

Creating a Distributed
NATional **CARB**on
Sequestration Database
and Geographic Information
System (**NATCARB**)



An Incomplete Author List

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- And Many Others

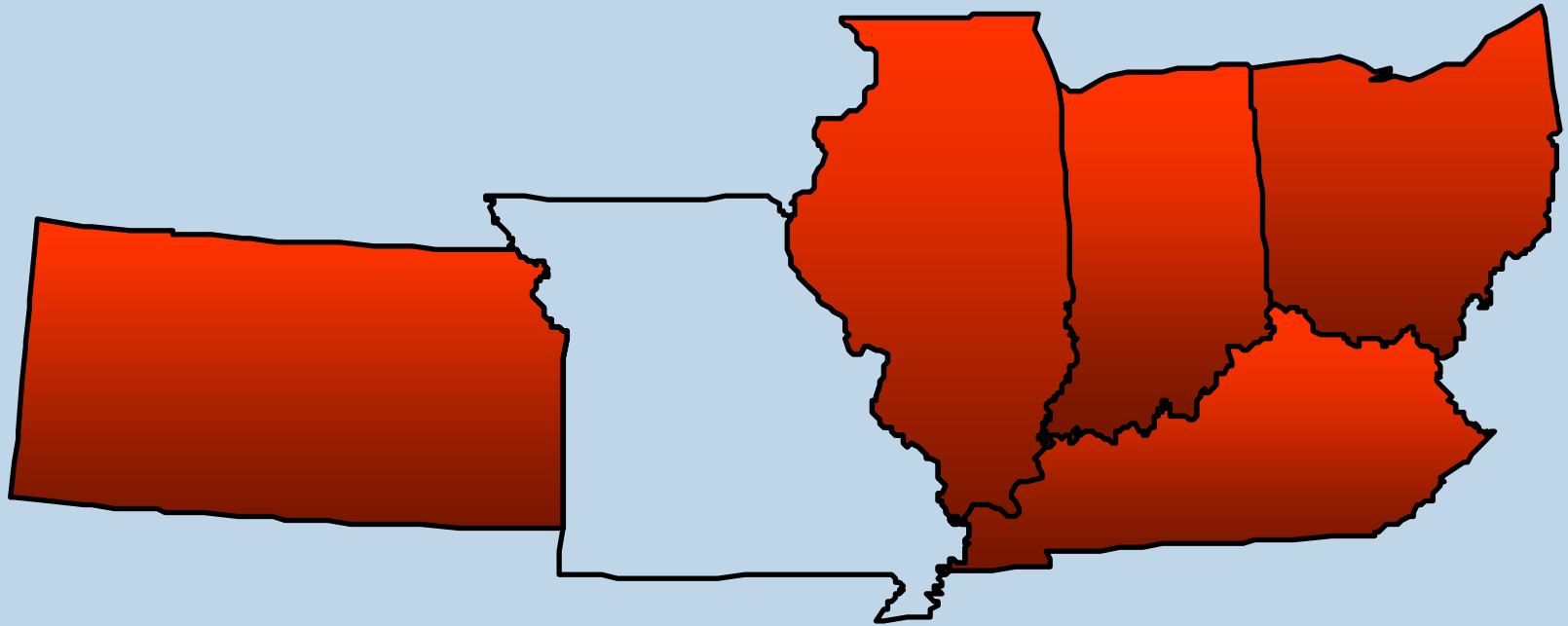


Goals

- Distributed National Database of Carbon Sequestration
 - MIDCARB ==> NATCARB
- Federation of Map Servers
 - Distribute the management
 - Distribute the computer resources/activity
 - Distribute the metadata
- Intelligent Portal
 - Interoperability through web mapping services
 - Tools to access and analyze the distributed data
- Partners
 - Increased synergy and communication among regions



Original MIDCARB Consortium



The MIDCARB (Midcontinent Digital Carbon Atlas and Relational DataBase) Carbon Sequestration Project

www.midcarb.org



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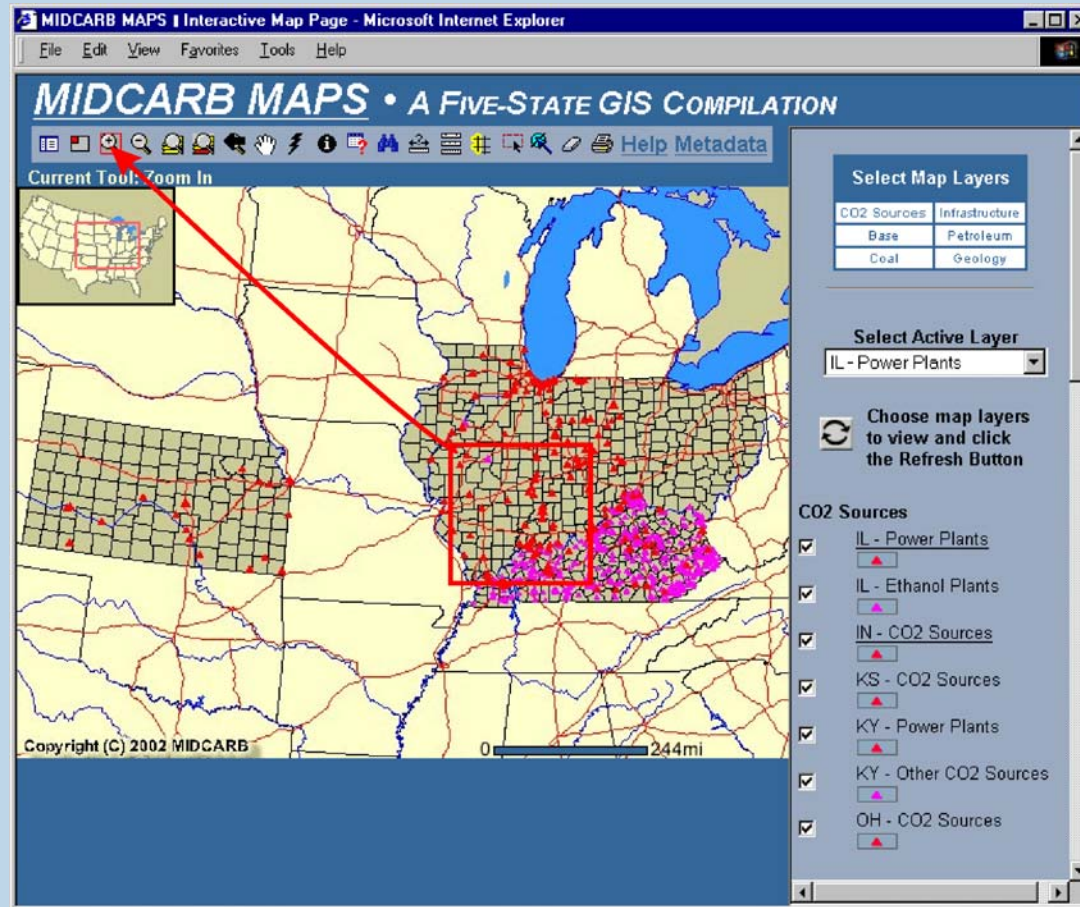
May 5, 2004, - 3:50 PM

