Banking on Conservation

Species and Wetland Mitigation Banking

THE KATOOMBA GROUP'S
Ecosystem Marketplace

2006

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Here at the Ecosystem Marketplace, we are well into our second year of covering the twists, turns and straight-aways of the mitigation/conservation banking industry. As mitigation banking continues to grow and diversify, we think it is a good time to highlight some of the intelligence we have amassed. In the following pages, we provide a cross section of the timely reporting, market analysis, personal perspectives, controversial debates, and glimpses of the future that make this industry so exciting.

This collection of feature stories demonstrates the breadth and depth of issues we cover at the Ecosystem Marketplace, and, we hope, it will give you a sense of the practical approach we take to reporting on wetland and species mitigation banking.

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Introduction

Galileo Galilei, writing some 400 years ago, once argued that were soil and earth as rare as jewels or precious metals, they would be infinitely more valuable. Given scarcity, he wrote, there would not be a prince un-willing to trade cartloads of rubies or mountains of gold in exchange for enough soil to watch an orange tree grow.

As with so many other things, Galileo was right: as natural systems and the goods and services they provide grow ever more scarce, we are starting to see their value increase. But does it take scarcity to give nature's services value? Is there no better way of assigning value to nature's services before they grow dangerously scarce?

This is the central question that we ask ourselves at the Ecosystem Marketplace: how can society fix its economic system before it becomes too late to conserve the natural resources on which we all depend? So far, this question remains unanswered, but there is growing evidence that new markets linking people's economic self-interest and the health of ecosystems represent one of the most promising ways to garner interest in the conservation challenges facing our world today. Over the last five years we have witnessed the emergence of a whole new set of markets aimed at internalizing the true cost of environmental degradation by giving value to nature's services. These markets include the carbon market in Europe, the sulfur dioxide trading system in the U.S., and one of the most interesting, though least understood environmental markets out there—the market for wetland mitigation and species offsets.

In some ways, it is easier to see how markets for carbon and sulfur dioxide might emerge than it is to conceive of market-based mechanisms aimed at protecting the marvelous biological diversity from which all of nature's varied services ultimately flow. In part, the problem stems from the nature of biodiversity: not only is it a somewhat amorphous concept (do we mean diversity of species, diversity of ecosystems, genetic diversity, or the healthy interaction and functioning of all the above?), but it is also the opposite of a commodity. Biodiversity has no common currency. How can we ever dream of trading eagles for woodpeckers or coral reefs for rainforests?

And yet, despite the problems inherent in designing markets for biodiversity, there are numerous initiatives from which we derive hope that one day, in the not-too-distant future, markets and market-like mechanisms will help us better understand the true value of biological diversity. Chief among these hope-inspiring market-like mechanisms is the process of wetland mitigation and conservation banking in the U.S. In order to provide an overview of this market, the Ecosystem Marketplace has compiled some of our best stories on mitigation and conservation banking.

The actual mechanisms behind conservation and mitigation banking are deceptively simple, they are what observers in other countries have called "biodiversity offsets" and the laws that create these markets work somewhat like this: Before a developer or a private owner is allowed to harm a wetland or "take" (a euphemism for kill) an endangered species, laws in the U.S. say they must obtain a permit from the relevant government agencies. In the case of wetlands, the agency responsible is the U.S. Army Corps of Engineers (U.S. ACE), in the case of species, there are various responsible agencies, usually the U.S. Fish and Wildlife Service (USFWS) or state-level departments of fish and game.

Introduction

Before receiving permits, U.S. laws require that the party harming the species or wetland provide "compensatory mitigation" (basically an offset) for the expected damage. Clearly, the system is much more complicated than this, but that is it in a nutshell.

As a result of these laws, a whole new industry has emerged in the U.S. with the sole purpose of providing needy developers and private landowners with the "mitigation credits" they need to get their development or "take" permits. And these businesses are not all small; some are multi-million dollar enterprises working in dozens of U.S. states.

More importantly, however, the introduction of mitigation and species banking has begun to put a price on wetlands and endangered species (a price that can sometimes amount to hundreds of thousands of dollars per acre) such that, whereas most landowners once viewed wetlands or species on their properties as a "liability", some now see them as potential assets. In other words, these markets are –to borrow from the Ecosystem Marketplace's slogan—beginning to make the priceless valuable.

And, not only are these markets having an impact in the U.S., they are also being discussed (and sometimes copied) in countries as far flung as Australia, Brazil, France, and Germany.

In the U.S., in particular, these markets are coming of age, with distinct niches offering specialty credits for uplands, wetlands, and riparian buffer zones. Species banking, too, is spreading out in all directions from California, pushing the boundaries of bankable habitat to include marine species. It is a time of tremendous growth for the industry.

What is more, regulations issued by the U.S. Army Corps of Engineers and the U.S. EPA at the end of March 2006, now look set to send one section of the industry (private, for-profit mitigation banks) into overdrive. What these regulations say –again in a nutshell—is that all forms of mitigation need to be held to the same standards; a move that benefits private bankers whose work is already held to higher standards than other forms of mitigation. The regulations also address what many had argued was a major failing of the mitigation markets: their unwavering preference for mitigation as near to the site of impact as possible. Scientific studies had criticized this as being needlessly shortsighted, when mitigation could be used to address broader problems at the watershed scale. In other words, these new regulations are only likely to help this market grow.

Here at the Ecosystem Marketplace, we are well into our second year of covering the twists, turns and straight-aways of the mitigation/conservation banking industry. As mitigation banking continues to grow and diversify, we think it a good time to highlight some of the intelligence we have amassed. In the following pages, we provide a cross section of the timely reporting, market analysis, personal perspectives, controversial debates, and glimpses of the future that make this industry so exciting.

As you read these stories, you will see that one of the vital roles we play is to connect industry news to big picture political trends and media events. For instance, when Hurricane Katrina stirred up controversy and conversation about the flood control services of coastal wetlands, we asked if it would lead to any new conservation strategies along the U.S. coastline. In Bringing Back the Buffer, we synthesize the answers unearthed by our investigation.

In addition to painting the big picture, our reporting also seeks to drill deep into the industry news that impacts mitigation bankers on a daily basis. For instance, we ran articles and sent out a newsletter the same day the

official USACE regulations were released, investigating why one industry observer called these regulations "the most significant piece of legislation to come out in the short-lived history of the mitigation banking industry."

Of course, the new U.S. ACE regs are generating lots of talk elsewhere, too, but other important topics are not getting quite so much attention. In the past year, the Ecosystem Marketplace has worked hard to identify issues that require greater analysis, hard questions such as: What happens when things go wrong and a mitigation bank files for bankruptcy? How can it be prevented? Looking at the examples of Ecobank and U.S. Wetland Services, we've asked experts to analyze these important questions.

Likewise, as North Carolina's Ecosystem Enhancement Program (EEP) rounded the corner on its third year, the Ecosystem Marketplace surveyed the model's successes and shortcomings.

Since controversy and debate always accompany significant change and growth, we've left plenty of room in our mitigation banking coverage to air the opinions of those actively involved in the industry. Some environmentalists, for instance, claim we are not seeing the benefits promised by banking, and point instead to a litany of problems. In a two part series, the Ecosystem Marketplace spoke to the environmental community about their concerns and to wetland mitigation bankers about their responses to these concerns. In a follow up article, the Ecosystem Marketplace then visited restored wetlands on the doorstep of New York City to explore the science of re-creating wetlands.

Perhaps the most exciting aspect of our job is spotting trends ahead of others and reporting on what we see. One such trend involves using markets to capture the wide range of values and services (for carbon sequestration, wetland mitigation, species mitigation, water filtration, etc.) of a particular piece of land. In one article, we explored how conservation pioneers in Texas are planning to stack multiple land-use values in ways that will optimize economic and ecological benefits.

Moving further north, we explored how Oregon and Washington are testing the water with several conservation banks focusing on a ubiquitous and well-known endangered species: Pacific Salmon. And since mitigation banking is spreading across national boundaries as well as state lines, we recently followed the path that conservation banking blazed across the ocean to New South Wales. Read on to find out how the ever-innovative Aussies are adapting mitigation banking to suit their needs.

The following collection of feature stories demonstrates the breadth and depth of issues we cover at the Ecosystem Marketplace, and, we hope, it will give you a sense of the practical approach we take to reporting on wetland and species mitigation banking. If you like what you see, we hope you come to our web site and maybe even sign up for our monthly newsletter on issues related to conservation and mitigation banking: Mitigation Mail. In any case, we look forward to seeing you at www.ecosystemmarketplace.com, where we will always strive to provide you with "all the conservation and wetland news you can bank on."

Sincerely,
Ricardo Bayon
Amanda Hawn
Nathaniel Carroll

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At the Tipping Point

New Regulations Could Mean Big Business for U.S. Mitigation Bankers

by Ricardo Bayon

A bill passed by the U.S. Congress calls on the U.S. Army Corps of Engineers to prepare new regulations on wetlands mitigation and mitigation banking, regulations that could mean huge increases in business for mitigation bankers in the U.S. One observer calls these new regulations "the most significant piece of legislation to come out in the short-lived history of the mitigation banking industry."

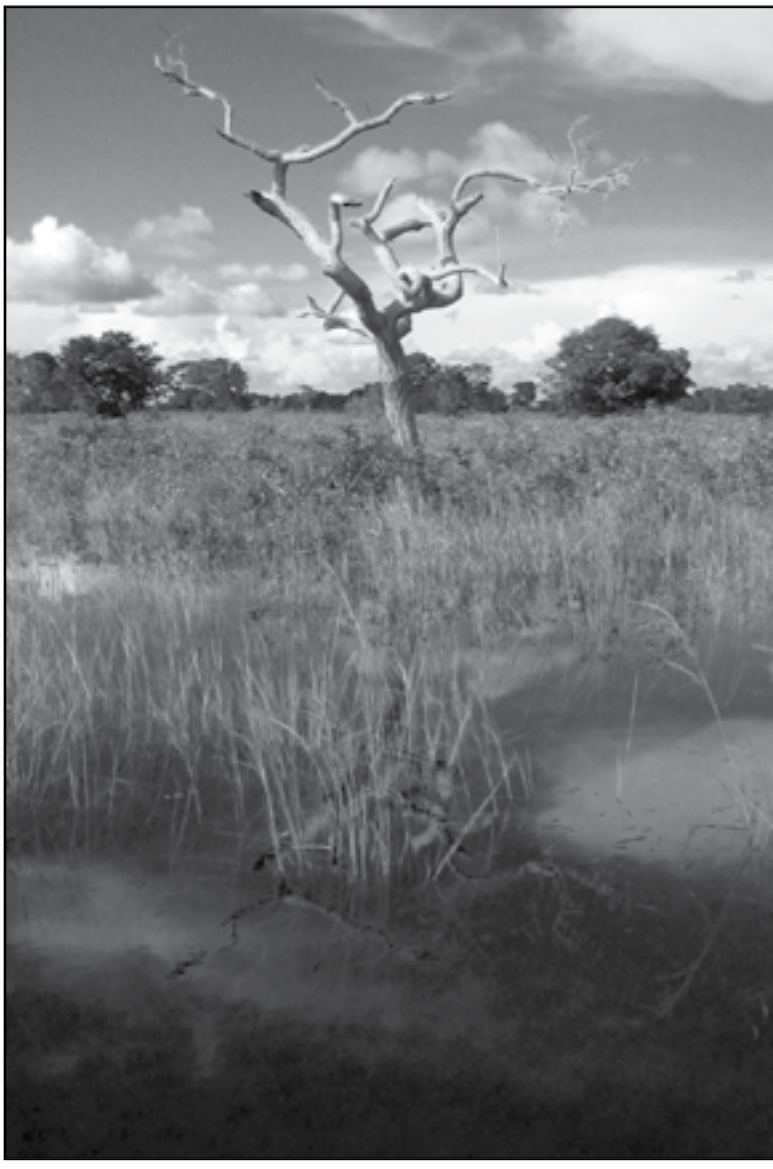

PHOTO BY BORIS GAASBEEK

John Ryan, the President of Land and Water Resources Inc. in Chicago, Illinois, is the perfect example of how environmental markets are transforming the way people do business in the U.S. In Ryan's particular case, not only has his business been radically transformed, but so has his life, his career, and even his legacy.

Ryan, you see, comes from a long line of earth moving contractors based in southern Wisconsin. His father was an earth-moving contractor, as were his grandfather, and his great grandfather. In fact, Ryan Inc., the company that bears his family's name, is still one of the largest earth moving companies in the U.S. Ten years ago, however, Ryan left his family's profitable business to set up a construction company of a very different sort: one that builds, maintains, protects, and restores ecosystems, or, to be more precise, wetlands.

He is able to make a living building wetlands because of a unique environmental market that exists in the U.S. that is sometimes referred to as "mitigation banking", or "wetlands mitigation banking." The system works

roughly like this: Whenever a developer wants to impact a wetland, the U.S. Clean Water Act says they need to obtain a permit for this work from the U.S. Army Corps of Engineers. In issuing that permit, the Corps is supposed to look first at whether the damage is truly necessary. Then, if it determines that the damage is indeed necessary, the Corps is supposed to require that the developer minimize any potential harm to the wetland. Finally, where damage is unavoidable, the developer is required to compensate (or mitigate) for this damage by restoring a former wetland, enhancing a degraded wetland, creating a new wetland, or, in some very rare cases, preserving an existing wetland.

As he describes it, the idea to go from earth-mover to earth-saver came in the form of an epiphany born of frustration.

The law states that developers can fulfill this "compensatory mitigation" themselves (usually at or near the development site), or they can pay third parties to do this in their stead. If they decide to pay someone else to do the work for them, they have several options: (1) They can buy "wetland credits" from a mitigation bank, usually a for-profit entity that "creates, enhances, or restores" a wetland and then is allowed by the Corps to sell credits for these wetlands -measured in acres- to needy developers. (This is how Ryan makes a living.); or (2) they can pay fees established by the Corps to public entities or private not-for-profit organizations that, in agreement with the Corps, use the money to "protect, enhance, or restore" wetlands. These are known as "in-lieu-fee" arrangements; or (3) They can pay a third party that is neither a mitigation bank nor an in-lieu fee provider to undertake the mitigation. These are referred to as "ad-hoc" arrangements.

As a result of these requirements for wetlands mitigation, there has developed in the U.S. a burgeoning market for wetlands mitigation. Indeed, a report by the Environmental Law Institute (http://www2.eli.org/wmb/index.html) estimates that between 1992 and 2002 there has been a 376 percent increase in the number of private wetlands banks in the U.S. They estimate that in 2002 there were 219 approved banks, with some 95 more pending approval. Although no one knows for sure, the market for environmental mitigation in the U.S. is almost certainly worth hundreds of millions -perhaps even billions- of dollars.

That is the market that John Ryan moved into when he left his family's business way back in 1990. As he describes it, the idea to go from earth-mover to earth-saver came in the form of an epiphany born of frustration. "In doing the earth moving work," he says, "it always seemed that we negotiated a contract to do some building and then the people would say, 'Well, gee, we'll get started just as soon as we can get our wetlands permits sorted out.' And when people said that, we knew it would be six months to a year before the work would begin. Then, when the work began, we were asked to help build this small wetland on-site. After a bit of this I woke up one night thinking to myself that it would be better for everyone concerned -the developers, the contractors, the environment- if we were to build a small number of real functioning wetlands instead of a large number of small pieces of wet dirt. The very next day I started talking to people, brewing the idea for my company."

He adds that the transformation hasn't been easy. "It was a gamble," he comments. "I sold my shares in my family company's stock, a successful company, and invested in a new business that no one knew existed." He says he got strange looks and no doubt his family was mortified, but as it turns out, the gamble paid off. His company now owns 22 mitigation banks across the country and does a comfortable $5-6 million dollars in business a year. He says he is quite happy the way things are going.

As well he should be. Not only has the mitigation banking business grown considerably since Ryan opened his business, but now some observers believe it is poised to grow even more rapidly, thanks largely to a bill that was passed by the U.S. Congress in December of 2003. George Kelly, the Managing Director of Environmental Banc and Exchange LLC (EBX), a mitigation banking company based in Maryland, calls the bill "the most significant piece of legislation to come out in the short-lived history of the mitigation banking industry."

The bill he praises so highly is, oddly enough, the National Defense Authorization Act for Fiscal Year 2004, and the language in question comes in Section 314. It calls on the Army Corps of Engineers to "issue regulations establishing performance standards and criteria for use of on-site, off-site, and in-lieu fee mitigation and mitigation banking" by two years after the passage of the act, in other words by December 2005. The real bombshell, however, comes a few lines later, when the law states that the regulatory standards and criteria shall seek to do three things: First, they "shall maximize available credits and opportunities for mitigation." Secondly, they shall "provide flexibility for regional variations in wetland conditions, functions, and values." Most importantly for the mitigation bankers, however, the bill finally says that the regulations shall "apply equivalent standards and criteria to each type of compensatory mitigation."

The reason that Kelly, Ryan, and other mitigation bankers are excited about this law is that they see it as helping correct a fundamental problem with the way wetlands mitigation is conducted in the U.S.; a problem that directly affects their profit margins and -they argue- the environmental integrity of the entire mitigation process.

It all goes back to the various mitigation options that are open to developers intent on impacting a wetland. As was discussed above, developers have essentially four options: they can do the mitigation themselves, they can pay a bank to mitigate, they can enter into in-lieu fee arrangements and pay the government or a non-profit to mitigate, or they can get someone else to do the mitigation. From the perspective of the developer, all of these options are the same, they all allow the developer to continue building, they all fulfill a regulatory requirement. As far as they are concerned, they will look for the cheapest, easiest, and most expedient option.

As far as the Army Corps of Engineers is concerned, however, each of these options is treated differently. If a developer decides to do the mitigation on its own, they are required to submit plans to the Corps for approval, but once they receive this approval, they can go ahead and damage a wetland before any mitigation is undertaken. Also, they are not held to stringent ecological standards in terms of wetland quality, wetland function, etc. Sometimes the result isn't even monitored to ensure that it exists several years later.

George Kelly calls the bill "the most significant piece of legislation to come out in the short-lived history of the mitigation banking industry."

In-lieu-fee arrangements, likewise, are held to relatively lax standards. To participate in an in-lieu-fee arrangement, it used to be that the public agency or non-profit simply had to say that they were going to mitigate, they would then receive approval by the corps and they could begin collecting the money. There was no real oversight on how the money was used, and there were no real biological standards that projects were expected to uphold (though guidelines were issued in 2000 that address some of these issues). As a result, says Ryan, there have been cases where money was being collected by in-lieu-fee providers "in hope and prayer" that wetlands would someday, somehow be protected, enhanced, or restored. There were even cases where the money collected by in-lieu-fee arrangements went, not to a wetland, but rather to education, research and the like. "Education and research are great," says Ryan, "but they don't directly protect wetlands."

By contrast, mitigation banks are usually held to the strictest of standards. Not only do they usually have to complete their projects before being able to sell credits, but completion of the project generally requires that they establish conservation easements legally setting aside their land in perpetuity, and that they set aside a substantial amount of cash, a form of bond, to ensure the project's long-term viability. In addition, mitigation banks tend to be closely watched by the Army Corps of Engineers and are, by law, forced to meet a pretty strict set of ecological standards. By way of example, Ryan explains that mitigation banks need to reduce the amount of exotic species on their wetlands to 5% or less, whereas other mitigation arrangements can get away with having as much as 20% exotic species. "And each percentage point," he adds, "adds a tremendous amount of work and cost."

Craig Denisoff, the Vice President for Government Affairs and New Project Development at Wildlands Inc., a California-based mitigation banking company, who is currently serving as President of the National Mitigation Banking Association (NMBA), says that these differences in treatment have artificially held back the mitigation banking industry. "Because we are held to such high biological, financial, and legal requirements," he says, "we just cannot compete with other forms of mitigation. They can often afford to charge thousands of dollars less per acre than we can… Besides, they can be up and running right away whereas it can often take us 2 to 3 years to get permitted… And to make matters worse, the government imposes all kinds of capricious restrictions on mitigation bankers; restrictions on the size of our projects, restrictions on who can purchase credits from mitigation banks, restrictions on the use of fines and other mitigation money for mitigation banks, among others."

For all these reasons, he estimates that private, for-profit, mitigation banks today make up only about 6% of all the mitigation done in the U.S.. "I would guess," he says, "that in-lieu-fee arrangements account for about 4% of the industry, while mitigation done by individuals, usually for their own projects, accounts for the other 90%."

Beyond being bad for the industry, Denisoff argues, the current set-up is bad for wetlands and bad for the environment. He explains that when the standards are low, the job is often done badly. "In fact," he adds, "the Government Accounting Office (GAO) did a study recently which found that the system for in-lieu-fee arrangements is not working… And we have seen time and time again that permitee-responsible mitigation [where a developer is responsible for their own mitigation] is also not working. It is not tracked, there are no provisions for long-term stewardship, and the performance standards are low."

Denisoff says that mitigation bankers see the new regulations being drafted by the Corps as an important opportunity to "level the playing field", not by lowering standards, but by raising all of them up to the levels currently applied to mitigation banks. To the "94% of people in this business that have lower standards than we do" Denisoff has one thing to say: "Stop playing in the minor leagues and come join us in the major league."

Denisoff says that mitigation bankers see the new regulations as an important opportunity to "level the playing field."

Rich Mogensen, who preceded Denisoff as President of the NMBA and is Director for the Mid-Atlantic Region at the EarthMark Companies, believes that any new regulations that that apply equivalent standards across all forms of mitigation will strongly stimulate the U.S. mitigation banking industry. "I know of no definitive study," he says, "that estimates how much mitigation is done by private banks as opposed to other actors. If I had to hazard a guess, however, I would say that mitigation banks account for less than 15% of the mitigation market. But if mitigation standards are all brought up to the same level, and if there is follow-through and enforcement, this will definitely change. If that happens I think we could easily see, within 3 to 5 years, a situation where private mitigation banks make up 50% of the market."

