Completion of the Australian Regional Environmental Accounts Trial

Wentworth Group of Concerned Scientists in association with NRM Regions Australia

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In 2008, the Wentworth Group of Concerned Scientists and other experts in science, economics, statistics and public policy, developed the *Accounting for Nature* model. This model places scientific information about the condition of environmental assets into an accounting framework. The community and policy makers will be better positioned to understand complex scientific information that is needed to underpin policy, evaluate and investment decisions, and the success of these investments over time.

> **Key features of the Australian region trial:**
> - 10 Australian NRM regions
> - 40 individuals partnering with the NRM regions
> - 10 assets within 4 asset classes tested (land, freshwater, coast and marine)
> - 30 individual accounts developed

Over the past four years, Australia's Regional Natural Resource Management authorities, in cooperation with universities, Commonwealth and State government agencies, have conducted a continental scale trial to test the practical application of the *Accounting for Nature* model.

The purpose of the trial was to test whether it is practical and affordable to apply a scientifically robust measure of the condition of any environmental asset to produce ongoing regional scale, national environmental accounts, based on the *Accounting for Nature* model.

The *Accounting for Nature* methodology predates the revision of the United Nations' System of Environmental-Economic Accounting (SEEA) and the subsequent development of the Experimental Ecosystem Accounting framework (United Nations *et al.* 2012; United Nations *et al.* 2013). The trial contributed to the development of this international standard, and subsequent collaboration has endeavoured to ensure consistency between the approaches.

Ten of Australia's 54 Natural Resource Management regions piloted the *Accounting for Nature* method between 2011 and 2014.

These regional bodies were selected because they reflect different landscapes (forests, savannahs, rangelands, woodlands, urban), they are subject to different environmental pressures, and have different levels of resourcing and access to information.
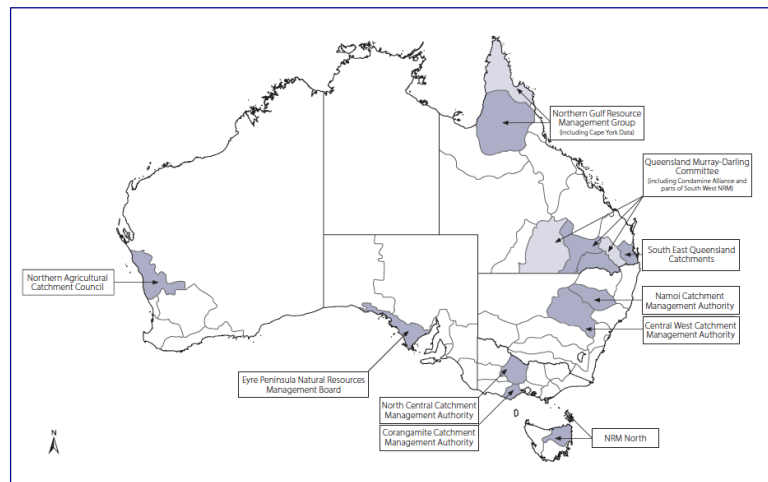
This diversity provided a unique opportunity to test whether those regions with the least data, in the remotest locations, and with the fewest resources have the capability to create a set of accounts that still satisfy appropriate standards. Regional environmental asset condition accounts were completed for native vegetation, native fauna, soil, rivers, wetlands, estuaries, and marine fauna.

A Scientific Standards and Accreditation Committee, supported by the Wentworth Group secretariat with funding from The Ian Potter Foundation, has now completed an extensive technical review of the accounts. This has produced:

1. *Guidelines* for Constructing Regional Environmental Asset Condition Accounts (16 pages);

2. An *Evaluation* of the Australian Regional Environmental Accounts Trial, which provides a summary of the findings of the trial (40 pages); and

3. A *Technical Analysis* of the Australian Regional Environmental Accounts Trial, which is a supporting document that presents a detailed analysis of the accounts (240 pages).

