

# Creating a Distributed **National Carbon** Sequestration Database and Geographic Information System (**NatCarb**)

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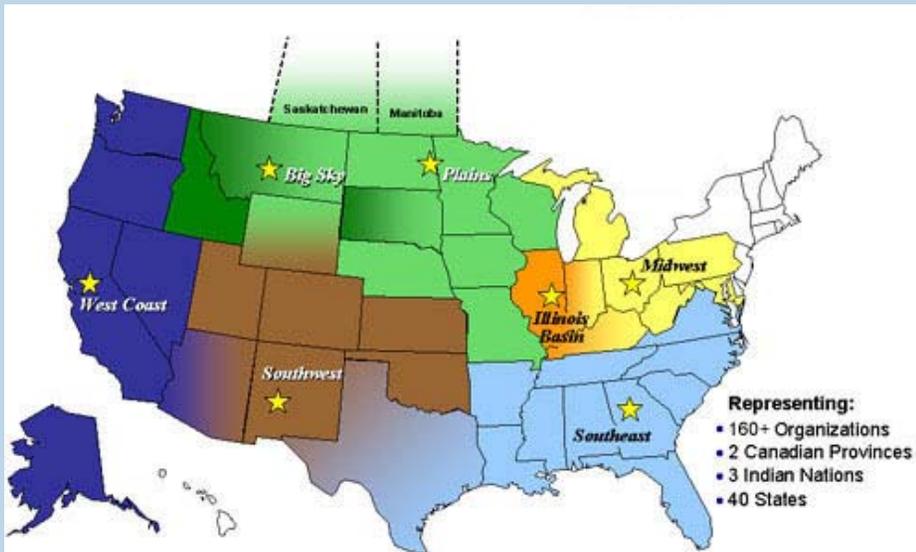


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2004 Annual Program Review Meeting

*November 16-17, 2004*

# National Database For Carbon Sequestration



NETL - Regional Carbon Sequestration Partnerships - Netscape

NATIONAL ENERGY TECHNOLOGY LABORATORY  
CARBON SEQUESTRATION

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## Regional Carbon Sequestration Partnerships

*Building the Foundation and Infrastructure for Carbon Sequestration*

Regional Carbon Sequestration Partnerships and Web Links  
Secretary Abraham's Announcements & Press Releases  
NETL & Partnership Contacts  
DOE Partnership Factbooks  
FAQs

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.

The partnerships include 160 organizations spanning 40 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 (GCCI).

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 (GCCI) 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 GCC. The geographical differences in fossil fuel use and sequestration sinks across the United States dictates that regional approaches will be required to address the sequestration of CO<sub>2</sub>.

[Return to top of page](#) Last Updated: 10/28/04

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U.S. Department of Energy



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# NatCarb Over-Arching Goals

- Connection
  - Bring Society Together with Solutions
  - Complete Online Access
- Complexity
  - Harder to Display
  - Harder to Analyze (Integrate Data with Models)
  - Harder to Manage
- Coordination
  - Bring the Players Together
  - Bring the Data Together

**Provide Basis for Better Policies and Decisions**

**Connect the Dots**



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# Goals

- Distributed National Database of Carbon Sequestration
  - Characterize Major CO<sub>2</sub> Sources (power, ethanol, & cement plants) & Potential Sequestration Sites (petroleum, coal, aquifers, terrestrial-landuse practices).
  - Provide other ancillary data that may help in identifying sequestration sites (pipelines, population centers, infrastructure, federal lands)
- Federation of Map Servers
  - MIDCARB → NatCarb
  - Distribute the management
  - Distribute the computer resources/activity
  - Distribute the metadata
- Intelligent Portal
  - Interoperability through web mapping services
  - Build tools to access and analyze the distributed data off of standard IMS get\_features responses
- Partners
  - Increased synergy and communication among Partnerships and outside of Partnerships

