

Phase III Large Volume Sequestration Test

Jurassic-Triassic Deep Saline Deployment Project

WP Phase III deployment plans

- Location of Project
- Geologic Setting and Regional Aspects

Some important questions:

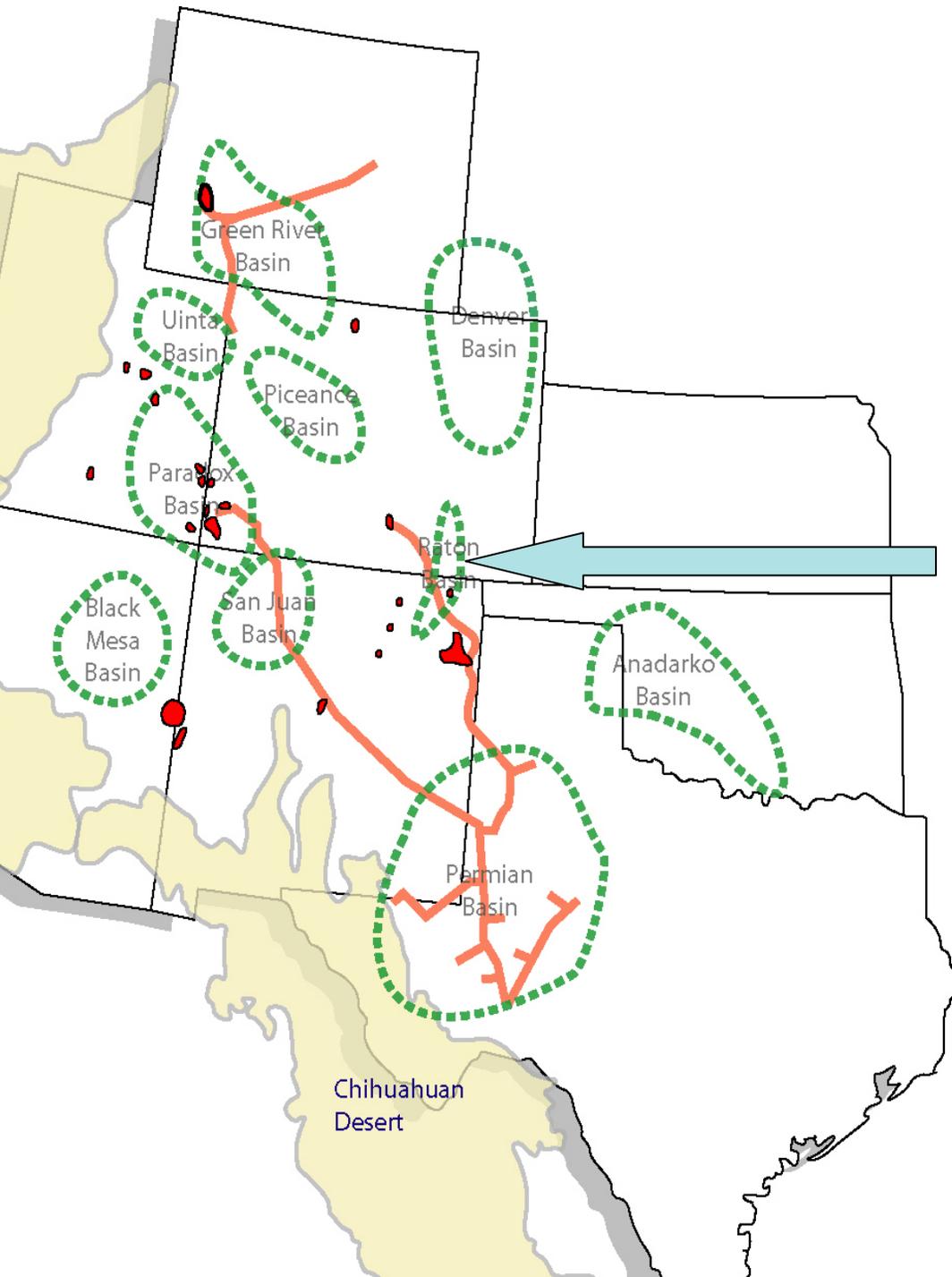
- How will large-scale deployment be tested?
- Why 1 Mt/year?
- What is being tested?

Jurassic-Triassic Deep Saline Deployment Project

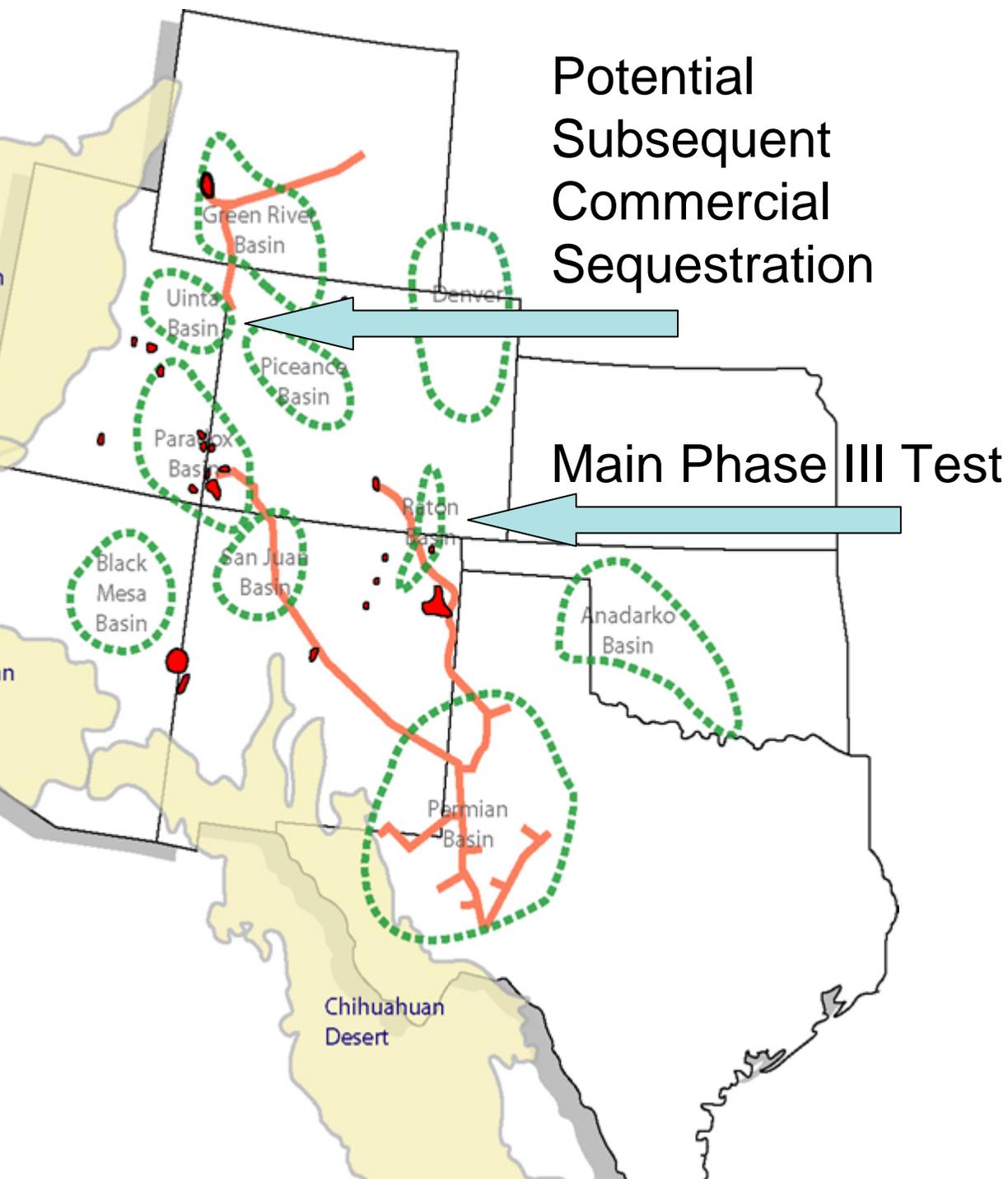
mentary basins throughout the Southwest Partnership region
cross several deep saline formations that are common to most or a

of these regional formations is the Jurassic-age Entrada Formation
relatively clean sandstone unit that exists in most states of the SWP
R, and Big Sky regions

proposed a deep saline sequestration deployment including injected
“picking up” to ~1 million tons per year in the deep saline Jurassic or
s formations within the Raton Basin of southern Colorado.



