# Description

**Title:** NATCARB Saline Poly (v1302)

**Originators:** NATCARB Map Team, US Dept. of Energy (DOE) National Energy Technology Laboratory (NETL)

**Publication date:** 20130408

**Edition:** v1302

**Data type:** vector digital data

**Other citation details:** http://www.netl.doe.gov/technologies/carbon_seq/natcarb

**Abstract:** The National Carbon Sequestration Database and Geographic Information System (NATCARB) Saline spatial database is a small-scale (large-area) overview of carbon dioxide (CO2) geologic storage potential in saline formations across the USA and parts of Canada. Saline formations are composed of brine-saturated porous rock and capped by one or more regionally extensive, low-permeability rock formations. Only saline formations containing formation fluid with total dissolved solids (TDS) greater than 10,000 ppm merited evaluation for potential CO2 storage. A saline storage resource can include one named geologic stratigraphic unit or be defined as only a part of a stratigraphic unit. This data layer reflects the best available knowledge regarding the location of carbon sequestration potential in the USA and Canada, both onshore and offshore.

**Version Log:**
- v1101 - Initial release for Atlas III;
- v1103 - Metadata revised;
- v1104 - No changes to Saline layer;
- v1204 - Initial release for Atlas IV. New data submitted by all regional partnerships;
- v1302 - Metadata revised.

NATCARB is administered by the US Dept. of Energy (DOE) National Energy Technology Laboratory (NETL) and contains data provided by several Regional Carbon Sequestration Partnerships (RCSP). RCSPs originally developed the data per individual geologic storage resource, or as continuous surface models, and then converted these data into a 10 km X 10 km vector "grid". The NATCARB Team at the Kansas Geological Survey compiled the regional datasets into a single, seamless layer.

**Purpose:** This dataset provides a single, seamless spatial database of carbon storage potentials for saline formations across the USA and parts of Canada compiled from regional datasets created by the RCSPs and site characterization projects. Storage resource estimates are based on physically accessible CO2 storage pore volume within subsurface geologic formations, and on the assumption that the storage reservoirs are open systems in which in situ fluids will either be displaced from the injection zone or managed accordingly. Economic and regulatory constraints are not considered. These data are intended to be used as an initial assessment of potential geologic storage and are not a substitute for site-specific assessment, testing, and geologic investigation. This spatial data layer provides carbon capture and storage (CCS) project developers a starting point for further inquiry into CCS technologies aimed at reducing CO2 emissions and is intended for use by RCSPs, project developers, and governmental entities for regional- and national-scale assessments of potential CO2 storage resources in the United States and parts of Canada.

**Supplemental information:** For a detailed methodology of storage resource estimates refer to Appendix B of The United States 2012 Carbon Utilization and Storage Atlas - Fourth Edition (Atlas IV). For data access please contact the US DOE-NETL NATCARB Map Team - NatCarb.Maps@netl.doe.gov For questions regarding how the data were assembled, contact the KGS NATCARB Team - natcarb@kgs.ku.edu

**Dataset credit:** Version 1302 (second quarter release of 2013) of the NATCARB Saline spatial database was created by the NATCARB Team at the Kansas Geological Survey (KGS). The following Regional Carbon Sequestration Partnerships (RCSP) contributed data to the national dataset:

- Big Sky Carbon Sequestration Partnership (BSCSP);
- Midwest Geological Sequestration Consortium (MGSC);
- Midwest Regional Carbon Sequestration Partnership (MRCSP);
- Plains CO2 Reduction Partnership (PCOR);
- Southeast Regional Carbon Sequestration Partnership (SECARB);
- Southwest Regional Partnership on Carbon Sequestration (SWP);
West Coast Regional Carbon Sequestration Partnership (WESTCARB).
Several site characterization project teams also contributed data through the RCSPs to be included in the national dataset:
Black Warrior Basin - University of Alabama;
Cambro-Ordovician Strata of the Illinois and Michigan Basins - University of Illinois;
Gulf of Mexico Miocene - University of Texas;
Triassic Newark Basin of New York and New Jersey - Sandia Technologies;
Ozark Plateau Study Area - University of Kansas;
Rocky Mountain Region - University of Utah;
South Georgia Rift Basin - South Carolina Research Institution;
Two Elk Energy Park - North American Power Group;
Wilmington Graben, Offshore Los Angeles - Terralog Technologies USA;
Wyoming - University of Wyoming.

