VOLUME 24 | NUMBER 4 | DECEMBER 2006 : $2.50

Enviropreneur Issue

PERC REPORTS

THE MAGAZINE OF FREE MARKET ENVIRONMENTALISM

Mushrooms Meet Brownfields

Deadbeat Dams

Enviropreneurs in Action

Bees & Barbed Wire For Water

On the Bolivian Frontier

From the Editor

En·vi·ro·pre·neur: difficult to pronounce but easy to conceptualize. Enviropreneurs are individuals who conceive new green business opportunities and who take on the risks required to convert those ideas into reality. In the past, business has been perceived as the enemy of the environment. As you will see in this issue of PERC Reports*, enviropreneurs are blowing this notion out of the water.*

Business schools know that the best way to teach entrepreneurship is through case studies. This issue takes this same approach by showcasing the stories of a few mavericks. We hope these stories will act as a catalyst to entice other interested entrepreneurs to invest in the environment by demonstrating the benefits of aligning business with conservation.

Asquith

In the cover story, NIGEL ASQUITH explains how markets, contracts, and property rights came into play to preserve water and trees in a Bolivian cloud forest. The incentives for loggers and irrigators to help with the preservation came in the form of beehives and barbed wire.

Nugent

Remediator SAM NUGENT helps himself by helping owners of contaminated properties recapture their investment values using mushrooms to clean them up. Despite facing large bureaucratic hurdles, Nugent is proving that fungal remediation is a safe and cost-effective way to recycle contaminated soils.

Workman

Can "Deadbeat Dams" become lucrative assets? JAMES G. WORKMAN explains how a dam brokerage house plans to convert "fixed liabilities" into "liquid assets." Although his business plan is in the early stages, all signs indicate that obsolete dams are worth more broken up than left intact.

This issue also includes three snapshots of "Enviropreneurs in Action." Their stories, covering California to South Africa, involve converting agricultural land into recreational property, grassbanking, and conserving biodiversity. Also contained in this issue are the usual first-class columns by TERRY L. ANDERSON and DANIEL K. BENJAMIN and of course LINDA PLATTS' "Greener Pastures."

The letters to the editor section offers a small sample of the many notes PERC has received praising JANE SHAW's work as editor over the past 20 years. It is an honor to follow in her giant intellectual footsteps. First introduced to Jane several years ago as a participant in PERC's summer student and graduate fellowship programs, I admired her work and followed it closely as a research fellow at the Hoover Institution at Stanford University. I have recently had the opportunity to work closely with Jane as PERC's Director of Development and as a research fellow. I look forward to the challenge of maintaining her high standards and to seeing PERC Reports *flourish as free market environmentalism moves deeper into the mainstream.*

Finally, if you value PERC Reports *and want to join in championing market solutions to environmental problems, please open your pocketbooks and make a tax-deductible investment in PERC. LEIGH PERKINS, former CEO of Orvis, writes to you in the centerfold and reflects on his involvement with PERC over the last two decades.*

Laura E. Huggins | Editor

PERC REPORTS
The Magazine of Free Market Environmentalism

PERC Reports | Volume 24 Number 4 | Dec. 2006

ISSN 1095-3779

Letters: Address letters to **PERC, 2048 Analysis Drive, Suite A, Bozeman, Montana 59718-6829**
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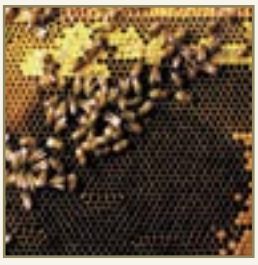

Photo credit: Cover: Michael Poles/CORBIS. Honeybees with Queen Bee on Honeycomb.

Bees & Barbed Wire FOR WATER

On the Bolivian Frontier

Butch Cassidy and the Sundance Kid's holdup of a Union Pacific train in Wagner, Montana, was the final straw: Such lawlessness was no longer acceptable in "the not so wild wild west," where local rules were creating cooperation rather than conflict (see Anderson and Hill 2004). As law enforcement closed in on the Hole-in-the-Wall gang, Butch and Sundance were forced to hightail it to Bolivia, where property rights were enforced less rigorously. A hundred years later, Bolivian property rights still are a morass of overlapping, extralegal claims and counterclaims, with weak central authority, and a predominance of locally developed institutions.

BY NIGEL ASQUITH

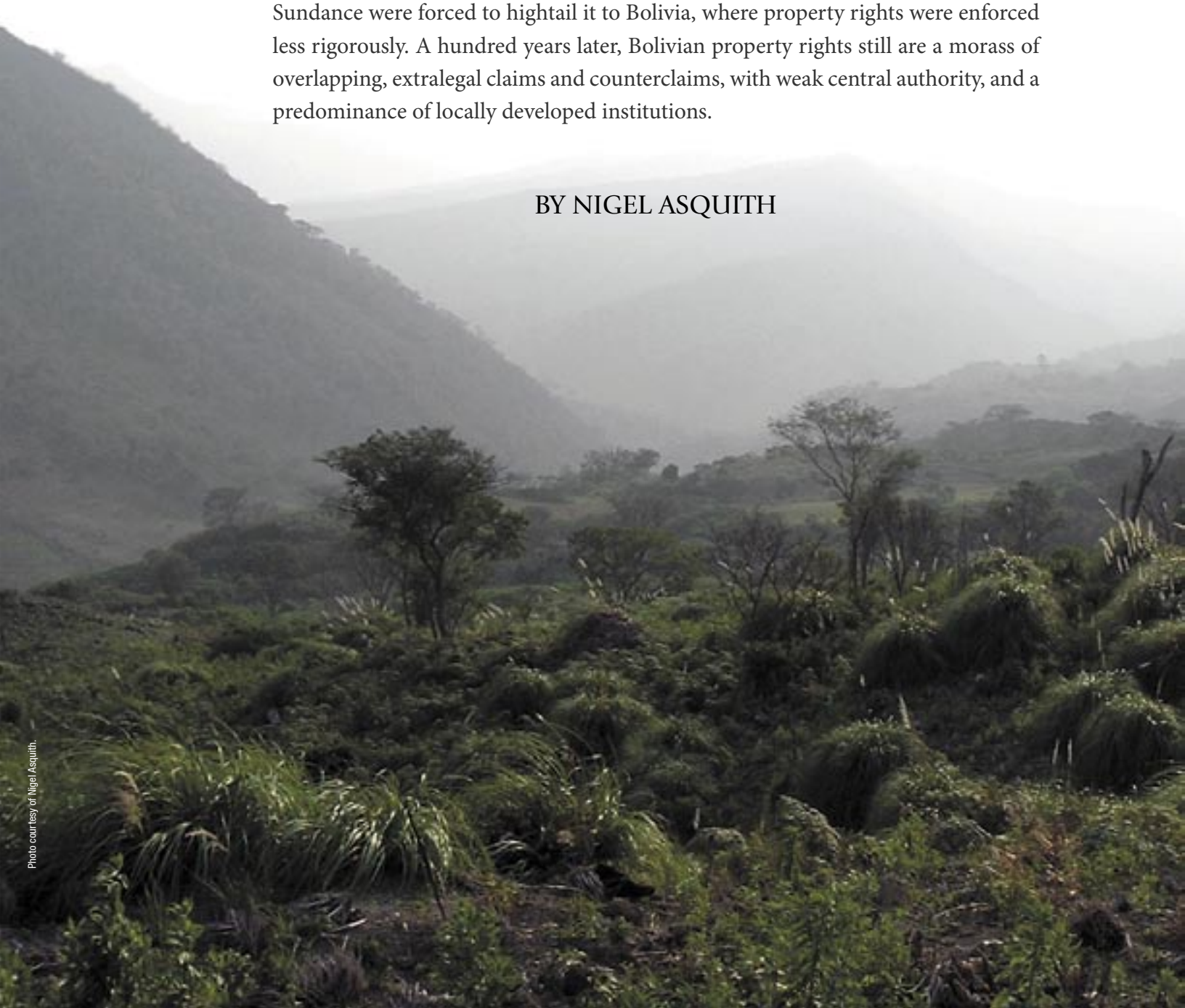

Photo courtesy of Nigel Asquith.

The Los Negros Valley, in the Department of Santa Cruz, is a case in point. When Butch and Sundance visited Santa Cruz in 1907 they marveled at the affordability of good land with plenty of water. Since then, things have deteriorated. Dry season water flows in Los Negros have halved in the last twenty years. While this growing scarcity is a combined result of factors such as reduced water supply caused by land-use changes, more water use by irrigators upstream, and inefficiencies in water distribution, downstream landowners clearly point the finger at increases in upland deforestation.