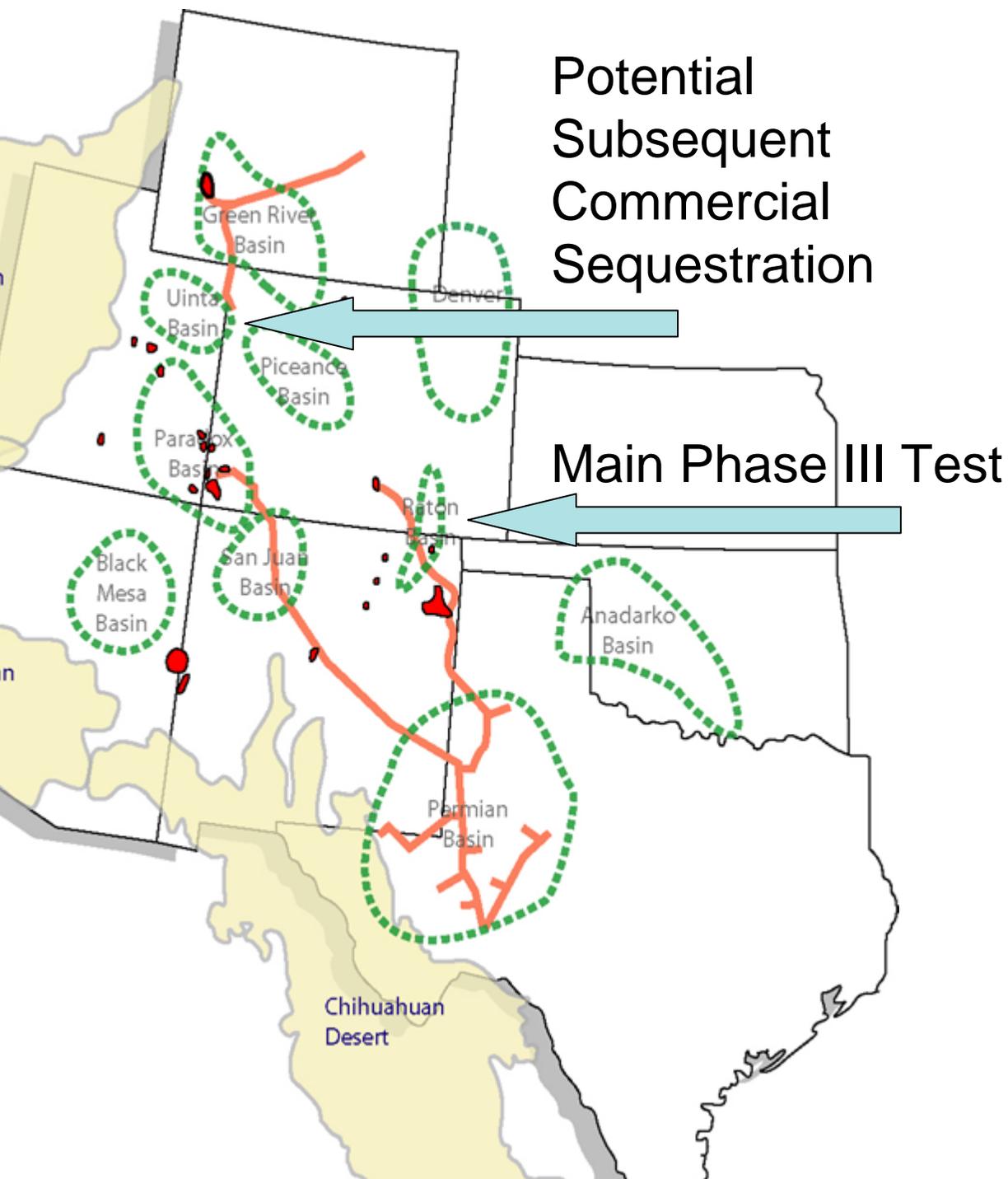
The deep saline Jurassic-Triassic injection site within Raton Basin is located along the Sheep Mountain pipeline.



Potential
Subsequent
Commercial
Sequestration

Main Phase III Test

- Southern Cal Edison (<http://www.sce.com/>), or SCE, major power company providing electricity to users in Los Angeles. SCE is determining whether to build a new IGCC plant in the Uinta Basin.
- Any new IGCC plant will not be operational until 2015 or 2020, thus the SWP Phase III deployment will provide a solid basis for engineering and design of future commercial deployments.
- The structure and stratigraphy of the deployment test site is extremely similar (almost identical), to the other possible commercial sequestration sites.
- SCE will carry out a second (s...

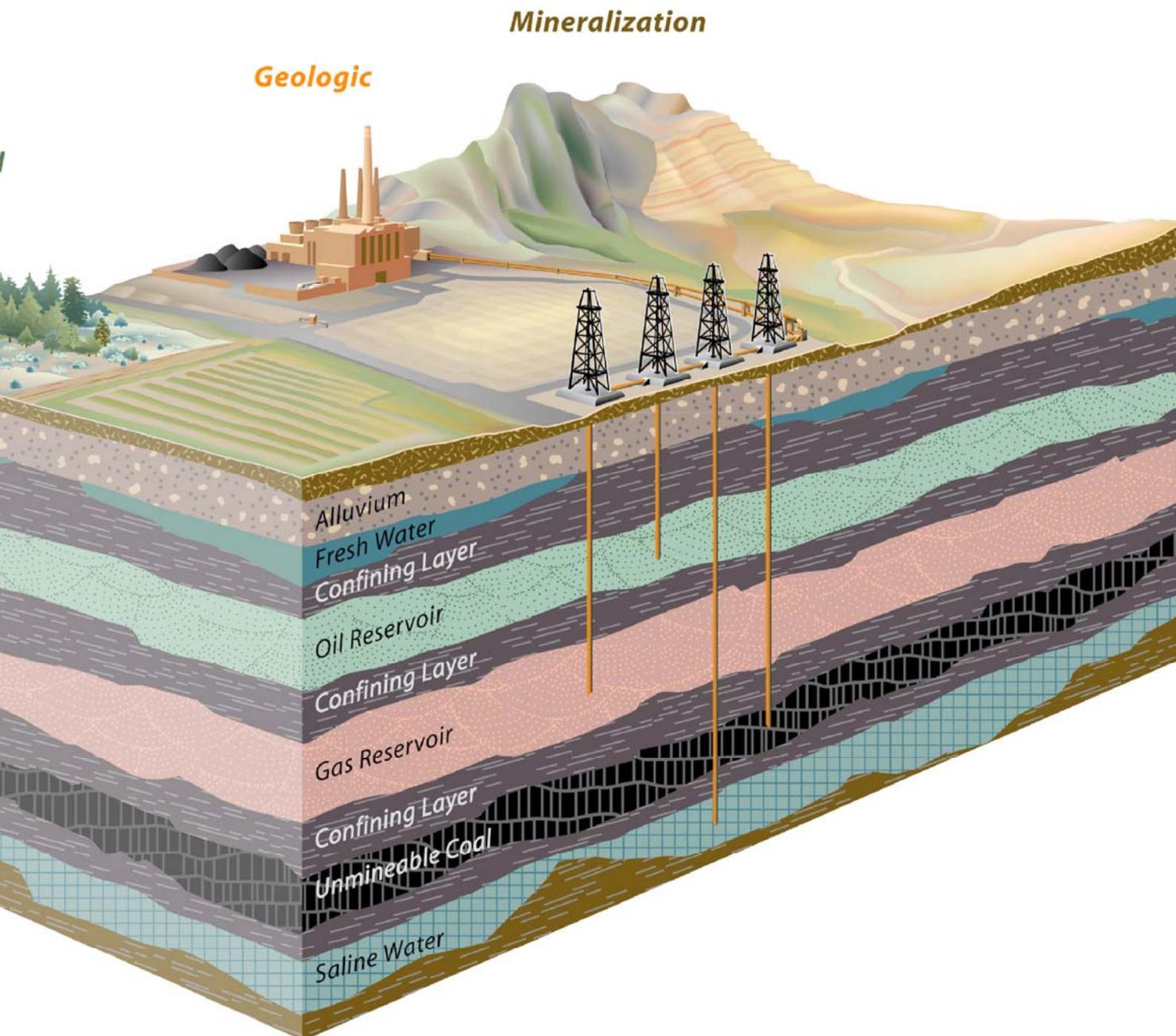


First:

