THE PINCHOT LETTER

Vol. 15, No. 1 Winter 2010

Leadership in Conservation Thought, Policy and Action

Bay Bank—The Chesapeake's Conservation Marketplace

The collective actions of millions of farmers and woodland owners are the key to the restoration of the Chesapeake's streams, farms, forests, wetlands, and the largest estuary in the United States, the Chesapeake Bay itself. Private families and individuals own nearly 80% of the land in the Chesapeake region and live within minutes of the 100,000 streams and rivers that flow directly into the Bay.

New and innovative market-based approaches have emerged to offer landowners realistic financial incentives to implement conservation actions. Market-based conservation harnesses economic markets to efficiently deliver environmental objectives. For many market-based projects, property owners who implement conservation practices that enhance ecosystem services generate credit supply in an environmental marketplace. For example, by installing a suite of practices that include planting of riparian buffers and other actions to manage nutrient runoff to streams, landowners can generate nutrient reductions that create credits. These credits can then be sold to buyers in a water quality market.

Buyers provide the established need and money that drives markets. For example, water quality markets will be driven by the demand for nitrogen and other nutrient reductions across the watershed. The businesses, institutions, and citizens demanding these reductions do so to comply with regulations like the Clean Water Act, to prepare for future regulations, or for strictly voluntary reasons. Although these markets are becoming available nationwide, there is no efficient way to link landowners with this capital.

Bay Bank (www.thebaybank.org) fills this need by serving as the Chesapeake's conservation marketplace. As markets develop, Bay Bank will make sense of all developing rules and tools and present them so the main suppli-

(continued on page 5)

Status of Markets for Ecosystem Services

Sara Vickerman

In recent years, enthusiasm for market-based approaches to the conservation of ecosystem services appears to have increased. Private businesses, landowners and operators, government agencies, and other parties are all actively trying to determine their opportunities and roles. Organizations like the Bay Bank in the Mid-Atlantic and the Willamette Partnership in the Pacific Northwest are working to coordinate market-based projects among these varied interests.

Although an influential element of conservation today, the definitions and diversity of markets are both interesting and complex. A description of several of existing and emerging markets and supportive policies may be useful.

Wetland Mitigation Banking

The most mature domestic market for ecosystem services is probably wetland mitigation banking. Wetlands are protected by the federal Clean Water Act, and the U.S. policy of "no-net-loss" triggers mitigation responsibilities for developers and others who impact wetlands. A historic preference for on-site, in-kind mitigation projects produced a rash

(continued on page 3)

INSIDE

Executive Office: 1616 P Street NW, Suite 100, Washington, DC 20036 202.797.6580 fax: 202.797.6583 www.pinchot.org

Grey Towers National Historic Site: P.O. Box 188, Milford, PA 18337 570.296.9630 fax: 570.296.9675

From the President

Dear reader,

Supporting the conservation and sustainable management of natural resources for the entire array of ecological, economic, and social values they represent continues to be the fundamental purpose and mission of the Pinchot Institute. Accomplishing this means informing and guiding policies that are likely to affect the future of forests and other natural resources, and ensure that policymakers fully understand the potential long-term consequences of policy decisions. It also means working with local conservation organizations and agencies to address the particular issues and opportunities in the conservation of a specific forest region, whether it is the Chesapeake Bay watershed, Colorado's Front Range, or Ecuador's Cotapaxi Cayapas Reserve.

This issue of the *Pinchot Letter* takes a look at the role of market-based conservation in sustaining our natural resources. The Pinchot Institute is proud to be working with a host of partners in the Chesapeake Bay region and across the country to help the primary stewards of our land, private farmers and forest landowners, to learn about and enroll in market-based programs from forest conservation banking to more traditional Farm Bill programs through our program, the Bay Bank.

One of our partners in the Pacific Northwest, Sara Vickerman, highlights the state of market-based conservation and points out some of the challenges ahead. William Hudnut III, looks at the significance of USDA's new Office for Ecosystem Services and Markets; and Al Todd and Emily Wiedner present an approach for considering drinking water values in forest land use and policy decisions. Pinchot Institute Senior Fellow, Char Miller describes the continuing challenges in maintaining the globally significant ecosystem services of the Brazilian Amazon.

The development and operation of ecosystem service markets is clearly moving beyond theory to becoming a mainstay in the future of conservation.

Al Sample

PINCHOT INSTITUTE FOR CONSERVATION

The Pinchot Letter is a publication of the Pinchot Institute for Conservation.

Designer: Judith Barrett Graphics
Composition: Peter Lindeman, Arlington, VA
Printed on recycled paper.

of criticism from the scientific and conservation communities, who documented the failure of many of these projects to replace lost or degraded ecosystem functions and values. The sites tended to be small, located in developed areas, and inadequately maintained over time. In contrast, a landowner or restoration business can restore or enhance a large, properly situated wetland and provide long term management to protect its ecological values. Credits are generated and approved by regulators, then sold to developers to offset the adverse impacts to wetlands on the development site. Although some wetland banks have been more successful economically and ecologically than others, the general trend in wetland mitigation banking has been toward improvement in the regulations guiding the process and the application on the ground.

Water Quality Trading

Another example is a water quality trading program operated by Clean Water Services, a special district that provides sewer and water services to Washington County in Oregon. Its treatment facilities must comply with the Clean Water Act, which regulates discharges of warm water. The Oregon Department of Environmental Quality authorized a water quality trading program in which the district compensates landowners for providing riparian vegetation that shades streams and cools the water. This approach provides a much broader spectrum of benefits than traditional engineering solutions, including improved fish and wildlife habitat, aesthetic and recreational values. It also pencils out at about ten percent of the cost of cooling towers at the end of the pipe. A number of other water quality trading programs have been authorized around the United States, each focused on a specific problem, like excess phosphorus or nitrogen. However, many of them have never executed a trade, largely due to the complexity of the regulations and associated transaction costs, and uncertainty on the part of the regulated community.

Riparian vegetation not only provides habitat by shading and cooling the water, but also supplies the local landowner with compensation for utilizing sustainable ecosystem management techniques.

Sara is the senior director of biodiversity partnerships for Defenders of Wildlife and director of the Northwest office. She has been an enthusiastic advocate for policies at the state and federal level that assist landowners in conserving priority habitats for fish and wildlife. She initiated and managed one of the first statewide biodiversity assessments and strategies and published the results in 1998 as part of the Oregon Biodiversity Project. She and her staff have promoted several sustainability and landowner incentive bills in the Oregon Legislature, including SB 513 that establishes a policy framework for ecosystem service markets. Sara has received numerous awards, such as the Distinguished Achievement Award from the Society for Conservation Biology, and serves on several boards, including the Oregon Sustainability Board. Sara can be reached at svickerman@defenders.org for more information.

Carbon Trading

A quasi-regulatory market prominently featured in the news and policy debates is carbon trading. In a regulated version of this market ("cap and trade"), carbon dioxide emissions are capped, and companies are allowed to buy and sell credits or allowances not needed for compliance. Since the federal government has not adopted laws that mandate and guide a cap and trade market in the U.S., trades are voluntary, though some are driven by the anticipation of future regulation. There is potential for carbon trading to benefit forest ecosystems in the United States if the rules allow forest projects that sequester carbon to qualify. Ideally, forest conservation and sustainable management for a broad spectrum of values, including fish and wildlife habitat will provide revenue to landowners who sell carbon credits. However, the rules associated with an-

To avoid the loss of endangered and non-endangered species habitat, landowners will have market opportunities by establishing areas focusing on suitable habitat needs

cillary benefits to sequestration are not clear, and tend to vary according to different voluntary standards.

Conservation Banking for Endangered and Non-Endangered Species

An emerging ecosystem market is conservation banking, common in California but rare elsewhere. This program addresses the loss of endangered species habitat by allowing landowners to establish banks with suitable habitat and sell the credits to developers who impact habitat for the same species. Oregon's first example, the Agate Desert Conservation Bank, is operated by the state Department of Transportation to offset impacts from several highway construction projects. The 80-acre bank contains vernal pools, prairie and oak savanna in the Agate Desert area near Medford.

For non-endangered species, voluntary habitat-based markets are developing. The Bay Bank is developing a market-based approach to implementing State Wildlife Action Plans in the Mid-Atlantic. Initial market areas are focusing on habitat needs for eastern brook trout and bog turtles as well as Atlantic white cedar and ancient sand ridge forests. Compliance driven markets have more defined sources of demand, but voluntary market-based approaches do provide a number of advantages including proactive protection for a greater number of habitats and species and opportunities to test innovative strategies.

