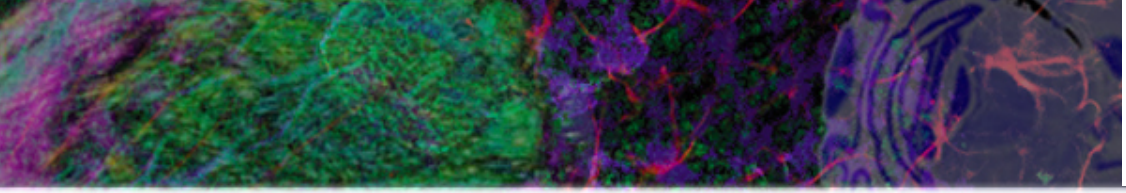
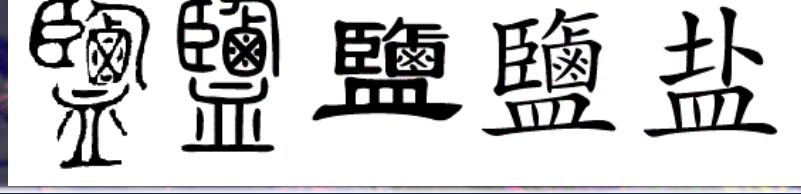




# The Perspectives of Digital Curators on Building Distributed Repositories


**Richard Marciano**

*Lead Scientist, Sustainable Archives & Library Technologies lab (SALT) / SDSC*

***Chien-Yi YOU***

*Digital preservation specialist, SDSC*

***Reagan MOORE***

*Director of Data and Knowledge Systems, SDSC*

***Caryn WOJCIK***

*Government Records Archivist, State of Michigan*

***Mark CONRAD***

*Archives Specialist, ERA/NARA*



DigCCUR April 19-20, 2007 – Chapel Hill, NC

# Recent Collaborations on Preservation (NARA, NHPRC, LOC, NSF, IMLS)

**NARA:** **1998-2007**, *NARA - U Md, GTech, SLAC, UC Berkeley*
**Transcontinental Persistent Archive Prototype based on data grids.**

**IP2:** **2002-2006**, *NHPRC/SSHRC/NSF - UBC and others.*
**InterPARES 2 collaboration with UBC on infrastructure independence**

**PERM:** **2002-2004**, *NHPRC - Michigan, SDSC*
**Preservation of records from an RMA. Interoperability across RMAs.**

**LoC:** **2003-2004**, *LoC - SDSC, LOC*
**Evaluation of use of SRB for storing American Memory collections**

**ICAP:** **2003-2006**, *NHPRC - UCSD,UCLA,SDSC*
**Exploring the ability to compare versions of records, run historical queries**

**A&W:** **2000-2003**, *NHPRC - SDSC*
**Methodologies for preservation & access of software- dependent electronic records**

**DIGARCH:** **2005-2007**, *NSF - UCTV,Berkeley,UCSD Libraries,SDSC*
**Preservation of video workflows**

**eLegislature:** **2005-2007**, *NSF - Minnesota, SDSC*
**Preserving the records of the e-Legislature**

**VanMAP:** **2005-2006**, *UBC - UBC,Vancouver*
**Preserving the GIS records of the city of Vancouver**

**eLegacy:** **2006-2008**, *NHPRC - California*
**Preserving the geospatial data of the state of California**

**T-RACES:** **2006-2008**, *IMLS - UCHRI,SDSC*
**California's redlining archives testbed**

**PAT:** **2004-2007**, *NHPRC - Mi,Mn,Ke,Oh,Slac,SDSC*
**Demonstration of a cost-effective system for preserving electronic records.**

UCSD

SDSC

# Project Summary

- **Participants were digital curators from:**
  - Libraries / archives / historical societies / scientific data environments / museums
  - IT researchers and staff
- **Main Goal:**
  - Design a distributed repository for electronic records management
  - Demonstrate the management of various types of records with a common software infrastructure
- **Approach:** *each site…*
  - chose an archival collection
  - set up access control and update permissions for their preservation environment independently of the other participants
  - implemented a different preferred interface for interacting with their archival collections

UCSD

SDSC

# Presentation Goals

- **Comments:**
  - “No repository is an island”, David Giaretta
  - … PAT fits the archipelago model
- **Examine:**
  - lessons learned and skills needed by digital curators to automate archival functions: appraisal, accessioning, arrangement, description, preservation, and access of records.
  - benefits achieved by using common infrastructure

# Partners


St. Paul
State of Minnesota
State of Michigan
Lansing
Yale University
New Haven
State of California
Sacramento
Menlo Park
SLAC
State of Ohio
Columbus
Washington
College Park
NARA
NHPRC
Frankfort
State of Kentucky
Getty Research Institute
Los Angeles
San Diego
SDSC
Atlanta
Georgia Institute of Technology

# PAT Project

- **Test a *community model* for electronic records management, with archival and technological functions in a distributed network (using the SRB: Storage Resource Broker – data grid technology)**
- **Initial Test sites:**
  - **(1) Michigan Department of History, Arts and Libraries,**
  - **(2) Ohio Historical Society,**
  - **(3) Kentucky Department for Libraries and Archives,**
  - **(4) Minnesota Historical Society,**
  - **(5) SLAC Stanford Linear Accelerator Archives and History Office.**

