Supplementary Materials

1: Regional Asset Condition Accounts

The regional environmental accounts have been prepared for each region (listed below).

Accounts are currently available to download by region (all assets within region) and by asset (all regions submitting accounts).

They are available at www.wentworthgroup.org/programs/environmental-accounts and http://nrmregionsaustralia.com.au/our-projects/regional-environmental-accounts/.

Central West CMA, NSW

Corangamite CMA, VIC

Natural Resources Eyre Peninsula, SA

Namoi Catchment Management Authority, NSW

North Central Catchment Management Authority, VIC

Northern Agricultural Catchments Council, WA

Northern Gulf Resource Management Group, QLD (also for Cape York)

NRM North, TAS

Queensland Murray-Darling Committee, QLD (also for Condamine, Southwest NRM)

SEQ Catchments, QLD

2: Information Statements

Information statements have been prepared for each region (listed below) and outline the approach taken to construct their regional environmental asset accounts. They are available at www.wentworthgroup.org/regional-environmental-accounts/by-regions and http://nrmregionsaustralia.com.au/our-projects/regional-environmental-accounts/

Central West CMA, NSW

Corangamite CMA, VIC

Natural Resources Eyre Peninsula, SA

Namoi Catchment Management Authority, NSW

North Central Catchment Management Authority, VIC

Northern Agricultural Catchments Council, WA

Northern Gulf Resource Management Group, QLD (also for Cape York)

NRM North, TAS

Queensland Murray-Darling Committee, QLD (also for Condamine, Southwest NRM)

SEQ Catchments, QLD

3: Accreditation Criteria

Table 59: Summary of Accreditation Criteria for the Environmental Accounts

Accreditation Questions	
Criterion 1: Classification of Classification of Environmental Assets	
1.1	Does the account contain assets within the land/freshwater/marine asset class?
1.2	Do the selected assets meet the definition of an environmental asset as defined for the trial?
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)
1.4	Does the selected set of assets adequately describe the condition of the asset class?
Overall Measure for Criterion 1: Extent to which the set of assets in the account is appropriate for that region.	
Criterion 2: Selection of Indicators	
2.1	Does the choice of indicators adequately satisfy the indicator principles? (Relevant, Simple, Sensitive, Measurable, Timely, Aggregative)
2.2	Does the set of indicators adequately describe the condition of the relevant asset?
Overall Measure for Criterion 2: Extent to which the selected indicators are suitable measures of environmental assets in the region.	
Criterion 3: Estimating Reference Condition	
3.1	Do the methods for determining reference condition benchmarks comply with one of the standard methods, and are they the most appropriate methods? (See *Quick Guide* p9)
Overall Measure for Criterion 3: The extent to which the set of Reference Condition Benchmarks are correctly determined.	
Criterion 4: Data Sources, Quality and Analysis	
4.1	Does the provided information statement give sufficient detail to assess data quality? If not what further information is needed?
4.2	Is the data of sufficient quality? Does it meet each data quality standard to a sufficient degree?
4.3	Are the datasets that are used for Reference Condition Benchmarks satisfactory and do they comply with the data quality measures?
Overall Measure for Criterion 4: The extent to which the account is based on quality data.	
Criterion 5: Calculation of Indicator Condition Scores	
5.1	Are the Condition Scores for each indicator calculated correctly?
Overall Measure for Criterion 5: The extent to which the Indicator Condition Scores are correctly determined and calculated.	
Criterion 6: Calculation of *Econds*	
6.1	Do the methods for calculating indices comply with one of the standard methods? (*See Quick Guide p12.* If the account includes methods other than a standard, is this 'alternative' method acceptable?)
6.2	If any weighting has been performed is it rigorous and scientifically defensible?
Overall Measure for Criterion 6: The extent to which the set of indices are an appropriate description of the condition of assets in that region.	
CONCLUSION	
The overall extent to which the account is an appropriate description of the condition of the assets in the region, using the *Accounting for Nature* model.	

Table 60: Accreditation Ratings for regional environmental accounts.

QUALITY ASSURANCE RATING (QAR)	
Comprehensive	5
Substantial	4
Good	3
Reasonable	2
Acceptable	1
Not fit for purpose of regional environmental asset condition accounting	0

4: Accreditation Reports

Native Vegetation Accreditation Report

Environmental Account 2014

Central West Catchment Management Authority, NSW

Criterion 1: Classification of Environmental Assets
Two native vegetation accounts were provided to test various concepts: a state-based dataset provided snapshot information for all described native vegetation types (31 Keith classes) and another account used native woody vegetation (a national forest classification) (QAR=3).
Criterion 2: Selection of Indicators
Proposed indicators of extent, composition and configuration are suitable for the environmental accounts, but measures of extent only have been provided in this account (QAR=0).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from two datasets: one, a state native vegetation assessment program snapshot dataset for all regional vegetation types, and the other, a time series for forest extent based on the National Carbon Accounting Scheme (QAR=2). Measures of composition and configuration were not available for this account.
Criterion 4: Estimating Reference Condition
Pre-European reference benchmarks and reference measures for the state dataset are documented sufficiently (QAR=3). It appears that the first point of data (~1970) is used as the reference benchmark in the time series analysis. This is not sufficient to derive indicator condition scores for the accounts (QAR=0).
Criterion 5: Calculation of Indicator Condition Scores
Indicator condition scores for extent are appropriate for both datasets (QAR=1). Indicator condition scores cannot be calculated for composition or configuration. Extent ICS: ✓ Composition ICS: n/a Configuration ICS n/a
Criterion 6: Calculation of *Econds*
Econds cannot be calculated for this asset as composition measures are not yet available (QAR=0). Incorporating composition assessments, such as field surveys or by convening an expert panel assessment, will enhance future accounts.
CONCLUSION
While the submitted account allows methods for time series to be tested, it is not representative of the condition of native vegetation across the region without native vegetation composition information (QAR=0). The use of time series data for forest extent is highly informative and the methods developed here have wider application for regional accounts. Other satellite-based data (LANDSAT, SLATS) are becoming available and these more comprehensive data sources should be looked at for future rounds of accounts.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
	Prof Hugh Possingham	
	Dr Richard Thackway	
	Dr Denis Saunders	
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

Corangamite Catchment Management Authority, VIC

Criterion 1: Classification of Environmental Assets
The asset (14 Major Vegetation Groups) is sufficient for the environmental account (QAR=1). Producing an account based on a regional vegetation classification will enhance the quality of the account.
Criterion 2: Selection of Indicators
Indicators of extent and an aggregate condition index (comprising Habitat Hectares as composition and configuration) are comprehensive and suitable for the environmental accounts (QAR=5).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state native vegetation assessment program dataset (Habitat Hectares, Victoria). Overall expert advice indicates that Habitat Hectares is a robust measure of configuration and composition, and sampling points are representative within the region (QAR=3).
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures for Habitat Hectares is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Measures are acceptable and documented evidence supports the indicator condition scores (QAR=4). Habitat Hectares aggregates condition scores from 1 hectare grid blocks across the region. Extent ICS: ✓ Composition ICS: ✓ Configuration ICS ✓* *provided in the form of a composite index, Habitat Hectares (Hha)
Criterion 6: Calculation of *Econds*
Econds for the individual assets have been calculated through the product of weighted indicators: Extent * (0.75 composition and 0.25 configuration). Spatial scaling was used to create the regional *Econd*. Substantial documented evidence has been provided to support the method of combining the indicator condition scores to create an *Econd*. (QAR=4).
CONCLUSION
The underlying data for the native vegetation assets are of excellent quality and *Econds* are credibly derived (QAR=4). The account as documented to date does not contain time series information which would substantially enhance the account.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
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	Dr Richard Thackway	
	Dr Denis Saunders	
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

Eyre Peninsula NRM region, SA

Criterion 1: Classification of Environmental Assets
The asset (23 Major Vegetation Subgroups) is sufficient for the environmental account (QAR=3).
Criterion 2: Selection of Indicators
The region has done a commendable job of selecting extent, composition and configuration indicators based on a regional interpretation of the state monitoring program (Bushland Condition Monitoring program). The methods were designed to enable data collection by non-specialist volunteers as well as experienced botanists. These data provide a snapshot of condition. The quality of the data provide robust measures of condition (QAR=3).
Criterion 3: Data Sources, Quality and Analysis
Data were collected for this environmental account, using methods adapted from Nature Conservation Council SA's Bushland Condition Monitoring method by state scientists. The methods were optimised for collaborations between botanists/ ecologists and volunteers. These data provide a snapshot of condition. The quality of the data provide robust measures of condition (QAR=3).
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Measures are acceptable and documented evidence supports the generation of weighted indicator condition scores (QAR=4). Extent ICS: ✓ Composition ICS: ✓ Configuration ICS ✓
Criterion 6: Calculation of *Econds*
Econds for the individual assets have been calculated through the product of weighted indicators: Extent*(0.5 composition and 0.5 configuration). Spatial scaling was used to create the regional *Econd*. Documented evidence has been provided to support the method of combining the indicator condition scores to create an *Econd* (QAR=4).
CONCLUSION
The underlying data for the Native vegetation assets are of excellent quality and *Econds* are credibly derived (QAR=4). Composition data were previously unknown for these assets, and Natural Resources Eyre Peninsula is commended for their implementation of an effective and efficient method for assessing condition of regional native vegetation assets. This account provides helpful lessons regarding collaborations with state scientists which could be broadened to other regions, and demonstrates opportunities for enhancing community participation in natural resource management through citizen science.

Accrediting Scientists:	Mr Peter Cosier Prof Hugh Possingham Dr Richard Thackway Dr Denis Saunders	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

Northern Agricultural Catchments Council, WA

Criterion 1: Classification of Environmental Assets
The asset (87 Major Vegetation Subgroups) is sufficient for the environmental account (QAR=3).
Criterion 2: Selection of Indicators
Indicators of extent, composition and configuration are comprehensive and suitable for the environmental accounts (QAR=5).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a range of state native vegetation assessment datasets and aerial photography of the region through an expert elicitation process. The region has provided a comprehensive record of the expert elicitation process used in the development of the accounts and assumptions are well documented. Acknowledging the limitations of the state-based sampling programs which provided data towards the expert elicitation process, data quality is of sufficient quality for an environmental account (QAR=2). Future rounds of the account can incorporate trend data by conducting surveys.
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Measures are acceptable and documented evidence supports indicator condition scores (QAR=4). Extent ICS: ✓ Composition ICS: ✓ Configuration ICS ✓
Criterion 6: Calculation of *Econds*
Econds for the individual assets have been calculated through the product of weighted indicators: Extent * (0.5 composition and 0.5 configuration). Spatial scaling was used to create the regional *Econd*. Documented evidence has been provided to support the method of combining the indicator condition scores to create an *Econd* (QAR=4).
CONCLUSION
The underlying data for the Native vegetation assets are of excellent quality and *Econds* are credibly derived. The data as reinterpreted by NACC is fit for purpose (QAR=4). The account as documented to date does not contain time series information which would substantially enhance the account.

