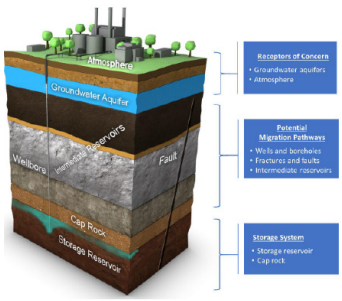
The National Risk Assessment Partnership

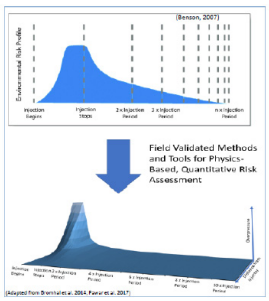
NRAP
National Risk Assessment Partnership

Risk Management Products for Carbon Storage Deployment

The National Risk Assessment Partnership (NRAP) is a research collaboration between five U.S. DOE national laboratories supporting geologic carbon storage deployment goals by developing methods and open-source computational tools to:

- **Assess and manage leakage risk**
- **Assess and manage induced seismicity risk**
- **Design risk-based, adaptive monitoring networks**
- **Inform site selection and permitting**





NRAP's computational approaches are embodied in public, open-source tools that support quantitative risk assessment.

U.S. DEPARTMENT OF ENERGY | BIL Bipartisan Infrastructure Law

NRAP Approach

NRAP addresses the challenges of enabling science-based risk assessment and management at carbon storage sites, supporting the deployment of a nationwide decarbonization strategy that relies on carbon storage.

Utilizing reduced-order modeling and various computational approaches, NRAP enables fast prediction, uncertainty quantification and credible characterization of system attributes, providing valuable tools for quantitative risk assessment and stakeholder decision-making.

Stakeholder Value

Expediting Risk Evaluation

Reducing Uncertainity in Risk/Liability

Decreasing Cost for Operators

NRAP IS A COLLABORATIVE EFFORT

Los Alamos NATIONAL LABORATORY

Lawrence Livermore National Laboratory

NATIONAL ENERGY TECHNOLOGY LABORATORY

Pacific Northwest NATIONAL LABORATORY

BERKELEY LAB

https://edx.netl.doe.gov/nrap/

NRAP Products

Scan to access the NRAP Toolset!

NRAP-Open-IAM

NRAP-Open-IAM is an open-source software product that enables the quantification of containment effectiveness and leakage risks at geologic carbon storage sites in the context of system uncertainties and variability.

Operational Forecasting of Induced Seismicity Toolkit (ORION)

ORION is an open-source, observation-based ensemble forecasting toolkit which is geared towards helping operators understand the seismic hazard at a site and suggesting possible mitigation strategies. *This product was developed in collaboration with the SMART Initiative for Carbon Storage.*

State of Stress Analysis Tool (SOSAT)

SOSAT is an online tool designed to quantify uncertainties in the initial state of stress and aimed at assessing geomechanical risks associated with CO_2 injection operations.

Designs for Risk Evaluation and Management (DREAM)

DREAM is a tool that generates and optimizes monitoring networks for detecting potential leaks from geological carbon storage.

Passive Seismic Monitoring Tool (PSMT)

PSMT is a tool that allows for the optimal design of microseismic monitoring networks using surface or borehole geophones.

Risk-Based Adaptive Monitoring Planning (RAMP) Tool (Coming Soon!)

RAMP is an open-source software product that enables users to design, assess, and optimize a geologic carbon storage site monitoring plan with combinations of monitoring technologies, sensor configurations, and schedules.

Technoeconomic and Liability Evaluation (TALES) Model (Coming Soon!)

The TALES model represents a comprehensive engineering economic model for calculating revenues and costs for all aspects of a CO_2 saline storage project, including financial costs and costs of remedial responses to potential adverse events. *This product was developed in collaboration with the SMART Initiative for Carbon Storage.*