Phase III Jurassic-Triassic Deep Saline Deployment

***transition* to**

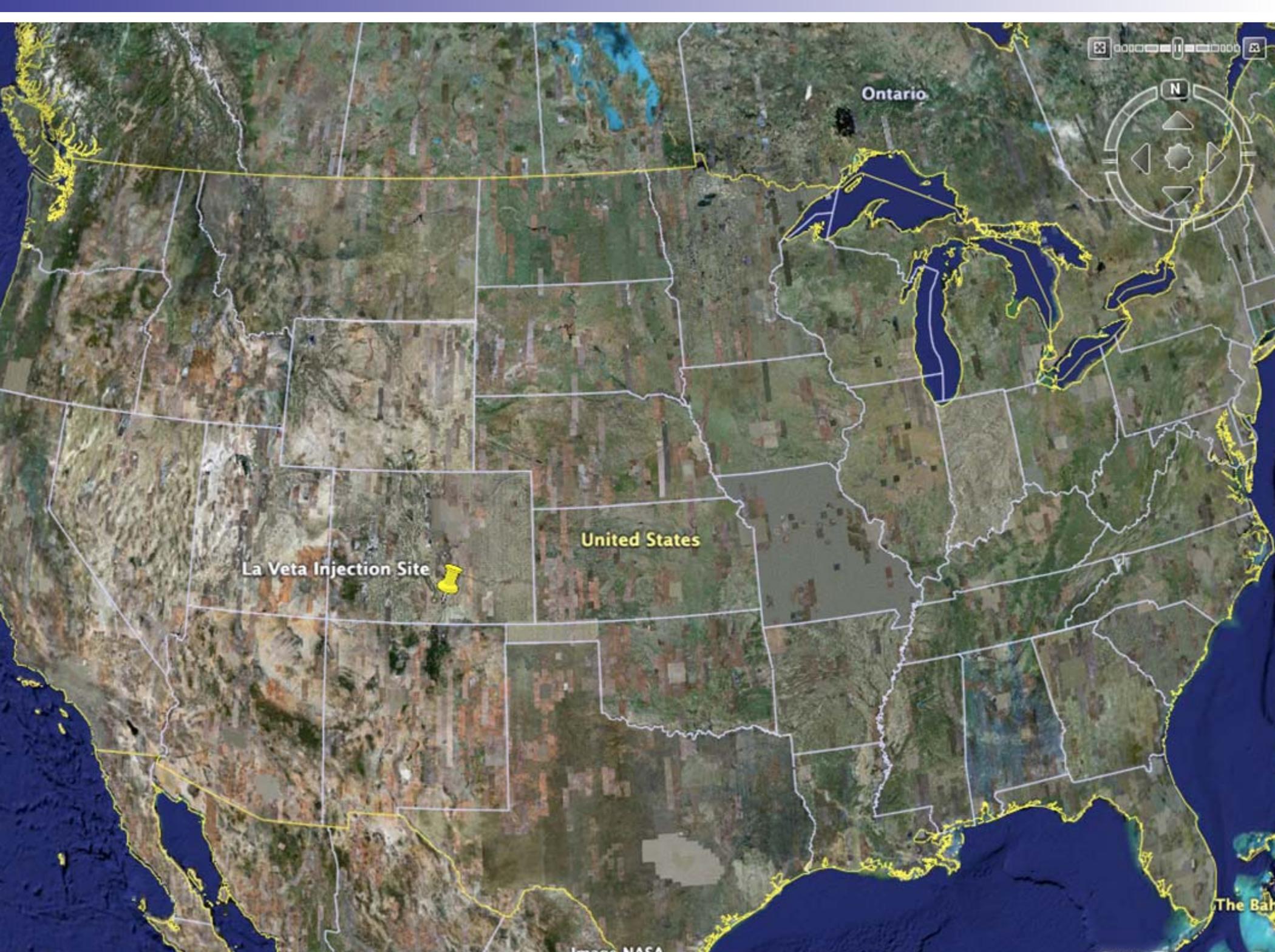
Commercial deployment (injection to begin in 2016-2017)