Accrediting Scientists:	Mr Peter Cosier Prof Hugh Possingham Dr Richard Thackway Dr Denis Saunders	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

Namoi Catchment Management Authority, NSW

Criterion 1: Classification of Environmental Assets
The Native Vegetation asset (18 of 77 regional ecological vegetation classes) is sufficient for the environmental account. While the submitted partial account allows methods to be tested, it is not representative of the condition of native vegetation across the region. Future rounds of the account should include all native vegetation types (QAR=1).
Criterion 2: Selection of Indicators
Indicators of extent, composition and configuration are comprehensive and suitable for the environmental accounts (QAR=5).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a native vegetation assessment dataset, collected by a contractor, EcoLogical. Expert advice indicates EcoLogical's measures of native vegetation condition are robust (QAR=3) and based on comprehensive analysis of satellite imagery and in-field surveys. The region indicates time series of native vegetation condition is available; future accounts should seek to include this where possible.
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Insufficient documented evidence has been provided to support the scores generated for the indicator condition scores. However, the committee has accepted score calculations based on knowledge of the quality of contractor's body of work (QAR=1). Extent ICS: ✓ Composition ICS: ✓ Configuration ICS ✓
Criterion 6: Calculation of *Econds*
Econds were calculated through spatial scaling and the use of the simplified *Econd* calculation. The method for combining indicator condition scores is acceptable for those native vegetation assets where data were available for all three indicators of condition. However, for the *Econd* to represent native vegetation across the entire region, future rounds of the account must include all vegetation types (QAR=1).
CONCLUSION
The underlying data for the Native vegetation assets are of excellent quality and *Econds* are credibly derived. The data is of sufficient quality to prove the concept of a regional condition account, as described by the *Accounting for Nature* model, although there are weaknesses in the sampling representativeness (QAR=1). The region has applied robust methodologies to produce a partial account (for one-third of regional vegetation types), and as a result a regional *Econd* for native vegetation cannot be produced at this time. The region advises further condition assessments have been contracted. This account provides helpful lessons regarding condition assessments which could be broadened to other regions, particularly in Queensland, New South Wales and Victoria.

Accrediting Scientists:	Mr Peter Cosier Prof Hugh Possingham Dr Richard Thackway Dr Denis Saunders	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

North Central Catchment Management Authority, NSW

Criterion 1: Classification of Environmental Assets
Two accounts were prepared to test and demonstrate potential differences based on classification systems. An account was presented for national native vegetation classes (12 Major Vegetation Groups, MVGs) and state/regional classes (103 Ecological Vegetation Classes, EVCs) (QAR=5).
Criterion 2: Selection of Indicators
Indicators of extent and an aggregate condition index (comprising Habitat Hectares as composition and configuration) are comprehensive and suitable for the environmental accounts (QAR=5).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state native vegetation assessment program dataset (Habitat Hectares, Victoria). Overall expert advice indicates that Habitat Hectares is a robust measure of configuration and composition, and is acceptable for the environmental account. There are known issues with the representativeness and frequency of sampling locations within the region which should be addressed in future rounds of the accounts. Data are sufficient to test the accounting concept (QAR=3). Data are currently available for one time step.
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures for Habitat Hectares is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Measures are acceptable and documented evidence supports the indicator condition scores (QAR=4). Habitat Hectares aggregates condition scores from 1 hectare grid blocks across the region. Extent ICS: ✓ Composition ICS: ✓ Configuration ICS ✓* *provided in the form of a composite index, Habitat Hectares (Hha)
Criterion 6: Calculation of *Econds*
Econd have been calculated through the product of weighted indicators: Extent*(0.75composition and 0.25 configuration). Spatial scaling was used to create the regional *Econd*. Substantial documented evidence has been provided to support the method of combining the indicator condition scores to create an *Econd*. (QAR=4).
CONCLUSION
The underlying data for the native vegetation assets are of excellent quality and *Econds* are credibly derived (QAR=4). The account as documented to date does not contain time series information, which would substantially enhance the account. Accounts produced from two classification systems were compared. Accounts for both yielded similar regional *Econds* (14 based on MVG; 17 based on EVC). However, the account based on the regional classification system demonstrates its improved relevance for regional management.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
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Native Vegetation Accreditation Report

Environmental Account 2014

Northern Gulf Resource Management Group for areas covering Northern Gulf Resource Management Group and Cape York Peninsula, NT

Criterion 1: Classification of Environmental Assets
The native vegetation asset (14 Broad Vegetation Groups) is sufficient for the environmental account (QAR=3). This account includes native vegetation assets for both the Northern Gulf and Cape York Peninsula regions.
Criterion 2: Selection of Indicators
Indicators of extent, composition and configuration are comprehensive and suitable for the environmental accounts. Fire is the articulated dominant determinant of native vegetation condition in the northern region. Fire metrics, based on time since last fire, were used to represent the composition indicator, in the absence of any other comprehensive composition assessments in the regions (QAR=1). These measures are suitable for environmental accounts.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a range of sources to provide measures of extent, composition and configuration. The region employed innovative data treatments for fire metrics based on Time Since Last Fire, suggested by an expert panel and developed by scientists at the University of Queensland for this environmental account (QAR=1). Mapping has not been completed for sections of the region. The mapping of these areas would enhance the accuracy of the account. Time series are not included in this account. These measures represent a valuable source of information for native vegetation management. An expert panel may be convened to provide an indicative measure of composition to supplement the fire-based metrics for enhancing future accounts.
Criterion 4: Estimating Reference Condition
Use of best estimate of Pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
In the absence of specific advice, an average of the two composition indicators (two fire metrics) was taken to produce the composition indicator condition score. (QAR=1). This likely requires review to ensure assumptions for doing so are valid. Extent ICS: ✓ Composition ICS: n/a Configuration ICS ✓
Criterion 6: Calculation of *Econds*
Econds for the individual assets have been calculated through the product of weighted indicators: Extent * (0.5 composition and 0.5 configuration). Spatial scaling was used to create the regional *Econd*.
CONCLUSION
The region has made a commendable effort to implement novel methodologies and reanalyse existing data for including fire pressures in a regional environmental asset condition account. The use of MODIS satellite imagery is useful for northern regions, but loses ability to detect fire in southern areas of Australia. This could have implications for utilising this methodology in other parts of Australia. The account as documented to date does not contain time series information, which would substantially enhance the account.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
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	Dr Richard Thackway	
	Dr Denis Saunders	
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

NRM North, TAS

Criterion 1: Classification of Environmental Assets
For the committee to assess the account, the region must supply information regarding its specified assets (regional vegetation classes or national level classifications).
Criterion 2: Selection of Indicators
Information not supplied. The committee advises future accounts should comply with advice provided in the draft protocol for constructing a native vegetation condition account.
Criterion 3: Data Sources, Quality and Analysis
Information not supplied. The committee suggests high quality data is available from multiple sources, such as Forestry, which contributed to TasVeg assessments and could be used in future accounts.
Criterion 4: Estimating Reference Condition
n/a
Criterion 5: Calculation of Indicator Condition Scores
Insufficient data provided. Indicator conditions scores cannot be calculated at this time. Extent ICS: n/a Composition ICS: n/a Configuration ICS n/a
Criterion 6: Calculation of *Econds*
Insufficient data provided. *Econds* cannot be calculated at this time.
CONCLUSION
An account has not been submitted and therefore cannot be assessed at this time. The Committee advises there are high quality data available for this region which could be used for future accounts.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
	Prof Hugh Possingham	
	Dr Richard Thackway	
	Dr Denis Saunders	
Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

Queensland Murray-Darling Committee for the Queensland Murray-Darling Basin, NSW

Criterion 1: Classification of Environmental Assets
The native vegetation asset (19 Major Vegetation Groups) was sufficient to test the concepts of the environmental accounts trial. However, the use of this classification system was found to be insufficient to report on the condition of native vegetation assets within the region. Major Vegetation Groups (MVG) are not useful for the QMDB, as Myall and Brigalow (Acacia) woodlands are combined into one MVG. However, Brigalow is listed in the EPBC Act and requires especial management that Myall does not. Broad Vegetation Group mapping is being made available to these regions and future accounts would benefit from the more detailed classification (QAR=0).
Criterion 2: Selection of Indicators
Indicators of extent, composition and configuration have been proposed, however, for this account extent and configuration measures only are provided (QAR=0).
Criterion 3: Data Sources, Quality and Analysis
Data to populate the extent and configuration indicators were repurposed from a state native vegetation assessment program dataset, BioCondition (QAR=1). Adequate mapping of the region with finer vegetation classifications is not yet available, and when available will enhance the accuracy of the account. Composition and time series are not included in this account.
Criterion 4: Estimating Reference Condition
Use of best estimate of Pre-European reference benchmarks and development of reference measures for BioCondition is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Indicator condition scores for extent are appropriate (QAR=1). Indicator condition scores cannot be calculated for composition or configuration). Extent ICS: ✓ Composition ICS: n/a Configuration ICS ✓
Criterion 6: Calculation of *Econds*
The inclusion of measures of native vegetation composition are required to construct an *Econd* for the vegetation assets and as such *Econds* cannot be calculated at this time (QAR=0.) An expert panel may be convened to provide an indicative measure of composition to enhance future accounts until condition assessments are available.
CONCLUSION
The account for Queensland Murray-Darling Committee demonstrates the national classification system for native vegetation does not provide sufficient resolution for management of native vegetation in this region. Broad Vegetation Group mapping is being made available to Queensland regions via the state agency and future accounts would benefit from using the more detailed classification. In addition, the lack of composition data limits the utility of the account and the creation of *Econds* (QAR=0). Important information for populating accounts could be gained from undertaking native vegetation condition assessments or convening an expert panel to provide an interim assessment of condition. The region's main focus for the trial was Soil, and as such the region is commended for the inclusion of these assets in the account.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
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	Dr Richard Thackway	
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Report Prepared by:	Carla Sbrocchi	01/07/14

Native Vegetation Accreditation Report

Environmental Account 2014

SEQ Catchments, QLD

Criterion 1: Classification of Environmental Assets
The native vegetation asset (15 Major Vegetation Groups) is sufficient for the environmental account (QAR=1). Producing an account based on a regional vegetation classification will enhance the quality of the account.
Criterion 2: Selection of Indicators
Indicators of extent, composition and configuration and proposed measures are suitable for the environmental accounts (QAR=3). Measures from the Vegetation Assets, State and Transition framework were used towards the composition indicators of structural integrity, species richness and regenerative capacity.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state native vegetation assessment program dataset through an expert elicitation process, acceptable as measures of condition for the environmental account (QAR=1). Future rounds of account should explore increasing representativeness and frequency of sampling locations within the region for regional vegetation classes. Two time series are available for remnant extent, but composition data for remnant and regrowth are only available for one time step.
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Use of scaled and weighted measures are acceptable and documented evidence supports the scores generated for the indicator condition scores (QAR=4). Extent ICS: ✓ Composition ICS: ✓ Configuration ICS ✓
Criterion 6: Calculation of *Econds*
Econds for the individual assets have been calculated through the product of extent and composition (*Econd* = extent*composition). Spatial scaling was used to create the regional *Econd*. Substantial documented evidence has been provided to support the method of integrating the indicator condition scores (QAR=4).
CONCLUSION
The underlying data for the Native vegetation assets are of excellent quality and *Econds* are credibly derived. Composition data were previously unknown for these assets, and SEQ Catchments is commended for their implementation of an expert-based panel to assess condition of regional native vegetation assets. This process is applicable to other regions. The data as reinterpreted by SEQ is fit for purpose (QAR=1). The account as documented to date contains limited time series information, the inclusion of which would substantially enhance the account.

Accrediting Scientists:	Mr Peter Cosier	01/07/14
	Prof Hugh Possingham	
	Dr Richard Thackway	
	Dr Denis Saunders	
Report Prepared by:	Carla Sbrocchi	01/07/14

Rivers Accreditation Report

Environmental Account 2014

North Central Catchment Management Authority, VIC

Criterion 1: Classification of Environmental Assets
Rivers accounts have been prepared based on catchments and subcatchments (4 catchments; 57 waterways) (QAR=4).
Criterion 2: Selection of Indicators
Condition indicators submitted include hydrology, physical form, streamside vegetation, water quality and aquatic life, which are comprehensive and suitable for a regional environmental account (QAR=5).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state river assessment program dataset, the Index of Stream Condition, and is considered to be suitable for a regional environmental account. Data were available for three sampling periods, between 1999-2010. Future rounds of the account should increase sampling frequencies/locations for some indicators (QAR=2). A set of accounts has also been prepared to show condition scores for catchments and subcatchments.
Criterion 4: Estimating Reference Condition
The Pre-European benchmarks for the Index of Stream Condition were obtained using modelled pre-development river flows (AR=5).
Criterion 5: Calculation of Indicator Condition Scores
Substantial documented evidence has been provided to support the weighting of indicators contributing to the indicator condition score themes (QAR=4). Where data were unavailable, scores were imputed based on ISC2 methodology to calculate the theme indices.
Criterion 6: Calculation of *Econds*
Inverse ranking is applied to the indicator themes within the Index of Stream Condition, which weights the contributions of the indicator themes used to produce the final index (the *Econd*). Spatial scaling of the individual asset *Econds* was used to create the regional Rivers *Econd*. Documented evidence has been provided to support the method of combining the indicator condition scores to create the *Econd* (QAR=4).
CONCLUSION
The underlying data for the rivers assets are of excellent quality and *Econds* are credibly derived (QAR=3). To improve interpretation of trend data, further research is required to support changes in methodologies between sample periods. In addition, the availability of two river condition datasets for this region (Sustainable Rivers Audit and Index of Stream Condition) provides an opportunity to further assess the use and reuse of existing data for constructing *Econds* and comparison of condition indicators.

