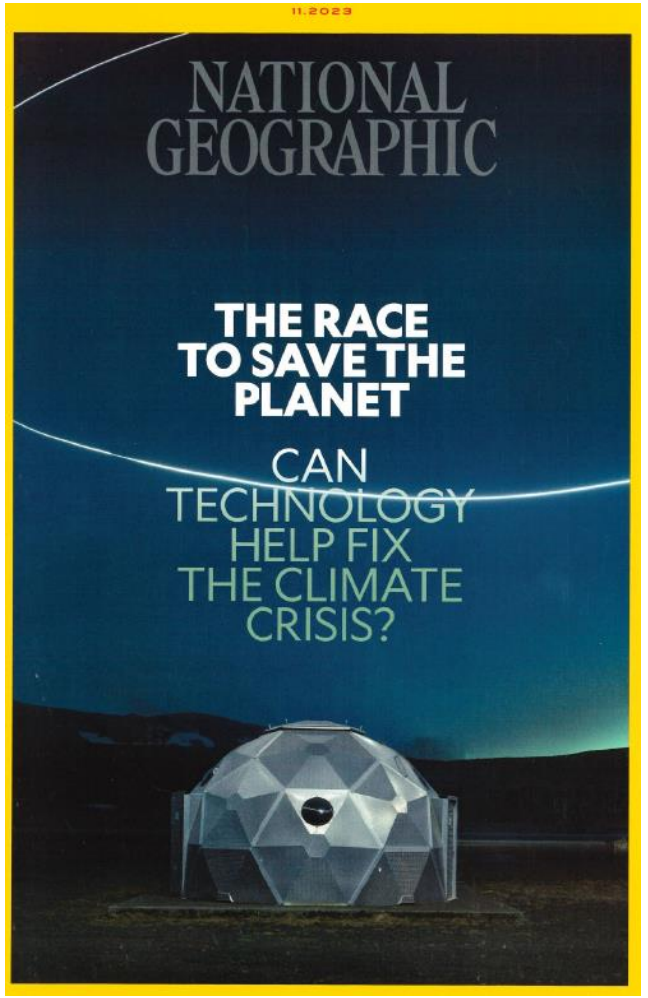
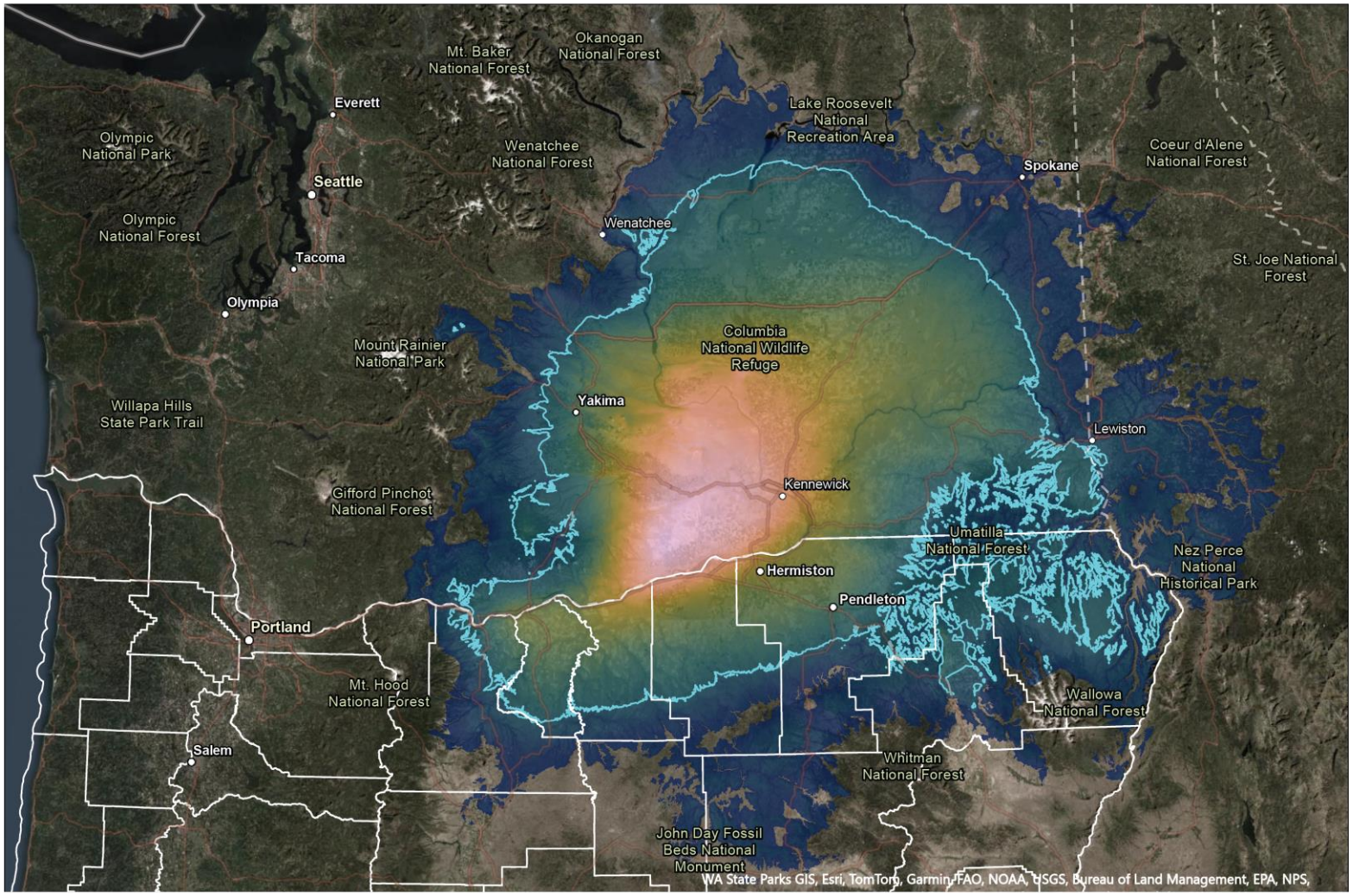
Geologic Carbon Sequestration in Oregon

