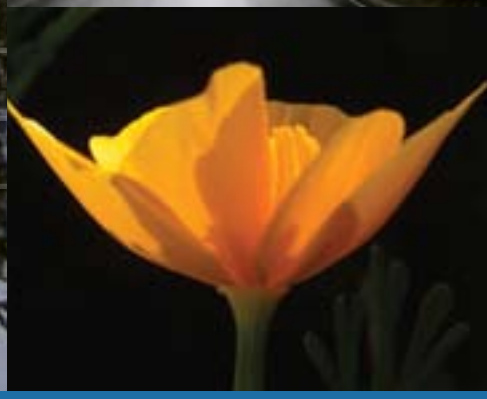
Northwestern Lights

Regional Leadership in Environmental Markets



THE KATOOMBA GROUP'S
Ecosystem Marketplace

2006

Northwestern Lights

Regional Leadership in Environmental Markets

Here at the Ecosystem Marketplace, we are well into our second year of covering the twists, turns and straight-aways of payments for ecosystem services. As environmental markets continue to grow and diversify in the Pacific Northwest, we think it is a good time to highlight some of the regional 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 field 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 environmental markets.

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Introduction

The Pacific Northwest: Critical Challenges Meet Compelling Opportunities

In terms of environmental issues and, more specifically, issues of environmental markets, the Pacific Northwest of North America (stretching from Northern California in the US, to British Columbia in Canada) is a land ripe with opportunities and rife with challenges.

First of all, it is a part of the world that is facing severe development pressures with populations growing at a breakneck pace. Couple this with a vocal environmental constituency and iconic endangered species such as the Northern Spotted Owl, Redwoods, and Salmon, and you have the potential for serious environmental confrontation.

Luckily, the Pacific Northwest—and the North American West in general—is also a place of has high environmental standards, the home of progressive thinkers (think John Muir and Silicon Valley), and globally significant natural resources. All of this would suggest a geography well poised for the development of markets for ecosystem services, a place where the services nature provides—climate regulation, pollination, clean water, habitat –are understood, valued, and invested in. And, if you look closely enough (as we have done), you find that this is indeed the case. Not only are cities like Portland meeting and surpassing emissions targets set at the global level by the UN Framework Convention on Climate Change and its Kyoto Protocol, but the state of California has actually developed one of the most robust climate change registries anywhere in the world. You also see organizations establishing innovative forestry investment funds, and public agencies dreaming up new approaches to conservation and wetland mitigation banking.

This publication further explores this leadership and what is being done in the Pacific Northwest to spur the development of these markets in ecosystem services. Our premise is that the region's unique geography, history, and social fabric make it especially fertile ground for the development of environmental markets. And, as far as we're concerned, and based on the articles in this booklet, the premise holds.

The bulk of this publication is a collection of articles commissioned by the Ecosystem Marketplace (www.ecosystemmarketplace.com) on emerging ecosystem markets in the west. The Ecosystem Marketplace is a web-based information service that was created two years ago to help spur the development of environmental markets worldwide. It seeks to become the world's leading source of information on markets and payment schemes for ecosystem services such as water quality, carbon sequestration and biodiversity, and is based on the belief 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 environmental services that, for too long, have been taken for granted. The Ecosystem Marketplace is a project of the DC-based non-profit, Forest Trends.

Beyond providing insights into the work being done in the Pacific Northwest, the articles here are intended to serve as context and provide background for the Pacific Northwest Katoomba conference, held in Portland on June 7–9, 2006. The conference is the ninth in a series of Katoomba conferences designed to stimulate

and strengthen environmental markets around the world. Launched in Katoomba, Australia in 1999, the Katoomba Group is an international working group composed of leading thinkers and practitioners from academia, industry and government all committed to enhancing the integrity of ecosystems through market solutions that are efficient, effective, and equitable. The group is also organized and sponsored by Forest Trends.

In producing this booklet, and in the organization of the meeting in Portland, Forest Trends, the Katoomba Group, and the Ecosystem Marketplace are working hand-in-hand with Ecotrust, a Portland-based conservation organization working to build a restorative economy throughout the region. Ecotrust and its partners recognize the critical role that ecosystem service markets can and must play in the region, and the Pacific Northwest Katoomba conference is a launching point for a regional initiative to sharply accelerate their development and rapid adoption.

What Makes the West Different?

One thing that makes the West unique (at least relative to the rest of the US) is the large role that the federal and state governments play in land ownership. For example, the government owns over half the forestland in Oregon, and has a similar presence in Washington, and a smaller but still influential role in California. This has significant implications for how westerners think about nature and how they protect natural resources and ecosystem services. This compares to the northeastern United States, for example, where public ownership is fairly minimal In the Northeast, if we are to preserve wildlands, open space, habitat, and clean water, private landowners must and often do, play a leading role. Hence the high levels of conservation purchases, conservation easements, tradable development rights, carbon credit purchases, and other market-based mechanisms. In the West, however, any public demand for intact landscapes and ecosystem services can –and often is—met instead by requiring public land management agencies to produce the desired outcomes.

For example, rancorous public debate over the fate of the region's old-growth forests and the continued decline of forest dependent species such as the northern spotted owl and marbled murrelet led to federal intervention by President Clinton in 1993. This resulted in the development of the Northwest Forest Plan which has guided the management of the region's federal forests ever since; and severely restricted federal timber harvests. The Plan put the burden of habitat creation squarely on the shoulders of federal land, leaving private lands relatively unburdened in terms of obligations to create and maintain habitat for endangered species. But this is beginning to change, and as it does—as we increasingly recognize the need for species recovery plans across the entire landscape—we can instead imagine that the West will see even greater use of market-based approaches to conservation; approaches whereby willing landowners are paid for creating habitat, paid by landowners or constituencies wishing to focus more intently on, say, industrial timber production.

This sea-change (away from public management and towards public-private partnerships) will also generate a considerable shift in the politics and the tone of debate in the region. Whereas before, everyone believed they were best served by demonizing the other (and the resulting "jobs versus environment" plays well in terms of a battle call), all parties will soon find out that such posturing does little to advance the public interest and develop creative solutions which will produce both abundant natural resources and vibrant communities. Developing environmental markets and market-based solutions to these problems—which could accomplish a more inclusive vision—requires full engagement of industry, the conservation community, and the public sector, and is best cultivated in an environment of trust and cooperation which is often undermined by heated and acrimonious debates over public land management.

Another unique feature of the American West is the presence of tribes, some with significant landholdings. This tribal presence could become a positive contributor to the development of robust markets for ecosystem

services. This is so because many tribes truly understand the inherent value of nature and the services it provides. They have long managed their holdings for a range of benefits—commercial production, subsistence food gathering, spiritual values. In their case, the concept of managing resources for future generations (for sustainability) is infinitely more than theoretical; it is rooted in a long and rich history, in traditions and inherited patterns of use, and in deep (often spiritual) relationships to the lands they inhabit. It is therefore no accident that tribes are becoming more active in developing and using markets for ecosystem services, with strong leadership by the Tulalip, Lummi, Confederated Tribes of Warm Springs, and many others. Additionally, with their standing as sovereign nations, tribes may also have a unique –if often misunderstood—status in international markets and accords not available to other U.S. political entities.

From Premise to Promise

The premise is that environmental markets can and will take root in the fertile soil of the Pacific Northwest. That this premise is well-founded becomes evident in reading the stories in this compilation. For instance, in 1997 Oregon became the first state in the U.S, to have a regulatory carbon dioxide standard in place when the Legislature enacted the first law in the U.S. aimed at reducing greenhouse gas levels. This law (the Oregon Standard) requires new power plants built in Oregon to offset part of their emissions of carbon dioxide (CO2), the most abundant greenhouse gas. The Oregon Standard allows power plants to comply by paying mitigation funds to a non-profit organization that meets certain qualifications. In turn, the qualified organization must use the funds to carry out projects that avoid, sequester, or displace the carbon dioxide the plant will emit in excess of the required standard. To date, The Climate Trust—the non-profit in question—has contracted for ten high-quality projects worth $4 million that will offset more than 1.6 million metric tons of carbon dioxide, and is in the process of sourcing about $5 million more in carbon offset projects. So, long before Europe had its Emissions Trading Scheme, Oregon had already created a type of carbon market (even if today it is considered modest by global standards).

Likewise, in California, the simple act of creating a voluntary registry for carbon emissions could one day lead to a robust carbon market in the region, as described in detail in “California Leading: New thinking on Carbon Accounting” (page 9). Not only are states filling in for the lack of federal leadership on greenhouse gas reductions, cities and counties are also leading global efforts through innovative approaches to reducing emissions. “Portland and emission reductions: much gain, little pain” chronicles Portland’s approach and success in reducing greenhouse gas emissions, with the goal of achieving a 10% reduction below 1990 levels by 2010.

Other stories in this series chronicle how California and the Pacific Northwest are beginning to create markets for endangered species habitat, how these approaches are being used with respect to fish species, and how pioneers on Oregon’s Willamette river are looking to environmental markets—specifically a water temperature trading system—to facilitate the cooling of an entire river. The articles in this series also describe the emergence of new investment funds aimed at capitalizing on environmental markets. One such fund, Ecotrust Forests LLC, has been created to acquire and manage forestland for the production not only of timber, but also for the provision of an array of ecosystem services. The Fund’s premise is that by getting value for the full range of products and services a forest produces—timber, water quality, carbon storage, habitat, flood storage, recreational opportunities, and scenic vistas—the Fund can produce returns that outperform a strategy based solely on timber production.

In addition to these stories we also have a series of profiles and guest editorials on issues related to environmental markets. So, read on and see why we think that the Pacific Northwest is a “region to watch”—a Northwestern Light—when it comes to environmental markets.

Bettina von Hagen, Ecotrust • Michael Jenkins, Forest Trends • Ricardo Bayon, Ecosystem Marketplace

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Investing in the Long-Term

by Rebecca Clarren

A longtime environmental leader in the Pacific Northwest of the United States, Ecotrust is now exploring the world of ecosystem services and conservation finance with a new multi-million dollar private equity fund. The Ecosystem Marketplace gets the scoop on Ecotrust Forests LLC's next-generation investment strategy.

At the former Crown Pacific forest in Washington's Olympic Peninsula, light green swaths of recently planted trees meet homogenous stands of older Douglas Fir, Cedar and Alder, only to meet 80-acre clear cuts where stumps and denuded soil stretch like a fresh scar. Wide roads crisscross the property like a giant web, at times blocking rivers and preventing fish passage. This patchwork quilt of industrial forestland apes the status quo of mainstream timber management. But not for long.

Ecotrust Forests LLC, a new $20 million dollar private equity fund focused on land investments, purchased this 3,300- acre parcel in December 2005. The fund, say its directors, intends to make money managing the land, not only for timber, but also for ecosystem health.

Ecotrust Forests plans to purchase additional industrial lands located in strategic watersheds throughout the Pacific Northwest, where it will manage forests to preserve watersheds. The LLC, newly formed by Ecotrust, a non-profit organization based in Portland, Ore., is America's first such private equity fund, where investors will make money not just from timber receipts but from selling the forest's "ecosystem services" such as carbon, clean water and recreation values.

"Our belief is that we must work with nature and respect natural systems or we will hurt the long term productivity and health of both the forest ecosystem and the people that live there. You might create short term gains but you will sacrifice long term value," says Spencer Beebe, Ecotrust's founder and director. "I created Ecotrust to forge a conservation economy in this region, where every transaction enriches people and place. To that end, we're trying to influence the way forestry in the Pacific northwest is practiced."

This is America's first such private equity fund, where investors will make money not just from timber receipts but from selling the forest's "ecosystem services" such as carbon, clean water and recreation values.

The time is ripe for revolutionary ideas in the U.S. forestry sector. Due to increased globalization, American paper companies are selling off much of their U.S. forests in favor of cheaper land in places like Brazil and New Zealand. Over the next 20 years, nearly 40 million acres of America's timberlands are at risk of development, according to a new report by the U.S. Forest Service. To Beebe and others in the conservation community, these changes represent a historic opportunity to convince society that forests are worth far more than the timber they produce. It's an ambitious concept and it's too early in their effort to know its impact, but already the Ecotrust Forest LLC is attracting attention from investors, environmentalists and academics throughout the country.

"Ecotrust's effort is a great example of innovation coming from the non-profit sector; it's creative and useful," says William Ginn, author of Investing in Nature. "At the moment their fund is small but they have big aspirations. I hope they can achieve those aspirations. For the conservation community to make a serious enough difference in the state of forests we need lots of different approaches and more examples. This is absolutely the kind of idea we need to grow."

An Innovative Model

Just outside Ecotrust's office in downtown Portland, a moose head hangs from the interior brick wall of a former historic warehouse. The building, developed by Ecotrust in 1998, houses 25 non-profits, government agencies and businesses that all work to make money in a socially conscious and environmental manner. The winner of a gold rating from the U.S. Green Building Council, it is credited with helping to spur a revolution in green building in Portland. The building also houses Shorebank Pacific, the nation's first commercial bank committed to environmentally sustainable community development. Co-founded by Ecotrust in 1994, the bank now has $105 million in assets, 200 borrowers and has made money for the past three years.

This reputation is part of what gives Ecotrust Forests credibility, according to environmentalists and investment firms alike. While Beebe admits, "people aren't exactly knocking down our door," the Fund has commitments from18 initial investors and over $20 million in it's first two years. Within 10 years, it hopes to grow to $500 million.

In a show of support, last May the U.S. Treasury Department gave Ecotrust $50 million in federal tax credits. Because the land they plan to purchase will supply steady forestry jobs in nearby rural and impoverished communities, this "New Markets Tax Credit" allows investors to claim a 39 percent tax credit over seven years. Helpful for attracting investors, the tax credit is part of Ecotrust's creative approach to making money.

