The Economics of Wilderness

Overcoming Challenges, Seizing Opportunities in Europe

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Abstract: Wilderness protection is a relatively new concept in Europe. Nonetheless, there have recently been several policy successes with respect to the protection of Europe's last remaining wilderness areas and the promotion of the restoration of wilderness attributes in other areas. Ecosystem services analysis and valuation are progressively becoming important for protected area management, promotion, and expansion worldwide. In addition to their intrinsic spiritual, landscape, and biodiversity values, wilderness areas can offer several sustainable economic, social, cultural, and environmental benefits to local European communities, landholders, some business activities, cities, and society in general. However, despite the progress recently made in understanding the values of ecosystem services in a range of contexts, there are relatively few studies providing a comprehensive analysis of the bundle of ecosystem services generated by European protected areas. Houdet and Kun (2012) recently provided a better understanding of the economic benefits and costs of European wilderness areas to European stakeholders. Indeed, although TEEB (2010) reports have successfully mainstreamed concepts such as the economic values of nature and payments for ecosystem services (PES) to support effective protected area (PA) management, tangible mechanisms and tools are needed by PA managers to help them engage with stakeholders to achieve ecological and financial stability.

Wilderness in Europe

Wilderness protection is a relatively new concept in Europe. Recently, however, there have been several policy successes with respect to the protection of Europe's last remaining wilderness areas and promotion of restoration of wilderness attributes in other areas. A special report on wilderness was adopted in 2009 by a majority of the European Parliament. This notably led to the development of an Agenda for Europe's Wilderness and Wild Areas ("Message from Prague," www.panparks.org/learn/wilderness-resource-bank/an-agenda-for-europes-wild-areas-message-from-prague), outlining 24 tangible recommendations. This also provided a welcome mandate for European conservation NGOs to strengthen work for wilderness. In 2010, the NGO community formed a Wilderness Working Group (WWG) chaired by a representative of Europarc Federation to develop a wilderness definition for a multicultural continent and prepare a set of criteria for a wilderness register for Europe. The WWG finalized this process in 2012 and agreed on the following definition: "Wilderness areas are large unmodified or only slightly modified natural areas, governed by natural processes, without human intervention, infrastructure or permanent habitation, which should be protected and overseen so as to preserve their natural condition and to offer people the opportunity to experience the

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spiritual quality of nature." The WWG also set the minimum size requirement at 3,000 hectares (7,410 acres).

It is believed that only 1% of Europe's land territory remains in a relatively pristine status. At a recent European Commission workshop it was suggested that 13% of the Natura 2000 (N2000) network is managed to protect wilderness attributes. The N2000 is a network of areas across European Union (EU) Member States established for biodiversity protection. The primary aim of the network is to guarantee long-term survival of Europe's most valuable and threatened species and habitats. This network contains Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also includes Special Protection Areas (SPAs) that are designated under the so-called Birds Directive, approved in 1992.

It must be noted that the N2000 network is not a system of strict nature reserves where all human activities are excluded. As the N2000 network covers roughly 17% of the land territory of the EU Member States, we can infer that wilderness areas may cover around 2% of the 27 member states. This clearly underlines our lack of accurate information and constitutes a real barrier to enhancing European wilderness protection. This in fact highlights why the "Message from Prague" included clear recommendations to improve the scientific background for wilderness protection in Europe, including mapping of wilderness and linking societal benefits to wilderness protection.

Ecosystem Services of Wilderness Areas

In addition to their intrinsic spiritual, landscape, and biodiversity values, wilderness areas can offer several sustainable economic, social, cultural, and environmental benefits to local European communities, landholders, some business activities, cities, and society in general. However, the ecosystem services linked to wilderness are not exclusively provided by wilderness. Depending on their ecosystem characteristics and dynamics as well as their spatial configuration in relation to human populations and economic activities, some of the most significant benefits provided by wilderness may contribute to many important regional regulation and cultural ecosystem services, including:

- Addressing climate change through carbon sinks/sequestration;
- Providing clean water, water purification, and flood mitigation services;
- Growing nature-based tourism and job opportunities in rural landscapes; and
- Providing opportunities for youth development, education, and health care, and acting as places of inspiration, renewal, or recreation far from the bustle and pressure of modern stressful urban lives.