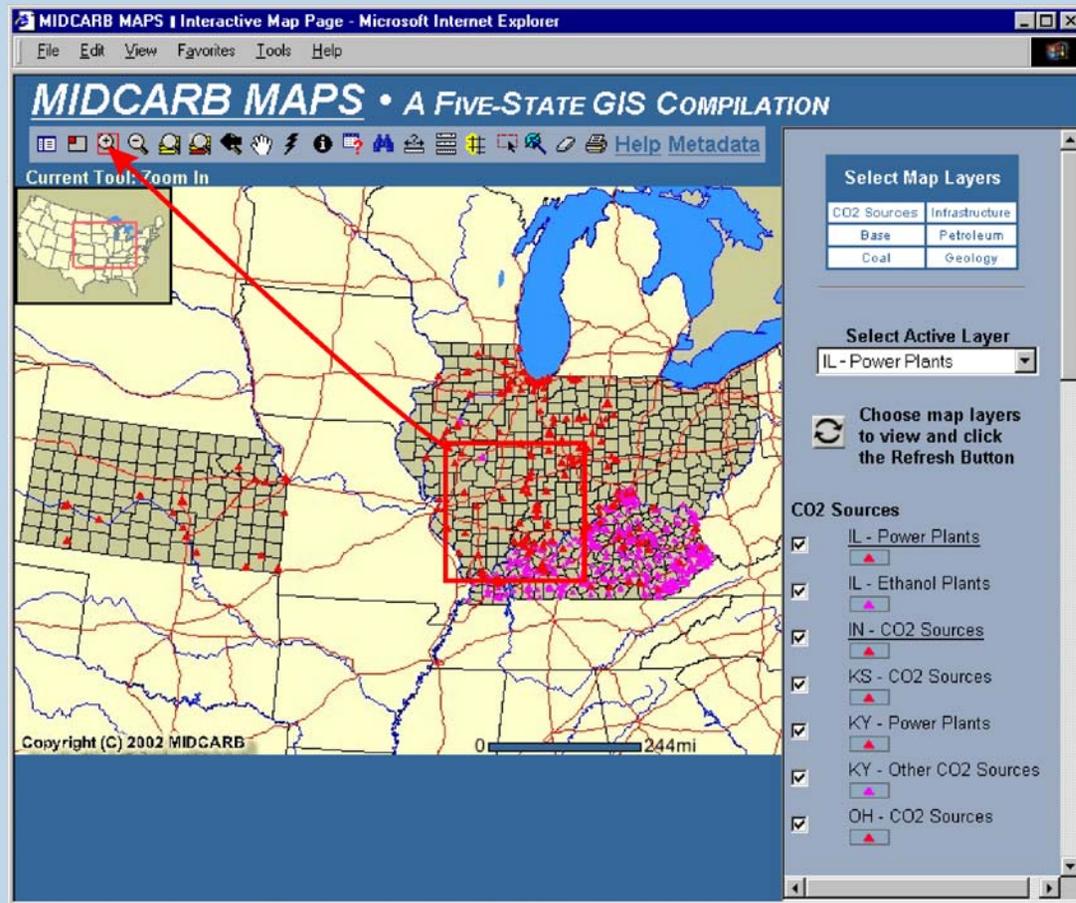


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# MIDCARB Browser



**Limited Tools**  
**Limited Coverage**  
**Direct Database Access**



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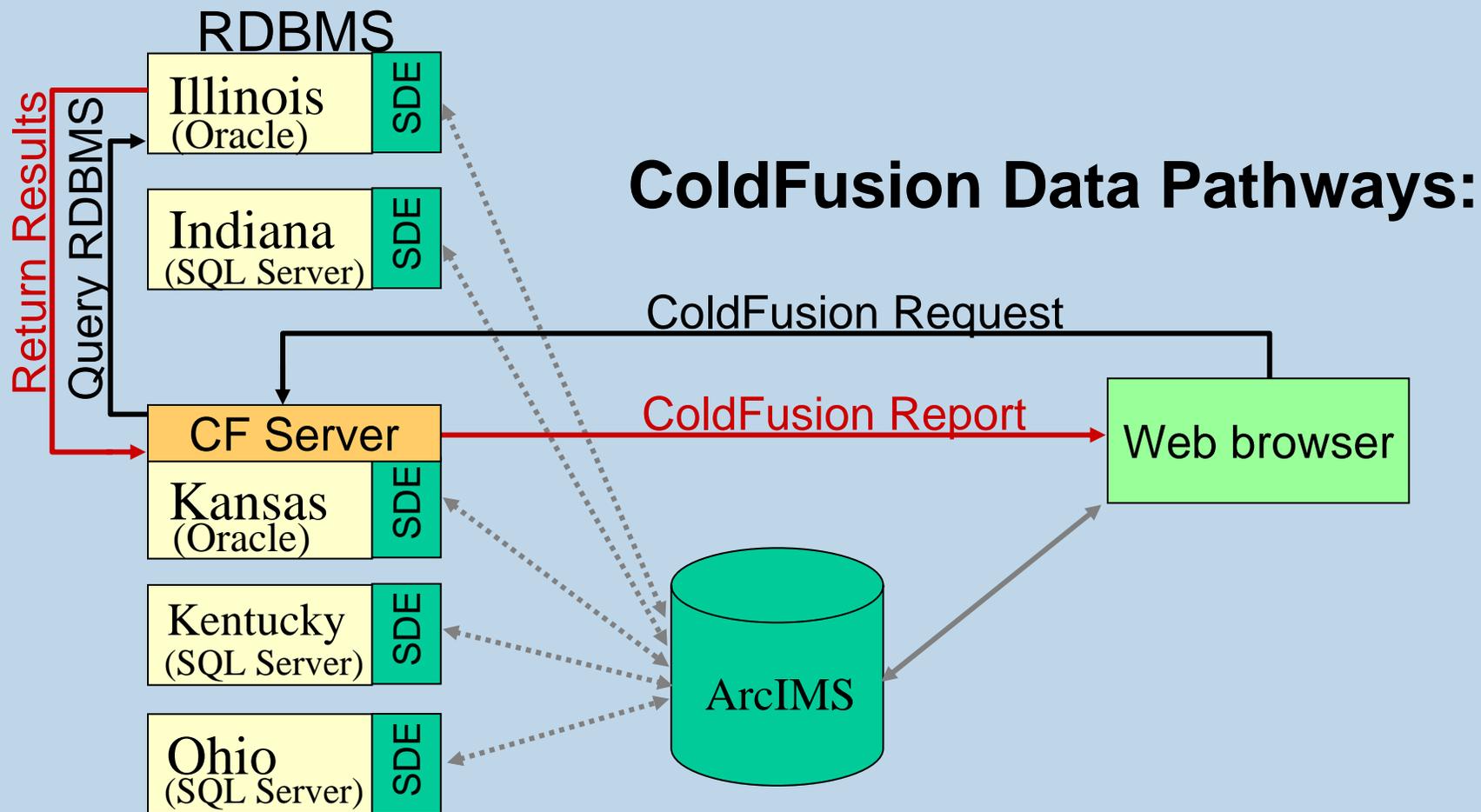
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# MIDCARB System Background