Investing Values

Most industrial forests today, harvest timber in 40-year cycles. In order to better protect watersheds, Ecotrust Forests will wait to log until trees are 70-years-old. While the group will thin some trees earlier, this slower rotation cycle means that investors won't see returns for a longer time. In the mean time, says Beebe, the tax credit should help make up the difference; over the next 10 to 15 years, proponents of ecosystem forestry predict a 7 to 9 percent return.

For people interested in investing their values, such ecosystem-based forestry makes financial sense, says Clark Binkley, managing director of International Forestry Investment Advisors, and an advisor to Ecotrust. Aside from the tax credit, the LLC will sell carbon credits, development rights, and other "ecosystem services." With plans to certify its logs through the Forest Stewardship Council, the gold standard of environmental certification, Binkley says Ecotrust will create a niche market and escape competition with mainstream international companies.

It's the kind of idea that socially conscious investors are seeking. "As more and more people are looking to integrate their environmental values with their investments, new things like this are getting a lot of play," says Justin Conway of the Washington, D.C.-based Social Investment Fund.

Ecotrust Forests proposed management style results in better biodiversity and sustains local economies, according to a widely acclaimed study published in the Journal of Sustainable Forestry in 1999.

"This type of management attempts to meet the full values that society needs," says Andrew Carey, co-author of the study and an emeritus forest ecologist with the U.S. Forest Service. "A responsible investor wants to maintain the natural capital and live on the interest. That's what [Ecotrust] wants to do. It is absolutely a critical juncture in forestry in this country. We stand to lose the opportunity for us to have rural communities supported by forestry. We need to educate people to be responsible self-serving consumers. It's a race; we've got to get a change in public attitude soon."

A Long Haul

Not everyone is convinced that Ecotrust Forests will translate as a model. For starters, 'how many other entities can obtain such tax credits?' asks Andy Kerr, a long-time Oregon environmentalist working on a book about the economics of preserving and restoring forests. Plus, Kerr wonders whether the tax credit is really worth the ecological benefits.

> "For the conservation community to make a serious enough difference in the state of forests we need lots of different approaches and more examples. This is absolutely the kind of idea we need to grow."

"Eighty-year rotation cycles are certainly better than 40, but is it enough? Salmon don't care that the trees are growing twice as long, they care that the watershed is healthy and a truly healthy North Pacific Coast watershed is best served by at least 300 year old trees," says Kerr. "It's intriguing but I'm skeptical. Ecotrust is trying to prove that one can do well while doing good. It'd be nice but usually there's more money ripping off nature than conserving it."

Furthermore, while the idea of making money from ecosystem services like carbon or clean water is compelling, these services are not a practical moneymaker at the moment, says author Ginn.

"I believe it is going to be very many years before we see robust carbon market in this country. Not only is the current admin opposed to it, the current Kyoto protocol doesn't extend carbon sequestration to existing forests," says Ginn. "We're years away from this being a robust reality."

Yet for Beebe, these questions are par for the course.

> "A responsible investor wants to maintain the natural capital and live on the interest. That's what [Ecotrust] wants to do. It is absolutely a critical juncture in forestry in this country."

"Every time I've started something new, I've been surrounded by skeptics and doubters and in every case it's been harder to get off the ground than I originally anticipated, and then once it got going it became more powerful than I ever imagined," says Beebe. "As a non-profit we have a special opportunity with our tax-exempt status. We should be stirring the pot and coming up with new ideas. Right now our example is not big enough to have much impact but we hope to grow it. Trees grow seven days a week, 52 weeks of the year. They don't care who is in the White House or how the Dow finishes the day. What could be lower risk than investing in the long term?"

Rebecca Clarren is a freelance journalist based in Portland, Ore. A winner of five grants from the Fund for Investigative Journalism, her work appears in Salon.com, The Nation, Orion and High Country News. She may be reached atrclarren@yahoo.com.

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Environmental Venture Capital: Putting the Green in ROI

by Jeff Plunkett

Environmental Venture Capital is nothing new: More than seven years ago various funds were created to invest in green businesses while still turning a profit. Now, some of those funds have disappeared, while others remain. Although these funds have their eyes on the triple "bottom line"—social, economic, and environmental—the Ecosystem Marketplace finds that, ultimately, it is the financial bottom line that counts for most investors.

In a fourth floor conference room of the Washington Battery Building in downtown San Francisco, Jason Winship—a sharply dressed 30-year-old with millions of dollars in venture capital at his disposal—is talking cod.

"Hook-and-line fishermen have a better product," says Winship, comparing them with net fishermen. "They have their fish gutted and on ice within minutes of taking them out of the water, so they're fresh. But if there's no assurance that their hook-and-line cod will remain differentiated from those caught in nets, why do it? It kills the incentive."

Winship calls it a supply chain problem, and it's exactly the type of problem his Sea Change Investment Fund was created to solve. Over the next five years, the fund will invest $20 million in progressive thinking supply chain companies in the seafood industry. Make no mistake about it: the Sea Change Fund's mission is to protect "environmentally-preferable sources"—like those hook-and-line cod fishermen—but it is first and foremost an investment fund.

Winship, the managing principal of the fund, insists, "Our financial goals will not be sacrificed for our conservation goals."

The small world of green venture capital funds is getting bigger (and bolder) these days. A month after the Sea Change Fund launched this March (with a $10 million push from the Packard Foundation's program related investment), the United Nations Development Program unveiled Equator Ventures, a fund aimed at conserving biodiversity and reducing poverty through $30,000 to $500,000 loan investments to small and medium-sized businesses.

Philipp Kauffman, the manager of Equator Ventures, says the fund has a co-financing target of $30 million over the next four years, what he calls "the kind of money that can change the world."

Both start-ups share a belief in the transformative power of green venture capital, but there's certainly no shared investment model.

When in Rome

The Sea Change Fund plans on going the traditional venture capital route: making equity investments and assuming minority ownership positions in its portfolio companies. Its exit strategy lies with the potential for industry consolidation, specifically, the hope that one of its companies will become the Niman Ranch of the seafood industry. Admittedly, Winship expects lower returns than venture capital firms investing in the technology or health care sectors, but he anticipates ROIs in the neighborhood of 10%.

For Terry Anderson, executive director of the Property and Environmental Research Center and a professor at Stanford Graduate School of Business, the future of green venture capital firms depends on that single bottom line (multiple bottom lines include the social or environmental benefits of the investment). If you want to push the environment as a sound investment with a bunch of businessmen, he contends, you must be prepared to think in their terms. "If it is a so-called double- or triple-bottom line fund at the cost of financial gains, it will remain in a niche market."

Anderson explains that cap-and-trade regulations fit the single-bottom line paradigm. "Once we implemented SO2 trading, we opened a legitimate market. IFQs—individual fishing quotas—would do the same thing." Fisherman would immediately become aware of the value of conservation.

Investors, he argues, respond much the same way to investment funds. "Until we look at the environment as an asset whose returns are comparable to other ROIs, it will never be a mainstream investment market."

When in Rio

Equator Ventures employs precisely the type of double-bottom line thinking that Anderson discourages when talking ROIs in the United States. Founded to help the UN reach its Millennium Development Goal of significantly reducing poverty by 2015, Equator Ventures currently aims just to "break even."

The goal sounds a little ho-hum until one considers that the fund canvases investment opportunities in cities more like Pointe Noire than Portland. Whereas The Sea Change Fund is interested in seafood companies headquartered in North America, Equator Ventures, as the name suggests, is focused on the less-predictable Tropics.

Kauffman explains that if his top priority was ROI, he would be looking to invest in established commodity markets like coffee. “That’s not our role,” he says. “It’s about innovation, to create new domains in the conservation sector.”

“At this time, realistically, I don’t think there’s money to be made,” Kauffman continues, “But if I could put the preservation of the environment into the balance sheet we’d be profitable.”

Kauffman is not alone in arguing for the inclusion of environmental costs and benefits when measuring a green venture fund’s ultimate success. Indeed, much of Europe stands with him, according to Jeroen Loots, a program manager for sustainable development at the DOEN Foundation in Amsterdam.

“The main difference between Americans and Europeans could be that the idea of ‘external costs’ is more incorporated in European policy making and European thinking in general,” says Loots. Currently, those external (environmental) costs are zero, but many European investors have recognized that this calculation is incorrect. In the Netherlands, Loots points to VBDO, an association of sustainable investors that includes both banks and pension funds, as one such forward thinking organization.

On this side of the pond, Kauffmann points to New Jersey-based E+Co (which invests in sustainable energy projects throughout the developing world) as a better benchmark for his fund than the traditional venture capital model.

“We realized very early that we needed to provide enterprise development services for these entrepreneurs,” says Christine Eibs-Singer, Deputy Executive Director of E+Co. Those services included market and financial research as well as technology assistance—all of which allows them to “put a business plan in place that is bankable.” E+Co pays for these enterprise development services through grants and donations and doesn’t figure those costs into their portfolio’s 8% ROI.

> “Until we look at the environment as an asset whose returns are comparable to other ROIs, it will never be a mainstream investment market.”

Well into its second decade in operation, though, E+Co has proven it has staying power. Eibs-Singer says much of that has to do with its focus: energy.

“From a developing country’s perspective, energy is key,” says Eibs-Singer. “It is at the core of development, so the sector is ripe. Biodiversity is much harder, much harder.”

Terra Capital, a fund launched in late 1998 by the International Finance Corporation, learned that lesson the hard way. The ambitious 10-year, $15-million fund planned to invest in 12-14 projects and predicted a 20% ROI for investors. But after making only four investments (totaling $5.5million), the fund suspended new investments in 2002 and entered divestment phase. In a presentation given in Berlin a year later, Patricia Moles, the general manager of Terra Capital, explained that “heavy hands-on management requirements” and the challenges of investing in rural areas made the investments too risky. One of the presentation’s conclusions: “what works in the US probably does not work in Latin America.”

There have been successes, though. About the same time Terra Capital was approaching investors with its plan, Tammy Newmark was pitching a similar biodiversity fund—with a similar equity financing investment model—but with more modest, 6.5% returns.

"We use the term venture capital very loosely," says Newmark. president of the Nature Conservancy's EcoEnterprises Fund, which supports environmental entrepreneurs in Latin America and the Caribbean. EcoEnterprises currently has $4.4 million invested in projects ranging from an organic flower business in Ecuador to bee farming in El Salvador. She explains that the approach to investing must be different in the developing world. Managing the expectations of investors (three individual and five institutional) is just as important as providing support and technical assistance for the local entrepreneurs.

"In the classic venture capital model, you finance 19 and hope that one is a winner," says Newmark. "In our business, we finance 19 and hope that 10 are winners."

Common Ground

Eventually, success in the venture capital world comes down to betting on winners, and in that sense, Sea Change and Equator Ventures are quite similar. Both funds put a premium on research and meeting entrepreneurs face-to-face. Both funds have an investment committee and an environment committee stacked with experts who must approve each project before money changes hands. Both funds are part of a growing, global, green investment movement that is beginning to place real value on environmental assets. And both funds are about to make their first bets.

"With a difference in [investment] size, it's a whole new ballgame," says Equator Ventures' Kauffmann. "And if you're doing that in remote areas, it's a very interesting ballgame."

Kauffmann is currently in Africa exploring an ecotourism business in Ibo, a picturesque island off the Mozambique coast. Two entrepreneurs from Mozambique and one from South Africa have proposed building a tourism facility and lodge on the island. Kauffman is concerned about the buy-in from the rest of community and whether ecotourism will provide indirect benefits for local people not directly employed. He's also concerned about the politics of Mozambique, which is why he will be stopping in the capital city of Maputo to make sure political leaders are behind the project. Overall, though, Kauffmann is optimistic that this will become Equator Venture's first portfolio company.

The Sea Change Fund's Winship is playing his cards closer to his chest. "To make the biggest impact, you've got to start with the most popular fish." For that reason, the fund is closely watching the shrimp, cod, and canned tuna markets, but Winship refuses to get more specific. Smiling coyly, he says the fund will announce its first investment in the next few months.

"The first thing we do is going to be closely watched," he says, "so we want to make sure we get it right."

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A Brave New World:
The West Tackles Climate Change

California Leading:
New Thinking on Carbon Accounting

By Ricardo Bayon

For four years California has been quietly developing a set of greenhouse gas emission accounting standards and a climate registry. Now it has come up with ideas on how to measure and account for the climate impact of forests. This work could one day have repercussions on carbon trading across the US and the world. The Ecosystem Marketplace takes a closer look.

PHOTO BY DAVID HUGH KEMPER

With Europe's newfound emphasis on carbon markets, with the impending entry into force of the Kyoto Protocol, and with the launch of the European Union's Emissions Trading System (ETS) in January of 2005, it comes as a bit of a surprise that some fundamental developments relating to the establishment of carbon markets appear to be coming from a country -the US- that steadfastly refuses to sign the Kyoto accord, and a state -California- that does not yet have (and is not currently planning) an emissions trading system.

Although the US has been characterized as a climate laggard by many observers, there is a little-known initiative in California -the California Climate Action Registry- that has for three years been providing leading-edge thinking on issues of carbon accounting and emissions registries; issues that will likely prove instrumental in the creation of emissions trading regimes like those being put in place in Europe, Japan, Australia, and many other countries around the world. Indeed, on at least one issue -forest-related carbon and sequestration- the Registry has already begun to have an impact far beyond California's borders.

In US politics, California has a history of instigating back-door revolutions: the sort of political change that happens when and from whence it is least expected. After all, the state is so big, and its approach to a variety of issues (especially environment) so progressive, that the California tail often wags the US dog: witness emissions standards for automobiles, anti-tobacco legislation, among others. So perhaps it isn't all that surprising that California, through the Climate Action Registry, should also be providing leadership on climate change. Still, for those interested in environmental markets, understanding the California Registry and its achievements is a worthwhile undertaking.

