Provisions Supporting Ecosystem Services Markets in U.S. Farm Bill Legislation

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Summary

Environmental goods and services are the benefits society obtains from the environment and ecosystems, both natural and managed, such as water filtration, flood control, provision of habitat, carbon storage, and many others. Farmers' participation in providing these types of goods and services began in earnest in the 1990s with the development of watershed approaches incorporating nutrient credit trading and wetlands mitigation banking, and continued with the more recent development of voluntary carbon credit markets. These efforts have triggered further interest in the possibility of developing market and trading opportunities for farmers and landowners as a source of environmental offsets. These services would be in addition to the food and fiber services traditionally supplied by the agriculture and forestry sectors. Congress is expressing growing interest in developing such market-based approaches to complement existing federally supported programs that promote conservation in the farm and forestry sectors, as well as to complement existing and/or emerging environmental regulations or natural resource requirements that may affect the agriculture and forestry sectors.

The enacted 2008 farm bill (P.L. 110-246, the Food, Conservation, and Energy Act of 2008) contains a new conservation provision that seeks to facilitate the participation of farmers and landowners in environmental services markets by directing USDA to develop technical guidelines for measuring farm- and forestry-based environmental services. This provision focuses first on carbon storage and indirectly references various agriculture and forestry provisions in some legislative initiatives that are being considered as part of the broader climate change debate, which have highlighted the perceived need for uniform standards and ways of measuring emissions reduction and increases in carbon storage in the agriculture and forestry sectors. These types of provisions could expand the scope of existing land-based conservation programs and facilitate the development of private-sector markets for a range of environmental goods and services from farmers and landowners.

Among the possible questions that may emerge as these agriculture and forestry provisions are either implemented as part of U.S. farm conservation policy, or considered as part of a broader climate change initiative, are the following: Can agricultural interests effectively provide environmental services along with traditional food and forestry services? How would uniform standards address differences within production areas, types of resources, and ecosystems? What is the role of USDA as the lead federal agency in establishing technical guidelines for the agriculture and forestry sectors? How would collaboration work between other participating federal agencies? How would the agreed-upon decisions and standards work within existing regulatory authorities, and within possible forthcoming regulatory authorities, such as proposed climate change options currently being debated in Congress? What role should federal agencies play in establishing environmental services markets?

Contents

What Are Ecosystem Services Markets? 1
Example: Carbon Markets 3
Example: Water Quality Markets 3
Example: Habitat/Conservation Markets 4
What Are the Benefits and Barriers? 4
What Is the Recent Congressional Action? 5
Enacted 2008 Farm Bill 5
Climate Change Legislation 7
Other Related Actions 8
What Are Some Possible Considerations? 9

Tables

Table 1. Possible Range of Services and Regulatory Drivers 2

Contacts

Author Contact Information 10

The enacted 2008 farm bill (Food, Conservation, and Energy Act of 2008, P.L. 110-246) includes a new conservation provision that seeks to facilitate the participation of farmers and landowners in environmental services markets, covering a range of farm and forestry services, including improved water and air quality, increased carbon storage, and habitat protection. The inclusion of this provision could expand the scope of existing farmland conservation programs and facilitate the development of private-sector markets for agriculture- and forestry-based environmental goods and services.

In part, congressional interest in this area has developed in response to increased attention to the agriculture and forestry sectors' contributions to existing environmental pollution and resource degradation. For example, the U.S. Environmental Protection Agency (EPA) reports that agriculture is the leading source of water pollution in U.S. lakes and rivers, and a major contributor of pollution in U.S. estuaries. EPA also reports that agriculture contributes to an estimated 6% of all greenhouse gas emissions in the United States. At the same time, some in Congress are suggesting that U.S. farm support programs should do a better job promoting environmental benefits and also complying with domestic support constraints called for by the World Trade Organization. The agriculture and forestry sectors are also being regarded as a possible source of carbon capture and storage within the broader climate change debate.

The development of market-based approaches to farm conservation and land management might complement existing and/or emerging environmental regulations or natural resource requirements affecting the agriculture and forestry sectors, as well as complement existing federally supported programs that promote conservation in the farm and forestry sectors. Environmental goods and services from the agriculture and forestry sectors might also provide for environmental improvements and mitigation at a relatively lower cost, compared to mitigation in other sectors of the economy. Environmental services markets may also offer additional financial opportunities to farmers and landowners.