And what does the Army Corps of Engineers say about all this? According to David Olson, one of the people working on the new regulations at the Corps, it is still too early to say much about the new regulations. The drafting hasn't even begun. "At this stage," he says, "we are in the process of doing some early scoping to see what the regulations should contain. We have talked to the National Mitigation Banking Association; we have talked to people involved in in-lieu-fee arrangements such as the Virginia Chapter of the Nature Conservancy. And we are talking to others. We are also talking to the legislators who drafted the [DOD appropriations] bill to get a better sense of the law's intent. So we are still just gathering ideas."

"When I was a dirt mover," Ryan muses, "I looked on wetlands as soft spots that needed to be dug out and filled in with good solid stuff…Now I understand the beauty, the values, the services they provide. Now I am happy to be leaving behind a living legacy of wetlands that will still be there long after I'm gone."

He explains that after an initial round of consultations, a draft of the regulations will go to several other government agencies, including the Environmental Protection Agency (EPA), the Fish and Wildlife Service (U.S. FWS), the National Oceanic and Atmospheric Administration (NOAA), among others. The regulations will also go through a consultation process managed by the government's Office of Management and Budget (OMB) before being released for comment by the interested public. All in all, they should, he says, be ready in time for the December 2005 deadline.

The slow and arduous process of drafting the new regulations doesn't daunt John Ryan. He's seen it all before. "I was involved in the consultations surrounding many of the regulations that exist in this industry," he recounts. He first went to Washington to talk about differences in mitigation standards back in 1999 and remembers that when he started in the business, there weren't really any rules whatsoever. "Rules," he says, "take time."

Regardless of how long they take to write, Ryan is convinced the new regulations will be good for his business. But more importantly, he says, they will be good for the environment. He explains that over the years he has seen many bad mitigation sites: wetlands that were squeezed, as it were, in between buildings or shopping malls; wetlands built where they don't make sense; wetlands that were built by developers who then leave without providing for its ongoing survival. His stories are legion. Mitigation done badly, he concludes, doesn't help anyone.

And no one -least of all John Ryan, a man who gambled his entire family legacy to turn wetlands protection into a business- wants to see mitigation done badly. "When I was a dirt mover," he muses, "I looked on wetlands as soft spots that needed to be dug out and filled in with good solid stuff. They were nothing but bad pieces of dirt that needed to be dealt with. Now I understand the beauty, the values, the services they provide. Now I am happy to be leaving behind a living legacy of wetlands that will still be there long after I'm gone."

In short, Ryan wants mitigation done right and he expects that whatever regulations the Army Corps of Engineers eventually comes up with, they will do at least that. Beyond that he hopes that they will also help strengthen and sustain an industry that has radically transformed his life and his environment.

First Published: August 2004

U.S. Mitigation Banking Regulations Released

by Amanda Hawn

Mitigation bankers and conservation organizations throughout the United States have been speculating about the release of new federal regulation governing the protection of wetlands since 2003. The wait is over: the new Compensatory Mitigation for Loss of Aquatic Resources regulation is here.

George Dunlop, deputy assistant secretary of the U.S. Army, and Benjamin Grumble, assistant administrator for water at the U.S. Environmental Protection Agency, announced the release of new federal regulation for wetland mitigation on March 27, 2006.

Dunlop referred to the new regulation—Compensatory Mitigation for Loss of Aquatic Resources—as the most important piece of regulation for the protection of U.S. aquatic resources since the passage of the Clean Water Act in the 1970s.

Under the Clean Water Act Section 404 program, anyone who destroys wetlands in the United States must compensate for the destruction by: restoring other wetlands on the same site, paying in-lieu fees to a conservation organization that will restore wetlands in the future, or buying credits from someone who has already restored wetlands elsewhere in the same watershed.

In the past, the Army Corps of Engineers, which oversees compliance under section 404, held each of these different options to different standards. In general, individuals who banked credits to sell to developers needing them, had to meet more stringent environmental accountability standards than individuals undertaking on-site mitigation projects. If approved, the new regulation will change this practice, requiring those pursuing each option to publish management plans and provide for long-term monitoring of restoration sites.

Grumble at the U.S. EPA also stressed that the new regulation will place greater emphasis on the ecological health of watersheds in their entirety rather than on the importance of on-site mitigation. The aim, according to Dunlop, is to increase the "ecological uplift" associated with compensatory mitigation projects throughout the country.

Mitigation bankers, who restore wetlands and bank credits to sell to others, have welcomed the new regulations because they remove the historic bias toward on-site mitigation and tighten accountability standards for organizations accepting in-lieu fees to put toward future restoration efforts. The result, then, is that mitigation banking is expected to become an increasingly attractive option for developers needing to compensate for the destruction of wetlands.

"We look forward to working with the federal agencies and other stakeholders on these regulations to continue to improve wetland mitigation," said Craig Denisoff, president of the National Mitigation Banking Association (NMBA). "These regulations can improve the Section 404 program for all participants—the permit applicants, the mitigation providers, the federal agencies, and most importantly, the physical environment."

According to the NMBA, there are currently 500 mitigation banks in 35 states across the U.S. Dunlop said the Army Corps of Engineers expected this number might double as a result of the new regulations.

The proposed regulations represent a move toward private-sector conservation that will be closely watched by fans and critics alike.

Environmentalists are split over whether or not such a development would be desirable, with some holding that the changes will make developing on wetlands too easy for developers and others contending that mitigation banks generate better restoration projects and should be supported. All agree, however, that the proposed regulations represent a move toward private-sector conservation that will be closely watched by fans and critics alike.

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The Big Picture

Wildlands Inc.: Profile of a Company and an Industry

By Eileen Campbell

The idea for Wildlands Inc.— the first for-profit mitigation banking company west of the Mississippi—was hatched by two businessmen in a duck blind. This mix of money and nature, of land use and land preservation, of practical business and idealistic ecology, has defined and driven the company ever since. The Ecosystem Marketplace considers how the company's life history traces that of the U.S. mitigation banking industry at large.

PHOTO BY SCOTT SCHOPIERAY

In 1989, Steve Morgan—the current CEO of Wildlands Inc.—was just looking for a way to keep a freeway from plowing through a piece of his favorite hunting property. Morgan was an entrepreneur who had founded several businesses already. He felt the intrinsic value of natural areas, but he also knew how the economic world worked. As he talked about it with fellow hunter Riley Swift, they began to imagine ways that property in its natural state could be valued economically—and even marketed.

Morgan and Swift latched onto the idea of mitigation banks, then a minor mitigation method used by a few state and local agencies. They bought a property in Placer County, in northern California, and began working with government agencies, describing what they were up to and seeking permits to offer mitigation credits on their property. It took five years, but when they were done, they'd formed the first mitigation bank west of the Mississippi and, in the process, created the regulatory groundwork for mitigation banking in California.

Fueled by the success of their first Placer County project, Morgan and Swift incorporated Wildlands in 1991 and began looking for other properties to buy. Four years later, in 1995, California and the U.S. issued formal guidelines for mitigation banks. Since then, the company has added 31 properties to its holdings, ranging from freshwater wetlands to vernal pools and beyond.

Wildlands—which now boasts five regional offices in California and Washington state, manages over 15,000 acres, and employs close to 80 people— is one of the largest mitigation banking companies in the U.S. "Some banks have more land than us," says Craig Denisoff, the company's Senior VP for Governmental Affairs, "and some may have as many properties, but combining the two, no one is as big." Although the privately held company does not, as a matter of policy, release income or other such figures, some reports from 2004 cite Morgan as saying that the company's annual revenues are in the "mid-to-low eight figures."

Wildlands is also unique in two other ways: in a world of governmental and NGO players, it is one of the early for-profit businesses. And no other organization, says Denisoff, offers the same range of services. "It's a niche business," says founder and CEO Steve Morgan, "but we provide customer service and a range of products."

Customer Service

Wildlands bills itself as a "turn-key" mitigation provider, meaning that the company offers all the services connected with a mitigation project: identifying and buying sites for specific mitigation needs; navigating permitting and other regulations; handling finances such as credit sales and endowments; planning, designing, and overseeing the restoration process; and managing properties into the future.

The company's Pope Ranch project, in Sacramento's Yolo Bypass area, provides an example of Wildlands' comprehensive, yet targeted, approach to mitigation banking.

After severe flooding of the Sacramento River in 1997, the U.S. Army Corps of Engineers and the California Department of Water Resources repaired levees around Sacramento, but destroying giant garter snake habitat in the process. Since the giant garter snake is a threatened species, the agencies were legally required to mitigate the damage they caused and so turned to Wildlands for help.

> The idea for Wildlands Inc.— the first for-profit mitigation banking company west of the Mississippi —was hatched by two businessmen in a duck blind. This mix of money and nature, of land use and land preservation, of practical business and idealistic ecology, has defined and driven the company ever since.

The mitigation banking company located a hayfield with several advantages: it was within a few miles of the impact site, lay adjacent to a channel that could serve as a water source, and was contiguous with thousands of acres of other protected wetland habitat. Once the property was in hand, Wildlands worked with state and federal agencies to design a landscape that would maximize the site's ability to support giant garter snakes. A fat binder holding the detailed restoration plans, approvals, and permits attests to the work that went into this phase of the project.

The Pope property took shape over two years: bulldozers gave relief to the flat land, carving channels and pushing up islands; water gates were installed to allow managers to adjust flow to different parts of the new

habitat; and workers planted the new landscape with vegetation appropriate to both permanent and seasonal wetlands in California's Central Valley, thereby creating avenues for the snakes to migrate into the site.

On a visit to the area a few seasons later, there's a clear contrast between the un-restored field to the north—flat as graph paper and growing only hay—and the restored marsh, with its muddy channels, mix of vegetation, and diverse chorus of bird, bug, and frog sounds.

This would be the end of a project for most mitigation banking companies, which generally place restored lands with government or non-profit organizations to manage long-term. In contrast, Wildlands holds onto its properties and provides stewardship. "We're one of the only ones I know who do it all," says Denisoff.

Caring for a mitigation site involves many skills: land management, biology, and good old farmhand know-how.

Caring for a mitigation site involves many skills: land management, biology, and good old farmhand know-how. For Wildlands, managing the property includes scheduling "prescribed grazing" visits by the company's herd of longhorn cattle (which mimic the historical vegetation control of native tule elk), managing water-flow regimes, monitoring the habitat, and harvesting. The company generally adds one land manager and "half a biologist" to their staff for each four properties it obtains.

Wildlands believes its turnkey approach helps create projects that are both ecologically and economically sound. The Pope site, for instance, is managed specifically for the giant garter snake, but has also attracted threatened species such as burrowing owls and Swainson's hawks in the past few years. And, according to the California Department of Water Resources, the restoration cost $2.2 million less than it would have for the agencies (the U.S. ACE and the California DWR) to develop their own mitigation project.

A Range of Products

In addition to cost efficiency, other standard business considerations also apply when it comes to commercial mitigation banking. Making money at protecting the environment is an idea environmentalists have long considered oxymoronic, but says Wildlands President Greg Sutter, "The impetus for our founding was an interest in ecology and business. We make a living doing something we think is important."

What's the market? Who's the competition? How might social, political, and economic factors affect business? To manage the risk factors associated with such dynamic considerations, Wildlands carries a diverse "product line" that allows it to tap into a variety of markets.

Today, the company's 31 properties provide mitigation for impacts to a variety of habitats, species, and locations. Wildlands is betting on continued demand for their products in those locations, but as Morgan points out, "If there's a building moratorium, or a hold on water hookups, or a development bust, we're left without a market." Aware that mitigation sites are the ultimate location-dependant product—you can't pick up a wetland and ship it to a hotter market—Wildlands also pursues a number of income generating activities on its properties after their mitigation credits have been sold.

Government regulations require the creation of an endowment for every mitigation property. As each mitigation property's credits are exhausted, the site retires and begins to live off its endowment. Some sites con-

tinue to produce other forms of income—many are still farmed, for example, and Wildlands even makes some money selling beef from its herd of controlled-grazing longhorns.

The real income, however, comes from credit sales. And so executives at Wildlands say they are eagerly looking at what they expect to be a growing variety of markets in environmental functions—things like clean water, flood control, and carbon sequestration.

New Opportunities, New Challenges

As the variety of potential markets for mitigation banking expands, regulators must walk a fine line as they learn to set standards that allow bankers to turn a profit—thus encouraging new investments—while keeping foremost the aim of preserving and restoring natural systems.

The Environmental Protection Agency says it is currently considering a number of issues related to mitigation banking's projected growth in the coming years: For example, what kind of restoration work should qualify for saleable credits? What units should be used to measure such credits? Should companies be allowed to "double-dip" by selling clean water credits, for example, on land already restored and marketed for wetland mitigation credits?

As the variety of potential markets for mitigation banking expands, regulators must walk a fine line as they learn to set standards that allow bankers to turn a profit—thus encouraging new investments—while keeping foremost the aim of preserving and restoring natural systems.

Ultimately, the answers to these questions will determine how well mitigation banking works to increase (or at least maintain) our country's wetlands, habitats, species, and ecosystems. The answers will also help determine how well the U.S. environment is protected into the future, as well as the role that for-profit firms might play in the process. Companies like Wildlands—begun by a few entrepreneurs with a novel idea—have turned mitigation banking into a viable and growing business. Now, regulators will help decide where and how companies like Wildlands Inc. go in the not too distant future.

First Posted: June 7, 2005

Conservation Banking Emerges in the Pacific Northwest

By Nathaniel Carroll

Over the past decade, California has permanently conserved over 40,000 acres of habitat in conservation banks. Now, Oregon and Washington are testing similar waters, with several conservation banks under development. The Ecosystem Marketplace surveys the growing business of conservation banking.

Bill Warncke works his way along the river's edge, scrambling through willow thickets in the autumn sun. Gazing into the cool, clear waters that will eventually empty into the Pacific, Warncke examines the quality of the habitat around him and asks himself: Is it capable of harboring endangered species, or does it already?

This would be a typical day for an Oregon environmentalist. But Warncke doesn't work for an environmental organization, or even for the U.S. Fish and Wildlife Service, he works for Oregon's Department of Transportation (ODOT) and his job is to help make sure new highways, bridges, and overpasses get built in a way that is environmentally sound.

As ODOT's mitigation and conservation specialist, Warncke scours Oregon for suitable endangered species habitat that, if conserved, would help the State offset the habitat damage caused by its transportation projects. Specifically, he is looking for sites for conservation banks, a market-like conservation tool just beginning to gain traction in the Pacific Northwest.

PHOTO BY LISA NORWOOD

As ODOT's mitigation and conservation specialist, Warncke scours Oregon for suitable endangered species habitat that, if conserved, would help the State offset the habitat damage caused by its transportation projects.

Banking on Birds

Conservation banking officially began in California in 1995 when the state released an Official Policy on Conservation Banks and approved the Carlsbad Highlands Bank in San Diego County. Established by Bank of America, the conservation bank provided coastal sage scrub habitat for the California gnatcatcher. California's Department of Transportation was the bank's first customer, buying eighty-three acres to mitigate a highway project.

At the time, California was struggling to find mitigation tools to effectively deal with the widespread conflict between the state's large number of endangered species and a rapidly expanding population. Accordingly, California threw a new slant on the Endangered Species Act's (ESA) mitigation requirement—allowing mitigation credits to be created, held, and sold.

Until this point, mitigation required for an 'incidental take' permit was mostly administered on site or in the form of an 'in lieu' fee to be used for later species recovery efforts. The common result of such an ad hoc approach was fragmented habitat restoration or conservation projects with little ecological significance and often less monitoring and maintenance.

"By completing the necessary mitigation prior to project impacts, banking assures that the mitigation is done, and done properly."

Conservation banking, on the other hand, offered a number of advantages when compared to project-specific, site-by-site mitigation.

"By completing the necessary mitigation prior to project impacts, banking assures that the mitigation is done, and done properly,"[1] writes Marybeth Bauer in the Environmental Law Reporter. Mitigation prior to impacts avoids any time gap between the destruction and replacement of habitat, providing increased assurance of mitigation success.

A significant advantage of conservation banking is that it allows mitigation to be done on fewer, larger sites, which avoids multiple "postage stamp" size projects that often suffer from minimal ecological benefits and unsustainable costs. Instead of restricting mitigation options to a project site, banking allows flexibility to establish banks on a site that may result in greater ecological benefit than mitigation performed at the project site.

"Since the number of credits that some banks earn is a function of how successful species or habitat are restored, bankers have a compelling economic incentive to do the best restoration job possible," argues Bauer.

But perhaps the most compelling advantage of conservation banking is that it has reversed the common perception of endangered species on private property, from liability to asset. Traditionally, private property owners have viewed endangered species on their property as a burden leading to federal restrictions of land-use. Conservation banking, instead, creates the potential for landowners to profit from the conservation of endangered species on their property.

1 Bauer, M., Fox, J., Bean, M.. 2004. Landowners Bank on Conservation: The U.S. Fish and Wildlife Service's Guidance on Conservation Banking. Environmental Law Reporter. August: V 34 pp 10717-10722

Having pioneered the use of conservation banking, California is still by far the leading user of the mitigation tool. But other States are increasingly seeing the establishment of the banks for a variety of endangered species: red-cockaded woodpeckers in the U.S. Southeast, gopher tortoises in Alabama, pima pineapple cacti in Arizona, Preble's meadow jumping mice in Colorado, and several subterranean invertebrates in Texas, among others.

Follow the Leader

So with California, the conservation banking industry leader on its southern boarder (it already has more than 50 conservation banks established), why has it taken the Pacific Northwest so long to begin experimenting with the tool?

"One of the main reasons [the Pacific Northwest] is not at the same place as California is that we don't have the same number of endangered species," explains John Marshall of the U.S. Fish and Wildlife Service. "California has had to struggle with the endangered species problem at a much greater intensity and for a longer time than the Northwest—and 'necessity is the mother of invention.'" With 289 threatened and endangered species (Oregon only has 51 and Washington, 39), California has had a lot of practice trying to make endangered species mitigation work.

"One of the big differences between California and Oregon & Washington is that California has over 270 endangered species, second only to the state of Hawaii, associated with just about every type of habitat in the state," echoes Craig Denisoff of Wildlands Inc., a private mitigation bank development company. "Secondly, the growth pressures in California have been huge. California is close to 39 million people going to 50. In two of that last three years, [California] has had the 2 fastest growing counties in the nation."

California's dramatic combination of endangered species and development pressure may have forced it to pioneer conservation banking. And the Pacific Northwest's milder conditions over the past 10 years may have kept it from being an early adopter of the tool. But with proof now on the table and rapidly sprawling suburban development of their own, are the conditions ripe for conservation banking in Oregon and Washington?

Two conservation banks under development in Oregon are poised to be the first species credit banks in the Pacific Northwest. The banks are specifically set up to protect the federally endangered Oregon Chub and may represent a harbinger of things to come for ODOT.

In fact, ODOT recently signed an agreement with a wide range of agencies—U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration Fisheries and a number of state agencies—to implement a Statewide Mitigation/Conservation Banking Program. Documents suggest an aging system of bridges is fueling ODOT's considerable commitment to conservation and wetlands mitigation banking.

"Many of Oregon's bridges were designed to last about 50 years, and they are now nearing the end of their useful life," reads the Banking Program agreement. "The bridge replacement/repair will entail unavoidable impacts to natural resources, such as wetlands, waters of the state, fish and wildlife habitat, endangered and threatened species…Ongoing maintenance activities create additional unavoidable impacts that must be offset."[2]

2 Oregon Department of Transportation. 2005. Oregon Statewide Banking Program. Agreement on the Implementation of ODOT's Statewide Program For Mitigation and Conservation Banking. ODOT Misc. Contracts and Agreement No. 22141.

ODOT sees the utility of consolidating their compensatory mitigation from many bridge projects to a smaller number of nearby banks for which they can more easily ensure mitigation prior to environmental impacts, quality and permanent conservation, and ongoing management and monitoring.

The state of Washington, not as far along as Oregon, is watching conservation banking developments in Oregon closely. ODOT's Warncke says of Washington State Department of Transportation (WSDOT), "We have had some preliminary discussions with them and are very enthusiastic to follow our progress. We have some important endangered species in common."

First you need Demand…

Like any other market, conservation banking requires: demand, supply, and supporting institutions. The Northwest increasingly seems to be developing all of these.

"We're optimistic about conservation banking in the states of Oregon and Washington because they're seeing urban growth and the need for effective, quality mitigation," says Denisoff. Based on this logic, Wildlands Inc. recently opened a satellite office in Washington State to cover both wetlands and conservation banking in the region.

Oregon and Washington are both on course to double their populations in fewer than 50 years—mainly in their urban centers: Seattle/Tacoma, Portland, and smaller cities: Spokane, Salem, Eugene, and Medford. Of the two Oregon Chub conservation banks under development, one is outside of Salem and the other on the edge of Eugene. And Wildlands Inc. is considering two potential conservation bank sites north of Seattle on the Puget Sound and possibly several others in the Portland area.

In addition to the demand from private sector development, ODOT's aging bridge infrastructure illustrates the significant demand that public works projects create. ODOT is also considering a bank site in the Columbia River gorge—upstream from the City of Portland, and in southern Oregon's Medford and Klamath Falls area.

Warncke of ODOT, points out "we are specifically not to compete with private banks. If there is a private bank within the service area, we'd prefer to use that." This policy ensures opportunities for enterprising private landowners to capitalize on the value of their endangered species habitat.

…Then you need Supply

Despite significantly fewer endangered species than California, the Northwest has a number of species that may benefit from, and serve as the basis for, conservation banking.

"All the Willamette valley species make good banking candidates," points out Marshall, "…Fender's blue butterfly, Nelson's Checker-mallow, as well as vernal pool fairy shrimp in the Agate Desert near Medford."

It is the species that gives the greater Northwest its moniker, Salmon Nation, which ultimately may have the greatest potential for conservation banking in the Pacific Northwest.

Indeed, vernal pool fairy shrimp habitat has been a popular banking credit in California, fetching prices upwards of $100,000 per acre. Like vernal pool habitat in California, the Willamette valley will likely continue to face land development and resulting mitigation demand.