These can be accessed at: www.wentworthgroup.org/programs/environmental-accounts/

Creating accounts which measure the condition of environmental assets is challenging because there is no agreed unit of measure of asset condition which can be used to populate accounting tables. This condition measure needs incorporate elements of both the quantity of an asset (for example, the area of a forest) and the quality of that asset (for example, the diversity of plant and animal species that inhabit that forest).

> **Key Features of the Accounting for Nature model:**
> - scale independent
> - uses an accounting framework
> - constructs an index of condition common to all environmental assets (an *Econd*)
> - scientifically accredited against national standards

The *Accounting for Nature* model allows for the use of different indicators to measure condition of the same asset in different ecological systems provided they satisfy a scientific standard that is fit for purpose and incorporates aspects of quantity and quality of the asset.

It is scale-independent and therefore applicable across different regions, and provide consistent measures across time to show trends.

To do this it uses the science of reference benchmarking to create a non-monetary environmental condition index, which we call an *Econd*. An *Econd* describes the condition of an environmental asset relative to a scientific estimate of that asset in an undegraded state.

The trial has demonstrated the multiple benefits of converting environmental statistics into a composite index:

- *#1:* **Understanding complex information:** It presents complex scientific information in a simple and clear way, within its historical context, which describes the impact human activity is having on the natural capacity of environmental assets to provide on-going benefits to people.

- **#2: Informing policy and investment decisions:** *Econds* present environmental information in an accounting format that can be applied to a diverse set of assets, at different times and spatial scales, relevant to policy and investment decisions.

- *#3:* **Managing threats and demonstrating progress:** Data underpinning the *Econds* can be readily interrogated through these environmental accounts, allowing for identification of pressures driving changes in the condition of environmental assets, the location of key threats, cost effective actions to manage those threats, and demonstrate progress.

- **#4: Efficiencies in environmental monitoring:** *Accounting for Nature* a national approach that will result in consistent, coordinated and efficient monitoring across jurisdictions, and provide decision-makers with confidence the quality of the data through scientific accreditation processes.
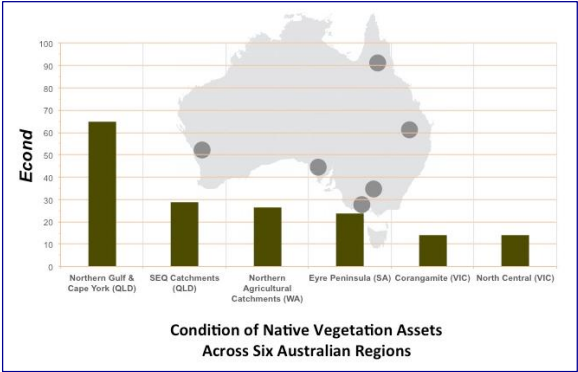
Assets were identified by NRM regions from their strategic plans. They represent a wide range of geographical situations and aspirations of different regional communities across Australia. They are valued by these communities for the ecosystem services they provide including: clean drinking water, food and fibre, recreation, and habitat for threatened species.
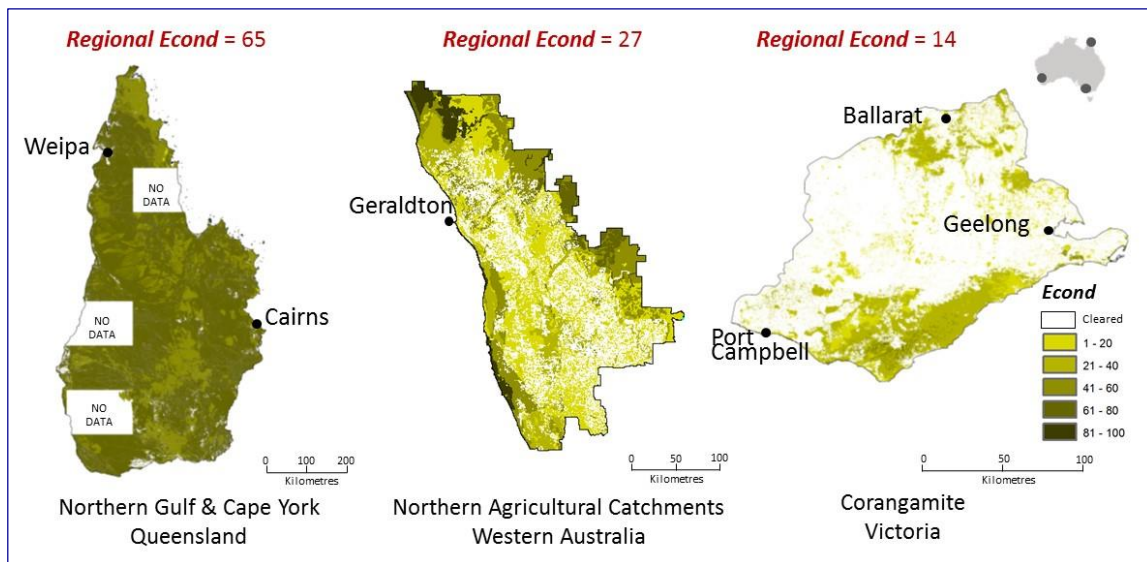
Accounting frameworks must be rigorous, credible and consistent so the accounts can be relied upon for decision making. The Standards and Accreditation Committee established a number of safeguards to establish the credibility of the accounts. This included accounting guidelines describing a systematic seven step methodology for compiling accounts, protocols and standards for indicator selection, and a scientific accreditation process. To describe confidence in how the accounts achieved each of the accreditation criteria, quality assurance ratings were also assigned to each asset account.

