Submission 40.1
Received 15/05/2012

Answers to questions taken on notice by Charles Sherwin from BirdLife Australia, 4th May 2012

Q
Ms Hall asked (p. 17 of the transcript): "Mr Sherwin, you suggested putting in place a national environmental account. What sorts of things should be included in that?"

A
The document *Accounting for Nature, A Model for Building the National Environmental Accounts of Australia* published by the Wentworth Group of Concerned Scientists, which I tabled at the Inquiry's public hearing in Melbourne, outlines five asset classes suggested for inclusion in national environmental accounts, as follows: Land (native vegetation, fauna and soils), Water (rivers, wetlands and estuaries), Atmosphere (greenhouse gas emission), Marine and coastal resources (fish stocks, reefs, beaches and estuaries) and Towns and cities ((air quality, waste, water use and consumption) (pp 4-5).

The Wentworth Group's subsequent paper *Accounting Metrics for Building Regionally Based National Environmental Accounts* (attached to this response) spells out in some more detail what this might entail. BirdLife Australia commends the Wentworth Group's thinking on this matter to the Inquiry.

We note that the Wentworth Group looks to BirdLife Australia's Atlas of Australian Birds (in an "expanded" form) as a surrogate for assessing the condition of native vegetation. We support this notion. We further note that the United Kingdom has already developed a set of "Biodiversity Indicators" as a basis for national environment reporting, and that this set of indicators forms the basis of regular publications as part of the UK's National Statistics. This UK set of indicators includes "Populations of selected species (birds)", drawing on data from the UK's major non-government bird conservation organisation, the Royal Society for the Protection of Birds.

Another potentially useful indicator of biodiversity is the Red List Index (RLI) of trends in extinction risk. This has been adopted by the world's governments as one means of assessing performance under the Convention on Biological Diversity. The RLI has recently been applied at the national scale in Australia for the first time, evaluating trends in the conservation status of Australian birds for the period 1990 to 2010 (Szabo, J.K., *et al*. (in press) Adapting global biodiversity indicators to the national scale: A Red List Index for Australian birds. Biol. Conserv. (2012), doi:10.1016/j.biocon.2012.01.062). We commend this study to the Inquiry as it exemplifies one replicable indicator of biodiversity consistent with those being utilised at global level.

Q
Ms Marino was interested in carbon and biodiversity plantings (p. 18) and I offered to supply further information (top of page 19)…

A
In supplying further information about opportunities and risks relating to carbon sequestration in the Australian landscape, particularly with biodiversity co-benefits, we point the Inquiry to three documents which give some spatial pointers and much useful discussion in this regard, as follows:

- Wentworth Group of Concerned Scientists 2009, Optimising Carbon in the Australian Landscape, How to guide the terrestrial carbon market to deliver multiple economic and environmental benefits, October

- Crossman, N.D., Bryan, B.A. and Summers, D.M 2009, Hotspots of threat and opportunity from widespread reforestation for carbon offsets, paper to the 18th World IMACS / MODSIM Congress, Cairns, Australia 13-17 July.
- CSIRO, 2009. *Analysis of Greenhouse Gas Mitigation and Carbon Biosequestration Opportunities from Rural Land Use*. Edited by Sandra Eady, Mike Grundy, Michael Battaglia and Brian Keating for the Queensland Premiers Climate Council

These papers suggest large scope for sequestering carbon with biodiversity co-benefits at national level, in South Australia, and in Queensland respectively, and point to the potential benefits of this, and also to risks including that of displacing agricultural land uses.

BirdLife Australia notes that the Australian Natural Resources Atlas suggests that 80% of the returns from agriculture in Australia might be generated from around only 3% of the country's agricultural land (http://www.anra.gov.au/topics/economics/costs-returns/index.html). A map indicating this area is displayed at http://www.anra.gov.au/topics/economics/images/popups/top80pfe.jpg. Given this, it strikes us that there may be considerable scope to provide for sequestration of carbon in restored biodiverse native vegetation (whether regenerated or replanted- although the former would be much more cost effective) within the areas currently utilised for lower return agricultural activities, including areas where land may be degraded from traditional agricultural activities and actually benefit from revegetation in terms of erosion, salinity control and land health in general.

