

Site Screening, Selection and Characterization of CO₂ Stored in Deep Geologic Formations

Regional Carbon Sequestration Partnerships Annual Review, November 2009



Site Screening, Selection and Characterization of CO₂ Stored in Deep Geologic Formations

- Provide stakeholders and greater sequestration community a compilation of best practices on site screening, selection and characterization
- Develop a consistent (**industry standard**) framework, terminology and guidelines for communicating “project” related storage/capacity estimates and risk associated with project development
- Communicate experience gained and processes developed through DOE Regional Partnerships Program (Characterization through Validation Phases)

Geologic Storage Framework

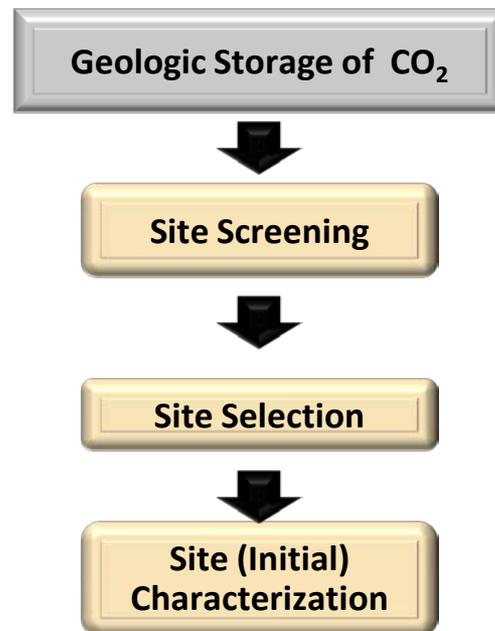
One Consistent and Proven Framework

- **Create Framework** – to categorize storage assessments from Prospective Storage through “project development” to Storage Capacity
- **Build on the current DOE Storage Classification** methodologies as defined by the DOE Atlas 2008/CSLF efforts
- **Adapt SPE/WPC/AAPG/SPEE Resource Classification System** (Petroleum Management System – PRMS)
- Integrate knowledge from SPE/WPC/AAPG/SPEE, CO2CRC, Frailey, S.M. and Finley, R.J., and EERC

Site Screening, Selection and Characterization

Integration into Classification Framework

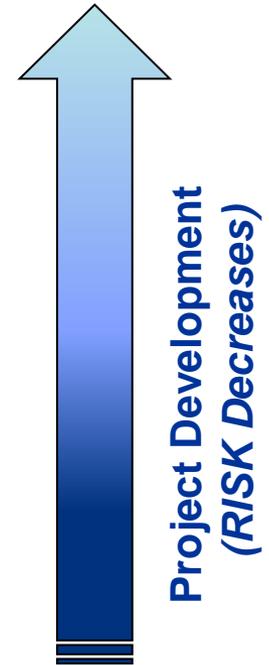
Integrate the developed processes and best practices from field projects into the Classification Framework; provide guidelines for level of data associated



