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A Comparative Analysis of Accountability Mechanisms for Ecosystem Service Markets in the US and the EU

Robert L. Glicksman* & Thoko Kaime**

Abstract:

Markets in ecosystem services have the potential to provide financial incentives to protect the environment either in lieu of or in addition to more traditional regulatory programmes. If these markets function properly, they can provide enhanced levels of environmental quality or more efficient mechanisms for protecting natural resources that provide vital services to humans. The theoretical benefits of ecosystem services markets may be undercut, however, if care is not taken in creating the legal infrastructure that supports trading to ensure that trades actually provide the promised environmental benefits. This article identifies five essential pillars of an ecosystem services market regime that are necessary to provide operational accountability safeguards. These include financial safeguards, verifiable performance standards, transparency and public participation standards, regulatory oversight mechanisms, and rule of law safeguards. The article assesses whether US and EU laws are well designed to provide such accountability. It concludes that despite recognition of the risk of market manipulation and outright fraud, regulators in the US and the EU to date have responded to these risks largely in ad hoc and incomplete fashion, rather than embedding the mechanisms for operation accountability discussed in this article into the regulatory framework that governs ecosystem services trading markets.

Keywords:

Markets for Ecosystems Services; Accountability; Safeguards; Legitimacy; Payments for Ecosystems Services

1. INTRODUCTION

The role of market-based mechanisms in environmental law has increased significantly since economists began entreating policymakers in the 1970s to rely on incentive-based techniques rather than solely on more traditional forms of regulation. Market-based components of environmental regulatory and natural resource management programmes have proliferated, in domestic United States (US) and European Union (EU) environmental regulatory programmes as well as in international environmental law agreements such as the Kyoto Protocol.¹ There is now sufficient experience with market-based mechanisms to assess both their potential for enhancing the efficiency of

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¹ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto (Japan), 11 Dec. 1997, in force 16 Feb. 2005, available at: http://unfccc.int/kyoto_protocol/items/2830.php.

environmental protection efforts and the risks they pose to the effectiveness of those efforts. On the one hand, the promise of market-based mechanisms is illustrated by programmes such as the US Clean Air Act's (CAA) acid deposition control marketable permit scheme,² which has achieved pollution reductions at a lower cost than would have occurred if trading had not been permitted. Another example of such a mechanism is the EU Emissions Trading System (ETS).³ Launched in 2005, it is the cornerstone of the EU's policy to combat climate change and a key tool for reducing industrial greenhouse gas (GHG) emissions cost-effectively by providing a platform for the trading of those emissions. On the other hand, widespread fraud has characterized the operation of other such programmes, highlighting the need for policymakers to build safeguards into market-based environmental regulatory programmes to minimize opportunities for participants to exploit them for financial gain at the expense of the broader public interest.⁴

This article focuses on the role of markets in protecting ecosystem services - an area in which momentum for increased reliance on market-based programmes has grown. In particular, it addresses the need to incorporate into any market-based approach mechanisms that protect against fraud and abuse, while preserving the potential for these programmes to facilitate buy-in by those whose activities threaten ecosystem integrity and to provide cost-efficient means of protection. Drawing on experiences in both the US and the EU, the article provides examples of past abuses of market-based environmental regulatory programmes to underscore the need for careful design of these programmes. It then discusses five forms of operational accountability to mitigate such abuses, including financial safeguards, verifiable performance standards, transparency and participatory mechanisms, oversight techniques, and rule of law guarantees. To date, neither US nor EU ecosystem services trading programs systematically rely on each of these mechanisms to protect the integrity of trading programs. We argue that used in combination, these operational safeguards could significantly increase the chances of realizing the efficiency benefits of the operation of markets while preventing behaviour that subordinates environmental public policy goals to manipulative private gain.

2. ECOSYSTEM SERVICES AND THE PROMISE OF MARKETS

The Millennium Ecosystem Assessment defines ecosystem services as the benefits that people obtain from natural ecosystems.⁵ Similarly, Gretchen Daily describes these services as 'the conditions and processes through which natural ecosystems . . . sustain and fulfill human life.'⁶ Following the lead of the Millennium Ecosystem Assessment, ecosystem

² 42 U.S.C. §§ 7651-7651o.

³ Directive 2003/87/EC establishing a Scheme for Greenhouse Gas Emission Allowance Trading Within the Community and Amending Directive 96/61/EC [2003] OJ L275/32.

⁴ Operation of the EU's emissions trading program for GHGs has also been hampered by a drop in the price of allowances. To the extent that this kind of market impact on emissions trading programs is not due to manipulation and fraudulent trades, it is beyond the scope of this article.

⁵ K. Chopra et al (eds.), *Millennium Ecosystem Assessment, Ecosystems and Human Well-being: Policy Responses* (2005), available at: <http://www.maweb.org/documents/document.772.aspx.pdf>, vol. 3, at p. vii.

⁶ D. Goble, 'What Are Slugs Good For? Ecosystem Services and the Conservation of Biodiversity' (2007) 22(2) *Journal of Land Use and Environmental Law*, pp. 411-40, at 423, quoting G. Daily, *Nature's Services: Societal Dependence On Natural Ecosystems* (Island Press, 1997), at p. 3. See also J.B. Ruhl, 'Ecosystem Services and Federal Public Lands: Start-up Policy Questions and Research Needs' (2010) 20(2) *Duke Environmental Law and Policy Forum*, pp. 275-90, at 275-6 ('Ecosystem services are the economic benefits humans derive from the ecosystem structure and processes that form what might be thought of as natural capital.').

services are often broken down into four categories: supporting, provisioning, regulating, and cultural services.⁷ As James Salzman explains:

“ [t]he concept behind ecosystem services is very simple—the environment offers critically important services for free that, if we had to pay for substitutes in markets, would command extremely high prices. Government policies that recognize this basic fact, and that focus on landscape management to ensure and provide services, could result in increased social welfare [...].⁸”

Increasingly, policymakers not only recognize the value of the services provided to humans by nature, but also seek to protect those valuable services through regulatory programmes that seek to take advantage of the operation of markets by commoditizing such services. ‘[i]n principle, markets help to ensure that choices are economically efficient.’⁹ The proponents of markets in ecosystem services argue that creating markets for trades in ecosystem services may convince those otherwise skeptical of the desirability of protecting critical resources, including those whose land contains those resources, that protection can benefit them economically as well as fostering the broader public good. As Barton Thompson puts it:

“the goal is to encourage people to think of conservation as a ‘private good’ that benefits them as any other good or service might and in which they should invest, rather than as a ‘public good’ that should be supported by governmental funding or private donations because it is the environmentally ‘correct’ thing to do.¹⁰”

Payments for ecosystem services can take place in a variety of contexts, including business-to-business deals, the development of mitigation markets, the provision of government subsidies, and competitive grant programmes.¹¹ All of these mechanisms seek to channel some of the benefits of environmental protection to the landholders with control over the fate of the resources being protected.¹² Landowners may receive income from agreeing not to develop or impair resources they control either from the government or from other private landowners who purchase development ‘credits’. These credits enable purchasers to engage in development or other activities that otherwise would have been precluded in exchange for the offsetting protections afforded by the development restrictions agreed to by the sellers.¹³

⁷ K. Chopra et al, n. 5 above, at 3.

⁸ J. Salzman, ‘Creating Markets for Ecosystem Services: Notes from the Field’ (2005) 80(3) *New York University Law Review*, pp. 870-961, at 877.

⁹ M. Smith et al (eds.), *Establishing Payments for Watershed Services* (IUCN, 2006), at p. 39, available at: <http://data.iucn.org/dbtw-wpd/edocs/2006-054.pdf>.

¹⁰ B. Thompson, ‘Ecosystem Services and Natural Capital: Reconceiving Environmental Management’ (2008) 17(1) *New York University Environmental Law Journal*, pp. 460-89, at 475.

¹¹ J. Salzman, ‘What is the Emperor Wearing? The Secret Lives of Ecosystem Services’ (2011) 28(2) *Pace Environmental Law Review*, pp. 591-613, at 602-3.

¹² C. Giupponi et al, ‘A Pilot Study on Payment for Ecological and Environmental Services in Lashai Nature Reserve, China,’ in P. Kumar & R. Muradian, *Payments for Ecosystem Services* (Oxford University Press, 2009), pp. 110-43, at 111.

¹³ D. Hirsch, ‘Trading in Ecosystem Services: Carbon Sinks and the Clean Development Mechanism’ (2007) 22(2) *Journal of Land Use and Environmental Law*, pp. 623-39, at 634. See also J.B. Ruhl, ‘Agriculture and Ecosystem Services: Strategies for State and Local Governments’ (2008) 17(1) *New York University Environmental Law Journal*, pp. 424-59, at 434-5 (discussing ‘incentive programmes . . . designed to compensate farmers for enhancing the flow of regulating ecosystem services above [a prescribed] baseline to identified off-farm populations and areas. For example, if riparian buffers and onsite recharge features were not required under the baseline, providing them would entitle a farmer to some compensatory benefit in return.’).

