

# Feasibility: monetizing ecosystem services

---

## Five Rivers Reserve



A report to Conservation International - KPI 48

June 2014

[www.tasland.org.au](http://www.tasland.org.au)

Sprod, D. (2014) The feasibility of monetizing ecosystem Services on the Five Rivers Reserve. Report to Conservation International, Tasmanian Land Conservancy, Hobart, Tasmania.

## Table of Contents

---

Introduction .....	1
Ecosystem Services Defined.....	2
Use of the ecosystem services concept .....	5
Integrative framework .....	5
Use in developed countries .....	7
Valuation of ecosystem services .....	8
Valuation methodologies.....	8
Spatial identification .....	8
Payments for ecosystem services .....	10
Five Rivers Reserve .....	12
High potential monetisation opportunities .....	13
Carbon credits .....	14
Skullbone Experiment .....	15
River Fly.....	16
Gravel .....	17
Firewood .....	18
Small scale sawlog.....	19
Deer shooters.....	20
Education/Research Centre .....	21
Walking experiences .....	22
Potential in Tasmania.....	23
Prioritisation models.....	23
Attachment 1: Ecosystem services work plan - 31 Jan 2013 .....	27
References .....	28

## Introduction

---

This document aims to fulfil KPI 48 of the Five Rivers Grant agreement.

Outcome 4 (of Objectives 5 of the Five Rivers work plan) is to:

***Explore and implement the monetisation of other ecosystem services***

*KPI 46 TLC has developed a plan to explore the monetisation of other (non-carbon) ecosystem services derived from the Properties and has consulted with CI in the development of that plan. (by 31 Jan 2013)*

*KPI 47 The plan is implemented (progress made by 30 Jun 2013)*

***KPI 48 The plan is implemented (feasibility report done by 30 June 2014)***

KPI 46 was satisfied in January/February 2013.

KPI 47 was satisfied with an earlier draft of this report in June 2013.

The primary purpose of this paper is to report progress in the investigation of ways to monetise ecosystem services on the Five Rivers Reserve.

A short section also reports on the lack of progress in using an ecosystem services framework to achieve better conservation outcomes in the wider Tasmania context.

This paper is structured in three parts.

The introduction, which defines an approach to ecosystem services, examines how ecosystem service frameworks have been used; lists approaches to valuation and explores how payments for ecosystem services have been implemented- all particularly in the context of the developed world.

The second part draws upon an analysis of the potentials for monetising ecosystem services on the Five Rivers Reserve that was conducted in a spreadsheet format. It examines what broad options may be viable, and then reports on progress of those that have been identified as the highest potential.

The third part of the paper explores the likelihood of an ecosystem framework being able to achieve better conservation outcomes in the wider Tasmania context.

## Ecosystem Services Defined

Ecosystem services are the benefits that functioning ecosystems provide to people. Humans realize these benefits in terms of factors that contribute to personal health, jobs, and safety. The 2005 Millennium Ecosystem Assessment (MEA 2005<sup>1</sup>) organizes ecosystem services into four overarching categories:

- Provisioning services : goods or products produced by ecosystems (e.g., food, freshwater, wood, fibre, etc.).
- Regulating services: Natural processes regulated by ecosystems (e.g., regulation of climate, food, or disease; water purification; etc.).
- Cultural services: Nonmaterial benefits obtained from ecosystems (e.g., aesthetic, spiritual, educational, recreational, etc.).
- Supporting services: **Functions** that maintain all other services (e.g., nutrient cycling, soil formation, primary production, etc.).

Interestingly, for a concept that has been studied for a number of decades, agreement on definitions and lists of concepts such as ecosystem function, ecosystem process, ecosystem service and even benefit is elusive (Australia 21<sup>2</sup>). Various lists have been made to enumerate the different ecosystem services, but it is generally agreed that different lists will be useful in different locations.

Bruner and Niesten 2013<sup>3</sup>, comparing the concept to that of Total Economic Value (Krutilla 1967<sup>4</sup>) map the services as Table 1, which essentially recognises that the fourth category – supporting, or habitat services – are actually *functions* of the ecosystems rather than *services* and thus may have no direct relation to human well-being, despite being critical to the internal health of the ecosystems themselves.

**Table 1 Map of ecosystem services to Total Economic Value (Bruner and Niesten 2013)**

Group	Direct Use	Indirect use	Option value	Non-use value
Provisioning	✓		✓	
Regulating		✓	✓	
Cultural	✓		✓	✓
Supporting (Habitat)	Valued through other categories of ecosystem services			

The Economics and Ecosystems and Biodiversity project (TEEB - 2008<sup>5</sup>) takes a slightly different approach, showing a cascade of structures, functions and processes resulting in benefits to humans (Figure 1). Whilst they note that benefits accrue to humans from ecosystem services, they make the point that these may not always have a monetary value. This is a key consideration in any attempt to monetise ecosystem services: whilst values of ecosystem services may be calculated, unless there is a willing buyer of services, the value remains as a potential only, and may provide opportunity to earn income for the provider.



In this paper, the TEEB approach has been meshed with that of Maynard et al 2010<sup>6</sup> in South East Queensland, to provide a framework for Tasmania (Figure 2), based loosely, almost figuratively, in the ancient *earth, water, fire* and *air* model of classical Greek thought. For this model, the traditional *fire* has been interpreted as life, and an extra element that is purely human added to the model.

In the literature, there is considerable tension between citing the value of ecosystem services in a theoretical sense, the value to human well-being, and the monetary value in an economic sense. For instance Maynard et al (2010) differs to de Groot (2002<sup>7</sup>) in that their assessment of ecosystem function does not necessarily relate to a function for human needs. The approach taken here is to apply a strict hierarchy of where Ecosystem structures (and processes) deliver Ecosystem functions, which deliver Ecosystem services (and goods), which in turn deliver human benefits (whether economic or not).

This framework, somewhat flawed though it is, has the advantage of providing a conceptual link from easily understood initial natural categories, through ecological functions, processes and services to elements of human well-being. It also demonstrates that the human perspective dominates the framework by introducing human view on the same level as the four classic elements, and tracing the expansion of provisioning and cultural services that lead to human well-being.

