ArcGIS Hub for Carbon Capture, Utilization, and Storage in Alaska

Scott Norton, Alaska GIS Manager

HDR, Inc.

Agenda

1. Introduction
2. What is CCUS?
3. Short history of CCUS in Alaska
4. ArcGIS Hub
5. Q&A

Introduction

Scott Norton

45yo

Born and raised here in Anchorage Ak...

What is Carbon Capture Utilization and Storage (CCUS)?

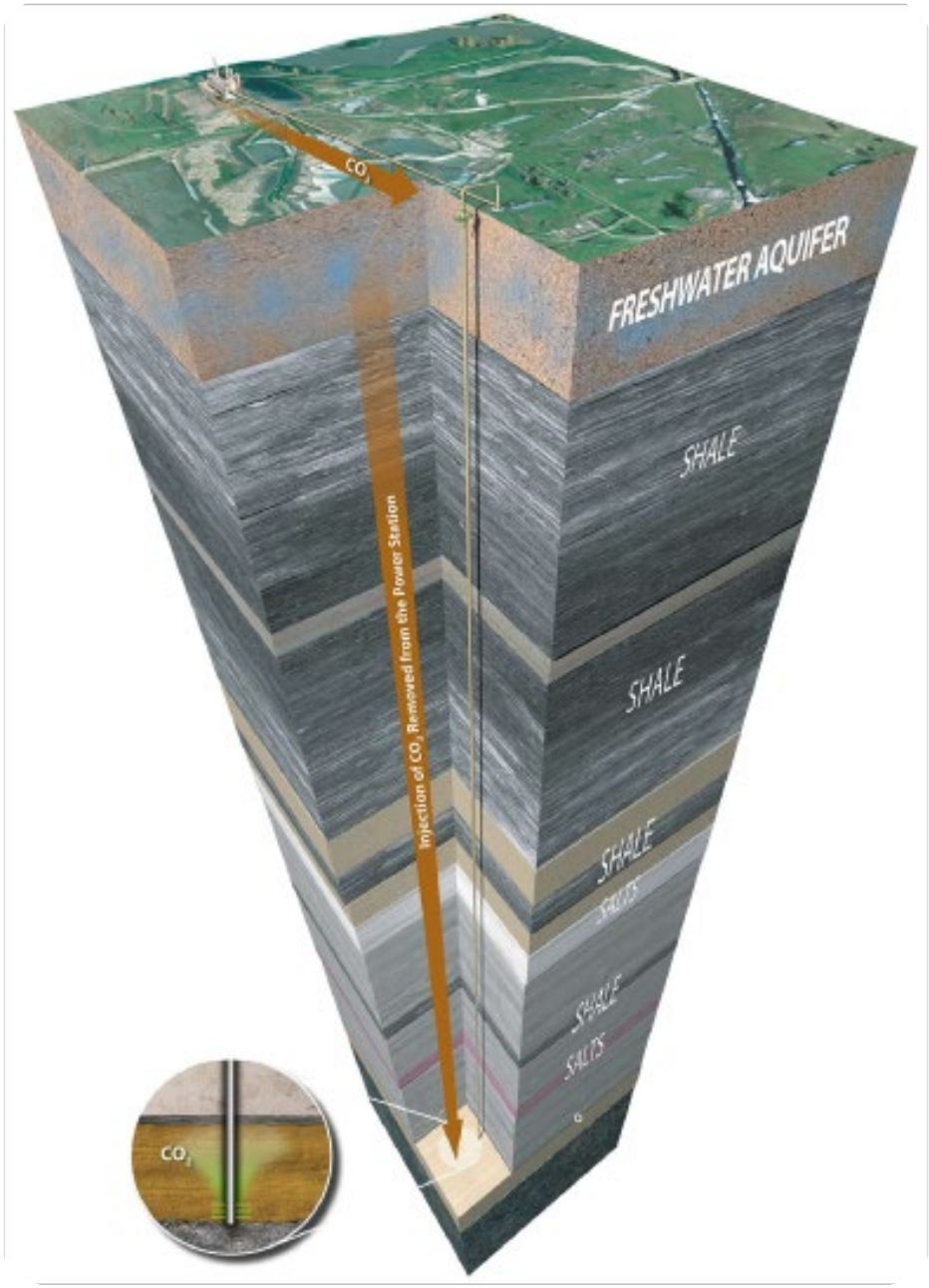

Capture

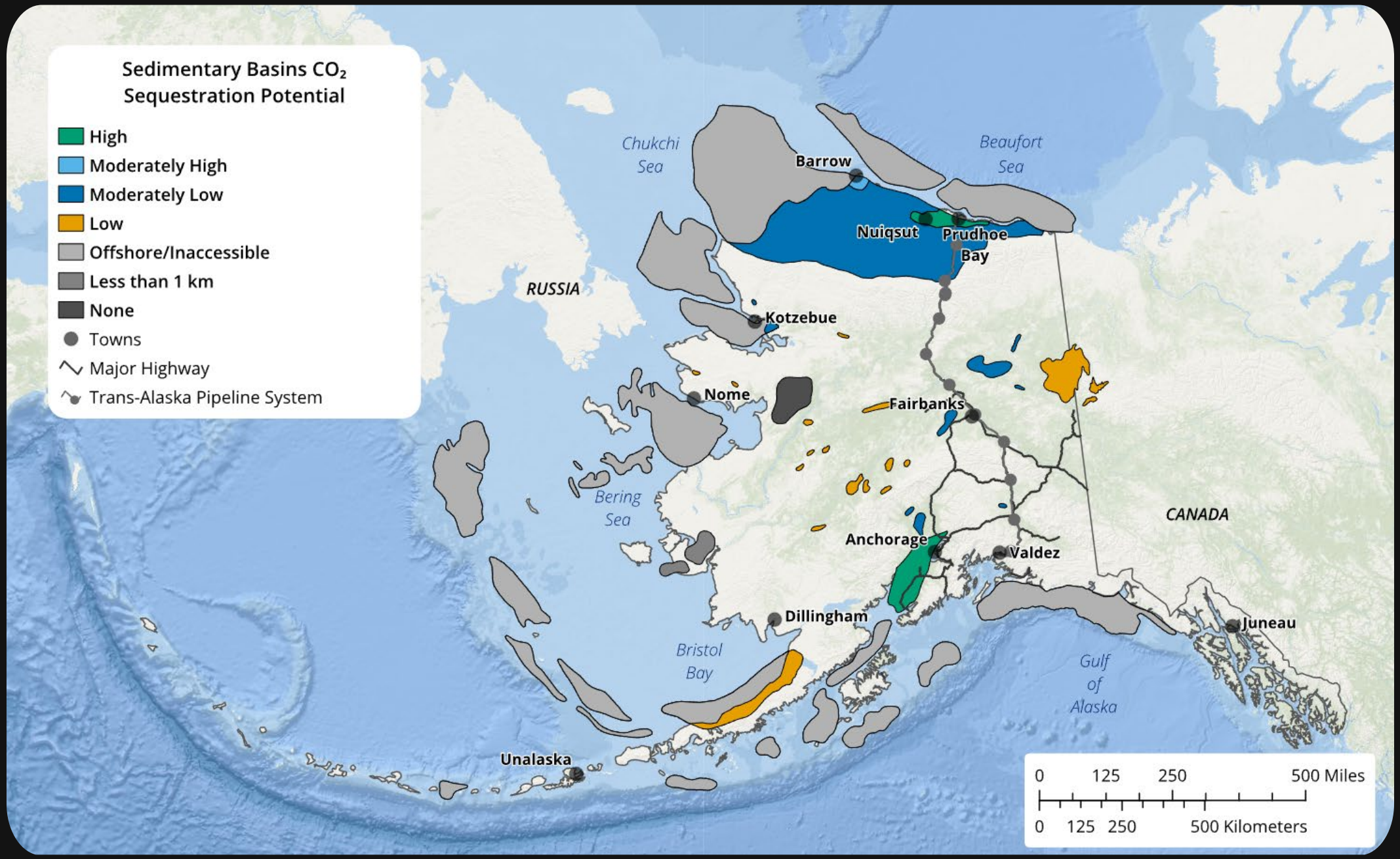

Capture

Utilization

- Use as raw input for products and processes
  - Synthetic fuels
  - Chemicals
  - Building Materials
  - Vegetable production and Biofuels
- Enhanced Oil Recovery (EOR)

