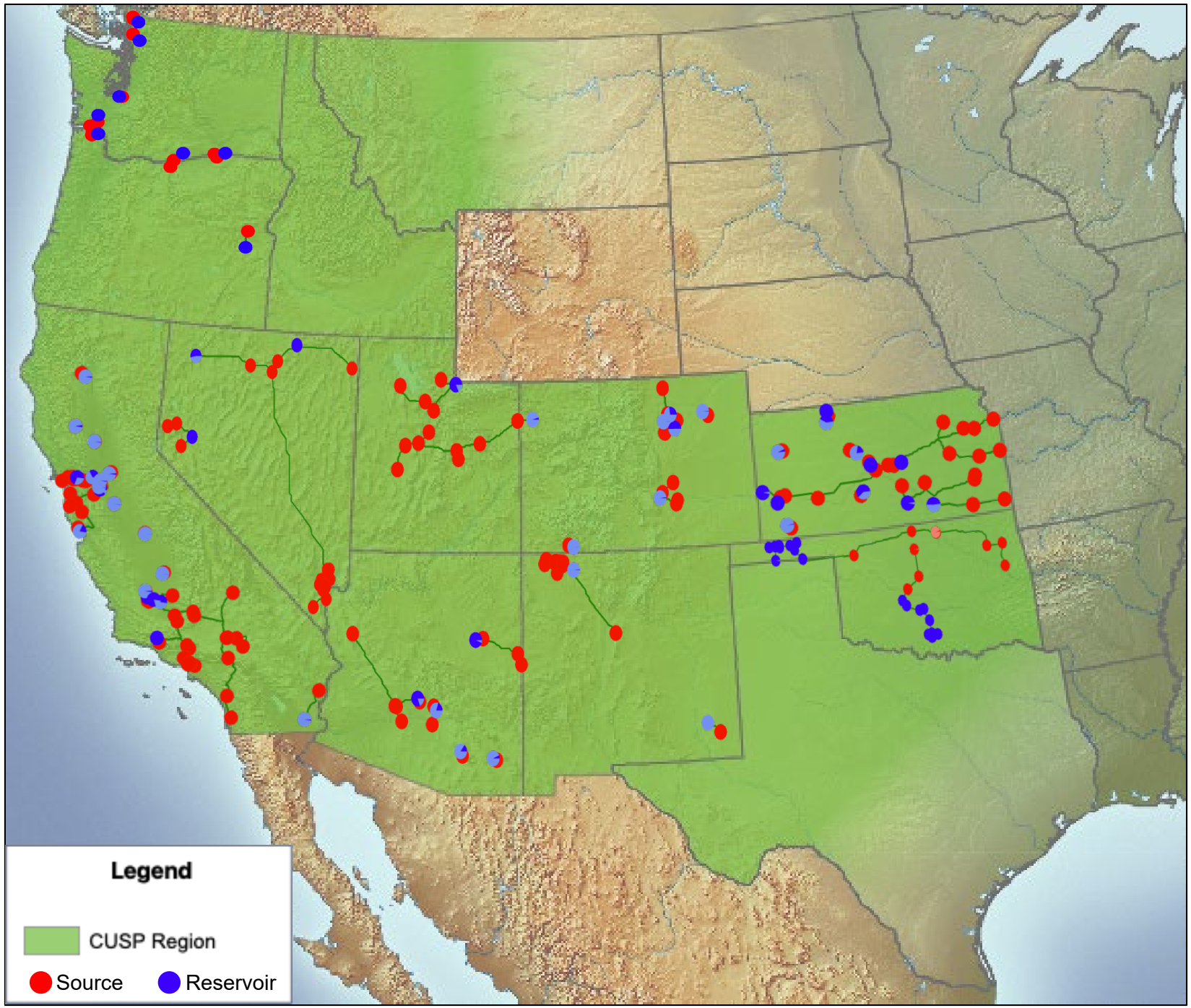

CUSP
Analytics Working Group

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Montana State University
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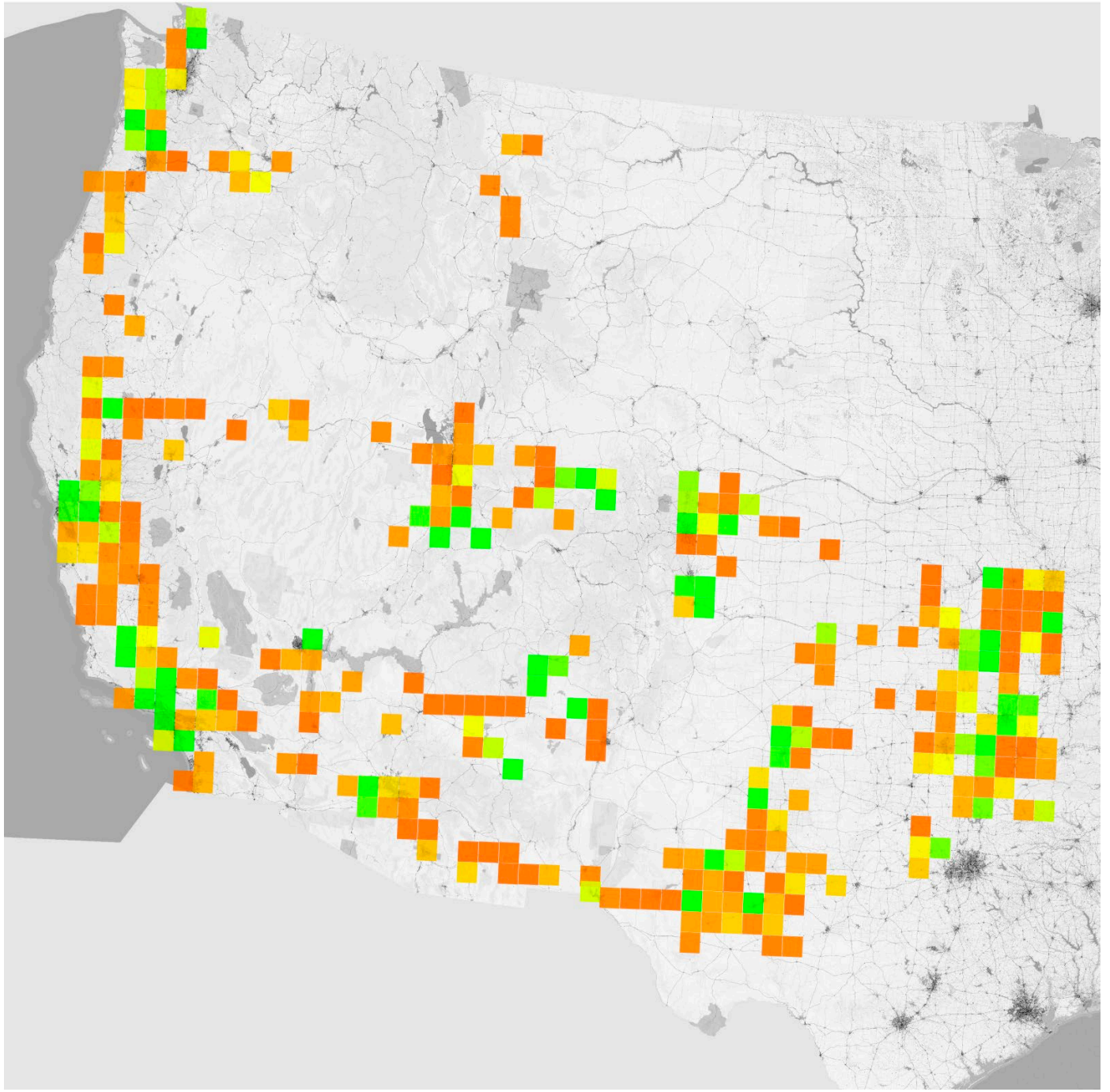
Readiness Indices

SOPO: “The partnership will develop a set of metrics to help rank sub-regions using a variety of parameters…that contribute to a readiness index for CCUS.”



Readiness Indices Workflow

Data:
- Capture
- Transport
- Storage
- Economic
- Risk

Assumptions:
- Appetite for risk
- Future projections

"What does CCS deployment look like assuming ____?"

