Transaction prices for ecosystem accounting

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1. Background

The measurement challenge

The role of natural capital accounting to support assessments of environmental sustainability and improved understanding of the connections between economic activity and the environment is increasingly recognized. At a national level, this recognition is reflected in the development of accounting frameworks that extend the standard System of National Accounts (SNA) that underpins the measurement of economic activity (e.g. GDP) and national wealth (EC et al. 2009). The System of Environmental-Economic Accounting Central Framework or SEEA CF (UN et al 2014a) was adopted as a statistical standard in 2012 by the United Nations Statistics Commission. Its implementation is being actively undertaken at national level including through the World Bank WAVES program.

[1] The authors of this note would like to thank the reviewers and experts participants who have offered comments, advice and guidance, especially all the members of the WAVES Policy and Experts Committee (PTEC). Further information on WAVES can be found in http://www.wavespartnership.org/. The views expressed in this document are those of the contributors and do not necessarily reflect the judgements of the World Bank.

A substantial extension in the SEEA is the application of national accounting principles to the measurement of ecosystems. This is described in the SEEA Experimental Ecosystem Accounting (SEEA EEA) (UN et al 2014b). In broad terms, it presents an accounting model in which information on ecosystem assets (defined in terms of spatial areas such as forests, wetlands and agricultural land) is combined with information on flows of ecosystem services. This, in turn, is integrated with information on produced assets and measures of income, production and consumption from the SNA.

A significant measurement challenge for SEEA EEA is in the area of the monetary valuation of ecosystems. Environmental economics has made substantial progress in valuation techniques which have been increasingly applied to ecosystem valuation (e.g. Freeman et al. 2013; Champ et al. 2016). On the face of it, initiatives for valuing ecosystems for national accounting purposes are well situated to take advantage of this progress. Whether or not this happens depends, in no small part, on determining if the integration of those ecosystem values with national accounting frameworks is not combining apples and oranges. UN et al (2014b) highlighted some important conceptual requirements for consistency with those values currently recorded in the SNA. It also speculated that the wide range of valuation techniques developed in environmental economics may not satisfy those conceptual requirements. Unfortunately, the SEEA EEA left the discussion at that point and only noted the need for further research and discussion to investigate precisely which valuation approaches would be appropriate for national accounting purposes.

Progress to date

In the light of this situation and the strong interest in valuation of ecosystem services, in 2015 the World Bank WAVES project commissioned environmental economist Giles Atkinson (LSE) and national accountant Carl Obst (IDEEA) to lead work to examine the conceptual linkages between the economic and accounting perspectives on valuation and to ultimately provide some guidance to countries based on the findings. An important early "steer" to the work was provided in a paper from Jeff Vincent who was also involved in the discussions.

In March 2016, a first draft was circulated to a limited number of experts, both economic and accounting, for feedback. The views were mixed with a clear gap in the paper in portraying the valuation challenge and also confusion on the need for the extensive discussion of externalities. The feedback was summarized and presented to the WAVES Technical Expert Group meeting in April 2016.

Immediately following that meeting a one-day invited workshop was held to discuss in detail the concerns raised and significant progress was made in moving toward a common understanding. The process of revising the paper to take that discussion and feedback on board is continuing but an updated draft is expected to be available for further review and discussion in early October. To give an insight into the proposed direction of the paper the following section outlines some key points to be explained and section 3 presents an early version of the new introduction. This new text and the topics it covers respond to one of the main issues raised in the feedback that the framing of the measurement issue was not clear to many reviewers.

Based on the findings of this paper, it is planned to develop two complementary papers. The first would focus on applying the lessons on ecosystem service valuation techniques to provide guidance to countries on undertaking valuation exercises. The second is to take the step beyond ecosystem service valuation and move to valuation of ecosystem assets discussing the additional assumptions and techniques that are required. To the extent possible given timing considerations, the findings

from this work will be incorporated into the final SEEA EEA Technical Recommendations due for completion in December 2016. It is expected that the work will, more generally, contribute to the longer term process of updating the SEEA EEA and associated material beyond the end of this year.

2. Key findings

Transaction prices

The feedback and discussion revealed that an important stumbling block for environmental economists in understanding the valuation issue from an accounting perspective was the use of the term "exchange values" to refer to the valuation concept required for national accounting. In particular the use of the word "value" raised a number of varying concepts into play.