The Los Negros Valley covers approximately 270 square kilometers, with 35 kilometers separating the upstream Santa Rosa (population: 481) from downstream Los Negros (population: 2,970). Irrigation canals provide water to 1,000 hectares (10,000 square meters or 2.47 acres) in Los Negros, providing the markets of Santa Cruz and Cochabamba with a year-round supply of carrots, tomatoes, lettuce, and other vegetables. Bordering the upper reaches of the Los Negros watershed is the 637,000-hectare Amboró National Park, one of the most biologically diverse areas in the world—712 species of birds have been discovered so far.

The national park and its buffer zone are increasingly threatened by illegal land incursions. Encouraged by local political leaders, migrants from the Bolivian highlands frequently enter the buffer zone and the park itself to extract timber and to clear forest for agriculture. The local communities, with their unclear, extralegal property rights systems, often have little recourse when their lands are invaded. As a result, forests are cut, wildlife disappears, the Los Negros River dries up earlier every year, and agricultural production and the local economy suffer.

Sixty beehives were provided to five farmers in 2003, in return for the conservation of 600 hectares of cloud forests. By September 2006, 39 farmers were protecting 2,100 hectares.

PAYMENTS FOR ENVIRONMENTAL SERVICES

To help resolve these problems, Natura Bolivia, an environmental group led by Maria Teresa Vargas, a PERC Lone Mountain Fellow and graduate of PERC's environmental entrepreneurship course, is developing local capacity for a payments-for-environmental-services (PES) system. PES has a simple economic logic; the users of an environmental service, in this case water, should compensate the providers of the service, in this case the upstream farmers, for the opportunity cost of providing the service. Easy in theory, but difficult in practice in a country where simply defining who of the upstream residents are legal landowners presents an insurmountable challenge.

Raised in the neighboring San Juan Valley, Vargas decided that Los Negros was an appropriate pilot PES site because of a number of favorable preconditions. Most importantly, locals were aware of forest-water links: With clouds almost permanently present above the upstream forests, downstream farmers understood the connection between forest protection and the maintenance of water supplies. However, Vargas and Natura quickly identified a fundamental constraint to developing any type of contract-based system: the lack of confidence, by both upstream and downstream users, that the other party could fulfill a contract. Natura, therefore, agreed to pilot the first three years of payments by mobilizing biodiversity funds from an external donor in order to build mutual confidence that a PES system could work.

HONEY FOR WATER

Through participatory negotiations, it was decided that downstream water users would provide compensation for protection of the native vegetation in the watershed. This compensation would take the form of one beehive and training in honey production for every ten hectares of water-producing cloud forest that upstream landowners protected—a cash equivalent of U.S. $3 a year per hectare, payable up front. Other compensation alternatives discussed included infrastructural improvements to benefit upstream communities, but participants explicitly rejected the option of payments in cash. One PES-enrolled farmer explained in an interview: "If I receive cash, I know I will spend it right away. Instead, I want these payments to create something that lasts."

All upper watershed landowners were invited to volun-

Photos courtesy of (top) Maps.com; (bottom) photostogo.com.

Natura Bolivia, an environmental group led by Maria Teresa Vargas (left), is developing local capacity for a payments-for-environmental-services (PES) system. Vargas and a representative of the municipal government (right) present a landowner (center) with barbed wire.

Photos courtesy of Nigel Asquith.

tarily enter the PES program, but building trust and confidence in the scheme among service providers was a slow process. Sixty beehives were provided to five farmers in 2003, in return for the conservation of 600 hectares of cloud forests. In 2004, another 11 farmers received beehives from the municipal government, in return for the protection of 600 more hectares. By September 2006, 39 farmers were protecting 2,100 hectares. Original contracts were for a year, but responding to demand, some longer-term contracts (up to 10 years) have recently been signed. Payments are made annually, and honored contracts can be re-enrolled into the program.

BREAKING DOWN BARRIERS

Vargas and Natura had to overcome a number of difficulties to develop a market for watershed services. Lack of a credible downstream association made it tricky to ensure that service buyers would contribute equitably. As mentioned previously, trust was lacking—downstream farmers did not believe that payments to upstream farmers would lead to more conservation and waterflows; upstream users worried that the initiative was designed to appropriate their land. The scheme thus faced two fundamental barriers: unclear property rights

and a lack of credible institutions to guarantee contract compliance and an efficient market.

Natura's challenge was therefore to try to provide security of contracts and markets, and clarify property rights, in a situation where neither security, clarity, or the resources needed to provide them existed. Sound familiar? Such were the challenges when the American West was won. As in the West, Vargas believes that the answer is not to wait for centralized legal processes, but to find cheap and efficient ways to build on and develop existing, locally accepted customs and rights. Resolution of the major constraints required that Vargas and Natura tackle the following questions:

Many Santa Rosa farmers requested compensation not in beehives but rather in what had been the bane of Butch Cassidy and many other outlaws' lives—barbed wire.

■ *How can local property rights mechanisms be strengthened when national government is unable to help?* Use technology to reinforce hand-written bills of sale/purchase. Natura measures and demarcates forest conservation plots with a hand-held GPS receiver. The data is later plotted on a satellite image-based land use map. Field demarcation is by natural boundaries. Trails, signs, wire fencing, and parcels are only allowed into the scheme when—and this is critical—every single one of the landowners' neighbors agree that these indeed are the property's limits.

■ *How can a market for an environmental service emerge given the high cost of defining exactly what is being bought and sold?* Make a best-guess estimate, rather than exhausting resources and time to define the precise details of the service. Natura is collecting hydrological data on eight small streams in the watershed and along the main channel of the Los Negros River. Twice-weekly water depth measurements, periodic stream flow velocity calibrations, and daily rainfall measurements are helping estimate how much additional water will be provided by protection of the cloud forest. Of particular interest are differences in water flow in the dry season when lack of water becomes the limiting factor for agricultural productivity. Landowners themselves are taking the measurements in order to minimize data collection costs, to increase local credibility in the data, and to try to ensure the scheme's self-sustainability.

■ *How can binding contracts be established when the rule of law rarely percolates down from central government?* Have the buyers and sellers themselves co-design the contracts. In the case of an infraction, Natura could not, for political reasons, use legal means to force a non-compliant landowner to return the beehive received the previous year. Sanctions for breaking a contract might instead affect whether it is renewed, and under what conditions. Rather than impose an external legal construct, Natura helped service buyers and sellers to participatively draft contracts that respected local beliefs, customs, and culture, and provided locally acceptable and enforceable sanctions for non-compliance.

BARBED WIRE REVISITED

Although still an experiment in progress, the Los Negros PES scheme is gradually building trust in contracts and markets, and strengthening property rights by reinforcing locally developed and accepted institutions. Interestingly, for the 2006 contract renewal, many Santa Rosa farmers requested compensation not in beehives but rather in what had been the bane of Butch Cassidy and many other outlaws' lives—barbed wire. The farmers explained that in addition to allowing them to keep their cattle out of environmentally sensitive areas, enclosing their land with barbed wire would help them strengthen their existing land claims.

Butch and Sundance's lack of respect for Bolivian property rights finally caught up with them: not through centralized legal processes, but through a locally developed enforcement mechanism. One-hundred years later, Bolivian enviropreneur Maria Teresa Vargas is also developing and strengthening local property rights—this time not through a posse, but through institution building, an innovative conservation and development scheme, and good old-fashioned barbed wire.

