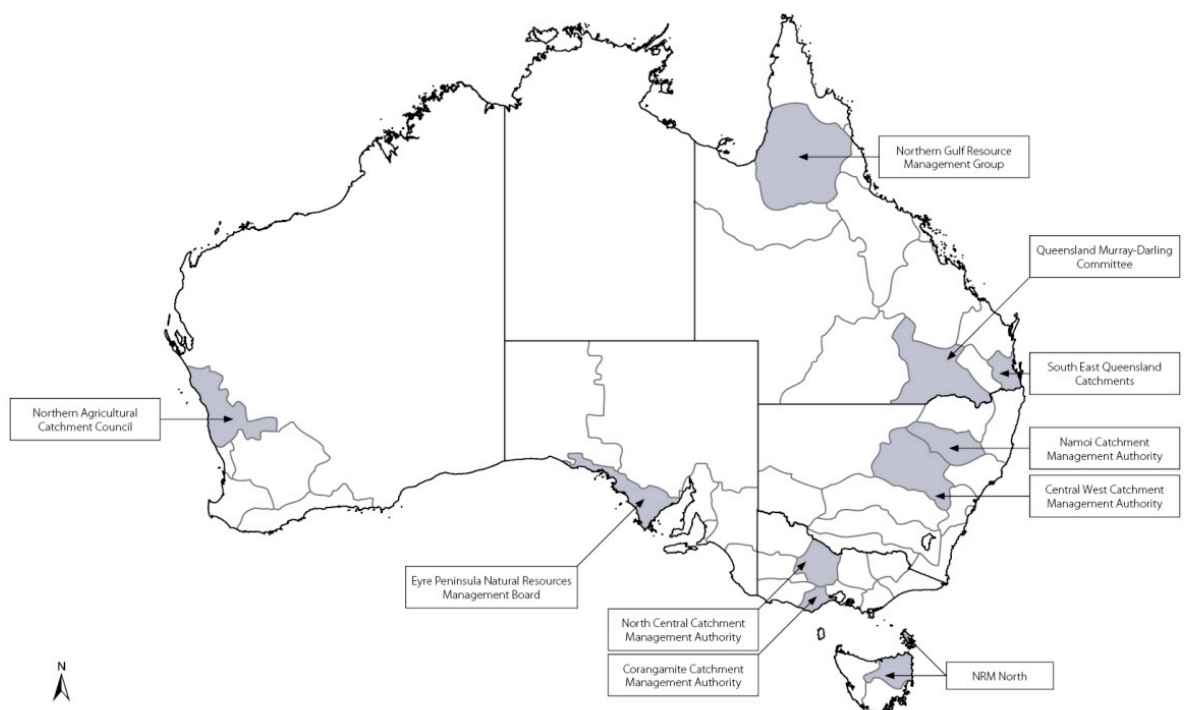


# AUSTRALIAN REGIONAL ENVIRONMENTAL ACCOUNTS TRIALS 2011 - 2012



## Draft Standards and Accreditation Manual

Scientific Standards and Accreditation Committee

Technical Environmental Accounting Standards Committee

Version 7 – March 2012

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# 1 Introduction

*“Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history (and) this has resulted in a substantial and largely irreversible loss in the diversity of life on Earth”.<sup>1</sup>*

Millennium Assessment, 2005

Public policy decisions on population, water reform, climate change and food security are taking place in a vacuum because we have no accounting system in place that measures the impact these pressures are having on the health of environmental assets across the Australian continent.

Economic accounts present a statistical picture of the structure of the economy and the detailed processes that make up its production and distribution. This information is used by Treasury, the Reserve Bank, governments, financial markets, businesses and individuals to guide policy and inform investment decisions.

Australia now needs to confront the challenge of managing our natural capital with the same discipline with which we manage our economy.

To do this, environmental accounts need to measure the stock and change in condition of environmental assets so that they are able to inform policy and planning, and guide public and private investments at multiple scales.

If you don't measure it, you can't manage it.

In 2008, the Wentworth Group of Concerned Scientists, in association with others produced *Accounting for Nature*, a model for building the national environmental accounts of Australia.

The *Accounting for Nature*<sup>2</sup> model has two unique characteristics:

1. It is constructed at a regional scale, because it is this scale that best reflects the bio-geographic uniqueness of the Australian landscape, and it is where a substantial amount of data exists or is likely to exist in the near future; and
2. It is built using a common unit of account that allows us to compare the relative condition of one asset with another. This will allow data from any scale, irrespective of the unit of measurement, to be aggregated to create regional (and subsequently state-wide, national and international) accounts.

National economic accounts are built using a national currency (a dollar) which assigns a common value for the exchange of goods and services. Without this common currency it is not possible to construct economic accounts.

The starting point for building a system of environmental accounts must therefore be the creation of a common unit of account that is capable of assigning a value for all environmental assets and indicators of ecosystem health.

The *Accounting for Nature* model creates a common unit of account for all environmental assets and indicators of ecosystem health, irrespective of the unit of measurement, by using the science of reference condition benchmarks.<sup>3</sup>

## 1.1 Accreditation Process

The following section outlines how the *Scientific Standards and Accreditation Committee* will assess each regional account and make a determination on whether it can be accredited.