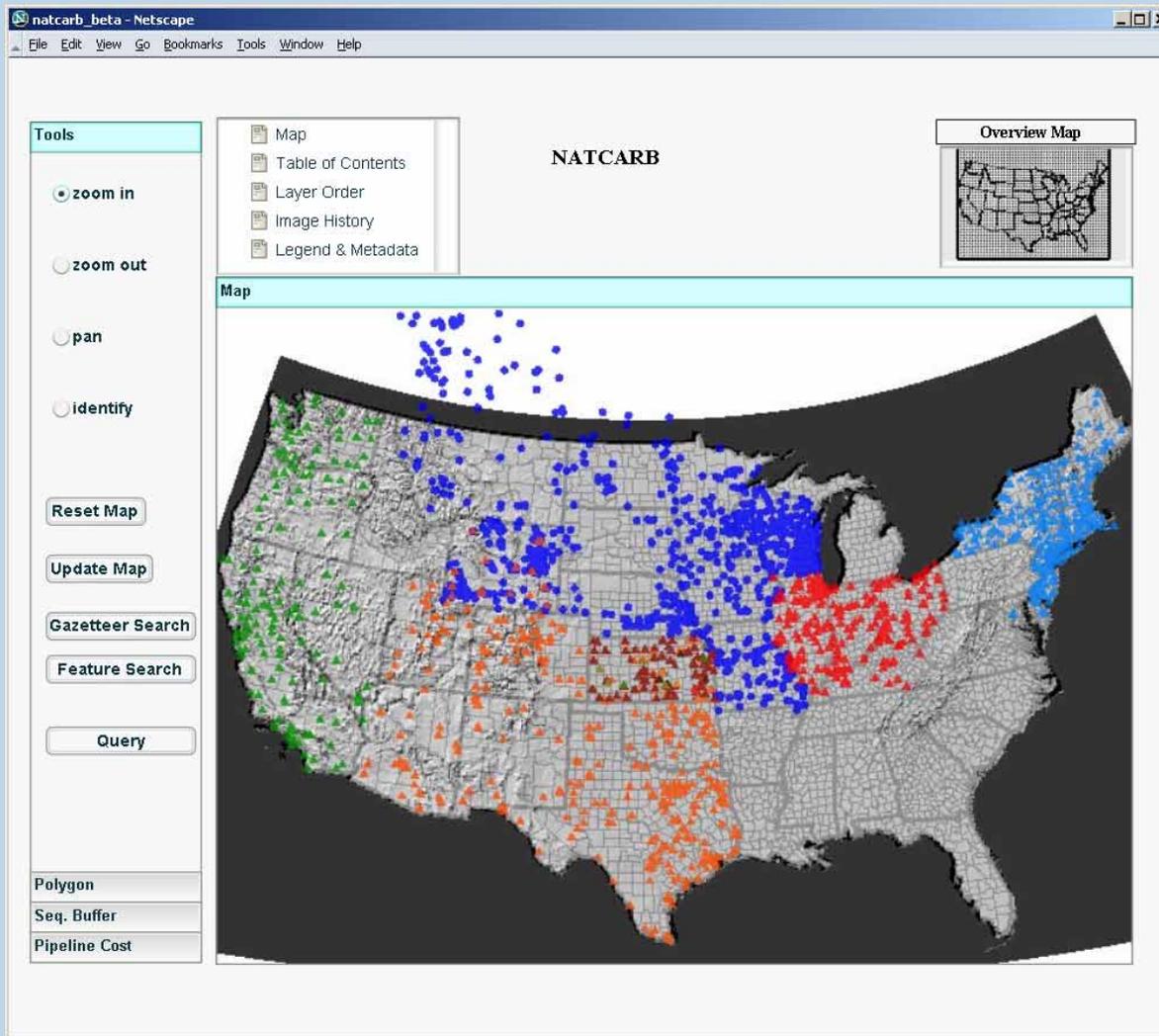
- 125 different layers from five different databases.
- No background database of metadata. The database was the AXL file.
- Hard to incorporate dynamic tools
  - Table of contents, Graphing
  - Built on lists of codes in javascript parameter file.
- Requests to multiple offsite databases for spatial 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.



# MIDCARB System Structure



# NatCarb Browser



**Expanded Tools  
National Coverage  
Web Based Access**



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# Federation of Web Mapping Services

## What are the advantages of a distributed national database?

- De-centralization of metadata and data
  - There is no reason to replicate data that can be served in a web service environment
  - Especially useful for national layers that can be provided by large data warehouses (EROS, GeographyNetwork, Census Bureau)
- Local control over data layers (maintain, enhance, add)
- Portal is easily customized
- Data requests & structures are driven by XML (ArcXML)
- 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



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# Interoperability Through Web Mapping Services

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

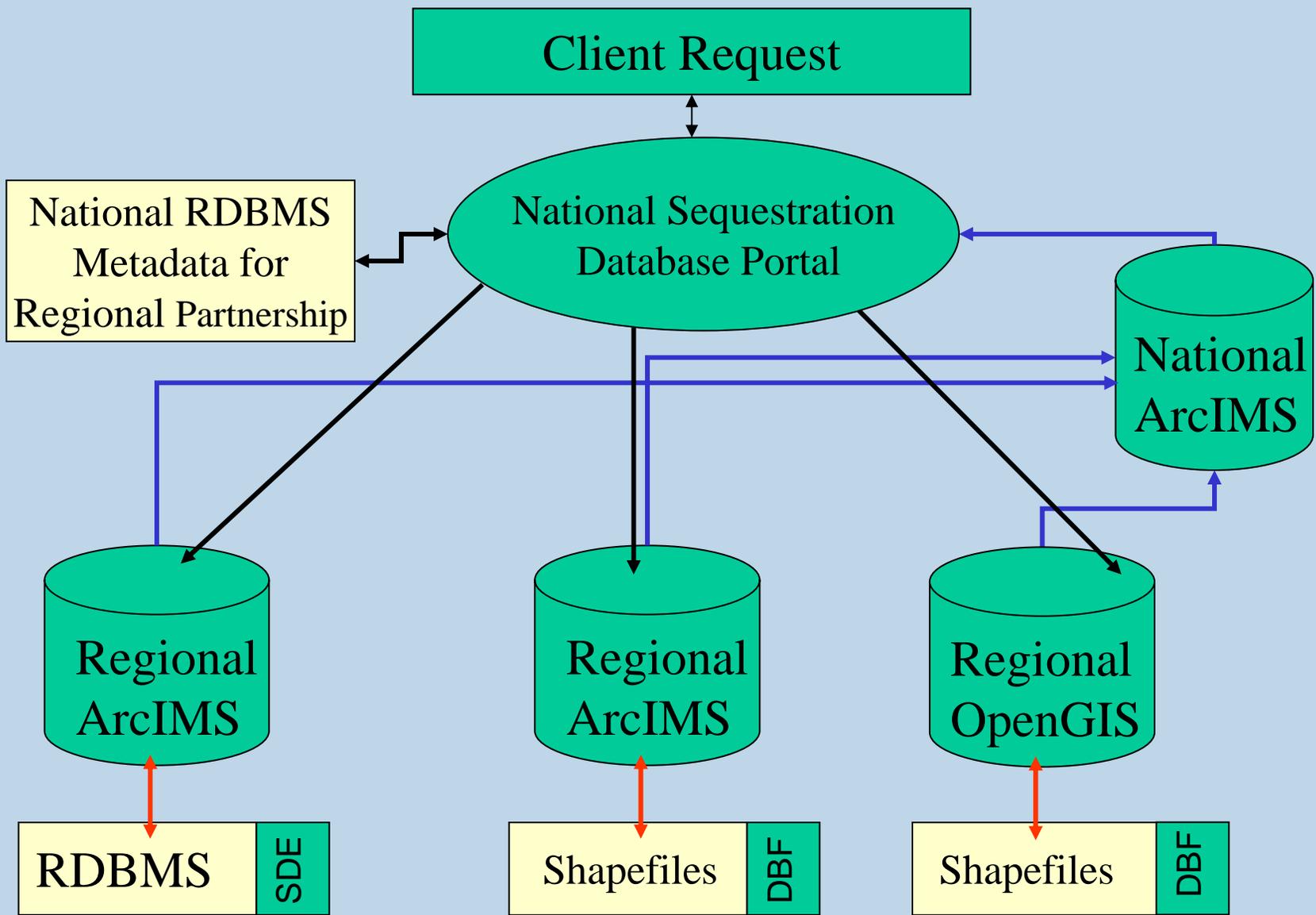
1. A series of requests are generated based on the client input to the map portal. For example, the client would like to see the following:
  - Potential CO<sub>2</sub> storage in petroleum fields in Kansas (KGS),
  - Kansas and Missouri CO<sub>2</sub> sources (KGS & EERC),
  - National Elevation Dataset (EROS)
  - Federal Lands (Geography Network)
2. The portal simultaneously issues an XML 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.