Project Ther

*1. In the South
Region, locate
saline sequestr
operations und
oil/gas fields*

*2. Optimize por
or transferabili
results for com
sequestration
operations*



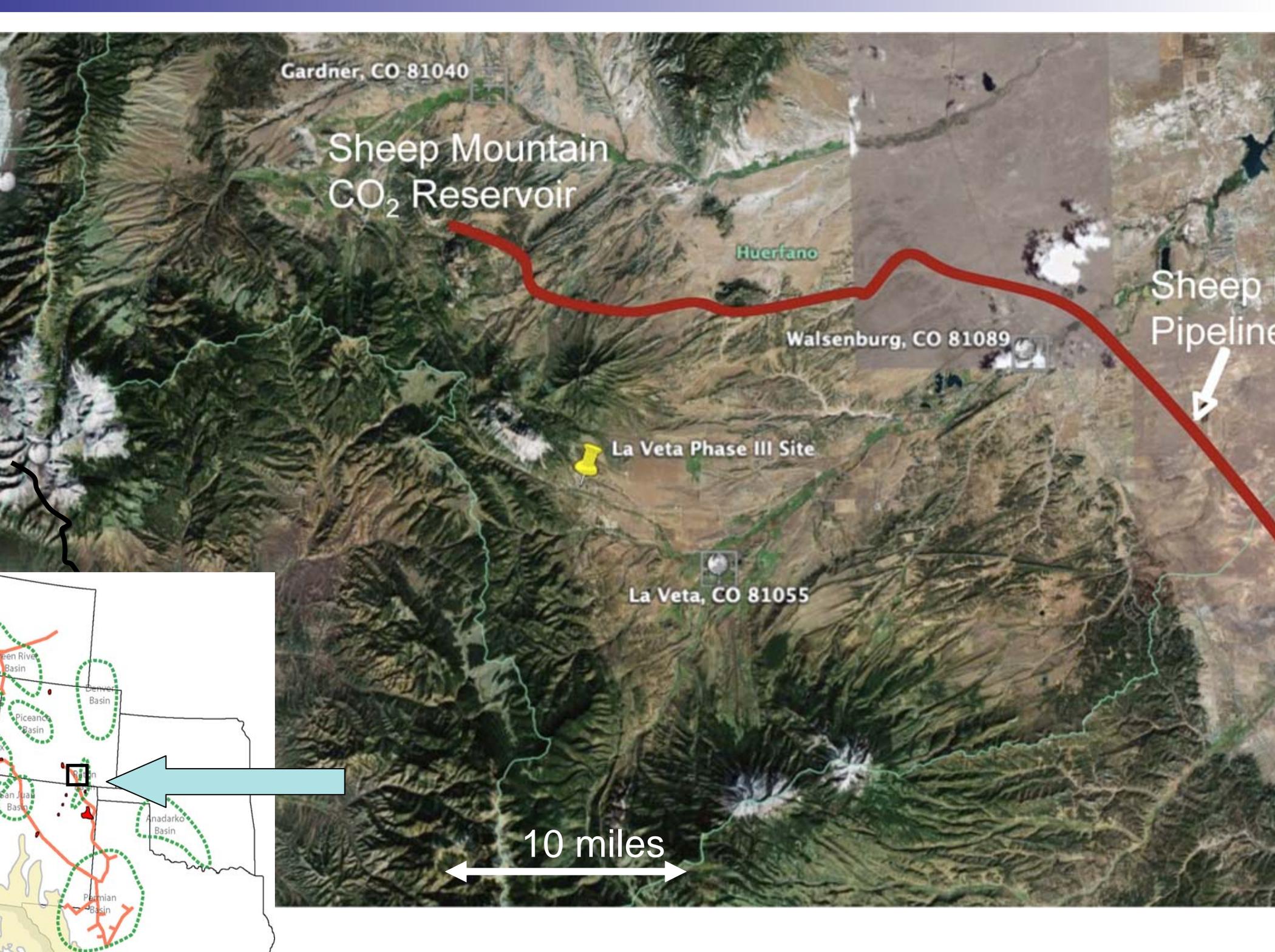
Ontario

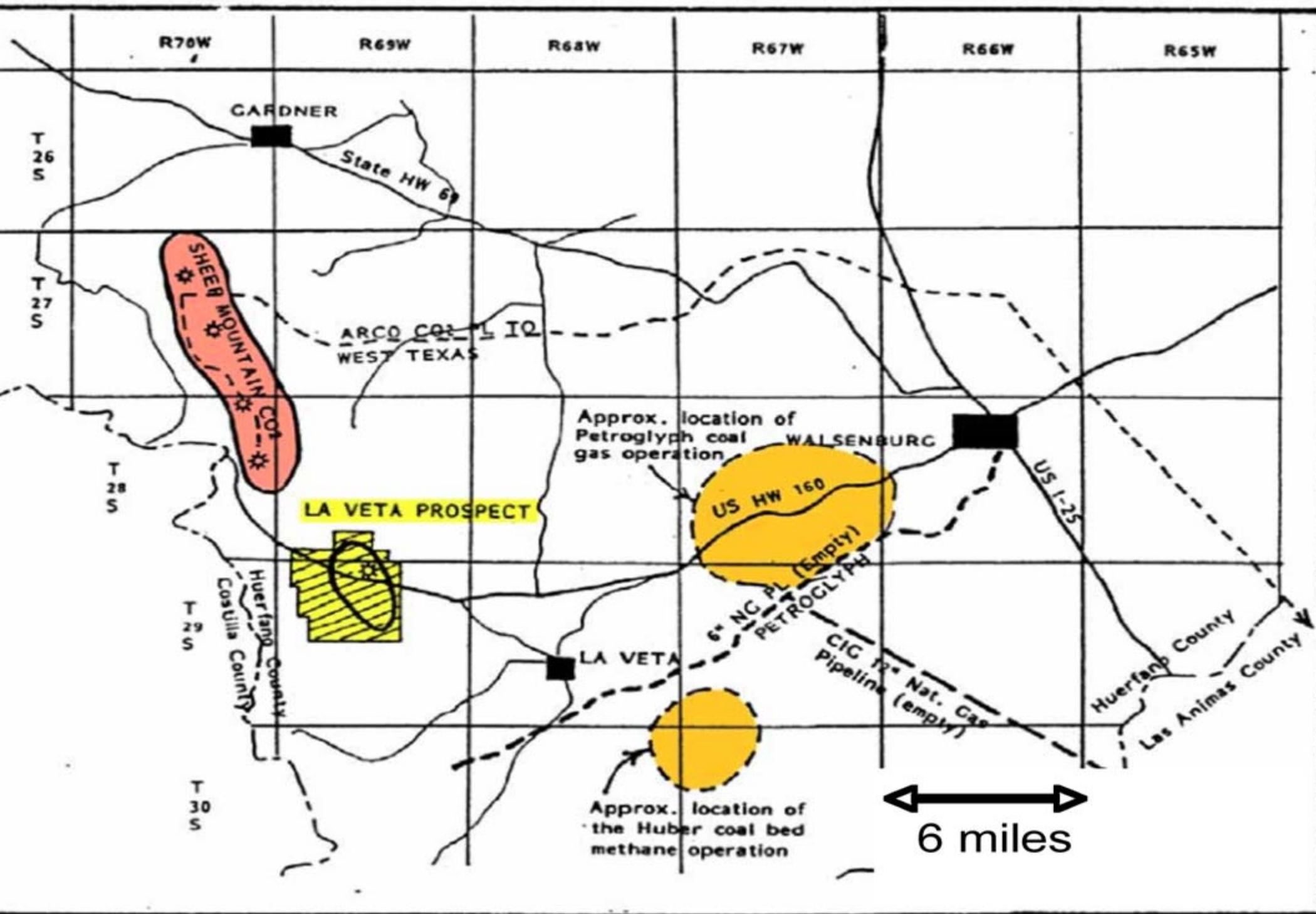
United States

La Veta Injection Site

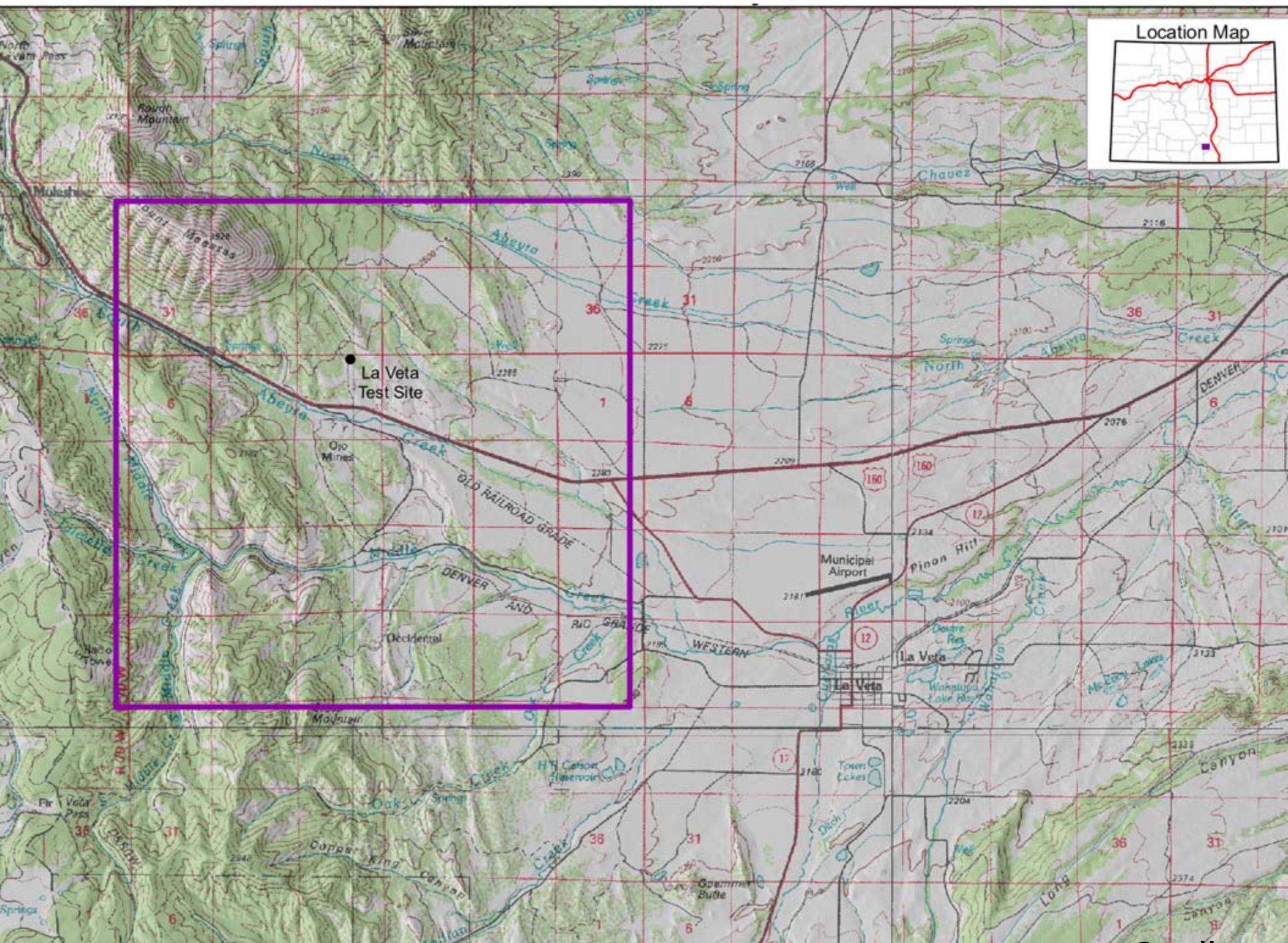
The Bahamas

Image: NASA





Location Map

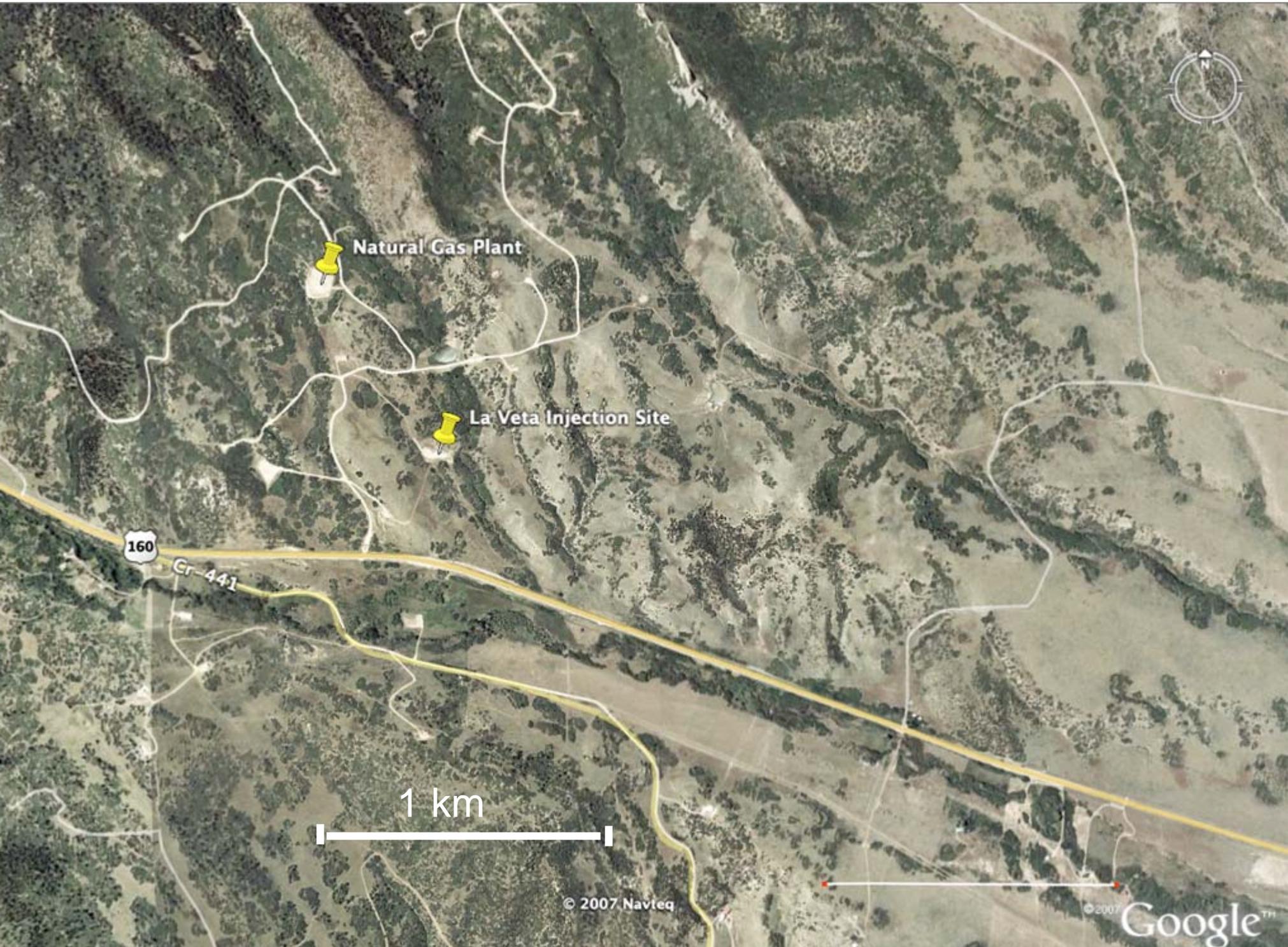


La Veta
Test Site

Municipal
Airport