Salmon Run

But it is the species that gives the greater Northwest its moniker, Salmon Nation, which ultimately may have the greatest potential for conservation banking in the Pacific Northwest.

Salmon, once widespread throughout virtually all of the rivers and streams of the Pacific Northwest, are now at a fraction of their historical populations. A cultural icon and economic powerhouse for the region, Pacific salmon are, at the same time, a lightning rod for controversy. Their political & economic importance, ecological vulnerability, and widespread distribution make salmon an important species to restore to viable populations, and a species for which there is considerable demand for effective mitigation.

"There are no other endangered species in the Northwest with the range and magnitude of the salmon. Salmon species are 1000 times greater an opportunity for conservation banking than all the other endangered species combined," says Sky Miller of Wildlands Inc.'s Seattle office.

Bettina Von Hagen, of Ecotrust, an organization promoting a sustainable economy in the Northwest, is interested in the multiple co-benefits that salmon conservation banking could bring to the region.

"You have an opportunity to transfer wealth from urban areas with high levels of development to rural areas were the economic development options are fewer. And [banks can] restore the natural hydrology and ecology of the area for salmon habitat as well as natural flood storage."

"There are no other endangered species in the Northwest with the range and magnitude of the salmon. Salmon species are 1000 times greater an opportunity for conservation banking than all the other endangered species combined."

Despite her enthusiasm for the potential of salmon banking, Von Hagen also warns that the research she's done on the subject suggests that the science behind creating salmon habitat credits remains complex and perhaps prohibitively unclear. In particular, creating a comprehensible accounting methodology to quantify the relationship between improvements in salmon habitat quality and species abundance proved a stumbling block.

Wildlands Inc. has since confronted this challenge in one of their banks in Sacramento County, California. The company developed a habitat accounting methodology for Chinook salmon credits in their Kimball Island bank. They plan to transfer this knowledge to the Northwest and are currently planning two Chinook salmon banks in the Puget Sound outside of Seattle, both over 300 acres.

This transfer of procedural knowledge strengthens the third ingredient for a robust conservation banking market in the Northwest: institutional support.

And Finally: Supporting Institutions

With supply and demand looking up in the Northwest, the question becomes: is there sufficient institutional support to facilitate a market? Are the regulating agencies ready to review, approve, and certify new banks in

a timely manner and enforce the regulation to require compensatory mitigation? These are the questions early bankers like ODOT and Wildlands are asking themselves.

Conservation bank creation in the past has often taken more than 2 years for a single bank. The need to efficiently move banks though the approval process is of concern for both ODOT, which urgently needs to create credits for it's bridge repair and maintenance projects, and for a private company like Wildlands Inc., for which every minute a purchased property sits unused is a loss of profit and an increased liability.

The Pacific Northwest is set to be a hot area for the conservation banking industry to watch.

"The schedule of the regulating agencies to review, approve, and certify conservation banks would be my first concern" says Wildlands Inc's Miller. "If we have to sit around for a long time to get back our investment, that is a big concern."

"Fortunately we're bringing a template that has been approved by NOAA Fisheries…that meets federal guidelines," continues Miller. This kind of knowledge transfer from the more experienced California bankers may enable the Northwest to streamline the bank creation process.

Another critical function of regulating institutions is complete enforcement of mitigation requirements. Enforcing agencies must require, when appropriate, that those impacting endangered species habitat go beyond on-site efforts to avoid and minimize impact, and actually perform compensatory mitigation. Otherwise there is no demand for the sorts of credits that Wildlands Inc. and others are trying to create. In conservation banking, it is enforcement that makes a bank's credits valuable.

A Bright Future?

For Chinook salmon and NOAA Fisheries the historical precedent is optimistic. "Our Chinook habitat bank in the Sacramento delta is sold out and we have another phase under review now, so based on those successes we think we can bring that kind of success up to the Northwest," says Miller.

Such success may augur good things for conservation banking in the Pacific Northwest, but institutional support will truly be put to the test as more banks are proposed and credits put up for sale. In fact, the true nature of the region's supply, demand, and support will become clearer over the next several years as the region's first conservation banks come on-line: ODOT plans to open their two Oregon Chub banks next spring and Wildlands Inc. is hopeful that their Chinook banks in Washington will be in operation within 12 to 18 months.

Fortunately, the Northwest appears to have all the necessary ingredients for a healthy conservation banking industry. And if Pacific salmon habitat banking methods are accepted, the tool could have a widespread impact on the Pacific Northwest's ecology and economics.

With demographic trends and state transportation departments promising demand, Pacific salmon and other species as supply, and willing institutions such as U.S. Fish and Wildlife, NOAA fisheries, and Wildlands Inc. to provide know-how and regulatory support, the Pacific Northwest is set to be a hot area for the conservation banking industry to watch.

First Posted: November 23, 2005

III An Ongoing Debate

Wetland Mitigation Banking: Environmentalists Express Concerns

By Deborah Fleischer

If you talk to some environmentalists about wetland mitigation banks, passions run high. Environmentalists are not seeing the benefits they have been promised by banking, and point instead to a litany of problems. The Ecosystem Marketplace talks to the environmental community about its concerns with mitigation banks.

PHOTO BY CRISTIAN GALLETTI

No Net Loss: Are We Meeting the Goal?

When the U.S. program for wetland mitigation and compensation (the program that gave birth to the wetland mitigation banking industry) was set up more than two decades ago, it was touted as a way to achieve "no net loss" of wetlands in the U.S. Not surprisingly, therefore, at the heart of the controversy over mitigation banking lie two simple questions: "Are we achieving no net loss?" and "Do wetland mitigation banks replace lost functions better than other forms of mitigation?

Answering the first question is fairly straightforward. A 2001 National Research Council (NRC) report concludes that while the loss of total wetland area has slowed in the past two decades, the goal of "no net loss" of wetlands (particularly when one takes into account wetland functions) is not being met by mitigation. According to John Mack, a wetland ecologist with Ohio EPA, if you measure the quality of wetland habitat we are creating, "we are not meeting the no net loss goal."

Replacement of Lost Functions: On-Site vs. Off-Site Banks

Answering the second question is a bit trickier. The answer will depend on what criteria you use to measure success and who you talk to.

If developers cannot feasibly avoid impacting wetland resources, a wetland mitigation bank allows them to compensate for the unavoidable impact by purchasing credits at an off-site location where wetlands have been restored, created, enhanced, and in exceptional cases, preserved by a bank.

Bankers are enthusiastic about mitigation banking and argue it offers both economic and ecological benefits to on-site mitigation because you consolidate your scientific, economic, and adaptive management resources.

"Show me the science. Show me that they are producing superior wetlands."

Proponents of banks maintain that mitigation banks provide ecological benefits by creating large, more ecologically viable wetlands, make the development process more efficient, and avoid the creation of small, isolated pockets of wetlands. Another benefit from the banker perspective is that the mitigation sometimes takes place before the impact, minimizing temporal losses. And finally, proponents propose that banks provide a higher level of wetland restoration and management expertise than an individual developer can provide.

"Long term, ecologically, mitigation banks are more viable," offers Anthony Georges of the Mount Burdell Wetland Conservation Bank in northern California. Georges adds, "mitigation banks are the preferred method for wetland mitigation for two main environmental reasons: their larger size can support greater plant and animal diversity and they have a higher probability of remaining ecologically viable over the long-term."

"Prove it, prove it, prove it," responds Julie Sibbing, Senior Program Manager for Agriculture and Wetlands Policy at the National Wildlife Federation.

"We are not opponents of mitigation banking, we are being pushed in that direction due to the belligerence of the mitigation community. We see a place for banking. It is a viable approach to mitigation. Our objection is to the assumption—with absolutely no evidence—that mitigation banking somehow creates superior mitigation and does a superior job at replacing functionally the wetlands that are destroyed through development," says Sibbing.

"Show me the science. Show me that they are producing superior wetlands," she adds.

Georges backs up his claims with the recent position statement by the Society of Wetland Scientists supporting wetland mitigation banks and the 2001 NRC report, which states that third-party compensation approaches, including mitigation banks, "offer some advantages over permittee-responsible mitigation."

Some of the differences between Georges and Sibbing may in fact be answered through Mack's work. The Ohio Environmental Protection Agency (EPA) is completing a study to assess the ecological functioning of 12 mitigation banks in Ohio. The results of this study will help shed more light on the ecological success of wetland mitigation banks.

Watershed Planning vs. Loss of Local Wetland Functions

There is a growing body of evidence, supported by the 2001 NRC report, that mitigation sites identified in the context of a watershed plan can improve the ability to establish wetland functions. Therefore, in some situations, off-site mitigation can be preferable to random, isolated mitigation projects that do not take into account such factors as historic wetland ranges, threats to the ecosystem and functions of concern, and specific restoration needs within a watershed.

If you lose ecosystem services such as flood storage, groundwater recharge, wildlife and fisheries habitat, and nutrient cycling at one location, can it really be replaced at another location miles away?

Despite this trend, the Sierra Club and Golden Gate Audubon would prefer to see mitigation occur as close as possible to the impact site and via project-by-project mitigation.

Art Feinstein, Director of Conservation at Golden Gate Audubon, cautions, "Wetland functions are very site specific." For instance, he argues, if you lose ecosystem services such as flood storage, groundwater recharge, wildlife and fisheries habitat, and nutrient cycling at one location, can it really be replaced at another location miles away?

Feinstein explains, "If the system worked appropriately, mitigation would be more effective if regulators looked for sites as close as possible to the impact."

Robin Mann, Chair of the Sierra Club National Wetlands Working Group, agrees. "Some wetland functions," she says, "are important to keep local, such as flood storage and habitat functions."

Performance Standards

Another concern that has been raised regarding mitigation banking has to do with how you measure success. Without adequate performance criteria, say the critics, it is difficult to determine the success or failure of a mitigation site. And, they add, the performance standards currently in place tend to be stated in vague goals or based on criteria that do not measure ecological functions and values. According to a 2002 Environmental Law Institute (ELI) report entitled Banks and Fees: The Status of Off-Site Wetland Mitigation In the United States, over a third of the instruments for wetland mitigation banks fail to specify required performance standards.

"And very few included standards for water quality, soils, wildlife habitat or other criteria," adds Jessica Wilkinson, Senior Science and Policy Analyst at ELI and Director of their wetlands program. "Ideally, you would have a lot tied to the performance standards, including credit release schedules and mitigation ratios," explains Wilkinson.

The ELI report argues that, ideally, standards should measure a broad array of the major functions, related to hydrology, vegetation, water quality, wildlife habitat, and soil. Also, the report suggests that banks could have their monitoring periods directly linked to achieving final performance criteria, ensuring the development of a functional wetland.

Mitigation before Impact

Another important issue related to mitigation banking has to do with the timing of when credits are sold. The 1995 banking guidance defines banking as "in advance of development action," but allows for the advance sale of credits under certain circumstances.

From an ecological standpoint, you want a mitigation project to be up and running, having met performance standards, before you allow an impact to occur at another location. One argument in support of banks is that they can be implemented and functioning in advance of project impacts. In theory, this could reduce temporal losses in the functional values and reduce uncertainty over whether mitigation is successful in offsetting impacts.

However, in reality, credits are sometimes sold before a bank has created functioning habitat.

"The bankers are organized, very vocal and have a fair amount of influence. What they say over and over again, is mitigation banking is the only form of third party mitigation that is in advance. But it is not. I think it is a false claim," explains ELI's Wilkinson. According to the 2002 ELI report, "Only 17 banks, or eight percent of all the banks in the U.S., do not allow credits to be debited until final performance standards for the bank have been met."

NWF's Sibbing adds, "They claim that they are doing mitigation in advance, but that is completely ridiculous. They are not."

The 2002 ELI report backs up this claim with the fact that, "on average, banks allow for the advance debiting of 66 percent of credits prior to meeting all performance standards." It also points to 10 banks where 100 percent of the credits were sold prior to meeting any performance standards.

"They claim that they are doing mitigation in advance, but that is completely ridiculous. They are not."

Accountability

Another persistent complaint about mitigation is the lack of accountability in the system. "One of the real frustrations," notes Sierra Club's Mann, "is that the Corps of Engineers [U.S. ACE, the government entity responsible for overseeing mitigation banking in the U.S.] is not enforcing mitigation—it is either never done or done poorly."

Sibbing shares this frustration. She points out, "No one is held accountable to build a fully functioning wetland that replaces the values destroyed. There is no political will to enforce."

"If a project has failed to meet performance criteria, it is difficult to get the banker to fix the problem. There are not a lot of regulatory hooks," adds Mack from Ohio EPA.

Mack poses the question, "Who would you sue for enforcement? The answer is not clear."

Public Involvement and Transparency

The federal guidance for the establishment of mitigation banks requires that the U.S. ACE provide notification of the availability of a proposed banking prospectus and allow the public to comment. However, in practice, when speaking with NGOs, they feel they have little or no ability to influence the process on decisions regarding location, design, or service area designation.

"The public comment process is very limited—the other evil of the process," comments Golden Gate Audubon's Feinstein. The 2002 ELI report states, "with the exception of a few Corps district and states that provide banking instruments and other documentation on their web sites, the public has very little access to information of banking…"

Facilitation of Development

Another concern of environmentalists is that mitigation banks facilitate development by making it easier for regulatory agencies to give a permit. NWF's Sibbing explains, "Since COE [U.S. ACE] staff believe that mitigation banks work, it makes it easier for them to say yes to a permit."

Georges, the managing tenant-in-common at the Mount Burdell Wetland Conservation Bank in California, responds strongly to this claim.

"They claim that this promotes development. And the lie of that is that it doesn't because you can't fill [i.e. damage a wetland] just because you have a bank—there is a long, arduous process one must go through first. You must show there are no alternatives, and if they allow you to build, then you address how you will mitigate and you have the choice to mitigate on site."

"If a mitigation bank exists or does not exist, does not make any difference for someone getting a permit. If we didn't exist as a mitigation bank, the service area we have would not reduce the number of permits allowed for fill," he adds.

Conclusion

"The bottom line," says Mack is that "consolidation of scientific, technical, economic resources is a really good thing, but what it means is that banks should be the best of what we can achieve mitigation-wise. They should be able to produce a product that is much better than your average mitigation, and if they are not, why bother?"

Where does the motivation come from to be a "better than average" banker? "The only way to do it is for the state or federal government to impose uniform ecological performance goals; level the playing field and raise the bar so the more conscientious bankers are rewarded," explains Mack.

Many environmental NGOs are opposed to creating more mitigation banks and do not see them as the solution to solving all of the flaws with the current mitigation process.

"The only way to do it is for the state or federal government to impose uniform ecological performance goals; level the playing field and raise the bar so the more conscientious bankers are rewarded."

"Mitigation has huge problems. I have gotten to the point where I am despairing of it ever improving because instead of really seriously trying to improve mitigation, the lobbyists for the mitigation banking community are pushing to say, we are the answer. When, we don't know if that is true," concludes NWF's Sibbing.

Bankers and environmentalists both have the goal of creating successful, functioning mitigation projects. There could be an obvious partnership between bankers and NGOs that want to work together to address some of the environmentalist's concerns.

A start to begin improving the mitigation banking system could include consideration of the following five key elements:

1. If off-site mitigation is necessary, incorporate a watershed approach to site selection that takes into account such factors as: position within the landscape, soils, connectivity, and the hydrological regime.

2. A data driven release of credits for banks where bankers would get an initial release of credits to cover construction costs, but subsequent releases would be tied to meeting performance standards.

Bankers and environmentalists both have the goal of creating successful, functioning mitigation projects. There could be an obvious partnership between bankers and NGOs that want to work together to address some of the environmentalist's concerns.

3. Development of stronger performance goals to ensure that ecological and hydrological functions are replaced.

4. Incorporation of an adaptive management approach that articulates a process for how a mitigation project will be revised if monitoring data shows that a site is not meeting its performance goals.

5. Improve the availability of information on mitigation banks and engage stakeholders in a process that allows meaningful input on proposed banking instruments.

Whether or not regulators and mitigation bankers will meet environmentalists on these issues, however, remains to be seen.

First Posted: April 25, 2005

Wetland Mitigation Banking: Bankers and Regulators Respond to Criticisms

By Deborah Fleischer

The wetland mitigation-banking world often looks very different to private-sector bankers and not-for-profit environmentalists. The Ecosystem Marketplace previously ran an article focusing on the environmental community's concerns with wetland mitigation banks. This follow-up piece records bankers' reactions to these concerns.

It is hard to be a wetland these days. Not only are wetland watersheds being polluted, but the pressures associated with growing populations is leading to the construction of new homes, more port-related activities, airport expansions, bridge retrofits, and transportation improvements—all with the potential to unavoidably impact wetlands. Add to that the current political environment where resources for enforcement and monitoring are limited, and the future of wetlands is looking pretty dim.

PHOTO BY DANIEL WEST

Mitigation bankers and environmental regulators argue that wetland mitigation banks are an important and viable mechanism to achieve a "no net loss" of wetlands.

Faced with these pressures, mitigation bankers and environmental regulators argue that wetland mitigation banks are an important and viable mechanism to achieve a "no net loss" of wetlands and reduce the need to manage and monitor numerous small, isolated wetland mitigation projects.

A Matter of Perspective

While bankers and regulators see the world from one perspective, most environmental non-profits working to protect and restore the remaining wetland habitat see things a little differently. When the environmental community looks out into the world, they see a land-

scape where 50 percent of the nation's original wetland habitats have been diked and filled for farming, grazing, homes, and other development and infrastructure projects. Given this history, they say that the focus should be on avoiding future damage to wetlands.

If wetlands must be damaged and mitigation is required, most within the environmental community make a case that mitigation banking is not automatically the preferred choice. One of their concerns is that off-site mitigation banks may result in the loss of important local and regional wetland functions.

The flip side of this concern is that "sometimes a project will be designed to avoid [damaging] an on-site wetland resource, but then it [the remaining wetland] is totally isolated and cut off from connection with the larger ecosystem," remarks Molly Martindale, a Regulatory Project Manager with the San Francisco District of the U.S. Army Corps of Engineers (U.S. ACE). While there is a current policy preference for on-site mitigation, there appears to be a growing trend, encouraged by the banking community, for regulators to pursue the most "ecological preferable" approach.

While a 2001 report by the National Academy of Science National Research Council (NRC) (entitled Compensating for Wetland Losses Under the Clean Water Act) details the concerns with mitigation, it concludes that "third-party compensation approaches (mitigation banks, in-lieu fee programs) offer some advantages over permittee-responsible mitigation." In addition, the report states that a "preference for on-site and in-kind mitigation should not be automatic, but should follow from an analytically based assessment of the wetland needs in the watershed and the potential for the compensatory wetland to persist over time."

Keeping an Eye on the Prize

Based in part on the findings of the NRC report, both bankers and regulators consistently argue that larger-scale, ecosystem-based, off-site mitigation banks provide a higher level of ecological function over the long term than piecemeal small-scale projects, where the wetlands are isolated. Faced with the choice of protecting an acre of wetland at the backside of a big shopping mall or requiring a developer to purchase credits at a 100-acre large-scale project, from the regulator and banker perspective, banks offer better ecosystem functions and a more viable long-term solution for wetland mitigation.

"Mitigation banks are an important tool to make conservation work when you have lots of development going on," explains Carl Wilcox, Habitat Conservation Manager of the Central Coast Region of the California Department of Fish and Game (C-DFG). "When developers are having lots of small impacts across an ecosystem, it is difficult for them to do mitigation effectively. In this instance, banks provide an opportunity for meaningful mitigation."

While the majority of environmental organizations express concern that banks facilitate development, regulators and bankers consistently disagree with this statement.

Wilcox further suggests a provocative idea: in some cases, keeping your eye only on the goal of no-net loss can actually be harmful to the very same resources you are working to protect. Another goal to consider, he argues, is to "recreate an ecosystem rather than focus just on wetland acreage."

For example, if you are looking to preserve and enhance a threatened resource, such as vernal pools, in the face of development pressures, and are only focusing on no-net loss of acres, you start requiring bankers to create higher densities or take out upland habitat. Wilcox suggests that at some sites you might want to cre-

ate less actual wetland acres, but create an ecosystem that includes upland habitat that functions better and enhances the services for the species that you are interested in.

He acknowledges that this concept is difficult for people because it goes against a long tradition of focusing on acreage. This approach, he says, "requires a broader consideration of what the biological objectives are."

Facilitation of Development

While the majority of environmental organizations express concern that banks facilitate development, regulators and bankers consistently disagree with this statement.

Martindale of the U.S. ACE admits if a mitigation bank is available, it might make it easier for a project manager to approve a project, however, she says, with or without banks, "almost all permits do get approved. Not having mitigation banks does nothing to stop development," she stresses.

Philip Shannin, Senior Project Manager with the San Francisco District of U.S. ACE agrees. "Banks do not facilitate development. It really isn't any easier to get a permit because there is a mitigation bank present." In fact, some argue, the upfront cost of purchasing credits at a mitigation bank can provide a clear economic signal to developers, creating an incentive to avoid wetland impacts.

Financial Safeguards

One of the advantages of mitigation banks compared to regular mitigation is the financial assurance required by a banking agreement.

One of the advantages of mitigation banks compared to regular mitigation is the financial assurance required by a banking agreement. "Mitigation banking provides the best procedural substantive safeguards," suggests George Kelly, a principal with Environmental Banc & Exchange (EBX), a private firm that develops and manages wetland mitigation projects. "We feel that every other form of mitigation should be held to these same safeguards."

One such safeguard is the requirement that banks provide "financial assurance" for their projects. This assurance is typically required for three key items: bank construction, a contingency fund to ensure completion of construction and achievement of ecological function, and an endowment fund to generate interest to help manage the site in perpetuity.

An assurance can come in several forms, the most common being performance bonds, escrow accounts and letters of credit. At the U.S. ACE San Francisco District, before they will release the first 15 percent of credits, a banker must provide a financial assurance to cover 100 percent of the estimated construction costs. This assures that a banker will not sell the initial 15 percent of credits and walk away from the project. This sort of assurance is not required for other forms of mitigation (i.e. permitee-responsible mitigation and "in-lieu-fee" mitigation).