History of the Registry

The California Climate Action Registry was established by California law as a non-profit voluntary registry for greenhouse gas (GHG) emissions with a view to protecting and rewarding any early action companies might take in reducing greenhouse gas emissions. Diane Wittenberg, the registry's president, puts it rather simply: "We are," she says, "a voluntary but rigorous registry that can help companies and others establish greenhouse gas emissions baselines against which any future reduction requirements may be applied. Additionally, all our registered emissions are third party certified and made publicly available through our web site (www.climateregistry.org)."

The California Climate Action Registry has for three years been providing leading-edge thinking on issues of carbon accounting and emissions registries; issues that will likely prove instrumental in the creation of emissions trading regimes like those being put in place in Europe, Japan, Australia, and many other countries around the world.

The idea for the registry, she explains, started at the grassroots (or, if you prefer, at the point source) when a few companies in California went to the state government in 2000 saying they wanted to reduce their carbon emissions, but that, before doing so, they wanted some assurances from the state that their actions would not harm them down the line if a climate regulatory regime was established. Specifically, they said they wanted the state to protect their baselines and give them some sort of credit -should a regulatory system be put in place- for their early actions. They also wanted the state to help them gain recognition for their actions.

The result of these requests was a law, California Senate Bill 1771 (SB 1771), and its amendments (e.g. SB 527) which were approved at the end of 2001. Together, these laws establish the California Registry and charge it with the following functions and responsibilities:

- To enable the voluntary recording of GHG (greenhouse gas) emissions in a consistent certified format;
- To qualify third-party organizations that have the capability to certify reported baseline emissions;
- To maintain a record of all certified GHG emissions baselines and emissions results;
- To adopt industry-specific reporting metrics;
- To encourage voluntary actions to increase energy efficiency and reduce GHG emissions;

- To provide participants with referrals to approved providers for technical assistance and advice on programs to monitor, estimate, calculate, report, and certify GHG emissions; establish emissions reduction goals; and improve energy efficiency;
- To recognize, publicize, and promote participants;
- To recruit broad participation from all economic sectors and regions of the state; and
- To provide additional services for participants such as workshops, training seminars, and "best practices" exchanges.

From the point of view of business, what is interesting about the law is that, in return for participation in the Registry, the state of California undertakes to "offer its best efforts to ensure that participants receive appropriate consideration for early actions in the event of any future state, federal or international greenhouse gas regulatory scheme." In short, California promises to throw its considerable political weight behind carbon market leaders; not to mention provide them with some level of environmental recognition.

Carbon Accounting Standards

From the point of view of markets, what is interesting about the law and California's Registry is that early on, its creators realized that in order to give credit to the State's "climate leaders", they needed to set up the accounting systems, the reporting mechanisms, and the certification/verification mechanisms that would enable them to ensure that emissions were being, in fact, reduced, and to compare these reductions to those of others; to, in other words, differentiate between the apples and the lemons.

As a result, since the passage of that law, the California Registry has spent a considerable amount of time and technical expertise to establish a set of protocols that enable companies to measure, report, and certify their emissions. These have recently been supplemented by two industry-specific emissions reporting and certification protocols: one for the power/utility industry sector, and one for the forestry sector.

> The California registry involves industry, government, and non-profits as integral parts of their work.

According to Peter Miller—senior scientist at the Natural Resources Defense Council and a member of the Registry Board- what California's registry is trying to do is essentially establish the generally agreed accounting principles for carbon; the sort of ability to measure and verify emissions that will ultimately enable those emissions to be freely traded and marketed. "The closest analogy I can think of for the Registry," he says, "is the Financial Accounting Standards Board (FASB) which establishes the standards by which all company finances in the US are judged." It is these standards, he adds, that allow companies to be analyzed, understood, and ultimately traded. In a similar fashion, he expects that the standards being developed and tested by California's Climate Action Registry will ultimately enable not only carbon trading mechanisms, but also effective greenhouse gas regulatory regimes. "After all," he says, "you can't manage what you can't count." To which one might add: neither can you trade what you can't count.

The Benefits of Being Voluntary

The work that the California registry is undertaking may be innovative, but what makes it even more interesting is how this work is being undertaken. For instance, while the negotiations surrounding the Kyoto Protocol have been largely governmental (with NGOs and companies, it is true, working in the background and/or shouting from the sidelines), the California registry involves industry, government, and non-profits as integral parts of their work. To give but a few examples: representatives of government, industry, and NGOs all sit on the Registry's Board, have largely equal powers, and participate actively in the development of protocols, standards, and workplans. Additionally, the Registry has a membership structure that includes companies like Pacific Gas and Electric, Eastman Kodak, and BP, as well as NGOs like the Union of Concerned Scientists, the Natural Resources Defense Council, and Environmental Defense, together with local governments such as the City of San Francisco, the City of Los Angeles, and the City of San Diego.

Wendy Puling, director of environmental policy for Pacific Gas and Electric (PG&E), one of the State's largest power companies, says that from the perspective of a large company, the registry process has been a success. "We are a charter member of the Registry," she says, "and have been supportive of the concept since its inception." She explains that PG&E joined the registry for a variety of reasons, including: to get a better sense of their own emissions, to better understand how the measurement protocols work, to prepare for a more carbon-constrained future, and to influence the development of emissions protocols for the power sector.

Puling continued: "We believe there will be some sort of regulatory structure on carbon in place in the US within the next 10 years. Now our crystal ball isn't any better than anyone else's, but we think this is the direction we are headed in, and if and when that happens, we want to be ready." She further explains that PG&E supports market based solutions to the carbon problem and has therefore been very happy with the way the Registry has allowed them to understand and experiment, in a non-threatening way, with the sorts of information they will need to provide as climate change regulations develop worldwide.

"We believe there will be some sort of regulatory structure on carbon in place in the US within the next 10 years. Now our crystal ball isn't any better than anyone else's, but we think this is the direction we are headed in, and if and when that happens, we want to be ready."

"Being voluntary," says NRDC's Miller, "does have its benefits. If the process was too legal, we wouldn't be able to focus on doing just what is right. As it is, we've been showing that large companies, cities, and environmental groups can work together in reasonable and effective ways to address the climate problem." He notes that to the extent that the Registry has been successful, it has been largely due to the fact that it conducts its business "in an atmosphere that is open and not highly politicized or charged."

Going Beyond California

Miller further believes that the impact of the California registry will go -indeed has already gone- well beyond the state's boundaries. Already, he says, the Registry is working closely with the World Economic Forum on

their on their global greenhouse gas registry, and he believes that ultimately the principles established by the California registry will be adopted and adapted by other US states, by other countries, and possibly even lead to creation of national and international carbon accounting standards sometime in the future. Agreeing with PG&E's Puling, he predicts: "Eventually, the US will have a regulatory regime for greenhouse gases. It may not be as broad or as good as some might wish, but I think it will inevitably involve some sort of trading. When and if that happens, the standards being developed in California will become increasingly important."

> "Being voluntary does have its benefits. If the process was too legal, we wouldn't be able to focus on doing just what is right. As it is, we've been showing that large companies, cities, and environmental groups can work together in reasonable and effective ways to address the climate problem."

Wittenberg agrees and points out that the Registry is already working closely with states that are exploring regulatory approaches to climate change in both the Northeast and Northwest of the US. "I could easily see California's work on the Registry," she says, "have an impact at the national level across the US." She also explains that some of the Registry's participants are not limiting themselves to only reporting on their emissions in California, but are also using the Registry's protocols to report on their national, or even global, emissions. "Kodak," she says, "is an example of a company that recently joined the Registry and is planning on using our protocols to report on its global emissions."

One area where the Registry's work is already having national -and maybe even international- repercussions is in the measurement of carbon emissions and reductions from forestry projects.

The Forestry Protocols

As anyone involved with the Kyoto negotiating process will tell you, the issue of how (or even whether) emissions reductions credits from forests should be included in any carbon trading scheme is exceedingly difficult and contentious (see overviews of the case for and against forest sinks at **http://www.ecosystemmarketplace.com/news/article.feat.027.php** and **http://www.ecosystemmarketplace.com/news/article.feat.018.php** respectively). But while the Kyoto crowd continues to endlessly debate the whys, wherefores, and hows of forestry projects and their relationship to carbon emissions, the California Climate Action Registry recently approved a series of protocols and standards that go a long way towards resolving many of the long-standing disputes surrounding this issue.

According to Michelle Passero, director of policy initiatives at the Pacific Forest Trust, a non-profit environmental group that was closely involved in the preparation of the forestry protocols, the decision to look at the carbon implications of forests was actually taken by the government of California in law SB 812. This law, which was enacted in January of 2003, called on the Registry to "adopt procedures and protocols, including specified criteria, for the monitoring, estimating, calculating, reporting, and certifying of carbon stores and carbon emissions resulting from the conservation and conservation-based management of native forest reservoirs in California." After an exhaustive process that took over a year and a half and involved consultations and reviews with a wide range of experts, non-profits, other stakeholders, and even a series of public reviews, the Registry's Board approved the new protocols in October of 2004.

> "I could easily see California's work on the Registry have an impact at the national level across the US."

"Addressing the issue of forests and their relation to climate change is important," says Passero, "because forests are the world's second largest source of anthropogenic greenhouse emissions; largely through deforestation. In other words, they are a part of the problem and so should also be a part of the solution." The idea behind the protocols, she adds, has always been to provide incentives for landowners in California to protect, maintain, or enhance forest cover. "We wanted," Passero explains, "for California's forests to provide both climate benefits, as well as benefits to biodiversity and to the people on the ground."

Key Provisions on Forests

Like all of the Registry's protocols, the Forestry protocols are quite thorough and rigorous. Indeed they are composed of three different protocols: (i) the Forest Sector Protocol which helps forest companies measure and report on their emissions of greenhouse gases from biological sources at the entity level (the aptly-named General Reporting Protocol looks at non-biological emissions at the entity level); (ii) the Forest Project Protocol which looks at the biological emissions of GHGs at the project, as opposed to entity, level; and (iii) the Forest Certification Protocol, which explains how information provided on biological emissions of GHGs from forestry entities and projects is to be verified and certified (all these protocols are available at **http://www.climateregistry.org/PROTOCOLS/).**

Some of the key provisions of the forest protocols attempt to address many of the contentious issues related to sequestration that have come up during the Kyoto negotiations, including:

Additionality: For carbon stocks or emissions to be registered in the California Registry, the underlying forest activities must go beyond existing legal requirements, and they must truly be new. At the same time, anyone wishing to register emissions reductions from a forestry project must first have registered their emissions at the company or entity-wide level.

Permanent risk mitigation: According to the protocol, all eligible forestlands will have to be dedicated to forest use permanently through a deed restriction that is granted in perpetuity—i.e. through a conservation easement.

Net carbon stocks: The protocols set out a series of models to establish a baseline of carbon storage, and then provide steps that need to be taken to more precisely track the net gains and losses to the system. The Registry argues that their protocols provide a practical methodology that makes economic sense for landowners, while reliably reflecting the benefits to the atmosphere of proper forest management.

Native forests: Registration of forest carbon stocks and emissions must promote and maintain native forest types.

In addition to the above, the Registry's protocols go far beyond the current Kyoto thinking (and well beyond what the CDM currently allows), by accepting GHG reductions from three distinct types of forest projects:

Conservation-based Forest Management: Forest projects that are based on the commercial or noncommercial harvest and regeneration of native trees and employ natural forest management practices;

Reforestation: Forest projects that are based on the restoration of native tree cover on lands that were previously forested, but have been out of tree cover for a minimum of ten years; and

Conservation: Forest projects that are based on specific actions to prevent the conversion of native forests to a non-forest use, such as agriculture or other commercial development.

Balancing Accuracy and Cost

Although NRDC's Miller believes that the above provisions make the Registry's Forestry Protocols extremely innovative -he in fact believes they are the first attempt by any organization anywhere to provide a rigorous yet practical system for measuring not just emissions of CO2 from forests, but also their role in sequestration- he does admit that in order to make the protocols workable, some shortcuts needed to be taken. For instance, he explains, the protocols do not address issues of "below-ground" CO2, the carbon dioxide that can be stored or emitted in forest soils. And this is no small omission, for he says that there can be twice as much carbon in the soils as in the atmosphere. "The problem," he says, "is that there is no easy or manageable way to measure these things. They are extremely heterogeneous and measurement/studies can be extremely expensive." He also says that the Protocols could have required registrants to certify reductions every year (instead of every five as the Protocols require) and to sample every tree every year, but he believes such onerous restrictions would have been counter-productive. "In other words," he explains, "we were constantly struggling with the issue of how much accuracy to require at what cost. In the end, I think we struck the right balance."

So what now? Miller says the registry is currently in discussions with a number of forest companies about pilot projects that use the forest protocols, so these should be put to the test shortly. The Forest Trust's Passero, for her part, says that she would like to see other organizations take advantage of the Registry's work on forestry, particularly within the US. She adds that the protocols are very compatible with existing systems and are easily replicable. In other words, she believes they can export well. "Although the protocols were designed for California," she says, "95% of them can carry to other states and countries."

Indeed, in a recent move, the Chicago Climate Exchange -a US-based carbon trading system- announced that as of November 2004 it would accept emissions and reductions calculated using the Registry's forestry protocols for trading on its market, and added that it was in discussions with the Registry to further harmonize the two organization's reporting and certification requirements. It is also worth noting that the announcement was in fact made at the most recent meeting of the International Emissions Trading Association (IETA) in Zurich, Switzerland, so clearly the California Climate Action Registry is developing a solid international, as well as national, profile.

> "We wanted for California's forests to provide both climate benefits, as well as benefits to biodiversity and to the people on the ground."

In Praise of Standards

This was to be expected. After all, it is precisely as a result of the growing interest in environmental markets worldwide, that people are beginning to pay closer attention to carbon metrics and accounting standards. As markets spread, people are coming to the realization that all markets—be they environmental or not—rely heavily on trust, standardization, and verification for their effective operation. Markets just can't function if people don't know what they are buying, if they can't measure what is being traded, and if there is no third party verification and certification of quality.