The 5 stage accreditation process involves the following steps:

- 1 Regional group submits account
- 2 Committee assesses account using assessment templates
- 3 Committee gives feedback to regional group
- 4 Regional group adapts account/responds to feedback
- 5 Committee makes final accreditation judgement (accreditation report)

During the trials, accreditation stages may occur at different times throughout the year, and therefore the process may be completed gradually rather than in the discrete steps outlined.

An accreditation assessment template has been developed to guide the Committee through the accreditation process. These worksheets comprise a transparent assessment of the quality of each regional environmental account.

The template contains a series of questions which the Committee needs to answer and rank for each criterion. The Committee will document evidence on whether criteria are being met, and make observations of gaps/constraints/issues/areas for improvement.

The Committee will make a judgement of the extent to which each accreditation measure is satisfied. This will be a ranking on a qualitative scale of 0 to 5: 0 = unacceptable, 1-5 are varying degrees of acceptability.

Final accreditation will involve:

- The Committee making a judgement on accreditation Yes/No/Yes with conditions
- A brief report justifying the Committee's decision and identifying areas for improvement (if required)

## 1.2 Accreditation of Environmental Accounts

For environmental accounts to be accepted for use in decision-making, the users of the accounts must have confidence that the common environmental currency properly reflects the condition of the environmental assets in a region.

Environmental accounting standards set the expectations that must be met in the construction of regional accounts. Accreditation involves experts assessing accounts against these standards and making a judgement about whether they meet the standards to an acceptable level.

The purpose of accreditation is to assure the users of the account that it is fit-for-purpose, scientifically robust, based on quality data, that it contains appropriate measures of environmental health in the region, and that it can be aggregated to contribute to national- and international-scale environmental accounting.

This manual describes the criteria, standards and the process for accreditation of environmental accounts, in particular the regional accounts currently being trialled around Australia.

It is intended that these environmental accounting standards will also be applicable to the construction and accreditation of local (sub-regional) and property scale environmental accounts in the future.

The committee will assess each aspect of the account (as outlined throughout this manual) on a scale of 0 – 5:

0 = unacceptable; will not be allowed into the Account

1 = acceptable; minimum level of acceptability to be included in the Account

2 = acceptable; acceptable quality to be included in the Account

3 = acceptable; good quality

4 = acceptable; very good quality

5 = acceptable; excellent quality

## 2 Regional Environmental Accounts Trials

In March 2010, the Chairs of Australia's 56 Natural Resource Management regions resolved to "pursue the development of a set of a National Environmental Accounts", using the *Accounting for Nature* model.

Monitoring, evaluation, and reporting is an integral part of their charter, and the quality of their decisions is dependent on the quality of information they have to inform those decisions.

Ten regional natural resource management (NRM) groups across Australia have volunteered to develop environmental accounts for their regions during 2011-12 (Figure 1). These ten regions reflect the wide variety of landscape types and environmental pressures across rural and urban Australia. They also reflect diverse levels of institutional capacity and data availability, from the relatively well resourced and data rich urban regions, to the less well resourced and data poor remote regions.

The purpose of the trials is to:

- test, and modify where appropriate, the *Accounting for Nature* model at a regional (sub-national) scale;
- provide a practical example of how a 'common currency' for measuring environmental health can be incorporated into an accounting framework;
- prepare standards on environmental accounts; and
- provide information and insights on the practical development of environmental accounts and inform international environmental accounting processes.

The trials will be conducted over three stages as depicted below. Stage 1 is the focus for this manual.



During the trial the groups will collate and analyse existing data (including historical and trend data where available) to construct a regional environmental account.

This involves the following steps:

1. Select the environmental assets to be measured;
2. Choose indicators;
3. Use data to measure selected indicators;
4. Define and calculate a reference condition benchmark for each asset;



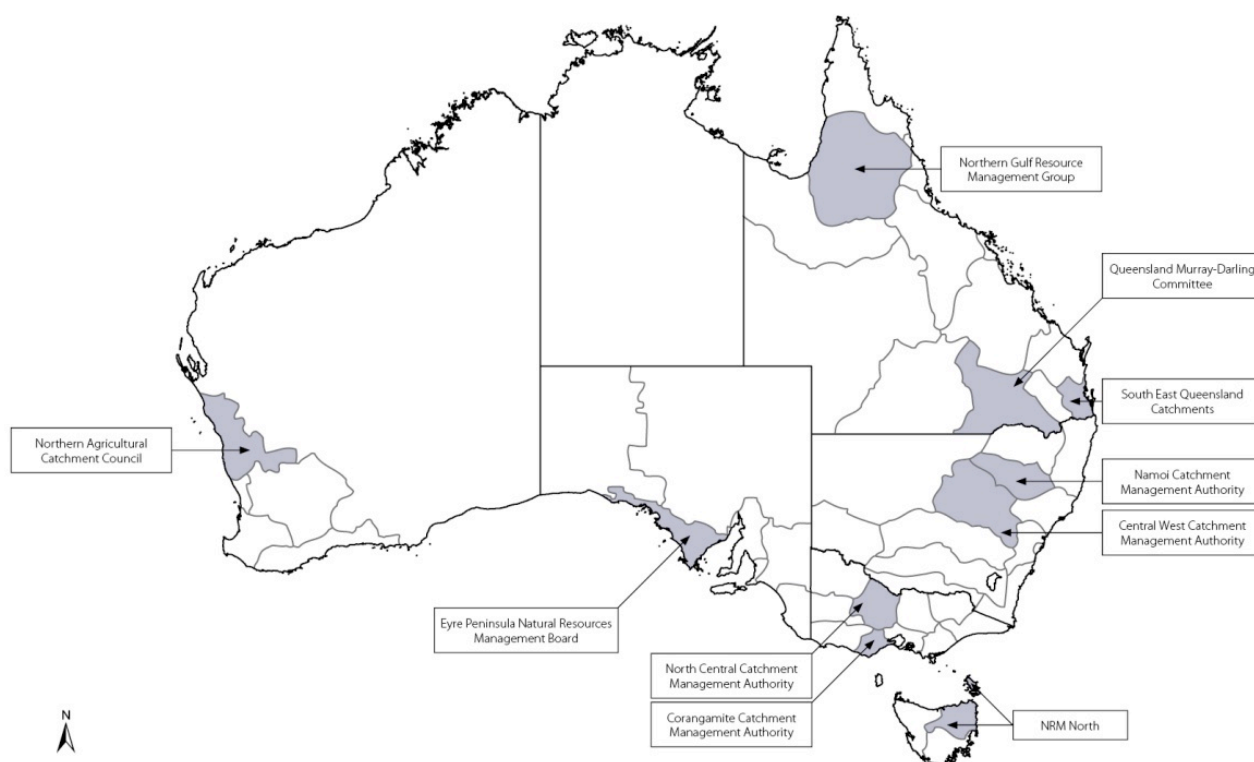
5. Create an index of environmental health;
6. Create an account for each asset and prepare Regional Environmental Accounts (see Appendix A for an example of a possible structure; and
7. Combine the Regional Environmental Accounts with established policy/target objectives and analysis in the context of pressure, threats, management and investments to create a Regional Environmental Health Report (optional).

