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## Protected areas, conservation and tourism – financing the sustainable dream

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Many commentators suggest that tourism could help fund the ever growing number of protected areas. The traditional reliance on government sources to support protected areas is increasingly untenable, in both the developed and developing world. This paper reviews the relationship between tourism and protected areas to assess opportunities for sustainable funding to assure effective stewardship. It explores a range of innovative and creative alternative funding mechanisms which could be consistent with a positive evolving relationship between tourism and protected areas. An outline classification of four protected area archetypes for management and funding purposes is suggested, based on a combination of visitation and biodiversity levels. To service the management of those four types, a series of non-government revenue streams are explored such as payments for ecosystem service (ES), environmental mortgages, intrinsic value funding, carbon abatement funding and research dividend funding. Issues discussed include: the willingness to pay on the part of potential visitors, the potential impact of fees on visitation, “quarantining” particularly valuable ecosystems from visitation and intrinsic value funding, the unpredictability of environmental mortgages and the potential stability of ES payments. Further research is required in data analysis and into the design of land tenure systems and regulatory mechanisms.

**Keywords:** nature-based tourism; protected areas; ecosystem services; alternative funding mechanisms

### Introduction

Protected area managers confront a multiplicity of challenges, each of which warrants research and the formation of a strategic response (Eagles, 2014). Eagles has argued that 10 issues warrant particular attention: visitor use monitoring; park tourism economic impact monitoring; park finance; professional competencies for tourism management; building public support; visitor satisfaction; licenses, permits, leases, and concessions for tourism; pricing policies; management capacity; and park tourism governance (p. 1). This paper reviews park finance and related issues.

With growth in the number of protected areas, the funding provided by Government sources is increasingly inadequate (Adams et al., 2008; Buckley, 2003; Eagles et al., 2012; Mitchell, Wooliscroft, & Higham, 2013; Saayman & Saayman, 2006). This shortfall has highlighted the importance of ensuring effective visitor management within protected areas to maximise the environmental and economic returns that are attributable

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to – or obtainable from – nature-based tourism (Eagles & Hillel, 2008). In the light of such challenges, it is timely to explore prospective non-government funding sources and related models of governance, management and stewardship which can strike an appropriate balance between environmental conservation and visitor servicing (Buckley, 2003; Darcy, Griffin, Crilley, & Schweinsberg, 2010; Eagles et al., 2012; Inglis, Whitelaw, & Pearlman, 2005; Jamal & Stronza, 2009; Lindberg & Denstadli, 2004; Mitchell et al., 2013; Wilson, Nielsen, & Bultjens, 2009).

This paper reviews the sources of revenue that can support the management of protected areas with particular reference to tourism. A classification of protected areas is proposed on the basis of level of visitation, visitor uses and the value attributable to biodiversity. The authors then introduce the concept of ecosystem services (ES), which has become increasingly popular for estimating the values attributable to ecosystems. Various methods of raising revenues from ES are described, including payments for ES, and environmental mortgages. There is also a discussion of user payments and licensing fees as a means of raising money from recreational activities within protected areas. The paper considers the merits of using an ES approach for fundraising with a view to supporting protected areas through mechanisms such as carbon abatement schemes. In the final section, a range of governance, visitor management and marketing approaches are proposed, based on the protected area classifications mentioned earlier.

### **The relationship between tourism and protected areas**

With the growth of nature-based tourism and ecotourism, and the businesses associated with these activities, many protected areas have acquired importance as tourism destinations (Dharmaratne, Sang, & Walling, 2000). However, the relationship between tourism and protected areas is often complex because of the distinct economic focus of tourism and the contrasting conservation focus of protected areas (Wilson et al., 2009). Where protected areas have been created to protect and conserve nature this may be incongruous, with the negative impacts that are sometimes associated with visitation and the profit-seeking orientation of commercial tourism businesses creating a use-conservation gap (Jamal & Stronza, 2009; Wilson et al., 2009). And, linked to increasing and changing visitor activities within protected areas, visitors have demanded improved facilities and services (Department of Conservation, 2013; Karanth & DeFries, 2011; South African National Parks, 2012; Wang et al., 2012). While visitation has levelled or even decreased in the most established protected areas within the developed world, increased visitation is of major importance for the more recently established protected areas commonly found within the developing world (Karanth & DeFries, 2011).

The increasing expectation that protected areas will be self-funded is placing pressure on those with responsibility for managing them (Buckley, 2003; Darcy et al., 2010; Eagles et al., 2012; Inglis et al., 2005; Lindberg & Denstadli, 2004; Mitchell et al., 2013; Wilson et al., 2009). At the same time, protected area authorities have been criticised for overemphasising restrictions and prohibitions rather than taking a proactive, sustainable development approach to management (Sharpley & Pearce, 2007). This problem is sometimes exacerbated by a history of poor communication between the tourism industry and protected area authorities (Sharpley & Pearce, 2007). These combined pressures suggest that innovative means are needed to fund and manage protected areas. Irrespective of management arrangements, there is a finite capacity for tourism revenues to finance-protected areas. This is particularly pertinent since the presence of tourism infrastructure and visitation can have detrimental effects on biodiversity. The remediation of such

detrimental effects must be funded by tourism as the cause of the initial problem (Buckley, 2003; Cater et al., 2008; Wilson et al., 2009). To determine the appropriateness of particular management and finance models, the protected areas must first be classified on the basis of both visitation and biodiversity.