Oregon Dept. of Geology and Mineral Industries
& Department of State Lands
April 2025

Potential for Geologic Carbon Sequestration in Oregon

- Carbon Sequestration Overview
- Oregon Basalts and Geologic Carbon Sequestration
- State Lands Opportunities
- Regulatory Framework
- Community Engagement





Columbia River Basin: modelled basalt thickness

0 ~2600 ft feet 17,210

0 800 m meters 5,250

100 miles

100 km

How deep are the rocks and how big is the opportunity?

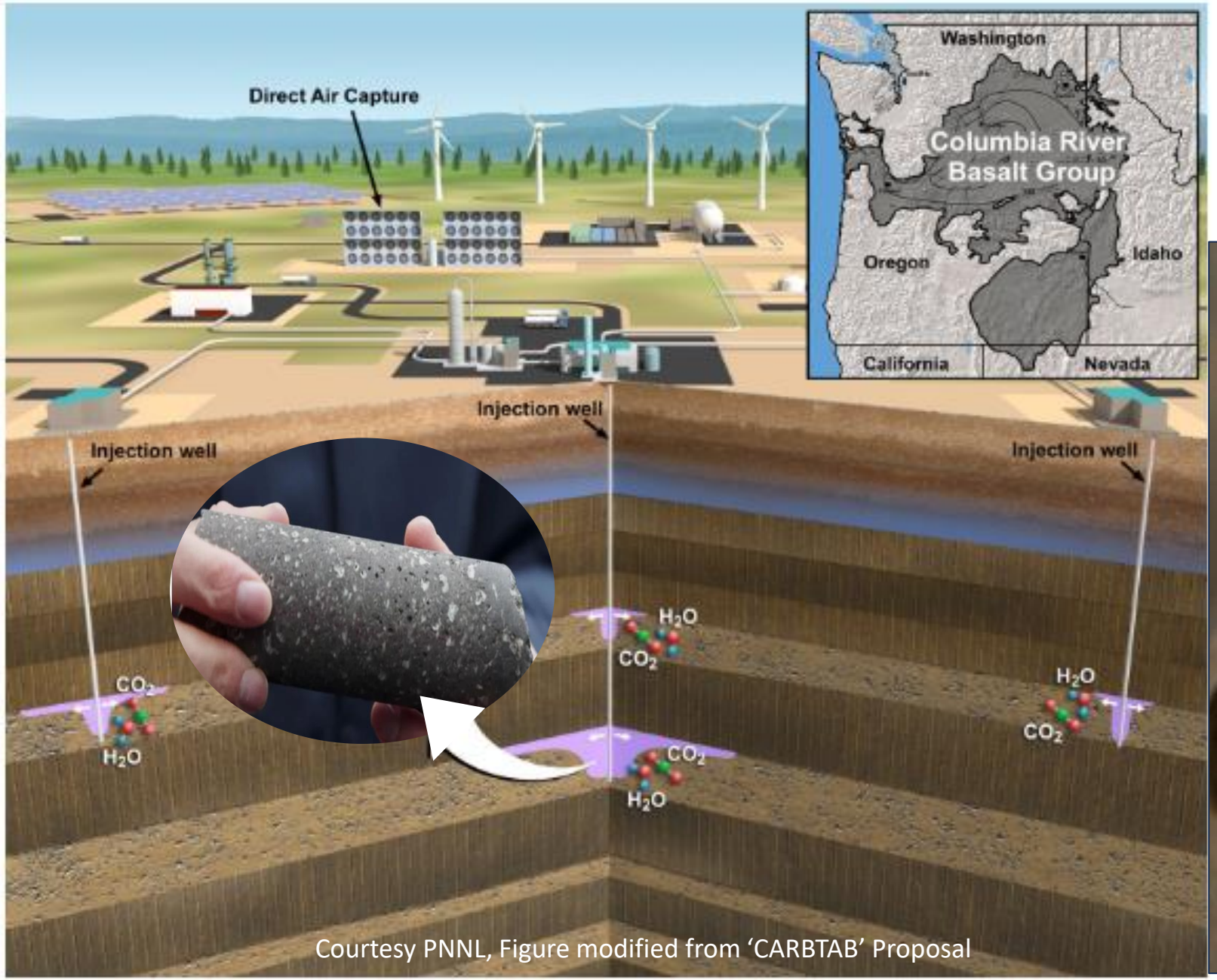
Modeled thickness of the Columbia River Basalt across the Columbia Plateau