A separate document *Draft Guidelines for Australian Regional Environmental Accounts Trials* explains these steps in detail.

More than 20 experts have agreed to assist the NRM regions undertake these trials. Two committees have been established to develop standards for indicator selection, reference condition benchmarking, index creation, and account reporting. These are the *Scientific Standards and Accreditation Committee*, and the *Technical Accounting Standards Committee* (see Appendices B and C for terms of reference and committee members).

As this is a trial, the standards and accreditation requirements will be developed and refined as the trial progresses. That is, the trial will involve iterative feedback and advice processes between the regional NRM groups and the two committees to develop accreditation criteria in conjunction with the trial participants. The work of the NRM groups and committees will intersect and interact throughout the trial.

Once a draft set of scientific and technical standards is agreed by the committees, the *Scientific Standards and Accreditation Committee* will trial the accreditation process. This will include recommendations on how regional environmental accounts should be improved over time. Regional environmental accounts may be accredited as meeting standards to different degrees during this trial.



**FIGURE 1: Participating regions Stage 1 Regional Environmental Accounts trial**

## 2.1 Participants in the trials

The trials involve close collaboration and coordination between the regional NRM groups, scientists and environmental accounting professionals. The roles of each party are outlined in Table 1.

**TABLE 1: Roles of the participants in the trials**

Party	Role
Regional Environmental Accounts Steering Committee	<ul style="list-style-type: none"> <li>Coordinate and manage the trial process</li> </ul>
Regional Environmental Accounts Working Group (Figure 1)	<ul style="list-style-type: none"> <li>Trial the development of an environmental account for each region</li> <li>Co-ordinate and manage trial implementation in each of the regions</li> </ul>
Scientific Standards and Accreditation Committee (Membership and Terms of Reference in Appendix B)	<ul style="list-style-type: none"> <li>Provide expert advice to the trial regional NRM groups, as the need arises</li> <li>Establish scientific standards for: selection of assets and their indicators; data quality; selection of reference condition benchmarks; and development of indices of environmental health</li> <li>Accredit accounts in each region against standards and criteria</li> </ul>
Technical Environmental Accounting Standards Committee (Membership and Terms of Reference in Appendix C)	<ul style="list-style-type: none"> <li>Provide expert advice to the trial regional NRM groups, as the need arises</li> <li>Develop the regional accounting framework</li> <li>Ensure compatibility with national and international environmental accounts</li> </ul>

## 2.2 How this manual is being developed

During the trials the *Scientific Standards and Accreditation Committee* and the *Technical Accounting Standards Committee* will use this manual to guide them through the process of developing standards and accreditation criteria in a structured and transparent manner. As the trials progress, the committees will add details and fill in gaps.

This manual is a working document and is being developed in an ongoing manner as the trials progress. It will be reviewed and updated over time, as knowledge on how to conduct environmental accounts grows, and as the associated science improves.

## 2.3 Evaluating the trials

The trials will run over the course of 2011-12 and are intended to be completed by September-2012. As such, the regional environmental accounts may only represent a short snapshot in time, and may reflect capacity constraints at that time. The key purposes of the trials are to test the *Accounting for Nature Model* and develop environmental accounting standards.

At the end of the trials, the process will be reviewed, involving all trial participants. The evaluation will aim to identify lessons learnt, areas of best practice and areas for improvement with the objective of refining the *Accounting for Nature* model.

### 3 Standards for Regional Environmental Accounts

Each regional environmental account must go through an accreditation process to assure the users of the account that it is fit-for-purpose, scientifically robust, based on quality data, that it contains appropriate measures of environmental health in the region, and that it can be aggregated to contribute to national- and international-scale environmental accounting.

