

State Policy on Geologic Sequestration: 2009 Update

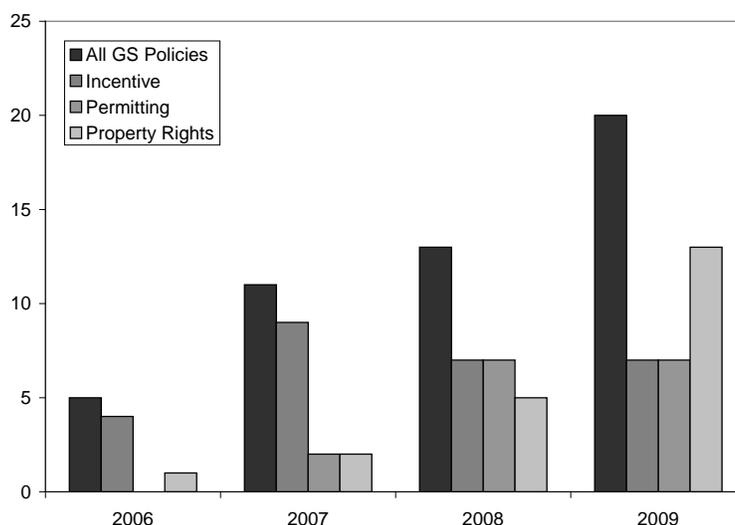
Melisa F. Pollak* & Sarah Johnson Phillips
University of Minnesota, Humphrey Institute of Public Affairs

1. Introduction

State policy activity on geologic sequestration (GS) has steadily increased over the past few years. 2009 was the most active year to date and property rights emerged as a major legislative focus, as show in Figure 1. Since 2006, states have enacted nearly 50 different policies (legislation, rulemakings, and other official actions) addressing GS.

Many of the first state GS policies focused on incentives such as providing tax credits or other financial assistance for coal power plants committed to capturing and sequestering CO₂. In 2008 and 2009, policy activities have increasingly focused on tactical issues such as permitting, property rights, and long-term stewardship of GS sites. Our complete listing of state policy on CCS is available at ccsreg.org.¹ This white paper discusses state policy activity on geologic sequestration, with a focus on the latest trends and developments from 2009.

Figure 1. State Policies Enacted on Geological Sequestration.



Note that some state GS policies fall into more than one category, that is the same policy might address both property rights and permitting for GS. That means the totals shown for each year in the "All GS Policies" category might be lower than the sum of the policies shown in each of the other categories for that year

Studying state GS policy choices and state experiences with implementing these policies is useful for several reasons. In their role as laboratories of democracies, states can provide national policy makers with important guidance for designing federal GS policy. The role of states in regulating GS is likely to remain important even if federal GS regulation is adopted because several aspects of GS regulation, especially defining property rights and site permitting, are traditional state roles. State policies adopted now can inform policymakers how the cooperative federalism model can be adapted for realizing the potential of CCS and managing its risks.

* 301 19th Ave. S. Minneapolis, MN 55455; email: fryxx035@umn.edu

2. Summary of State GS Policies and 2009 Developments

Twenty-one states now have some kind GS policy in place, as shown in Figure 2. In 2009, new GS policies were adopted in Illinois, Louisiana, Mississippi, Montana, North Dakota, Oklahoma, Texas, Utah, West Virginia, and Wyoming. Figure 1 shows the growth of state GS policies since 2006 and the changes in the major areas of state focus during this time. In 2006 and 2007, most state GS policies focused on incentives, including tax incentives, regulatory incentives, and state funding for studies of GS. In 2008, permitting joined incentives as a major focus of state activity. In 2009, property rights became the most commonly addressed issue in state GS policies. In 2009, GS legislation also covered long-term stewardship of GS sites, incentives, and permitting. Several states now have what approach comprehensive policies for GS in that they address several critical issues that could make GS projects viable, including permitting, property rights and long-term stewardship. Table 1 lists all of the GS policies adopted in 2009 and describes their major features.

Figure 2. States with Geological Sequestration (GS) Policies Enacted.