MIDCARB Project Goals

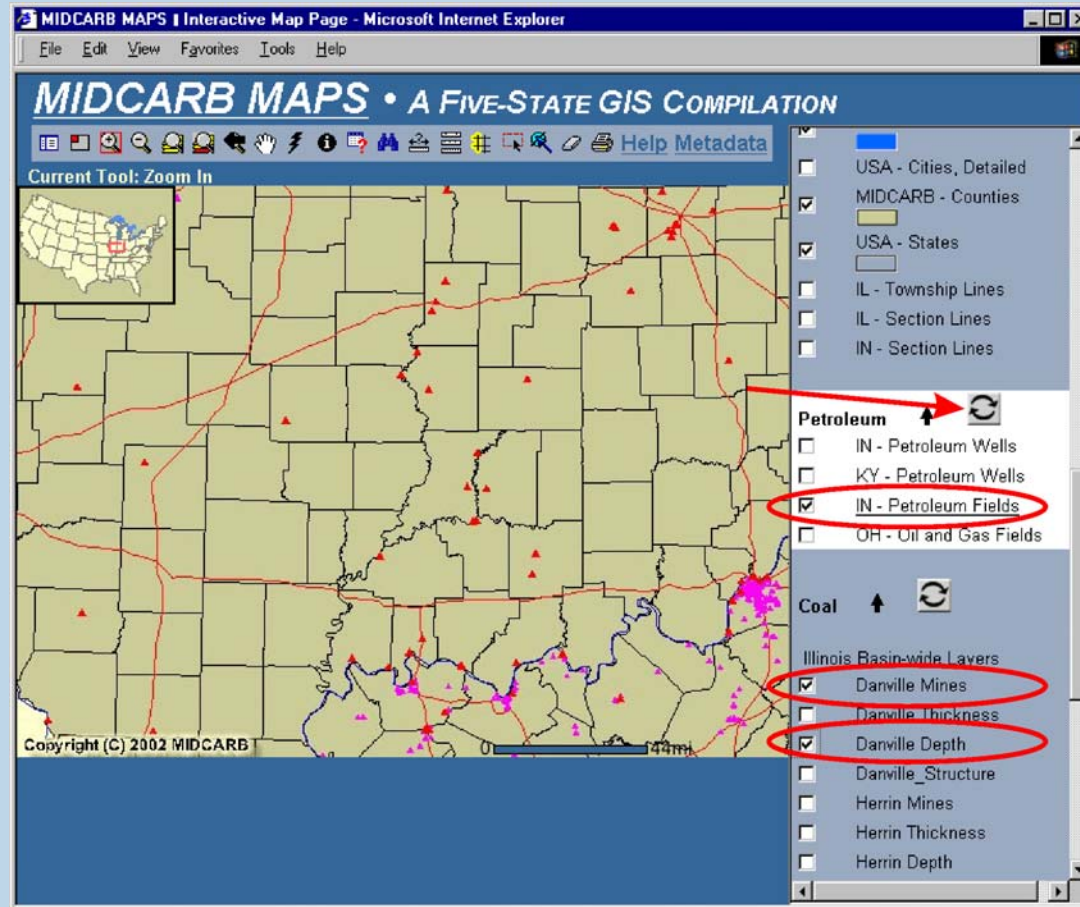
- Characterize Major CO₂ Sources
 - Quantity, Quality, Location
- Characterize Potential Sequestration Sites
 - Geology and Reservoir Characteristics
- Develop Relational/Spatial Databases
 - Local and Regional Reporting Levels
- Supply this data to the public
 - For use as tools in cost/feasibility analyses, etc.