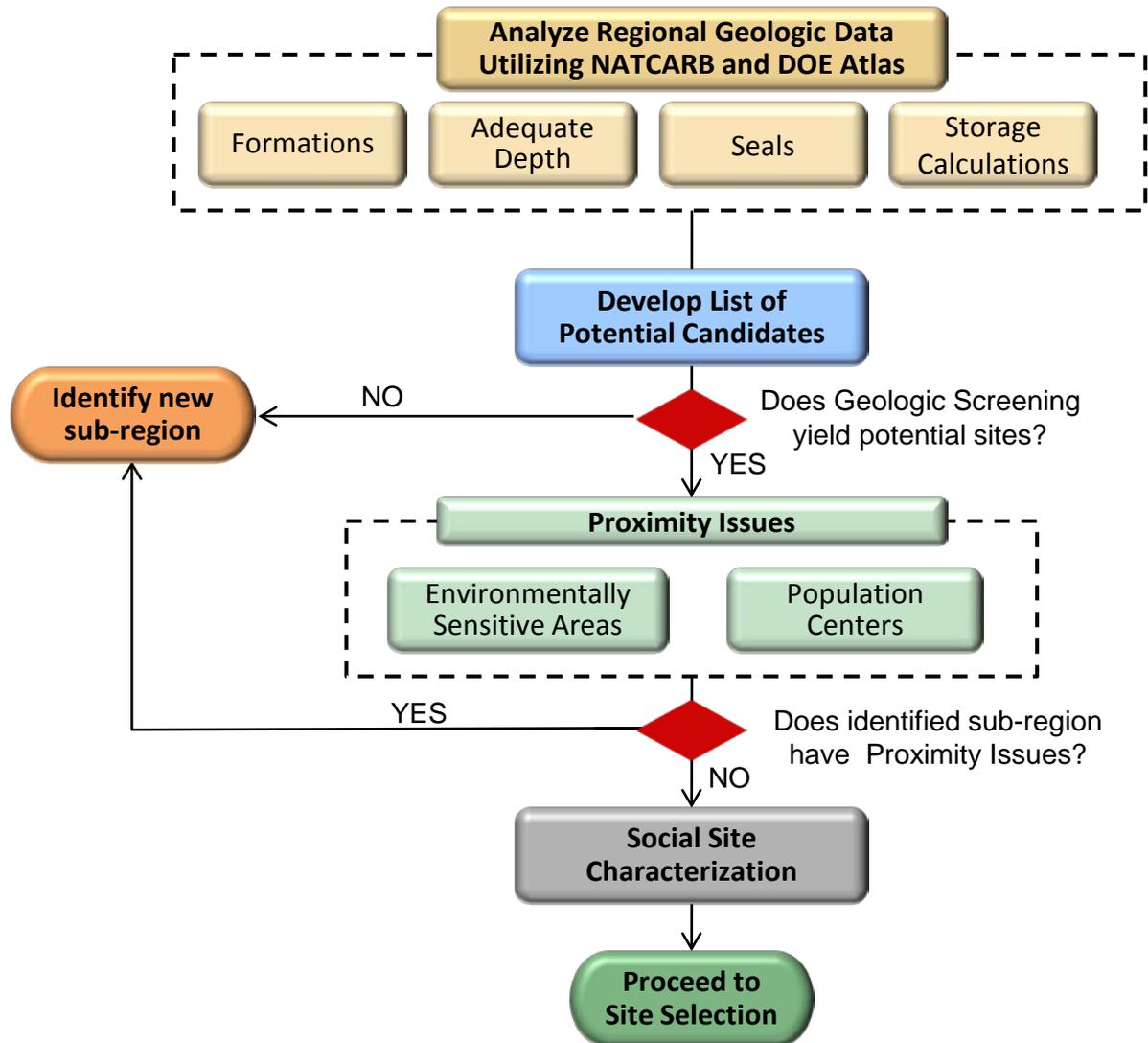
Geologic Storage Framework

Adapted from SPE_WPC_AAPG_SPEE

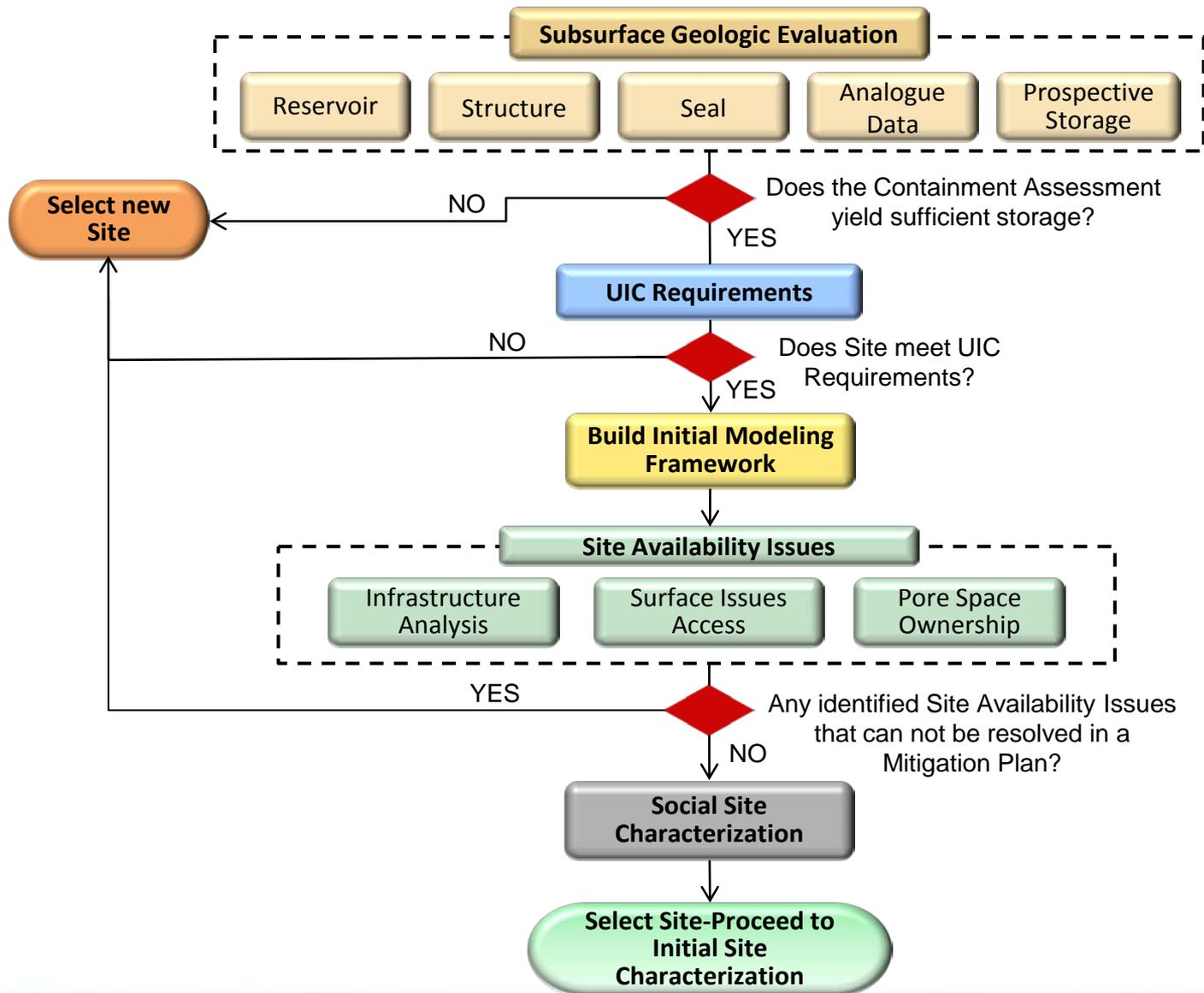
Total Geologic Storage	Discovered	Commercial	INJECTION			PROJECT STATUS			Higher Risk -----Project Development-----Lower Risk
			<u>Storage Capacity</u>			Current Injection			
			1PC (P10)	2PC (P50)	3PC (P90)	Approved Injection Project			
		Proved Cap	Probable Cap	Possible Cap	Planned Injection Project				
		Sub-Commercial	<u>Contingent Storage</u>			Site Char/Project Pending			
			1CS (P10)	2CS (P50)	3CS (P90)	Site Char/Development on Hold			
				Site Char/Development Not Viable					
	Undiscovered	Geologic Storage	Un-Injectable CO2						
			<u>Prospective Storage</u>			Site Characterization (Initial)			
			Low	Medium	High	Site Selection			
			Site Screening (Sub-Regional)						
		Un-Injectable CO2			(National Parks, Great Lakes, Inaccessible Lands)				
		Low-----Uncertainty-----High							



