

# Analysis of Carbon Management GIS Data

Second Annual Conference on Carbon Sequestration  
May 6, 2003

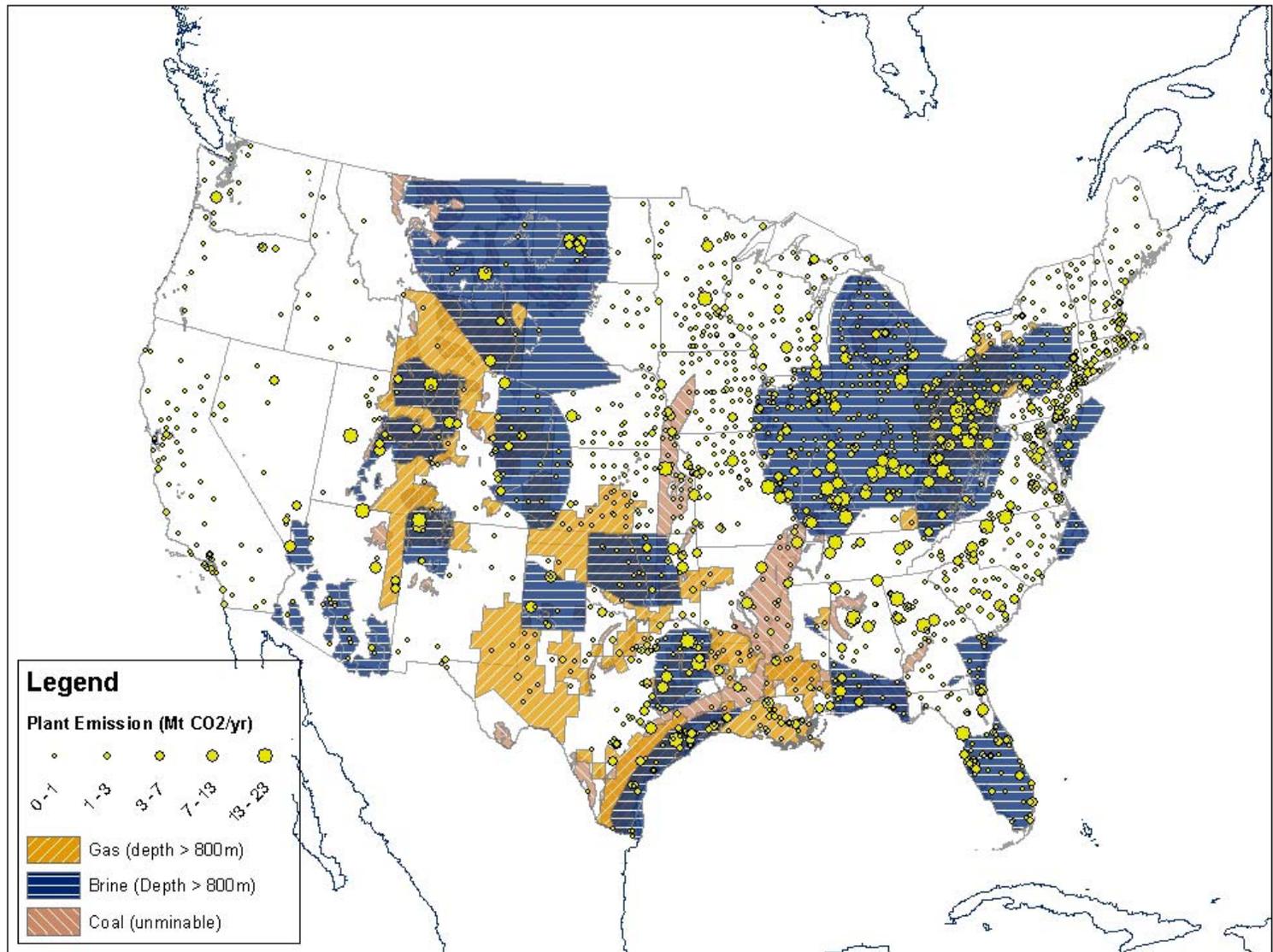
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# Geographic Information Systems