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WENTWORTH GROUP

OF CONCERNED SCIENTISTS

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In association with Dr Eva Abal, Ms Di Tarte, Ms Leith Boully, Dr Neil Byron, Prof Ian Lowe, Mr Dennis Trewin, Ms Pam Green, Mr Gary Stoneham, Mr Mark Eigenraam, and Dr Phil Gibbons.[1]

Accounting Metrics for Building Regionally Based National Environmental Accounts

We are heartened by the energy and level of interest in this initiative inside the senior levels of the Commonwealth government, across many agencies.

We can also confirm an equal level of excitement and anticipation in the NRM bodies across Australia and in Local government.

The area of contest between *Accounting for Nature* and the NEIS model led by DEWHA is the regionally based health metric.

Whilst we are not wedded to the *Accounting for Nature* model in its totality, we do believe a regionally based benchmark (health or reference condition) type metric is central to the design of the national environmental accounts.

The attachment sets out eight design considerations for building the National Environmental Accounts. We believe that these are fundamental to the design of an effective National Environmental Accounts framework, to achieve more effective policy and more cost effective investments in environmental protection.

The advantage of building the National Environmental Accounts on a regionally based, health or reference condition type metric is that it produces three benefits:

- Firstly, it reduces the amount of information that needs to be collected to produce a systematic accounting framework that can operate at all scales, rather than require the collection of an impossibly large number of indicators (e.g. the 200 indicators still unresolved by the NRM Minco after over 10 years of argument),
- Secondly, the information is in a format that indicates whether we are making a net loss or gain for investments in environmental management, and
- Thirdly, the accounts can be used by any institution, for any asset, at any scale, to guide policy or economic investment decisions, because they are built from a common currency.

A Common Currency for Determining Environmental Value

Describing the stock and flow of assets for economic accounts is relatively simple, because all economic assets can be measured under a common currency.

Economics and related fields often distinguish between quantities which are stocks and those which are flows. A stock variable is measured at one specific time, and represents a quantity existing at that point in time, which may have been accumulated in the past. A flow variable is measured over an interval of time, that is, quantity per unit of time.

For environmental accounts it is not so simple, because as yet, we do not have a common currency for environmental assets. Traditional assets accounts (the number of trees or volume of water) are limited in their ability to guide policy and cannot be used to guide cost/benefit analyses, either within an asset class or between asset classes for two reasons:

1. There is no policy objective that emerges from knowing the number of trees in a region vs the area of grassland in another, or scientific context for knowing how many trees or what area of grassland a region should have. These answers depend on what was there before and what is considered to be adequate for conservation outcomes in the future; and
2. Because many assets use different measures of stock (number of fish which could be millions of individuals, area of grasslands which is hectares, volumes of water which is megalitres), it is not possible to create a common currency to compare them.

The concept of a 'common currency' for environmental assets does not imply a monetary value, or any assignment of value. It is simply a means of standardising our measurement of environmental assets. Nor does it imply that all decisions are made based on the 'currency' alone, as other factors such as urgency, priority, status and cost-effectiveness will also have to be considered. What it does mean, however, is that we can, for the first time, plot our environmental assets on a common scale and understand how they are tracking relative to their pre-modification (healthy) condition.

Using either a health or reference condition metric allows the creation of a common currency not only within asset classes but between assets:

- it allows every asset to be compared relative to that same asset at any scale, Australia wide;
- it allows us to compare the rate of change not only within each asset class, but between assets classes, and
- it allows regional reporting to be aggregated to form a national, meaningful picture of the state of the environment.

With health based or reference condition metrics it is possible to compare the relative contribution to environmental health of an investment in one creek over another, between an investment in repairing a sand dune or a eucalypt forest, or even between the creek and the sand dune.

The great value of such a benchmark metric is that it creates a common environmental currency that allows us to evaluate the environmental improvement of one action over another, at any scale, from the billions of dollars of investments we are making.