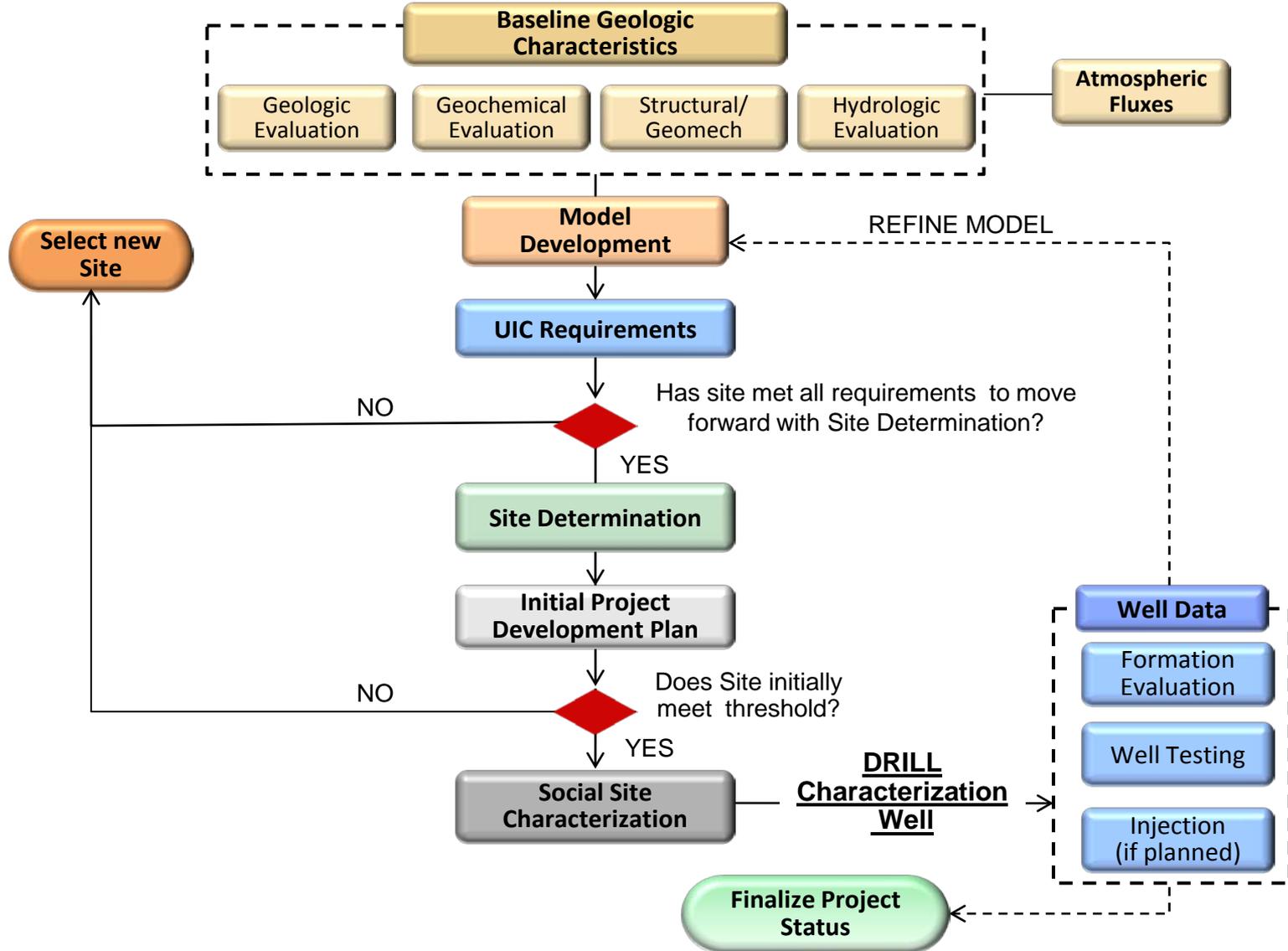
Site Screening Process Diagram



Site Selection Process Diagram

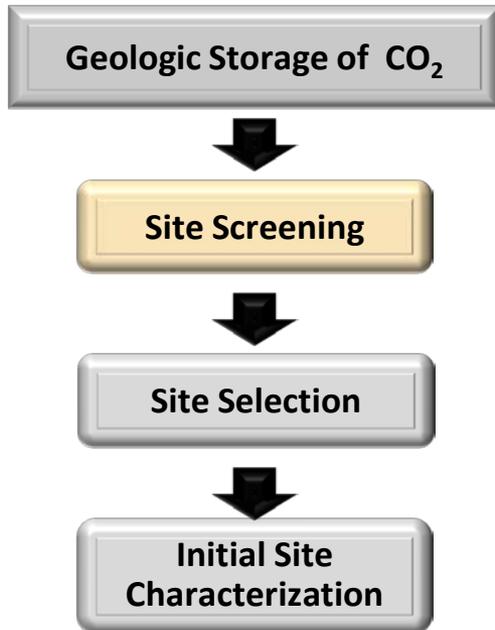


Site (Initial) Characterization Process Diagram



Site Screening, Selection and Characterization

Guidelines on Data and Analyses - Reservoir Example



Identification of potential sites

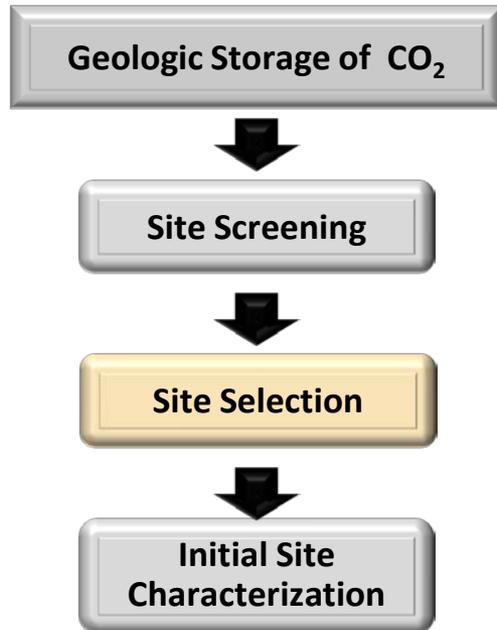
Utilize existing regional data in sources (such as NATCARB, Geological Surveys, and Regional Partnership databases) to identify regional potential:

- Identify potential storage/formations/wells
- Adequate depth
- Storage/source proximity
- Initial regional storage potential

Does regional screening identify potential storage sites?

Site Screening, Selection and Characterization

Guidelines on Data and Analyses - Reservoir Example



Evaluation of sites selected

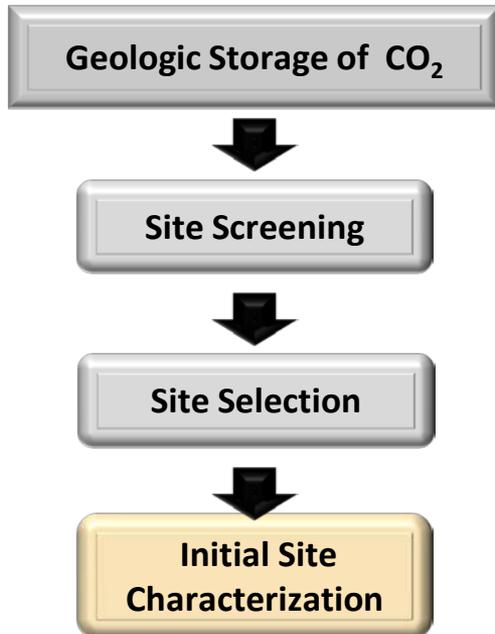
Begin initial reservoir evaluation at each site selected:

- Develop Type Log of Regional Stratigraphy
- Create maps of Reservoir Tops/Bases/Isopachs
- Develop initial well log correlations/cross-sections
- Evaluate and integrate analogous well data
(perm, porosity, core, etc)

Does initial reservoir evaluation yield sufficient potential for further evaluation?

Site Screening, Selection and Characterization

Guidelines on Data and Analyses - Reservoir Example



Perform Initial Site Characterization

Begin in depth geologic characterization of reservoir:

- Type Log of Stratigraphy for Site area
- Detailed correlation of reservoir architecture and sequence stratigraphy in the area
- Develop appropriate models—
(depositional/ facies/digenesis)
- Assess porosity permeability and develop maps
- Integrate all data into ***Initial Stratigraphic Model***

Does initial site characterization justify drilling characterization well?

