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How to Get Wall Street to Hug a Tree

Environmentalists and investment bankers are working together to put a price tag on nature. The new 'greens' think that human beings are ready to start paying for Mother Nature's services—and that calculating their financial worth will save the planet.

By David Wolman

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Gretchen Daily, an ecologist at Stanford University, wears butterfly-patterned socks. She's a careful recycler and bikes to work. She composts.

So what's she doing hanging out with guys from Goldman Sachs?

As a tried-and-true "green," she believes she doesn't have a choice.

"Time is running short," she says. "Appealing to moral sense isn't enough anymore. We have to make conservation fit mainstream business calculations."

In her fourth-floor office in the Herrin Labs just off Stanford's main quad, Daily, a professor of biological sciences and director of the tropical research program at Stanford's Center of Conservation Biology, shows me what she means. She clicks open a series of digital maps compiled for a meeting in New York with Goldman Sachs. The maps' rich purple-and-blue hues convey information about California's Central Coast eco-region, which stretches from Santa Barbara north to Napa County and includes San Francisco Bay. Daily explains how each image tells a story of the terrain's value—not property value as a real estate agent would figure it but value in terms of service to mankind. Where the terrain offers a high degree of flood protection, for example, the map is the brightest purple; where the flood-protecting function is comparatively low, the color is light blue. The ecosystems providing the most overall value to people are shaded to indicate highest priority.

If Daily and her colleagues can get Wall Street on board, the maps will also be shaded to indicate financial worth.

This is the future of the environmental movement. Increasingly, economic measures are being used to assess ecosystems by way of the universally comprehensible currency of money. The calculations can be quite explicit: A recent study by the World Wildlife Fund reckoned that the bees that pollinate a Costa Rican coffee farmer's crop, and by extension the nearby forest where the bees live, are worth as much as \$60,000 annually to the farmer. Last year, two entomologists, one from Cornell University and the other from the Xerces Society for Invertebrate Conservation, figured that a \$60-billion-a-year chunk of the U.S. economy is supported by wild bugs such as dung beetles and bees that pollinate plants,

hasten the decomposition of manure, feed on crop pests and end up as dinner for birds, small mammals and fish.

Such huge numbers can be compelling, and they get people talking. Which is the point.

"We need a new conservation," Daily says. "We don't want to let go of the past. We just want to bring revenue streams into conservation." As it is, environmentalists "aren't really relevant in policy and business decision-making. If we don't do something to become relevant, we don't have a chance."

For most of history, nature, when not playing the part of a wild force to be reckoned with, has been a remarkably consistent servant of civilization. In agriculture, for example, much of humanity's success has depended on the functions of bees, bats and other pollinators. These organisms never submitted an invoice, though, and there was never reason to imagine that their work wouldn't continue in perpetuity.

So much for that. Since the '60s, scientists have been declaring with increasing acuity that environmental degradation isn't just heartbreaking and hazardous, it's also expensive. The financial stakes really came into focus when big-name number crunchers—including Cambridge University economics professor Sir Partha Dasgupta, former World Bank economist Herman Daly and Stanford economist and Nobel laureate Kenneth Arrow—began gauging the negative effect of binge consumption of natural capital on world economies.

Now, says Humboldt State economist Steven Hackett, we know that "the economy doesn't exist in a vacuum." When competitive markets don't put financial values on nature's services, "there is the potential for maladies." Deforestation is an example. A small number of people profit from the sale of timber or cattle raised on cleared forest lands, but all of us bear the costs of soil runoff, increased carbon emissions and so forth. Many scholars and activists suspect (or at least hope) that human beings have reached the point where we're willing to pay for nature's services, because we've finally come to accept that there's a relationship between caring for the environment and ensuring our well-being.

Evidence isn't hard to come by, and sales of hybrid cars and tickets for "An Inconvenient Truth" are only the beginning. One of my neighbors recently paid a few extra dollars to fly to St. Louis from Portland, Ore., so that his journey would be carbon neutral. A for-profit outfit called TerraPass, based in Menlo Park, did the math for him: To offset the carbon that one person's trip on a jetliner will introduce into the atmosphere during a 2,200-mile flight, that person must make a \$5.99 investment in a carbon-reducing enterprise, such as a wind farm. TerraPass makes the investment for you, and in the process makes a little money for itself too.

Even if a TerraPass holder believes that he's looking out for his own interests by reducing emissions, he's probably not acting out of rational self-interest the way people generally do in the wacky world of economics; he's basically making a donation. What Daily and her colleagues are after is a financial markets-approved system that applies a straight-up profit

incentive to being green. Instead of a voluntary payment of \$5.99 for carbon-neutral travel, imagine an economy in which a company would pay you \$5.99 to stay home so it could sell a pollution credit to someone who wants to fly to St. Louis more than you do.