Point Of Contact

Organization: NATCARB Map Team, US Dept. of Energy (DOE) National Energy Technology Laboratory (NETL)
Phone: 304-285-2006
Phone: 304-285-1354
Email: NatCarb.Maps@netl.doe.gov
Address type: mailing and physical
  Address: 3610 Collins Ferry Road M/S F04
  City: Morgantown
  State or Province: West Virginia
  Postal code: 26507
  County: US

Data Type

Data type: vector digital data
Native dataset environment: Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri ArcGIS 10.1.1.3143

Status

Data status: Complete
Update frequency: Quarterly

Key Words

Theme:
  Keywords: US Department of Energy, Energy, Carbon Sequestration, NATCARB, Saline
  Keyword thesaurus: None
Theme:
  Keywords: climatologyMeteorologyAtmosphere, environment, geoscientificInformation
  Keyword thesaurus: ISO 19115 Topic Categories
Place:
  Keywords: Canada, USA, North America
  Keyword thesaurus: ISO 19115 Topic Category
Stratum:
  Keyword thesaurus: ISO 19115 Topic Category

Data Access Constraints

Access constraints: None
Use constraints: See access and use constraints information.
Spatial Reference Information

Horizontal Coordinate System

Coordinate System Details

Map projection

Map projection name: Lambert Azimuthal Equal-area
Longitude of projection center: -100.0
Latitude of projection center: 45.0
False easting: 0.0
False northing: 0.0

Planar Coordinate Information

Planar coordinate encoding method: coordinate pair
Coordinate representation:
Abscissa resolution: 0.0001
Ordinate resolution: 0.0001
Planar distance units: meter

Geodetic model

Horizontal datum name: D WGS 1984
Ellipsoid name: WGS 1984
Semi-major axis: 6378137.0
Denominator of flattening ratio: 298.257223563

Spatial Domain

Bounding Coordinates

In Unprojected coordinates (geographic)

<table>
<thead>
<tr>
<th>Boundary</th>
<th>Coordinate</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>-180.000000 (latitude)</td>
</tr>
<tr>
<td>East</td>
<td>180.000000 (latitude)</td>
</tr>
<tr>
<td>North</td>
<td>82.319791 (longitude)</td>
</tr>
<tr>
<td>South</td>
<td>17.772467 (longitude)</td>
</tr>
</tbody>
</table>

Data Structure and Attribute Information

Overview

Direct spatial reference method: Vector

Attributes of NATCARB_Saline_Poly_v1302

Description: Vector polygon features representing saline storage resources in the USA and Canada
Source: NATCARB

Attributes

OBJECTID

Definition: Internal feature number.

Attribute values: Sequential unique whole numbers that are automatically generated.
Attribute definition source: ESRI
**SHAPE**

*Definition:* Feature geometry.

*Attribute values:* Coordinates defining the features.

*Attribute definition source:* ESRI

**PARTNERSHIP**

*Definition:* Abbreviation for RCSP.

*Attribute domain values*

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWP</td>
<td>Southwest Regional Partnership on Carbon Sequestration</td>
</tr>
<tr>
<td>PCOR</td>
<td>The Plains CO2 Reduction Partnership</td>
</tr>
<tr>
<td>BSCSP</td>
<td>Big Sky Sequestration Partnership</td>
</tr>
<tr>
<td>MRCSP</td>
<td>Midwest Regional Carbon Sequestration Partnership</td>
</tr>
<tr>
<td>SECARB</td>
<td>Southeast Regional Carbon Sequestration Partnership</td>
</tr>
<tr>
<td>WESTCARB</td>
<td>West Coast Regional Carbon Sequestration Partnership</td>
</tr>
<tr>
<td>MGSC</td>
<td>Midwest Geological Sequestration Consortium</td>
</tr>
</tbody>
</table>

*Attribute definition source:* Atlas IV

**ARRA_PROJECT**

*Definition:* Name of the site characterization study project.