La Veta

La Veta



Natural Gas Plant

La Veta Injection Site

160

Gr-441

1 km

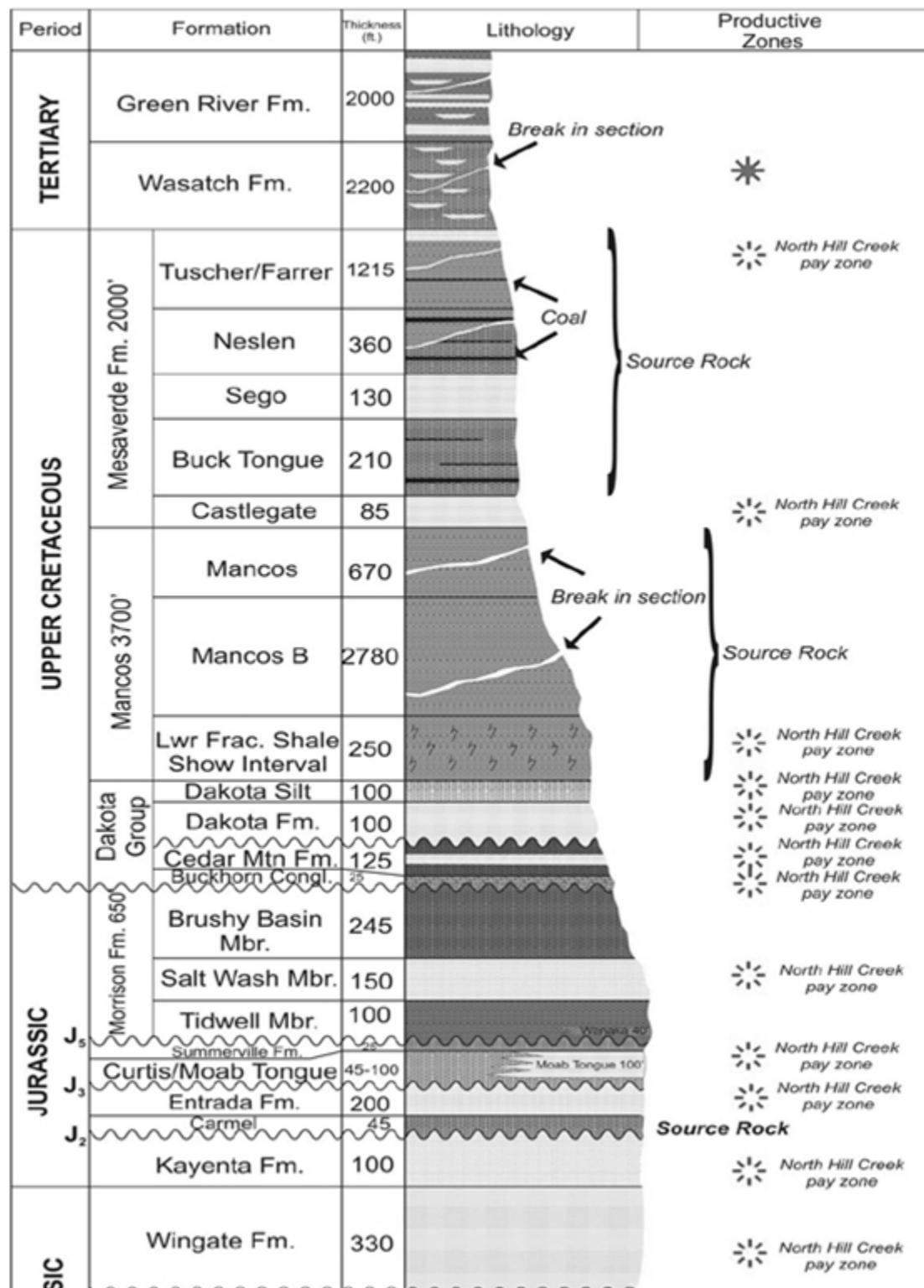
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Colorado test site is geologically equivalent to the commercial target zones in Utah.

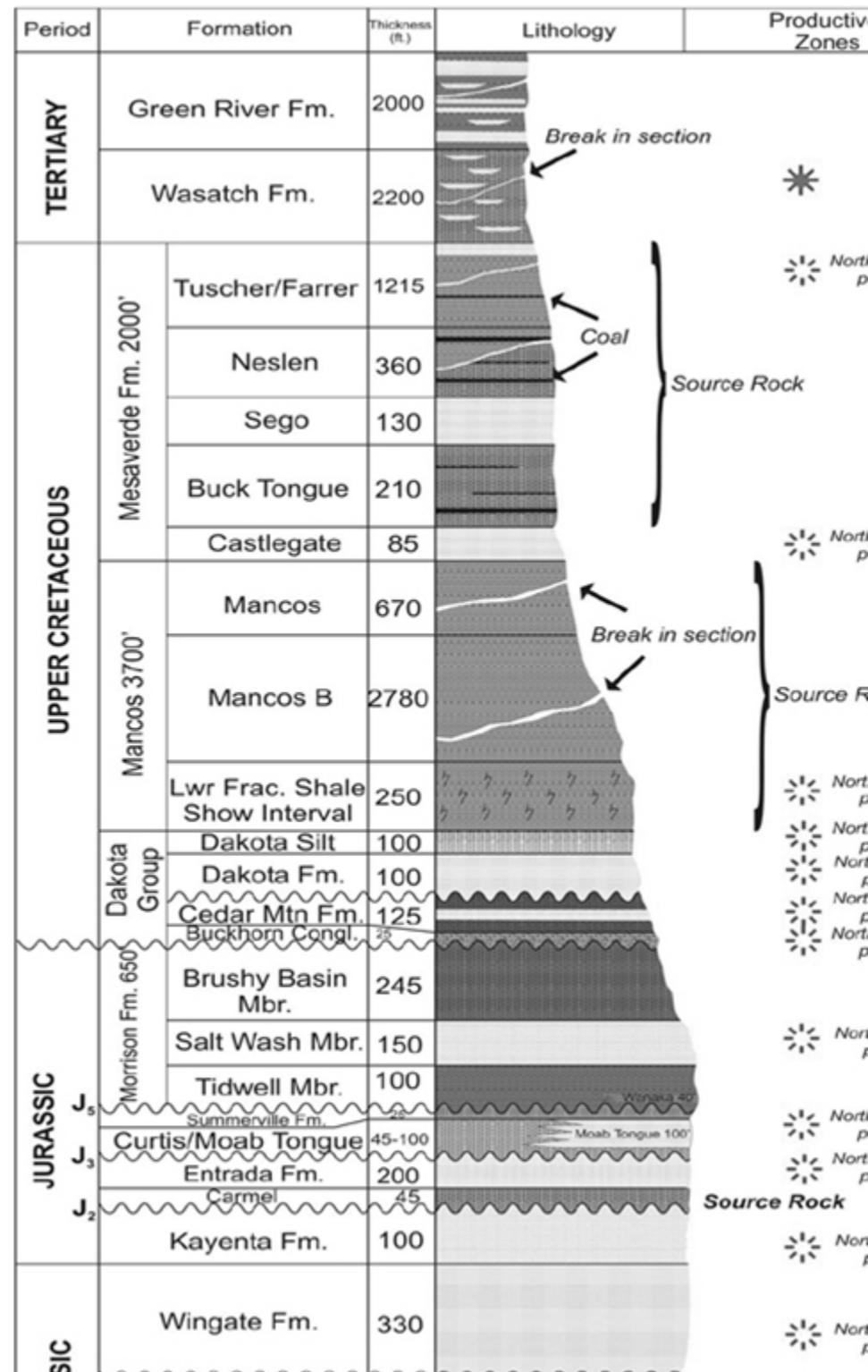
Upper Cretaceous down through Jurassic - during this time, shallow seas covered much of the western U.S., depositing the same rock units throughout the region.]