As a result the proposal to adopt the term "transaction prices" as reflected in the title of this note. From an accounting point of view this change is a point one since accounting systems are fundamentally about recording transactions between units and the intent has always been to estimate prices for ecosystem services.

Focus of accounting valuations

The SEEA EEA was clear on the need to value ecosystem services using transaction prices given the underlying motivation of SEEA EEA, with respect to valuation, was to establish ways in which ecosystem services and ecosystem assets could be integrated with the values in the SNA – both supply and use tables and balance sheets. Transactions prices were needed to ensure that consistent valuation concepts were reflected in any aggregate estimates such as broader measures of national wealth or degradation adjusted GDP measures.

Although the SEEA EEA also made clear that other valuation concepts would likely be relevant for other purposes this message has not been widely understood and was clearly not sufficiently well conveyed in the first draft of the paper. There are a range of situations in which concepts other than transactions prices will be relevant, particularly in establishing whether certain policy choices would result in lower or higher overall social welfare outcomes. This is no different from the fact that in the SNA medical services are valued at the price paid to visit the doctor and not at the likely broader individual and social welfare that would likely be attached to that visit. Both are relevant pieces of information but this messages needs to be explained further.

The use of economic "channels"

A particularly important step forward emerged when it became clear that a framing commonly used in environmental economics valuation was to consider different types of connections, or channels, between the environment and business, individuals and society. Freeman (2013) identifies three main channels: inputs to production, inputs to household consumption and inputs to well-being.

As distinct from an externality based framing for valuation, this approach seems to provide a much more direct parallel to the way in which national accountants look to frame the valuation question. Indeed, the different channels can be seen as equivalent conceptually to different cells within a supply and use table which each record a different link between supplier (in this case the ecosystem) and user (in this case the different beneficiaries). The updated draft plans to use this as the starting point for framing different valuation techniques rather than working through potential interpretations of positive and negative externalities.

Perhaps the key conclusion that is emerging from this new line of thinking is that the choice of valuation technique will not be purely dependent on the type of ecosystem service – which has been the most observed approach to date. In addition, the valuation technique must also consider the characteristics of the beneficiary. In many cases this may not make a significant difference to the choices of technique that have been made but it does provide a valuation setting that is more satisfactory from a national accounting perspective.

Other points

Finally, the feedback highlighted a range of conceptual points that will need to be worked into the new draft. Some of these related to explaining the national accounts perspective on valuation, that is for the accounts we are looking to estimate prices for transactions in ecosystem services that have already been revealed – i.e. the actions of connections of people to ecosystems have already taken place. Thus for the national accounts we are no aiming to imagine an alternative scenario.

Related to this point, some clarity is needed on the assumptions required or embodied in accounting valuations, in particular the appropriate institutional settings. The standard logic from a national accounting perspective is to effectively assume the institutions and market settings are what they were at the time the transaction took place. In this sense the accounts take a position on the institutional setting but the valuations obtained to not rely on a particular assumed setting such as perfect competition. On the other hand, since the transactions in ecosystem services commonly occur with no market structure in place it is necessary to assume some institutional structure. The SNA uses the phrase in relation to the valuation of assets on the balance sheet "as though a market existed" but discussion and more clarity on what this means in the context of ecosystem services valuation is required.

3. For information: Redrafted introduction

The following pages provide a more detailed description of the new framing that has been developed in the wake of the feedback and discussion earlier this year. This text is provided for information only – it is subject to further review and discussion before wider circulation.

Defining Transaction Prices in Accounting and Economics

Our focus is on what was perhaps was one of the significant hurdles set out in UN et al 2014b. This is that the monetary values for national accounting, or more specifically the 'monetary prices' to be attached to the quantities supplied by ecosystems (i.e. ecosystem services), are required to be interpreted as 'transaction prices'. This latter concept is the key valuation principle in the SNA and is defined in UN (2008, para. 3.119, p50) as the price that represents the: "… amounts of money that willing buyers pay to acquire something from willing sellers …".[2] There are undoubtedly challenges in reconciling such a definition with the provision of goods and services from ecosystems. The SNA definition arguably more clearly fits an institutional context where there are observable prices for transactions that are made voluntarily. Clearly, if this is the requirement for valuing ecosystems in national accounts then a short conversation only need ensure; at least, until such a time when analogous institutions[3] for ecosystems prevail - although see Vincent, 2015, for

[2] Specifically, UN (2008) refers to this as an "exchange value". However, in this paper, we use the terminology of transaction price in order to avoid confusion with how exchange and value is understood in economics.

