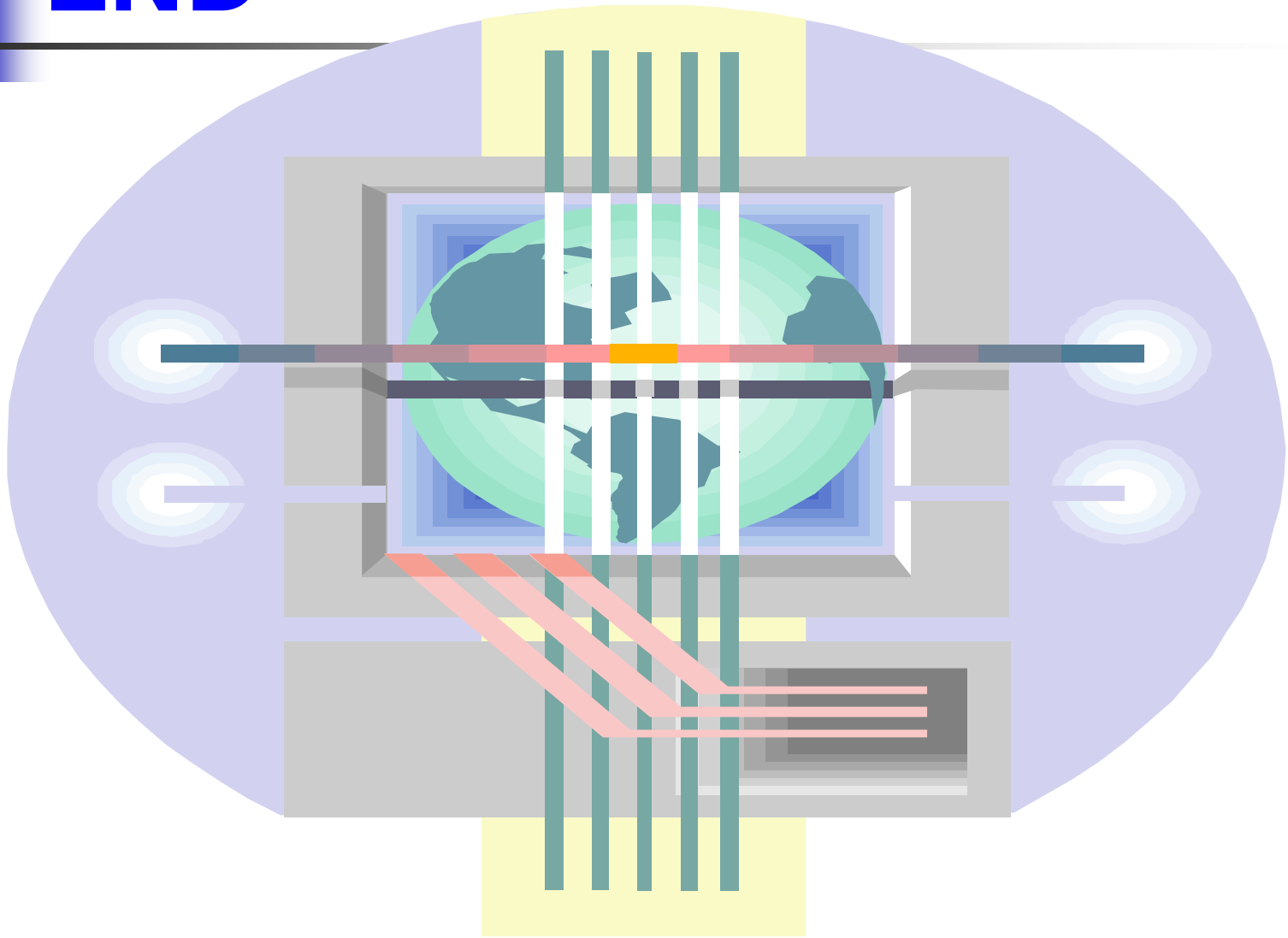
Summary: CHAPIS Visualization Tool

- **CHAPIS Phase 1 helps users visualize and analyze emission data spatially**
- **Long-term goal: combine emissions, air monitors, modeling, toxic risk, and other data**
- **Data quality is key**
- **Communicate data -- promote involvement and improve decision-making**

