

Natural Capital Accounting for State of the Environment Reporting in the Australian Capital Territory: A Proof of Concept

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Summary

The Australian Capital Territory (ACT) Office of the Commissioner for Sustainability and the Environment (OCSE) undertook to develop natural capital accounting (NCA) for State of the Environment (SoE) reporting in the ACT. In developing the accounts, the OCSE sought to better link environmental information with policy development and sustainability goals while also maintaining legislated environmental reporting requirements and building local capacity. These accounts, released along with a 'Proof of Concept' paper for expert and public review, represents the first time that an Australian jurisdiction has attempted to include NCA in regular environmental reporting.

Working with local and federal agencies, the OCSE produced environmental-economic accounts across seven environmental themes: land, environmental condition, biodiversity, water, air, solid waste and environmental expenditure. These largely followed SEEA practices and methodologies but also explored novel datasets and experimental designs and methodologies not previously used in environmental economic accounting. The development of the accounts and the Proof of Concept have provided a valuable tool to initiate dialogue with data custodians and potential users including government, business and community decision makers. Importantly, high-level officials have recognised the importance of the accounts in delivering environmental information in a form which can better inform policy development and sustainability goals.

Introduction

Last year, at the 1st Forum on Better Policy Through Natural Capital Accounting, we presented plans to use natural capital accounting for State of the Environment (SoE) reporting in the Australian Capital Territory (ACT) (see Smith et al., 2017a).

This year we are pleased to report that we successfully executed the plans and in September produced a first set accounts along with a "Proof of Concept" paper that are now available for expert and public review (Smith et al., 2017b). The accounts were presented to a variety people, including the ministers responsible for planning and the environment.

In this note we highlight lessons and achievements over the course of the project for development, communication and use of the accounts.

Background

The ACT holds a unique place in the Australian cultural and natural landscape. It is a small landlocked jurisdiction dominated by an extensive system of national reserves juxtaposed against the city of Canberra, which is Australia's national capital (Fig. 1). Local residents place a high value on environmental health and natural capital and the ACT Government has set ambitious policy and sustainability goals to guide future development (ACT Government, 2009; OCSE, 2017b). These goals focus on economically, socially and environmentally sustainable policy outcomes that align well with the United Nations Sustainable Development Goals (SDGs). However, despite significant advancements in some areas, the ACT still faces challenges in meeting some of these sustainability goals.

