

Climate Change, Sustainable Development, and Ecosystems Committee Newsletter

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MESSAGE FROM THE CHAIRS

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Welcome to a new ABA year of the *Climate Change, Sustainable Development, and Ecosystems Committee Newsletter*. We are happy to be chairing this committee for the 2007-2008 year and look forward to several terrific events, increased membership, and several newsletters about the issues on the cutting edge of environmental law.

As in the past, this issue of our newsletter will continue to offer articles covering different aspects of our three disciplines. This newsletter begins with the second part of an article that appeared in our August 2007 newsletter by Laurie Ristino with this part discussing the investment of private carbon offset project dollars on public lands. Sheryl Law, Pieter Booth, Nicholas Gard, and Richard S. Davis discuss ways that ecological assets management can help businesses with sustainable development. Two articles focus on climate change, a constantly evolving area; one by Michael Manuel exploring the momentum in the United States behind a carbon cap and trade system; another by Joshua Kahan examining climate change adaptation in the United States.

We also want to remind you of the upcoming and ongoing events our committee is hosting. We have scheduled a series of Quick Teleconferences on various climate change subtopics. The Oct. 31, 2007 Quick Teleconference on science and technology was a huge success with nearly 200 participants. The next Quick Teleconference, on national climate change legislation, will be offered on Dec. 7. The program will feature key players from Capitol Hill, environmental groups, and industry. Subsequent teleconferences will take place approximately every month thereafter through June 2008.

We look forward to a terrific new year as chairs of this committee and want to thank John Dernbach for his excellent leadership as chair during the past two years. Please take a look at the committee Web page for more details on our activities and contact information if you are interested in volunteering for specific projects. And please feel free to contact us with any questions or comments.

***ABA Section of Environment, Energy,
and Resources***

**37th Annual Conference on
Environmental Law
March 13-16 2008
Keystone, Colorado**

PLAN TO ATTEND!

Climate Change, Sustainable Development, and Ecosystems Committee Newsletter
Vol. 11, No. 1, December 2007
Gabriel Calvo and Seema Kakade, Newsletter Vice Chairs

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CARBON OFFSET PROJECTS ON PUBLIC LANDS AND THE ROLE OF FEDERAL RESOURCES IN CLIMATE CHANGE MITIGATION

Laurie A. Ristino

This is the second part of a two-part article exploring how the growing market for carbon offsets in the United States is generating funding for conservation on both private and public lands. The first part of this article was published in the August newsletter and discussed how the value of ecosystem services in the form of carbon sequestration is generating funding for private lands conservation through the emergence of mandatory and voluntary markets addressing climate change. This article discusses the investment of private carbon offset project dollars on public lands and the larger policy issues implicated by those projects.

In particular, the involvement of federal lands in carbon offset projects raises the fundamental question of what the role of public lands should be in federal climate change policy given the responsibility of federal agencies to manage those natural resources consistent with their public missions. The experimentation with carbon offset dollars on public lands comes at a time when the federal agencies responsible for managing our public natural resources are being criticized for not adequately considering and addressing the current and projected impacts of climate change on the natural resources they manage. It also serves to highlight the growing struggle of federal managers to manage public resources with dwindling public dollars. The convergence of these issues is particularly timely and important given the various bills being considered and debated by Congress to address climate change.

Background

The rise of greenhouse gas (GHG) emissions in the earth's atmosphere is largely attributable to human activity through the extraction and burning of fossil fuels and the depletion of forests. Carbon sequestration is considered an important and economically viable piece of the overall strategy to mitigate global climate change, especially in the near term.

Despite the lack of federal regulation of GHGs to address global climate change, there is a growing market for carbon offsets and the carbon credits those offsets seek to generate. Several factors related to climate change have fueled this growth, including increasing public concern, the emergence of GHG registries and regional cap and trade markets such as the California Climate Action Registry and the Regional Greenhouse Gas Initiative (RGGI), and the expectation of eventual federal regulation. At the same time, the rapid popularization and growth of the voluntary carbon market in the United States may also serve to over-simplify the challenges of carbon offsetting. *See, e.g., Ben Elgin, Little Green Lies, BUSINESSWEEK, Oct. 29, 2007, at 45-52.*

Much of the carbon offset market that relates to terrestrial carbon sequestration focuses on forests because forests are a significant terrestrial carbon sink. (Carbon sinks remove carbon dioxide from the atmosphere whereas carbon sources do the opposite). Forest offset projects are recognized by existing cap and trade frameworks such as RGGI, the Chicago Climate Exchange, and the Clean Development Mechanism (CDM) under the Kyoto Protocol. Carbon offset project proponents seek to create tradeable carbon credits by investing in projects on lands that sequester more carbon than would have been sequestered under a business as usual scenario. This increased amount of carbon removed from the atmosphere is called “additionality” and is critical to creating viable credits as well as bona fide environmental benefits in the form of climate mitigation.

Each framework has its own requirements for carbon offset project creation, verification, monitoring, and baseline determination (the point from which additional carbon sequestered is measured). As an example of the variability among frameworks, under RGGI, only afforestation projects on land that has not been forested for 10 years are eligible forest offset projects, and the carbon sequestered must be protected permanently through a conservation easement. Under the CDM, afforestation and reforestation projects are eligible. Afforestation under the CDM is defined as land not forested for 50 years. Reforestation means land that was forested but has been converted to non-

forested land. CDM reforestation projects are limited to lands that did not contain forest on Dec. 31, 1989.

Federal agencies manage nearly 30 percent or 600 million acres of the land area of the United States, most of which exists in the West. Given their substantial area, federally managed lands may serve both to mitigate climate change through carbon sequestration and to contribute to it through catastrophic wildfire and natural processes such as respiration through photosynthesis and decay.

Carbon Offset Projects on Public Lands

Just as private conservation groups have seized upon carbon offset projects as a funding source for conservation, the federal government has been exploring ways to tap into this funding stream as it struggles to manage its lands with limited resources.

Indicative of the budget issues facing federal land management agencies, the retired chiefs of the Forest Service (R. Max Peterson, F. Dale Robertson, Jack Ward Thomas, Michael P. Dombeck, and Dale N. Bosworth) submitted a combined statement to Congress addressing the Forest Service (FS) FY 2008 appropriations. In their statement, they urged Congress to change the way it funds fire suppression activities and stated that the current funding mechanism, based upon a 10-year average cost, severely undercuts the ability of the Forest Service to carry out non-fire suppression programs. Specifically, the letter states:

From FY 2000 through the President’s budget for 2008, the proportion of the FS budget devoted to fire (both preparedness and suppression) increased steadily from 25% to 44%. These increases in funding for fire, coming at a time of ever more constrained budgets, has resulted in a 35% reduction in funding for non-fire programs when adjusted for inflation. FS staffing has been reduced by 5900 positions. With the 10-year average cost of fire suppression increasing by about \$80 million per year (with more increases likely in the future) the overall ability of the FS to do its assigned job is more and more limited.

The Forest Service's FY 2007 budget justification states that since FY 2000 national forest reforestation needs have been on the rise, in part because of large wildfires in the West and insect epidemics in the East. From FY 2000 through FY 2005, the Forest Service was only able to address about 20 percent of its reforestation needs, down from a 45 percent accomplishment rate during the FY 1994 through FY 2000 period. In FY 2005, the agency was only able to accomplish reforestation treatments on 153,000 acres, although it had identified 1.1 million acres as needing treatment.

Wildfires in North America will likely increase in intensity and scope as the result of climate change. Intergovernmental Panel on Climate Change, *Climate Change 2007: Impacts, Adaptation and Vulnerability*, 619 (2007). Wildfires in the United States have increased in frequency and intensity in just the last 20 years. *To Consider Scientific Assessments of the Impacts of Global Climate Change on Wildfire Activity in the United States*, Hearing Before S. Comm. on Energy & Natural Resources, 110th Cong. 5 (2007) (statement of Dr. Ann Bartuska, Deputy Chief Research & Development, Forest Service). Consequently, the financial burden on the public land management agencies to address wildfire will likely also increase as will catastrophic losses and carbon release from wildfire events. Large portions of the United States are at high risk for wildfires, including the Southeast and Southwest and Northern Rockies. Moreover, there are other stresses associated with climate change that have already begun impacting public lands, including insect infestations and invasive species.