To receive accreditation, a regional environmental account will need to be assessed as meeting a set of standards to a satisfactory degree. The *Scientific Standards and Accreditation Committee* is responsible for assessing and deciding whether an account can be accredited.

During this trial, different accounts may be accredited as meeting the standards to different degrees, reflecting the differences in capacity and constraints across the trial regions.

The Committee's accreditation assessment will determine whether the regional environmental account:

1. Contains an appropriate set of assets within each environmental asset class;
2. Is based on indicators that are suitable measures of environmental assets in that region;
3. Is based on quality data;
4. Contains reference condition benchmarks that are correctly defined and calculated;
5. Contains indices for each asset that are an appropriate description of the condition of the assets in that region;
6. Is able to be aggregated with environmental accounts from other regions; and
7. (optional) Combines established policy/target objectives to create an Environmental Health Report.

The following sections describe each criterion, and outline what the committee will look for to assess whether they are being satisfied.

## Criterion 1: Environmental Assets

### Concept

Environmental accounts will describe both the current condition, and any change in the condition, of Australia's environmental assets.

Environmental assets are defined for the purpose of these environmental accounts as physical features in the landscape that can be measured in time and space.

These assets are broadly categorised into environmental asset classes such as Land, Water and Marine.

An environmental asset can be large or small, degraded or pristine, localised or dispersed. An asset can be a discrete thing (such as a particular wetland), or it could be a collection of assets (such as a particular soil type occurring in different locations across a region).

Measurements of these assets through indicators will reflect the state and condition of these assets. Whilst measurement of environmental assets will involve discrete components of the landscape, interaction and systems function will be partly incorporated in the measure of environmental health.

### Accreditation measure

*The extent to which the set of assets in the account is appropriate for that region.*

The regional account must contain an appropriate set of environmental assets for the region within each environmental asset class. Each asset set must be relevant and comprehensive enough to be able to describe the condition of each asset class in the region.

The focus of the trials will be on 'Land' and 'Water' asset classes. However, regions may include 'Coastal and Marine' and 'Atmosphere' if time and resources permit.

The regional NRM group will select a set of assets for inclusion in its account that are *relevant in their region and that also meet the definition of 'environmental asset'*. The Committee may seek additional information from the region in order to assess the criteria, for example, on the process the group undertook to select the assets.

The Committee will assess the selected indicators against accreditation questions below, and make a judgement on the extent to which the set of indicators for each asset is an adequate description of the condition of the relevant asset. This will be ranked on a scale of 1 to 5.

The Committee may also seek additional information from the group in undertaking its assessment.

### Accreditation questions

Criterion 1.1 Does the account contain assets within each asset class?

Criterion 1.2 Does the selected asset meet the definition of an environmental asset as defined for the trial?

Criterion 1.3 Is the selected set of assets relevant for that region:

- a) Has the set of assets been determined in consultation with stakeholders and the community, and does it incorporate assets of state and national significance?
- b) Has the NRM governing body endorsed the set of assets as being consistent with the region's vision, goals, and NRM priorities? (required at a minimum)

Criterion 1.4 Does the selected set of assets adequately describe the condition of the asset class?

Criterion 1.5 If the account includes an asset, is this 'novel' asset appropriate for its asset class?

Criterion 1.6 Are there any gaps or areas for improvement? If so, what are they?

## Criterion 2: Indicators

### Concept

The task of accounting for the complexity of ecosystems is made possible by using the science of environmental indicators. Environmental indicators are quantifiable and transparent measures of the characteristics of an ecosystem that can be used to detect change. With careful selection, they are capable of providing a simple measure for a complex system.<sup>4</sup>

For the environmental accounts trials, indicators will measure the condition, or state, of the environment, and should be able to track changes in condition. They are not intended to cover pressures on environmental assets or management responses to pressures, other than when these are appropriate surrogates of condition.

An indicator may reflect a function or process of the ecosystem of which the asset is a part. For example, an indicator might be frequency of overbank flows, which performs a function in the landscape.

The regional NRM group will select indicators for each asset in their account. Indicators may vary from region to region according to the principles outlined below.

### Accreditation measure

*The extent to which the selected indicators are suitable measures of environmental assets in that region.*

The indicators within an account must satisfy the indicator selection principles (see Box 1), and each asset must have a set of indicators which, as a set, adequately describe the condition of the relevant asset.

The Committee will assess the selected indicators against accreditation questions below, and make a judgement on the extent to which the set of indicators for each asset is an adequate description of the condition of the relevant asset. This will be ranked on a scale of 0 to 5.

The Committee may also seek additional information from the group in undertaking its assessment.

#### **Box 1 - Indicator Selection Principles**

1. **Relevant** – the indicator is a measure or surrogate of the condition of an environmental asset or system
2. **Simple** – the indicator is easily interpreted, monitored, and appropriate for community use.
3. **Sensitive** – the indicator is able to detect change in the condition of the environmental asset.
4. **Measurable** – the indicator can be statistically verified, reproduced and compared.
5. **Timely** – the indicator shows trends over time, provides early warning of potential problems and highlights future needs or issues.
6. **Aggregative** – the indicator is amenable to combination with other indicators to produce more general information about environmental conditions.<sup>56</sup>

Accreditation questions

- Criterion 2.1 Does the choice of indicators adequately satisfy the indicator principles?
- Criterion 2.2 Does the set of indicators adequately describe the condition of the relevant asset?
- Criterion 2.3 Are there any gaps or areas for improvement? If so, what are they?