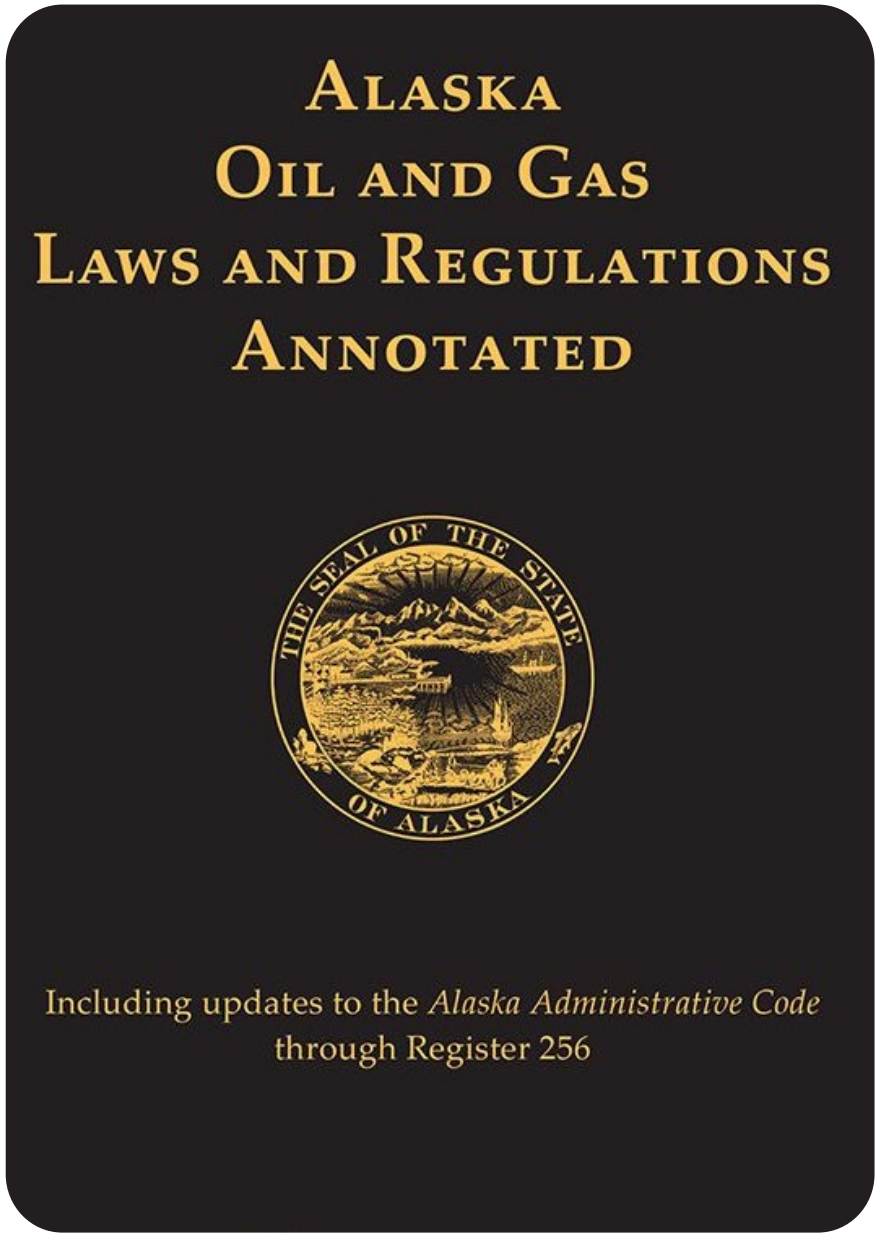
Storage


CO_2
FRESHWATER AQUIFER
SHALE
SHALE
SHALE
SALTS
SHALE
SALTS
Injection of CO_2 Removed from the Power Station
CO_2


Sedimentary Basins CO_2 Sequestration Potential
High
Moderately High
Moderately Low
Low
Offshore/Inaccessible
Less than 1 km
None
Towns
Major Highway
Trans-Alaska Pipeline System
Chukchi Sea
Beaufort Sea
Barrow
Nuiqsut
Prudhoe Bay
RUSSIA
Kotzebue
Nome
Fairbanks
Bering Sea
CANADA
Anchorage
Valdez
Dillingham
Juneau
Bristol Bay
Gulf of Alaska
Unalaska
0 125 250 500 Miles
0 125 250 500 Kilometers

Carbon Capture Utilization and Storage in Alaska

...A Short History



2023 – Alaska Governor Mike Dunleavy introduced state senate and house bills SB49 and HB50
That created “new authorities for State agencies to license, lease, and administer the State’s pore space for geological storage; administer pipeline infrastructure for transportation of captured carbon to geological storage facilities and administer injection wells…”

2024 – HB50 passed in the house and was signed into law
This enabled the Department of Natural Resources (DNR) to lease the pore space and empowered the Alaska Oil and Gas Conservation Commission (AOGCC) to regulate the carbon injection.

New Statues - Title 38, Chapter 5, Article 15A, Carbon Storage Exploration Licenses; Leases (AS 38.05.700 – AS 38.05.795)

2025 – Regulations for implementing the new statues were adopted.

STATE OF ALASKA REQUEST FOR PROPOSALS

RFP 2025-1000-0026

As Needed Geographic Information System (GIS) - ArcGIS Hub and Data Services

Issued July 3, 2024

The State is seeking a Contractor to design and build a publicly accessible geospatial database supporting Alaska Carbon Capture Utilization and Storage in Alaska.

The Department of Natural Resources is soliciting proposals for as needed Geographic Information System (GIS) Services to design and build a collection of data, with publicly accessible data services and web apps that will progress Carbon Capture Utilization and Storage (CCUS) in Alaska....


