



Australian Government  
Department of Agriculture,  
Water and the Environment

# User Needs for the case study on the Gunbower-Koondrook- Perricoota Forest Icon Site

A report from the Land and Ecosystem  
Accounts Project

**Dayani Gunawardana<sup>1</sup>, Susan Goff<sup>2</sup>, Terry Hills<sup>1</sup>**

Department of Agriculture, Water and the Environment<sup>1</sup>, Murray-Darling Basin Authority<sup>2</sup>



Source: DAWE. Gunbower Forest.

© Commonwealth of Australia 2021

### **Ownership of intellectual property rights**

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

### **Creative Commons licence**

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](#) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to [copyright@awe.gov.au](mailto:copyright@awe.gov.au).



### **Cataloguing data**

This publication (and any material sourced from it) should be attributed as:

DAWE 2021, *User Needs for the Case Study on Gunbower Koondrook Perricoota Forest Icon Site – A Report from the Land and Ecosystem Accounts Project*, Department of Agriculture, Water and the Environment, Canberra, August CC BY 4.0.

ISBN 978-1-76003-459-7

Department of Agriculture, Water and the Environment

GPO Box 858 Canberra ACT 2601

Telephone 1800 900 090

Web [awe.gov.au](http://awe.gov.au)

### **Disclaimer**

The Australian Government acting through the Department of Agriculture, Water and the Environment has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, Water and the Environment, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

### **Acknowledgements**

The authors thank the potential users, technical experts and other key stakeholders who participated in the consultations for their input in preparing this report.

# Contents

<b>Contributors .....</b>	<b>iv</b>
<b>1 Purpose of this report.....</b>	<b>1</b>
<b>2 About the Valuing Parks Case Study Project.....</b>	<b>1</b>
<b>3 About the Gunbower-Koondrook-Perricoota Case Study Site .....</b>	<b>2</b>
3.1 The Gunbower Forest.....	3
3.2 The Koondrook-Perricoota Forest.....	4
<b>4 Policy applications.....</b>	<b>5</b>
<b>5 Features of ecosystem accounts of most interest to users .....</b>	<b>7</b>
5.1 Multiple perspectives of value.....	8
5.2 Ecosystem services of interest to users.....	9
<b>6 Target users group and suggested product types.....</b>	<b>10</b>
<b>7 Communication, engagement and risk management.....</b>	<b>11</b>
<b>8 Technical specifications.....</b>	<b>12</b>
<b>Appendix A: List of stakeholders consulted July – December 2019 .....</b>	<b>13</b>
<b>References .....</b>	<b>14</b>

## Tables

Table 1 Policy challenges for the GKP ecosystem accounts study.....	5
Table 2 Technical challenges for the GKP ecosystem account case study.....	6
Table 3 Target user groups and suggested product types for the Gunbower-Koondrook-Perricoota Case Study .....	10

## Figures

Figure 1 4 elements of ecosystem accounting (Based on SEEA 2013) .....	7
Figure 2 Multi-purpose approach to accessing ecosystem condition (Keith et al. 2019)... ..	8

# Contributors

The Valuing Parks Case Study Project (the Project) is part of the Land and Ecosystem Accounts Project (LEAP), progressing under the national strategy for a common national approach to environmental-economic accounting (IJSC 2018), governed by the Environmental-Economic Accounts Board. Leaders of each sub-project are underlined.

Component	Role or sub-project	Contributors
Oversight of all environmental-economic accounts	Environmental-Economic Accounts Board	DAWE: <u>Maya Stuart-Fox (Chair)</u> ABARES: Jared Greenville ABS: John Shepherd Bureau of Meteorology: Robert Argent CSIRO: Libby Pinkard Geoscience Australia: Alison Rose
	Interjurisdictional Steering Committee	DAWE (Chair), and representatives from the Australian Bureau of Statistics and state and territory agencies
	Scientific Advisory Panel	<u>Bruce Thom (Chair)</u> , Peter Harper, Richard Kingsford, Anna Skarbek, Celine Steinfeld
Ecosystem accounts	Management and approvals	CSIRO: Stephen Roxburgh DAWE: Ian Towers
	Project Leaders	CSIRO: Becky Schmidt DAWE: <u>Dayani Gunawardana/Terry Hills</u> Marsden Jacob: Jeremy Cheesman
	Partner and targeted user	MDBA: <u>Neville Crossman</u> , Susan Goff
	Communications and stakeholder engagement	CSIRO: Helen Beringen DAWE: Peter Graham, Melanie Cherian, Lazaro Hernandez MDBA: Susan Goff
	Biodiversity	CSIRO: <u>Karel Mokany</u> , Simon Ferrier, Tom Harwood, Chris Ware
	Carbon input for ecosystem services	DISER: Tim Liersch
	Compilation (including account compilation, monetary valuation and ecosystem services)	GHD: <u>David May</u> , Fiona Coates, Jesse Finkelstein, Coraline Jauniau, Claire McArthur IDEEA Group: <u>Carl Obst</u> , Mark Eigenraam, Reiss Mcleod Marsden Jacob: <u>Jeremy Cheesman</u> , Lachlan Dawson
	Ecology	Aberystwyth University: Richard Lucas CSIRO: <u>Anna Richards</u> , Jodie Hayward, Heather McGuinness, Paul McInerney, Richard Mount, John Pengelly, Suzanne Prober, Ashmita Sengupta, Sally Tetreault-Campbell, Chris Ware, Kristen Williams Plymouth Marine Laboratory: Dan Clewley
	Economics input for biodiversity and ecology sub-projects	CSIRO: <u>Gabriela Scheufele</u> , Sean Pascoe