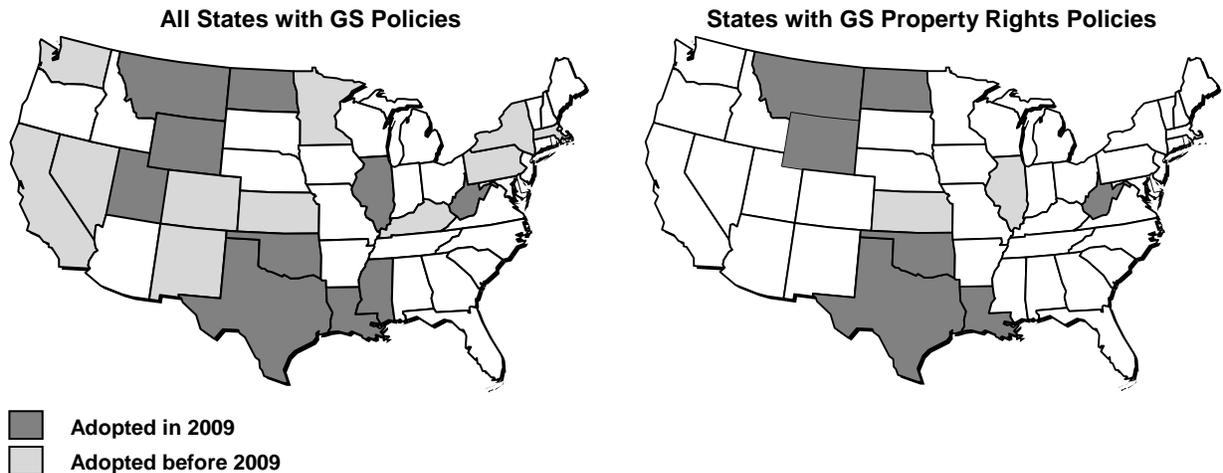


Table 1. State Geological Sequestration Policies Adopted in 2009.* The table below lists state GS policies adopted in 2009. Each policy is categorized as an incentive, permitting, or property rights policy, followed by a brief description of each policy's major features.

State	2009 Policies	Description
Illinois	SB 1987	Incentive. Enacts a Clean Coal Portfolio Standard, which supports development of CCS in Illinois and imposes requirements for utilities to purchase "clean coal" and new coal plants to use CCS in the future.
Kansas	KAR 82-3-1100-120**	Permitting. Proposed rule would establish permitting requirements, procedures, and standards for GS.
Louisiana	HB 661	Permitting/Property Rights. Instructs the Conservation Commission to set permitting rules for GS. Defines property rights for injected CO ₂ , provides parameters for use of eminent domain for GS facilities and CO ₂ pipelines, and limits operator liability. Directs state to take ownership of GS sites 10 yrs. after injection stops and establishes fund for regulatory costs, remediation, and long-term stewardship.
Mississippi	HB 1559	Incentive. Sets favorable income tax rates for businesses that sell CO ₂ for EOR or GS.
Montana	SB 498	Permitting/Property Rights. Instructs the Board of Oil and Gas to establish rules for CO ₂ storage. Declares pore space the property of the surface owner, assigns ownership of injected CO ₂ to the operator, gives mineral rights primacy and provides for unitization for GS sites. The state is directed to accept long-term liability and a fund is created to pay for regulatory costs, remediation, long-term stewardship.
North Dakota	SB 2095	Permitting/Property Rights. Instructs Industrial Commission to set rules for GS. Assigns ownership of injected CO ₂ to the operator, gives mineral rights primacy, and provides for unitization. Directs state to accept long-term liability, establishes fund for regulatory costs, remediation, and long-term stewardship.
	SB 2139	Property Rights. Declares pore space property of the surface owner.
	SB 2034	Incentive. Tax incentive for EOR with CO ₂ .
Oklahoma	SB 610	Permitting/Property Rights. Instructs the Corporation Commission and the Dept. of Env. Quality to set rules for GS. Assigns ownership of injected CO ₂ to the operator and gives mineral rights primacy.
	SB 679	Incentive. Extends the OK GS Task Force until Dec. 2009.
	OK Admin. Code T. 155 s 3-4-101thru105	Incentive/Property Rights. Establishes inventory accounting rules for GS as part of the OK Carbon Sequestration Verification Program, which is designed to provide certification for carbon offsets.
Texas	SB 1387	Permitting/Property Rights. Injected CO ₂ is property of the operator. Creates fund for long-term monitoring, remediation and enforcement.
	HB 1796	Permitting/Property Rights. State accepts liability during operations and ownership of injected CO ₂ for offshore GS on public lands.
	HB 469	Incentive. Tax incentives for projects that capture and sequester CO ₂ .
Utah	HJR 12	Incentive. Resolution supporting Hydrogen production from coal with CCS.
West Virginia	SB 2860	Permitting/Property Rights. Study group to recommend GS rules by 2011.
Wyoming	HB 57	Property Rights. Establishes mineral rights primacy.
	HB 58	Property Rights. Injector owns and is legally liable for the CO ₂ during operations.
	HB 80	Property Rights. Allows for unitization at GS sites.
	Water Quality Rules & Regs, Chap. 24**	Permitting. Proposed permitting rules adapt Underground Injection Control (UIC) program rules for GS.