- Geographic Information System (GIS)
  - Tool to model, analyze and visualize spatial relationships between data
  - Composed of computer programs, data, and personnel
  - Increasingly used in areas of spatial analysis
- MIT's Carbon Management (CM) GIS is applying GIS tools to inform and support CM decisions

# MIT's CM Data

- Developing from public data sources
- Evaluating these GIS data sources
- A selection of data under consideration
  - Power Plants
  - Brine Aquifers
  - Coal Seams
  - Gas Reservoirs

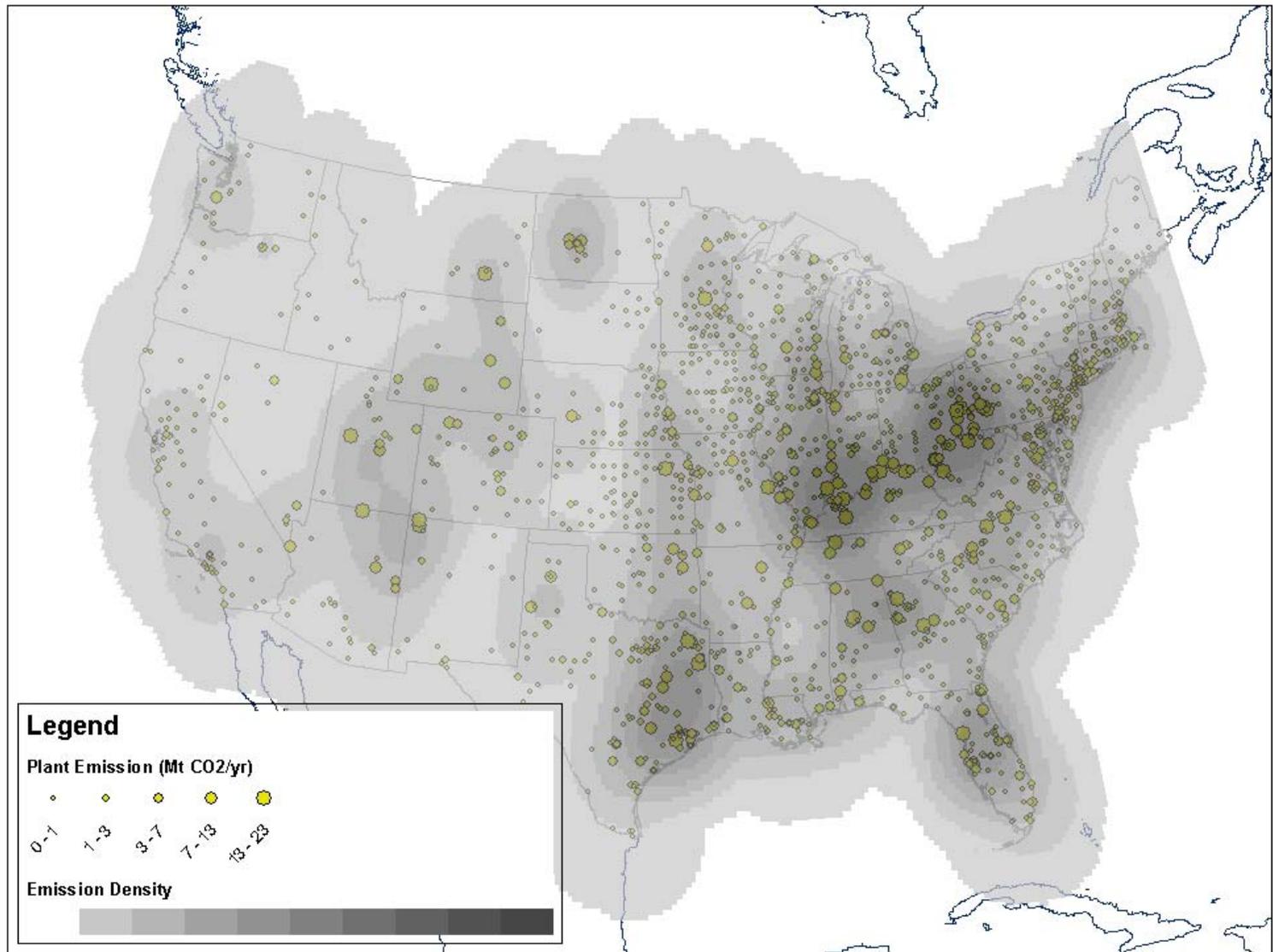


# Data Concepts

- Coverage
  - Geographic coverage of the area of interest
  - Resolution of information
- Characterization
  - Properties associated with items
  - Values used in analysis
- Timeliness
  - Up-to-date for analysis

# Power Plants

- E-Grid
  - Integration of federal databases
    - » Databases from EPA, EIA, FERC
    - » Previously confidential data
  - Data provided on U.S. power plants
    - » Air pollution emissions: SO<sub>2</sub>, NOX, CO<sub>2</sub>
    - » Generation resource mix
    - » Location and identification