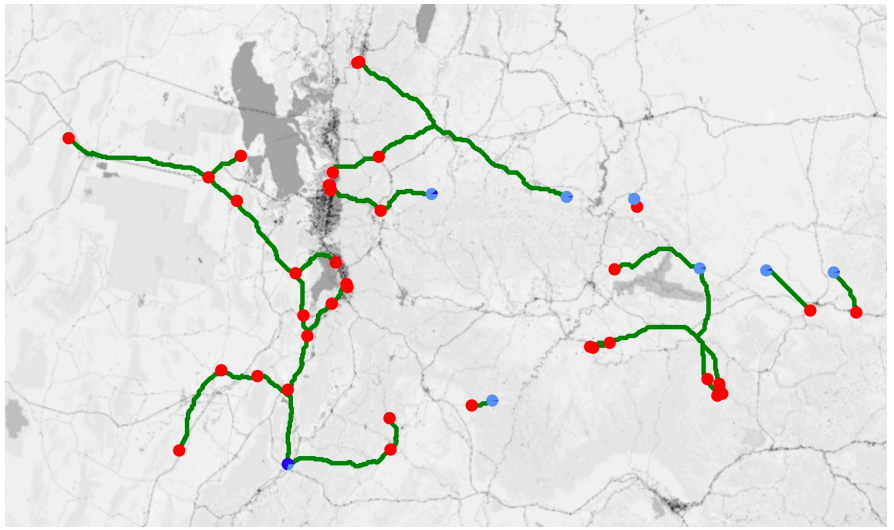
Readiness Indices Workflow

Data:
- Capture
- Transport
- Storage
- Economic
- Risk

Assumptions:
- Appetite for risk
- Future projections

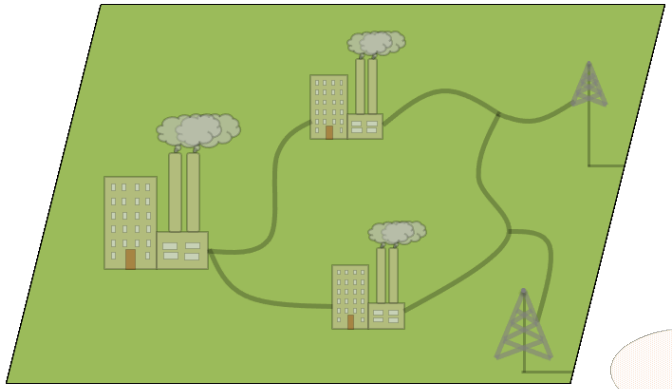
Storage Performance:
Pessimistic
Saline Credit:
$85/ton
IS Uncertainty:
Pessimistic

SimCCS



$$\text{Minimize} \left\{ \begin{array}{l} \sum_{\text{for each source}} \left[\left(\text{Variable Capture Cost} \right) * \left(\text{Amount of } CO_2 \text{ Captured} \right) \right] \quad \text{Capture Cost} \\ + \sum_{\text{for each reservoir}} \left[\left(\text{Variable Injection Cost} \right) * \left(\text{Amount of } CO_2 \text{ Injected} \right) \right] \quad \text{Storage Cost} \\ + \sum_{\text{for each pipeline}} \left[\left(\text{Fixed Build Cost} \right) * \left(\text{Component Opened Or Not} \right) + \left(\text{Variable Transport Cost} \right) * \left(\text{Amount of } CO_2 \text{ Transported} \right) \right] \quad \text{Transport Cost} \end{array} \right.$$