The southern Colorado Phase project is an effective analog for commercial deployment

can test different engineering plans at the Phase III site (Colorado)

will help us refine the commercial (Utah) deployment, engineering optimization of engineering plans based on 4+ years of injection, storage, and monitoring during the Phase III deployment in Colorado.

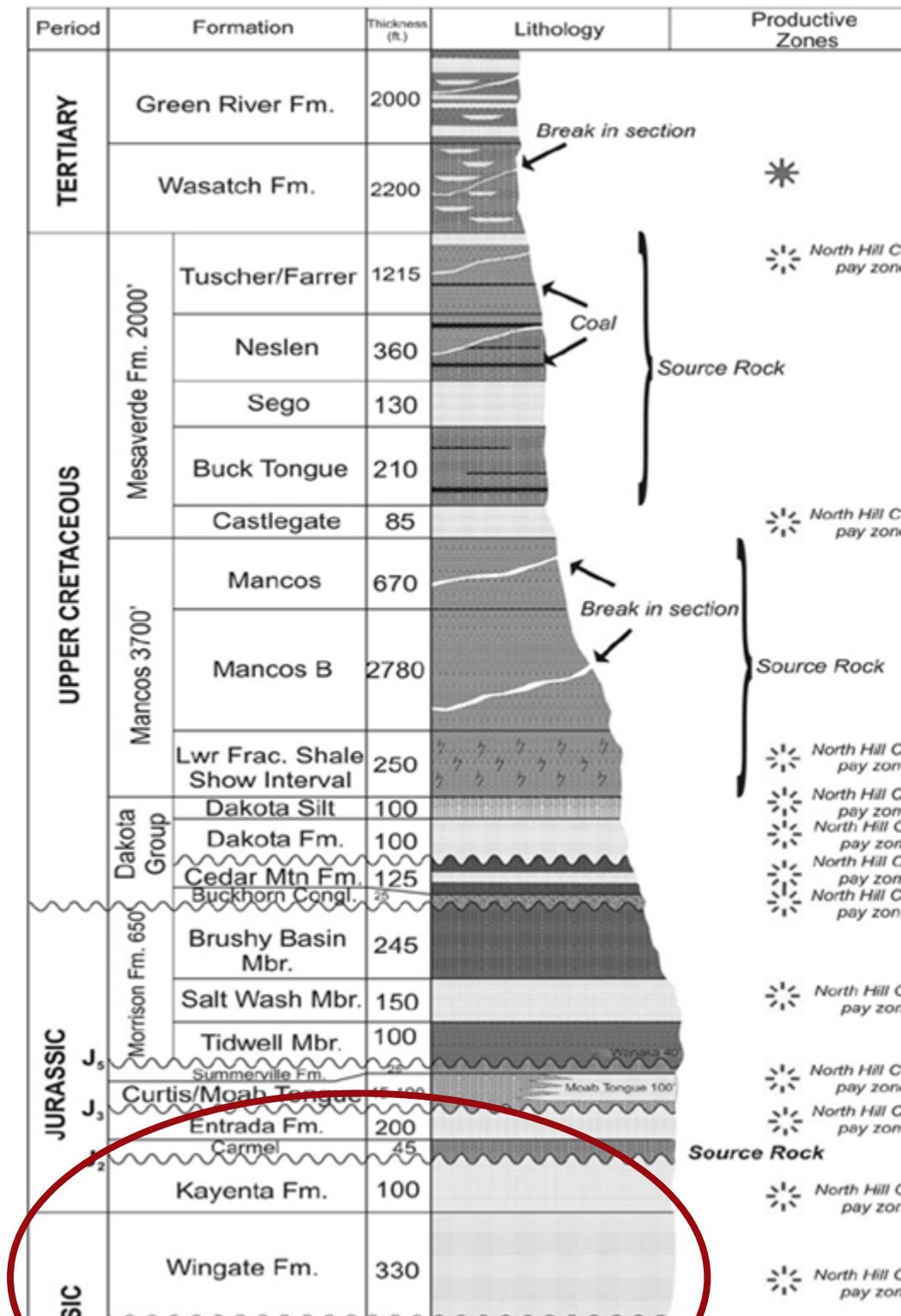


ideal target storage
 reservoir is the Deep Jurassic
 Triassic sandstones.

These same formations are
 found throughout:

Utah
 Colorado
 Mexico
 Wyoming

Localities:
 Grand Canyon National Park



**ideal target storage
reservoir is the Deep Jurassic
Triassic sandstones.**

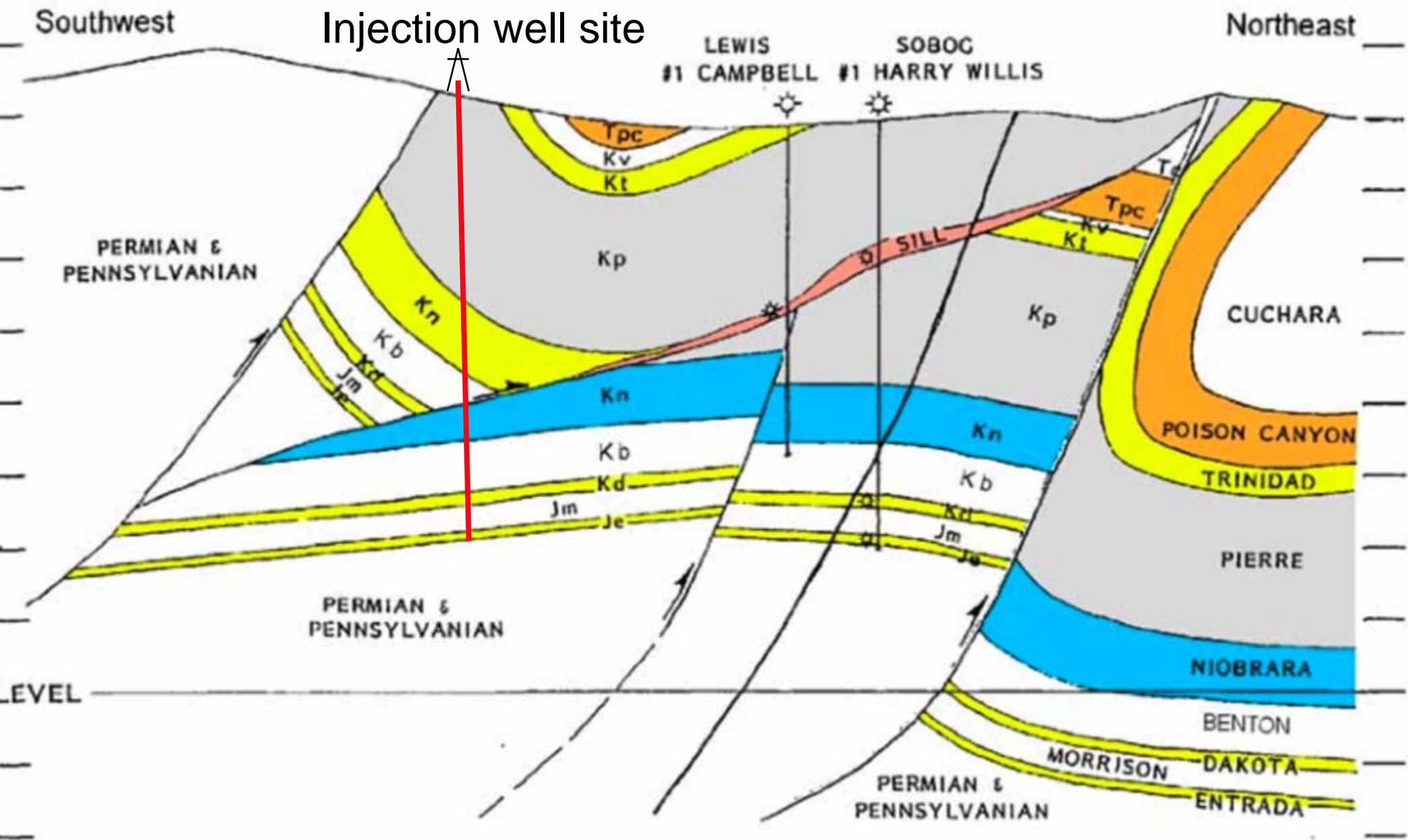
**These same formations are
found throughout:**

**Arizona
Colorado
New Mexico
Utah
Wyoming**

**Key Locality:
Zion National Park**



**In both the Colorado and Utah sites,
deep Jurassic and Triassic sands are
capped by 300' - 500' shale units. One
of these is the Dakota/Mancos combination**



Southwest - Northeast true scale cross-section across the La Veta CO₂ Prospect.