### Classifications of protected areas

The protected area classifications that have been used in this paper are drawn from the work of Inglis et al. (2005), the International Union for Conservation of Nature (IUCN) (Day et al., 2012) and the Ontario Provincial Parks (1992). The approach considers two main factors which are treated as two independent dimensions; level of visitation and maintaining biodiversity. This classification reflects interconnectedness between tourism activities and natural assets in protected area settings. Though natural assets attract tourism, the level of visitation will influence their ultimate sustainability. Visitation by tourists may assist biodiversity through its educative and revenue-generation activities. However, excessive visitation can damage natural assets, which in turn reduces the intrinsic value of the area and its attractiveness for subsequent visitation (Wearing & Neil, 2009). Implementation of this model requires the availability of comprehensive data about both protected area ecologies and tourist recreational activities. The IUCN typology of protected areas has played a key role in developing the biodiversity dimension. Four protected area archetypes are presented in Figure 1, derived from the application of these classifications.

The outline management typology that is presented here contrasts with some established approaches to protected areas by proposing the use of natural values, carrying capacity and potential visitation as a means of classification and by recommending appropriate management strategies. It is evident that certain park archetypes inform both management strategies and revenue generation models. Higher use – lower environmental value parks for example could have potential for picnic grounds where visitors pay for services such as car parking, and in some cases for low impact self-catering services. In contrast, settings which are characterised by higher environmental values which necessitate stricter visitor movement controls could generate funding by licensing appropriately trained and skilled organisations to conduct guided tours and activities that are compatible with high-value

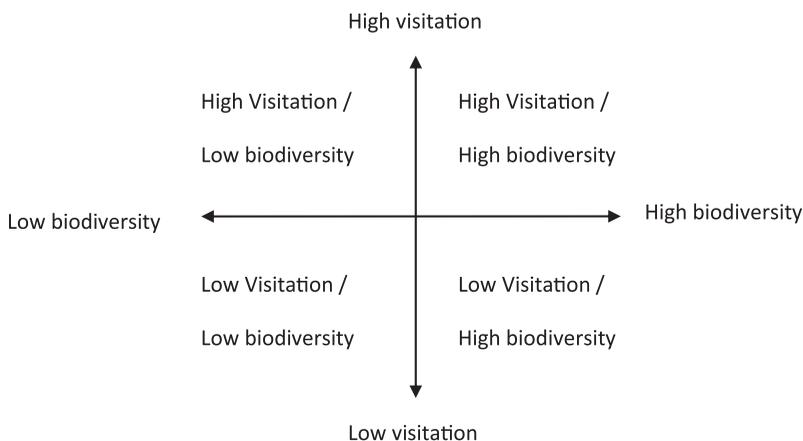


Figure 1. Classification of protected areas by visitation and biodiversity.

protected areas. Since the model is tourism- and visitor-management oriented, it offers the prospect of evolving and advancing management practices that maximise revenue in appropriate zones whilst protecting key ecological characteristics.

In this paper, it is argued that the well-established practice of using semi-autonomous government agencies to manage protected areas may not be sustainable in the longer term (Eagles & Hillel, 2008; Wilson et al., 2009). Alternatives include direct ownership by government, the community, non-profit organisations, for-profit organisations or multi-stakeholder ownership and management (Eagles, 2009). The suitability of each of the various alternatives depends on the circumstances of each protected area. However, it is widely accepted that collaboration between relevant stakeholder groups will be both beneficial and worthwhile (Jamal & Stronza, 2009). Some protected areas have already implemented alternative structures and mechanisms which are intended to increase funding through mechanisms such as private company sources, local community-based organisations, trusts and royalties (Eagles et al., 2012; Inglis et al., 2005; Laing, Lee, Moore, Wegner, & Weiler, 2009). Though Eagles has contributed various insights into the use of “para-statal” models, there is scant information about the various non-government and partnership models of protected area governance that can support strategic decision-making and such approaches warrant further exploration (Eagles & Hillel, 2008; Inglis et al., 2005; Wilson et al., 2009). According to Eagles and Hillel (2008) private-public partnerships offer a viable option for improving the funding of protected areas and for making better use of revenues arising from private tour operators. This approach may involve granting additional autonomy to the local agencies responsible for managing protected areas (Eagles & Hillel, 2008). The benefits associated with using a partnership approach between such stakeholders include income generation, cost effectiveness and an expanded range of appropriate visitor activities and facilities (Wilson et al., 2009). To date no comprehensive methodology and theoretical framework has been proposed to evaluate the outputs of protected areas (Adams et al., 2008; Eagles & Hillel, 2008; Hughes & Carlsen, 2008). On this basis it has not yet been possible to undertake a comprehensive operationalisation of the model. In addressing this gap, the following section of the paper explores the attribution of value to the ES that are derived from protected areas.

### Valuing protected areas

Policy-making for the environment generally, and for conservation in particular, has typically attempted to constrain development by preserving environmental values. This has prompted the application of a “polluter pays” approach, with the levying of environmental taxes to mitigate the negative impacts of business-related developments in protected areas (Houdet, Trommter, & Weber, 2012). Environmental taxes are typically targeted at activities (usually levied by type and volume) that have been shown to impact negatively on the environment. Such environmental imposts may include energy taxes, transport taxes, pollution taxes and resource taxes. In certain circumstances environmental subsidies have been used to induce behavioural responses, leading to a reduction in the activities which have negative environmental effects, thereby producing mutually beneficial outcomes.

Despite the compelling logic to adopt such approaches, there is rarely any guarantee that any revenues raised via “environmental taxes” will be spent on protected areas or even on the environment in more general terms. Palm and Larsson (2007) suggest that to avoid any adverse political consequences, any revenues that are raised from environmental taxes should be spent on the applicable protected area or on associated environmental

issues. A literature review on environmental economics suggests that alternatives to the “polluter pays” approach should be considered in order to realise the value of the preserved natural estate (Gómez-Baggethun & Ruiz-Pérez, 2011; Houdet et al., 2012; Norgaard, 2010).

