



Great Lakes Maritime Research Institute

*A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium*

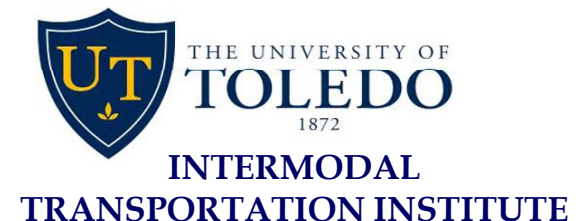
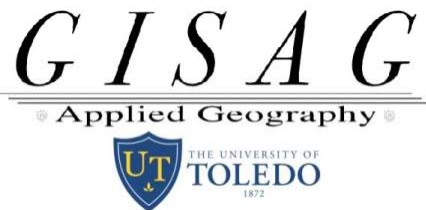


Continued Progress: The Great Lakes Maritime Information Delivery System

Peter S. Lindquist

GLMRI Affiliates Meeting

September 24, 2009



BACKGROUND

Long-term web development project:

- To develop and manage a comprehensive data repository and information clearinghouse for the maritime transportation system in the Great Lakes
- To facilitate the acquisition, storage, management, analysis and exchange of data between analysts and stakeholders
- To draw linkages between maritime freight movements and economic development
- Transitional stage of project



Objectives

Provide a single repository for regional data with convenient secure access

Manage a comprehensive database relating:

- Economic activity among all sectors
- Regional population patterns
- Import and export flows
- Intra-regional flows
- System capacity among all modes
- Intermodal connectivity

Continue to assemble a regional database that can support freight modeling efforts.



Great Lakes Maritime Research Institute

*A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium*

GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

Objectives, Continued

Comprehensive, seamless, spatially registered and current data repository in a GIS framework

Focus on data and information support functions for public officials and policy analysts

Projected users:

- Federal, state, and local governments
- Port Authorities
- Metropolitan planning organizations (MPOs)
- Transportation-related associations
- University research centers
- Other public stakeholders

Data Residing in Repository to Date



Data Residing in Repository to Date

O/D Flow Data

- Local/Regional flows within the region
- Flows into and out of the region
- International Flows
- Flows across international boundaries
- Flows by Commodity Type and by Mode



Data Residing in Repository to Date

O/D Flow Data

- Local/Regional flows within the region
- Flows into and out of the region
- International Flows
- Flows across international boundaries
- Flows by Commodity Type and by Mode

Traffic Flows by Link

- Highway Truck Traffic Volume (AADTT)
- Air Freight Flows
- Waterborne Traffic Volumes by Commodity (Great Lakes)
- Railroad Traffic Volumes Class I Links



Data Currently Residing in Repository, Continued



Data Currently Residing in Repository, Continued

Transportation Facilities

- Intermodal Terminals
- Ports
- Airports
- Rail Yards
- Weigh Stations
- Toll Facilities
- Customs Stations



Data Currently Residing in Repository, Continued

Transportation Facilities

- Intermodal Terminals
- Ports
- Airports
- Rail Yards
- Weigh Stations
- Toll Facilities
- Customs Stations

Demand Data / OD Base Data

- Economic Production Measures by Sector (e.g., employment)
- Population / Market Characteristics



Data Currently Residing in Repository, Continued

Transportation Facilities

- Intermodal Terminals
- Ports
- Airports
- Rail Yards
- Weigh Stations
- Toll Facilities
- Customs Stations

Documentation

- Metadata
- Data Dictionary
- Technical Documentation
- User Guides / Manuals

Demand Data / OD Base Data

- Economic Production Measures by Sector (e.g., employment)
- Population / Market Characteristics





Great Lakes Maritime Research Institute

*A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium*

GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

Data Currently Residing in Repository, Continued

Transportation Facilities

- Intermodal Terminals
- Ports
- Airports
- Rail Yards
- Weigh Stations
- Toll Facilities
- Customs Stations

Documentation

- Metadata
- Data Dictionary
- Technical Documentation
- User Guides / Manuals

Detailed Data List Available

Demand Data / OD Base Data

- Economic Production Measures by Sector (e.g., employment)
- Population / Market Characteristics





GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

Project Web Site

[Access at: *http://maritime.utoledo.edu*](http://maritime.utoledo.edu)





Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium

GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

Related Projects

- Data Collection: USACE Master Docks Plus Data Collection
 - ◆ Develop and Test New Methods for Data Collection
 - *Satellite Imagery and Air Photos*
 - *Web-Based Data Entry*
 - *Telephone Survey*
 - *Site Visits*
 - ◆ Test Methods at Selected Ports (Sponsor: USACE)
- Data Management: Development of Data Library Functions, Training, and User Interface Improvements (UT-UTC)
- Data Collection: Landside Modes (CFIRE)
- Data Collection: AIS Acquisition (Great Lakes and Seaway Shipping Online, Inc.)



Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium

GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

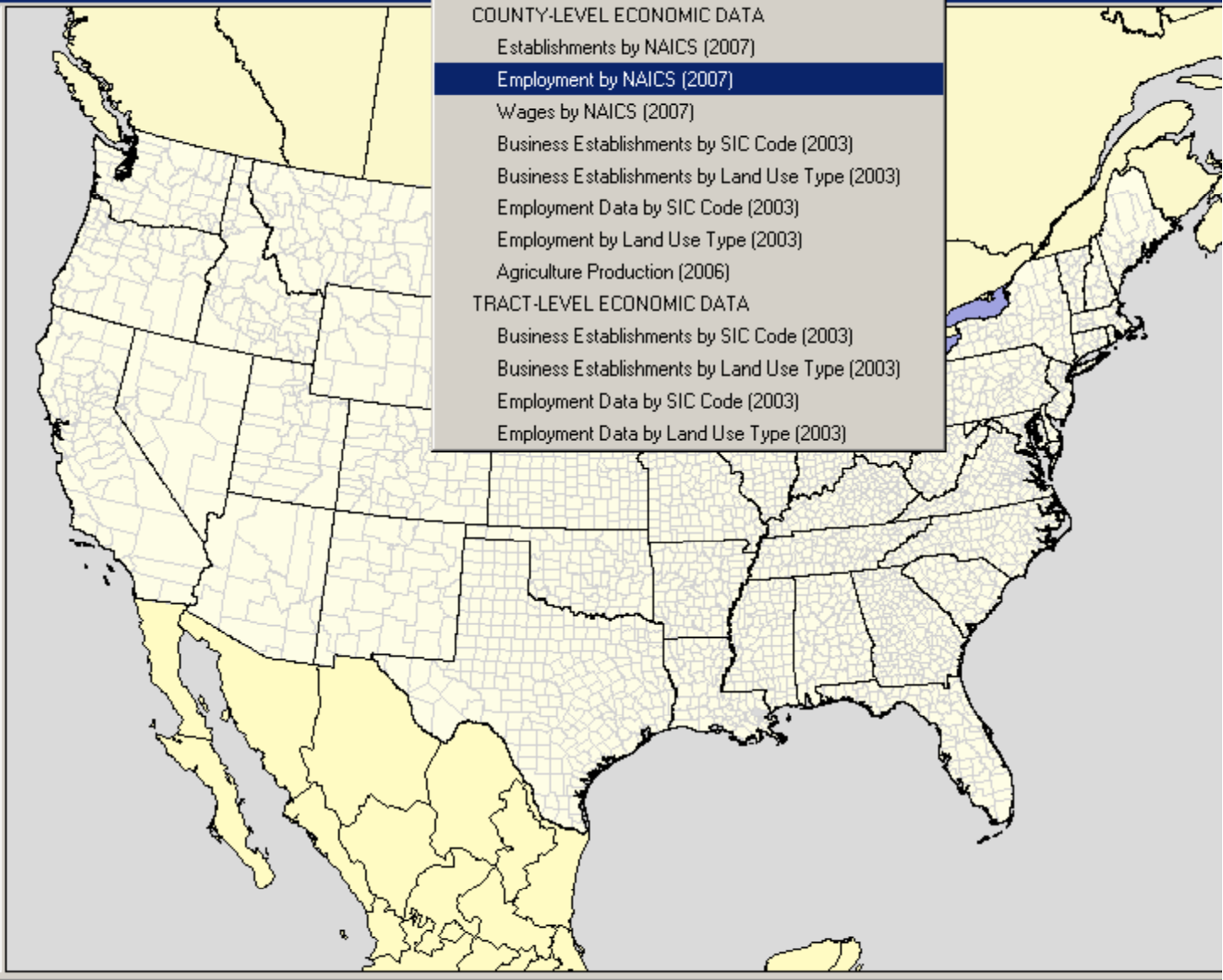
LOOKING AHEAD:

- Transition to Self Sufficiency:
 - ◆ *Great Lakes Maritime Information Exchange (GLMIX)*
 - ◆ *Partnerships: Greenwood's Guide / Harbor House*
 - ◆ *Seek Additional Funding Sources*
- New Data
- Metadata Warehouse / Library Functions
- Continual Updating and Additions to Project Web Site
 - ◆ *Atlas of Great Lakes Maritime Commerce*
- Customized Data Query / Analysis / Information Retrieval within MWFV



Reporting Upper Midwest Freight Corridor--Nationwide Scale

- Great Lakes
- US State Boundaries
- US County Boundaries
- Mexico_states.shp
- Canadian Boundary