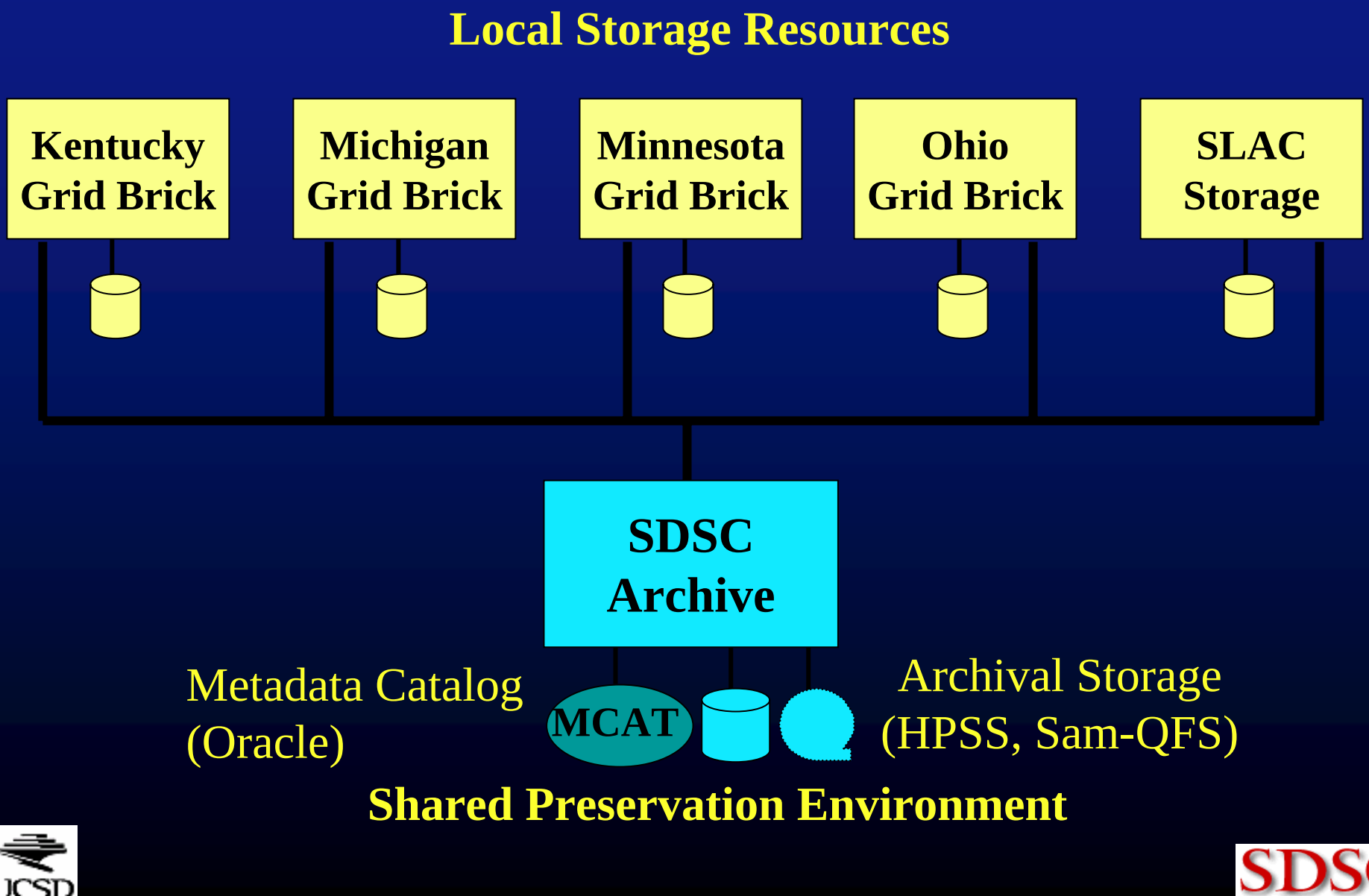
Participants:

- (a) California State Archives
- (b) Kansas State Historical Society
- (c) University of Illinois Urbana Champaign
- (d) University of California Los Angeles (UCLA):
- (e) Yale Manuscripts and Archives
- (f) Georgia Tech

Observers:

- (a) Getty Research Institute

# PAT Community Grid



# Automating Archival Processes

| | *Kentucky Web* | *Michigan RMA -Precinct Results DB* | *Minnesota Spatial* | *Ohio E-mail* | *SLAC Documents* |
|---|---|---|---|---|---|
| *Appraisal* | | | | X | |
| *Accession* | X | | | X | X |
| *Arrangement* | X | X | | X | X |
| *Description* | X | X | X | X | X |
| *Preservation* | X | X | X | | X |
| *Access* | X | X | X | | X |

# Unique Contributions of the Digital Curators to the Infrastructure

- **Windows-based SRB clients / servers**
- **Development of a Perl for Windows client library**
- **Bulk operations were developed, tested, and refined** (registration, accessioning, metadata extraction from records, metadata loading, validation of data movement into/out of/within the system)
- **End-to-end workflows were developed** (accessioning, replication)
- **SRB bugs revealed: better reliability**
- **MCAT ported to mySQL** (Oracle, DB2, Sybase, Informix)
- **Development of a wiki for documentation**
- **Registration of filenames with unusual characters discovered and fixed**
- **Suggestions on ways to simplify governance issues tied to particular types of data management:**
  - Need to express such policies as rules to be applied to the data mgt. system
  - Development of the next generation of data grid technology: iRODS (integrated Rule-Oriented Data System)
  - Each preservation process is express as a set of micro-services (operations that can be performed using a remote storage system access protocol)

# What Digital Curators Liked…

- Leverage common software and hardware
- Use commodity storage hardware
- Lower the cost of participation
- Reduce the level of expertise required at each site
- Focus on management of the archival collections and outsource the details of the archival repository
- Automate the manipulation of collections to minimize the level of effort

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SDSC

# Conclusions

- PAT suggests that sustainability is probably beyond the capability of most individual archival repositories (cost of tracking new types of technology, expertise required to manage new technology, costs of the storage systems and databases, expertise necessary to manage multiple types of storage systems)
- Outsourcing of the mgt. or records is feasible through use of data grid technology
- Preservation environments can be assembled by creating regional community archival partnerships with university data centers
- Independence can be maintained:
- Service agreements for storage and preservation or archival e-records are needed