Capture data
Transport data
Storage data



Readiness Indices Workflow

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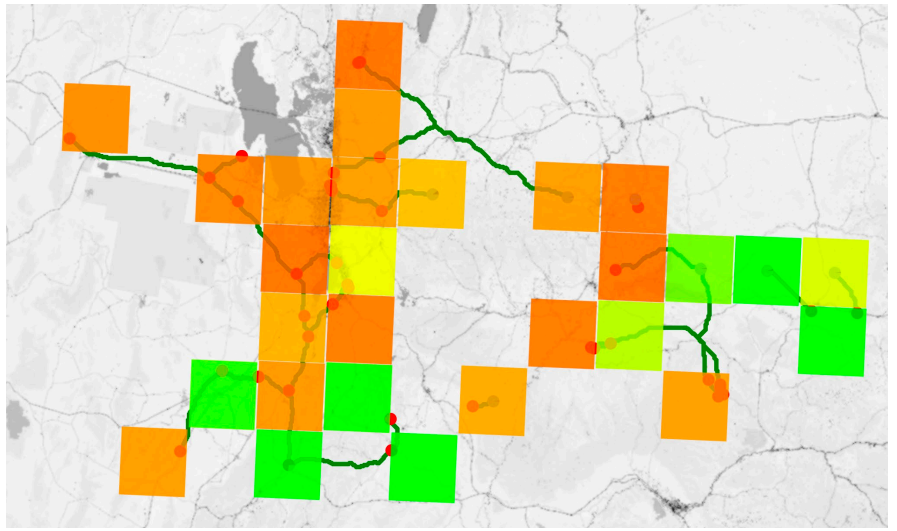
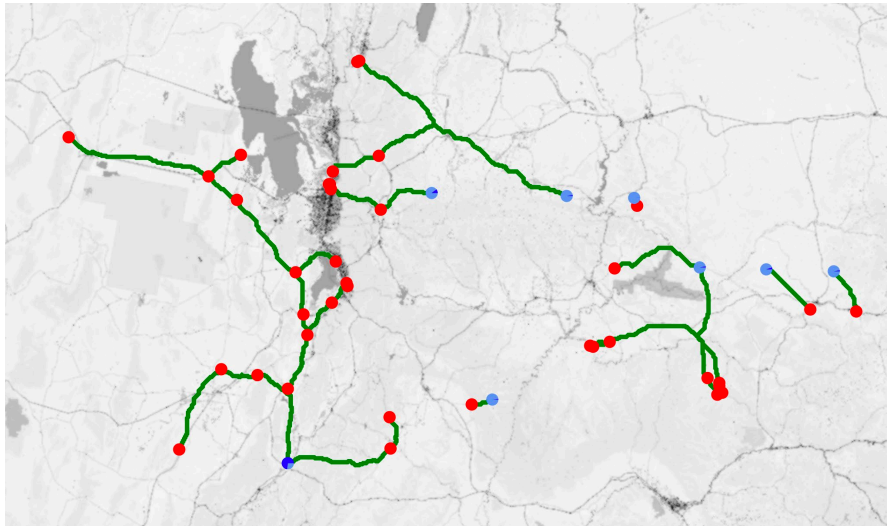