*Attribute domain values*

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Gulf of Mexico Miocene - U. of Texas at Austin</td>
</tr>
<tr>
<td>NEWARK BASIN</td>
<td>Triassic Newark Basin of NY and NJ - Sandia Technologies</td>
</tr>
<tr>
<td>BLACK WARRIOR</td>
<td>Black Warrior Basin - U. of Alabama</td>
</tr>
<tr>
<td>WILMINGTON GRABEN</td>
<td>Wilmington Graben, Offshore Los Angeles - Terralog Technologies USA</td>
</tr>
<tr>
<td>TWO ELK</td>
<td>Two Elk Energy Park - North American Power Group</td>
</tr>
<tr>
<td>WYOMING</td>
<td>U. of Wyoming</td>
</tr>
<tr>
<td>OZARK PLATEAU</td>
<td>Ozark Plateau Study Area - U. of Kansas</td>
</tr>
<tr>
<td>SOUTH GEORGIA</td>
<td>South Georgia Rift Basin - South Carolina Research Institution</td>
</tr>
<tr>
<td>ROCKY MOUNTAIN</td>
<td>Rocky Mountain Region - U. of Utah</td>
</tr>
<tr>
<td>CAMBRO ORDOVICIAN</td>
<td>Cabro-Ordovician Strata of the Illinois and Michigan Basins - U. of Illinois</td>
</tr>
</tbody>
</table>

*Attribute definition source:* DOE-NETL

**RESOURCE_NAME**

*Definition:* Name of the geologic storage resource.

**ASSESSED**

*Definition:* Flag defining whether storage resource has been assessed for carbon storage potential

*Attribute domain values*

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Storage resource has not been assessed. Capacities must be &lt;Null&gt;.</td>
</tr>
<tr>
<td>1</td>
<td>Storage resource has been assessed. Capacities may be &quot;0&quot;.</td>
</tr>
</tbody>
</table>

*Attribute definition source:* DOE-NETL/KGS

**OVERLAP**
**Definition:** Flag indicating an overlapping resource with another partnership.

**Attribute domain values**

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No overlap</td>
</tr>
<tr>
<td>1</td>
<td>Overlap exists with adjacent partnership</td>
</tr>
</tbody>
</table>

**Attribute definition source:** KGS

**DUPLICATE**

**Definition:** Flag indicating data is a duplicate of data from another partnership. Data was not used to calculate summaries in the Atlas.

**Attribute domain values**

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not a duplicate</td>
</tr>
<tr>
<td>1</td>
<td>Duplicate data with adjacent partnership</td>
</tr>
</tbody>
</table>

**Attribute definition source:** KGS

**SHAPE_Length**

**Definition:** Length of feature in internal units.

**Attribute values:** Positive real numbers that are automatically generated.

**Attribute definition source:** ESRI

**SHAPE_Area**

**Definition:** Area of feature in internal units squared.

**Attribute values:** Positive real numbers that are automatically generated.

**Attribute definition source:** ESRI

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**SDTS Feature Description**

**Spatial data transfer standard (SDTS) terms**

**Feature class**

- **Type:** GT-polygon composed of chains
- **Count:** 323

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**Data Quality and Accuracy Information**

**General**

**Logical consistency report:** All RCSPs provided carbon storage data in accordance with common standards developed by the RCSPs and the NATCARB project teams. (See Sources for more information on methodologies). Discrepancies and overlaps occur at the boundaries of some adjacent partnerships and DOE-NETL is the final authority on the handling of these issues (see data fields OVERLAP and DUPLICATE in Entity Attributes section of this document for details).

**Completeness report:** This dataset reflects the best available knowledge regarding the location of potential carbon sequestration potential in the USA and Canada, both onshore and offshore. However, not all areas of the United States and Canada have been assessed (e.g., offshore New England). Not all RCSPs provided data for all attribute fields in the database (indicated by <Null>). Values of "0" represent actual measurements. Not all RCSPs provided low (VOL_LOW), medium (VOL_MED) and high (VOL_HIGH) estimates of carbon storage capacity. In cases where only medium estimates (VOL_MED) were provided, the medium capacities were copied into the VOL_LOW and VOL_HIGH attribute fields. If the RCSP provided low and high estimates of capacity but not medium, the VOL_MED field was set to <Null>.
Attribute Accuracy

Attribute accuracy report: Questions regarding accuracy of the data (spatial and attribute) should be directed to the individual RCSPs. Except for certain cases of inter-partnership overlap, NATCARB did not make any changes to the data except for corrections to values in text fields (spelling, capitalization, etc.) when errors were noticed.

