

## ELEVENTH ANNUAL GILBERT AND SARA KERLIN LECTURE

### What is the Emperor Wearing? The Secret Lives of Ecosystem Services

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Good afternoon. I have to confess that your invitation is more meaningful than you may know. When I started teaching in 1995, Pace Law School was the “gold standard” for environmental law programs – in terms of the breadth of coverage, the depth of coverage, the quality of the faculty, and the institutional commitment. It still is. Fifteen years ago, I had just started teaching, had my own office, was actually getting mail delivered to my office, and received a copy of the *Pace Law Review*. The lead article was about the distinguished lecture for that year. I clearly remember thinking, “How cool would it be if, at some point, maybe, I could get invited to give this kind of lecture at Pace?” And, I have got to say, it’s really cool. I am more than delighted to be here, and I thank you for inviting me.

I want to start off with a story that a number of you know. I said some nice things about Pace Law School and I meant them. But I am from Boston and I’ve got to tell you up front, I’m not wild about New Yorkers. Part of it may be 1978 and Bucky Dent’s home run that knocked the Red Sox out of the playoffs. Part of it might be 1986 and Bill Buckner’s ground ball error that knocked the Red Sox out of the World Series. I am now over that, mostly, but one of the things that still bugs me is when New Yorkers brag about their tap water. They are always shoving a glass toward me, asking “Isn’t this great?!?”

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Well, yes, it is great drinking water; and the reason it is great drinking water is that it doesn't come from New York City. It comes from about 120 miles away in the Delaware and Catskill Watersheds, where it is piped to city reservoirs. The story I am going to tell you has become the archetypal story for ecosystem services. It started with an amendment to the Safe Drinking Water Act back in the 1980s. Large municipalities taking their drinking water from surface water sources (such as reservoirs, rivers, and lakes) were now required to pre-treat the water.<sup>1</sup> When the folks in New York City's Department of Environmental Protection did the calculations, they figured it was going to cost about \$6 billion to actually build a water treatment plant and hundreds of millions to operate every year. The EPA said this was ridiculous because it would only cost \$3 billion to build. Those are big numbers, but it is a lot of water for a lot of people.

New York was fretting over this cost when a very clever city official by the name of Al Appleton took a close look at the law and realized that there was a waiver provision. The law essentially said that if you could demonstrate to the EPA that there were other ways to provide safe drinking water or clean drinking water, then you did not have to build the treatment plant. Al and some other folks started thinking, "since we're getting our water from the Catskills and Delaware watersheds, maybe we should think about how land management up there provides water quality in New York City."

This insight soon led to a series of negotiations that went on for several years and resulted in memorandum of agreements – quite complex – that essentially exchanged payments from New York City for specific land management practices, such as riparian buffers and septic systems. The bottom line is that, for the cost at the time of a \$600 million "green bond," New York City ensured that its water remained drinkable. EPA waived the pre-treatment requirements in 2002, waived them again in 2007, and the expectation is they will waive them again in 2012.

The Catskills story is often held out as the creation myth for ecosystem services because it presents the core idea so neatly –

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1. Safe Drinking Water Act Amendments of 1986, Pub. L. No. 99-339, § 101(b)(7)(C), 100 Stat. 642 (1986).

New York City needed the service of water purification so it could deliver clean water. They could get it one of two ways: through “built capital” – where they would actually build a treatment plant, engineer it and run the water through it – or they could invest in what you might call “natural capital” - where they could actually change the landscape practices where the water flowed to ensure the ecosystem service of water purification. They found that if they invested in the “natural capital” rather than the “built capital,” it was a better deal, purely in financial terms. Obviously, there are a lot of other benefits, as well. Since the Catskills story was first made popular in the late 1990s, it has been held out as a parable for the proposition that we should think differently about how we provide basic amenities.

Gretchen Daily, one of the leading thinkers in this area, has defined ecosystem services as the conditions and processes through which natural systems make up, sustain and fulfill human life.<sup>2</sup> A way to think about this more practically is as three suites of services. One might think of translocation processes – the natural service of moving things from one place to another. This would include pollination (moving pollen from one flower to another) and seed dispersal. Another set includes stabilizing processes such as natural pest control (how most agricultural pests are controlled); climate regulation through carbon sequestration (vegetation sucking up CO<sub>2</sub>); mitigating droughts (such as retaining water and metering the flow over time); and flood control (coastal wetlands are great at buffering floods). The third category is what you might call cycling or filtration processes. That would include things such as water purification (what was going on in the Catskills), waste degradation (breaking down waste products), and renewal of soil fertility.

Now there are a lot of different ways you can slice and dice ecosystem services. The Millennium Ecosystem Assessment, which I will talk a bit about later, breaks ecosystem services down into four different categories: (1) Supporting services, (2) Provisioning services, (3) Regulating services, and (4) Cultural

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2. See generally JOHN PETERSON MYERS ET AL., NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 3 (Gretchen Daily ed. 1997) [hereinafter Daily] (defining and explaining the concept of ecosystem services).

services.<sup>3</sup> However you cut them up, though, the bottom line is the same every time. These things are unbelievably important. Try to imagine growing crops for an entire society without fertile soil. Try to imagine climate stabilization without vegetation that sequesters the carbon we emit into the atmosphere.

The notion of ecosystem services or the fact that they are important is not new. Far from it. Plato wrote about the ecosystem service of water metering in ancient Greece.<sup>4</sup> George Perkins Marsh, one of the founders of ecology, was talking back in the 1800s about how minute organisms perform the most important functions in both the living and inanimate kingdoms.<sup>5</sup> In the 1960s and 1970s, Paul and Anne Ehrlich, among others, described the critical role of services to our well-being.<sup>6</sup> So the idea that natural systems provide benefits for us is hardly a new idea. Indeed, given how important they are, you would have good reason to think the law explicitly protected ecosystem services and that they would be valued in the marketplace. And you would be wrong. The law does not protect ecosystem services, except in a few rare exceptions. Nor are they generally captured in markets. The question is, why?