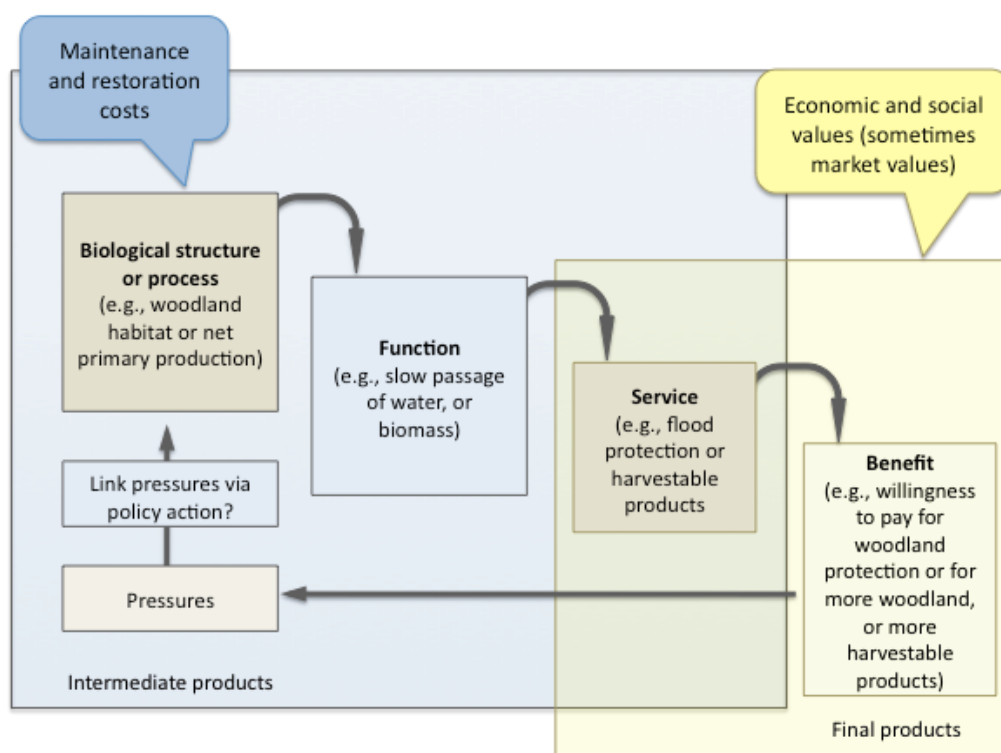


Figure 1: The conceptual framework used by The Economics and Ecosystems and Biodiversity project (2008<sup>8</sup>) to link ecosystems and human wellbeing.

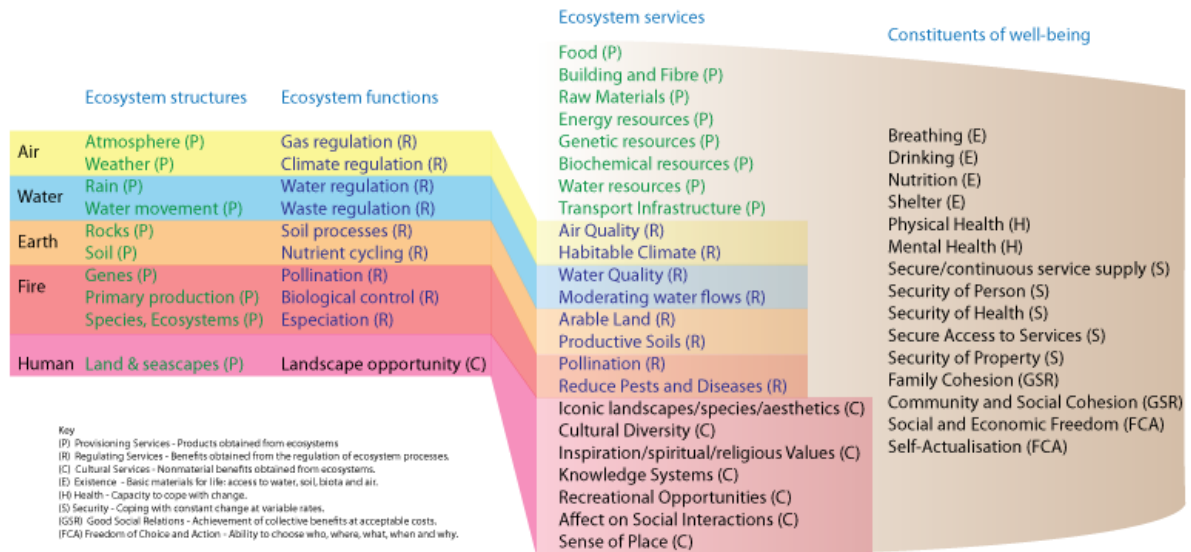


Figure 2 Relationship between ecosystem structures and human well-being (after Maynard et al 2010)

## Use of the ecosystem services concept

The key contributions of an ecosystem services approach are to provide an integrative framework for considering benefits delivered to human well-being from the environment in the language of economics (Australia 21, 2012<sup>2</sup>) and to attempt to bring ecological considerations to a level playing field in dialogue about landuse planning, land management and policy development for these issues.

### Integrative framework

Scholars emphasise that the ecosystem services framework does not really introduce any novel ideas into the conservation dialogue, more that it tries to provide a way to link the environment into our dominant paradigm of evaluating development options: that of economics. Indeed, some practitioners feel that the attempt to do this undermines the 'purity' of ecological thinking, and that any attempt to equate ecology to economy fails to recognise that in a fundamental way, ecology is a central part of the biophysical world, whilst economics is purely a human construct imposed upon the natural biophysical world or that some goods simply should not have monetary value ascribed to them (Sandal, 2013<sup>9</sup>).

Cosier (2012<sup>10</sup>) expresses this fundamental difference and attempts to overcome it by proposing a numerator of ecology (the Econd) as a parallel to the numerator of economics (money). This measure can be applied to any unit of ecology, be it an ecosystem, a species or a defined area (an asset). It is developed by assessing the ecological health (condition) of the asset and rating it an ordinal scale of 1-10 compared to the pristine 'benchmark' condition of the asset. This approach has the advantage and disadvantage of recognising that a human's view of an asset may be quite different to a natural ecological view. For instance, an agricultural asset (a paddock) may be rated as being in good condition (high Econd) if the soil is fertile and not prone to erosion. An ecosystem services view may rate the exact same paddock as having good provisioning benefits (ie food), but flawed regulatory (eg hydrology) and cultural (eg iconic species) benefits. In some ways, the Econd approach remains neutral in any attempt to evaluate development options. Conversely, however, the Econd approach does provide a relatively rapid and consistent framework to value and report on the environmental 'worth' of various assets, and give the potential to integrate this information into the national accounts and provides a real basis for adaptive management to improve both asset condition and human well-being.

The ecosystem services framework, theoretically at least, gives a way of assessing the integrated benefits to human well-being of development options versus leaving areas as they currently are, or even of rehabilitating the condition of an area.

### *Direct linking of ecosystem services to human well being*

Ecosystem services analyses may directly link and measure the benefits to human well-being of functioning ecosystems. For instance, in Tasmania, hydrological modelling the proposed conversion of old-growth forest to plantation allowed the computation of the value of excess water used in plantations (and robbed from an urban water source) as an aid to resolving controversy over



clearance and conversion (Peel et al 2002<sup>11</sup>). More difficult is trying to integrate all the values of ecosystem services for an area.