The exploitation of certain provisioning ecosystem services from wilderness areas in Europe – such as harvesting timber, extracting minerals, using land for food production/vegetation for livestock grazing, and water resources for development opportunities – may be detrimental to other wilderness values. In the Protected Area Network (PAN) Parks certified wilderness areas in Europe (see "Principles and Criteria" at www.panparks.org/learn/partnerships-for-protected-areas/apply-for-verification), management authorities restrict access to and use of provisioning resources, as well as prohibit infrastructure development and certain recreation activities (see table 1). Therefore, legally protecting areas worthy of wilderness status is highly likely to impact certain stakeholder groups with preexisting economic or social uses of ecosystem services (loss of benefits) or others that are looking for new development or use opportunities. In other words, stakeholders may depend and impact on different ecosystem services from wilderness areas, whether legally protected or worthy of legal protection. The effective protection and management of wilderness areas calls for efficient stakeholder engagement at local, regional, and (sometimes) international levels. To that end, the economic valuation of ecosystem services can be a very useful tool.

Benefits and Costs of Wilderness Protection

Ecosystem services analysis and valuation are quickly becoming important for protected area management, promotion, and expansion worldwide (Hein 2011; Kettunen et al. 2009). This is, first, because the socioeconomic benefits of protected areas are often not quantified, and they may be underestimated in policy-making and land-use planning (e.g., Tallis et al. 2009). This is critical given the current economic crisis that is leading to further pressures on government budgets and hence on the budget available to maintain existing protected areas or create new ones. Second, integrated ecosystem management has become an integral part of protected area management. It requires the provision of different types of ecosystem services simultaneously to satisfy the needs and aspirations of different stakeholder groups. As previously argued, many protected areas provide additional benefits to their primary goal of biodiversity conservation so that the total value of their ecosystem services can be divided into two components: the added value

Table 1 – Use status of ecosystem services in PAN Parks certified wilderness areas.

Theme	Ecosystem services class	Use status
Provisioning	Nutrition	Use forbidden, apart from extensive livestock grazing in appropriate areas
	Materials	Use forbidden: e.g., no mining, no forest exploitation
	Energy	Biomass/minerals extraction and energy production forbidden
Regulation and Maintenance	Regulation of wastes	Benefits to various stakeholders: e.g., assimilation of effluents in soils and plants
	Flow regulation (natural risks)	Benefits to various stakeholders: e.g., erosion control, wind breaks, flood control
	Regulation of physical environment	Benefits to various stakeholders: e.g., global and local climate regulation, water purification, air quality purification, soil structure and quality maintenance
	Regulation of biotic environment	Benefits to various stakeholders: e.g., maintenance of habitats and population sources for many species with positive impacts on economic activities, including pollination services (wild bees) and the regulation of pathogens
Cultural	Intellectual and experiential	Only wilderness recreation (hiking) and ecological research opportunities; no hunting and motorized access
	Symbolic	Spiritual and heritage benefits

of designation and the value of services maintained without designation (see figure 1).

However, despite the progress recently made in understanding the values of ecosystem services in a range of contexts, there are relatively few studies providing a comprehensive analysis of the bundle of ecosystem services generated by European protected areas (Gaston et al. 2008; Jongeneel et al. 2008) as well as the associated management and opportunity costs (see table 2). Studies on European forest ecosystem services are rare (Elsasser and Meyerhoff 2007; EUSTAFOR and Patterson 2011).

The situation appears even worse for European wildernesses, which are a subset of the larger network of protected areas, thus resulting in a general lack of understanding of the actual and potential economic benefits and costs associated with their specific management frameworks and rules. Unlike some protected areas that may allow for some controlled economic activities to take place within their borders (e.g., hunting, harvesting of wild food and medicinal products, motorized recreation access), legally protected wilderness areas provide