# The Michigan example:

- Preservation of historical election data for the state of Michigan:  precinct-level election data
- Process:  from tape to archive to web…

# Before

2004 votes totals.txt - Notepad

File Edit Format Help

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 2 | 0 | 1 | | 435 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 2 | 0 | 901 | AVCB | 373 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 4 | 0 | 1 | | 512 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 4 | 0 | 901 | AVCB | 203 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 6 | 0 | 1 | | 533 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 6 | 0 | 901 | AVCB | 167 |
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| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 16 | 0 | 1 | | 333 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 16 | 0 | 901 | AVCB | 130 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 18 | 0 | 1 | | 366 |
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| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 22 | 0 | 1 | | 267 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 52 | 0 | 901 | AVCB | 61 |
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| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 52 | 2 | 1 | | 84 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 1 | 52 | 3 | 1 | | 81 |
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| 2004 | GEN | 0 | 00000 | 0 | 0 | 2 | 10 | 0 | 1 | | 303 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 2 | 12 | 0 | 1 | A | 868 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 2 | 12 | 0 | 2 | | 228 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 2 | 14 | 0 | 1 | | 254 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 2 | 16 | 0 | 1 | | 200 |
| 2004 | GEN | 0 | 00000 | 0 | 0 | 2 | 16 | 0 | 2 | | 255 |
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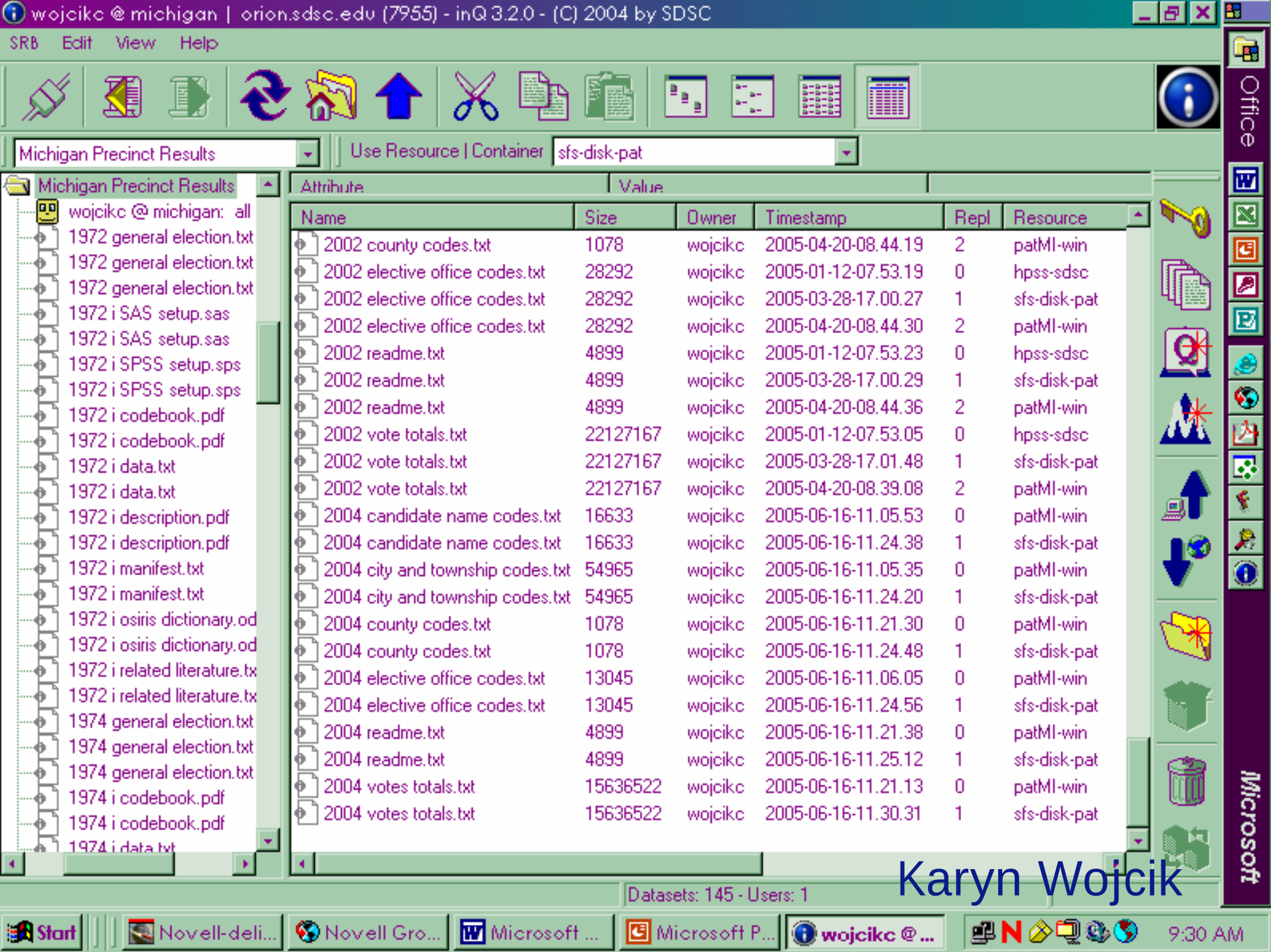
| 2004 | GEN | 0 | 00000 | 0 | 0 | 3 | 8 | 0 | 1 | | 674 |