In short, ‘the value of the ecosystem products (services) is tied to a regulatory requirement to offset damages or measures to prove environmental performance.’¹⁴

3. EXISTING ENVIRONMENTAL MARKETS AND PAST ABUSES

3.1. Examples of Markets for Ecosystem Services

One of the first prominent examples of the use of a marketable permit or emissions trading scheme as a component of a US federal environmental regulatory programme was the emissions trading programme designed to abate acid deposition that was adopted as part of the Clean Air Act (CAA) amendments of 1990.¹⁵ That programme is widely regarded as having achieved reductions in harmful sulfur dioxide (SO₂) emissions at significantly lower costs than predicted at the time the programme was adopted, or than could have been achieved solely through traditional, source-by-source regulation.¹⁶ Based perhaps on the perceived success of that programme, market-based programmes began to appear in other US regulatory contexts, including not only pollution control programmes such as the one for acid deposition control,¹⁷ but also habitat and ecosystem preservation programmes.¹⁸

The market that has developed for the protection of wetlands is perhaps ‘the most mature and robust ecosystem service market in the United States.’¹⁹ Section 404 of the federal Clean Water Act (CWA) restricts the development of privately owned wetlands, requiring a permit from the US Army Corps of Engineers that is supposed to include potentially costly protective measures,²⁰ including a commitment to provide compensatory mitigation for unavoidable wetlands losses.²¹ Developers may meet mitigation requirements by creating wetlands elsewhere or by purchasing credits from the sponsors of mitigation banks, which ‘typically involve larger, more ecologically valuable parcels, and more rigorous scientific and technical analysis, planning and implementation than permittee-responsible mitigation.’²² Private entrepreneurs have created ‘banks’ of preserved wetlands which are marketed as credits to land developers, who may meet their CWA section 404 obligations by using the credits they purchase to compensate for (or offset) the adverse impacts of wetlands

¹⁴ D. Cooley & L. Olander, ‘Stacking Ecosystem Services Payments: Risks and Solutions’ 42(2) *Environmental Law Reporter*, pp. 10150-65, at 10150-1.

¹⁵ 42 U.S.C. §§ 7651-7651o.

¹⁶ See, e.g., P. Womble & M. Doyle, ‘The Geography of Trading Ecosystem Services: A Case Study of Wetland and Stream Compensatory Mitigation Markets’ (2012) 36(1) *Harvard Environmental Law Review*, pp. 229-96, at 234. By one account, the acid deposition control programme ‘changed the way that policymakers thought about environmental regulation by creating a model within which every measureable unit of environmental improvement had economic value.’ A. Davis, ‘Ecosystem Services and the Value of Land’ (2010) 20(2) *Duke Environmental Law and Policy Forum*, pp. 339-84, at 347.

¹⁷ 42 U.S.C. §§ 7651-7651o.

¹⁸ See, e.g., J.B. Ruhl, ‘Keeping the Endangered Species Act Relevant’ (2009) 19(2) *Duke Environmental Law and Policy Forum*, pp. 275-93, at 291-2 (discussing the use of conservation banking to protect endangered species habitat).

¹⁹ Womble & Doyle, n. 16 above, at 235.

²⁰ 33 U.S.C. § 1344(a).

²¹ 33 C.F.R. §§ 332.1 to 332.8 (US Army Corps of Engineers regulations governing compensatory mitigation for loss of aquatic resources).

²² 33 C.F.R. § 332.3(b)(2).

development in which they engage.²³ By 2009, several hundred wetlands mitigation banks were operating in the US, each of which sold credits to land developers whose purchases allowed them to satisfy regulatory mitigation requirements.²⁴ Wetland mitigation banking reportedly accounts for more than 30 % of all regulatory mitigation conducted under the CWA section 404 permit programme.²⁵ Developers also may meet compensatory mitigation requirements by purchasing credits from governmental entities or non-governmental organizations (NGOs) that operate in-lieu fee programmes. The compensatory mitigation obligations of permittee/credit purchasers is transferred to the in-lieu programme sponsor.²⁶ These markets in compensatory wetlands mitigation have become ‘a mainstream way’ to meet CWA regulatory requirements.²⁷

A second significant US ecosystem services market is tied to regulatory requirements under the federal Endangered Species Act (ESA). Section 10 of that statute prohibits the taking of members of an endangered species,²⁸ and the US Supreme Court has upheld an Interior Department regulations defining a ‘taking’ to include some forms of habitat modification.²⁹ The statute authorizes the agencies that administer the law, the US Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), to issue a permit for any taking that ‘is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.’³⁰ However, the agencies may not issue such an incidental take permit unless, among other things, they conclude that the permit applicant (such as a private landowner whose property includes habitat of a listed species) ‘will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.’³¹

That set of statutory provisions has generated a ‘conservation banking’ programme whose goals and operation are analogous to the wetlands mitigation banking programme that has developed in connection with the CWA section 404 wetlands protection requirements. If one landowner voluntarily agrees to conserve habitat, she may generate and sell credits (usually measured in acres of affected habitat) to others to enable them to meet the requirements for issuance of an incidental take permit. This mechanism has developed into ‘the mitigation method of choice’ under the statute.³² As one report noted:

²³ Womble & Doyle, n. 16 above, at 235-6. See also J.B. Ruhl & R. Juge Gregg, ‘Integrating Ecosystem Services into Environmental Law: A Case Study of Wetlands Mitigation Banking’ (2001) 20(2) *Stanford Environmental Law Journal*, pp. 365-92, at 365-6 (‘In wetlands mitigation banking, a “bank” of wetlands habitat is created, restored, or preserved and then made available to developers of wetlands habitat who must “buy” habitat mitigation as a condition of federal government approval for development in wetland areas.’); L. Wainger et al., ‘Wetland Value Indicators for Scoring Mitigation Trades’ (2001) 20(2) *Stanford Environmental Law Journal*, pp. 413-78, at 414 (‘Under this banking mechanism, land developers must either purchase credits from specific mitigation banks or pay into “in-lieu fee” trust funds in order to receive permits to alter wetlands.’).

²⁴ J.B. Ruhl, J. Salzman & I. Goodman, ‘Implementing the New Ecosystem Services Mandate of the Section 404 Compensatory Mitigation Program: A Catalyst for Advancing Science and Policy’ (2009) 38(2) *Stetson Law Review*, pp. 251-72, at 254.

²⁵ *Ibid.*, at 255.

²⁶ 33 C.F.R. § 332.2.

²⁷ M. Walls & A. Riddle, *Biodiversity, Ecosystem Services, and Land Use: Comparing Three Federal Policies* (Resources for the Future, 2012), at p. 9, available at: <http://www.rff.org/RFF/Documents/RFF-DP-12-08.pdf>.

²⁸ 16 U.S.C. § 1538(a)(1)(B).

²⁹ *Sweet Home Chapter of Communities for a Great Oregon v. Babbitt*, 515 US 687 (1995).

³⁰ 16 U.S.C. § 1539(a)(1)(B).

³¹ 16 U.S.C. § 1539(a)(2)(B)(iii).

³² J.B. Ruhl, n. 18 above, at 291-2.

“[t]hrough regulation, government creates a demand for biodiversity that government, the private sector, or non-profits can supply. Because the suppliers can sell credits to regulated parties that need to find appropriate mitigation for their impacts, the law thus provides a financial incentive to permanently protect endangered species habitat.³³”

Other, more recently created or less fully developed, ecosystem service markets in the US include watershed payment programmes and water quality trading programmes under the CWA that are designed to facilitate improvements in impaired surface water quality,³⁴ and fish catch-share programmes that allow the sale of rights to catch specified amounts of the total allowable catch of a fishery in areas where fisheries are depleted.³⁵

Tradable permit markets have also emerged in the EU. Perhaps the best-known example is the ETS,³⁶ which has been in operation since 2005, and is regarded as the first international trading system for carbon dioxide (CO₂) emissions in the world.³⁷ The ETS is a cap-and-trade system, which caps the overall level of emissions allowed; within that limit it allows participants in the system to buy and sell permits as they require. The paper discusses some of the operational accountability challenges faced by the ETS in subsequent sections.

Another significant European mechanism is the EU’s Common Agricultural Policy (CAP)³⁸ and its related agri-environmental measures (AEMs).³⁹ Although the CAP is principally an agricultural framework, its AEMs provide incentives to encourage farmers to protect and enhance the environmental attributes of their farmland.⁴⁰ Under these measures, farmers are paid in return for the provision of an environmental service. Service contracts are signed with a domestic public regulator and farmers are paid for the additional cost of implementing such commitments and for loss of income due, for example, to reduced production. The two main objectives are to reduce environmental risks and to preserve nature

³³ B. Madsen et al (eds.), *State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide* (Ecosystem Marketplace, 2010), at p. 2, available at: <http://www.ecosystemmarketplace.com/documents/acrobat/sbdmr.pdf>.