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# NatCarb Homepage

**NatCarb**  
a national look at carbon sequestration

**NETL**

[Interactive Map](#)

[Regional Partners](#)

[Reports](#)

[Sequestration Calculators](#)

[NETL Website](#)

[Data Download](#)  
(password required)

**Welcome to the NATCARB Homepage!**

NATCARB is a project to explore geological sequestration of carbon through linking geological and emission databases from several regional centers into a single interactive mapping system.

**Highlights and New Items**

- Data download added for unaffiliated states (see [partner download page](#))
- New states added to regions ([News release from NETL](#), June 2004)
- [Creating a Distributed NATIONAL CARBON Sequestration Database and Geographic Information System \(NATCARB\)](#), paper given at Third Annual Conference on Carbon Sequestration (9 MB Acrobat PDF file)
- [NATCARB Progress Report \(PDF, 3 MB\)](#)

NATCARB is an extension of [MIDCARE](#), a project that linked databases from 5 state geological surveys in the Midwest. NATCARB allows each partner to retain ownership and control of their own data, while allowing visitors to explore data across partner boundaries.

This server is run by the [Kansas Geological Survey](#) for NatCarb, a project funded by the U.S. Dept. of Energy's [National Energy Technology Laboratory](#).  
This page Updated Nov. 4, 2004.  
The URL for this page is <http://www.natcarb.org/index.html>  
Comments to [webadmin@kgs.ku.edu](mailto:webadmin@kgs.ku.edu)  
[Photo Credits](#)



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# Interactive Browser

The screenshot shows a Netscape browser window titled "natcarb\_beta - Netscape". The interface includes a menu bar (File, Edit, View, Go, Bookmarks, Tools, Window, Help) and a main content area. On the left, there is a "Tools" panel with radio buttons for "zoom in", "zoom out", "pan", and "identify", along with buttons for "Reset Map", "Update Map", "Gazetteer Search", "Feature Search", and "Query". Below these are checkboxes for "Polygon", "Seq. Buffer", and "Pipeline Cost". A central menu lists "Map", "Table of Contents", "Layer Order", "Image History", and "Legend & Metadata". The main map area displays a topographic map of the central United States with various colored overlays (red, green, yellow, blue) and a black horizontal band at the top. An "Overview Map" in the top right corner shows a small map of the United States with a black rectangle indicating the current map's location. The text "NATCARB" is centered above the main map.



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# Table of Contents

The screenshot shows a Netscape browser window titled "natcarb\_beta - Netscape". The browser's menu bar includes "File", "Edit", "View", "Go", "Bookmarks", "Tools", "Window", and "Help". The main content area is titled "NATCARB" and features a "Table of Contents" menu with options: "Map", "Table of Contents", "Layer Order", "Image History", and "Legend & Metadata". The "Table of Contents" option is currently selected. To the right of the menu is an "Overview Map" showing a map of the United States with a small inset map of the central region. Below the menu is a list of categories: "Agricultural", "Aquifer", "Base", "CO2 Sources", "Coal", "Geology", and "Petroleum". The "Petroleum" category is highlighted in cyan. Below this list is a "Select All" checkbox and a scrollable list of sub-categories: "OH - OIL GAS FIELDS", "IN - Oil and Gas Fields", "Devonian Shale Subsurface", "Devonian Shale Outcrop", "Devonian Shale Isopach", "Devonian Shale Structure", "Devonian Shale Faults", "KY - Petroleum Fields", and "PCORP - Oil and Gas Fields". At the bottom of the interface, there are several buttons: "Reset Map", "Update Map", "Gazetteer Search", "Feature Search", and "Query". On the left side, there are radio buttons for "zoom in", "zoom out", "pan", and "identify", along with buttons for "Polygon", "Seq. Buffer", and "Pipeline Cost".



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# Legend and Metadata

natcarb\_beta - Netscape

File Edit View Go Bookmarks Tools Window Help

**Tools**

- zoom in
- zoom out
- pan
- identify

Reset Map

Update Map

Gazetteer Search

Feature Search

Query

Polygon

Seq. Buffer

Pipeline Cost

Map

- Table of Contents
- Layer Order
- Image History
- Legend & Metadata

**NATCARB**

Overview Map

**Legend & Meta**

- Springfield Mines
- Herrin Structure
- Herrin Depth
- Herrin Thickness
- Herrin Mines
- Danville\_Structure
- Danville Depth
- Danville Thickness**
- Danville Mines
- OH Upper Freeport Coal Isopach
- OH Lower Kittanning Coal Isopach
- OH Middle Kittanning Coal Isopach
- OH Lower Freeport Coal Isopach
- OH Pittsburgh Coal Isopach
- USGS Surface Geology
- Regional - Precambrian Structure
- Regional - Mount Simon Isopach
- OH Rose Run Isopach
- OH Rose Run Structure
- OH Oriskany Isopach

**Danville Thickness**

- 1 to 28 in
- 28 to 42 in
- 42 to 66 in
- Channeled or not deposited
- Greater than 66 in
- insufficient data
- No data