Health or reference condition metrics have a second advantage: they also drive cost efficiencies in data collection, because they allow areas under intense environmental pressures (significant net loss over time) to be measured with much greater precision than areas under less pressure, without diminishing the ability to compare one region with another. It allows indicator selection to be chosen at a local/regional scale, rather than the collection of a raft of data at a national scale in an attempt to satisfy all user needs where the result is redundancy.

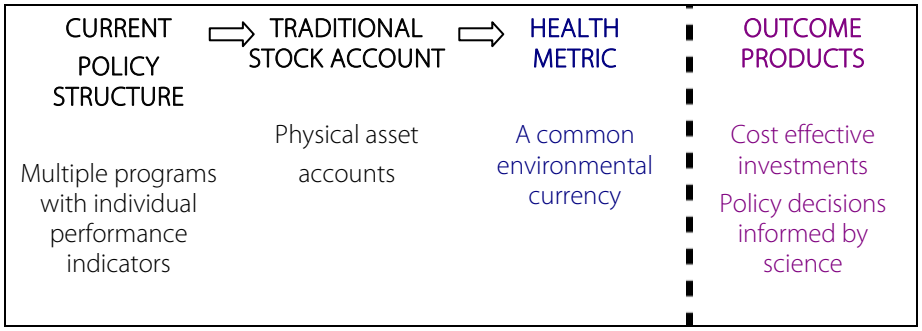
Where to draw the line: health and reference condition metrics?

The first step in building stock and flow accounts for environmental assets must therefore be to create a common environmental currency. In doing so, it allows all environmental assets, irrespective of the unit of measure, to be compared against a common standard.

The only way to achieve this is to create a 'health' or 'reference condition' metric as the foundation for the environmental accounts.

In *Accounting for Nature* we argued that a 'health' metric was the preferred benchmark because environmental management and investment should be aimed at improving environmental health, and hence 'health' was the logical standard for measurement. 'Health' and 'reference condition' were not differentiated because it was assumed they were one and the same.

DESIGN LOGIC IN *ACCOUNTING FOR NATURE*

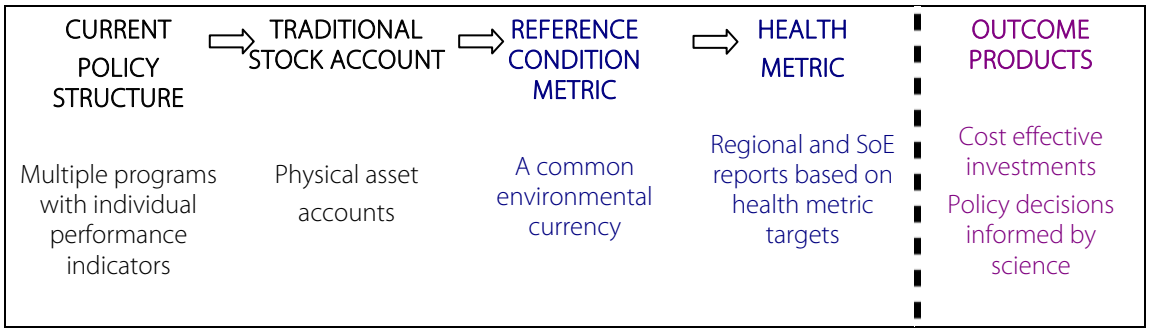


In subsequent discussions with DEWHA, Treasury and others, it has become evident that the term 'health' is likely to be interpreted by many as a surrogate for policy. Whilst we would argue that the whole purpose of creating the environmental accounts is to guide better policy, we accept that policy should be a product derived from accounts, and not visa versa.

One option for differentiating 'accounts' from 'policy' is to use 'reference condition' metrics as the foundation currency for the National Environmental Accounts, and for the more policy-based Catchment and State of the Environment Reporting of status and progress towards policy targets, to be described by 'health' metrics.

Differentiating reference condition from health enables environmental data to be collected under a common environmental currency, for all asset types, at all scales, without compromising the integrity and consistency of information embedded in the accounts.

DIFFERENTIATING BETWEEN ENVIRONMENTAL ACCOUNTS AND POLICY BASED REPORTING



It also allows environmental reporting to be tailored to specific 'policy' circumstances of a nation, state, catchment or local area, if that is what is desired by policy makers.