ArcGIS Hub

Hub site development process

- Requirements
- Data Inventory / Management Plan
- Site Architecture

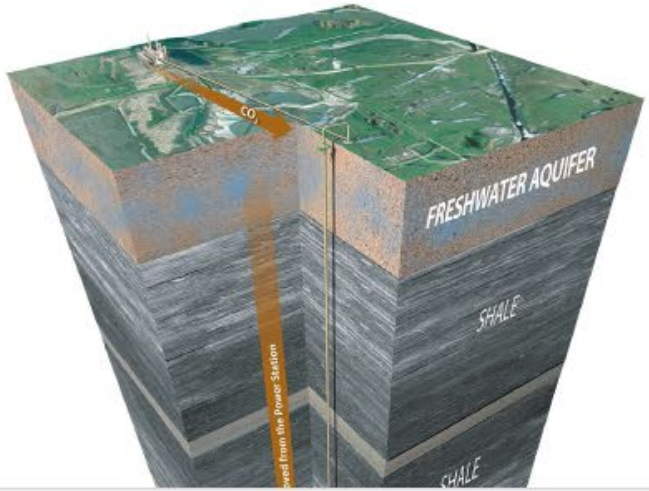
Alaska CCUS Hub Site

Carbon Capture, Utilization and Storage

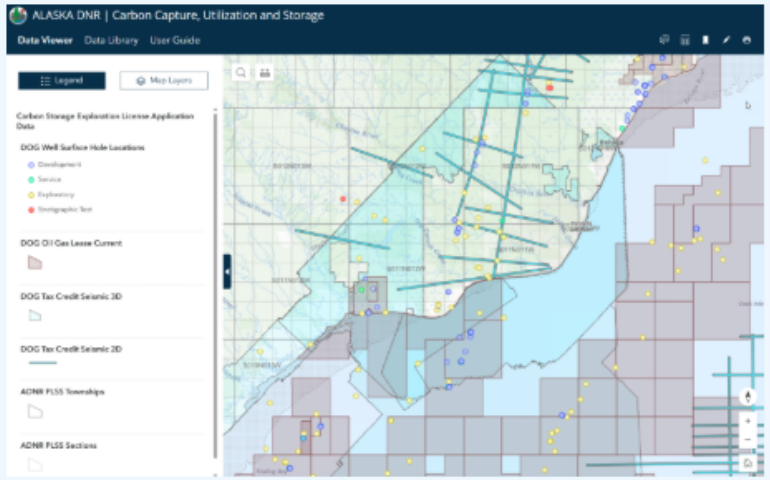
Tools for exploration licensing and permitting

What is Carbon Capture, Utilization and Storage (CCUS)?

Carbon Capture, Utilization, and Storage (CCUS) is the term for a suite of technologies that capture CO_2 from industrial processes, fossil fuel power generation, or directly from the atmosphere, for use in other applications or to be stored deep underground in geologic formations. Naturally mined and point source captured CO_2 has been injected underground for decades as a part of enhanced oil recovery operations. On the North Slope of Alaska, 8 billion cubic feet of natural gas is reinjected every day, containing approximately 10% CO_2. Evolving technologies and market conditions are expanding the opportunities for CO_2 storage, transforming



How to Use this Site



View the Map

Use the CCUS Data Viewer to explore carbon storage site potential.

- Turn on and off map layers such as land ownership, well site locations, geological formations, seismic data, water resources and more
- View descriptive information in popups
- Download GIS data
- Read the User Guide for more map tool instructions

ADEC Active Public Water System

Drinking water sources

ADNR Alaska Pipelines

Existing infrastructure

DOG Well Surface Hole Locations

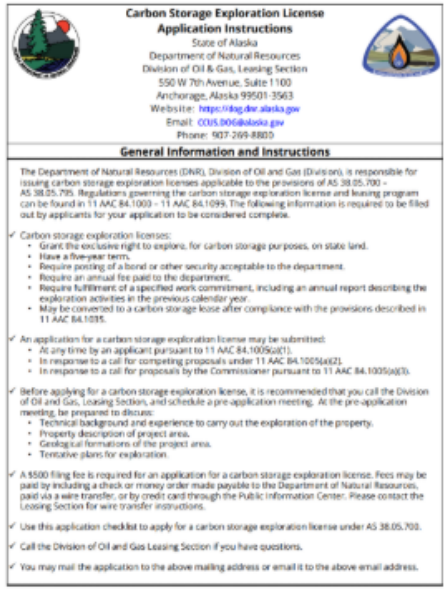
Existing wells updated monthly

DOG Well Bottom Hole Locations

Existing wells updated monthly

Research and Gather Data

Use the CCUS Data Library to review available GIS data sources, download data, or find web services for use in desktop GIS software.



Carbon Storage Exploration License Application Instructions

State of Alaska
Department of Natural Resources
Division of Oil & Gas, Leasing Section
550 W 7th Avenue, Suite 1100
Anchorage, Alaska 99501-3563
Website: https://dog.dnr.alaska.gov
Email: CCUS.DOG@alaska.gov
Phone: 907-269-8800

General Information and Instructions

The Department of Natural Resources (DNR), Division of Oil and Gas (Division), is responsible for issuing carbon storage exploration licenses applicable to the provisions of AS 38.05.700 – AS 38.05.795. Regulations governing the carbon storage exploration license and leasing program can be found in 11 AAC 84.1000 – 11 AAC 84.1099. The following information is required to be filled out by applicants for your application to be considered complete.

✓ Carbon storage exploration licenses:
- Grant the exclusive right to explore, for carbon storage purposes, on state land.
- Have a five-year term.
- Require posting of a bond or other security acceptable to the department.
- Require an annual fee paid to the department.
- Require fulfillment of a specified work commitment, including an annual report describing the exploration activities in the previous calendar year.
- May be converted to a carbon storage lease after compliance with the provisions described in 11 AAC 84.1035.

✓ An application for a carbon storage exploration license may be submitted:
- At any time by an applicant pursuant to 11 AAC 84.1005(a)(1).
- In response to a call for competing proposals under 11 AAC 84.1005(a)(2).
- In response to a call for proposals by the Commissioner pursuant to 11 AAC 84.1005(a)(3).

✓ Before applying for a carbon storage exploration license, it is recommended that you call the Division of Oil and Gas, Leasing Section, and schedule a pre-application meeting. At the pre-application meeting, be prepared to discuss:
- Technical background and experience to carry out the exploration of the property.
- Property description of project area.
- Geological formations of the project area.
- Tentative plans for exploration.

✓ A $500 filing fee is required for an application for a carbon storage exploration license. Fees may be paid by including a check or money order made payable to the Department of Natural Resources, paid via a wire transfer, or by credit card through the Public Information Center. Please contact the Leasing Section for wire transfer instructions.

✓ Use this application checklist to apply for a carbon storage exploration license under AS 38.05.700.

✓ Call the Division of Oil and Gas Leasing Section if you have questions.

✓ You may mail the application to the above mailing address or email it to the above email address.

Prepare an Exploration Lease Application

Review the Carbon Storage Exploration License Application and the program background information provided.

The Data Viewer includes tools to help visualize a proposed study area and nearby features.