There are four basic reasons. The first is ignorance. We take them for granted. Why, if you always get something for free, would you even think about losing it? We have always had clean water before, so why worry about that? For folks who live in New Orleans, hurricane floodwaters had never swept through before, so why worry about the coastal wetlands and their service of storm water buffering; they were taken for granted and degraded.

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3. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: A FRAMEWORK FOR ASSESSMENT 3 (2003) [hereinafter MEA], available at <http://www.maweb.org/en/Framework.aspx>.

4. See Daily, *supra* note 2, at 5 (“What now remains of the formerly rich land is like the skeleton of a sick man with all the fat and soft earth having wasted away and only the bare framework remaining . . . The soil [used to be] deep, it absorbed and kept the water . . . and the water that soaked into the hills fed springs and running streams everywhere.”).

5. See *id.* at 12 (“Earth, water, the ducts and fluids of vegetation and animal life, the very air we breathe, are peopled by minute organisms which perform most important functions in both the living and inanimate kingdoms of nature.”).

6. See generally PAUL R. EHRLICH & ANNE H. EHRLICH, POPULATION, RESOURCES, ENVIRONMENT: ISSUES IN HUMAN ECOLOGY (1970).

The second problem is that we do not understand the biophysical provision of services very well. We know that if we wipe out an entire wetland, we are going to have water quality problems. But most land use decisions are marginal. Lose some wetlands here, some there. We do not understand very well what will happen if we lose 10% of the wetland or 15%. It's just something that scientists have not traditionally focused on. Interestingly, we know a lot about the provision of what you might call "ecosystem goods." We are good at managing the land to provide food, very good. We know how to manage for most "ecosystem goods," usually that can be bought and sold. We just do not have a lot of experience explicitly managing land to provide for services.

A related problem is so-called "market failure." Many ecosystem services are known as public goods. They can be used by everyone and users cannot be excluded. You cannot put a property fence around services. We all benefit from carbon sequestration whether we drive a Hummer or a Prius. A related challenge is that the market does not capture the environmental impacts of what we are doing. More precisely, we are not internalizing the negative costs or positive benefits of our actions. Say you own a wetland and you are benefiting the local fishermen by providing a place where the young fish can spawn. You likely don't get paid for that. So, why should it be surprising if you choose to make a bundle filling it in and selling it as real estate rather than keeping it undeveloped? There is no economic reason to manage the wetland for the valuable services it offers. We will talk about that a bit later in the speech.

And finally, we have institutional obstacles. If you look at a map of counties and states, you see a lot of straight lines. But when you look at an ecosystem, not a lot of straight lines. Political jurisdictions rarely track what you might call the ecological contours of ecosystems. In general, the area where these services originate does not align with the political reach of the beneficiaries. The scales do not match and, as a result, you get all kinds of collective action problems. We see analogies in everyday life. Should I decide to see a movie with two friends or eight friends? You know which is harder to do. There are real

problems trying to get multiple jurisdictions to work together for service provision and protection.

You might think that, because of these challenges – services are hard to protect, not explicitly protected by the law, and not valued in markets – interest in ecosystem services would be a dead topic. And yet, something is most definitely going on. Figure 1 shows the number of ecosystem services articles published in academic journals starting in 1990. What you see is an explosion over the last decade. You see the same surge of interest from Figure 2, showing unique Google hits for “ecosystem services.”

Figure 1

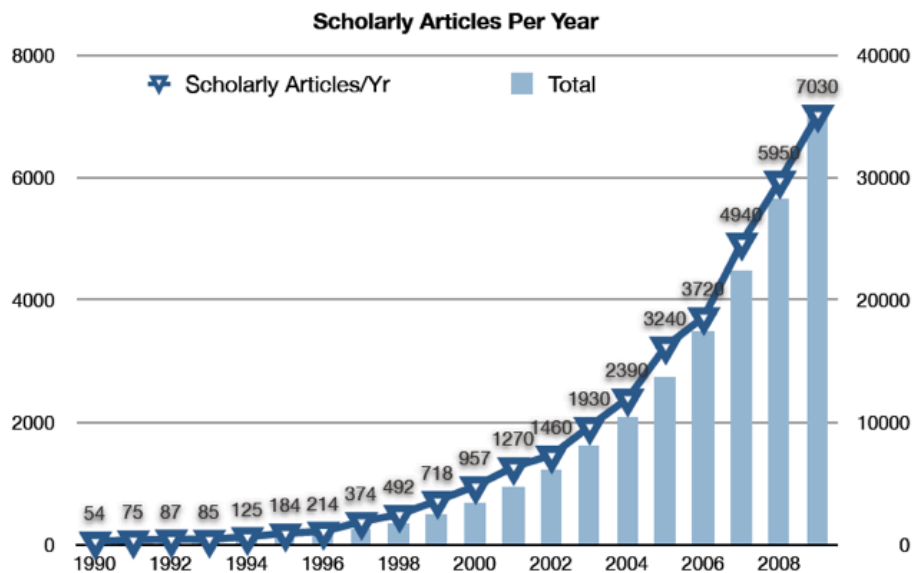
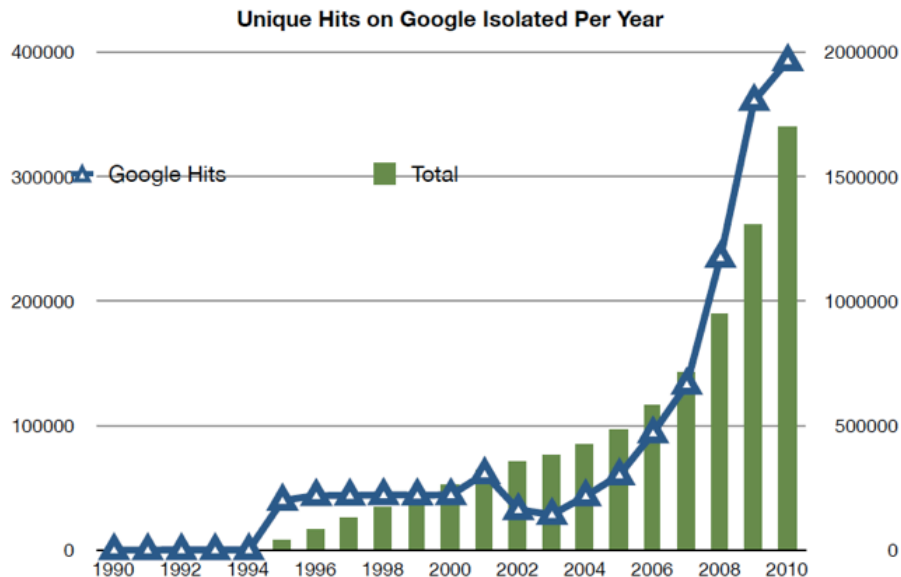