What Are Ecosystem Services Markets?

Ecosystem (or environmental) goods and services are the benefits society obtains from the environment and ecosystems, both natural and managed, such as water filtration, flood control, provision of habitat, carbon storage, and many others (**Table 1**). In most cases, these constitute "free services" since landowners and managers are not compensated in the marketplace.[1] However, as many such services have become degraded over time, there is growing recognition that they should be sustained or substituted by market capital, similar to investing in water treatment plants and engineered flood control systems. One solution would be to create markets, often developed through regulation, so that providers of environmental services can be compensated in private markets for the services they provide. This could offer a potential business opportunity to the farm and forest sectors, which may be able to provide for such services and participate in the market, for example, by creating, restoring, preserving function and value in a natural resources area, or by capturing and storing carbon before gases that contribute to global climate change are released into the atmosphere. These services would be in addition to the food and fiber services traditionally supplied by the agriculture and forestry sectors.

[1] For more general information, see World Resources Institute, *Millennium Ecosystem Assessment, Ecosystems and Human Well-being*, 2005, http://www.millenniumassessment.org/en/index.aspx.

Table 1. Possible Range of Services and Regulatory Drivers

Tradable Resource/Credit (Type of Service)	Regulatory Driver
Wetland, stream, aquifer recharge, forests, buffers, stormwater controls, habitat/biodiversity (e.g, habitat creation/preservation, water filtration, flood control and protection, water/air pollution controls, runoff reduction)	Federal and/or state
Nutrients (e.g, runoff reduction, water pollution controls)	State
Carbon/greenhouse gas (e.g., capture, storage/sequestration, methane destruction; air pollution controls)	State (and possibly federal)
Renewable energy (e.g., biofuels generation, fuel substitution)	State
Water and development rights (e.g., alternative land and natural resource preservation, habitat creation/preservation, aesthetic value, recreational use)	State, county, or local

Source: CRS, information from American Farmland Trust and World Resources Institute.

The market for environmental goods and services involving the agricultural and forestry sectors began mostly through various pilot programs starting in the 1990s. The development of voluntary carbon credit markets and watershed approaches incorporating nutrient credit trading, along with wetlands mitigation banking, have involved the farm and forestry sectors. These programs provide a market for farmers to sell carbon or nutrient farm-based offsets to emitters/dischargers that are looking to buy offsets to mitigate their own emissions/discharges. These efforts have triggered interest in other types of tradable permits and credits, including habitat credit trading and other types of conservation banking. USDA identifies environmental markets with relevance to the agriculture and forestry sectors to include water quality, air quality, wetlands, endangered species, greenhouse gases, and developmental rights.[2] Often the impetus for these efforts may be linked to a "regulatory driver" specific to an actual or anticipated environmental regulation or natural resource requirement, such as requirements in the Clean Water Act (CWA), Endangered Species Act (ESA), or other state or local regulation. Other incentives may include market drivers that make trading environmental services financially attractive, or the desire to cultivate community goodwill.

The participation of agriculture and forestry in emerging environmental services markets is gaining wide support within the farm community and its supporting organizations and agencies, as well as among the regulatory agencies and some environmental groups.[3] As part of its recommendations for the 2007 farm bill, the U.S. Department of Agriculture (USDA) proposed to further facilitate the development of environmental services markets in ways that would more effectively involve the farm and forestry sectors. Both the House- and the Senate-passed versions of the 2008 farm bill included similar provisions as part of the conservation title in their respective bills. A version of this provision is in the enacted 2008 farm bill (for further discussion, see section titled "Enacted 2008 Farm Bill").

Information and examples of ecosystems services markets that have involved the participation of U.S. farmers and landowners include voluntary markets for land-based reductions or storage of

[2] USDA, *2007 Farm Bill, Conservation and Environment Theme Paper*, June 2006, http://www.usda.gov/documents/FarmBill07consenv.pdf.

[3] See, for example, Ann Sorensen, "Ecosystem Service Markets in Agriculture," May 2007, http://www.aftresearch.org/aaas; two presentations at USDA's Ag Outlook forum by Ginny Kibler, "Water Quality Trading Basics," and Carl Lucero, "USDA Farm Bill Conservation—Supply Side of Trading," March 2007; and presentation material distributed by staff at Environmental Defense.

carbon, water quality improvements, and preservation or restoration of habitat, as briefly described below.