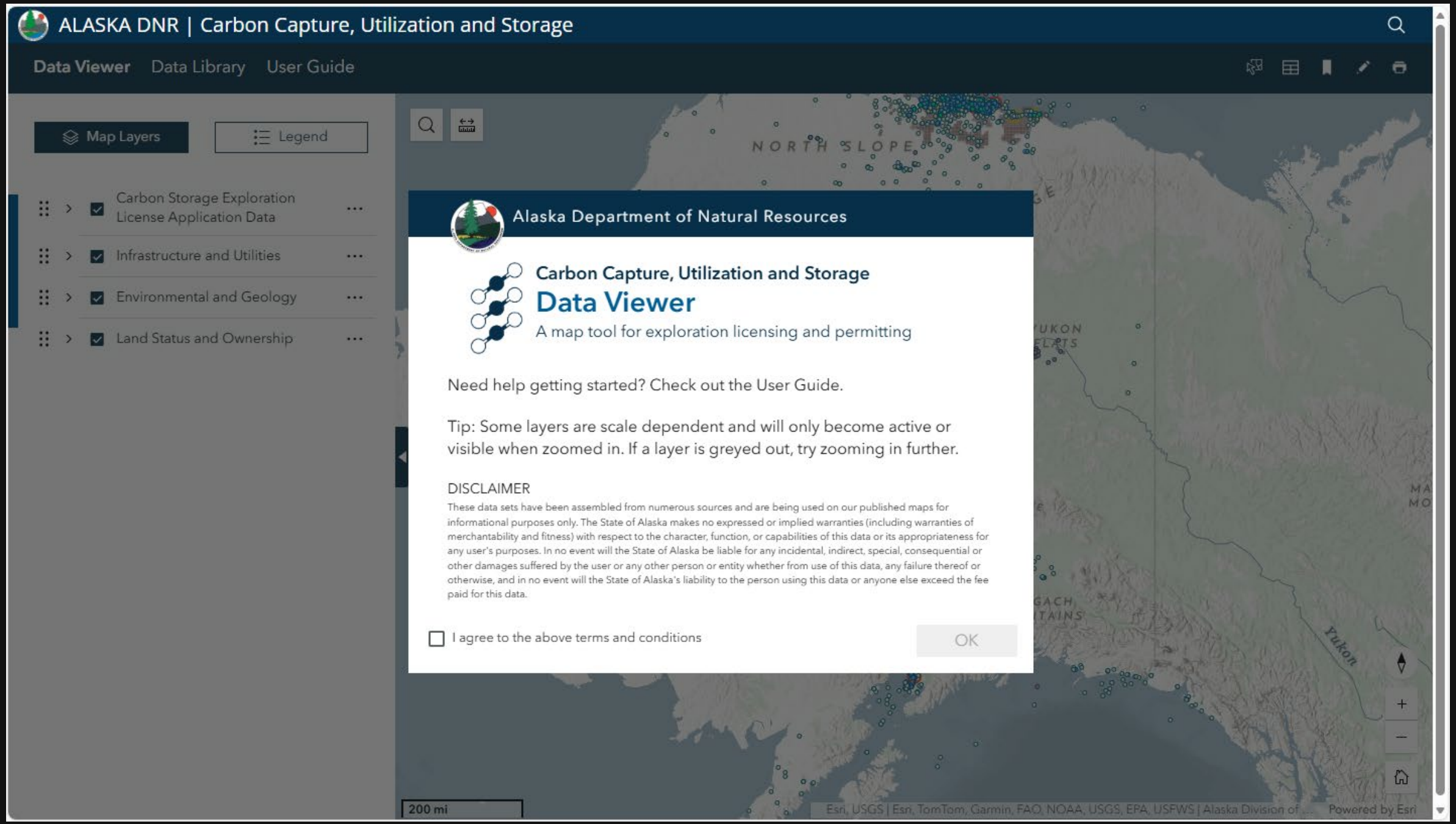
- Select
- Draw
- Print a map
- Download data
- See the User Guide for more details

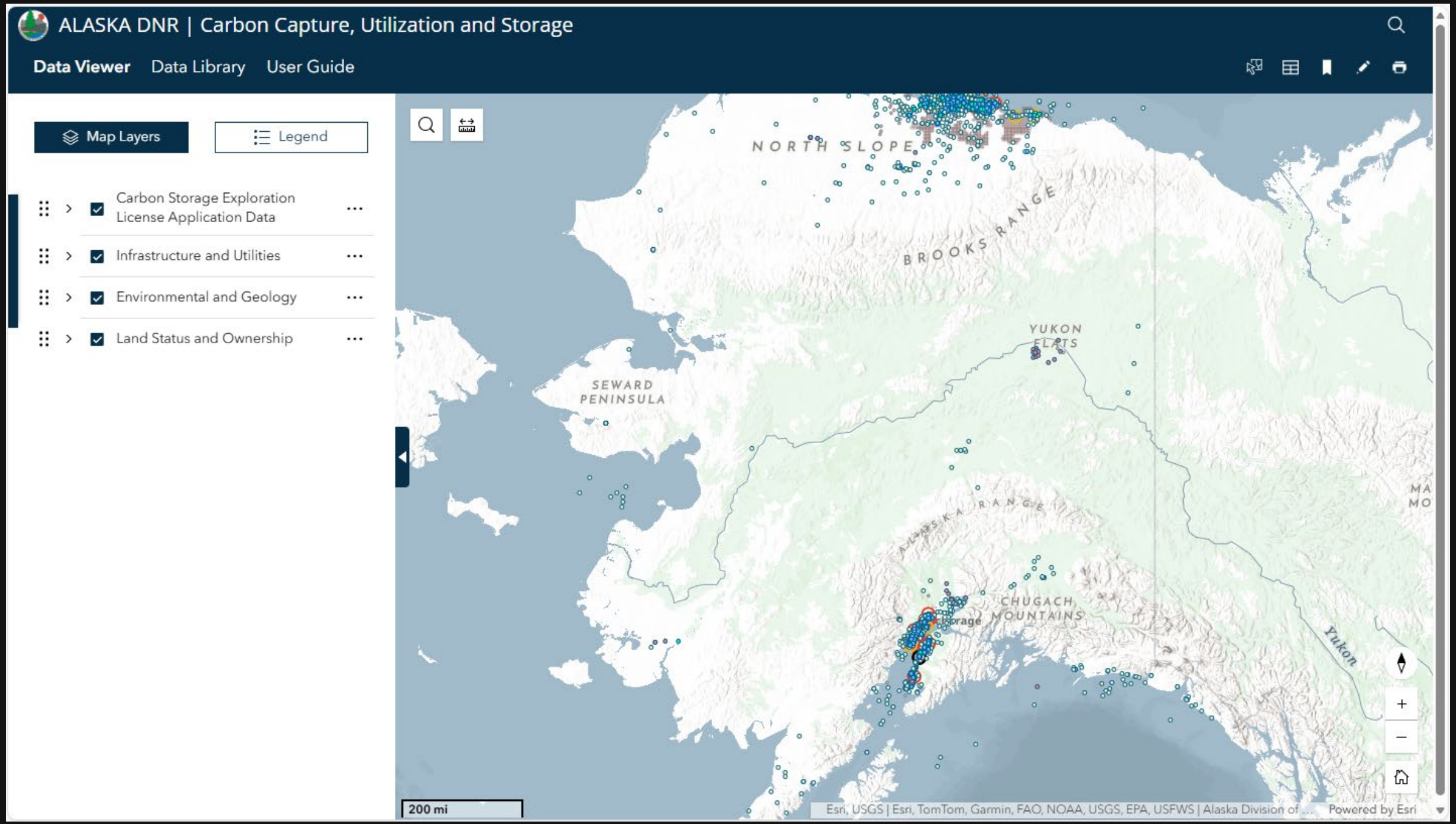
The Data Library organizes data specifically needed for a permit application. Explore these sources or download the GIS data for use in desktop GIS software for further review.

What's Next?

After submitting a carbon storage exploration license application packet, a Class VI permit is required.

Read more about the regulatory requirements and processes from the Alaska Oil and Gas Conservation Commission (AOGCC).