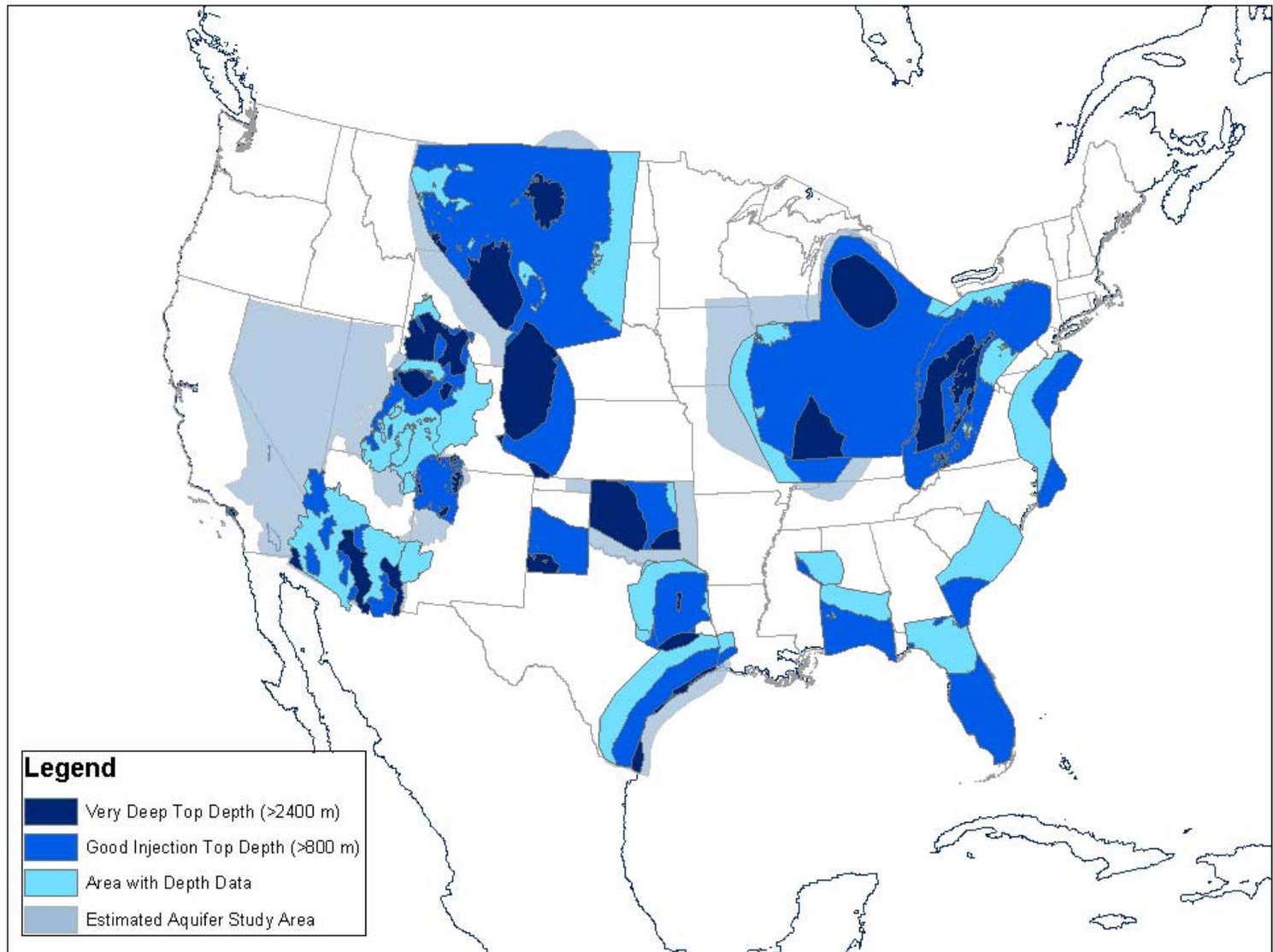


# Power Plant Data

- Coverage
  - » Plant level information on all U.S. power plants
- Characterization
  - » Emission quantities, but not flue gas concentration
  - » Does not include physical characteristics that may affect capture costs
- Timeliness
  - » Annual or Bi-annual updates

# Brine Formations

- University of Texas at Austin, Bureau of Economic Geology
  - Best compilation of available data
  - Specifically targeted to sequestration
  - DOE/NETL funded
  - 16 characteristics of 21 brine formations