Example: Carbon Markets

Farmer participation in voluntary carbon credit trading programs has been growing rapidly. As of mid-2009, participation involved an estimated roughly 10,000 farmers across about 35 states covering more than more than 10 million acres.[4] The two largest programs providing for farm-based carbon offsets are programs operated by the North Dakota National Farmers Union and the Iowa Farm Bureau. The National Farmers Union program involves more than 4,000 producers in more than 30 states, with more than 5 million acres of farmland enrolled. The Iowa Farm Bureau involves 5,000 to 6,000 producers also in more than 30 states, with more than 5 million acres enrolled. Most projects are located within the Central and Midwestern states. Other similar programs are operated by the Illinois Conservation and Climate Initiative, the Environmental Credit Corporation (based in Indiana), the Upper Columbia Resource Conservation and Development Council (Northwest), and Terrapass (based in California). Among the types of practices that are eligible to participate are no-till crop management; conversion of cropland to grass; managed forests, grasslands, and rangelands; new tree plantings; anaerobic digesters and methane projects; wind, solar, or other renewable energy use; and forest restoration.

Example: Water Quality Markets

Water quality trading programs involve the participation of an estimated more than 300 farmers in programs across six states.[5] These include initiatives such as those by the Southern Minnesota Beet Sugar Cooperative, the Grassland Areas Farmers (California), the Rahr Malting Company (Minnesota), the Great Miami River Watershed (Ohio), and the Red Cedar River (Wisconsin), among others. These programs cover some or all of the following types of nutrient runoff reduction activities: cover cropping; reduced fertilizer use; conservation tillage; tree-plantings; buffers; drainage management; and wetlands mitigation trading.[6] Most water quality trading programs are initiated at the local or state level, often involving EPA, and cover impaired waters as well as unimpaired waters to maintain water quality standards. In general, EPA supports trading of nutrients and sediment load, as well as cross-pollutant trading of oxygen-demanding pollutants. EPA also works with USDA's Natural Resources Conservation Service (NRCS) and, in 2006, signed a partnership agreement to establish uniform trading standards, along with supporting other collaborative efforts.[7] USDA programs related to water quality trading include funding for best management practice (BMP) installation and farmland conservation practices, technical assistance, and tool development and outreach efforts; USDA is also developing a

[4] Statements by the National Farmers Union and the Iowa Farm Bureau/AgraGate to House Agriculture Committee staff, May 18, 2009.

[5] Information from EPA based on EPA-supported projects in 2008. Does not include the Tar-Pamlico in North Carolina since not enforceable through a CWA permit.

[6] H. L. Breetz et al., *Water Quality Trading and Offset Initiatives in the U.S.: A Comprehensive Study*, Dartmouth College, http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf; and EPA's website at http://www.epa.gov/owow/watershed/trading.htm. Also see CRS Report RS21403, *EPA's Water Quality Trading Policy*.

[7] USDA, "USDA and EPA Sign Water Quality Credit Trading Agreement," October 13, 2006, http://www.nrcs.usda.gov/news/releases/2006/usdaepawqagreement.html. The agreement text can be found at http://www.epa.gov/owow/watershed/trading/mou061013.pdf.

handbook for NRCS field staff and partners to explain and support various types of trading, including water quality trading, wetlands trading, and carbon offsets.[8]

Example: Habitat/Conservation Markets

Habitat or conservation markets and trading are still mostly under development. In April 2007, the U.S. Fish and Wildlife Service, USDA's NRCS, and the Association of Fish and Wildlife Agencies signed a partnership agreement to promote habitat credits that could offer incentives to landowners who preserve and enhance the habitat of endangered or at-risk species. Among the stated objectives of this agreement is to develop and adopt common definitions, standards, and measurement protocols.[9] Habitat credits or "conservation banking" act like a savings account, where credits are earned for land preservation of habitat and credits can then be sold to land use industries or others who are required to mitigate the loss of habitat under the ESA and other laws that restrict or prohibit development. This is conceptually similar to wetlands and stream mitigation banking, which allows for compensation of adverse impacts of development activities ("compensatory mitigation") to wetlands, streams, wildlife refuges, or other aquatic resources. Such allowances, whether through wetlands or conservation banking, typically involve creating, restoring, enhancing, or preserving function and value in a natural resources area, often within the context of meeting a federal, state, or local regulatory requirement.