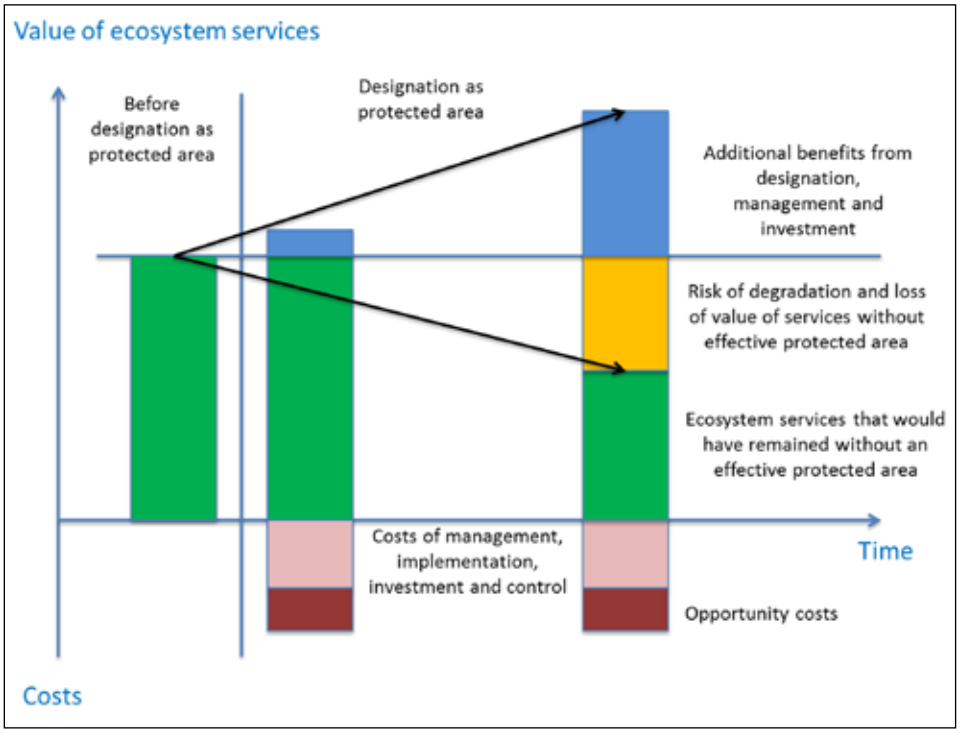

Figure 1 – The total value and costs of protected areas before and after designation (ten Brick, in Kettunen et al. 2009).

Table 2 – Examples of protected area benefits and costs accruing at different scales (Kettunen et al. 2009).

	Benefits	Costs
Global	Dispersed ecosystem services (e.g., climate change mitigation/adaptation)	Protected area management (global transfers to developing countries)
	Nature-based tourism	Alternative development programs (global transfers to developing countries)
	Global cultural, existence, and option values	
National	Dispersed ecosystem services (e.g., clean water for urban centers, agriculture, or hydroelectric power)	Land purchase
		Protected area management (in national protected area systems)
	Nature-based tourism	Compensation for forgone activities
	National cultural values	Opportunity costs of forgone tax revenue
Local	Local ecosystem services (e.g., pollination, disease control, natural hazard mitigation)	Restricted access to resources
		Displacements (people, economic activities)
	Local cultural and spiritual values	Protected area management (private landowners, municipal land)
	Consumptive resource uses	Opportunity costs of forgone economic activities
		Human-wildlife conflict

more limited income opportunities for stakeholders, especially local communities. They may also generate additional management and opportunity costs.

As argued by Kettunen et al. (2009), "Not all protected areas are expected to generate income to help local communities, but where the opportunity exists they can make an important contribution to livelihoods. … Protected areas also impose costs on society, arising from restricted access to resources and foregone economic options." When making the case for effective protection and management of wilderness areas toward securing both their ecological and financial viability, their costs must be recognized alongside their benefits. This calls for embedding the valuation of biodiversity and ecosystem services into the cost-benefit analysis (CBA) of existing and proposed protected wilderness areas to allow stakeholders to better understand the trade-offs – at the local, national, and international levels – between the benefits from legitimate (authorized) consumptive and nonconsumptive uses of their ecosystem services and the associated management and opportunity costs.

For all these reasons, wilderness managers and promoters recommend putting emphasis, within the scope of full CBA, on accounting for the costs of inaction (i.e., the costs of not protecting the ecological assets and ecosystem services underpinning wilderness values). This would imply:

1. Accounting for the potential loss of non-monetary values of all key ecosystem attributes (assets, functions, processes, and services) contributing to wilderness status (e.g., naturalness assessment methods, Winter et al. 2010);
2. The mainstreaming of the biodiversity no-net-loss/enhancement principles for the effective management and restoration of wilderness ecosystem attributes; principles borrowed from research on the impact mitigation hierarchy, biodiversity offsets, and ecological equivalency accounting (e.g., Germaneau et al. in press; Quétier and Lavorel 2011);
3. As appropriate given the local circumstances, accounting for the costs:

- Of the potential loss (or degradation) of key ecosystem attributes if various development opportunities (e.g., hunting, wood harvesting, dam construction) had not been forgone (i.e., no effective legal protection for the wilderness area). This would amount to assessing the added value of wilderness area designation as avoided damage costs to wilderness values (see figure 1) and would be instrumental for comparative analysis with the opportunity costs

of wilderness area protection.