³⁴ See T. Stanton et al (eds.), *State of Watershed Payments: An Emerging Marketplace* (Ecosystem Marketplace, 2010), available at: http://www.foresttrends.org/documents/files/doc_2438.pdf; Davis, n. 16 above, at 357 (noting that ‘trading programs which enable potentially liable parties [for impaired water bodies] to purchase offsets are in development across the country’).

³⁵ Davis, n. 16 above, at 355.

³⁶ EU ETS, n. 3 above .

³⁷ See A.D. Ellerman & B.K. Buchner, ‘The European Union Emissions Trading Scheme: Origins, Allocation, and Early Results’ (2007) 1(1) *Review of Environmental Economics and Policy*, pp. 66-87; J. Kruger, W.E. Oates & W.A. Pizer, ‘Decentralization in the EU Emissions Trading Scheme and Lessons for Global Policy’ (2007) 1(1) *Review of Environmental Economics and Policy*, pp. 112-33.

³⁸ A. Oskam. ‘Understanding the Common Agricultural Policy’ (2012) 39(4) *European Review of Agricultural Economics*, pp. 735-8; W. Grant ‘Policy Instruments in the Common Agricultural Policy’ (2010) 33(1) *West European Politics* , pp. 22-38.

³⁹ See V. Beckmann, J. Eggers & E. Mettepenningen, ‘Deciding How to Decide on Agri-Environmental Schemes: The Political Economy of Subsidiarity, Decentralisation and Participation in the European Union’ (2009) 52(5) *Journal of Environmental Planning and Management*, pp. 689-716; T.L. Dobbs & J. Pretty, ‘Case Study of Agri-Environmental Payments: The United Kingdom’ (2008) 65(4) *Ecological Economics*, pp. 765-75.

J. Poláková et al, ‘Addressing Biodiversity and Habitat Preservation through Measures Applied under the Common Agricultural Policy’ (Institute for European Environmental Policy, 2011), available at: http://ec.europa.eu/agriculture/analysis/external/biodiversity-protection/full_text_en.pdf.

⁴⁰ European Commission, *Our Life Insurance, Our Natural Capital: An EU Biodiversity Strategy to 2020*, COM(2011)244), Annex outlining proposals that the European Commission will propose that CAP direct payments will reward delivery of environmental public goods.

and cultivated landscapes. AEMs go beyond usual good farming practice⁴¹ -- the standard legal obligations and levels of environmental care that each farmer routinely has to comply with, compiled in 'regional' codes submitted by Member States to the European Commission for approval. Some AEMs concern productive land management, such as input reduction which includes reduction of fertilizers and plant protection products, crop rotation measures, organic farming, extensification of livestock, conversion of arable land to grassland, under-sowing, cover crops, farmed buffer strips, prevention of erosion and fire and rotation measures, and actions such as late mowing in areas of special biodiversity/natural interest. Also considered are measures that enhance genetic diversity, maintenance of existing sustainable and extensive systems, farmed landscapes, and water use reduction measures. Other AEMs concern non-productive land management, such as setting aside land, upkeep of abandoned farmland and woodland, and upkeep and maintenance of the countryside and landscape features.

Ecosystems service markets have also emerged in connection with the implementation of international environmental agreements. One example of such an ecosystem service market is the Clean Development Mechanism (CDM) developed as part of the Kyoto Protocol.⁴² Article 12 of the Protocol allows parties to receive credits for participation in projects certified on the basis of their capacity to produce 'real, measurable, and long-term benefits to the mitigation of climate change.' Among the projects capable of meeting these requirements are renewable energy initiatives and carbon sequestration efforts. In particular, developing countries could expand forests that sequester carbon as a means of generating credits that could then be sold to developed countries to help the latter meet their GHG emission reduction obligations more efficiently than they could have done by pursuing emission control or other technological solutions.⁴³ In 2010, one observer described the market for GHG offsets as 'large and rapidly growing,' although forest carbon offsets accounted for a relatively small percentage of the value of all trades.⁴⁴

3.2. Abuses of Ecosystem Service and Related Markets

As experience with the US CAA's deposition control programme demonstrates, the operation of markets in ecosystem services has the potential to achieve ecosystem protection goals at a lower cost than more traditional regulatory techniques. However, these opportunities for efficient environmental protection and improvement are accompanied by risks. One risk is that those who generate and get paid for credits will not follow through with their commitments, creating compensatory wetlands, for example, that do not provide the same levels of ecosystem services as those that are developed as a result of a trade. Participants in environmental markets also may engage in market manipulation or outright fraud, thwarting the goals of the particular regulatory programmes to which ecosystem markets are attached and more generally undercutting the legitimacy of markets in ecosystem services. Market participants who claim to have generated tradable credits may seek to be paid for environmental protections and improvements that would have occurred even without the sale of credits if, for example, these results are required independently by other regulatory

⁴¹ Dobbs et al, n. 43 above, at 766.

⁴² See generally M. Wara, 'Measuring the Clean Development Mechanism's Performance and Potential' (2008) 55(6) *UCLA Law Review*, pp. 1759-803.

⁴³ D. Hirsch, n. 13 above, at 625-6.

⁴⁴ Davis, n. 16 above, at 353-4.

programmes (creating an ‘additionality’ problem).⁴⁵ They may seek payment for improvements for which they have already been compensated (‘double-dipping’). They may even claim credit for having made improvements or provided protections that never occurred (‘paper’ or ‘phantom’ trade transactions).⁴⁶ An assessment of one relatively early US emissions trading programme characterized it as ‘plagued by . . . institutional manipulation.’⁴⁷ William Rodgers dubbed the CDM an ‘unmitigated disaster.’⁴⁸ The problem is that trading programmes ‘create strong[] incentives to manipulate the numbers and cheat, because credits that are fraudulently created are still worth money.’⁴⁹ Described below are four examples of environmental markets gone bad, each of which involved egregious manipulation of the currencies created by trading programmes.

The first example of marketable permits running amok, arose under a state pollutant emissions trading programme operated by the state of California, US. The south coast of California has long been plagued by unhealthy levels of air pollution, particularly smog, generated by a mix of stationary source and vehicle emissions. In an effort to tackle the longstanding surface-level ozone problem, state regulators adopted Rule 1610, also known as the ‘car scrapping programme.’ Rule 1610 allowed factories to avoid installing expensive pollution control equipment by purchasing pollution credits generated by destroying old, high-polluting cars (and measured by the projected avoided emissions from the destroyed vehicles). The hope was that pollution could be controlled at a much lower cost by taking high-polluting older vehicles off the road than by requiring factories to curtail smokestack emissions through technological fixes.⁵⁰ The programme encountered multiple difficulties. For one, many of the cars whose avoided emissions generated credits were already at the end of their useful lives, and were destined for the scrap heap anyway. Worse yet, some of those who generated and sold credits by allegedly taking old vehicles out of circulation actually failed to destroy them. Instead, they crushed the bodies of the cars whose avoided emissions generated valuable credits and sold many of the engines for reuse in other cars still on the roads.⁵¹ The result was that the factories that purchased credits were allowed to emit more than their individual emission caps would have allowed in the absence of trading. But the *quid pro quo* reductions in emissions of ozone precursors by permanent removal of high-polluting vehicles from the road never occurred because the high-polluting engines were recycled into other car bodies and allowed to continue spewing ozone precursors into the air. Instead of achieving equivalent reductions at a lower cost, the trading programme resulted in higher levels of pollution than would have been legally possible under a traditional regulatory approach.

⁴⁵ See Cooley & Olander, n. 14 above, at 10157; G. Achterman & R. Mauger, ‘The State and Regional Role in Developing Ecosystem Service Market’ (2010) 20(2) *Duke Environmental Law and Policy Journal*, pp. 291-337, at 325 (‘Additionality is the concept that credited ecosystem improvements must “represent an overall increase in, or a [measurable] avoided reduction of, ecosystem services, relative to those services that would have existed without creating the credits.”’).

⁴⁶ D. Driesen & S. Ghosh, ‘The Functions of Transaction Costs: Rethinking Transaction Cost Minimalization in a World of Friction’ (2005) 47(1) *Arizona Law Review*, pp. 61-111, at 94 (‘Paper trades allow operators to escape an applicable emission control requirement in exchange for a claimed reduction that reflects no extra actual emission reduction.’).

⁴⁷ R. Drury et al, ‘Pollution Trading and Environmental Injustice: Los Angeles’ Failed Experiment in Air Quality Policy’ (1999) 9(2) *Duke Environmental Law and Policy Forum*, pp. 231-89, at 263.

⁴⁸ W. Rodgers, ‘The Worst Case and the Worst Example: An Agenda for Any Young Lawyer Who Wants to Save the World from Climate Chaos’ (2009) 17(2) *Southeastern Environmental Law Journal* pp. 295-335, at 323.

⁴⁹ Drury et al, n. 51 above, at 259.

⁵⁰ *Ibid.* at 277.

⁵¹ *Ibid.* at 260-2.