ALASKA DNR | Carbon Capture, Utilization and Storage
Data Viewer
Data Library
User Guide
Map Layers
Legend
Carbon Storage Exploration License Application Data
Infrastructure and Utilities
Environmental and Geology
Land Status and Ownership
NORTH SLOPE
Alaska Department of Natural Resources
Carbon Capture, Utilization and Storage
Data Viewer
A map tool for exploration licensing and permitting
Need help getting started? Check out the User Guide.
Tip: Some layers are scale dependent and will only become active or visible when zoomed in. If a layer is greyed out, try zooming in further.
DISCLAIMER
These data sets have been assembled from numerous sources and are being used on our published maps for informational purposes only. The State of Alaska makes no expressed or implied warranties (including warranties of merchantability and fitness) with respect to the character, function, or capabilities of this data or its appropriateness for any user's purposes. In no event will the State of Alaska be liable for any incidental, indirect, special, consequential or other damages suffered by the user or any other person or entity whether from use of this data, any failure thereof or otherwise, and in no event will the State of Alaska's liability to the person using this data or anyone else exceed the fee paid for this data.
I agree to the above terms and conditions
OK
Yukon
200 mi
Esri, USGS | Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS | Alaska Division of ...
Powered by Esri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NORTH SLOPE
BROOKS RANGE
YUKON FLATS
SEWARD PENINSULA
ALASKA RANGE
CHUGACH MOUNTAINS
Yukon
200 mi
Esri, USGS | Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS | Alaska Division of ...