What Are the Benefits and Barriers?

The development of market-based approaches has been widely touted as a possible source of additional farm income, whether through the sale of tradable credits or from other types of payments, such as recreational use or hunting fees. This could offset or partially offset the costs of pollution abatement incurred by farmers who make environmental improvements on their farmlands. In some cases, adopting alternative production practices could also result in on-farm cost savings, such as the use of renewable fuel generated on-farm. Market-based approaches are also often viewed as encompassing broader societal benefits by complementing existing farm conservation programs and evolving regulatory approaches intended to address environmental improvements in the farm and forestry sectors.

USDA recognizes that creating markets for ecosystem services could increase farmer investments in environmental stewardship and provide for environmental services including clean air and water, carbon sequestration, and improved wildlife habitat, among other conservation benefits.[10] However, USDA also reports that there are several existing barriers that may prevent the development of fully functioning markets for agricultural environmental services and may be difficult or costly to overcome.[11]

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[8] EPA, *EPA Water Quality Trading Evaluation—Final Report*, October 2008, http://www.epa.gov/evaluate/wqt.pdf.

[9] The agreement text can be found at http://www.fws.gov/endangered/pdfs/Credit_Trading_MOU.pdf.

[10] See, e.g., M. Ribaudo, "Creating Markets for Environmental Stewardship: Potential Benefits and Problems," *Amber Waves*, USDA's Economic Research Service, Sept. 2008; and M. Ribaudo et al., *The Use of Markets to Increase Private Investment in Environmental Stewardship*, ERR-64, Sept. 2008, http://www.ers.usda.gov/publications/err64/.

[11] Ibid. Also see USDA, *2007 Farm Bill, Conservation and Environment Theme Paper*, June 2006, at http://www.usda.gov/documents/FarmBill07consenv.pdf; and Ribaudo, M. and C. Jones, "Environmental Credit Trading: Can Farming Benefit," *Amber Waves*, USDA's Economic Research Service, Feb. 2006.

These impediments include but may not be limited to:

- uncertainty quantifying, measuring, and valuing credits;
- low demand for or discounted value of credits from agricultural sources because of uncertainty about the measurement and value of these credits;
- low participation in the farm and forestry sectors due to uncertainty over the value of environmental credits compared to the cost of pollution abatement;
- reluctance by farmers and landowners to participate in a regulatory-based program;
- small quantity of benefits that can be provided by individual farmers or landowners;
- high transaction costs;
- performance risks and liability;
- lack of information about program benefits and how to participate;
- lack of monitoring and enforcement; and
- uncertainty about whether conservation and environmental improvements that were initially funded through other publicly funded programs, such as cost-share programs administered by USDA, will be allowed to be traded.

What Is the Recent Congressional Action?

Enacted 2008 Farm Bill

The 2008 farm bill (P.L. 110-246, the Food, Conservation, and Energy Act of 2008) contains a new conservation provision that seeks to facilitate the participation of farmers and landowners in environmental services markets by directing USDA to develop technical guidelines for measuring farm- and forestry-based environmental services. This provision focuses first on carbon storage and indirectly references various agriculture and forestry provisions in some legislative initiatives that are being considered as part of the broader climate change debate, which have highlighted the perceived need for uniform standards and ways of measuring emissions reduction and increases in carbon storage in the agriculture and forestry sectors.

In the managers report on the 2008 farm bill, the conferees state that "the largest barrier to participation [in emerging environmental services markets] is the lack of standards and accounting procedures that make transparent the benefits that are being produced and marketed." To address this concern, the enacted bill contains a new provision in the bill's conservation title that seeks to "establish technical guidelines that outline science-based methods to measure the environmental services benefits from conservation and land management activities in order to facilitate the participation of farmers, ranchers, and forest landowners in emerging environmental services markets" (Sec. 2709, Environmental Services Markets).

The intended purpose of these technical guidelines is to develop (1) a procedure to measure environmental services benefits; (2) a protocol to report environmental services benefits; and (3) a registry to collect, record, and maintain data on the benefits measured. The provision also

requires that USDA provide guidelines for establishing a verification process as part of the protocol for reporting environmental services, but it allows USDA to consider the role of third parties in conducting independent verification. In carrying out this directive, USDA is directed to work in consultation with other federal[12] and state government agencies, nongovernmental interests,[13] and other interested persons as determined by USDA.