Maynard et al (2010), in their wide ranging and inclusive process to value ecosystem services for South East Queensland, stepped back from trying to economically value the range of ecosystem services, and instead, sought to assign relative values, thus enabling a spatial expression of the relative value of integrated ecosystem services arising from their defined assets. This was done by assigning a relative magnitude of the provision of , for instance, the ecosystem function 'climate regulation' to discrete ecosystem reporting classes, then assigning the relative magnitude of a resultant ecosystem service to each function; and then finally, computing these scores for the sum of ecosystem services supplied by the various ecosystem reporting classes. These scores could then be mapped at the regional scale to gain a visual representation of the relative values.

### *Input into land use policy*

This pragmatic and useful approach was designed to directly inform policy and management. It resulted in probably the most developed application of an ecosystem services approach to influencing fundamental policy in the developed world. It has been integrated in a long term natural resources plan - The South East Queensland Regional Plan 2009–2031 (Hinchcliffe, 2009<sup>12</sup>) in which recommendations are made for identifying areas of high multiple ecosystem function as core landscape areas as priorities for protection. And further, the approach has been translated into local government planning tools via a user guide for Local governments (DPI 2010<sup>13</sup>).

In Canada, the ecosystem services framework was implemented using a package of software InVEST, and the results of this modelling helped to inform marine spatial planning (Guerry et al, 2012<sup>14</sup>).

Another approach (Anielski and Wilson 2009<sup>15</sup>), resulted in recommendations to government, but no on-ground change.

### *Input into land use management*

Using the ecosystem services framework for altering land management has a long history in the developed world.

Payment for ecosystem services (PES) is now quite a mainstream approach. In the developed world, it has its roots in the 1990s via the recognition by New York City that financing watershed conservation upstream in the Catskills region in lieu of building additional drinking water treatment infrastructure was a more cost effective way of meeting water quality standards. The difference has been quoted (Kenny 2006 in Hanson et al 2011<sup>16</sup>) as US\$1.5 billion over 10 years for ecosystem service investment versus \$8 – 10 billion for infrastructure investment. Payments fund conservation easements (covenants) on the forests and open spaces around reservoirs, native habitat restoration and have the added benefits of providing ancillary ecosystem services such as carbon sequestration and recreational opportunities. Other US jurisdictions have successfully followed suit. There are many examples of similar approaches that have been used for protection of wetlands, agricultural lands and forests (Molnar 2012<sup>17</sup>)

In Australia, PES have primarily been used for biodiversity conservation. BushBids (SA) and Bush Tender (Victoria) both used reverse auction (or tender) based approaches to seek interest from landholders in protecting land for specific biodiversity values (Stonham et al, 2003<sup>18</sup>). In Tasmania, similar approaches have been used for grassland and woodland values (Iftakhar et al 2013<sup>19</sup>) and forests (Zammit 2013<sup>20</sup>)

### *Use in developing countries*

In many parts of the developing world, valuing ecosystem services has been instrumental in protecting extensive areas of habitat. The most numerous and successful of these programs are the Water Funds as spearheaded and supported by many NGOs including The Nature Conservancy (Goldman et al 2010<sup>21</sup> and<sup>22</sup>). These Funds have a variety of business models, but typically, downstream water users pay into the fund in proportion to their use, which funds the protection of the upstream land – again typically highly biodiverse and pristine forests. Valuation of the ecosystem services (and particularly the value of hydrological provision) provided by the forest underpins the recognition by the users that there is a real return on their investment, and provides a satisfactory link for the company's shareholders and business managers.

### *Use in developed countries*

Estimates of the overall value of ecosystem services to the economy have been made for various jurisdictions commencing at the global level with Costanza et al 1997<sup>23</sup>, and now being utilised at national and state scales (eg Costanza 2010<sup>24</sup>, TEEB<sup>25</sup>). Studies of this kind usually make no effort to tie the value(s) to discrete areas, but only to estimate their overall value to society.

Maynard 2013<sup>26</sup> in a survey examining the use of ecosystem services frameworks in the developed world found that uptake remained very limited and patchy. This is despite some 15 – 20 years of accelerating research into the concept (Molnar 2012).

### *Use in Australia*

A recent review for the Australian Government Department of Agriculture, Fisheries and Forestry examining the role for ecosystem services by Australia 21 2012<sup>2</sup>, found that ecosystem services frameworks were a potentially powerful way for “cross-societal dialogue in relation to major, complex environmental-social challenges facing this country”. To operationalize this, they saw a central role for government in setting up better systems within which this dialogue might occur. No such progress has been made to date.

## Valuation of ecosystem services.

Having identified the concept of ecosystem services as an integrative framework and how it may be used in both developing and developed countries, we now move to the issue of valuing these services.

In the four-tier cascade of assets, function, services to well-being of TEEB (Figure 1), the first two tiers need not relate to human well-being at all. Indeed, one reason for separating out ecosystem function from ecosystem service is that functions may be required to underpin ecosystems, but may not translate directly into any human benefits, whereas services are a necessary precursor to understanding any resultant human well-being. Despite this, some frameworks maintain that ecosystem services need not *actually* provide benefit to humans, but can be viewed as *potentially* providing these benefits (eg Maynard et al 2010). This is the basis of the 'option value' as expressed in Total Economic Value.

## Valuation methodologies

Primary valuation methodologies (Earth Economics 2010, [www.ecosystemvaluation.org](http://www.ecosystemvaluation.org)) may be grouped into three categories:

- Conventional market approaches – simply observing market valuations of goods and services;
- Revealed preference or implicit market approaches - research that uses market information to reveal people's preferences;
- Stated preference or constructed market approaches - such as 'willingness to pay' studies

These methodologies, performed appropriately, can be accurate and defensible, but are often costly, and require great specificity.

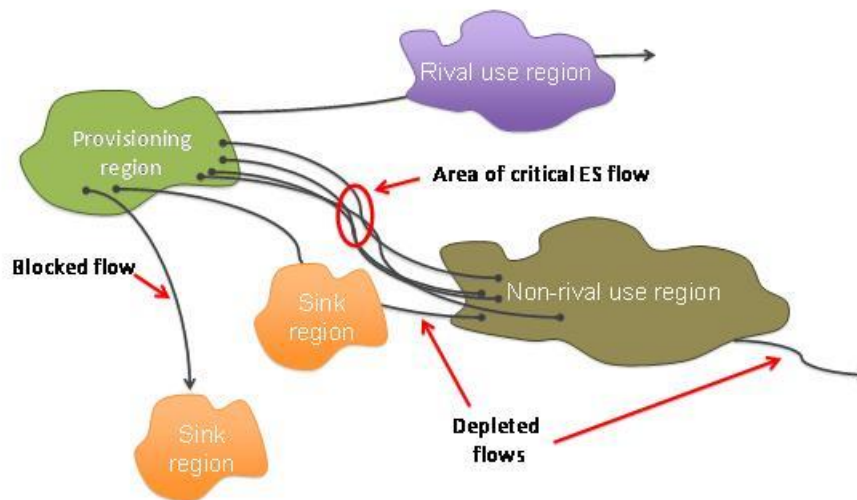
'Secondary' valuation methods - also termed "benefit transfer" (Smith et al. 2002<sup>27</sup>) - often provide more accessible options, and involves porting primary studies with appropriate adjustments, to the site under consideration. Databases of studies to support these methods have been built up around the world, including in Australia (EnValue<sup>28</sup>). The simpler end of the use of these methods is not spatial and may involve meta-analyses of similar situations to yield an appropriate value function.