This past summer, the Forest Service signed a Modification to its Master Memorandum of Understanding (MOU) with the National Forest Foundation (Foundation, NFF). (The Foundation is non-profit authorized by Congress to serve as fundraising source for the benefit of the Forest Service in carrying-out its programs. *See*, 16 U.S.C. 583j). The purpose of the modification is to "clarify the framework for cooperation between the Foundation and the Forest Service regarding reforestation projects on the National Forest System lands and/or acquisition

and afforestation of land for incorporation into the National Forest System." The MOU goes on to recognize the Foundation's increased focus on carbon sequestration and help for those who wish to voluntarily reduce their carbon footprint. Under the MOU, the Forest Service agrees to identify and make available appropriate National Forest System lands for reforestation projects and other lands within National Forest Systems for acquisition and afforestation. All project lands are subject to applicable federal laws, regulations, and forest plans. The Forest Service provides for long-term management of such lands and concurs with the Foundation's carbon accounting procedure and verification processes for offsets generated. In return, the Foundation collects and provides funds to carry out reforestation, afforestation, and acquisition.

The MOU also states that projects identified as a result of the partnership will not generate carbon credits that may be sold or traded. The MOU provides that no tradeable carbon credits are to be claimed by those who donate funds through the Foundation, nor are any such credits ceded by the Forest Service. NFF created a new Carbon Capital Fund through which individuals and organizations may donate funds to support these reforestation efforts.

Some of the funding generated by the Forest Service's partnership with NFF is being used to reforest acreage burned by fires and damaged by tornados on national forests in Idaho and Montana. Chief Gail Kimbell of the Forest Service stated that these reforestation efforts are not necessarily intended to replace all the carbon released by wildfire but to have those sites begin storing carbon at a good rate as soon as possible. Dan Berman, *Lawmakers Seek Answers on Forest Service's Carbon Credit Plan*, GREENWIRE, Aug. 17, 2007, available at <http://www.eenews.net/Greenwire>.

For several years now, the Department of Interior has been using the funding that carbon offset projects generate to restore existing public lands and acquire new lands. For example, in August of 2002, the U.S. Fish and Wildlife Service (FWS), which administers the National Wildlife Refuge System,

dedicated the Red River National Refuge. FWS was able to do so with the financial assistance of Entergy Corporation and The Conservation Fund. Entergy is a major global energy company that, among other things, delivers electricity to over two million customers in the Southeast. The company had planted more than 180,000 trees to restore an area to native bottomland and sequester carbon. The Wall Street Journal reported that Entergy will retain any carbon credits generated from its “donation” to FWS, if the federal government regulates greenhouse gas emissions. John J. Fialka, *Entergy Gives Land to Create Refuge, Wins Emissions Credit*, WALL ST. J., Aug. 26, 2002, at A4)

The Red River Refuge project is just one of many carbon offset projects involving FWS. According to its Web site, the Conservation Fund’s Go Zero program will reforest areas in National Wildlife Refuges across the country. The Conservation Fund has focused its reforestation efforts on the Lower Mississippi River Valley but has assisted reforestation efforts on National Refuge land from New Jersey to California. The Conservation Fund receives donations for these carbon offset projects from large corporate partners seeking to offset corporate emissions and from individuals seeking to “zero-out” their emissions.

FWS and The Conservation Fund entered into an MOU in March 2007 setting forth the parties’ relationship and responsibilities regarding The Conservation Fund’s Go Zero carbon sequestration projects on National Wildlife Refuge System lands. The objectives of this MOU include: expanding the Go Zero program by reforesting native habitat through multiple projects on National Wildlife System lands; reducing atmospheric carbon dioxide; and creating public/private partnerships as a way to generate support for habitat conservation. The MOU specifically provides that the public/private partnership for generating conservation funding does not create carbon credits that can be sold or traded. The MOU further states that no carbon sequestration credits will be claimed by those who donate funds or make other in-kind contributions, and FWS will not cede any credits.

Public Land’s Role in Climate Change Mitigation

The intent of both the Forest Service and FWS MOUs is to leverage private dollars to pay for needed reforestation and acquisition of recently afforested lands, not to generate carbon credits. In any event, it is speculative whether bona fide credits would be created by such projects given the lack of a federal regulatory framework for carbon markets. However, funds under these MOUs are being generated under the premise that they offset carbon emissions. Consequently, the use of this funding mechanism by public land management agencies begs the more fundamental question: what is the role of public natural resources in addressing and/or responding to climate change?

In fact, there is no comprehensive federal policy addressing the management of natural resources in the era of climate change. This past August, the Government Accountability Office (GAO) released a report entitled: “Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources.” As the title indicates, GAO concluded that agencies responsible for managing public resources (namely, the Forest Service; Department of Commerce National Oceanic and Atmospheric Administration; and, under the Department of Interior, the Bureau of Land Management, the Fish and Wildlife Service, and the National Park Service) should develop guidance on whether and how to address the effects of climate change. The GAO report concludes that climate change has already begun to affect federal resources adversely, and these effects will likely continue and intensify. GAO found that:

Resource managers are uncertain about what actions, if any, they should take to address the current effects of climate change and to plan for future effects on their resources. Agencies have not assigned climate change a priority among other factors they must address and have not provided resources managers with direction on how or whether to address the effects of climate change. Without such guidance—and additional site-specific data—resource managers are constrained

in their ability to address climate change in their management and planning activities.

U.S. Government Accountability Office, *Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources*, 9-10 (2007). Of the 155 national forests and twenty national grasslands managed by the Forest Service, only twelve forests have forest management plans that consider the effects of climate change.

The recommendation of the report is for the secretaries of Agriculture, Commerce, and Interior “to develop clear, written communications to resource managers that explains how managers are expected to address the effects of climate change, identifies how managers are to obtain any site-specific information that may be necessary, and reflects best practices shared among the relevant agencies, while also recognizing the unique missions, objectives and responsibilities of each agency.” Inherent in this recommendation is the need for coordination between the various federal resources management agencies given the non-localized nature of climate change.

Public lands have the potential to play two inter-related roles in any over-arching federal climate change policy—they may provide climate change mitigation opportunities, but they will also be impacted by climate change. Consequently, future planning will need to address strategies to manage and conserve natural resources given the stresses of climate change, including wildfires, infestation, and the migration of species. Other considerations may include whether public natural resource managers will seek to maximize carbon sequestration on public lands, focus on minimizing catastrophic forest losses (and the concomitant release of carbon), or follow some combination thereof as the management consideration of multiple resources require. A related inquiry is whether carbon sequestration is a public good and so should remain in the public realm, or if public natural resource management agencies may be subsidized by selling carbon offsets in any future national or existing regional markets.

Conclusion

The use of private funds through carbon offset projects to address the reforestation backlog on public lands and new acquisitions is a reflection of several complicated, inter-related issues. The leveraging of private funds to pay for environmental services is indicative of constrained agency budgets and federal managers seeking new sources of funds to carry out their basic missions. It also reflects the growing awareness that public lands provide multiple benefits beyond traditional timber, recreation, and wildlife, such as clean air and water, which have a growing value in the market place. And, finally, federal resource agencies, given the vast acreages they manage and their existing missions, will likely need to address climate change as part of their management planning, including addressing, where appropriate, both the role of public resources in mitigation and, critically, strategies to minimize natural resource losses that result from, and contribute to, global warming.

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SUSTAINABILITY: CONSIDERATIONS FOR INCLUDING ECO-ASSETS IN A COMPANY'S BOTTOM LINE

**Pieter Booth
Nicholas Gard
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Richard Davis**

The term “sustainability” encompasses the idea that a company can maintain and achieve long-term success by integrating economics, environmental policies, and social values (also known as the triple bottom line). But, how does one translate this concept into action that improves a company’s bottom line? The term sustainability has become a buzz word for companies and is increasingly captivating Wall Street. Analysts are viewing sustainable practices as indicators of successful future performance. The attractiveness to investors of sustainable companies is reflected in many ways. For example, mutual funds that specialize in socially responsible investing have increased from \$12 billion to \$178 billion since 1995.¹ Beyond the basics of environmental process efficiency, such as reductions in water and energy use and waste minimization, information that is easily and inexpensively collected, environmental health and safety (EHS) and sustainability managers should not ignore the potential for ecological assets to help achieve corporate sustainability goals and increase their corporation’s bottom line.