The inclusion of this provision could expand the scope of existing farmland conservation programs by facilitating the development of private-sector markets for a range of environmental goods and services from farmers and landowners. Although the provision covers a range of farm and forestry services, including improved water and air quality, increased carbon storage, and habitat protection, among other types of environmental services, it explicitly gives priority to first establishing guidelines related to participation in carbon markets.

Both the House- and Senate-passed farm bills (H.R. 2419) proposed versions of this provision in their respective bills. Although the two versions differed in scope and in overall approach, both were similar in their intent to establish a framework to develop consistent standards and processes for quantifying farm- and forestry-based environmental services. The House-passed provision (Sec. 2407) proposed to establish a USDA-led Environmental Services Standards Board, which would provide contracts, cooperative agreements, and grants to develop consistent standards and processes for quantifying environmental benefits from the farm and forestry sectors, thus establishing a framework to develop such standards and processes.[14] The Senate-passed version (Sec. 2406) also directed USDA to establish a framework to develop consistent standards and processes that would facilitate the marketability of farm- and forestry-based environmental services, but differed in that it directed USDA to "give priority" to providing assistance to farmers and landowners participating in carbon markets. The Senate version differed also in that it called for a "collaborative" process involving governmental and nongovernmental representatives. It also required a series of progress reports to Congress, which were subsequently not included in the enacted bill.

The House, Senate and conference versions of this provision differed in terms of funding. For FY2008-FY2012, the House bill authorized $50 million to be appropriated for this provision, whereas the Senate bill authorized such sums as are necessary annually. However, the enacted bill does not specifically address funding; instead, the manager's report states that USDA is expected to "fulfill the intent of this section with resources available to the Department." In contrast, USDA's farm bill recommendations requested authorization of $50 million in mandatory funds to cover the types of tasks addressed in this provision.

In December 2008, USDA announced it would create a federal government-wide "Conservation and Land Management Environmental Services Board" to assist USDA with the "development of

[12] In the House- and Senate-passed versions of this provision, other federal agencies were identified as including the Departments of Interior, Energy, Commerce, and Transportation; the Environmental Protection Agency; and the Army Corps of Engineers.

[13] Identified as including farm, ranch, and forestry producers; financial institutions involved in environmental services trading; and institutions, nongovernmental organizations, and private sector representatives with relevant expertise or experience.

[14] The House provision is similar to that proposed by USDA as part of its farm bill recommendations. See USDA, *USDA's 2007 Farm Bill Proposals*, Jan. 31, 2007, at http://www.usda.gov/documents/07finalfbp.pdf; USDA, *2007 Farm Bill, Conservation and Environment Theme Paper*, June 2006, at http://www.usda.gov/documents/FarmBill07consenv.pdf.

new technical guidelines and science-based methods to assess environmental service benefits which will in turn promote markets for ecosystem services including carbon trading to mitigate climate change."[15] A federally chartered public advisory committee will advise the board, and will include farmers, ranchers, forest landowners, and tribal representatives, as well as representatives from state natural resource and environmental agencies, agriculture departments, and conservation and environmental organizations. USDA's press release also announced that USDA was establishing a new Office of Ecosystem Services and Markets (OESM), which will be located within the Office of the Secretary. OESM will provide administrative and technical assistance in developing the uniform guidelines and tools needed to create and expand markets for ecosystem services in the farming and forestry sectors. At a May 2009 briefing, USDA's Sally Collins indicated that official meetings and proceedings of the USDA-led Environmental Services Board, as well as formal actions within OESM, have been delayed by leadership changes due to the Administration's transition.[16]

Climate Change Legislation

Aside from the 2008 farm bill, other legislative initiatives might also facilitate the development of environmental services markets involving the farm and forestry sectors—particularly in the areas of carbon storage and emissions reduction—as part of the ongoing climate change debate. Starting in the 110th Congress, Congress debated a range of climate change policy options that would have either mandated or authorized a cap-and-trade program to reduce greenhouse gas (GHG) emissions.[17] These actions have continued in the 111th Congress. Some proposals dovetail with provisions enacted as part of the 2008 farm bill, including a provision that directs USDA to develop guidelines and standards for quantifying carbon storage by the agriculture and forestry sectors, among other farm bill provisions that indirectly encourage emissions reductions and carbon capture and storage.