BOUNDARY DATA:

FLOW DATA

- View FAF Zone 2002 OD Flows
- View FAF2 Provisional 2007 Domestic Flows
- View FAF2 Truck Data On Network

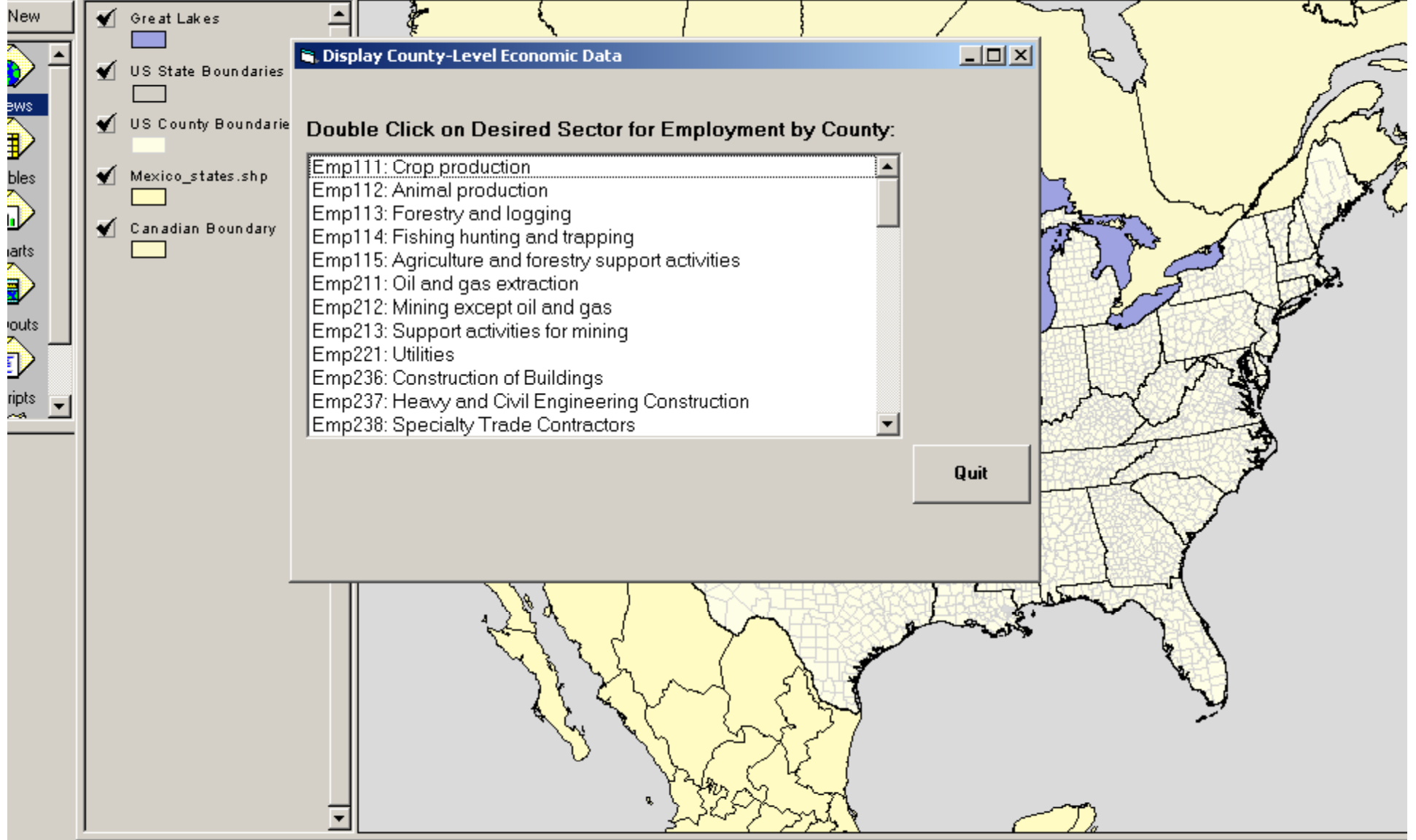
25,852,146 503,734
1,954,055

COUNTY-LEVEL ECONOMIC DATA

- Establishments by NAICS (2007)
- Employment by NAICS (2007)**
- Wages by NAICS (2007)
- Business Establishments by SIC Code (2003)
- Business Establishments by Land Use Type (2003)
- Employment Data by SIC Code (2003)
- Employment by Land Use Type (2003)
- Agriculture Production (2006)

TRACT-LEVEL ECONOMIC DATA

- Business Establishments by SIC Code (2003)
- Business Establishments by Land Use Type (2003)
- Employment Data by SIC Code (2003)
- Employment Data by Land Use Type (2003)