So, again, in retrospect and with the benefit of hindsight, perhaps it should come as no surprise that players in the global carbon markets are beginning to gravitate towards the California Climate Action Registry and its set of coherent standards for measuring, reporting, and verifying emissions of greenhouse gases. That such standards are to be found in a perceived climate laggard such as the US matters less than the fact that they exist and that they are perceived as rigorous, credible, and most importantly, workable.

Accountants and accounting standards may be much maligned, but they are nonetheless essential; even—or perhaps especially—when it comes to environmental markets.

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Portland and Emissions Reductions: Much Gain, Little Pain

By Oakley Brooks

Portland, Oregon was the first city in the United States to adopt a greenhouse gas reduction plan in 1993. Now, the city claims to have achieved an overall emissions reduction. In other words, while the rest of the country has been discussing the costs and benefits of cutting greenhouse gas emissions to 1990 levels, Portland has all but done it. The Ecosystem Marketplace reports from the US metropolis that has decided to stop talking and start walking.

PHOTO BY MELISSA TATGE

In 1997, Eric Sten, then a year into his first term as a city commissioner in Portland, Oregon, visited Japan to discuss his city's efforts to combat global warming. Portland—the first US city to adopt a greenhouse gas reduction program—had been working on the issue since 1993 and local governments around the world were interested in what the city had done. At a Japanese forum, a member of the audience rose and asked Sten how city officials had convinced Portland citizens to care about cutting fossil fuels. Sten's response was surprisingly candid, "I'm not sure the public does care."

Eight years later, in June of this year, Portland announced that it had succeeded in cutting greenhouse gas emissions levels to within 1% of 1990 levels, on the way to a targeted 10% reduction below 1990 levels by 2010. Sten, still a Portland commissioner, insists that the reductions came not because Portland converted all of its citizens into global warming believers but because the city made investments that had tangible environmental and quality of life benefits, in addition to reducing greenhouse gasses. "We made progress on this issue by doing things that make Portland a good place to live," Sten says, "Not because of things that are specific to global warming."

Sten's observation is provocative in light of recent debates concerning the best approach to global warming. When it comes to cutting greenhouse gases, politicians at the federal level have been arguing over the choice

between a healthy environment and a healthy economy. But cities such as Portland are showing that they can cut greenhouse gas emissions without bringing communities and local economies to a grinding halt.

"I knew there were efforts going on but to have that kind of significant reduction was remarkable," says Dennis Wilde, a Portland-based developer. "What's really remarkable is there's been no pain. People didn't put on hair shirts and go live in caves."

Slowly But Surely

As Portland officials count it, overall greenhouse gas emissions have dropped to 0.7% above 1990 levels. Transportation-related emissions essentially have been flat, combined emissions in homes, offices and industry have decreased slightly, and waste gases—largely extrapolated from methane gas escaping from rotting landfill waste—have decreased significantly.

For more than three decades, continued investments in public transit have given Portlanders one of the best transit systems in the country. Meanwhile, statewide energy efficiency programs aimed at stabilizing prices have also conserved energy. On top of transportation and energy efficiency, Michael Armstrong, Portland's lead analyst on global warming, says that the state's land use program has provided a solid foundation for greenhouse gas reductions over the last 15 years. "We wouldn't be here without land use," Armstrong says.

Oregon's 30-year-old land use system was formed in the early 1970s, after Oregonians watched California-style growth creep onto the state's farmland, forests and wild coastline. The system confines most development to urban centers.

There's little question that compact development has been effective in limiting auto use and related emissions. A recent study by the Seattle-based think tank Northwest Environment Watch found that the 45% of Portlanders living in compact inner-city neighborhoods use 25% of the gas of typical suburbanites. Portlanders' low driving rate can be attributed to widespread transit use. Downtown Portland, in particular, is served well by the local transit agency, Trimet. And there are corresponding greenhouse gas benefits—75% of Trimet's 290,000 daily trips are by "choice" riders who leave a car at home.

Politicians at the federal level have been arguing over the choice between a healthy environment and a healthy economy. But cities such as Portland are showing that they can cut greenhouse gas emissions without bringing communities and local economies to a grinding halt.

Energy efficiency efforts were aided by two key policy decisions: around 1990, Oregon's utilities commission began requiring investor-owned power companies to include energy efficiency spending in new resource plans; at the same time, the state also dramatically raised building code requirements for things such as roof and wall insulation.

Utilities began pumping more money into streamlining industrial processes and weatherizing homes because reducing energy demand through efficiency projects often proved cheaper than building new capacity. Portland General Electric, one of two electric utilities that serve Portland, bought roughly 150 average megawatts worth of efficiency in the 1990s, the equivalent of a gas turbine power plant.

"We'd never touched the commercial or industrial markets until [the new policy]," says Carol Brown head of PGE's efficiency services. "On a regional basis, it just became more important."

At the same time, building code upgrades dropped energy bills an average of 40% in new homes.

Overall greenhouse gas emissions have dropped to 0.7% above 1990 levels.

The Downside

Portland's greenhouse gas reductions were not, however, entirely pain-free. "It's OK to look at how our living patterns affect emissions," says Jack Orchard, a Portland land use attorney and keen observer of city politics. "But we've made some political decisions along the way that we have to face up to."

Home prices in Portland, for instance, have been on a steady climb in recent years, with the median home price rising 12% in the last year and topping $200,000 for the first time. Many developers and real estate agents whose businesses might benefit from faster development blame Portland's urban growth boundary, which limits new land available at the city's fringes. Other developers, mainly those who have figured out how to navigate the land use system, note that Portland prices still don't approach those of Seattle and San Francisco, the nearest comparable markets, and that a constrained land supply guards against raw land speculation and huge market fluctuations. Whichever way you look at it, it is clear that Portland's battle against urban sprawl has made home-ownership more expensive for some.

Some critics have also blasted the region's spending on light rail, including a line to Portland's western suburbs, which cost almost $1 billion—$250 million of which came from local coffers.

"The city should stop spending money on a form of transit that people gave up on 50 years ago," says John Charles, president of the libertarian Cascade Policy Institute and former director of the Oregon Environmental Council. "For a lot less time and energy they could put out pretty good bus service."

Likewise, the jury is still out on whether or not Oregon's recent 3% tax on energy bills, used to fund energy efficiency and renewable energy projects, is good policy. As part of energy deregulation in the late 1990s, the utilities commission established the tax and shifted efficiency projects from the utilities to a new nonprofit, the Energy Trust of Oregon, backed by a portion of the tax. The commission reasoned that stable funding for a nonprofit, rather than market driven spending would better drive efficiency efforts and renewable energy production. Eric Sten admits that the tax-funded trust may not represent the most efficient way to back renewables and efficiency. But, he says, in the absence of strong federal renewables programs, the Energy Trust is a good method for transforming the Oregon energy market.

"You have to look at the 3% tax in the vacuum of federal policy," Sten adds. "Is it a good response to bad policy at the federal level? Probably."

The Upside

Despite seeing the costs associated with the Portland's greenhouse gas plan, attorney Jack Orchard says that many of the related investments in things such as bike lanes, walking routes and tree planting strengthen the city economically. "Those kinds of things reduce the city to a human scale," he says. "From a business standpoint, that's been a positive."

Sten argues that those smaller projects, combined with the transportation and land use systems, have encouraged inner-city investment. Those investments gave Portland thriving commercial districts and an enviable cultural scene that are attractive to young people moving into the city. The metropolitan area has grown by 400,000 people since 1990 and though the economy took a beating from the high-tech bust, it is now spawning new industries that owe their growth, in part, to global warming efforts.

Portland's exploding "green building" industry provides a ready example. Spurred by state efforts to encourage energy efficiency, new construction in Portland and elsewhere has a significantly smaller climate imprint than it did in the past. The city now has nine high-performance, energy-efficient buildings certified by the US Green Building Council and another 47 awaiting certification—combined they give Portland the most green buildings of any city in the country.

Dennis Wilde of Gerding/Edlen Development, a high performance building pioneer, is now involved in remaking an entire industrial section of South Portland into a green residential and office center. Wilde says the company will leverage the gamut of local incentives in order to make their project both more profitable and energy efficient. Key among the incentives is the state's Business Energy Tax Credit, which allows a building owner to write off 35% of spending on efficiency and renewable power purchases and on-site power generation.

> The state's land use program has provided a solid foundation for greenhouse gas reductions over the last 15 years.

"That's been huge; it's one of the best programs in the country," says Wilde, who's now managing projects up and down the West Coast. "We use it with our build-to-suit customers and they'll make investments because we can pass that through to them."

The green building boom extends into support industries. The Energy Trust estimates that its spending last year generated $7.8 million in new wages and the equivalent of 138 jobs. The trust's alliance of 400 statewide contractors installs everything from HVAC systems to solar panels.

In September, Portland General Electric will spin off a separate consulting company, Green Building Services, which has been working recently with officials in Shanghai.

"They have a lot of respect that we're from Portland and they know what work's been done here," Green Building Services' Jay Colson says of clients around the world. Lately, the competition in the United States

is stiffening, Colson says. Already, Chicago has built a green technology center and city officials are pushing aggressive new building standards.

Portland Now Leads a Pack

While Congress and the White House haggle over how to tackle global warming, cities and states are following Portland's lead and pressing ahead with their own plans to cut carbon emissions. Following international ratification of the Kyoto treaty, which asks signatories to cut emissions below 1990 levels by 2012, more than 170 cities nationwide have joined Seattle Mayor Greg Nickels in pledging to make similar cuts. The group includes 800-pound gorillas such as Chicago and New York and, collectively, it represents 36 million people. Governors on the West Coast and in the Northeast are also setting greenhouse gas reduction goals.

The city now has nine high-performance, energy-efficient buildings certified by the US Green Building Council and another 47 awaiting certification.

Local plans don't take care of huge greenhouse gas emitters such as national defense operations and energy intensive industry outside local jurisdiction. But they hold legitimate clout. "Local government is important because cities are where a lot of the energy is consumed and governments can determine how intensely that energy is used," says Abby Young, director of strategic planning at ICLEI, an international nonprofit working to combat global warming.

Besides, local governments, perhaps more than Washington, have an acute interest in stopping global warming. After all, they stand to bear the burden of warming's potential effects: changes in water cycles, increasing weather intensity, rising sea levels. In the words of Portland's Michael Armstrong, "The projections about the water situation," he explains, "are making us all stand up and pay attention."

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Emerging Markets:
Exploring New Approaches to Water-quality and Species Habitat

Markets to Help Willamette River Keep Its Cool

By Cameron Walker

The U.S. Environmental Protection Agency recently selected the Willamette Partnership as a grant recipient in its Targeted Watershed Grants program. The Ecosystem Marketplace finds out about the 'cool' new market the money will be backing on Oregon's Willamette River.

PHOTO BY KATY LANGSTAFF

From its headwaters high in Oregon's Cascade Range, the Willamette River wends a 190-mile course to its mouth at the Columbia River. Along the way, the Willamette and its tributaries pass rich agricultural lands planted with vineyards and berry bushes, major cities where the concrete gleams with rainwater, and mills turning the state's timber into blank pages. All of these contribute to the change of the Willamette's character from the braided river system of centuries past, flush with salmon, to an often-channeled one, running with the byproducts of agriculture, industry, and urban living.

The Clean Water Act and other regulatory moves, along with dedicated Oregonians, have improved Willamette water quality since it hit a low in the early 20th century. But to restore the river to full health—including functioning flood plains and natural stream channels—Oregon stakeholders are starting to look to the market. A project called the Willamette Partnership is working to create a trading market based on forthcoming temperature limits on the river and plans to trade a wider variety of conservation credits in the future.

Few ecosystem markets have relied on temperature as their hot commodity. And few have done it the way the Willamette Partnership intends—by setting up trades between two different types of pollution sources. "There are hardly any projects out there that do point/non-point trading on a significant scale," says Claire Schary, an EPA water-quality trading expert.

Point-source pollution is easy to identify. Effluent shoots out of a pipe from a wastewater treatment plant, a pulp mill, or another spot that creates a single, measurable output into the river. Non-point source pollution, on the other hand, makes its way to the watershed with the help of Oregon's plentiful precipitation. Street runoff carries pollutants from car oil and tires, among other things; runoff can carry sediment and agricultural pesticides from farmlands into the watershed. The result: it's hard to pinpoint exactly where it's coming from (see Nutrient Trading and Dead Zones—Can they wake each other up?

Willamette Ecosystem Marketplace

The Willamette Partnership's proposed market, dubbed the Willamette Ecosystem Marketplace, will give point source polluters the chance to mitigate their high-temperature discharge by buying conservation credits that can be used to address non-point source pollution. For example, a treatment plant could pay farmers to plant trees along streamside land, cooling the water temperature down with natural shade.

This fall, the Environmental Protection Agency selected the Willamette Partnership as a grant recipient in its Targeted Watershed Grants program. In 2005, the EPA awarded $9 million to 12 organizations that promote watershed health through innovative programs. The Willamette Partnership will receive $779,000 to get their market up and running.

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The cap for this temperature-based trading market will be the temperature total maximum daily load, or TMDL. The state Department of Environmental Quality plans to put the TMDL plans through a public comment period this spring; it could become final as early as the summer. "Once you have a load allocation, then you have a ceiling," says David Primozich, the Willamette Partnership's executive director. "The market will be more effective when the TMDL is set."

Willamette Water

Human influence on the lands surrounding the Willamette has a long history. Native Americans used frequent, low-intensity fires to maintain their food sources, edible plants and wild game. Once settlers reached the terminus of the Oregon Trail, the river became a transportation lifeline. Towns sprang up on its banks and pollutants began to fill the water. In 1937, salmon put in at the river's mouth emerged dead or gagging after a few minutes. The river became increasingly channeled, with 13 dams put in place between 1941 and 1969.