The approach that has been described as economic valuation of ES attempts to translate environmental issues into the language of politics and economics (Chan, Satterfield, & Goldstein, 2012; Gómez-Baggethun & Ruiz-Pérez, 2011). Within this framework ES are the benefits that humans obtain from high-quality ecosystems such as clean air, clean water, agricultural goods or tourism expenditures (Engel, Pagiola, & Wunder, 2008; Heal, 2007; Liu & Costanza, 2010). Such ecosystems represent a stock of depletable natural capital which must be preserved so that it continues to deliver the resource and its inherent benefits (Heal, 2007; Norgaard, 2010). ES valuation refers to the provision of monetary incentives for conservation through the use of market mechanisms that manage the benefits and costs associated with protected areas (Gómez-Baggethun, de Groot, Lomas, & Montes, 2010; Gómez-Baggethun & Ruiz-Pérez, 2011; Norgaard, 2010). The prospect of attaching a monetary component to the valuation of such ecosystems provides conservationists with new arguments when debating with policy-makers and land managers.

There are three ways of classifying the benefits that may be extracted from protected areas when valuing ES. They are:

- *Consumptive benefits*: These involve the outputs of an ecosystem which constitute a form of consumption – for example, the clean air provided by forests and water provided by upstream sources;
- *Non-consumptive on-site benefits*: In this case benefits are derived from being on-site, but not actually consuming anything that is produced explicitly by the ecosystem – for example, recreation and tourism activities; and
- *Non-consumptive off-site benefits*: Though the beneficiaries do not visit the site in person, they benefit from knowing that the protected ecosystem exists. (Balmford et al., 2002; Engel et al., 2008; Heal, 2007; Spörri, Borsuk, Peters, & Reichert, 2006)

Equally, there are three main ways of stating the costs that are incurred by protected areas as follows:

- *Direct costs*. These refer to the establishment, conversion or enhancement of the site and its ongoing maintenance, especially in terms of providing tourism and recreational infrastructure.
- *Indirect costs*. These may refer to the costs of providing roads, or other services, to the site.
- *Opportunity costs*. Such costs arise from failing to engage in an alternative economic activity on the site, such as agriculture. (Balmford et al., 2002; Engel et al., 2008; Heal, 2007; Spörri et al., 2006)

Multiple approaches may be required to finance environmental protection, embracing activities that are both internal and external to the applicable protected area. The suitability of particular approaches in different settings will, to a large extent, depend on the scale and scope of the tourism industry involved. It is also worth mentioning two schemes which value consumptive benefits, namely carbon abatement and the valuation of

scientific discoveries deriving from the natural estate. In the case of carbon abatement schemes, receipts are generated based on the amount of carbon dioxide (CO<sub>2</sub>) which has been sequestered by the relevant protected area (Pagiola, 2008). The term “scientific discoveries dividend” describes the quantification of scientific research and discoveries that are derived from the natural estate. These may provide a means of valuing the conservation of protected areas that have high natural values, especially where they are associated with high commercial value, typically in cases where such discoveries lead to the production of highly marketable pharmaceutical materials, or to the discovery of rare species of flora and fauna (Dharmaratne et al., 2000).

Two further models have been used that involve tourism in protected areas: the money generation model (MGM) and the tourism impact model (TIM). The MGM considers tourist expenditures, expenditures by park authorities and regional multipliers. Through the use of input–output modelling, MGM can estimate economic benefits to the region and also the employment created by tourist activities occurring within the applicable area. The MGM determines employment generated as a function of total output and employment multipliers (Bultjens & Luckie, 2004; Driml, Brown, Ballantyne, Pegg, & Scott, 2011; Hughes & Carlsen, 2008; Saayman & Saayman, 2006).

It is suggested that visitors to protected areas merit inclusion within the model because they spend money and use resources and facilities in nearby locations and buffer zones as well as within the applicable protected area. On this basis it is important to consider the cost of resourcing such facilities. The TIM has been used by local governments to assess the extent to which finance is allocated to support visitor activities and facilities. TIM makes calculations attributable to tourism including visitor numbers, tourism expenditures, population and employment and the economic and budgetary impacts that would arise in the absence of tourism (Driml et al., 2011; Hughes et al., 2009).

Various investigations have been conducted to assess the economic valuation of parks. These studies have included Economic Benefits of National Parks and Other Reserves in New South Wales (Department of Environment, Climate Change and Water NSW, 2009) and The Economic Impact of Canada’s National, Provincial & Territorial Parks in 2009 (The Outspan Group Inc., 2009). The former used the travel cost method to estimate the economic value of parks, while the latter estimated economic impacts by considering direct, indirect, induced and tax impacts. The aforementioned methods for modelling the consumptive and non-consumptive economic benefits of protected areas may serve stakeholders in different ways and their applicability depends on the reasons for conducting the study (Driml & McLennan, 2010). Nevertheless, there is a strong impetus to make use of the values attributable to environmental services and tourism attractions in order to demonstrate the benefits of protected areas to key stakeholders and decision-makers and to enhance decision-making about the development and use of land within and around protected areas. The value of non-consumptive, off-site benefits can be estimated by measuring donations from any foundations that support a particular protected area (Dharmaratne et al., 2000). Such park “existence value” warrants further exploration, since it has the potential to produce imbalances between the funding of popular and less popular parks.