The second example is also related to efforts to reduce vehicle emissions. In 2005, Congress amended the US CAA by creating a new renewable fuels programme as a means of reducing the use of fossil fuels whose combustion generates GHG.⁵² The statute requires ‘obligated parties’ such as fuel importers, blenders, and refiners to introduce at least a minimum volume of renewable fuel into the domestic gasoline market each year. The programme includes a credit trading component, which allows an obligated party to generate credits for over-complying with its annual obligation (called a renewable volume obligation (RVO)) and then sell these credits to another obligated party, which may use them to offset the RVO with which it would otherwise have had to comply.⁵³ Like all trading programmes, the CAA renewable fuels programme holds out the promise of increasing the use of renewable fuels efficiently because an obligated party would not over-comply unless it could sell the credits that resulted from the production of excess renewable fuel volumes for more than it cost to produce them. Conversely, an obligated party would not purchase a credit unless its cost was lower than the cost of producing the renewable fuel volume that the credit offset.

In theory, the trading programme provides an efficient way to tackle climate change. In practice, however, its implementation has been deeply flawed. As the US Environmental Protection Agency (EPA) eventually discovered, some obligated parties sold credits, claiming to have produced amounts of renewable fuels far in excess of their RVOs, even though they imported, blended, and produced no qualifying renewable fuels at all (except on paper), and even though EPA regulations prohibit the sale of invalid credits.⁵⁴ The transactions generated enormous profits for the sellers who, after all, incurred no costs at all. On the other side of the ledger, the credit purchasers were left with fraudulent and worthless credits, and the required renewable fuel volumes did not replace the fossil fuels they were supposed to displace. The EPA accused one company alone of selling US\$84 million worth of illegitimate credits, and a Maryland jury convicted its owner of 42 counts of fraud, money laundering, and CAA violations.⁵⁵ In the aftermath of the discovery of instances of fraud, credit purchasers sued their sellers for breach of contract and breach of warranty, even though those sellers had in turn purchased the credits from other sellers responsible for their fraudulent creation.⁵⁶ The price of renewable fuel credits plunged, confidence in the credit market disappeared, and the market was ultimately frozen, as obligated parties feared they would remain responsible for complying with their initial RVOs despite having spent money purchasing credits that turned out to be invalid.⁵⁷ Refiners and the EPA debated whether those who purchase fraudulent credits in good faith should be able to raise that good faith as an affirmative defence to charges of regulatory violations instead of being fined for failing to meet their RVOs. They also fretted over whether the best way to minimize future manipulation of the market would be to put the EPA or independent third parties in charge of certifying credits as valid.⁵⁸

⁵² 42 U.S.C. § 7545(o).

⁵³ *National Petrochemical & Refiners Ass’n v. EPA*, 630 F.3d 145, 147 (D.C. Cir. 2010).

⁵⁴ Notice of Violation of Renewable Fuel Standards (7 Nov. 2011), available at: <http://www.epa.gov/compliance/resources/novs/civil/caa/fuel/astraoil.pdf>; 40 C.F.R. § 80.1460(b).

⁵⁵ J. McArdle, ‘Md. Man Found Guilty of Selling Fraudulent Renewable Credits’, *E&E News PM*, 25 June 2012, available at: <http://www.governorsbiofuelscoalition.org/?p=3072>; A. Peterka, ‘As Fake Credits Roil Markets, Companies and Policymakers Scramble for Solutions’, *Greenwire*, 29 June 2012, available at: <http://www.eenews.net/Greenwire/2012/06/29/4>.

⁵⁶ See, e.g., *Vinmar Overseas, Ltd. v. OceanConnect, LLC*, 2012 WL 3599486 (S.D. Tex., 20 Aug. 2012).

⁵⁷ Peterka, n. 59 above.

⁵⁸ J. Siciliano, ‘EPA Slated to Offer Regulatory Plan to Address Concerns Over RINs Fraud’, *InsideEPA Environmental Policy Alert*, 25 July 2012, at 27, available at: <http://insideepa.com/Inside-EPA/Inside-EPA-07/20/2012/epa-slated-to-offer-regulatory-plan-to-address-concerns-over-rins-fraud/menu-id-153.html>.

The third example of the perverse operation of environmental markets relates to the Kyoto Protocol's CDM. The carbon credits available under that programme are valued according to the impact on global warming and the staying power in the atmosphere of particular GHGs once they are emitted into the environment. Methane (CH₄), for example, is 21 times more powerful an agent of atmospheric warming than CO₂. The value of a nitrous oxide (N₂O) credit is 30 times greater than a credit for CO₂. HFC-23, a chemical produced as a byproduct of manufacturing HCFC-22 (a refrigerant and feedstock for certain plastic products) is 11,700 times more potent as a GHG than CO₂.⁵⁹ Between the initiation of the trading programme and mid-2012, 46 % of all credits were awarded to coolant factories, mostly in developing countries.⁶⁰ These companies realized that they could generate 11,700 times as many credits by destroying a ton of HFC-23 than by capturing a ton of CO₂. They responded by choosing to generate enormous volumes of HCFC-22 so that they could generate credits by destroying (very cheaply) the HFC-23 that is its waste byproduct. Some of the companies generating CDM credits from the capture of HFC-23 earned nearly twice as much (an average of US\$20-40 million each year) from the sale of credits as from the production of HCFC-22.⁶¹ Indeed, many of the plants operated only until they had produced (and destroyed) the maximum amount of HFC-23 eligible for credits and then shut down operations until the following year.⁶² They apparently went out of their way to use inefficient manufacturing processes to maximize the production of coolant gases and waste HFC-23.⁶³ In addition, the incentives to manufacture HCFC-22 as a means of generating CDM credits through the destruction of HFC-23 resulted in the manufacture of so much HCFC-22 that the price of that coolant gas fell, discouraging air-conditioning companies from seeking out less environmentally damaging alternatives.⁶⁴ As Michael Wara puts it, '[t]he economics of HFC-23 projects create incentives for strategic behavior that, if left unchecked, would undermine the environmental efficacy of the CDM.'⁶⁵ Eventually, regulators caught on and the EU declared that, as of 2012, it would no longer accept CDM credits for the destruction of HFC-23.⁶⁶ The United Nations (UN) also acted, refusing to award credits to any factories that are not already in the business of producing HCFC-22 or that expand production of the coolant.⁶⁷ The response of some companies in China no longer able to earn credits for destroying HFC-23 has been to vent it into the atmosphere.⁶⁸

The fourth example relates to Europe's flagship environmental permit trading programme, the ETS, which, despite relative success, has faced serious questions relating to fraud, such as the introduction into the market of recycled trading permits and tax fraud. Early in 2010, in an attempt to raise revenue, the Hungarian Government sold permits known as Certified Emission Reductions (CERs), which had been issued under the Kyoto Protocol's CDM and had already been surrendered by companies to meet their ETS compliance requirements. The government claimed that it sold the credits on condition that they must not

⁵⁹ See Wara, n. 37 above, at 1782.

⁶⁰ E. Rosenthal & A. Lehren, 'Carbon Credits Gone Awry Raise Output of Harmful Gas,' *New York Times*, 9 Aug. 2012, at A1, A10, available at: <http://query.nytimes.com/gst/fullpage.html?res=9B06E5DD1638F93AA3575BC0A9649D8B63&ref=andrewlehren>.

⁶¹ *Ibid.* at A10.

⁶² *Ibid.* at A10.

⁶³ *Ibid.*

⁶⁴ *Ibid.* at A1.

⁶⁵ Wara, n. 46 above, at 1783.

⁶⁶ Siciliano, n. 62 above, at A1.

⁶⁷ *Ibid.* at A10; Wara, n. 46 above, at 1785.

⁶⁸ Siciliano, n. 62 above, at A10. See also Wara, n. 46 above, at 1789.

be resold in the ETS. However, ten trading houses found they had some of them in their accounts after they bought CERs on the Paris-based bourse BlueNext. The news disrupted the carbon market, as ETS exchanges ascertained if their own inventories contained the offending instruments. At least three exchanges reacted by temporarily ceasing all trade in CERs. The European Commission moved to safeguard the ETS by subsequently banning such reuse, but how the credits came to be sold on BlueNext remains unclear.⁶⁹

Despite receiving widespread attention only recently, fraudulent activity has been a problem for the ETS since 2008, initially in the form of value-added tax (VAT) fraud. In some European countries, governments treat carbon permits as a taxable consumptive good, and so those governments place a VAT on the transfer of carbon credits. Criminals found a way to exploit the tax-code variation among countries by opening trading accounts, buying permits in countries without a tax, and then selling them in countries with a tax. Through repeatedly buying and selling the permits, they generated large amounts of money from the VAT that disappeared before the VAT was collected. It has been estimated that in 2009, EU Member States lost a combined total in excess of €5 billion (Germany is reported to have lost €850 million; the Netherlands €300 million).⁷⁰

It is impossible to know how many other cases of scamming and manipulation of environmental credit trading markets have yet to be discovered. The four cautionary tales described above, however, dramatically illustrate the need for building into programmes that encourage the operation of markets for ecosystem services meaningful safeguards to protect against abuses that undercut environmental protection goals and allow participants to reap undeserved profits. The next section describes five sets of safeguards that we regard as indispensable to a well-functioning and accountable market in ecosystem services

4. OPERATIONAL ACCOUNTABILITY SAFEGUARDS

A well-functioning market in ecosystem services depends on attributes required for any viable environmental market. These include a stable political environment,⁷¹ a clear assignment of property rights to foster confidence in the security of credit transactions and to avoid conflicting claims to rights to accrue the value of credits,⁷² clear allocation of authority to administer the trading programme to public entities,⁷³ and the provision of adequate financial resources to the agencies responsible for those who manage the programme.⁷⁴

⁶⁹ Point Carbon - 14 May 2010 quoting Hungarian Government Report, available at: <http://www.kvvm.hu/index.php?pid=1&sid=1&hid=2640>

⁷⁰ M.-C. Frunza, D. Guegan & A. Lassoudiere, 'Missing Trader Fraud on the Emissions Market' (2011) 18(2) *Journal of Financial Crime*, pp. 183-94; K. Nield & R. Pereira. 'Fraud on the European Union Emissions Trading Scheme: Effects, Vulnerabilities and Regulatory Reform' (2011) 20(6) *European Energy and Environmental Law Review*, pp. 255-89.