Reference Condition Accounting

Reference condition accounting (RCA) compares the level of an asset relative to its reference condition.

This would be a score between 0 and 100, for all assets types at all scales. For example, one indicator for the land asset would be the condition of native vegetation. In Victoria, that indicator would score 28%, because there has been a decline in native vegetation condition by 72% (using a *Habitat Hectares* condition metric) benchmarked against its pre-modification (c1750) state. Using a reference point in time of 1750 in this example, allows a common time and condition to be established from which change can be measured. In doing so, this does not imply or suggest that landscapes should be returned to this condition, rather that change is simply measured against this state as a common denominator.

An example of reference condition accounting metrics for native vegetation asset:

Accounting for Nature suggests that we start the regional level of the National Environmental Accounts with 2 indicators for land assets: native vegetation; and soil health. Each would have its own metric defined by relevant variables.

The most basic native vegetation metric would be defined using vegetation extent. If that's all there is, that's a fine start as many native biota are significantly associated with the extent of native vegetation. You just cookie-cut annual land cover layers derived from satellite imagery with vegetation association maps to produce the stock and flow accounts, which describe the % of each vegetation type remaining and the change in the stock of each vegetation type over the previous year.

But if the data are available, it would be better to take it a step further and create a simple, science derived metric including connectivity and minimum area thresholds.

But then it may also be possible to go a further step, and include the survey data from the Australian Bird Atlas as a cost effective surrogate of vegetation condition. In some areas it might be even possible to build in a sample design using variables collected for Habitat Hectares (Victoria), Biometric (NSW) and BioCondition (Qld).

Ultimately we might even lay out digital recording systems across each State that collect real-time data that are uploaded via telecommunication networks and produce regular lists of animals and plant cover that are available via the internet. This system can start with the existing

basic information and progressively build up to a much more complete and sophisticated system with time and experience, guided by emerging priorities.

A Common Account Structure

A second key element of an environmental accounting system is a common account structure.

Each country of the world applies a common account structure, based on the System of National Accounts (SNA), to ensure that measures of economic stocks and flows are comparable across jurisdictions and through time. The SNA is coordinated by the United Nations, IMF, OEC, EU and World Bank.[2]

A common account structure and common conceptual basis for environmental stocks and flows will also provide significant benefits in terms of policy value and resource allocation.

The System of Integrated Environmental and Economic Accounting (SEEA 2003) has been developed and coordinated by the same international bodies that oversee the SNA. In 2012, if approved by the UN Statistical Commission, SEEA will become the international standard (*statistical standard*) as is the SNA currently.

There are four broad classes of economic accounts which should also be employed for environmental accounts.

- *Flow accounts for pollution, energy and materials* - information at the industry level about the use of energy and materials as inputs to production and the generation of pollutants and solid waste.
- *Environmental protection and resource management expenditure accounts* - expenditures incurred by industry, government and households to protect the environment or to manage natural resources.
- *Natural resource/environmental asset accounts* - that follow the structure of asset accounts reported in the SNA but are constructed for natural resources and environmental stocks such as land, fish, forest, etc, that are not included in the SNA.

  Such balance sheets may be compiled in physical as well as monetary units and are useful for measuring environmental 'wealth', and changes between accounting periods.
- *Valuation of non-market flow and environmentally adjusted aggregates* - this includes the provision for macroeconomic aggregates adjusted for depletion and degradation costs and adjustments concerning the so-called defensive expenditures.

SEEA employs the same accounting concepts and account structures as national accounts with modifications to enable stocks and flows to be represented in physical rather than financial units, or hybrid units.

The National Environmental Accounts of Australia framework would need to set standards for Reference Condition Accounting, to ensure consistency of data collection.

Through the development of the National Environmental Accounts, Australia has the opportunity to influence reform in environmental accounting across the globe.