Rising concern for the river's health led to a widespread cleanup of point sources in the 1960s. In 1972, National Geographic ran a cover story about the Willamette's improving water quality. The headline: A River Restored.

Since then, researchers and water managers have learned that there's more to protecting a river than cleaning up what comes out of a pipe. Subsequent work has focused on overall ecosystem health along with tightening discharge standards.

Travis Williams, Executive Director of Willamette Riverkeeper, recently got a bird's-eye view of the river. From a plane, he looked down on the range of habitats in place on a river which once had floodplains extending as much as seven miles. "In some places it looks like a drainage ditch with a few cottonwoods," says Williams, who's also on the Willamette Partnership's board of directors.

Growing urban areas will place even more demands on the river, but most regulatory measures aren't set up to deal with the non-point source pollution that can be a result. "The Clean Water Act is heavily skewed to addressing point sources," says Dennis Ades, the Tualatin Basin coordinator at the state Department of Environmental Quality. But with Oregon's population set to boom in the next 50 years, especially in the Willamette Valley, non-point source pollution will grow, he says.

Taking a River's Temperature

"When we get sick, what do we do? We take our temperature," says Mary Lou Soscia, the EPA's project officer for the Willamette Partnership. Temperature is an indicator not only for human health but for rivers as well, says Soscia, who worked with temperature on the Columbia and Snake Rivers.

Temperature itself isn't usually what harms fish and other species. Increased temperature can cause physiological problems, accelerate fish metabolism, and decrease immunity, making fish more susceptible to disease.

A river's temperature is dynamic, rising and falling over the course of the day and throughout the seasons. Fish have evolved with these natural patterns. Changing river temperatures often give fish the push to embark on their seaward migration.

Temperature is an indicator not only for human health but for rivers as well.

If the thermostat is set too high, fish may wait too long to migrate and then not have the energy to navigate dams and other aquatic obstacles, Soscia says. Rising temperatures aren't just the result of warm water discharges. There's another culprit, rising and setting each day. But solar radiation—especially between April and October when the sun is higher in the sky—naturally warms up the water. Where riverside vegetation has been removed to build a new strip mall or plant grapes, the river loses protection from this natural warming.

Cost-effective Cooling

In Eugene, Oregon's second largest city, the city's wastewater treatment plant takes in warm water from showers, dishwashers, and washing machines for treatment for most residents of Eugene, neighboring Springfield, and the surrounding area. It's the largest municipal point-source discharger into the upper Willamette, putting out processed wastewater into the river through an underground pipe, perforated like a sieve to diffuse the water as it is released.

"What's happening nationwide is that the changes to water quality standards are such that it's no longer possible to respond to them with straightforward technological measures," says Peter Ruffier, director of Eugene's wastewater divisions. The technological approach to cooling water would be to draw heat from water with chillers—machines that cost about $50 million to install and $4 million to operate each year. While the water would be cooler, it might come in at a loss for the environment. Huge amounts of energy—produced by burning natural gas or even coal—would be required to run the chillers.

The Wasterwater Division's discharge permit from the DEQ is set to be renewed in 2007, and Ruffier says the temperature limit is likely to be much more stringent. Instead of looking at the pipe buried beneath the Willamette, which discharges water between 65 and 70 degrees in the summer months, a trading market could let Ruffier and others stay under the temperature cap by paying for riparian restoration to reduce water temperatures.

Planting trees streamside has more than just temperature-reduction benefits: fish can use the shaded water as habitat, migrating and resident birds can perch in the branches, and a spreading root system can combat erosion. Ruffier is also interested in looking at the hyporheic zone, areas in the river where groundwater and river water meet and create natural cooling. In the past, the Willamette had more gravel bars and other shal-

Complete river recovery will require more than the market alone. Not all of the ecosystem's inter-connected web of salmon runs, hardwood forests, and floodplains can become commodities. But the proposed marketplace doesn't need extensive new regulatory structures and could function well when combined with other conservation efforts.

low areas that may have helped prevent temperature from climbing too high. Rehabilitating gravel bars could not only increase cooling, but also provide habitat for fish to spawn and rear, Ruffier says. Floodplain restoration could also have a significant impact on the river's temperature.

Trades on the Willamette may link up point sources with riparian areas on different streams. Small streams often respond more quickly to riparian repair than large ones. "If you look at Portland harbor, even the largest Doug fir won't cast a long shadow" to shade and cool the lower reaches of the Willamette, Ades says.

The market could help not only protect and repair habitat, but aid municipal plants in planning for the future. With new facilities needed if the population rises, municipal plants could start trading now so that as demands increase, they can respond without going above the cap.

The Willamette Partnership's proposal aims to funnel money where the river needs it most by using the market's efficient resource distribution. "The whole purpose [of the market] is to have the money in places where it will do a lot of good" by generating a wide range of ecological benefits, says Sara Vickerman, Director of Defenders of Wildlife's northwest office, "and not just cool the water."

Complete river recovery will require more than the market alone. Not all of the ecosystem's inter-connected web of salmon runs, hardwood forests, and floodplains can become commodities. But the proposed marketplace doesn't need extensive new regulatory structures and could function well when combined with other conservation efforts, says Bobby Cochran, a program associate with Defenders of Wildlife.

Next Steps

The Willamette Partnership has set the goal of opening temperature trading within 30 months. In the meantime, the EPA grant will enable Primozich and others to start setting up the framework of regulatory, legal, and technical structures on which to build a market.

It may take a while for results to come in. But a program on the neighboring Tualatin River seems to be catching on. In January 2005, Clean Water Services, which provides wastewater treatment for 500,000 residents of urban Washington County, launched a trading program based on the temperature TMDL they first received in 2001. Instead of putting in $150 million of cooling technology, they'll be responsible for providing shade along both sides of 35 miles of the basin's streams in the next five years to offset their thermal discharge. Since the program started, 14 Washington County farmers have committed to planting nearly 9 miles of rural waterways, which would help restore 120 acres of stream corridors.

Back on the Willamette, shade trees will take several years to grow and make measurable impacts on water temperature. But over time, the benefits that come from habitat restoration will likely put the environment in the black. And here, the market's success is secondary to the Willamette's own. "I don't want trading for trading's sake," Schary says, "I want it to be set up to realize the environmental goals we want to achieve."

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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. Will focusing on an endangered species help the Pacific Northwest live up to its reputation as Salmon Nation? The Ecosystem Marketplace investigates.

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 US 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.

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.

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.

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.

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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

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 (see Wildlands Inc.: Profile of a Company and an Industry). "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."

> 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.

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 their 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.

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

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 complete 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."

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.”

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 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.

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IV Uncharted Waters: Taking PES Out to Sea

Sustainable Fisheries: Can Market-Mechanisms Help Get Us There?

by Cameron Walker

As fisheries worldwide continue to collapse, governments are increasingly turning to market-based mechanisms to ensure their conservation. One such approach is the use of so-called Individual transferable quotas (ITQs). Since New Zealand has experimented with quota systems more than any other country, the Ecosystem Marketplace considers what the Kiwis have learned about the pluses and minuses of this market-based approach to fishery management.

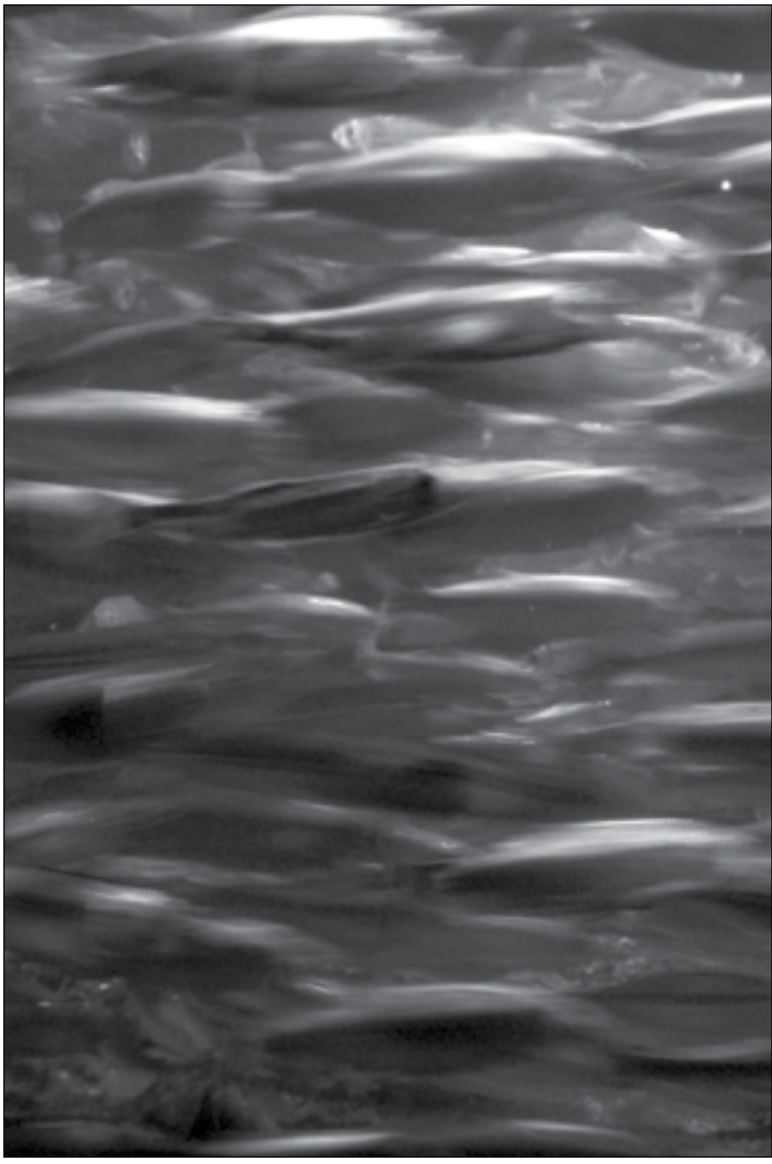

PHOTO BY OLAF BELZER

In the classic children's book "One fish, two fish, red fish, blue fish," sorting out the species in Dr. Seuss' whimsical ocean is child's play. Some fish, Seuss says, are black, some are blue; others old and still others are new. In the real world, interdependent fishing stocks, a fluctuating ocean environment, and the trouble with fish not respecting any watery boundaries makes divvying up—and even identifying—the ocean's resources much more complex.

When it comes to turning fisheries into a sustainable market, the problem magnifies. Fish are far too slippery to parcel out like land, fisheries cover enormous areas of water, and the combination is extremely hard to monitor. "From an academic's perspective, fisheries are the worst example of common pool resources out there," says Tracy Yandle, an environmental policy professor at Emory University.

In the last three decades, several countries have turned to transferable quotas to manage their commercial fisheries. This system sets a maximum total allowable commercial catch, then gives fractions of the right

to catch fish to members of the fishing industry. The quotas can then, depending on the individual quota management system, be bought, sold, traded, and leased on the open market. The quotas themselves—commonly known as individual transferable quotas (ITQs), or individual fishing quotas (IFQs)—are a form of property right, giving each fisherman the right to catch a designated portion of the total catch in perpetuity. In structure, then, fisheries quota markets resemble sulfur dioxide and other cap-and-trade systems—with the ocean's greater uncertainty thrown into the mix.

The response to quota management systems, which have emerged in force in the last three decades, has been similar to the situation of a fisherman casting out a net—when the net comes back in, not all of the fish may be ones he intended to catch. While many quota systems have resulted in observable economic gains, some concerns have been raised about the system's ability to maintain sustainable fisheries and fishing livelihoods.

Of all the world's coastal nations, New Zealand has implemented the most extensive quota management system with nearly 100 species, often with multiple fisheries for each one, under the quota system's umbrella.

Leading the Pack

Lord of the Rings fans might see New Zealand as a land of gorgeous, snowcapped peaks and expanses of amber-grained valleys, but, in fact, the country gets much of its identity from the ocean. "You can't go any more than 93 miles from the sea," says Daryl Sykes, executive officer and research program manager of the New Zealand Rock Lobster Industry Council.

The oceans used to be the last lands of lawlessness, where pirates sailed the high seas—and fisherman threw out their nets for whatever would come. Over the years, countries from the New World seekers, Spain and Portugal, to the Truman-era United States have tried to create control over their surrounding waters.

New Zealand's journey toward a quota market began in 1977, when the country declared a 200-mile exclusive economic zone for its fisheries, allowing the country to develop its own deepwater fishing fleet in waters previously fished by the Soviet Union, Japan, and Korea. In 1983, total allowable commercial catches were introduced to the new deepwater fisheries. Three years later, the country set more extensive quotas, covering 17 inshore and 9 offshore species. The initial move to a market-based system was driven by two aims—increasing economic sustainability and preventing overfishing.

The Economic Upside

On some levels, the quota management system has risen to the challenge. New Zealand's seafood industry now contributes more than $NZ1.2 billion each year—up from $NZ200 million three decades ago—and is the island nation's fourth-largest export industry.

A thirty-three species study of the quota management system found that quota prices increased along with rising fish prices over a 15-year period. Fisheries stocks that experienced an early reduction in total allowable catch had quota sales rise by 9% annually, while prices for quota leasing—allowing another fisherman to use quota temporarily while the owner retains the long-term rights—rose at an average annual rate of 4%.

Economist Suzi Kerr, a co-author of the study, says that streamlining the fishing fleet, as well as making fishing itself more efficient, may drive increased profitability. “By creating property rights, you can get rid of excess fleet capacity,” she says. If fishermen see that their fishing costs are rising above their profits, they can use quota sales to exit the fleet with security.

“By creating property rights, you can get rid of excess fleet capacity.” If fishermen see that their fishing costs are rising above their profits, they can use quota sales to exit the fleet with security.