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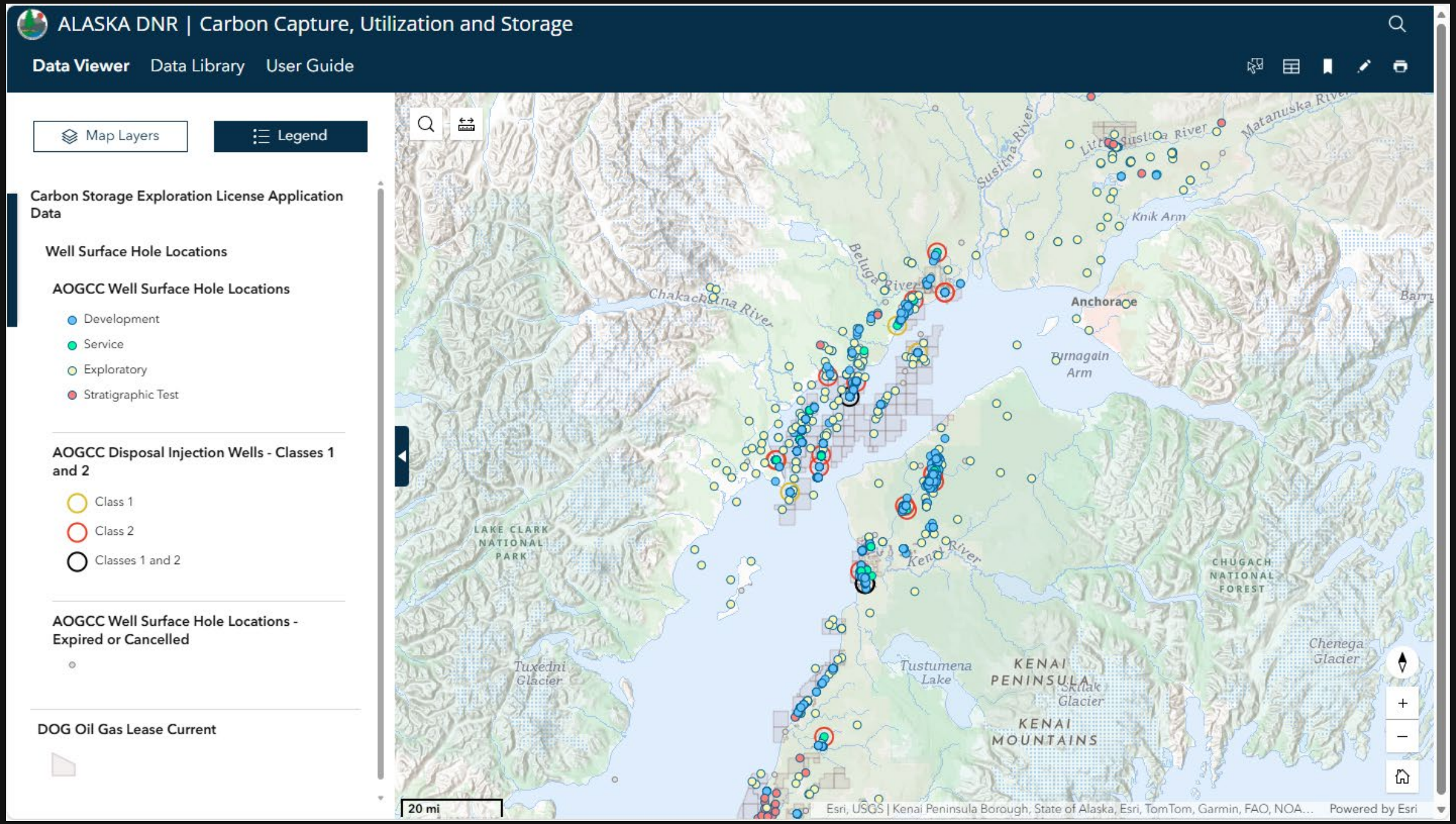
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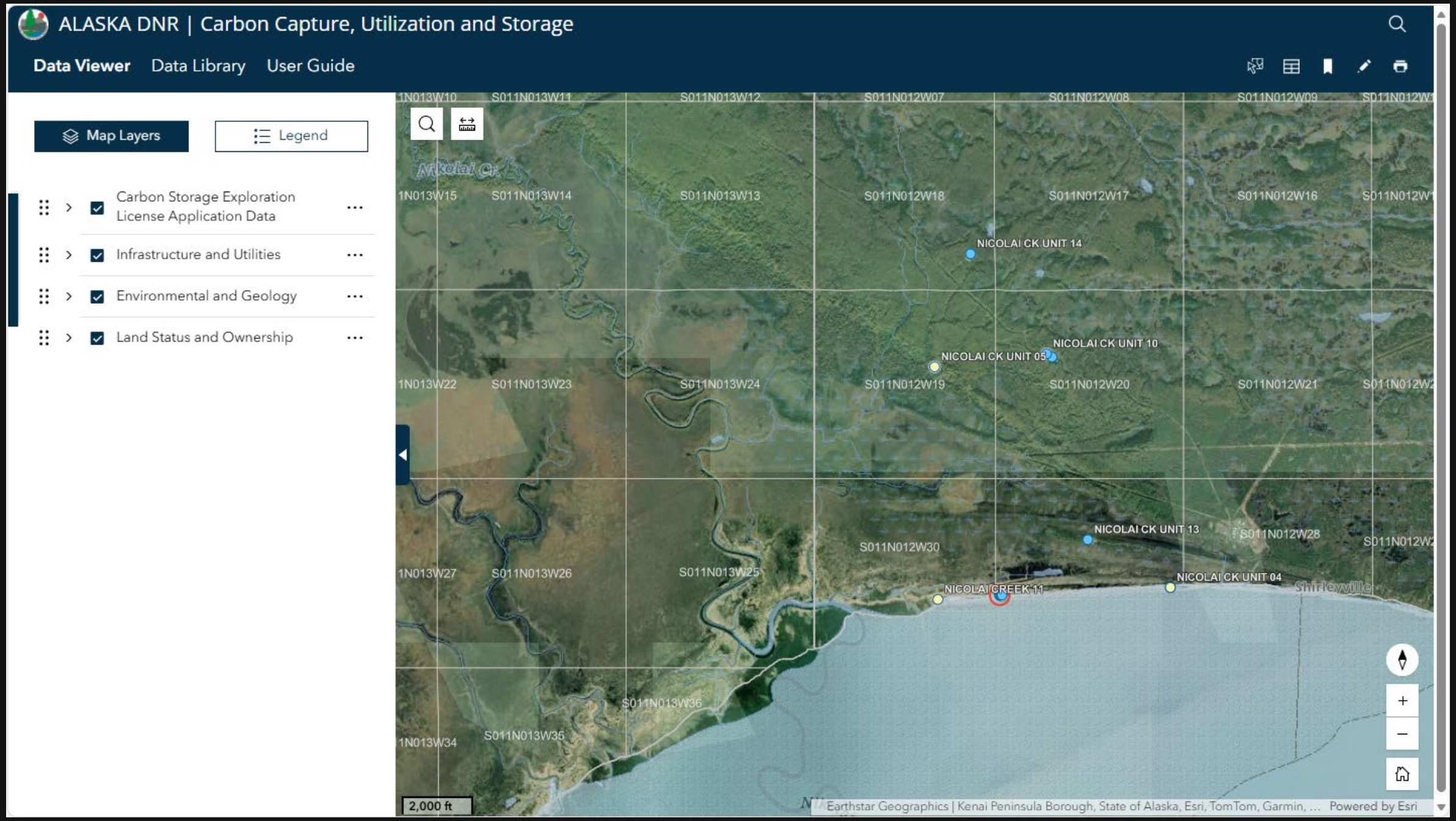
Carbon Storage Exploration License Application Data
Well Surface Hole Locations
AOGCC Well Surface Hole Locations
Development
Service
Exploratory
Stratigraphic Test
AOGCC Disposal Injection Wells - Classes 1 and 2
Class 1
Class 2
Classes 1 and 2
AOGCC Well Surface Hole Locations - Expired or Cancelled
DOG Oil Gas Lease Current
Susitna River
Little Susitna River
Matanuska River
Knik Arm
Beluga River
Chakachatna River
Anchorage
Turnagain Arm
LAKE CLARK NATIONAL PARK
Kenai River
CHUGACH NATIONAL FOREST
Tuxedni Glacier
Tustumena Lake
KENAI PENINSULA
Skilak Glacier
KENAI MOUNTAINS
Chenega Glacier
20 mi
Esri, USGS | Kenai Peninsula Borough, State of Alaska, Esri, TomTom, Garmin, FAO, NOA...
Powered by Esri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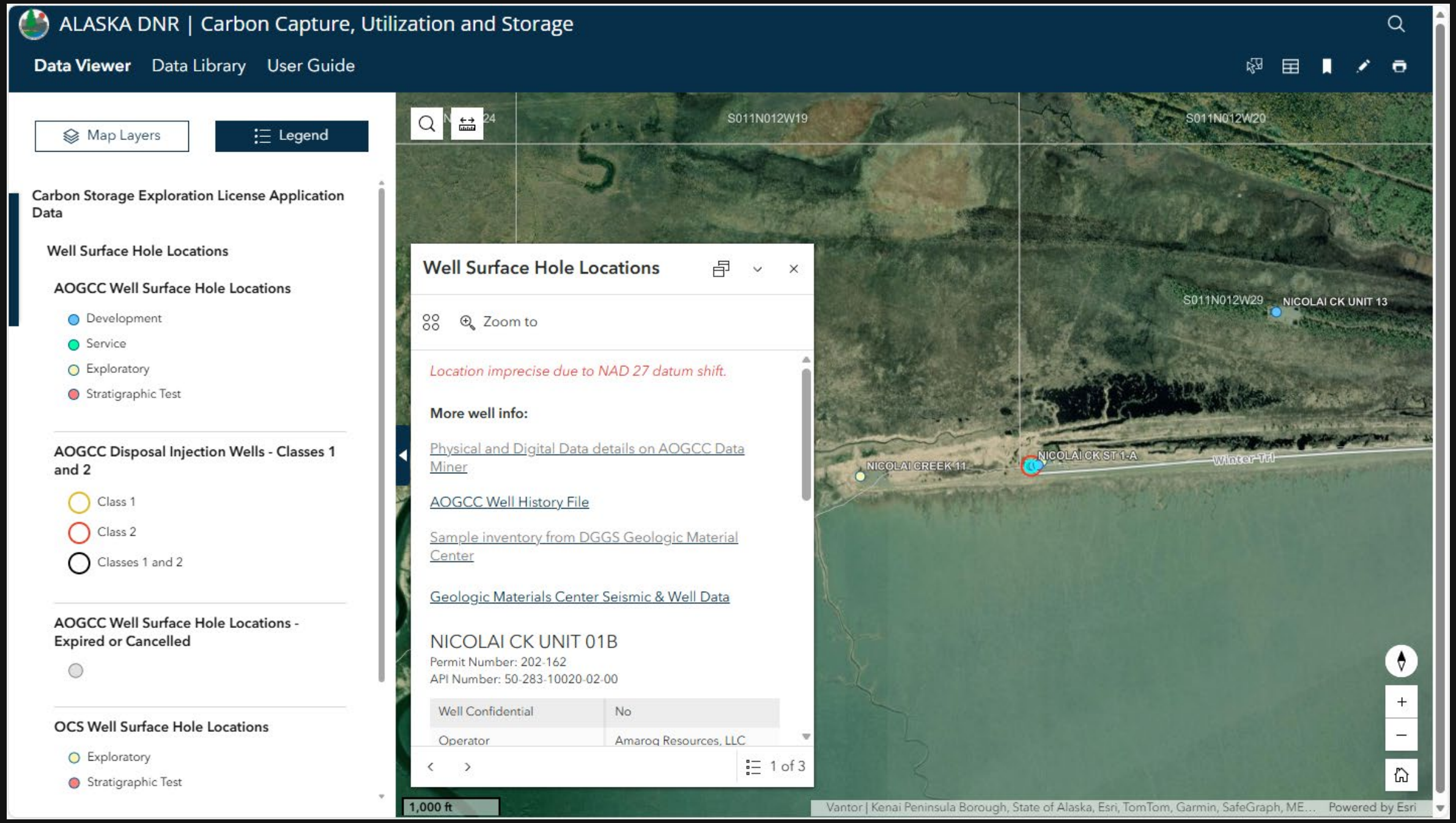
NICOLAI CK UNIT 14
NICOLAI CK UNIT 10
NICOLAI CK UNIT 05
NICOLAI CK UNIT 13
NICOLAI CK UNIT 04
NICOLAI CREEK 11
Shirleyville
2,000 ft
Earthstar Geographics | Kenai Peninsula Borough, State of Alaska, Esri, TomTom, Garmin, ...
Powered by Esri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Class 2
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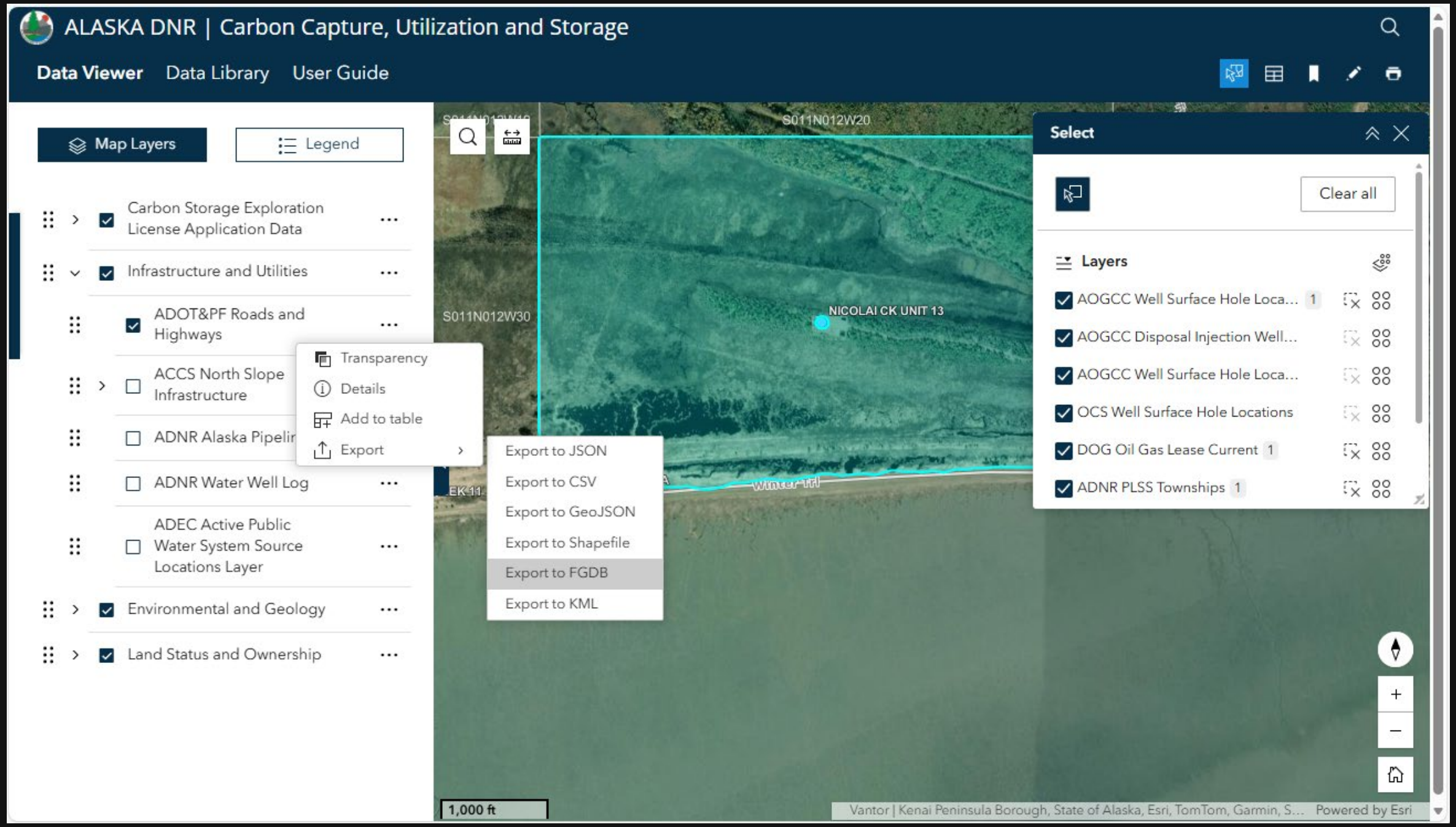
OCS Well Surface Hole Locations
Exploratory
Stratigraphic Test
S011N012W19
S011N012W20
S011N012W29
NICOLAI CK UNIT 13
NICOLAI CREEK 11
NICOLAI CK ST 1-A
Winter Trl
Well Surface Hole Locations
Zoom to
Location imprecise due to NAD 27 datum shift.
More well info:
Physical and Digital Data details on AOGCC Data Miner
AOGCC Well History File