Acknowledgements

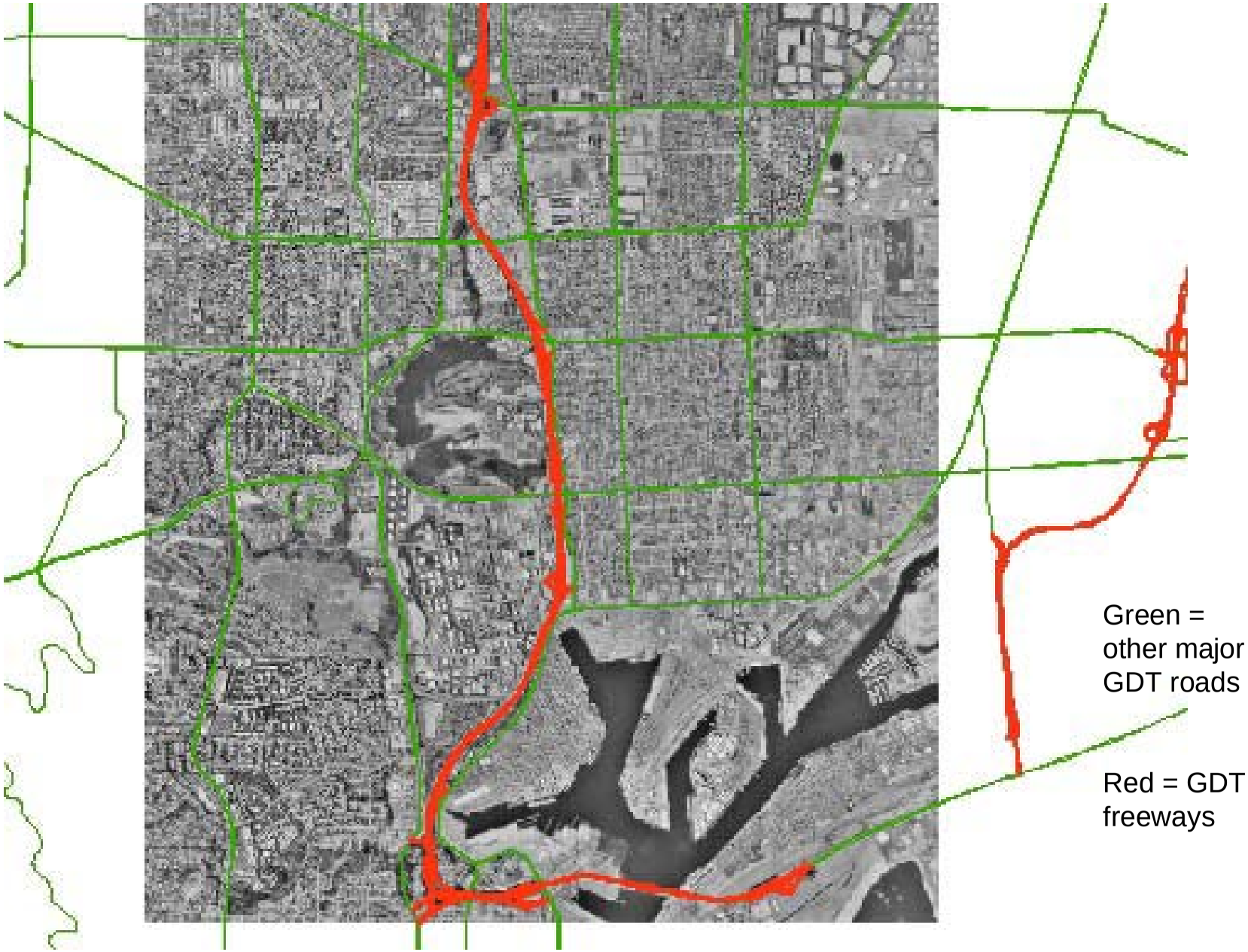
- VESTRA Resources, Inc. – CHAPIS programming
  - David Marley, Mark Smith, Perry Rice
- Dillingham Software Engineering – HARP program
  - Jeff Dillingham
- Web page support
  - Desktop Advantage; Chris Halm, ARB