Eco-Asset Management

One way to realize business sustainability is through eco-asset management, which is a way to translate ecological conservation efforts into economic benefits for the company. Companies have typically undertaken environmental projects, such as site cleanup or habitat restoration, in response to government enforcement and have accounted for these projects as liabilities on their financial statements. Many companies establish substantial environmental reserve accounts to meet unexpected costs related to ecological and environmental risks that may arise in the future. In this vein, habitat conservation or restoration has been accounted for as an externalized expense. However,

within the eco-asset management construct, ecological conservation projects can go beyond compliance and become a recognized asset that adds to the bottom line.

How Eco-Assets Provide Value

Eco-assets provide two benefits to companies: ecosystem products and ecosystem services. Ecosystem products are resources, such as timber and minerals, which have well-defined values because they are traded on open markets. Ecosystem services such as carbon sequestration, flood control, potable water, and habitat for endangered species are often overlooked as assets because they have typically been considered “given” or “free for the taking.” Valuing property with conventional economics fails to account for such services, which can make significant differences to a firm’s bottom line.

The concept of eco-assets is gaining popularity as companies find ways to incorporate eco-assets as additional monetized holdings. Sachin Kapila of Shell comments, “I see a time when offsets just become a market mechanism. I believe one day we will be able to trade biodiversity offsets.”² Innovative business leaders foresee eco-assets, like other valued goods and services, translating into economic benefits through the basic economic principles of supply and demand.

There are two key components to managing eco-assets for the bottom line: (1) find hidden economic assets within the ecological characteristics of a property, and (2) explore markets for those assets. The framework can best be explained using an example of a company with a large number of properties. The company needs to know exactly what land holdings they own, the ecological characteristics of their holdings, and the environmental health of the land. They need adequate data to evaluate the physical and biological characteristics of their land, historical uses of the properties, current land use, hydrology, habitat types, biodiversity, and other ecological characteristics, such as the presence of endangered species or sensitive habitats. Such a large undertaking for inventory and spatial-relationship analysis can be

done cost-effectively by knowledgeable ecologists using tools such as geographic information systems (GIS).

The second part of the eco-asset management framework is quantifying the value of the eco-services on each property. For example, restoration or conservation of an area can often be accomplished at low or moderate cost, and generate savings in the long run by preventing or offsetting potential future liabilities such as remediation costs or natural resource damages, providing tax benefits from conservation easements, increasing future property value and salability, and reducing costs of future monitoring and maintenance. In addition, a portion of the value of ecological services to a corporation often consists of intangible benefits such as company reputation, brand recognition, corporate values, investor relations, and license to operate. Thus, this same restoration effort may also provide public benefits such as recreational and educational opportunities that can enhance a company's reputation for environmental stewardship, both locally and globally. These benefits are usually difficult to monetize, but they have well-recognized impacts to the bottom line, and often get the interest of investors and analysts.³

Reporting direct savings, savings from cost avoidance, and ecological assets should be carefully considered within the same requirements as general securities reporting, particularly the Sarbanes-Oxley Act of 2002. Sarbanes-Oxley makes the corporate officer signing a financial report responsible for the integrity of internal company controls designed to ensure that reported information is true, contains no material omissions, and is not misleading. In the immediate aftermath of the accounting scandals that spawned this legislation, responsible corporations quickly put in place the kinds of internal controls necessary to satisfy this new obligation in the context of traditional financial transactions. As these same corporations enter into the novel arena of eco-asset management, prudent corporate officials will want to re-visit their traditional internal controls to assure that they accurately describe, value, and assign this emerging class of assets. Overstatement, or simply misstatement of the nature or legal status of an eco-asset, could result in substantial and unnecessary liability for both the

corporation and the signatory of its financial reports, not to mention an erosion of the public confidence in the company, one of the principal intangible benefits of an eco-asset management program. Careful attention to these issues will be a hallmark of successful participation in the eco-asset marketplace.

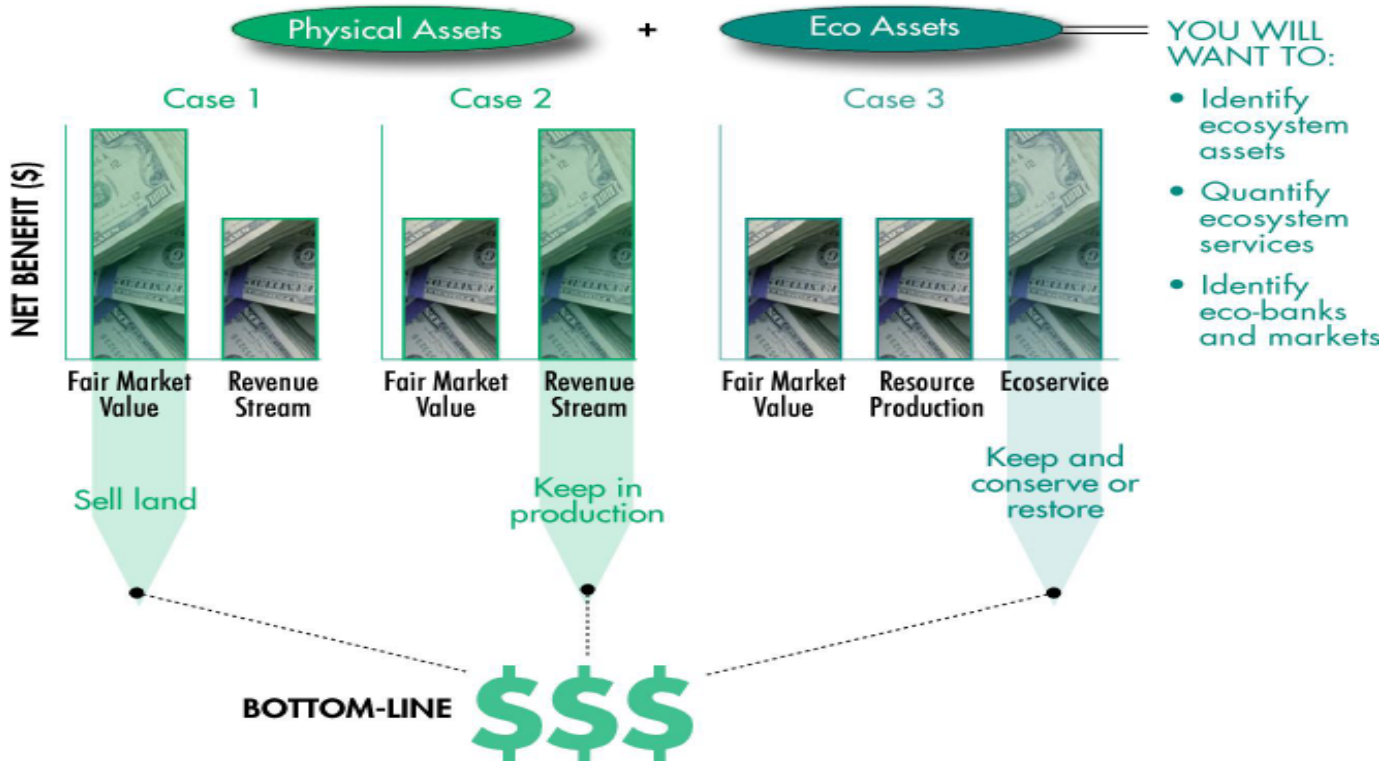
Markets for Eco-Assets

For eco-assets that can be monetized and reported on financials, there are marketplaces such as conservation banks and mitigation banks. The most developed market, which has received the greatest publicity in recent months, is the carbon credit market.⁴ Other lesser-known markets include wetland banks, sulfur dioxide trading credits, water quality banks, aquifer recharge credits, mitigation credits, as well as emerging markets for biodiversity banks and habitat credits.⁵ Some of these markets were established by governmental agencies granting credits as a reward for conservation or improvements in ecological services. These credits can be bought and sold on the open market, meaning that these credits not only have a value, but also have a price.

