

The Economic Value of Ecosystem Services from and for Wilderness

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Introduction

In the Sierra Club classic *On the Loose* (1967), Terry and Renny Russell reject attempts to place economic values on wilderness, emphasizing that the true rewards of the wilderness experience are spiritual: the freedom of self-reliance and the uplifting beauty of wild nature. At the same time, citing Winston Churchill, they issue a key challenge: to learn the game one has to play for more than one can afford to lose. Some wilderness scholars are taking up this challenge by reexamining and reemploying economic tools they had long since dismissed.

Economic valuations of wilderness have concentrated on direct benefits (e.g., commodity goods, recreation) and nonuse benefits (e.g., existence, bequest) (Haynes and Horne 1997; Schuster et al. 2006; Cordell et al. 1998; Loomis 2000; Loomis and Walsh 1992; Loomis and Richardson 2001; Richardson 2002; Walsh et al. 1984; Walsh and Loomis 1989). Increasing public importance has been noted for *indirect* values from wilderness, such as ecosystem services (see figure 1) (Morton 1999, 2000; Cordell et al. 2003). Ecosystem services are the naturally occurring contributions to life support and quality of life that people normally do not have to pay for (Daily 1997; Costanza et al. 1997; de Groot et al. 2002). Actual typologies vary, however (see Boyd and Banzhaf 2005; Costanza et al. 1997; de Groot et al. 2002; Alcamo et al. 2003; Heal et al. 2005; Brown et al. 2006). They can be experienced *directly* (provisioning food, freshwater, and cultural and recreational opportunities), or *indirectly* (regulating floods or climate or supporting the other services through soil formation or nutrients) (Millennium Ecosystem Association 2005; Chapin this issue).

Creative experiments are bringing values of ecosystem services into the marketplace, including carbon markets, wetland and habitat banking, water temperature credits, certifications, and tax incentives (Wunder 2005). Market values have helped raise awareness for ecosystem service contributions to quality of life, and help harness funds for their protection. Achieving these outcomes for wilderness involves particular challenges. This article discusses four of these challenges.

Broadening the Methods

One challenge is that reducing a multifaceted issue such as wilderness to the market is by nature a subjective and exclusionary process (Funtowicz and Ravetz 1994; Funtowicz et al. 1999), one that will reflect only a subset of the many values associated with wilderness around the world. When Costanza et al. (1997) estimated the value of the world's ecosystem services as US\$33 trillion, 1.8 times the world's GDP, some logically wondered how people's willingness to pay could exceed what they had (Bockstael et al. 2000). The overreliance on certain methodologies can obscure the pos-

sibility that the value of the commons is greater than the sum total of all the things we own as individuals. In addition to neoclassical economic tools, social science deliberative and consensus methods, multicriteria and conjoint analysis, and ecological pricing (e.g., energy and exergy) can elucidate and convey values from multiple perspectives (Patterson 2005). These are necessary to relating willingness-to-pay to the market, the market to the economy, and the economy to wilderness.

Distinguishing Growth from Development

The term *economic growth* is often used interchangeably with economic development (Daly 1977), but with different implications for wilderness (Czech 2000). *Growth* (a quantitative attribute) involves increasing economic activity, commonly a result of increasing population and/or per capita energy/material consumption. Technology often does not fully mitigate the impacts of growth, and sometimes we allow the negative impacts to be borne out in future generations. The increasing land areas and use intensity needed to support economic growth can ultimately compete with, or adversely impact wilderness. This occurs not only at geographic boundaries (White et al. 2000), but also with systemic changes in climate, species dynamics, and soil and water transport. In contrast, *development* (a qualitative attribute) can be

achieved by economic rearrangement, in theory improving the ability of wilderness and the human-made economy to coincide. This must be the center of our focus if economic tools are to be harnessed effectively from and for wilderness. Accounting ecosystem services from wilderness can help to distinguish these qualitative improvements.

Developing Creative Markets, Flexible Institutions

The characteristics of various goods and services affect the ease with which market-based tools can elicit their value. Marketed goods are most often *excludable* (a legal concept that allows an owner to prevent another person from using the asset), and rival (where consumption or use reduces the amount available for other people), whereas most ecosystem services are nonexcludable, and nonrival (see Daly and Farley 2004 for applications). To some extent, social agreements can engineer excludability or rivalness, or create a proxy (consider carbon "credits") to make ecosystem services marketable. Wilderness (often on public land) requires additional creativity because most market-based mechanisms are salient to private lands. That said, offsets elsewhere can benefit the wildland network as a whole, and ecosystem services that are not marketable (e.g., biodiversity) can be bundled to one that is (e.g., water temperature credits).

Regulations (laws and standards), market incentives, information (e.g., certification), and institutional flexibility all influence the longer standing success of attempts to bring wilderness attributes to market. Simply because the market is trading carbon credits in quantity does not mean abatement is occurring. Market price for carbon was more than halved in April 2006 when European countries set first-round emission targets too high.