When New Zealand turned to a quota management system, the initial quotas were distributed, free of charge, to fishermen based on the historical distribution of the catch. “Part of the bargain is, you get them for free in exchange for reducing the catch,” says Richard Newell, a senior fellow at the Washington, D.C.-based institute Resources for the Future and co-author of the study. Many of the gratis quotas have seen significant increase in value—in the rock lobster fisheries, quota prices have increased from an average of $26,000 per metric ton in 1990-1991 to an estimated $220,000 per metric ton a decade later.

Kerr, director of the Wellington, New Zealand-based economic and public policy research institute Motu, says that from an economic point of view, the system is definitely working. On the conservation side, she says, “If we didn’t have a quota system, we’d be much worse off. We haven’t got the problems of other places in the world. We actually have some stocks doing better, when that’s not the situation elsewhere.”

Along the way, several changes have altered the quota management system. Initially, the total allowable catch was distributed in fixed annual tonnages. In order to reduce the total catch from the fishery, the government had to buy back quota on the open market—a prospect, the government realized, that would run in the tens of millions of dollars.

Starting with the 1990 fishing season, quota shares were designated as a percentage of the total allowable catch—still rendered in metric tons, but fluctuating annually as the total allowable catch changed. This shifted the operating costs for the quota system from the government to the fishing industry. In addition, the original leasing system was changed into a system called annual catch entitlements—a process which involved legal and administrative changes that could make the market more efficient.

One Fish

Along with overall economic success for the fisheries industry, the quota system has had its share of failures. The tale of one particular fish, the orange roughy, illustrates the declines that can result if the crucial total allowable catch (TAC) is set incorrectly.

Little was known about orange roughy’s life history when the Ministry of Fisheries ushered the new deepwater fishery into the quota system in the 1980s. It’s now thought that orange roughy are extremely long-lived—with lifespans that can top 100 years—and mature, on average, at the age of 30. As a result, fish need to stay in the water for decades in order to reach reproductive age and maintain population levels.

But because the fish's longevity was initially a mystery, the total allowable catch was set at 58,920 metric tons in 1986. By 2000, the catch shrunk to 15,641 metric tons. Two roughy fisheries have collapsed, and most are now at 10% of their original populations, says Barry Weeber, senior conservation researcher at the Royal Forest and Bird Protection Society of New Zealand.

The problem, Kerr and others say, isn't the system itself, it's how the total allowable catch is set. "There's no reason that it shouldn't have worked for orange roughy," Kerr says. But uncertainty about the stock levels, along with time between when the problem was recognized and when the TAC was reduced, slowed the process.

In the case of the orange roughy, economic concerns may also have motivated the industry to be resistant to change when severe cuts were first proposed. "Some people have said the stocks collapsed because the industry has no interest in them not collapsing," Kerr says. Some would argue that the industry would be better served, economically, by fishing as much as they can and then moving on to another fishery.

> "If we didn't have a quota system, we'd be much worse off. We haven't got the problems of other places in the world. We actually have some stocks doing better, when that's not the situation elsewhere."

The key for fisheries under the ITQ system is setting the total allowable catch correctly, a process that can be extremely difficult because of scientific uncertainty and debate about the goals of a specific ITQ program. Simply keeping track of the number of fish in the water can be nearly impossible. "One fisherman told me that stock assessment is like counting sheep from a helicopter on a cloudy day," Yandle says.

Currently, the total allowable catch is set to maximum sustainable yield—a level that supports the largest possible annual catch. Kerr and colleagues are looking at a proposal to set the TAC for an economic maximum yield, which in many cases would suggest that the TAC be set lower than it would under the current system.

Too (many) Fish?

Setting the total allowable catch correctly isn't the only concern when managing a quota system. Whenever you set a trap, drop a line, or drag a net, there's always the possibility that you'll reel back in something other than you intended to catch. This unintended catch, called bycatch, is an enormous fisheries problem—a 2003 Pew Oceans Committee report estimated that 25% of caught fish are thrown back overboard.

New Zealand's quota system, with its large umbrella covering many species, has a way to address bycatch. If fishermen notice they have a certain amount of bycatch, they can buy quota for these species as well.

But not all agree that quotas are the best way of addressing bycatch, or catch in general. Economist Parzival Copes, at British Columbia's Simon Fraser University, has been concerned with several fishing practices that can result from a quota system since the systems were implemented.

One of Copes' concerns: the practice of high grading, or dumping less valuable fish to get the most value for the quota. "As a fisherman told me," Copes says, "you throw away the 60-cent fish and keep the dollar fish."

And in many fisheries, that spells disaster. When looking at quota fisheries in Iceland, Copes found that the mortality of discarded fish is extremely high, in many fisheries nearly 100%. Unrecorded fish mortality can affect the stock that year and create a cycle of setting total allowable catches on incorrect data.

A possible solution to the problem of high grading would be to recast the quota shares in terms of value, instead of quantity. Putting a monetary amount—the right to bring in $1000 worth of a certain species, for example—instead of a number, could make any caught fish worthwhile. In practice, however, value-based quota could prove difficult to monitor, Copes says.

Cheating in fisheries isn't specifically a problem of the tradable quota system. In other fisheries management strategies, where input—type and amount of gear, for example—is monitored, fishers could fudge about the kind of traps they're setting. "Any time you're regulating, there's going to be some kind of cheating," Yandle says. In theory, a quota-based market system would make fishermen more interested in the value of their catch, and more likely to try to preserve its value and discourage cheating. In practice, however, cheating often needs to be fairly severe before this happens.

One method of addressing problems in New Zealand is the installation of GPS devices on larger commercial boats. That way, fisheries managers can make sure boats are fishing in the location and at the time they report.

The Case of the Vanishing Fisherman

While New Zealand's rock lobster fisheries have been succeeding in economic terms, the attitude behind fishing may be changing as fishermen leave the market. "Until 1999 or 2000, I knew nearly every fisherman by first or second name," says Sykes, who fished rock lobsters for 20 years before moving to the industry council. "Now, they see that quota shares have a value. They're thinking this is as good at it gets," he says.

The rock lobster fishing population has started to shift from owner-operators, who are out on the water and have first hand experience with the health of the catch, to a more transient fishing population, which may lease quotas while the quota holders stay ashore. "You've created the whole notion of absentee landlords," Sykes says, a situation which can result in unanticipated changes in fishing behavior.

There have been a few incidents where rock lobsters have been caught and kept in the water. Fisherman then hauled in the lobster when the price soars. Meanwhile, if the catch is destroyed by storms or accident, the lobsters don't count against a person's quota, as they were never officially taken.

To understand how many fishers are leaving the industry, economist James Stewart and colleague Peter Callagher, both at UNITEC Institute of Technology in Auckland, have examined how quota ownership and quota leasing changed between 1986 and 2000. During this time period, they found, quota ownership became more concentrated for each of the 15 species they studied.

Increasing concentration could have several effects on both social structure and environmental sustainability. New Zealand's more diversified economy offers more options for people leaving the fishing industry, but in Iceland, where fisheries contribute 70% of exports and employ 12% of the working population, severe layoffs in fisheries since quota markets have been implemented have prompted great concern.

When small fishers exit the market, the fishing fleet also tends toward larger boats which fish more intensively, having a potentially greater effect on stock levels and on sensitive areas such as coral reefs.

However, Stewart says, if fewer fishermen own quota, each has more incentive to preserve the fishery for the future, and more power to convince other quota holders when fishing needs to be controlled. In New Zealand's narrowly-held hoki fishery, for example, the industry has been receptive to decreases in total allowable catch, Stewart says. "The ITQ changed the structure of the industry," Stewart says, "and it has an ongoing affect on the industry's structure."

Market Futures

From the variations within fisheries not only in New Zealand, but elsewhere, it seems that market-based system needs to be tailored to the specific fishery, not used as a blanket solution to any aquatic problem. "IFQs don't solve all the problems of the ocean," says Newell, the Resources for the Future economist.

Variations on the tradable quota strategy are in the works. The Washington, D.C.-based conservation group Environmental Defense is working with a cooperative quota system structure, where a group of fishermen receive quota shares in a New England longline cod fishery. In California, fishermen may someday apply to a state-managed revolving loan fund to implement a management structure of their choice, with the ultimate goal of downsizing fisheries. And in the quota market hotspot of New Zealand, rock lobster fisheries and others have started to transform into co-management systems, in which commercial stakeholder groups increase their participation in fisheries management. *(For more on the quota system in the US, see box on next page.)*

In the end, the problem of regulating fisheries will likely come down to several answers, not just one. With creativity in combining a host of management tools to insure fisheries' profitability and long-term sustainability, perhaps the world's oceans could one day recover enough to merit the Seussical conclusion: "Say! what a lot of fish there are!"

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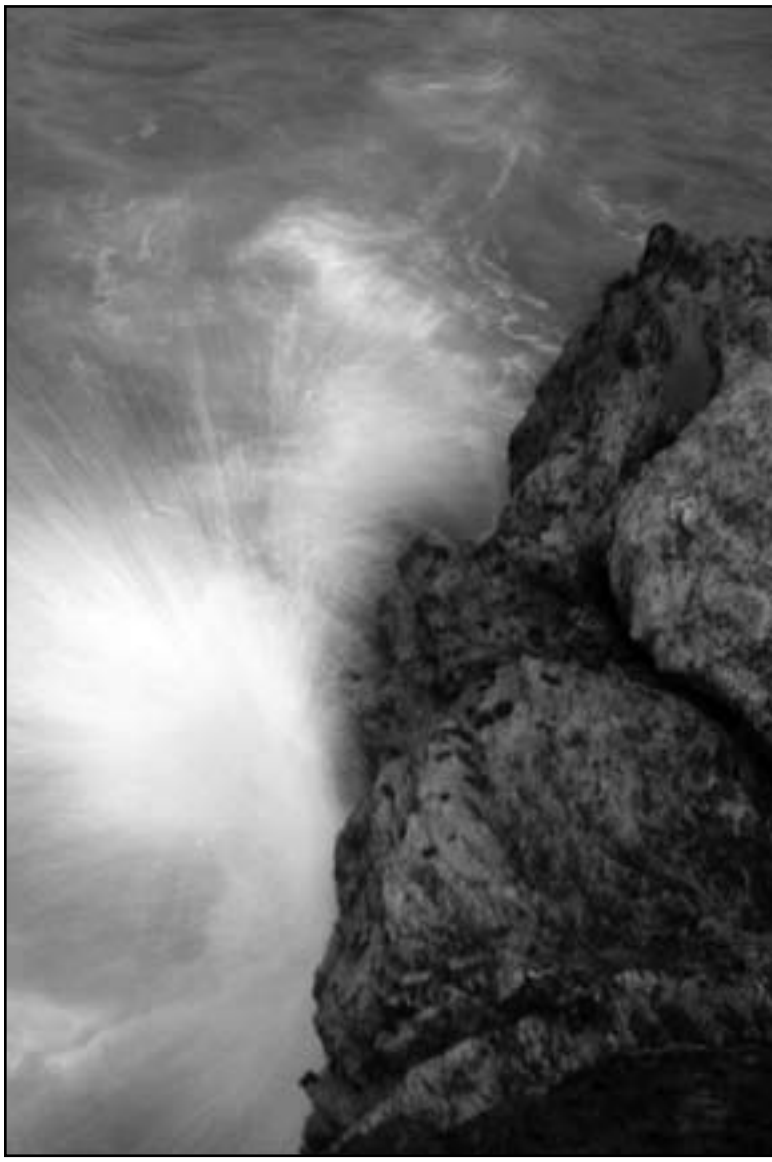
Conservation Banking Tests New Waters

by Cameron Walker

While most conservation banks focus on terrestrial species, fish banking is suddenly a hot topic. The Ecosystem Marketplace finds out who is talking and reports on what they are saying.



Nestled in California's Central Valley between Sacramento and Stockton, California's Delta gathers up five rivers, forming a network of approximately 1,000 miles of waterways flowing into the Pacific Ocean. The Delta's rivers, streams and marshes host diverse fish species, from the three-inch-long delta smelt to the green sturgeon, which can span more than seven feet.

Spanish explorers who spotted the Delta in 1772 described it as "a labyrinth of lakes." These days, deep-water shipping channels run to the inland ports of Sacramento and Stockton, and recreational users drop fishing lines off docks or navigate the waters in everything from powerboats to inner tubes. Pollution enters the river from urban and agricultural areas; water pumps from the Delta to Central Valley crops and Southern California's suburbs. An extensive levee system protects valuable farmlands, neighborhoods, and even downtown Sacramento, from flooding.

While much of this transformation has helped California's economy become the seventh largest in the world, the changes have not helped the Delta's resident fish. Twelve of 29 original indigenous fish species in the Delta have vanished or are threatened with extinction.

The tiny delta smelt, with its steely blue sheen and surprising cucumber smell, was once one of the Delta's most abundant pelagic fishes. But populations have plummeted; in 2005, the delta smelt's abundance was less than three percent of what it was in 1993.

To help bring back the delta smelt (and turn a profit), Wildlands, Inc. developed the country's first fish conservation bank in 1997. Conservation banks, which first emerged in California in 1995, are organizations that

restore habitat for threatened and endangered species in exchange for government-approved credits to sell to projects impacting habitat elsewhere.

While most conservation banks focus on terrestrial species, fish banking is now garnering attention at the federal level: agencies such as NOAA's National Marine Fisheries Service and the U.S. Army Corps of Engineers are currently considering fish-specific banks for protecting threatened and endangered species.

In particular, NOAA Fisheries has been exploring conservation banking to protect several of the Delta's species—including the threatened Central Valley steelhead and Central Valley spring-run Chinook salmon, and the endangered Sacramento River winter-run Chinook salmon. Using a species-specific bank could create, preserve, and restore habitat for these species, says Howard Brown, a Sacramento-based NOAA Fisheries biologist.