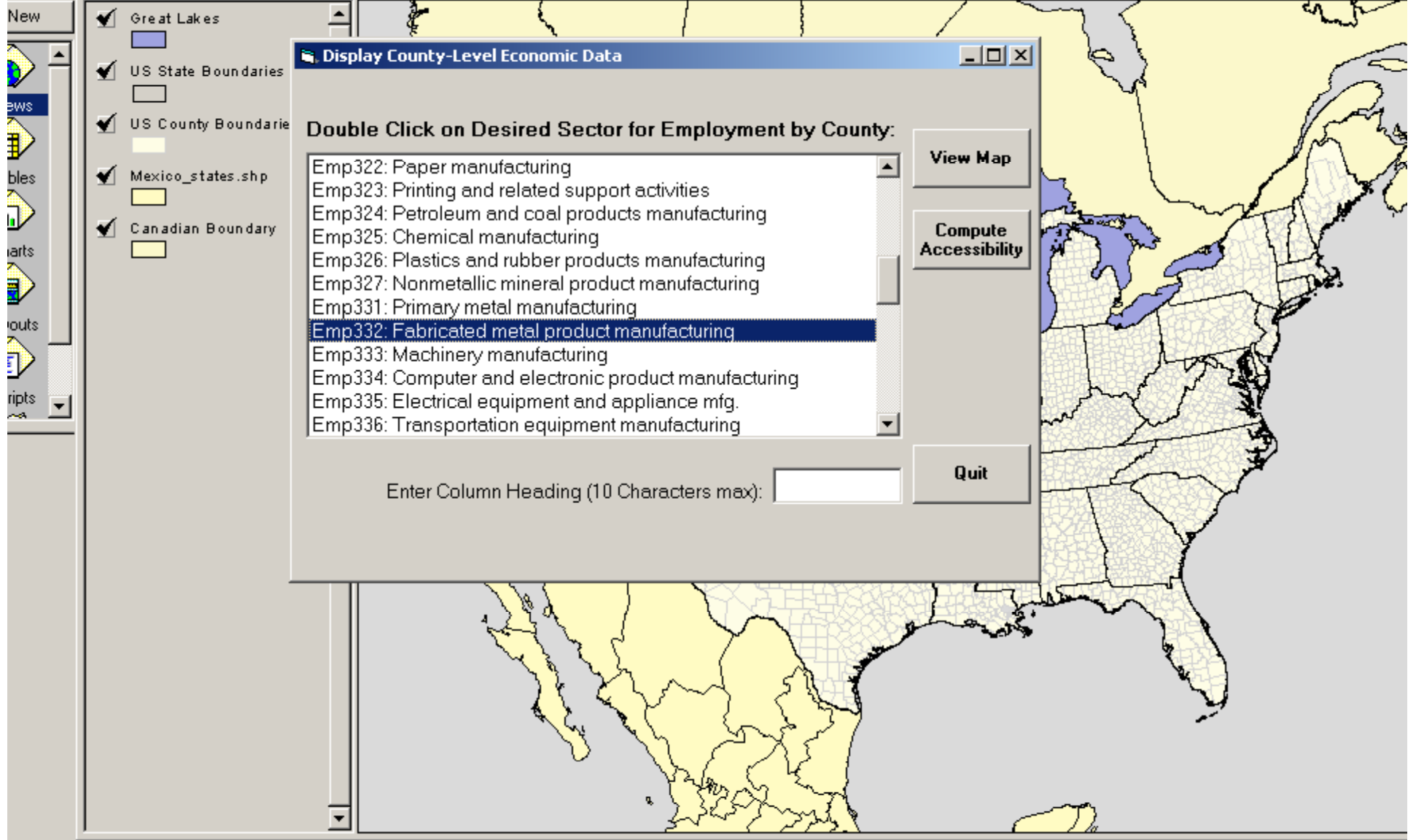


Display County-Level Economic Data

Double Click on Desired Sector for Employment by County:

- Emp111: Crop production
- Emp112: Animal production
- Emp113: Forestry and logging
- Emp114: Fishing hunting and trapping
- Emp115: Agriculture and forestry support activities
- Emp211: Oil and gas extraction
- Emp212: Mining except oil and gas
- Emp213: Support activities for mining
- Emp221: Utilities
- Emp236: Construction of Buildings
- Emp237: Heavy and Civil Engineering Construction
- Emp238: Specialty Trade Contractors

Quit



- Great Lakes
- US State Boundaries
- US County Boundaries
- Mexico_states.shp
- Canadian Boundary

Display County-Level Economic Data

Double Click on Desired Sector for Employment by County:

- Emp322: Paper manufacturing
- Emp323: Printing and related support activities
- Emp324: Petroleum and coal products manufacturing
- Emp325: Chemical manufacturing
- Emp326: Plastics and rubber products manufacturing
- Emp327: Nonmetallic mineral product manufacturing
- Emp331: Primary metal manufacturing
- Emp332: Fabricated metal product manufacturing**
- Emp333: Machinery manufacturing
- Emp334: Computer and electronic product manufacturing
- Emp335: Electrical equipment and appliance mfg.
- Emp336: Transportation equipment manufacturing

Enter Column Heading (10 Characters max):

View Map

Compute Accessibility

Quit



- Great Lakes
- US State Boundaries
- US County Boundaries
- Mexico_states.shp
- Canadian Boundary

Display County-Level Economic Data

Compute Accessibility Indices

Select Distance Metric

- Great Circle Mileage
- Highway Mileage
- Highway Impedance
- Rail Mileage
- Rail Impedance
- Water Mileage
- Water Impedance
- Highway-Rail-Highway Impedance

Choose Accessibility Option

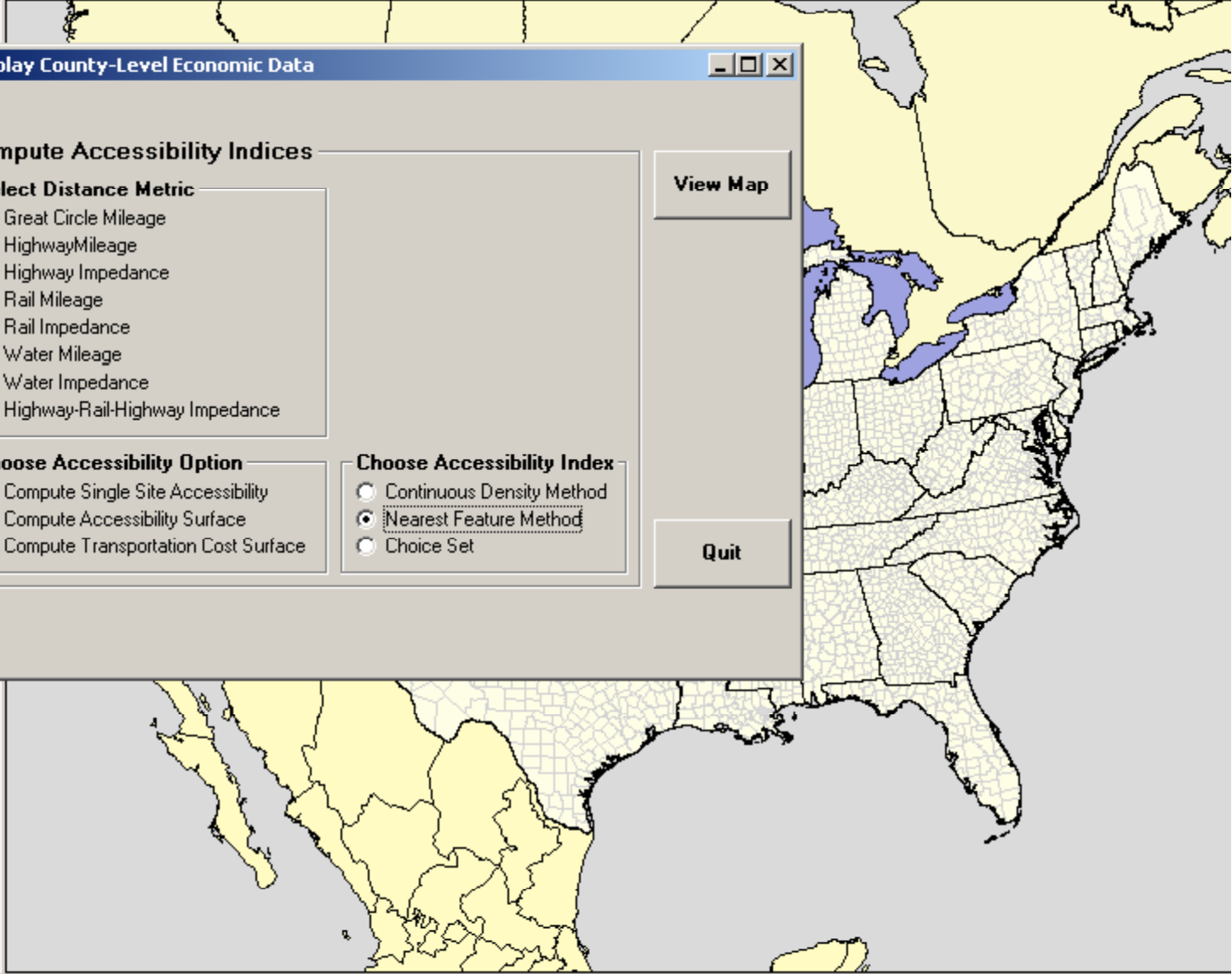
- Compute Single Site Accessibility
- Compute Accessibility Surface
- Compute Transportation Cost Surface

Choose Accessibility Index

- Continuous Density Method
- Nearest Feature Method
- Choice Set

View Map

Quit



Legend Editor

File name: County data display.shp

Load...