[3] For example, via payments for environmental service schemes and so on.

a discussion of exceptions to this rule within the SNA, which are required to cover a range of non-market and similar transactions within scope of the measures of production and income defined in the SNA; e.g. imputed rent for owner-occupied dwellings..

Yet this would be an overly unyielding interpretation of the intended meaning of a 'transaction price' in the setting of national accounting. Indeed, much of this is anticipated already in the SEEA EEA and subsequent contributions. One instance is in the definition of buyers and particular sellers (see e.g. Edens and Hein, 2013; Obst et al. 2013). The "buyers" are those parties who benefit from (i.e. use or consume) the goods and services that ecosystems provide (e.g. farmers, water supply companies, tourists). The "seller", by contrast, is harder to definitively identify although agreement is coalescing around the principle that the "ecosystem" itself is a useful (albeit new) institutional unit in this respect.[4] What this means is that the notion of the transaction price reflects what buyers would pay for what is produced by an ecosystem and what the seller of this (the ecosystem itself) would accept.

This seems a little abstract. But there is perhaps a parallel here with notions of 'demonstrating' and 'capturing' value in economic debates about conservation policy. The former is concerned with methods to show that ecosystem services have value. The latter is concerned with establishing markets (or related mechanisms) which actually realizes this value. There is a crucial difference, however. Identifying a transaction price for accounting purposes should not require an actual market exists or needs to be created before it becomes a relevant parameter for valuing flows of ecosystem services for purposes of ecosystem accounting. What should be asked instead is what the producer would receive in exchange for the service 'as if' a market (or similar) had existed.[5] The key ingredient here is whether it could be imagined that there is some plausible economic relationship (at least, in principle) between buyer and seller that would facilitate the interpretation of a transactions price to characterize this exchange.

In taking this path to understanding how a 'transaction price' relates to ecosystem valuation, closer links between economics and accounting may emerge (in contrast to the past, where arguments from the latter have tended to focus on whether environmental valuation techniques drawn from the former include estimates of consumer surplus). For example, an economic interpretation is that transaction price is the value that the buyer (e.g. an economic producer or household) places on receiving the marginal (i.e. last) unit of "something": typically, a good or service, although conceivably it could be an asset (or liability) too. This is essentially what techniques of environmental valuation, in environmental economics, seek to measure.

A further interpretation of what these techniques seek to do is important too: that is, what are the circumstances where these estimates also can be said to represent the value at which the seller (e.g. a producer) is willing to give up this same "something". Similar to national accounts, this refers to a price at which a transaction was actually made, albeit implicitly. That is, it is not some idealized price – rather it reflects the value of a transaction given institutions as they actually were during the accounting period.[6] That is, situations where such goods and services are provided as unpriced inputs (for whatever reason), externalities (such that what is transacted between buyer and seller is unintended) or public goods (where there are possibly large numbers of buyers, who might not

[4] Proposals for additional "quasi" institutional units to reflect the connections between the economy and the environment are longstanding in SEEA discussions. See for example Harrison (1995) and Vanoli (1995).
[5] This framing is precisely the expectation of the SNA in the valuation of natural resources on the balance sheet where observable asset markets do not exist – see SNA Chapter 13.
[6] Recall that for accounting purposes the intent is to record the stocks and flows at points in time that have past. Thus, the prices being sought are for transactions in ecosystem services that have already been revealed.

easily be excluded from using or consuming a good or service).[7] This is not to suggest tensions between economics and accounting simply disappear. For example, national accounts have always excluded the value of externalities *precisely* on the basis that these do not represent transactions in goods and services between economic agents (EC et al, 2009). A critical task, in what follows, is demonstrating the extent to which the relationships embodied in an externality based framing can be re-presented as transactions between economic agents and ecosystems; i.e. formulating both a buyer and a seller (see, also, Vincent, 2015, for a discussion on this theme).