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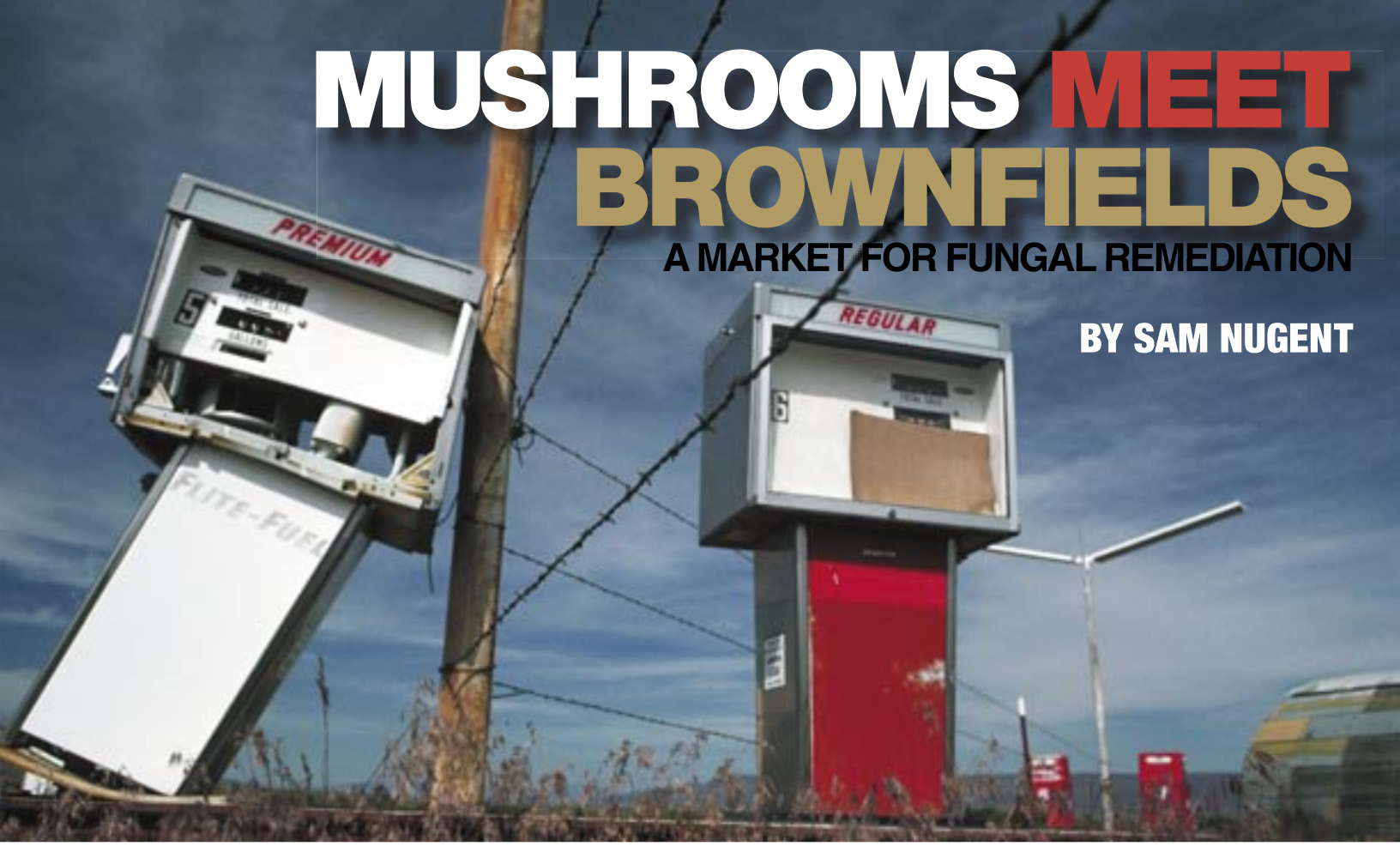
Visit www.naturabolivia.org for more information

Photos courtesy of Nigel Asquith.

MUSHROOMS MEET BROWNFIELDS

A MARKET FOR FUNGAL REMEDIATION

BY SAM NUGENT



Photos courtesy of Phil Schermeister/CORBIS.

When people learn that I am an environmental entrepreneur building a business with mushrooms, it is often assumed that it has to do with the commercial-gourmet mushroom industry. That is, of course, after a fleeting notion is entertained about the counterculture variety.

But I use the term "mushroom" loosely in my business. While in the minds of most people, the word mushroom conjures the concept of edibles—the canned button variety commonly found on pizzas, or the various portabellas, chantarelles, and oysters that have become popular on the produce shelves of supermarkets—mushrooms are actually a form of fungi that play an important role in the environment by decomposing organic matter in the soil.

As the study of fungi is known as *mycology*, the economic use of them is what I refer to as *myco-economics*. My partners and I formed The Remediators Inc. to develop a market for using fungi to clean up contaminated soils. By enhancing soil conditions and providing adequate biomass, we then can reintroduce naturally occurring organisms to create an environment which rejuvenates the soil and disintegrates chemical compounds. Enhanced growing conditions provide a vigorous colonization of the soil, breaking down toxic elements into beneficial soil components and returning the soil to a healthy state.

> *21,000 known contaminated brownfields are paralyzing more than 81,000 acres of once valued land parcels.*

In 2000, the U.S. Conference of Mayors reviewed 231 cities and estimated that nearly 21,000 known contaminated *brownfields*—abandoned or underused industrial or commercial properties where redevelopment is complicated by actual or perceived environmental contamination—are paralyzing more than 81,000 acres of once valued land parcels. If redeveloped to their full potential, the study estimated the cities would realize cumulative gains, in tax revenues alone, of $878 million (U.S. Conference of Mayors 2000). On a national level, a U.S. Senate report from the same year identified more than 45,000 brownfield locations in the entire country (U.S. Senate 2001).

One must also take into account the properties which contain unresolved contamination issues but are not defined as brownfields. In 2001, there were more than 217,000 confirmed toxic release sites listed with various state and federal agencies in the United States. The estimated cost of cleanup is more than $187 billion (Probst and Konisky, et



Photos courtesy of (left) Herbert Zettl/zefa/CORBIS; (middle) Christof/zefa/CORBIS; (right) Paul van Gaalen/zena/CORBIS.

al. 2001). And on a global scale, the commercial need for soil contamination solutions is staggering. In China alone, the market is valued in the hundreds of billions of dollars (*Business Week*, Aug. 22, 2005).

These numbers point to some questions. Are these properties so toxic that nothing can be done? Are we to believe that these properties are forever lost to the economic market because they are toxic wastelands?

TOXIC FALLACIES AT PLAY

There are two fallacies at play here which seem to be preventing the recapture of market values of contaminated properties.

First is the idea that federal agencies such as the Environmental Protection Agency (EPA) or state agencies want to step in to oversee the cleanup of every contaminated site in the country regardless of cost. Nearly every property owner I have spoken to, including city and county officials, believe this. A quick glance at the Web sites for the EPA and Department of Energy, however, will dispel that notion. In fact, these agencies encourage property owners to remediate their own contamination issues and have set up clear guidelines for doing so under "Voluntary Cleanup Programs (VCP)."[1] The process and cost of cleanup are left up to the owner, and emphasis is placed on achieving reduction or elimination of the pollution. Other programs such as Agreement Orders and Decree Orders can be arranged at varying levels of government oversight.

In addition to this misconception about government interference, a second fallacy preventing the restoration of brownfields and other property is the concept of "once contaminated, always contaminated." Property owners too often assume that once discovered to contain hazardous materials, their land cannot be restored, economically or environmentally, and rarely both, and therefore are willing to write off their investment. They may even assume that their liability for remediation can never be assuaged. The stigma of contamination is a major hurdle to overcome, but an economically important one. In a 2003 report printed by the EPA, stigma of contamination is mentioned as an important consideration in redevelopment: "Once the stigma of contamination is removed, these sites typically become irresistible to purchasers and developers, who quickly return them to use" (U.S. EPA 2003b).

While nuclear contamination may indeed be a consideration for thousands of years, I would hazard to guess that 99.9 percent of contaminated properties in the United States are not contaminated with nuclear waste. The vast majority are impacted by petroleum-based compounds such as diesel fuels, gasoline or lubricating oils, all of which are easily digested by many organisms if given the proper conditions.

THE REMEDIATORS

The Remediators help owners of contaminated properties recapture their investment values. Or, in some cases, we act as a way out of legal liability by purchasing contaminated land, cleaning it up ourselves using bio-remediation, and then reselling it at a profit.

The potential for economic partnerships with public entities is another opportunity we are mining, particularly involv-

Fungal remediation is a cost-effective way to recycle contaminated soils . . . and more agencies are embracing innovative technologies like ours.

—The Remediators



Photos courtesy of (top left) Herbert Zettl/zeta/CORBIS; (top middle) Sam Nugent; (top right) James Noble/CORBIS; (bottom) Sam Nugent.

ing landfills. The EPA lists 1,767 functioning landfills in the United States (U.S. EPA 2003a). One of the most prevalent forms of dealing with petroleum contaminated soil is containment within these landfills. Many municipalities are already closing their landfills due to environmental and economic pressures. In my town of Port Angeles, Washington, the city has recently closed its landfill and contracted to have its entire waste stream hauled to a larger, regional landfill, located more than 300 miles away. Other cities are following suit. Very few municipalities within the Pacific Northwest currently operate their own landfill. Space for municipal waste streams will continue to sell at a premium, as additional space for new landfills moves further and further from urban areas.

Futhermore, the cost of containing and moving petroleum contaminated soil such long distances is more costly than recycling it locally. Our company is positioning itself to take advantage of this economic turning point.

We are working with the City of Port Angeles to establish a pilot scale treatment facility to recycle the small volumes of contaminated soils it handles. It is our hope to establish a working model for recycling petroleum contaminated wastes in other cities as an alternative to concentrating toxic soils into landfills.

Despite facing hurdles such as government regulations, bureaucratic permitting, insurance requirements, legal considerations, and proprietary intellectual property rights, we are confident that fungal remediation is a cost-effective way to recycle contaminated soils. Fortunately for us, the current breezes of government involvement are blowing in our direction as more and more agencies are embracing innovative technologies like ours. P

The Remediators, from left, are Howard Sprouse, Thom O'Dell, and Sam Nugent.