Cultivating Socially and Environmentally Just Markets

Links between wilderness and ecosystem services often involve broad spatial scales

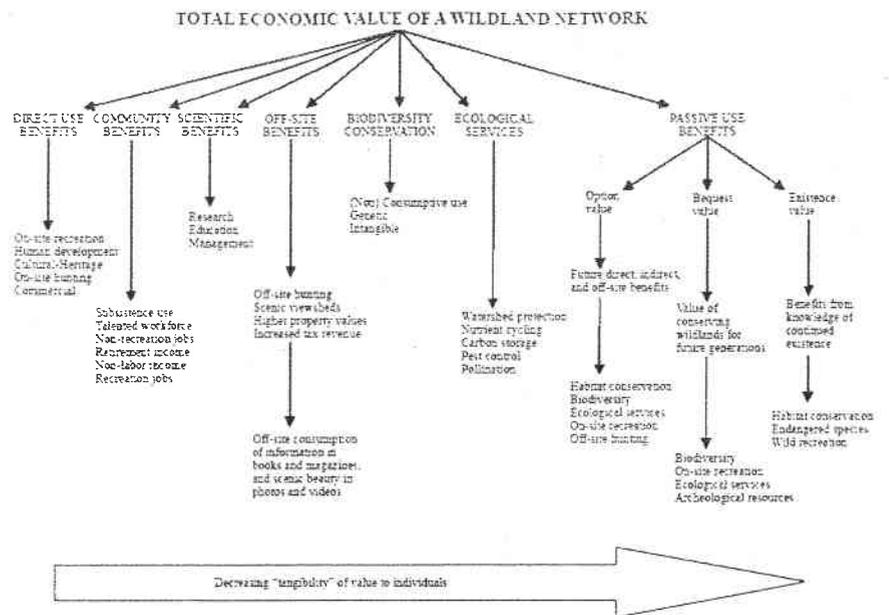


Figure 1—Morton's (2000) total economic valuation framework for estimating wilderness benefits based on seven categories, arranged from left to right in order of decreasing tangibility to humans

that are rarely congruent with market and property boundaries. Time lags and feedback loops can also muddle the cause-effect relations needed to reflect marginal gains. Wilderness affects ecosystem services and vice versa: forest loss in Amazonia reduces rainfall in Texas (Avisar and Werth 2005), and carbon emissions from cities affect Arctic wilderness (Bachelet et al. 2005).

Conditions that satisfy market efficiency don't include environmental sustainability or socially just distribution (Daly and Farley 2004). For the world's poorest, ecosystem services provide "natural insurance" for people living in or near wilderness as has been documented in Peru, the Amazon (Takasaki et al. 2004), Knuckles Wilderness in Sri Lanka (Gunatilake et al. 1993), and others (Pattanayak and Sills 2001). Despite this, wilderness conservation has at times been cast as elitist, because demographic disparities exist in those who access it (Johnson et al. 2004). Exclusive focus on direct (rather than indirect or nonuse) benefits can obscure important distributive justice benefits of wilderness.

Conclusion

Wilderness contributes to indirect eco-

nommic value through broad-scale ecosystem services, buffering severity and directionality of environmental change, and helping us understand the way nature works. One barrier to stemming the losses of ecosystem services and wilderness alike is an inability to account for their nonmonetary contributions to quality of life, or the damage costs to be incurred when they are lost.

Broadening assessment of value to include the indirect (public) goods and services can prevent assets of "the commons" from taking a backseat to private profit, *sensu* Hardin (1968). This article has mentioned four challenges particular to wilderness: ensuring that the market and willingness-to-pay is not the only way we elucidate economic value, distinguishing economic *growth* (a quantitative goal) from economic *development* (a qualitative goal), employing creativity and skill with economic instruments and flexibility with social institutions, and looking beyond market efficiency to social and environmental justice issues.

The economic approach is not for everyone. If the Russell brothers had been asked to put a dollar value on wilderness, they probably would have responded with a public moaning. Yet the market is already valuing wilderness by way of a

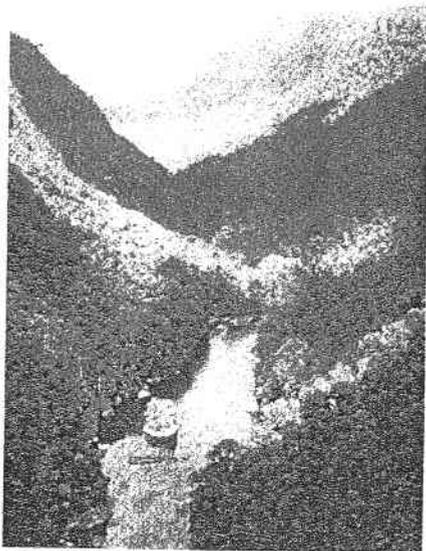


Figure 2—Pristine rain forest in Guyana. Loss of rain forest in South America has global impacts, including decreasing rainfall in the southern United States.

very few commodified and direct-use values. Progress from and for wilderness is perhaps most hindered when we do not have any new or compelling tools with which to construct a vision for the future. More use can be made of economic instruments without eclipsing values in social, cultural, or ecological terms.

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Figure 3—Pollution from large cities affects both polar regions. This is especially true of fast-industrializing nations such as South Africa, which have many coal-fired power plants feeding the city of Johannesburg and surroundings.

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