<b>Component</b>	<b>Role or sub-project</b>	<b>Contributors</b>
	Project administration	DAWE: Crystal Bradley, Melanie Cherian, Alison Cowood, Dayani Gunawardana, Melanie Kaebernick
Land accounts	Project Leaders	ABS: <u>Jonathon Khoo</u> DAWE: Alison Cowood
	Communications and stakeholder engagement	ABS: Kanchan Dutt DAWE: Lazaro Hernandez
	Account compilation	ABS: <u>Jonathon Khoo</u> , Alison Cowood, Peter Meadows
	Land cover	Aberystwyth University: Richard Lucas, Christopher Owers Geoscience Australia: <u>Norman Mueller</u> , Sean Chua, Gabrielle Hunt, Belle Tissott University of New South Wales: Sophia German, Graciella Metternicht
	Land use and tenure	ABARES: <u>Jane Stewart</u> , David Galeano
	Land value	ABS: <u>Jonathon Khoo</u> , Amanda Clark, Peter Meadows



# 1 Purpose of this report

This document summarises the results of a series of consultations with potential users, technical experts and other key stakeholders to inform the implementation of the Gunbower-Koondrook-Perricoota Forest Icon Site Case Study in such a way that optimises the value of the Project to key decision-makers and other target audiences.

## 2 About the Valuing Parks Case Study Project

The Valuing Parks Case Study Project (the Project) is part of the Land and Ecosystem Accounts Project (LEAP), progressing under the national strategy for a common national approach to environmental-economic accounting (IJSC 2018).

The objectives of the Project are to:

- describe the values of the case study sites in accordance with the United Nations (UN) System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA EA) framework (UNCEEA 2021)
- illustrate applicability of ecosystem accounting to support a wide range of decision making
- involve local stakeholder engagement
- generate lessons that can be fed into future ecosystem accounts, including by building and illustrating an operational accounting framework for ecosystems.

The Project delivered a series of ecosystem accounts, covering ecosystem extent and condition, biodiversity, the flow of a set of ecosystem services and the benefits or value (monetary and non-monetary) these services provide. The case study site selected was the Gunbower-Koondrook-Perricoota Forest Icon Site (GKP) (in partnership with the Murray-Darling Basin Authority (MDBA)).

This report is one output of the GKP case study, which was led by the Department of Agriculture, Water and the Environment (DAWE), in partnership with the MDBA; Commonwealth Scientific and Industrial Research Organisation (CSIRO); Department of Industry, Science, Energy and Resources (DISER); GHD; Institute for Development of Environmental-Economic Accounting (IDEEA) Group; and Marsden-Jacob Associates. Other Commonwealth, state and local jurisdictional agencies, private sector entities and academia were involved where relevant.

A key feature of the national strategy is that accounts will be:

- Decision-centred, i.e. providing relevant and timely information for decision-makers
- Demand-led, i.e. providing information demanded or needed by decision-makers at specific levels of decision-making.

With this in mind, from July to November 2019, a series of meetings and workshops were held with potential users, data providers and technical experts (see Appendix A for list of stakeholders) to help the LEAP Team design and deliver a credible and useful set of ecosystem accounts for the Gunbower-Koondrook-Perricoota Forest Icon Site. The consultations aimed to:

- Refine the LEAP Team's understanding of the policy applications of accounts and specific user needs:
  - a) Identify target user groups and other key stakeholders
  - b) Identify ecosystem services of highest priority to users
  - c) Identify specific product types and content required to meet the needs of target user groups.
- Align generic ecosystem accounting methods with systems, data and information needs of the MDBA and other key stakeholders
- Identify data availability and gaps
- Establish relationships with key stakeholders including potential users, data providers and technical experts.