NOTE

1. Since 1995, EPA has encouraged protective cleanup of sites under VCPs by entering into non-binding Memoranda of Agreement (MOAs) with states based on a review of the state VCP. The purpose of the MOAs is to foster more effective and efficient working relationships between EPA and individual states regarding the use of their VCPs. Online: www.epa.gov/compliance/cleanup/redevelop/state.html.

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SAM NUGENT is the co-founder and Director of Marketing for The Remediators Inc., a soils remediation company located in Port Angeles, Wash. Nugent was a 2003 fellow of PERC's environmental entrepreneurship course. The Remediators Inc, is a member of the Incubator at Lincoln Center program, a business development group for growing new companies on Washington State's North Olympic Peninsula. Nugent can be contacted at ssnugent@theremediators.com.

Visit www.theremediators.com for more information

DEADBEAT DAMS

Perhaps it's time to pull the plug

BY JAMES G. WORKMAN

Most people who think of dams envision strapping big boys: Hoover, Glen Canyon, Grand Coulee, or Three Gorges in China. Asked how many dams are in the United States, people typically guess eight or nine hundred. In fact, America's rivers contain 79,000 high-hazard dams the size of a two-story building; another estimated two million smaller dams clog upstream tributaries. Worldwide, there are ten times more dams than in the United States, most of them in China and India.

That's a lot of dams and they're not getting any younger or healthier. Dams in the United States have an average life span of 50 years, according to the American Society of Civil Engineers, and by the year 2020 some 85 percent of them will have outlived their 'natural' existence.

Perhaps it's time to pull the plug.

WHAT'S WRONG WITH DAMS?

What have I got against dams? Nothing, personally. But antiquated dams have a lot going against them: seismic shifts shake them from below; compound water pressures scour them from behind; sediment fills reservoirs; evaporation drinks more than people; invasive species choke intake and outflow; and a fast-changing climate brings drought and then flooding on scales for which they were never designed.

Not surprisingly, some dams can no longer serve the purpose for which they were originally built—to help turn mills, transport barges, irrigate crops, store drinking water, generate power, manage floods, and provide recreation.

All dams created economic benefits at some point, and many still do. Unfortunately, most benefits have diminished with time and with competition. Stone mills are now shopping malls; canals are freeways; and farms are subdivisions. More irrigators now pump groundwater than tap dam reservoirs. Water is far more securely stored in cool, clean aquifers than on hot, polluted surfaces. Cleaner power comes from wind, sun, geothermal or wave energy than from warm, stagnant, shallow dams filled with rotting vegetation. More lucrative recreation splashes from whitewater than from flat ponds. As one recent survey found, residential property values rose overnight after a liberated current transformed lakefront lots into riverfront property.

All of which remind us of dams' mortality. As dams age they have physical weaknesses, cracks and leaks that require frequent and expensive care to keep them active or simply alive. To be sure, some dams may cheat death or prolong activity via private investments or public subsidies for facelifts. But despite lobbying and D-grade warnings by engineers, taxpayers have so far kept a tight fist. With interest earnings higher elsewhere, and with safety compliance costs escalating, the number of obsolete, orphaned, or "deadbeat" dams has risen; today 15 percent of America's National Inventory of Dams are classified as being of "indeterminate ownership."

DAM BUSTERS TO THE RESCUE

In economic terms, I began to see it this way: Dams are bonds. Many once generated strong yields and high-grade investment ratings but have deteriorated to the status of junk—personal, legal, and financial fixed liabilities. Junk bonds that cannot compete in the current marketplace will be liquidated.

So what I'm betting my personal savings on is that when faced with a hefty price tag for fixing what has become a public nuisance, dam owners—whether a farmer or a county executive—will logically seek a more affordable exit strategy.

With half a dozen colleagues at PERC, I began to develop a business plan for dam removal. It focuses less on structural removal, which is straightforward, and more on whom might finance it, which is trickier. Though dam removal has proven to be roughly one-third the price of repair, it is never cheap. On the Baraboo River in Wisconsin, for example, a dam's repair was pegged at $694,000; removal cost locals $214,000.

In Wisconsin, as elsewhere, removal funds come from the generous purses of foundations, environmental groups, and taxpayers trying to make the world a better place.

That's fine. But in my experience, these sources of funding can prove sporadic and slow, with hidden strings attached. To lower transaction costs, I have begun to pursue the more reliable dark side of dam removal financing—to raise additional funds from the so-called evildoers. These are the economic interests that lead public and private institutions to build roads, pave parking lots, develop

golf courses, add pesticides, cut forests, degrade watersheds, emit pollutants and, ironically, dam more rivers.

How and why would dam builders or freeway pavers fund dam removal? Here's where it gets interesting. Before business interests start any development, they must by law complete an environmental impact assessment to show how their action will result in no net loss for the public or the environment. For every acre of wetland that developers drain, for example, they need to restore two acres of wetlands somewhere else. Similarly, emissions from new coal burning operations must be offset by reductions in emissions elsewhere. The quantification of damage should be transparent in the environmental impact assessment; and the corrective offsetting proof comes as a credit. Until a credit is approved by government, the development sits on hold, driving up project costs by millions. Non-compliance leaves business interests liable for additional hefty punitive lawsuits, bankruptcy, or foreclosure.

To avoid these before-or-after costs, businesses seek out credits generated by third-party projects for environmental services in advance of their proposed development—and pay handsomely for them. A lucrative national market is emerging for those credits in many areas of the environment such as endangered species habitat conservation, wetlands mitigation banking, emissions trading, and water quality trading credits. Demand for these credits, however, currently outstrips supply because it is hard to manufacture a functional artificial wetland (or carbon sink, or fish habitat) where nature never intended one in the first place.

It is easier to re-create healthy wetlands, fresh air, and spawning grounds where they thrived during the pre-dam millennia. In short, the average obsolete dam may be worth far more broken up than left intact; the sum of its removed parts are worth more than the integrated whole. Busting the dam could release a net gain in legitimate, measurable economic value, which can be brought to market and sold to willing buyers.

TESTING THE MARKET

How realistic is this approach? It's early, but variations of the business model have been tested before. Consider several cases from around the country:

- In North and South Carolina, two innovative restoration engineers who qualified for wetlands credits have begun to make money off dam removal for their restoration and wetlands mitigation business.

- When the Federal Energy Regulatory Commission required the removal of Edwards Dam in Augusta, Maine on the Kennebec River, the cost of removal was financed in large part by upstream industrial interests as part of their mitigation for environmental compliance.

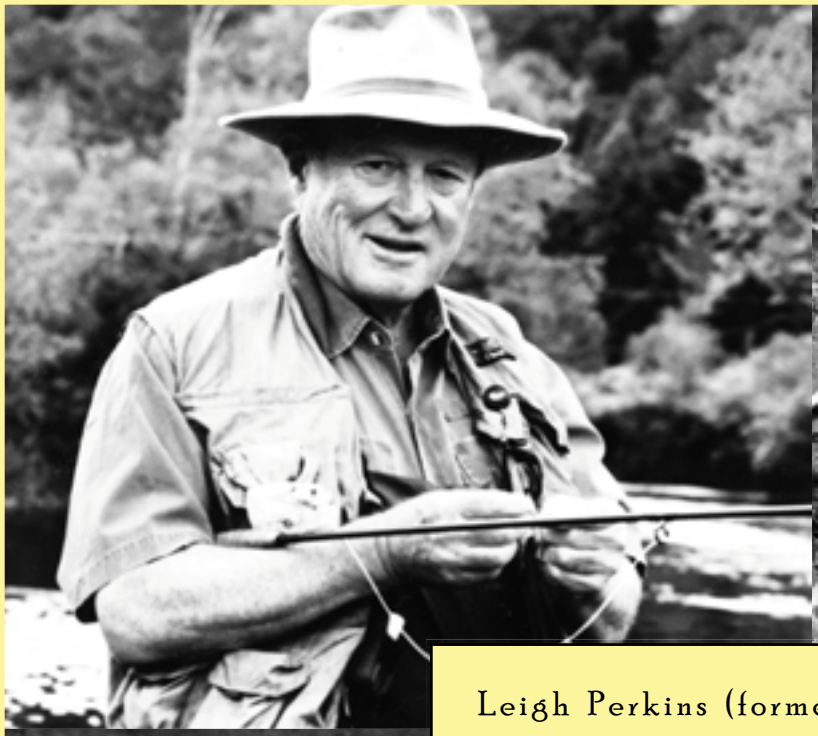
- In northern Wisconsin, the regional power company bought and removed two weak dams in exchange for a 25-year operating license to operate three healthier ones on the same watershed.