## Criterion 3: Data Quality

### Concept

Environmental accounts must be underpinned by quality data. Data are of high quality if they are fit for their intended use, and suit their context.<sup>7</sup>

Apart from the data's fitness, other aspects or elements of data quality include: adherence to relevant data quality standards; sampling program and data collection methods; data treatment, analysis and evaluation methods; whether data are statistically verifiable and reproducible; and data management methods.

Metadata describes data and provides a rapid way to assess datasets' fitness for a specific purpose. The regional NRM groups will provide metadata information in accordance with the ANZLIC Metadata Profile. This contains, at a minimum, information on data name, purpose, jurisdiction, status, reference, scale, spatial representation and extent, as well as a quality statement for each dataset against each of the points under the accreditation measure below. For each indicator, the quality statement will include an explanation on how the data were collected, treated, analysed and interpreted, as well as the group's own assessment of data quality (for each indicator). Some of this information is covered under the categories of the ANZLIC Metadata Profile, but the group will also supply additional information.

The Accreditation Committee will look at datasets for each of the indicators selected for the account and review the metadata and quality statement for an account in order to assess the quality of the data.

### Accreditation measure

*The extent to which the account is based on quality data and the Committee's confidence in the data for each indicator.*

The Committee will assess each dataset (informed by a Data Quality Statement) against the accreditation questions, and make a judgement on its confidence in each dataset. This will be ranked on a scale of 0 to 5.

Box 2 outlines the required data quality standards.

#### **Box 2 – Data quality standards**

*The standards of data quality for the regional environmental accounts include:*

1. *Field data should be collected under appropriately designed sampling programs that are: fit for the issue, question or hypothesis of interest; are of an acceptable spatial and temporal resolution; and detect change and do not pick up change that is not there.*
2. *Data sets should be suitably accurate and precise, statistically verifiable and reproducible.*
3. *Data sets should be treated and analysed to accepted standards (if available).*

Accreditation questions

- Criterion 3.1 Does the provided metadata and quality statement give sufficient detail to assess data quality? If not, what further information is needed?
- Criterion 3.2 Is the data of sufficient quality? Does it meet each data quality standard to a sufficient degree?
- Criterion 3.3 What is the Committee's confidence in the data underpinning each indicator?
- Criterion 3.5 Are there any gaps or areas for improvement? If so, what are they?

## Criterion 4: Reference Condition Benchmarks

### Concept

Reference condition benchmarks are used to construct a common unit of measure so that diverse and varying information can be incorporated into an accounting framework. Reference condition benchmarks provide a base against which change in any indicator can be measured.

Reference condition, within this trial, is defined as:

*“the status of an ecosystem’s components as they would be had significant human (post-industrial) intervention not occurred in the landscape”.<sup>8</sup>*

The reference condition of an environmental asset can be:

- a fixed point in time (for example, an estimate of its condition prior to industrial development),<sup>1</sup>
- observed at reference condition sites,<sup>9</sup>
- a scientifically accredited model that estimates the naturalness of the biota in the absence of significant human alteration.<sup>10</sup>
- based on expert opinion. This may be useful in the absence of reliable data and may be generated based on anecdotal observations, data from other locations and/or incomplete data sets. This method can be used in combination with other methods or in the short-term while data are being collected

Modelling of reference condition should, wherever possible, incorporate landscape scale processes which impact on the condition and resilience of that asset, such as connectivity in terrestrial landscapes, or the timing and duration of environmental flows in freshwater ecosystems.

Applying a reference condition benchmark performs the essential function of allowing different landscapes to be measured with indicators that are specifically suited to a particular location. This avoids having to use one set of indicators for distinctly different landscapes.

The regional NRM group will select reference condition methodologies for each indicator, determine a reference condition measure for each indicator, and calculate a Condition Score (which compares the current indicator measure with the reference condition) to generate a score out of 100.

### Accreditation measure

*The extent to which the set of reference condition benchmarks and Condition Scores are correctly determined and calculated.*

Reference condition benchmarks (RCBs) must be determined according to one of the following methods:

1. a fixed point in time (for example, an estimate of its condition prior to industrial development),
2. observed at reference condition sites,

3. a scientifically accredited model that estimates the naturalness of the biota in the absence of significant human alteration
4. based on expert opinion.

A condition score (C) must be calculated by measuring the current observed condition against the reference condition benchmark (RCB). This can be expressed as a ratio, in accordance with the following formula:

$$C = (I_i / I_0) * 100$$

where:  $I_i$  = Environmental indicator measure at any given point in time, for example, the year 2010.

$I_0$  = the reference condition benchmark for that indicator

C = Condition Score for an indicator of an asset

Other methods of calculating condition score may be used with different indicators. Formulas must be documented as part of metadata analyses.

#### Accreditation questions

- Criterion 4.1 Do the methods for determining reference conditions in the account comply with one of the methods above, and are they the most appropriate methods?
- Criterion 4.2 Are the datasets that are used for reference condition benchmarks satisfactory and do they comply with the data quality measures in Criterion 3?
- Criterion 4.3 Are the reference condition benchmarks measured in the same units as the relevant environmental indicators?
- Criterion 4.4 Are the condition scores (C) calculated correctly?
- Criterion 4.5 If the account includes reference condition methods or benchmarks other than those above, is this 'alternative' method acceptable?
- Criterion 4.6 Are there any gaps or areas for improvement? If so, what are they?