Metadata Link

**Partnership : Midwest Regional Carbon Sequestration Partnership**  
**Metadata :**



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# Layer Order

The screenshot shows the 'natcarb\_beta' web application running in a Netscape browser window. The browser's address bar and menu bar are visible at the top. The application interface is divided into several sections:

- Tools:** A vertical toolbar on the left side containing radio buttons for 'zoom in', 'zoom out', 'pan', and 'identify', along with buttons for 'Reset Map', 'Update Map', 'Gazetteer Search', 'Feature Search', and 'Query'. Below these are three stacked buttons: 'Polygon', 'Seq. Buffer', and 'Pipeline Cost'.
- Map:** The central area displays a topographic map of a region in the central United States. It features a grid overlay, numerous blue circular markers, and several colored polygons (red, yellow, and blue) representing different data layers or regions.
- Overview Map:** A small inset map in the top right corner shows the entire United States, with a small rectangle indicating the current map's geographic extent.
- Navigation:** A menu in the top left of the application area lists 'Map', 'Table of Contents', 'Layer Order', 'Image History', and 'Legend & Metadata'.



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# Image History

The screenshot shows the NATCARB web application running in a Netscape browser window. The browser title is "natcarb\_beta - Netscape". The menu bar includes "File", "Edit", "View", "Go", "Bookmarks", "Tools", "Window", and "Help".

The main interface is divided into several sections:

- Tools:** A vertical sidebar on the left containing radio buttons for "zoom in", "zoom out", "pan", and "identify", along with buttons for "Reset Map", "Update Map", "Gazetteer Search", "Feature Search", and "Query".
- Map:** A central map area displaying a topographic map with a grid overlay. The map features colored overlays: a large yellow area in the center, a red area in the lower-left, and a blue area in the upper-left. Numerous small blue and red triangles are scattered across the map.
- Overview Map:** A small inset map in the top right corner showing the United States with a black box indicating the current map's location.
- Navigation and Search:** A central panel with a "Map" menu (where "Image History" is selected), a "Table of Contents", "Layer Order", and "Legend & Metadata" options. Below this is an "imagenam" field with two entries: "http://drysdale.kgs.ku.ec" and "http://drysdale.kgs.ku.ec".
- Map Controls:** A "Revert" button is located at the bottom center of the map area.

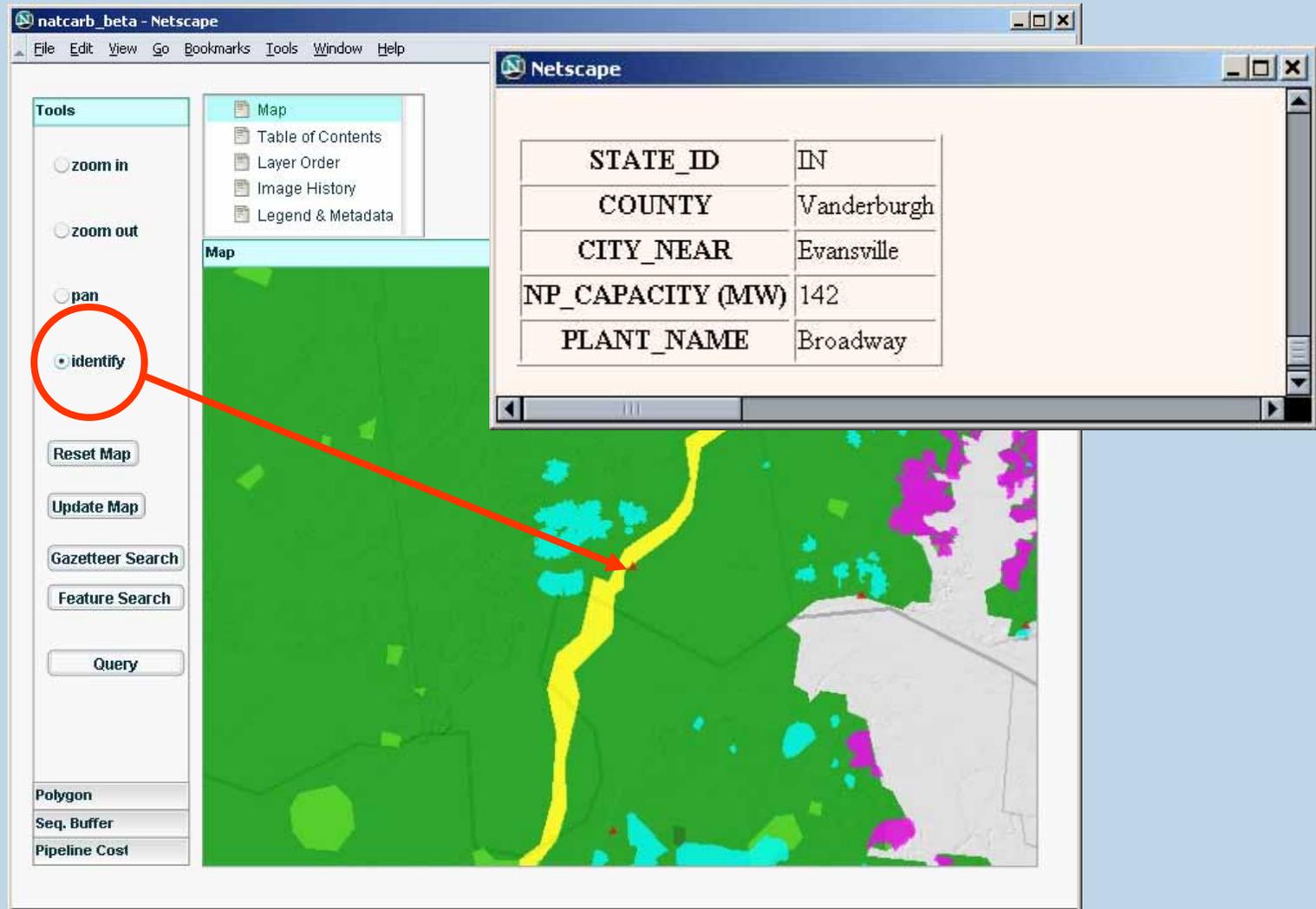


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# NatCarb Tools - Gazetteer



The screenshot shows the NatCarb Gazetteer tool interface in Netscape. The 'identify' tool is circled in red, and a red arrow points from it to a yellow line on the map. An inset window displays the following data table:

STATE_ID	IN
COUNTY	Vanderburgh
CITY_NEAR	Evansville
NP_CAPACITY (MW)	142
PLANT_NAME	Broadway

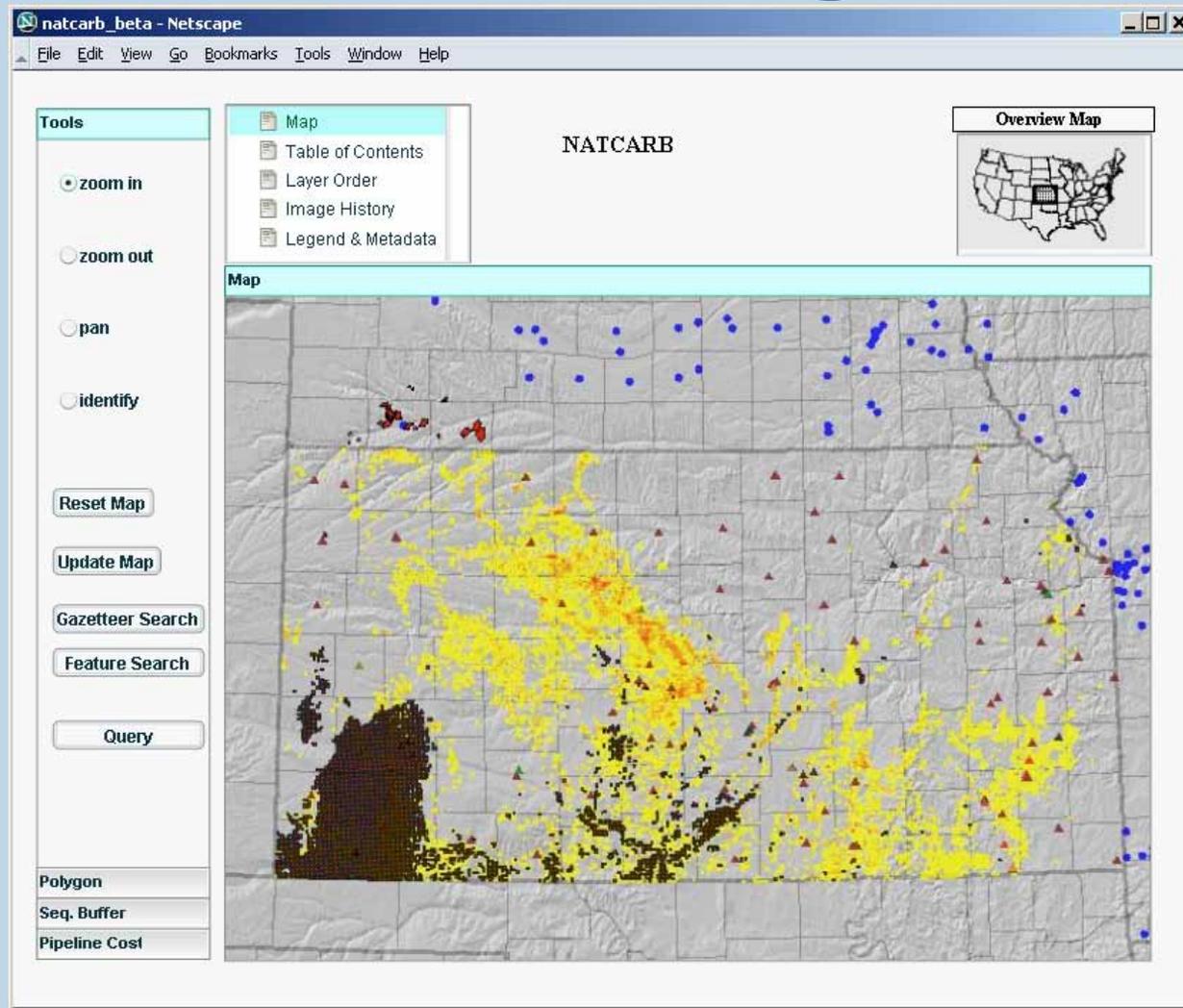


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# NatCarb Tools - Targeted Query



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# New NatCarb Tools

The screenshot shows the NatCarb web application running in a Netscape browser window. The browser title is "natcarb\_beta - Netscape". The application interface includes a menu on the left with options: "Map", "Table of Contents", "Layer Order", "Image History", and "Legend & Metadata". The main map area displays a satellite-style map with a red line representing a pipeline route and a red triangle indicating a specific location. The "Pipeline Cost" tool is active, showing a "Pipeline rate" of 5 MMscf/D. The "Result" section displays a "Cost is : 1263244" and a "Distance is : 11 Miles". An "Equation Used" button is also visible. An "Overview Map" in the top right corner shows the United States with a small red triangle indicating the current map's location.



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# New NatCarb Coverages

The screenshot shows a Netscape browser window titled "natcarb\_beta - Netscape". The main content area displays "NATCARB" with a large map of the United States. The map is overlaid with a grid and various colored polygons (blue, red, purple) and points (blue dots, red triangles). To the left of the map is a "Tools" panel with the following options: "zoom in" (selected), "zoom out", "pan", "identify", "Reset Map", "Update Map", "Gazetteer Search", "Feature Search", and "Query". Below these are "Polygon", "Seq. Buffer", and "Pipeline Cost" options. Above the main map is a "Map" menu with "Map", "Table of Contents", "Layer Order", "Image History", and "Legend & Metadata". To the right is an "Overview Map" showing a small-scale map of the United States with a black rectangle indicating the current map's location.



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# New NatCarb Coverages

Mozilla  
 http://drysdale.kgs.ku.edu/natcarb/tools/ag\_quest/detailed\_info.cfm?fips=20013  
 natcarb\_new | natcarb\_beta | http://hercul...sreplace.cfm | Add Layer Page | Solubility of CO2 and Volu... | http://drysd...?fips=20013 | HTML COLSPAN and ROW...