*Based on Pollak and Wilson 2009

**Proposed Rules

3. Property Rights

Most states adopting GS policies in 2009 addressed property rights, with 13 of the 20 new policies covering property issues. This is a new focus on property issues at the state level. Only eight policies covered GS property rights before 2009. With the new policies, eight states now have a total of 21 statutes or rules governing GS property rights. The now expanded group of GS property rights policies is summarized by state in Table 2.

Major property rights issues addressed by state GS policies include: pore space ownership, ownership of injected CO₂, whether CO₂ is considered a commodity (as opposed to a waste), liability during injection operations, whether mineral rights have primacy over pore space rights, authority to use eminent domain for GS projects, unitization authority and processes, and whether enhanced oil recovery (EOR) will be subject to GS rules. Some states also address long-term liability and stewardship of GS sites, which will be discussed in Section 4 below. These property rights issues will be described in more detail below with comparisons of how states have addressed them.

Pore Space Ownership. Geological formations suitable for permanent sequestration of CO₂ are deep below the surface. In the United States, property rights are traditionally governed by the states and there are no uniform rules for subsurface use rights. For GS projects, obtaining clear rights for long-term access and use to these deep formations is a necessary condition for development. Pore space rights vary for different kinds of injection activities and it is not clear how those existing rules would apply to GS.² Thus, it is a significant development that states have begun to define ownership rights and rules governing subsurface pore space for GS. Three states – Montana, North Dakota, and Wyoming – have passed laws declaring that surface owners own pore space rights. North Dakota's statute prohibits severance of pore space rights from surface rights, though leasing is allowed. Montana and Wyoming, in contrast, allow pore space rights to be severed and transferred as a separate property interest from surface, mineral, or other property rights. In addition to the three state laws specifically defining pore space rights, West Virginia passed a new law in 2009 creating a CO₂ Sequestration Working Group with directions that it study pore space ownership issues and report back with recommendations to the legislation by January 2011.

CO₂ Ownership. Ownership of CO₂ injected into the ground for GS is important because ownership matters for determining liability and rights to any value of the CO₂ as a commodity. Most states passing GS laws covering property rights issues have created a default rule that presumes that the GS site operator owns the CO₂. The operator is free to assign those rights with a legally binding instrument (e.g. a contract

or a deed). Montana, North Dakota, Oklahoma, Texas and Wyoming's laws all take this approach. Louisiana leaves the issue of CO₂ ownership up to the interested parties to determine by contract without creating any default presumption for the operator. Texas creates two special cases where a state entity would own the CO₂: FutureGen and GS sites on offshore public lands. For other GS projects, the operator owns the CO₂ by default in Texas.

CO₂ Designated a Commodity. Laws in Louisiana, North Dakota and Oklahoma explicitly designate CO₂ as a commodity. This action avoids having CO₂ treated as waste or a pollutant, thus potentially reducing liability risks and environmental compliance complexity for GS site operators.

Liability during Operations. States addressing this issue generally have made the GS site operator liable for the duration of the active injection and post-injection phases of the project, usually until provisions made for long-term liability and stewardship begin. Louisiana, Montana, North Dakota, and Wyoming statutes all take this approach of assigning liability to the operator. But unlike the other states, Louisiana limits civil damages against the operator for noneconomic injuries. In Texas, the state will assume liability for offshore GS projects on state-owned land.

Mineral rights primacy. Several states have declared that mineral rights have primacy over pore space rights or other interests related to GS. In most cases, the state laws merely affirm that new provisions governing GS and pore space rights will not interfere with existing rights. Wyoming's law explicitly says that mineral rights have priority over pore space rights for GS. Some states qualify the primacy of mineral rights slightly by making activities that could compromise the integrity of a GS site subject to regulations to prevent leakage of CO₂. Oklahoma, North Dakota, Montana, and West Virginia all include such qualifying language with their provisions affirming the primacy of mineral rights.