### **Payments for ecosystem services**

The method known as payments for ES (PESs) can be used to estimate the value attributable to ES. This is described as a “beneficiary pays” approach, wherein markets remunerate the providers of biodiversity and ES. The payments may be tied to any opportunity

costs (i.e. foregone revenues) (Gross-Camp, Martin, McGuire, Kebede, & Munyarukaza, 2012) or to economic benefits attributable to protected areas. The consequences of PES offer the prospect of shifting business community perceptions from a constrained view of biodiversity and ES to one that seeks sustainable, non-destructive business opportunities from and within the natural environment (Houdet et al., 2012). In certain circumstances the application of PES may offer an alternative to protection since payments may provide private landlords with an incentive to change their land use practices. This has been documented in Costa Rica (Marsden, 2000; Mayrand & Paquin, 2004). Such examples may be used to consider PES from a more proactive perspective thereby extending its potential applications to protected areas.

Coasean theory (Coase, 1960) offers one way of explaining the application of PES. According to this theory, a market bargaining process achieves the optimal societal solution in cases where transaction costs are low, irrespective of initial property allocations, including management rights. Such circumstances may obviate the need for direct intervention by governments, which have the reputation of acting slowly and involve the burden of excessive compliance costs. In practice though, PESs tend to be implemented and regulated by governments rather than by market mechanisms. Governments may play the role of providers of ES or else as buyers (Muradian, Corbera, Pascual, Kosoy, & May, 2010; Pascual, Muradian, Rodríguez, & Duraiappah, 2010).

Vatn (2010) has argued that, consistent with the treatment of most public or common goods, the application of PESs needs representative bodies to be able to exercise political power with a view to ensuring cost-effective transactions. He asserts that PESs, which are totally reliant on market mechanisms will be ultimately inefficient. However given that both approaches have tended to be unsuccessful in the longer term, the “either–or” debate may be fruitless (Norgaard, 2010; Slavíková, Kluvánková-Oravská, & Jílková, 2010). Instead of disputing whether it is more efficient to regulate PESs through government or through market mechanisms, it may be more appropriate to examine how institutions and markets can pursue sustainability through more effective collaborations. Gómez-Baggethun and Ruiz-Pérez (2011) and Vatn (2010) have suggested that debates about the use of market-related tools for conservation purposes often overlook the extent to which they are compatible with established national political and economic processes. Following the Coasean approach, there is a need for comprehensive information, but this is unrealistic in the case of many ecosystem-services-related projects. In the absence of research to identify and quantify the influential factors that apply within the particular ecosystem, many PES-related schemes are impractical and/or infeasible (Muradian et al., 2010; Pascual et al., 2010). Furthermore, PES will have minimal influence in cases where the owner of the relevant ecosystem cannot be identified, where there is no responsible party for the ecosystem, where the prevailing rules cannot be enforced by the state or where the owner is identified but has no management authority. The successful establishment of a PES scheme will depend on carefully designed property rights, on the availability of credit to finance protection and remediation programmes, and on a heightened awareness amongst relevant private landholders (Börner et al., 2010; Engel et al., 2008). It is clearly a challenge to monitor the effectiveness and efficiency of a PES on ES (Wunder, Engel, & Pagiola, 2008). Four main issues will need to be addressed if a PES is to be deemed effective and efficient and performance is to be monitored.

First, the environmental service must be a genuine consequence of the existence of a protected area (Engel et al., 2008). In the absence of any identifiable causal relationships between land use and ES provision, there is a prospect of developing projects that do not produce any demonstrable improvement in the applicable ecosystems. Next, beyond the

monitoring of landholder convergence to preferred land uses, it is important to monitor the performance of the ES itself. Third, non-compliance must be sanctioned (Wunder et al., 2008). Poor monitoring of PES compliance can lead to “goodwill” payments, instead of appropriately structured income sources involving a direct link between management decisions, the value derived and ultimate payments. Finally, it is important to give proper consideration to the monitoring of any leakages from the land that is enrolled in PES and to the permanence of applicable contractual obligations (Asquith, Vargas, & Wunder, 2007; Muradian et al., 2010; Pascual et al., 2010; Wunder et al., 2008; Wünscher, Engel, & Wunder, 2008).

### **Environmental mortgages and derivatives**

A number of sophisticated financing arrangements may be adopted other than macro-taxation and PES that can benefit any groupings that engage actively with protected areas, particularly in the case of indigenous communities. These may be helpful for addressing any existing deficiencies of access to economic opportunities. Mandel, Donlan, and Armstrong (2009) have argued that shortcomings within the US Endangered Species Act have led to the inefficient use of conservation dollars in that it (1) only provides conservation protection to distressed or rapidly declining species and (2) does not take full advantage of the market to reduce conservation costs. Environmental mortgages constitute a prospective offset-based response (Donlan, Mandel, & Wilcox, 2009) wherein interested stakeholders can secure funding at discounted rates in exchange for undertaking conservation.

Similarly, Donlan et al. (2009) suggest that new, derivative-based insurance products (financial instruments designed to allow the commoditisation and sale of risk) can provide investors with insurance against risk in exchange for fixed payments and thus support microfinanciers who provide access to capital, training and savings accounts. Modifications to these financial derivatives, which are used to distribute risk and stabilise forecasts across many corporate and social scenarios, could allow purchasers to take preventative action which simultaneously protects their investments and decreases the likelihood of the insured event. The latter might involve a decline in environmental well-being, such as the extinction of a species. In applying these approaches to protected areas and species, Donlan et al. (2009) have proposed that governments should issue modified derivative contracts to sell the risk of extinction of a species to market investors and stakeholders. Using the USA example of the endangered red-cockaded woodpecker (*Picoides borealis*), they showed how a biodiversity derivatives programme can play a proactive role in generating new funding, resulting in more cost-effective conservation, alignment of stakeholder interests and the creation of incentives for private conservation efforts.