- Funds generated by the Bonneville Power Administration for the Columbia River Basin in Oregon are being used to pay for dam removals on its tributaries.

I wish I could say my idea is original. In truth I'm just following established models.

When I recently described this concept to one of my finance friends, a former investment banker, he likened my venture to that of Michael Milken, the "junk bond king" who, in the 1980s, brought discipline to a neglected financial field that had grown soft and complacent. Buying and breaking up unproductive firms, his predatory approach, like mine to obsolete dams, erased dysfunctional inventory. Conversely, 'bonds' that remain grow progressively stronger, tighter, healthier and more vigorous through the process. Deadbeat dams can once again become lucrative assets. ℘

For the last decade JAMES G. WORKMAN has helped: U.S. Interior Secretary Bruce Babbitt pioneer consensus-based dam removal; Nelson Mandela articulate the landmark World Commission on Dams; and the government of Karnataka, India reverse its destructive spiral of groundwater over-pumping. He can be reached at jgworkman@hotmail.com



Leigh Perkins (former CEO of Orvis) ENCOURAGES those who care about improving ENVIRONMENTAL QUALITY through markets and the promotion of property rights to support PERC'S COMMITMENT to shape public policy by making a TAX-DEDUCTIBLE CONTRIBUTION.

For more information on PERC's research, outreach, and educational activities please visit www.perc.org.

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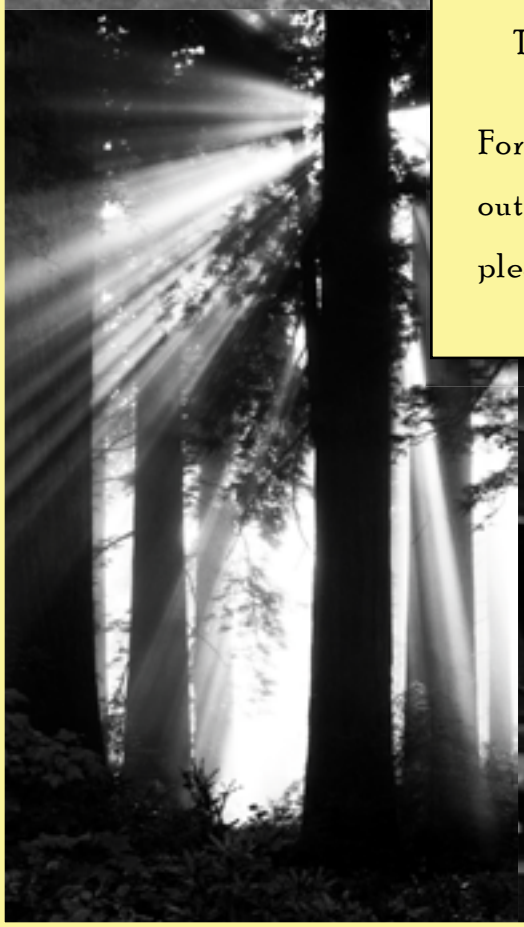

ORVIS

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a sporting tradition

Dear PERC Reports constituency:

I'm often asked if I miss running The Orvis Company. Of course I miss it—it was my life for 27 years. But I have been put out to a nice pasture surrounded by plenty of birds, dogs, and grandchildren. Plus there is a lot more time now for the kind of charitable philanthropic work in which I have always been involved.

I have served on the PERC Board for many years and have gotten much satisfaction out of the relationship (and not just because its annual board meeting is in September when both bird hunting and trout fishing in Montana are superb). PERC's ideas about free market solutions to environmental problems match my own experiences. Without question, my best hunting and fishing days have come on private property where landowners have an incentive—either for profit or from personal ethics—to preserve the environment.

Since its founding in 1980, PERC has moved from being a voice in the wilderness to a highly respected environmental research center. The time has now come to open the doors of PERC to a broader audience. I am pleased to announce that PERC has recently established an ambitious strategic plan. Over the next five years PERC will emphasize three critical areas: 1) branding PERC by building on existing programs and more deeply penetrating audiences; 2) cultivating emerging constituencies by establishing programs that include key markets such as enviropreneurs, environmental science scholars, and business leaders; and 3) executing significant growth by better utilizing existing staff and better leveraging its fellows around the country.

PERC can only achieve these new goals with the generous support of readers such as you. Whether you support PERC's research, education, or outreach efforts, you can be assured that your investment will be well spent. Orvis grew by blending a love for nature with business acumen. PERC has promoted this same philosophy in the nonprofit sector. I URGE YOU TO MAKE YOUR TAX-DEDUCTIBLE CONTRIBUTION TO PERC TODAY BY MAILING A CHECK OR CREDIT CARD INFORMATION IN THE ATTACHED ENVELOPE OR DONATE ONLINE AT WWW.PERC.ORG. Thank you for helping PERC pursue its mission of improving environmental quality through markets. Your support will ensure that PERC thrives into the future.

Sincerely,

Leigh Perkins

Enviropreneurs in Action

From California to South Africa, the entrepreneurial spirit is flourishing. Enviropreneurs are applying their talents and the tools of the marketplace to converting agricultural land into recreational property, grassbanking, and conserving biodiversity. On these pages, meet a few enviropreneurs in action.

Beartooth Capital Partners:
Mixing Business & Conservation

By Robert Keith & Carl Palmer

A few years ago, before starting his MBA at Stanford Graduate School of Business, Carl Palmer spent a summer at PERC working with board member and venture capitalist John Tomlin. The pair looked into opportunities to make profitable investments that also realized positive results for the environment. "We were looking for ways to do good things and make money too," Palmer said.

With this concept in mind throughout graduate school, Palmer started his own business venture after graduation that would allow him to combine business with conservation. Palmer and business school classmate, Robert Keith, formed Beartooth Capital Partners to make investments in ecologically important ranches that generate both strong financial returns and conservation benefits. The company channels private investment capital (typically directed to investment in the stock market, venture capital, or buyout funds) into conservation on western lands.

Operating in Montana, California, Idaho, and Wyoming, Beartooth Capital currently is working on a number of land deals while raising additional capital from investors. Its investment properties often are degraded but have the potential for a significant increase in value with enhancements through restoration, land protection and, where appropriate, limited development.

Beartooth also captures financial value through the sale of land to government agencies, land swaps, conservation easements, or tax-deductible donations. Furthermore, they develop conservation enterprises such as ecologically sound agriculture and timber operations, carbon credit sales, and mitigation banks.

Beartooth works closely with environmental organizations such as Trout Unlimited, state chapters of the Nature Conservancy, and the Montana Land Reliance to identify investment opportunities and execute transactions. These partnerships are mutually beneficial: Beartooth gets restoration assistance, easement allies, and conservation science expertise; and the organizations accomplish more conservation than they otherwise could.

"We find unpolished property, restore and protect it, creating ecological and real estate value," according to Palmer. "We take advantage of opportunities to sell ecosystem services and undertake other conservation transactions when possible, but fundamentally we create value by converting agricultural land into recreational property via habitat restoration and protection, entitlement, and ecologically appropriate limited development."

After the Beartooth Capital partners told the story of their entrepreneurial endeavors at PERC's Enviropreneur Camp in June, one participant called it "inspiring and important work"—what all enviropreneurs strive to do. P

Prior to co-founding Beartooth Capital, ROBERT KEITH was an investment partner at Greenbridges, a real estate investment firm, and worked at Morgan Stanley in New York City. He received his B.A. from Yale University and earned his MBA from the Graduate School of Business at Stanford University. Robert can be reached at: robert.keith@beartoothcap.com.

Prior to co-founding Beartooth Capital, CARL PALMER was President and CEO of Greenbridges, a real estate investment firm, and worked at the Teton Science School in Grand Teton National Park. He graduated from Brown University and earned an MBA from the Graduate School of Business at Stanford University. Carl can be reached at: carl.palmer@beartoothcap.com.

Photos courtesy of (left) Robert Keith; (right) Carl Palmer.

Visit www.beartoothcap.com for more information

Biodiversity Stewardship in South Africa:

KwaZulu-Natal Wildlife, South Africa

By Steve McKean

Photos courtesy of Steve McKean.

The outlook for private and communal land conservation in the biologically diverse KwaZulu-Natal (KZN) in South Africa is looking more positive than ever before as KZN Wildlife, the local conservation authority, opens the door to a program that uses market-based mechanisms to conserve biodiversity.

KwaZulu-Natal, a province situated on the eastern seaboard of South Africa, is one of the most biologically diverse and important areas in the world. The province, which makes up 7.6 percent of South Africa—approximately the size of Oregon—has two World Heritage Sites and more than a hundred formally protected areas. However, less than half of the more than 4,000 species found here, not to mention the diverse landscapes and vegetation, are conserved in these nature reserves.