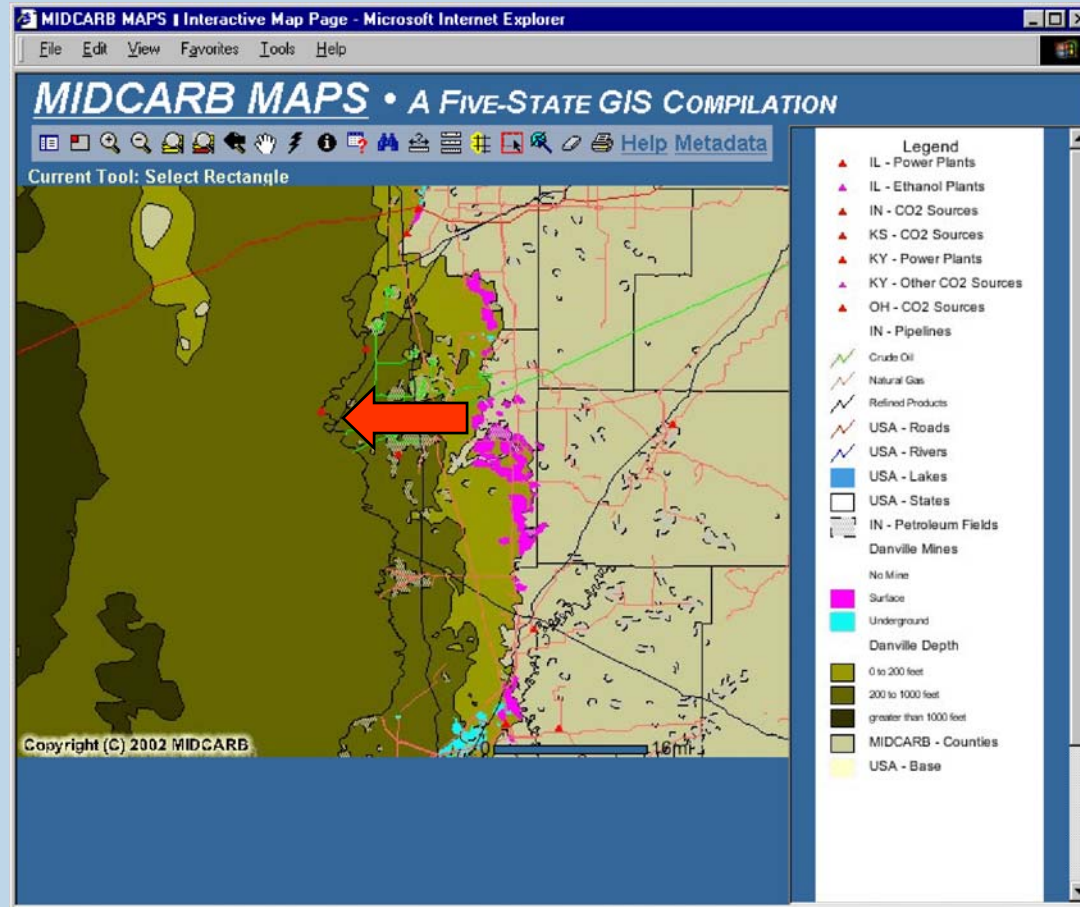
Carbon Sequestration Database Background



Carbon Sequestration Database Background



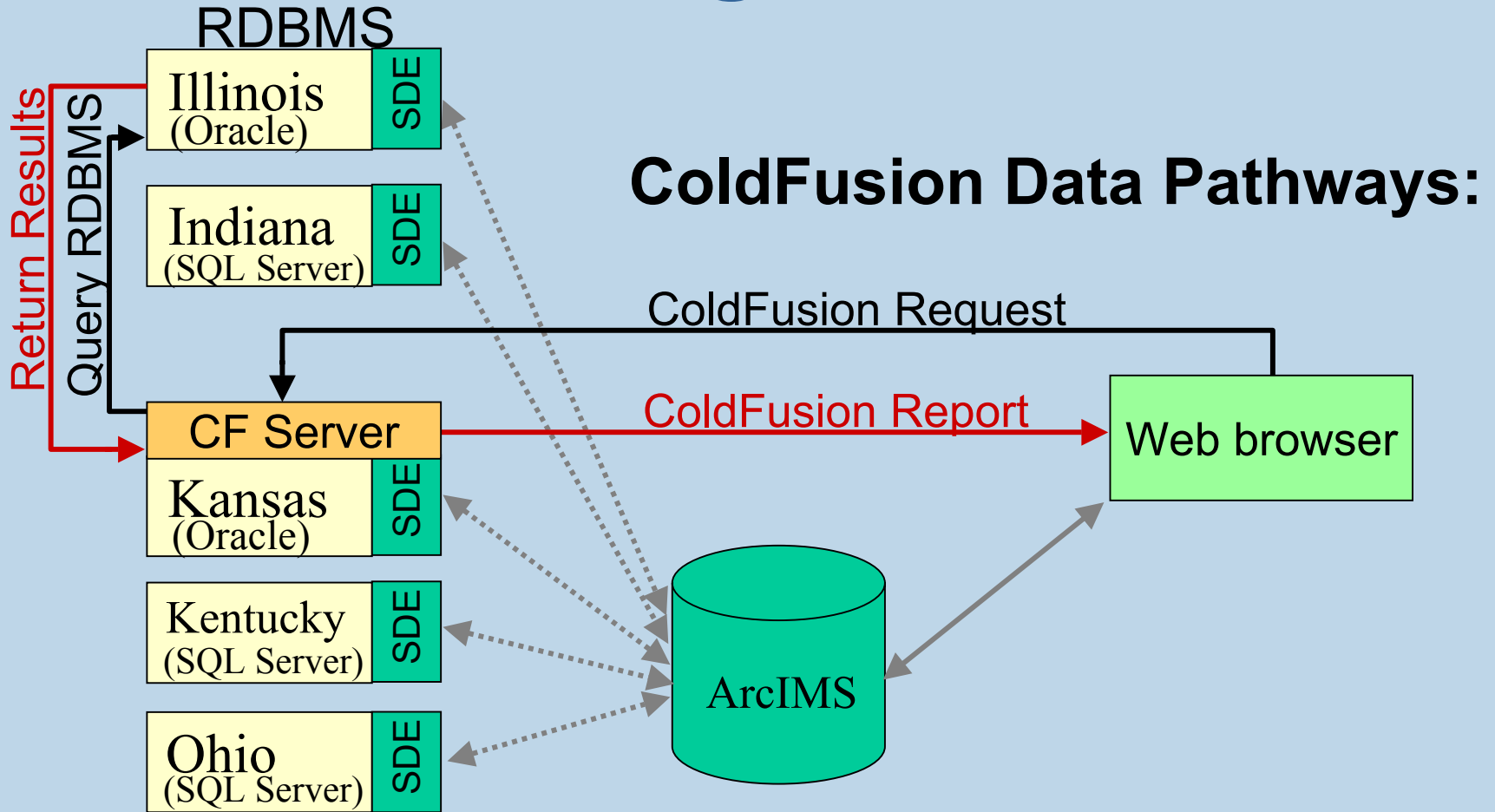
Carbon Sequestration Database Background