Oregon Approves Ecosystem Markets Legislation

The Oregon Legislature approved SB 513 in the 2009 session, which addresses the development of markets for ecosystem services. The bill includes formal recognition that maintaining sustainable rural landscapes is important to people, and that landowners need assistance to maintain ecological values on the land and pass it on to future generations.

Specific provisions establish a state policy supporting the *maintenance enhancement and restoration of ecosystem services throughout Oregon, focusing on the protection of land, water, air, soil and native flora and fauna,* and explicitly authorizes the use of adaptive management.

The bill creates a working group to address several thorny issues, including the need to develop shared conservation goals, how to develop more consistency in ecosystem service accounting, how to integrate the activities of multiple agencies and other actors, and the appropriate role of government in guiding markets for ecosystem services. The work group will present recommendations to the 2011 legislature.

Challenges Ahead

Experiences with these programs have revealed a number of thorny challenges that frustrate practitioners and stakeholders. They need to be addressed before markets reach their potential in providing broad ecological and economic benefits.

- **Ecosystem services are unevenly regulated**. For example, water quality, endangered species, air quality and wetlands are regulated to varying degrees, but other resources, like forested watersheds, native prairie, and functioning floodplains are not. This situation suggests that either regulations should be more consistent across resources, or that other approaches, like incentive payments and market-based approaches are needed to achieve holistic conservation goals.
- **Narrowly focused mitigation approaches remain imbedded in agency policy and culture.** To the extent that a separate program is created for each ecological element, confusion and complexity will continue to baffle landowners who are interested in selling multiple ecological services. A more consistent and integrated approach is needed.
- **The role of government in ecosystem markets is unclear.** Government agencies can either enable and encourage the development and efficient functioning of ecosystem markets, or strangle them with excessive administrative requirements. Ensuring the economic and ecological integrity while minimizing transaction costs is challenging but necessary for vibrant markets.

Making it work

Although multiple challenges must be addressed before ecosystem markets reach their full potential, the benefits of market-based approaches to the conservation are significant. Defenders of Wildlife looks forward to working with The Pinchot Institute for Conservation to meet these challenges.

(continued from page 1)

er of credits, farmers and woodland owners, can easily and more cheaply enter these markets. Bay Bank is currently in the pilot phase in Maryland and Delaware and will be operational in the entire states of Virginia, West Virginia, Pennsylvania, and New York in 2010.

In addition to the social, economic, and environmental needs for Bay Bank, there is also a more practical reason: numerous organizations in the watershed have demanded it. One of the most significant requests for Bay Bank was from the Chesapeake Bay Executive Council—the six Governors of the Bay states, the mayor of DC, the US EPA Administrator, and the Chesapeake Bay Commission. The State of Maryland is also using Bay Bank to help implement its current sustainability initiative.

The Problem—Limited Access and High Costs

Just as economic capital provides steady financial returns, the natural capital of private farms and forests provide steady environmental, economic, and social returns in the form of ecosystem services. In fact, the public spends millions of dollars on technological replacements for services that these lands provide naturally—such as drinking water filtration, storm water management, air pollution control, and flood mitigation. As we lose farms and forests, we also lose the ecosystem services that they provide.

While Bay Bank will eventually facilitate numerous markets and programs, it is initially focusing on the following market areas:

- Forest conservation: credit for maintaining, planting, and enhancing forest lands
- Habitat conservation: credit for preserving and enhancing high-value habitats
- Carbon sequestration: planning for emerging markets that will incentivize conservation actions that increase carbon storage
- Conservation programs: cost-share funding for conservation actions that leverage ecosystem service markets
- Water quality: credit for implementing practices that reduce nutrient pollution

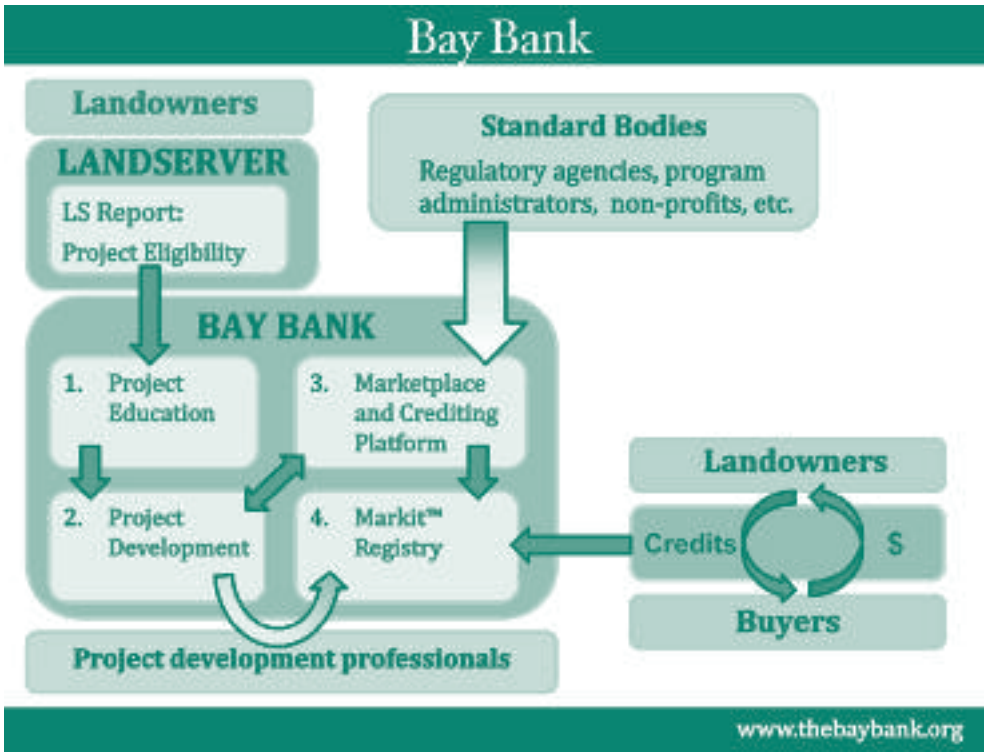
Numerous regulatory tools exist to protect the provision of ecosystem services. These include regulation of industrial discharges, land use restrictions, requirements to protect endangered species, land acquisition, and a complex system of mitigation requirements for some resources but not others. Regulations on their own have not been able to deliver the ecosystem gains needed to restore the Chesapeake ecosystem.

Recent landowner incentive programs have been successful in encouraging the implementation of conservation actions, but funding and agency capacity to administer these programs has not met landowner demand.

There are existing and emerging markets available to farmers and woodland owners to help them implement conservation practices, but their utility is limited by a couple of factors: high costs of participation and a lack of awareness. For a landowner that has never been involved in a conservation program before, joining one can be daunting. To develop a forest mitigation bank in Maryland, a landowner needs to know about the program, conduct research on their options, contact a county program, find a project developer that can help set up the bank, and then make contact with a buyer. Forest mitigation credits can sell for a nice sum, but by themselves may not be enough to convince a landowner to join the program. A landowner could attempt to leverage their forest bank with income from other programs, but the enrollment process would need to be repeated all over again with new players.

The Solution—Market-Based Approaches to Conservation

Implementing market-based conservation can be complex. From



Bay Bank will facilitate landowner involvement in market-based programs by communicating the rules of the road, evaluating opportunities, and connecting landowners to project developers and buyers.

landowner outreach to payment for credits, a number of dedicated agencies, organizations, and volunteers are needed to complete the entire process. Bay Bank is developing the partnerships and infrastructure needed to make existing markets and programs more cost-effective and transparent, speed the development of emerging ecosystem markets, and encourage the creation of new ecosystem markets. Bay Bank provides the following services to conservation buyers, farmers, and woodland owners:

- Market education and outreach;
- Market facilitation; and
- Coordinated third-party verification and independent registry services

Market education and outreach

Bay Bank makes sense of ecosystem market and conservation program rules to increase participation, save conservation buyers' and landowners' time, and ensure environmental gains. This is accomplished through a number of online tools and resources including LandServer and the Ecosystem Crediting Platform.

LandServer

LandServer is a web-based tool that provides farmers and woodland owners with a quick and easy natural resource assessment, an evaluation of their property's potential to receive payments for implementing conservation actions, and information on how to get started. In the Chesapeake, users have access to the Bay Bank marketplace where ecosystem service credits are generated and posted for potential buyers. Governments, conservation organizations, foundations, and other groups will benefit from the ability of LandServer to educate landowners on conservation programs and other priorities.

The heart of LandServer is a robust database that contains regional geospatial datasets provided by state agencies, conservation groups, and other partners used to process landowner reports. LandServer will be continually updated to reflect that latest information for landowners.