However, the implementation of such arrangements need not be delayed until the threat of extinction is imminent. It may be beneficial for businesses and communities whose economic well-being is tied to the health of a protected area to access such funding mechanisms in support of sustainable development. By using such mortgage-based approaches, a community can access collateral capital that will provide opportunities to improve facilities such as visitor infrastructure while preserving natural environments. The loan is explicitly linked to identifiable environmental outcomes, notably the management of interest rates. If environmental conditions improve, the community or business receives loans at lower interest rates. In contrast, the interest rate increases accordingly where there is a decline in the quality of the ecosystem. While protected area authorities are usually required to undertake environmental assessments, measuring the quality of an

ecosystem is contentious, and a potential limitation to the application of environmental mortgages. Environmental mortgages are tied to environmental outcomes and may stimulate the tourism industry towards environmentally friendly behaviours (Heyniger & Donlan, 2012). However, according to Mandel et al. (2009), environmental mortgages are likely to face the following challenges:

- the need to amend environmental laws to allow derivatives to be issued;
- communication between stakeholders;
- calculating the risk of species extinction;
- prevention of price manipulations;
- ensuring long-term environmental stewardship;
- preventing harmful behaviour towards a habitat in the pursuit of financial benefit;
- attracting enough investors to cover costs; and
- obtaining and giving enough information about threatened species.

### **Tourism and environmental services**

To date, the most widely used tourism-related approach to funding protected areas has involved the levying of fees directly on visitors or through licensing commercial operators and the provision of concessions and leases. Fees provide a means of attaching a value to the direct use of protected areas (Buckley, 2003; Driml, 1997; Edwards, 2009; Thur, 2010). The levying of fees has been used widely for a variety of purposes, including: cost recovery, funding conservation activities, supporting local business opportunities, providing learning, interpretation and appreciation services, and managing visitor numbers (Buckley, 2003; Lindberg & Halpenny, 2001). There is an option of including a fee within tour or permit prices or collecting fees at the entrance to the protected area.

There is ongoing debate about the appropriateness of levying visitor fees in protected areas, since there is an argument that public goods are most appropriately funded through central taxation systems. Eagles and Hillel (2008) have argued that those visiting protected areas receive exclusive recreational benefits compared with the general public, that international visitors are excluded from the taxation system and therefore could avoid payment and that remediation can be costly since visitors may impact negatively on protected areas. Whilst the levying of visitor fees may be justified, there is reasonable argument that they may be inadequate in terms of the costs of both management and remediation. Since visitor fees are a form of economic instrument, and influence commercial operators as well as individual visitors they may be influenced by government economic policies and ideologies (Buckley, 2003). New Zealand park agencies are prohibited from levying visitor fees and “external revenue” is generated through “contracts to individuals and businesses to conduct commercial activities such as tourism, agriculture, horticulture, telecommunications and commercial filming on public conservation land” (Marsden, 2000, p. 49). Setting fee levels is difficult. The level at which fees are levied on visitors is often lower than both willingness to pay (WTP) and management costs (Adams et al., 2008; Buckley, 2003; Laarman & Gregersen, 1996; Thur, 2010). Casey, Brown, and Schuhmann (2010) identified a WTP amongst tourists of between \$42 and \$58 to raise revenue for coral reef protection in Riviera Maya, Mexico depending on the estimation method. Based on a WTP survey, Thur (2010) concluded that the annual fees levied at the Bonaire National Marine Park, Jamaica, could be at least doubled from \$10 (mean WTP was \$61). Allowing for a degree of inaccuracy amongst WTP surveys because there is no risk involved for participants to state a higher WTP, existing data

nonetheless suggests that the visitor fees for many protected areas have scope to be increased.

Low visitor fees have an effect whereby the host country (often a lower income, developing country) subsidises foreign visitors to protected areas (who are often sourced from comparatively rich countries). This provides little stimulus for governments to invest in protected area management. Decisions about whether to visit an attraction are largely determined by the WTP, which depends on visitor socio-economic and demographic backgrounds, and on the appeal of the particular protected area (Adams et al., 2008; Lindberg & Halpenny, 2001; Thur, 2010). The WTP will be determined on the basis of applicable protected area attributes such as infrastructure and attractions. Relatively accessible protected areas offering well-maintained infrastructure and facilities are likely to possess the highest potential WTPs. It is self-evident that not all protected areas are equal and that there will be variable market acceptance of visitor fees across different jurisdictions and by market segment.

Issuing licences to those who operate in protected areas can provide another source of revenue beyond visitor fees, with commercial tours being the most common target (Buckley, 2003; Buckley, Witting, & Guest, 2001). Ideally obtaining a licence should be simple and a single comprehensive licence should be available from one agency. Licensing is typically aimed primarily at the enforcement of sustainable behaviours on the part of tour operators and their clients in protected areas (Catlin, Jones, & Jones, 2011). To date, licence fees have been viewed as a funding opportunity. Indeed, a review of the annual reports and financial statements of Australian protected area agencies suggests that there is generally no separation in the budget process between expenses attributable to the administration of licensing and compliance and to raising visitor fees. In aggregate, there is little knowledge of or awareness about how much park agencies spend on licensing and whether the administration costs are covered in full by licence revenues. Raising revenue through an accreditation requirement of licence holders is another opportunity. However, protected area authorities rarely engage in accreditation for such purposes (Buckley et al., 2001). The tracking of costs and operating impacts will depend on fairly complex accounting and control systems and on a systematic management approach (Buckley, 2003). Other innovative opportunities to generate additional funding have included licensing intellectual property such as park names and park images. Support from volunteers and community-oriented work can also provide a source of support for park managers though this is a cost-defraying mechanism rather than a revenue-generating activity (Inglis et al., 2005).