- Of restoring lost wilderness values: costs of future increases in ecological values due to management and investment (see figure 1).

The resulting coupled non-monetary and monetary information could then be used as tools for engaging with stakeholders, from national/state treasury for budgetary negotiations to local communities for comanagement purposes. Indeed, exclusively relying on economic valuation of ecosystem services may not always constitute the most efficient approach to make the case for promoting the expansion and ensuring the ecological, social, and financial viability of wilderness areas. Two major risks may occur. First, it is easy to spend large amounts of money on economic studies that attempt, against all odds, to assign monetary values to changes in ecosystem services. Second, it is easy for stakeholders to misuse the results of these studies in ways that can undermine support for wilderness protection, for instance through overestimation of direct use values, the underestimation of bequest values, or the inability to demonstrate short-term economic benefits to some users of areas warranting wilderness protection. As argued by Farrell (2007), the goal is to articulate accurately the appropriate set of monetary and non-monetary values to various stakeholder groups in different contexts (i.e., economic valuation is not an end in itself). Therefore, it may sometimes be more useful or practical to make decisions based on ranking or prioritizing the expected benefits of ecological investments. These can be used to set priorities by determining the greatest benefits per euro spent, without resorting to monetary valuation of biodiversity.

Making European Wilderness Areas Both Ecologically and Economically Sustainable

Making wilderness areas ecologically sustainable in the face of rapid change (e.g., climate change, land conversion) in Europe involves both their effective protection and significant expansion. Provided management and restoration objectives are clearly defined, the framework of Natura 2000 does provide enough flexibility to implement nonintervention management techniques and hence secure wilderness areas in the long term. This would also imply investing in restoration of degraded and fragmented landscapes: approximately 200,000 kilometers[2] (77,220 sq. miles) of farmland could be abandoned by 2050, which offers huge opportunities for restoring wilderness conditions (Secretariat of the Convention on Biological Diversity 2010).

Wilderness restoration could occur both naturally and with human assistance throughout Europe. Examples of the former include wolves crossing from Poland into Germany, with at least 30 of them currently inhabiting Saxony. Depending on the history of the protected area, intervention may be needed only for a limited time in order to undo past damages, as in the case of some old-growth forests where the elimination of pressure due to logging and grazing will suffice (passive restoration). However, active restoration may be needed in certain circumstances, especially where more profound changes have taken place, resulting in the loss of various ecological components. Such active restoration measures may involve the reintroduction of extinct species, the control or removal of nonnative and invasive species, prescribed burning, replanting to hasten forest regeneration, or seedling selection. However, given the scale of current ecosystem damages, cost-efficient ecological restoration should play an important role in wilderness area expansion in Europe. The current financial crisis in Europe generates panic reaction among politicians, and they want to provide more opportunities to traditional exploitation of protected areas. For instance, a new zoning proposal discussed in the Czech Parliament would limit the size of nonintervention management zones while allowing for further fragmentation of wilderness by making areas available for ski resort development projects.

Ecosystem services analysis and valuation are progressively becoming important for protected area management, promotion, and expansion worldwide.

The emergence of payments for ecosystem services (PES) seems highly appealing for the sustainable financing of European wilderness areas. Combining strategies for mitigating biodiversity and ecosystem services (BES) loss (OECD 1975; SLWRMC 1999) and remunerating BES supply (Aretino et al. 2001; Hackl et al. 2007; Siebert 1992) opens the door to new forms of arbitrage with respect to land-use planning, including the expansion of wilderness areas. This approach sees ecosystem services provision becoming an integral part of interactions among economic agents (Houdet et al. 2012).

If the various ecological and institutional challenges (Perrings et al. 2009; Pascual et al. 2009) for economic agents to fully embrace markets for biodiversity and ecosystem services

are overcome (see table 3), payments for ecosystem services could provide significant support for the sustainable financing of European wilderness areas. This would imply diversifying income sources for PA, in addition to public subsidies, and may include:

- Payments for certified wilderness recreation services (e.g., PAN Parks Foundation's tourism model);
- Payments for water-related and natural-risk regulation services (direct payment by beneficiaries);
- Payments for carbon-related services (payments by polluters – voluntary carbon offset market);
- Voluntary payments for biodiversity conservation: i.e., payments by organizations seeking to improve their brand or image (e.g., Green Development Initiative, – gdi.earthmind.net/); and
- Offset measures (mitigation credits) for residual development impacts (polluters pay – regulated impact mitigation markets).