Karyn Wojcik

Start | Novell-... | Novell ... | Microso... | Microso... | wojcikc ... | 2004 vot... | 9:36 AM


wojcikc @ michigan | orion.sdsc.edu (7955) - inQ 3.2.0 - (C) 2004 by SDSC
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Michigan Precinct Results
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2002 elective office codes.txt 28292 wojcikc 2005-01-12-07.53.19 0 hpss-sdsc
2002 elective office codes.txt 28292 wojcikc 2005-03-28-17.00.27 1 sfs-disk-pat
2002 elective office codes.txt 28292 wojcikc 2005-04-20-08.44.30 2 patMI-win
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2002 vote totals.txt 22127167 wojcikc 2005-03-28-17.01.48 1 sfs-disk-pat
2002 vote totals.txt 22127167 wojcikc 2005-04-20-08.39.08 2 patMI-win
2004 candidate name codes.txt 16633 wojcikc 2005-06-16-11.05.53 0 patMI-win
2004 candidate name codes.txt 16633 wojcikc 2005-06-16-11.24.38 1 sfs-disk-pat
2004 city and township codes.txt 54965 wojcikc 2005-06-16-11.05.35 0 patMI-win
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Karyn Wojcik
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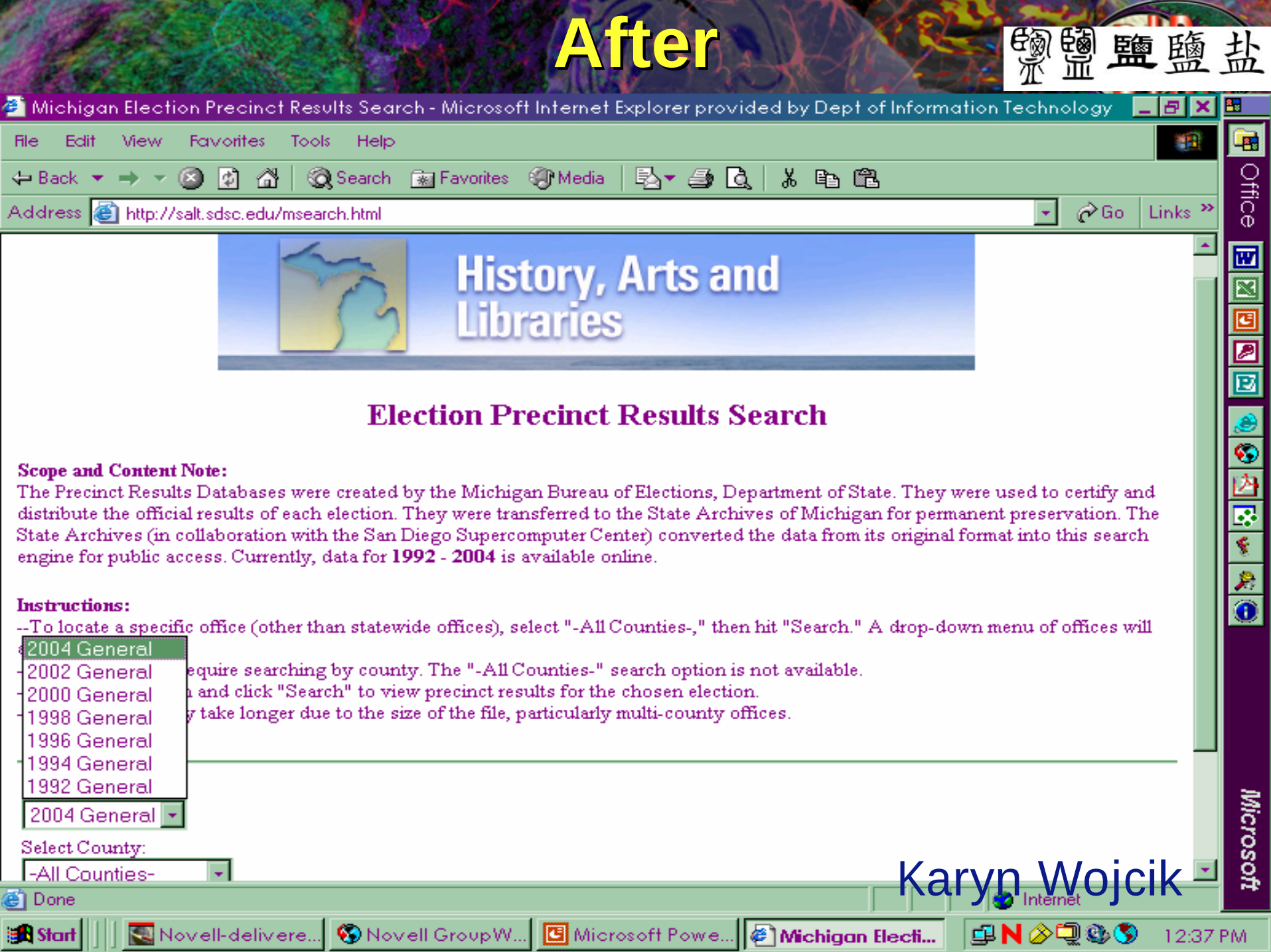
# After




Karyn Wojcik

History, Arts and Libraries

# Election Precinct Results Search

Please choose the Office Sought for INGHAM COUNTY
or go BACK to change other criteria:

POLL BOOK TOTALS (TOTAL VOTERS)