These consultations have informed this report as well as a series of Method Alignment Reports which explain how generic LEAP ecosystem accounting methods will be implemented in the context of the Gunbower-Koondrook-Perricoota Case Study Site.

## 3 About the Gunbower-Koondrook-Perricoota Case Study Site

The Gunbower-Koondrook-Perricoota Forest Icon Site (GKP) is one of 6 icon sites along the Murray River identified as a priority under The Living Murray (TLM) river restoration program. Established in 2002, TLM is a partnership of 6 governments and is coordinated by MDBA. The long-term goal of this program is to achieve a healthy working River Murray system for the benefit of all Australians. Icon sites are chosen for their significant ecological, cultural, recreational, heritage and economic values. Since the Basin Plan came into effect in 2012, TLM has helped deliver the Basin Plan. It is also transitioning to align more effectively with the Plan ([MDBA 2018](#)).

Key policy and planning documents relevant for GKP include:



- The Basin Plan 2012 and the Basin-wide Environmental Watering Strategy (MDBA 2019). The strategy supports environmental water holders, Basin state governments, water managers and river operators to plan and manage environmental watering at a Basin scale and over the long term, to achieve the environmental objectives of the Basin Plan. It is complemented by regional long-term watering plans for each water resource plan area, which have a catchment focus.
- Environmental water management plans for i) [Gunbower \(MDBA 2012a\)](#) and ii) [Koondrook-Perricoota](#) (MDBA 2012b) which establish priorities for the use of environmental water within the Gunbower-Koondrook-Perricoota Forest Icon Site.
- Ecological Character Descriptions (ECD) and Information Sheets for the Gunbower Forest Ramsar Site (Hale and Butcher 2011) and the NSW Central Murray Forests Ramsar Site (Harrington and Hale 2011) which includes the Koondrook-Perricoota Forest). The ECD forms the foundation on which a site management plan and associated monitoring and evaluation activities are based. It also forms the basis for the assessment of actions which are likely to impact on the Ramsar site. The ECD provides details on the interactions between ecological components, processes and functions to give a comprehensive description of ecological character. This information supplements the Ramsar Information Sheet which is prepared at the time of designation.

### 3.1 The Gunbower Forest

Gunbower Forest is located on the mid-Murray floodplain in northern Victoria. Gunbower Forest spans approximately 20,000 ha and is a combination of state forest (8,843 ha), national park (8,892 ha) and River Murray reserve (1,666 ha). Gunbower Forest was officially designated as a Wetland of International Importance under the Ramsar Convention in 1982.

Gunbower State Forest is managed by the Department of Environment, Land and Water Planning, with all remaining land under the management of Parks Victoria. The North Central Catchment Management Authority manages the Gunbower Forest Icon Site and coordinates the delivery of environmental water to Gunbower Forest.

The forest supports a range of vegetation types, including wetlands, river red gum (*Eucalyptus camaldulensis*) communities, black box (*E. largiflorens*) and grey box (*E. microcarpa*) woodland. The health of the forest and the native fauna it supports is closely tied to local hydrology, which has been significantly altered by regulation of the River Murray and water extraction. Floods now occur less frequently and are reduced in duration and magnitude. More frequent flooding of the forest through managed environmental releases and investments in environmental management has the potential to maintain and enhance Gunbower Forest's ecological, cultural, social and economic values ([MDBA 2012a](#)).

The Gunbower Forest Environmental Water Management Plan ([MDBA 2012a](#)) identifies the following overarching objectives:

- For vegetation
  - a) Increase area of healthy permanent and semi-permanent wetlands
  - b) Ensure maintenance of healthy river red gum communities



- c) Maintain black box and grey box communities.
- For waterbirds
  - a) Provide suitable feeding, breeding and refuge habitat for waterbirds, including colonial nesting species.
- For fish
  - a) Maintain healthy populations of native fish in wetlands and increase opportunities for riverine fish to access floodplain resources.
- For frogs
  - a) Increase the diversity and abundance of native frog species within the forest.

## 3.2 The Koondrook-Perricoota Forest

The Koondrook-Perricoota Forest is located opposite Gunbower Forest on the NSW floodplain. The Koondrook–Perricoota Forest covers approximately 30,000 ha and is managed by NSW Forestry Corporation as a state forest. NSW Forestry Corporation manages the Koondrook–Perricoota Icon Site and coordinates the delivery of environmental water to Koondrook–Perricoota Forest. It was officially designated as a Wetland of International Importance under the Ramsar Convention in 2003.

The Koondrook-Perricoota Forest is a large mosaic of river red gum (*Eucalyptus camaldulensis*), black box (*E. largiflorens*) and grey box (*E. microcarpa*) communities, interspersed by wetland ecosystems in southern New South Wales. The forest has a number of environmental, social, cultural and economic values. Its current condition reflects the long-term inadequacy of the primary driver of floodplain forest health—the flood regime ([MDBA 2012b](#)).