Sample inventory from DGGS Geologic Material Center
Geologic Materials Center Seismic & Well Data
NICOLAI CK UNIT 01B
Permit Number: 202-162
API Number: 50-283-10020-02-00
Well Confidential
No
Operator
Amaroq Resources, LLC
1 of 3
1,000 ft
Vantor | Kenai Peninsula Borough, State of Alaska, Esri, TomTom, Garmin, SafeGraph, ME...
Powered by Esri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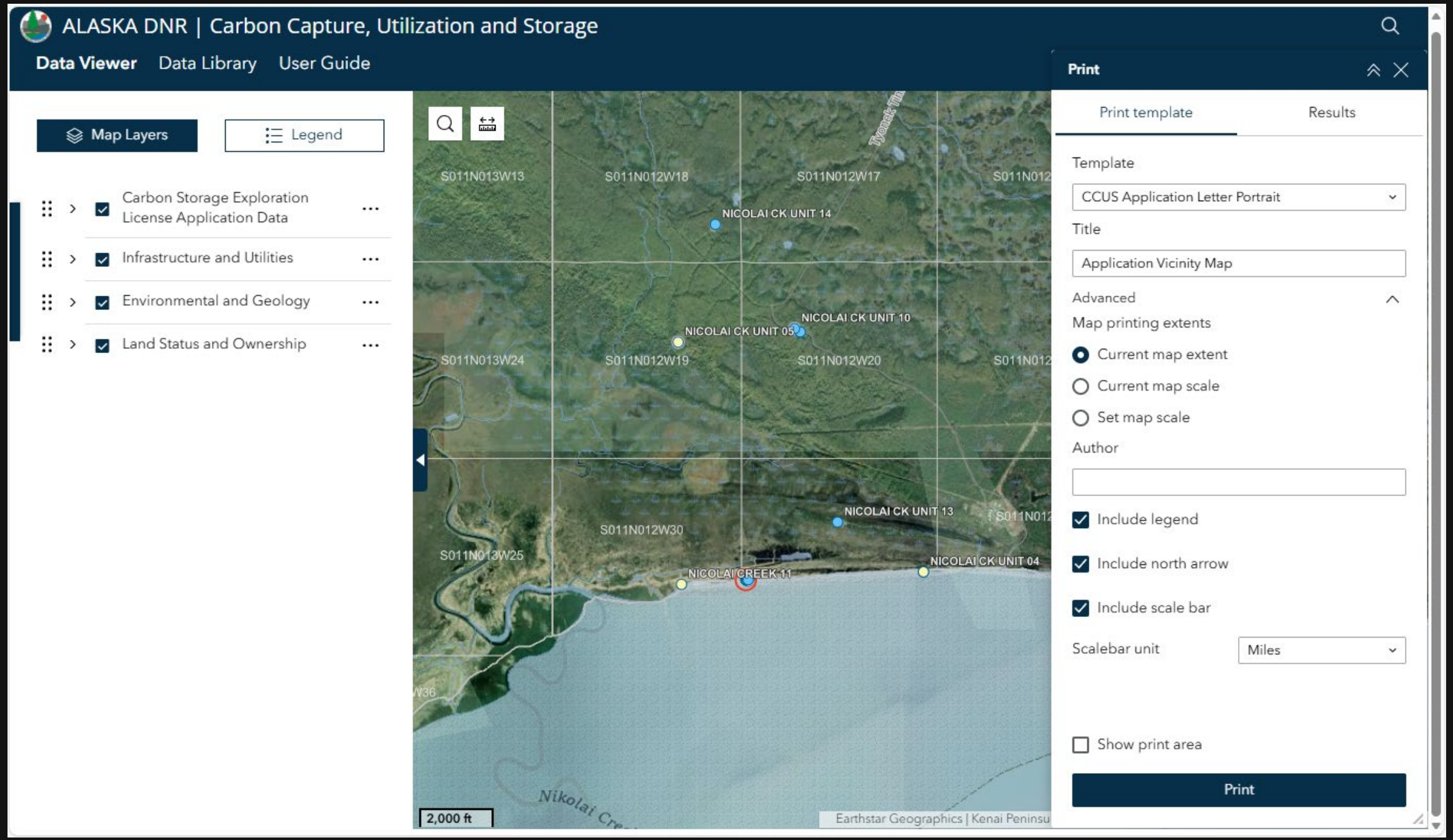
ADOT&PF Roads and Highways
ACCS North Slope Infrastructure
ADNR Alaska Pipelir
ADNR Water Well Log
ADEC Active Public Water System Source Locations Layer
Environmental and Geology
Land Status and Ownership
Transparency
Details
Add to table
Export
Export to JSON
Export to CSV
Export to GeoJSON
Export to Shapefile
Export to FGDB
Export to KML
S011N012W20
S011N012W30
NICOLAI CK UNIT 13
Winter Trl
Select
Clear all
Layers
AOGCC Well Surface Hole Loca... 1
AOGCC Disposal Injection Well...
AOGCC Well Surface Hole Loca...
OCS Well Surface Hole Locations
DOG Oil Gas Lease Current 1
ADNR PLSS Townships 1
1,000 ft
Vantor | Kenai Peninsula Borough, State of Alaska, Esri, TomTom, Garmin, S... Powered by Esri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S011N013W13
S011N012W18
S011N012W17
NICOLAI CK UNIT 14
NICOLAI CK UNIT 10
NICOLAI CK UNIT 05
S011N013W24
S011N012W19
S011N012W20
NICOLAI CK UNIT 13
S011N012W30
S011N013W25
NICOLAI CK UNIT 04
NICOLAI CREEK 11
2,000 ft
Earthstar Geographics | Kenai Peninsu
Print
Print template
Results
Template
CCUS Application Letter Portrait
Title
Application Vicinity Map
Advanced
Map printing extents
Current map extent
Current map scale
Set map scale
Author
Include legend
Include north arrow
Include scale bar
Scalebar unit
Miles
Show print area
Print