Natural resource assessment

By opening a private LandServer account, farmers and woodland owners can generate a natural resource assessment for their property. This report will include detailed information on the natural resources on their land including land use/land cover, soil types, and presence in conservation priority areas. The assessment will also estimate how their property provides valuable ecosystem services like growing food

and fiber, cleaning water, filtering the air, and maintaining healthy wildlife habitat. By providing landowners with a natural resource assessment, LandServer serves as an educational resource raising awareness of natural systems' provision of valuable ecosystem services.

Conservation funding assessment

LandServer's most unique service to landowners and organizations is its ability to translate complex program requirements into simple eligibility models. These models will be continually updated to reflect program changes and new models will be developed when new opportunities arise. LandServer will allow landowners to:

- Easily evaluate potential to enroll in valuable state and federal cost share programs;
- Evaluate potential to receive payments for implementing land practices that enhance ecosystem services; and
- Save time by easily moving to the next step and enrolling in Bay Bank to generate ecosystem service credits, and list credits online for buyers.

Market facilitation

After learning about their conservation funding opportunities in LandServer, landowners can choose to enroll in Bay Bank. Bay Bank will facilitate landowner involvement in market-based programs by communicating the rules of the road, evaluating opportunities, and connecting landowners to project developers and buyers.

Market protocols

In order for Bay Bank to succeed in its mission to use innovative, market-based tools to facilitate conservation in the Chesapeake, clear standards for participation in each market area in which credits will be transacted are needed. These "market protocols" establish the rules of the road for landowners wishing to participate in ecosystem markets. These protocols outline rules such as:

A forested area within the floodplain of the Chesapeake Bay watershed

- Landowner eligibility,
- Verification and certification procedures for practices generating credits,
- Credit definition,
- Stewardship requirements for maintaining credits over time, and

Trees provide multiple services, such as habitat and sequestering carbon, that can provide finacial incentives.

- Others needed to ensure only high-quality credits are transacted.

Within each of these market areas, protocols provide landowners and project developers with the information they need to develop certified credits. The protocols within each market area were thoroughly developed over the past year by chaired workgroups consisting of experts from across the region. The protocols, in most cases, are translations of regulatory standards for the given market. These translations place all of the rules in a single, sequential protocol that can be used by project developers and landowners to move step-by-step through the credit development process. Some markets may have more than one protocol. For example, habitat conservation markets have a protocol for each habitat type, and forest conservation markets have a protocol for each different participating county or city.

Ecosystem Crediting Platform

After identifying potential conservation actions, landowners can then use a simple map interface to evaluate how their preferred actions can be integrated with their management goals and to identify baseline credit and financing potential.

Bay Bank provides landowners a list of certified project developers to help them design and implement their chosen conservation actions. Project developers can use the online tools provided by Bay Bank to help landowners make good project planning decisions, verify eligibility, and assist landowners with implementation of conservation actions. This tool is being built in partnership with the States of Maryland and Delaware and the Willamette Partnership (www.willamettepartnership.org)—a regional market coordinator in the Pacific Northwest.

At the conclusion of this process, landowners will have a credit listed on the Bay Bank Marketplace.

Marketplace

The Bay Bank Marketplace allows buyers to view credits and/or expressions of interest in generating credits for particular markets that have been "posted" by the credit generator. Bay Bank also provides basic market information to the buyer and seller such as current average sale price of credits to ensure transparency.

The Marketplace posts three stages of credits that are designed to help buyers and sellers manage their risk during transactions:

- Expression of interest—a landowner has expressed interest in generating credits, but is waiting for demand to be established before implementing conservation actions.
- Verified opportunity—a landowner has verified that their site conditions are suitable for credit generation. This includes an assessment that the site meets regulatory requirements to generate credits.
- Certified credit—a landowner has implemented conservation practices according to market protocols and has received confirmation from Bay Bank or regulatory agencies that their credit is eligible for sale.

The Marketplace will be available to landowners in Maryland and Delaware in early 2010 and to residents of other Bay States later in the year.

Conservation targeting

Bay Bank allows non-profit, government, and corporate organizations to better target their objectives by finding landowners and operators willing to implement conservation actions in

places they care about. In the Chesapeake, organizations can inquire with Bay Bank to access interested landowners. Elsewhere, LandServer will have some basic querying functions available that allow organizations to find willing landowners. For example, a small watershed group can easily identify landowners interested in planting riparian buffers through the Conservation Reserve Enhancement Program. The LandServer database can be loaded with any state or local priority area GIS data that can then be included in the report to the user. This GIS data can include special resource areas, priority funding areas, wildlife action plan data, zoning, rural legacy, cost share programs, etc.

Verification

Technical service provider certification

Bay Bank provides landowners access to certified technical service providers (i.e., project developers) to assist them in project design, implementation, and credit marketing. Landowners can be assured that technical service providers found through the Bay Bank will deliver honest and high-quality service. Bay Bank's educational resources and tools help prepare landowners for these discussions and quicken the overall process.

Training

To ensure technical service providers are able to meet landowners' needs, Bay Bank offers training on eligible practices, certification standards, and verification requirements for the Bay Bank. In addition, Bay Bank is developing a comprehensive protocol that will allow for effective verification of credits for multiple markets. This will limit the number of site visits to a landowner's property by verifiers.

Multiple-market registry

Bay Bank is partnering with Markit Environmental Registry (www.markit.com) to provide a multiple market registry that allows credits to be tracked from generation through verification. This transparency will serve markets by ensuring that individual credits are not being sold multiple times (i.e., double dipping). The multi-state nature of the registry will also assist the development of regional markets (e.g. intra-basin water quality trading). The registry is a first step in developing protocols that allow credit bundling or stacking, the ability to generate multiple credits from a single conservation action.

Within the watershed, all residents live within minutes of a nearby stream or river that flows into the Chesapeake Bay

The Future—Making the Most of What Resources Provide

Bay Bank is being developed through a unique partnership of the Pinchot Institute for Conservation and Sustainable Solutions, LLC. The program's ultimate success lies with our multiple other non-profit, university, foundation, state, and federal partnerships. Bay Bank has a 20-plus member advisory committee that provides guidance on broad organizational issues and six market-area workgroups that are defining landowner opportunities.

Bay Bank is beginning landowner pilots in early 2010 in Maryland and Delaware. Lessons learned from the pilot process will be incorporated for the expansion to Virginia, West Virginia, Pennsylvania, and New York in late 2010 and the public launch in January 2011.

Linking farm and forest landowners to current and upcoming market-based programs is an essential element to restoring the Chesapeake Bay. Demanded by numerous organizations in the region and supported by both the policy and the natural resource community, Bay Bank will coordinate market-based conservation in the Chesapeake to restore the bay and conserve working lands.

For more information about the work of the Pinchot Institute through our Bay Bank program, please go to http://www.pinchot.org/gp/bay_bank or www.thebaybank.org or contact Eric Sprague directly at esprague@pinchot.org.