Our Focus: Valuing Ecosystem Services

In the framework of the SEEA EEA, ecosystem services[8] are seen as the flows of "production" (and hence income in a national accounting context) that are supplied by the underlying ecosystem assets or "capital" (e.g. forest, wetland, agriculture land). Our emphasis, in what follows, is on the valuation of flows of ecosystem services, rather than the stock of underlying assets. We adopt this focus in order to concentrate our discussion on defining transaction prices.[9]

However, our discussion is also directly relevant to the valuation of ecosystem assets, since their value will be equal to the capitalized value of flows of future ecosystem services. Since the prices of ecosystem services are not observed neither are the prices of ecosystem assets.[10] This relevance is important as we recognize that a critical application of ecosystem accounting is to throw light on what is happening to ecosystem assets, and whether national development paths more generally are sustainable or not. The literature on wealth accounting, in particular, identifies a clear role for ecosystem services valuation to estimate (the change in) asset values (including via ecosystem degradation) and constructing measures of *adjusted net income* and *adjusted net saving* (e.g. World Bank, 2006; Barbier, 2010; Arrow et al. 2012).

As shown in Fenichel and Abbott (2014), however, accounting for the value of an ecosystem asset (or renewable natural capital more broadly) requires estimation of a range of parameters, of which the value of the flow of ecosystem services is just one ingredient. Firstly, when the asset is renewable (or regenerates), the ongoing resource productivity must be considered in discounting the (future) value of the asset.[11] Secondly, there is a capital or holding gain, which Irwin et al.

[7] Although implicit, the transaction price in such instances is unlikely to be zero or trivial unless, to take two opposite examples, there is no scarcity (e.g. an uncongested and abundant ecosystem used for recreational opportunities) or a resource (e.g. a fishery) is open access and over-used such that rents are dissipated.

[8] This term itself refers to both tangible goods as well as intangible services, which are provided by ecosystems.

[9] Knowing the value of current flows of ecosystem services in ecosystem accounts could also be useful information for other reasons. Linked to income and production accounts, for example, this could permit better understanding of the extent to which ecosystem services support the economy currently and in what ways. In principle, such information further could be used to augment a measure of current (gross) production such as GDP. In other cases, this might involve re-attributing elements that currently comprise GDP (e.g. identifying ecosystem service values which are implicitly already in the national accounts and explicitly re-assigning to a new "institutional producer": the ecosystem asset).

[10] Partial observed valuations for some ecosystem assets will exist, for example in terms of observed prices for land, but these values will not captured the full suite of ecosystem services produced by that ecosystem asset. For a more complete discussion of this issue see UN et al 2014b, Chapter 6.

[11] That is, asset price, $p = \frac{V+\dot{p}}{r-\dot{s}}$, where V is the value of the marginal unit (current) service flow from the asset and r is the discount rate. One additional term, in the denominator, is $\dot{s}$, which refers to (net) resource productivity and is used therefore to calculate an effective discount rate. A further term, in the numerator, $\dot{p}$ refers to the "scarcity effect" of holding the last unit of the asset. From this perspective, our focus in this paper is on V only.

(2016) term as a 'scarcity effect' arising from holding the last or marginal unit of the asset. Thus accounting for ecosystem asset values, as well as degradation or enhancement of these assets, raises additional and important concerns.[12] These will be considered in a separate paper and, as such, these are (largely) left to one side in what follows here. This allows us to concentrate on our specific objective: the extent to which ecosystem values estimated using valuation techniques in environmental economics can be measured consistently using the valuation principles underlying the values currently recorded in the SNA.

Ecosystem Services: Channels from Economics to the National Accounts

Initial clues for practical accounting for ecosystem values can be found by reflecting on how ecosystem services – flows of "production", in the SEEA EEA, that are supplied by an underlying ecosystem asset (e.g. forest, wetland, agriculture land) – ultimately provide benefits to people and businesses. This is what Freeman et al. (2013) term: "The economic channel through which wellbeing is affected" (p13)[13]. These channels are manifold (e.g. Brown *et al*. 2007, Freeman et al 2013) but can be summarized in three ways.

ES#1: Firstly, there are those ecosystem services which are used as inputs to economic production. Examples include soil fertility which is an input to agricultural production. Water regulation and water purification services are inputs to those economic (producing) units which need a supply of clean water as an input perhaps alongside e.g. other factors of production.

ES#2: Secondly, ecosystem services can act as joint inputs to household consumption. That is, there is use of ecosystem services in combination with expenditure on produced goods and services in providing a "product" for consumption. In such cases, an ecosystem services and the market goods/services are complementary inputs. Examples include nature services which in combination with travel expenditures are used to produce nature recreational experiences. However, an ecosystem service can be a substitute for a market good. An example is air purification services which can substitute for purchase of a produced good which filters air.