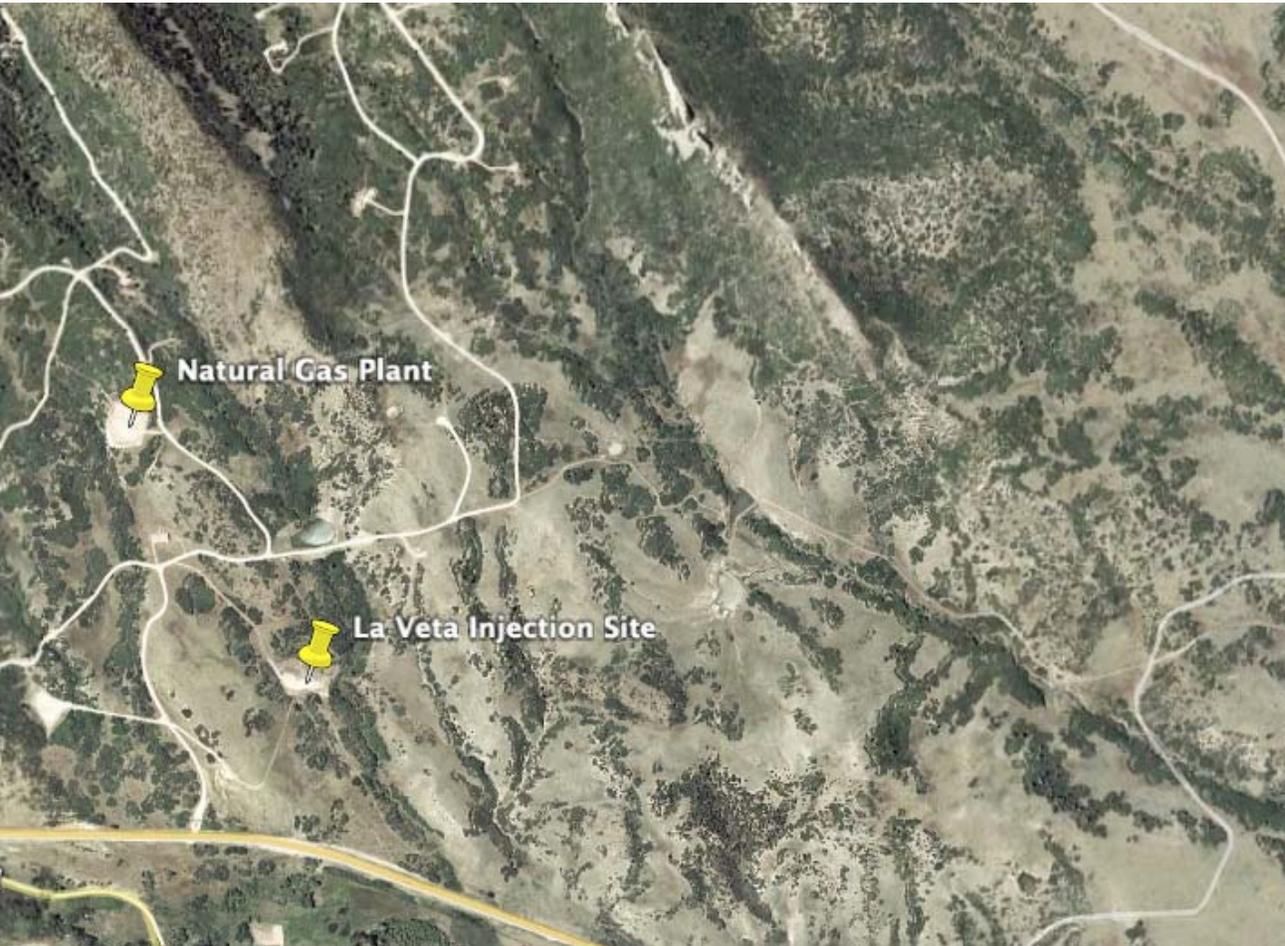
WP Phase III deployment plans

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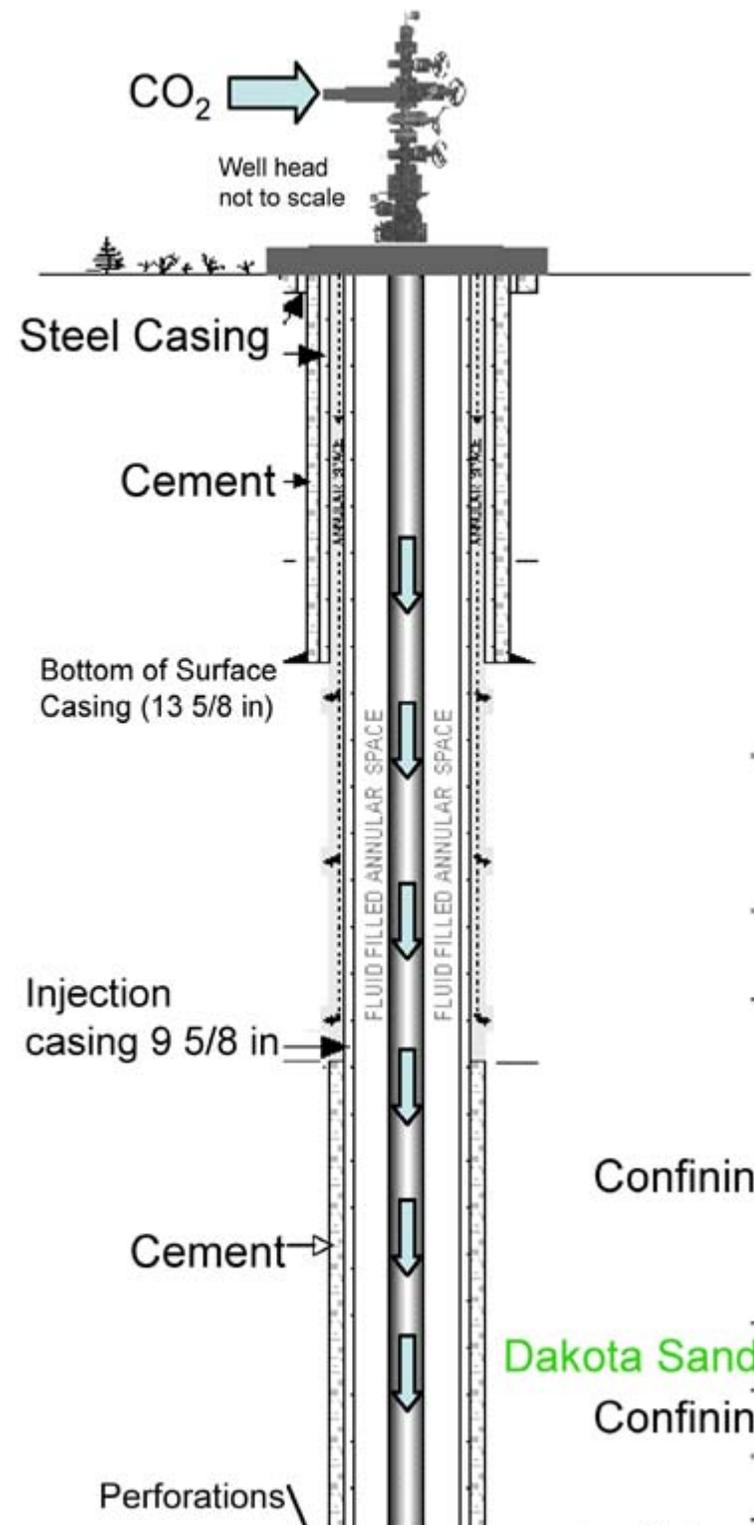
Some important questions:

- How will large-scale deployment be tested?
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0,000 tons/year CO₂ from a natural gas processing plant is being released to the atmosphere. This CO₂ will be captured, gathered and pumped into the deep Jurassic or Triassic formations.