- POLL BOOK TOTALS (TOTAL VOTERS)
- PRESIDENT OF THE UNITED STATES 4 YEAR TERM (1) POSITION
- 8TH DISTRICT REPRESENTATIVE IN CONGRESS 2 YEAR TERM (1) POSITION
- 67TH DISTRICT STATE REPRESENTATIVE 2 YEAR TERM (1) POSITION FILES IN INGHAM COUNTY
- 68TH DISTRICT STATE REPRESENTATIVE 2 YEAR TERM (1) POSITION FILES IN INGHAM COUNTY
- 69TH DISTRICT STATE REPRESENTATIVE 2 YEAR TERM (1) POSITION FILES IN INGHAM COUNTY
- MEMBER OF THE STATE BOARD OF EDUCATION 8 YEAR TERMS (2) POSITIONS
- MEMBER OF THE UNIVERSITY OF MICHIGAN BOARD OF REGENTS 8 YEAR TERMS (2) POSITIONS
- MEMBER OF THE MICHIGAN STATE UNIVERSITY BOARD OF TRUSTEES 8 YEAR TERMS (2) POSITIONS
- MEMBER OF THE WAYNE STATE UNIVERSITY BOARD OF GOVERNORS 8 YEAR TERMS (2) POSITIONS
- JUSTICE OF THE SUPREME COURT 8 YEAR TERMS (2) POSITIONS

History, Arts and Libraries

# Results of the Election Precinct Results Search

*Criteria used:* -- *Election:* ***2004 GEN;***
-- *Office sought:* ***PRESIDENT OF THE UNITED STATES 4 YEAR TERM (1) POSITION;***
-- *County:* ***INGHAM;***

| County | Office Sought | City/Township Name | Precinct Identifier | COBB DAVID | BUSH GEORGE W. | KERRY JOHN F. | BADNARIK MICHAEL | PEROUTKA MICHAEL ANTHONY | NADER RALPH | BROWN WALTER | Precinct Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INGHAM | PRESIDENT OF THE UNITED STATES 4 YEAR TERM (1) POSITION | ALAIEDON TOWNSHIP | 1 | 0 | 220 | 178 | 1 | 0 | 1 | 0 | 400 |
| INGHAM | PRESIDENT OF THE UNITED STATES 4 YEAR TERM (1) POSITION | ALAIEDON TOWNSHIP | 2 | 0 | 264 | 196 | 0 | 0 | 3 | 1 | 464 |
| INGHAM | PRESIDENT OF THE UNITED STATES 4 YEAR TERM (1) POSITION | ALAIEDON TOWNSHIP | 3 | 1 | 360 | 267 | 1 | 0 | 1 | 0 | 630 |
| INGHAM | PRESIDENT OF THE UNITED STATES 4 YEAR TERM (1) | ALAIEDON | 4 | 1 | 244 | 197 | 2 | | | | |