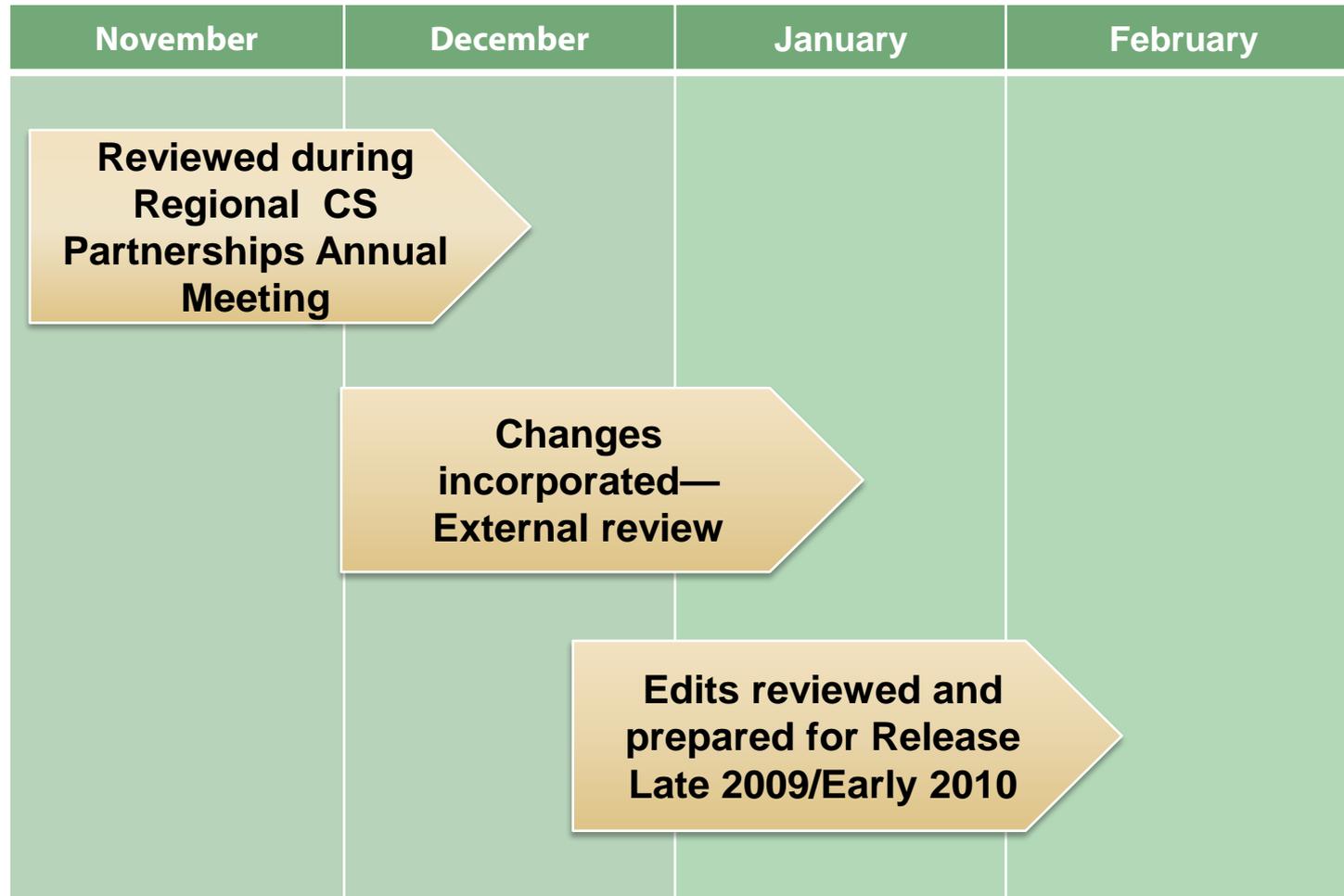
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Undiscovered	Geologic Storage	<u>Prospective Storage</u>			Site Characterization (Initial)
		Low Medium High			Site Selection
		Un-Injectable CO2			Site Screening (Sub-Regional)
					(National Parks, Great Lakes, Inaccessible Lands)
Low-----Uncertainty-----High					

Next Steps

Site Screening, Selection and Characterization



CCS Best Practice Manuals

Critical Requirement For Significant Wide Scale Deployment -Capturing Lessons Learned

Best Practices Manual	Version 1 (Phase II)	Version 2 (Phase III)	Final Guidelines (Post Injection)
Monitoring, Verification and Accounting	2009	2017	2020
Site Characterization	2010	2016	2020
Simulation and Risk Assessment	2010	2017	2020
Well Construction and Closure	2010	2017	2020
Regulatory Compliance	2010	2016	2020
Public Outreach and Education	2009	2016	2020
Terrestrial	2010	2016 – Post MVA Phase III	

Questions?