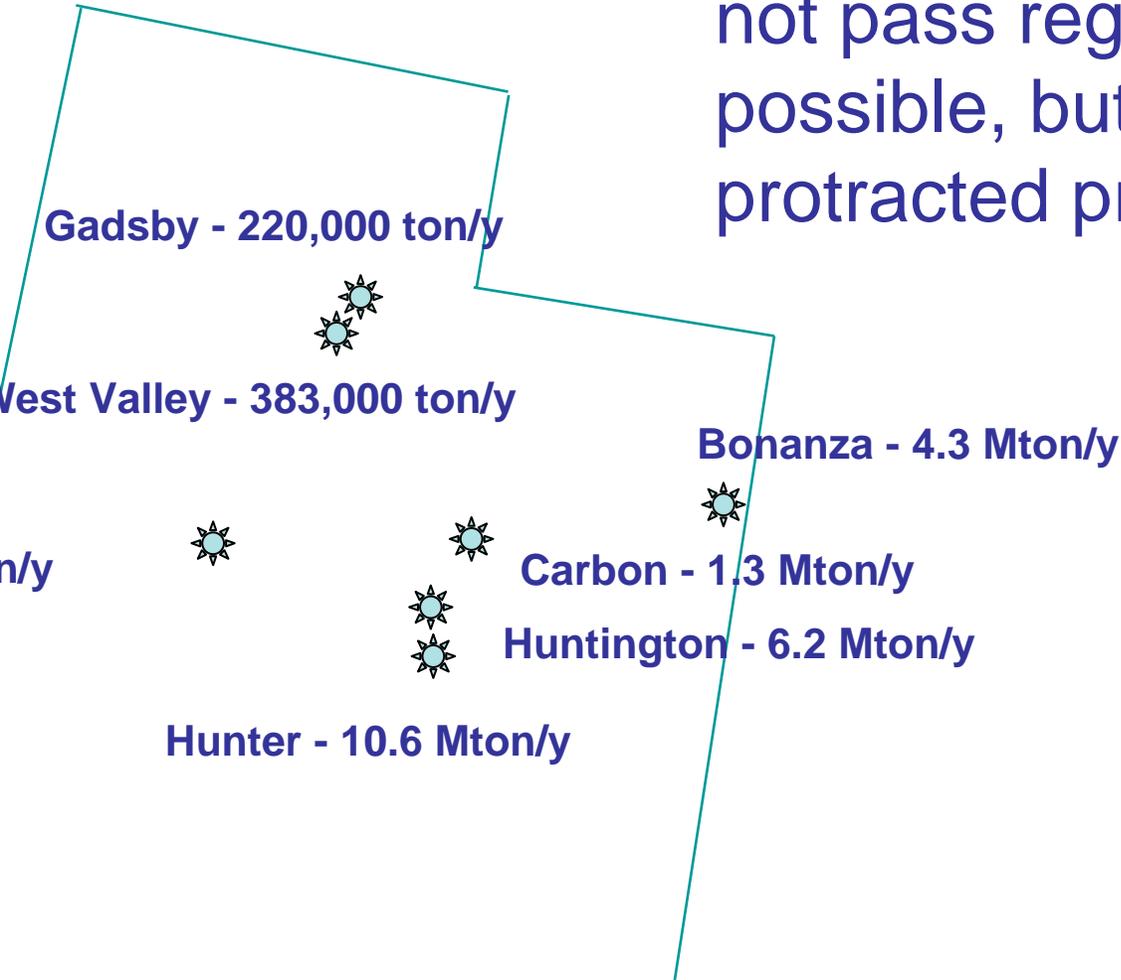


of injection and monitoring
begin August, 2008
will begin December, 2008
tons injected in year 1

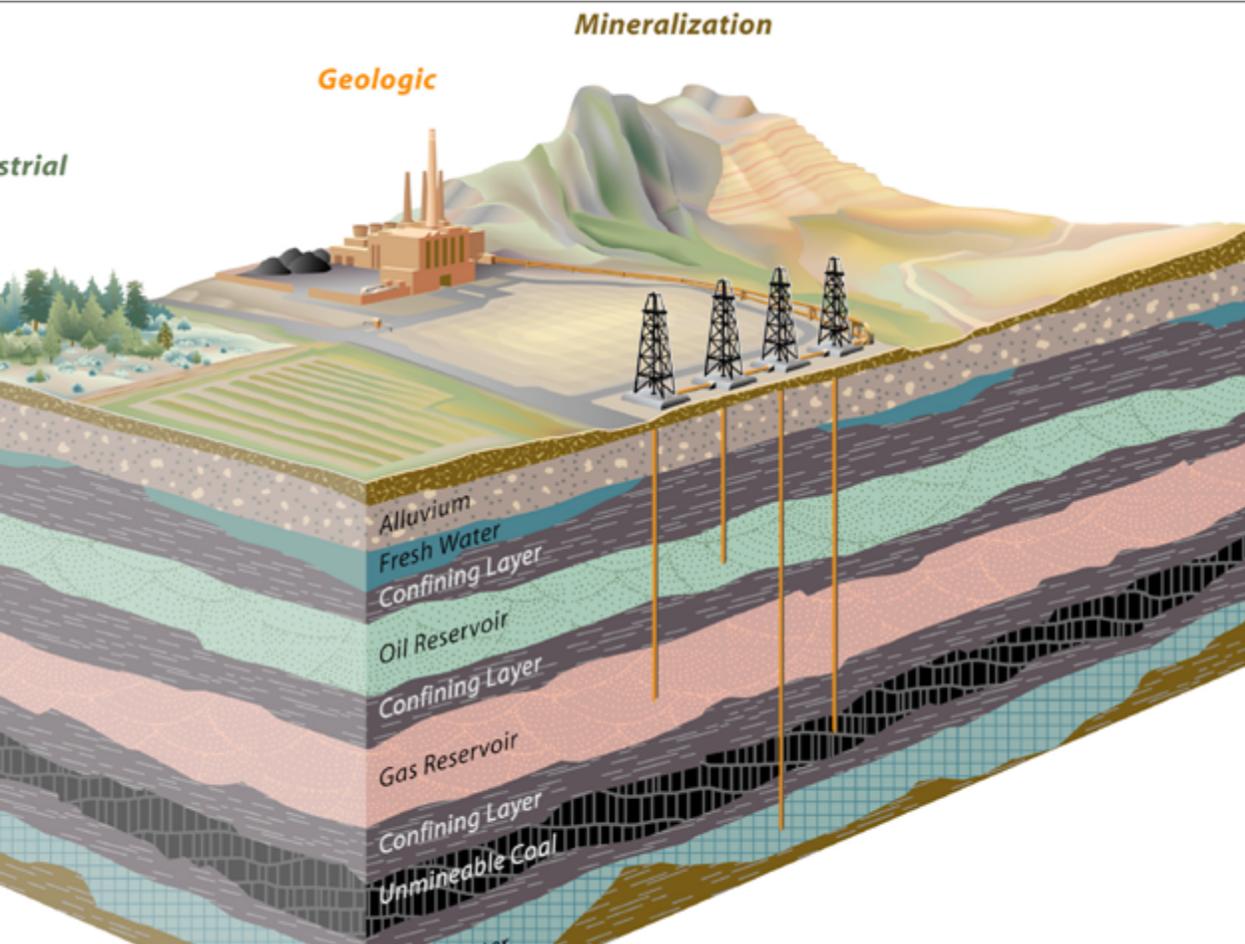


1 million t/year? It is a typical size of annual emissions. For example, the coal-fired power plants in Utah range from 220,000 t/year to 6.2 Mt/year.

After discussions with regulators, it is clear that 5 Mt/year to 20 Mt/year would most likely not pass regulatory approval; approval is possible, but not without an extremely protracted process.



inject up to 1 Mt/year into a regional deep saline formation target
evaluate technical viability and practicality for future commercialization
evaluate engineering (transportation, injectivity, etc.)
evaluate risks (health, environmental, financial)
evaluate monitoring efficacy



Ultimately, we intend to provide a “blueprint” for future commercial sequestration operations in the region.

- At this time, the RPs are literally training some industry workers
- By the time Phase III is complete we anticipate the CO₂ sequestration industry will be extensive!

any thanks to the U.S. Department of Energy and NETL for supporting this project

We express our gratitude also to our many industry partners, who have committed a great deal of time, funding and other general support for these projects

The work presented today is co-authored by all partners in the Southwest Partnership