⁷¹ See C. Giupponi et al, n. 12 above, at 114.

⁷² See M. Smith, n. 8 above, at 75; Achterman & Mauger, n. 49 above, at 317-8. According to one account, the operation of the CDM has been hampered by unclear property rights, among other factors. K. Chopra et al, n. 5 above, vol. 3, at 7.

⁷³ See C. Giupponi et al, n. 12 above, at 114-5.

⁷⁴ For analysis of the impact of inadequate financial support for agencies charged with administering environmental, health, and safety regulatory programmes, see R. Steinzor & S. Shapiro, *The People's Agents and the Battle to Protect the American Public* (University of Chicago Press, 2010), at pp. 54-71 (describing the consequences of 'hollow government').

In addition to these institutional prerequisites, however, we believe that the foundation of a reliable market that is capable of achieving efficient and effective protection of ecosystem services must rest on five pillars of accountability: financial safeguards, verifiable performance standards, transparency and public participation standards, regulatory oversight mechanisms, and rule of law safeguards. We derive these standards from three sources. First, these accountability tools emerge from identification of the flaws we believe are responsible for the abuses of market-based approaches to environmental protection discussed in section 3 above. Second, we draw on experience from market-based programs that appear to have worked well or that include mechanisms that promise to effectively curb abuses of environmental markets, such as the US CAA's acid rain control program and CWA wetlands protection program. Third, we rely on important principles of international law, such as the obligations to provide transparency and opportunities for public participation that the Aarhus Convention imposes on signatory nations.. The following sections describe the role of each of these safeguards in creating an accountable market in ecosystem services that minimizes opportunities for fraud and abuse. They provide examples of US and EU market-based programmes that either foster or fail to promote accountability, and suggest additional ways to build strong accountability pillars.

4.1. Financial Safeguards

No environmental market programme can completely eliminate the risk of fraud and abuse, or even well-intentioned participation that falls short of achieving statutory environmental protection goals. It is therefore important that a sound ecosystem service market require those participating in the market to provide financial assurances to guard against the possibility of project failure.⁷⁵ The CWA wetlands banking scheme supervised by the US Army Corps of Engineers provides one model for such a set of financial safeguards. The Corps' regulations require that those applying for a permit to develop protected wetlands provide 'sufficient financial assurances to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with applicable performance standards.'⁷⁶ Among the instruments that may satisfy this requirement are performance bonds, escrow accounts, casualty insurance, letters of credit, or legislative appropriations for government sponsored projects. In calculating the level of assurance required, the Corps must consider factors such as the cost of providing replacement mitigation, including costs for land acquisition, planning and engineering, legal fees, mobilization, construction, and monitoring.⁷⁷ Each development permit for a project subject to financial assurance requirements must include a provision requiring that the assurances be in place before the permitted activity may commence.⁷⁸ An additional level of protection may be provided if those responsible for administering an ecosystem services trading programme require that funds to be used for mitigation by bankers or others who have assumed the regulatory obligations of credit purchasers be placed in segregated accounts to minimize the risk of diversion of those funds for non-authorized uses.

⁷⁵ See, e.g., Davis, n. 16 above, at 350 (describing financial assurances in a wetlands banking scheme 'similar to a bond tied to project success').

⁷⁶ 33 C.F.R. § 332.3(n)(1).

⁷⁷ 33 C.F.R. § 332.3(n)(2).

⁷⁸ 33 C.F.R. § 333.3(n)(3).

4.2. Verifiable Performance Standards

The second pillar of an accountable market in ecosystems services is the adoption of performance standards for activities conducted by a credit seller to meet the regulatory obligations of a credit buyer. Salzman and Ruhl have distinguished between wholesale and retail review of environmental trading, arguing that both are important. Wholesale review involves creation of general rules governing trades, while retail review applies to individual transactions to ensure compliance with those rules and to verify that the promised environmental services are actually being provided.⁷⁹ With respect to wholesale review, those structuring an environmental trading programme must balance the ability of detailed trading rules to check abuses with the tendency of detailed rules to reduce the flexibility of market participants to craft, and oversight agencies to approve, innovative arrangements capable of achieving desired levels of protection efficiently. At the retail stage, the more extensive the review, the greater the chance that regulators will be able to halt inappropriate trades before they occur. Extensive retail review, however, increases transaction costs, which may preclude potentially beneficial trades because they are too costly to arrange and implement.⁸⁰

The CWA's permit programme for wetlands development provides an example of what both wholesale and retail review mechanisms might look like. The Corps of Engineers in 2008 adopted elaborate rules governing wetlands mitigation trades.⁸¹ The rules require the preparation of baseline aquatic resource inventories, including identification of degraded resources and immediate and long-term aquatic resource needs within watersheds that can be met through trading.⁸² The rules also require clear identification of the parties responsible for implementation and long-term management of compensatory mitigation projects.⁸³ Permit applicants must prepare mitigation plans that specify the legal arrangements to ensure long-term protection of the compensatory mitigation project site.⁸⁴ Each plan also must include objective and verifiable performance standards that can be assessed in a practical manner using the best available science.⁸⁵ As the next two sections indicate, the capacity of such requirements to foster an accountable trading system largely depends on follow-through by administering agencies, with the assistance of stakeholders with access to important information on programme and project performance.

4.3. Transparency and Public Participation Safeguards

According to the Millennium Ecosystem Assessment, '[i]nsufficient participation and transparency in planning and decision-making have been major barriers' to ecosystem

⁷⁹ J. Salzman & J.B. Ruhl, 'Currencies and the Commodification of Environmental Law' (2000) 53(1) *Stanford Law Review*, pp. 607-94, at 671-73 ('Put differently, if wholesale review resembles the government's oversight of a commodity market, then retail review requiring substantive approval by the government looks more like a barter market. . . . The challenge lies in devising a program that enables the arbiter to "see" bad trades and provides the institutional authority and incentives to do something about them.').

⁸⁰ *Ibid.* at 673.

⁸¹ Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594 (10 Apr. 2008) (codified at 33 C.F.R. pts. 325 & 332, and 40 C.F.R. pt. 230).

⁸² 33 C.F.R. § 332.3(c)(2)(iv).

⁸³ 33 C.F.R. § 332.3(l)(1).

⁸⁴ 33 C.F.R. § 332.4(c)(2)-(14).

⁸⁵ 33 C.F.R. § 332.5(b).

protection, through market-based mechanisms and otherwise.⁸⁶ Transparent decision-making and meaningful opportunities for public participation are critical because the interests of traders may not correspond to the broader public interest.⁸⁷ Transparency promotes legitimacy by fostering trust in the system that encourages buy-in. Opportunities for public participation promote that same goal,⁸⁸ while also facilitating the ability of those managing a trading programme to accumulate information from a diverse array of sources that may assist in identifying which trades (or aspects of trades) would best serve regulatory aims.

Within the EU, the principal framework for accountability in environmental decision-making is founded upon the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention).⁸⁹ As the Convention's title suggests, one of its key pillars is public participation in environmental decision-making, an obligation that is binding both to signatory states as well as EU institutions.⁹⁰ It is clear under this framework that the development of markets for ecosystems services must be accompanied by robust public participation systems or otherwise fail regulatory scrutiny.

The implication of these observations for markets for ecosystems services is that whilst the Aarhus Convention framework provides a theoretically robust framework for establishing accountability, the complicated nature of ecosystem services and the instruments chosen to realize their value may work to thwart the realization of participation and ultimately the possibilities for ensuring accountability. It is imperative, therefore, that clear principles are articulated in order to mitigate the risks that are contingent upon the adoption of market-based initiatives for ecosystems services. In this regard, the Aarhus Convention provides a very good starting point for articulating a regulatory framework that entrenches accountability as a key requirement for all environmental governance efforts, including the regulation of markets for ecosystems services.