KZN Wildlife has been a leader in working with landowners to support biodiversity management outside protected areas. While the efforts of these people have had a positive impact, conservation arrangements have never been legally binding, with the landowner being able to "pull out" of an arrangement at any time. In addition, KwaZulu-Natal has a system of communal land as well as privately owned land. Communal land occupants have a very different set of economic and social circumstances governing their land use, requiring innovative approaches to achieve conservation ends. Any conservation agreement on communal land would have to, at least partly, address issues of extreme poverty (daily income less than U.S. $2), such as the need to use land to house poor people and to expand agriculture. Given the economic and political pressures placed on farmers in South Africa, no longer is it adequate to offer a private landowner a "feel good" certificate for conservation effort.

Until recently, there have been limited mechanisms for partnerships and no dedicated unit in KZN Wildlife to formally bring landowners on board as effective partners in a coordinated effort to secure biodiversity. However, over the past year, a new "KZN Biodiversity Stewardship Programme" has set aside funding and employed three additional staff whose responsibilities are to coordinate and implement the program for private and communal land conservation.

A comprehensive business plan has been developed and "pilot" sites for negotiations for conservation agreements have been identified. The pilot sites are important biodiversity areas whose owners are willing to establish formal conservation agreements. Successful agreements for these sites will form the basis for arrangements in other areas and will provide much needed credibility for the program.

Numerous market- and incentive-based mechanisms for conservation are in the program's plan of action. For example, land owners who enter into legal and binding agreements to conserve biodiversity on their land are eligible for property tax rebates. The possibility of private and communal landholders being paid to enhance ecosystem services such as water production is also being explored and moving closer toward realization. Furthermore, agreements similar to conservation easements in the United States are likely to be a key tool in successfully implementing a program for conservation outside formal protected areas.

The KZN Biodiversity Stewardship Programme is a new concept in South Africa and, though in its infancy, is already receiving numerous inquiries from willing private landowners and some communal landholders who want to establish formal conservation agreements. Now that the business plan is complete, KZN hopes to establish three formal conservation agreements by March 2007. Negotiations for these are underway, however, the challenges are significant, and the perverse incentives for environmentally destructive land use considerable.

Given this complex set of scenarios, it became increasingly clear that a more focused program with a more complete "toolkit" was required to successfully address conservation on private and communal land. These tools need to offer various types of incentives to offset any potential costs incurred by landowners which are associated with conservation commitments. In the case of communal land holders, these tools need to be more effective in improving livelihoods. P

Steve McKean is a resource ecologist with KZN Wildlife and was part of the team that developed the KZN Biodiversity Stewardship Programme. He is a 2005 graduate of PERC's environmental entrepreneurship course, a member of IUCN's Southern African Sustainable Use Specialist Group, and has published widely on natural resource use issues. He can be reached at Steve@kznwildlife.com.

Visit www.kznwildlife.com for more information

Enviropreneurs in Action

To Graze or Not to Graze

Protecting native prairie habitat

By Stephanie Gripne

Cattle ranchers have something that conservationists want. And conservationists have something that cattle ranchers need. Putting the two together, enviropreneurs have created grassbanks—a mutually beneficial solution to protect native prairie habitat.

More than a decade ago, the Nature Conservancy (TNC) purchased the Vina Plains Preserve in California with the goal of conserving the endemic plant species associated with the springlike pools found on the preserve. Having determined that the grazing practices on the land were a threat to the biological diversity, TNC promptly removed cattle from the preserve. Surprisingly, though, the cattle removal did not have the positive effect that was expected. Instead, the lack of grazing allowed invasive plants like yellow star thistle and medusa head to crowd out the indigenous plant species that TNC was trying to preserve.

Ten years later, TNC has reintroduced prescribed fire and cattle grazing back into the preserve, realizing that both are beneficial to biodiversity. TNC also realized, after several conversations with local ranchers, that there was only one deterrent to ranchers using prescribed fire in addition to grazing on their own lands—alternative pasture for their cattle while their grassland recovered from the prescribed fire.

From this observation, an idea was born—to offer grass on the TNC preserve at reduced rates to local ranchers as incentive for them to use prescribed burning, in addition to grazing, on their private lands. This practice—the exchange of forage for a conservation benefit—is referred to as a grassbank.

For the past five years, I have been researching and assisting grassbank efforts across the West, from the Vina Plains Lassen Foothills Grassbank in California and the Valle Grande Grassbank in New Mexico, to Heart Mountain Grassbank in Wyoming and the Rocky Mountain Front and Matador Grassbanks in Montana.

The conservation gains from a grassbank can come in many forms, such as restoring a landscape with fire, controlling invasive weed species, protecting endangered species like sage grouse, or providing permanent protection against fragmentation using conservation easements. The gains to ranchers, such as alternative sources of forage, are also evident.

Despite these benefits, there are a number of hurdles to overcome before grassbanks become prolific. Developing markets for goods and services where there are "free-riders"—individuals who can enjoy the resource without paying for it—is difficult, as is the case with grassbanks.

Even though many people value benefits such as open space, healthy forests, and prairies there, are not markets for these goods and services. In many instances, ranchers provide some of these benefits without receiving compensation. Hence, a grassbank is an attempt to create a market by asking the public whether these conservation benefits are important to them. If so, are they willing to pay for them? In almost every instance, grassbanks have struggled financially and have had to be subsidized either by government grants, foundation funding, or individual donor support.

Another challenge is defining and expanding the conservation benefits that grassbanks deliver. For example, how do you measure a "fair trade" of forage for conservation? Or what is improvement to sage grouse habitat worth to society?

As with any new market approach in the environment, grassbanking is being honed to address these challenges with hopes that native prairie habitat will continue to be restored well into the future. P

Stephanie Gripne is the Land Conservation Program Manager for the Nature Conservancy Colorado field office. She also is president of Compatible Ventures, LLC, and a 2006 fellow in PERC's Enviropreneur Camp. She can be reached at steph@compatibleventures.com.

Photos courtesy of Stephanie Gripne.

Visit www.compatibleventures.com for more information

NOTHING OXYMORONIC about free market environmentalism

When *Free Market Environmentalism*, by Donald Leal and me, was first published in 1991, a reviewer called the title an oxymoron (saying that the authors were the morons). There is nothing oxymoronic about markets and the environment. A new wave of "enviropreneurship" is changing the environmental movement. As the term implies, this new wave combines business acumen with environmental passion.

The essence of enviropreneurship is disrupting the status quo with new ideas.

Perhaps the environmental group most readily associated with a business approach is the Nature Conservancy (TNC). For decades it has been using land markets to save habitat crucial to biodiversity.

But even TNC is searching for new business models. At the Lone Mountain Summit, a meeting of environmental leaders organized by PERC to find common ground for applying market solutions, Paul Bauman, principal gifts officer for TNC, identified the need for a "virtual university" to generate those models. Noting that no business school is filling the void, he suggested that PERC, TNC, and other groups team up to create this university.

If this were to happen, imagine what the university might look like. It would have "students" like people featured in this issue of *PERC Reports*. These students would recognize the potential to give Adam Smith's invisible hand a green thumb.

The "classes" at the virtual university will also be different. Instead of teaching "how to plan campaigns" and "how to work with the media" as Greenpeace does in its seminars for "student activists," classes at the virtual university will teach negotiating and management skills; help identify legal barriers to trade; and help evaluate financing options. In short, it will give environmental leaders a "crash MBA."

Fortunately, the foundation for this virtual university is already being laid with PERC's Teaching Enviropreneurs About Markets (TEAM) program. TEAM consists of several components: a two-week camp where enviropreneurs hone their market skills; advanced seminars where they can delve deeper into marketing, finance, contracting, and other business tools; and an in-residence fellowship for developing and refining business plans.

This foundation is only a start. To build the complete virtual university will require nurturing enviropreneurship through partnerships of traditional environmentalists and free market environmentalists. A perfect example is the partnership that Pamela Baker of Environmental Defense and Donald Leal of PERC have formed to tackle overfishing problems. As enviropreneurs, they have paved the way for introducing a property rights approach (in this case individual fishing quotas) to ocean fisheries. When their environmental leadership and scholarly research are combined with the voices of fishers, who see how such an approach can improve their bottom line, it is difficult, even for the most ardent supporters of the command-and-control method, to maintain the status quo.

Indeed, the essence of enviropreneurship is disrupting the status quo with new ideas. Joseph Schumpeter, one of the twentieth century's most influential economists, argued that entrepreneurs bring the winds of "creative destruction"—replacing old ways of doing things with new, more effective ways. By bringing these winds to the environmental sector, enviropreneurs will replace the political activist ways of old with market solutions of the future.