Valuing Drinking Water as an Ecosystem Service

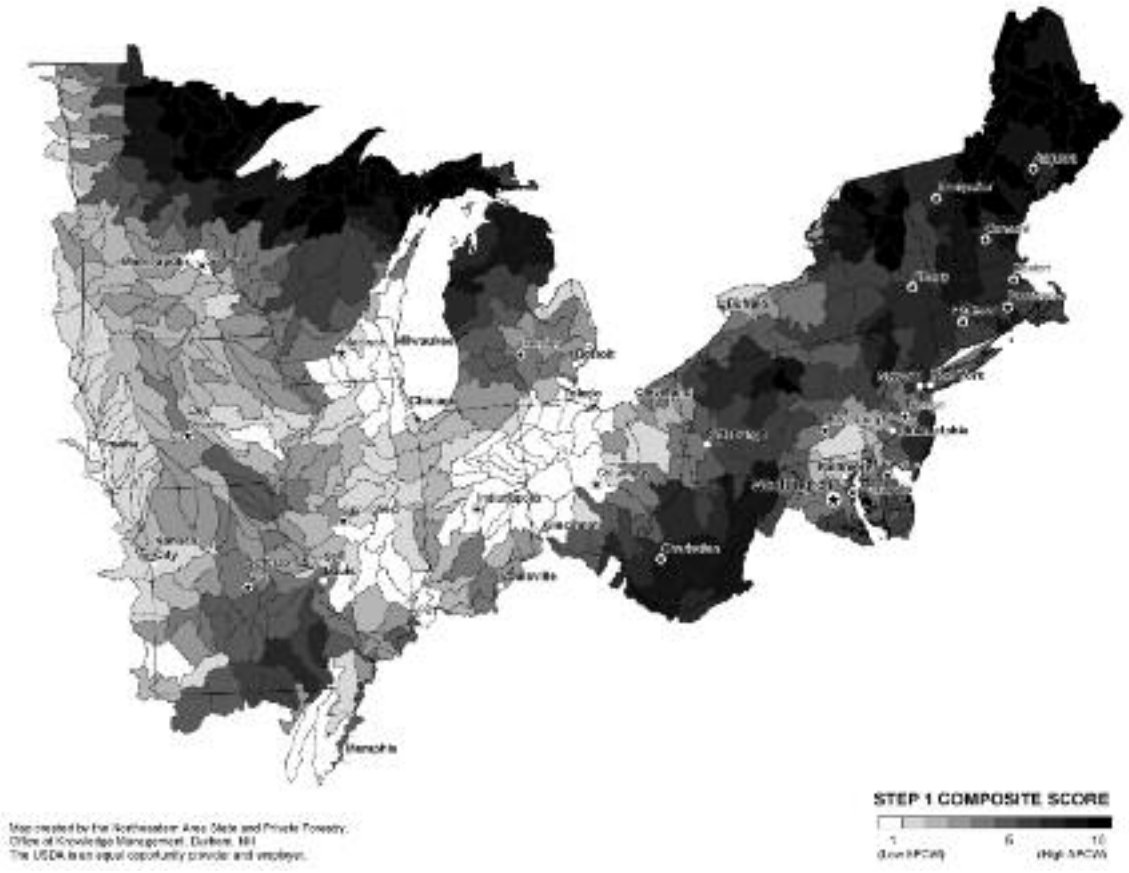
Albert H. Todd and Emily Weidner

In his 1905, "A Primer of Forestry," Gifford Pinchot wrote, "*A forest, large or small, may render its service in many ways. It may reach its highest usefulness by standing as a safeguard against floods, winds, snow slides, or especially against the dearth of water in the streams. A forest used in this way is called a protection forest.*"

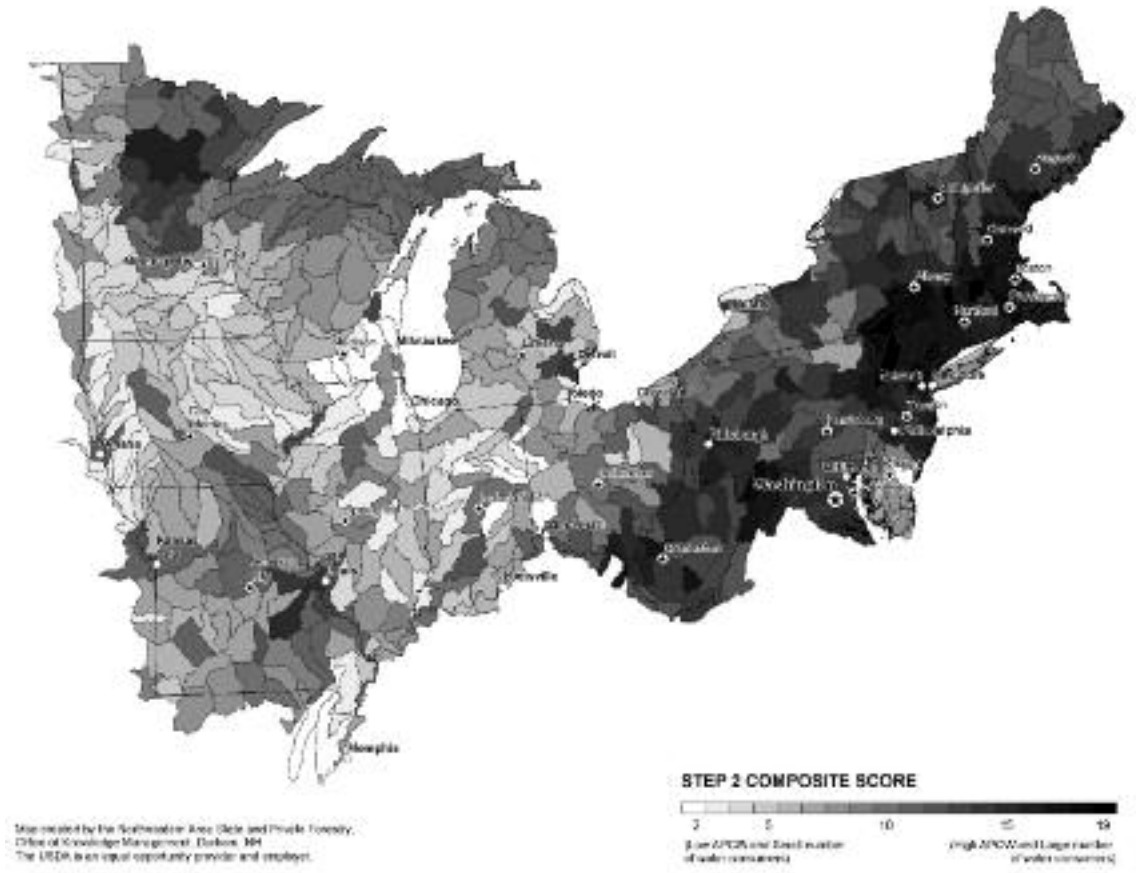
More and more these days we see recognition of what Pinchot knew 100 years ago, that clean water is one of the most important products of our forests. Forest lands are the source of nearly two-thirds of water in the 48 contiguous states—the clean water that fills our rivers, streams, lakes and wetlands, sustains our fisheries, or flows from the taps of our homes and businesses. Forests serve as a living sponge to capture, store, and slowly release precipitation as well as trapping and transforming the chemicals and nutrient deposits that come in the rain or from adjacent runoff. Trees can also be used as a solution for existing pollution problems. This is especially true on farms where forest buffers can protect streams from fertilizers and pesticides, or in urban areas where tree canopy helps to reduce storm water runoff and improve air quality. All the benefits that forests provide—like erosion and sediment control, maintenance of water quality, regulation of flows, and provision of clean drinking water—are called *ecosystem services*, and in this case can be called *watershed services.*

Valuing Watershed Services

For many, managing land for watershed services is not without cost and may require significant, predictable, and continued funding. Without for-



This map shows the ability of 540 watersheds in the Northeast and Midwest to produce clean water. This ability is represented by an index of water quality and watershed integrity that characterizes the biophysical conditions of each watershed. The greater a watershed's abilty to produce clean water, the darker it appears on the map and the higher its score.



This map shows the importance of watersheds for drinking water supplies for each of 540 watersheds in the Northeast and Midwest. It highlights those areas that provide surface drinking water to the greatest number of consumers. The higher a watershed's ability to provide drinking water, the darker it appears on the map an the higher its score.

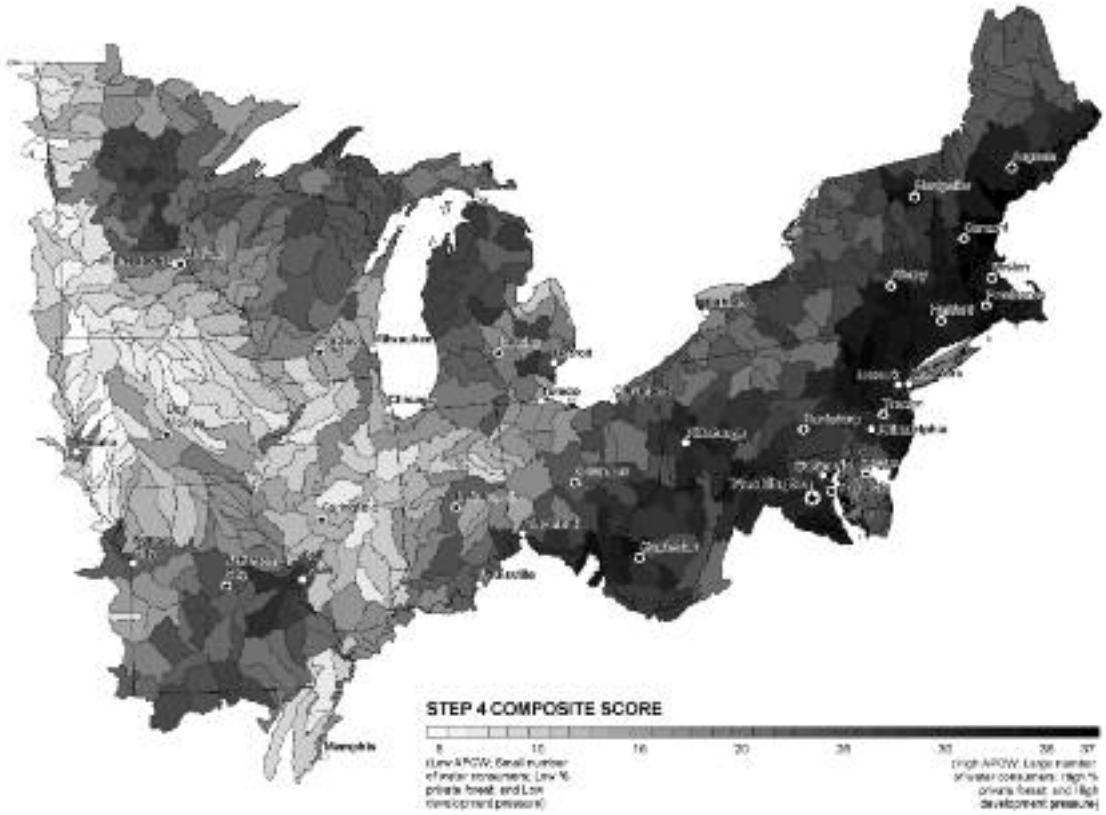
mal markets that reward landowners for their water protection efforts, watershed management of Gifford Pinchot's "protection forests" has historically fallen to government or been an act of altruism—stewardship by private landowners. Most family forest landowners cannot sustain their property long without generating some form of income from the land. Even if the land is paid for, annual taxes and upkeep can make forestland a liability, not an asset, especially when land values rise. Hence, the need for economic return may compete with watershed protection objectives.