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Rivers Accreditation Report

Environmental Account 2014

NRM North, TAS

Criterion 1: Classification of Environmental Assets
The rivers assets have been delineated by subcatchments of the Tamar system. The Tamar catchment only was included and as such is not representative of rivers in the region, but provides a sufficient test of the accounting methods for the environmental account (QAR=1).
Criterion 2: Selection of Indicators
Condition indicators included themes of water quality, macroinvertebrates and streamside zone vegetation, suitable for the environmental accounts (QAR=3). The water quality theme consisted of electrical conductivity, pH, turbidity, total phosphorus and total nitrogen. One indicator, observed to expected ratio, represented the macroinvertebrates theme and the streamside zone vegetation indicator theme comprised 13 indicators.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a regional river assessment program dataset, the Freshwater Ecosystem Health Assessment Program. Known issues with the representativeness and frequency of sampling within the region should be addressed in future rounds of the accounts. Data has been amalgamated across multiple years as an account for one time period (2012) (QAR=1).
Criterion 4: Estimating Reference Condition
Water quality guidelines were used to represent reference conditions in the Freshwater Ecosystem Health Assessment Program. In many cases, these were derived reference sites or default measures (the ANZECC guidelines) where reference site values were not available (QAR=1). It may have been more beneficial to use the dataset applied to the 2012 account as the current measure to understand the variability of system, to better articulate reference benchmarks.
Criterion 5: Calculation of Indicator Condition Scores
Indicator condition scores for macroinvertebrates and streamside zone vegetation were calculated using mean values for the zones. For the water quality theme, the mean of scores for each zone was assigned a categorical value (1 to 4), then converted into an ordinal value (0-100). The method for calculating water quality condition scores is not sufficient for regional environmental accounts (QAR=0). It may be more beneficial to use the raw data and a statistical design to determine a sufficient method of combining scores into an intermediate index.
Criterion 6: Calculation of *Econds*
Indicator condition scores are assigned categorical values (1-4). The mean of the categorical values is converted into an ordinal value (0-100). There are many concerns with this method, and combined with a substantial level of missing data for many sites, the quality of the calculated *Econd* is reduced (QAR=0). An expert panel might be convened to provide supporting information or data techniques to supplement the missing data as an interim measure.
CONCLUSION
A considerable number of issues regarding the method of calculating indicator condition scores could not be explained through the supplied documentation, and remain outstanding. *Econds* generated from this account are not sufficient for regional asset accounting at this time (QAR=0). The application of confidence measures around scores is useful, and the region has been proactive in suggesting improvements to be made in future assessments.

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Rivers Accreditation Report

Environmental Account 2014

Queensland Murray-Darling Committee for the Queensland Murray-Darling Basin, NSW

Criterion 1: Classification of Environmental Assets
Catchment-scale (4 catchments) accounts have been provided for the environmental accounts trial, which are sufficient for this purpose (QAR=1).
Criterion 2: Selection of Indicators
Indicator themes comprise riparian vegetation, physical form, hydrology, macroinvertebrates and fish. These themes are comprehensive and suitable for the environmental accounts (QAR=5).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a jurisdicational river assessment program for the Murray Darling Basin, the Sustainable Rivers Audit. Designed specifically to assess condition of the Murray-Darling river system, the measures of the Sustainable Rivers Audit and data used are robust. However, changing methodologies between assessment years affects trend analysis. A substantial amount of work is required to improve the quality of the supporting information in the information statement (QAR=1).
Criterion 4: Estimating Reference Condition
The benchmark used in the Sustainable Rivers Audit was obtained using modelled pre-development river flows (QAR=5).
Criterion 5: Calculation of Indicator Condition Scores
The individual indicators within themes were integrated at the site or reach, then aggregated to a zone and subcatchment. A process of expert systems was used to weight the indicators contributing to the theme index and substantial documented evidence is available (through the Sustainable Rivers Audit) to support the scores (QAR=4).
Criterion 6: Calculation of *Econds*
The indicator themes of fish, macroinvertebrates and hydrology are combined in the Sustainable Rivers Audit 1 to create an ecosystem health rating score (used as the *Econd* in the accounts), and themes of fish, macroinvertebrates and riparian vegetation are used in the Sustainable Rivers Audit 2. In each assessment period, expert systems were used to combine and weight the theme indicator condition scores within each zone to generate the Ecosystem Health rating of the Sustainable Rivers Audit. In the SRA2, hydrology and physical form indicator themes do not contribute to the ecosystem health rating/ *Econd* but instead are used to inform drivers of river health. Substantial documented evidence is available (through the Sustainable Rivers Audit) to support the method of combining the indicator condition scores (QAR=4). Spatial scaling was used to create the regional *Econd* from the zone and catchment *Econds*.
CONCLUSION
The underlying data for the rivers assets are of excellent quality and *Econds* are credibly derived. The region should assess the relevance of catchment-scale accounts to decision-making and modify to different scale if required (QAR=3).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Rivers Accreditation Report

Environmental Account 2014

South East Queensland Catchments, QLD

Criterion 1: Classification of Environmental Assets
Rivers assets have been delineated by 13 catchments (QAR=3).
Criterion 2: Selection of Indicators
Condition indicators were submitted for themes which include ecosystem processes, nutrient cycling, macroinvertebrates and fish. Measures of flow and riparian vegetation are proposed but are not as yet included in the account. (QAR=4).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from an established catchment assessment program dataset, the Ecosystem Health Monitoring Program. Overall expert advice indicates the methods and data provide robust measures of condition at the regional (catchment) scale, and are therefore acceptable for the environmental accounts (QAR=5). Methods have also been endorsed by an independent review of the program. Time series data (2002-2012) are available.
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures (thresholds) is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Indicators within themes are calculated based on distance-to-threshold methods and averaged across samples to produce indicator condition scores. Where data were missing these blank cells were ignored in the indicator condition score computation. Substantial documented evidence has been provided to support the scores generated for the indicator condition scores (QAR=4).
Criterion 6: Calculation of *Econds*
Econds for the individual rivers assets have been calculated by averaging indicator theme condition scores. Spatial scaling was used to create the regional *Econd* from the individual river *Econds*. Substantial documented evidence has been provided to support the method of integrating the indicator condition scores (QAR=4).
CONCLUSION
The underlying data for the rivers assets are of excellent quality and *Econds* are credibly derived. Reinterpreting and reanalysing the data from an existing monitoring program has been a useful exercise in testing the Environmental accounts (QAR=5).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Wetlands Accreditation Report

Environmental Account 2014

Corangamite Catchment Management Authority, VIC

Criterion 1: Classification of Environmental Assets
Wetlands accounts have been prepared and delineated by six Corrick's classes, sufficient to test the concept of regional environmental accounting. The provision of spatial information (such as shape files) will further assist with interpreting the condition of wetlands in the region.
Criterion 2: Selection of Indicators
Condition indicators submitted include catchment disturbance, physical form, hydrology, water properties, soils and biota. These indicators were developed through a state-based assessment process, and also comply with the national Framework for Assessment of River and Wetland Health (QAR=4). 'Extent' is incorporated as a component of the 'physical form' indicator.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state assessment program dataset, the Index of Wetland Condition, and also complies with the national framework for wetland health assessments (the FARWH). Data are robust and appropriate to test the concepts within the trial. However, future rounds of the account should explore increasing representativeness of sampling locations within the region (QAR=2).
Criterion 4: Estimating Reference Condition
Substantial documented evidence has been provided to support the indicator condition scores (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Use of pre-European reference benchmarks and development of reference measures is well supported (AR=4).
Criterion 6: Calculation of *Econds*
Econds have been calculated for 1 hectare cells through weighted indicator condition scores within the Index of Wetland Condition (wetland catchment (48%), physical form (17%), hydrology (15%), water properties (10%), soil (5%) and biota (5%)). Documented evidence has been provided to support the method of combining the indicator condition scores to create the *Econd* (QAR=4).
CONCLUSION
The underlying data and *Econd* derived for the Wetlands assets are of excellent quality and credibly describe their condition for the given time period (QAR=4).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Wetlands Accreditation Report

Environmental Account 2014

North Central Catchment Management Authority, NSW

Criterion 1: Classification of Environmental Assets
Wetlands accounts have been prepared in two forms to test and demonstrate potential differences based on classification systems: delineated by six Corricks classes, and 33 individual wetlands (QAR=4).
Criterion 2: Selection of Indicators
Condition indicators submitted include catchment disturbance, physical form, hydrology, water properties, soils and biota. These indicators were developed through a state-based assessment process, and also comply with the national Framework for Assessment of River and Wetland Health (QAR=4). Extent is incorporated as a component of the physical form indicator.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state assessment program dataset, the Index of Wetland Condition, and also complies with the National Framework for Wetland Health Assessments (the FARWH). Data are robust and appropriate to test the concepts within the trial. However, future rounds of the account should explore increasing representativeness of sampling locations within the region (QAR=2).
Criterion 4: Estimating Reference Condition
Substantial documented evidence has been provided to support the indicator condition scores (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Use of pre-European reference benchmarks and development of reference measures is well supported (AR=4).
Criterion 6: Calculation of *Econds*
Econds have been calculated for 1 hectare cells through weighted indicator condition scores within the Index of Wetland Condition (wetland catchment (48%), physical form (17%), hydrology (15%), water properties (10%), soil (5%) and biota (5%)). Documented evidence has been provided to support the method of combining the indicator condition scores to create the *Econd* (QAR=4).
CONCLUSION
The underlying data and *Econd* derived for the wetlands assets are of excellent quality and credibly describe their condition for the given time period (QAR=4). The provision of two types of wetlands accounts (based on Corrick's classes and on individual wetlands) is highly informative.