Then there is the contingency fund, which is created so that if a banker does not meet their performance criteria, funds are available to cover the corrective construction or interim adaptive management actions necessary to ensure the achievement of performance standards. The San Francisco District of the U.S. ACE is moving to require a contingency fund of 10-20 percent of total construction costs.

One complaint from the environmental community on this front, however, is that contingency funds are typically not big enough to solve any of the real problems that result should a project fail to perform.

"A huge amount of effort goes into planning and wetlands that get created have a high probability of success," responds C-DFG's Wilcox. "I haven't been associated with many that needed much ultimate remediation. If you are picking sites that are conducive to wetlands creation or restoration and you are paying attention to the soils and hydrology, you have a pretty high potential for success at the start."

"If a bank isn't functioning, the ultimate performance bond is taking away the banker's ability to sell credits. If they are not meeting their success criteria, they won't get their credits released," he explains.

Release of Credits

Another criticism of banks is that they are allowed to sell credits before the bank is fully functioning, leading to temporal habitat losses and raising issues of accountability. According to the ELI 2002 report, Banks and Fees: The Status of Off-Site Wetland Mitigation in the United States, "The percentage of credits released before achieving all performance standards ranges from 15 percent to 100 percent."

Banking is an expensive business, and it requires a lot of capital to get a project built. To help raise capital to construct a project, typically, up to 15 percent of credits can be sold upfront.

"Some credits are released early," explains Shannin of U.S. ACE, "but that is a better scenario than with standard mitigation, where you are essentially giving full credit upfront as soon as they do construction, 100 percent release before you know that it is working. In that respect, bankers are right. You do have a greater assurance of success [with a mitigation bank] than you do with regular mitigation."

The latest trend is to link the credit release schedule to reaching specified success criteria. There is a new standard credit release schedule being used by the San Francisco District of the U.S. ACE that releases 15 percent of the total credits upon signing, 25 percent once the hydrology is functioning, and an additional 15 percent released annually if interim success measures are met.

Performance Standards

If credit release is based on performance criteria, it raises the question, how are you going to measure success or the ecological effectiveness of a project?

The 2002 ELI report recommends that standards "should measure a broad array of the major functions of wetlands, particularly related to hydrology, vegetation, water quality, wildlife, habitat and soil." An assessment of 135 banks found that the most common standards used are for vegetation, hydrology and the presence of non-native species. Here, again, there is change afoot. At the San Francisco District of U.S. ACE they are beginning to base performance criteria on a reference site, the goal being to create functions similar to a functioning wetland.

"The most important thing when you are creating wetlands is to hit the correct hydrology because with wetlands, the whole basis for the system is the correct hydrologic system. If you hit the target hydrology, you have more assurance that it will support the target vegetation," explains Shannin of the U.S. ACE.

The ELI report also states that since 1995, 49 banks have been established without performance standards or success criteria included in the authorizing instruments. However, while interviewing regulators and bankers for this article, they all said performance standards are clearly articulated in all the banking agreements they have been involved with.

Greg Lyman, San Francisco Bay Area Regional Manager for Wildlands, Inc., a private habitat development and land management company that has established nine banks in California, reports that every bank Wildlands is working on includes specific performance criteria.

Tool for Private Land Owners

Landowners interested in generating an economic return from land without developing it also see wetland mitigation banks as a practical option. With limited state and federal resources available to support outright land acquisition and restoration, in certain circumstances a mitigation bank is one of the few potential tools available to support acquisition and restoration goals while allowing private landowners to generate a cash flow from conservation.

"Banks from six months ago are not going to look the same as banks six months from now. That is how quickly the regulation is changing."

Land trusts play a key role in this regard, and the California Central Valley Land Trust Council is holding a mitigation workshop in July of 2005 to explore when it is appropriate for a land trust to get involved in the mitigation process. When state or local resources are not available to support outright acquisition of a property, some argue, development of a mitigation bank should be a potential tool for land trusts to consider. However, without an open dialogue with key stakeholders—and the development of a detailed organizational policy—others in the land trust movement believe that diving into the mitigation-banking world could result in a high-level of controversy.

In the case of Southern California Edison (SCE), the potential economic return from a mitigation bank motivated them to restore an additional 20-acres of tidal wetland at their Del Mar, California wetland mitigation project. However, navigating the complex regulatory process and balancing the various competing needs takes time and patience.

"It is not easy to execute a bank agreement that all parties feel good about," reports David Kay, Manager of Environmental Projects at SCE.

The Future of Banking

"The best thing is to not impact wetlands, but as we all know, sometimes it happens," summarizes Kevin L. Irwin, an ecologist who works on wetland issues in Florida. And if one must mitigate impacts, he says, then mitigation banking "is a good tool to have in the tool kit."

The regulatory framework for mitigation banks, and mitigation in general, is growing and evolving as we speak. "Banks from six months ago are not going to look the same as banks six months from now," says Wildlands Inc.'s Lyman. "That is how quickly the regulation is changing."

The NRC and ELI reports include dozens of recommendations on how mitigation in general, and banking specifically, can be improved to better support conservation goals. These suggestions include: Engage stakeholders in the process in a more meaningful way; require detailed performance goals to ensure no-net loss of wetland area and functions; link the release of credits to meeting performance standards; and require a contingency fund and a clear process for how to catch potential problems and implement corrective actions.

According to Craig Denisoff in his recent Editorial, "mitigation bankers continue to hold out an olive branch to the environmental community… And, believe it or not, we too are in favor of higher standards for all forms of wetland mitigation across the U.S." Given this common goal, there seems to be plenty of room for future dialogue among regulators, bankers, and the environmental community on how to improve the mitigation banking process so that when this tool is pulled out of the toolbox, it will consistently support a brighter future for wetlands in the U.S.

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IV A Look at the Science

The Science of Wetland Restoration: Putting Nature Back Together Again

By Alice Kenny

With the rapid rise of wetland mitigation banking in the last ten years, an important debate has surfaced between mitigation bankers and skeptical environmentalists about whether or not wetlands, once broken, can ever really be fixed. The Ecosystem Marketplace looks at restored wetlands on the doorstep of New York City and asks: Can complex ecosystems be re-created?

PHOTO BY HAGIT BERKOVICH

Despite the stench wafting from a nearby landfill and the roar of the New Jersey Turnpike, muskrats and fiddler crabs furrow among an abundance of grasses and meandering streams at the Meadowlands Mitigation Bank. They are among more than 100 species of mammals, fish and birds that have returned to this 206-acre wetland between Giants Stadium and the Manhattan skyline since its recovery in 1999.

The lush land stands in sharp contrast to the degraded wetlands surrounding it. There, a single, non-native, ten-foot grass has taken over the marshland, providing haven for only a handful of wildlife species.

Transforming the Meadowlands degraded wetlands into a thriving ecosystem wove together new technologies and regulations with new environmental and economic priorities. The story of this enhanced wetland provides a glimpse into the ongoing debate between environmentalists, private investors and government officials about how best to recover the nation's rapidly dwindling wetland stock.

Three methods have been touted for repairing and replacing wetlands - creation, restoration and enhancement. Numerous studies have concluded that the first method, creating wetlands in landscapes that never before supported them, is rarely successful. Conversely, environmental bankers have found it fairly simple and inexpensive to restore former wetlands that had been dried through damming or draining.

What environmentalists and economists now wonder is how successful the third method, enhancement, is for recovering wetlands. Enhancement involves repairing degraded wetlands such as those along the New Jersey Turnpike that have been severely impaired but still support some degree of wetland soil, hydrology and/or vegetation.

Some say that wetlands are too complex to be put back together again once they have been degraded. "I have a lot of doubt that new or any technology could improve a degraded wetland," says Navis Bermudez, a Washington representative for the Sierra Club environmental organization. "There is no way to replace a wetlands' functioning exactly."

Some say that wetlands are too complex to be put back together again once they have been degraded.

Others disagree, pointing to the Meadowlands project and others like it.

"You need to get your science right; then you can be successful," says W. Michael Dennis, president of the environmental firm Breedlove, Dennis, and Associates. His firm designed the Disney Wilderness Preserve, a 12,000-acre mitigation project considered a model for enhancing, restoring and preserving wetlands.

Getting the Science Right

Fewer than half the wetlands that covered the New World at the time of its discovery by Europeans remain. Yet wetlands serve vital functions providing flood protection, preventing shoreline erosion, filtering pollution and offering a home to endangered and migratory wildlife.

Concerned about wetlands' rapid decline, the federal government passed the Clean Water Act in 1972. The Act mandated that builders create, restore or enhance an equal number of wetland acres—preferably in the same watershed—as those they destroyed. Yet wetlands continued disappearing. Over a million more acres of wetlands were destroyed or degraded between 1985 and 1995, according to a report by the U.S. Interior Department.

Acknowledging regulatory defeat, the government agreed in the 1990s to give the private sector, specifically mitigation banking, a shot at helping with the cleanup. Wetland-mitigation banks such as the one in the Meadowlands pull private industry into the environmental-preservation business. The goal is to protect wetlands while minimizing the impact on economic sectors. Unlike financial banks built from bricks and mortar, mitigation banks are actual wetlands that have been created, restored or enhanced by private companies or government agencies. Developers can buy "credits" from these banks to replace marshes they destroy while constructing roads, subdivisions and shopping malls.

Many environmentalists, however, remain skeptical when it comes to mixing environmental goals with economic incentives.

"Banks have a profit motive," observes Robin Mann, chair of the Sierra Club's Wetlands Taskforce "and the fact is that a profit motive impacts the whole set up."

But mitigation bankers and enforcement agencies including the U.S. Environmental Protection Agency and Army Corps of Engineers dismiss this concern.

"Every environmental organization I know of supports rehabbing wetlands," says Craig Denisoff, president of the National Mitigation Banking Association and vice president of Wildlands Inc. "Now they say banks are a bad thing just because money is involved."

Meanwhile, mitigation banks have thrived. Approximately 100 are in operation or proposed for construction in 34 states across the country, according to Environmental Protection Agency data.

Successfully enhanced wetlands typically share a number of characteristics, says Joy Zedler, chair of Restoration Ecology at the University of Wisconsin. Zedler co-authored a study on wetland-mitigation banking in 2001 and found that wetlands ripe for successful enhancement are: usually surrounded by larger natural wetlands; have relatively intact topography and have not been severely contaminated. She also says it is important that some natural soil remain on the site and that the site be monitored through a long-term restoration mandate.

The Meadowlands Mitigation Bank meets most of these criteria.

Vibrant Wetland to Putrid Swamp

The New Jersey Meadowlands, a former freshwater swamp wedged between the Hackensack River and the Hudson Bay, ripples through one of the most populated areas of the U.S. As developers raced to find room for the exploding population —building homes, highways, airports, bridges and dams— the Meadowlands was considered a nuisance, a swamp to be filled, drained, and built over.

The first real crisis these wetlands faced was just after the turn of the twentieth century with the construction of the Oradell Dam. The dam restricted freshwater flows from the Hackensack River, creating a saltwater wedge that moved in from the Hudson Bay, squeezing out native life, decimating Atlantic white cedar forests, destroying arrowhead marshes and killing off the freshwater fish that swam there.

Meanwhile, in a misguided effort to control mosquitoes, the Bergen County Mosquito Commission ditched and drained portions of the Meadowlands. But instead of reducing the number of these bloodthirsty insects, the efforts created stagnant pools of water and, in turn, mosquito breeding grounds.

Successfully enhanced wetlands…are: usually surrounded by larger natural wetlands; have relatively intact topography; and have not been severely contaminated.

Later, the New Jersey Turnpike dumped muck and rocks into the wetlands. It also excavated wetlands fill for highway construction, creating unnatural hills and valleys while disrupting the wetlands' ecosystem.

During this period, an aggressive reed-like grass known as Phragmites made its way into the Meadowlands. Within a few years, the Phragmites, which flourishes in coastal areas, took over. Small mammals fled to more hospitable sites. Only seven bird species, including the redwing black bird, sparrow and hawk found the site worth a visit, according to a recent Rutgers University report.

Saving the Meadowlands

Marking time at the Charleston International Airport in South Carolina after attending a Society of Wetlands Scientists forum in June, Richard Mogensen, a geologist and certified wetlands scientist, reminisces about technologies he used to restore the Meadowlands Mitigation Bank when he worked for the mitigation banking company Marsh Resources. The Society of Wetlands Scientists, a group of university-affiliated wetland scientists, representatives of government enforcement agencies and wetland mitigation bankers, last year endorsed wetland mitigation banking. Making it work, Mogensen says, requires pulling together discoveries in botany, chemistry, biology and mechanics. That's what they did at the Meadowlands site, he continues.

More than 80 species of birds now inhabit the site, according to a recent Rutgers University report, ten times the number of bird species spotted on the adjacent non-restored acreage.

The first challenge was how to keep muck and tide out of the site so they could work there. To do this, they laid six-foot aqua tubes—blue-plastic pipes filled with water—along the edge of the area to de-saturate one quarter of the site at a time. Then they brought in enormous pallets called timber mats that enable heavy equipment to ride over the muddy surface.

From there they could focus on their primary goal—eradicating the invasive Phragmites. Men sporting backpacks loaded with herbicides and helicopters descended on the site, spraying the area. Then rollogons - tractors with huge tires - rolled through the marshland, crushing any Phragmites they found.

Still, the tenacious Phragmites remained. Botanists pitched in, determining that Phragmites, unlike the more desirable marshland plants they wished to introduce to the area, could not tolerate long periods with its roots buried under water. If heavy tidal flows could be successfully reintroduced to the area, they hypothesized, natural marshland plants would be able to out-compete the Phragmites. So Marsh Resources hauled in long-reach excavators and dredges that broke berms built along the river's edge, cutting meandering channels throughout the 206-acre site.

Finally, tidal inundation returned. And so did a healthy ecosystem. Today brown-tipped spike rush, salt-meadow and smooth cord grass flourish along the shoreline. Oak trees, elderberry shrubs and giant chord dominate the upland islands. The company introduced a minnow-like fish called fundulus or mummichog into the wetlands. When these small food-chain items appeared, bigger predators followed. More than 80 species of birds now inhabit the site, according to a recent Rutgers University report, ten times the number of bird species spotted on the adjacent non-restored acreage.

"Wetlands degraded will come back quickly but you have to have the technology."

But revitalization technologies must be site-specific, Mogensen cautions. For example, in other wetlands biological controls have been used to eradicate purple-Loose-strife, a magenta-flowered grass whose tenacious root system has overtaken numerous marshes throughout the Northeast, turning them into unproductive monocultures. When pulling the plants proved fruitless, wetland scientists introduced European beetles that feed exclusively on these plants-after first determining that the beetles could be controlled.

"There are too many things that preclude us from getting the natural system back the way you want without help." says Tom Cannon, an aquatic biologist for Wildlands Inc. "Wetlands degraded will come back quickly but you have to have the technology,"

Mother (Nature) Knows Best

Yet even a successfully restored wetland such as the one in the Meadowlands rarely duplicates Mother Nature, many environmentalists point out. For example, the Meadowlands marshes, once home to freshwater vegetation and fish, have been restored to house saltwater life.

Further, mitigation sites, by virtue of being situated in different locations from the destroyed wetlands, rarely provide immediate neighbors who have lost their wetlands with identical flood and erosion protection. Indeed, Zedler's study found that only 21 percent of mitigation sites met various tests of ecological equivalency to functions lost at destroyed sites.

And, finally, say some conservation groups, mitigation bankers are not interested in repairing severely damaged sites. They leave the cleanup of brownfields, strip mines and landscapes contaminated with heavy metals to the government or businesses responsible for damaging them.

Environmental Bang for Buck

Despite these limitations, mitigation has often proven a boon for the environment and the wallet. In the Meadowlands Mitigation Bank, for example, the cost to restore the swampland came in at $65,000 per acre, recounts Mogensen. That meant that over $13 million was spent to repair the 206 acres of wetlands, a significant amount of cash that taxpayers might otherwise have been asked to pay. The mitigation bank subsequently sold credits for $150,000 per mitigated acre, nearly three times the cost of the work, netting them nearly $31 million.

Meanwhile, Marsh Resources continues spending thousands of dollars every year to monitor the marsh and control the Phragmites. The payoff comes when a Meadowlands interagency mitigation advisory counsel accepts the company's reports, allowing them to sell more credits from the Meadowlands Mitigation Bank. Already the bank has received payment in compensation for wetlands impacted by expanded runways at Newark Airport, as well as for widening the New Jersey Turnpike, and to mitigate for the construction of homes near the marshland.

A Wetland Scientist's Quandary

Repairing one wetland to destroy another comes at an obvious cost. But projects such as the Meadowlands Mitigation Bank indicate that with the right site, technology, determination and follow-up, mitigation can prove successful. And, of course, it is much better than no mitigation at all.

Projects such as the Meadowlands Mitigation Bank indicate that with the right site, technology, determination and follow-up, mitigation can prove successful. And, of course, it is much better than no mitigation at all.

"I'm a wetlands scientist," says Mogensen. "I love wetlands and would spend all my days there if I could. But our population is going to grow. When you need to widen a highway, you can't just move it somewhere else." And, he adds, in the real world -a world where development will continue to grow to keep apace with populations, incomes, and people's desire for a better life-difficult decisions will need to be made: "Would you rather build on old-growth forest to stay out of a swamp?"

Last Edited: June 27, 2005

Market-Based Approaches for Reconnecting the Landscape

By Doug Bruggeman

Environmental markets work best when based on quantifiable estimates of ecological services. Markets for endangered species habitat are currently based on a poor surrogate for biodiversity services, namely habitat area. Researchers at Michigan State University have taken a fresh look at the problem, integrating theories in evolutionary ecology with economics. Doug Bruggeman shares the results of his research with the Ecosystem Marketplace.

Anyone who has looked outside an airplane window knows the extent to which human development can change the landscape. The patchwork of forests, savannah, prairie, desert, and wetlands historically found has been reduced and broken apart by agricultural lands and real estate development. Dubbing this process "habitat loss and fragmentation," scientists have been studying it closely in recent years because it represents one of the biggest threats to biodiversity conservation in the world today.

Anyone who has looked outside an airplane window knows the extent to which human development can change the landscape.

Market-based approaches are being developed to help prevent the loss of biodiversity, but they largely ignore the influence of habitat fragmentation. To wit, conservation credits for endangered species habitat in the United States are awarded based on the size of a given restoration project rather than its ecological integrity. Acreage is a crude, often inappropriate, measure of the biodiversity support services flowing from a piece of land since the ways in which species utilize a protected area frequently depend upon habitat quality and location, rather than size.

Wildlife often needs different land cover types (i.e., habitats) for migrating, feeding, mating, and rearing young. For example, Whooping Cranes may use forested areas to nest, but they require riparian

PHOTO BY BRAD HARRISON

systems for feeding. The combination of these two different habitat types, then, is much more attractive to a Whooping Crane than large isolated expanses of either one. Similarly, bats or other mammals may use the river as a movement corridor, but they generally reproduce in forested areas.

Since wildlife species frequently utilize widely varied types of habitat at different stages in their life history, it is important to take landscape level analysis into account when determining the conservation value of any property. In a study funded by the U.S. EPA S.T.A.R. Program at Michigan State University, we have been investigating a method for doing just this.

Landscape Equivalency Analysis or "LEA" compares ecosystem services provided by different landscape patterns, thus recognizing the effects of both habitat loss and fragmentation on the flow of ecosystem services from any given area. LEA makes possible a market for those ecosystem services that depend on the spatial arrangement of different land cover types. Importantly, the application of LEA to conservation decisions may decrease conservation costs, while increasing the sustainability of species.

The Big Picture

The exchange of genetic material though sexual reproduction is the basis for much of the world's biodiversity. When two individuals with different genetic backgrounds mate, their offspring have a greater diversity of genes. Such individuals may display increased survival and reproductive capacity because genetic diversity often confers increased immunity to disease and greater adaptability to changing environmental conditions, while decreasing the chance that deleterious traits are expressed. Conversely, when individuals with similar genetic backgrounds mate, their offspring often have lower survival and reproductive capacity because they are more vulnerable to disease and environmental change, and are more likely to express deleterious traits.

In order to reverse the extinction vortex… it is important to make sure that local populations of a species remain connected.

Since developers too often sub-divide wildlife populations when sub-dividing land, real estate development frequently restricts the ability of individuals within a population to choose from a diverse pool of mates. Genetic diversity declines as related individuals are forced to breed with one another and mortality rates rise. Habitat fragmentation thus revs the engine on local extinction rates, kicking off what scientists call an "extinction vortex."

In order to reverse the extinction vortex or, even better, to avoid it in the first place, it is important to make sure that local populations of a species remain connected. In the field of evolutionary ecology, we refer to the network of local populations connected by migration and gene flow as a metapopulation. Since many endangered species require migration and gene flow over large areas, it is important to design conservation strategies that ensure gene flow throughout an entire metapopulation. Often, this means designing plans at the landscape level so that local populations are connected to one another through habitat corridors.

Imagine, a jigsaw puzzle: Adding any piece to the puzzle is nice, but filling in the key missing link between two sections of the puzzle is much nicer. Just as there are key puzzle pieces in the world of parlor games, there are key habitat parcels in the world of species conservation. Because of their location, some habitat areas contribute more to gene flow throughout a metapopulation than others. In essence, they are more important

puzzle pieces to protect from development, and they are more important puzzle pieces to restore through mitigation projects.

To capture this idea, LEA estimates the conservation value of credits traded at a local scale based on the equivalency of metapopulation dynamics before and after the trade.

Preliminary results… indicate bankers could sell credits to twice as many landowners under LEA than would be possible if habitat connectivity were ignored.