### **The “commodification of nature” critique**

There is an incompatibility between ecological economy theory of the neo-liberal approach to economic growth and conservation, since pristine natural assets are finite and outputs, such as ES, can only be produced by drawing upon existing pristine ecosystems. The supply of pristine environments which produce ES is threatened by unencumbered economic development. When such environments are lost, their capacity to produce ES cannot be fully restored (Kronenberg, 2010). A number of novel approaches are, however, available for valuing and maintaining ecosystems which combine elements of both ecological and neo-liberal economics. Approaches which define nature on the basis of the ecosystem-related services that it “generates” have been criticised as a form of commodification (Gómez-Baggethun & Ruiz-Pérez, 2011). However, the meanings that may be attributed to the terms “commodification” and “valuation” are not synonymous. Valuation

refers to an assessment of the worth of a product or service, whereas commoditisation implies transformation into something tangible that will form the basis for a subsequent trade. Critics have argued that using “services generated” as a lens for interpreting nature may negatively impact on how people perceive and relate to nature (Gómez-Baggethun & Ruiz-Pérez, 2011; Norgaard, 2010).

It is also alleged that commodification elevates the human benefits that are gained from the services provided above the inherent value of nature (Gómez-Baggethun & Ruiz-Pérez, 2011). The commodification of nature raises social justice concerns by placing possible restrictions on social classes that have less access to natural assets. According to its critics, the economic and commodity-based views of nature inherent in market environmentalist ideology favour those who can afford to purchase the rights to access highly valued ecosystems (Börner et al., 2010; Kosoy & Corbera, 2010; Pascual et al., 2010; Vatn, 2010).

It is important to consider environmental and ethical trade-offs (Muradian et al., 2010; Pascual et al., 2010). It may for example be more profitable to use a protected area for the purposes of ecotourism than to leave it unprotected. However, such uses may disadvantage indigenous access to natural resources which may in turn impact negatively on traditional lifestyles (Norgaard, 2010).

The emergence of para-statal and privately owned protected areas can present challenges in this respect. Whilst the protection of the environment is laudable, the nature of private ownership and fee-based access raises issues of equity and proprietorship. Conservación Patagónica (<http://www.conservacionpatagonica.org/home.htm>) has addressed this concern by establishing a long-term programme wherein the privately owned park will eventually be turned over to the national government as part of the national park network in Chile.

There are several other challenges associated with the use of market valuations as the primary basis for decision-making about nature conservation (Gómez-Baggethun & Ruiz-Pérez, 2011; Kosoy & Corbera, 2010). First, neoclassical economics emphasises nature’s physical constraints as well as the institutional failures of conservation (Slavíková et al., 2010). It may also be problematic to assign a single value (price) to ecosystems, since many services (e.g. appealing scenery or the knowledge that a species will be preserved) are perceived and valued differentially by each person. There may also be technical difficulties associated with linking nature to the services that it provides (Gómez-Baggethun & Ruiz-Pérez, 2011; Kosoy & Corbera, 2010). ES projects are highly contextualised and the variables used for decision-making may vary between project settings (Norgaard, 2010). Since each ecosystem is unique, it may be unrealistic to undertake a genuinely *pro forma* driven and scientific evaluation when comparing two ecosystems (Norgaard, 2010).

### **A way forward for the funding and management of protected areas?**

Since the context in which protected areas operate is rapidly changing, it is widely acknowledged that greater innovation is needed by the responsible management agencies (Eagles et al., 2012; Inglis et al., 2005; Laing et al., 2009; Lindberg & Denstadli, 2004). Alternatives to the currently prevailing government-driven centralised model merit further exploration and consequent implementation (Eagles, 2009; Jamal & Stronza, 2009). However, it is not self-evident that outsourcing the management of protected areas to private contractors will result in better governance. Rather, a wider variety of approaches to governance should be developed and rigorously evaluated (Eagles et al., 2012). Various

joint management options could stimulate private sector investments, active involvement by adjacent communities, and financing environmental services through tourism operations. Given that protected areas impact on adjacent lands, it will be challenging, though important, to integrate visitor, social and ecological information to develop a holistic approach to protected area management (Buckley, 2004; Mitchell et al., 2013). An integrated management model should be flexible, adaptable and as far as possible, should not require extensive and/or intensive human and financial resources. As Marsden (2000, p. 27) noted, financial sustainability “means nothing if the core aspects of the protected area are not maintained. On the other hand, the core aspects of the protected area cannot be maintained in the absence of sufficient financing”.

Some of the visitor-management strategies that have been discussed are readily suited for raising funds to assist conservation activities. In locations with high-level environmental values and tightly controlled visitor movements, revenues can be generated by licensing appropriately trained and skilled organisations to conduct guided tours and other compatible activities such as the low-key guiding programmes offered by Parks Victoria or the extensive offshore tourism operations conducted on the Great Barrier Reef and on Ningaloo Reef (see Catlin et al., 2011). In such circumstances, the provision of ecological services may refer to any area within the typology of protected areas based on visitation levels and maintaining biodiversity (see Figure 1). The more pristine areas will possess higher quality ecological services, and accordingly a higher PES price that must be generated in order to fund protection and/or remediation activities. This typology lends itself to an income matrix that relates fee-for-service visitor charges with high-quality PES. There are four related points to note.

First, given the “green” nature of such settings, there is scope for a PES component within each of the four quadrants noted in Figure 1— although the price paid will be a function of the quality of the environmental setting and of the benefit derived by the visitor, coupled with the importance, type, and level of the remediation that is needed to address any visitor impacts.

Second, the PES can operate at two levels that are independent of visitors and visitation:

- At the functional level. This may apply to the provision of carbon abatement and sequestration and to high-quality water and other ecological outcomes, including scientific discoveries for medical research (Dharmaratne et al., 2000; Pagiola, 2008). Importantly, the quality of these outcomes, and thus the prices paid, are a function of the environmental quality of the setting and its outputs.
- The intrinsic level. This occurs in cases where there is a particularly rare and pristine setting that produces benefits because of its existence, and the knowledge of it is valued by citizens (Dharmaratne et al., 2000).