## Spatial identification

However, ecosystem services are inherently spatial, flowing from source areas to beneficiaries in a range of different patterns (Figure 3). Among the issues that considering ecosystem services spatially can help address are: number and types of beneficiaries, distribution of benefits and costs, and appropriate design of instruments to reward ecosystem services provision (Bruner and Niessen 2013).

Several sets of tools for achieving this have been developed, including ARIES (ARTificial Intelligence for Ecosystem Services<sup>29, 30</sup>), SPAN (Service Path Attribution Networks, Johnson et al 2012<sup>31</sup>) and

InVEST (INtegration and Valuation of Ecosystem Services and Trade-offs – Natural Capital Project, Tallis et al 2013<sup>32</sup>). These tools have each been developed to fulfill particular functions and are constantly being adapted and upgraded as better understanding are developed. For instance, InVEST uses increasingly sophisticated and data intensive models to understand the level of provision of different ecosystem services to beneficiaries and users, then provides ways to understand the competition and trade-offs involved in scenarios where provision of different ecosystem services are internally competitive. All of these tools must consider each ecosystem services individually, then integrate the findings into a common framework. They are very time and resource hungry.



**Figure 3: Spatial relationships between supply, sinks and beneficiaries of ecosystem services (representation as modeled in ARIES; modified with permission from Villa et al. (2011))**

In Australia, the best developed ecosystem services framework (Maynard et al 2010) used an expert group approach to develop the typology and values of ecosystem functions, then mapped these numerical values to produce a numerical and visual representation of the relative importance of different areas in their provision of ecosystem services<sup>33</sup>. As noted earlier, there was no attempt in this approach to assign absolute values to ecosystem services, but merely to rate these on an ordinal and comparative scale.

Thus it can be seen that valuation of ecosystem services may not even result in a monetary value, either due to the methodological approach adopted, the difficulty of assigning a monetary value, or to the nature of the benefit being non-monetary. If valuation cannot be expressed in monetary terms, then it is difficult to see how this value can be translated into monetisation of an ecosystem service.

## Payments for ecosystem services

Strictly, a payment for an ecosystem service is (Wunder, 2005<sup>34</sup>)

1. a voluntary transaction where
2. a well-defined ecosystem service (or a land-use likely to secure that service)
3. is being 'bought' by a (minimum one) ecosystem services buyer
4. from a (minimum one) ecosystem services provider
5. if and only if the ecosystem services provider secures ecosystem services provision (conditionality)

Four basic concepts must normally be satisfied to increase the likelihood that that any payment can be obtained for the provision of an ecosystem service:

- excludability – that one can exclude others from the use of the service - ie it is not a freely available common good;
- rivalry – that if one person uses the service, then it not available to others to use;
- additionality – that the activity (based in a provider actions) adds value to the service – ie that without intervention, the service would not have been provided anyway
- conditionality – that if payment for the service does not occur, then the service and the benefits that it can provide can be withheld (and conversely, that if the provider does not supply the service, then the buyer can withhold payment).

Taken together, these four conditions constrain potential for payment of ecosystem services. For instance, when looking at the provisioning ecosystem services provided by water, one needs a dam to exclude others from the use of the water or one cannot claim payment for what would be provided anyway. Similarly, where water rights exist, mere ownership of the conduit of the water (rivers, streams) does not enable demand of payment for allowing the water through the owned property.

However, there are many cases where all four conditions are not met, for instance in carbon deals, rivalry is not satisfied, as everyone can use the service of CO2 diminishment provision. This has led to abstraction of the market to carbon credits, a tradeable commodity, rather than carbon itself.

A variety of other routes for payments exist that are not strictly payments for ecosystem services. These include:

- leveraging the protection of ecosystem services via fundraising or advertising , for instance where a conservation group uses the knowledge that ecosystem services are being protected or enhanced in a particular area as the basis for a fundraising campaign<sup>35</sup>;
- transacting protection of ecosystems services via provision of negotiated community services (for instance, this is commonly the case in the Conservation International's Conservation Stewards Program<sup>36</sup> ) and
- leveraging the protection of ecosystem services by using brand identification to promote corporate image, for example, companies paying for conservation management in order to gain greater market acceptance for their products or services.





## Five Rivers Reserve

---

The primary purpose of this project is to identify opportunities to monetise ecosystem services on the Five Rivers Reserve. This has been conducted on the framework as presented in Figure 2. The analysis identifies ecosystem services that exist and examines them under three scenarios in an attached spreadsheet:

1. those that existed pre-purchase by the Tasmanian Land Conservancy (TLC);
2. those that exist post-purchase, but prior to a covenant (easement) being placed over the property, and
3. those that exist after covenants are placed over title.

Note that many of the monetising opportunities diminish after covenanting.

According to Wunder 2005<sup>34</sup>, in forested ecosystems such as the Five Rivers Reserve, four ecosystem services are of particular relevance: carbon sequestration, biodiversity protection, watershed protection or hydrological services, and ecosystem services derived from aesthetics – termed here cultural services.

TLC is already pursuing carbon sequestration via dual certification under the Verified Carbon Standard VM 00010 and the Climate, Community and Biodiversity Standard and – it could be argued - has monetised biodiversity protection via BHP-Billiton philanthropy.

This implies that the primary unexplored potentials exists in

- watershed protection (provisioning and regulatory ecosystem services) and
- cultural services - aesthetics and science.

Whilst these ideas hold well for the second major potential (cultural services) in a wide variety of options, the idea that there may be good potential in watershed/hydrology does not appear to be supported.

The nature of the properties, their geography and the legal framework within which they sit militate against high potential for monetising watershed protection:

- The soils, predominantly low erodibility<sup>37</sup>, having low slope classes (mainly under 20%) and experiencing a mild rainfall regime (BOM 2013) means that erosion and sedimentation rates are quite low<sup>38</sup>, except for roading situations (see below). There is little prospect for either water purification or sediment retention ecosystem services (as per InVEST models).
- The Five Rivers properties occupy parts of two sub catchments<sup>39</sup>. One (Pine Tier) has at its base an existing impoundment owned by Hydro Tasmania, including an easement that buffers the lake into the Five Rivers properties and an offtake flume from the dam that feeds water into their hydro-power system. The other sub catchment is similarly dammed with the water being pumped into a flume.. Water use is legally authorised under water licences, thus there is no potential to provision water for hydro-electricity.
- Similarly, as the hydrology of the area is already being controlled, there is no potential to seek monetisation for flood regulation ecosystem services (as per ARIES model)

- One outlier to the sedimentation analysis is the roading network. On the Five Rivers, this network is extensive (formed gravel surfaces occupy about 80-100m<sup>2</sup>/ha, and probably a similar amount is occupied by unformed snig tracks). Formed roads in particular alter the natural hydrology, concentrating flows and introducing infrastructure such as culverts that can fail in high flow events, and roading materials that can contribute to sedimentation downstream. TLC has an active road program addressing (eg) culvert maintenance, and has developed a strategy to retire unneeded formed roads. Snig tracks are being left to revegetate naturally. It is difficult to conceive how these activities could be directly monetised.