The blue line represents a basalt thickness of 2,600 ft

An important step is to understand the subsurface geology

Cao et al. (2024) estimate that the Columbia River Basalt Group could store up to 40 Gigatons of CO_2

CO_2 Storage in Columbia River Basalt



Courtesy PNNL, Figure modified from 'CARBTAB' Proposal

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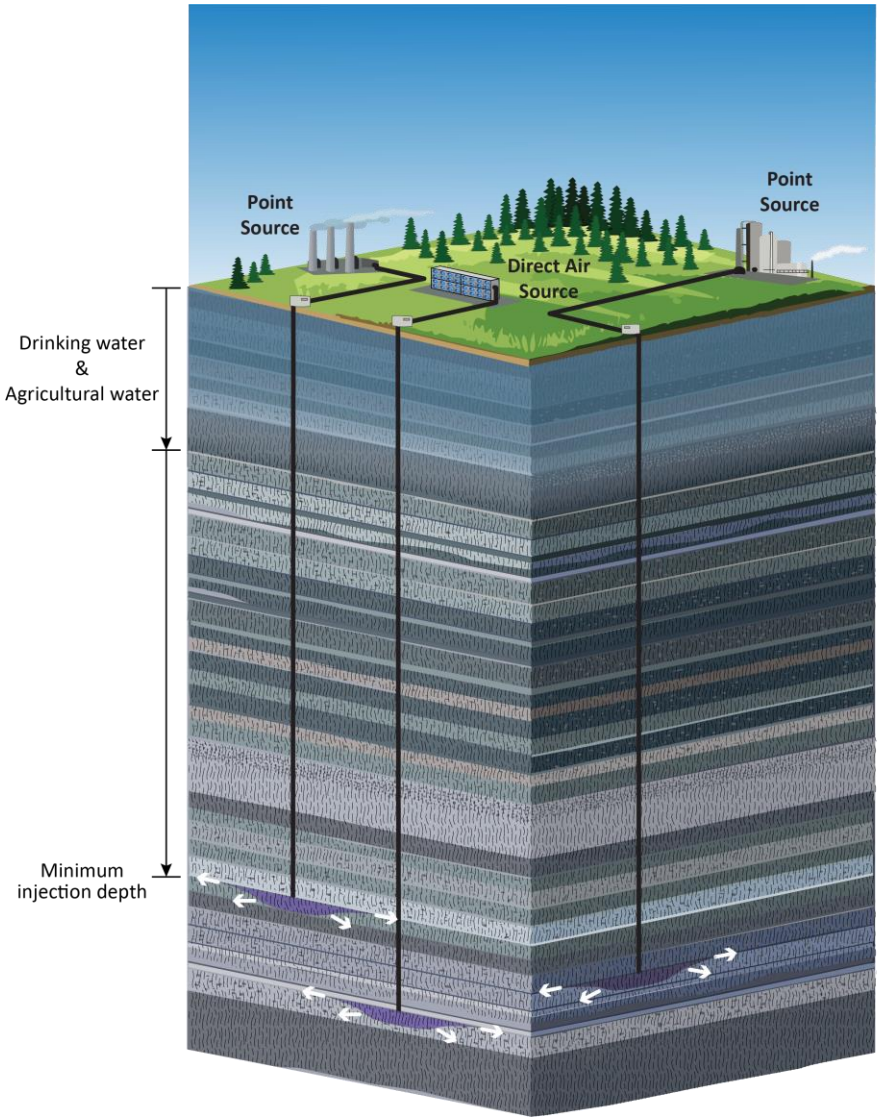

