**Title:** NATCARB Oil and Gas (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) Oil and Gas spatial database is a small-scale (large-area) overview of carbon dioxide (CO2) geologic storage potential in oil and/or gas fields across the USA and parts of Canada. Storage estimates are quantified by the volume of oil and gas that has, or could be, produced, assuming that it could be replaced by an equivalent volume of carbon dioxide. Only oil and/or gas reservoirs containing water with total dissolved solids (TDS) greater than 10,000 ppm merited evaluation for potential CO2 storage. Storage resources labelled as "OIL" may represent oil-only fields, or combined oil and gas fields. Storage resources labelled as "GAS" represent gas-only fields. 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 Oil and Gas layer;
- v1204 - Initial release for Atlas IV. New data submitted by all regional partnerships;
- v1302 - No changes to Oil and Gas layer. 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 oil and gas reservoirs across the USA and Canada compiled from regional datasets created by RCSPs and the KGS. Storage resource estimates are based on physically accessible CO2 storage pore volume within subsurface geologic formations, and on the assumption that the storage resources 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 2012) 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:** climatology, Meteorology, Atmosphere, environment, geoscientific, Information

**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>-172.598993 (latitude)</td>
</tr>
<tr>
<td>East</td>
<td>-36.003643 (latitude)</td>
</tr>
<tr>
<td>North</td>
<td>80.133277 (longitude)</td>
</tr>
<tr>
<td>South</td>
<td>22.536770 (longitude)</td>
</tr>
</tbody>
</table>

Data Structure and Attribute Information

Overview

Direct spatial reference method: Vector

Attributes of NATCARB_OilGas_v1302

Description: Vector polygon features representing oil and gas 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

**FIELD_NAME**

**Definition:** Name of oil/gas field

**TOTAL_FIELD_AREA**

**Definition:** Area (square meters) of entire oil/gas field

### Attribute domain range

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
</tbody>
</table>

**Attribute units of measurement:** square meters

**FIELD_TYPE**

**Definition:** Type of reservoir

### Attribute domain values

<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OIL</td>
<td>Oil only reservoir</td>
</tr>
<tr>
<td>GAS</td>
<td>Gas only reservoir</td>
</tr>
<tr>
<td>OIL &amp; GAS</td>
<td>Oil and gas reservoir</td>
</tr>
<tr>
<td>UNDETERMINED</td>
<td>Field type unknown</td>
</tr>
</tbody>
</table>

**Attribute definition source:** DOE-NETL

**RESERVOIR_NUM**

**Definition:** Number of reservoirs within field.

**RESERVOIR_NAME**

**Definition:** Name of reservoir within field
**VOL_LOW**

**Definition:** Low (P10) estimate of carbon storage potential in metric tonnes.

**Attribute domain range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
</tbody>
</table>

Attribute units of measurement: metric tonnes

**Attribute definition source:** Atlas IV

**VOL_MED**

**Definition:** Medium (P50) estimate of carbon storage potential in metric tonnes.

**Attribute domain range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
</tbody>
</table>

Attribute units of measurement: metric tonnes

**Attribute definition source:** Atlas IV

**VOL_HIGH**

**Definition:** High (P90) estimate of carbon storage potential in metric tonnes.

**Attribute domain range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
</tbody>
</table>

Attribute units of measurement: metric tonnes

**Attribute definition source:** Atlas IV

**DEPTH_FT**

**Definition:** Mean depth (feet) of storage resource

**Attribute domain range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Attribute units of measurement</td>
<td>Feet</td>
</tr>
<tr>
<td>Attribute measurement resolution</td>
<td>whole number</td>
</tr>
</tbody>
</table>

**Attribute definition source:** Atlas IV

**THICKNESS_FT**

**Definition:** Mean thickness (feet) of storage resource

**Attribute domain range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Attribute units of measurement</td>
<td>Feet</td>
</tr>
<tr>
<td>Attribute measurement resolution</td>
<td>whole number</td>
</tr>
</tbody>
</table>

**Attribute definition source:** Atlas IV

**SALINITY_TDS**

**Definition:** Mean salinity (total dissolved solids) of storage resource

**Attribute domain range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
</tr>
<tr>
<td>Attribute definition source:</td>
<td>Atlas IV</td>
</tr>
</tbody>
</table>

**PRESSURE_PSI**

*Definition:* Mean pressure (pounds per square inch) of storage formation

<table>
<thead>
<tr>
<th>Attribute domain range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Attribute units of measurement</td>
</tr>
<tr>
<td>Attribute measurement resolution</td>
</tr>
</tbody>
</table>

**TEMPERATURE_F**

*Definition:* Mean temperature (degrees F) of storage resource

<table>
<thead>
<tr>
<th>Attribute domain range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Attribute units of measurement</td>
</tr>
<tr>
<td>Attribute measurement resolution</td>
</tr>
</tbody>
</table>

**POROSITY_PCT**

*Definition:* Mean porosity (percent) of storage resource

<table>
<thead>
<tr>
<th>Attribute domain range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Attribute units of measurement</td>
</tr>
</tbody>
</table>

**PERMEABILITY_mD**

*Definition:* Mean permeability (millidarcies) of storage resource

<table>
<thead>
<tr>
<th>Attribute domain range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Attribute units of measurement</td>
</tr>
</tbody>
</table>

**ASSESSED**

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

<table>
<thead>
<tr>
<th>Attribute domain values</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value</strong></td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>
Storage resource has been assessed. Capacities may be "0".

**Attribute definition source:** DOE-NETL/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

**SDTS Feature Description**

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

**Feature class**

- **Type:** GT-polygon composed of chains
- **Count:** 56781

**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**

**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 Inermountain 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  
**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).

**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/](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
**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  
**Data location:** http://www.undeerc.org/pcor/, http://www.netl.doe.gov/technologies/carbon_seq/infrastructure/rcsp.html  
**Source contribution:** The Plains CO2 Reduction Partnership provided data for the upper Midwest and Central Canada (Iowa, Minnesota, Missouri, Eastern Montana, Nebraska, North Dakota, Eastern South Dakota, Wisconsin, Eastern Wyoming, Alberta, Northeastern British Columbia, Manitoba and Saskatchewan).

**MRCSP**

**Title:** MRCSP Coal 10K Carbon Sequestration Potential  
**Originators:** Midwest Regional Carbon Sequestration Partnership  
Batelle Memorial Institute  
**Data type:** vector digital data  
**Data location:** http://www.mrcsp.org/, http://www.netl.doe.gov/technologies/carbon_seq/infrastructure/rcsp.html  
**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).

**MGSC**

**Title:** MGSC Coal 10K Carbon Sequestration Potential  
**Originators:** Midwest Geological Sequestration Consortium  
Illinois State Geological Survey  
**Data type:** vector digital data  
**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  
**Data location:** http://www.secarbon.org/, http://www.netl.doe.gov/technologies/carbon_seq/infrastructure/rcsp.html  
**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 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 as 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 date:** 20120912

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 Technoloy 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:

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
  Time convention: local time

FGDC Plus Metadata Stylesheet

  Federal Geographic Data Committee