Accrediting Scientists:	Dr Richard Davis	01/07/14
	Dr Ronnie Harding	
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Report Prepared by:	Carla Sbrocchi	01/07/14

Wetlands Accreditation Report

Environmental Account 2014

Queensland Murray-Darling Committee for the Queensland Murray-Darling Basin, QLD

Criterion 1: Classification of Environmental Assets
Wetlands accounts have been provided by hydrological type (lacustrine, palustrine, riverine) (QAR=1). Provision of spatial information would further assist interpretation of accounts.
Criterion 2: Selection of Indicators
Extent of wetlands (area) is a useful first measure but does not solely describe condition (QAR=1). Indicators describing the condition of the wetland are recommended for improving the quality of the account.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state assessment, the Queensland State of the Environment Report (2011). Spatial extent and integrity of wetlands is an acceptable first measure of wetland condition for the environmental accounts (QAR=1). The level of information should be supported with location (via shape files) and a more detailed assessment of the methodologies used.
Criterion 4: Estimating Reference Condition
Use of Pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Extent indicator condition scores are adequately documented (QAR=1). Condition scores are not available at this time.
Criterion 6: Calculation of *Econds*
The inclusion of measures of wetland condition are required to construct an *Econd* for the wetland assets and as such a regional *Econd* cannot be produced at this time (QAR=0.) An expert panel may be convened to provide an indicative measure of condition to enhance future accounts.
CONCLUSION
Trend in wetland extent (three time periods) provides useful information towards regional decision making, but *Econds* cannot be calculated for this asset as condition measures are not yet available (QAR=0).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Wetlands Accreditation Report

Environmental Account 2014

South East Queensland Catchments, QLD

Criterion 1: Classification of Environmental Assets
Wetlands have been delineated by hydrological type (lacustrine, palustrine, riverine) (QAR=1). Provision of spatial information would further assist interpretation of accounts.
Criterion 2: Selection of Indicators
Measuring the condition of wetlands via wetland-based native vegetation is endorsed by the Framework for the Assessment of River and Wetland Health Indicators. Indicators of wetland-based native vegetation extent and condition are sufficient (QAR=3).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state native vegetation assessment program dataset, BioCondition, through the use of an expert elicitation process which focussed on wetland-specific native vegetation. Expert assessment of wetland condition using methods developed for native vegetation condition assessments provides an acceptable measure for the environmental accounts (QAR=1). Data are available for one accounting period.
Criterion 4: Estimating Reference Condition
Use of pre-European reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Using methods developed for the native vegetation asset account, scaled measures are acceptable and documented evidence supports the scores generated for the indicator condition scores (QAR=4).
Criterion 6: Calculation of *Econds*
Spatially scaled, non-weighted indicators were used to calculate the *Econd*. Substantial documented evidence has been provided to support the method of integrating the indicator condition scores (QAR=4).
CONCLUSION
The region has been proactive in suggesting an alternative method for measuring the condition of regional wetlands. The *Econd* and underlying data derived for the Wetland assets are of sufficient quality to prove the concept of a regional condition account, as described by the Accounting for Nature model (QAR=1).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Floodplains Accreditation Report

Environmental Account 2014

Central West Catchment Management Authority, NSW

Criterion 1: Classification of Environmental Assets
Floodplain assets have been delineated by 17 zones, sufficient to test the concept of regional environmental accounting. The provision of spatial information (such as shape files) will further assist with interpreting the condition of the floodplain in the region.
Criterion 2: Selection of Indicators
The indicator of the area receiving one in 10-year flood was selected on the basis of the ecological requirements of floodplain vegetation to be flooded. The ratio describes a general approach to this indicator and could be refined (assessing different return intervals, inclusion of hydrological timing) over time.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from outputs of a model designed by CSIRO for the Murray-Darling Basin. The data is of sufficient quality to answer some initial aspects of the account, and incorporates knowledge from experts in CSIRO. The region assessed the availability of other sources of data to improve upon the quality of the account; however, available models (CSIRO, NSW Office of Water) were not a viable option for the environmental accounts trial due to financial constraints. Incorporation of these models could assist in differentiating between human induced changes and natural fluctuations.
Criterion 4: Estimating Reference Condition
The benchmark used for the data provided represents a historical perspective rather than a true undisturbed reference. This historical benchmark has not taken into account local engineering changes on the floodplain. In the case of the Central West region, these are significant. Models are available which incorporate a true reference, but requires a financial investment from the region to access the data.
Criterion 5: Calculation of Indicator Condition Scores
Calculation of indicator condition scores has been conducted according to suggested practices (distance-to-reference). However, in this case, an additional step is required to interpret scores that are greater than 100. This requires a scientist to assess the degree to which the indicator measure has changed from reference, and scaling the number against its reference, as 100 represents the best it could possibly be (QAR=0).
Criterion 6: Calculation of *Econds*
Econds are based on a sole indicator condition score, area inundated with one in 10-year flood. This provides some useful information, but still requires some refining to ensure a) all numbers are scaled between 0-100 and b) the account incorporates additional indicators of condition. *Econds* are intended to reflect the condition of the asset due to human impact (where possible). As such, the current *Econd* require some interpretation to provide a representation of the condition of the asset, with expected climate signals filtered out (QAR=0).
CONCLUSION
The area of a flood inundation with one in 10-year return interval provides useful information towards regional decision-making and is an excellent first step in constructing a regional asset condition account. The quality of the account will be increased by including additional indicators of floodplain condition, such as condition of floodplain vegetation or hydrological characteristics, and assessing and improving the robustness of the reference measure (QAR=0).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Groundwater Accreditation Report

Environmental Account 2014

Namoi Catchment Management Authority, NSW

Criterion 1: Classification of Environmental Assets
The environmental account was tested against one aquifer (Upper Namoi Alluvium) with 12 groundwater zones (QAR=1). Accreditation ratings will increase with the number of examples of this asset assessed, and provision of spatial information (via shape files) will assist with interpretation of their condition.
Criterion 2: Selection of Indicators
One indicator (depth to groundwater) was provided as part of the environmental accounts. This provides a good first step in assessing the condition of the aquifer, but could be supported with other indicators to better describe the water balance (QAR=0). Water balance indicators may include a description of the total volume of the aquifer and expected changes due to recharge rates and discharge. The region has indicated that water quality issues are not a problem, however, a statement to support this would be helpful.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a state groundwater dataset, provided by the NSW Office of Water. Data on groundwater depth has been provided for multiple time periods (five decades, 1970-2010). The data is of sufficient quality to provide information towards some aspects of the account; however, not comprehensive enough for assessing the condition of the aquifer (QAR=0). By incorporating expert knowledge of the aquifers or by using available models (CSIRO, NSW Office of Water) a wider group of datasets could assist in differentiating between human-induced changes and natural fluctuations.
Criterion 4: Estimating Reference Condition
Calculation of indicator condition scores has been conducted according to suggested practices (distance to reference). However, in this case, an additional step is required to interpret scores that are greater than 100. This requires a scientist to assess the degree to which the indicator measure has changed from reference and scaling the number against its reference, as 100 represents the best it could possibly be (QAR=0).
Criterion 5: Calculation of Indicator Condition Scores
Further work is required to support or modify the reference measure to ensure robustness in representing an unaltered state (QAR=0). Inclusion of expert knowledge or use of available models (CSIRO, NSW Office of Water) will strengthen the reference benchmark.
Criterion 6: Calculation of *Econds*
Trend in depth to groundwater (five decades, 1970-2010) provides useful information towards regional decision making, but an *Econd* cannot yet be calculated for this asset (QAR=0)
CONCLUSION
Trend in depth to groundwater (five decades, 1970-2010) provides useful information towards regional decision making and is an excellent first step in constructing a regional asset condition account. The quality of the account will be increased by including additional indicators of aquifer condition, such as water balance, and assessing and improving the robustness of the reference measure (QAR=0).

Accrediting Scientists:	Dr Richard Davis Dr Ronnie Harding Dr Terry Hillman	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Estuaries (Tamar) Accreditation Report

Environmental Account 2014

NRM North, TAS

Criterion 1: Classification of Environmental Assets
This account represents the major estuary in the region, the Tamar, and is sufficient to test the concept of an asset account (QAR=1). A comprehensive estuaries account would include other estuaries of the region.
Criterion 2: Selection of Indicators
Indicators are based on a state-developed monitoring program (Ecosystem Health Assessment Program, TAS), and comprise water quality and bacteriological indicators. It is important to re-evaluate the inclusion of certain indicators (bacterial, toxicants) to determine their relevance to a regional environmental condition account. Articulating the links between indicator and ecological condition would be helpful, and incorporating additional indicators of asset condition, such as biotic elements, will provide a more robust picture of estuary condition. The region has indicated this information is available but has not yet been incorporated into the account. Bacteriological indicators are important for human health, but not for ecological. Therefore it is an important aspect for reporting to the community, but not for environmental accounting. (QAR=0).
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a regional estuary assessment, the Tamar Estuary and Esk Rivers program. Evidence provided suggests the sampling program and data are of good quality, but are only able to support one aspect of estuary health - water quality (QAR=1). The region indicates other biotic data are available, but these have not been included. Time series is available for two years.
Criterion 4: Estimating Reference Condition
Reference benchmarks are based on best available information; however, an articulation of the link between guideline values and the pre-industrial conditions needs to be made to determine the robustness of the reference benchmark. Further work could be undertaken to specify guideline values for Tasmanian estuaries (QAR=1).
Criterion 5: Calculation of Indicator Condition Scores
Indicator condition scores have been derived through a system of expert rules and assigning categorical scores. Although substantial documentation has been provided for the calculation of indicator condition scores, additional rationale or evidence is required to ensure the method represents the true state of the parameter (QAR=0).
Criterion 6: Calculation of *Econds*
Econds have been calculated through a series of ranks which loses absolute-level information. Using the raw data where possible is likely to yield a more descriptive *Econd*, reflecting a truer representation of the condition of the estuary (QAR=0).
CONCLUSION
The presented data (water quality) provides a start to an estuary account, but is not sufficient to describe the condition of the asset (QAR=0). The region indicates biotic data are available, but these have not been included. Further information is required to link provided indicators to ecological condition and support the methods for calculating the index (QAR=0).

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Estuaries Accreditation Report

Environmental Account 2014

SEQ Catchments, QLD

Criterion 1: Classification of Environmental Assets
18 individual estuaries are identified in the accounts. This is appropriate and represents the region adequately (QAR=3).
Criterion 2: Selection of Indicators
Indicators of ecological health (EHI), biological health (BHR) and foreshore habitat extent (riparian) are suitable for the environmental accounts (QAR=3). Measures contributing to the ecological health indicator are total nitrogen, total phosphorus, chlorophyll a, dissolved oxygen, turbidity and uptake of nutrients. Measures contributing to the biological health indicator are seagrass depth range, coral cover, nutrient processing (mixing plots) and sewage plume mapping.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a regional catchment-based assessment program, the Ecosystem Heath Monitoring Program. Time series is available. Evidence provided indicates the sampling program yields a robust measure of condition, and is acceptable for the environmental account (QAR=4).
Criterion 4: Estimating Reference Condition
Use of reference benchmarks and development of reference measures is well supported (QAR=4).
Criterion 5: Calculation of Indicator Condition Scores
Calculation of indicator condition scores for EHI, BHR and foreshore habitat extent is well supported, including the method of weighting components (QAR=4).
Criterion 6: Calculation of *Econds*
The *Econd* for individual estuaries has been calculated with weighted components (70% EHI, 15% BHR, 15% riparian). The regional *Econd* is scaled by estuary area. Sufficient documented evidence has been provided to support the method of creating an *Econd* (QAR=4).
CONCLUSION
The underlying data for the estuaries assets are of excellent quality and *Econds* are credibly derived (QAR=4). The accounts for this region demonstrate the value in maintaining a long-term monitoring program so that trends can be observed.

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Moreton Bay Accreditation Report

Environmental Account 2014

SEQ Catchments, QLD

Criterion 1: Classification of Environmental Assets
A discrete asset identified in the regional plan and delineated by zones (QAR=4).
Criterion 2: Selection of Indicators
Indicator themes of ecological health (EHI) and biological health (BHR) are suitable for the environmental accounts (QAR=3). Measures contributing to the ecological health indicator are total nitrogen, chlorophyll a, salinity, temperature, sewage plume mapping, secchi depth and presence of the toxic alga, Lyngbya. Measures contributing to the biological health indicator are seagrass depth range, seagrass distribution and variation and coral cover.
Criterion 3: Data Sources, Quality and Analysis
Data for the accounts were repurposed from a regional assessment program, the Ecosystem Health Monitoring Program. As the original purpose of the data collection appeared to focus more on pressures than ambient conditions, further investigation for future accounts may be required to ensure indicators represent the ecological condition of Moreton Bay. Time series is available (QAR=4).
Criterion 4: Estimating Reference Condition
Water quality objectives from the South East Queensland Regional Water Quality Management Strategy were used to assist in determination of reference benchmarks for Moreton Bay. The water quality targets were derived from measures taken at geographic or historical reference sites and represent exceedence thresholds for various indicators. As the objectives were established in response to the identification of pressures on the environmental systems in SEQ, they may be limited in their ability to reflect ecological condition, but are sufficient for testing environmental account approaches (QAR=2).
Criterion 5: Calculation of Indicator Condition Scores
Calculation of indicator condition scores for EHI and BHR is well supported, including the method of weighting components (QAR=4).
Criterion 6: Calculation of *Econds*
The underlying data for the Moreton Bay asset are of excellent quality and Econds are credibly derived (QAR=4). This account shows the value in long-term data collection so that trends in condition can be observed.
CONCLUSION
Substantial evidence has been provided to support the method of combining the scores to create the ***Econd*** (QAR=4).