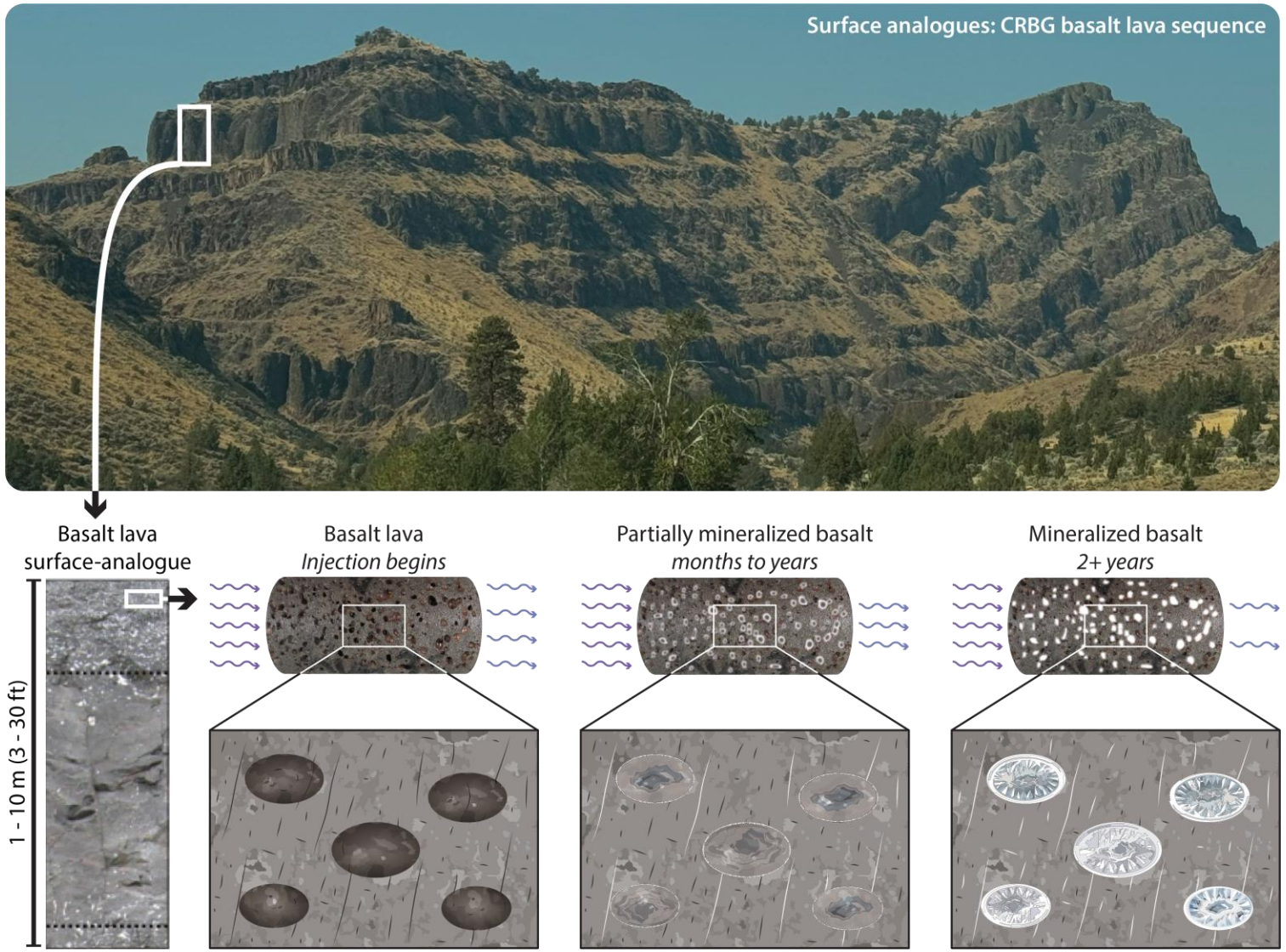

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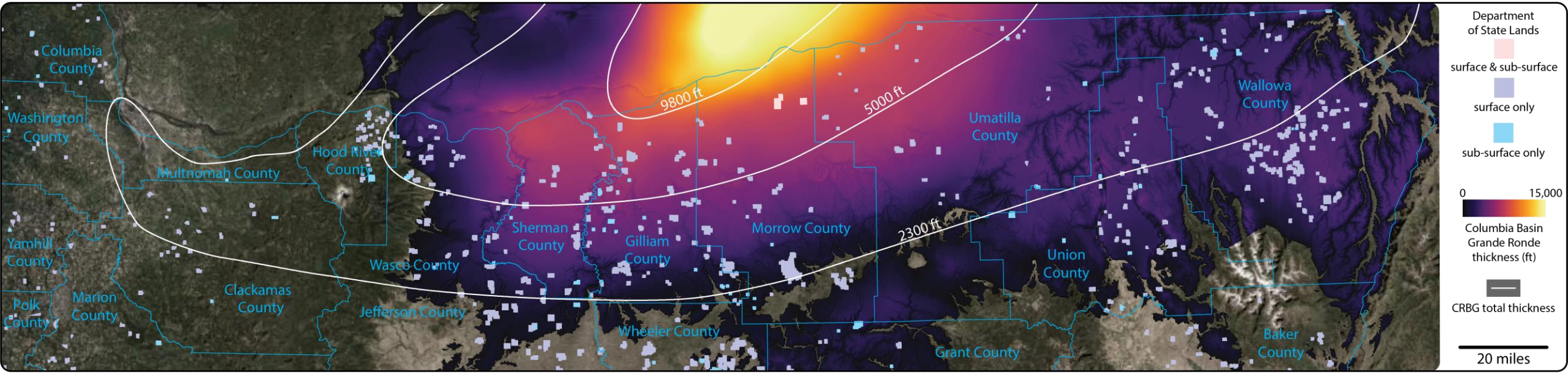

Target reservoirs in the CRBG, below the potable water zone. The Grande Ronde (basalt) comprises extensive lavas, with a total thickness up to ~15,000 ft, over an area of ~65,600 square miles. The Department of Geology & Mineral Industries (DOGAMI) intends to continue geologic characterization of the CRBG in Oregon by drilling a stratigraphic research well, sited on a Department of State Lands parcel.

State Lands Opportunities

- Royalties on surface rights, pore space
- Facility siting and leasing

- 25-27 Policy Package 217 – *supporting important first steps*
  - Up to $10 million from Land Revolving Account
  - Legislative approval requested for limitation
- Land Revolving Account available only for suitable investments in school lands
  - State Land Board will consult with Oregon Investment Council and decide whether to invest

OREGONLIVE
The Oregonian

Tech group will pay $40 million to capture carbon dioxide in Oregon, fight climate change

Updated: Jul. 15, 2024, 7:06 a.m. | Published: Jul. 11, 2024, 5:36 p.m.

State of Oregon Opportunities

- State of Oregon decarbonization
  - Treasury decarbonization
- Economic Development
  - Non-agricultural
- Climate Change Mitigation
  - DAC mitigates:
    - CO_2 already in atmosphere
    - Hard to abate economy sectors

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Oregon's Volcanic Rocks Could Unlock Major Carbon Storage Potential

Published Nov 21, 2024 at 12:16 PM EST

By Tom Howarth
Science Reporter (Nature)