The current cap-and-trade proposals would not require emission reductions in the agriculture and forestry sectors. However, many of these proposals would allow for regulated entities (e.g., power plants) to purchase carbon offsets, including those generated in the agriculture and forestry sectors.[18] The inclusion of these provisions as part of a cap-and-trade framework could provide financial incentives to encourage additional land-based conservation activities involving the agriculture and forestry sectors. For example, the provisions could allow farmers and landowners to participate in this emerging market by generating (and selling) carbon offsets and credits associated with carbon capture and storage, emissions reductions, and/or other implemented environmental improvements on their farm or forested lands. These allowances and credits could be sold to regulated facilities (e.g., power plants) covered by a cap-and-trade program to meet their emission reduction obligations. Under some cap-and-trade proposals, certain segments of the agriculture and forestry sectors also might receive proceeds from the sale of allowances,

[15] USDA, "USDA Announces New Office of Ecosystem Services and Markets," Release No. 0307.08, Dec. 18, 2008.

[16] Statements by Sally Collins, Director of USDA's Office of Ecosystem Services and Markets, to National Capital Society of American Foresters: Luncheon and Program, May 14, 2009.

[17] A cap-and-trade program provides a market-based policy tool for reducing emissions by setting a cap or maximum emissions limit for certain industries. Sources covered by the cap can choose to reduce their own emissions, or can choose to buy emission credits that are generated from reductions made by other sources.

[18] In the context of these legislative proposals, a carbon offset is a measurable avoidance, reduction, or sequestration of carbon dioxide (CO_2) or other GHG emissions, expressed in carbon-equivalent terms.

credits, and auctions to further promote and support activities in these sectors that reduce, avoid, or sequester emissions.[19]

Many of these bills contain language highlighting the perceived need for uniform standards and ways of measuring emissions reduction and increases in carbon storage in the agriculture and forestry sectors. Such initiatives generally stipulate that measurements of emissions reductions and carbon uptake should be real, verifiable, additional, permanent, and enforceable. However, there is considerable uncertainty about the accuracy of measuring and verifying emissions reductions and carbon storage using various forestry and agricultural and land management practices. This uncertainty has led some to question the potential for carbon offset projects in the agriculture and forestry sectors, but these types of projects are nonetheless being considered as part of a cap-and-trade program. The new conservation provision in the 2008 farm bill (see previous section) that seeks to establish technical standards and accounting procedures for environmental services generated in the agriculture and forestry sectors is intended to address such measurement, verification, and monitoring issues.

For more information, see CRS Report R40896, *Climate Change: Comparison of the Cap-and-Trade Provisions in H.R. 2454 and S. 1733*, and CRS Report RS22834, *Agriculture and Forestry Provisions in Climate Change Bills in the 110th Congress*. For information on the measurement, verification, and monitoring challenges in the agriculture and forestry sectors in the context of evolving carbon markets, see CRS Report RS22964, *Measuring and Monitoring Carbon in the Agricultural and Forestry Sectors*.

For other general information on the current GHG policy debate and legislative proposals, see CRS Report R40896, *Climate Change: Comparison of the Cap-and-Trade Provisions in H.R. 2454 and S. 1733*, and CRS Report R40556, *Market-Based Greenhouse Gas Control: Selected Proposals in the 111th Congress.*

Other Related Actions

A separate provision enacted as part of the Energy Independence and Security Act of 2007 (P.L. 110-140) directs the Department of the Interior to conduct a national assessment and a methodology to assess carbon sequestration and emissions from ecosystems (Section 712, "Assessment of Carbon Sequestration and Methane and Nitrous Oxide Emissions from Ecosystems"). Once completed, this assessment will provide additional information regarding the two primary greenhouse gases associated with agricultural practices: methane and nitrous oxide.

DOI's national assessment will address the quantity of carbon stored in and released from ecosystems, and the annual flux of covered greenhouse gases in and out of ecosystems. The methodology to assess carbon sequestration and emissions from ecosystems will cover measuring, monitoring, and quantifying GHG emissions and reductions, and provide estimates of sequestration capacity and the mitigation potential of different ecosystem management practices. Identified components of the national assessment are (1) determining the processes that control the flux of covered greenhouse gases in and out of each ecosystem; (2) estimating the potential for increasing carbon sequestration in natural and managed ecosystems through management

[19] In the context of these legislative proposals, a set-aside allowance refers to a set percentage of available allowances under the overall emissions cap that is allocated to non-regulated entities, in this case domestic agriculture and forestry entities.

activities or restoration activities in each ecosystem; (3) developing near-term and long-term adaptation strategies or mitigation strategies that can be employed; and (4) estimating the annual carbon sequestration capacity of ecosystems under a range of policies in support of management activities to optimize sequestration.