If ecosystems that do a great deal for people are to be recognized as of great monetary value, "ecosystem services" will have to become a household phrase.

Despite the snooze-inducing moniker, ecosystem services have occasionally appeared on the public-consciousness radar. The most frequently referenced episode occurred a decade ago, when New York City officials determined that it would be cheaper to protect from pollution the upstate New York watershed, which naturally purifies the city's water, than it would be to spend billions of taxpayer dollars on a municipal water treatment plant. The next visibility boost for ecosystem services came in 1997, when a team of scientists led by Robert Costanza, then with the University of Maryland, published a study in *Nature* that estimated the value of all the ecosystems and natural capital on the planet. The very rough figure: \$33 trillion a year. The research led to a predictable rush of newspaper stories about Mother Nature's price tag and, despite being criticized for weak methodology, the study nudged the concept of ecosystem services valuation further into the mainstream.

Perhaps the biggest indicator of the trend—you might call it environomics—is that the world's largest conservation organizations have embraced it. The just-launched Natural Capital Project, a \$15-million-plus program that seeks, as its literature explains, to make conservation "economically attractive," is a collaboration of Stanford's Woods Institute for the Environment, the Nature Conservancy and the World Wildlife Fund. The project will measure the carbon, hydrology and biodiversity benefits of the Afromontane region of East Africa; China's upper Yangtze River basin; California's Sierra Nevada range; and the islands of Hawaii. The goal? Putting a price tag on all of them.

This sort of effort not only holds promise for conservation gains but also neutralizes the charge that nature-loving nongovernmental organization types care more about cute animals than they do about people. Not that environmental groups will stop trying to save vulnerable creatures and habitats anytime soon. Soliciting donations from the penguin-enamored citizenry, and pressing conservation agendas with intensive lobbying efforts and photo-saturated campaigns, has kept the groups in business. Donors like to see pictures of colorful frogs and think that their checks help save them.

They do. But for every one frog species protected, hundreds of other species are becoming extinct—and those species' disappearance might be more harmful to your economic future than the one you just wrote a check to save. If conservation is to matter, both for its own survival as a movement and to effectively reduce damage to the biosphere, the mission must be recast. "You do realize how badly we're losing, don't you?" asks Rebecca Shaw, director of conservation science and planning at the Nature Conservancy in San Francisco.

Once the spectrum of nature's needs and human activities are analyzed together, planners can make development decisions that minimize environmental costs while maximizing investment. Reaching out to the likes of Goldman Sachs and other powerhouse financial

institutions is part of the broader quest to show the world that capital markets could do wonders for environmental protection—and that there could be big money in nature for pioneering investors. The Natural Capital Project has only recently begun recruiting banks, but bringing them on board is crucial, Daily says. "Just having biologists trying to set this up would be disastrous."

In fits and starts, trading and payment schemes are taking shape. In 2000, a \$25-million company specializing in bio-reserves was listed on the Australian stock exchange—history's first publicly traded conservation company. Although Earth Sanctuaries Ltd. later struggled and was bought out by a nonprofit, it generated considerable buzz. Meanwhile, the government of Costa Rica has been experimenting with programs to compensate landowners for leaving some of their acreage undeveloped; in Quito, Ecuador, an alliance of local water companies, an electric company and a brewery pays to protect and manage the 5.4-million-acre Condor Bioreserve, which is the source of much of the city's water.

In Washington, some members of Congress are toying with replacing the government's often-lambasted farm subsidy program. "The idea is to revise the farm program to reward, incentivize or pay farmers for ecosystem conservation," says Dennis Aigner, an economics professor at UC Irvine's Merage School of Business.

One of the more famous examples of a market-style strategy for environmental improvement is the Acid Rain Program, started in 1990. The U.S. Environmental Protection Agency established a limit for overall sulfur-dioxide emissions nationwide, then distributed pollution credits among the major emitters (i.e., power companies). From there, the market took over, with some polluters using up their credits, others buying credits from companies with greener practices and still others saving credits.

Not long after the Acid Rain Program began, another market, this one for wetland banking, emerged, aided by federal regulation requiring degraded wetlands to be replaced with "compensatory mitigation," usually in the form of restored wetlands elsewhere. Today, wetland bankers carry out large-scale restoration projects and then sell credits to customers, usually developers (although critics argue that murky ponds filled with cattails are no substitute for biologically rich natural wetlands). Then there is the Big Kahuna: markets for trading greenhouse-gas emission credits. The European Union Greenhouse Gas Emission Trading Scheme is by far the largest, but many people are eager to see what happens with the relatively new Chicago Climate Exchange after the planet's most prominent global-warming naysayer leaves the White House in 2008.