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Carbon Sequestration Database Background



Carbon Sequestration Database Background

MIDCARB - Generating Facility Emissions - Microsoft Internet Explorer

Illinois
HUTSONVILLE

Unit: 05; Boiler: Tangentially-fired
Rated Capacity (MWe): 83
Plant Operation Start: Feb 1, 1953
Most Recent Data: 1-2001

Data Type	Most Recent Data		
	Quarterly totals Jan 24, 2002	Cumulative for 2002	
CO2 (Tons)	48,761.00	349,524.30	Make Chart
SO2 (Tons)	1,100.40	7,865.60	Make Chart
NOX (Tons)	.53	.55	Make Chart
Heat Input (mmBtu)	475,262.00	3,406,655.00	Make Chart

Unit: 06; Boiler: Tangentially-fired
Rated Capacity (MWe): 83
Plant Operation Start: Jul 1, 1954
Most Recent Data: 1-2001

Data Type	Most Recent Data		
	Quarterly totals Jan 3, 2002	Cumulative for 2002	
CO2 (Tons)	39,829.40	323,901.60	Make Chart
SO2 (Tons)	886.90	7,236.50	Make Chart
NOX (Tons)	.50	.52	Make Chart
Heat Input (mmBtu)	388,196.00	3,156,939.00	Make Chart

Part of the MIDCARB project
Programs Updated Nov. 2001

MIDCARB - Illinois - Emissions Charts - Microsoft Internet Explorer

Illinois
HUTSONVILLE

Unit: 05; Boiler: Tangentially-fired
Rated Capacity (MWe): 83
Plant Operation Start: Feb 1, 1953
Most Recent Data: 1-2001

CO2 Tons Quarterly

Operating Hours Quarterly

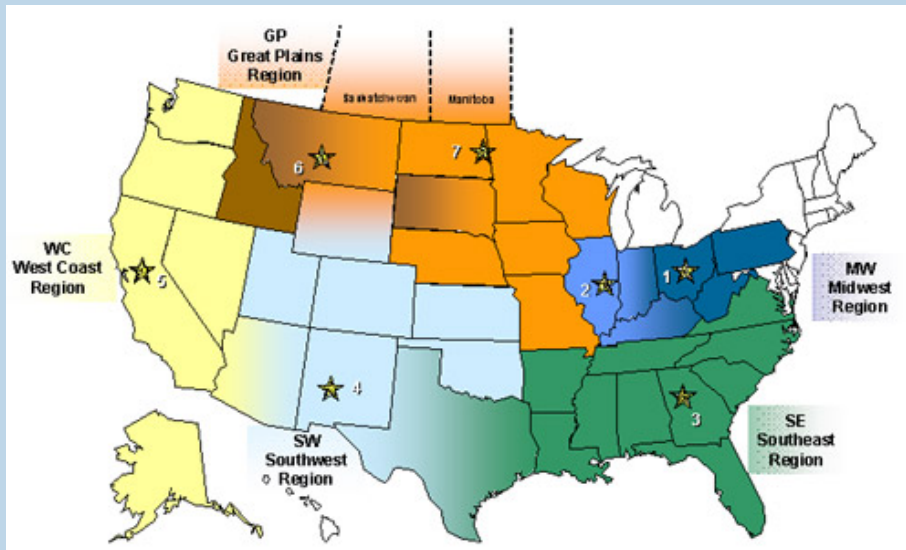


Carbon Sequestration Database Background

- 125 different layers from five different databases.
- No background database of metadata. The database was the AXL file.
- Hard to incorporate dynamic tools
 - Table of contents, Graphing
 - Built on lists of codes in javascript parameters file.
- Requests to multiple offsite databases for spatial data can be a performance bottleneck!
 - Performance heavily dependant on the off-site network speed for each server.
- SDE/ODBC Connections through a firewall problematic.



National Database For Carbon Sequestration



NATIONAL ENERGY TECHNOLOGY LABORATORY
CARBON SEQUESTRATION WEBSITE

Home | Site Index | Feedback

February 23, 2004

Regional Carbon Sequestration Partnerships

The U.S. Department of Energy has seven partnerships of state agencies, universities, and private companies that will form the core of a nationwide network to help determine the best approaches for capturing and permanently storing gases that can contribute to global climate change.

Building the Foundation and Infrastructure for Carbon Sequestration

- Regional Carbon Sequestration Partnerships
- Secretary Abraham's Announcements & Press Releases
- Meetings & Presentations
- NETL & Partnership Contacts
- Partnership Links
- FAQs

The partnerships include more than 140 organizations spanning 33 states, three Indian nations, and two Canadian provinces. In announcing the initiative

Last November, Secretary of Energy Spencer Abraham said the partnerships would become "the centerpiece" of expanded federal efforts to investigate the potential for carbon sequestration. The partnerships are a key part of President Bush's Global Climate Change Initiative (GCCCI).

Regional Carbon Sequestration Partnerships are a government/industry effort to create a nationwide network of partnerships to determine the most suitable technologies, regulations, and infrastructure needs for carbon capture, storage and sequestration in different areas of the country.

This initiative directly supports the President's Global Climate Change Initiative (GCCCI) goal of reducing greenhouse gas intensity by 18% by 2012 and will help ensure that a suite of commercially-ready sequestration technologies are available for the 2012 technology assessment mandated by the GCCCI. The geographical differences in fossil fuel use and sequestration sinks across the United States dictate that regional approaches will be required to address the sequestration of CO₂.