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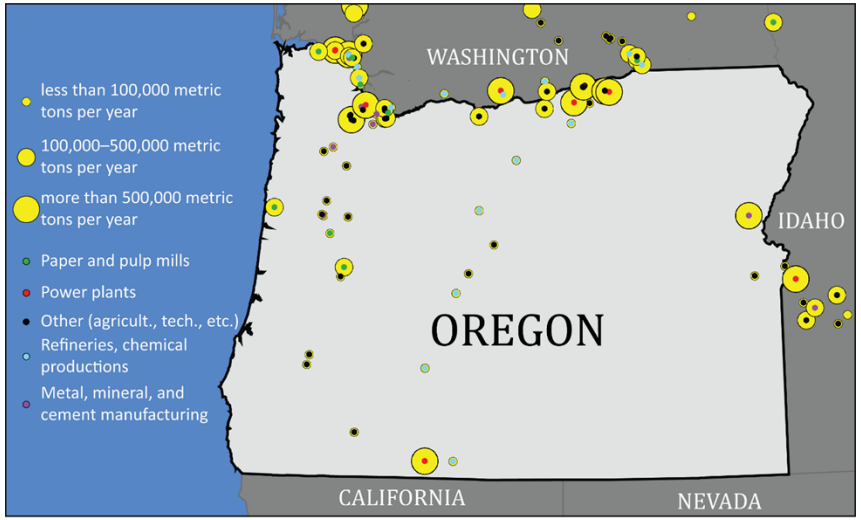
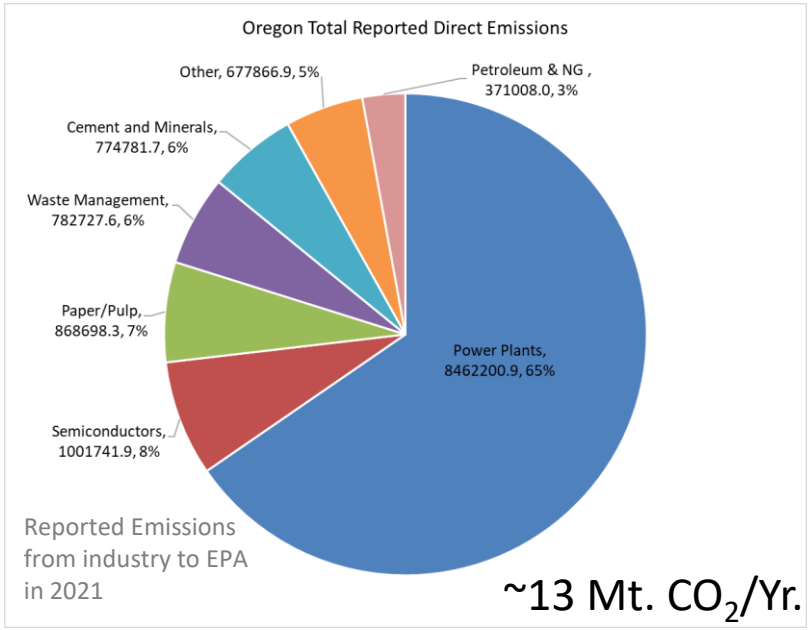
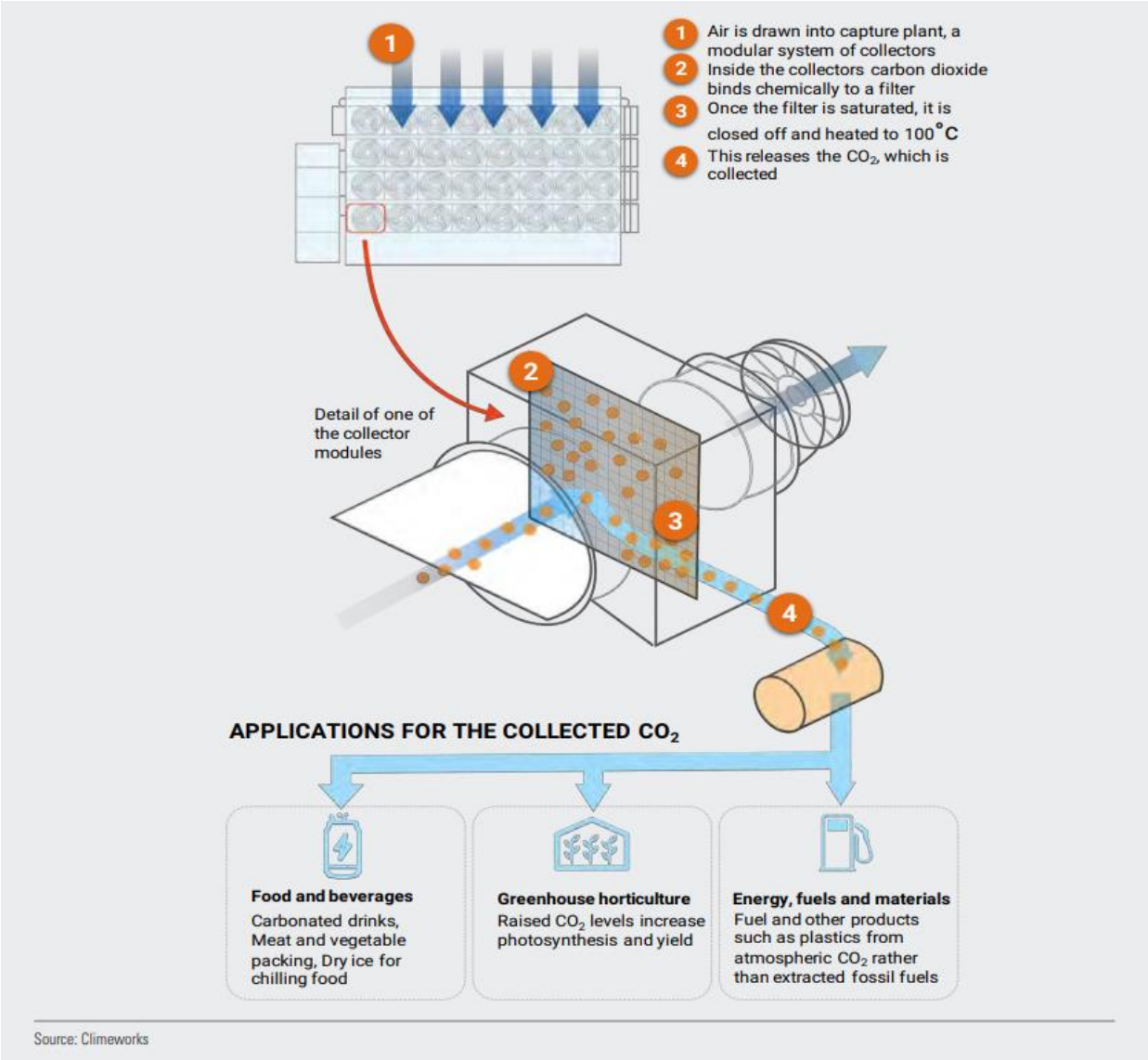
PNW: CO_2 Point Source Capture or Direct Air Capture?