## High potential monetisation opportunities

Following this broad overview of monetisation potentials, all possibilities were analysed in detail, and the results are provided as a short summary here (see **Error! Reference source not found.** and ecosystem services-frameworks.xls for full details). Each of these opportunities have been summarised overleaf.

- Carbon is a key area and is already being exploited (TLC now has a validated carbon project),
- Research and science comes up very strongly, and the TLC has the potential to develop a Science and Research facility on the property. This could dovetail with the next item.
- Recreational opportunities based on the cultural ecosystem services abound on the Five Rivers: naturalists, walkers, mountain bikers, horse riders, artists, meditators and others could all form bases of businesses where the TLC could earn money from the properties. This may include the provision of a facility (as above), potentially set up tracks of various kinds that are serviced by shelters, again of appropriate kinds. This may be in conjunction with the adjoining publically owned World Heritage Area.
- Harvest of feral species, notably trout, deer and rabbits are firm options. Note that both trout and deer harvest are primarily recreational opportunities that are already being monetised – trout under a licence agreement with a small operator 'Riverfly' and deer with a variety of hunting groups. TLC is also developing a deer policy, as it is a destructive feral animal, but has a semi-protected status under State legislation.
- Small scale sawlog harvest under a sustainable regime
- There is already a gravel quarry operational and royalties are being paid
- Firewood collection has been conducted in the past, and the potential to continue this to service the West Coast market has been explored.
- Services deriving from biodiversity are already being generated, although there may be opportunity for enhancing or optimising these - for example helping to increase the productive success of rare or threatened species such as the Wedge tailed eagle or the Tasmanian devil, or a variety of threatened plants.

## Carbon credits

### What we are doing?

The TLC has implemented the New Leaf Carbon Project over logged forest on the Five Rivers Reserve and other properties. The project is jointly validated under the VCS/CCBA protocols to the gold standard. It protects the Red Listed Tasmanian devil, a huge array of curious marsupials, and amongst many other species, the magnificent Wedge-tailed eagle. Continuous monitoring of the animals, plants and carbon are reported every five (5) years.

The Five Rivers area contains some 4,515 ha generating 10,713 carbon credits (VCU/yr).

### And why?

The Carbon project has great potential to return finances into the TLC to help pay for ongoing conservation activities both on the property and elsewhere.

### Key outcomes sought

Protection, enhancement and monetisation of the carbon ecosystem service.

### Time frame for returns and risks

The project has taken 3 ½ years to bring into fruition. A grant to help pay for the project's initiation helped to defray about 80% of the costs.

Every second year, TLC may have the previous two vintages verified, and once verified, can have them available for sale.

Ongoing risks in a volatile global and domestic carbon policy frameworks and markets mean that there are real risks of the project being unable to reach its current 30 year potential. Biophysical risks (mainly fire) also exist.



Monitoring vegetation in the Five Rivers

### Progress in 2013-14

- The first years vintage (2011) has been sold at a price of \$12/VCU, thus generating \$128,557 in gross income from the Five Rivers Reserve.
- The buyer is Virgin Australia, which brings huge potential for co-branding and very widespread publicity
- The second year's vintage (2012) has been verified and is for sale.

### Key recommendations for future management

- Build upon the co-branding and publicity potential with Virgin, including having a exclusive arrangement
- Sell the 2012 vintage and verify and sell the 2013 and 2014 vintages
- Continue to keep abreast and influence where possible, the carbon policy and market spaces

## Skullbone Experiment

### What we are doing?

In February 2013, eleven high profile Australian artists were invited as guests of Rob and Sandy Purves to explore the wild and remote landscape of Skullbone Plains on a four-day artists retreat. An exhibition featuring works developed by the artists will be shown at art galleries in Launceston and Sydney, with each also featuring an in-gallery dinner for high net-worth individuals.

### And why?

The aim of the residency, exhibition and dinners is to raise the profile of the Tasmanian Land Conservancy and its work in protecting Tasmania's biodiversity, and to expand the TLC's networks into a wider nature conservation-minded community.

### Key outcomes sought

This innovative exploitation of the Five Rivers cultural ecosystem services aims to expose the TLC to high net-worth individuals, with future philanthropy as an outcome.

### Time frame for returns and risks

Drawing the link between the cultural ecosystem event(s) and return may prove difficult, except in cases where we did not know the donor prior to the event(s). The overall strategy must be classed as high risk/high return.



Megan Walch: 'Convulsion 1' (detail) 2013

### Progress in 2013-14

- Artist's residency held.
- 1<sup>st</sup> exhibition held Queen Victoria Museum and Art Gallery (QVMAG) in Launceston
- 1<sup>st</sup> dinner held with 10 supporters, \$14,000 donation at that time
- 2<sup>nd</sup> exhibition and dinner set up for July 2014

### Key recommendations for future management

- Continue to cultivate relationships established and strengthened through the Skullbone Experiment



## River Fly

### What we are doing?

TLC has granted a three year licence to Riverfly Tasmania (<http://riverfly.com.au/>) to establish huts and operate their World Heritage Area tours from Skullbone Plains. Riverfly is a niche guiding business that takes mainland and international customers on guided fly fishing trips in Northern Tasmania and wilderness fly fishing campouts in the Western Lakes region of the WHA.

### And why?

The TLC believes, and has found, that there are synergies between the 'eco-tourism' business and our business in terms of people enjoying the cultural ecosystem services that the Five rivers offer.

### Key outcomes sought

A sustainable income stream from cultural ecosystem services, plus  
Informed and caring 'eyes on the ground'.

### Time frame for returns and risks

Returns from this monetization are low risk and stable: currently \$5,000/yr. The lease is due for renewal later in 2014.

One 3-day trip/year for TLC supporters has also been supplied.



Dismountable huts: RiverFly, Skullbone Plains

### Progress in 2013-14

- All lease conditions for protection of natural values have been fulfilled
- The operator has proved to be an effective advocate for the TLC, as well as being an able and effective caretaker in season
- Good natural values data has been gathered and forwarded to the TLC

### Key recommendations for future management

- RiverFly has approached the TLC with a view to expanding the operation into the 'high end' sector of the fly fishing market
- Assessment and decisions regarding this proposal need to take careful account of all potential impacts: on natural values, brand and other potential development proposals

## Gravel

### What we are doing?

The TLC inherited a large gravel quarry as part of the land purchase. This has been leased to a commercial partner, with royalties flowing back into the organisation.