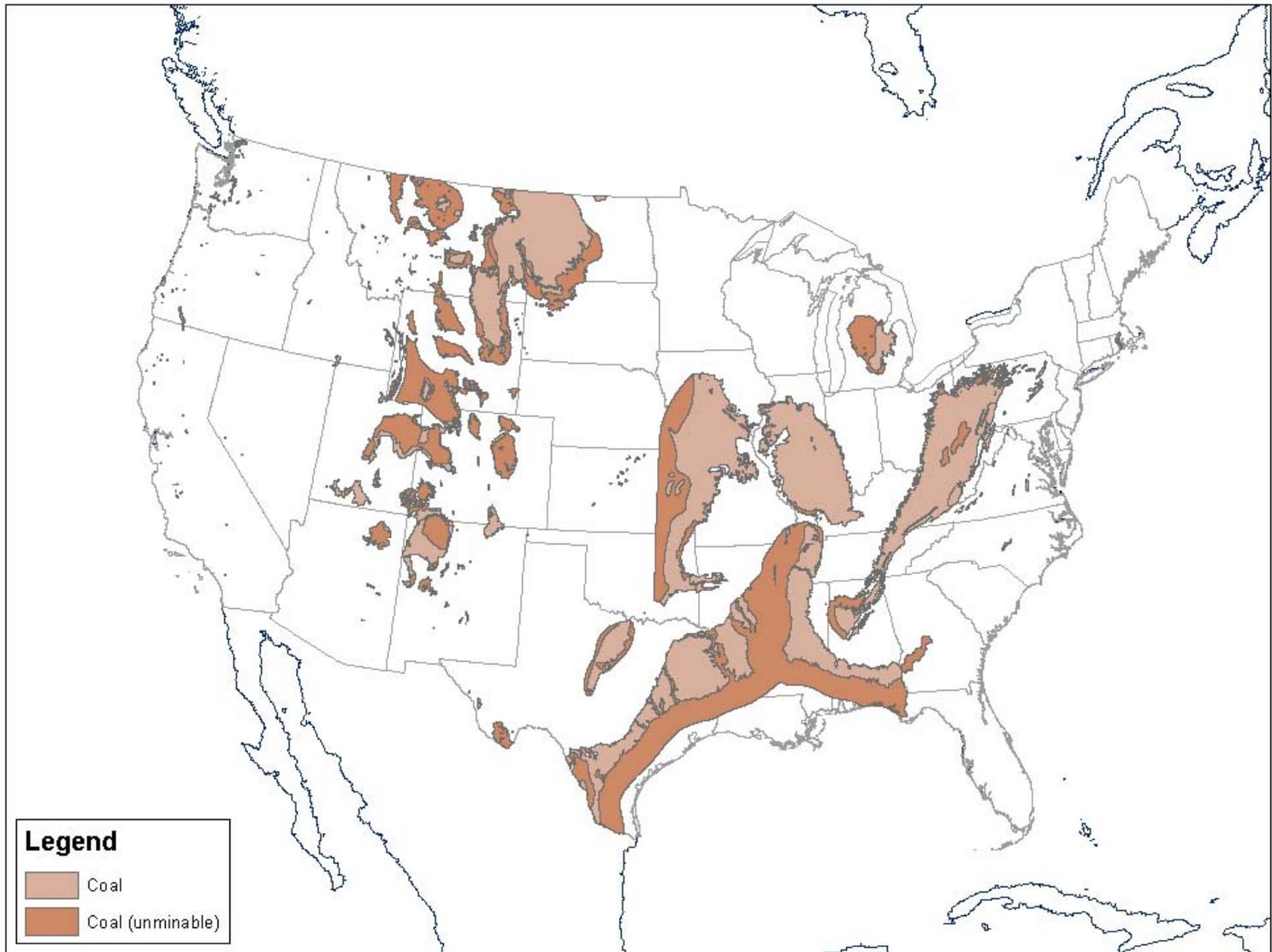


# Brine Data

- Coverage
  - » Most complete database, contains selected formations
  - » Better for regional screening than site selection
- Characterization
  - » Characterization data overlaps in only small regions
- Timeliness
  - » Contains the most up to date information
  - » Data is not routinely collected for brine formations

# Coal Fields

- Coal Fields of the United States
  - Classified coal areas as minable or unminable