Figure 2



Why is it that until the late 1990s there was almost nothing written about ecosystem services? What caused this to go viral and where is it going?

Part of the story starts with the ecologist, Gretchen Daily. She edited a book in 1997 called, *NATURE'S SERVICES*.<sup>7</sup> Written by ecologists and economists, each chapter focused on a different ecosystem service, describing the ecological nature of the service – how it is produced, what we know about the biophysical aspect – and the economic nature – the extent that we could put a dollar figure on each of these services. It was a simple approach but it was also the first time ecologists and economists had comprehensively assessed the suite of services. And there was a lot of interest. A number of foundations funded this and, in a clever move, also provided a PR budget for media interviews with mainstream publications such as the *New York Times*.<sup>8</sup> The same year, 1997, there was an article in the prestigious journal, *Nature*, called “The Value of the World’s Ecosystem Services and Natural Capital.”<sup>9</sup> Robert Costanza and his coauthors valued basically all of the ecosystem services around the globe. They came up with the figure that ecosystem services were worth between \$16 and \$54 trillion per year.<sup>10</sup> The global GNP was \$18 trillion per year.<sup>11</sup> You can imagine the headlines. “Globe’s Ecosystem Worth More Than Globe’s GDP!” There were some major theoretical problems with this exercise, but it got a lot of press. Soon after came another piece in *Nature* setting out the Catskills story.<sup>12</sup> More and more folks started getting interested, thinking, “Wow, there may be some money in this.”

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7. See Daily, *supra* note 2.

8. See Daily, *supra* note 2, at xvi; Interview with Gretchen Daily, Stanford University, June 24, 2010.

9. Robert Costanza et al., *The Value of the World’s Ecosystem Services and Natural Capital*, 387 *NATURE* 253 (1997).

10. *Id.*

11. *Id.*

12. Graciela Chichilnisky & Geoffrey Heal, *Economic Returns from the Biosphere*, 391 *NATURE* 629, 630 (1998).

I met Gretchen in 1996 at a conference in Japan. She sent me an early draft of NATURE'S SERVICES. I read it and said, "This is terrific. You're really on to something, but there is a problem. There is nothing here about law or institutions. And if you want to take this idea and make it happen, then you have to figure out how the legal aspects work, what the institutions are going to look like." And Gretchen, being Gretchen, said, "You are so right. Why don't you do that?" In short order, she and Paul Ehrlich helped me get an EPA STAR Grant and I spent a year at Stanford. Working with a bunch of law professors around the country, we came out with a special issue of the *Stanford Environmental Law Journal*. We looked at every major environmental law, asked whether ecosystem services were currently protected and, if not, whether these laws could be used to protect ecosystem services.<sup>13</sup> This was the first comprehensive legal analysis of ecosystem services.

Obviously, this involved more than just me. A lot of folks have been writing in this area, particularly J.B. Ruhl and Buzz Thompson on the legal issues. But there have also been academic journals in other disciplines with dedicated issues specifically to ecosystem services and conservation biology, ecological economics, ecology, and others. A lot of books have come out in the last decade full of case studies of payments for ecosystem services like the Catskills story.<sup>14</sup> The Ecological Society of America had a whole outreach program with educational materials and ecosystem services.<sup>15</sup> The UN got involved with an initiative called the Millennium Ecosystem Assessment. It was supposed to be like the Intergovernmental Panel on Climate Change but for ecosystem services. Over 1,300 scientists looked at the status of ecosystem services around the globe.<sup>16</sup> This really got the term,

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13. See generally James Salzman et al., *Protecting Ecosystem Services: Science, Economics, and Law*, 20 STAN. ENVTL. L.J. 309 (2001).

14. See, e.g., NATASHA LANDELL-MILLS & INA T. PORRAS, SILVER BULLET OR FOOLS' GOLD?: A GLOBAL REVIEW OF MARKETS FOR FOREST ENVIRONMENTAL SERVICES AND THEIR IMPACT ON THE POOR (2002); STEFANO PAGIOLA ET AL. SELLING FOREST ENVIRONMENTAL SERVICES: MARKET-BASED MECHANISMS FOR CONSERVATION AND DEVELOPMENT (2002).