For example, some land cover types may provide the linkage among local populations that is critical for migration and sharing genetic material. Under LEA, development of said habitat for residential or commercial purposes would create a large negative externality (i.e. loss of biodiversity). Therefore, such development would require any conservation bank selling credits to the developer to be similarly well connected to local populations, thus able to generate a large positive externality (i.e. addition of biodiversity). In contrast, LEA would show that isolated habitat contributing little to genetic variance may be developed by buying fewer credits from a conservation bank.

In theory, a market based on LEA would direct trading toward a landscape supporting the same level of metapopulation dynamics after mitigation as it did prior to development.

Preliminary results recently submitted for publication indicate bankers could sell credits to twice as many landowners under LEA than would be possible if habitat connectivity were ignored. These trades met the regulatory requirement of avoiding a “take”, or preventing a reduction in the number of individuals in a population. Further, after these trades were made in a computer simulation, large positive externalities remained as measures of genetic variance shifted toward recovery goals.

We suggest that private individuals or public agencies could purchase these “habitat de-fragmentation credits” if a secondary market for genetic variance credits were created. This would have to serve as a voluntary market, much like the CO2 market, because there are no provisions under the Endangered Species Act for private individuals to contribute to the recovery of the species or to manage genetic diversity. An additional benefit of a market for de-fragmentation credits lies in the financial incentive it would provide for bankers and regulators to collect data on the effects of land cover on dispersal behaviors of imperiled species. Without this data we cannot determine whether habitat trades increase or decrease the probability of population extinction.

In sum, then, our study indicates that increasing the scientific rigor used to evaluate habitat trades may create opportunities to better balance the financial sustainability of biodiversity markets with the natural sustainability of biodiversity itself.

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Some Tough Questions

Bringing Back the Buffer

By Alice Kenny

Hurricane Katrina stirred up plenty of conversation about the flood control services of coastal wetlands, but will it lead to any new conservation strategies along the U.S. coastline? The Ecosystem Marketplace asks the question and unearths some answers.

PHOTO BY ROBIN KLAISS

From the New Orleans jazz fans swilling the city's signature drink, "hurricanes," to the scientists issuing unheeded warnings, nearly everyone recognized that development robbing the Gulf Coast of its indigenous defenses meant man's fight to hold back nature would ultimately fail. A century ago, any hurricane heading towards New Orleans would have been slowed by hundreds of square miles of coastal swamps. Today little of this natural buffer remains.

Louisiana has lost over 1.2 million acres of coastal wetlands since the 1930s and continues losing them at a rate of nearly 16,000 acres a year. New Orleans—a below-sea-level-bowl surrounded by lakes, bordered by the Gulf of Mexico, and bisected by the Mississippi River—is soppy even on a sunny-day, leaving this southern city with the eerie signature symbol of aboveground tombs extending for miles.

So on August 29, 2005, when Katrina slammed the wetland-denuded Gulf Coast, it laid waste to 95,000 square miles of land. One thousand three hundred people were killed and 150,000 homes destroyed. It wreaked havoc on a host of industries and caused economic aftershocks that reverberate still.

In the wake of Katrina, the loss of coastal wetlands has become front-page news, but whether or not anyone will pay attention long enough to do anything about it remains to be seen.

What's it Worth?

Before civilization tried taming the mighty Mississippi, the land through which it flowed thrived in an ecological balance. The river used to carry 200 million tons of sediment annually into the delta, creating a wide belt of wetlands between dry land and sea. Had these wetlands remained when Hurricane Katrina hit New Orleans earlier this year, studies indicate each acre might have absorbed up to 1.66 million gallons of floodwater.

If value equals the protection healthy wetlands likely would have offered New Orleans, then the latest figures suggest this lost ecosystem service was worth more than one hundred billion dollars. The calculation is straightforward. Hurricane Katrina shut down the United States' largest port, along with six oil refineries and four national gas-processing plants. Building materials whose ingredients include petroleum and natural gas such as asphalt, plastic pipe and insulation soared in price. The insurance industry lost between $40-$60 billion dollars in claims. New Orleans' multi-million dollar tourism and seafood industry shut down completely. City infrastructure, meanwhile, was smashed and bashed to the tune of somewhere between $25–$50 billion.

"If this tragic experience in New Orleans can be a wakeup call allowing us to move past the polarizing dialogue of decades and see where the environment and economy can be served together then something positive will be brought out of this experience," says Dennis Hirsch, director of the Environmental Law Concentration Program at Capital University Law School in Columbus. "The broad lesson of Katrina is that protection of an ecosystem and protection of the economy go hand in hand."

"The broad lesson of Katrina is that protection of an ecosystem and protection of the economy go hand in hand."

Freeloading on Coastal Ecosystems

Despite coastal wetlands' value to private industry, the government remains the primary, if not sole, underwriter of wetland protection. After all, businesses point out, the government, both federal and state, own from the shorelines to the ocean.

But if Katrina has taught anything, it is that the government, by itself, has not been up to the task. For instance, New Orleans counted on a federally funded program called Coast 2050 to restore its natural protections. Designed after the near miss of Hurricane George in 1990, Coast 2050 offered a $14-billion government-sponsored plan to protect the coast by restoring natural ecosystem services. But with the budget deficit, tax cuts and the struggle to meet expenses to fight the war in Iraq, only a fraction of the money allotted was actually spent.

Now, after the government's monumental failure, some are beginning to look for ways to spur businesses that benefit from wetland protection into helping underwrite the cost. Finding a marketplace for coastal flood control, however, is trickier than it might first appear.

Although the oil, gas, shipping, tourism and fishing industries suffered extensive losses from Katrina, they have indicated no solid interest in sharing in the cost of shoring up ecosystems. Further, no mechanism yet exists to determine each industry's share. Even private insurance companies that experienced near-catastrophic losses have little interest in getting involved in flood control, according to their spokespersons. Their policies, they say, cover wind and not flood damage. Further, insurers write policies for one year at a time, leaving little incentive to invest in long-term solutions.

This leaves one obvious but cautious market that might be convinced to try making a buck shoring up coastal wetland. This is the wetland mitigation banking business. The industry exists thanks to federal laws requiring that whenever wetlands are destroyed, new, additional wetlands must be restored. Developers, in the business of creating real estate and not restoring wetlands, often choose to pay mitigation bankers to restore wetlands in other areas to compensate for the wetlands the developers destroy.

A Good Investment?

Although wetland mitigation banking has flourished across the country since its introduction in the early 1990s, bankers have avoided using coastal wetlands for their restoration projects. There are many reasons for this, says Rich Mogenson, a spokesperson for the National Mitigation Banking Association, ticking them off one by one. First, he says, coastal property is typically too expensive.

Although wetland mitigation banking has flourished across the country…bankers have avoided using coastal wetlands for their restoration projects.

"And we're entrepreneurs, trying to make a profit."

Further, he continues, while mitigation bankers are responsible for maintaining wetlands long-term, coastal wetlands are the first place hit by storms. Finally, he adds, since the federal government controls water up to the coastline, coastline mitigation banking would require partnering with the government, a relationship from which many in the private industry remain wary.

Daniel Bolich of CK Associates, who consults for mitigation banks in Baton Rouge, observes, "This is an area where you can spend $60,000 an acre restoring a marsh, then an event like last month occurs and what happens to the landowner? Without a clear answer, the government is not providing enough certainty to get mitigation bankers interested."

There are, however, at least two scenarios that could provide the certainty that bankers seek.

In the first, coastal mitigation banking would be run akin to banking in other wetland areas, with private developers buying wetland restoration credits from bankers that restore wetlands. A few strategic adaptations, however, would have to be incorporated. For example, unlike with inland wetlands where mitigation banks must be established and functioning before bankers can sell credits—a process that takes years—permission to release credit releases with coastal wetland restorations would be expedited. This, bankers say, would allow them to recoup their high initial investment once they complete initial restoration work. It would also minimize the time frame that an "act of God" could sweep in before they recouped their investment.

Developers could be spurred into purchasing credits from these more expensive coastal wetland banks if the federal government enacted a "no net loss" region-specific cap. No-net-loss legislation would force hotels that build in coastal flood planes and oil developers that muck up marshland to purchase credits from banks restoring marshland along the coast instead of buying into mitigation banks located in less expensive, inland areas.

Some Tough Questions

"We need to have the right legislation to send the right message to the market," says Andrew Logan who oversees the insurance industry for the Coalition for Environmentally Responsible Economies out of Boston, Mass. "If there were a real cap on [coastal] wetlands loss, we could have a trading scheme."

The overall impact of any no-net-loss legislation, however, would be limited to the small percentage of new damage taking place. Most wetland destruction in the Gulf and other coastal areas occurred decades ago when the Army Corps of Engineers dried them out by building artificial levies and dikes.

The government's responsibility for wetland destruction leads some bankers to suggest a second scenario for wetland restoration involving a public-private partnership. Currently, FEMA buys out properties in flood plains, then turns the land over to counties that build public greenways and bike paths. These mowed-grass areas provide more flood protection than if they were blacktopped, but fall far short of the flood protection that they would have if they had been restored as wetlands.

To encourage coastal wetland restoration, FEMA would continue buying out flood plain properties. But rather than handing these properties over to local governments, FEMA would instead sell the land to mitigation bankers at below-market rates. The bankers could then afford to restore the wetland and sell restoration credits at a profit.

With enough tweaking, mitigation bankers could establish a working relationship with the government that would allow both to realize their goals. The government would have help from experienced mitigation bankers in avoiding another Katrina. And these bankers would have good reason to expect to profit from their work.

Because, "if Katrina has taught us anything," says Jim Salzman, liaison for the Trade and Environment Policy Advisory Committee, "it is that coastal services have to get into the board room. This is not a ecology question," he adds. "This is a dollars and cents question."

"If Katrina has taught us anything, it is that coastal services have to get into the board room. This is not a ecology question. This is a dollars and cents question."

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Can Wetlands Go Bankrupt?

By Alice Kenny

Many publications, including this one, have touted mitigation banking as a win-win solution to wetland restoration in the United States. The environment benefits from private sector investment while bankers feel good about making a buck. But what happens when things go wrong? Does win-win suddenly look more like lose-lose? The Ecosystem Marketplace asks the experts.

Back in the pioneer days of wetland mitigation banking when businesses got their first whiff of the cash they could make and environmentalists envisioned a world of restored wetlands, a group of investors from U.S. Wetland Services, Inc. proposed building a wetland mitigation bank on a dredge-spoil pile along New Jersey's Delaware River.

In many ways, it seemed like a great idea. U.S. Wetland Services would convert manmade-polluted hills of dredge into wetlands that filter pollution and get paid big bucks for doing so.

But the venture failed miserably. While building new wetlands, the company destroyed existing ones. Then, instead of paying for the cleanup and returning to work, U.S. Wetland Services declared bankruptcy.

This was one of two mitigation bank bankruptcies declared since the field of wetland mitigation banking began in the United States during the early 1990s. In U.S. Wetland's case, the corporation used the bankruptcy court as a shield to avoid its wetland commitments. In the other case, conversely, Ecobank, Inc. looked to the courts for help structuring its debt, then fulfilled its wetland obligations and remained in business.

The banks' experiences offer a cautionary tale about the romance between business and the environment and the importance of regulation for wetland mitigation banking's continued success.

PHOTO BY MICHAEL SLONECKER

Now, with the Army Corps of Engineers imminent release of its long-awaited wetland mitigation bank regulation draft revisions, many are watching to see whether they will close the bankruptcy loophole through which U.S. Wetlands Services slipped. During the ensuing comment period, as regulators, environmentalists and bankers hash out how to advance the documented environmental benefits associated with the rise of the mitigation banking industry, many say it would be wise to consider how to curtail the environmental risks of its potential fall from grace.

"Taken individually, the wetlands losses in the past were small and disparate… But collectively it was like a death by a thousand paper cuts."

"Rules should be tight for mitigation," says wetland banker and scientist Richard Mogensen. "After all, part of the service we sell is assurance of mitigation over a long period of time."

The Rise of Mitigation Banking

When mitigation banking arrived on the wetlands scene, it was heralded as a key for enabling the private sector to fix environmental problems that had long-stymied government bureaucracies. And clearly, the public sector needed help.

Ever since Europeans began colonizing the New World, wetlands—which provide flood protection, shoreline-erosion control and pollution filtration—have been dried out, built over and used as virtual cesspools.

"Taken individually, the wetlands losses in the past were small and disparate," comments wetlands mitigation regulator Todd Gipe, a Florida wetland regulator. "But collectively it was like a death by a thousand paper cuts."

Concerned about wetlands' rapid disappearance, the federal government passed the Clean Water Act in 1972. The Act mandated that developers create, restore or enhance as many wetlands as they destroy. Yet more than a million additional acres of wetlands were destroyed without replacement during the next two decades.

Crying "uncle," the government agreed in the 1990s to give the private sector, specifically mitigation banking, a shot at helping. Mitigation banks, unlike financial banks built from bricks and mortar, are actual wetlands created, restored or enhanced by private companies or government agencies. Developers, whose expertise and income lies in building on filled wetlands and not in creating new ones, can buy credits from these banks to replace the marshes or other forms of wetlands they destroy.

Soon after wetland mitigation banking began, however, the private sector discovered what public environmental groups had already learned; successfully creating or enhancing a wetland can be exceedingly difficult. According to a recent study published in the National Wetlands Newsletter, only 21 percent of wetland mitigation banks function at a level ecologically equivalent to natural wetlands.

Yet wetlands repaired by private developers often fare even worse and their bankruptcy numbers are far higher. So mitigation banks have continued growing despite their limitations, from 46 in 1992 to 400 today. According to Stetson University College of Law Professor Royal Gardner, this makes it even more important to ensure that mitigation bankers who promise to revive wetlands do not hide behind bankruptcy's shield should things go wrong. The professor, who served on the National Research Council's Committee on Mitigating Wetland Losses and is also the director of Stetson University Institute for Biodiversity Law

and Policy, recently coauthored a study on mitigation bank bankruptcy, providing a detailed history of U.S. Wetland Services Inc. and Ecobank.

From Buoyant to Bankrupt

Before the lawsuits, bickering and bitterness, U.S. Wetland Service, Inc.'s plans to enhance wetlands in Gloucester County New Jersey began with optimism and accolades. The company promised to create Woodbury Creek Wetland Mitigation Bank in 1995. It would enhance nearly 129 acres of degraded wetlands, create 39 new acres of wetlands and add nearly 19 acres of upland buffers for wetland protection. In return for this environmental bonanza, the corporation would be lucratively rewarded, selling credits in its newly created wetlands to developers legally responsible for building or repairing wetlands to replace ones they had damaged. After receiving government approvals, the corporation began to carry out its plans, selling nearly a third of its credits.

But things went wrong almost from the sketch board, recalls wetland scientist Mogensen who worked on a nearby bank. "The bank should never have been built," says Mogensen. "It should never have gotten approvals in the first place."

The basic design was critically flawed, he explains. First of all, Woodbury Creek' bank was designed to be built atop a spoil pile dredged from the Delaware River. But building on a dredged pile meant building a wetland on a hill. Since water runs down hill, this would be nearly impossible to maintain. Further, since a wetlands' function is to filter pollutants, building a wetland on contaminated dredge seemed inherently contradictory. And, finally, LandBank, the owner of U.S. Wetland Services, made financial assurances that it would complete the work without ensuring that it had the long-term financial wherewithal to stand behind those promises.

Instead of creating new wetlands, the mitigation bank left New Jersey with more damaged ones.

The bank's plans unraveled quickly after LandBank, while creating a new wetland, inadvertently drained almost 19 acres of an existing one. The New Jersey Department of Environmental Protection expected the corporation had funding to remediate the problem since LandBank had put up a performance bond. But the corporation, it turned out, had failed to pay the premiums on the bond, rendering it worthless. Then LandBank's controlling corporation, IT Group, Inc., filed for Chapter 11-bankruptcy protection. Meanwhile, IT Group moved its assets, turning LandBank into a shell corporation.

The New Jersey Department of Environmental Protection refused to accept the legal maneuverings, insisting that LandBank pay for the wetlands it destroyed. To penalize the corporation, the agency demanded LandBank restore the destroyed 19 acres of wetlands at a three-to-one ratio, creating 57 new acres of wetlands. The department also levied a $9,000 fine against the bank. Aware of LandBank's bankruptcy application, the department added that the order be binding on bankruptcy trustees.

But the judgments and penalties turned out to be meaningless; New Jersey learned that federal bankruptcy court trumps a state administrative order. The court directed New Jersey to dismiss its claim on December 6, 2004, ruling that the state, similar to other creditors, had only a financial claim against LandBank.

So instead of creating new wetlands, the mitigation bank left New Jersey with more damaged ones.

Down but Not Out

Fortunately, from a wetlands-preservation perspective, the other wetland-bank that filed for Chapter 11 bankruptcy, Ecobank, is working out a far different resolution.

In this case, the Florida wetland mitigation corporation entered into a joint venture with Da Capo al Fine, Ltd. Together they developed three mitigation banks, Lake Louisa/Green Swamp Regional and Hunter Mitigation bank in Florida and Barra Farms Cape Fear Regional Mitigation Bank in North Carolina. Ecobank provided the know-how and Da Capo provided the cash.

Speaking from his air-conditioned Florida office as temperatures outdoors soared to a humid 100 degrees Fahrenheit, Ecobank Vice President, Alan Fickett describes his company's mitigation banks, the difficulties they encountered and the resolutions they are stitching together.

Ecobank and LandBank's bankruptcies spotlight loopholes that mitigation-bank watchdogs… say they hope will be closed by the Army Corps of Engineers' upcoming regulations.

Unlike Woodbury Creek, Ecobank has almost completed restoring and enhancing 2700 acres of once-damaged wetlands at three sites. And, based on credit releases permitted by its regulators, its reclamation work has been largely successful. At Lake Louisa in Clermont, Florida, the corporation turned over a thousand of acres of once-converted citrus groves back into wetlands and hills that protect wetlands called uplands. Here, Ecobank turned off pumps in manmade wells, removed the citrus trees and completely replanted historic oak, pines and herbaceous wiregrass. It removed pesticide and fertilizer runoff, stocked the lakes with fish and allowed the aquifer to recharge.

At East Central Florida Regional Mitigation Bank in Orange County, Ecobank created nearly 1000 acres of wildlife conservation corridor between the Econolockhatchee River Basin and St. Johns River. To restore wetlands, the company filled 2.5 miles of canals, reestablished Christmas Creek's flow into St. Johns River and fenced the restored land to protect it from nearby grazing.

And in the Carolina Bays, the corporation restored historic streams within a 632-acre site that had been ditched and drained to support agricultural activities.

But despite its success restoring these wetlands, the corporation hit an impasse. Over the years, Fickett says, Da Capo "became inpatient" about collecting a profit, causing the joint venture to break up. Since De Capo was the venture's financial backer, providing the bank's financial assurances for long-term maintenance, this unleashed a financial crunch. But, in contrast to LandBank in New Jersey, Florida had required as a preliminary condition of approval that the joint venture supply foolproof letters of credit.

So when the corporation filed for Chapter 11 bankruptcy, funding for the wetland banks' long-term maintenance remained in place. Moreover, Fickett says, Ecobank would "pay within the next 14-15 months 100 percent of its creditors 100 cents on the dollar…because that's good business."

Here Comes the Army

Ecobank and LandBank's bankruptcies spotlight loopholes that mitigation-bank watchdogs like Gardner, the law professor, say they hope will be closed by the Army Corps of Engineers' upcoming regulations. Pushed by environmentalists and mitigation bankers dissatisfied by what they characterize as the Corps' lax and inconsistent oversight, the agency has worked on rewriting its mitigation bank regulations for the past two years. The draft rules are expected to be published in the federal register within the next month. After that, the Army Corps, wetland bankers and environmentalists will sit down to refine the new regulations before they are published in final form this December.

For this new industry to last, it must demonstrate that the wetlands it enhances can be sustained.

U.S. Army Corps of Engineers Regulatory Branch Chief Mark Sudol declined to discuss specifics about the proposed regulations, waving off questions regarding bankruptcy regulations until the draft is published. He says, however, that the draft regulations require increased mitigation standards that will lead towards improved success.

In contrast to the Corps' chief, Gardner offers detailed suggestions. First, he says, financial assurances must be available to be drawn on at every stage of a mitigation site's life. During the construction/restoration phase of a mitigation bank, bankers should be required to provide adequate notice before they are allowed to cancel performance bonds or other financial guarantees, he says. When credits are sold, money to fund long-term stewardship should be put aside. And, finally, once all the banks' credits are sold, funds must be guaranteed to cover the site's long-term care.

Banking on Benefits

With over two decades in the business, Gardner adds, wetland mitigation banking has played a significant role reversing the decline of this nation's valuable wetlands. And banking has often been more tightly regulated and more successful at preserving wetlands than private developers and environmental organizations.

It is important to note, however, the synergistic relationship wetland banking has with long-term wetland restoration. Wetland restoration can only be deemed a success if the wetland flourishes over time. So for this new industry to last, it must demonstrate that the wetlands it enhances can be sustained. Otherwise, the industry could experience another LandBank, with wetlands lost and the tax-paying public picking up the tab.

Entrepreneurship in any field is a high risk, high return proposition. But for the public to support mitigation banking, the risk must remain on the banker's side. The public's return must be a near-guarantee.

With appropriate regulations, Gardner concludes, "bankruptcy doesn't necessarily mean disaster."

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VI People

From Successful Financier to Mitigation Banker: Fred Danforth

By Ricardo Bayon

After a successful career in private equity investing, Fred Danforth followed his passion for fly-fishing into a second career as a wetland and stream mitigation banker. His story may provide some interesting insights into the future of conservation finance. The Ecosystem Marketplace catches up with Danforth for a quick conversation about his work in Montana.

PHOTO BY ROGER HUGHES

Ask Fred Danforth how he first got involved in mitigation banking and you just may find that his answer boils down to one word: fly-fishing. He is one of the rare few who, after a successful career in the world of private finance, decided to follow his passion for fishing, conservation and the outdoors into something completely different.