Transparency and opportunities for potential market participants and NGOs, among others, to participate are critical at all stages of the process, including rule development and review of specific trades. Public input at the retail level is particularly important because those potentially affected by projects that a trade would enable, may have valuable location-

⁸⁶ K. Chopra et al, n. 5 above, vol. 3, at 3.

⁸⁷ See Salzman & Ruhl, n. 83 above, at 668 ('Unlike children trading baseball cards, when trading involves the environment there are interests beyond those of the traders that must be taken into account.').

⁸⁸ J. Salzman, *A Policy Maker's Guide to Designing Payments for Ecosystem Services* (2009), at p. 51, available at: http://scholarship.law.duke.edu/faculty_scholarship/2081 ('Public participation ensures not only that the relevant stakeholders are involved but feel they have meaningfully participated in decisions – that their concerns have been heard. Broad participation provides decisionmakers important information about the needs and concerns of relevant stakeholders and may also inject new, creative ideas into the program design. Moreover, stakeholders are more likely to support decisions in which they feel vested.').

⁸⁹ Aarhus (Denmark), 25 June 1998, in force 30 Oct. 2001, available at: <http://www.unece.org/env/pp/welcome.html>. The Convention has been applied through a raft of EU instruments, see Regulation (EC) No. 1367/2006 on the Application of the Provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters to Community Institutions and Bodies [2006] OJ L264/13; Directive 2003/35/EC Providing for Public Participation in Respect of the Drawing Up of Certain Plans and Programmes Relating to the Environment and Amending with Regard to Public Participation and Access to Justice Council Directives 85/337/EEC and 96/61/EC [2003] OJ L156/17; Directive 85/337/EEC on the Assessment of the Effects of Certain Public and Private Projects on the Environment [1985] OJ L175/40.

⁹⁰ Directive 2003/35/EC, *ibid*.

specific information that would be difficult for government overseers to acquire.⁹¹ Transparency in the transfer of funds is also important. Salzman and Ruhl contend that markets can only work if knowledge of their existence is widespread, information about individual transactions is available, and mechanisms exist to allow prospective traders to find trading partners and determine the prices at which transactions are taking place.⁹²

One option for enhancing transparency at the project-level stage is the creation of a registry that permits interested members of the public to track transactions.⁹³ Many US ecosystem trading programmes, including water quality programmes under the CWA, rely on internally created databases and accounting tools rather than external or commercial registries.⁹⁴ The Ecosystem Marketplace, a website maintained by the Katoomba Group, is designed to provide a comprehensive source of information on environmental markets around the world,⁹⁵ and to become a ‘one-stop shop’ for information about markets and payment schemes for ecosystem services.⁹⁶

Procedures that foster transparency and public participation come at a cost, however, because they increase the length and expense of the trade approval process. One way to balance the benefits and costs of public participation would be to create public boards staffed by scientific experts as well as representatives of all affected interests to review and provide input on individual trades, but such an approach would limit opportunities for individual input, and pose a risk that board members may be captured. Another option, suggested by Salzman and Ruhl, is to subject all trades to review by ad hoc stakeholder groups acting as mediators. Any agreement reached in approving a trade would be immune from attack by other interested parties.⁹⁷ The Millennium Ecosystem Assessment listed other participatory options, including citizens’ juries, community issue groups, electronic democracy, focus groups, and consensus conferences.⁹⁸ Local traditions and customs may make some of these options more suitable for a particular place than others.

The US track record on public participation is mixed. Rules issued by federal agencies to govern how trading systems work or what performance standards trade participants must meet are likely to be governed by the Administrative Procedure Act,⁹⁹ which requires issuance of proposed rules and opportunities for public comment. Opportunities for public participation in the formulation and implementation of individual trades have sometimes been less available. The California auto scrapping programme that resulted in the recycling of high-polluting engines that were supposed to have been destroyed did not provide

⁹¹ Salzman & Ruhl, n. 83 above, at 681 (arguing that the public should be allowed to comment on proposed individual mitigation sites).

⁹² J.B. Ruhl & J. Salzman, ‘The Law and Policy Beginnings of Ecosystem Services’ (2007) 22(2) *Journal of Land Use & Environmental Law*, pp. 157-72, at 162.

⁹³ See M. Peters-Stanley, *Back to the Future: State of Voluntary Carbon Markets* (Ecosystem Marketplace, 2011), at p. 38 (‘To inspire consumer confidence in the quality of carbon offsets as financial instruments, a growing number of suppliers and standards are turning to registries for clarity of ownership and transparency.’).

⁹⁴ T. Stanton et al, n. 34 above, at 53-4.

⁹⁵ Available at: <http://www.ecosystemmarketplace.com>.

⁹⁶ J. Salzman, ‘A Field of Green? The Past and Future of Ecosystem Services’ (2006) 21(2) *Journal of Land Use & Environmental Law*, pp. 133-51, at 148.

⁹⁷ Salzman & Ruhl, n. 83 above, at 668-9.

⁹⁸ Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Synthesis* (Island Press 2005), at p. 99

⁹⁹ 5 U.S.C. § 553(b)-(c).

opportunities for public review of individual trades.¹⁰⁰ The Corps of Engineers' CWA wetland banking regulations, on the other hand, require the Corps to provide public notice of a proposed permit, including an explanation of the form that compensatory mitigation will take. The regulations specify that '[t]he level of detail provided in the public notice must be commensurate with the scope and scale of the impacts.'¹⁰¹ Other federal and state agencies with environmental expertise also may comment, and the Corps regulations create a dispute resolution process in the event of disagreement between the Corps and other agencies such as EPA or the FWS.¹⁰²

4.4. Regulatory Oversight Safeguards

Neither the government nor the public can root out abuses in market-based programmes without access to key information. The fourth pillar of an accountable ecosystem services market, therefore, is oversight through public and private access to information through vehicles such as mandatory monitoring, reporting, and inspections. The function of these tools is to verify that the ecosystem services supposedly being provided by market participants are actually being supplied, and that the result is effective protection in a manner consistent with statutory or regulatory goals. In order to ensure the integrity of these markets, accurate monitoring is paramount¹⁰³ The same holds true of information that may be gleaned from reports, inspections, and other documents concerning the performance of market-based arrangements.

Within the EU, the Aarhus Convention's provisions on public access to environmental information were implemented through Regulation 1367/2006.¹⁰⁴ This Regulation sets out the basic terms and conditions for granting access to environmental information held by or for public authorities, aiming to achieve the widest possible systematic availability and dissemination to the public. However, despite this framework, access to information has not been straightforward for some ecosystems market mechanisms. For example, there have been concerns with the ETS data availability and transparency, which have allowed the multiple resale of permits and VAT fraud to take place. In its defence, the Commission has argued that it has taken measures to improve data availability and transparency, noting that the latter increases the ability of participants to make informed trading decisions, and reinforces confidence in market integrity and efficiency, whilst being one of the main ways to counter misconduct.¹⁰⁵ It points out that exchanges and other organized trading venues display anonymized information about bids, offers, trades, and closing prices for market participants, and that this information is also available to the general public after a small delay. However, despite these mechanisms, over the counter transactions are still in principle unavailable to other market participants, allowing an opening for market abuse.

¹⁰⁰ Drury et al, n. 51 above, at 278-9 (noting that in California the public faces numerous difficulties finding out what companies are trading to avoid compliance with pollution control standards').

¹⁰¹ 33 C.F.R. § 332.4(b)(1).

¹⁰² 33 C.F.R. § 332.8(e).

¹⁰³ L. McAllister, 'The Enforcement Challenge of Cap-and-Trade Regulation' (2010) 40(4) *Environmental Law*, pp. 1195-230, at 1198-9.

¹⁰⁴ Regulation (EC) No 1367/2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies [2006] OJ L 264/13. See also Directive 2003/4/EC on Public Access to Environmental Information and Repealing Directive 90/313/EEC [2003] OJ L41/26.

¹⁰⁵ Commission Communication, *Towards an Enhanced Market Oversight Framework for the EU Emissions Trading Scheme* COM(10)796 final, 21 Dec. 2010.