Legend Type: Graduated Color






Save...

Default

Classification Field: Data

Classify...

Normalize by: <None>

Symbol	Value	Label
	0 - 494.253	0 - 494.253
	494.253 - 736.988	494.253 - 736.988
	736.988 - 991.895	736.988 - 991.895
	991.895 - 1337.682	991.895 - 1337.682
	1337.682 - 2668.183	1337.682 - 2668.183



Color Ramps: Red monochromatic

Advanced...

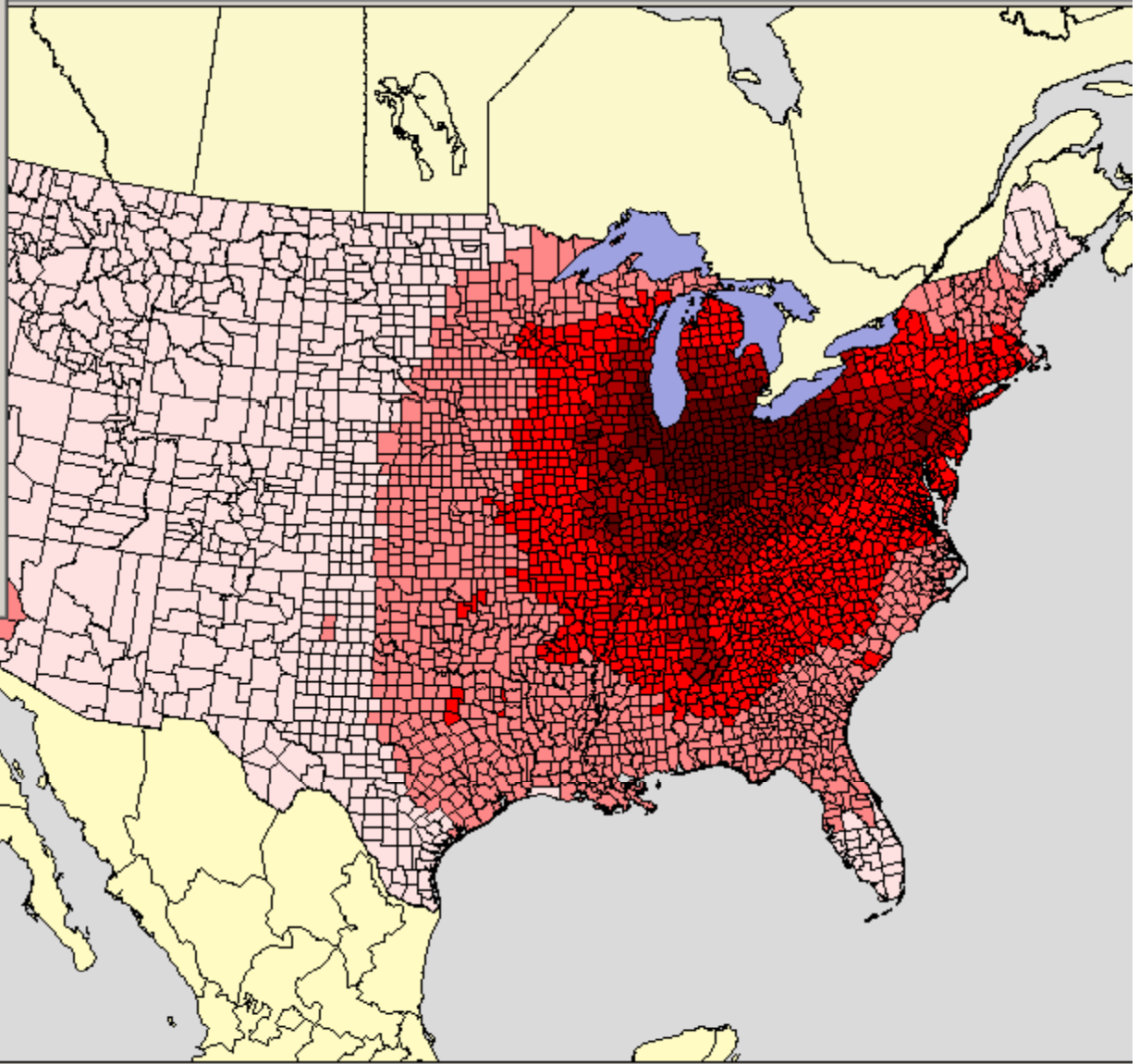
Statistics...