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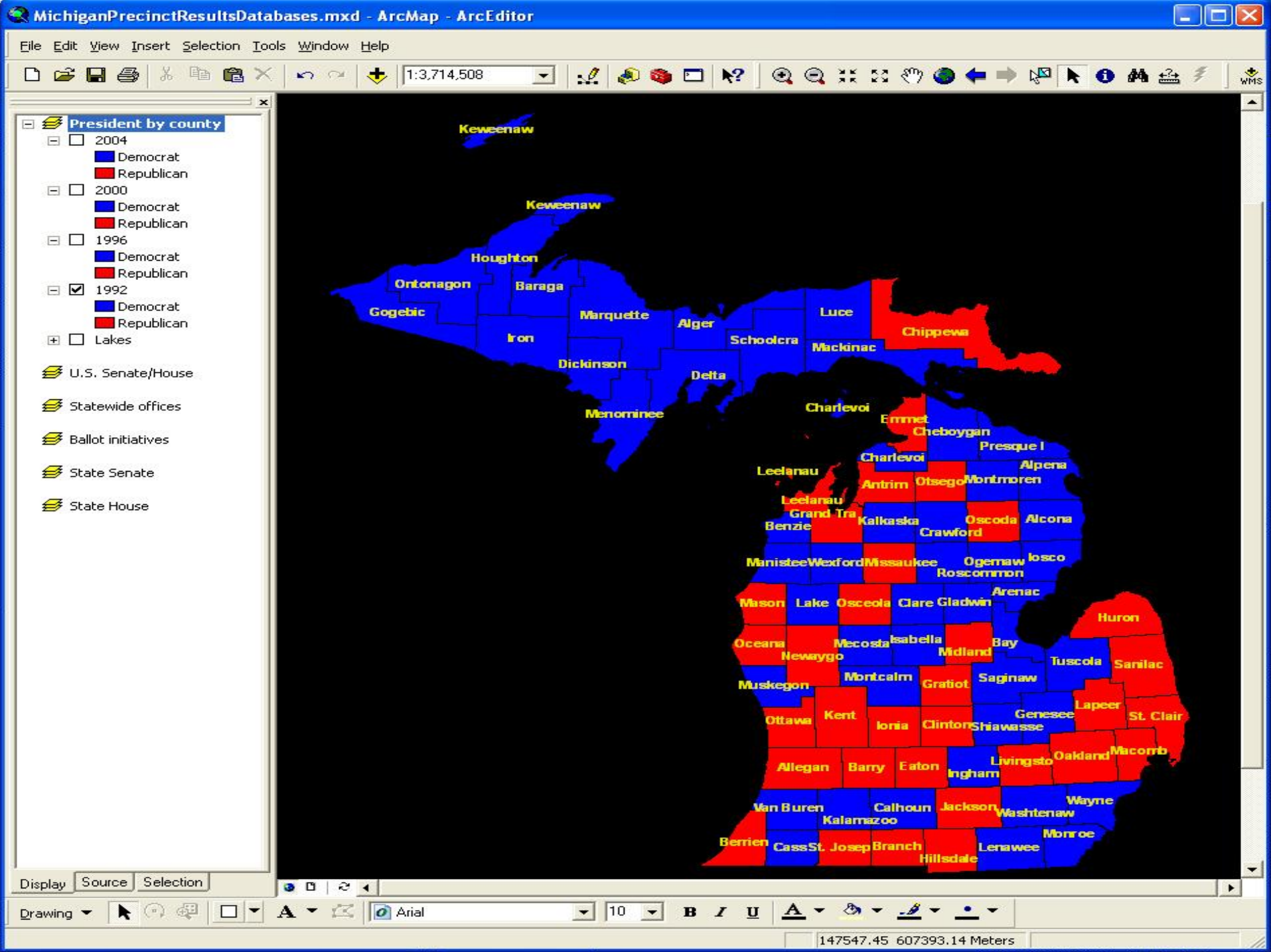
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President by county
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Statewide offices
Ballot initiatives
State Senate
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Otsego
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Muskegon
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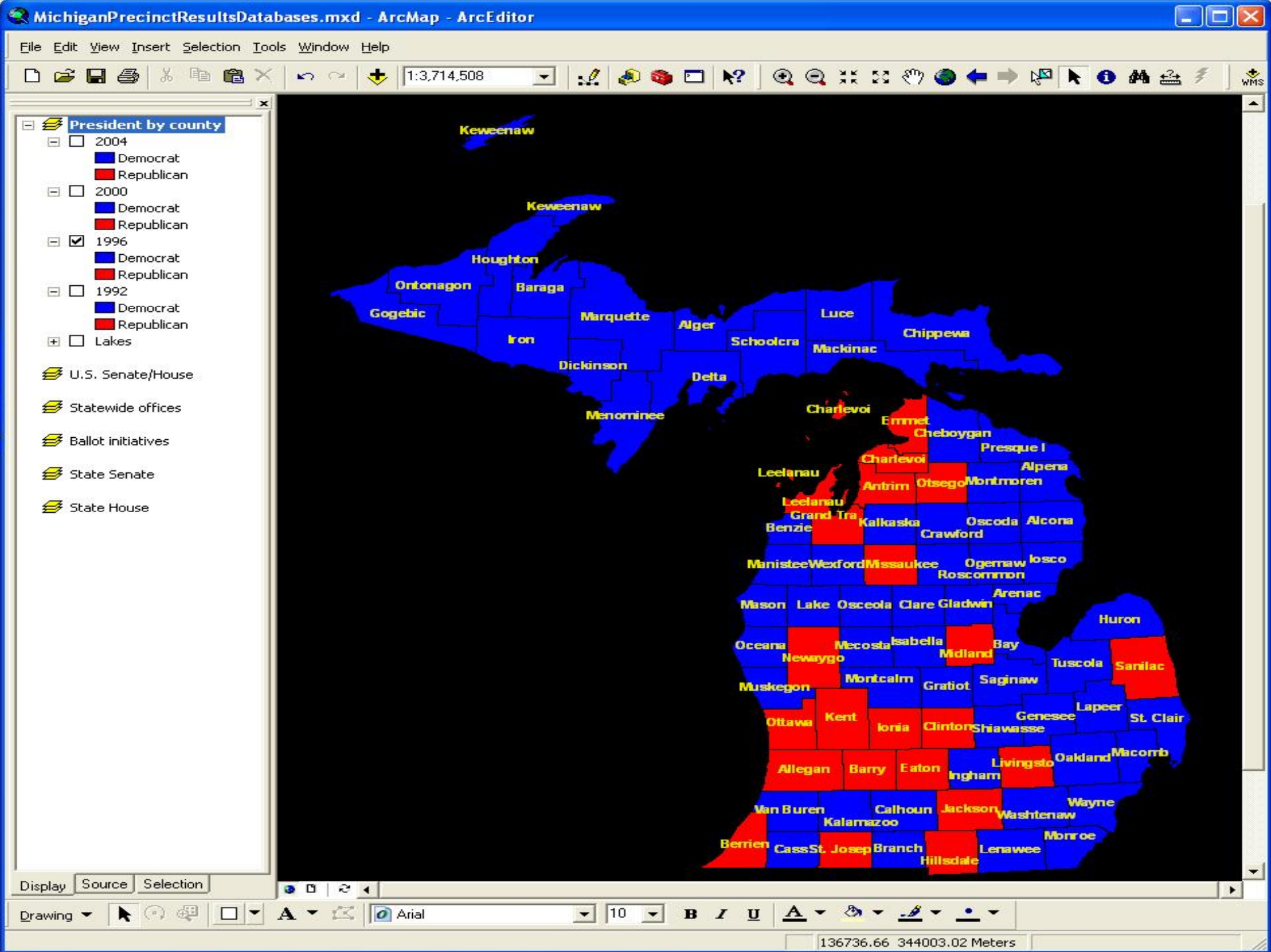
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Iosco
Roscommon