### And why?

The quarry on Roscarborough is a viable and needed resource for the local area. Currently, there is an investigation into mixing together some of the products to suit a particular roading application.

### Key outcomes sought

Sustainable operation of the quarry with income.

### Time frame for returns and risks

The quarry does not have a closing date as the resource is very large. It has the potential for a long-lived, modest income stream



Quarry

### Progress in 2013-14

- There has been no activity at the quarry this year, apart from a current exploration to develop a specific product from the raw material available
- Lease conditions have been met

### Key recommendations for future management

- Continue operation of the quarry



## Firewood

### What we are doing?

The TLC is exploring the potential for an on-going sustainable harvest for one small firewood contractor, to harvest approximately 375 tonnes of firewood on an annual basis.

### And why?

Under the Climate, Community and Biodiversity Standard (CCBS), the TLC recognised that providing livelihood opportunities for the local community was important. Quite independently, we had also recognised that there are real benefits to be gained from having community members acting as 'caretakers' for us on the properties, as there is always high pressure for unauthorised access by some segments of the community.

### Key outcomes sought

Effective caretakers on the property, sustainable livelihood for one operator and some income.

### Time frame for returns and risks

The potential return is around \$3,750, which could commence immediately. It would be a low risk and stable return.



Small-scale firewood harvest on the Five Rivers property


### Progress in 2013-14

- Feasibility study completed, including calculations of volume, and exploration of the regulatory constraints (including those arising from the carbon project)
- 

### Key recommendations for future management

- Develop proposal and seek Board approval for implementation

## Small scale sawlog

<b>What we are doing?</b> Retaining the ability to harvest 50 tonnes sawlog/year	
<b>And why?</b> As building materials for structures on the property.	
<b>Key outcomes sought</b> Timber for structures	
<b>Time frame for returns and risks</b> No potential for monetary returns	
Potential sawlog for small scale harvest	
<b>Progress in 2013-14</b> <ul style="list-style-type: none"><li>Approval for 50 tonnes/yr within the Nature Conservation Plan of the Covenant</li></ul>	
<b>Key recommendations for future management</b> <ul style="list-style-type: none"><li>Currently no recommendations</li></ul>	

## Deer shooters

### What we are doing?

The TLC currently licences a number of deer hunting group access to the Five Rivers

### And why?

The TLC regards deer as an invasive feral species, despite their status as partly protected under Tasmanian law. We are currently developing a comprehensive policy in regards to them, buy in the interim; we are monetizing the desire to hunt them. We also recognise that there are real benefits to be gained from having community members acting as 'caretakers' for us on the properties, as there is always high pressure for unauthorised access by some segments of the community.

### Key outcomes sought

Control of a feral species, effective caretakers on the property and some income

### Time frame for returns and risks

Low risk and stable returns. Current receipts are \$4,320 for FY 14



Deer (Dama dama) on Five Rivers property

### Progress in 2013-14

- 36 individuals in three hunting groups are licenced
- High degree of adherence to licence conditions

### Key recommendations for future management

- Develop a comprehensive policy in regards deer
- Review licence conditions as appropriate



## Education/Research Centre

### What we are doing?

A scoping study to explore the possibility of developing a research and education facility has been undertaken. It concluded that a small scale development could encourage research, education and/or nature-based tourism facilities and services. However, the case presented was not compelling, the potential locations unsuitable, and the idea is currently 'on ice'

### And why?

A major donor has expressed interest in developing a research centre on Skullbone Plains and has offered \$0.5 million towards setting it up. The TLC is very interested in the idea, but needs to assured that it would be viable, useful, sustainable (in the broadest sense) and not present a drag on the TLC resources.

### Key outcomes sought

A sustainable and permanent research/visitor facility on the Five Rivers property.

### Time frame for returns and risks

No business model has currently been presented that would show a positive return to investment, and current indications are of a strongly negative return.



Potential site for Education/Research Centre

### Progress in 2013-14

- Scoping study reviewed
- Potential areas for a centre scoped.

### Key recommendations for future management

- Concept to be developed further as options for a suitable site become clear.
- Get to know the Five Rivers properties better in order to make an assessment of the best position for a centre

## Walking experiences

### What we are doing?

The TLC has been considering how to initiate the development of walking experiences on the Five Rivers area. To date, this has been only notional, and no solid business cases have been considered. TasTrail has approached the TLC exploring the potential to use some of the existing track network.

### And why?

The TLC recognises that there is great potential to increase enjoyment of the area (and the adjoining public World Heritage Area) through provision of walking tracks and potential huts. A solid business case would need to be developed to achieve this.

### Key outcomes sought

A sustainable business based in cultural ecosystem services.

### Time frame for returns and risks

Currently unknown



TasTrail reflective marker on a Five Rivers property

### Progress in 2013-14

- Approach from TasTrail being considered

### Key recommendations for future management

- Continue to seek potential partners and potential projects that would satisfy TLC's requirements for a sustainable business

## Potential in Tasmania

---

In order to prompt a dialogue and assess the appetite and acceptance of an ecosystem services framework for Tasmania, a series of presentations was given in 2013:

- At the Tasmanian Government offices, a talk by Daniel Sprod “*What are Ecosystem Services, and how could a framework be deployed in Tasmania?*”<sup>40</sup>, was paired with Professor John Tisdall, examining “*Economic techniques used to value ecosystem services*”
- This format was repeated at the TLC Board ;
- At the University of Tasmania, a series of talks to final year undergraduates in Environmental Management and Planning

Discussion at the various forums highlighted the thirst for information and the interest in seeing the concepts understood. They were very well attended and sparked interesting discussions in all venues.

Contact with a key ecosystem services researcher in Australia – Simone Maynard – resulted in an offer to help to pull together a framework that could be applied in the Tasmanian context.

However, despite offers to help to facilitate a burgeoning approach, there was no contact to either of the speakers following the talks as how collaboration could be established to take the issue further.

One of the themes of the talks was that there would need to be widespread and high-level support for the ideas, and it is evident that this is not the case. (As an aside, both the Australian and the Tasmanian Governments have since changed, with a result in massive cuts to science generally, but particularly to the environment and a complete severance with any expertise or effort to combat climate, including repealing the legislation that underpins Australia’s emissions trading scheme.)

Thus there seems to be little appetite for developing an ecosystem services framework for Tasmania.

### Prioritisation models

The TLC, in partnership with the DPIPWE, has developed the Tasmanian Spatial Conservation Index (TSCI - Carter et al, in print). This is a simple and open framework that rates various spatially expressed conservation policy priorities and integrates them into a prioritisation surface. Various elements have been recognised as being inadequately represented, including some issues to do with ecosystem function.

The TSCI has been used by TLC to guide conservation attention over the past five years.

In late 2013, the TLC Science Council meeting resolved to use a different framework (known as the JANIS criteria<sup>41</sup>) to define what the organisation means by a world class reserve system, and to



enable measurement of shortfalls and progress towards a complete system. This approach does not encompass the use of either ecosystem function or services as discrete inputs.