Enterprising for-profit companies have sprung up to coordinate the buying, selling, and trading of these credits. For example, the Chicago Climate Exchange's (CCX) price for carbon credits was \$2.25 per metric ton of carbon dioxide on Oct. 15, 2007, and since its inception in 2003, \$92,344,370 worth of carbon credits has been traded. Since 2005, the U.S. Conservation Bank, which trades endangered species and their habitat credits, has protected and/or restored 44,621 ha of land through 930 transactions, with an average price of \$2,697 per credit, and a total transaction value of \$375,908,799. The U.S. Wetland Mitigation Bank has bought and sold wetland credits ranging from \$5,000 to \$250,000 per credit, with an average of \$36,357 per credit, for a total transaction value of \$289,659,887 between 2000 and 2005. Clearly, new market and non-market methods are emerging for valuing eco-services, and this dynamic is affecting the ways businesses manage their holdings.

These new opportunities to generate income from environmental credits come with varying degrees of regulatory and contractual constraints. Carbon credits,

Figure 1. **ARE ECO-ASSETS INCLUDED ON YOUR BOTTOM-LINE?**



for example, often are generated quite simply by the terms of a binding permit. Wetlands and conservation banking often are based on contractual agreements and, especially in the wetlands arena, the imposition of deed restrictions to limit the use of the subject land holding. Water quality credits present the most complex picture, as the generation of the ecological benefits underlying these credits often requires continued affirmative activity that, in turn, requires a combination of regulatory and contractual control to ensure its continued delivery.

Just as these classes of credits vary in the complexity of the mechanism necessary to secure them, they also can vary substantially in their value. Carbon credits, for example, exist in a relatively pure, global marketplace, meaning that they are efficiently priced in response to a wide range of relatively stable factors. The pricing of wetlands credits can be more variable because their value is more heavily influenced by regional needs and opportunities. Water quality credits are perhaps the

most variable in their pricing, providing some of the greatest economic opportunities for those alert to their local markets. For example, because of the coming imposition of stringent water quality-based effluent limitations on nutrient discharges from publicly owned treatment works, many cities are likely to find themselves in need of sizeable blocks of nutrient credits to avoid the obligation to construct tens or hundreds of millions of dollars of new treatment technologies. The capacity to generate saleable nutrient credits in one of these localized markets could produce very substantial returns.

Eco-Asset Case Examples

The challenge for businesses with extensive or diverse land holdings is to determine what eco-assets they own and whether these assets can be reasonably valued in the available marketplaces by being sold, or traded locally or regionally. If the company was trying to decide whether or not to sell an unused property, for

example, the eco-asset framework would incorporate the value of credits that can be earned for significant ecological services, such as a wetland that provides ideal habitat for an endangered species, in addition to the current real estate price or revenue-generating capability of the land (such as rent, resource extraction, or development). In cases where markets for ecological services do not exist, ecologists can work with corporate financial experts to determine the “good will” value of a preservation or restoration portfolio. In many cases, conservation or restoration may be more financially sound than selling the land at fair market value or keeping the land in production (Figure 1).

One case example is International Paper (IP), which opted to restore habitat for the red-cockaded woodpecker in return for mitigation credits in 1999.⁶ IP’s 90-year old longleaf pine Southlands Forest in Georgia was habitat to only three male woodpeckers. Initially, IP managed only 728 ha of the habitat, and after its conservation agreement, it increased the available habitat to 2,140 ha. IP relocated red-cockaded woodpeckers from other properties, constructed artificial nest cavities, and restored longleaf pine to increase the population to fifty-five birds, including fifteen breeding pairs by 2006.⁷ According to IP’s agreement with the conservation bank, once eighteen breeding groups have been established, IP can sell credits to developers who have the endangered woodpeckers on their land and wish to market the lands’ timber. In 2004, it was estimated that a red-cockaded woodpecker credit was worth \$250,000.⁸ The establishment of a conservation bank for red-cockaded woodpeckers can become a source of revenue for IP operations in Georgia. Additionally, IP can use its credits to harvest timber in other areas that are used by red-cockaded woodpecker as habitat. Thus, IP’s efforts that go beyond requirements from the Endangered Species Act also give IP greater flexibility in managing its operational timberlands.

A second case example involves the conservation of the California gnatcatcher. In 1993, the Bank of America foreclosed on a 105-ha property known as the Carlsbad Highlands but found limited potential for developing the land or selling the land to developers. The constraints were caused by high mitigation costs

that would be incurred for building on ideal coastal sage scrub habitat for the recently listed, endangered California gnatcatcher. Opportunistically, the California Department of Transportation paid the Bank of America an undisclosed sum of money to conserve 33 ha of the Carlsbad property for mitigation of California gnatcatcher habitat in areas where highways were being constructed. In return, Bank of America received 180 mitigation credits that were subsequently sold to other developers for \$10,000 to \$15,000 each.⁹ In 2002, California gnatcatcher credits in California were being priced at a minimum of \$25,000 each.¹⁰ In this case example, the Bank of America not only found eco-assets on a property that would otherwise have been deemed non-valuable but also was able to recoup the loan amount originally given to the previous Carlsbad owners.

Outright land exchanges provide another example of identifying and capitalizing on the eco-assets inherent in land holdings. There are several cases in which the land desired by public entities for incorporation into existing parkland or for the establishment of new park or preservation areas has been exchanged by its private owner for previously public land rich in eco-assets (such as timber, minerals, hydrocarbon, hydropower potential). These cases often require innovative agreements with environmental regulators, as well as with federal and state land managers. The incentive that drives such agreements to completion is the simple recognition by the sophisticated public and private land managers of a win-win proposition. Although land exchanges historically have been associated with extraction operations in the West, pressures to find and more efficiently use land elsewhere in the country have revealed opportunities to apply this pioneering technique in many other settings.

Conclusion

Eco-assets have the potential to increase a corporation’s bottom line. By integrating ecological knowledge with an understanding of the various innate and legal factors that affect the value of eco-assets, an eco-asset management program provides a framework that can inform and guide land management decisions and enable companies to derive the maximum value of

their holdings—a value that incorporates both environmental and financial attributes. Both shareholder perception and direct corporate profitability can be increased by enhancing sustainable ecosystems and, through them, sustainable business practices.

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Endnotes

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BUSINESS AND LEGAL RAMIFICATIONS OF REGULATING CARBON EMISSIONS

Michael Manuel

Using a cap and trade system to reduce greenhouse gas (GHG) emissions enjoys a nearly irresistible appeal of elegance and simplicity. Yet, we can see from proposals and pilot programs that the reality is going to be quite different. Under a cap and trade system, government involvement will be constant, government regulations will be complex and participation, directly or indirectly, will affect a significant portion of the economy. The resulting challenges to the regulated community and to consumers and businesses at large will be to learn how to create, account for, save, borrow, and trade this new commodity; how to navigate the new bureaucracy that supports the regulation; and, in general, how to adapt to this new aspect of modern life.

Cap and Trade Is Widely Promoted

Momentum behind a carbon cap and trade system continues to grow at all levels of government. Domestically, a group of Northeastern and Mid-Atlantic states has agreed to establish a regional system that would take effect on Jan. 1, 2009. California has expressed strong interest in joining such a system. The European Union (EU) has been operating under a cap and trade system since 2005. In Congress, several pieces of legislation proposing a cap and trade system have been proposed. Nearly all of the leading presidential candidates have expressed some support for a carbon cap and trade system.

The enabling legal principle of a carbon cap and trade system is the nationalization of the right to emit carbon from certain activities. With sovereignty over those rights, the government redistributes such allowances to those that the government deems appropriate. Recipients of such rights may be direct emitters or they may be non-emitters who, in the eyes of the government, have sufficient interests in carbon emissions.

The main goal of a cap and trade system is to reduce carbon emissions over time in an economically efficient

manner. The innovation of the system is in the attempt to create markets for the rights to emit carbon. In a properly designed carbon market, the right to emit will be properly priced, emissions reductions will be achieved at the lowest possible price and the potential for profit will encourage development of new technology.

Proponents of a cap and trade system have good reason to be optimistic. A market based system for reducing certain other airborne pollutants has proven highly successful. The nascent effort to establish a carbon emissions trading system in the EU, while encountering some difficulties, has at least proven the concept to be feasible. Private sector initiatives at carbon trading continue to grow in popularity.

It is no surprise, therefore, to learn that there are many carbon trading system proposals that have been offered in Congress and even at the state and regional levels. It is unlikely that any federal legislation will be passed under the current Presidential administration. But GHG emissions control is a priority of the leadership of both houses of Congress. And it is supported in concept by a growing segment of the U.S. population. As a result, the debate over a possible emissions trading program has begun in earnest in Washington. It is a good bet that Congress will make a strong effort to craft a program over the next couple of years and that the next president will be interested in seeing this effort to the end.