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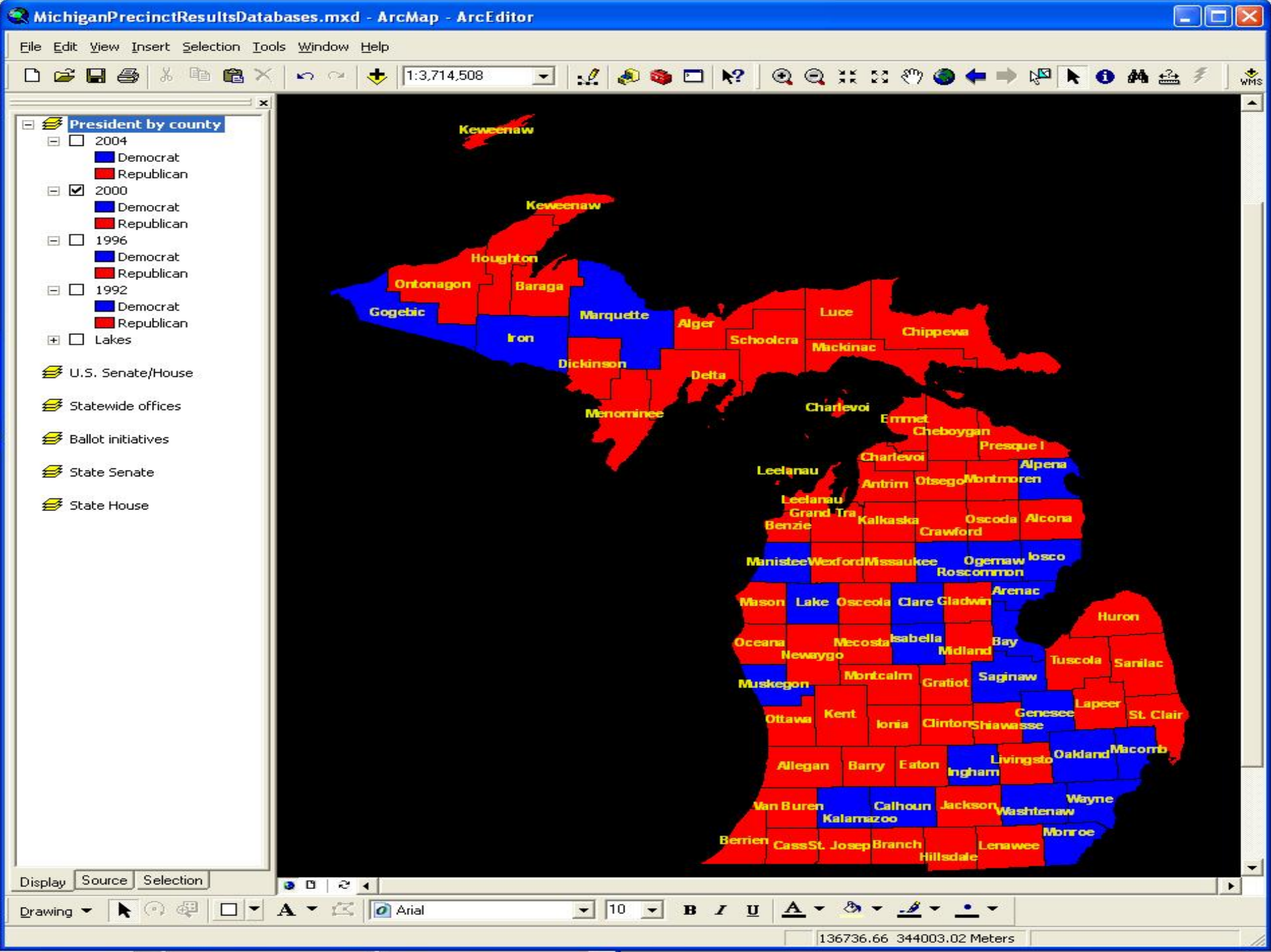
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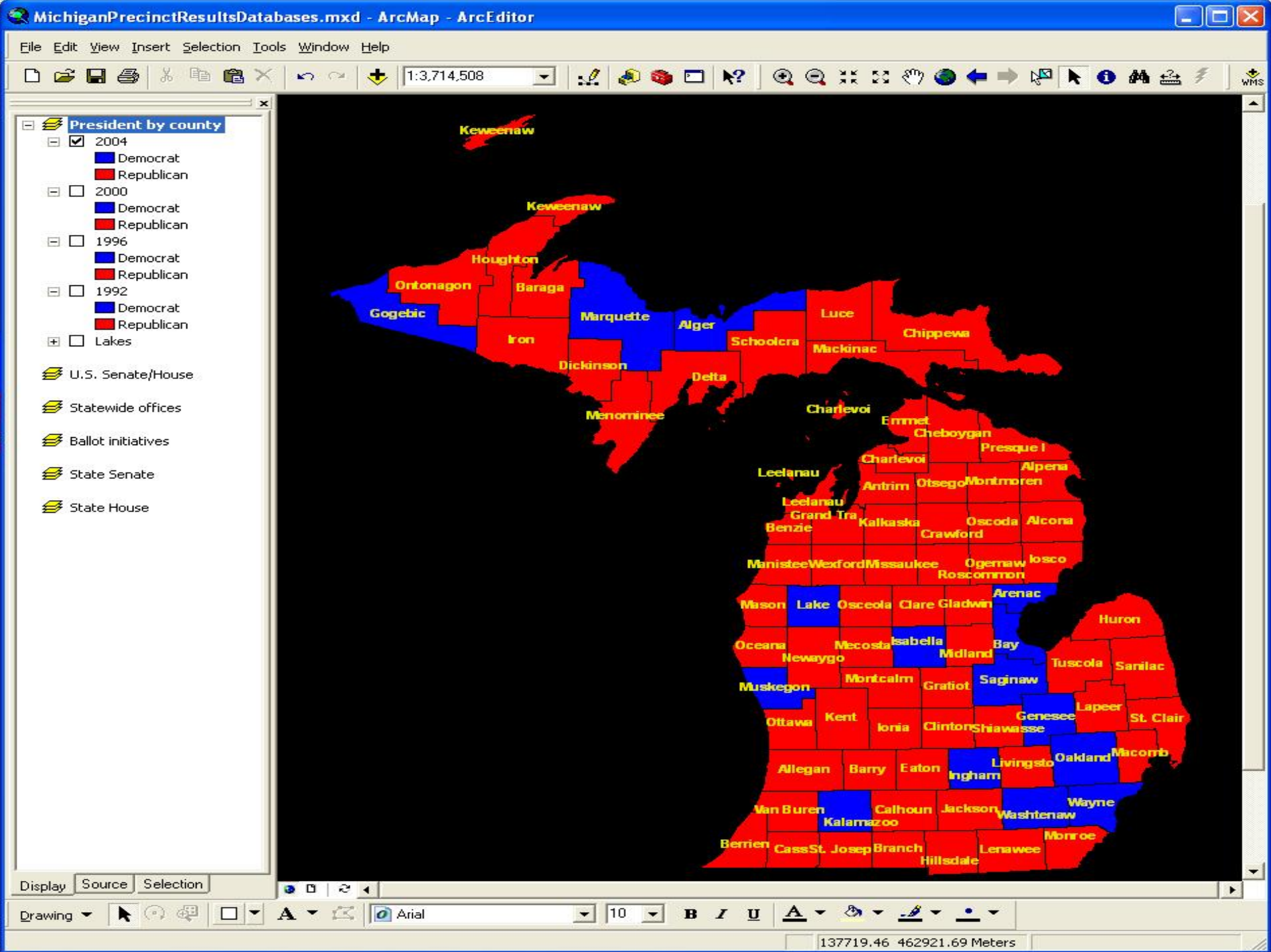
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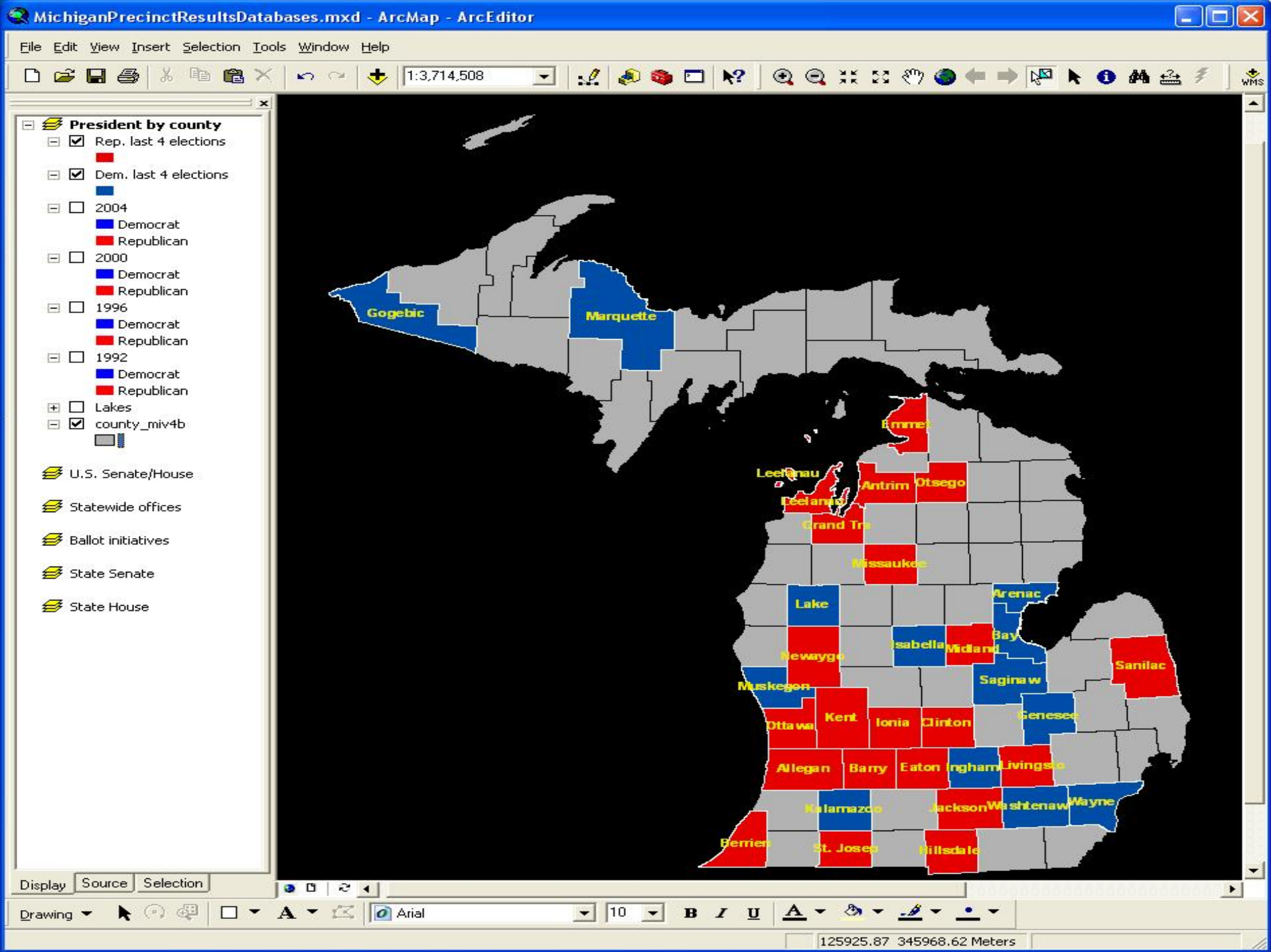
Washtenaw
Wayne
Monroe
Berrien
Cass
St. Josep
Branch
Hillsdale
Lenawee


MichiganPrecinctResultsDatabases.mxd - ArcMap - ArcEditor
File Edit View Insert Selection Tools Window Help
1:3,714,508
President by county
Rep. last 4 elections
Dem. last 4 elections
2004
Democrat
Republican
2000
Democrat
Republican
1996
Democrat
Republican
1992
Democrat
Republican
Lakes
county_miv4b
U.S. Senate/House
Statewide offices
Ballot initiatives
State Senate
State House
Display Source Selection
Drawing
Arial
10
Gogebic
Marquette
Emmet
Antrim
Otsego
Lake
Arenac
Bay
Isabella
Midland
Newaygo
Sanilac
Muskegon
Saginaw
Kent
Ionia
Clinton
Genesee
Ottawa
Allegan
Barry
Eaton
Ingham
Livingston
Kalamazoo
Jackson
Washtenaw
Wayne
Berrien
St. Joseph
Hillsdale
125925.87 345968.62 Meters

# For More Information

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