Data Source and Process Information

Data Sources

Data source information

CAMBRO ORDOVICIAN

Title: An Evaluation of the Carbon Sequestration Potential of the Cambro Ordovician Strata of the Illinois and Michigan Basins
Originators: University of Illinois
Illinois State Geological Survey
Data type: vector digital data
Media: None

BLACK WARRIOR

Title: Site Characterization for CO2 Storage from Coal-fired Power Facilities in the Black Warrior Basin of Alabama
Originators: University of Alabama
Data type: vector digital data
Media: None
Source contribution: The University of Alabama contributed data for multiple saline resources in the Black Warrior Basin in Alabama.

WESTCARB

Title: WESTCARB Coal 10K Carbon Sequestration Potential
Originators: West Coast Regional Carbon Sequestration Partnership
California Energy Commission
Data type: vector digital data
Media: None
Source contribution: West Coast Regional Carbon Sequestration Partnership provided data for the Western United States and Canada (Alaska, Western Arizona, Western British Columbia, California, Hawaii, Nevada, Western Oregon and Western Washington).

BSCSP

Title: BSCSP Coal 10K Carbon Sequestration Potential
Originators: Big Sky Sequestration Partnership
Montana State University
Data type: vector digital data
Media: None
**Source contribution:** Big Sky Carbon Sequestration Partnership provided data for the Innermountain West region of the Northwestern United States (Idaho, Eastern Montana, Eastern Oregon, Western South Dakota, Eastern Washington and Wyoming).

**DOE-NETL**

**Title:** US Department of Energy (DOE) National Energy Technology Laboratory (NETL) NATCARB Team

**Data location:** http://www.netl.doe.gov/technologies/carbon_seq/natcarb/

**Media:** None

**Source contribution:** As the responsible authority for the National Carbon Sequestration Database and Geographic Information System (NATCARB), the US Department of Energy (DOE) National Energy Technology Laboratory (NETL) NATCARB Team provided data, methodological guidance and expertise in handling issues specific to creation of the composite NATCARB data layers.

**SWP**

**Title:** SWP Coal 10K Carbon Sequestration Potential

**Originators:** New Mexico Institute of Mining and Technology

Southwest Regional Partnership on Carbon Sequestration

**Data type:** vector digital data


**Media:** None

**Source contribution:** Southwest Regional Partnership on Carbon Sequestration provided data for the Southwestern United States (Eastern Arizona, Colorado, Kansas, New Mexico, Western Texas and Utah).

**ROCKY MOUNTAIN**

**Title:** Characterization of Most Promising Sequestration Formations in the Rocky Mountain Region

**Originators:** University of Utah

**Data type:** vector digital data


**Media:** None

**Source contribution:** The University of Utah contributed data for the Weber Sandstone saline resource in Colorado.

**Atlas IV**

**Title:** The United States 2012 Carbon Utilization and Storage Atlas

**Publisher:** US Department of Energy (DOE) National Energy Technology Laboratory (NETL)

**Publication place:** 3610 Collins Ferry Road, Morgantown, WV, 26507-0880, US

**Publication date:** 20121219

**Edition:** Fourth

**Data location:** http://www.netl.doe.gov/technologies/carbon_seq/refshelf/atlasIV/

**Media:** onLine

**Source contribution:** The United States 2012 Carbon Utilization and Storage Atlas - Fourth Edition (Atlas IV) provides updated information regarding carbon dioxide storage potential in the US and Canada and includes maps, summary tables and, in Appendices A and B, detailed methodologies.

**KGS**

**Title:** Kansas Geological Survey (KGS) NATCARB Team

**Media:** None

**Source contribution:** As the primary entity responsible for compiling the NATCARB layers, the Kansas Geological Survey NATCARB Team worked closely with the DOE-NETL NATCARB Team to develop rules and methods for assembling the composite datasets.

**PCOR**
Title: PCOR Coal 10K Carbon Sequestration Potential
Originators: University of North Dakota, Energy and Environmental Research Center
The Plains CO2 Reduction Partnership
Data type: vector digital data
Media: None

MRCSP
Title: MRCSP Coal 10K Carbon Sequestration Potential
Originators: Midwest Regional Carbon Sequestration Partnership
Batelle Memorial Institute
Data type: vector digital data
Media: None
Source contribution: Midwest Regional Carbon Sequestration Partnership provided data for the Ohio Valley and Northeastern United States (Eastern Indiana, Eastern Kentucky, Maryland, Michigan, New Jersey, New York, Ohio, Pennsylvania and West Virginia).