Thus there seems to be little appetite for developing prioritisation models using an ecosystem services framework for Tasmania.

Table 2 Potentially monetisable ecosystem services on the Five Rivers properties

Potential	Ecosystem service	Type	Monetisable product/service	Beneficiary/user pays	Fund-raising	Leverage opportunity	Discrete opportunity
***	Food (P)	Feral species	Deer, rabbit, trout, hunting/fishing opportunities	user pays, direct to market, royalty		potential	RiverFly, rabbits, deer
***	Building and Fibre (P)	Timber	sawlog	direct to market/internal use			write sawlog into covenant
***	Raw Materials (P)	Gravel	mined gravel	royalties			Stornoway
***	Energy resources (P)	Firewood	Contracted collection	royalties		potential	West coast business
***	Genetic resources (P)	All spp	cold/frost/drought tolerance genes (eg E. gunnii)				respond to requests only?
***	Water resources (P)	Drinking water	specialist water	potential		potential	sphagnum water to whiskey distillers
***	Habitable Climate (R)	CO2 sequestration, rainmaking	carbon credit	direct to market	potential	potential	many - Ian to market credits, Clarrisa leverage opps
***	Iconic landscapes/species/aesthetics (C)	Many of these	Ecotourism/recreation	direct to market	potential	potential	Many opportunities
***	Cultural diversity and knowledge systems (C)	Aboriginal	not monetisable, but good anyway				Develop opportunity in conjunction with TAC?
***	Knowledge Systems (C)	Science	Research centre and field studies		potential	potential	update Inspiring Place investigation, explore locations in detail
***	Recreational Opportunities (C)	artistic	eg Artists retreat	direct to market	potential	potential	need infrastructure?
***	Recreational Opportunities (C)	ecotourism	Ecotourism/recreation				key area with many opportunities
***	Recreational Opportunities	Walking	Ecotourism/recreation				set up walks with drop-

***	(C) Sense of Place (C)	Ecotourism	Ecotourism/recreation				in shelters key area with many opportunities
***	Sense of Place (C)	Sense of place	Ecotourism/recreation				key area with many opportunities
**	Food (P)	Native foods/ species	Wallaby, native pepper, others	direct to market		potential	In conjunction with TAC and Michael Johnston
**	Food (P)	Honey	Honey bee harvest				Shane to discuss will bee keepers
**	Genetic resources (P)	Threatened species	glycine latrobeana, others?	potential	potential	potential	enhanced breeding?
**	Water Quality (R)	potable water	reduce costs to downstream WSB? Council?	unlikely		potential	work with Hydro? Water and Sewage Board?
**	Reduce Pests and Diseases (R)	DFTD, chytrid etc	safe haven		potential		explore
**	Recreational Opportunities (C)	Meditation	Meditation retreat	direct to market	potential	potential	explore
*	Building and Fibre (P)	Weaving materials	reeds, lilies			potential	TAC?
*	Energy resources (P)	Wind	wind farm	potential		potential	West wind? Hydro?
*	Biochemical resources (P)	Native pepper	Native pepper, unknown	potential		potential	Anita Wild? TazWild?
*	Water resources (P)	Drinking water	provision to Water and Sewage Board	potential	potential	potential	explore
*	Water resources (P)	Hydro	already owned by Hydro Tas			potential	establish ownership
*	Water Quality (R)	Sediment retention	reduced dredging costs in Pine Tier Lagoon/flume	unlikely		potential	work with Hydro? Water and Sewage Board?
*	Knowledge Systems (C)	Forestry	maybe? If OK to have sustainable forestry under covenant			potential	explore

## Attachment 1: Ecosystem services work plan - 31 Jan 2013

Date	KPI (#)	Date	Task	Resp	Progress
31-Jan-13	<b>KPI 46</b> TLC has developed a plan to explore the monetisation of other (non-carbon) ecosystem services derived from the Properties and has consulted with CI in the development of that plan				
		31-Jan	Research ecosystem services and potential for monetization	DS	Done
		7-Feb	Work with CI to ID key players	DS/CB	Done
		14-Feb	ID key players, nationally and internationally	DS	Done
		28-Feb	Contact key players and set up possible interactions	DS	Done
		7-Mar	Time line who/where/what/when	DS	Done
		Mar - Oct 13	Interact with key players	DS	Done
30-Jun-13	<b>KPI 47</b> Plan implemented (progress to date)		Progress report to JH	DS	Done
		Dec-13	ID 5Rivers opportunities	DS	Done
		Dec-13	ID external opportunities (non 5rivers)	DS	Done
		Feb-13	ID potential buyers of ecosystem services	DS/IH	Done
		Mar-14	Feasibility report for opportunities	DS	This report
		Apr-14	Consult with CI re report	DS	
		May-14	Review report	DS	
30-Jun-14	<b>KPI 48</b> Plan implemented (feasibility identified)		Feasibility report for opportunities to JH	DS	