One asset common across regions (native vegetation) was chosen to determine whether different measures of the same asset could be compared.

A protocol was developed to assist the regions construct their native vegetation accounts. This protocol included a draft national standard for constructing a regional scale native vegetation asset condition account.

The information on individual assets within each regional account can also be described spatially as shown for three of the NRM regions in the following diagram.

Condition of Native Vegetation Assets Across Six Australian Regions

Regional Econd = 65   Regional Econd = 27   Regional Econd = 14

Weipa

NO DATA

Geraldton

Ballarat

Geelong

NO DATA

Cairns

Port Campbell

NO DATA

Econd
- Cleared
- 1 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100

0 100 200
Kilometres

0 50 100
Kilometres

0 50 100
Kilometres

Northern Gulf & Cape York
Queensland

Northern Agricultural Catchments
Western Australia

Corangamite
Victoria

The South East Queensland region offers examples of the three levels of accounting tables: summary, asset tables and data tables. The summary table provides the highest level of information, showing *Econds* and Indicator Condition Scores for all assets across the entire region at each time period. For each asset, indicator themes are shown (e.g. for estuaries, they are physical/chemical index, biological health rating and foreshore/riparian habitat extent) with their corresponding Indicator Condition Scores. From these Indicator Condition Scores, regional *Econds* (bold) have been calculated (e.g. 41 for estuaries in 2011, circled in red).

REGIONAL ASSET ACCOUNT
SEQ CATCHMENTS, QUEENSLAND

Summary Table

Class	Asset	Econd & ICS	2003	2004	2005	2006	2007	2008	2009	2010	2011
LAND	Native Vegetation	Econd				29					
		Extent (Ha)				53					
		Composition (index)				53					
		Configuration (rank)									
FRESH-WATER	Rivers	Econd	74				70	76	78	79	81
		Physical/chemical index (%)	82				77	84	85	86	91
		Nutrient cycling index (%)	64				60	75	70	73	61
		Macroinvertebrates index (%)	76				69	74	79	82	88
		Fish index (%)	62				68	65	69	71	76
	Wetlands	Econd				33					
		Extent (Ha)				62					
		Composition (index)				59					
COASTAL	Estuaries	Econd			57	55	42	44	39	41	41
		Physical/chemical index (%)	51		57	57	39	40	34	36	37
		Biological Health Rating (%)			58	51	50	53	51	53	49
		Foreshore / riparian habitat extent (km)				48	51	51	51	51	
	Moreton Bay	Econd									
		Physical/chemical index									
		Biological Health Rating									
MARINE	Dugong	Econd									
		Dugong population									