The structure of the environmental stock and flow accounts might look like:

ENVIRONMENTAL STOCK ACCOUNT[3]

ASSET	REFERENCE CONDITION	2008	ENVIRONMENTAL ACCOUNT
LAND			
Terrestrial Carbon (Mt CO2e)	69.1	38.2	55%
Native Vegetation Condition (0 -1 per ha)	1.328 m	0.375 m	28%
WATER			
Runoff (ML)	5.2	13.5	160%
MARINE			
etc			

ENVIRONMENTAL FLOW ACCOUNT

ASSET	2007 STOCK	2008 STOCK	CHANGE
LAND			
Terrestrial Carbon	10.7	12.8	+19.6%
Native Vegetation	28	26	-7.1%
WATER			
Runoff	160	163	+1.9%
MARINE			
etc			

A range of other account products can be derived from this information. For example, environmental asset accounts can take the same form as asset accounts in the SNA as illustrated in the table below (Environmental Asset Account – Land). Asset accounts record opening stock, additions due to transactions, deductions, revaluations and closing stock.

ENVIRONMENTAL LAND USE STOCK ACCOUNT

	AGRICULTURE	NATURAL	FORESTRY	URBAN	WATER	TOTAL
Pre-1750		1,328,241				
2008	835,149	219,367	176,159	101,221	5,345	1,328,241
% Change		-83%				

Based on the Australian Land Use Management (ALUM) classification system

ENVIRONMENTAL LAND USE FLOW ACCOUNT

	AGRICULTURE	NATURAL	FORESTRY	URBAN	WATER	TOTAL
2008	835,149	219,367	176,159	101,221	5,345	1,328,241
Transactions	- 330	+ 330				
Additions		+ 1800	+ 2300	+ 1600		
Deductions	- 5700					
Other		+ 700		- 700		
2009	829,119	222,197	169,459	102,121	5,345	1,328,241
% Change	- 0.7%	+ 1.3%	+ 1.4%	+ 0.9%		

Health Based State of the Environment and Catchment Reporting

Health based metrics would be built from the reference condition accounts, but could, if desired, benchmark condition not simply against a pre-modification state, but against specific policy objectives.

For example, a policy objective for the Commonwealth, a State, a CMA or a Local Council, might be to have 30% of each native vegetation type in their region in a healthy condition. Such an example could be derived from a metric created, for example, from the definition of a threatened ecological community under the EPBC or a State Threatened Species Act.

In this case, the Victorian SOE or a Catchment Health Report would show a native vegetation health condition of 26/30 = 86% (calculated based on the environmental flow account, 2008 closing stock), because anything above 30% satisfies the policy objective and gets a 100% score. Anything below gets x/30. Many report cards convert these metrics into simple rating scores: A, B, C, …, F, etc.

Another example of where the health report metric might vary from the reference condition account might be the percentage of fish stocks relative to the sustainable yield of the fishery. Its reference condition account on the other hand would be an estimate relative to the pre-exploitation stock.

It is possible of course for the reference condition to also be the basis for the health reporting, as occurs for example, in the Healthy Waterways Partnership program in South East Queensland. However, by separating Reference Condition Accounting from Health Metrics, that would not be a necessary pre-condition.

Recommendations:

1. Differentiate reference condition from health, to enable environmental data to be collected under a common environmental currency, for all asset types, at all scales, without compromising the integrity and consistency of information embedded in the accounts.
2. Environmental stock and flow accounts should be built on an environmental 'reference condition accounting' metric, to allow the creation of a common currency for all environmental assets;

   This should be in the form of a national (and subsequently international) standard that can be applied at all scales: property (EcoTender, Biometric, BioCondition), catchment (Sustainable Rivers Audit, Healthy Waterways Partnership), national (scaled regional accounts), and international (scaled national accounts);
3. Health based policy derived metrics should be used for national, state, and local government State of the Environment Reporting and Catchment/Regional Health Report Cards, because they allow more policy-based reporting of status and progress towards policy targets.
4. The indicators chosen within agreed asset classes should be able to be varied from region to region, to drive cost efficiencies and maximise the value of data collection; and
5. Indicator selection within each asset class should show a response to management intervention in a reasonable time-frame to ensure the information collected is fit for policy and investment decisions.

DESIGN CONSIDERATIONS FOR BUILDING THE NATIONAL ENVIRONMENTAL (STOCK AND FLOW) ACCOUNTS

1. What are we seeking to achieve?

The reason for collecting environmental information is to help us create a healthier environment.