15. *Ecosystem Services: A Primer*, ACTIONBIOSCIENCE, <http://www.actionbioscience.org/environment/esa.html> (last visited Feb. 3, 2011).

16. MEA, *supra* note 3.



“ecosystem services,” in popular use. And the UN still is involved. The UN Food and Agriculture Organization’s flagship publication, THE STATE OF FOOD AND AGRICULTURE, focused in 2007 on ecosystem services.<sup>17</sup> A lot of NGOs have gotten involved. Two of the most influential thought leaders, Forest Trends and its spin-off, the Katoomba Group, go back the longest.<sup>18</sup> The World Resources Institute has a special division that works on ecosystem services.<sup>19</sup> The World Wildlife Fund and The Nature Conservancy have gotten together with Stanford and the University of Minnesota for the Natural Capital Project, coordinating ecosystem service projects in the field and developing assessment tools and science to influence policy.<sup>20</sup> The popular press is following this, as well. The mainstream financial journal, *The Economist*, dedicated a cover story to payments for services.<sup>21</sup>

Governments have gotten the fever, as well. Mike Johanns, the Secretary of Agriculture in the Bush administration, announced in 2005 that the USDA would seek to increase the use of ecosystem services. He stated, “I see a future where credits for clean water, greenhouse gases, and wetlands can be traded as easily as corn or soy beans.”<sup>22</sup> For any of you who know anything about the history of the USDA, this is a stunning statement. This is the place Earl Butz ran. Basically, they have been all about commodities. Pork bellies. Grain. And for the head of the USDA to say our future lies in ecosystem services shows a seismic shift

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17. See generally U.N. FOOD AND AGRIC. ORG., THE STATE OF FOOD AND AGRICULTURE 2007: PAYING FARMERS FOR ENVIRONMENTAL SERVICES (2007).

18. *Who we are*, FOREST TRENDS, <http://www.forest-trends.org/page.php?id=153> (last visited Jan. 17, 2011); *Our History*, THE KATOOMBA GROUP, <http://www.katoombagroup.org/about.php?focus=history> (last visited Jan. 17, 2011).

19. *People and Ecosystems*, WORLD RESOURCES INST., <http://www.wri.org/ecosystems> (last visited Jan. 17, 2011).

20. NATURAL CAPITAL PROJECT, <http://www.naturalcapitalproject.org> (last visited Jan. 17, 2011).

21. *Rescuing Environmentalism: Market forces could prove the environment's best friend—if only greens could learn to love them*, THE ECONOMIST, Apr. 21, 2005, available at <http://www.economist.com/node/3888006>.

22. Press Release, Mike Johanns, Sec’y, U.S. Dep’t of Agric., White House Conference on Cooperative Conservation: Innovations In Land and Resource Governance (Aug. 29, 2005).

in thinking. Taking all these developments together, it is no overstatement that ecosystem services are the “new, new thing.” As Jessica Dempsey and Morgan Robertson described in a recent article, “Across the world, then, supranational entities, governments, NGOs, regional administrations, scientists, policymakers, and resource managers are learning to govern nature in the form of services, often priced and occasionally commodified.”<sup>23</sup> Future’s so bright, I gotta wear shades.

But let’s hold on for a second. While there are lots of reasons to be excited about the potential of an ecosystem services approach, some caution is in order. It’s fair to ask, just what is the emperor wearing? Is the emperor standing out there in splendid garb or is there some velcro and rayon we cannot see? I think it is a bit of both –promise and hype. What I want to focus on with you for the next few minutes is what I call “The Secret Lives of Ecosystem Services.” Where are the areas that ecosystem services have really made a difference to how we think about environmental protection? How is this playing out? And where is it going? In particular, I want to talk about three secret lives: Payments for Ecosystem Services, Planning for Ecosystem Services, and Ecosystem Services and the Law.

Let’s start with what has gotten the most attention and is known in the lingo as “PES” – Payments for Ecosystem Services. Michael Jenkins, the founder of Forest Trends, has framed this approach very well. He asks, “What can we do to make forests worth more standing than cut down?”<sup>24</sup> How do you make the services and values of forests more valuable than the timber alone? This is, unfortunately, simple to say and hard to do.

Let’s begin from a law and policy perspective. Imagine a community where the water starts from near the top of the watershed and flows down. The water is purified as it passes through the root systems and the soils. But there is a problem. Along the path of the flow, before it gets to the reservoir, some farmers are letting their cows hang out in the river and do what

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23. Jessica Dempsey & Morgan Robertson, *Ecosystem Services: Tensions and Developments Within Neoliberal Environmentalism* (2010) (unpublished manuscript) (on file with author).

24. Personal Communication with Michael Jenkins, Dir., Forest Trends (June 12, 2010).

cows do. This is leading to water quality problems for the reservoir drinking water. Your experts tell you that the best way to solve this problem is through farmers putting in riparian buffers, fencing off strips of vegetation along the riverbanks. These provide the ecosystem service of nutrient retention by the plant roots taking up the nitrates and phosphates before they get into the water. It also keeps the cows out of the water. For those of you who need a popular culture way to think about this, imagine Ned Flanders of the farming world. He has already fenced off his streambanks. He is a great land steward. And then we've got Homer Simpson, who is really causing a problem. The environmental policy experts say we have got to get Homer to put in some riparian fencing, but how are we going to do that?

I like to teach with mnemonics, so when I teach environmental law I tell my students there are "5 P's" to think about when you are trying to address an environmental problem. You can have "Prescriptive" regulation – thou shalt fence off your riverbanks. You can have financial "Penalties" such as taxes and fees if there are no buffers. You have "Property" rights – some kind of trading system. You can use "Persuasion" through pilot projects. If you are counting, there is still a fifth P, and you can probably guess what it is. It is "Payments." You could actually pay the farmers for providing an ecosystem service. Just as we pay farmers for potatoes, for corn, or for any other crop, why not pay them for the ecosystem service of water purification? That is the basic idea behind payments for ecosystem services (PES). It is one of the policy instruments in the tool kit that we can use.