## Criterion 5: A Common Environmental Currency

### Concept

In order to describe the complexity of an ecosystem in numerical values, several condition scores may be integrated to generate a single measure that best describes the health of that environmental asset.<sup>11</sup> These environmental health indices<sup>1</sup> will create the common environmental currency which can then aggregate to produce environmental accounts at a range of spatial scales.

Each environmental health index will be referred to as an “*Econd*”. The *Econd* describes the common environmental currency, in the same way the dollar (\$) is the term used to describe our economic currency.

An *Econd* is defined as:

*“an accredited measure, metric or model that reflects the health of an environmental asset, that is created by combining (where appropriate) condition scores of environmental indicators based on a reference condition benchmark.”*

The regional NRM group will select the condition scores that are to form the index for each environmental asset; choose a method for combining the condition scores to create the *Econd*; and where appropriate, aggregate sub-regional environmental indices to create an *Econd* for each environmental asset in the region.

### Accreditation measure

*The extent to which the set of indices are an appropriate description of the condition of the assets in that region.*

An environmental health index can be constructed from:

- a combination of condition scores; or
- based on peer reviewed, scientific models.

Combining a set of condition scores into an environmental health index (*Econd*) must be calculated according to the following formula:

$$Econd = \frac{C_1 + C_2 \dots + C_n}{n}$$

where: *Econd* = the environmental health index for each asset

*C* = condition score of selected indicator

*n* = the total number of selected indicators

Spatial aggregation of environmental health indices (*Econds*) should be performed according to the following steps:

1. Define the asset scale from which you wish to aggregate (for example: a river or a forest).
2. Calculate the *Econd* for that environmental asset (0-100).

<sup>1</sup> The terms “environmental (ecosystem) health” and “condition” are generally used interchangeably in the literature. The appropriate choice of term in these environmental accounts is described in the Glossary.

- Where there is a large number of sampling sites the median is best practice.
  - Where there are less sample sites or where remotely sensed data is used, it will be appropriate to use the average.
3. Define the scale to which it will be spatially aggregated (for example: sub-catchment, catchment, or regional).
  4. Weight the scores according the size of the asset (for example: the length of each river, the area of each forest).
  5. Average the scores by the size of the aggregation area, according to the following calculation:

$$Econd_{SA} = \frac{(Econd_i * A_i) + (Econd_{ij} * A_{ij}) + (Econd_n * A_n)}{A_{total}}$$

where:

*Econd* = the environmental health index for each asset

*SA* = spatial aggregate

*i* = environmental asset

*A* = area

*n* = the total number of environmental assets

#### Accreditation questions

- Criterion 5.1 Do the methods for calculating indices in the account comply with one of the methods above?
- Criterion 5.2 If any weighting has been performed is it rigorous and scientifically defensible?
- Criterion 5.3 If the account includes index calculation methods other than those above, is this 'alternative' method acceptable?
- Criterion 5.4 Are there any gaps or areas for improvement? If so, what are they?

## Criterion 6: Account Structure and Aggregation

***This criterion is incomplete. The Committee needs to decide whether it is necessary to accredit this criterion, and if so, whether it is the responsibility of the Technical Committee or the Science Committee.***

### Concept

#### Suggestions:

- Accounts need to be carefully designed so that they serve their purpose;
  - To store data
  - Focus on condition data
  - Raw form

So that the user can distil what information they need and combine it however they like.

- Account summary table needs to be consistent with the model one. As this is a trial, provide feedback to committees...
- Regional accounts should be capable of aggregation to the National scale (only where things are additive/where it is appropriate to aggregate data). You need to know what things are in order to aggregate that type of thing...
- Environmental accounts need to be able to link to economic accounts
- Regional accounts should be comparable and able to be aggregated.

### Accreditation questions

Criterion 6.1 Does the format of the account satisfy the requirements above?

*The following section has been copied wholly from the Guidelines for information.*

This step outlines how to build environmental asset accounts and construct a Regional Environmental Account for your region.

The following tables, designed by the *Technical Environmental Accounting Standards Committee*, are a way to house, compute and present information for your accounts.

There are 3 levels of tables. All are designed and linked so that users can drill downwards through the cells and can also aggregate upwards. All show change over time.

1. The most simple is the SUMMARY table in which you summarise your calculated Econd for each asset.
2. The next sets of tables are ASSET tables. For each asset, you input measures for indicators and reference condition benchmarks, to calculate Condition Scores and Econds.
3. The DATA tables contain the raw data which underpin the ASSET tables.

The SUMMARY table should be linked to an ASSET table and the measures within the ASSET tables should be linked to a DATA table.

The tables depicted below are examples only. Population of the tables should be completed in Excel or a similar program (an Excel template is available). The empty tables do not have equations embedded in them. This will be up to the participant to fill in (the Excel tables have examples of linked cells for demonstration).