It is no different to our goals for economic policy (to make us more wealthy), health policy (to make us more healthy), or law and order and defence (to keep us safe).

2. Why set up National Environmental Accounts?

So that we can:

- develop more effective environmental policy; and
- deliver more cost effective outcomes from our investments in the environment.

We need therefore to not just count things, but to count the right things in the right place at the right scale in a manner that allows this information can be used to diagnose problems accurately, to guide policy decisions and optimise investments, to achieve our objective.

3. At what scale do we need information for:

- making policy: national, state, regional (NRM), local and property
- making investment decisions: national, state, regional (NRM), local, and property

There is no point setting up National Environmental Accounts if they can't be used to guide investments – at all scales, by all investors.

Most investments (even for national programs) are made at a regional, local or property scale. That's why we need to build the National Environmental Accounts from the regional scale up.

4. How long will it take to achieve this outcome?

Not as long as it took to build the national economic accounts, but still a long time – 10 to 20 years.

But we have more than enough information, institutional capacity and technology to produce the first set of reasonable quality of national environmental accounts that covers all asset classes within 4 or 5 years.

Therefore the first principle for the system design must be to encourage the accounts to grow and evolve in their sophistication and complexity, and not to lock in only what we have available today.

What is feasible today is vastly different to what was feasible 10 years ago – even 5 years ago. Plug-in laptop computers, GPS based GIS systems, decision-support tools, remote sensing and satellites fundamentally change what is possible in national environmental accounting.

Satellites now measure individual trees. Water can be monitored remotely via satellite links. And these technologies are still in their infancy.

5. Environmental investments are not just about the *Caring for our Country* program.

   If we are going to go to the trouble of building the National Environmental Accounts, we should make sure they are capable influencing all public investment in environmental management, not just focus on improvements to Commonwealth grants programs.

Caring for Our Country	$400 million
Other Commonwealth Environment Programs	$3,600 million
State and Local Government Programs	$4,000 million
Sub-total	*$8,000 million*
CPRS (afforestation alone) 25% of 600Mt x $30	$5,000 million and rising
Total	$13 billion (1.3% GDP)

6. Health metrics are not targets

   If you want the accounts to guide investments they need to be built on health based metrics.

   Health metrics are not targets. They are simply the means for creating a common environmental currency.

   NRM targets are built from the health metrics but must also factor in a whole raft of other issues – eg the funding available and tradeoffs with economic and social objectives.

   If you don't build targets from health metrics then there is no way of comparing the cost/effectiveness of an investment between projects, not only within asset classes but between asset classes and between regions.

7. What level of detail do we need?

   Not all regions, in fact very few, will need to apply the detail and precision to water quality monitoring that occurs in SEQ. It has immense pressures from a rapidly growing population.

   Other more remote regions, particularly in arid landscapes, will require far less data collection.

   Most regions will sit between these extremes.

8. Do not decide on indicators or data sets until you have established your policy framework.

   Environmental accounts are not about creating greater and greater scientific accuracy for the sake of science; they are about arranging scientific information that is necessary to guide economic (and policy) decisions. The required scale, quality, quantity and type of information will vary from region to region.

NOTES AND REFERENCES

[1] Gary Stoneham, Mark Eigenraam and Phil Gibbons have contributed to a workshop on native vegetation accounting and have also provided advice on the international SEEA process.

Gary Stoneham is the Assistant Director Market Reform in the Victorian Treasury and former Chief Economist in the Victorian Department of Sustainability and Environment. Mark Eigenraam is the Project Director for ecoMarkets in the Victorian Department of Sustainability and Environment. Dr Phil Gibbons is a Senior Fellow at the Australian National University.

[2] Stoneham, Eigenraam and Bain, 2009. Creating environmental accounts for diffuse-source environmental problems. London Group on Environmental Accounting workshop, Canberra.

[3] These tables have been provided by Mark Eigenraam. They are based on pilot environmental accounts developed as a part of the Victorian Government's ecoMarkets project in the Corangamite Catchment.