Third, beyond PES there is considerable scope to drive income generation on the basis of tourism activities. The relationship between visitor numbers and the marketability or attractiveness of the setting that applies in such situations will shape the style of the services offered and the prices that are charged. As has previously been noted it is worth paying particular attention to the willingness of visitors to pay when determining the levels of visitor and licensing fees that should be levied (Lindberg & Halpenny, 2001; Thur, 2010). In practice, the pricing of such payment systems has rarely been based on market research. The application of marketing activities in protected areas should not be exclusively reserved as a tool to maximise revenues and satisfy tourists. It can also play a role

in achieving the organisational goals and mission, notably of educating visitors about biodiversity or to “demarket” a protected area with a view to reducing negative tourism impacts (Beeton & Benfield, 2002; Sharpley & Pearce, 2007). Demarketing can, however, increase the risks and likelihood of commercial failure, especially in view of the pursuit of sufficient revenue to fund remediation activities and park operations. The user-pays system also offers the prospect of providing opportunities to manage visitor numbers, where the fees are applied at levels comparable to WTP, rather than the low levels that currently prevail in many protected areas (Buckley, 2004).

There are further opportunities to connect PES systems with tourism operators involved in the delivery of environmental services in ways other than financing indirectly through the levying of visitor fees or leasing arrangements. Eco-lodges or tour operators may for instance deliver environmental services to a protected area by eradicating pests and weeds or planting native species on- or off-site and may receive credits, and marketing advantages, in return for results achieved. By forming such a link between tourism and PES, additional incentives may be offered to invest in ecotourism products and in the development of innovative and sustainable activities which inform visitors about surrounding conservation values. Whilst the benefits of involvement in both tourism and contracting for environmental services seem axiomatic and substantial, the available data indicates that such benefits cannot be assumed. The relations between collaborating stakeholders should be carefully managed to ensure that optimal outcomes are achieved for all parties involved (Jamal & Stronza, 2009; Laing et al., 2009). It is important to view the management of protected areas in the context of complex ecosystems. Nature-based tourism is a substantial activity which relies heavily on intact biodiversity and on viable ES. This provides opportunities for park managers to embrace market-influenced and outcome-based approaches towards environmental protection which in turn provides an incentive for place-based environmental stewardship. However, undertaking a valuation of all ES and using all of the available funding strategies may not be relevant or practical and may incur high costs. It may be appropriate to consider only those ES that have the highest net economic benefits. The information above may be summarised in the three tables below.

Table 1 outlines the various valuation methods and funding strategies applicable to ES encountered in protected areas. It includes consumptive uses that do not directly benefit environmental conservation. Nevertheless, the IUCN guidelines (Marsden, 2000) have proposed consumptive uses as a possible source of income for protected areas that possess lesser biodiversity value.

The information collected about the value attributable to biodiversity in protected area and the role of tourism in the protected area and adjacent region can be used in defining the applicable archetype. This can in turn inform decisions about governance, management and marketing. Table 2 provides an overview of the governance, visitor management and marketing-related options for each protected area archetype based on visitation levels and on the importance attached to maintaining biodiversity.

## Conclusions

This paper highlights and discusses the funding and management challenges faced by the managers and custodians of protected areas. It reviews a range of options for consideration by protected area authorities. Recognising that protected areas differ greatly in the significance of their biodiversity and their visitation patterns, the paper proposes a classification of protected areas into four archetypes with governance and management options

Table 1. A process to determine sources of funding for protected areas.

Ecosystem service	Value estimation method	Funding strategy	Examples
Consumptive benefits (e.g. any type of exploitation of natural resources including indigenous practices) Water resources	Estimate the final value of the products derived from the exploration (avoid double-counting)  Estimate the economic impact of the use of the water resource (drinking water, irrigation or other industrial and personal water-related uses)	Establish PES for the exploitation of resources (excluding indigenous practices, non-monetary instruments should be used instead) paid to the protected area authority.  Establish PES for water users, the payment amounts should persuade owners to convert to sustainable water usage activities	Private game reserves in South Africa (Buckley & Sommer, 2001)  PES system to protect the quality of water all year, and especially the quantity of water in the dry season in the Palauco River (Wunder & Alban, 2008) PSA programme, Costa Rica (Wünscher et al., 2008)
Carbon abatement	Calculate on the basis of estimating the carbon captured by the ecosystem multiplied by the carbon price used in carbon trading schemes (e.g. the European Union or California)	Participate in the carbon-trading market	
Recreation and tourism	Estimate the value attributable to tourism based on the money generation or tourism impact models	Establish license and visitor fees tied to the WTP of visitors and expenditure necessary for tourism infrastructure maintenance and fee collection	User fees at Bonaire National Marine Park (BNMP), Netherlands Antilles (Thur, 2010) WWF's Adopt an Animal programme (WWF, 2013)
Intrinsic/existence benefit	Money generated by donations to conservation foundations or protected area managing body (Note: has to be protected-area-specific)	Set up "adopt a park" foundations or similar if necessary and found appropriate	Red-cockaded woodpecker ( <i>Picoides borealis</i> ) protection, USA (Donlan et al., 2009) No exact match has been found, however some bio-prospecting agreements resemble this model (Quezada, 2007)
Protection of endangered species	Estimate through expenditure on species-specific environmental programmes and importance of a species for attracting visitation	Develop financial derivative instruments to insure against the protection of endangered species	
Future discoveries	In cases where they exist and are quantifiable, estimate the value of the future discoveries within the protected area applicable to the pharmaceutical or other industries	A company(s) interested in preservation of the resource for future exploration should be able to provide a payment to the protected area authority in exchange of an assurance that the resource will be protected and will be available for exploration in future by the company(s)	

Table 2. Alternative governance and management models in protected areas.