Demonstration Project in Iceland

climeworks

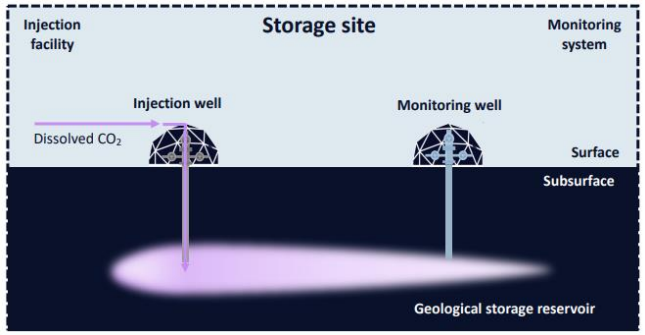
4,000 tCO_2/yr capacity

RMI – Energy. Transformed.

Carbfix

Injected to 400-2,000m depth

Mineralization verified using chemical tracers



Source RMI

CCUS Map

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Base Maps

Geology

- Saline Aquifers by DOE/NETL
- Main Basins Modified from EIA

Pipelines and Infrastructure

- CO_2 Pipelines
- NatGas Pipelines by U.S. EIA
- US county names
- US county borders
- GLO RFP 2024
- Power Generators
- Lease Areas

Projects

- Class VI Projects
  - Pending
  - Permitted
  - Active
- Class VI Planned
- Capture Projects
- Class II MRV Projects
- Past / Cancelled Projects
- DOE Projects
- User Projects
- Planned Industrial Plants

Emitters — New 2023 data

Class VI Wells

- Active
- Permitted
- Pending

Wells

- Strat Test Wells

Search for places

Geologic Carbon Sequestration projects in US and Canada

Legend

- Class VI / MMV projects
- CCS planned
- EOR / Class II projects
- Capture projects
- CO2 pipeline
- CO2 pipeline (planned)
- power plants (activate)

300 km
200 mi

Leaflet | © OpenStreetMap contributor

Geologic Carbon Sequestration in Oregon –

Project Goals (0-3 years)