ESTUARIES ASSET ACCOUNT
SEQ CATCHMENTS, QUEENSLAND

Asset Table: Freshwater > Estuaries

Class	Indicator (unit)	Reference Benchmark	2009 Measure	2009 ICS	2009 Econd	2010 Measure	2010 ICS	2010 Econd	2011 Measure	2011 ICS	2011 Econd
Total					39			41			41
Albert River estuary					22			18			20
	Physical/chemical index (%)	100	15.2	15		9.2	9		12.4	12	
	Biological Health Rating (%)	100	29.2	29		29.2	29		29.2	29	
	Foreshore / riparian habitat extent (km)	32.2	15.5	48		15.5	48		15.5	48	
Bremer River estuary	Physical/chemical index (%)										
	Biological Health Rating (%)										
	Foreshore / riparian habitat extent (km)										
Brisbane River estuary	Physical/chemical index (%)										
	Biological Health Rating (%)										
	Foreshore / riparian habitat extent (km)										
Caboolture Tree Creek estuary	Physical/chemical index (%)										
	Biological Health Rating (%)										
	Foreshore / riparian habitat extent (km)										
Caboolture River estuary	Physical/chemical index (%)										
	Biological Health Rating (%)										
	Foreshore / riparian habitat extent (km)										

ESTUARIES ASSET ACCOUNT
SEQ CATCHMENTS, QUEENSLAND

Data Table: Coastal > Estuaries > Albert River Estuary > 2010 - 2011

Indicator	Reference benchmark	Measure	ICS
Physical/chemical index (%)	100	12.4	12
Chlorophyll-a (index)	100	2	2
Dissolved Oxygen (%)	100	46	46
Total Nitrogen (index)	100	14	14
Total Phosphorus (index)	100	0	0
Turbidity (index)	100	0	0

Regional *Econds* are also reported in the more detailed asset table (e.g. 41, circled in red). In this table, the regional *Econds* are further dissected into individual asset classes (e.g. for estuaries, Albert River estuary, Bremer River estuary etc.). *Econds* and Indicator Condition Scores are reported for each asset class, with their corresponding reference benchmarks and measures. For example, the Albert River estuary *Econd* is 20 in 2011, and the physical/chemical Indicator Condition Score is 12 (circled in yellow).

The data table contains the most detailed level of data, showing specific indicators and the measures used to construct the Indicator Condition Scores for each asset class. For example, the Albert River Estuary (2010-11) shows indicators (by indicator theme), reference benchmarks, measures and indicator condition scores.

References

Sbrocchi C., Davis R., Grundy M., Harding R., Hillman T., Mount R., Possingham H., Saunders D., Smith T., Thackway R., Thom B., and Cosier, P. (2015) *Evaluation of the Australian Regional Environmental Accounts Trial*. Wentworth Group of Concerned Scientists, Sydney.

Sbrocchi C. (2013) *Guidelines for Constructing Regional Environmental (Asset Condition) Accounts: Quick Guide*. Wentworth Group of Concerned Scientists, Sydney.

Cosier P. & McDonald J. (2010) *A common currency for building environmental (ecosystem) accounts*. In: 16th Meeting of the London Group on Environmental Accounting.

Wentworth Group of Concerned Scientists. (2008) *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia*. Wentworth Group of Concerned Scientists, Sydney.

Sbrocchi C., Davis R., Grundy M., Harding R., Hillman T., Mount R., Possingham H., Saunders D., Smith T., Thackway R., Thom B., and Cosier P. (2015) *Technical Analysis of the Australian Regional Environmental Accounts Trial*. Wentworth Group of Concerned Scientists, Sydney

United Nations, European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Cooperation and Development & World Bank. (2012) *System of Environmental-Economic Accounting Central Framework*. United Nations Statistics Division.

United Nations, European Commission, Organisation for Economic Co-operation and Development & World Bank. (2013) *System of Environmental- Economic Accounting Experimental Ecosystem Accounting*.