Obviously, a cleaner atmosphere provides countless benefits to humanity. But environomicists want more than gradual pollution reduction through cap and trade programs; they want a marketplace in which conservation is a moneymaker. For that to happen, they must bring the idea of ecosystem services not only to Goldman Sachs but to Everyman, then quantify the value of those services and then, for a select audience, explain why partnering with Wall Street doesn't mean selling out.

Conservation used to be about suspending raw financial interest to protect places and

species that have a Wordsworthian value beyond the measure of economics. The national parks system and the Endangered Species Act are, at least in part, products of this powerful idea, and the American conservation ethos is rooted in the nature-as-sacred worldview romanticized by the likes of Henry David Thoreau and Sierra Club founder John Muir. The essence of the conventional and by-now-familiar ethic goes something like this: Because nature is of inherent and infinite value, humans have a moral obligation not to trash it. In the abstract, this resonates with most reasonable people; tree-huggers or not, we generally agree that littering is uncool, and a sense of right and wrong does influence many people's relationship to the natural world.

Think of the collective outrage in the wake of Rachel Carson's book "Silent Spring" and the Exxon Valdez catastrophe, or the long-running battle over drilling for oil in the Arctic National Wildlife Refuge. Then think of all those \$50 checks sent over the years to the Sierra Club, Nature Conservancy and—don't tell the neighbors—Greenpeace.

Proponents of valuing and eventually trading in ecosystem credits largely bypass this kind of emotional appeal, favoring instead a realpolitik tack. Yet discussion of moral imperatives can't be brushed aside as merely the warm-fuzzy verbiage of idealism—not yet, anyway. The ends may very well justify the means, and profit-driven conservation may be overdue and ultimately brilliant. But are we certain we want to apply a capitalist approach to protecting nature? "My fear," one scientist told me on condition of anonymity, "is that once we really go down the ecosystem services road, it becomes the only way that people measure things."

Consider a recent article on the MSN website pointing out that a drunk-driving conviction costs far more than one might expect. "Insurance-rate increases, legal bills, alcohol treatment and licensing fees can push the cost into five figures." The message: Some individuals may be on the fence about the ethics of driving drunk, but nobody misunderstands the easy math of fiscal pain. Or look at economic rationales for curbing greenhouse-gas emissions. A handful of CEOs of the very companies that run coal-fired power plants now advocate federal regulation that would charge for carbon dioxide emissions. The idea is to push for standards now, so industry can better position itself financially for the day when legislation makes it onto the books.

From an ethical standpoint, this obsession with fiscal reasoning reeks. Immediate action to curb carbon emissions is warranted for countless reasons that have nothing to do with money, not the least of which are the burdens that global warming dumps on coastal communities, residents of poorer countries and our parched offspring. But forget all that, the market-savvy greens tell us—climate change will hurt your bottom line!

OK, just because a DUI is expensive doesn't change the fact that it's wrong. The same could be said of our failure to act as stewards of the environment; that is, it's wrong and expensive. The more nuanced, and perhaps demoralizing, point has to do with human nature. We know that ransacking the planet is unethical and stupid, but only when our economic interests are threatened do we rally for any substantial change. For conservationists, an important question is: Will capitalizing on the selfish aspect of human

behavior be a viable strategy for getting things done?

Christine Tam, project director for the Natural Capital Project, tells a story about China. A few years ago she went on an excursion into the Gaoligongshan Nature Reserve in Yunnan province. The core area of a Chinese reserve is, at least on paper, off-limits, similar to a designated wilderness in the United States, only more so. On the ground, though, the situation was different: "Once we were inside, we encountered many local people who were grazing their yaks, collecting non-timber products, even some hunters with crossbows who told us they were hunting small birds or rodents," Tam says. "I think this use situation is true of every 'core' area of nature reserves in China, and probably most protected areas in the developing world." Conservationists, she says, "need to acknowledge this and work with it, rather than ignore that people are in there."

Human well-being and conservation are inextricably linked, and ecosystem markets, if done right, offer a chance to do right by people and Mother Nature.

Last fall, the journal *Nature* published an essay by Douglas McCauley, a Stanford University graduate student in biology. Under the headline "Selling Out on Nature," the essay questioned the ethics and efficacy of marshaling market forces to save the planet. McCauley asserted that nature for nature's sake should remain the preeminent rationale for conservation. It's wrong to presume that people, decision-makers in particular, are incapable of making good policy without thinking about the bottom line, he wrote, calling that "akin to saying that civil-rights advocates would have been more effective if they provided economic justifications for racial integration. Nature conservation must be framed as a moral issue and argued as such to policymakers, who are just as accustomed to making decisions based on morality as on finances."

McCauley struck a nerve. The last thing market-savvy greens needed was someone accusing them, in as visible and influential a forum as *Nature*, of bowing to the same capitalist forces that have so efficiently enabled wholesale destruction of the environment.