In conducting its assessment and developing the underlying methodology for the assessment, EISA directs DOI to consult with other agencies, including USDA, EPA, the Department of Energy, the Department of Commerce, and other relevant agencies. DOI is directed to develop its methodology for conducting the assessment, and then to release its national assessment. To date, the report has not yet been released.

What Are Some Possible Considerations?

Among the principal questions regarding the inclusion of these types of provisions as part of any major legislative initiative is whether the agriculture and forestry sectors can effectively provide environmental goods and services along with the more traditional food, fiber, and other services these sectors already provide. The inclusion of these provisions could also raise certain procedural or implementation questions as Congress debates future farm policy or as it continues to consider the role of the agriculture and forestry sectors in climate change legislation.

- **Standards-setting process/implementation.** Aside from establishing the board discussed earlier, how will USDA implement its new farm bill directive for establishing uniform standards, accounting procedures, protocols, and registries for quantifying farm- and forestry-based environmental services? Can USDA accomplish its task using available agency resources?
- **Jurisdictional issues.** What are the advantages of establishing USDA as the lead role? What lead role will USDA play, given the mostly regulatory authority and statutory obligations of other likely participating federal agencies? Might putting USDA as the lead create conflict of interest as both the regulator and promoter of standards? Are there other jurisdictional issues, such that this provision needs to be referred to other authorizing congressional committees? How might existing state and local programs implemented by other agencies be affected? How will the collaborative effort between USDA and the other participating federal agencies be put into practice? How will disagreements be addressed and resolved among all federal partners?
- **Consistency with existing and possible future authorities and initiatives.** Will the agreed-upon decisions and standards resulting from such an effort be binding among all federal agencies? What assurances are there that these decisions will not override the authorizing legislation regulating water and air quality, and wildlife habitat? Will regulatory agencies with authorizing legislation have the flexibility to not adopt the standards authorized by the board or other collaborative process, if they violate the individual agencies' authorizing statutes, or contain regulations, such as measurement protocols? What are the possible implications if these decisions and standards are inconsistent with other existing regulatory guidelines and authorities? Will such a standard-setting framework and the agreed-upon standards be consistent with, or readily adapted to, other possible future regulatory initiatives, such as those involving climate change? If possible future climate change initiatives do not provide for carbon offsets and

credits from the agriculture and forestry sector, will the agreed-upon standards be enforceable within the existing voluntary carbon market? What are the potential implications if these decisions and standards are inconsistent with other possible forthcoming regulatory guidelines and authorities?

- **Standards.** Will uniform standards be national, regional, local, or site-specific in scope? How will uniform standards address differences within different production areas, types of resources, and ecosystems? Will established protocols and management practices take into account these differences? Will these standards consist of an assigned value? Given the wide range in the types of environmental services, how will outcomes or benefits be measured and expressed as standards? Will there be penalties for non-compliance?
- **Federal versus marketplace functions.** What roles should government agencies play in actually establishing environmental services markets involving agriculture and forestry? What roles will be strictly within the purview of the private-sector and independent credit markets? Is there a federal role beyond developing the reporting and credit registries that would require the board to act as intermediary between sellers and buyers? Who will be responsible for oversight of third party verification and certification, and for assigning market value to tradable credits within an environmental services market? Will the federal agencies play a role in market oversight, enforcement, risk management, and capital investment? What other types of federal assistance may be needed to further facilitate the development of environmental services markets?
- **Congressional reporting/timeline.** How and when will the agencies involved in setting standards be expected to report their accomplishments to Congress? Should reporting requirements be included as part of these provisions?
- **Market barriers.** How effectively do the current proposals address the types of barriers that have been identified by USDA and others that may prevent the development of environmental goods and services markets?
- **Possible unintended consequences.** Might establishing a market-based approach shift governmental and/or industry priorities away from addressing more serious environmental problems by allowing some industrial facilities to buy relatively lower-cost farm-based carbon credits rather than pay for on-site pollution abatement at the facility? Might a market-based program shift USDA resources away from established farm conservation programs?

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