The Koondrook-Perricoota Environmental Water Management Plan ([MDBA 2012b](#)) identifies the following overarching objectives:

- Protect and enhance a diverse range of healthy wetlands
- Protect and enhance diverse, healthy vegetation communities
- Provide for successful waterbird breeding and recruitment events
- Protect and enhance viable native fish communities.

## 4 Policy applications

Overall, consultation participants were very supportive of the Project, identifying a range of potential applications for ecosystem accounts. Tables 1 and 2 summarise how ecosystem accounts for the GKP Case Study Site could be applied to address policy challenges and needs identified during consultations with users, technical experts and other stakeholders.

**Table 1 Policy challenges for the GKP ecosystem accounts study**

Policy Challenges	User Need	How the GKP Case Study Could Help	Specific Use Cases	Desired Outcome
<p><b>How can we quantify the optimisation of social, economic and environmental outcomes from Basin Plan implementation?</b></p> <p>Lack of information to inform decisions involving trade-offs between social, economic and environmental outcomes. While environmental watering plans mention trade-offs there is not a framework to operationalise this.</p> <p><b>How is environmental water helping people?</b></p> <p>Lack of social licence, especially with local communities, for environmental watering (and water reform and the MDB Plan more generally) in part due to a lack of understanding of how environmental watering is required to maintain healthy river ecosystems which in turn underpin ecosystem services which provide benefits to the community.</p> <p><b>How can we improve the condition of our ecosystems?</b></p> <p>Continued pressures (e.g. river regulation, drought, climate change, insufficient flows and invasive species) are continuing to negatively impact biodiversity, forest health and ecosystem condition.</p>	<p>Credible and trusted information on the social, economic and environmental benefits of environmental watering (or more broadly water reform and the MDB Plan).</p> <p>Current monitoring and reporting are focused on environmental objectives and outcomes and the social and economic benefits provided by ecosystems dependant on environmental water are not well quantified or communicated.</p>	<p>Use of international statistical guidelines/standards to improve consistency and credibility.</p> <p>Quantify the ecosystem services and social, economic and environmental benefits provided by the GKP to policy development, evaluation and decision making.</p> <p>Examine the relationship between environmental watering, ecosystem condition and delivery of ecosystem services.</p> <p>Quantify the difference (in terms of ecosystem condition, services and benefits) between watered and unwatered sites in the GKP.</p>	<p>Provide information to support more effective policy development, evaluation and decision making including:</p> <ul style="list-style-type: none"> <li>the five yearly evaluation of the MDB Plan (next due 2020)</li> <li>annual State of the Basin Reports</li> <li>Basin-wide Environmental Watering Strategy</li> <li>Environmental Water Management Plans for Gunbower Forest and for Koondrook-Perricoota</li> <li>Triple bottom line reporting of NSW Forestry Corporation</li> <li>Ramsar site reporting.</li> </ul> <p>Provide information (directly and indirectly) to educate and increase understanding of how GKP and environmental watering contributes to the well being of the local community.</p>	<p>Policy and management decisions optimise social, economic and environmental outcomes (link to objectives of the <a href="#">Basin Plan 2012</a> section 5.02c: to optimise social, economic and environmental outcomes arising from the use of Basin water resources in the national interest):</p> <p>The Australian community (especially communities in the MDB) has a better understanding of the environment's contribution (especially the contribution of ecosystems within the MDB that rely on environmental watering) to human wellbeing including the interactions, dependencies and trade-offs between social, economic and environmental outcomes.</p> <p>Improved condition of ecosystem assets and improved sustainability of ecosystem service delivery including timber provisioning.</p>

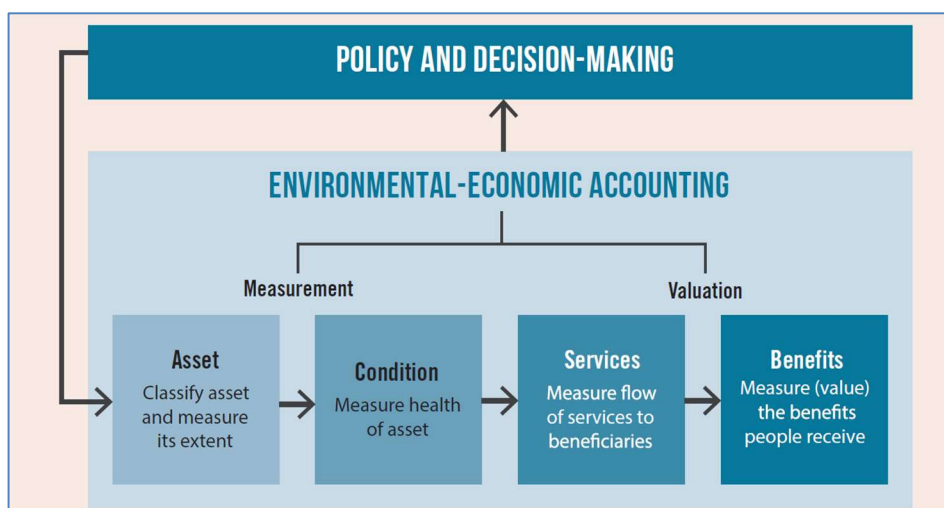
**Table 2 Technical challenges for the GKP ecosystem account case study**