  - Unminable areas potential sequestration site
- Data under development
  - Surveys of major coal regions
  - Enhanced coal-bed methane report



# Coal Field Data

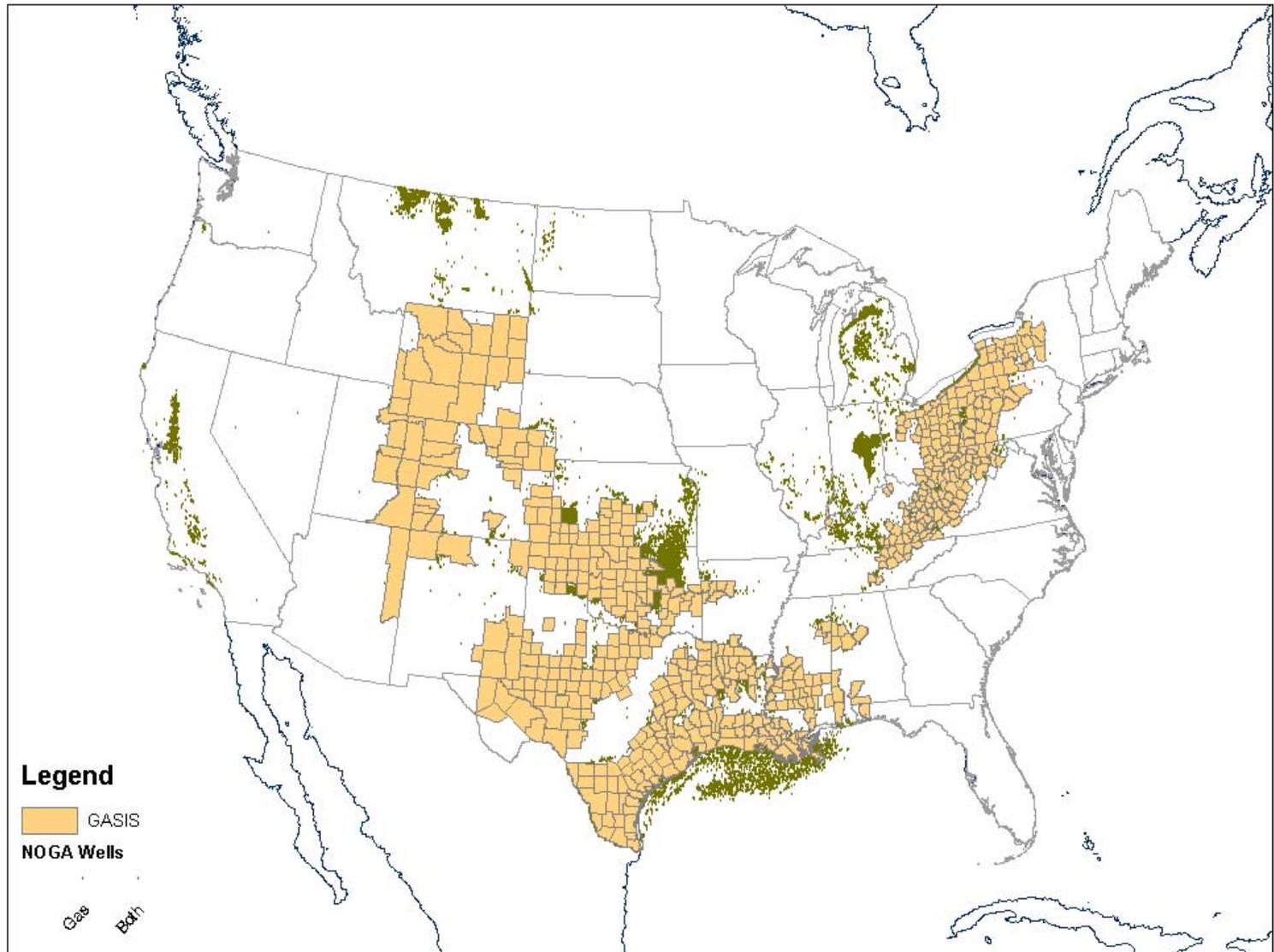
- Coverage
  - » Covers major coal seams
  - » Low resolution, only general areas
- Characterization
  - » No data on seam characteristics
  - » Selected core samples
- Timeliness
  - » Published by USGS 2001
  - » Data not typically collected on unminable seams