**EXAMPLE TABLE A - Environmental Account SUMMARY table**

Environmental Asset Class	Environmental Asset	Econd		
		2008	2009	2010
LAND	Vegetation	40		
	Soils	60		
	Fauna	80		
WATER	Rivers	60		
	Wetlands	54		
	Floodplain	75		
	Groundwater	68		

Note: Colours and example Econds derived from INPUT tables

**EXAMPLE TABLE B – Native Vegetation ASSET table**

Native vegetation					Year 1		Year 2	
		Indicator*	Unit of Measure	Reference Condition Benchmark	Year 1 measure	Condition Score	Year 2 measure	Condition Score
Econd TOTAL	Classification of asset				40			
VA1 Econd								
VA1	Classification of asset	Vegetation extent						
		Structure						
		Connectivity						
VA2 Econd								
VA2	Classification of asset	Vegetation extent						
		Structure						
		Connectivity						
VA3 Econd								
VA3	Classification of asset	Vegetation extent						
		Structure						
		Connectivity						
VA4 Econd								
VA4	Classification of asset	Vegetation extent						
		Structure						
		Connectivity						

Notes: VA = Vegetation Asset (community/type, etc)

\*Indicators listed here are example only. Please use indicators and assets relevant to your region.



## Criterion 7: (Optional) Environmental Health Reports

*This section is incomplete and requires advice from the Committee on standards in this area*

### Concept

*This is where a region would compare the environmental accounts against goals or targets for that indicator or combine the environmental accounts with other information (for example, social and economic indicators) to measure and report on progress towards established policy goals and targets and/or regulatory standards.*

### **Committees to do:**

12. *Discuss and agree standards to be met in this area*

### Accreditation questions

Criterion 7.1 .....?

Criterion 7.2 .....?

### Accreditation measure

*The extent to which the account.....*

## 4 Draft Program for Committees

The following program outlines the broad tasks for the *Scientific Standards and Accreditation Committee* to undertake as the trial progresses. This program guides it through tasks for developing the standards within this document, and for testing accreditation processes.

Schedule	Tasks
First meeting	<ul style="list-style-type: none"> <li>• Agree Terms of Reference</li> <li>• Agree standards for Criterion 1: Assets</li> <li>• Agree standards for Criterion 2: Indicators</li> </ul>
Second meeting	<ul style="list-style-type: none"> <li>• Respond to queries from regional groups</li> <li>• Agree standards for Criterion 3: Data quality, Criterion 4: Reference condition benchmarks, Criterion 5: Indices</li> </ul>
Third meeting	<ul style="list-style-type: none"> <li>• Respond to queries from regional groups</li> <li>• Continue to agree standards</li> <li>• Begin formal process of accreditation</li> </ul>
Fourth meeting	<ul style="list-style-type: none"> <li>• Begin trial process of accreditation</li> </ul>
Fifth meeting	<ul style="list-style-type: none"> <li>• Respond to queries from regional groups</li> <li>• Continue accreditation</li> </ul>
Sixth meeting	<ul style="list-style-type: none"> <li>• Continue accreditation</li> </ul>
Seventh meeting	<ul style="list-style-type: none"> <li>• Finalise accreditation</li> </ul>
Eight meeting	<ul style="list-style-type: none"> <li>• Evaluate accreditation process and this manual</li> </ul>

## GLOSSARY

**Environmental asset** - a physical feature in the landscape that is measurable in space and time.

**Environmental asset class** – overarching themes, such as Land and Water, to describe the environment that incorporate sets of environmental assets.

**Environmental health** – the level of health relates to an ecosystem’s vigour (level of productivity), organisation (structure and interactions) and resilience (ability to rebound from a shock). In general, a healthy ecosystem has high rather than low productivity, is more complex than simple, and is more able to bounce back after a disturbance. ‘Environmental health’ is interchangeable with ‘ecosystem health’ and ‘ecosystem condition’.

**Ecosystem condition** – see above

**Ecosystem health** – interchangeable with environmental health.

**Target** – A policy objective set by government or environmental managers.

The target is a level to which managers are aiming for, set with consideration for a number of factors such as environmental prioritisation, achievability, and social and economic values and priorities.

**Goal** – see target and vision.

**Vision** – A description of how the landscape could be, or is desired to be, understanding landscape health and taking into account the people and activities that rely on those landscapes.

**Indicator** – Environmental indicators help track changes in the environment by measuring key measures – which may be physical, chemical, biological – that provide useful information about the whole system.

Using indicators it is possible to evaluate the fundamental condition of the environment without having to capture the full complexity of the system (adapted from ANZECC State of the Environment Reporting Task Force).

**Indicator of environmental health** – Indicators of system health and function expressed as the divergence from a reference condition – a known measure of ‘health’ or good condition for that indicator.

Environmental health indicators are expressed as a percentage between 0-100. For example, an indicator for the health of vegetation is tree cover. The indicator can be expressed in appropriate units such as 10,000ha. When the indicator is measured against a known reference condition (the original extent was 100,000ha) then the indicator of environmental health is expressed as 10%.

***Indices or metrics of environmental health*** – An aggregation of indicators that when combined, best describes the function of ecosystem.

Indicators need to be measured in the same units in order to be aggregated. The typical method for combining indicators into a single unit or score is the ‘distance to reference point’. That is, each indicator is compared to a common reference condition and can be expressed as a percentage in relation to that point. The indicators are then amendable to combination to give a single number because the indicators are measured on the same scale (0-100).

Environmental health indicators are predisposed to aggregation because they are already measured against a common benchmark and can be expressed between 0-100.

***Reference condition*** - For the purpose of these trials reference condition is defined as a reference point where “the status of an ecosystem’s components as they would be had significant human (post-industrial) intervention had not occurred in the landscape”.