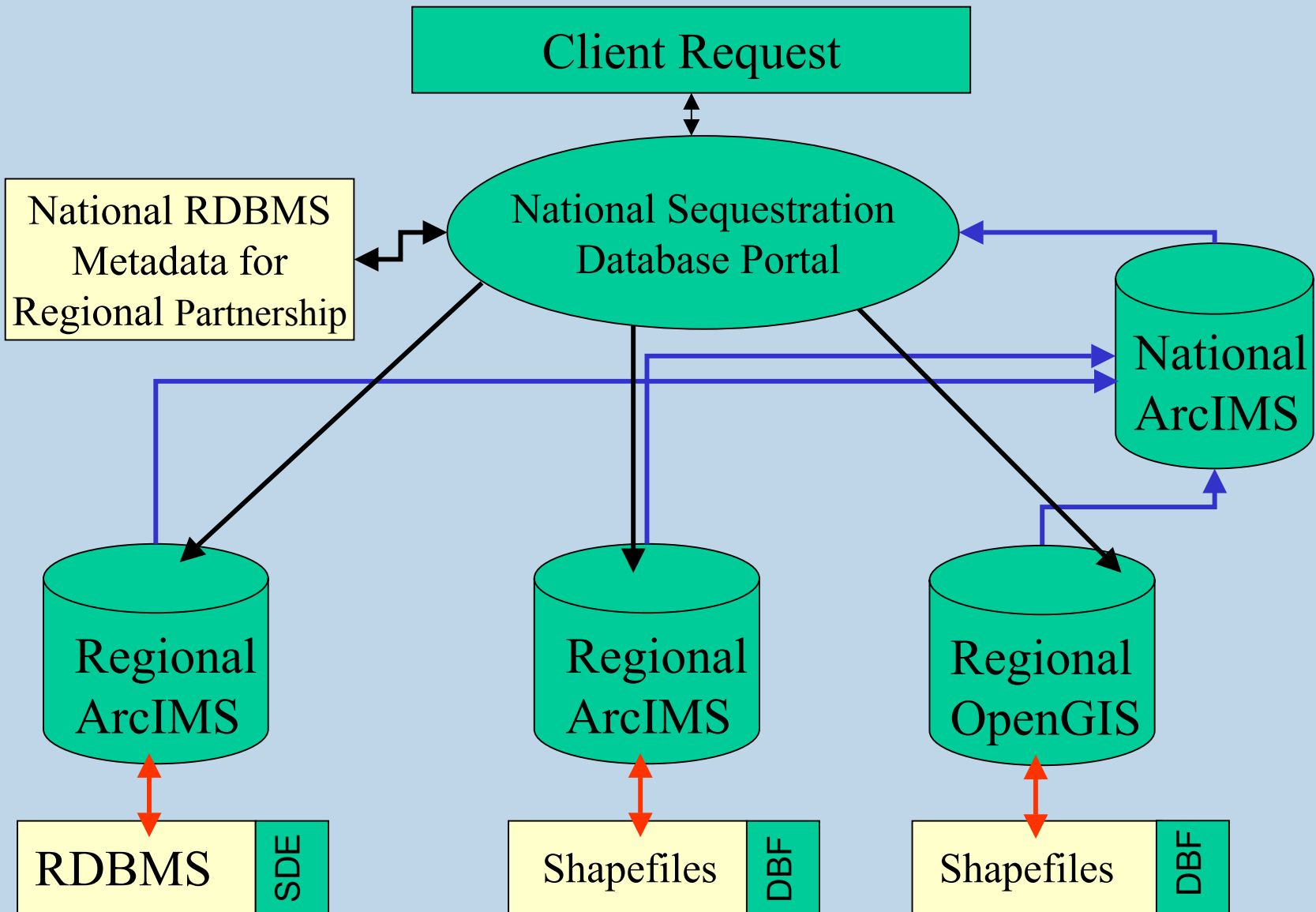


Federation of Web Mapping Services

What are the advantages of a distributed national database?

- De-centralization of metadata and data
- Local control over data layers (maintain, enhance, add)
- Portal is easily customized
- Data requests & structures are driven by XML (IMS-XML)
- Server Resources are split among different computers
- Portal can request data in a multithreaded fashion
- Portal can be interoperable with different databases in different formats
- Interaction among GIS/IT personnel across partnerships
- By incorporating and cooperating now we can answer national scale questions in the future





Metadata

- Portal serves as a central metadata repository and catalog:
 - Spatial information and data types are driven by local IMS servers
 - Repository allows for detailed information about models/datasets/calculations to be entered by the user and stored in the portal
- Regional partner requirements:
 - Publish data through ArcIMS
 - or Open GIS Consortiums (OGC) Web Mapping Service (WMS) and Web Feature Service (WFS)
 - Metadata publishing is pushed to the partnerships
- Distribute the management of the system to each partnership



Metadata: Map Service Metadata Application

Add Server Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address <http://drysdales.kgs.ku.edu/natcarb/midmanagement/addse> Go Links

Search Web Radio Music Games Sports News

MIDCARB Mapservice data entry

Add Server	Add Layer	Add Column	View Server	View Layer	View Column
----------------------------	---------------------------	----------------------------	-----------------------------	----------------------------	-----------------------------

Please Enter name and port of server you want to add

Server Name

Port

Internet



Metadata: Map Service Metadata Application

MIDCARB Mapservice data entry

[Add Server](#) [Add Layer](#) [Add Column](#) [View Server](#) [View Layer](#) [View Column](#)

Please Enter name and port of server you want to add

Server Name

Port

Connection to ims-dev.isgs.uiuc.edu succeeded

9 Map services found for ims-dev.isgs.uiuc.edu

Choose map service below and click on next to proceed and add server

- NG_Logs
- Counties
- Already present! IL_MIDCARB_030904
- Streets
- USA
- Washington
- demog
- Already present! midcarb_ks_test