Technical Challenges	User Need	How the GKP Case Study Could Help	Specific Use Cases	Desired outcome
<p><b>How can we provide consistent credible information on the social and economic benefits of the MDB Plan?</b></p> <p><b>In a very noisy system, how can we disentangle the impact of environmental watering from natural variation?</b></p> <p><b>How do we harmonise social, economic and environmental data and information and fill the resulting knowledge gaps?</b></p> <p><b>How do we scale up or replicate information collected at sites to the whole of the MDB so we can manage environmental watering for the whole system rather than at a site level?</b></p> <p><b>Can this be done in a way that can accommodate local diversity in environmental, social and economic conditions?</b></p>	<p>Demonstration of a technically feasible, credible and consistent way to provide information on social and economic benefits.</p> <p>A better understanding of natural variation in the system and credible methods to disentangle the impact of environmental watering from natural variation.</p> <p>Credible methods which integrate environmental with social and economic data and values to inform transition to a balanced and healthy MDB.</p> <p>Credible methods which enable scaling up information from site to Basin scale.</p>	<p>The value of an ecosystem accounting approach is clearly demonstrated.</p> <p>Develop state and transition models which quantify the range of natural variation (by quantifying a dynamic reference state) and thresholds for transitions to alternative or modified states. Use these models to underpin accounts which:</p> <ul style="list-style-type: none"> <li>• Examine the relationship between environmental watering, ecosystem condition and delivery of ecosystem services.</li> <li>• Quantify the difference (in terms of condition, services and benefits) between watered and unwatered sites in the GKP.</li> </ul> <p>Test methods which can be scaled from site to Basin and/or applied consistently (replicated at multiple sites) Basin wide.</p>	<p>Enable leaders within the MDBA to evaluate the usefulness of an ecosystem accounting approach and make informed decisions about further investment in ecosystem accounts for MDB.</p> <p>Evaluate the usefulness of methods with potential for application as part of MDBA's transition to a whole of Basin 'systems approach' including managing for resilience and managing for thresholds.</p>	<p>Adoption of ecosystem accounting approach by MDBA to complement their existing monitoring and reporting systems.</p> <p>Adoption of elements of the ecosystem accounting method to underpin a whole of Basin triple bottom line 'systems approach' within the MDBA.</p>

## 5 Features of ecosystem accounts of most interest to users

The core framework for the Project will be the 4-element ecosystem model, as follows:

**Figure 1 4 elements of ecosystem accounting (Based on SEEA 2013)**



Key elements of the ecosystem model are defined for the Project as follows:

- **Ecosystem asset** – spatial areas comprising a combination of biotic and abiotic components and other elements which function together.
- **Ecosystem services** - the contributions of ecosystems to benefits used in economic and other human activity.
- **Benefits** - goods and services that are ultimately used and enjoyed by people and which contribute to individual and societal wellbeing.

The application of this framework does not require the Project to progress to the monetisation of benefits. The Project will focus on those elements which are most meaningful to decision-making and the policy issue.

The Project will apply the United Nations System of Environmental-Economic Accounting (UN SEEA) framework and standards where relevant including the Experimental Ecosystem Accounting (EEA) Framework. However, where the outputs requested by users and other key stakeholders are not possible under the UN SEEA, departures from the Central Framework and EEA Framework will be considered.

Consultation confirmed the value of all 4 components of the ecosystem accounting method and that a comprehensive approach may assist the MDBA and others to transition to a more 'systems'-based approach to policy development and management. Furthermore, development of quantitative state and transition models (including a dynamic reference state model), based

on the Australian Ecosystem Models Framework approach, has multiple practical uses to MDBA including: categorising disturbance, tracking increased disturbance and threshold conditions or progress of rehabilitation; provision of a systemic modelling approach that can capture layers of disturbance at multiple scales; provision of a non-linear modelling approach linked to water planning, climate and other Basin factors.