And it turns out there are a lot of examples of PES around the globe. The largest in the United States is the Conservation Reserve Program, where we pay farmers for land use practices that set aside agricultural lands for biodiversity conservation, erosion control, and other services. Farmers are paid through a competitive bidding process.<sup>25</sup>

But it is not just in the United States. Costa Rica has long had payments for ecosystem services. In its Pagos por Servicios

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25. *Conservation Programs*, U.S. DEPT OF AGRIC., <http://www.apfo.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp> (last visited Feb. 8, 2011).

Ambientales,<sup>26</sup> the government acts as a broker and brings parties together to purchase the provision of ecosystem services from landowners. For example, hydropower benefits from the service of erosion control. Upper watershed owners are paid not to cut down their trees to keep the dam lake from silting up. In Brazil, there are a number of payment programs in different states where folks are paid for particular land use practices. Australia's got a really interesting program called "BushTender." Government field workers go onto farmers' lands who are willing to be paid to conserve biodiversity by changing their land use. The inspectors basically create a score for the property's biodiversity and potential benefits from habitat management. The farmers then tell the Department how much they are willing to be paid. With these data, you can actually graph how much the farmers are willing to be paid by how valuable the habitat changes would be and you get effectively the biodiversity bang for a buck.<sup>27</sup> This is a very innovative way to identify which bids are the best investments and which ones may not be so valuable.

China has adopted this on a huge scale. They have two main programs. The Grain for Green program is concerned about erosion so they are paying farmers to put in trees. A lot of trees – \$43 billion over a 10-year period. The other is the Natural Forest Conservation program where they are trying to change harvesting practices and increase ecosystem services. The area of China affected by these two programs is quite stunning, literally a national transformation of the landscape. And \$43 billion goes a long way in China. There are social justice issues associated with implementation, but they have adopted this payment scheme in a big way.

Payment for carbon sequestration through forest management has become a major market and, through REDD, holds the potential to become much larger still. I have a lot more examples I could give, but the basic point should be clear. There are a lot of different ways to pay for ecosystem services: business-

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26. Payments for Environmental Services.

27. See generally Gary Stoneham et al., *Auctions for Conservation Contracts: An Empirical Examination of Victoria's BushTender Trial*, 47 AUSTRALIAN J. OF AGRIC. AND RESOURCE ECON. 477 (2002), available at <http://dSPACE.anu.edu.au/bitstream/1885/40973/2/stoneha1.pdf>.

to-business, mitigation markets, government subsidies, competitive payment grant programs, and hybrids such as the Catskills. The simple fact is there are a lot of innovative, entrepreneurial people doing this.

Now there are real concerns raised with payments for ecosystem services. The most obvious is why you would *pay* anyone to stop water pollution from their cows' grazing. They should not be fouling the waters in the first place. Why would you pay a polluter? Am I going to pay someone to stop mugging me? That does not make any sense! Paying the polluter is, understandably, a controversial practice. Farm welfare run amok. We can talk about this in the Q&A afterwards, if you like, but it comes down to how you think of property rights. If farmers actually have the right to allow cows to graze in streams, then you are paying them not to exercise it. Simple Coasean bargaining. If they do not have the right, though, it gets more complicated and turns on whether, in practice, you can enforce against them or not.<sup>28</sup>

There is a flipside of this, as well – the moral hazard problem. Why are you paying Homer more than you are paying Ned, who is behaving really well? The problem is that you maximize your ecosystem service bang for the buck by paying more to the Homers of the world, but what kind of message does that send to the good actors? Does that basically say the only way we are going to manage our landscape to provide services is if we are paid? What does that do to the moral stewardship notion? Aldo Leopold, a very smart guy, was writing about this issue in a slightly different context in the 1930s/1940s. He was concerned about buying land to conserve wildlife, but it is the same type of problem. He argued that you could never pay enough money to conserve enough wildlife and that, at its core, this was an ethical issue (not surprising from the father of the Land Ethic). In the long term, he thought the only way to conserve nature would be an ethical shift.<sup>29</sup>

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28. For a more complete discussion of this issue, see James Salzman, *Creating Markets for Ecosystem Services: Notes From the Field*, 80 N.Y.U. L. REV. 870, 934 (2005).

29. See Barton H. Thompson, Jr., *Markets for Nature*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 261, 277-78 (2000).

Despite these concerns, and they are real, what you are trying to do with PES is pretty straightforward. You are basically trying to shift landowners' vision of value away from traditional commodity crops of agriculture and toward services. The implication is that farmers will think differently and farms are going to look different. Landowners start to think, "We're providing services like storing carbon, nature conservation, cleaning water. And now we can get paid for all of these." If you're getting multiple income streams, you are going to manage your land differently. Right now, farms lands are largely managed for large-scale monocultures. That is hardly surprising, since that's how farmers get paid. You can imagine a world, though, where farmers are getting paid for more than the produce they bring to market. This is what Mike Johanns and Michael Jenkins were getting at.<sup>30</sup> If you can change the balance sheet, you can change the landscape.