Metadata: Map Service Metadata Application

MIDCARB Mapservice data entry

[Add Server](#) [Add Layer](#) [Add Column](#) [View Server](#) [View Layer](#) [View Column](#)

Please enter information below to complete the addition of drysdale.kgs.ku.edu to the server list

Server Name:

Service Name:

Mapservice Name:

Region:

States Served:

Can Portal access Map Server? Yes No

Contact Person:

Contact Number:

Contact Email:

Username for contact person:



Metadata: Map Service Metadata Application

Add Layer Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

MIDCARB Mapservice data entry

Add Server	Add Layer	Add Column	View Server	View Layer	View Column
------------	-----------	------------	-------------	------------	-------------

21 server(s) found in database

Please select server to which you want to add a layer and click next

corona.isgs.uiuc.edu - natcarb_ib_co2fac_test

next



Metadata: Map Service Metadata Application

Add Layer Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

MIDCARB Mapservice data entry

[Add Server](#)
[Add Layer](#)
[Add Column](#)
[View Server](#)
[View Layer](#)
[View Column](#)

Showing Layers for natcarb_ib_co2fac_test on corona.isgs.uiuc.edu

select	layername	ID	minscale	maxscale	minx	miny	maxx	maxy	layertype	featuretype
Add Layer										
Add Layer	IL Basin clipped	3			2491256.47309166	1269576.77737318	4188522.84051957	3166026.65101285	featureclass	polygon
Add Layer	MGSC Counties	2			2410933.67901281	1269576.71084634	5202522.67537691	3532124.38279832	featureclass	polygon
Add Layer	MGSC States	1			2410933.72643623	1269576.65043692	5202522.63177404	3532124.40924466	featureclass	polygon
View Layer	CO2 Facilities	0			2574462.53726404	1375722.71209232	5003409.25302528	3471730.51466225	featureclass	point



Metadata: Map Service Metadata Application

Add layer page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

MIDCARB Mapservice data entry

[Add Server](#) [Add Layer](#) [Add Column](#) [View Server](#) [View Layer](#) [View Column](#)

Adding Information for layer MGSC Counties for natcarb_ib_co2fac_test on corona.isgs.uiuc.edu

List of layer types	CO2 Sources
Display Name	MGSC Counties
Layer Group	None
Is layer queryable?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Layer Source (Source institution for data. For example, KGS or EPA)	
Can Layer be identified?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Column to use for rendering	OBJECTID
Layer Authentication	Full access
Is Layer Visible on Viewer?	Yes
Detailed Metadata	

save



Metadata: Map Service Metadata Application

Add layer page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

+ Back → Search Favorites Media

MIDCARB Mapservice data entry

Add Server	Add Layer	Add Column	View Server	View Layer	View Column
------------	-----------	------------	-------------	------------	-------------

Choose the Mapservice containing the layer to which you want to add columns and click submit

submit

Showing layers for drysdale.kgs.ku.edu
Select layer for which you want to add columns and click next

next



Metadata: Map Service Metadata Application

MIDCARB Mapservice data entry

[Add Server](#) [Add Layer](#) [Add Column](#) [View Server](#) [View Layer](#) [View Column](#)

Showing columns for layer [KS - Weir-Pitt Structure of KS_MIDCARB](#) on [drysdale.kgs.ku.edu](#)

[Add All Columns](#)

Add data	Name	Precision	Size	Type
Add Column	MIDCARB.STRCT_WPIT_UTM15_83.ID			featureclass
Add Column	MIDCARB.STRCT_WPIT_UTM15_83.GRIDCODE			featureclass
Add Column	#SHAPE#			featureclass
Add Column	MIDCARB.STRCT_WPIT_UTM15_83.OBJECTID			featureclass



Metadata: Map Service Metadata Application

Add Column page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

+ Back → Search Favorites Media

MIDCARB Mapservice data entry

Add Server Add Layer Add Column View Server View Layer View Column

Adding Information for column
MIDCARB.STRCT_WPIT_UTM15_83.ID for KS_MIDCARB on drysdale.kgs.ku.edu

Display Name

Column Units

Sequestration Column? Yes No

Is Visible? Yes No

Detailed Metadata

save



Interoperability Through Web Mapping Services

How does the portal communicate in real-time with the other Regional Partnerships?

1. A series of requests are generated based on the client input to the map portal. For example, the client would like to see the following:
 - Potential CO₂ storage in petroleum fields in Kansas,
 - Kansas and Illinois CO₂ sources,
 - Illinois net coal thickness
2. The portal simultaneously issues a request to the regional map servers to create an image of the data.
3. The portal stores the requested images locally and creates a world file for each image (so that the images can be georeferenced).
4. The portal IMS server creates a national map with the stored georeferenced images.



NATCARB

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

zoom in zoom out pan identify Reset Map

Overview Map

Table of Contents

Update Map Legend

Layer List Layer Order

Agricultural

Select All

National Land Cover Dataset

Aquifer

Base

CO2 Sources

Coal

Geology

Petroleum

Sequestration Layer

Done Internet



NATCARB

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

- zoom in
- zoom out
- pan
- identify
- Reset Map

Overview Map

Table of Contents

- Update Map
- Legend
- Layer List
- Layer Order

legend - Microsoft Internet Explorer

CO2 Sources

- OH_MIDCARB.DBO.CO2_FACILITIES
- KANSAS FACILITIES
- CO2 Sources
- SE Industry
- swnatcarbmissionsalb
- wcnatcarbmissions
- IL / IN / KY CO2 Facilities
- SE Power

NATCARB_SPATIAL.KS_FACILITIES_SDE

- AMMONIA
- CONCRETE
- ETHANOL
- NON-UTILITY
- REFINERY
- UTILITY

Geology

- Select All
- USGS Surface Geology
- Regional - Precambrian Structure
- Regional - Mount Simon Isopach
- OH Rose Run Isopach