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Southern Rights Whales Accreditation Report

Environmental Account 2014

Eyre Peninsula NRM region, SA

Criterion 1: Classification of Environmental Assets
Assets are described as southern right whales at the head of Bight aggregation ground in the Great Australian Bight (QAR=1).
Criterion 2: Selection of Indicators
Relative abundance, measured through number of female-calf pairs, is a suitable indicator for the environmental accounts (QAR=3).
Criterion 3: Data Sources, Quality and Analysis
Data were collated as part of ongoing survey work, incorporating state and volunteer surveys. Time series has been provided. Evidence provided indicates the sampling program provides a robust measure of condition, and is acceptable for the environmental account (QAR=4).
Criterion 4: Estimating Reference Condition
The region has documented a series of logic steps used to recreate a pre-whaling reference benchmark relevant for the regional asset. This method is innovative and well supported (QAR=3).
Criterion 5: Calculation of Indicator Condition Scores
Measures are acceptable and documented evidence supports generation of indicator condition scores using the distance-to-reference method (QAR=4).
Criterion 6: Calculation of *Econds*
A single indicator condition score contributed to the *Econd*, which has sufficient documented evidence to support the method (QAR=4).
CONCLUSION
The sole indicator of southern right whale condition is sufficient as it incorporates aspects of resilience and vigour. The underlying data for the southern right whales asset are of excellent quality and *Econds* are credibly derived (QAR=4). The account demonstrates an innovative use of science to estimate the reference benchmark.

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
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Dugongs Accreditation Report

Environmental Account 2014

SEQ Catchments, QLD

Criterion 1: Classification of Environmental Assets
Dugongs are a discrete asset without clear delineation, but appropriate as identified in the regional plan (QAR=1).
Criterion 2: Selection of Indicators
A dugong population indicator, relative abundance, is suitable for the environmental accounts (QAR=1).
Criterion 3: Data Sources, Quality and Analysis
Data were derived from different monitoring programs, but data for the indicator has been collected consistently and are acceptable for the environmental accounts (QAR=1).
Criterion 4: Estimating Reference Condition
Reference benchmarks have been derived from an expert-based method whereby abundance of dugongs can be estimated from knowledge of dugong diet requirements and the availability of food sources. Suitable for the environmental accounts, future accounts will require a more thorough articulation and documentation of the methods used to estimate reference (QAR=1)
Criterion 5: Calculation of Indicator Condition Scores
Measures are acceptable (QAR=1).
Criterion 6: Calculation of *Econds*
The *Econd* is based on a single indicator condition score, which has sufficient documentation to support its use. Measures are acceptable, but additional information may be needed to interpret trends (eg habitat presence and condition; pressures such as floods and effect on habitat). This account raises issues around accounting for species such as dugong, which do not exist in clear spatial boundaries. It may be worth exploring in future accounts how these estimates can be adjusted where there are known influences on dugongs, where information is available regarding the presence of the same dugongs from year to year, or how population numbers are driven by resources in Moreton Bay (QAR=1).
CONCLUSION
The *Econd* is based on a single indicator condition score. The *Econd* is acceptable as a test of the environmental accounts, but documentation to support the reference benchmark could be more explicit (QAR=1). This account raises issues around accounting for trans-boundary assets (such as migratory species), which do not exist in clear spatial boundaries.

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
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Marine Fauna Accreditation Report

Environmental Account 2014

SEQ Catchments, QLD

Criterion 1: Classification of Environmental Assets
The region proposed an account for marine fauna, intending it to be inclusive of all fauna known to the region. The asset as described in the account is insufficient for regional decision-making and would be better described in discrete faunal groups (eg fish, marine mammals) aligned with the regional plan (QAR=0).
Criterion 2: Selection of Indicators
An indicator theme, habitat, was proposed by the region to represent the condition of marine fauna in the SEQ Catchments region. This theme is supported by indicators of seagrass, saltmarsh, mangrove and undisturbed beach extent. However, clearer articulation of the assumptions between habitat and marine fauna condition would be required to make the use of this surrogate indicator theme appropriate (QAR=0). The indicators presented here may be more relevant to something such as a marine habitat account.
Criterion 3: Data Sources, Quality and Analysis
The data provided were not evaluated due to inappropriate indicator selection.
Criterion 4: Estimating Reference Condition
Criteria was not evaluated due to inappropriate indicator selection.
Criterion 5: Calculation of Indicator Condition Scores
Criteria was not evaluated due to inappropriate indicator selection.
Criterion 6: Calculation of *Econds*
Calculation is not appropriate as indicator is not adequate to represent condition of the asset (QAR=0).
CONCLUSION
The indicators used do not describe the condition of the asset (QAR=0).

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

Fish Stocks Accreditation Report

Environmental Account 2014

SEQ Catchments, QLD

Criterion 1: Classification of Environmental Assets
Coastal fisheries have been accounted for by five catch methods (line, net, trawl, pot-crab, pot-spanner) rather than species. In future, species-based accounts are likely to be more effective (QAR=1).
Criterion 2: Selection of Indicators
A single indicator, catch per unit effort, is shown in the account. The inclusion of recruitment, biomass estimates or depletion are recommended for future accounts to more fully describe the condition of fish stocks.
Criterion 3: Data Sources, Quality and Analysis
The data provided are sufficient to comment on one aspect of fisheries (catch effort) (QAR=1).
Criterion 4: Estimating Reference Condition
Reference benchmark is not representative of an unfished reference (QAR=0).
Criterion 5: Calculation of Indicator Condition Scores
Calculation method is appropriate for the given indicator, catch per unit effort, but the resultant score in not adequate due to issues with the reference benchmark (QAR=1).
Criterion 6: Calculation of *Econds*
A catch effort indicator is not sufficient by itself to measure the condition of the asset, therefore the *Econd* derived from the sole indicator condition score is not sufficient to represent the condition of the asset (QAR=0).
CONCLUSION
There are significant limitations with the approach presented in this account, despite presenting time series using catch-based metrics (QAR=0). Fish stock accounts are likely to be more informative where appropriate fish stock classification is used (eg species-based rather than by fish catch method) and employing an unfished reference benchmark. State and Commonwealth stock assessments may be helpful when considering regional fish stock accounts, as their methods are tested, robust and include additional measures of condition (eg recruitment, biomass, depletion).

Accrediting Scientists:	Dr Richard Mount Dr Tony Smith Prof Bruce Thom	01/07/14
Report Prepared by:	Carla Sbrocchi	01/07/14

5: Working Paper Series

The Environmental Accounts Working Paper Series includes these papers:

1. Working Paper 1: Draft Protocol for Constructing a Native Vegetation Condition Account
2. Working Paper 2: An Evaluation of Methods for Accounting for the Condition of Regional Native Bird Communities
3. Working Paper 3: Fire as a Landscape Complexity Metric Contributing to Native Vegetation Composition Account
4. Working Paper 4: Methodology for Correlating Vegetation Extent Data with Forestry Canopy Change Data
5. Working Paper 5: Geographical Systems Approach to the Assessment of Soil Erosion Using the RUSLE Model

Methods statements and papers in the Working Paper series are published separately and can be downloaded from http://nrmregionsaustralia.com.au/our-projects/regional-environmental-accounts/

6: Contributors, Committees and Terms of Reference

Table 61: Roles and membership of parties of the trial. All organisational titles correct at time of contribution.

Scientific Standards And Accreditation Committee	
• Provide expert advice to the regional NRM regions, as the need arises • Establish processes and criteria for accreditation of regional environmental accounts including the selection of assets and indicators, data quality, selection of reference condition benchmarks, and development of *Econds* • Accredit accounts in each region against standards and criteria	
Mr Peter Cosier, Wentworth Group of Concerned Scientists, Convenor of Scientific Standards and Accreditation Committee Prof Bruce Thom, Wentworth Group of Concerned Scientists Dr Denis Saunders, Wentworth Group of Concerned Scientists Prof Hugh Possingham, University of Queensland, Wentworth Group of Concerned Scientists Mr Mike Grundy, CSIRO	Dr Richard Davis, Wentworth Group of Concerned Scientists Dr Richard Mount, Bureau of Meteorology Dr Richard Thackway, University of Queensland Dr Ronnie Harding, Wentworth Group of Concerned Scientists Dr Terry Hillman, Wentworth Group of Concerned Scientists Dr Tony Smith, CSIRO
Regional Environmental Accounts Steering Committee	
• Assist in managing trial implementation in each of the regions	
Max Kitchell, NRM Regions Australia Convenor, Convenor of Steering Committee Chris King, Presiding Member, Northern Agricultural Catchments Council	Danny O'Neill, Executive Officer, NRM Regions Australia Heather Baldock, Presiding Member, Natural Resources Eyre Peninsula John Bethel, Chair, Northern Gulf RMG Royce Bishop, Chair, Reef Catchments
Regional Environmental Accounts Working Group	
• Test the *Accounting for Nature* model at the regional scale and construct regional environmental asset condition accounts	
Andrew Baldwin, NRM North Annie Lane, Natural Resources Eyre Peninsula Anthony Greenhalgh, Central West Catchment Management Authority Bronwyn Cameron, Namoi Catchment Management Authority Bruce Brown, Namoi Catchment Management Authority Carolyn Raine, Central West Catchment Management Authority Damian Wells, North Central Catchment Management Authority David Manning, SEQ Catchments Donna Smithyman, Corangamite Catchment Management Authority Emma Jackson, Northern Agricultural Catchments Council Gareth Smith, Corangamite Catchment Management Authority Evelyn Poole, Natural Resources Eyre Peninsula Francesca Andreoni, Namoi Catchment Management Authority Geoff Penten, Queensland Murray-Darling Committee George Truman, Namoi Catchment Management Authority James McKee, NRM North	James Shaddick, North Central Catchment Management Authority Jen Shearing, Central West Catchment Management Authority Jim McDonald, Namoi Catchment Management Authority Marieke Jansen, Northern Agricultural Catchments Council Nick McCristal, Corangamite Catchment Management Authority Niilo Gobius, Northern Gulf Resource Management Group Noel Ainsworth, SEQ Catchments Pam Green, Southern Rivers Catchment Management Authority Rebecca Kelly, NRM North Roxane Blackley, Queensland Murray Darling Committee Shelley Spriggs, Northern Agricultural Catchments Council Simon Warner, SEQ Catchments Sophie Keen, Natural Resources Eyre Peninsula Tim Hoogwerf, Northern Gulf Resource Management Group Tracey Macdonald, Central West Catchment Management Authority

Technical Environmental Accounting Standards Committee

- Provide expert advice to the trial NRM regions, as the need arises
- Develop the regional accounting framework
- Ensure compatibility with national and international environmental accounts

Peter Greig, Convenor of Technical Environmental Accounting Standards Committee
Andre Zerger, Bureau of Meteorology
Belinda Allison, Bureau of Meteorology
Bill Allen, Australian Bureau of Statistics
Jane McDonald, University of Queensland
Jessica Hasker Bowman, VIC Department of Environment and Primary Industries
Joselito Chua, VIC Department of Environment and Primary Industries
Mark Eigenraam, VIC Department of Environment and Primary Industries
Mark Lound, Australian Bureau of Statistics
Michael Vardon, Australian Bureau of Statistics
Neil Byron, Wentworth Group of Concerned Scientists
Phil Tickle, CRC for Spatial Information
Rob Sturgiss, Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education
Warwick McDonald, Australian Bureau of Meteorology