**Detailed crop practice information for Brown county in Kansas.**

**Continuous Corn - No-Till (NT)**

Total CO2 Emissions (tons) Attributed to Direct & Embodied Energies

Soil Type	Total Acres	% of Total Cropland Acres	Total CO2 Emissions - Soil Type	Diesel Fuel Combustion	Fertilizers	Hericides & Pesticides	Seeds	Machinery
Pawnee	37830	11.01	58,029.42	589.23	6,586.05	1,067.26	1,078.74	82.82
Marshall	10730	8.58	12,039.02	167.13	1,868.05	302.72	305.97	23.49
Wymore	56970	34.18	59,213.55	887.35	9,918.25	1,607.24	1,624.53	124.72

**Corn Soybean - No-Till (NT)**

Total CO2 Emissions (tons) Attributed to Direct & Embodied Energies

Soil Type	Total Acres	% of Total Cropland Acres	Total CO2 Emissions - Soil Type	Diesel Fuel Combustion	Fertilizers	Hericides & Pesticides	Seeds	Machinery
Pawnee	37830	11.01	9,661.09	1,261.22	6,586.05	1,474.19	1,790.00	168.03
Marshall	10730	8.58	2,260.10	357.73	1,868.05	418.14	507.71	47.66
Wymore	56970	34.18	13,565.80	1,899.33	9,918.25	2,220.05	2,695.64	253.05

**Corn Soybean - Conventional Tillage (CT)**

Total CO2 Emissions (tons) Attributed to Direct & Embodied Energies

Soil Type	Total Acres	% of Total Cropland Acres	Total CO2 Emissions - Soil Type	Diesel Fuel Combustion	Fertilizers	Hericides & Pesticides	Seeds	Machinery
Pawnee	37830	11.01	-2,382.02	847.27	1,885.57	337.47	512.47	69.08
Marshall	10730	8.58	-905.41	240.32	534.82	95.72	145.36	19.59
Wymore	56970	34.18	-4,024.22	1,275.94	2,839.57	508.22	771.76	104.03



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# NatCarb Management

- 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



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# NatCarb Services

Netscape

File Edit View Go Bookmarks Tools Window Help

**NATCARB Server-Service Information**

Server Name	Mapservice Name	GetServerVersion	GetServiceInfo	GetImage	GetServices
drysdale.kgs.ku.edu	KS_MIDCARE	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
meltwater.isgs.uiuc.edu	il_midcarb_030904	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
129.79.145.5	NATCARB	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
198.234.182.60	midcarb_test	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
drysdale.kgs.ku.edu	NATCARB_KS_FACILITIES	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
drysdale.kgs.ku.edu	NATCARB_INFRASTRUCTURE	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
Microsoft TerraServer Map Server	http://terraServer.microsoft.com/ogccapabilities.aspx	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
seamless.usgs.gov	The_National_Map_Elevation	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
drysdale.kgs.ku.edu	NAVDAT_USGS	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
drysdale.kgs.ku.edu	NADCARB	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
seamless.usgs.gov	The_National_Map_Hydrography	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
seamless.usgs.gov	The_National_Map_Transportation	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
kgsmmap.uky.edu	kyco2	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
drysdale.kgs.ku.edu	NATCARB_CBM	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
63.241.155.42	ESRI_Satellite	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
w3.undeerc.org	PCORP	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
e40-481-1.mit.edu	sercsp_sources	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
utstdp-ims.state.ut.us	swsources	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
meltwater.isgs.uiuc.edu	il_natcarb_arcmap	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
utstdp-ims.state.ut.us	wcsources	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
www.geographynetwork.com	Census_Density	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
www.geographynetwork.com	Atlas_Fedlands	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
128.102.142.10	cquest	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
seamless.usgs.gov	The_National_Map_Land_Cover	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>
hercules.kgs.ku.edu	KS_AG_SEQUEST_12NOV2004	<a href="#">Get Version</a>	<a href="#">Get Info</a>	<a href="#">Get Image</a>	<a href="#">Get Services</a>



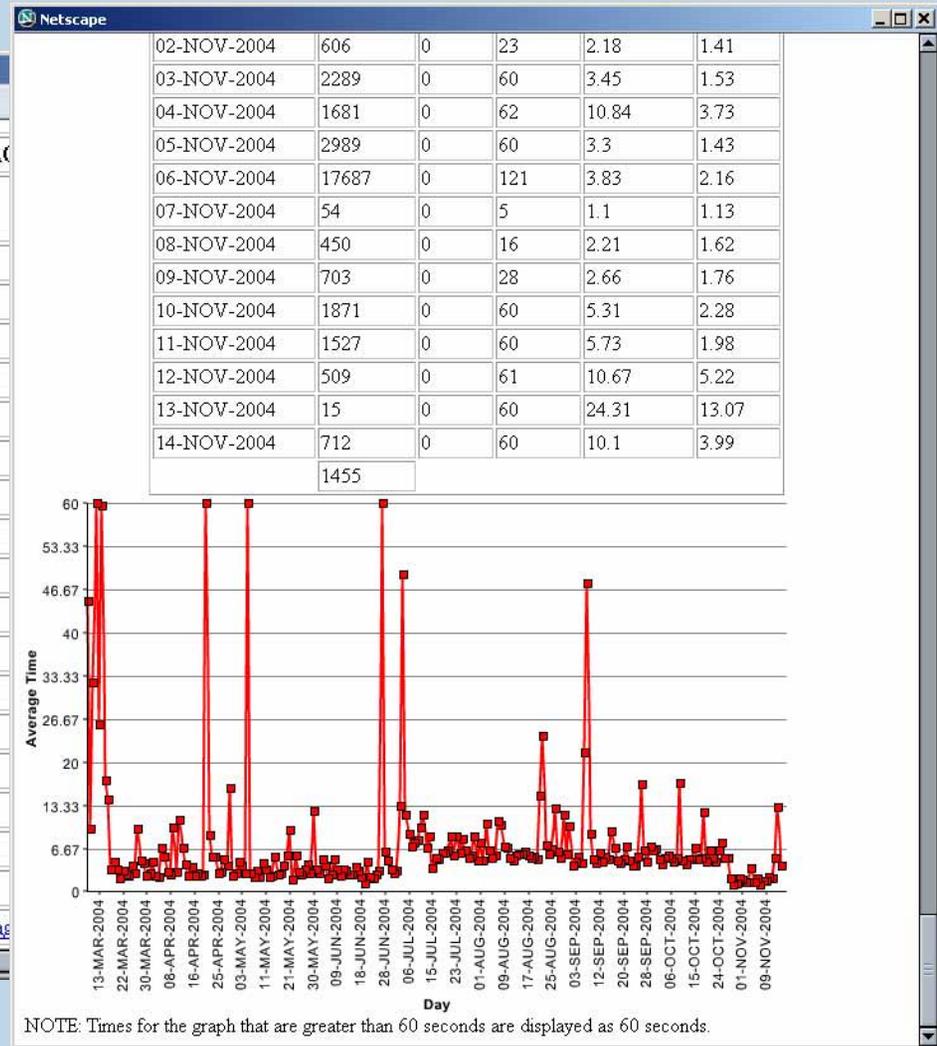
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# NatCarb Services