Petroleum

- Sequestration Layer



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May 5, 2004, - 3:50 PM

NATCARB

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

- zoom in
- zoom out
- pan
- identify
- Reset Map

Overview Map

Table of Contents

Update Map Legend

Layer List Layer Order

Agricultural

Aquifer

Base

CO2 Sources

Coal

Geology

- Select All
- USGS Surface Geology
- Regional - Precambrian Structure
- Regional - Mount Simon Isopach
- OH Rose Run Isopach

Petroleum

Sequestration Layer

legend - Microsoft Internet Explorer

CO2 Sources

- OH_MIDCARB.DBO.CO2_FACILITIES
- KANSAS FACILITIES
- CO2 Sources
- SE Industry
- swnatcarbmissionsalb
- wcnatcarbmissions
- IL/IN/KY CO2 Facilities
- SE Power

NATCARB_SPATIAL_KS_FACILITIES_SDE

- AMMONIA
- CONCRETE
- ETHANOL
- NON-UTILITY
- REFINERY
- UTILITY

Geology

Done Internet



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NATCARB

natcarb - Microsoft Internet Explorer
 Address: http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_cor

NATCARB BETA FLASH SITE

Tools: Polygon, CO2 Buffer

Tools: zoom in, zoom out, pan, identify, Reset Map

legend - Microsoft Internet Explorer

CO2 Sources

- OH_MIDCARB.DBO.CO2_FACILITIES
- KANSAS FACILITIES
- CO2 Sources
- SE Industry
- swnatcarbemissionsalb
- wcnatcarbemissions
- IL/IN/KY CO2 Facilities
- SE Power

NATCARB_SPATIAL.KS_FACILITIES_SDE

- AMMONIA
- CONCRETE
- ETHANOL
- NON-UTILITY
- REFINERY
- UTILITY

Emissions Plot Applet should appear below, [Problem Loading Applet.](#)

Emissions
108 CO2

Y-axis: Billion CO2 (CO2) * 10⁶
 X-axis: Year (1995-2001)

Modify Plot

Convert Units: Display Grid Divide By CO2 (%)

Year: Annual Emission/Raw Data

Minimum:	11995	Maximum:	1100000.0
Maximum:	2002	Maximum:	1.0E7
Increment:	1	Color:	2.0

Java Applet Window

Done Internet



NATCARB

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Time search Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools
zoom in zoom out pan identify Reset Map

Overview Map

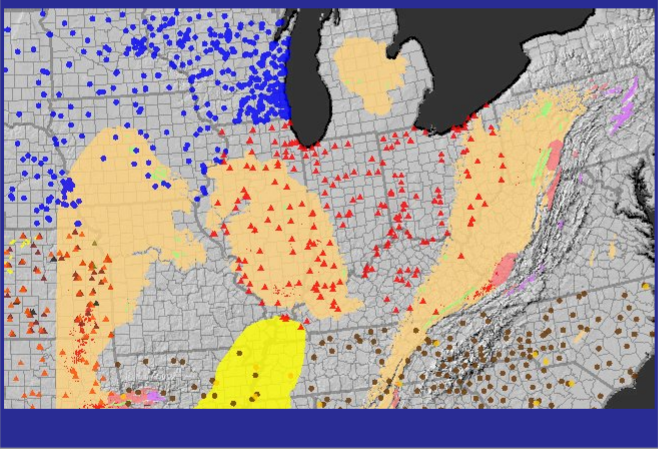


Table of Contents

Update Map Legend
Layer List Layer Order

Agricultural
Aquifer
Base
CO2 Sources

Coal

- Springfield Mines
- Herrin Structure
- Herrin Depth
- Herrin Thickness
- Herrin Mines
- Danville_Structure
- Danville Depth
- Danville Thickness
- Danville Mines
- Coal Basins and Coal Fields
- CBM Fields

Geology
Petroleum
Sequestration Layer

Done Internet

legend - Microsoft Internet Explorer

CO2 Sources

Coal

Coal Basins and Coal Fields

CBM Fields

Coal Basins and Coal Fields

- Anthracite
- Antracite
- Lignite
- Lignite
- LV Bituminous
- MV-HV Bituminous
- MV-HV Bituminous
- Unclassified
- Sub-Bituminous
- Sub-Bituminous



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May 5, 2004, - 3:50 PM

NATCARB

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Time search Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

zoom in zoom out pan identify Reset Map

Overview Map

Table of Contents

Update Map Legend

Layer List Layer Order

Layer Order

up down

- CO2 Sources
- OH - OIL GAS FIELDS
- Coal Basins and Coal Fields
- CBM Fields
- National Elevation Dataset Shaded Relief

legend - Microsoft Internet Explorer

CO2 Sources

Coal

Coal Basins and Coal Fields

CBM Fields

Coal Basins and Coal Fields

- Anthracite
- Anthracite
- Lignite
- Lignite
- LV Bituminous
- LV Bituminous
- MV-HV Bituminous
- MV-HV Bituminous
- Unclassified
- Sub-Bituminous
- Sub-Bituminous



Intelligent Portal

- Use the metadata catalog to build “Intelligent” requests (XML) to the federation of loosely coupled map services.
- The map table of contents is a dynamic system that runs off the metadata catalog.



NATCARB Intelligent Portal

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

zoom in zoom out pan identify Reset Map

Overview Map

Table of Contents

Update Map Legend
Layer List Layer Order

Agricultural

Aquifer

Base

CO2 Sources

Coal

Geology

Petroleum

Select All

KS Cumulative Gas Production

OH - OIL GAS FIELDS

IL - Oil and Gas Fields

IN - Oil and Gas Fields

Sequestration Layer



NATCARB Intelligent Portal

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Seq Buffer

buffer distance(in miles) 50

Overview Map

Table of Contents

Update Map Legend

Layer List Layer Order

Agricultural

Aquifer

Base

CO2 Sources

Coal

Geology

Petroleum

Select All

KS Cumulative Gas Production

OH - OIL GAS FIELDS

IL - Oil and Gas Fields

IN - Oil and Gas Fields

Sequestration Layer

http://drysdale.kgs.ku.edu/natcarb/midflash/buffer_summa...