The Millennium Ecosystem Assessment remarked that '[e]ffective monitoring, assessment, and reporting is a key to success in allocating ecosystem services and implementing response options.'¹⁰⁶ The information provided by monitoring, inspection, and reports can provide feedback on the ongoing success or failure of transactions in environmental markets and allow mid-course corrections and the initiation of enforcement action if regulatory violations or breaches of conditions on project approval have occurred.¹⁰⁷

Monitoring needs to occur on at least two levels. Firstly, it needs to ensure that the services actually being provided by the sellers match the services that credit buyers were excused from delivering. Secondly, monitoring is needed to check whether individual trades and market-based programmes in the aggregate are actually achieving regulatory goals.¹⁰⁸ With respect to the first level, it is important to evaluate whether credit sellers are fulfilling the commitments that allowed buyers to escape regulatory requirements.¹⁰⁹ The US CAA's acid deposition control programme requires that regulated utilities install continuous emissions monitoring equipment. Coupled with significant penalties for noncompliance, the programme has experienced high levels of compliance.¹¹⁰ Similar information collection requirements are more difficult to create for programmes involving a more diverse array of regulated entities and third-party service providers. In those contexts, the need for potentially costly physical inspections is heightened.¹¹¹ At the second level, if ambient monitoring shows that the intended environmental protection benefits of trading are not actually being achieved, programme adjustments should ensue.¹¹²

Reporting requirements for market participants are important because, as the instances of fraud and abuse discussed in section 3.2 above indicate, profit-motivated buyers and sellers of environmental credits have incentives to cheat. Doing so decreases the costs of doing business. It also frustrates the environmental protection goals of trading regimes, however, requiring the establishment of robust accounting protocols to preserve the credibility of trading programmes.¹¹³ Under the wetlands mitigation banking programme under the US CWA, the approval of mitigation banks is conditioned on the sponsor's establishment and maintenance of a ledger to account for all credit transactions. Every time an approved credit transaction occurs, the sponsor must notify the Corps of Engineers.¹¹⁴ The

¹⁰⁶ Chopra, n. 5 above, vol. 3, at 4.

¹⁰⁷ See Achterman & Mauger, n. 49 above, at 329 ('The public and environmental NGOs should expect trades to include meaningful ecosystem functions, to be subject to objective and meaningful monitoring and transparent data collection about trades, and to reassess their goals continually to assure they are being met.');

M. Stanton, 'Payments for Freshwater Ecosystem Services: A Framework for Analysis' (2012) 18(1) *Hastings West-Northwest Journal of Environmental Law and Policy*, pp. 189-290, at 270. ('Monitoring also enables decisionmakers to adjust and improve the design of the program over time and enforce penalties whenever there is a breach of contract.')

¹⁰⁸ See Achterman & Mauger, n. 49 above, at 331; Driesen & Ghosh, n. 50 above, at 94-6.

¹⁰⁹ See J. Wilkinson & R. Bendick, 'The Next Generation of Mitigation: Advancing Conservation Through Landscape-Level Mitigation Planning' (2010) 40(1) *Environmental Law Reporter*, 10023-49, at 10035.

¹¹⁰ T. Tietenberg, 'Tradable Permits in Principle and Practice', in J. Freedman & C. Kolstad (eds.), *Moving to Markets in Environmental Regulation* (Oxford University Press, 2007), pp. 65-88 at 71-2. See also L. McAllister, n. 109 above, at 1204, 1210 (noting that EPA's regulations on continuous emissions monitoring under this programme cover several hundred pages).

¹¹¹ For a discussion of the unanticipated cost of inspections and auditing under a California emissions trading programme for ozone pollution, see McAllister, n. 109 above, at 1214-5.

¹¹² Cf. McAllister, n. 109 above, at 1200 ('Accurate monitoring is also critical to whether the program's environmental goal the overall cap imposed on all the regulated sources is truly attained.')

¹¹³ L. Wayburn & A. Chiono, 'The Role of Federal Policy in Establishing Ecosystem Service Markets' (2010) 20(2) *Duke Environmental Law and Policy Forum*, pp. 385-415, at 410.

¹¹⁴ 33 C.F.R. § 332.8(p)(1).

ledger is publicly available on request.¹¹⁵ Project approval documents must include a schedule for both monitoring and reporting on monitoring results.¹¹⁶ The information that must be included in these reports ‘must be sufficient for the district engineer to determine how the compensatory mitigation project is progressing towards meeting its performance standards.’¹¹⁷ The failure to submit required reports allows the Corps to initiate enforcement action.¹¹⁸ CWA regulations also authorize the Corps to conduct site inspections on a regular basis to evaluate mitigation site performance.¹¹⁹

The oversight safeguards built into the Corps of Engineers’ 2008 regulations governing the CWA’s wetlands mitigation banking programme appear to be rigorous. Yet without commitment and follow-through by agencies, monitoring, reporting, and inspection requirements are likely to fall short of what is needed to mitigate the risks of abuses and under-performance in market-based programmes. In an evaluation of an earlier iteration of the wetlands banking programme, the US General Accountability Office (GAO) identified significant flaws in the programme’s oversight mechanisms.¹²⁰ According to the GAO, the Corps’ pre-2008 guidelines for compliance inspections by agency officials were vague on key issues such as how to determine whether mitigation is substantial. The GAO also found that the guidelines were vague about what information had to be included in reports, that required reports were often not submitted, and that compliance inspections often did not take place. Instead, the Corps largely relied on the good faith of permit holders to comply with compensatory mitigation requirements. As a result, the agency was often unable to definitively assess whether compensatory mitigation had been performed. In some cases, the Corps did not even enter into agreements with third-party sponsors to ensure the agency had legal recourse if compensatory mitigation was not being performed. The result was that some projects were unfinished and permit conditions were not met in some finished projects.¹²¹ Other studies of the wetlands mitigation banking programme concluded that only about 20 % of sites met the ecological equivalent of the displaced wetlands.¹²² It is not yet clear whether recent revisions to the Corps’ guidance have adequately addressed these problems. Other US ecosystem services markets may suffer from similar flaws. Another GAO report concluded that the FWS does not track monitoring reports required by biological opinions and incidental take permits under the ESA effectively.¹²³

The European Commission argues that the ETS Directive gives it a specific monitoring role which is linked but not limited to the introduction of auctioning as the main allocation method. It adds, however, that as financial intermediaries and power companies are the main participants on the European carbon market, any examination of the level of market oversight has to take account of more general legislation relating to both financial and energy markets. The former includes the Market Abuse Directive¹²⁴ (which applies to those emission

¹¹⁵ 33 C.F.R. § 332.8(q)(1).

¹¹⁶ 33 C.F.R. § 332.6.

¹¹⁷ 33 C.F.R. § 332.6(c)(1).

¹¹⁸ 33 C.F.R. § 332.6(c)(2).

¹¹⁹ 33 C.F.R. § 332.6(a)(2).

¹²⁰ US Government Accountability Office, *Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure That Compensatory Mitigation Is Occurring*, GAO-05-898 (2005), available at: <http://www.gao.gov/products/GAO-05-898>.

¹²¹ *Ibid.* at 14-6, 27.

¹²² See Walls & Riddle, n. 27 above, at 9-10.

¹²³ See Wilkinson & Bendick, n. 115 above, at 11 (citing US General Accountability Office, *Endangered Species Act: The U.S. Fish and Wildlife Service Has Incomplete Information About Effects on Listed Species From Section 7 Consultations*, GAO-09-550 (2009), at p.11).

¹²⁴ Directive 2003/6/EC on Insider Dealing and Market Manipulation (Market Abuse) [2003] OJ L96/16.

allowance derivatives which are regarded as financial instruments and traded on regulated markets) and the Markets in Financial Instruments Directive.¹²⁵ Additionally, the Auctioning Regulation,¹²⁶ adopted in November 2010, which establishes a regulatory framework for the auctioning of emission allowances in the 2013-2020 trading period, increases regulatory oversight by, inter alia, broadening the scope of the Market Abuse and Markets in Financial Instruments Directives in the carbon market and by extending to auctioning participants a number of measures stemming from the Anti-Money Laundering Directive.¹²⁷ Yet, these mechanisms rely on the European Commission essentially marking its own homework.

Third-party verification may be a way to enhance the effectiveness of informational oversight safeguards. Because the self-interest of market participants may make self-monitoring suspect, verification, either by the government or by independent third parties, can perform a valuable function in checking abuse.¹²⁸ US states such as Oregon have provided for review of the functioning of offsets in carbon trading markets by academic institutions, or have hired independent third parties to perform cost-benefit analyses.¹²⁹ EcoTrust, an advocacy programme for ecosystem services markets in the rain forests of the US Pacific Northwest, requires independent third-party monitoring for projects that create carbon offset credits.¹³⁰ California requires third-party verification as part of its GHG cap-and-trade programme.¹³¹ The government should oversee the verification bodies, however, to ensure the accuracy of their reports and findings, and such efforts will add to implementation costs.

4.5. Rule of Law Safeguards

Ultimately, all those participating in ecosystem service markets that are part of a government regulatory programme, including government officials who administer the programme, need to be held accountable for noncompliance with the law. Rule of law safeguards should therefore be built into the operation of ecosystem service markets to establish consequences for noncompliance and procedures to impose those consequences.

Access to the courts should be available to stakeholders, including interested NGOs, to challenge the ground rules for operation of an ecosystem service market. In addition, judicial review should be available for agency approval of individual transactions.¹³² The statutes and regulations establishing programmes for markets in ecosystem services should specify penalties for violating regulatory requirements and contract terms, and authorize the government to impose or seek judicial imposition of those penalties. The Corps of Engineers

¹²⁵ Directive 2004/39/EC on Markets in Financial Instruments Amending Directives 85/611/EEC and 93/6/EEC and Directive 2000/12/EC and Repealing Directive 93/22/EEC [2004] OJ L145/1.