Even though it is very early in what will surely be a long process, it is possible to get a sense of the magnitude of such a system and the impact that it will have on consumers, the business community and society at large. Carbon emissions from energy production, transportation and industrial use are vast. Such emissions are expected to exceed 6 billion tons annually by 2008. These emissions represent energy consumption that is an integral part of how we live, including how goods and services are produced, how food is brought to our table, where we live and work, and how we heat and cool our buildings. When carbon emissions become constrained, this energy equation will change.

The process of controlling carbon emissions will be highly complex. The right to emit carbon as a byproduct of certain activities will be permitted, regulated, accounted for, verified, and bought and sold. Any emissions trading system will allow for use of offsets: carbon reductions achieved by parties not subject to the emissions restriction part of the system. These too will be subject to complicated technical and legal requirements. Complexity can breed many negatives, including significant transaction costs and opportunities for fraud. On the other hand, a primary goal of such a system is to use the power of a marketplace and a profit motive to achieve emissions reduction at the lowest possible cost. In this regard, understanding this new legal reality and these new rules will lead to competitive advantage and, thus, opportunity.

Powerful Ingredients: Size, Complexity, Bureaucracy, and Ambiguity

The America's Climate Security Act of 2007 (S.2191) proposed by Sens. Lieberman and Warner in the U.S. Senate (the "Climate Act"), as well as the Model Rule established under the Regional Greenhouse Gas Initiative (the "RGGI Rule") can illustrate some of these aspects. The Climate Act was recently introduced as a bill in the Senate by Sens. Lieberman and Warner and so, perhaps, represents the most developed thinking on the issues. The RGGI Rule is promulgated by an agency formed pursuant to the Regional Greenhouse Gas Initiative (RGGI). RGGI is a compact between and among a group of Northeastern and Mid-Atlantic states. Each of the member states has committed to pass legislation that would subject large electric power generation facilities in their state to a regional emissions trading system. The RGGI Rule is the model for each state to follow to assure that the programs are properly coordinated. Even though the RGGI system is limited in scope, the RGGI Rule has the most detail of how a cap and trade system might function.

Under the Climate Act and the RGGI Rule, specified types of carbon emissions from specified types of emitters are prohibited unless the emitter can redeem a corresponding emission allowance. Emissions and allowances are denominated in units of tons of carbon

per calendar year. Regulated entities are obligated to settle their accounts after the end of each control period, which is normally a 3-year period, by redeeming one unit of emissions allowance for each unit of carbon emitted during the subject control period. Under the RGGI Rule, emission allowances are allocated by an agency designated by each state. Under the Climate Act, emission allowances would be distributed by the administrator of the Environmental Protection Agency (EPA).

Both programs would dictate how allowances would be distributed among the groups that are entitled to receive them. For example, under the Climate Act the total amount of allowances for the first year of the program, 2012, would be amount of emissions for 2005 (5.2 billion tons). EPA would be required to give 76 percent (3.952 billion tons)¹ of the first year's total allowances to various groups such as the industrial sector (20 percent) or for purposes such as reducing the rate of deforestation in other countries (3 percent). The remaining 24 percent of allowances (1.248 billion tons)² would be sold at auction. By the year 2035, total allowances would need to be 42.5 percent lower than the 2005 amount, and the share of allowances to be auctioned would increase to 67 percent.³ The RGGI Rule does not dictate how any member state might allocate allowances, other than mandating that 25 percent of the allowances are to be granted for "a consumer benefit or strategic energy purpose." XX-5.3(a).

Auctioning is a vital element of the program envisioned under the Climate Act. Yearly allowance auctions would be conducted by a new Climate Change Credit Corporation (the "CCCC"). The members of the board of this new corporation would be appointed by the president with the advice and consent of the Senate. The CCCC would have primary responsibility for distributing auction proceeds, per the broad dictates of the act. The Climate Act would direct the CCCC to distribute auction proceeds for the following purposes:

- To carry out the following types of programs:
 - (i) deployment of zero- or low-carbon energy technologies, (ii) advanced coal and sequestration technologies, (iii) production of

fuel from cellulosic biomass, and (iv) the advanced technology vehicles manufacturing incentive program.

- To a new Climate Change and National Security Fund to allow the president to implement the recommendations made by a new advisory panel, the Climate Change and National Security Council, to assist in avoiding the politically destabilizing impacts of climate change in volatile regions of the world;
- To a new Energy Assistance Fund to be used for: low-income home energy assistance, weatherization assistance for low-income persons, and rural energy assistance program;
- To “carry out activities (including research and education activities) that assist fish and wildlife, plants, and associated ecological processes in adapting to and surviving the impacts of climate change” (§ 4702(a));
- To mitigate damages suffered by workers displaced by the act in the form of job training, temporary wages, and other methods.

The RGGI Rule does not require auctioning, though it could be incorporated into any state’s allocation process.

Emission allowances will be tradable, subject to applicable rules. Under the RGGI Rule, for any such transfer to be valid, it must be recorded with the government agency having oversight. The Climate Act would provide for unlimited trading of allowances. However, a certification of the transfer must be signed by a responsible official of each party, and it must be received and recorded by the administrator. § 2103(a). The rules governing trading would have to be drawn up by EPA and other agencies.

The Climate Act contemplates a much more robust trading system. Under RGGI, only electric generating facilities of a certain size are required to obtain allowances; thus, the potential market is limited. The size of the regulated community under the Climate Act is substantial, in that it would be nationwide and cover a broader range of emissions sources. Predicting pricing for carbon in the year 2012 is an exercise that economists and investment bankers will engage in for

years to come. For this analysis, it’s worthwhile to note that prices on the European carbon market presently hover around \$28 per ton (20 Euros) and that a recent analysis of a different carbon trading proposal by the Department of Energy uses approximately \$13/ton for 2012 in some of its projections. If these prices were still “market” in 2012 the value of the domestic carbon allowances could easily exceed \$100 billion per year.⁴

The Climate Act doesn’t take lightly the possible economic impacts of such a comprehensive carbon trading scheme. The proposal calls for establishment of a new Carbon Market Efficiency Board, “modeled after the Federal Reserve” to oversee the carbon market (§ 2602). This new board would regulate how parties bank, borrow and trade allowances. The board, like the Federal Reserve, would have authority to intervene when necessary to protect market integrity.

Carbon offsets are another important feature of both the Climate Act and the RGGI Rule. Carbon offsets, also denominated in tons of carbon per year, represent carbon emissions removed from the atmosphere by parties that are not subject to emission restrictions. Offsets, again, benefit from theoretical simplicity and elegance. One ton of carbon removed from the atmosphere should offset one ton added to the atmosphere. If a non-regulated entity can remove its carbon at a lower cost than the regulated entity, that overall efficiency should be encouraged.

The reality of offsets is going to be much trickier than offsets in theory. Most experts agree that to be recognized as tradable, an offset must be verifiable, permanent and represent a true net reduction of carbon. In practice demonstrating all of these essential elements has proven to be challenging, though there is still great optimism that these challenges will be overcome.

Offsets would be subject to regulatory approval and oversight under both the Climate Act and the RGGI Rule. Offset providers would bear the burden of proving that their offsets meet the criteria established by the overseeing agency. Only after satisfying the applicable governmental agency would the offsets be

eligible to be introduced into the emissions trading system.

Offsets are useful only if they can be used by a regulated entity. Under either trading program, the amount of offsets that any entity can use in a given year is limited. For example under the Climate Act, only fifteen percent of allowances in a given year may be obtained by using offsets. No other details are provided regarding the functioning of offsets under the Climate Act, which leaves to EPA the task of establishing nearly the entire offset program. The RGGI Rule provides many details about offsets. The rule sets forth the types of projects that may be eligible for generating offsets—there are five types. It provides that offset generators must be approved by the regulatory agency having oversight. Approval is conditioned on the applicant proving that the project meets the standards of the RGGI Rule regarding additionality, verifiability, and permanence.