Undo

Apply

Scale 1: 25,852,146

-2,410,131.0
982,766.0

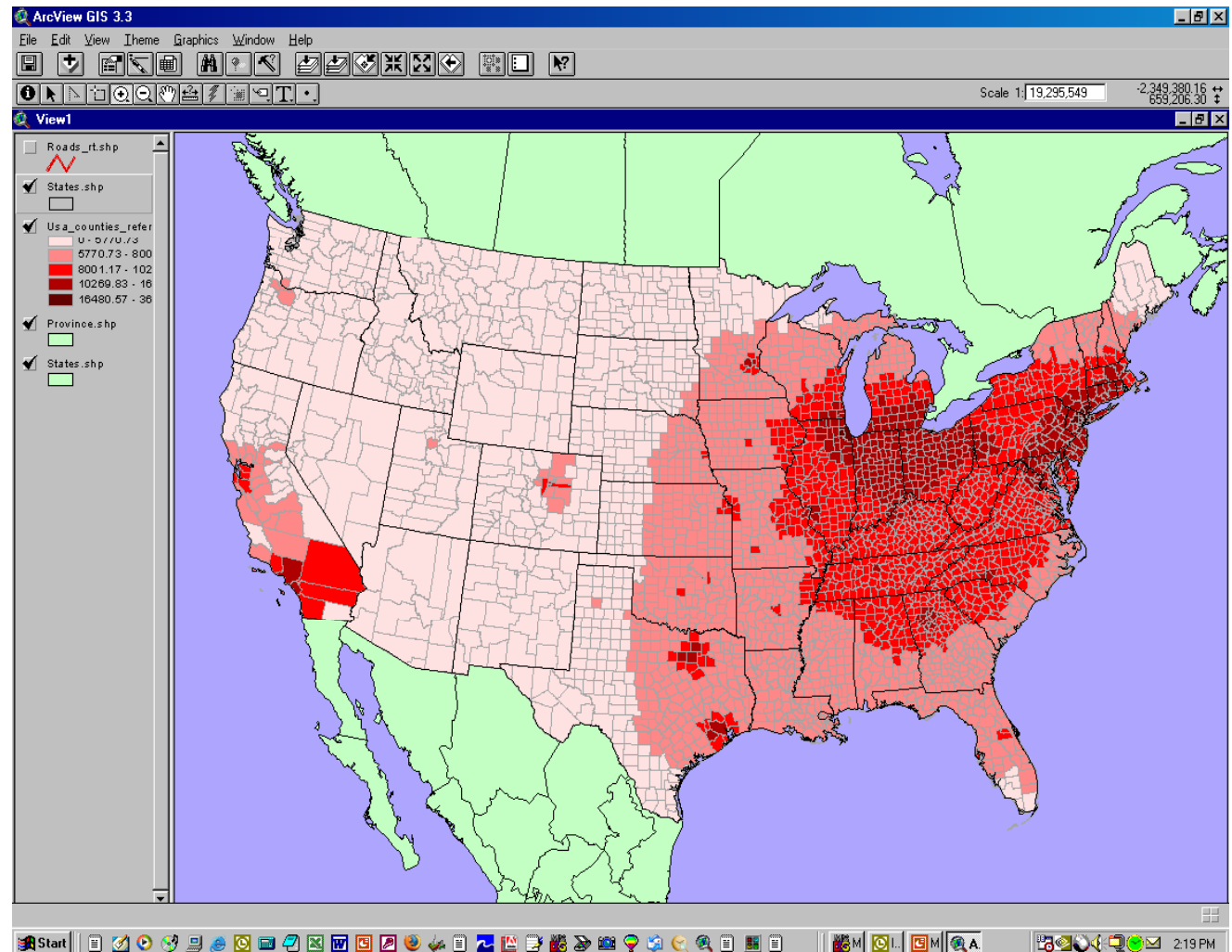


Identifies a network location by cursor



Data Analysis Software

The map at the right displays the density of *wholesale trade* activity in the US among counties. This density map shows the proximity of wholesale distributors relative to each county, weighted by employment. Those regions in the darkest colors have the greatest accessibility to wholesale trade in the U.S.