The second life to explore is what one might call Planning for Ecosystem Services. The basic question you are trying to address here is if services have always been taken for granted, how do you change the land use planning process to account for their value? How do you get people to wake up and say, "Listen, even if these services are being provided, they could still be under threat. We need to think about how we can change our planning process for land use." In the developing world, in particular, ecosystem service provision is closely linked to poverty reduction. Urban populations in very poor countries, actually rural populations, too, face tremendous problems associated with poor water quality. Bill Reilly, the former head of the EPA, has said that climate change is not the biggest threat to the developing world; it's drinking water.<sup>31</sup> If you can improve provision of certain ecosystem services to the poor, you are doing a great deal of good. You do not simply have to go in and build a treatment plant. There are other ways to think about this. One of the key conclusions of the Millennium Ecosystem exercise was that if you

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30. See Press Release, Mike Johanns, Sec'y, U.S. Dep't of Agric., White House Conference on Cooperative Conservation: Innovations In Land and Resource Governance (Aug. 29, 2005).

31. Interview with William K. Reilly, former Administrator of the Environmental Protection Agency (Nov.3. 2009).

are concerned about human well being and poverty reduction, you have got to place ecosystem services front and center because that can be the lowest cost provider in many of these situations. More important, degrading services can have direct effect on people's well-being.

The second aspect of planning that I think is pretty interesting concerns conservation groups. Say you are an NGO like the World Wildlife Fund or The Nature Conservancy. It is pretty obvious that if you protect a totally natural landscape, you are going to have relatively high biodiversity. At the same time, if you have an industrial monoculture, you are going to have relatively low biodiversity. The question is, what about in between? And the thing is, we really do not know. Yet this is where the action is. We live in a human-dominated landscape. There are very few truly natural landscapes anywhere in the world. In fact, you might argue there are no truly natural areas left anywhere in the world. So the issue becomes how intensely you can manage the landscape and still get a lot of biodiversity.

Why does this matter to conservation groups? Well, let us say they have an area they want to manage for biodiversity. In the past, they may simply have said, "You know what? We're going to put a fence around this big area." This used to be the traditional way of thinking about this. Or, you might decide that we need to focus just as much on local inhabitants (or local communities) and their livelihoods, as well. If we think about conservation and ecosystem services at the same time we may well decide to protect different areas of land and protect them differently. The Natural Capital Project that I mentioned earlier has developed a new tool called InVest.<sup>32</sup> It is a GIS planning tool for a suite of ecosystem services and how they are delivered across the landscape. It helps answer the question about how specific land use changes will impact service provision. If you care about these services, this is the land that is the most important. Do not just put a big fence around the area. This is the type of thinking behind the massive Chinese initiatives I mentioned earlier. Which policies are going to deliver these types

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32. *InVest: Integrated Valuation of Ecosystem Services and Tradeoffs*, NATURAL CAPITAL PROJECT, <http://www.naturalcapitalproject.org/InVEST.html> (last visited Feb. 8, 2011).

of services? Which lands do you protect? This is a very different way of thinking about conservation than has been done in the past.

Public lands are also really interesting. The U.S. Forest Services and U.S. Department of Agriculture have got a problem. We don't cut much timber on national forest lands anymore, not really. So what is going to justify how these forests are managed? There is a lot of talk in the Forest Service of managing explicitly for ecosystem service provision. Lots of interesting discussions over what that would look like.

And finally is cost-benefit analysis. I will not spend a lot of time on this but it is interesting. There was a Science Advisory Board set up by the EPA on Valuing the Protection of Ecological Systems and Services and co-chaired by Buzz Thompson. They were essentially asked how to value ecosystem services.<sup>33</sup> The subtext for this, in my view, was the Executive Order requirement that major regulations must be reviewed by OIRA, a regulatory affairs group within the Office of Management and Budget.<sup>34</sup> If the benefits do not exceed the costs, then the EPA runs into problems. One impetus for the Board's creation may have been so EPA could go to OIRA and say, "Hey, these regulations actually provide a lot of benefits so get off our back." It is a way to push back on the cost-benefit world of policy evaluation using the coin of the realm.

The last private life is Ecosystem Services and the Law. More specifically, is there actually a law of ecosystem services at all? The answer is, not surprisingly from a lawyer, yes and no. In terms of specific laws, there have been some really interesting developments. I mentioned before Mike Johanns' statement.<sup>35</sup> The Bush administration, in the Farm Bill language it sent to Congress, actually called for the creation of four new institutions

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33. *See generally* ENVTL. PROTECTION AGENCY, SCI. ADVISORY BD., VALUING THE PROTECTION OF ECOLOGICAL SYSTEMS AND SERVICES: A REPORT OF THE EPA SCIENCE ADVISORY BOARD (2009), *available at* [http://yosemite.epa.gov/sab/sabproduct.nsf/F3DB1F5C6EF90EE1852575C500589157/\\$File/EPA-SAB-09-012-unsigned.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/F3DB1F5C6EF90EE1852575C500589157/$File/EPA-SAB-09-012-unsigned.pdf).

34. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Oct. 4, 1993).

35. *See* Press Release, Mike Johanns, Sec'y, U.S. Dep't of Agric., White House Conference on Cooperative Conservation: Innovations In Land and Resource Governance (Aug. 29, 2005).



to create ecosystem service markets within the country. There was a separate title of the bill that was going to create different institutions that would have addressed buyers, brokers, aggregators, and sellers. They wanted something along the lines of the FDIC, the FTC (the rights to oversee and enforce). They wanted a credit institution, as well. Congress changed things, of course, as they always do. But some of the proposals survived. There is now an Ecosystem Services Credit Standards Board being put together. The key thing is not what came out in the Farm Bill. The key thing is that the administration of the President of the United States put forward real policies that begin to change how we think about, how we manage, our farms in this country going forward. That is potentially a big change.