¹²⁶ Commission Regulation (EU) No. 1031/2010 on the Timing, Administration and Other Aspects of Auctioning of Greenhouse Gas Emission Allowances Pursuant to Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emission Allowances Trading Within the Community [2010] OJ L302/1.

¹²⁷ Directive 2005/60/EC on the Prevention of the Use of the Financial System for the Purpose of Money Laundering and Terrorist Financing [2005] OJ L309/15..

¹²⁸ See McAllister, n. 109 above, at 1210-1 ('Without verification, self-reporters will become lax, and likely lean towards underreporting if that is in their self-interest.').

¹²⁹ Achterman & Mauger, n. 49 above, at 330.

¹³⁰ Ibid.

¹³¹ McAllister, n. 109 above, at 1229.

¹³² See Achterman & Mauger, n. 49 above, ('governments should create procedures that allow NGOs and the public to challenge transactions that are fraudulent or detrimental to public interest and to hold legally responsible parties accountable').

can assess administrative penalties for violating wetlands protection regulations or permits, suspend or revoke permits, and recommend the imposition of harsher sanctions by the US Department of Justice.¹³³ The GAO has reported, however, that the agency rarely pursues enforcement actions, relying on negotiations with alleged violators instead.¹³⁴

The available penalties might include bond forfeiture, the withholding of future payments by credit buyers, financial penalties, permit suspensions or revocations, injunctions shutting down projects or requiring restoration, and even the imposition of criminal sanctions for behavior such as willful submission of false reports.¹³⁵ Policymakers should consider making the entity that purchases credits legally responsible for its seller's failure to meet performance standards or otherwise comply with programme requirements, so that someone other than the government is highly invested in successful ecosystem protection actions.

The threat of sanction imposition must be meaningful, requiring adequate financing of enforcement agencies and the independence of government officials from those who would profit from avoidance of the rules. An accountable market-based programme would include an additional safety net by authorizing judicial review of ongoing project implementation, including performance of contract or regulatory requirements, at the behest of private citizens and public interest groups.¹³⁶

5. CONCLUSION

The use of market-like approaches to protect the environment has deep roots in the economics literature, dating at least as far back as A.C. Pigou's proposals to adopt pollution taxes.¹³⁷ In the US, economists began in the 1970s arguing vigorously that environmental protection goals could be achieved more efficiently if the "command-and-control" regulatory programs established beginning around 1970 were replaced or supplemented with reliance on markets. Property rights proponents provided additional support for a shift toward markets, claiming that laws creating property rights in natural resources or in efforts to protect them would align the interests of property owners with the goals of environmental protection laws, to the benefit of all.¹³⁸

Environmental protection advocates initially reacted with skepticism, fearing exactly the kind of market manipulations reflected in the examples described in section 3 above. Some also questioned the morality of creating tradeable rights to pollute or otherwise despoil natural resources.¹³⁹ Over time, many environmental non-governmental organizations in the US, such as the Environmental Defense Fund, largely overcame these qualms and began to accept the potential value of such mechanisms to both garner political support for

¹³³ See Wilkinson & Bendick, n. 115 above, at 10036.

¹³⁴ US General Accountability Office, n. 126 above, at 22.

¹³⁵ See Smith, n. 9 above, at 82; Salzman, n. 92 above, at 53.

¹³⁶ See Smith et al, n. 9 above, at 75 ('Provision for citizen participation is important, including the right of citizens and non-governmental organizations to bring lawsuits for the purpose of enforcing the rules and contracts associated with payment schemes.');

¹³⁷ Salzman & Ruhl, n. 83 above, at 683 (endorsing liberal citizen suit rights to enforce trading performance standards under strict standards of judicial review).

¹³⁸ Arthur Cecil Pigou, *The Economics of Welfare* (London: Macmillan and Co., 1920).

¹³⁹ See, e.g., Terry L. Anderson & Donald R. Leal, *Free Market Environmentalism* (New York: Palgrave, 2001) (revised ed.).

¹³⁹ See Richard J. Lazarus, *The Making of Environmental Law* (Chicago: The University of Chicago Press, 2004), at pp. 183-84.

environmental protection programs and achieve environmental protection goals more efficiently than traditional regulation alone could do. Ironically, when the US Congress considered the adoption of legislation during President Obama's first term to mitigate climate change by controlling GHG emissions, it was the progressive side of the political spectrum, including many environmental groups, that most strongly supported enactment of a cap-and-trade program for GHGs. Conservative politicians, who once championed market-based approaches because of its recognition of new property rights in environmental protection efforts, now demonized the proposal as an unacceptable "cap-and-tax" regime.¹⁴⁰ Nevertheless, it is hard to imagine mature environmental protection regulatory programs in the US and the EU ever eliminating reliance on market-based approaches. Environmental markets are here to stay.

The framing of environmental protection laws and policies as an effort to protect ecosystem services is a much more recent phenomenon than the use of markets to achieve environmental protection goals. The acceleration of legal and policy initiatives to protect ecosystem services is due at least in part to advances in scientific knowledge concerning how ecosystems work and the nature and extent of the benefits that well-functioning ecosystems provide to society.¹⁴¹ Protection of ecosystem services has now moved to the forefront of environmental protection and natural resources management initiatives in the US. The US Forest Service, for example, recently identified as a key objective of its land use planning process maintenance of the capacity of the national forests to provide ecosystem services that generate a range of social, economic, and ecological benefits.¹⁴²

The use of market-based methods of environmental protection in legal efforts to protect the flow of ecosystem services therefore represents the interface between an entrenched methodology for structuring environmental law and policy, and enhanced appreciation by scientists and policymakers of the importance of the natural environment in providing social benefits that have not always been fully appreciated. The promise of achieving efficient protection of ecosystem services through a trading regime is an enticing one.

At the same time, that combination is potentially incendiary. Notwithstanding great leaps forward in scientific knowledge of how ecosystems function and identification of the valuable services they provide, there is much that neither scientists nor resource managers understand about these matters. Scientific uncertainty, the backdrop against which much of environmental law has been adopted, remains considerable in this area.¹⁴³ These knowledge gaps create risks that participants in trading regimes of the kind discussed in this article will engage in abuses that are difficult to detect. It may not always be clear, for example, whether those claiming credits for protective measures have actually taken the necessary steps to protect ecosystem services to a degree that offsets resource impairment authorized by a trading regime. The need for the accountability mechanisms suggested in this article is therefore perhaps even more acute than it is in the context of regulatory programs that

¹⁴⁰ D. Spence, 'Regulation, "Republican Moments" and Energy Policy Reform' (2011) 2011(5) *BYU Law Review*, pp. 1561-1623, at 1612-3.

¹⁴¹ K. Hansen et al., 'A Bold Ocean Agenda: Recommendations for Ocean Governance, Energy Policy, and Health' (2009) 39(1) *Environmental Law Reporter News and Analysis*, pp 10012-9, at 10017.

¹⁴² 36 C.F.R. § 219.1(c).

¹⁴³ See, e.g., A. Grêt-Regameya et al., 'Facing Uncertainty in Ecosystem Services-Based Resource Management' (2012) *Journal of Environmental Management*, available at: <http://www.sciencedirect.com/science/article/pii/S0301479712003921>.

involve better understood cause-and-effect relationships between pollutants that have been regulated for decades and the environmental resources the law seeks to protect.

Experience with ecosystem services trading programs such as the one administered by the Corps of Engineers under the CWA to protect wetlands therefore warrants careful scrutiny. Some aspects of the Corps' approach to ensuring an accountable trading regime raise fewer questions than others. It ought to be a relatively simple matter, for example, to assess the degree to which different financial assurance mechanisms mitigate the risk that trade participants will have the resources to make good on their commitments if the anticipated environmental benefits of a trade do not materialize. The agency's supervision of the implementation of mitigation plans is likely to be less straightforward and the adequacy of these plans is likely to be more difficult to assess. It may also take some time before it becomes clear whether the latest iteration of the Corps guidelines for monitoring trades has cured the defects in earlier version that the GAO identified.

In short, the use of trading in ecosystem services protection is a work in progress. Markets for ecosystem services hold a certain promise for greater and more efficient environmental protection. As the case studies discussed in this article demonstrate, however, that potential may be easily derailed by poor regulatory oversight, which enables market abuses to occur, highlighting the need for consolidated regulatory frameworks designed to ensure the integrity of the markets. It is crucial that market mechanisms to protect ecosystem services integrate the five components of operational accountability identified here, including financial safeguards, verifiable performance standards, transparency and public participation mechanisms, regulatory oversight, and rule of law safeguards. We have suggested the forms that each of these components might take. Whether they represent the best ways to minimize opportunities for fraud, abuse, and failed environmental protection programs should be determined by ongoing review of the performance of existing and future trading regimes affecting ecosystem services. Unless effective safeguards are implemented and embedded into the design of markets for ecosystem services, the legitimacy of these interventions will remain questionable.