Compounding this financial disincentive to protect forests for drinking water quality is the fact that American water consumers have historically paid very little if anything for their water. Utility bills generally reflect only the infrastructure needed to collect, purify, and distribute drinking water. No cost is assigned to the water itself or the costs associated with sustaining the watershed that provides the clean water supply. Excluding these real costs from water pricing undervalues the forest and reduces the consumers' concern with source water protection. In addition, the increased cost of water treatment that results from the loss of forests, is simply reflected in expenses of providing the water without the chance to connect these increased costs to land. In the end, forest owners bear the cost of water supply as a public service, and the positive externality of clean and abundant water is passed on to water consumers free of charge.

Paying for Watershed Services

Market-based financing of watershed management through Payment for Watershed Services (PWS) schemes –a type of Payment for Ecosystem Services (PES) scheme, is emerging as a promising instrument to connect the forests to the faucet in clear economic terms. In a PWS scheme, landowners are financially compensated for the watershed services they provide. The payment for watershed services helps incentivize watershed protection and leads to net increases in forest protection and improved management.

For example, in New York City, the local government pays landowners for provision of watershed services directly and provides a suite of enhanced services to landowners, in part funded by water users downstream. Through



This map shows the development pressure on forests and drinking water supplies. The map combines maps of the abilty to produce clean water, surface drinking water consumers served, percent private forest land, and housing conversion pressure. To highlight important water supply protection areas that are at the highest risk for future development. The greater a watershed's development pressure, the darker it appears on the map, and the higher its score.

conservation easements, riparian restoration, and land purchase, the city has protected more than 35% of the watershed, and it remains in compliance with the drinking water quality standards put forth in the Surface Water Treatment Rule without the need of a modern filtration plant. The Watershed Forestry Program, run by the non-profit Watershed Agricultural Council in partnership with city, state and federal partners, including the Forest Service, provides the enhanced services and incentives to landowners.

The City of Santa Fe along with the Santa Fe National Forest have proposed a PWS scheme in which after a 5-year phase-in period, water customers will pay $0.13 per 1,000 gallons per month, or an average monthly fee of $0.54 into a fund that will support forest restoration in the watershed above the City's intake. Because the Santa Fe National Forest is threatened by catastrophic forest fire that could devastate the capacity to provide watershed services, the payments will support forest management that will carefully reduce the density of trees to more historic levels and reduce the potential for large fires. The payment will help ensure that the Forest Service will be able to continue its restoration activities at a higher rate within the watershed than would be possible otherwise.

Forests, Water, and People

The Forest Service has long been interested in the connection between forests and water. Its recently publicized *Forests, Water, and People* report illustrates this connection and seeks to fill regional data gaps on the linkage of land use with demand and supply of clean water. Although it does not establish detailed cause and effect relationships, it does paint the broad strokes of the most important landscapes to drinking water quality and those that are currently vulnerable to development threats across 20 states of the Northeast and Midwest.

The analysis itself is a GIS-based watershed assessment. First, it ranks watersheds (8-digit Hydrologic Unit Code) on their ability to produce clean water based on a combination of factors including percent of intact riparian forest cover, road density, soil erodibility, housing density and land cover. Next, each watershed's importance for drinking water supply was ranked by overlaying data on the number of surface drinking water customers. This step therefore ranks watersheds based on their ability to produce clean water and the demand for the water supply. Areas ranking

highest emerge as priority surface drinking water watersheds. Next, forest cover is overlaid to identify those watersheds where forests are providing protective services. Lastly, by adding data on development pressure (future housing density increases), the results show which priority surface drinking water watersheds also are highly threatened by future development.

To have a successful PWS scheme, there must be: (1) a clear connection between forest management and clean water to instill stakeholder confidence in the proposed management action, (2) a consumer demand for the clean water and a willingness to pay, and (3) a threat to the existing watershed services that can be avoided or averted through a payment designated for management or protection. On a macro scale, the *Forests, Water, and People* report identifies these areas—areas with a great ability to supply clean water, a large consumer demand for this water, and facing significant development threats. This assessment provides the groundwork for identifying potential sites for PWS schemes, and sets the stage for more site-specific analysis.

Forests to Faucets

Currently, the Forest Service is working on a new *Forests to Faucets* assessment, which will expand upon the work reported in *Forests, Water, and People*. Moving beyond the 20 states, this work will expand to national coverage, incorporate additional threats and vulnerabilities, and uses smaller watersheds to enable better regional and local analysis. Using smaller watersheds requires more refined methods on determining the relative importance to drinking water quality. The final report is expected to be complete by September 2010.

In addition to providing insight on potential areas for PWS schemes, completion of the work provides:

1. *Tools for better decision-making*: The results from the assessments give insight to areas where it would be most wise to establish watershed forest management strategies and forest land protection efforts to benefit surface drinking water quality.
2. *Consistent data on priority watersheds*: At a watershed scale, data layers from these assessments can be utilized by states in future State Forest Resource Assessments and Strategies, and in the development of targeted source water stewardship demonstration projects that guide local actions in land protection and forest management.
3. *Improved Performance Measures*: The assessments provide a context for leaders to use in measuring the impact of their management actions and conservation projects. The data illuminates the number of people who may be affected by improvements in different areas.
4. *Heightened awareness of our dependency on forests for clean water:* These reports illuminate the link between forests and provision of watershed services. The maps and statistics provide easy to understand illustrations and talking points on watershed services.

Conclusion

Abundant, clean water is a precious resource and one of the most valuable products provided by public and private forest lands. Drinking water is also one of most direct links between people and the valuable services that forests provide. Private forest owners and the Forest Service clearly have an important responsibility as stewards of not just the land but the nation's liquid assets as well.

The complete *Forest, Water, and People* report along with state-specific maps and fact sheets is available to the public from the U.S. Forest Service's Northeastern Area website (See http://www.na.fs.fed.us/watershed/fwp_preview.shtm). Watch www.fs.fed.us/ecosystem services/ for more information on the national *Forest to Faucet* assessment.

Al Todd (atodd@fs.fed.us) is the Assistant Director and Emily Weidner (eweidner@fs.fed.us) is the Natural Resource Specialist with the Cooperative Forestry department of Ecosystem Services and Markets within the USDA Forest Service.

A "Watershed Protection Forest" is…

- Vigorous and diverse
- Multi-aged and irregular in structure
- Actively reproducing
- Accumulating biomass, assimilating nutrients
- Continuous with minimum opening sizes for desired species
- Regulating temperature and decomposition
- Deliberately patterned
- Resistant and resilient

Sustaining the World's Natural Capital

William H. Hudnut III

William H. Hudnut III, a former clergyman, Congressman and Mayor of Indianapolis, is a Senior Fellow Emeritus at the Urban Land Institute and managing partner of his own consulting firm. The author of five books on cities, he believes strongly in the importance of a market based approach to generating revenues from users, based on the principle that the user of an asset should pay his/her share of the freight. He also thinks the new Office of Ecosystem Services and Markets in the U.S. Department of Agriculture deserves more attention than it has received.