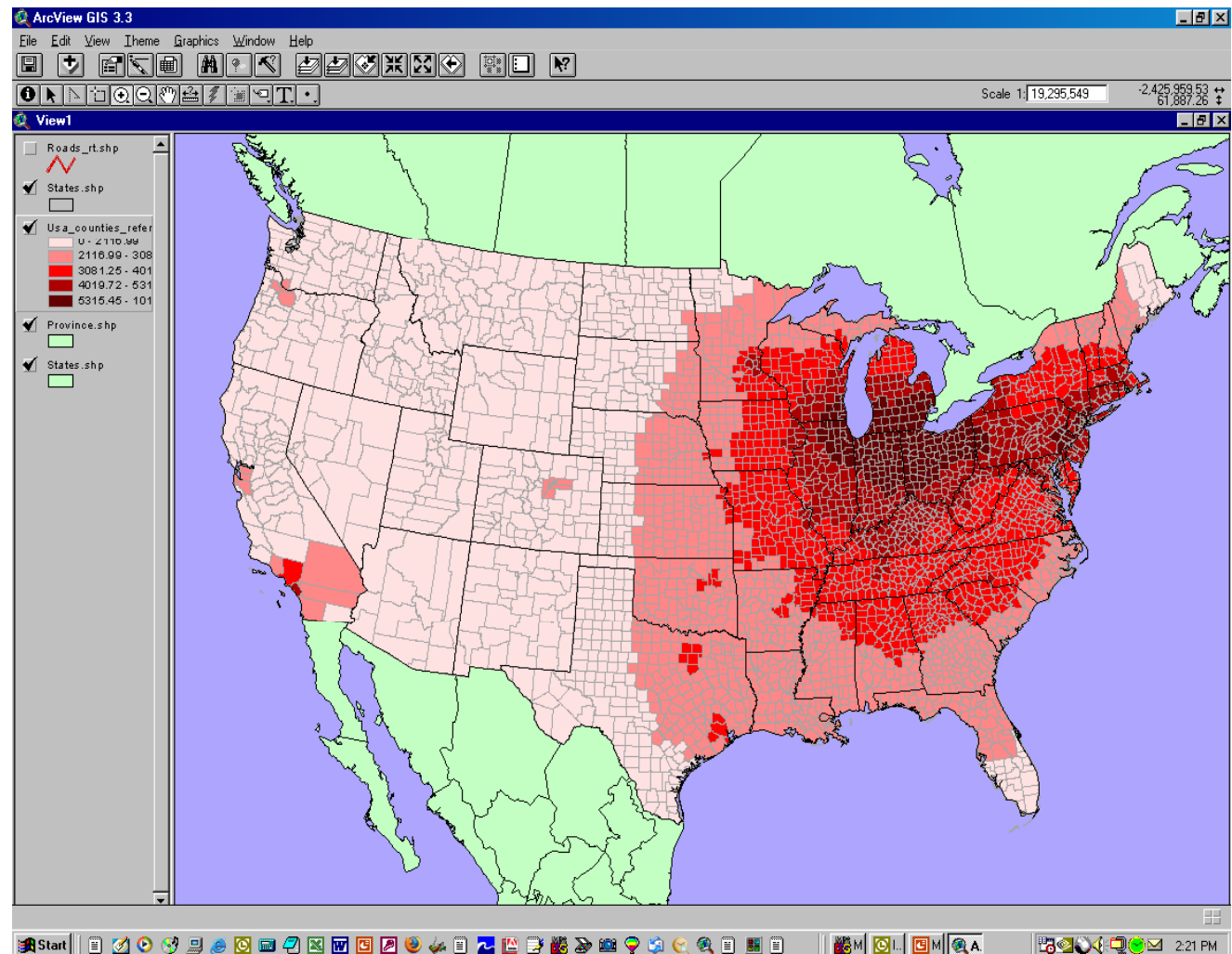
**Great Lakes Maritime
Research Institute**



**GREAT LAKES
MARITIME INFORMATION
DELIVERY SYSTEM**

Data Analysis Software

MWFV now uses the same software to display the density of *heavy equipment manufacturing by county*. This density map shows the proximity of heavy equipment manufacturers relative to each county weighted by employment. Those regions in the darkest colors have the greatest accessibility to this sector in the U.S.





Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium

GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

LOOKING AHEAD, continued:

- Development of Analytical Tools
 - ◆ Location Analysis and Site Selection Models
 - ◆ Accessibility Measures and Trade Area Analysis
 - ◆ Economic Indices and Analyses
 - ◆ Intermodal Cargo Routing using Integrated Network
- Building Information from Data
 - ◆ *Linking commodity flows to economic output*
 - ◆ *Economic Impacts of GL MTS*
 - ◆ *Analyzing patterns of commodity flows*
- [Automating Data Acquisition: AIS System Pilot Study](#)



Great Lakes Maritime Research Institute

*A University of Wisconsin - Superior and
University of Minnesota Duluth Consortium*

GREAT LAKES MARITIME INFORMATION DELIVERY SYSTEM

Thank you