Storage Performance

Pessimistic
Expected
Optimistic

45Q Saline Credit Value

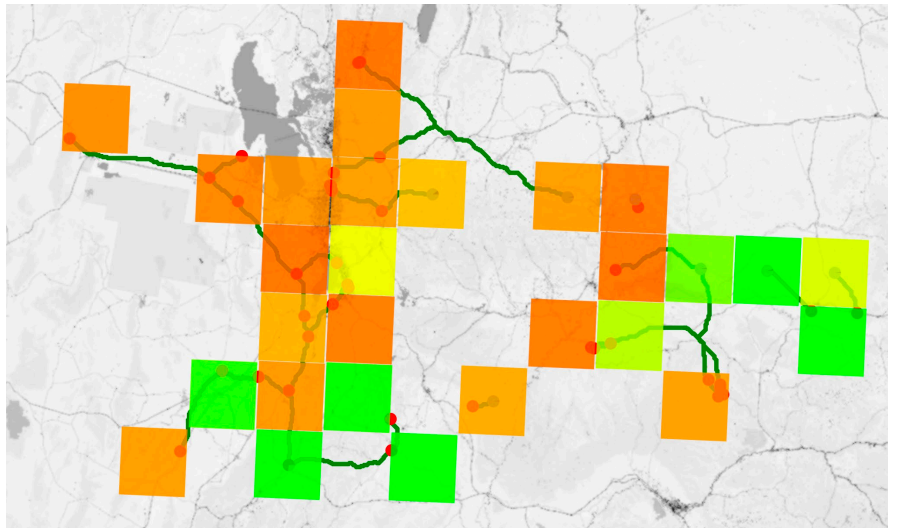
$85
$100
$115

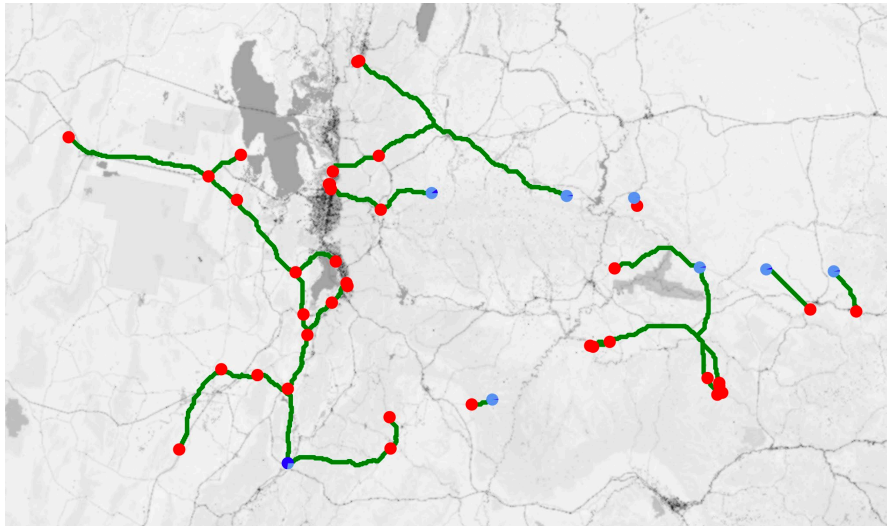
Induced Seismicity Uncertainty

Pessimistic
Optimistic

Storage Performance:
Pessimistic
Saline Credit:
$85/ton
IS Uncertainty:
Pessimistic

SimCCS





Storage Performance

- Pessimistic
- Expected
- Optimistic

45Q Saline Credit Value

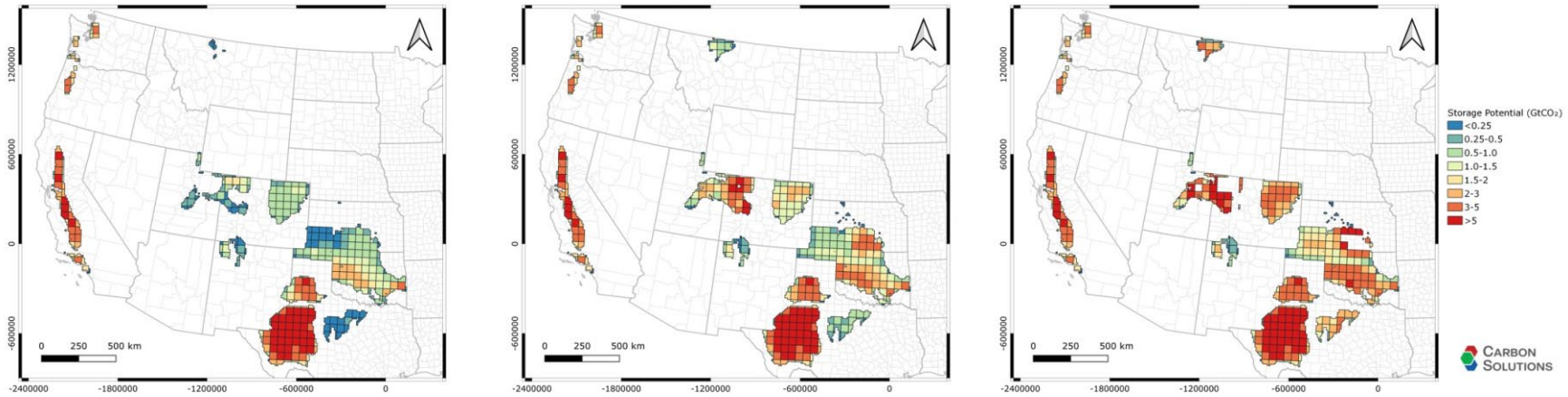
- $85
- $100
- $115

Induced Seismicity Uncertainty

- Pessimistic
- Optimistic

Carbon Solutions' SCO_2T tool used to estimate storage capacity and cost under the assumptions:

1. **The reservoir under-performs.**
2. **The reservoir performs as expected.**
3. **The reservoir over-performs.**