Eminent domain. In general, the power of eminent domain is limited to circumstances where condemnation of property is for a public purpose. Federal law broadly defines what might constitute a public purpose, while many states have set limits. Several state laws – Louisiana, North Dakota, Oklahoma, and West Virginia – declare GS to be in the public interest, which potentially sets up the possibility of using eminent domain to secure sites for GS. Louisiana goes further in explicitly granting authority to use eminent domain for GS, even by private entities under certain conditions.

Exemption for EOR. Many states addressing property rights for GS exempt enhanced oil recovery (EOR) from GS rules. EOR is a process where a gas, such as CO₂, is injected into an oil-bearing formation under

high pressure in order to increase the amount of oil that can be recovered. Most states that have authorized permitting rules for GS or significantly addressed property rights for GS have exempted EOR from the GS regulations. In several cases, these states' policies address how sites using EOR might be converted to GS sites or direct a state agency to develop rules to govern that process. Montana's law directs the Board of Oil and Gas Conservation to develop rules for converting CO₂ injection wells used for EOR to GS with guidance that converted wells will be subject to GS site regulations. North Dakota will allow regulators to impose extra requirements on EOR operations converting to GS that would not otherwise be required for permitting GS sites in the state. Kansas would require an EOR operation to apply for a storage permit in order to convert to GS. West Virginia and Wyoming do not provide a specific process for conversion, but say that a converted EOR operation will be subject to GS regulations.

Unitization. Three states have established a process for unitization or pooling for GS: Montana, North Dakota, and Wyoming. Unitization is a process designed to consolidate legal interests in order to efficiently manage the use of a geological structure as a single unit. States adopting policies for unitization for GS so far require consent from owners of 60-80% of the storage capacity of the proposed storage area. The three states authorizing unitization for GS are the same three states that have statutorily defined pore space ownership rights. This makes sense because unitization depends on being able to identify the various parties who might have an interest in the geological formation in question.

In Montana, owners of the rights to 60% or more of storage capacity of a proposed storage area may apply to the Montana Board of Oil and Gas Conservation to have the area operated as a unit. North Dakota requires permit seekers to have made a good faith effort to obtain consent from all owners of a storage reservoir's pore space and, at minimum, to have consent from owners of 60% of the storage reservoir. Where there is not full consent, non-consenting owners must be equitably compensated. Wyoming allows any interested person to apply to pool interests in pore space in a proposed unit for the purpose of conducting unit operation of a GS site. For the Wyoming Oil and Gas Conservation Commission to approve a unitization application for GS, owners of at least 80% of the pore space storage space must approve. The commission may reduce that percentage to 75% under certain conditions.

Table 2. Comparison of State Property Rights Policies for CCS. The following table summarizes the policies of 8 states that have addressed property rights for GS. Explanations of the terms used in this table are included in Section 3.

	Pore space ownership	Severance allowed?	CO ₂ ownership during operations	CO ₂ a commodity?	Liability during operations	GS in the public interest?	Eminent Domain?	Unitization	Mineral Rights Primacy?	EOR Exempt?
Illinois* 2007: SB 1704					State for FutureGen, post-injection.					
Kansas 2009: KAR 82-3-1100-1120** 2007: HB 2719										yes
Louisiana 2009: HB 661 2008: HB 1220, 1117			Matter of private contract, no default rule.	yes	Operator, but non-economic damages are limited.	yes	Yes. Public and private entities, subject to certain findings.			yes
Montana 2009: SB 498	surface owner	yes	operator		operator			yes	yes	yes
North Dakota 2009: SB 2095, SB 2139	surface owner	No. Leasing is allowed.	operator	yes	operator	yes		yes	yes	yes
Oklahoma 2009: SB 610 2008: SB 1765			Operator, if not otherwise agreed.	yes		yes		Corp. Comm. will regulate if a process is adopted.	yes	
Texas 2009: HB 1387, 1796			Operator, unless otherwise agreed. State for FutureGen and for public offshore GS.		State for public offshore GS.					yes
West Virginia 2009: HB 2860, W.V. Code, Chap. 22, Art. 11A	Under review with other issues by CO ₂ Seq. Working Group.					yes			yes	yes
Wyoming 2009: HB 57, 58, 80, Water Qual. Rules & Regs. chap. 24** 2008: HB 89, 90	surface owner	yes	Operator, by rebuttable presumption.		Operator, not the pore space or surface owner.			yes	yes	yes

*Illinois law directs the state to assume post-injection liability for GS sites related to the FutureGen Project. This policy is included here because "post-injection" as defined in the IL statute could be during active injection operations.