The reference condition enables the generation of environmental health indicators (see ‘Indicator of Environmental Health’) and normalisation of indicators for aggregation and comparison (see Indices or metric of environmental health).

***Surrogate*** – A representative indicator that provides information on other or a range of other parameters.

***State*** – the current status or ‘health’ of an environmental asset.

## APPENDIX A

### Possible Structure of a Regional Environmental Account

Regional environmental accounts will contain a great depth of information, and can be summarised to display varying levels of detail according to need. The most basic structure of a regional environmental account may be a summary table, displaying the environmental asset classes and the environmental health indices, or Econds, generated for that time period and over time.

Each asset class can be represented in a stock account, which has embedded the assets and associated indicators that are used to measure the health of that asset.

**Example summary table of an environmental account**

Environmental Asset Class	Environmental Asset	Econd		
		2008	2009	2010
LAND	Vegetation	40		
	Soils	60		
	Fauna	80		
WATER	Rivers	60		
	Wetlands	54		
	Floodplain	75		
	Groundwater	68		

These accounts will be underpinned by data at much finer scales and will be accessible by drilling down through input tables.

**EXAMPLE TABLE – Groundwater ASSET table**

Groundwater	Indicator*	Unit of Measure	Reference Condition Benchmark	Year 1		Year 2	
				Year 1 Measure	Condition score	Year 2 Measure	Condition score
Econd TOTAL				68			
Aquifer 1 Econd							
Aquifer 1							
Aquifer 2 Econd							
Aquifer 2							
Aquifer 3 Econd							
Aquifer 3							
Aquifer 4 Econd							
Aquifer 4							

\*Indicators listed here are example only. Please use indicators and assets relevant to your region.

## APPENDIX B

### Scientific Standards and Accreditation Committee

**Purpose:**

1. To establish which scientific standards apply to regional environmental accounting;
2. Accredited indicator selection, reference condition benchmarks, indices of environmental condition, and data quality;
3. Provide a consultative forum that can effectively address scientific matters arising during the trial.

**Terms of Reference:**

1. To establish standards and criteria for:
  1. Selection of environmental assets and their indicators;
  2. Data quality;
  3. Selection of reference condition benchmarks; and
  4. Development of indices of environmental condition.
2. To develop guidelines for the trial participants on the methods and procedures for undertaking 1-4 above to meet accreditation criteria.
3. To accredit accounts from each trial region against standards and criteria.
4. To provide access to scientific advice to the trial participants in response to matters as they arise.
5. To prepare issues papers and progress reports for the Technical Environmental Accounting Standards Committee with reference to matters that affect both the scientific and accounting aspects of the trial, and review issues papers produced from this committee.

**Membership:**

<i>Peter Cosier</i>	<i>Chair</i>
Dr John Williams	Land (Agricultural Systems)
Prof Hugh Possingham	Land (Spatial Models)
Dr Denis Saunders	Land (Ecology)
Mr Mike Grundy	Land (Soil Science)
Dr Ronnie Harding	Environmental Indicators
Dr Richard Davis	Water Resources Policy
Dr Terry Hillman	Freshwater (Metrics)
Dr Eva Abal	Waterways (Monitoring)
Prof Bruce Thom	Coasts and SoE Reporting
Dr Tony Smith	Marine Science
Jane McDonald	Research Analyst – Wentworth Group
Carla Sbrocchi	Policy Analyst – Wentworth Group
Claire Parkes	Accreditation adviser
Danny O'Neill	Executive Officer – National Chairs Working Group
<i>Dr Peter Greig</i>	<i>Chair, Technical Committee</i>

## APPENDIX C

### Technical Environmental Accounting Standards Committee

#### Purpose:

1. To develop an accounting framework fit for purpose at multiple scales;
2. Ensure compatibility with national and international environmental accounts; and
3. Provide a consultative forum that can effectively address accounting matters arising by the Regional Groups during the trials.

#### Terms of Reference:

1. To develop standards for:
  1. The design of the accounting framework for use at different scales;
  2. Quality measures;
  3. Data aggregation;
  4. Linking regional accounts to national and international environmental accounting standards.
2. To develop templates and guidelines for the trial participants on the methods and procedures for building a regional environmental account.
3. To provide advice to the trial participants in response to matters as they arise.
4. To prepare issues papers and progress reports for the Scientific Standards and Accreditation Committee with reference to matters that affect both the scientific and accounting aspects of the trial, and review issues papers produced from this committee.

#### Membership:

<i>Dr Peter Greig</i>	<i>Chair</i>
Dr Neil Byron	Resource Economics
Mark Eigenraam	Information Systems
Dr Tom Hatton	2011 Chair, Australian State of the Environment Committee
Mark Lound	Australian Bureau of Statistics
Dr Warwick McDonald	Australian Bureau of Meteorology
Dr Gary Richards	Dept Climate Change - Carbon Accounts
Gary Stoneham	Environmental Markets
Dr Michael Vardon	International Standards
Jane McDonald	Research Analyst – Wentworth Group
Carla Sbrocchi	Policy Analyst – Wentworth Group
Danny O'Neill	Executive Officer – National Chairs Working Group
<i>Peter Cosier</i>	<i>Chair, Scientific Committee</i>
<i>Dr Peter Greig</i>	<i>Chair</i>

## NOTES AND REFERENCES

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