Expert Panels and Additional Support

- Provide expertise to regions in constructing regional Environmental Asset Condition Accounts

Alan Anderson, CSIRO
Andrew Biggs, QLD Department of Natural Resources and Mines
Andrew Cadogan-Cowper, Australian Bureau of Statistics
Andrew Houley, Reef Catchments
Annelise Wiebkin, SA Department of Environment, Water and Natural Resources
Annie Kelly, QLD Herbarium
Ayesha Tulloch, University of Queensland
Bob Walker, Queensland Murray-Darling Committee
Brad Page, SA Department of Environment, Water and Natural Resources
Brian Foster, Natural Resources Eyre Peninsula, SA Department of Environment, Water and Natural Resources
Bruce Wilson, QLD Herbarium
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Cecilia Woolford, Natural Resources Eyre Peninsula, SA Department of Environment, Water and Natural Resources
Dan Rogers, SA Department of Environment, Water and Natural Resources
Dave Pongracz, WA Department of Parks and Wildlife
Diane Allen, QLD Department of Science, Information Technology, Innovation and the Arts
Eva Abal, University of Queensland
Fiona McKenzie, Wentworth Group of Concerned Scientists
Garry Cook, CSIRO
Gary Stoneham, Victorian Department of Treasury and Finance
Greg Keighery, WA Department of Parks and Wildlife
Ian Overton, CSIRO
Jan Rowland, SA Department of Environment, Water and Natural Resources
Jane McDonald, University of Queensland
Jeff Baldock, CSIRO
Jeremy Russell-Smith, NAILSMA
John Neldner, QLD Herbarium
Judy Henderson, Northern Rivers Catchment Management Authority
Kate Clarke, Natural Resources Eyre Peninsula, SA Department of Environment, Water and Natural Resources
Mark Silburn, QLD Department of Natural Resources and Mines
Matt Royal, SA Department of Environment, Water and Natural Resources
Paul Grimshaw, QLD Herbarium
Peter Thompson, Cape York Sustainable Futures
Peter Young, QLD Herbarium
Phil Pisanu, SA Department of Environment, Water and Natural Resources
Ram Dalal, QLD Department of Science, Information Technology, Innovation and the Arts
Steve Murphy, Australian Wildlife Conservancy
Tim Croft, SA Department of Environment, Water and Natural Resources
Tim Ryan, QLD Herbarium

Wentworth Group of Concerned Scientists

- Support regions and committees in development of trial process and provide resource material

Carla Sbrocchi
Carley Bartlett
Caroline McFarlane
Celine Steinfeld
Claire Parkes
Emma McIntosh
Paula Steyer

SCIENTIFIC STANDARDS AND ACCREDITATION COMMITTEE

Role: to establish processes and scientific standards for application to regional environmental accounting; accredit evidence base used towards the regional accounts, including indicator selection, reference benchmarks, construction of *Econds,* and data quality; provide a consultative forum that can effectively address scientific matters arising during the trial.

TERMS OF REFERENCE:

1. To establish processes, standards and criteria for assessment of an account's evidence base, through:
    a. Selection of environmental assets and their indicators;
    b. Data quality;
    c. Selection of reference benchmarks; and
    d. Development of *Econds*.
2. To develop guidelines on the methods and procedures for developing an evidence base for a regional account in accordance with accreditation criteria.
3. To accredit accounts from each trial region against standards and criteria for indicator selection, reference benchmarks, ***Econds*** and data quality.
    a. As part of the accreditation process, the Scientific Standards and Accreditation Committee (SSAC) will develop criteria for instituting Regional Assessment Panels which will act as regional accreditation bodies, who will review regional accounts according to standards set out by the SSAC.
    b. The Regional Assessment Panels will assess the account against standards and criteria developed by the SSAC and provide recommendations and interim accreditation grades to the SSAC.
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.

TECHNICAL ENVIRONMENTAL ACCOUNTING STANDARDS COMMITTEE

Role: To develop an accounting framework fit for purpose at multiple scales; ensure compatibility with national and international environmental accounts; and 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:
    a. Design of the regional accounting framework;
    b. Quality measures;
    c. Data aggregation;
    d. 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 SSAC with reference to matters that affect both the scientific and accounting aspects of the trial, and review issues papers produced from this committee.

7: NRM Regions and their Governance

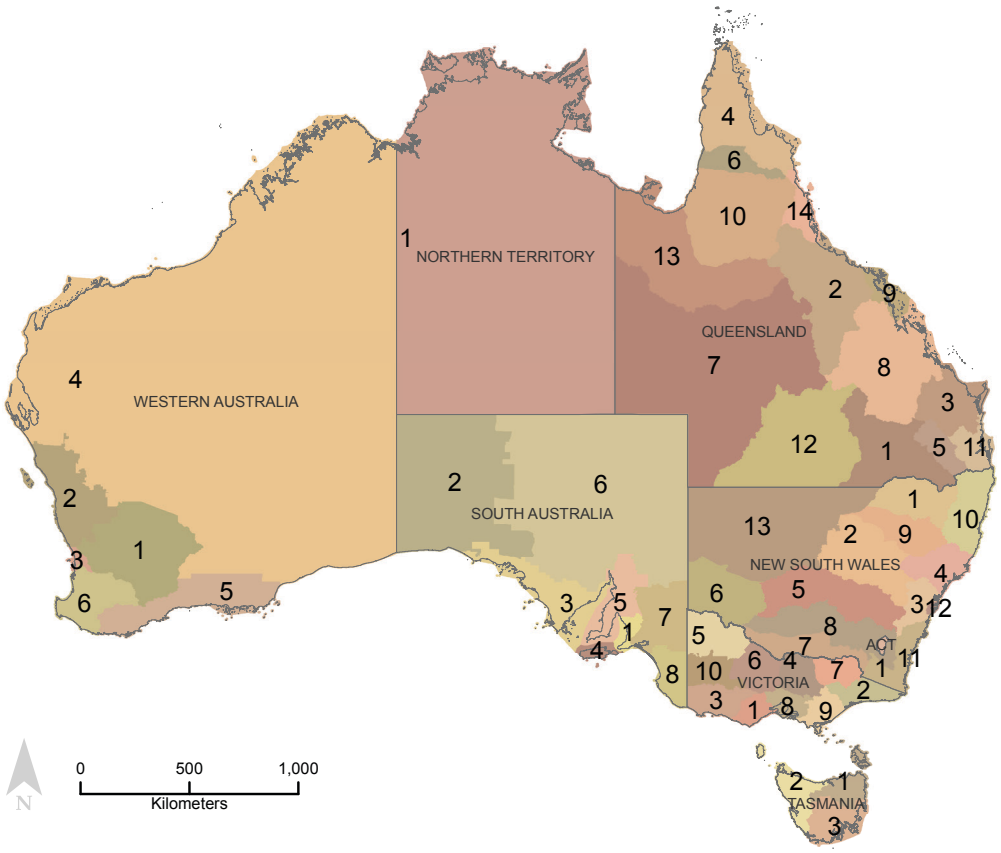


Figure 57: Regional NRM body boundaries, as of June 2013 (Australian Government 2014)

Table 62: Names and locations of regional NRM bodies, Australia, 2005-2013

Australian Capital Territory	
1	ACT
New South Wales	
1	Border Rivers/Gwydir
2	Central West
3	Hawkesbury/Nepean
4	Hunter/Central Rivers
5	Lachlan
6	Lower Murray/Darling
7	Murray
8	Murrumbidgee
9	Namoi
10	Northern Rivers
11	Southern Rivers
12	Sydney Metro
13	Western
Northern Territory	
1	Northern Territory
Tasmania	
1	North
2	North West
3	South

Queensland	
1	Border Rivers
2	Burdekin
3	Burnett Mary
4	Cape York
5	Condamine
6	Cooperative Management Area
7	Desert Channels
8	Fitzroy
9	Mackay Whitsunday
10	Northern Gulf
11	South East Queensland
12	South West Queensland
13	Southern Gulf
14	Wet Tropics
Western Australia	
1	Avon
2	Northern Agricultural Region
3	Perth
4	Rangelands
5	South Coast Region
6	South West Region

Victoria	
1	Corangamite
2	East Gippsland
3	Glenelg Hopkins
4	Goulburn Broken
5	Mallee
6	North Central
7	North East (VIC)
8	Port Phillip and Westernport
9	West Gippsland
10	Wimmera
South Australia	
1	Adelaide and Mount Lofty Ranges
2	Alinytjara Wilurara
3	Eyre Peninsula
4	Kangaroo Island
5	Northern and Yorke
6	SA Arid Lands
7	SA Murray Darling Basin
8	South East (SA)

Table 63: Organisational arrangements by state and territory 2005-2013 (Pannell *et al.* 2008)

State/Territory	Title of regional bodies (number of regional bodies in parentheses) (Robins and Dovers 2007)	Form (Robins and Dovers 2007)	Legal responsibilities of regional NRM bodies	Key State agency who manages relationship
NSW	Catchment Management Authorities (13)	Statutory authority	Support development and implementation of Property Vegetation Plans under the Native Vegetation Act 2003	Office of Environment and Heritage
VIC	Catchment Management Authorities (10)	Statutory authority	Responsible for beds, bank and floodplain of river and the Catchment and Land Protection Act 1994	Department of Environment and Primary Industries
WA	Regional NRM Groups or Catchment Councils (6)	Nonstatutory	n/a	Department of Environment and Conservation
SA	Regional NRM Boards (8)	Body corporates	Comprehensive statutory powers for planning and managing natural resources, particularly water allocation planning and ensuring compliance for soil conservation, pest plants and animals and biodiversity	Department of Environment, Water and Natural Resources
QLD	Regional Committees, Groups and Associations (14)	Eight limited companies, Five incorporated associations, An advisory body	n/a	Department of Environment and Heritage Protection
TAS	Regional Natural Resource Management Committees (3)	Incorporated associations or body corporates	Limited: develop and implement regional strategies, nominate member to NRM Council, report annually to Parliament	Department of Primary Industries, Parks, Water and Environment
ACT	ACT Natural Resource Management Council (1)	Nonstatutory advisory committee	n/a	ACT Minister for the Environment and Sustainable Development
NT	Territory Natural Resource Management (1)	Incorporated association	n/a	Federal Government

Table 64 shows the complete list of environmental assets with the exception of assets appearing in three or less regions: Murray-Darling icon sites, drinking water supply for large metropolitan areas, oyster and prawn production, caves, mangroves, seagrass and saltmarsh, forestry infrastructure, mound springs, thermal pools, fishing industry, atmosphere, air quality, natural integrity, islands, Torres Strait protected zone, estuaries, heritage-listed rivers, international bird areas, sandstone rock features, important bird areas, alpine regions, Great Dividing Range.

Table 64: Complete list of regional assets (GHD 2012)[1]. Grey boxes indicate that asset is identified in the regional plans.