Danforth's story begins in the world of traditional finance: first he worked for a variety of banks around the U.S., including the likes of Citibank in New York. Then, in 1986 he set up his own private equity investment firm, Capital Resources Partners (CRP), based in Boston, Massachusetts. There he served as Managing Partner until 2002 by which time the company had nearly $1 billion dollars under management and was working with a variety of very large institutional investors, including General Motors, the states of Washington, Wisconsin, and Virginia, the Rockefeller Foundation, and the Episcopal Church. By the time he left CRP, Danforth had done what every financier dreams of: he had created his own successful invest-

ment company, built it up, and then retired early. He was justifiably proud of what he had accomplished, but he wasn't satisfied.

"After a career of being fully engaged in a highly competitive environment with the best and brightest of the investment community," explains Danforth, "I came to a point where the idea of winning and making money at all costs just began to lose its appeal. So I began to gravitate to a different place; to a place where my real interests and passions lay." In short, he headed for the wilderness and went fishing.

"I began to gravitate to a different place; to a place where my real interests and passions lay."

In particular—and like many before him—Danforth became enchanted with Montana's Blackfoot river, the river made famous by the book and movie "A River Runs Through it." Having fished on the Blackfoot many times, Danforth became a partner -together with Montana's iconic fly fishing guide and outfitter, Paul Roos—in the development of a fishing lodge, The North Fork Crossing, on the Blackfoot river. That, it turns out, was the thin edge of a very interesting wedge.

As an investor in a fishing lodge, Danforth soon realized that his investment (i.e. the quality of the fishing) depended, to no small extent, on the quality of the tributary waters feeding into the river. So he began working with various conservation groups and land trusts to help protect and repair the legendary Blackfoot. In this process, one conservation group with whom Danforth was working, The Nature Conservancy (TNC), determined that a priority for the protection of the Blackfoot was conserving one particular tributary known as Nevada Spring Creek.

What makes Nevada Spring Creek so important is the fact that it is born from an emergent artesian spring whose water gushes year around at a constant temperature and with remarkable purity. Once upon a time, this creek, with its cool waters and healthy riparian corridor of willows and cottonwoods, served as an important fishery; feeding haying crews in the Valley and helping give the Blackfoot its renown among U.S. anglers. When TNC became interested in the land, the area surrounding the creek had been seriously impacted by poor grazing practices, so that the water—which emerges from its source at a cool 45 degrees Fahrenheit- was entering Nevada Creek and the Blackfoot river at summertime highs of 80 degrees. There was also siltation, pollution, erosion, as well as many of the other traditional ills that now befall the world's rivers. In short, when Danforth first encountered Nevada Spring Creek, it was no longer the bustling ecosystem -nor the famed fishing spot- it had once been.

The creek, however, has one thing going for it: From the spring at which it emerges, for 4.2 miles, all the way until it meets up with the broader Nevada Creek, Nevada Spring Creek runs mostly across one piece of property, a 1900-acre piece of land known as the Potts Ranch. The only exception is a small piece of the creek that is controlled and has been restored by Perk Perkins, a dedicated conservationist who also happens to be the CEO of Orvis. This, from a conservation perspective, means that whoever controls Potts Ranch, controls the fate of the creek. There is, in other words, no upstream.

Recognizing this unique hydrological situation, The Nature Conservancy had long had its eye on Potts Ranch. Many times they, along with the Blackfoot Challenge watershed group, had tried to convince the previous owner to help with the conservation and restoration of the damaged river, but to no avail. So when the

property finally went on the market, TNC quickly bought it. Then, as is their usual operating procedure, they structured a conservation easement for the land and began looking for a buyer interested in helping with the property's conservation and restoration. They finally found, in Fred Danforth, a perfect partner.

It was late 2001 when TNC first approached Danforth with the possibility of helping with the conservation and restoration of the Nevada Spring Creek. And it didn't take much to convince Danforth to get involved. He quickly saw in this creek both a personal and a business opportunity: he could help repair one important tributary of the Blackfoot and, in the process, help re-build a prime fishing spot. This was not only good for the environment, it was also good for fishing and his lodge on the Blackfoot. So, using his experience and contacts from the world of finance, Danforth rapidly put together a partnership that included fellow Boston venture capitalist, Steve Woodsum, and, in March of 2002, bought Potts Ranch from The Nature Conservancy.

"It just seemed," he recalls, "like a compelling direction for me."

There was only one problem: restoring the stream to its once and future glory would require a tremendous amount of biological expertise and a not inconsiderable amount of money. "We soon realized," recounts Danforth, "that to do what we wanted to do on Nevada Spring Creek, we needed help and we needed investment. In terms of help I decided to look around Montana and the country for the best stream and wetland restoration people I could find; to put together the best possible team to get the job done. On the finance side, as the restoration began, we quickly began exploring the various ways that the costs of the restoration could be offset."

This was not only good for the environment, it was also good for fishing and his lodge on the Blackfoot.

Danforth explains that he was committed to the project, and that the restoration was going ahead no matter what. But, he adds, given his background in finance, he was interested in seeing if there were other, more creative, ways of financing the work that needed to be done. To this end, he and his colleagues considered all kinds of financial tools: from contributions and donations, all the way to fancy forms of loans and investments. "Eventually," he says, "we came across the whole notion of wetlands and stream mitigation banking. Something I had never heard of before, nor ever even dreamed existed."

Intrigued by the notion of deriving some form of value from conservation, Danforth explored the issue further. "I just started becoming aware of the possibility," he says, "of using market-based mechanisms to provide some return for the large amount of capital that is required for this kind of conservation and restoration. I found the whole notion of the double bottom-line fascinating."

Exploring the concept of mitigation banking, Danforth came across, was impressed by, and eventually hired, David Patrick, an ecological expert with many years of experience in mitigation banking. "David," says Danforth, "is one of the best in this business and when he came aboard, he explained to me some of the values that could be extracted from the land via stream and wetland mitigation banking. This convinced me that this was the way to go. And, as we dug deeper into the subject, I realized that mitigation banking might not only help offset the costs of the restoration, but that, done right, it could even help pay for the land."

Shortly thereafter, Danforth, Patrick and the rest of the partners began the restoration work. At the same time, they began putting together the business plans and the prospectuses for both a stream mitigation bank and a wetland mitigation bank on the land surrounding Nevada Spring Creek. By September of 2004, the stream mitigation bank prospectus was completed and sent in for approval, while the wetland mitigation bank proposal was expected in early 2005. Initially, the stream mitigation bank will include some 11,000 linear feet of stream restoration credits, though Danforth explains that the total restoration they are doing could be about 20,000 linear feet and will include an upstream basin-fed tributary with additional fisheries benefits. The wetland mitigation bank will include credits for some 250 acres of restored and created wetlands.

"I just started becoming aware of the possibility," he says, "of using market-based mechanisms to provide some return for the large amount of capital that is required for this kind of conservation and restoration. I found the whole notion of the double bottom-line fascinating."

Stream mitigation banks, like wetland mitigation banks, work by selling restoration credits to developers and public entities who are legally forced to offset the damage they are causing to wetlands or streams within a given "service area" (as defined by the U.S. Army Corps of Engineers). At present, Danforth admits that he is not entirely sure what kind of demand there will be for the stream and wetland mitigation credits his project is creating, though he is optimistic. "The truth," he says, "is that there has never been a private, for profit, mitigation bank in the state of Montana. What mitigation is being done in this state is in the Montana DOT [Department of Transportation] reserve program or is ad-hoc, so it is difficult to judge the market. But, given the nature of our service area and the feasibility work we completed, I am confident that we will be providing a valuable service and that we will sell credits."

Just as importantly, he says, his banks will be providing leadership on the subject in Montana. And that, he adds, gives him a great sense of pride. In fact, Danforth couldn't be happier or more sanguine about the future. He is so sure that his project will succeed -despite the fact that neither of his mitigation banks has been officially approved (as of Sept. 2004)- that like any good financier, he is already looking two or three steps into the future.

"The idea," he explains, "is that if we are right, and mitigation banking -together with other forms of innovative conservation finance- can help cover not just the restoration, but also the cost of the land, then we will use the proceeds to invest in other projects to restore and enhance ecosystems." In fact, Danforth has already brought together David Patrick, Paul Roos and two other partners (John Kowalski and stream restoration expert Don Peters) to create a new company, called Oxbow Land Management, whose role would be to work with other landowners in the U.S.—starting in Montana—to help them do the same thing that Danforth and his colleagues are doing on Nevada Spring Creek; turning conservation and restoration into thriving and viable businesses.

"With Oxbow," says Danforth, "we hope to take our experience and expertise to other landowners and watersheds throughout the Mountain West where a conservation vision is possible. We hope to help people deal with the capital constraints inherent in conservation and restoration, and to form unique turn-key partnerships that bring the necessary talent and expertise to bear in the creation of value for conservation."

And the vision goes beyond simple mitigation, Danforth says Oxbow is actively looking at all kinds of innovative financial tools that can help landowners fulfill their conservation vision; from carbon credits and nutrient trading, all the way to recreational opportunities, hunting, fishing, etc.

So, given Danforth's extensive experience in the world of traditional finance, how does he view this new field of conservation finance? "I am very excited," he says, "about the possibilities. And, to be frank, I like the fact that, when this works, it can be a tremendous win-win situation for all concerned: investors, the environment, everyone. You don't have to engage in the kind of cut-throat competition that became all-too familiar to me in the world of private equity finance." He does feel, however, that his years of experience in traditional finance give him a very important edge; a skill-set that will be extremely useful in helping push forward the goals of innovative conservation finance.

And does he think that his current and past worlds will ever meet? Will conservation finance ever go mainstream enough to interest institutional investors? Danforth says he hasn't yet made up his mind on this question. "I haven't fully concluded," he says, "whether these markets have the potential for investment returns that would be needed to interest an institutional investor." "Besides," he adds, "these are very complicated markets, markets that are driven by regulation, markets that need to be explained several times before they are understood." He notes that traditional investors usually have a serious aversion to complex and regulatory-driven markets, so convincing them to will be hard.

Nevertheless, even on this he is optimistic. He says it will take time and work, but that he believes the day will come when the markets will mature, when someone will be able to show sufficient deal flow and a history of transactions -a track record of producing returns that are repeatable- that these markets will eventually become of interest to a traditional investors. "Mind you," he says, "it will require a very special kind of investor to get involved in this in the first instance, maybe an institutional investor with the right social underpinnings. And you'd need to make the deal sing; you'd need the right group of people behind it."

…the day will come when the markets will mature, when someone will be able to show sufficient deal flow and a history of transactions -a track record of producing returns that are repeatable- that these markets will eventually become of interest to a traditional investors.

No doubt it will be hard, but if anyone can help bring the world of conservation finance into the mainstream, it is Fred Danforth—a successful financier with a passion for fly-fishing and the company he's created, Oxbow Land Management. Already his work on Nevada Spring Creek is bearing fruit: the native vegetation is coming back, the number of fish in the creek have increased by over 400%, siltation and erosion have been virtually eliminated, and the water is flowing out of his land at under 60 degrees Fahrenheit year around, a full 17 degrees, on average, less than when they started. Danforth and his colleagues, in other words, are well on their way to saving the "river that runs through it."

First Posted: 2004

The U.S. Army Corps' Man of Action: Mark Sudol

By Cameron Walker

Bringing with him experiences culled in the Navy, academia and the private sector, Mark Sudol, the chief regulator at the U.S. Army Corps of Engineers, guides the U.S. government's approach to wetland mitigation. He is currently involved in a major regulatory overhaul that will have big impacts on mitigation bankers everywhere, but, as the Ecosystem Marketplace finds out, Sudol isn't out to please everyone.

His title, regulatory program chief, sounds like a euphemism for head paper-pusher. But Mark Sudol, who's headed up the U.S. Army Corps of Engineers regulatory program since 2002, is anything but.

Sudol seems to dive into everything head-on, from exploring the New Jersey streams of his childhood to flying Navy jets to regulating the nation's wetland mitigation projects. "I'm a field biologist at heart, I don't mind getting out in swamps and getting dirty, getting muddy," Sudol says.

His roll-up-the-sleeves take on wetlands comes at a crucial time in the Army Corps' 100-plus years of regulating waterways. For the past two years, the agency and others have been constructing a new rule on wetland mitigation, the process of preserving and restoring wetlands that can be damaged during land development. The proposed regulations may radically change wetland mitigation banking by tightening standards on all mitigation, making wetland banks more appealing to developers who might once have tried to restore wetlands on their own.

"Mitigation is not going away," Sudol says. "So we just have to do a better job of making sure our mitigation is successful." Meeting the goal using mitigation to prevent any net loss of wetlands is integral to the Army Corps' mission, he says, and wetland mitigation banks are a critical part of doing that successfully.

PHOTO BY JESSI J

Land, Sea and Sky

Growing up in New Jersey, Sudol got his first taste of wetlands by exploring a stream running near his home. Early on, he says, he saw that his local stream wasn't just water, but a whole system of animals, plants, soil, and hydrology.

By the time he started at the University of Rochester on an ROTC scholarship, ecology seemed like second nature. He signed up for graduate-level ecology course as a junior, intrigued by the complexity of ecosystems. "You can't look at one part of it, either the animals or the birds or the plants, without looking at the water, the landforms," he says.

In high school, he'd saved up to take a SCUBA class at the local pool—his first dive was at a quarry in north New Jersey, the second at a wreck off the New Jersey coast in about 100 feet of water. To satisfy his ROTC requirements and get his underwater fix after college, Sudol signed up for the Navy, intent on becoming a diver.

The Navy had other plans. Poor vision took him out of contention for the coveted diving posts and sent him instead to flight officer training school. As a flight officer, Sudol did everything but fly the plane, serving as flight navigator, bombardier, and communications officer.

Sudol worked in anti-submarine warfare, dropping sonic buoys into the ocean to listen in on underwater chatter. Along with picking up submarine sounds, he tapped into the clicks and songs of whales and other denizens of the deep.

His post also gave him a bird's eye view of the water. Once, soaring high above the Indian Ocean, he spotted a strange series of intermittent blips on his radar. His jet zoomed over to investigate and found a pod of 100 or more breaching sperm whales.

His aquatic fascination earned him a few nicknames: Shamu, after SeaWorld's well-known orca, and Cousteau—for another naval officer who went on to become a world-famous oceanographer.

Along with nicknames, Sudol's eight-year naval career left him with on-the-fly decision-making skills that he brings into his role as an administrator. With environmental problems, he says, there's rarely a time when you have all the information needed to make a decision. "In the Navy, flying a jet at 300 knots, you don't have time to question your decision," he says. "You have to take the best data that you have, make a decision, and move on."

When it comes to wetland mitigation, Sudol thinks sound decision-making based on the best available data is better than waffling to please everyone—and never getting any mitigation in place. As a result, the draft rule will give swifter and more predictable decisions on mitigation banks, he says.

Sudol thinks sound decision-making based on the best available data is better than waffling to please everyone—and never getting any mitigation in place.

Fire Hose Treatment

While in the Navy, Sudol realized that he wanted to pursue his interest in ecology—and wanted to make his education count. "What I began to see in the Navy is that you want to make a difference, you don't want to

study something for the sake of studying it," he says. At UCLA, he started out in a biology masters' program, then found out about the environmental science and engineering doctorate the school offered, which seemed to explore turning environmental concepts into results.

A stroke of luck sent him back into wetlands, and into the Army Corps of Engineers. Ducking through the doorway of the student lounge, he ran into another student who'd gotten a summer job with the Corps and had to back out at the last minute. "All they had to do was scratch her name off and put my name in," Sudol says. He started the next week.

"Essentially, the rule has to be beneficial to everyone."

At the time, an extremely high turnover rate within the Corps threw four projects, three with complex environmental impact statements, across Sudol's desk during his first week. "I got the fire hose treatment," he says. With full immersion, a dissertation topic floated to the surface. He realized the Corps hadn't been doing a stellar job on mitigation, so he decided to evaluate the success of the Corps' Orange County wetland mitigation projects.

Many may think of the Army Corps of Engineers as builders, constructing everything from the Hoover Dam to the new levees needed outside New Orleans. The Corps' regulatory branch—with slightly more than 1000 employees of the Corps' approximately 35,000-strong force—forms a small, yet integral, part of the agency's mission.

The regulatory branch emerged in 1899 with the passage of the Rivers and Harbors Act. The U.S. Congress was looking for a way to regulate navigable waterways and passed this task to the Corps, allowing them to regulate waterway obstructions, which included everything from bridges to polluted effluent. Between the 1920s and the 1960s, the Corps' authority expanded to include aesthetics and fish and wildlife values, Sudol says. Once the Clean Water Act came along, the Corps also took charge of the disposal of dredged material under Section 404—making the agency, along with the EPA, responsible for the nation's wetlands.

The O.C.'s Wetlands

In Orange County, Sudol looked at the mitigation projects instated after the Clean Water Act, from 1979 to 1993. At first, he waded through 700 project files to see what projects had been approved. Then he headed to the sites to see the results.

As seen on TV, the O.C. is a place for gorgeous, rich teens and adults who sip cocktails by the infinity pool. Sudol's O.C. days, however, were spent slogging through 240 acres of wetlands. "People wouldn't go out on a site visit with me more than once," Sudol says. "There's a lot of bushwhacking, a lot of not-so-nice areas, and a lot of heavy, sweaty, dirty work."

Once in the field, Sudol realized that mitigation often followed the Corps' technical requirements, but didn't create wetlands. At one time, people thought that planting trees was enough for long-term restoration. "What they did was build flat fields—I call them tree farms—irrigate the trees for five years, got good habitat, and then shut off the water after 5 years, because we were done monitoring." In Orange County, groundwater often hides deep in the sandy, dry soil. Once the tap turned off, most trees died.

Sudol focused specifically on 40 sites, concentrating on low-gradient riparian zones and measuring characteristics from how trees had survived over time to how the wetland was shaded. Of those 40, only three were

partially successful; the rest of the projects were failures. “The majority [failed] because we hadn’t done a good job of putting hydrology functions into the mix,” Sudol says.

Incorporating wetland functions—and often repairing upland and riparian habitat as well—Sudol realized that wetland banks could work if done right. “You know, if you look at those functions, if you look at it from an ecology point of view, taking into account the entire ecosystem, you can actually do a pretty good job either restoring or creating large areas of habitat,” he says. The most successful mitigation work, Sudol says, came from large tracts of preexisting wetlands. “Instead of just recreating wetlands in a place they weren’t in the landscape, which is difficult to say the least, you were restoring and building on existing wetlands,” he says. These ideas come into play in the new draft rule, which tilts future watershed mitigation banks toward watershed-level thinking and rebuilding.

In the O.C. today, he says, things are looking up. “We’re still fighting the battles, but the irrigated tree farms are no longer even thought of being approved,” he says.

There and Back Again

After UCLA, Sudol took a two-year detour into the private sector—a jaunt that showed him the developers’ side of wetland mitigation banking.

“pretty much everyone has to abide by the same standards now.”

Most developers, Sudol says, view regulations as a necessary evil, and try to hire people who will get mitigation projects built to code. “Don’t get me wrong, they’re trying to make a profit,” he says, “but they understand they have to go through the regs and they’re trying to do the right thing within the realm of what they’re allowed to do.” His work on the other side of the banking scene made him realize that developers wanted more information and responsiveness from the Corps’ regulators.

A year into starting his own consulting firm, he was swamped in work—and his wife had just had the couple’s first son. During the same time, the supervisor of the Corps’ Los Angeles regulatory branch had a heart attack and died. Sudol stopped by his old office to talk with his former co-workers, and several encouraged him to apply for the job. When his application was accepted in December 1999, he went back into the Corps, and freed up his weekends again for his new family.

Taking the reins at the Los Angeles branch that January, Sudol saw his chance to start implementing what he’d learned at UCLA: the importance of ecology and large-scale habitat.

Even though he’d worked in the private sector, his new team trusted him. “One of the things I found in consulting is that you can keep your morals and be a consultant,” he says. People in the regulatory office, who Sudol calls the hardest working folks in the Corps, understood that he hadn’t become a mouthpiece for developers, he says. “We had to live by the regs and we treated people fairly.”

Sudol thinks he helped to turn things around in the district, in part because he got all wetland stakeholders riled up when determining which mitigation projects would be approved.

“In Los Angeles, I learned clearly that if everyone’s mad at you, you’ve done a pretty good job,” he says. “If everybody’s had to compromise some, if developers couldn’t develop everything they wanted, if environ-

mentalists didn't get to save everything they wanted—and sometimes even your own folks are upset at you because you forced them to make a decision—you've done a pretty good job of getting things moving."

Sudol was soon on the move himself. He'd spent a year in the Los Angeles office, and had just put a down payment on a house, when the chief of the Corps' regulatory program in Washington, D.C. quit. In June 2002 he flew out for an interview. By September, he sat in the regulatory side's top spot.

As chief of the regulatory program in the Corps' D.C. headquarters, he's brought his willingness to be the focus of stakeholders' ire along from Los Angeles. In the new draft rule, everyone from developers to environmentalists will have to compromise to ensure combined economic and ecosystem health. "Essentially, the rule has to be beneficial to everyone," Sudol says.

New Rule

When Sudol spoke with Ecosystem Marketplace, the draft rule was circulating through other agencies for comment before going to the federal register for public comment.

Sudol says the new regulations try to take into account the latest wetland science, addressing many of the criticisms the National Academy of Science had in a 2001 report on the wetland mitigation program, which focused on the continuing loss of wetlands and the importance of considering wetland services on a broader geographic scale. The new draft rule will move toward a watershed approach based on some of these criticisms, and also put in timelines and predictability to the Corps' decisions about watershed mitigation banks.

The new regulations also level the playing field on mitigation between watershed mitigation banks, developers who perform their own mitigation, and in-lieu mitigation, which occurs off-site. Currently, few regulations govern the second two categories, while watershed bankers have been held to stricter standards. In the draft rule, Sudol says, "pretty much everyone has to abide by the same standards now."

While there's been some concern about what shape the new rulings will take, Sudol says people shouldn't be surprised if they've been paying attention. "We've been telling people those things for a year and a half," he says, speaking of the shift to watershed-based mitigation, streamlined permitting, and applying the same standards to all mitigation projects.