PAGE NAME	SERVER NAME
natcarb/midflash/image_generate.cfm	129.79.145.5
natcarb/midflash/image_generate.cfm	meltwater.isgs.uiuc.edu
natcarb/midflash/id.cfm	seamless.usgs.gov
natcarb/midflash/image_generate.cfm	128.102.142.10
natcarb/midflash/id.cfm	129.79.145.5
natcarb/midflash/image_generate.cfm	drysdale.kgs.ku.edu
natcarb/midflash/image_generate.cfm	kgsmmap.uky.edu
natcarb/midflash/polyid.cfm	drysdale.kgs.ku.edu
natcarb/midflash/id.cfm	utstddp-ims.state.ut.us
natcarb/midflash/id.cfm	utstddp-ims.state.ut.us
natcarb/midflash/id.cfm	drysdale.kgs.ku.edu
midcarb/flash/id.cfm	129.79.145.10
natcarb/midflash/id.cfm	hercules.kgs.ku.edu
midcarb/flash/id.cfm	meltwater.isgs.uiuc.edu
midcarb/flash/image_generate1.cfm	kgsmmap.uky.edu
midcarb/flash/id.cfm	198.234.182.60
midcarb/flash/id.cfm	kgsmmap.uky.edu
natcarb/midflash/image_generate_highlight.cfm	sdale.kgs.ku.edu/natcarb/midflash/ima



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# NatCarb Management

The screenshot displays three overlapping browser windows from the NatCarb Management system:

- Top Window (Netscape):** Titled "Add Server Page - Netscape". It shows a header "NATCARB" and three buttons: "Add Server", "Add Layer", and "Add Column". Below these is a form with the text "Please Enter Server Name" and "Port", followed by a "submit" button.
- Middle Window (Microsoft Internet Explorer):** Titled "Add Server Page - Microsoft Internet Explorer". It shows a header "MIDCARB Mapservice" and three buttons: "Add Server", "Add Layer", and "Add Column". Below these is a form with the text "Please Enter name and port of", "Server Name", "Port", and a "submit" button. Below the form, it says "Connection to ims-dev.isgs.uiuc.edu" and "9 Map services found for". It then lists several services with radio buttons: "NG\_Logs", "Counties", "Streets", "USA", "Washington", "demog", and "Already present! midcarb\_ks\_test".
- Bottom Window (Microsoft Internet Explorer):** Titled "Add Server Page Step 2 - Microsoft Internet Explorer". It shows a header "MIDCARB Mapservice data entry" and six buttons: "Add Server", "Add Layer", "Add Column", "View Server", "View Layer", and "View Column". Below these is a form with the text "Please enter information below to complete the addition of drysdale.kgs.ku.edu to the server list". The form includes fields for "Server Name" (ims-dev.isgs.uiuc.edu), "Service Name" (5300), "Mapservice Name" (NG\_Logs), "Region" (Other), "States Served" (a dropdown menu with "Idaho", "Illinois", "Indiana", and "Iowa" visible), "Can Portal access Map Server?" (radio buttons for Yes and No), "Contact Person" (Chris Korose), "Contact Number" (111-111-1111), "Contact Email" (korose@il.edu), and "Username for contact person" (korose). A "submit" button is at the bottom right.



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# NatCarb Management

Add Server Page Step 2 - Netscape

## NATCARB Mapservice data entry

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

Information displayed below for [drysdale.kgs.ku.edu](http://drysdale.kgs.ku.edu)

[Delete Server](#)

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:

Add layer page - Netscape

## NATCARB Mapservice data entry

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

Viewing Information for layer **Devonian Shale Subsurface** for [kyco2 on kgsmap.uky.edu](http://kyco2 on kgsmap.uky.edu)

[Delete Layer](#)

ArcIMS Layer Id	<input type="text" value="104"/>
ArcIMS Layer Name	<input type="text" value="Devonian Shale Subsu"/>
Display Name	<input type="text" value="Devonian Shale Subsu"/>
Minscale	<input type="text"/>
Maxscale	<input type="text"/>
minx	<input type="text" value="95666.1562028623"/>
maxx	<input type="text" value="1080704.64168483"/>
miny	<input type="text" value="4039081.31859062"/>
maxy	<input type="text" value="4668674.54901879"/>
Feature Type	<input type="text" value="polygon"/>
List of layer types	<input type="text" value="Petroleum"/>
Layer Group	<input type="text" value="None"/>
Is layer queryable?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Layer Source (Source institution for data. For example, KGS or EPA)	<input type="text"/>
Can Layer be identified?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Is Layer Visible on Viewer?	<input checked="" type="radio"/> Yes <input type="radio"/> No
Column to use for rendering	<input type="text" value="PETO.DBO.KY_DEVONIAN_SHALE_SUBSURFACE.DEVONIAN_SHALE"/>
Layer Authentication	<input type="text" value="Full access"/>
Metadata url for layer	<input type="text"/>
Detailed Metadata	<input type="text"/>



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# 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.



# National Sequestration Database

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

**Online at the Booth**



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# NatCarb Over-Arching Goals

- Visible
  - Bring Society Together with Solutions
  - Complete Online Access
- Viable
  - Display Data
  - Integrate Data with Models
  - Manage Data
- Valuable
  - Bring the Players Together
  - Bring the Data Together

**Provide Basis for Better Policies and Decisions**

**Connect the Dots**



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# 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.



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# An Incomplete Contributor List

- Asif Iqbal, Ken Nelson, Kurt Look, Melissa Moore, Dana Adkins-Heljeson
  - Kansas Geological Survey, University of Kansas
- GIS Coordinators and Contributors in Each Partnership
- And Many Others