Wildlands' delta smelt project may be the first in a string of efforts to push the boundaries of conservation banking into watery terrain.

Opportunity Knocks

Salt is an important factor in smelt survival. Many fish can pump water in and out of their bodies to balance their salinity levels. Smelt don't have this natural balancing system, so they have to swim in water with the right salinity.

On the shores of Kimball Island, which sits in the heart of the Delta, brackish water rises from Suisun Bay; an inland tidal marsh ebbs and flows with saltwater. While studying the island in the early 1990s, Wildlands' workers realized this salt influx could provide prime habitat for delta smelt. Not long after, the bank began selling credits for delta smelt, planting thousands of cottonwoods, willows, and brush to restore shoreline habitat. The bank quickly ran through two miles of shoreline credits, and then opened up 100 acres of tidal marsh for delta smelt credits as well.

Tidal and freshwater marshes can also host juvenile salmon, which linger there for two weeks to two months before heading out to sea. Accordingly, Wildlands is working with NOAA Fisheries to create banks for ocean-bound fish. NOAA Fisheries' interest in conservation banking originally emerged through the agency's work with the U.S. Army Corps' Sacramento River Bank Protection Project, a long-term program to protect the Sacramento River's levees.

Natural river functions—including processes that create and maintain habitat for migratory fish—can be hit hard by bank protection and levee construction, Brown says. In working with Wildlands, Brown and others realized that fish conservation banking could help mitigate other projects impacting Delta habitat as well.

> "In any place that you have growth nearby, you have opportunities for fish banking," says Craig Denisoff.

Tom Cannon, an ecologist who manages Wildlands' aquatic programs, says they're investigating 30 potential banking sites within the Delta. "Anybody that's going to impact an endangered fish species could compensate for their takes by buying into the conservation bank," he says. Likely candidates could be anyone from the state highway agency, CalTrans, to a Delta fisherman constructing a dock for a new boat.

Fish conservation isn't limited to the Delta. "In any place that you have growth nearby, you have opportunities for fish banking," says Craig Denisoff, president of the National Mitigation Banking Association.

For fish conservation banks to capitalize on these opportunities, regulatory agencies must first require mitigation for impacts on threatened and endangered species. The U.S. Fish and Wildlife Service, along with state agencies, regulates inland species like the threatened delta smelt. NOAA Fisheries is the federal agency governing salmon species, steelhead, and the newly-listed green sturgeon, all species that migrate from fresh-water breeding grounds to the ocean.

"There's a definite market need out there."

An Umbrella Bank

One of the likely candidates for the first salmon and steelhead bank may be Fremont Landing, an old floodplain terrace at the confluence of the Feather River, Butte Creek, and the Sacramento River. Once a forested floodplain, the area spent nearly a century as farmland. Now when it floods, fish swim over what looks like a dirt field, Brown says.

A conservation bank could change that. Replanting riparian areas could provide shoreline habitat for fish from all three flows. And strategically placing downed trees and other woody material toward the center of the flow could also boost protected spots, as fish can move up and down in the water column, ducking behind logs and other debris to hide from predators.

Habitat repair in this biologically-significant spot could help fish from multiple rivers, Brown says.

NOAA Fisheries wants to create an umbrella bank for its species-banking program; individual sites, like the one proposed at Fremont Landing, would function under the larger banking system, with each site tailoring restoration to the intended species.

Brown anticipates that fish conservation banks would mitigate smaller projects, such as docks or boat ramps. In many cases, NOAA Fisheries instructs people to avoid in-river construction during the summer, when fish are most likely to be affected, and to replace vegetation. Conservation banks would increase mitigation options. "In a lot of places, where we wouldn't recommend much else, we could have something for them to do," Brown says.

The Corps, too, has its eye on fish conservation banking. The Delta's complex flooding system requires constant maintenance. Ideally, according to the Corps' Mike Dietl, there would be multiple banks up and down the river. This combination of private and public agencies, partnerships, and mitigation options would possibly reduce regulatory hurdles for projects that require mitigation.

"There's a definite market need out there," he says. How much demand, and how soon, will be determined by how much repair the levees need, and how much the Corps receives in federal funding for those repairs. If the money comes through, the Corps intends to develop on- or off-site mitigation responses, which could take the form of a mitigation bank.

With a bank up and running, the Corps could start purchasing credits as early as this year. "If we knew where we were going to do the mitigation up front, it would be a lot easier to attain regulatory approval," Dietl says.

No Field of Dreams

Despite enthusiasm for fish banking, some basic ecological hurdles remain before the strategy can, or should, be deployed on a widespread scale.

More specifically, the problem with fish conservation banks is that no one has direct evidence for the Field of Dreams-style promise: if they build it, fish will come. Fish suffer from a range of impacts—from dams blocking migratory paths to stream-clogging erosion—and it's not clear that improving habitat can tip the balance in favor of fish.

When fish populations are already low, even less is known about their needs. "There has never been a delta smelt egg found live in the wild," Cannon says. "There's not a lot known about these species because they're so rare." The smelt have never been spotted in the inland tidal marsh areas that Wildlands sells for delta smelt impacts, even though the habitat is thought to be suited for the species.

Salmon, both in California and up north, present similar challenges. "Salmon are just so difficult," says Ecotrust's Bettina von Hagen, who has conducted studies on the feasibility of salmon banking in the Columbia River system. There's very little scientific evidence that shows the relationship between habitat quality and salmon abundance, she says.

Clearly, the information gap concerning habitat quality and the population dynamics of different fish needs to be filled before fish banking becomes a 'go-to' strategy for every situation. Toward this end, however, von Hagen observes that conservation banks create incentives to jumpstart more extensive monitoring.

Poised for Growth

In fact, conservation bankers are considering focusing on fish in the Pacific Northwest. In Puget Sound, says Sky Miller, Wildlands' Pacific Northwest regional manager, "we've got properties that we're developing under the wetlands model that would be perfect for threatened Chinook salmon."

Based on Wildlands' work in wetland mitigation, it could take several years before a salmon bank was up and running, Miller says. But setting up a conservation bank could be quicker than putting wetland mitigation banks in place, he says, with fewer agencies supervising the review team for individual species compared to those on a wetland bank review.

NOAA Fisheries has been looking at the draft plan for salmon and steelhead banking since October, and the U.S. Fish and Wildlife Service is reviewing Wildlands' plans for more delta smelt banks. It's possible that a delta smelt bank could be approved in the next year, Cannon says.

Until then, Kimball Island keeps plugging along. Wildlands has sold 80 percent of the bank's credits for delta smelt. "As soon as it sells out," Cannon says, "we'll hopefully have another bank ready."

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Voices from the Field:
People and Opinion

Transforming Markets and Supply Chains: A Profile of Nicole Rycroft

by Cameron Walker

According a 1997 Nature study, world temperate and boreal forest ecosystems contribute approximately $894 billion (US) each year in ecosystem goods and services, especially in the areas of regulating climate, producing food, and treating waste. By this reckoning, Canada's 310 million hectares of boreal forest chip in $93.6 billion (US) to the environment's account. The Ecosystem Marketplace profiles one woman's efforts to make sure the world recognizes the value of old growth forests in the Pacific Northwest.

Nicole Rycroft has been channeling some of this forest magic with Markets Initiative, a Canadian campaign to reduce the use of old growth and endangered forest products. The Australian-born founder of Markets Initiative thinks of herself as a bit of a late bloomer with a circuitous path to forest protection. Yet her winding path—including a childhood exploring the Australian bush, a career as an elite rower, and a volunteer stint in Southeast Asia—has given her the resources to create a market-based environmental campaign that's transformed everything from company office supplies to the publishing of Harry Potter.

Rycroft, now 38, says, "I feel like I've been a little slow on the draw to a lot of things in life." Once she decided to transform her years of exploration into market-based environmental activism, however, she's been a fast-moving force for change. Since Markets Initiative's jumpstart in 1999, Canadian publishers have had just six years to transform their paper-intensive

industry to a more sustainable model. “It’s been a steep learning curve,” she says, “but a challenging and fascinating one at that.”

Her success speaks for itself: close to 80 Canadian publishers have committed to eliminating the use of papers with endangered or ancient forest fibers. These publishers represent about 75% of the paper volume for Canadian literary presses. “In a few short years, the Canadian industry has really changed the way it publishes books,” says Michelle Benjamin, publisher of Vancouver-based Raincoast Books—one of four initial supporters of Markets Initiative.

Global Experience in Market Problems

Rycroft’s meandering route to markets-based activism began in Sydney, where the bush surrounding her aunt’s home called her to explore. “The eucalypt forest that I grew up with will always hold a special place in my heart,” she says.

She studied physiotherapy at university and then began to row in her early twenties, quickly becoming an elite competitor. At the same time, she began to volunteer with an Australian-based environmental organization, the Wilderness Society.

Then at 27, she pulled up her oars to move to Southeast Asia, working at an environmental education organization in Katmandu and monitoring companies that received Australian government grants in Burma.

Her success speaks for itself: close to 80 Canadian publishers have committed to eliminating the use of papers with endangered or ancient forest fibers. These publishers represent about 75% of the paper volume for Canadian literary presses.

Here she spoke with teenagers who’d been conscripted into the Burmese army. They told her chilling tales of destroyed villages, human mine-shields and shackled workers who cleared the way for gas pipelines; all vivid examples of the connection between human rights violations and environmental destruction. “It’s a supply and demand world,” Rycroft says, “and the impact that market demand has on the quality of life of people around the world became crystal clear.”

When Rycroft moved to Canada in 1996, she began to volunteer several days a week for environmental groups while working as a physiotherapist. Living part-time on Vancouver Island, she developed an intense connection with Clayoquot Sound, a 350,000 hectare expanse of ocean and land on the island’s west coast. Here one can find temperate rainforests, considered one of the most endangered forest ecosystems in the world; globally, more than 55% of these forests have been logged.

Clayoquot Sound carries special significance for environmentalists. In the summer of 1993, 12,000 demonstrators from around the world converged to protest the provincial government’s land use decision, which gave protection to a third of the area—an amount environmentalists thought inadequate to protect old growth.

Rycroft, too, worked to protect the temperate rainforest once she arrived in Canada. In 1998, standing on the blockade at a Clayoquot Sound protest, Rycroft kept thinking about the relationship between market demand and environmental destruction, the same connection that she'd seen many years before in her work on the other side of the Pacific. "We'd been out there for six weeks off and on, and so I had the opportunity to become quite attached to the area," she says.

> "In a few short years, the Canadian industry has really changed the way it publishes books."

Rycroft realized that she wanted her professional life to focus on addressing forest issues on a more systemic level—specifically, to transform the destructive markets that she'd seen into positive environmental forces. And Canada was the perfect place to start. "Living in North America, I was living in the belly of the beast when it came to human consumption," Rycroft says. "So what an incredible opportunity to actually try and make some change."

Just months later, Markets Initiative emerged as a coalition of three environmental groups: Friends of Clayoquot Sound, the Sierra Club, and Greenpeace. Rycroft first targeted companies that had environmentally and socially progressive track records, including Mountain Equipment Co-op, Body Shop Canada, and Citizens Bank–companies that, by virtue of their size, consumed vast quantities of paper.

Since those first meetings, Mountain Equipment Co-op has worked with their suppliers to source ancient-forest-friendly papers; starting with the Fall/Winter 2003 edition, their catalogue has been printed on old-growth-free, chlorine-free paper made from 35% post-consumer waste. And, as of September, Citizens Bank has switched from 30% to 100% post-consumer waste for all its office paper.

Rycroft drew on the momentum built by these receptive companies to approach the publishing world in 2000. At that time, publishing and printing papers had less than five percent recycled content—for most papers, the content was primarily virgin fiber. "The vast majority of that in a North American context means that they're coming from endangered forests," she says.

Initially, publishers raised concerns about the price, availability and quality of paper. And rightly so, Rycroft says. "When we first started working with the book publishing industry, there were no ancient forest friendly papers that were available."

But Markets Initiative and the first four publishers that signed on—Raincoast Books, New Society Publishers, McClelland & Stewart, and UBC Press—started requesting better paper from printers, working down the supply chain to widen their options to include environmentally-friendly choices.

"They recognized the role of influence that they had on the supply chain, and they were very willing to step forward as leaders, and ultimately, as advocates for environmental change," Rycroft says of the publishers.

Once paper was found, the publishers had to suck up the added cost. In 2000, Raincoast Books paid up to 15% premiums for ancient forest friendly paper, says Raincoast's Benjamin. Publishers worked to juggle costs—a constant in the publishing industry, especially in Canada, where books are down-priced to meet the demands of a competitive U.S. market—and as more publishers signed on, prices started to fall with rising

demand. These days, it's tough to find a major printer in Canada that doesn't offer eco-friendly paper options, Benjamin says.

Some publishers, Rycroft says, are now able to use papers at the same cost as conventional paper; others, like Raincoast, still pay up to six percent premiums for 100% post-consumer waste paper.

But this extra cost may be more than balanced by the ecosystem services these forests provide. When endangered forests are slashed, the forests themselves aren't the only things that vanish. A study this spring by the David Suzuki Foundation suggested that 46% of the logging in the Great Bear Rainforest takes place in the area's most productive salmon watersheds. Logging can slash salmon populations when fallen logs block access to runs and spawning grounds, and tree removal can cause erosion that occludes streams.

> "It's a supply and demand world and the impact that market demand has on the quality of life of people around the world became crystal clear."

Many Canadian publishers have recognized where the extra costs are going. "It's a small premium to pay for the value you get, even if it's not always in dollars," Benjamin says.

Publishers now bear the brunt of additional costs associated with ancient forest friendly publishing. But from surveys done by Markets Initiative and by U.S. counterpart Green Press Initiative, readers might be willing to ante up for more eco-friendly choices. Polls of 1800 readers conducted by these two groups indicate that 78 percent of readers would pay more for books made from sustainable sources.