Pessimistic **Expected** **Optimistic**

Storage Performance

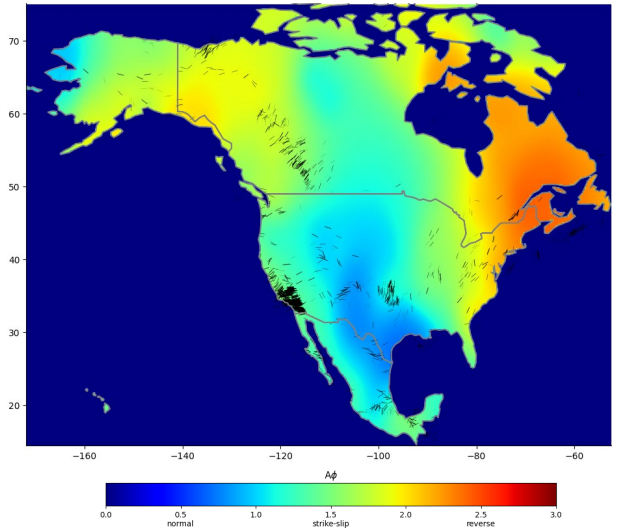
Pessimistic
Expected
Optimistic

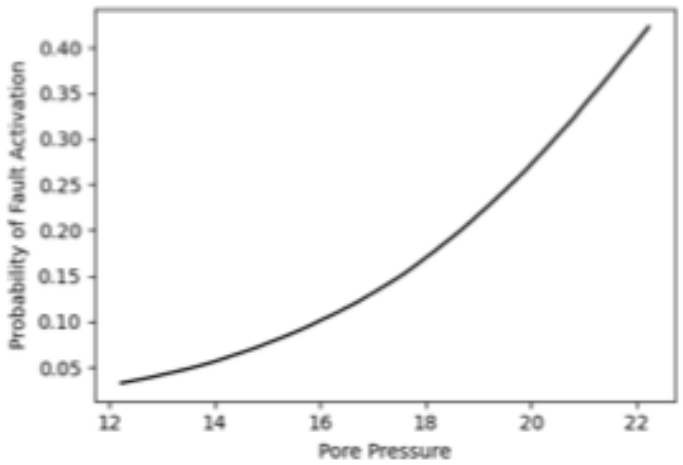
45Q Saline Credit Value

$85
$100
$115

Induced Seismicity Uncertainty

Pessimistic
Optimistic





PNNL's State of Stress Analysis Tool (SoSAT) used to calculate risk of fault activation under the assumptions:

1. **The fault data we have is missing critical faults.**
2. **The fault data we have is accurate.**

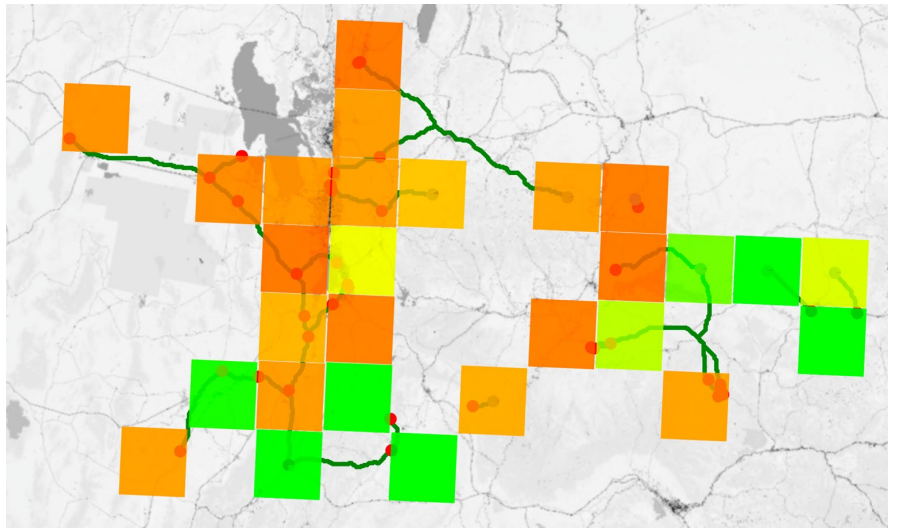
Removed storage locations where risk of fault activation is "elevated".