	Land							Water				Marine		Other	
Region	Native vegetation	Soils	Threatened species	Riparian areas	Migratory species	Floodplains + productive agriculture	Conservation areas	Wetlands	Rivers and lakes	Groundwater	Water quality	Coastal + marine ecosystem	Reef	Biodiversity	World heritage items
Border Rivers Gwydir	■		■		■			■							
Central West	■		■			■	■	■							
Hawksbury-Nepean	■		■			■		■		■					■
Hunter-Central Rivers	■		■		■	■	■	■	■			■			■
Lachlan	■		■		■	■	■	■	■						■
Lower Murray Darling	■					■	■	■	■						■
Murray	■		■		■		■	■	■					■	
Murrumbidgee	■		■		■	■	■	■						■	
Namoi	■	■				■	■		■	■	■				
Northern Rivers						■		■	■	■		■			■
Southern Rivers	■					■	■		■			■		■	
Sydney Metro	■		■					■				■		■	
Western						■	■	■		■					
Territory NRM	■		■			■	■	■	■			■		■	■
QMDC	■	■					■	■	■	■	■				
NQ Dry Tropics	■	■	■			■	■	■	■	■		■	■		■
Burnett Mary Regional Group	■		■		■				■	■	■	■	■	■	■
Cape York Peninsula region	■		■		■			■	■	■		■	■	■	■
Condamine Alliance	■	■	■			■		■	■	■					
Desert Channels	■	■		■		■	■		■	■	■			■	
Fitzroy Basin Association	■	■	■	■		■	■	■	■	■	■	■	■	■	■
Reef Catchments	■	■	■	■		■	■	■	■		■	■	■	■	■
Northen Gulf	■	■	■	■		■	■	■	■	■	■	■		■	■
Southern Gulf	■	■				■	■	■	■			■		■	■
South East Queensland	■	■	■	■		■	■	■	■	■	■	■		■	
South West Catchments	■	■						■	■	■				■	
Torres Strait Regional Authority			■				■			■	■	■	■	■	■
Terrain NRM	■	■	■	■				■	■		■	■	■		■
Corangamite	■	■	■	■		■	■	■	■	■	■	■		■	
East Gippsland	■	■	■	■		■	■	■	■	■	■	■		■	
Glenelg Hopkins	■	■	■	■		■	■	■	■	■		■		■	
Goulburn Broken	■	■	■	■		■	■	■	■		■			■	
Mallee	■	■	■	■		■	■	■	■	■				■	
North Central		■	■			■	■		■	■				■	
Port Phillip and Westernport	■	■	■			■	■	■	■			■		■	
West Gippsland	■	■	■	■		■	■	■	■	■	■	■		■	
Wimmera	■	■	■	■		■	■	■	■	■	■			■	
North East	■	■	■	■		■	■	■	■	■	■			■	
NRM North								■	■			■			
Cradle Coast	■	■		■		■	■	■	■	■	■	■		■	
NRM South		■					■				■	■		■	
Wheatbelt NRM (formerly Avon)	■	■	■	■		■	■	■	■	■	■			■	
Northern Agricultural						■	■			■		■		■	
Rangelands	■		■			■	■	■	■	■	■	■	■	■	■
South Coast NRM	■	■	■			■		■	■		■	■			
South West Catchments Council	■	■	■				■	■	■	■	■	■			
Perth Region NRM	■		■			■	■	■	■	■		■			
Alinytjara Wilurara															
Eyre Peninsula	■					■	■	■		■		■			
Kangaroo Island													■		
Adelaide and Mt Lofty Ranges			■									■	■		
SA MDB	■		■			■		■	■	■	■	■	■		
Northern and Yorke	■			■		■	■			■	■	■			
SA Arid Lands	■	■	■			■		■	■	■	■				
South East			■					■		■	■				
ACT NRM	■								■						
% regions reporting asset	80	48	68	30	13	70	66	77	73	61	46	57	20	54	29

1 Note: As a result of desktop analysis, listed assets come directly from regional strategies or plans, therefore interpretation of meaning of asset name or its similarity to another asset is unavailable. In some cases it may be possible that 'soils' and 'productive agriculture' would be identified by regions as meaning the same; similarly, 'biodiversity', 'threatened species', 'migratory species', and 'conservation areas' are all similar.

8: Glossary

Accreditation – certification of competence in a specified subject or areas of expertise, and of the integrity of an agency, firm, group, or person, awarded by a duly recognised and respected accrediting organisation (Business Dictionary 2015).

Account – a compiled set of information about the behaviour of institutional units and the activities in which they engage. Key elements of an account are entities engaging in activities, beneficiaries of the activities, and the transactions between them (adapted from European Commission *et al.* 2009).

Accounting – the process of identifying, measuring, recording and communicating economic transactions (Dictionary of Accounting 2010).

Assurance – a part of corporate governance in which a management provides accurate and current information to the stakeholders about the efficiency and effectiveness of its policies and operations, and the status of its compliance with the statutory obligations (Oxford Dictionary 2015).

Audit – an official inspection of an organisation's accounts, typically by an independent body (Oxford Dictionary 2015).

Aggregation – the process of combining data from two or more spatial locations (MDBA, 2012).

Asset – items of value to society (Australian Bureau of Statistics 2005).

Capacity – ecosystem capacity is the 'ability of a given ecosystem asset to generate a set of ecosystem services in a sustainable way into the future' (United Nations *et al.* 2013).

Common currency – a common, non-monetary unit of measure of the relative condition of environmental assets, based on a scientific estimate of the condition of an asset in the absence of significant post-industrial human alteration (its reference condition) as an index between 0 and 100. It does not imply a monetary value, nor does it describe a desired state.

Composite Index – also 'composite indicator'; a group of indicators combined and standardised into an index (a number between 0-100). In the *Accounting for Nature* model, the *Econd* is a composite index formed from multiple indicators of condition.

Condition – the scientific description of the quality or state of an environmental asset (Stoddard *et al.* 2006; Tierney *et al.* 2009; Bunn *et al.* 2010). Condition is measured through the use of indicators relating to the asset's vigour (level of productivity), organisation (structure and interactions) and resilience (ability to rebound from a shock) against a reference condition (Rapport *et al.* 1998). Condition underpins the assessment of the capacity of an environmental asset to provide goods and services that are of value to people, now and into the future. In the *Accounting for Nature* model, condition is represented by the composite index, the *Econd*.

Degradation – considers changes in the capacity of environmental assets to deliver a broad range of ecosystem services and the extent to which this capacity may be reduced through the action of economic units, including households (United Nations *et al.* 2012).

Econd *(Environmental Condition Index)* – describes the relative condition of any environmental asset as composite index, where 100 indicates the condition of an asset in the absence of significant post-industrial human alteration, and 0 indicates system function is absent (Cosier and McDonald 2010).

Ecosystem – a dynamic complex of plant, animal, and microorganism communities and their nonliving environment interacting as a functional unit (Millennium Ecosystem Assessment 2003; United Nations *et al.* 2012).

Ecosystem Account – environmental accounts for those assets that are not primarily used for production. The System of Environmental Ecosystem Accounts Experimental Ecosystem Accounts research agenda is currently testing methods for this form of accounting (United Nations *et al.* 2013).

Ecosystem services – benefits people obtain from ecosystems, comprising supporting services, provisioning services, regulating services and cultural services (Millennium Ecosystem Assessment 2003; United Nations, 2012; O'Connor & Schoer 2009).

Environmental account – an account for one or multiple aspects of the biophysical environment.

Environmental asset – the naturally occurring living and non-living components of the earth, together comprising the bio-physical environment, that may provide benefits to humanity (United Nations *et al.* 2013).

Environmental asset class – overarching themes used to describe the environment which incorporates sets of environmental assets. In the Australian State of the Environment reports, recognised environmental asset classes include land, water, coast, marine and atmosphere (State of the Environment Committee 2011).

Environmental Asset Condition Accounts – a set of tables that document the condition of an environmental asset which measure the change in quality and quantity of the asset. In the *Accounting for Nature* model, these accounts use the *Econd* as the unit of measure of change.

Environmental-economic account – a set of tables that account for those assets that may provide resources for use in economic activity, such as mineral and energy resources, land, soil resources, timber resources, aquatic resources, other biological resources and water resources (United Nations *et al.* 2012). The UN System of Environmental Economic Accounts was adopted as an international standard in 2012.

Environmental Health – a description of ecological condition related to a specific purpose and which can vary within a region or timeframe. It is an interpretation determined by expert opinion through scientific assessment of combined measures of condition for a specific social purpose. For example, a healthy waterway to a community might mean one which provides safe drinking water, whereas another community might consider a healthy waterway to be one which provides edible fish.

Environmental Health Reports – (or report cards); a produced report that uses information from condition accounts to create assessments with a range of available scoring methods such as A-F, traffic lights, ranges and so on. Examples of health reports in Australia include South East Queensland's Ecosystem Health Monitoring Program and NRM North's Tamar Estuary Report Card.

Flow (as in, 'stock and flow') – measurement of change over time. A quantity (such as expense, investment, or usage) takes meaning only when time is taken into account (Business Dictionary 2015).

Index – a method of combining a set of indicator measures to produce a number on a scale between 0 and 1 (or 0 and 100).

Indicator – environmental indicators are quantifiable and transparent measures (physical, chemical, or biological) of the characteristics of the ecosystem that can be used to detect change.

Indicator Condition Score (or *'theme index'* or *'theme score'*) – within the *Accounting for Nature* model, the Indicator Condition Score is a standardised raw value of the indicator measure against the reference benchmark. In some cases, the Indicator Condition Score may also act as an intermediate index, comprising multiple indicators of a similar type (*e.g.* water quality indicators combined to form a water quality index). Within the index 100 represents the reference benchmark for each indicator and 0 indicates system function is absent (modified from Cosier and McDonald 2010).

Indicator theme – an overarching description of a group of indicators that, together, provide a measure of an aspect of an asset's condition. For example, indicators of pH, turbidity, dissolved oxygen and salinity may comprise a water quality indicator theme for rivers assets.

Intermediate index – *see Indicator Condition Score*

Integration – the process of combining two or more metrics into an indicator, or two or more indicators into a theme index (MDBA 2012).

Level – an administrative scale with a characterisation of perceived influence for example local government area, state government jurisdiction or a nation (Millennium Ecosystem Assessment 2005; Dalmazzone and La Notte 2009).

Metric – a system or procedure for measurement.

Natural capital – the extension of the economic notion of capital (manufactured means of production) to environmental goods and services. Natural capital is thus the stock of natural ecosystems that yields a flow of valuable ecosystem goods or services into the future (Costanza 2008). The term natural capital is often used colloquially to mean 'nature's ability to provide economic and non-economic goods and services'.

Natural resource – natural biological assets that may provide resources for use in economic activity, such as mineral and energy resources, land, soil resources, timber resources, aquatic resources, other biological resources and water resources (Black *et al.* 2009). In Australia, the term natural resources is used to refer to all environmental assets, regardless of their use in economic activities.

Quality – the standard of something as measured against other things of a similar kind; the degree of excellence of something (Oxford Dictionary 2015).

Quantity – amount or measure (Macquarie Dictionary 2005).

Reference benchmark – a measure of the asset's reference condition, which can be a fixed point in time (for example, an estimate of its condition prior to industrial development) (Hughes *et al.* 1998; Norris and Thoms 1999, Wallin *et al.* 2003); observed at reference sites (Reynoldson *et al.* 1997); or a scientifically accredited model that estimates the condition of the biota in the absence of significant post-industrial human alteration (Karr 2006).

Reference condition – a scientific estimate of the condition of an ecosystem in the absence of significant post-industrial human alteration (Stoddard *et al.* 2006).

Scale – measured in physical terms (extent, size, area, span, years, and so on) (Millennium Ecosystem Assessment 2005; Dalmazzone and La Notte 2009).

Standard – something considered by an authority or by general consent as a basis of comparison; an approved model.

State – the current status or condition of an environmental asset.

Stock – the total quantity of the asset accumulated at a point in time (Black *et al.* 2009).

Stock account – quantification of a resource (stock), such as numbers of fish, amount of topsoil, and volume of timber. A stock account quantifies the productivity of an environmental asset and allows the observation of trends (changes over time). The SEEA Central Framework is a standard for producing a stock account.

Surrogate – a representative indicator that provides information on other (or a range) of parameters but is not necessarily a direct measure of the asset.