ES#3: Thirdly, ecosystem services can be inputs which directly contribute to household wellbeing. That is, there is no existing economic production or household consumption where these services act as inputs. These services are consumed directly in generating benefits (which themselves are ultimately a source of wellbeing). Examples here are by their nature rather abstract, but include those services are valued for reasons of what is usually termed 'non-use' or 'passive-use'.

All of these channels are well-rehearsed in the literature on categorizing ecosystem services in environmental economics. The ambition then is to apply this understanding in answering our question about transaction prices. There are parallels between these categories and national accounting. Thus, ecosystem services are "outputs" of ecosystem assets which, in turn, act as inputs to existing (economic) production processes, as in the case of ES#1, or as final (household) consumption as in ES#2 and ES#3.

[12] There could be additional complications including the effects of overuse of the ecosystem asset on the asset life and ecosystem capacity (REF).

[13] It may be noted that these "channels" could be considered to build on, or extend, the common representation of ecosystem services in the cascade model (REF) that shows the linkages between ecosystem functions and processes, ecosystem services and the benefits ultimately received.

An important consideration in making the link between the valuation of transactions and the national accounting principles concerns the production boundary of the standard SNA which currently excludes recording of ecosystem services. This may seem to be a particular challenge for those services, generated via the channel described in ES#3, which appear on the face of it to represent consumption which lies beyond the standard boundary of production in national accounts.

However, the approach applied for ecosystem accounting (as described further in Section 2), is to accept that the current SNA production boundary must be extended. To maintain a consistency in the supply and use of the additional production, i.e. the ecosystem services, the boundary is increased to recognize all of the ecosystem services supplied via the various channels.

The effect on measures of GDP from this change will depend on how the ecosystem services are used. If they are used as inputs into current production processes then the impact on GDP is zero – that is the increased output is completely offset by an increase in inputs. On the other hand, if the ecosystem services are inputs to household consumption, there will be an increase in GDP equal to the output (and consumption) of these ecosystem services. The message here is that by considering each transaction between buyer (household) and seller (ecosystem), it is possible to fully integrate the value of these transactions with the entries currently recorded in the national accounts. The impact of GDP will depend on the ecosystem service and channel.

Those ecosystem services in category ES#1 can be directly connected to outputs which are clearly within the current SNA production boundary. In other words, since they are inputs to the production of a marketed good, the value of such ecosystem services can be construed in terms of the (marginal) contribution to the value of market output.

Those ecosystem services in category ES#2 give rise to further consideration. Recall that these are cases involving the purchase of a market good, which in combination with an ecosystem service is used by households to produce an output that is subsequently consumed. These purchased market goods are transactions which lie within the current SNA production boundary. Importantly, demand for these market inputs provides information about the value of the ecosystem service too. This should make us optimistic perhaps about the consistency of valuing ES#2 in a way that is consistent with the SNA. Whether this optimism is justified depends on exploring further a number of related issues, perhaps best illustrated with reference to specific ecosystem services alongside the specific valuation techniques for those services.

Techniques of Environmental Valuation

The categorization of ecosystem services into channels, ES#1 through to ES#3, maps naturally onto appropriate techniques used to value the contribution of an ecosystem service via these economic channels. All of these techniques attempt to estimate a transaction price that the buyer would willing to pay (and, implicitly, that the seller would look to receive if there were a formal and explicit transaction), by extension of the sequence of ecosystem service categories just described and discussed, some of these techniques will be a way of estimating values which can be consistently combined with national accounts although others may not.

One positive message is that for ES#1, a variety of techniques exist to measure the value of the environment as an input to economic production. For example, these techniques explore the way in which this input contributes to the profits of economic producers perhaps by lowering other (market input) costs or boosting revenues (output).