So is there a law of ecosystem services? Well, the law firm, Baker Botts, thinks so. They marketed their counseling services on the firm's website.<sup>36</sup> J.B. Ruhl has co-authored a book entitled, *THE LAW AND POLICY OF ECOSYSTEM SERVICES*.<sup>37</sup> I have written a lot about this, as well. We would argue that there is not a law of ecosystem services, in the sense that there is not a Law of the Horse, either.<sup>38</sup> You can describe relevant laws but they do not really make a discrete body. The field does, however, raise really interesting and important legal questions. A lot of them come out of property rights. How do you transform property rights to capture positive externalities? How can the benefits be captured? How far can we push nuisance law if service provision is being interrupted? How do we do so at scale? And how do we create legal institutions that can reach out to where the ecosystem services are actually provided?

For starters, you want to reduce transaction costs. Something we have done at Duke with the Katoomba Group has

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36. Press Release, Pillsbury, Environmental Counsel Brad Raffle Joins Pillsbury in Houston (June 11, 2010), *available at* <http://www.pillsburylaw.com/index.cfm?pageid=19&itemid=5522>.

37. J.B. RUHL, STEVEN E. KRAFT, & CHRISTOPHER L. LANT, *THE LAW AND POLICY OF ECOSYSTEM SERVICES* (Island Press 2007).

38. *See, e.g.*, Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 HARV. L. REV. 501 (1999) (examining whether it is useful to think of a law of cyberspace).

been to create model contracts.<sup>39</sup> If you are in Brazil or Malaysia and you want to pay for ecosystem services, you can use our model contract and then tailor it to your specific situation.

We have now done a whirlwind tour of the different lives of ecosystem services, of the different robes the emperor is wearing. From one vantage, things look great. We've got service planning; we've got PES; we've got the U.S. government, the UN, and the business world talking about ecosystem services. If one is self-aware at all, this splendid picture raises an interesting question. How did ecosystem services shoot to prominence as the *New New Thing*?

It is hard for me to describe to you how stunning it is from today's vantage that, quite literally, in 1996 I had never heard the term "ecosystem services." Gretchen, I, and others were talking about this thing and you would get a blank stare. Now you talk to people and most get it. What got the ecosystem services bandwagon rolling?

The rise of the services concept is not due to a single factor but, I think, a sort of perfect storm. For starters, the rhetoric, talking about natural capital in the same terms as financial capital, works really well. You can actually transfer quite a bit of the thinking from one field to the other. Asset management, streams of services, managing for multiple services, portfolio management make sense for both financial and natural capital.

Ecosystem services also gets people's attention. \$18 to \$54 trillion of value? That is a lot of money. Katrina and New Orleans. Why did Katrina devastate the Big Easy? It was not because of rain. It happened because the hurricane pushed the flood waters right through the degraded wetlands. The wetlands service of stormwater buffering had been destroyed because no one cared about it. Now they do. Climate change is getting folks' attention, as well. So in terms of public relations it has been very effective. Money talks.

From the government's perspective, this is a way to get environmental protection without spending much of your budget.

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39. See, e.g., SLAYDE HAWKINS ET. AL., CONTRACTING FOR FOREST CARBON: ELEMENTS OF A MODEL FOREST CARBON PURCHASE AGREEMENT (2010), available at [http://www.forest-trends.org/documents/files/doc\\_2558.pdf](http://www.forest-trends.org/documents/files/doc_2558.pdf).

Or if you are going to spend your budget, you can do it more efficiently through targeted ecosystem services payments. NGOs can also get more conservation if they also increase livelihoods and revenue streams around the conservation areas. Wall Street is interested in this. Mark Tercek ran Goldman Sachs' initiative to make money out of ecosystem services until he was hired to be the new head of The Nature Conservancy. There has been increasing interest in this on Wall Street.

Getting back to the emperor motif, there is ideological cross-dressing. The ecosystem services approach provides a weird combination of groups that love conservation (liberal groups, environmental groups) and groups that love markets and property rights. Libertarians are all over this. A central message of ecosystem services is that strengthening property rights and clever market mechanisms can improve environmental protection. And that is a very powerful conversation starter between Liberals and Neo-Conservatives who normally do not talk about much together, much less in a nice way. Do not forget that it was the Bush Administration's Farm Bill that pushed services so strongly.

Overall, I think it is just a powerful framework to think through complicated issues. How do you design land management that ensures conservation is financially attractive? How can you work toward a win-win situation for critters and people? Talking about ecosystem services helps frame the options.

So that's all great. And yet, while I have been on this bandwagon for some time and remain impressed with the view, there are some issues that need to be acknowledged. Folks who work closely in the field recognize there are some challenges. What I want to do now is start taking a closer look at the Emperor's garb and suggest that there are some less positive things to keep in mind, as well.

One of these is equity. There is a lot of concern, particularly in developing countries, if you start placing prices on ecosystem services and charging people for things they have always gotten for free, that is actually going to exacerbate income inequality. It is not going to help things for the poor, the locals. It is actually going to make things worse because the money that is made will

not go to the locals. It will go to someone else. This is a big concern in China. The Grain for Green and National Forest Conservation programs are literally changing the landscape of China and there is a real question about how, or whether, the locals' social welfare is being taken into account. Some allegedly are being told they cannot farm here anymore. "Deal with it; it's for the greater good." So that is a concern. Can you actually manage for social welfare as well as you can manage for biophysical goals and service provision? We are not used to doing this.

The second is implementation problems. We are still learning how to make PES work in the field and get real benefits. A number of studies have found cases where landowners were paid for lands that do not provide much in the way of services. Or they were paid for actions they would have taken anyway. There is no point to pay landowners not to plant on steep lands if doing so will provide minimal services, or they would not have planted there, even without being paid.<sup>40</sup> We are still making our way up the learning curve for how to choose and pay landowners for services, how to ensure value for money.