Authors, too, have become strong supporters. Alice Munro, Canada's renowned short story writer, called her publisher, McClelland & Stewart, just days before her book was scheduled to go to press; her 2001 book, Hateship, Friendship, Courtship, Loveship, Marriage, hit book-stores on 100% post-consumer recycled paper. "You know, when someone like Alice Munro picks up the phone and says that something's really important to them, then it tends to happen," Rycroft says.

Harry Potter Goes Eco-Friendly: The World Follows?

The coup de grace—or at least, the goblet of fire—came when Raincoast Books printed Harry Potter and the Order of the Phoenix on 100% post-consumer recycled paper, saving an estimated 39,320 trees that would have been used to make virgin-fiber paper in its reported 900,000-plus first print run in 2003.

In J.K. Rowling's introduction to the Canadian edition of Harry Potter and the Order of the Phoenix, she writes, "Because the Canadian editions are printed on ancient-forest friendly paper, the Harry Potter books are helping to save magnificent forests in the muggle world, forests that are home of magical animals such as orangutans, wolves and bears. It's a good idea to respect ancient trees, especially if they have a temper like the whomping willow."

In July, Raincoast continued its effort with the latest installment, Harry Potter and the Half-Blood Prince. Some U.S. environmentalists encouraged American Potter fans to get their fix across the border.

Harry Potter's green appeal has spread to publishers in such far-flung places as Israel and Germany, where ancient-forest-free copies of the sixth Harry Potter now line the shelves.

> "Living in North America, I was living in the belly of the beast when it came to human consumption. So what an incredible opportunity to actually try and make some change."

While major strides in green publishing may make Rycroft's work seem as easy as flicking a wand, she's had her share of difficulties. Several logging companies' strong resistance to Markets Initiative's first push surprised Rycroft. In addition, she's not had the response she's expected from the Canadian government in protecting remaining tracts of ancient forests; her work with high-profile publishers and writers, she thinks, may help in the future. Throughout the process, her diverse background has served her well, including a drive similar to what got her up for those predawn rowing training sessions. "The tenacity—or some would say, obsessiveness, I guess—that is necessary to take a project to a certain level of success" can be a part of both worlds, she says.

Those characteristics help beyond the book world, as Markets Initiative has signed up 53 magazines and wants to start in on the newspaper industry as well. Rycroft has also been working with researchers who are developing agricultural waste as a source for book and magazine-quality paper. Next year, she wants to have a national magazine produce on a paper made completely from agricultural waste and recycled fiber.

With paper consumption expected to increase by 77% by 2020, Rycroft and Canadian publishers have taken on the challenge of transforming an ever-increasing market into an ever more sustainable one. "I think what Canadian publishers have stepped forward and taken on has really inspired publishers around the world, as well as other industries," Rycroft says. "[They've] provided a model of what's possible."

With Rycroft's own intensive push to spread eco-friendly paper throughout the industry, she's certainly shown what's possible, too: when market forces and environmental activists work together, the muggle world, it seems, can stir up some magic of its own.

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Oregon Innovates

by Bill Warncke

As the U.S. Federal Government releases new draft regulations for mitigation banking, the Oregon Department of Transportation has been working with a variety of state and federal agencies to come up with a more cost-effective and comprehensive approach to mitigation. Bill Warncke, mitigation and conservation program coordinator at the agency, explains this new approach to the Ecosystem Marketplace.

In some circles there has been a widely-held misconception that the construction of roads and other infrastructure need always conflict with the conservation of species and habitat. At the Oregon Department of Transportation (ODOT) we are working hard to dispel this notion through the development of an innovative approach to mitigation and conservation banking; one that addresses multiple resources at the same time (including wetlands, water quality, fish and wildlife habitat, and recovery of endangered species) and one that we think will improve the way the agency meets its natural resource mitigation obligations.

Why change? Why not maintain the status quo? We have decided to change the way we do conservation and mitigation banking at ODOT because we think our new approach is better for ODOT, better for the state, and better for conservation. Currently, ODOT relies primarily upon project-specific mitigation to off-set unavoidable natural resource impacts. Mitigating at the project-by-project level means that site identification, property acquisition, design, permitting, construction, maintenance, and monitoring efforts are required for each and every individual mitigation site. This can be time consuming, unpredictable, and expensive, not to mention ineffective for the environment.

As a result of this cumbersome process, ODOT has many small mitigation sites that are challenging and disproportionately expensive to develop and maintain, and often result in little long-term ecological value. ODOT has therefore determined that a more comprehensive mitigation and conservation banking program would be an effective solution to this problem, and would provide mutual benefit, not only to ODOT and the state's

taxpayers, but also for natural resources in the State of Oregon. The ODOT banking program will do this by streamlining permitting, reducing costs, improving environmental compliance efforts, and creating ecologically sustainable mitigation and conservation projects.

The new ODOT Banking Program is intended to "front-load" the process of developing and certifying individual mitigation banks. The certifying body for ODOT's banks is the Mitigation and Conservation Bank Review Team (MCBRT) and includes the following federal and state agencies: the U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), Federal Highways Administration (FHWA), U.S. Army Corps of Engineers (US ACE), National Marine Fisheries Service (NMFS), Oregon Department of State Lands (DSL), Oregon Department of Environmental Quality (DEQ), and the Oregon Department of Fish and Wildlife (ODFW). In Oregon, the MCBRT developed a statewide mitigation/conservation banking agreement that lays the foundation for ODOT's Banking Program, but does not specifically authorize individual bank sites. The agreement establishes the "sideboards" (or parameters) for developing individual bank sites and defines how ODOT will work collaboratively with state and federal agencies during bank creation.

Certification of individual banks is streamlined by having up front agreement on program elements including priority habitats targeted for restoration, mitigation site selection criteria, the process for certifying banks, and credit/accounting methods.

In this way, the same MCBRT members that contributed to program development help ODOT to select and design individual mitigation banks so that the bank approval process is not the beginning of a process, but rather the culmination of an intensive collaborative effort. Certification of individual banks is streamlined by having up front agreement on program elements including priority habitats targeted for restoration, mitigation site selection criteria, the process for certifying banks, and credit/accounting methods.

From Partnership to Action

In working with the MCBRT we use a watershed-based approach based on the following program elements: First, we have developed restoration goals we call "Ecoprovince Priorities" for each watershed in Oregon. These Ecoprovince Priorities are based on trends in habitat distribution and the ecological importance of focal habitats and species. The purpose of these goals is to further ODOT's ability to provide ecologically significant mitigation that truly contributes to the recovery of regionally important habitats and species.

Secondly, we have created a Habitat Assessment Method (HAM) that we believe provides an accurate and ecologically-sound means of measuring natural resource functions that will in turn allow for better accounting of both impacts and restoration efforts. We believe that this Habitat Assessment Method of debit and credit accounting is one of the most innovative program elements. It basically ensures that compensatory mitigation and conservation actions adequately address impacts to species, habitats as well as their values, and functions.

At its core, HAM is a functional assessment methodology that establishes the overall ecological value of the site in terms of "Habitat Value". Both impact and mitigation (bank) sites are evaluated with this method, thereby allowing a straightforward assessment and exchange of debits and credits. Essentially, the difference

between the baseline and the projected future Habitat Value becomes the debit at an impact site or a credit at a mitigation (bank) site.

HAM is a functional assessment methodology that establishes the overall ecological value of the site in terms of "Habitat Value". Both impact and mitigation (bank) sites are evaluated with this method, thereby allowing a straightforward assessment and exchange of debits and credits.

The foundation for HAM is the species and habitat associations documented in Wildlife-Habitat Relationships in Oregon and Washington (Johnson and O'Neil 2001). Habitat Value is determined by querying the Interactive Biodiversity Information System (IBIS) database and is based on the number and diversity of species that the habitat supports. One benefit of this methodology is that these associations have been developed for the entire Pacific Northwest, which makes it possible to transfer the banking framework being developed in Oregon to other parts of the region.

Habitat Value is the only credit sold at the bank. Because Habitat Value measures habitat quality and does not distinguish between different habitat types or regulated resources, sub-sets of habitat value or "back-stops" specific to regulated resources such as wetlands and salmonids are also tracked. Since overall habitat value is the currency for bank transactions, a given credit may be used to address multiple resources and regulations. The backstops, meanwhile, ensure that regulatory obligations for specific resources and regulations (e.g. salmon or wetlands) are met.

The Bottom Line

Using this new approach, ODOT has projected the need for approximately eight banks in the next five to ten years. It is important to note, however, that these banks are intended for ODOT use only and are not intended to compete with private mitigation banks. Meanwhile, three bank sites are being designed and permitted concurrent with program development, these include: The Mirror Lake site in the western Columbia River Gorge (Portland area), which will provide wetlands and salmonid mitigation; The Santiam River and the East Fork Minnow Creek sites in the Willamette Valley, which will both address the protection of the Oregon chub, an endangered endemic fish, and provide some wetlands and salmonid mitigation. In addition, the Lost River (Klamath Falls area) and Crooked River (Prineville area) advanced wetland mitigation sites east of the Cascades will also be converted to bank sites.

In summary, ODOT's Banking Program will meet the Agency's mitigation needs, address resource and regulatory agency statutes and regulations, and increase efficiency in the wetland/conservation mitigation permitting and approval process by:

- Improving project delivery by increasing certainty and removing mitigation and associated permitting issues from the critical path of project development;

- Reducing the costs of mitigation over that of individual on-site mitigation by taking advantage of economies of scale;
- Meeting or exceeding state and federal compensatory mitigation and conservation requirements;
- Focusing mitigation on ecosystem priority habitat and species, thereby providing greater ecological value;
- Implementing a Comprehensive Mitigation and Conservation Strategy (CMCS) that addresses multiple resources including wetlands, water quality, fish and wildlife habitat, and recovery of endangered species;
- Applying an innovative assessment methodology as an alternative to the standard acreage-ratio based approach to ensure that no net loss of wetland and species habitat (as well as their functions and values) occur; and
- Ensuring proper controls for monitoring, maintenance, long-term protection, and adaptive management are in place for regional bank sites.

Or, to put it another way, by using Ecoprovince Priorities for restoration and our new Habitat Assessment Method, by simultaneously mitigating for multiple resources and regulatory obligations at bank sites, and by working closely with a wide array of regulatory agencies, we believe that our mitigation will prove to be more cost effective and—just as important—more ecologically meaningful.

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Ricardo's articles on energy, SRI, climate, the environment, and finance have appeared in a variety of publications, including The Washington Post, The Atlantic Monthly, the International Herald Tribune, the San Francisco Chronicle, the Boston Globe, and The Milken Institute Review. He is also a regular contributor for the UK monthly "Environmental Finance."

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Before joining Forest Trends, Nathaniel worked as a consultant for a private forestry and real estate company in Panama, channeling private investment to restore degraded lands and generate profit from native species forestry. Nathaniel spent two years with Conservation International's Center for Applied Biodiversity Science, one with their Rapid Assessment Program and one with their Conservation Tools Program. He has over three years experience conducting ecological research, from the Rocky Mountains to the Andes, from the Northwest Hawaiian Islands to the Penobscot Bay.

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Environmental Benefits • Mohawk Paper

1,772 pounds of paper used • FSC-certified • 100% post-consumer • manufactured with windpower

Savings derived from using post-consumer recycled fiber in lieu of virgin fiber:

22.47 trees not cut down
64.68 lbs waterborne waste not created
9,542.15 gallons water/wastewater flow saved
1,012.38 lbs solid waste not generated
1,978.58 lbs atmoshperic emissions eliminated
12,930,887 BTUs energy not consumed

Savings derived from using windpower:

279.65 lbs air emissions (C02, SO2 and NOX) not generated

This amount of wind energy is equivalent to:

planting **18.93 trees**
not traveling **311.99 miles** in an average automobile

Environmental benefits determined by Mohawk Paper Environmental Savings Calculator

THE KATOOMBA GROUP'S

Ecosystem Marketplace

The Ecosystem Marketplace seeks to become the world's leading source of information on markets and payment schemes for ecosystem services (services such as water quality, carbon sequestration and biodiversity). 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 environmental services that, for too long, have been taken for granted. In providing useful market information, we hope not only to facilitate transactions (thereby lowering transaction costs), but also to catalyze new thinking, spur the development of new markets, and achieve effective and equitable nature conservation. The Ecosystem Marketplace is a project of Forest Trends. **www.ecosystemmarketplace.com**

FOREST TRENDS

Forest Trends is an international non-profit organization that works to expand the value of forests to society; to promote sustainable forest management and conservation by creating and capturing market values for ecosystem services; to support innovative projects and companies that are developing these new markets; and to enhance the livelihoods of local communities living in and around those forests. We analyze strategic market and policy issues, catalyze connections between forward-looking producers, communities and investors, and develop new financial tools to help markets work for conservation and people. **www.forest-trends.org**

the katoomba group

The Katoomba Group seeks to address key challenges for developing markets for ecosystem services, from enabling legislation to establishment of new market institutions, to strategies of pricing and marketing, and performance monitoring. It seeks to achieve the goal through strategic partnerships for analysis, information-sharing, investment, market services and policy advocacy. The Katoomba Group includes over 180 experts and practioners from around the world representing a unique range of experience in business finance, policy, research and advocacy. **www.katoombagroup.org**

ecotrust

Ecotrust is a conservation organization which works to strengthen communities and the environment from Alaska to California and is committed to the notion that every transaction should enrich people and place. Ecotrust works with native peoples and in the fisheries, forestry and farming sectors to build a regional economy that is based on social and ecological opportunities. Since its inception in 1991, Ecotrust has helped protect over a million acres of intact coastal rainforest, created the leading environmental bank, Shorebank Pacific, redeveloped a historic warehouse into an award winning multi-tenant center for the conservation economy, and launched a private equity forestland investment fund, Ecotrust Forests LLC. **www.ecotrust.org**