Techniques which are used to value ES#3 consist of stated preference methods (e.g. survey based techniques which ask respondents, in essence, directly for the price at which they would buy an ecosystem service if such a transaction was made in a contingent market). Whether these methods are potentially applicable for accounting purposes is a question that we will also address in what follows.[14]

For ES#2, valuation methods can be used to assess the marginal value of an ecosystem service given that these are revealed in expenditure on market goods which are complements to or substitutes for the ecosystem service. Some of these are possibly compatible with SNA valuation principles, while some are not, and in this respect the cases under ES#2 provide perhaps the most interesting interpretational challenges. One such instance of this category of final consumption is nature recreation for which the services provided by an ecosystem (e.g. a lake) is one input for providing this experience. Techniques for valuing this recreational demand might focus upon estimating the value revealed by actual expenditures required to enjoy these recreational opportunities (e.g. travel-related costs, boating equipment etc.). This tells us something about the price at which buyers would transact. Whether this is also the price at which the seller (in this case the lake) would conduct the same transactions requires some further reflection. Since the actual expenditures are for goods and services produced by economic units (e.g. boat manufacturers), they do not obviously represent the contribution of the ecosystem to household consumption.

Broadening the Discussion

Our emphasis on 'transaction prices' might seem somewhat single-minded given the breadth of debate likely to surround extensive adoption of valuation in ecosystem accounts. For example, there is presumably concern about the potential for monetary valuations to provide misleading signals to decision makers.[15] Yet there are vital decision making processes that currently involve monetary valuation and which do not, or only partially, incorporate environmental concerns. National accounting is clearly one of these domains and so it is important to consider how this shortcoming can be addressed. In doing so, it might be useful to think in terms of a hierarchy of concerns that flow from this starting point.

Our focus in this paper is what we consider to be at the top of this hierarchy: the conceptual consistency between methods used in environmental economics to value flows of ecosystem services and the concept of transaction prices needed for valuation in national accounts. Debate, however, does not (and should not) end here. Next, there will be practical concerns about these methods. Indeed, much of the focus in environmental economics itself has been concerned with testing these methods, scrutinizing where these techniques work and where these do not. Put another way, a concern here surrounds the robustness of these environmental economics based valuations compared to the usual standard of accuracy in national accounting. Third, there are questions about institutional processes and the capacity of those statistical organizations charged

[14] Needless to say, there are complications. Some ecosystem assets conceivably provide a number of ecosystem services some of which are inputs to (economic and/ or household) production and some of which are consumed directly by households. Conceivably, a given ecosystem service might be valued in distinct ways: i.e. via more than one economic channel as described above. The implication then is that some of these channels associated with that one ecosystem service or the multiple services provided by a single ecosystem asset (and so associated transaction prices) are admissible in a SNA consistent account that seeks to value flows of these services.

[15] For example, this could include suggesting that there may be substitutability between ecosystems and other assets types (including produced and financial capital) and, by definition, not incorporating intrinsic values of nature.

with valuing ecosystem services. Practical questions in managing this process might then also prescribe which valuation techniques are used and when.

While all this amounts to a challenging agenda, the interim conclusion is that there is reasonably good progress which can be made in valuing flows of ecosystem services using environmental economic techniques in ways that do not turn any valuation principle in national accounting on its head. Of course, it is likely that certain techniques of environmental valuation do not satisfy this requirement of consistency with integration in the national accounts but the rationale for this should be able to be clearly explained.

In addition, while some valuation techniques may not be appropriate for use in ecosystem accounting, these techniques remain vital for use in the domain of policy appraisal such as in (social) cost-benefit analysis. Indeed, even in a standard economic analysis context practice shows that analysts are able to understand the measures reflected in the standard national accounts and also conduct cost-benefit analysis using additional and different valuations. There is no intention in this paper to suggest that transaction based pricing of ecosystem services is the only or most appropriate valuation approach. Rather the choice of valuation approach should be aligned with the measurement and analytical intent.

It is also relevant to consider the specific accounting context. The use of transaction based pricing is necessary where the intent is to integrate the valuation of ecosystem services and, subsequently, ecosystem assets and flows such as ecosystem degradation, with the standard measures of national production, income, saving and wealth, including GDP. However, there may be an important opportunity to recognize a variation in accounting intention with a focus on the contribution of ecosystems to current and future welfare. In this case parallel accounting structures as well as alternative valuations are likely relevant, particularly to take into account those ecosystem services in channel ES#3.

More broadly, the real need is for an extended discussion between accountants and environmental economists to understand the nature of the differences in their approaches to valuation. This paper can be viewed then as a detailed attempt to better frame that discussion, recognizing that – while clarification of many issues will be reached – ongoing dialogue will be required in some areas.