# Oil and Gas

- National Oil and Gas Assessment
  - Assessment of oil and gas reserves in the US
  - Well grids
    - » Location and number of wells per square mile
    - » Type of well: Oil, Gas, or Non-producing
  - Play definitions
    - » Estimates of remaining reserves in each play

# Oil and Gas

- Gas Information System (GASIS)
  - Compilation of datasets
    - » Gas Atlas: five regions
    - » Dwight's databases
  - Data provided:
    - » Field location and identification
    - » Reservoir properties and geology
    - » Production and reserves



# Oil and Gas Data

- Coverage
  - » NOGA has more complete coverage, but GASIS does cover majority of Oil and Gas reservoirs
  - » GASIS resolution inconsistent, most fields located by county
- Characterization
  - » GASIS provides good characterization
  - » NOGA has poor characterization for sequestration
- Timeliness
  - » GASIS data released 1999
  - » Future updates are not currently planned

# Closing Remarks

- GIS is valuable for CM decisions
- Databases are still evolving
  - Data not always sufficient for robust analyses
  - Coverage, Characterization, and Timeliness varies greatly between datasets
  - Recognition of data issues is important for interpreting results

# Acknowledgement

Special thanks to DOE and NETL for their sponsorship of this work

- Further information about the MIT Program on Carbon Capture and Storage can be found at [sequestration.mit.edu](http://sequestration.mit.edu).

# Data sources

- Power Plants
  - [www.epa.gov/airmarkets/egrid/](http://www.epa.gov/airmarkets/egrid/)
- Brine Aquifer
  - [www.beg.utexas.edu/environqlty/co2seq/disp/salnt.htm](http://www.beg.utexas.edu/environqlty/co2seq/disp/salnt.htm)
- Coal Seams
  - [nationalatlas.gov/coalfdm.html](http://nationalatlas.gov/coalfdm.html)
- Oil and Gas
  - [energy.cr.usgs.gov/oilgas/noga/](http://energy.cr.usgs.gov/oilgas/noga/)
  - [www.eea-inc.com/gasis.html](http://www.eea-inc.com/gasis.html)