"We've been telling people those things for a year and a half," he says, speaking of the shift to watershed-based mitigation, streamlined permitting, and applying the same standards to all mitigation projects.

One of the concerns he's ready for is the shift to the watershed approach; he says that some will not want to restrict on-site, in-kind mitigation at all. Some environmentalists, he says, might also be concerned that a watershed approach means that the Corps will allow impacts to one watershed's habitat and mitigate cheaply in a second watershed.

Instead, Sudol says, the watershed approach can be used to combine wetland restoration on and off-site to boost wetland health on a larger scale. For example, he says, under the new system, an applicant doing

"I honestly believe that this spatial analysis is the way we're going to look at environmental problems in the future."

mitigation for a fill north of New Orleans could do a portion of the needed mitigation on-site, and another portion in the city's threatened southern coastal wetlands—without doubling the applicant's mitigation requirements—for greater overall benefits to the area. "Those coastal wetlands are going to protect the wetlands north of New Orleans, too," he says, by providing environmental services like flood protection. "That's the watershed approach."

Sudol's getting ready for comments on all sides, but also putting a great amount of effort into another Corps project that could aid everyone from environmentalists to developers to the general public. The Corps is creating a new database packed with GIS information and watershed mitigation permits data, which should be up and running by fiscal year 2007. "I honestly believe that this spatial analysis is the way we're going to look at environmental problems in the future," he says. Sudol is trying to get other federal agencies to add their data in as well, to create an accurate picture of what's happening to the environment, and to let managers, stakeholders and the public see how mitigation affects the landscape over time.

Sudol's work, then, encompasses not only the nuts and bolts of regulation, but tries to connect people to wetlands and the services they provide. "He brings a vision for how to run a regulatory program that is both more effective at protecting our nation's critical aquatic resources and more efficient and thus responsive to the regulated public," says the EPA's Palmer Hough, who's worked with Sudol on wetlands mitigation banking since 2002.

End of the Day

Even with all the changes to wetlands mitigation on the horizon, Sudol still knows how to take it easy. While in the Navy, he learned that it was crucial to relax in order to be sharp the next time he was in the air. He encourages his team at the Army Corps to do the same, putting their families ahead of their regulatory duties. "A lot of people forget this, but your work is not your life," he says.

These days, he's substituted mid-air and underwater adventures for time with his family, but there's definitely more mucking about in his future. He hikes with his younger son, who at sixteen months has started fighter pilot training already from the pack on his father's back, Sudol says. "He's very aggressive—he and I get along very well because we move at the same rapid pace to get things done."

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VII Case Studies

The Ecosystem Enhancement Program Matures in North Carolina

By Alice Kenny

The Ecosystem Enhancement Program (EEP) in North Carolina has won awards for its new model of public-private partnership in the realm of wetlands conservation. As the program rounds the corner on its third year, the Ecosystem Marketplace surveys its successes and shortcomings.

Highway construction projects connecting the new businesses, malls and housing that fueled North Carolina's growing economy were screeching to dead ends when they unsuccessfully navigated wetland-protection regulations. Meanwhile, wetlands continued disappearing despite tough regulations designed to protect them.

As these clashes between protecting the environment and promoting the economy accelerate across the nation, solutions embracing the competing priorities have been difficult to concoct. In North Carolina, this impasse pushed environmentalists, government officials and developers to devise a completely new approach.

North Carolina unleashed this approach, named the Ecosystem Enhancement Program (EEP), in July 2003. Hailed as a model for public-private partnerships, the program has sparked enormous enthusiasm, cut costs and won national awards. Now, as the EEP approaches its third anniversary, other agencies and states have begun looking to it for a blueprint they might follow. But the EEP, say many working closely with it, still needs some tinkering before others extrapolate too much.

PHOTO BY LYNNE LANCASTER

"We're a young and evolving program," says the program's director, Bill Gilmore "and we're trying to partner with private industry to provide the best return to the state." This requires a collaborative process, he says, that will either collectively succeed or collectively fail.

A Common Goal

Before the (EEP), North Carolina owned most of its road network and had a trust fund earmarked to underwrite future expansion. The Department of Transportation, it seemed, had nearly everything it needed to support the state's thriving economy—everything, that is, except environmental support.

According to Gilmore, up to 40 percent of new-construction-project-missed-start dates were due to problems with wetlands requirements under the Clean Water Act. The Act, designed to protect wetlands serving as natures cleansing sponges, mandates that, whenever wetlands are destroyed, equivalent wetlands must be restored in the same watershed. Developers, in the business of creating real estate and highways, rather than wetlands, often pay consultants to restore wetlands for them.

…up to 40 percent of new-construction-project-missed-start dates were due to problems with wetlands requirements under the Clean Water Act.

Yet reports suggested fewer than a quarter of these wetlands 'mitigation' projects functioned at a level ecologically equivalent to the natural wetlands they were built to replace, and the mitigation expenses of these sub-optimal projects continued mounting. The North Carolina Department of Transportation spent between $40 and $60 million per year on mitigation, transportation department data reveals.

Frustrated by the mess, the regulators and the regulated sat down together to brainstorm fresh solutions. North Carolina's Department of Transportation met in 2001 with the state Department of Environment and Natural Resources, the federal Army Corps of Engineers and 10 other state and federal agencies. After contentious debates, the agencies ultimately decided they would have to work jointly to meet their varied goals and the EEP was born to bring sparring environmentalists and business planners under the same roof.

"It is no secret that the agencies historically did not see eye to eye on a range of policy issues," says Gilmore. "Suddenly watershed-planning specialists working for the environmental agency were asked to work shoulder-to-shoulder with transportation planners."

Under these novel conditions, environmentalists, engineers and urban planners at EEP began revolutionizing wetland mitigation in the United States.

Proactive Mitigation

Unlike wetland-protection programs in most of the United States, North Carolina's EEP insists that new wetlands be built before government development forces destroy existing ones. By addressing environmental impacts proactively, the program clears the path for both economic development and ecological restoration by signaling its level of demand for wetlands years in advance.

"Usually permitting is the thing thought of last yet it ends up holding up progress," explains Lamar Beasley, president of American Wetlands and former deputy chief of the United States Forest Systems "What North Carolina did that's visionary is try to anticipate where mitigation needs will be."

The Department of Transportation now designs seven-year highway construction plans that include future wetlands-damage projections. This enables EEP's partners to look for projects addressing cumulative impacts to watersheds.

The North Carolina Department of Transportation spent between $40 and $60 million per year on mitigation

Buck Engineering, for example, a firm that received lucrative EEP contracts to design mitigation sites as well as construct them, recently completed work reclaiming former wetlands on Privateer Farm southeast of Fayetteville. Cornfields supported by drainage ditches and dams still dominate much of the 5000-acre farm, but water oaks, green ash and sycamore trees now flourish once again amidst 420 reclaimed acres of native wetland grasses and along meandering streams. And the transformation was completed before highway construction caused any wetland loss.

"This was a radical change," says Gilmore. "We went from project by project mitigation where every road construction project was matched to a precise mitigation site to looking at multiple highway projects accumulated within a watershed, then designed several projects of high quality to meet future demand."

This proactive mitigation also forced a partnership with the private sector. Since environmental impact costs could no longer be hidden among the multitude of expenses associated with highway development contracts, to keep taxes down the new agency outsourced 97 percent of its work to private sector experts such as Buck Engineering. Already, the agency awarded over $80 million in contracts to the wetland mitigation industry, says Gilmore, and is currently advertising another $100 million in contracts.

The partnership also eliminated bureaucratic logjams that bogged down projects. Privateer Farms' wetland recovery, for example, took a year to design, says Buck Engineering President Jim Buck, and another six months to build, meeting the EEP's 18-month design-to-completion timetable.

A Balancing Act

Leaning heavily on private industry, however, also meant bringing in another lobbying group with its own priorities and agenda.

"We're walking a tightrope," says Gilmore, referring to the mixed reception private-sector wetland mitigation firms give the EEP. Those who successfully landed contracts enthusiastically support it; those who have had difficulty negotiating the new EEP landscape expressed reservations.

Among the fans, Jim Buck of Buck Engineering says, "What the EEP accomplished in 30 months is unbelievable. They created a state agency, delivered thousands of acres of restored wetlands and miles of stream restoration. The EEP is one of the best examples of the government responding to what is needed."

Speculative market risk is no longer a concern once contracts are awarded, he continued. While in other states contractors wait years to sell wetland credits, the EEP pays contractors up front for most of their costs. Buck Engineering received 75 percent of its contracted amount when it finished construction in April after 18 months' work. The final 25 percent will be divvied out during the five-year monitoring period.

Although this works for Buck Engineering, some wetland bankers feel it points to a fundamental problem in the EEP's approach. George Kelly, president of Environmental Banc & Exchange (EBX), says that there are many pros and cons associated with the EEP. One of the cons, he says, is that the EEP "uses a constrained market approach which can have negative implications to some of the providers." Despite the program's problems, he is quick to add, "on balance, the private providers in the state of North Carolina are better off with the EEP program in place."

Like Kelly, many bankers feel the EEP is useful, but that it does have some important problems that need correcting. For instance, some argue that the EEP skews the market by releasing numerous requests for proposals in a single watershed at the same time—as many as 25 in a day. With a limited number of appropriate sites to choose from, contractors wind up approaching the same landowners for options to mitigate damaged wetlands, artificially inflating real estate and increasing contractors' costs. Meanwhile, instead of letting the market decide the value of mitigated wetlands as is done in other states, the EEP sets ceilings on what it will pay per contract, further cutting into contractors' profits.

Worse still, mitigators say, is that their business in North Carolina depends on the whims of a single agency. In other states, contractors rehabilitate wetlands, then sell shares of the site to various developers required to purchase mitigation credits. But here, when the EEP changes its mind about restoring wetlands as it has already done, the expenses contractors fronted searching for appropriate sites, purchasing options to buy and laying out designs are lost.

The Department of Transportation now designs seven-year highway construction plans that include future wetlands-damage projections.

From some of the bankers' perspective, despite the EEP's obvious benefits, quality can sometimes be sacrificed to meet tight budgets. For example, they claim, while watershed associations claim that larger stream restoration projects involving at least three tributaries offer greater environmental value, the EEP keeps costs down by asking for restoration proposals involving a single tributary.

"I guess the EEP is due recognition as a model of public-private partnerships," says American Wetlands President Beasley, "but with a lot of caveats."

The Bottom Line

Since collaboration between agencies, priorities and the private sector are crucial to the EEP's success, the agency takes criticism seriously, says Gilmore. Teamwork is key, he continued, for the EEP to explore new mitigation options offering better economic and environmental returns. The program is considering wetland mitigation projects, for example, that would restore streams in coastal areas and apply engineered solutions to complex storm-water runoff issues in urban areas.

But some of the contractors' complaints, he adds, come as a cost of doing business. The EEP advertised for more work than they wound up contracting for when they learned that the state's fiscal standing was not as strong as anticipated. This is no different, he says, than if General Motors told venders they would order 100,000 windshields, then purchased fewer when the car market crashed.

"Contractors should recoup costs on the frequency that they win projects," he says. "It's the good-old American way."

Not a single highway project has been delayed because of mitigation during the past 28 months.

And as for the bottom line—reducing highway-development delays, increasing the number of functioning wetlands and teaming with the private sector to keep the price tag down—the program, he feels, is already a tremendous success.

Not a single highway project has been delayed because of mitigation during the past 28 months. Miles of wetlands and streams have been reclaimed years before development threatens others. And the EEP saved money on mitigation by leaning on the expertise of private-wetland-mitigation developers.

This visionary program succeeded by marrying typically sparring forces—regulators and the regulated, developers and environmentalists, bureaucracies and entrepreneurs. While conflicts must to be worked out, they also underline the magnitude of what has already been accomplished.

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Chevron Opens Mitigation Bank in Paradis(e)

Outside of the carbon markets, corporate involvement is still rare in emerging ecosystem-service markets. In the field of mitigation banking, however, this is beginning to change. The Ecosystem Marketplace gets the latest on Chevron's new mitigation bank in the United States.

By Alice Kenney

Gazing from his farmhouse towards adjacent pastures and distant swamps filled with water lilies and cattails, bald eagles and alligators, Eric Matherne drawls in a soft southern accent, "this is paradise to me."

Matherne lives in aptly named Paradis, a rural Cajun parish in southern Louisiana. His property abuts part-lush landscape, part-verdant pasture-land owned by Chevron. The corporation received approval in November 2005 to convert 11-square miles of this largely undisturbed habitat into the biggest wetland mitigation bank in the state. Matherne says he hopes the bank will preserve the fertile landscape he overlooks, forever.

Chevron appreciates the land's beauty and the ecological value of preserving it as a wetland, but economic rather than ecological incentives held the greatest sway in spurring this Fortune 100 Corporation's decision to expand into the field of mitigation banking. "A wetland mitigation bank made the best sense from a financial standpoint," says Matt Carmichael, a Chevron spokesman, from his office in nearby New Orleans.

PHOTO BY DALE EURENIUS

"A wetland mitigation bank made the best sense from a financial standpoint," says Matt Carmichael

Corporate involvement in the evolving field of ecosystem services markets is relatively rare. Chevron's market analysis and degree of success in expanding into mitigation banking offers a window into the benefits and challenges of investing in this new financial marketplace.

From Black Gold to Green Gold

For decades, Chevron's Paradis wetlands offered more riches for its corporate owners than just diverse wildlife. Oil companies drilled there for 60 years, prospering off oil swirling below the surface. But the oil productivity began declining in the 1980s. By the time Chevron and Texaco merged in 2001, geologists determined that the wells had been tapped out, explains Carmichael.

This pushed the new corporation to decide what to do with its former cash cow. They considered a variety of options, Carmichael says, from building homes and businesses to selling the land. But the property's elevation averaged six feet below sea level; percolation tests revealed that it was too weak to support structures. The land, says Carmichael "was essentially un-developable."

It could, however, function as a wetland mitigation bank. Unlike financial banks built from bricks and mortar, mitigation banks are actual wetlands that have been created, restored or enhanced by private companies or government agencies. The system, a byproduct of the federal Clean Water Act, mandates that builders replace as many wetlands as they destroy. Developers building on wetlands can buy credits, or shares, in mitigation banks typically located in the same watershed to offset the ecological damage they are causing.

By turning the land into a mitigation bank, Chevron has, in a sense, struck oil once again. Development pressures in this region along Highway 90, the main thoroughfare to New Orleans, are acute and accelerating. Exacerbating the pressures are the state's plans to incorporate the highway into a four-lane interstate called Highway 49, allowing traffic to race to jobs returning to New Orleans. As the city's suburban reach expands, developers are gobbling up available properties, including wetlands. With the supply of mitigation credits in this watershed sparse and the demand for them high, the corporation plans to demand a hefty price for its credits.

Meanwhile, turning the land into a mitigation bank requires only a minimal investment by Chevron, according to corporate data. Basically, Chevron plans to plant trees and dig ditches to turn "essentially un-developable" land into a wetland bank worth millions. Already, nearly half the property is considered wetlands. To meet the criteria to qualify as a wetlands bank, the wetlands portion needs to enhance its wetlands functions and the dry portion must be converted into a natural wetland state. The corporation will meet these objectives, according to the approved plan, by planting Cypress and bottomland hardwood trees in the wetlands portion and digging culverts in spoil banks that will hold and gradually release rainwater in the currently drained area.

With 7100 acres in its wetlands bank, this means that the corporation stands to gross over $150 million.

Each wetland acre/credit will then sell for $20,000-$25,000, Carmichael says. With 7100 acres in its wetlands bank, this means that the corporation stands to gross over $150 million. They have already begun releasing some of the credits.

Meanwhile, the local drainage board, called the Sunset Drainage Board and headed by Chevron's neighbor, Eric Matherne, remains responsible for maintaining the levee surrounding and preserving the land. The board charges $20 an acre for its services, "one of the best deals," Matherne says," that anyone ever had."

The deal, he adds, is also good for the drainage board. The restored, enhanced and created wetlands are expected to retain two-to-three weeks worth of rainwater, taking pressure off the drainage board's pumping stations.

And the plan appears to be good for the environment as well. Trees, unlike the seasonal grasses they will replace, provide long-term absorption of carbon that would otherwise seep into the air and contribute to global warming. Their powerful roots help prevent flooding by sucking up rainwater. And wetlands help filter out pollutants.

Doing Business in Hurricane Alley

In the wake of Katrina's wrath, many wonder about the lifespan of the Paradis Mitigation Bank, a below-sea-level wetland located in hurricane alley and protected by breachable levies.

Typically, federal legislation aimed at stemming the rapid loss of wetlands requires that wetland banks last "in perpetuity." James Barlow, project manager for the U.S. Army Corps of Engineers Regulatory Branch overseeing the Paradis wetlands bank, says this requirement poses a problem in the case of Chevron's bank. "[W]e've been criticized for setting up banks that are not self-sustaining. And this is not self sustaining."

An estimated half of the 220 million acres of marshes, bogs, swamps, and other wetlands that once existed in the United States have disappeared, according to U.S. General Accounting Office data, including over a million wetlands that have been destroyed or degraded since the passage of the Clean Water Act.

Paradis, similar to much of the soppy lower Mississippi Valley, survives thanks to protective levees and pumping stations built in the 1930s. Located just 23 miles southwest of New Orleans and seven miles from the Mississippi, the town of Paradis—and everyone investing in it—could have been devastated instead of just sideswiped by Katrina.

"It was pure dumb luck that Katrina's eye wall only grazed the town," says Corey Faucheux, economic development director for Paradis. "If the hurricane tracked a bit more westward, we would have been in the same boat as New Orleans."

Although the Paradis Mitigation Bank could sponge up excess rainfall, it would be impotent to protect the town if the levees surrounding the town broke. Since the land is below sea level, it would be covered with water and worthless for flood prevention. Further, the bank is located too far inland to provide a barrier to coastal flooding, experts agree.

This is no different, however, than much of the other prized wetlands within the bank's watershed. So, as a condition for approving the bank, the Army Corps decided to limit sale of the bank's credits to developers building on wetlands in similar, levee-protected areas.

Since the Sunset Drainage Board and not the multi-billion-dollar corporation is responsible for maintaining —and rebuilding—the levees, Chevron's investment is protected regardless of possible flooding. And if the levees were breached, Matherne promised that his board would rebuild them. After all, his home cannot survive without them.

The New American Way

Despite the multimillion-dollar profit Chevron anticipates from its mitigation bank, corporate involvement remains rare in the numerous ecosystem-service markets that have begun evolving. But in the field of mitigation banking, their ranks are growing.

Wetland mitigation banking, which began in the early 1990s, now counts over 450 approved banks throughout the United States and an additional 198 in the proposal stage according to an inventory completed last year by the Army Corps of Engineers. Between 20 and 30 percent of them are backed by large corporations, says Rich Mogensen, immediate past president of the Mitigation Bankers Association and director of Mid-Atlantic Mitigation LLC, an EarthMark Company. Corporations dabbling in mitigation banking are predominantly energy or pipeline companies such as Chevron, Tenneco and Florida Power and Light; corporations that are financially secure, have extra land and are looking for ways to diversify. Similar to the Paradis property, the land converted into wetland banks typically had a previous history as a site for oil exploration but no longer has any mineral value. Since the land often lies within flood plains or on wetlands, it cannot pass percolation tests required for development approval.

From Mogensen's perspective, "It's a great use of corporate assets that can't be used for anything else."

He does not mind the competition, he adds, even though he directs a mitigation banking company. "The big corporations are potential competitors but that's the American way," he says. Further, he adds, these larger corporations often spin their banks off to smaller companies, such as his, to handle the banking. "Besides, the more financially secure companies there are doing mitigation banking, the better off and stronger the industry is."

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VIII Peering into the Crystal Ball

Halting the Plunder Down Under

By Adam Ferguson

Real innovation sometimes arises from tweaking a model, not designing it from scratch. The Ecosystem Marketplace follows the path of an American conservation model across the ocean to New South Wales and discovers how the ever-innovative Aussies are adapting mitigation banking to suit their needs.

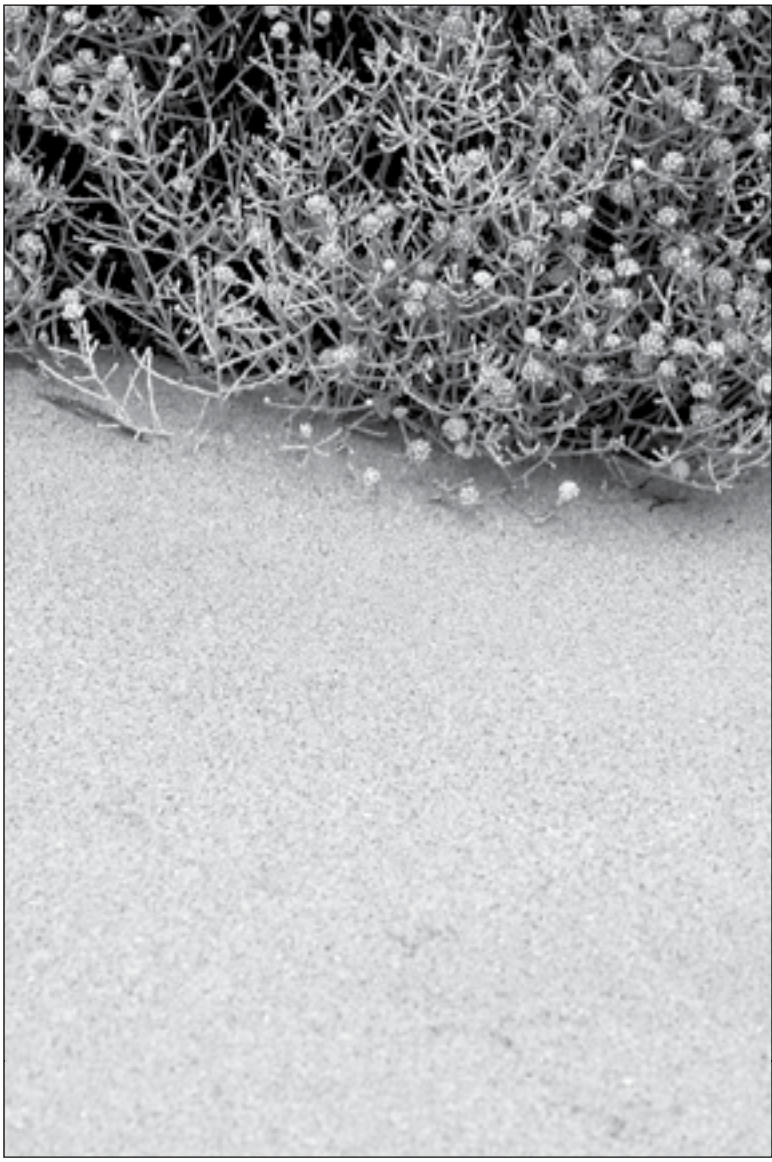

PHOTO BY CHRIS POTTER

The smell of cut Gum and tilled earth permeates the air as native habitats continue to disappear along the east coast of Australia under a rising tide of urban sprawl. 80 species of native plants and animals have gone extinct in the state of New South Wales since Australia was colonized in 1788, and another 1000 species are currently speeding down the same track.