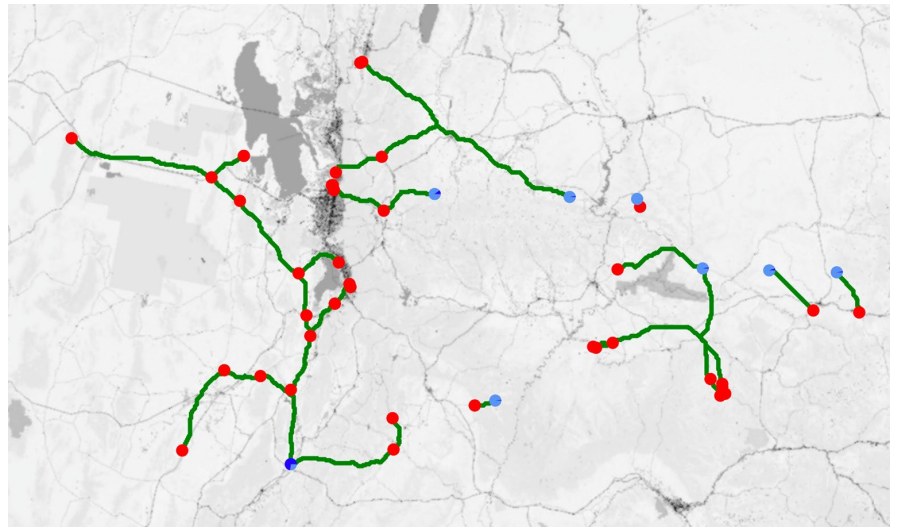
Storage
Performance

Pessimistic
Optimistic

Scoring schemes:

1. Volume: Aggregate the total amount of CO_2 processed in each cell, divide by the largest cell value, translate to Red-Yellow-Green color scale.
2. Cost: Aggregate the cost per ton of CO2 processed in each cell, divide by the largest cell value, translate to Red-Yellow-Green color scale.





Storage Performance

Pessimistic
Expected
Optimistic

45Q Saline Credit Value

$85
$100
$115

Induced Seismicity Uncertainty

Pessimistic
Optimistic

Storage Performance:
Pessimistic
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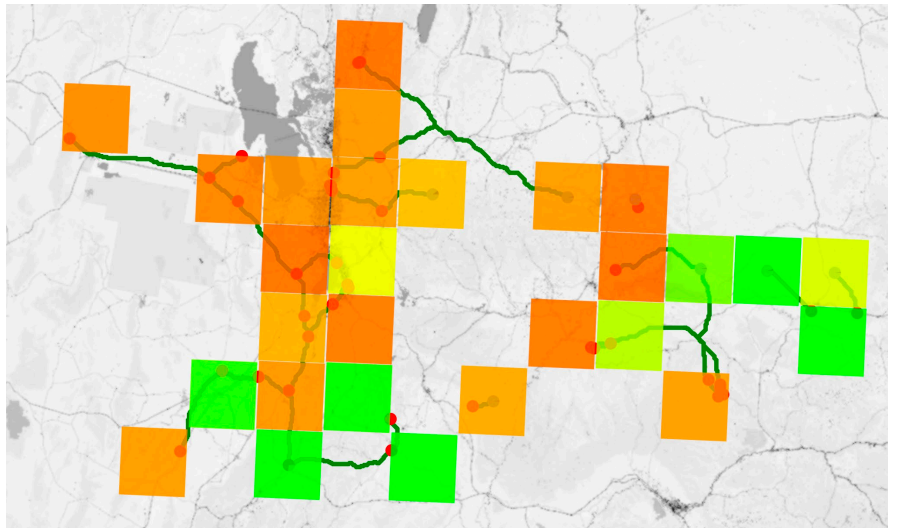