Keys: Preparation, Insight, and Advocacy

As is evident from the brief discussion above, a carbon emissions trading system will implicate a fairly sizable new bureaucracy. Those regulated under an emissions trading system will be responsible for proving to the governmental agency having oversight, on a periodic basis, that emissions and allowances match up. This means that parties will need to have standardized equipment, processes, and procedures for accurately monitoring carbon emissions. It also means that parties will be obligated to obtain a sufficient quantity of allowances, either from the issuing governmental agency or on the open market. The Climate Act and the RGGI Rule contemplate that regulated parties will be obligated to make a variety of filings, supported by appropriate certifications, to prove compliance with these requirements.

Offset providers will also need to interact with the governmental agency on a regular basis. The RGGI Rule requires offset providers to make periodic compliance certifications, grant the agency access for the purpose of completing physical audits, and have their projects audited by independent verifiers.

Sound business will dictate that these activities be undertaken at the lowest possible cost. For the regulated community, this will require knowledgeable participation in the annual allocation process and, perhaps, in the annual auction process. It will mean learning the rules regarding entitlement, transferability and expiration of allowances. Entities will be obligated to account for emissions and allowances, including offsets, on a current basis. Reporting to government agencies will be required annually and perhaps quarterly. Such reporting is likely to be subject to the same due diligence mandates as presently apply to reporting required under the public securities laws.

A central imperative of the Climate Act and RGGI Rule is to create scarcity. The Climate Act seeks to achieve this on many levels. First, total allowances would initially be established at a level 6.6 percent lower than what would have been emitted in the absence of regulation. Second, only a fraction of those allowances would be given directly to emitters with the balance being given to non-emitting interest holders or sold at auction. Third, over time both total allowances and the proportion granted for free to regulated entities will reduce. Thus, the system is designed to force the regulated community to find allowances on the open market. With potentially billions of dollars at stake, the regulated community will need to understand the rules applicable to such transactions. They will need to understand how much of their allowances can come from offsets, how much can come from a foreign exchange, which offsets are ineligible. How much of their allowance can be borrowed, and what is the penalty for failing to comply?

Risks and opportunities for hedging and arbitrage will be present and these will eventually need to become part of any participant's overall carbon trading strategy. Carbon allowances under a trading system, though expressly not property, will nonetheless have many property-like characteristics. Parties will naturally want to put allowances to their highest and best use. This may mean selling them, holding them for future use or investment purposes, or using them as collateral against which to borrow. Any property-like transactions must be accomplished under, and in compliance with, the applicable governing rules.

In its first year, under the Climate Act, the CCCC will auction more than a 5 billion tons of allowances and so will have tens of billions of dollars to distribute.⁵ The majority of these funds will be available, directly or indirectly, to private sector entrepreneurs looking to develop appropriate technologies. Gaining access to these funds will be another bureaucratic process.

As Congress works on a national emissions trading legislation, the lobbying is sure to become intense. Many alliances have already been formed. Industry groups, state and local governments, consumer groups, public interest groups, and others are staking out positions. Given the scope of such a system, the legislation is likely to lay out only the broadest outline and it will be up to the federal agencies to promulgate appropriate rules and regulations that will define the full contours of the system.

As governmental agencies at all levels struggle to create the right tools to implement a carbon emissions trading system, they will face many difficult policy and legal questions. These may be constitutional: Does the federal government have the power to seize the right to emit carbon without just compensation? What due process is required to deprive someone of allowances? There are certain to be tax questions: Is a grant of an allowance taxable income? What tax is payable if an allowance is sold at a profit? The system may implicate corporate fiduciary issues. Is it actionable if directors fail to safeguard a company against the economic harm caused by a restraint on carbon emissions?

Billions of dollars will be at stake in the U.S. economy as the result of a nationwide carbon trading system. There is great hope that such a system could be expanded globally to address carbon emissions attributable to Asian countries and other developing nations. If this were to happen the worldwide trade in carbon emissions allowances would certainly be counted in the trillions of dollars. Clearly, if any system approximating the Climate Act is established, carbon trading will be an important part of doing business. There will be collateral effects as well. The costs of obtaining allowances and complying with the recordkeeping, reporting, and auditing requirements alone will be significant and will add to the cost of

production of goods and services through higher energy costs. The added cost of using fossil fuel will make some businesses less competitive and others more so. Knowledge and expertise, combined with planning and early action, will lead to opportunity and success.

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Endnotes

1. Section 3201 allocates 18 percent of emission allowances to the 2012 auction and Section 3101 allocates 6 percent of the 2012 emission allowances to early auction, which leaves 76 percent (3.952 billion tons) to be distributed.
2. Section 3201 allocates 18 percent to the 2012 auction, which is 936 million tons. However Section 3101 also states that 6 percent of the emission allowances established for 2012, 4 percent of the emission allowances established for 2013 and 2 percent of the emissions established for 2014 should be allocated to the CCCC for early auction. This auction must be completed by Dec. 31, 2011. § 4301(b).
3. Section 1201(d) lists the total allowances for 2035 to be 2.992 billion tons. This is a 42.5 percent reduction from 2012. In 2035, the amount and share of allowances to be auctioned would increase to 67 percent. § 3201.
4. As long as a ton trades for \$19.23 or more in 2012, the value of the allowances for 2012 would be 100 billion dollars or more. § 1201(d).
5. Section 1201(d) states the amount of emission allowances for 2012 to be 5.2 billion tons.

**ABA SECTION OF ENVIRONMENT,
ENERGY, AND RESOURCES**

Calendar of Section Events

**National Global Climate Change
Legislation: How the Key Players
View the Issues**

Dec. 7, 2007

Quick Teleconference

ABA Midyear Meeting

February 6-12, 2008

Los Angeles, California

26th Annual Water Law Conference

Feb. 21-22, 2008

San Diego, California

**37th Annual Conference on
Environmental Law**

March 13-16, 2008

Keystone, Colorado

Eastern Water Resources

May 1-2, 2008

Charlotte, North Carolina

ABA Annual Meeting

Aug. 7-12, 2008

New York, New York

16th Section Fall Meeting

Sept. 17-20, 2008

Phoenix, Arizona

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**BEYOND MITIGATION: CLIMATE CHANGE
ADAPTATION INITIATIVES IN THE U.S.¹**

Joshua H. Kahan

To date, we have dealt with the quintessential sustainability issue of our time—climate change—principally by promoting the mitigation of greenhouse gases (GHGs). The rationale for such mitigation efforts, simply stated, is that if the concentration of GHGs is stabilized or reduced, ultimately the severity of climate change can be alleviated. There can be no doubt that such mitigation activities are clearly necessary to the long-term well being and stability of the global environment. But the level of attention being paid to mitigation-oriented science, technology, methodology, and policy—by the popular press, practitioners, regulators, and Congress—has served to obscure the pressing need to seriously address the inevitable question of adaptation to climate change.

**Understanding the Other Half of the
Equation**

The overwhelming focus on GHG mitigation tends to overshadow the adaptation half of the climate change equation. The reality is that, even if the most optimistic mitigation plans were adopted, and all GHGs were stabilized immediately, residual concentrations within the atmosphere will continue to create adverse consequences well into the future. Climate change adaptation must be accepted as a norm; a stable climate can no longer be assumed. The challenge is not successfully “managing a transition from one equilibrium to another,” as mitigation does, “but rather, adapting to a far more uncertain climatic future.” Burton, Ian; Dringer, Elliot; and Smith, Joel. *Adaptation to Climate Change: International Policy Options*-Pew Center on Global Climate Change, November 2006. In other words, at best, mitigation of anthropogenic sources of GHGs can attempt to minimize long-term climate change impacts but cannot halt or avoid all impacts. Human-induced climate change is going to proceed, and perhaps worsen with time. Therefore, adapting to the adverse impacts of climate change is a reality, and in some instances the need is immediate.

The Intergovernmental Panel on Climate Change (IPCC) defines climate change adaptation as, “an adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impact.”² Adaptation to climate variabilities and change is not a new concept. For centuries societies around the world have been coping with climate change. What separates the present situation from the past circumstances is the scale and urgency at which adaptive measures are needed—adverse consequences will be occurring globally on unprecedented levels.