In his "On Target" column, PERC's executive director TERRY L. ANDERSON confronts issues surrounding free market environmentalism. Anderson can be reached at perc@perc.org.

Visit www.enviropreneurs.org for more information

ECONOMIST, *n. a scoundrel whose faulty vision sees things as they really are, not as they ought to be. —after Ambrose Bierce*

AIR POLLUTION *and infant mortality*

Anyone who has experienced the summer smog of a major city has some sense of the costs of air pollution. As I have reported before in this column (March 2004), more precise estimates of these costs are scarce, but are slowly accumulating. Recent research by Janet Currie and Matthew Neidell (2005) adds significantly to our stock of knowledge, showing that some of the costs of pollution can come in the form of elevated infant mortality.

Currie and Neidell use data from California for the 1990s to investigate the impact of three key pollutants on infant mortality rates: carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM10), and ozone (O3). They find that although particulate matter and ozone have no discernable impact on infant deaths, exposure to higher levels of ambient carbon monoxide does elevate the infant mortality rate. Or, to consider the process in reverse: During the 1990s, emissions of CO in California were cut about 40 percent. According to the authors' estimates, this reduction saved the lives of about 1,000 infants over the decade.

Carbon monoxide is a colorless, odorless gas produced as a result of combustion. As an air pollutant, about 90 percent of it comes from automobiles. CO is highly poisonous in concentrated forms, and even in the dilute concentrations observed in polluted air, it reduces the body's ability to deliver oxygen to organs and tissues.

The potential for harm to infants is thought to be particularly great because of their immature respiratory systems.

In studying its effects on infants, the authors are able to control for an extraordinary array of other factors that might play a role in infant health outcomes. Most importantly, they control for the age and birth weight of infants, two factors known to play critical roles in influencing their mortality. But Currie and Neidell also control for racial, ethnic, and educational factors, as well as the age of the mother, pollution exposure before birth, and even the key weather features of the relevant geographic area. Moreover, they measure pollutants with far greater accuracy than is typically the case, which adds to the precision with which they are able to estimate its effects on infant mortality.

Recent research shows that some of the costs of pollution can come in the form of elevated infant mortality.

One particularly striking feature of the study is the authors' finding of lethal effects of carbon monoxide at the relatively low levels to which infants were exposed. The data come from a period in which CO levels in California were on average about two-thirds *below* the national ambient air quality standards established by the Environmental Protection Agency. The hazards of CO in higher concentrations are well known, but this is the first time significant adverse effects of the pollutant have been observed at such low concentration levels.

Although Currie and Neidell do not observe any impact of particulate matter or ozone on infant mortality, there may be simple explanations for this finding. For example, it is generally believed that PM10 has adverse effects arising chiefly from prolonged exposure, and it is in studies that measure such prolonged, chronic exposure to PM10 where such effects have been observed. In contrast, Currie and Neidell examine weekly mortality data, and so effectively measure the impact of changes in short run, or acute, exposure levels, minimizing the chances that PM10 will be observed to be harmful.

The failure to find any impact of ozone exposure may stem from the fact that the study focuses on infants, who spend much of their time indoors during the first year of life. It is well known that O3 reacts with indoor surfaces (and thus dissipates), so even high outdoor concentrations generally are not associated with high indoor levels. Thus, it is likely that the typical infant would have little *effective* exposure to ozone, regardless of the readings produced by outdoor pollution monitoring equipment.

Despite the study's statistically robust findings, it is worth putting its results in some perspective. Over the period covered by the research, there were 4.6 million infants born in California, about 18,000 of whom died in their first year of life. The vast majority of these deaths were caused by such factors as inadequate pre- or post-natal health care, premature birth, and low birth weight. Overall, the estimated impact of the reduction in CO during this period—about 1,000 fewer infant fatalities—was a cut in the infant mortality rate of about 5 percent.

Achieving the reduced infant mortality observed in this study required the investment of considerable resources in pollution control. These resources could have been used to produce other important outcomes—including, for example, improvements in pre- and post-natal health care for infants and expanded educational programs to reduce smoking and alcohol consumption among pregnant women. Whether the redeployment of these resources from pollution control to health care or education would have saved the lives of even more California infants remains an open question. But it is surely a question worth asking.

REFERENCE

Currie, Janet, and Matthew Neidell. 2005. Air Pollution and Infant Health: What Can We Learn from California's Recent Experience? *Quarterly Journal of Economics* 120(3): 1003–30.

DANIEL K. BENJAMIN is a PERC senior fellow and Alumni Distinguished Professor at Clemson University. This column, "Tangents," investigates policy implications of recent academic research. He can be reached at wahoo@clemson.edu.

Photos courtesy of AbleStock.

GREENER PASTURES

Compiled by Linda E. Platts

Green to the End

Dying is big business in the United States to the tune of $26 billion dollars annually. Yet a growing number of people and their next of kin are seeking an alternative path to the final resting spot. Ramsey Creek Preserve in South Carolina, a privately owned 32-acre plot of old growth woods, offers its land for natural, environmentally sensitive burials—banning metal caskets, concrete vaults, and toxic embalming fluids. Because it functions as a cemetery as well as a nature preserve, it is protected from future development, thus preserving open space and wildlife habitat as well as providing an alternative to modern cemetery burial.

At Ramsey preserve, the woods are unmanicured and the wildflowers bloom and die with the seasons. Burials are limited to 100 per acre compared to 1,000 per acre in a modern cemetery. Many families choose to bury their loved ones in untreated cardboard, a wooden box, or no box at all. The dirt removed from the grave site is carefully extracted so that the soil profile is retained for replacement. Graves are marked by stones from the property, laid flat on the burial site, or sometimes the graves are left unmarked.

This simple approach to burial is a far cry from what goes into modern graves each year, including 827,000 gallons of embalming fluid, 1.6 million tons of reinforced concrete, 104,272 tons of steel, 2,700 tons of copper and bronze, and 30 million board feet of precious hardwoods. The price also differs significantly. *Science & Spirit* reports that a no-frills cemetery burial runs about $6,000, while the cost at Ramsey Creek is about $2,500.

Ramsey Creek opened in 1996 and has since been followed by similar burial preserves that strive to provide a beautiful natural park for the living as well as a resting place for those who want the same thing in death. In Florida's panhandle, Glendale Memorial Nature Preserve is a 350-acre longleaf pine and wiregrass ecosystem and in Marin County, Calif., Forever Enterprises offers 16 pristine acres on a 40-acre site for natural, low-density burial.

By achieving land preservation as well as meeting a market demand for greener burials, these new memorial preserves could usher in a whole new approach to death for the funeral industry.

Photos courtesy of (left) David Samuel Robbins/CORBIS; (bottom) Mandy-Scott Bachelier.

Finding Common Ground

Komodo National Park is located on one of the Lesser Sunda Islands, just one of 10,000 islands in the Indonesian archipelago. Best known for the famous land-dwelling Komodo Dragons, *Grist* says it is also home to an underwater environment containing some of the greatest concentrations of marine diversity on the planet. It has more than 1,000 species of fish, 260 reef-building coral species, 70 sponge species, as well as whales, dolphins, manta rays, sea turtles, dugongs, and sharks. However, this environment has been severely threatened by the local human population of 20,000, which relies mainly on dynamite blast fishing for its survival.

To protect this unique area, the Nature Conservancy joined with local villages and the Indonesian Park Authority to develop a long-term plan that would reduce destructive fishing practices and provide islanders with new economic opportunities.

Local people were hired to collect park entrance fees, which will be spent in the park to support management and develop a visitor's center to draw more tourists. Concessionaires are also allowed to do business in the park for a fee. To prevent destructive fishing practices, operational support is supplied to patrols led by rangers as well as the Indonesian Navy, the police and the water police. Other efforts to provide alternative livelihoods include the promotion of deep-sea fishing far from fragile coral reefs, sea grass farming, souvenir carving, weaving, and tourism guide training. A fish culture center has been established where fish are hatched and then later transferred to local grow-out farms where they are raised to market-size and sold.

Monitoring efforts show that the reefs and fish populations are making a major comeback. However, local inhabitants are still more concerned with improving their standard of living than increasing biodiversity. Educational programs are making some headway, but ultimately alternative revenue streams are the only way to align local people with the mission of preserving the marine resources.

Since the launch of a new 25-year management plan in 2000, progress has been made on all fronts, but setbacks are common, and constant vigilance is essential if this amazingly rich marine habitat is to be saved. 𝒫

Photos courtesy of Theo Allofs/CORBIS.

California Cow Power

In a state with no shortage of daily manure, Reuters News Service reports that a major utility has signed an agreement to augment its energy supplies with natural gas generated from cow patties. Pacific Gas & Electric Company (PG&E). has signed a deal with Micrology Inc., a subsidiary of Portsmouth, New Hampshire-based Environmental Power Corp., to buy enough biomethane to power an estimated 50,000 homes.