MIDCARB.PETRO_CO2_STORAGE.CO2_TOTAL 25,189,393.00 TONS

Done Internet



NATCARB Intelligent Portal

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

zoom in zoom out pan identify

Overview Map

Table of Contents

Agricultural

Select All
 National Land Cover Dataset

Aquifer

Base

CO2 Sources

Coal

Geology

Petroleum

Sequestration Layer

Done Internet



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May 5, 2004, - 3:50 PM

NATCARB Intelligent Portal

The screenshot shows a Microsoft Internet Explorer browser window displaying the NATCARB Beta Flash Site. The browser's address bar shows the URL: http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html. The website has a blue background and features several interactive elements:

- Tools:** A section with buttons for "Tools", "Polygon", and "CO2 Buffer". Below this, there are radio buttons for "zoom in", "zoom out", "pan", and "identify", along with a "Reset Map" button.
- Overview Map:** A small map of the United States with a white box indicating the current map's location.
- Table of Contents:** A panel on the right side with buttons for "Update Map", "Legend", "Layer List", and "Layer Order".
- Agricultural Layer:** A section with a "Select All" button and a checked checkbox for "National Land Cover Dataset".
- Other Layers:** A list of layers including "Aquifer", "Base", "CO2 Sources", "Coal", "Geology", "Petroleum", and "Sequestration Layer".

The main map area displays a colorful, multi-layered map of a region, likely the Midwestern United States, showing various land cover and CO2 sources. The map is overlaid with a grid and contains numerous small red triangles. The browser's status bar at the bottom shows "Done" and "Internet".



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May 5, 2004, - 3:50 PM

NATCARB Intelligent Portal

natcarb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html Go Links

Search Web Radio Music Games Sports News Movies HotStuff

NATCARB BETA FLASH SITE

Tools Polygon CO2 Buffer

Tools

zoom in zoom out pan identify

Overview Map

Table of Contents

Agricultural

Select All
 National Land Cover Dataset

Aquifer

Base

CO2 Sources

Coal

Geology

Petroleum

Sequestration Layer

Done Internet



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May 5, 2004, - 3:50 PM

NATCARB Intelligent Portal

The screenshot shows a web browser window titled "natcarb - Microsoft Internet Explorer". The address bar displays "http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The address bar also shows "Back", "Forward", "Home", "Search", "Favorites", "Media", and "Go" buttons. Below the address bar is a toolbar with "Tune search", "Search Web", "Radio", "Music", "Games", "Sports", "News", "Movies", and "HotStuff" buttons.

The main content area is titled "NATCARB BETA FLASH SITE" and features a navigation menu with "Tools", "Polygon", and "CO2 Buffer" buttons. The "Tools" menu is expanded, showing "zoom in", "zoom out", "pan", "Identify", and "Reset Map" options. To the right of the main map is an "Overview Map" showing a small map of the United States with a red square indicating the current map's location. Further right is a "Table of Contents" panel with "Update Map", "Legend", "Layer List", and "Layer Order" buttons. Below this panel is a list of layers under the "Agricultural" category, with "National Land Cover Dataset" selected. Other categories listed include "Aquifer", "Base", "CO2 Sources", "Coal", "Geology", "Petroleum", and "Sequestration Layer".

The browser's status bar at the bottom shows "Done" and "Internet".



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May 5, 2004, - 3:50 PM

NATCARB Intelligent Portal

The screenshot shows a Microsoft Internet Explorer browser window displaying the NATCARB Beta Flash Site. The address bar shows the URL: http://drysdale.kgs.ku.edu/natcarb/midflash/natcarb_content.html. The browser interface includes a menu bar (File, Edit, View, Favorites, Tools, Help), a search bar, and a toolbar with various navigation and utility icons.

The website content is titled "NATCARB BETA FLASH SITE" and features a central map area. Above the map, there are navigation tabs for "Tools", "Polygon", and "CO2 Buffer". The "Tools" tab is active, showing options for "zoom in", "zoom out", "pan", and "identify", along with a "Reset Map" button. To the right of the main map is an "Overview Map" showing a small map of the United States with a white box indicating the current map's location.

On the right side of the page, there is a "Table of Contents" panel. It includes buttons for "Update Map", "Legend", "Layer List", and "Layer Order". Under the "Agricultural" section, there is a "Select All" checkbox and a checked checkbox for "National Land Cover Dataset". Below this, there is a scrollable list of other layers: "Aquifer", "Base", "CO2 Sources", "Coal", "Geology", "Petroleum", and "Sequestration Layer".

The browser's status bar at the bottom shows "Done" on the left and "Internet" on the right.



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National Sequestration Database

- Tools help answer technical and policy questions.
- Provides tools to access non-spatial data in a spatial way.
 - Emissions analysis for one power plant (identify) or many power plants (select all in a region).
 - Sequestration potential over multiple depths and datasets within a particular region (buffer around a power plant).
- Integrated but Distributed
 - Across Regions
 - Across Data Types



Partners

- DOE
- DOE-EIA
- EPA (Database on Emissions)
- Department of Agriculture
- USGS
- Partnerships
- Industry
- Universities

National Databases - Partnerships can correct, update, enhance and pass corrections back to the source.



Conclusions

- Distributed National Database of Carbon Sequestration
 - National databases and local databases
- Federation of IMS Servers
 - Distribute management
 - Distribute computer resources
 - Distribute metadata
- Intelligent Portal
 - IMS Interoperability
 - Tools that can access/analyze/display distributed data
- Partners
 - Increased synergy and communication

Online at the Booth