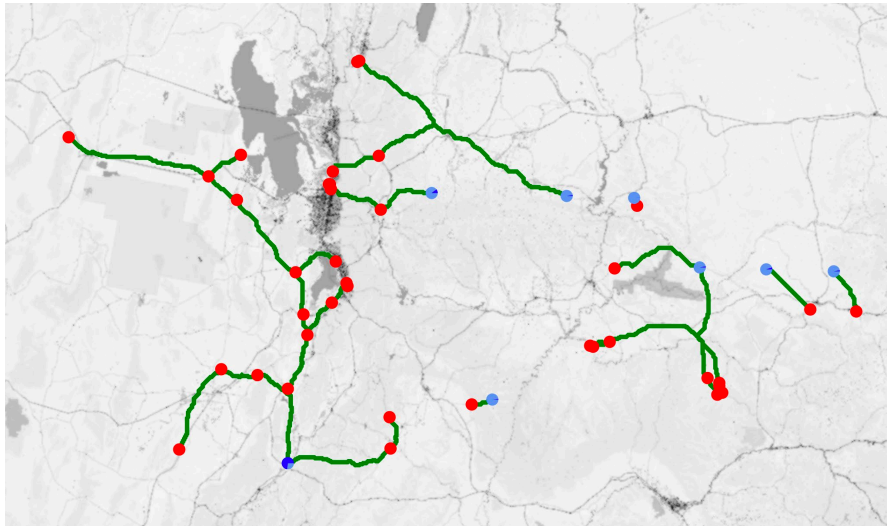

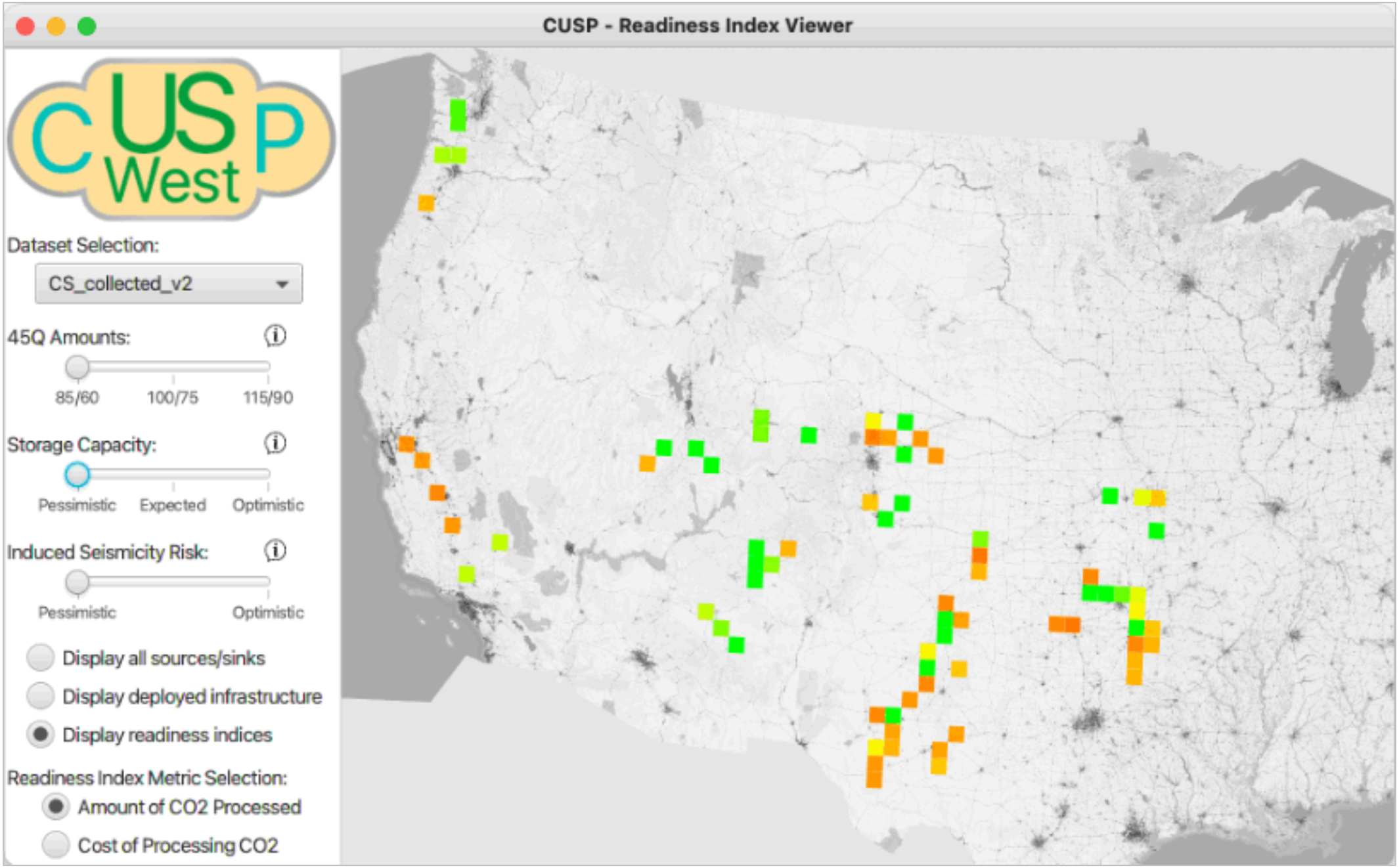
CUSP - Readiness Index Viewer
CUSP West
Dataset Selection:
CS_collected_v2
45Q Amounts:
85/60
100/75
115/90
Storage Capacity:
Pessimistic
Expected
Optimistic
Induced Seismicity Risk:
Pessimistic
Optimistic
Display all sources/sinks
Display deployed infrastructure
Display readiness indices
Readiness Index Metric Selection:
Amount of CO2 Processed
Cost of Processing CO2