The IPCC states with “high confidence”³ that: “(i) observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases; ii) a global assessment of data since 1970 has shown it is likely (66 percent to ninety percent probability) that anthropogenic warming has had discernible influence on many physical and biological systems; and iii) other effects of regional climate change on natural and human environments are emerging.” Intergovernmental Panel of Climate Change. *Climate Change 2007: Impacts, Adaptation, and Vulnerability/Working Group II Contribution of the IPCC Fourth Assessment Report. Summary for Policy Makers*. April 2007. The current knowledge of climate change, and the associated impacts, has led the global community to the conclusion that “adaptation will be necessary to address impacts from the warming which is already unavoidable due to past emissions” *Id.* at 16.

With the knowledge that climate change is an immediate threat, it is imperative for the United States to develop and implement strategies for climate change adaptation. However, recently, the United States has initiated adaptation considerations. Thus far efforts have been primarily focused on gathering and synthesizing data to lay the groundwork for further studies and future implementation. Most initiatives are serving in a catalyst capacity—they are attempting to stimulate research, collaboration, discussion, and awareness. Therefore, the article will discuss the recent developments in adaptation at the state and federal levels in the United States, along with a discussion of

U.S. Environmental Protection Agency (EPA) activities relating to climate change adaptation.

State-level Adaptation Action in the United States

Until recently GHG mitigation has dominated climate change discussions and planning considerations at the state level in the United States, mirroring developments at the national and international levels. However, several U.S. state governments are ramping up their consideration of climate change adaptation issues. Those states expressing an awareness of adaptation are in the early phases of identifying vulnerabilities,⁴ by: (i) creating separate adaptation commissions or committees with the intent to complement mitigation efforts, and (ii) integrating adaptation into state climate action plans, which largely address the reduction and elimination of GHG emissions. Pew Center on Global Climate Change. *Adaptation Planning-What States and Localities are doing*, 2007.

In all, “35 states have created, or are in the process of creating, climate action plans, with 14 new plans due later in 2007 or 2008.” *Id.* at 1. Of the thirty-five, several have added adaptation considerations into the scope of their climate action plan, including: Alaska, Arkansas, Arizona, California, Colorado, Hawaii, Illinois, Maryland, Minnesota, North Carolina, New Hampshire, Oregon, Vermont, Washington, and the Florida Energy Commission. Only a handful of states have developed plans, commissions, and/or reports specifically to address adaptation considerations, including: Alaska, Arizona, California, Maryland, Oregon, and Washington. The details of Alaska, Arizona, California, Maryland, Oregon, and Washington’s initiatives are described in Table 1.

In addition to state government adaptation action, the NGO community is also participating in developing action plans and vulnerability reports on the state level. For instance, the report *Confronting Climate Change in U.S. Northeast: Science, Impacts, and Solutions* (2007), prepared by the Union of Concerned Scientists, along with a team of independent experts, discusses the potential impacts of climate changes, general baseline data, and why

Alaska	The Climate Impact Assessment Commission is responsible for developing adaptation considerations. The commission is a legislative body that is “tackling adaptation issues, specifically associated with the protection or relocation of villages in the state at risk from coastal erosion and wave surges or flooding.” ⁷ The commission is currently analyzing the relationship of climate change and adaptation to a variety of multi-disciplinary issues, including communities, infrastructure, fish, wildlife, forests, agriculture, disease, pests, and financing. A rural relocation report is expected to be completed by the end of 2007.
Arizona	Arizona has developed a Climate Change Adaptation Strategy that recommends “the Governor appoint a task force or advisory group to develop recommendations for the state climate change adaptation strategy. Moreover, the Governor should direct state agencies and other appropriate institutions to identify and characterize potential current and future risks in Arizona to human, natural and economic systems, including potential risks to water resources, temperature sensitive populations and systems, energy systems, transportation systems, vital infrastructure and public facilities, and natural lands (e.g., forests, rangelands, and farmland).” <i>Id</i> at 5.
California	The California Energy Commission published a statewide assessment of climate change impacts and adaptation measures in the report <i>Climate Change Impacts and Adaptation in California</i> (2005). In addition, the California Climate Change Center (CCCC) has been conducting ongoing impact and adaptation studies within three main areas: i) agriculture and forestry -- “research is being conducted to identify vulnerable species and early signs of stress, predict their response under a range of expected climate scenarios, and determine ways that farmers and natural resource managers can best prepare for these changes, ii) water resources -- with the additional stresses of a growing population and ongoing development, a better understanding is needed of how hydrological processes will be impacted under all of these changing conditions, which regions or sectors of the economy will be most affected, and what steps can be taken to adapt to these impending challenges, iii) public health --More intense extreme weather events such as heat waves, flooding, landslides and wildfires, will directly affect human health. Successful research in this area will identify the increasing risks to human health, which segments of the population are most vulnerable, and how risks to their health can be reduced.” <i>Id.</i>

Table 1. States Pursuing Separate Adaptation Plans

Maryland	The Maryland Commission on Climate Change formed the Adaptation and Response Working Group, which “will recommend strategies for reducing the vulnerability of the State’s coastal, natural and cultural resources and communities to the impacts of climate change,” (<i>Id.</i> at 7) while also “developing a comprehensive strategy for reducing Maryland’s climate change vulnerability.” ⁸ It is expected that by November 2007 there will be an: i) updated on plan of action, ii) implementation timetable and benchmarks, iii) preliminary recommendations, and iv) draft legislation.
Washington	The Preparation/Adaptation Working Groups (PAWG) has been formed under the Washington State Department of Ecology. The working group’s primary task is to “develop recommendations for the Governor on how Washington can prepare and adapt to the impacts of climate change, including 5 sectors: Agriculture, Forestry Resources, Human Health, Water Resources & Quality, and Coastal Infrastructure. The working groups will identify issues and vulnerabilities, and make recommendations for adaptive strategies and areas requiring additional research.” ⁹
Oregon	The Climate Change Integration Group is responsible for “a preliminary assessment of how the state should prepare for adaptation to the impacts of climate change and deliver[ing] a report to the Governor with initial recommendations by the end of the year 2007.” ¹⁰

Table 1 (cont.). States Pursuing Separate Adaptation Plans

adaptation is necessary within the Northeastern states, including New York, Pennsylvania, New Jersey, New Hampshire, Vermont, Maine, and Massachusetts.

Federal-level Adaptation Actions

The states have led the way in climate change adaptation considerations in the United States, but the adaptation question is finally beginning to appear on the U.S. federal government’s radar in a substantive manner. Such discussions and considerations at the federal level are quite preliminary, but collectively they do represent a much needed first step in implementing adaptation on the national scale. For instance, in May 2007, the House Appropriations Subcommittee on Interior, Environment, and Related Agencies approved, by a voice vote, to increase EPA’s fiscal year budget to \$8.1 billion (which is \$887 million above President Bush’s recommended amount) to “create a new temporary commission on adaptation and

mitigation...to review the science questions on how to best adapt to a warming planet and the specific science investment needed to address this reality.” Environmental Policy Alert. House Spending Bill for E.P.A. Creates Panel on Climate Adaptation. Inside Washington Publishers, June 6, 2007.

The commission would include officials from EPA, the National Oceanic and Atmospheric Administration, the National Science Foundation, the Department of Energy, and the Forest Service, and would be responsible for the allocation of specific amounts of money to other governmental agencies to conduct adaptation research. “EPA would allocate \$45 million to itself and other agencies over the next two years, depending on the panel’s findings.” *Id.* at 1.

The commission has not been officially created as of yet, however the bill’s framework has two potential far-reaching implications: (i) “the call for significant

funding on adaptation could represent a new direction for EPA and other agencies to address the impacts of climate change, by going beyond the science of global warming or studies on policies to control greenhouse gases” and (ii) the commission’s ability to “direct specific amounts of money toward a problem, rather than only making general recommendations” enables research “to begin immediately without having to wait for another appropriations cycle.” *Id.*

Despite the intent of the House subcommittee bill, and the potential implications on adaptation research, more consistent and widespread action is required. A 2007 Government Accountability Office (GAO) report confirms that an overall wake up call is needed within the U.S. federal government. The GAO report concludes that federal “agencies that manage the nation’s parks, forests, oceans, and monuments are unprepared to deal with climate change. . . resource managers within the Agriculture, Interior, and Commerce departments have limited guidance about whether or how to address climate change—without such guidance, their ability to address climate change and effectively manage resources is constrained.” Morello, Lauren and Berman, Dan. U.S. Resource Managers Lack Direction on Warming-GAO. Greenwire-Air, Water, and Climate Vol. 10 No. 9. Environment, and Energy, Publishing, LLC. Sept. 6, 2007. The report elaborates on the evidence that climate change is increasing within “600 million acres of public lands and 150,000 square miles of waters managed by federal agencies—ranging from melting glaciers in Glacier National Park to rising sea levels in the Florida Keys.” *Id.* at 1.