**Proposed Rules.

4. Long-Term Stewardship of GS Sites

Several state policies address long-term stewardship of GS sites by addressing long-term liability and ownership of GS sites and establishing stewardship funds. In 2009, Louisiana, Montana and North Dakota joined Kansas in directing the state to assume long-term ownership and responsibility for GS sites. Louisiana's law limits the state obligation to assume responsibility for GS sites if the state's long-term stewardship trust fund is depleted. Texas' 2009 law provides for the state to take long-term ownership and liability for offshore GS sites. Like Illinois, Texas had previously passed a law that would have the state take long-term liability and ownership of a GS site for the FutureGen project. North Dakota's law explicitly assumes that the federal government will eventually assume responsibility for GS sites by providing for that event to mark the end of the state's responsibility. Among states that have defined requirements for site closure, only Wyoming has not made provisions for transferring liability to a government entity for the long-term stewardship phase. Wyoming, however, has assigned a working group to make recommendations for financial assurance and long-term care of GS sites in a report due by September 30, 2009.

In 2009, Louisiana, North Dakota, and Texas also established stewardship funds that will cover the long-term costs of monitoring and management of GS sites. Kansas passed legislation establishing a long-term stewardship fund for GS sites in 2008. In all four states, the funds come from fees paid by GS site operators, either from permitting or other regulatory fees or from a fee assessed per ton of CO₂ injected.

5. Inventory Accounting Rules

Oklahoma became the first state to issue inventory accounting rules for GS sites in 2009. These rules are part of the state's carbon sequestration verification program, which is meant to provide an official program for assuring that offsets are authentic in order to facilitate an offset market. Oklahoma's GS inventory accounting rules are geared toward voluntary carbon markets, and would need modifications to be suitable for a compliance market. They provide for verification of the quantity of CO₂ injected, but do not account for such things as emissions from energy used to capture and compress CO₂, or potential CO₂ seepage from the storage formation back into the atmosphere.

6. GS Permitting Rules

Washington remains the only state to have active permitting rules for GS, but several other states took significant steps toward that goal in 2009. Kansas and Wyoming issued draft permitting rules in 2009, while Louisiana, Montana, North Dakota, Oklahoma, Texas, and West Virginia passed new laws directing state agencies to write rules. The state permitting rules, along with EPA's proposed UIC permitting rules,

are among the most detailed proposals for regulation of GS so far. More than any other policy, permitting rules play a critical role in risk management. They provide the framework for appropriate site selection, monitoring, and addressing potential health, safety, and environmental issues.³

Many permitting policy choices will be made when final rules are promulgated, but some important decisions are also made in states' authorizing legislation. For example, states directing rules to be developed for GS must choose which agency will draft the rules and take the role of regulating GS sites. In most states, this means choosing between an agency charged with environmental protection and an agency charged with managing natural resource development (such as oil and gas regulators). Kansas, Louisiana, and North Dakota chose to direct their natural resource-based agencies to develop rules for GS, while Washington, West Virginia, and Wyoming chose their environmental agencies. Montana, Oklahoma, and Texas chose hybrid approaches. In Montana, the legislature directed the Board of Oil and Gas Conservation to develop GS permitting rules with substantial input from the Board of Environmental Review. The Oklahoma legislature divided jurisdiction based on the nature of the potential GS site, putting the Corporation Commission in charge of GS proposed for fossil fuel-bearing geologic formations and the Department of Environmental Quality in charge for all others. Texas divides jurisdiction between its Commission on Environmental Quality for public offshore GS and the Railroad Commission for other GS sites, subject to recommendations made in a study by the two agencies due in 2010.

7. “Comprehensive” State GS Policies

With the new legislation in 2009, several states now have (or approach having) comprehensive GS policies. By “comprehensive,” we mean a state has adopted one or more policies that collectively address most of the issues that are likely to be prerequisites for GS to be viable in the state. These threshold issues include permitting rules, property rights, and long-term liability and stewardship of GS sites.