The 2008 Farm Bill prompted creation of an Office of Ecosystem Services and Markets (OESM) within the U.S. Department of Agriculture (USDA), the first such office statutorily established in *any* country for the purpose of promoting "market based approaches to conservation/conservation programs in environmental service markets."[1]

This initiative constitutes a major policy innovation that can potentially have a huge impact on environmental conservation and farm revenues. It also offers USDA an extraordinary opportunity to show real leadership in an uncharted area, if the political will and scientific expertise are present.

Natural Capital Under Siege

The challenge to embark on such a program is fairly obvious because damage to the world's natural capital has been severe. Any day, one can read about it: One quarter of marine fish stocks are overharvested; Twenty-four percent of the earth's terrestrial surface is under cultivation, much of it unsustainably; More than 50% of wetlands (lakes, rivers, marshes, coastal regions) in parts of North America, Europe, Australia, and New Zealand were destroyed during the 20th century; Every second, a slice of the earth's rainforest natural capital the size of a football field is cut down; If current rates of human destruction of the biosphere continue, one-half of all species of life on earth will be extinct in 100 years. The discharge of greenhouse gasses into the atmosphere is creating climate change and global warming; and, so on.[2]

This brief litany is frightening, because people the world over depend on nature and ecosystem services for their survival. Life cannot be sustained without food, fiber, water, air, and energy.[3]

A Significant Forward Action

So, what can be done before it's too late, to stay the depletion of earth's natural capital? One step among many is the authorization for USDA to provide economic incentives for conservation. How? By empowering OESM to develop standards that other agencies can enforce. Presently, a lack of standards and accounting procedures "that make transparent the benefits that are being produced and marketed"[4] impedes the full development of environmental services markets.

To understand how complicated setting standards can be, imagine a forest. It has value for grazing, timber, fuel, and pulpwood, but it also provides unrecognized benefits in carbon sequestration, watershed protection, harvesting of non-timber products such as raw materials for certain medicines (118 of the top 150 prescription drugs used in the U.S. come from natural sources!),[5] and recreation and hunting. Putting a value on *all* these services will help people understand what conserving and sustaining a forest truly provides. It will also encourage us to develop markets where these services can be traded.

The Innovative Idea

The idea behind tying conservation to marketing of ecosystem services is to turn green into gold; that is, to capitalize on opportunities for agriculture and forestry to develop new income streams by undertaking conservation and land management activities that would provide environmental benefits and services that could be marketed. Environmental services are the benefits we receive, but often take for granted, from the world's natural capital, such as purer air and water. In exchange for the service, the provider is compensated either through direct payment or through the sale of credits that can be traded in a market to a buyer who needs them to offset environmental damage he, she or it is causing. Ecosystem service markets can also facilitate investments in voluntary action not directly related to offsetting environmental damage. For example, foundations or the general public can purchase credits to satisfy their own objectives.

Striking the Deal: Four Steps

The transaction process actually involves four complex stages, each of which requires the advice of experts, scientists, economists, and other players in the field.

First, the scarcity has to be determined and measured. For example,

the atmosphere can only hold so much carbon before we experience unacceptable effects on climate and the environment. Therefore, what is scarce is the capacity of the atmosphere to absorb greenhouse gas emissions, which is a service provided by the atmosphere. Without understanding how scarce a service is, its value cannot be estimated.

Secondly, quantifying an ecosystem service requires breaking it down into convenient units of measurement. Data has to be assembled from many sources—planning documents, government statistics, stakeholder interviews, and field visits, for example—and then processed in computer models and fed into a proposal. Corn, soybeans and wheat can be measured by yield per acre; gallons of filtered and purified water can be determined by the amount extracted from sources on or under the ground; the value of a body of water can be ascertained by the productivity of its harvestable fish. More difficult is measuring the amount of carbon that a forest stores, or assessing the impact of hydrological change on an ecosystem's service. If farmers, ranchers and landowners are to be rewarded for changing their practice from one kind of land management to another, how much should they be paid? The data will help answer that question.

The third step requires buyers to facilitate interaction with suppliers and supplier organizations to negotiate a transaction. Environmental markets are made, not born. The expertise of brokers, technical and business support services, project developers, and financial experts, will have to be enlisted. Presently, there seems to be a huge demand in the investor community for markets in ecosystem services. Several organizations offer bridge-building assistance to bring partners together to close a contract.[6] The market drives the prices that are negotiated, and the agreements are entered into voluntarily.

The fourth step involves monitoring the deal to verify that the promised service is being delivered, or that the agreed-upon land management practice is actually being implemented. This step requires the involvement of third parties, whose specialized help is readily available because verification and documentation "have become veritable cottage industries."[7] Agreement about who will do this and the indicators that will be employed should be incorporated into step three. Just as government sets standards for physicians but does not evaluate the results, so here, the government's role is to verify the verifiers, that is, to make sure they are certified and legitimate, and that their conformance with the standards are public knowledge. The need for transparency here is very clear, and certain information will have to be divulged, as the Securities Exchange Commission requires in another arena, although proprietary information will need to be protected.

Environmental markets are made, not born.

The Third Wave of Conservation

If this analysis is correct, it seems clear that we have arrived as a country at the third wave of conservation. The first was "progressive conservationism," exemplified by Theodore Roosevelt and the federal effort to preserve and protect our natural resources through acquisition. "Regulatory conservationism" constituted the next wave, incorporated in legislation known as "the Big Ten" of regulation,[8] with various agencies authorized to issue the "regs" and do the enforcement. But now, a third wave of conservation has rolled in, founded on performance-based standards. Call it "sustainable conservationism." Its goal is to design a long-term healthy relationship between ecology and economy. The Department of Interior thinks of the process as the creation of a "conservation bank," which is defined as "a free-market enterprise that offers landowners economic incentives to protect natural resources, saves developers time and money by providing them with certainty of pre-approved compensation lands, and provides long-term protection of habitat."[9]

An Opportunity for Leadership

The federal government must show coherent leadership in this area. Its job is to set the table so markets can operate. Government establishes the rules of the road. That means: break down the silos and put aside the turf protection in different agencies. Such collaboration will move the marketing of ecosystem services forward, and might even lead to the creation of an office or commission with coordinating authority over both standard setting and regulatory powers, like the Commodity Futures Trading Commission.

The government can also encourage efforts to broaden the public's understanding of what's happening here. This is a cutting edge initiative. Not enough people know about it. So an extensive public relations program about turning greenery into greenbacks needs to be mounted. USDA could promote the idea at the federal level, especially with Congress, and work with other organizations to communicate the benefits of market-based conservation to state and local constituents.

What the United States does will have global ramifications. The setting and enforcement of standards will influence how the rest of the world will handle these issues. The International Carbon Reduction and Offset Alliance maintains that the first item on the

agenda for self-regulation in the voluntary carbon offset market has to be the establishment of a global code of conduct.[10] But governmental oversight providing formal supervision is needed also. Why couldn't the United States establish a best-practice standard in this instance? And perhaps take the lead in incorporating it into a protocol successor to the Kyoto agreement?

Because protection of natural capital is a global problem, the United Nations could facilitate an international exchange for buyers and sellers to come together, particularly the developing and less-developed countries (LDCs), for whom the financial benefits could be substantial. The UN could also work with LDCs to assess awareness of payments for ecosystem services potential, and assemble landowners and resource users who are interested in the program. Additionally, it could supply the names of third-party professionals in various fields who would (1) provide scientific and technical assistance for measuring and documenting the value of ecosystem services; (2) assist in forging contracts with their negotiating skills; and (3) bring to the table expert verification and monitoring of results.

Conclusion

There's good news and bad news. The bad news is that humans cause the problem; the good news is that we can solve it...if we act now. The bad news we know; the good news we work for. If human activity has led to the disruption and degradation of the natural environment and impeded the delivery of its services and products, then we must take steps to counteract that. Establishing an office that will at once preserve natural capital and trade its services in the marketplace is one such step....new, untried, bold, innovative, entrepreneurial, waiting in the wings to come on stage.

Human life, human societies, and human economies depend upon the twin foundations of stability and productivity, that is, on the tradeoffs between nature's proper balance and civilization's dependence upon its products. Too often, productivity is achieved at the expense of stability, as John Holdren and Paul Ehrlich pointed out in a classic 1974 article in the *American Scientist* magazine.[11] Too often, the needs of people take priority over the services of nature. Short term goals of economic development threaten long term goals of sustaining ecosystem services. Wise policy will aim at achieving some sort of equilibrium between human productivity and nature's capacity.