OZARK PLATEAU
Title: Modeling CO2 Sequestration in a Saline Reservoir and Depleted Oil Reservoir to Evaluate The Regional CO2 Sequestration Potential of The Ozark Plateau Aquifer System, South-Central Kansas
Originators: University of Kansas
Kansas Geological Survey
Data type: vector digital data
Media: None
Source contribution: The University of Kansas contributed data for the Arbuckle saline resource in Kansas.

MGSC
Title: MGSC Coal 10K Carbon Sequestration Potential
Originators: Illinois State Geological Survey
Midwest Geological Sequestration Consortium
Data type: vector digital data
Media: None
Source contribution: Midwest Geological Sequestration Consortium provided data for Illinois, Western Indiana and Western Kentucky.

SECARB
Title: SECARB Coal Carbon Sequestration Potential
Originators: Southeast Regional Carbon Sequestration Partnership
Southern States Energy Board
Data type: vector digital data
Media: None
Source contribution: Southeast Regional Carbon Sequestration Partnership provided data for the Southeastern United States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Eastern Texas, West Virginia and Virginia).

Process Steps

Process step information

Process Step 1

Process description: The NATCARB Group at the Kansas Geological Survey assembled GIS datasets from the regional partnerships (and other sources where necessary) into a single layer using ESRI’s ArcInfo (v10.0) software in the Summer and Fall of 2012. All partnerships provided data in 10 km by 10 km vector "cells" and simple polygon outlines of resource boundaries. Not all partnerships provided low, medium and high capacity estimates. Where only medium capacities were provided, KGS made the low and high capacity fields (VOL_LOW and VOL_HIGH, respectively) equal to the medium capacity (VOL_MED). Where only low and high estimates were provided, medium values were set to <Null>. Other alterations to the data include identifying overlapping and duplicate data submitted by adjacent partnerships and making corrections to values in text fields (spelling, capitalization, etc.) when errors were noticed.

Organization: GIS Support Section, Kansas Geological Survey

Position: NatCarb Team

Phone: 785-864-3965

Email: natcarb@kgs.ku.edu

Hours of service: 8 am - 5 pm M-F

Address type: mailing and physical

Address: 1930 Constant Ave

City: Lawrence

State or Province: KS

Postal code: 66047-3726

County: US

Process Step 2

Process description: Metadata updated.

Organization: GIS Support Section, Kansas Geological Survey

Position: NATCARB Team

Process date: 20130329

Data Distribution Information

General

Distribution liability: See access and use constraints information.

Distribution Point of Contact

Organization: NATCARB Map Team, US Department of Energy (DOE) National Energy Technology Laboratory (NETL)

Phone: 304-285-2006

Phone: 304-285-1354

Email: NATCARB.Maps@NETL.DOE.GOV

Address type: mailing and physical

Address: 3610 Collins Ferry Road M/S F04

City: Morgantown

State or Province: West Virginia

Postal code: 26507
**County:** US

### Standard Order Process

**Digital form:**
- **Format name:** ESRI File Geodatabase
- **Format version number:** 10.1
- **File decompression technique:** zip
- **Digital transfer option:**
  - **Online option:**
    - **Computer information:**
    - **Network address:**
      - **Network resource name:** http://www.netl.doe.gov/technologies/carbon_seq/natcarb/download.html

**Fees:** None

**Ordering instructions:** GIS datasets in ESRI file geodatabase format are available online. Please contact NATCARB Map Team for custom requests.

### Metadata Reference

#### Metadata Date

- **Last updated:** 20130401
- **Future metadata review date:** 20130701

#### Metadata Point of Contact

- **Organization:** GIS Support Section, Kansas Geological Survey
- **Position:** NATCARB Team
- **Phone:** 785-864-3965
- **Email:** natcarb@kgs.ku.edu
- **Hours of service:** 8 am - 5 pm M-F
- **Address type:** mailing and physical
  - **Address:** 1930 Constant Ave
  - **City:** Lawrence
  - **State or Province:** Kansas
  - **Postal code:** 66047-3726
  - **County:** US

#### Metadata Standards

- **Standard name:** FGDC Content Standard for Digital Geospatial Metadata
- **Standard version:** FGDC-STD-001-1998
- **Time convention:** local time

- **FGDC Plus Metadata Stylesheet**
  
  Federal Geographic Data Committee