## 5.1 Multiple perspectives of value

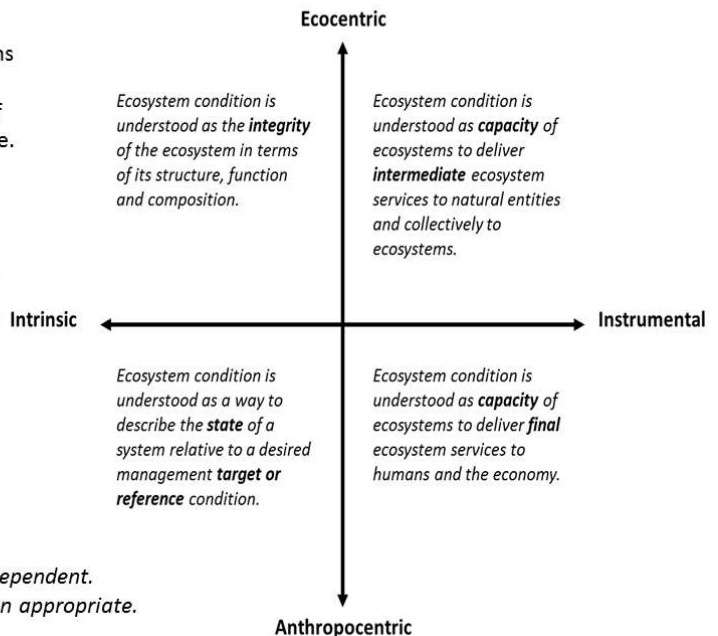
A number of participants noted the need for multiple perspectives of value; that the approach to valuation needs to reflect the diverse value positions of different audiences and that the values and benefits should not be limited to those that can be quantified in dollar terms. Many participants noted that the monetisation of services where possible and appropriate together with the integration of environmental, social, cultural and economic data will be of significant assistance to decision-makers.

The benefits that humans derive from ecosystem services are at the core of the UN System of Environmental Economic Accounting (SEEA) and Experimental Ecosystem Accounting (EEA) frameworks. However, the Project will accommodate the consideration of multiple perspectives of value, as illustrated through Figure 1, which explores multiple perspective on value in the context of ecosystem condition. This approach acknowledges that some decision types require information on change that is not limited to instrumental, anthropogenic values.

**Figure 2 Multi-purpose approach to assessing ecosystem condition (Keith et al. 2019)**

1. **Intrinsic values** where ecosystem condition is understood as the integrity of the ecosystem in terms of its structure, function and composition, and the intactness/degradation of the ecosystem in terms of ecological 'distance' from an initial or reference state.
2. **Instrumental values** where ecosystem condition is understood as the capacity to supply specific ecosystem services, with both use and non-use values, and as such has a more utilitarian approach.
3. **Ecocentric worldview** – interpretation of ecosystem goods and services in terms of all living things in nature.
4. **Anthropocentric worldview** – interpretation of ecosystem goods and services in terms of human values.

*Values and worldviews are not necessarily linear or independent.  
The framework can be collapsed to one dimension when appropriate.*



## 5.2 Ecosystem services of interest to users

Users expressed strong interest in all the ecosystem services proposed by the Project Team during consultations. These were:

- Water supply
- Water purification and quality
- Fishery/nursery services
- Carbon sequestration and storage
- Recreation (tourism and health benefits)
- Biodiversity
- Cultural connection
- Bee keeping (honey production)
- Forestry (timber production)
- Pest control (provided by birds from GKP to local agricultural land) was mentioned by some stakeholders but is not currently included in the list of ecosystem services proposed for the case study.

The ECD for the Gunbower (Hale and Butcher 2011) and Koondrook Perricoota Ramsar sites (Harrington and Hale 2011) also list ecosystem services provided by these sites including: timber, grazing, honey, firewood collection, commercial fishing, recreation and tourism, spiritual and inspirational (Barapa Barapa and Yorta Yorta Nations), science and education, carbon sequestration and flood control. The reports also identify supporting services including: diversity of wetland types (the largest remaining river red gum forest and provision of a mosaic of vegetated wetland habitats), physical habitat (for wetland bird breeding and feeding), threatened species (supporting at least 5 threatened species), ecological connectivity (providing important migratory routes between riverine, wetland and floodplain habitats for fish spawning and recruitment), and organic carbon cycling (as part of a major floodplain system, the site is important for the cycling of nutrients, particularly carbon both on the floodplain and as a source of organic carbon to receiving waterways).

While First Nations Australians groups have not been consulted about this Project to date, these sites no doubt generate many ecosystem services of value to First Nations Australians. As noted in Hale and Butcher (2011), 'Traditionally, Gunbower Island was frequented by 2 clans; the Barapa Barapa and the Yorta Yorta. The Barapa Barapa and Yorta Yorta people have long connections with the area now known as Gunbower National Park. The area was known as Kanbowro – twisting and tortuous like the necks of the black swans. The area contains many shell middens (kitchen hearths), burial sites and scar trees'.