A third concern is whether this is becoming sustainable development all over again. I think you can make the argument that "sustainable development" has become so popular to so many people that it does not actually mean a lot anymore. It had very specific meaning when it was introduced in the Brundtland Report,<sup>41</sup> but I would argue that it has been diluted significantly.

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40. See, e.g., Juan A. Robalino et. al, Changing Deforestation Impacts of Ecopayments: Evolution (2000-2005) in COSTA RICA'S PSA PROGRAM (2008), available at [www.duke.edu/~asp9/files/PSApost2000-v12ap.pdf](http://www.duke.edu/~asp9/files/PSApost2000-v12ap.pdf). See also Paul J. Ferraro & R. David Simpson, *The Cost-Effectiveness of Conservation Payments*, 78 LAND ECON. 339 (2002); Paul J. Ferraro & Subhrendu K. Pattanayak, *Money For Nothing? A Call For Empirical Evaluation of Biodiversity*, 4(4) PUB. LIBR. OF SCI. BIOLOGY 105 (2006).

41. Report of the World Comm. on Env't and Dev. Our Common Future, U.N. DOC. A/42/427 (Mar. 20, 1987) ("Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.").

Is it the case that too many folks jumping on the ecosystem services bandwagon risks breaking the axles? More and more, ecosystem services is being used by some people to mean “anything that’s good and associated with nature.” That’s not particularly useful in terms of policy or law.

PES provides for unnatural alliances, but this may not be all good. A number of folks think we are basically sleeping with the devil. “If you start putting a price on nature, if you start justifying things in the ecosystem because of their value, you’re not going to win. There’s a reason these things are called public goods, and you’re fighting a battle you’re going to lose.” The answer I generally give is that I may be sleeping with the devil but we’re in bunk beds. Ecosystem services is one approach among many to promote conservation. It doesn’t always work. But neither is it the choice of only valuing ecosystem services and nothing else.

A more serious issue, in my view, is the concern that, to paraphrase my British friends, PES is small beer. I could talk about the Catskills and other examples for hours. If you look at the scale of global commerce, though, the fact is that there are not a lot of PES examples out there. And many of these are pilot projects. If there are all these \$20 bills lying all over the ground in the form of PES opportunities, why aren’t people diving to pick them up? Why aren’t folks plucking low hanging fruit left and right?

One obvious reason, discussed earlier, is that PES is hard to do. Another is that PES tends to operate on the margins. These are generally supplemental payments. As J.B. Ruhl has described, if Wal-Mart wants your farm to build a superstore, they will get it. So how big can PES get? One way that is useful to think about this is to extend the Wall Street metaphor.<sup>42</sup> Wall Street basically makes money by service provision in two separate ways. One of them is what you might call “High Volume/Low Margin.” This is the stock market, where brokers place millions and millions of transactions. It is effectively the same transaction over and over but with a thin margin. Enough transactions, you make some real money. The second approach is

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42. I believe Adam Davis first suggested this metaphor.

“Low Volume/High Margin.” This would be investment banking. And the idea here is you are basically selling a few companies and you get a small share. It turns out to be a lot of money because it is a multi-billion dollar sale. To be complete, Wall Street also makes money through fraud and insider trading, but I am not going to focus on that. If you look at the first two models, ecosystem services do not match very well. They are not going to be high volume because they are generally landscape specific. Ecosystem services generally are locally produced and not very big. And they are not going to be high margin because many payment schemes operate at the level of communities and watersheds and such. There are a few examples of potentially big PES markets, such as REDD, but they are notable exceptions. There is a real question about how big payments for ecosystem services can ever get.

And this leads to the last concern which, for me, is actually the largest concern. The environmental community has a long history of seizing onto the silver bullet – the notion that this latest big idea is going to solve our problems. If you look back over the last twenty-five years you see this play out again and again. “Debt for nature swaps, that’ll solve our problems. Eco-labeling, that’ll do it. Bio-prospecting – pharmaceutical companies paying to preserve rain forests – that’s the ticket.” For each of these, the environmental community eagerly says, “This is it! This is the silver bullet for conservation!” To be sure, each of these has proven effective in some settings. But their impact has been limited. And worse, there’s still a real sense that we are going to hell in a hand basket in terms of conservation at the global level.

So the concern I have is whether PES (and I include REDD here) falls into the same category. Are we putting unrealistic expectations on this mechanism only to be disappointed? A services approach has a lot of potential, but can it really deliver as much as we want it to deliver? I think that is a genuine question.

I do not want to downplay these issues. Folks who work in the field are well aware of them. They are legitimate concerns and ones that deserve greater public discussion. And yet, I remain very excited by the ecosystem services concept. For one

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thing, there are responses to all of these concerns, which I can address in the Q&A. And ecosystem services is still evolving. After all, it is little more than a decade since it burst on the scene. That's not much time in the policy world.

So when I look back to the late 1990s, since I started working on the law and policy of ecosystem services, I feel incredibly lucky to have started writing on something that, for whatever reason, got big and has become a part of the debate over how to think about environmental protection. It has been fascinating to see how this idea has evolved and continues to evolve. To my mind, an ecosystem services perspective is actually going to be around for a long time. There are challenges and limits to what ecosystem services can do for us in terms of environmental protection on the ground, but that is true for every policy tool. To my mind, it's a genuinely useful and innovative way to think about environmental protection.

In my remarks today, I have sought to lay out some different ways to think about the influence of ecosystem services in practice – where we see it working well and what some of the concerns are. My hope is that you are now at the same level as anyone who is working in this field. And hopefully you will agree with me that the emperor's garb is looking pretty fine. Thanks for sharing your time with me.