The GAO report as issued includes responses from several federal departments as appendices; the Agriculture, Interior, and Commerce departments submitted comments on the GAO conclusions and recommendations. The federal agencies “generally agreed with the [GAO] recommendations,” and overall, the comments highlighted the climate change programs, initiatives, plans, and/or policies that (i) the GAO report omitted and (ii) note the inclusion and importance of climate change considerations. Government Accountability Office (GAO). Climate Change: Agencies Should Develop Guidance for

Addressing the Effects on Federal Land and Water Resources Report to Congressional Requesters, August 2007. The comments from all three agencies indirectly reaffirm the GAO conclusions—although climate change considerations may be an identified priority, there is an overall lack of consistent site-specific implementation guidance.

For instance, the Department of Agriculture agrees that Chugach National Forest (the forest discussed in the GAO report) does not specifically address the effects of climate change on programs and resources but noted that the GAO report did not accurately represent the activities that are being pursued. The department notes that the “examination of one national forest is inadequate to use a proxy for an agency that manages diverse ecosystem across 193 million acres for multiple objectives . . . where a broader evaluation would have revealed 12 National Forest Plans specifically consider the effects of climate change on existing programs and local resource values.” *Id.* at 172. However, the comments do not address if, or the extent to which, the National Forest Plans discuss site-specific adaptation concerns.

The Department of Interior recently initiated a task force to take “affirmative steps to assess the effects on our public lands arising from climate change and develop a process for anticipating and addressing these effects.” *Id.* at 178. However, as noted in the comments, the department is currently exploring how “new science can be focused to provide the information needed by our land, water, and infrastructure managers.” *Id.* at 179. The Department of Commerce noted its involvement in the effort to “expand both observation systems and modeling capabilities” within ocean and coastal monitoring systems, integrated drought systems, and regional ecosystem planning. In addition, the department is expecting to release the report a *Preliminary Review of Adaptation Options for Climate Sensitive Ecosystems and Resources* by the end of 2007.

U.S. Environmental Protection Agency

In 2004 EPA, in collaboration with other federal agencies, initiated a process for the *Preliminary*

Review of Adaptation Options form Climate-Sensitive Ecosystems and Resources to “review management options for adapting to climate variability and change in the United States, and to identify characteristics of ecosystems and adaptation responses that promote successful implementation and meet resource managers’ needs.” EPA -Adaptation Homepage <http://www.epa.gov/climatechange/effects/adaptation.html>. Accessed August 2007. The report is being completed in response to SAP 4.4⁵ of *The Strategic Plan of the U.S. Climate Change Science Program (CCSP)* (2001), which calls for the completion of “21 synthesis and assessment products to support policy making and adaptation decisions across the range of issues addressed by the CCSP,” to ultimately provide NGOs, individuals, federal, state, and local governments and agencies with adaptation options and information. The assessment will focus primarily on climate-sensitive ecosystem and resources located within federally protected and managed areas, including: national parks, national wildlife refuges, wild and scenic rivers, marine protected areas, national forest systems, and the national estuary program. The EPA project is implementing a process that is open to the public and engages stakeholders to provide valuable information about local systems. The report is expected to be completed by December 2007 and has the potential to lay the groundwork for future action by federal agencies and perhaps shed some light on the concerns addressed by the 2007 GAO report discussed above.

In March 2007, EPA launched “an effort to assess and respond to the effects of global warming on water resources and regulators’ ability to meet requirements of numerous water related laws,” while specifically focusing on “development strategies to adapt to climate change, rather than on plans for limiting resources.” Carbon Control News. E.P.A. Water Office to Draft GHG Strategy Emphasizing ‘Adaptation.’ Inside Washington Publishers, Mar. 12, 2007. This new effort will be primarily adaptation-focused within the context of water resources and the ability to meet Clean Water Act Requirements “in a changing environment.” Implementation will be fostered through a Climate Change Workgroup and plan, which is expected to be released by the end of 2007. The plan will emphasize that “despite uncertainty on the scope and timing of

climate change effects, EPA’s water program and its partners should take prudent steps now to assess emerging information, evaluate potential impacts of climate change on water programs, and to identify appropriate response actions.” *Id.* at 1.

Conclusion

It is clearly necessary to continue to pursue GHG mitigation strategies as aggressively as possible, but we must begin to implement adaptation strategies as a complement to mitigation efforts. Fortunately we have seen the beginnings of a dialogue on an adaptation and mitigation mix or “portfolio.” For example, the *IPCC Fourth Assessment Report-Climate Change 2007: Impacts, Adaptation, and Vulnerability (2007)* suggests “a portfolio of adaptation and migration can diminish the risks associated with climate change.” The report recommends that a portfolio or mix of strategies should include “mitigation, adaptation, technological development (to enhance both adaptation and mitigation) and research (on climate science, impacts, adaptation, and mitigation). Such portfolios could combine policies with incentive based approaches, and actions at all levels from the individual citizen through to national governments and international organizations.” *Id.* at 18.

Researchers and scholars are beginning to explore, given the limited resources in terms of funding, time, and human resources, “what would constitute a mix that is justifiable from a social, environmental, and economic perspective, and which elements would be part of such a mix.”⁶ But this is no longer an academic question. More enlightened business leaders already understand that the climate change equation includes both mitigation and adaptation components. As James E. Rogers, Duke Energy’s CEO and chairman, stated in a Newsweek interview in August 2007, “mitigation of climate change is not going to happen fast enough. That is the reality. We need to think in a broad sense about both adaptation [to climate change] and mitigation [of it].” Fareed Zakaria. *Energy official performs balancing act*, NEWSWEEK editorial, Aug. 14, 2007, at 4A. Adaptation and mitigation are complementary and ought to be inextricably linked as we plan for a carbon-constrained future.

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Endnotes

1. This article is adapted from a longer forthcoming report, "Preparing for the Day After Tomorrow: Frameworks for Climate Change Adaptation," by Ira Feldman and Joshua Kahan, which is in press in the Fall 2007 issue of Sustainable Development Law & Policy.
2. IPCC, Third Assessment Report, Climate Change 2001: Impacts, Adaptation & Vulnerability, 2001.
3. "High Confidence" is a term used by the IPCC to describe the accuracy of the conclusions. High confidence equals an 8 out of 10 chance of accuracy confidence, where the highest possible is "very high confidence," which equals a 9 out of 10 chance of being accurate.
4. Climate change vulnerability can be defined as "the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and adaptive capacity (IPCC, Third Assessment Report, Climate Change 2001: Impacts, Adaptation & Vulnerability, 2001)." For further discussion on vulnerability see Brooks, Nick. Vulnerability, risk and adaptation: A conceptual framework. Tyndall Centre for Climate Research, working paper 38, November 2003, and Brooks, Nick; Adger, W. Neil; and Kelly, P. Mick. The determinants of vulnerability and adaptive capacity at the national level and implications for adaptation. Elsevier, Global Environmental Change, 2004.
5. "SAP 4.4 addresses CCSP Goal 4 "to understand the sensitivity and adaptability of different natural and managed ecosystems to climate and related global changes. SAP 4.4 also addresses a stated research need in Chapter 8 (section 8.3) of the CCSP Research Strategy: How can climate-sensitive ecosystems and resources be managed to sustain ecosystem services in

the context of multiple demands and changing environmental conditions (U.S. Environmental Protection Agency. SAP-4.4 prospectus for Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources: US Climate Change Program. July 31, 2006)?"

6. Klein, Richard J.T., Schipper, E. Lisa. F., and Dessai, Suraje. Integrating mitigation and adaptation into climate and development policy: three research questions. Elsevier, Environmental Science and Policy, 8, at 579-588, 2005.
7. Pew Center on Global Climate Change. Adaptation Planning-What States and Localities are Doing, 2007.
8. Maryland Comm'n on Climate Change Homepage (www.mde.state.md.us/air/mccc).
9. Pew Center on Global Climate Change. Adaptation Planning-What States and Localities are doing, 2007.
10. *Id.* at 8.



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