The counterattacks were swift. Among the most formidable was a letter written to *Nature* by Walter Reid of the Conservation and Science Program at the David and Lucile Packard Foundation and signed by 14 other proponents of market-based approaches to environmental problems.

"Historically, conservation has largely relied on the considerations of intrinsic value," the letter said. "This has been manifestly insufficient as a response to the increasing threats to biodiversity, particularly in the world's poorest regions, where considerations of intrinsic and spiritual values are often trumped by the needs for survival."

So what to do with the Douglas McCauleys of the world? For starters, they deserve a hug. The fact that ethics never sufficiently compelled us to do right by nature must be most disappointing to people who possess the kind of respect for nature that, were it more widespread, might have guided civilization down a more sustainable path. But the other, more practical, reason not to pshaw the ultra-earnest greens is that environomics depends on

McCauley and other true believers.

That's because politicians—officials elected by green voters like McCauley—will have to buy into the whole deal too. "Sometimes people overlook the need for government regulatory intervention," says Mark Tercek, a managing director at Goldman Sach's Office of Corporate Citizenship. Market schemes for buying and selling pollution rights, forest sequestration plots or wetland credits won't work without regulation. If the services provided by the Arctic National Wildlife Refuge, for instance, were to be represented by a dollar figure less than the projected dollar amount gained from oil extraction, would conservation groups be compelled to sign off on drilling in the refuge?

Poorly constructed markets could also create perverse incentives, which is why fine print matters, including interest rates to be paid on natural capital investments. Those could make or break these schemes.

Suppose, for example, that watershed restoration required a substantial upfront investment. If prevailing interest rates were high, conventional economic models tell us that watershed restoration would be an attractive investment only if it yielded sufficiently large benefits in the near future. Yet as Humboldt State's Hackett explains, such environmental investments tend to produce "less tangible benefits that may start small and take many years to be fully realized." Without some kind of control of interest rates, few investors would want watershed restoration projects in their portfolios.

A similar pitfall emerges with harvested resources such as timber and fisheries. If prevailing interest rates were high, market forces would make it difficult for private landowners to delay cutting to let trees grow larger. Should interest rates climb even higher, commercial fishermen might determine—again, based on standard investment models—that the most profitable course of action would be to harvest certain species to extinction. Rules protecting against this kind of twisted outcome will prevent the vagaries of the market from negating the environmental gains that the markets were built to achieve in the first place.

And there's no guarantee that ecosystem markets will work. In the August 2006 issue of the magazine *Frontiers in Ecology and the Environment*, an EPA scientist examined the inner workings of wetlands banking in Illinois and concluded that the system "is prone to regulatory turbulence and may not fully address losses of wetland function."

In her 2002 book, "The New Economy of Nature," Daily outlines an even more disconcerting example of blowback. It occurred during a role-playing exercise at a meeting of environomics experts, in which groups exchanged commodities in an imagined marketplace for ecosystem services. Some of the results were encouraging: "The team that won had converted 80% of its high-yielding irrigated cropland to forest while strategically selling ecosystem services." There was one ugly side-effect: All of the participating teams found it profitable to clear-cut—call it liquidate—their forests in the final round of the exercise. The reason? The rules of the exercise did not provide enough long-term incentives to preserve the forests.

Daily says growing pains in an infant marketplace are inevitable. They serve as a reminder that profit-driven conservation is no panacea. "Markets can go awry," she says. "Look at how Enron exploited the energy markets, and the blackouts that later followed. The challenge is to make the markets a force for good."

Then, typifying the strange blend of realpolitik and idealism of the new environomics, she adds: "I've moved way past charity to see the beauty in what's closer to reality. We need people to care enough to change the system." But we still need to care.

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(INFOBOX BELOW)

Environomics

A new breed of greens believes that we should put a price tag on nature. The Natural Capital Project has set a goal of "making conservation economically attractive." Some examples of the value of ecosystem services:

\$788

per hectare

Value of carbon storage services provided by some trees in Paraguay's Mbaracayu Forest Biosphere Reserve

(Calculated by World Wildlife Fund conservation scientists, 2006)

\$380

million per year

Value of waste management services provided by dung beetles to U.S. cattle ranchers

(Calculated by scientists from Cornell and Xerces Society, 2006)

\$11.1

million per year

Value of pollination services provided to the state's sunflower seed production industry by California's wild bees

(Calculated by UC Berkeley and Princeton scientists, 2006)

\$2.4

million

Average value of protection from damage from storms proffered by one mile of American coastal wetlands

(Calculated by a Louisiana State economist, 1985)

\$33

trillion per year

Value to human beings of all the services provided by Earth's natural capital

(Calculated by a team of economists and academics, 1997)