Note that for purposes of the Project:

- ‘Cultural connection’ is considered a cultural ecosystem service.
- Biodiversity is not considered an ecosystem service, but is included as a separate method for ease of consideration.

## 6 Target users group and suggested product types

The table below identifies 6 target user groups for the products of the GKP Case Study, related to the policy applications in Table 1 and 2, and suggests types of products most appropriate for each.

**Table 3 Target user groups and suggested product types for the Gunbower-Koondrook-Perricoota Case Study**

Target Users	Suggested Product Types
General community including communities close to the GKP Forest Icon Site.	<ul style="list-style-type: none"> <li>• 2-4 page summary for general audience</li> <li>• Indirectly by providing reports and briefings to organisations involved with community engagement</li> <li>• Media releases and media interviews.</li> </ul>
Ministers, ministerial advisors and other members of parliament.	<ul style="list-style-type: none"> <li>• 2-4 page summary for general audience</li> <li>• Infographics and summary for decision-makers</li> <li>• Briefings</li> <li>• Indirectly by providing reports and briefings to policy advisors and senior executives with government agencies.</li> </ul>
Policy advisors and senior executives MDBA, Commonwealth Environmental Water Office (CEWO), Catchment Management Authorities (CMA) in Vic, New South Wales Forestry Commission (NSWFC), Victorian and NSW Government agencies.	<ul style="list-style-type: none"> <li>• 2-4 page summary for general audience</li> <li>• Infographics and summary for decision-makers</li> <li>• Presentations and/or briefings</li> <li>• Indirectly by providing reports and briefings to officers from organisations involved in the management of the site.</li> </ul>
Organisations involved in the management of the site including MDBA, CEWO, CMA in Vic, NSW FC, other Victorian and NSW Government agencies.	<ul style="list-style-type: none"> <li>• 2-4 page summary for general audience</li> <li>• Infographics and summary for decision-makers</li> <li>• Presentations and/or briefings</li> <li>• Full technical report(s)</li> <li>• Account tables and underlying data.</li> </ul>
Environmental economic accounts community in Australia and internationally including the Interjurisdiction Steering Committee	<ul style="list-style-type: none"> <li>• 2-4 page summary for general audience</li> <li>• Infographics and summary for decision-makers</li> <li>• Presentations and/or briefings</li> <li>• Full technical report(s)</li> <li>• Account tables and underlying data</li> <li>• Lessons learned report.</li> </ul>
Other users of environmental information e.g. State of the Environment Reporting teams, Geospatial and Information Analytics (GAIA) Branch	<ul style="list-style-type: none"> <li>• Infographics and summary for decision-makers</li> <li>• Full technical report(s)</li> <li>• Account tables and underlying data.</li> </ul>



## 7 Communication, engagement and risk management

While consultation participants were overall very supportive of the Project they did make a number of qualifying comments many related to communication and engagement:

- The MDBA works within a highly charged political environment and it is at a local scale where the products will be most tested. It is very important that the study tells a story that the local community can relate to and the need for adult learning is recognised. Trust with the community is an issue and there is a lot of misinformation on social media and therefore a need for better communication to address this. The local community is highly dependent on irrigated agriculture and highly vulnerable to reduction in water availability.
- The quality of communications will be essential to the success of the project:
  - a) Need to communicate the environmental benefits as well as the social and economic benefits in a way that is meaningful to the community (this may be in dollar terms or in other tangible ways, e.g. benefits related to deeply held values).
  - b) Irrigators understand terms like efficiency and productivity – so may be helpful to report that for  $x$  amount of water we got  $y$  amount of increase in bird/fish/frog numbers, where appropriate the link to agricultural productivity should also highlighted, e.g. which in turn produced  $z$  dollars of agricultural productivity.
  - c) The MDBA, North Central Catchment CMA and others have considerable expertise in communications and their advice should be sought.
- The approach to valuation and communication needs to reflect the diverse value positions of different audiences.
- The level of engagement will need to be quite high to achieve a good result from any work. Local buy-in is needed, with good representation of local people including First Nations Australians at the right level.
- The ongoing drought and fires are likely to make local engagement more challenging particularly during the summer. The best time for local research and engagement activities will be between May and August (during winter irrigation season) 2020. The potential for major impacts on water quality due to extensive bushfires over the summer of 2019-20 is also likely to increase interest in the capacity of systems such as GKP to improve water quality.
- Data availability is likely to be an issue, available data is patchy.
- Time series will need to be considered: short and long term analyses, particularly in reference to climate change.