Data Library

External Resources | Permit Application | Land Ownership | Environment & Geology | Infrastructure & Utilities

Use this Data Library to review or download GIS data relevant to CCUS project planning. Data sources needed to complete the Alaska DNR Division of Oil & Gas, Leasing Section Alaska Carbon Storage Exploration License Application are included here.

Data Library content is organized by **GIS Feature** and **Map Services**. A Feature Service is data published in a vector (point, line, or polygon) format. Users are able to select features and view popup or tabular information. A Map Service is a static image with no clickable functionality.

GIS Feature Service

GIS Map Service

Source Data Agencies	
ADEC - Alaska Department of Environmental Conservation	**DOG** - Alaska DNR Division of Oil & Gas
ADNR - Alaska Department of Natural Resources	**EPA** - U.S. Environmental Protection Agency
AOGCC - Alaska Oil and Gas Conservation Commission	**MOA** - Municipality of Anchorage
BLM - U.S. Bureau of Land Management	**MSB** - Matanuska-Susitna Borough
DGGS - Alaska Division of Geological & Geophysical Surveys	**USFWS** - U.S. Fish & Wildlife Service

External Web Sites and Applications

Alaska Oil and Gas Conservation Commission Data	Access to public AOGCC data including: Data Miner, Data Extract, Well History Files, Orders, and other information.
CCUS Publications	A list of publications about Cook Inlet geology and data sources (excluding GMC and AOGCC resources) that provide the foundation for someone to embark on a Carbon Capture, Utilization, and Storage (CCUS) project.
EPA EnviroAtlas	EnviroAtlas provides geospatial data, easy-to-use tools, and other resources related to ecosystem services, their stressors, and human health.
Geologic Map Index Web Application	This online exploration tool provides the boundaries of most DGGS and USGS geologic maps of Alaska.
Geologic Materials Center	Overview information about the Geologic Materials Center. Links to seismic and well data, as well as reports, can be found here.
UAF Alaska Geophysical Network Web Application	Interactive map of Alaska earthquakes.
National Pipeline Mapping System Public Map Viewer	Interactive map of NPMS pipline, liquefied natural gas (LNG) plant and breakout tank data, including attributes and pipeline operator contact information.

Land Status and Ownership

Datasets to assist in determining land status and ownership.

ADNR Easements

Public and private rights-of-way

ADNR Mineral Permit or Lease

Mineral estate ownership

ADNR Mineral Estate: Agreement Settlement Reconveyance

Mineral estate ownership

ADNR Mineral Estate: State TA Patented

Mineral estate ownership

ADNR Mineral Estate: Mental Health Trust Land

Mineral estate ownership

ADNR Mineral Estate: Other State Acquired

Mineral estate ownership

ADNR State Mining Claim Closed

Mineral estate ownership

DOG Tax Credit Seismic 2D

Alaska Division of Oil and Gas
Alaska Department of Natural Resources ArcGIS Online

View Map Download More

Summary

Subsurface survey data

Operators interested in developing a CCUS project will need to have an understanding of the underground geology in the vicinity of their project. Seismic surveys, traditionally used in oil and gas exploration, are now increasingly used in CCUS projects. They provide crucial information about the subsurface, aiding in site selection, risk assessment, and monitoring of CO2 storage. Seismic data helps understand subsurface geology, identify potential hazards, and monitor the migration of CO2 during storage. This dataset contains the location and extent of existing 2D seismic surveys that have occurred in Alaska and can be disclosed publicly.

1. This map is intended as a current snapshot of information that can be disclosed publicly

Read More

Details

Dataset
Feature Layer

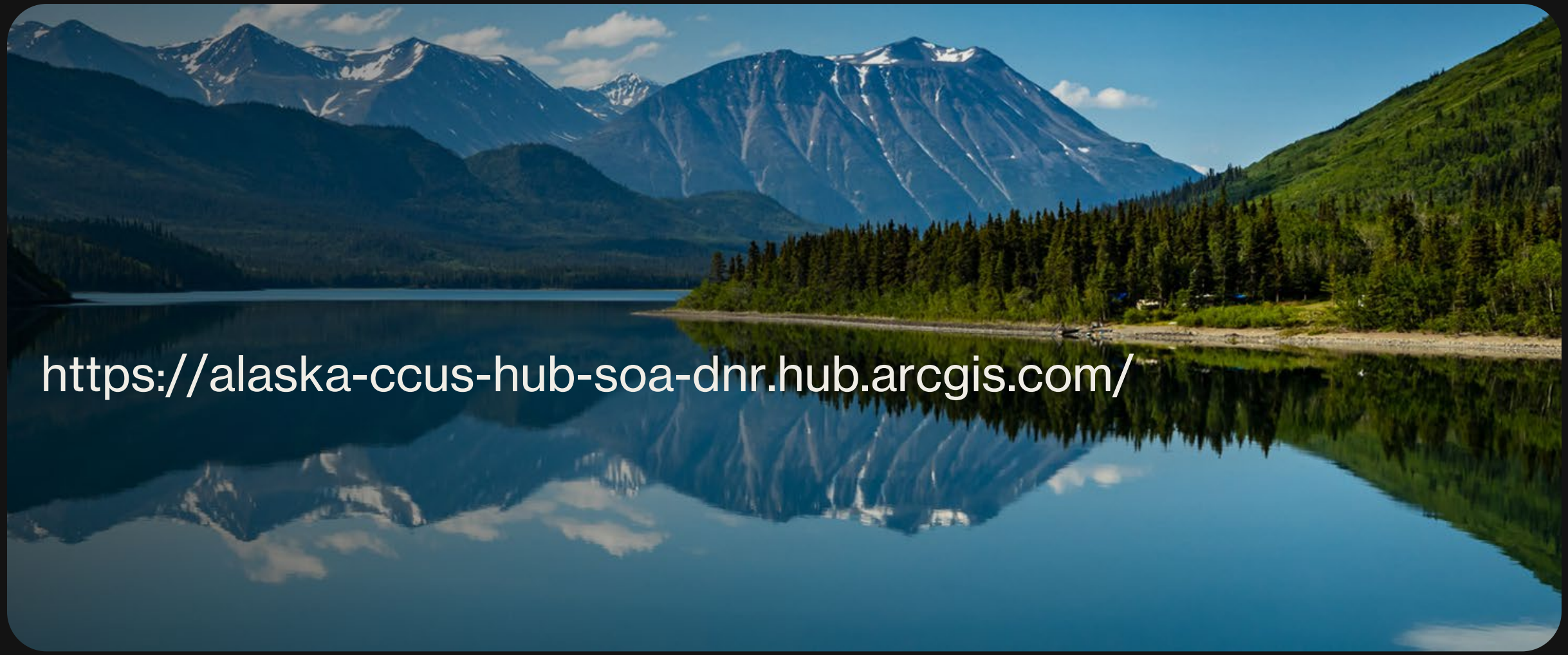
August 21, 2025 at 4:09:54 PM AKDT
Info Updated

April 12, 2026 at 5:55:37 AM AKDT
Data Updated

April 18, 2025 at 7:27:01 PM AKDT
Published Date

Records: 26
View data table

Public



Or just Google: “Alaska CCUS Hub”

Q & A