Initial community and Tribal engagement

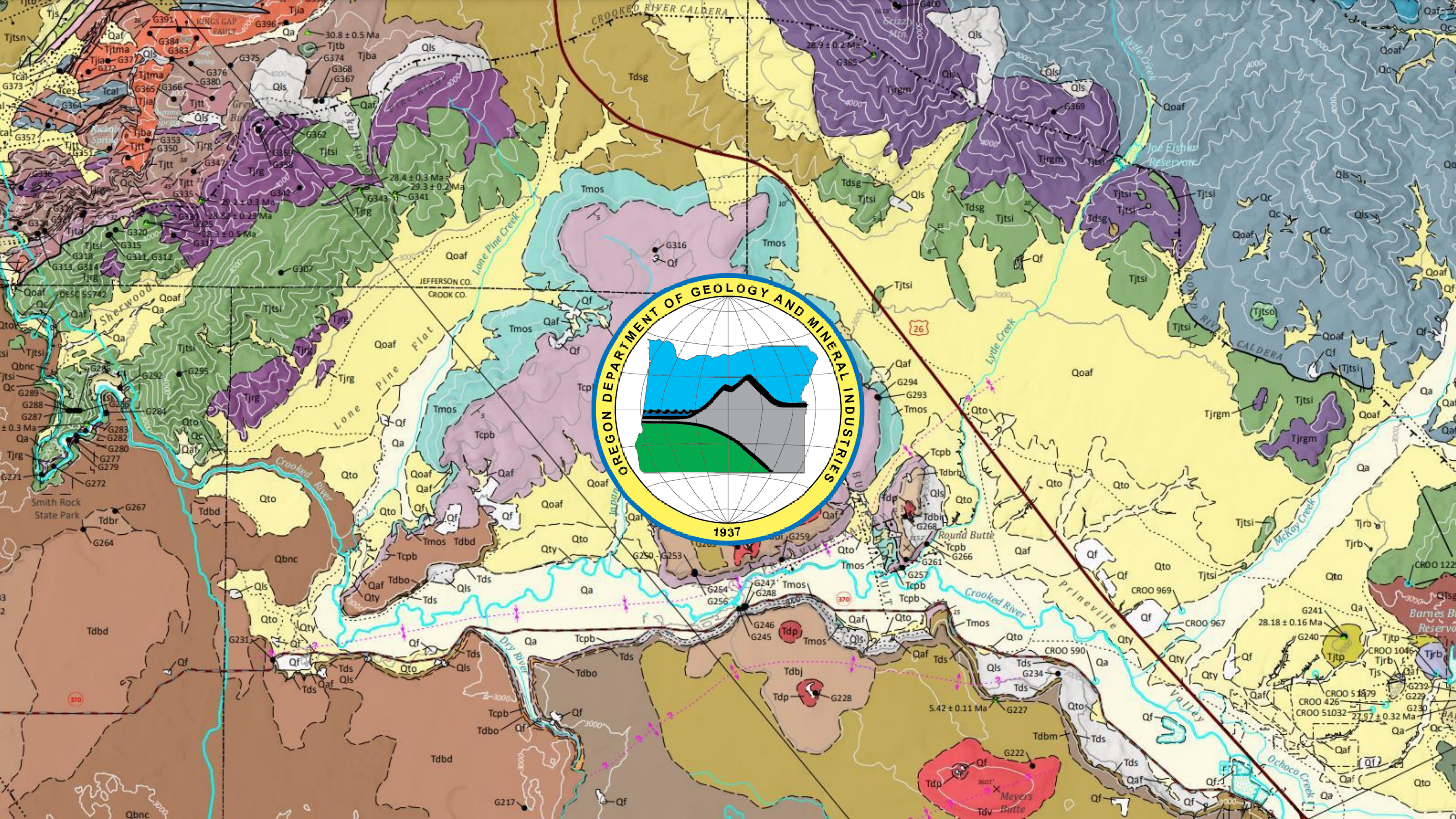
Geologic modeling and installation of research well on DSL managed land

Application for EPA funding for pursuing regulatory primacy

Community Engagement

Technical Feasibility

Regulatory Structure



CROOKED RIVER CALDERA
KINGS GAP FAULT
30.8 ± 0.5 Ma
28.9 ± 0.2 Ma
Grizzly Mtn
Lytle Creek
Joe Fisher Reservoir
28.4 ± 0.3 Ma
29.3 ± 0.2 Ma
Lone Pine Creek
Sherwood Canyon
JEFFERSON CO.
CROOK CO.
Lone Pine Flat
Smith Rock State Park
Crooked River
Round Butte
Prineville Valley
Dry River
McKay Creek
Ochoco Creek
Meyers Butte
5.42 ± 0.11 Ma
28.18 ± 0.16 Ma
27.97 ± 0.32 Ma
Barnes Butte Reservoir
OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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