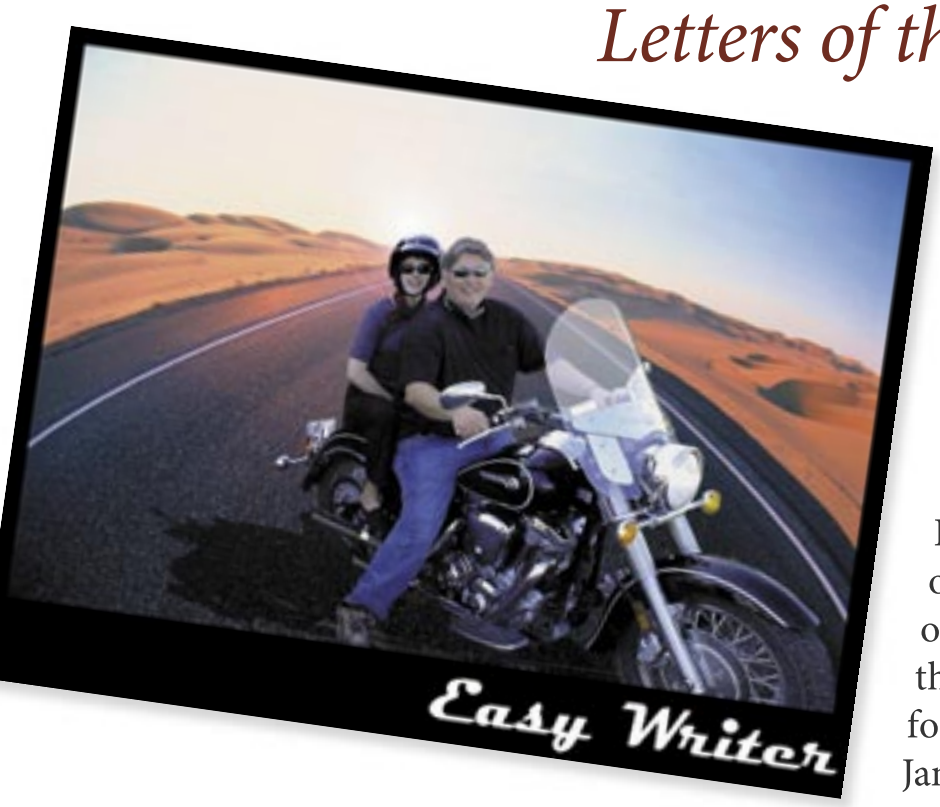
Micrology plans to build four production plants to process manure at dairy farms in California's Central Valley. The plants will be connected to PG&E's network of natural gas pipelines. Depending upon regulatory approvals, the gas could be flowing by the end of 2007. Micrology already supplies cow gas to Dairyland Power Cooperative in Wisconsin and is making deals with other U.S. utilities to supply gas.

If this initial project proves successful, PG&E expects manure-derived gas could make up a large portion of the San Francisco utility's electricity supply, all of which confirms what the rest of the nation already knows—California is always on the cutting edge of new technologies, even the cow-based variety. 𝒫

Visit www.perc.org/outtopasture.php for more information

Letters of thanks to Jane Shaw

Former editor of PERC Reports



Jane Shaw will be missed. PERC has continued to educate me over the years and I find PERCisms permeating my thinking and analysis processes. I am testifying in a Committee on Resources hearing on The Importance of Border Security on Federal Lands, on August 5 in California and will be thumbing through *PERC Reports* issues for inspiration and knowledge. Thanks Jane Shaw!!

—Carolyn Powers
Director
Tia Juana Valley County Water District

Hear hear! We will really miss the great work Jane has done. I will also miss her great guidance on the environment—we all will feel the loss.

—Alex Echols
Program Director, Special Projects
Sand County Foundation

Please extend my congratulations to Jane for a job well done, if not extremely well done. She has remained my contact with PERC since I was fortunate enough to attend a PERC meeting near Yellowstone National Park. I have always wanted to return but various other commitments have prevented even thinking about it. But she has graciously handled my correspondence and kept me in the fold as much as possible with my other responsibilities. Jane, thank you so much for all your efforts, and I wish you continued success in this exciting new opportunity that has come your way.

—Dr. H. Reid Wagstaff

Wow! This is a great opportunity for Jane. I offer her my heartiest congratulations. She has left an indelible mark on PERC.

—Lynn Scarlett

Thank you for your service at PERC. We have never met, but you and your organization have benefitted our program here at Converse College. We have had some of our students participate in the PERC Student Seminar Program, and their experiences have impacted not only them personally, but they have also shared their experiences with us. I know you will be missed at PERC.

—Woodrow W. Hughes, Jr.
Associate Professor of Economics
Converse College

Jane, congratulations on your new job. All these years, I've read your notes and the work of PERC scholars on so many topics and never took the trouble to write and say thanks. Well, thanks. We had met when you attended a PERC conference [in 1983] (I believe you were at *Business Week*) . . . thanks for finding me; I've been reading and then passing along PERC literature. I hope you enjoy your new pursuit.

—Roger Ruvolo
Assistant Managing Editor
The Press-Enterprise

A CASE OF GOVERNMENT DISCRIMINATION

I note an important oversight in Robert Glennon's tentative endorsement of market solutions for settling claims to water rights. Toward the end of the article he qualifies his endorsement with an argument that is as old as the environmental movement—that "Markets have difficulty internalizing environmental values." He then proceeds to illustrate but chooses an example easily resolved by the market. (This is the case with most, but not all, of the "environmental values" environmentalists embrace in order to prove the market doesn't work.)

Glennon says New Mexico may prohibit water transfers to protect "centuries old subsistence farming communities of Hispanic Roman Catholics." With some reluctance I set aside the question of why the farmers' religious and ethnic background might qualify them for special consideration and I go to the market issue. If we assume these farmers have riparian rights by very old claims, then simply allow them to decide if they want to transfer them by lease or sale to the state, local government, or other private parties.

I hope this is not a case where the state intends to tell the farmers that they must persist in their peasant-like agriculture because . . . well, because they are prisoners in and property of a defacto museum. Whatever the cause of the state's possible prohibition on transfers, it seems the example Glennon has chosen is not a case of the market failing to internalize environmental values, but of government discrimination or fear of allowing certain citizens to bargain in the market. For the good of the environment, of course, but also for their own good, since what bureaucrats determine is good for the environment must also be good for everyone who lives in that environment.

—Wallace Kaufman
Environmental Entrepreneur

NOT A PANACEA FOR WILD TIGER CONSERVATION

In his article "Saving the Tiger" Barun Mitra notes the radically different directions in tiger conservation policy being adopted by China and India. There are some interesting parallels between this situation and that of African elephant conservation policy, in which the southern African states have been at odds with various other African countries (notably Kenya) on the whole issue of sustainable commercial use of elephant products. The southern states generally have better developed market institutions that can harness and enhance the value of wildlife species and their products, but the workings of CITES have tended to pander to those countries with less developed institutions, by simply banning international trade in all products.

This prohibition approach has the unfortunate effect of reducing the effective economic value of live wild species relative to domestic ones, and is also frequently unenforceable (due to a lack of enforcement capacity), resulting in greater levels of uncontrolled (and unsustainable) illegal exploitation. In the long run, it tends to be economically unsustainable in developing countries, because if wild species are unable to generate economic returns for poor rural people, they will be eliminated and replaced with domestic species, which those people may own and use for their direct benefit.

Although I agree that "a successful wildlife economy will build awareness of the value of environmental resources," we must not lose sight of the complexity of the tiger conservation issue. Simply allowing trade in farmed tiger products is not necessarily a panacea for wild tiger conservation. To save the wild tiger, we must save the wild tiger's natural habitat and prey. And introducing farmed products onto the market will not necessarily remove the incentives for poaching. Poaching and the loss of habitat and prey are driven by various socio-economic and political factors, of which the demand for and consumption of tiger products is only one.

Ultimately, as with the case of the African elephant, the long-term solution must involve the development of appropriate institutions—those that harness the full economic value of wild species and create the right incentives to conserve them. In practical terms this usually means creating property rights over live wild species and placing them in the hands of appropriate custodians (typically local people rather than central government agencies!) who can derive long-term, sustainable economic benefits from these resources. In an institutional vacuum both prohibition and unfettered commercial consumption will fail!

—Michael 't Sas-Rolfes
Wildlife Resource Economist/
Director, The AfrEco Trust
Cape Town, South Africa

Laura welcomes vigorous debate about controversial environmental topics. Send your letters to her at: PERC Reports, 2048 Analysis Drive, Suite A, Bozeman, MT 59718 or laura@perc.org.