## References

---

- <sup>1</sup> Millennium Ecosystem Assessment. 2005. [http:// www.unep.org/maweb/](http://www.unep.org/maweb/)
- <sup>2</sup> Australia 21 (2012) Discussion Paper on Ecosystem Services for the Department of Agriculture, Fisheries and Forestry. Australia 21 Weston, ACT
- <sup>3</sup> Bruner and Niesten, in print, 2013. Chapter of....
- <sup>4</sup> Krutilla, John V.. "Conservation Reconsidered." *American Economic Review* 57, no. 4 (1967): 777–786.
- <sup>5</sup> TEEB (2010), *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB*.
- <sup>6</sup> Maynard, Simone, David James, and Andrew Davidson. "The Development of an Ecosystem Services Framework for South East Queensland." *Environmental Management* 45, no. 5 (May 2010): 881–95. doi:<http://dx.doi.org/10.1007/s00267-010-9428-z>
- <sup>7</sup> De Groot, Rudolf S, Matthew A Wilson, and Roelof M.J Boumans. "A Typology for the Classification, Description and Valuation of Ecosystem Functions, Goods and Services." *Ecological Economics* 41, no. 3 (June 2002): 393–408. doi:10.1016/S0921-8009(02)00089-7.
- <sup>8</sup> TEEB (2010), *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB*.
- <sup>9</sup> Sandal, M (2013) *What Money Can't Buy: The Moral Limits of Markets*. Farrar, Straus and Giroux
- <sup>10</sup> Cosier, P (2012) *Environmental Asset Condition Account Trials in Australia*. In *Towards Linking Ecosystems and Ecosystem Services to Economic and Human Activity*. United Nations Statistical Division Conference New York, 2012.
- <sup>11</sup> Peel, M.C., Watson, F.G.R., and Vertessy, R.A.,. "Modelling of Low Flows in the North Esk River Using the Macaque Model." Launceston City Council, 2002
- <sup>12</sup> Hinchcliffe, S. 2009. South East Queensland regional plan 2009–2031. Queensland Department of Infrastructure and Planning, Brisbane, Australia
- <sup>13</sup> DIP, DERM, SEQ Catchments, LGAQ (2010) *Implementing SEQ Regional NRM Plan Targets through Planning Schemes*, Council of Mayors, SEQ
- <sup>14</sup> Guerry, Anne D., Mary H. Ruckelshaus, Katie K. Arkema, Joey R. Bernhardt, Gregory Guannel, Choong-Ki Kim, Matthew Marsik, et al. "Modeling Benefits from Nature: Using Ecosystem Services to Inform Coastal and Marine Spatial Planning." *International Journal of Biodiversity Science, Ecosystem Services & Management* 8, no. 1–2 (2012): 107–121. doi:10.1080/21513732.2011.647835.
- <sup>15</sup> Mark Anielski and Sara Wilson (2009) "Counting Canada's Natural Capital: assessing the real value of canada's boreal ecosystems." The Pembina Institute, Canada  
[[http://www.borealcanada.ca/documents/BorealBook\\_CCNC\\_09\\_enFINAL.pdf](http://www.borealcanada.ca/documents/BorealBook_CCNC_09_enFINAL.pdf)]
- <sup>16</sup> Hanson, Craig, John Talberth and Logan Yonavjak (2011) *Forests for Water: exploring Payments for Watershed services in the US South*. World Resources Institute
- <sup>17</sup> Molnar, Jennifer L., and Ida Kubiszewski. "Managing Natural Wealth: Research and Implementation of Ecosystem Services in the United States and Canada." *Ecosystem Services* 2 (December 2012): 45–55. doi:10.1016/j.ecoser.2012.09.005
- <sup>18</sup> Stoneham, Gary Vivek Chaudhri, Arthur Ha, and Loris Strappazon. "Auctions for Conservation Contracts: An Empirical Examination of Victoria's BushTender Trial." *The Australian Journal of Agricultural and Resource Economics* 47, no. 4 (2003): 477–500.
- <sup>19</sup> Ifttekhar MS, Tisdell JG & Sprod D (2013) A review of conservation project selection criteria in the Midlands Biodiversity Hotspot Tender, Tasmania: sensitivity to project duration and auction budget, University of Tasmania, Hobart, Tasmania
- <sup>20</sup> Zammit, Charlie. "Landowners and Conservation Markets: Social Benefits from Two Australian Government Programs." *Land Use Policy* 31 (March 2013): 11–16. doi:10.1016/j.landusepol.2012.01.011.

- 
- <sup>21</sup> Goldman, R.L., Benitez, S., Calvache, A., and Ramos, A. "Water Funds: Protecting Watersheds for Nature and People." The Nature Conservancy, Arlington, Virginia., 2010.
- <sup>22</sup> <http://www.nature.org/ourinitiatives/regions/latinamerica/water-funds-of-south-america.xml> accessed May 2013
- <sup>23</sup> Costanza, Robert, Ralph d' Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, et al. "The Value of the World's Ecosystem Services and Natural Capital." , Published Online: 15 May 1997; | Doi:10.1038/387253a0 387, no. 6630 (May 15, 1997): 253–260. doi:10.1038/387253a0.
- <sup>24</sup> Liu, Shuang, Robert Costanza, Austin Troy, John D'Agostino, and Willam Mates. "Valuing New Jersey's Ecosystem Services and Natural Capital: A Spatially Explicit Benefit Transfer Approach." Environmental Management 45, no. 6 (June 1, 2010): 1271–1285. doi:10.1007/s00267-010-9483-5.
- <sup>25</sup> <http://www.teebweb.org/teeb-implementation/national-studies/> Accessed May 2013
- <sup>26</sup> [http://www.australia21.org.au/wp-content/uploads/2013/12/Maynard\\_Aust21\\_Forum\\_15Nov2013revised.pdf](http://www.australia21.org.au/wp-content/uploads/2013/12/Maynard_Aust21_Forum_15Nov2013revised.pdf). Accessed May 2014
- <sup>27</sup> Smith, V. Kerry, George Van Houtven, and Subhrendu K. Pattanayak. "Benefit Transfer via Preference Calibration: 'Prudential Algebra' for Policy." Land Economics 78, no. 1 (February 1, 2002): 132–152. doi:10.3368/le.78.1.132.
- <sup>28</sup> [Envalue \(Department of Environment and Conservation, New South Wales, Australia\)](#)
- <sup>29</sup> ARIES, Artificial Intelligence for Ecosystem Services <http://www.ariesonline.org/>
- <sup>30</sup> Bagstad, K.J., Villa, F., Johnson, G.W., and Voigt, B. "ARIES – Artificial Intelligence for Ecosystem Services: A Guide to Models and Data, Version 1.0." ARIES report series n.1., 2011.
- <sup>31</sup> Johnson, Gary W., Kenneth J. Bagstad, Robert R. Snapp, and Ferdinando Villa. "Service Path Attribution Networks (SPANs)." International Journal of Agricultural and Environmental Information Systems 3, no. 2 (32 2012): 54–71. doi:10.4018/jaeis.2012070104.
- <sup>32</sup> Tallis et al. 2013. InVEST 2.5.3 User's Guide. The Natural Capital Project, Stanford
- <sup>33</sup> Petter, Mik, Shannon Mooney, Simone M. Maynard, Andrew Davidson, Melanie Cox, and Ila Horosak. "A Methodology to Map Ecosystem Functions to Support Ecosystem Services Assessments." Ecology and Society 18, no. 1 (2013). doi:10.5751/ES-05260-180131.
- <sup>34</sup> Wunder, Sven (2005) Payments for environmental services: Some nuts and bolts. CIFOR Occasional Paper No. 42
- <sup>35</sup> One could argue that TLC has done just this in successfully pitching protection of all ecosystem services contained in the Five Rivers project to BHP-Bilidon
- <sup>36</sup> [http://www.conservation.org/global/csp/Documents/CSP\\_Overview\\_Low\\_Res\\_Web.pdf](http://www.conservation.org/global/csp/Documents/CSP_Overview_Low_Res_Web.pdf)
- <sup>37</sup> [http://www.fpa.tas.gov.au/\\_data/assets/pdf\\_file/0011/58547/32Interlaken-SoilFactSheet32.pdf](http://www.fpa.tas.gov.au/_data/assets/pdf_file/0011/58547/32Interlaken-SoilFactSheet32.pdf)
- <sup>38</sup> Forest Practices Board. Forest Practices Code. Forest Practices Board, Hobart, Tasmania, 2000.
- <sup>39</sup> Using the InVEST ecosystem mapping protocols
- <sup>40</sup> [http://prezi.com/fiivx\\_eo7war/es\\_june13/?utm\\_campaign=share&utm\\_medium=copy](http://prezi.com/fiivx_eo7war/es_june13/?utm_campaign=share&utm_medium=copy)
- <sup>41</sup> Commonwealth of Australia (1997) Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia. A report by the Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-committee, Canberra.