The good news is that many corrective steps have been taken since 1974 by persons and organizations the world over who care about the environment and are determined to build a sustainable planet. The choices we make today about how we use the resources of land and water will determine, for better or worse, the sustainability of tomorrow's ecosystems and the services they provide.[12] One constructive step toward achieving this goal will be the attempt by private and public interests to preserve and harvest responsibly the services of earth's ecosystems. Two rewards will result: the systems themselves will be protected and conserved, enabling the services to continue; and the needs of both buyers (who want the benefits) and suppliers (who own the land or water) will be met. And that's a pretty darn good result!

Notes

1. The Food, Conservation, and Energy Act of 2008, Sec. 1245, "Environmental Services Markets," an amendment to Subtitle E of title XII of the Food Security Act of 1985; also, 2008 Farm Bill, Conference Report, 162-163; and excerpts from the 2008 Farm Bill's Managers Report on Environmental Service Markets, 65-66.

2. Statement from the Millennium Ecosystem Assessment Board, "Living Beyond Our Means: Natural Assets and Human Well-Being," (2005); "Millennium Ecosystem Assessment—Synthesis report for wetlands and water," (2005), 5; "Facts About Rainforests," The Nature Conservancy, http://www.nature.org/ rainforests/explore/facts.html (accessed 9 December 2009); E.O. Wilson, *The Future of Life* (2002), http://en.wikipedia.org/wiki/E._O._Wilson (accesed 9 December 2009); Juliet Eilperin, "Lawmakers on Hill Seek Consensus on Warming," The Washington Post, 31 January 2007, A6.

3. See Daily, Alexander, Ehrlich, et. al. "Ecosystem Services: Benefits supplied to Human Societies by Natural Ecosystems," *Issues in Ecology*, reproduced with the permission of the Ecological Society of America, Washington DC, as found in http://www.ecology.org/biod/value/EcosystemServices.html (accessed 9 December 2009).

4. Section 1245 (35) of the Farm Bill of 2008

5. See "Ecosystem Services: A Primer," Ecological Society of America, (2000), http://www.actionbioscience.org/environment/esa.html (accessed on 9 December 2009).

6. For example, The Katoomba Group, Ecosystem Marketplace.com, Forest Trends, Conservation International, the Natural Capital Project, EcoSecurities, Global Carbon Exchange, the Center for Capacity Building, the Edinburgh Centre for Carbon Management, the Convention on Biological Diversity, Australian Climate Exchange, and more.

7. Forest Trends, The Katoomba Group, and UNEP; "Primer," 30.

8. For example, The Clean Air Act, the Clean Water Act, the Endangered Species Act, the National Forest Management Act, the Renewable Resources Planning Act, and other laws passed in the last 40-50 years.

9. Federal Register, Vol. 68, No. 89, 8 May 2003, 24753.

10. See http://www.icroa.org/pdf-/POLICY-FRAMEWORK-2008.pdf; Tom Stoddard, ICROA Co-Chair, "Opinion: Voluntary Carbon Needs Self-Regulation and Global Code of Conduct," The Katoomba Group's Ecosystem Marketplace, 20 March 2009.

11. Holdren, John P., and Paul R. Ehrlich. "Human Population and the Global Environment." *American Scientist* 62(3), (1974): 282-292.

12. See "Primer," Conclusion.

Inside the Institute

Forestry Done Right: Precious Woods and the Future of the Amazon

Char Miller

At first I thought I was fighting to save rubber trees, then I thought I was fighting to save the Amazon rainforest. Now I realize I am fighting for humanity.
—Chico Mendes

Tasso Azevedo, the young and energetic director of the Brazilian Forest Service (BFS), loves to tell stories. Such as the pointed one he spun while we were hiking through a section of the Amazon rainforest, near Itacoatiaria, 180 km east of Manaus, capital of the Brazilian state of Amazonas. "Here is one of the cultural problems we face," he told a group of international foresters attending Megaflorestais'08, an informal gathering of public land-agency leaders from around the world.[1] "Stand on a street corner in São Palo, and watch Brazilians react to two kinds of trucks. The first is a cattle carrier: everyone crowds around it, marveling over the animals' beauty." He paused. "The second is a logging truck; once spotted, everyone immediately flips open their cell phones to call the government to complain about deforestation." Smiling, with a slight shrug of his shoulders and an evocative eyebrow lift, Tasso paused again: "What they don't understand is that a cow is a sign of irreparable deforestation; the log is a sign of a renewable resource. They're protesting the wrong thing."

He is not the only head of a land-management agency battling against common misunderstandings of what constitutes an environmental problem; he is not alone in trying to remind his diverse constituency that sometimes what it holds to be self evident and true is neither. Yet the Brazilian experience is unique in this respect: its massive rainforests are disappearing at a bewildering clip; agricultural and grazing operations are the driving forces behind this devastation; and the carbon released as tens of thousands of forested hectares are cut down or go up in smoke has global significance in this age of climate change. Shifting public attitudes about the relative value of cows and logs, Tasso knows, would have a profound impact on whether his country can slow down, perhaps control, the speed by which its woodlands are converted to farmlands, pasture, or plantations.

That is his organization's long-term ambition. In the short run, the BFS, which was founded in 2006 to combat deforestation and bring public lands under regulated management, must reach out to local communities, indigenous peoples, and an array of commercial entities to find common ground. It was on the property of one of these valued partners, Precious Woods-Amazonas (PWA), that we gained a first-hand look at what the future might hold for these venerable forests and the humans they have long have sustained.

On the Ground

"A chain saw is only a tool." So argued Tim van Eldik, a Dutch forester who serves as PWA's sustainability director, and has worked these lands since the company set up shop in the Amazon in the early 1990s; "our commitment to the triple-bottom line means we must make a more decent use of this tool." He and his colleagues have done a good job of it, to judge from those applauding PWA's integrative and consistent focus on economic development, environmental sustainability, and social justice. In 1997, for example, the Forest Stewardship Council certified Precious Woods' operations, the first and largest forestry concern in Brazil to bears its coveted stamp of approval. Convinced too are the Tropical Forest Foundation, Ecological Society of America, Greenpeace In-

Helio Gabriel was Megaflorestais 2008's floating home-base on the Amazon.

ternational, and the Rainforest Alliance; each of which has honored PWA's commitment to the principles of sustainability.

I knew of these honors when my colleagues and I disembarked from the *Helio Gabriel*, after a night-long cruise down the Amazon from Manuas to Itacoatiaria. But I was not prepared for what we encountered when, after a short bus ride from the dock, we stepped into the woods. We followed Tasso and Tim into the thick tangle of trees, walking along a narrow trail until we reached a small clearing. As Tim spoke of how PWA conducts a 100% inventory of all trees on its 150,000 ha; described the buffer zones it protects around riparian systems; explained how it fells, winches, skids, and transports logs to its adjacent mill; and detailed its chain-of-custody controls as part of its certification procedures, we but half listened. Not because we weren't interested. On the contrary, this voluble set of foresters in a babble of tongues was asking each other the question one finally blurted out loud: "when did you last harvest this section?" The answer: less than five years earlier. "Where are the skids? The stumps?" Tim smiled.

At that, people began scattering into the woods, looking for tell-tale evidence. They found little. This is partly the result of how quickly rainforests can regenerate if given the chance. Yet it was also clear from the minimal depth of the skids we could locate and the tiny holes in the canopy that were discernible, that PWA was honoring the agreement it negotiated with Greenpeace in 2000 to set "clear logging limits to guarantee that 85% of standing tree volume [would] always remain in the forest." I have never visited any site that has demonstrated so cleanly how to cut trees while preserving the integrity of the forest ecosystem.

I've never seen anything quite like PWA's mill, either. Oh, the saws emitted the usual high-pitched whine; the sharp scent of fresh-sawed logs permeated the open-air shed, much as it does everywhere. But of sawdust I saw little. Every one of the saws had a hood which suctioned up the vast majority of the particulate matter; and what it did not capture settled down on a lengthy conveyor belt that ran beneath the building, joining all wood scraps, large and small, as it rumbled toward an ear-splitting shredder. Once ground down, the debris was blown into an incinerator whose heat powered a sophisticated, slick-and-clean generator.

An aerial view of the PWA mill and powerplant, Itacoatiaria, Brazil.