- Scale will be a problem that needs to be addressed over time by the MDBA with respect to the uptake of an ecosystem accounting approach for the Basin and regional scale water resource planning and reporting.
- The ambition to achieve a systems approach might not always be best served by methods which scale up in a quantitative way where the diversity of ecosystems, social and economic conditions is so great. Quantitative scaling up may be seen as the most credible method but often it is not able to fully accommodate local scale diversity potentially making the results alienable from the local audience and not very useful.
- The benefit of biodiversity to the community remains a challenge to explain.
- While not the focus of this case study, 'Reconciliation Ecology' is of interest to local farming communities and environmental water managers and could be informed by an ecosystem accounting approach.
- Competition for water between environmental uses and irrigation is a key issue in the region and this Project presents an opportunity to bring a better understanding of these two important uses of water. If it is possible to describe the monetary value of environmental water this may assist with analysis and improving understanding of the relative value of these uses.

## 8 Technical specifications

The following technical specifications are proposed:

- Preferred reporting dates and time periods:
  - a) Financial year - the best reporting cycle is the financial year, as it coincides with the MDBA's 'water year' and most MDBA data on environmental watering.
  - b) The preferred reporting periods depend on data availability. The longest trend analysis that is possible is preferred on an annual basis. If it is only possible to report on a limited number of years, then where possible a reporting period before 2012 and post 2012 would be useful as the Murray-Darling Basin Plan commenced in 2012.
- Ecosystem Accounting Unit (EAU) as the Case Study Boundary
  - a) The Gunbower-Koondrook-Perricoota Forest Icon Site boundary will be used as the EAU. The Gunbower site receives much more environmental water than Koondrook-Perricoota site and two sets of account tables will be compiled in a way which enables comparisons between the Gunbower site and the Koondrook-Perricoota site.

# Appendix A: List of stakeholders consulted July – December 2019

<b>Position</b>	<b>Agency</b>
Director, Social and Economic Integration	MDBA
Assistant Director, Social and Economic Integration	MDBA
Senior Research Officer, Social and Economic Integration	MDBA
Senior Analyst, Social and Economic Integration	MDBA
Policy Analyst, Social and Economic Integration	MDBA
Assistant Director, Water Resource Planning	MDBA
Director, Water Markets and Trade	MDBA
Assistant Director	MDBA
Director, Environmental Water and River Management	MDBA
Director, Water Quality and Salinity and River Management	MDBA
Director, Aboriginal Partnerships	MDBA
Director, Environmental Monitoring and Evaluation	MDBA
Director, Science and Evaluation	MDBA
Remote Sensing, Riverine Ecology	MDBA
Senior Policy and Research Officer, River Connectivity, Science and Evaluation	MDBA
Director, Hydrology and Modelling	MDBA
Assistant Director, Environmental Water Coordination	MDBA
Assistant Director, Science and Knowledge	MDBA
Executive Director, Science, Knowledge and Engagement Division	MDBA
Riverine Ecology, Science, Knowledge and Engagement	MDBA
'The Living Murray' Program Manager, Western Branch, Forestry Corporation of NSW	FCNSW
Environmental Water Manager, Gunbower Forest	NCCMA, Vic
Manager, Policy and Planning Direction	NCCMA, Vic
Executive Manager, Major Projects, North Central Catchment Management Authority	NCCMA, Vic
Director, Commonwealth Environmental Water Office	DoEE
Director, Commonwealth Environmental Water Office	DoEE
Assistant Director, Commonwealth Environmental Water Office	DoEE
Assistant Director, Commonwealth Environmental Water Office	DoEE

# References

Hale J and Butcher R (2011) Ecological Character Description for the Gunbower Forest Ramsar Site, Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Harrington B and Hale J (2011) Ecological Character Description for the NSW Central Murray Forests Ramsar site, Report to the Department of Sustainability, Environment, Water, Population and Communities, Canberra.

Keith H, Maes J, Czúcz B, Jackson B, Driver A, Bland L, Nicholson E (2019) [Discussion paper 2.1: Purpose and role of ecosystem condition accounts](#), Paper submitted to the SEEA EEA Technical Committee as input to the revision of the technical recommendations in support of the System on Environmental-Economic Accounting, Final version 36 pp

MDBA (Murray-Darling Basin Authority) (2012a) [Gunbower Environmental Water Management Plan](#), MDBA, Canberra.

— (2012b) [Koondrook-Perricoota Environmental Water Management Plan](#), MDBA, Canberra.

— (2018) [Icon site condition: The Living Murray](#), MDBA, Canberra.

— (2019) Basin-wide environmental watering strategy, MDBA, Canberra.