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

9: Program Logic and Evaluation Questions

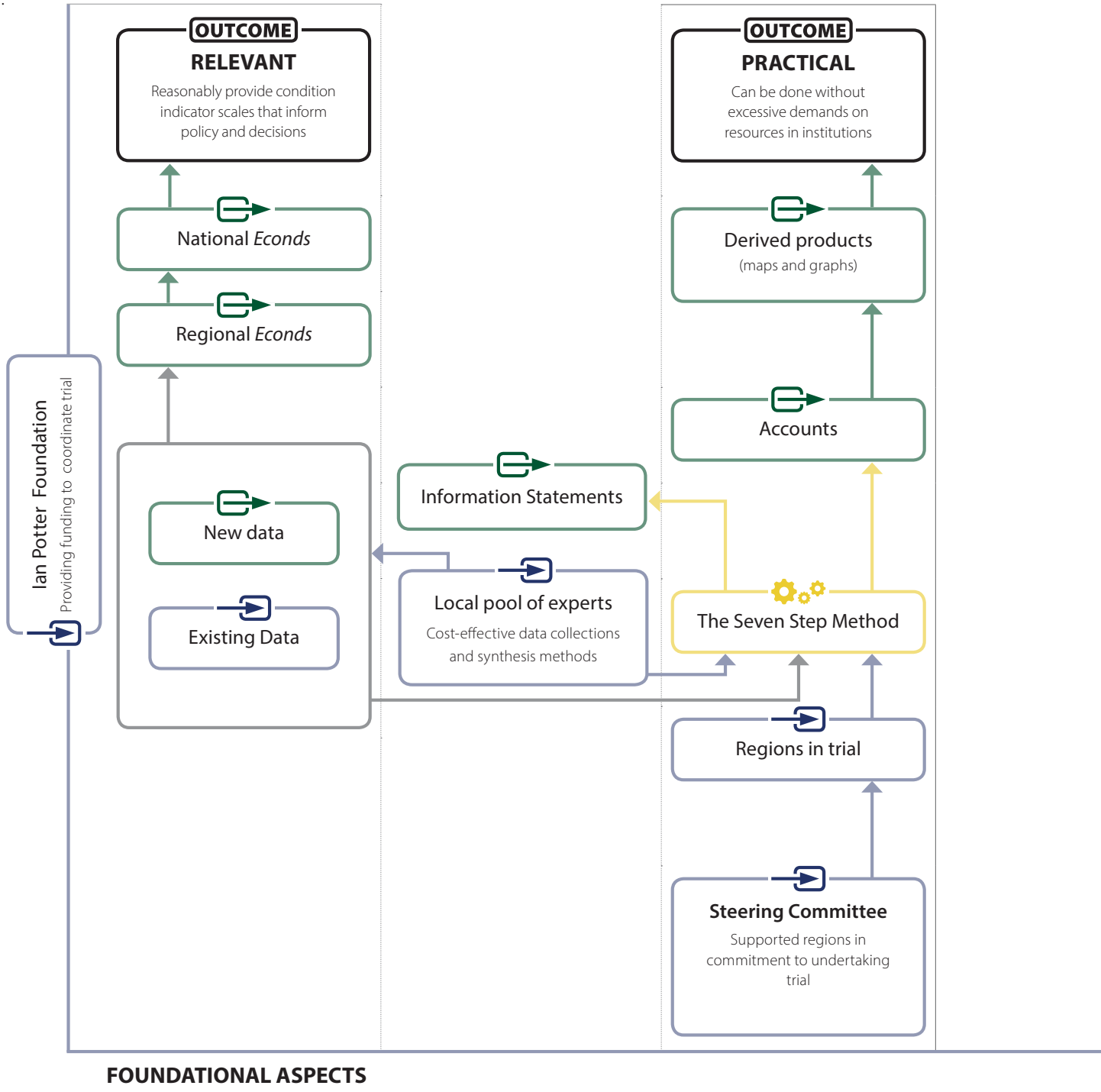
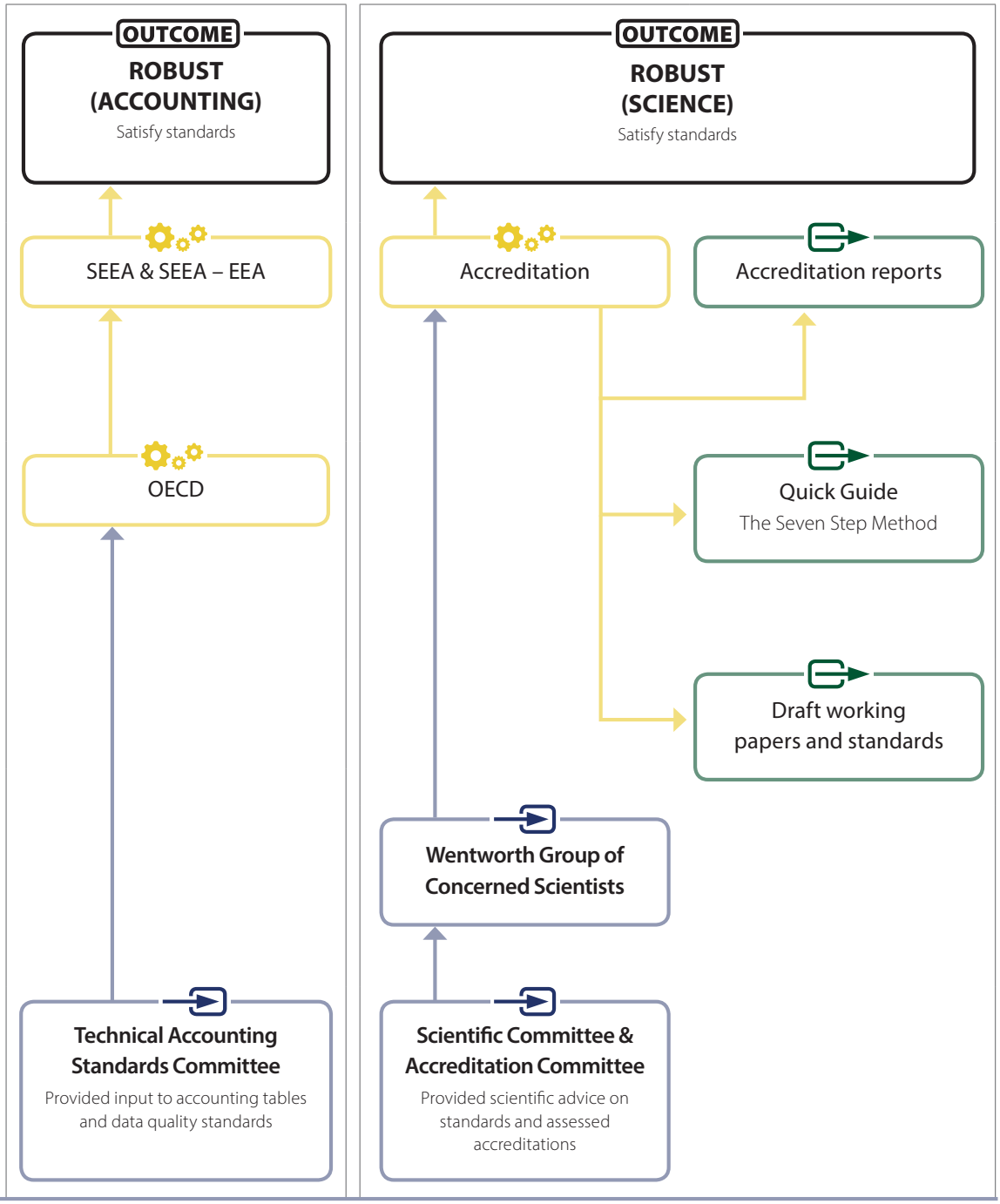


Figure 58: The logic model for the trial. The model underpins the evaluation by highlighting key relationships and guided the development of the evaluation questions (Table 65)



Regional Body Basis

- 54 across Australia

Accounting for Nature Model

- Accounts
- Assets
- Quantity and quality = *Econd*

Table 65: Evaluation questions, environmental accounts trial.

PRIMARY QUESTION	QUESTION SET	SOURCE OF EVIDENCE
Relevant – can it provide reasonable information for informing decision-making processes?	1. Can it be done with assumed 'no funding' and 'existing data'? 2. What can be done now, what can be done with some known level of work and what is unknown or requires more resources? 3. Is it possible to compare *Econds* comprising different indicators? 4. Is it possible to aggregate *Econds* from regional scale to national scale? 5. Does the general framework (Seven Step) make sense? 6. Are measurements scalable? 7. Did environmental accounts at regional scale enable contributions from others (outside of region)?	Answered through accreditation reports regarding issues of indicator comparability and scalability of indices Committee and policy analyst responses on the application of the general framework
Practical – can it be done cost-effectively and without excessive burdens?	8. What would be the appropriate coordination structure? 9. How could a national roll-out be resourced and staffed? 10. What is the timeframe that is practical for repeating asset measures? 11. What are the skill and capability needs? 12. How could the trial inform a national approach? 13. Did institutional arrangements affect application of the *Accounting for Nature* approach? 14. How did the methodology develop? Was it useful? How did it inform the approach? 15. What was revealed from testing the practical and technical implications of constructing a set of accounts where there is great diversity within and across assets?	Answered through committee and policy analyst responses to coordination/capability, accreditation reports, committee responses regarding suitability of existing data or collection of primary data, Policy analyst and committee responses on the utility of framework and processes/ systems
Robust – are the measures credible and how can credibility be demonstrated?	16. How is credibility generated for the measures? 17. What level of assurance is given to the actual (tested) measures? 18. Are different levels of credibility required for different purposes? 19. Are the measures sufficient for decision making purposes? 20. How do derived products support the analysis of credibility?	Answered through derived products (maps and graphs), accreditation reports, and committee responses to processes

These questions form the basis of the Technical Evaluation (Sbrocchi *et al.* in prep) and are listed here for reference purposes.

Table 66: Evaluation questions developed to assess the technical aspects of the trial (related to the Seven Step process and the design principles).

KEY QUESTION	QUESTION SET	SOURCE OF EVIDENCE
1. Does *Accounting for Nature*, as tested in the environmental accounts trial, enable the understanding of change in condition in environmental assets?	1. Was there sufficient information to understand change in condition? 2. How were changes in condition captured? 3. How meaningful are the results provided by application of the method to decision-making?	Regional environmental accounts Accreditation reports
2. How representative (meaningful) are selected environmental assets?	4. What is the relationship between the assets that communities strongly value and ecological significance? Did the assets represent social significance to stakeholders? 5. Did the assets represent environmental significance? 6. How effective was the selection process to linking environment to decision-making? 7. Are the assets in the trial adequate for describing the condition of national assets? 8. Was this change in condition captured for all assets?	Regional environmental accounts Regional information statements Accreditation reports
3. Can indicators that vary between regions be used for environmental accounting?	9. How did indicators vary between regions? 10. Are standards necessary? 11. Were standards already established? 12. Were standards established as part of this trial? 13. How did indicators stack up against the standards?	Regional environmental accounts Accreditation reports
4. How necessary is it for measurements of condition to be based on specified reference condition benchmarks in order to compare the relative condition of assets?	14. To what degree was it possible to construe these specified reference benchmarks? 15. To what degree was it necessary to use this specified reference benchmark to measure condition? 16. To what degree was it necessary to use this specified reference benchmark to compare the relative condition of assets?	Regional environmental accounts Accreditation reports
5. Was existing data sufficient for this purpose?	17. Did the data in its raw form enable this understanding? 18. If not, what transformations of the data had to occur to enable this understanding? 19. What were the data gaps? 20. Where do we need to harmonise data collection? 21. Were some data too difficult to collect in a timely/cost-effective way? 22. What were the pros and cons of primary data collection? Could more data be collected?	Regional environmental accounts Regional information statements Accreditation reports
6. Were the methods used to construct the index sufficient for describing condition?	23. Is the method as described sufficient to apply universally? 24. How did index construction vary between regions and assets? 25. Are processes required to make this process more transparent or effective? 26. Evaluate application of *Econds* at different scales	Regional environmental accounts Regional information statements Accreditation reports
7. Was the validation process sufficient?	27. Were the criteria sufficient to evaluate accounts? 28. Were the processes sufficient to evaluate accounts? 29. Are the descriptions of validation sufficient to communicate credibility to community (scientific and regional)?	Accreditation processes Accreditation reports