The nine-megawatt plant was built in 2005 to replace Itacoatiaria's old diesel-fueled generator, and now supplies most of the electricity the town's 70,000 residents consume while running the PWA mill. Because fuel is no longer trucked to Itacoatiaria (saving associated transportation costs as well); because biomass is now used in place of a fossil fuel; because methane gas buildup can be avoided by burning rather than stockpiling wood waste, the project is estimated to offset 1.4M tons of CO_2 over ten years. As such, it has qualified under the Kyoto Protocol's Clean Development Mechanism to sell carbon credits and in 2006 was approved for a total 512,385; these now account for roughly 30% of PWA's revenue stream. "Green smoke" pays.[2]

The "nonprofit" side of its ledger is just as compelling. In keeping with the company's commitment to social justice, it offers a living wage and a pension plan to its employees; provides free meals and transportation to and from work; picks up the lion's share of its staff's medical-assistance needs; and makes available a range of other services and benefits. But as befits its conviction that it is one element in a wider human ecology, PWA has enmeshed itself in Itacoatiaria's cultural institutions, schools, and communal life. Innovative too is its employment of two, full-time social workers in the office of "Social Environment." Their job is to gauge and evaluate the company's long- and short-term impact on surrounding towns and villages; to partner with local governments and NGOs to help resolve pressing issues; and to liaise between public officials and an oft-dispersed citizenry. To look over the Venn Diagrams these professionals regularly produce from the face-to-face interviews they conduct annually throughout the region is to catch a glimpse of the complex social fabric that PWA promotes—its self-proclaimed role is "to empower the social capital in the local communities for their self-development"—and within which is it is fully integrated.

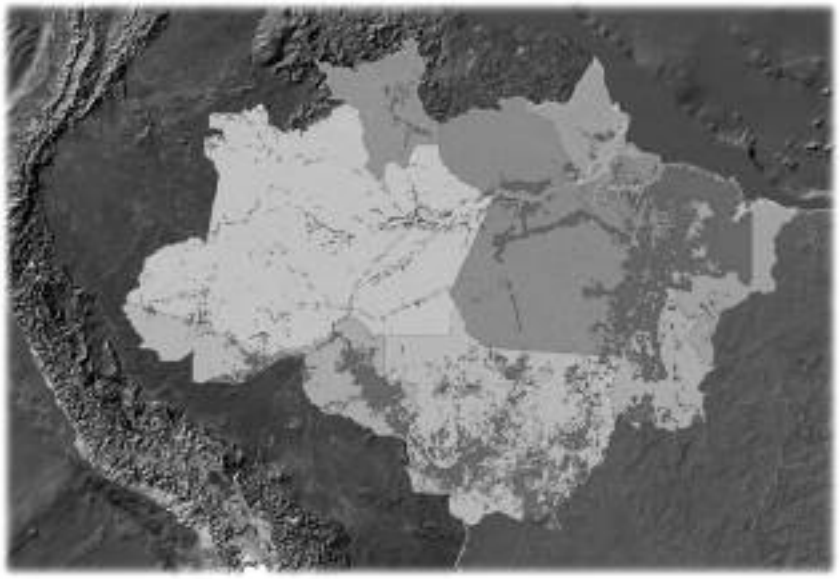
Crosscut

This description of PWA's business plan and corporate activism, I realize, sounds too good to be true. And there are downsides. Not least is that it is hard to figure out how its logging operations make any money. When asked about this during an information session, Tim acknowledged that its returns vary and can be low but reasserted that its economic goals were not just about making a profit but building a model of sustainable forestry. PWA's commitment to low-impact harvesting, while genuine and evident, nonetheless has an effect on the local biota. However careful the harvesting techniques, wildlife will be displaced, observed Manoel Francisco (Kiko) Brito, a noted Brazilian journalist who accompanied us on our tour: "mammals tend to flee an area

that is being logged, and can take a long time to return; the first ones to reappear are the herbivores," and they are drawn back to the new clearings "full of grass or plant shoots, ideal for them to feed on." Their predators stay away for a longer period of time, but not so certain insect populations, which rapidly recolonize the disturbed portions of the forest. These imbalances may well work themselves out over time, but how and to what degree is not yet known.[3]

Still, as Kiko notes, PWA's intentions are noteworthy. Its harvesting methods preserve the canopy keeping "intact the ability of a forest to provide environmental services." As confirmation of just how innovative this strategy is one need but read the commendation the company received from the Rainforest Alliance in 2004 when given the Corporate Sustainable Standard-Setter Award: "The Precious Woods Group caused what one expert calls "tectonic" change in sustainable tropical forest management. No other tropical operation changed more minds in the industry and the environmental community about the feasibility of the concept."[4]

For all PWA's virtues, it is but one actor in the Amazon; its sustainable harvests are the exception that proves the rule, as the preponderance of logging operations in the Brazilian rainforest is illegal. Indeed, the best guess is that 80% of timber felled there is off the books and conducted out of sight. According to the *Washington Post*, last year in the Amazon more than 4,600 square miles was deforested (for those keeping score at home, that's more than twice the size of Delaware). Across this vast terrain, in which property rights are unclear, unemployment is sky high, and federal authority is minimal, even those lands that the central government has demarcated as national forests or national parks have been devastated. Consider the plight of Bom Futuro National Forest: of its 283,280 ha, upwards of 68,797 already have been cleared. "Here we don't call it a 'national forest,'" ranger Antonio Elson Portela told the *Post*: "we call it a 'national grassland.' We do not have any control." So precarious is its existence that Bom Fortuno may be stripped clean within a decade.[5]



Deforestation occurring throughout the Amazon basin. Photo courtesy of PWA.

These intense pressures on public land speak to PWA's central value, as model and bulwark. It offers a prospect of what could happen if other legitimate timber corporations operating in the Amazon adopted its guiding principles, in theory and practice. Moreover, because of the size of its holdings it helps block deforestation in its immediate vicinity; satellite images indicate that timber cutting throughout the region radiates from highways and rivers but diminishes markedly as it approaches PWA's property. That's why Tasso Azevedo emphasized that his under-staffed and under-financed agency could use many more allies like PWA.

His emphasis, in turn, is a sobering acknowledgement of just how much more work must be done to protect the imperiled Amazon.

Pinchot Institute for Conservation Senior Fellow Char Miller is author of Ground Work: Conservation and American Culture *(Forest History Society)*, Gifford Pinchot and the Making of Modern Environmentalism *(Island Press), and is editor of the just-released* Water in the 21st-Century West *(Oregon State University Press). In July, Miller became the director of the environment analysis program and the W.M. Keck Professor of Environmental Analysis at Pomona College.*

Notes

1. For background on Megaflorestais, see: http://www.rightsandresources.org/programs.php?id=82; I have been fortunate to have attended the last two conferences; see Char Miller, "'The Wolf is at the Door': Forests, Foresters, and Global Climate Change," *Journal of Forestry*, January-February 2008: 5-6; and "The Changing Climate of Global Forest Management," *Journal of Forestry*, in press.

2. "New Sustainable Forestry Model—Basis of Highly Profitable Business Segment for Precious Woods," *Forest Trends*, 10 October 2006, http://www.forest-trends.org/resources/press/release_10-10-2006.htm (accessed February 21, 2009).

3. Manoel Francisco Brito to Char Miller, email communication, 22 February 2009.

4. Ibid; "14th Rainforest Alliance Gala Celebrates Sustainable Forestry," http://www.rainforest-alliance.org/news/2004/news91.html (accessed February 22, 2009).

5. Joshua Partlow, "A Protected Forest's Fast Decline," *Washington Post*, 6 February 2009, A10.

PINCHOT INSTITUTE FOR CONSERVATION

1616 P Street NW, Suite 100, Washington, DC 20036

Non-Profit Org.
U. S. Postage
PAID
Hagerstown, MD
Permit No. 93

Address Service Requested

www.pinchot.org

Combined Federal Campaign
The Pinchot Institute participates in the Combined Federal Campaign as **#11789.** All gifts are tax-deductible.

About the Pinchot Institute

Continuing the Pinchot Legacy

The mission of the Pinchot Institute is to advance conservation and sustainable natural resource management by developing innovative, practical, and broadly-supported solutions to conservation challenges and opportunities. We accomplish this through nonpartisan research, education and technical assistance on key issues influencing the future of conservation and sustainable natural resource management. The Pinchot Institute, based in Washington, DC, was dedicated in 1963 by President John F. Kennedy at Grey Towers National Historic Site, home of the early conservation leader Gifford Pinchot.

"The conservation of natural resources is the basis, and the only permanent basis, of national success. There are other conditions, but this one lies at the foundation."

—Gifford Pinchot

You can continue the Pinchot legacy and make a difference in forest conservation. For more information on ways to support the Pinchot Institute, please contact Star Dodd at 202.797.6582 or sdodd@pinchot.org, or visit www.pinchot.org