END

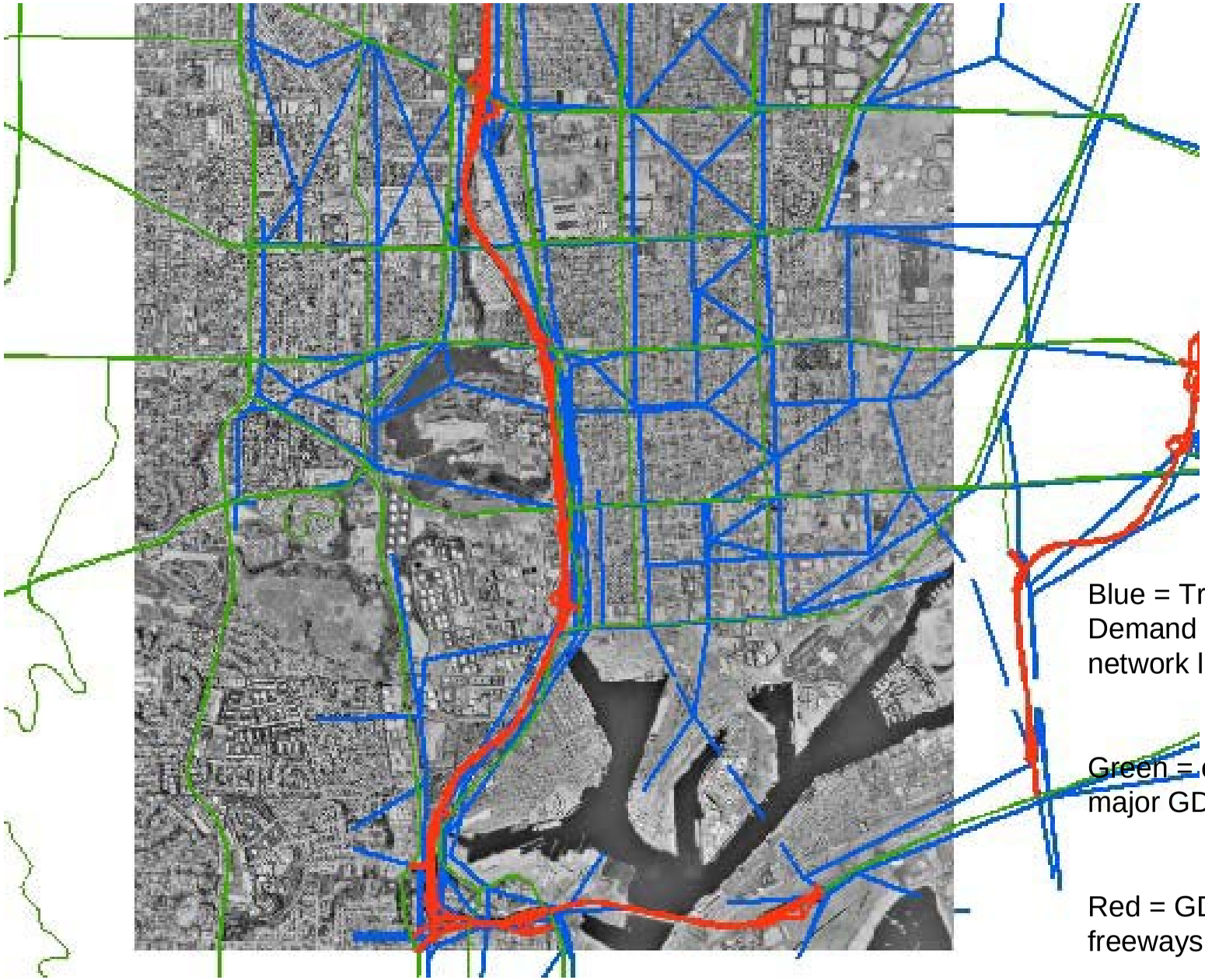


Ground-Truthing the Available Road Networks, Using Aerial Imagery

Ground-Truthing the Available Road Networks, Using Aerial Imagery



Ground-Truthing the Available Road Networks, Using Aerial Imagery



Blue = Travel Demand Model network links

Green = other major GDT roads

Red = GDT freeways

CHAPIS Design Considerations

- **Support public – diverse browsers, speeds**
  - “Thin client” (no plug-ins or frames)
  - Adjusts for user’s browser version, display resolution

- **GIS tools for the Internet**
  - Custom code on server; to allow simple client