Combining these payments is also called stacking PES, which can be contrasted with bundling ecosystem services for a single payment, such as a carbon offset project, with both Verified Carbon Standard and Climate Community Biodiversity Standard (www.climate-standards.org/) certification, which makes available for sale carbon credits with social and biodiversity cobenefits. PES may be stacked in different ways: (a) multiple payments for different ecosystem services; (b) one or more PES with one offset measure; and (c) multiple offsets or mitigation credits. Furthermore, stacking PES may occur in several ways (Cooley and Olander 2011): (1) horizontal stacking, which means selling credits from distinct, nonspatially overlapping parts of a single property; (2) vertical stacking, which involves multiple payments for a single management activity on spatially overlapping areas (i.e., in the same hectare: e.g., planting a forested riparian buffer to receive both water quality credits and carbon credits); and (3) temporal stacking, which implies one main management activity but payments separated in time (e.g., restoring habitat to receive endangered species credits, and then later receiving carbon offset credits – or vice versa). However, wilderness area managers or promoters should take great care in avoiding the potential pitfalls of stacking PES. Indeed, where offset and mitigation programs are part of the stack, there is potential for negative overall ecosystem service outcomes, and this is because these offset credits allow others to impact the environment (Cooley and Olander 2011).

What Way forward for Wilderness Managers and Promoters?

First, we need to have more information to effectively engage with stakeholders on wilderness protection decisions. Indeed, there is a general lack of understanding of the actual and potential economic benefits and costs associated with wilderness designation. A comprehensive comparative assessment of the benefits and costs of use and non-use of ecosystem services from wilderness areas and other types of protected areas in Europe is clearly warranted. For instance, this would be

Table 3 – Market mechanism options for biodiversity and ecosystem services (Houdet et al. 2012; adapted from Parker and Cranford 2010).

	Beneficiaries pay	Polluters pay
Ecosystem services	**Direct PES** Beneficiary pays for ES that flow to them. ES are not wholly public, but can be captured to some degree by paying beneficiaries (bilateral arrangements – e.g., payments for watershed services)	**ES markets** Polluter pays for damage they have done by buying an offset/credit. The beneficiaries are the population that receive the ES and are usually different from the population that is paying (bilateral/market arrangement -e.g. water quality trading, forest carbon storage)
	Indirect PES Consumers of final goods and services pay a premium for the sustainable ecosystem management practices higher in the supply chains (e.g., organic food)	
Biodiversity	**User fees** Beneficiary pays for access to/use of in situ biodiversity. Direct use biodiversity benefits accrue to those who pay for access (single payments – e.g., ecotourism, hunting licenses)	**Impact mitigation markets** Developer pays for damages it has done to biodiversity (habitats, species) by buying an offset/credit (bilateral/market arrangement – e.g., biodiversity offsets/banks, tradable fisheries quotas)

instrumental to establishing effective policies and mechanisms for the equitable sharing of costs and benefits arising from the establishment of protected wilderness areas, as well as create appropriate win-win incentives to overcome opportunity costs for affected stakeholders where this is justified by broader benefits.

Second, we need to make it clear that economic valuation is not a panacea, as putting a monetary value on non-use wilderness attributes is potentially both ethically and technically questionable (Farrell 2007). It is often more useful or practical to make decisions based on ranking or prioritizing the expected benefits of ecological investments. Although monetary measures of ecosystem benefits may be necessary to justify spending on wilderness, non-monetary indicators of the expected socioecological benefits can effectively be used to set priorities by determining the greatest benefits per euro spent. European wilderness area managers and promoters need to master such coupled economic and non-monetary accounting tools for effective negotiation outcomes: In other words, capacity building is critical.

Finally, although emerging markets for ecosystem services seem attractive, proactive actions and lobbying would be required to embed them into strategic conservation planning. The recent budget crises in several European countries will put pressure on efforts to secure the ecological and financial sustainability of wilderness. In addition to sustainable state subsidies, stacking payments for ecosystem services could well constitute new financing mechanisms for cost-effective wilderness conservation, restoration, or expansion. This, however, will require creative land-use planning and clear institutional mechanisms.

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