Roughly 85% percent of the population in New South Wales now lives within 50km of the East Coast, so it is no surprise that the state's Department of Environment and Conservation (DEC) says it is facing "unprecedented challenges" when it comes to conserving the biological wealth of its coastal areas.

The New South Wales government amended their threatened species laws in November 2004 in an attempt to "reverse" further biodiversity losses, signaling a new commitment to integrate conservation strategies into future polices affecting the development of Australia's environmental assets. The government now says it is ready to follow through on the commitment using a customized market-based instrument called biodiversity banking.

The Importance of an Endgame

The first step in designing a new market mechanism for conservation, say those behind New South Wales plans for biodiversity banking, is sorting out what you do and do not want from the scheme.

DEC, for instance, did not want a new plan for expanding public lands. Many of the most intact ecosystems are already managed as National Park and State Forest in New South Wales. With limited state funds, DEC instead needed a means of stretching its influence without bursting its pocketbook.

The agency thus turned its attention to private land holdings: outlining a protocol for development in areas lacking biological diversity, and a strategy for restoration in areas harboring it. The next (ongoing) step, then, was to map the concentration of plant and animal species across private lands throughout the state.

Toward this end, councils, landholders, catchment management authorities and conservation groups are pooling data about the relative riches of wetlands, heath lands and forests in New South Wales to ensure "plans fit with local knowledge," says DEC.

80 species of native plants and animals have gone extinct in the state of New South Wales since Australia was colonized in 1788.

As this data flows in from diverse sources, DEC uses it to identify "green-light", "amber-light" and "red-light" areas throughout the state. Each color signifies a different level of biodiversity: areas where low biodiversity occurs will be zoned as green-light properties for development; areas where medium biodiversity occurs will be zoned as amber-light properties for development; and, areas where high biodiversity occurs will be zoned as red-light properties for development.

"The aim is to secure and improve existing ecosystems rather than create new ones," explains Shona Bates, Principle Projects Officer at New South Wales DEC.

DEC thus is drawing a visual map of its endgame for New South Wales, putting numbers and names both to the places where it wants to advance development, and to the places where it wants to see ecological restoration. The next step, then, will be to move from cartography to conservation.

Re-using the Wheel

Australians have long been among the most innovative advocates of market-based conservation schemes, but in their stockpile of market mechanisms, DEC officials did not have quite the right tool for the fast growth areas they were trying to manage along the New South Wales coastline. Consequently, they looked to see what other ideas might be out there in the fast evolving world of market-based conservation. They soon discovered the expanding mitigation banking industry in the United States.

From North Carolina to Northern California, private sector companies are now restoring wetlands and endangered species habitat in exchange for government credits. These companies, or "mitigation banks," then sell the credits on to developers looking to offset environmental damage they have caused elsewhere. While environmental groups actively debate the relative merits of mitigation banking versus other forms of environmental compliance in the United States, many agree the new banking industry has begun fueling an important shift in the way private landowners view the nation's endangered species.

Peering into the Crystal Ball

American property owners used to think the presence of endangered species on their land came with a set of onerous responsibilities, leading some to "shoot, shovel, and shut up" rather than call attention to the biological value of their property. With the advent of mitigation banking, however, growing numbers of landowners are coming to view endangered species or wetlands on their land as a set of conservation opportunities rather than obligations.

Australians have long been among the most innovative advocates of market-based conservation schemes.

"Now I get people ringing up telling me they saw a threatened species while they were out driving on their tractor [and asking me]: do you think my land could be worth something?" says Craig Denisoff, President of the National Mitigation Banking Association in the U.S., and Senior Vice President of Wildlands Inc.

From across the ocean, the NSW DEC officials recognized this was just the sort of change in mentality that would advance ecological restoration on private lands with high levels of biological richness. "The [U.S. mitigation banking] industry has created a positive market value for high conservation value land, which provided strong incentives for it's ongoing protection without the need for government funding," observes Bates.

Accordingly, DEC officials approached Denisoff after a U.S. National Mitigation Banking Conference in March 2005, extending an invitation to fly to Australia to help New South Wales structure a mitigation banking industry of its own.

Custom Fit Conservation

Assessing the Australian landscape, Denisoff says he realized that New South Wales could easily adapt many American approaches to suit their needs and might even improve on the U.S. system with careful planning. In particular, Denisoff highlighted the importance of identifying areas that are critical in the recovery and survival of species and the importance of adequate legislation as a market driver.

"One of the problems in the U.S. was that the clean water and the endangered species acts were broad laws that didn't specify or enforce banking strategies" says Denisoff. With the 2004 amendments to the New South Wales Threatened Species Laws, Australian biodiversity legislation is a more general law that will allow for the comprehensive protection of biodiversity, not just endangered species or wetlands. "DEC has developed a model which is specific to the New South Wales context", says Bates.

Developers building in green-light areas with low levels of biological diversity won't be required to 'offset' or 'mitigate' the damage they cause. According to DEC, amber-light areas thought to house medium biodiversity will use a "rule-based method…to determine biodiversity loss at development application stage." Developers then must offset these calculated losses in amber-light areas by investing in biodiversity banking schemes that either maintain or improve biodiversity at the larger landscape scale. Red-light areas with high biodiversity values, meanwhile, will be targeted for restoration and investment.

While some Australian environmentalists remain skeptical of the idea of offsetting, the red-light areas in the New South Wales scheme interest them. "Any remnant bush is so valuable we can't afford to see it destroyed with the promise of making up for it elsewhere," says Felicity Wade of the Australian Wilderness Society. "But the prospect of keeping good bush intact through creating a market looks like a positive."

"Australia is in a very fortunate position," agrees Denisoff. "When mitigation banking commenced in the States, biodiversity had already been severely impacted, Australia is in the unique position to preserve much of what it still has."

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Growing numbers of landowners are coming to view endangered species or wetlands on their land as a set of conservation opportunities rather than obligations.

Stack ‘em Up

By Amanda Hawn

Trading ecosystem services is often difficult because of the complexities of matching supply and demand. In order to make conservation land-use profitable enough to compete with other market forces—namely, those driving increasing development—some of America’s conservation pioneers are looking at how to stack multiple land-use values in ways that will optimize economic and ecological benefits. The Ecosystem Marketplace surveys new efforts to stack ‘em up.

America’s Southeast—so famous for its rural charm—is rapidly urbanizing. Five of the ten fastest growing cities in the country lie in the twelve southeastern states, and patterns of land ownership suggest developers replacing woodpecker habitat with residential cul-de-sacs won’t hit roadblocks anytime soon.

Unlike the western United States, where many important ecosystems stretch across public land, almost 90% of the land in America’s southeastern states is private property. “[T]he future protection of biodiversity in the Southeast will depend on what happens on private land,” says David Wear, project leader of the Forest Economics Unit at the U.S. Forest Service Southern Research Station.

Wear’s observation, in combination with the region’s brisk pace of development, worries many environmentalists. Since developers hoping to subdivide private land generally offer property owners more than ecologists hoping to restore it, conservationists are stuck crunching ecological statistics and real estate numbers that don’t add up.

“Traditional conservation efforts by philanthropic enterprises and government funds are simply insufficient to address the scope or pace of urban sprawl,” says Brad Raffle, a partner specializing in private property land conservation with the Texas law firm of Baker Botts. “Ecosystem fragmentation reflects the economic decisions of hundreds of private parties—what [some] call the tragedy of small decisions.”

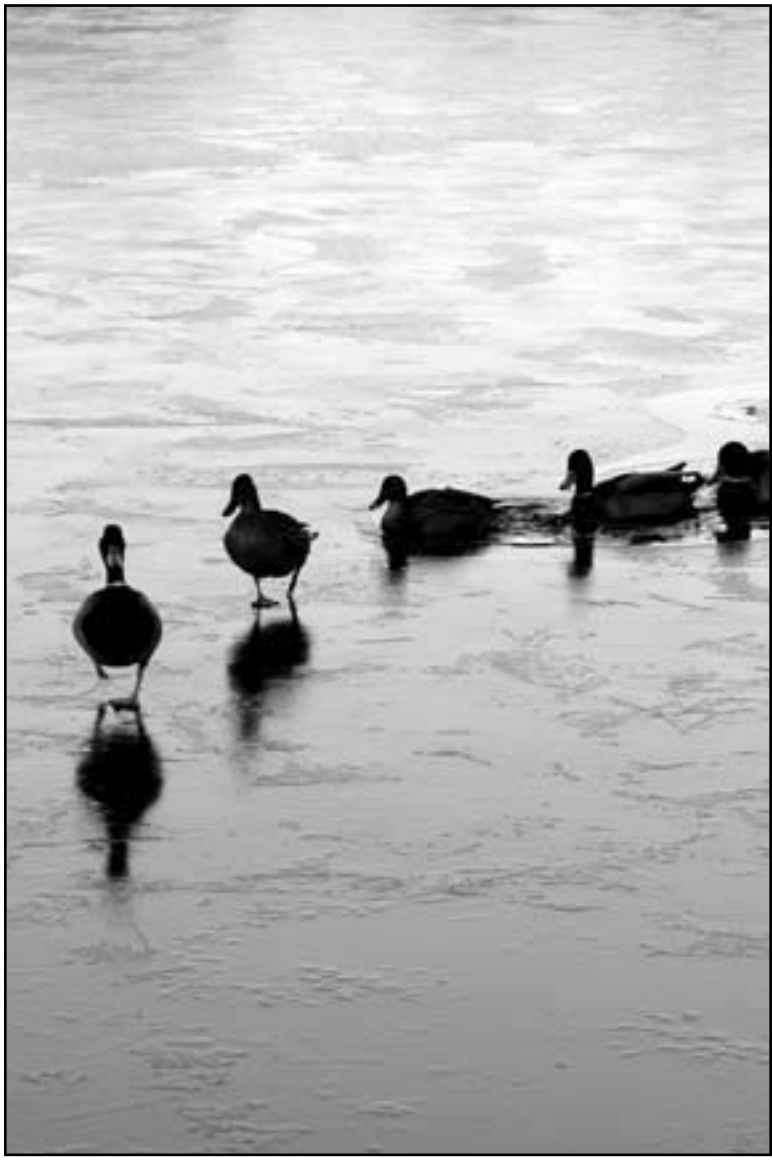

PHOTO BY PIERRE AMERLYNCK

Raffle, however, is not a fatalist. In fact, he is among a growing number of conservation pioneers who consider the Southeast's 21st Century conundrum—how to preserve functioning ecological landscapes across multiple parcels of private property—to be as rich with opportunities, as it is riddled with challenges.

Carrots and Sticks

According to Raffle, "A new strategy is needed, one that employs a carefully considered combination of enforceable regulatory constraints on ecosystem destruction and meaningful economic incentives for ecosystem conservation."

Markets for wetlands credits and pollution permits are not yet on the radar screens of most rural property owners. Why not?

Such a shuffling of carrots and sticks, argue those sketching the contours of a new approach to land conservation in the Southeast, might harness the diffuse decision-making of multiple landowners toward a 'triumph of small decisions' realized in the form of healthy watersheds, sufficient wetlands and protected endangered species habitat. While this vision may not yet represent reality, neither is it entirely notional.

The last two decades, in fact, have seen a sudden proliferation of market-based conservation mechanisms designed with this model in mind.

Federal measures like the Clean Water and Endangered Species Acts now compel developers to offset any damage they inflict on streams, wetlands and endangered species habitat, either by restoring 'equivalent' ecosystems elsewhere or by paying others to do the same in exchange for government certified credits. Entrepreneurs have responded to the resulting demand for credits by setting up stream, wetland and conservation 'mitigation banks' that restore large pieces of land in order to bank and sell the associated credits.

Likewise, the EPA frequently sets regulatory limits on water polluters within watersheds. Some factories, for instance, pay farmers to reduce their pollution emissions along a river so that the factory, in turn, can operate within overall pollution caps in a watershed. In effect, the factories are purchasing pollution permits from farmers at a market price that is amenable to both parties. Such 'cap-and-trade' systems, many argue, allow communities to meet pollution standards in the most cost-effective way possible. Similar cap-and-trade schemes have been used to reduce acid rain in the United States and to limit greenhouse gas emissions on an international level.

Not surprisingly, many of these innovative conservation mechanisms have grown and evolved fastest in the Southeast where property owners are used to looking to their land for revenue—albeit traditionally from things like minerals, oil and timber. Recent meetings about federal payments for protecting ivory-billed woodpecker habitat on private land, for instance, attracted packed house audiences in Arkansas.

Despite the recent surge of interest in incentive-based conservation in the Southeast, those involved in the field stress that markets for wetlands credits and pollution permits are not yet on the radar screens of most rural property owners. Why not?

Green Giant

For conservationists seeking insight into life as a landowner in the evolving Southeast, there may be no better place to start than Temple-Inland Inc., a Texas-based manufacturer of corrugated packaging and forest products that owns some two million acres of forestland in Texas, Louisiana, Alabama, and Georgia.

Peering into the Crystal Ball

Temple-Inland has long been familiar with the public relations value of conservation management—the U.S. EPA, the Dow Jones Sustainability Index and the Nature Conservancy have all lauded its environmental contributions—but the last few years have also seen the company exploring more direct means of generating economic returns through conservation efforts.

Temple-Inland's initial interest in cultivating the conservation value of its land began with monitoring the scientific and public policy debate on global climate change in the 1990s. The company joined the Chicago Climate Exchange (CCX) as a founding member in 2002 to explore the financial viability of trading carbon credits attributable to the trees on its forestlands, explains Mike Harbordt, Director of Environment and Sustainable Forestry at Temple-Inland.

From carbon sequestration, Temple-Inland began to consider the potential value of other "services" provided by its forestland—things like water filtration, flood control and endangered species habitat. "Over the last several years, Temple-Inland has devoted considerable resources to understanding ecosystem services and identifying specific opportunities across the Company's forestlands," says Bill Goodrum, Temple-Inland's Director of Non-Timber Resources.

More specifically, Temple-Inland began mapping areas of high conservation value on its land in 1996, creating a "first generation 'ecological' GIS layer" that combined external data on demand for ecosystem services credits with internal information about the company's landholdings. Working with this information, the company subsequently developed near-, medium- and long-term business plans for expanding its supply of ecosystem services.

Temple-Inland, for instance, has been participating in the U.S. Fish and Wildlife Service "Safe Harbor" program for managing red-cockaded woodpecker habitat since 1999 and is now looking to set up mitigation and stream banks, as well. Further out, the Environmental Affairs Group is considering how to maximize the availability and the quality of the company's water resources twenty years down the line.

Temple-Inland began to consider the potential value of other "services" provided by its forestland—things like water filtration, flood control and endangered species habitat.

"Temple-Inland's new environmental projects are interesting and could become more important over time," says Kheryn Klubnikin, an ecologist with the U.S. Forest Service. "The next step will be to find how to extend these ideas to the larger regional landscape so the critical working pieces of the region's ecosystems are there for following generations."

But while Goodrum and Harbordt say they are excited by the potential of market-based conservation, they also offer insight into the current difficulties associated with developing actionable business plans based on ecosystem services.

No Easy Trick

Goodrum observes, for instance, that despite devoting significant resources to understanding regulatory-driven markets in ecosystem services, the Company still finds it tough to put deals together on a regular

basis. "If it is difficult for a large company to figure this out, it is going to be tough for the average property owner to get involved."

As a means of illuminating some of the current barriers to mainstreaming environmental markets, he compares ecosystem service opportunities to more traditional mineral lease opportunities. Mineral leases have been around for a long time, Goodrum explains, so more landowners are aware of them and understand how they work. Conversely, ecosystem service markets lack any real historical precedent and thus remain unknown to many potential market players.

A single piece of land, for instance, might generate revenue through carbon sequestration, recreational leases, wetland mitigation banking, stream mitigation banking, and selective timber harvesting.

Mineral leases also aren't nearly as site specific as ecosystem service payments. The geographic scale of something like an oil or natural gas lease, for instance, is usually larger and more uniform than that associated with a wetland offset opportunity. "It's not apples to apples, so it is tougher to spread information," says Goodrum. "With a mineral lease, everyone in the targeted area gets a call."

Beyond spreading market knowledge and cultivating the supply of ecosystem services, both Goodrum and Harbordt stress that the demand side (which depends on external drivers like regulation) is really the hardest part when it comes to scaling up markets for conservation. But even here, all is not lost.

In order to overcome the lack of consistent demand in any single market, Temple-Inland is now exploring the possibility of "stacking" revenue streams from multiple types of land-use. A single piece of land, for instance, might generate revenue through carbon sequestration, recreational leases, wetland mitigation banking, stream mitigation banking, and selective timber harvesting.

Land of Opportunity

"In my opinion," says Raffle, "the only viable strategy for achieving significant conservation outcomes on the most threatened lands, especially lands within the 3-5 year growth corridors surrounding America's fastest growing urban areas, is stacking two or more value propositions on the land."

Raffle, in particular, envisions a portfolio of land-uses that would include five broad categories of conservation-oriented revenues: mitigation banking (stream, wetland and conservation); payments for ecological services linked to water quality/quantity and climate regulation; more traditional forms of federal and state conservation funding; limited development opportunities (e.g. conservation compatible clustered residential offerings); and low-impact extraction of natural resources (minerals/timber/water).

Projections suggest that, by stacking services in this way, a company could triple the earning potential of some parcels. And this, at last, is just the sort of statistic that might help conservationists compete with developers or other land-users when it comes to determining the fate of private land in the Southeast.

Importantly, stacking services eventually should make sense for both rural landowners already familiar with market-based conservation and rural landowners who don't yet know a thing about it. The natural inclination of a landowner interested in conserving his or her land, observes Raffle, is to think about how to blend conservation uses with traditional uses. "Like any other business, you are diversifying risk and broadening the base of your business."

The same logic holds for businesses currently focused on markets in ecosystem services.

Using wetland mitigation banking as an example, Raffle lists two of the well-known challenges facing stand-alone businesses in the industry. Namely, lower competition can always appear on the horizon, and the demand for wetlands credits can be volatile. Stacking more than one kind of conservation-oriented revenue stream on a single piece of land, he says, could provide such businesses with a buffer against the volatility of future market developments.

But while stacking clearly holds potential for a variety of landowners, it is unlikely to prove easy for any of them, at least in the short term. Stacking adds another layer of complexity to an already tricky process by forcing landowners to balance opportunities between markets and across time.

Once a piece of land has been set aside for stream mitigation, some environmentalists argue it is a waste of scarce funding to pay for other conservation uses on the same parcel. As the policy makers responsible for drafting the regulatory underpinnings of ecosystem services markets decide when and where to allow stacking, land managers are left to ponder an uncertain future. For instance, will mitigation opportunities today preclude the option of water quality trading tomorrow?

Projections suggest that, by stacking services in this way, a company could triple the earning potential of some parcels.

"Matching supply and demand is difficult for each market," reminds Goodrum, "start throwing in four, five and six and it gets really complicated."

As Temple-Inland's story demonstrates, stacking multiple land-uses takes time, money and a wide range of expertise. For companies that have large-landholdings, but for which land-management is not at the core of the business, it can be very difficult to pull together a team of in-house professionals to develop value stacking projects cutting across more than one department. At the other end of the spectrum, the regulatory and financial savvy required to stack land-uses is currently beyond the sophistication of most individual landowners.

Raffle predicts smaller businesses, operating somewhere between these extremes, may be the first to realize the opportunities associated with stacking. "I think the sweet spot, he says, "is really going to be in the combination of traditional and conservation land-uses around parcels that are at least 500 acres in size on the outskirts of fast-growing metropolitan areas."

If Raffle is right, the fringes of America's tame suburbs may represent the country's next real frontier for conservation pioneers hunting gold (and healthy ecosystems) in the Wild Southeast.

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THE KATOOMBA GROUP'S

Ecosystem Marketplace

Markets depend on transparent and reliable information to function:

…Think Bloomberg and the Wall Street Journal;
…Think streaming stock quotes;
…Think Morningstar;
…Think of the information required by the SEC.

What is true for Wall Street, is equally true for environmental markets trading carbon, water quality, and biodiversity. Unfortunately, obtaining information for these markets can sometimes be exceedingly difficult.

Enter the Ecosystem Marketplace.

The Ecosystem Marketplace seeks to become the world's leading source of information on markets and payment schemes for ecosystem services such as water filtration, carbon sequestration and biodiversity conservation. We believe that by providing reliable information on prices, regulation, science, and other market-relevant factors, markets for ecosystem services will one day become a fundamental part of our economic system, helping give value to fundamental ecosystem services that, for too long, have been taken for granted.

The Ecosystem Marketplace was created by the Katoomba Group—a multi-stakeholder group of businesses, NGOs, government representatives, and academics interested in environmental markets (www.katoombagroup.org) —and is a project of the Washington, DC-based non-profit, Forest Trends (www.forest-trends.org)

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