Protected area	Governance	Visitor management	Marketing
High visitation/low biodiversity	These may be operated most effectively as autonomous corporate entities reporting to a business or tourism-style ministry, rather than to an environment ministry. The term “para-statal model” has been applied, and whilst definitions and conceptualisation of the term vary, semi-professional independent boards with a commercial charter appear to be common forms of governance in the case of such parks.	The key focus is on providing an entertaining and satisfying experience for visitors within a clean, attractive and safe environment. They tend to require high investment in infrastructure and operating assets to provide human comforts. Similar to staffing, the level of the service offer will vary between peak and off-peak periods. Temporary infrastructure will also be required (e.g. portaloos, marquees) to ensure human comfort levels are maintained and risk is appropriately managed. Often this may involve a cooperative arrangement with one or more commercial partners.	Marketing has a strong consumer orientation, utilising traditional marketing principles, with the aim of maximising visitor expenditure in the park. Marketing activity is generally highly visible in the form of brochures and web-based distribution, informing potential visitors of products, activities and events that have the potential to generate revenue.
Low visitation/low biodiversity	These examples are often under the supervision of a local volunteer committee of management which may, with some support from local government, be granted limited autonomy to maintain the park and to undertake minor infrastructural developments (e.g. building picnic tables, toilet blocks and other visitor facilities).	Their lack of visitation and environmental significance suggests that these parks tend to have a very minimalist level of management intervention. The “bare minimum” will be spent on basic infrastructure and low level recreation facilities (e.g. seating, picnic areas) to meet the basic needs of users by keeping the park clean, tidy and safe as much as a “duty of care” to manage risk. If any further investment in facilities is forthcoming, it is likely to be generated by local community and volunteer organisations.	A minimalist approach to marketing with basic information provided through local government publications and web sites as well as newsletters of community organisations in relation to any community events held in these parks. There is unlikely to be a “park brochure” as such.
1	These may operate most effectively as semi-autonomous corporate entities	High levels of visitation competing with high ecological values is a clear indication that	Marketing has a strong “societal” emphasis to ensure that the organisation’s mission of

(continued)

Table 2. (Continued)

Protected area	Governance	Visitor management	Marketing
Low visitation/high biodiversity	<p>with a high degree of operational independence. Having both an environmental and a commercial charter, they need to report to a professional board of management for major policy decisions under the auspices of an environmental Ministry, rather than to a more business-oriented ministry. The board would consist of professionals with commercial and environmental expertise.</p> <p>Because of their environmental significance, these are best operated under the direct auspices of a centralised protected area management agency with limited devolved operational autonomy. Devolved management may occur in conjunction with one or more specialist interest groups with expertise in the area or habitat. An executive management group within an environmental ministry would determine overall policy, drawing upon specialist (co-opted) environmental and administrative expertise as required.</p>	<p>visitor management practices must protect the visitors and the environment but also provide for high levels of visitor satisfaction in an attractive environment. This will require a high level of service effort to provide interpretation that is both entertaining and educational whilst proactively managing physical risk to humans. Accordingly, investment in infrastructure will be strategic to conserve the natural environment, provide an acceptable level of human comfort within environmental constraints and minimise risk.</p> <p>As ecological integrity overrides all other considerations, ideally the main emphasis should be on educating visitors about conserving and preserving the natural assets, whilst providing minimal infrastructure to ensure visitor safety. However, with a diminishing funding base for investment in assets, rather than try to pursue an infeasible service promise, in some cases park managers may simply reduce or remove the service promise altogether and attempt to quarantine areas from visitation through enforcement. In this situation environmental mortgages may represent a particularly promising source of funding, as they do not require visitation, but rather the presence of highly valuable and vulnerable ecosystem.</p>	<p>environmental integrity is pursued. Whilst park brochures, notes and web sites contain information about products, activities and services, some of which are of a commercial nature, there is an underlying theme to inform visitors and tour operators of conservation values and positively influence their behaviour towards the environment once in the park. Where the environmental values and human usage are high, more resources are required to effectively communicate this message.</p> <p>In these settings, park managers may restrict access through limits on visitor activities or capacity, or simply by advising people not to visit, informing visitors of the rationale for such policies. This notion of “demarketing” will become more prevalent as park agencies have increasing areas to manage but relatively less funding to do so, thus deeming some parks as “non-operational”.</p>

proposed for each. This is a departure from the established “para-statal” model of protected area management. However, it enhances the likelihood of providing entertaining and high-quality visitor experiences in the case of high visitation/low biodiversity protected areas, whilst dissuading visitors from frequenting low visitation/high biodiversity protected areas.

Options proposed for the non-government funding of protected areas include visitor fees and licensing, payments for ES and environmental mortgages. To maximise the benefits arising from alternative funding approaches and minimising any adverse effects, certain conditions will need to be met. Appropriate levels of visitor and licensing fees should reflect a WTP on the part of potential visitors, the potential impact of fees on visitation, the costs of maintaining protected areas and resolving and repairing visit impacts, and the overall economic impact of tourism activity on protected areas and adjacent communities. It considers “quarantining” particularly valuable ecosystems from tourist visitation: intrinsic value funding may be necessary in such cases. Environmental mortgages are found to be rather vulnerable to the often unpredictable swings of the financial market. Payments for ES are likely to be more stable, but require careful data analysis and research, including careful design of prevailing land tenure systems and regulatory mechanisms. Further research – and on-site testing – for all of the above options is needed to ensure adequate sustainable funding and management for protected areas.

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