Nine states — Kansas, Louisiana, Montana, North Dakota, Oklahoma, Texas, Washington, West Virginia, and Wyoming — have passed legislation or adopted rules in at least two of these categories. Among these states some have been substantially more thorough than others. Details on these states' actions on permitting rules, property rights, and long-term liability and stewardship are discussed above. Table 3 provides a summary of the overall GS policy landscape in the nine states listed above, and identifies some of their remaining policy gaps. Despite the gaps, we begin to see a picture emerging of how states are approaching GS regulation. It remains to be seen whether the major trends that have emerged - most notably states' acceptance of long-term liability for GS sites, assignment of pore-space ownership to the surface owner, and provisions for unitization – will be more widely adopted in the future.

Table 3. Summary of Comprehensive¹ State GS Policies.

	Permitting Rules Agency assigned to promulgate rules; status of rulemaking process.	Property Rights Wide range of issues, including pore space ownership and liability during operations.	Long-Term Stewardship Liability, ownership, and funding.
Kansas 2009: KAR 82-3-1100-1120** 2007: HB 2719	Agency: KS Corporation Commission. Draft rules published in Jan. 2009.	Gap: property rights issues not addressed beyond permit requirements.	State will assume long-term ownership and liability. Fund: established.
Louisiana 2009: HB 661 2008: HB 1220, 1117	Agency: Office of Conservation, Dept. of Nat. Resources Rules not yet proposed.	Addresses CO ₂ ownership, liability during operations, and eminent domain. Gap: does not address pore space ownership.	State will assume long-term ownership and liability Fund established for long-term monitoring and remediation.
Montana 2009: SB 498	Agency: MT Board of Oil and Gas Conservation, with comments from MT Board of Env. Review. Rules not yet proposed.	Addresses pore space ownership, liability during operations, relationship to mineral rights, CO ₂ ownership, and provides for unitization.	State will accept long-term ownership and liability for GS sites at least 15 yrs after CO ₂ injection ends.
North Dakota 2009: SB 2095, SB 2139	Agency: ND Industrial Commission Rules not yet proposed.	Addresses pore space ownership, CO ₂ ownership, liability during operations, relationship to mineral rights, and provides for unitization.	State will assume long-term ownership and liability at least 10 yrs after CO ₂ injection ends. Fund established for long-term mgmt. and monitoring.
Oklahoma 2009: SB 610 2008: SB 1765	Agency: Corporation Commission for fossil fuel-bearing formations, Dept. of Env. Qual. for all others. Rules not yet proposed.	Addresses CO ₂ status and ownership and mineral rights primacy. Inventory accounting rules adopted. Gaps: pore space ownership and liability during operations not addressed.	Gap: Long-term liability and stewardship otherwise not addressed.
Texas 2009: HB 1387, 1796	Agency: Railroad Commission, Texas Commission on Env. Quality. Rules not yet proposed, study with recs due 12/01/10.	Addresses CO ₂ ownership, liability during operations. Gap: pore space ownership not addressed.	Fund established from permitting fees for inspection, long-term monitoring, repairs, and enforcement.
Washington 2008: WAC 173-407-110 2007: ESSB 6001	Agency: Department of Ecology Rules promulgated in 2008.	Gap: property rights issues not addressed beyond permit requirements.	Governed by pre-existing laws. Owner liable in perpetuity.
West Virginia 2009: HB 2860, W.V. Code, Chap. 22, Art. 11A	Agency: Dept. of Env. Protection Rules not yet proposed, will await study group recs.	Addresses mineral rights primacy. Assigns study group to make recommendations on other issues such as pore space ownership by 2011.	Gap: Long-term stewardship not yet addressed.
Wyoming 2009: HB 57, 58, 80, Water Qual. Rules & Regs. Chap. 24** 2008: HB 89, 90	Agency: Dept. of Env. Quality Draft rules published 3/13/09, rev. 9/25/09, report with recs for financial assurance and long-term care due 9/30/09.	Addresses pore space ownership, CO ₂ ownership, liability during operations, mineral rights primacy, and provides for unitization.	Gap: Long-term stewardship not yet addressed.

¹We define GS policy as comprehensive if it significantly addresses permitting, property rights, and/or long-term stewardship of GS sites.

**Proposed Rules

8. References

¹ CCS Regulatory Project, List of U.S. State Bills on CCS, available at http://www.ccsreg.org/working_papers.html.

² Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change, Carbon Sequestration, and Property Rights*, ___ U. Ill.L. Rev 22-36 (forthcoming 2010).

³ Pollak, M. F.; Wilson, E. J., Regulating Geologic Sequestration in the United States: Early Rules Take Divergent Approaches. *Environmental Science and Technology* 2009, 43, (9), 3035-3041.