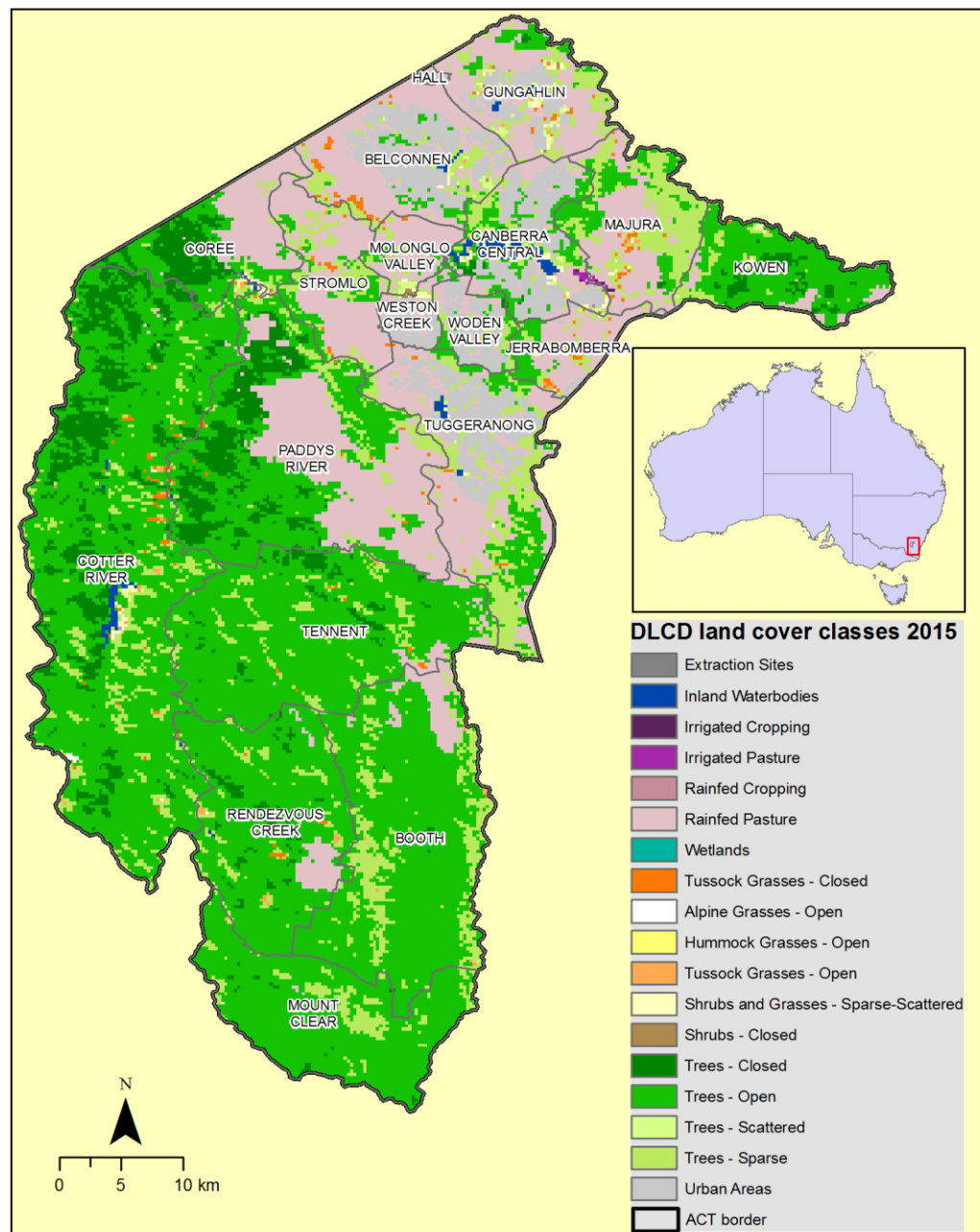


Fig. 1: Australian Capital Territory and dynamic land cover dataset (DLCD) classes for 2015

Canberra is a low density city by national and international standards. It is subject to many related sustainability issues, particularly around transport inefficiencies, waste disposal and energy use (Minister's Annual Report, 2016). The ACT has the highest ecological footprint of all Australian states and territories (ISARG, 2015) and this footprint is much higher than most similar international jurisdictions (Global Footprint Network, 2016). The city of Canberra is also growing rapidly with the population expected to rise from 409,100 to 500,000 by 2030 (ABS, 2013). Much of that growth is expected in greenfields developments with flow-on consequences for the environment, especially for transport and clearing of native vegetation. Furthermore, with world leading greenhouse gas emissions reduction targets (EPSDD, 2014), air emissions are of particular policy relevance to the ACT.

In 2016 the ACT Office of the Commissioner for Sustainability and the Environment (OCSE) undertook an effort to incorporate national carbon accounting (NCA) into its regular environmental reporting. The inception and initial stages of this plan were reported by Smith et al. (2017a) which provides extensive background material explaining the boundaries and motivations of the study, as well as the establishment of working groups, communications and engagement strategies and the rationale for selecting the System of Environmental-Economic Accounts (SEEA). Following this the OCSE undertook a pilot study to produce an initial set of environmental-economic accounts (EEA) for the ACT (from here ACT EEA) (OCSE, 2017a). The OCSE also published the 'Environmental-economic accounts for ACT State of the Environment Reporting: Proof of Concept' (Smith et al., 2017b) ('Proof of Concept') to report on the process and identify benefits and challenges for implementing EEA for the ACT SoE reporting.

Environmental reporting: The State of the Environment Report

The OCSE produces a quadrennial report called the State of the Environment (SoE) report. The next report is due in 2019. The SoE is intended to provide the basis for measureable, transparent and rigorous policy development and facilitate sustainable development outcomes. The content of the SoE report is stipulated by the Commissioner for Sustainability and the Environment Act 1993 (ACT)). Over time concerns have been raised that SoE reporting processes have not always provided the most suitable instrument to inform policy and help the ACT Government achieve sustainability goals.

To address these concerns, the OCSE joined with the Australian National University and the Australian Bureau of Statistics and others as part of a broader discussion in Australia in which we are considering the practical application and incorporation of environmental information in economic and policy decision making (Vardon et al., 2016). To this end, the OCSE undertook to develop a suite of EEA for the ACT to examine the utility of NCA to overcome some of the limitations of the current SoE reporting format while still meeting its legislated reporting requirements.

The SEEA Central Framework was adopted as the NCA format for the ACT accounts, providing the definitions and the structures for the organisation of data. The SEEA was chosen because it supports integration with the national accounts and other economic data as well as comparison of results with other jurisdictions and countries producing accounts and, where applicable, will support integration and analysis across themes.

The broad aims of the project were to:

- develop a suite of EEA for the ACT,
- assess the ability of EEA to meet the OCSE's statutory reporting obligations,
- test the practical issues related to producing the environmental-economic accounts,

- identify and understand required processes necessary for ongoing implementation of NCA accounts,
- provide a suite of accounts that would instigate discussion,
- allow for exploration of how environmental-economic accounts might be used in broader government, business and community decision making,
- assess the advantages and disadvantages of EEA with regard to previous SoE reporting methodologies.

Development of the ACT Environmental-Economic Accounts

Environmental-economic accounts for Canberra and the ACT were produced across seven different themes. These themes were land, environmental condition, biodiversity, water, air, solid waste and environmental expenditure (Table 1).

The accounts were developed through an iterative process. Initial designs were developed by the working group before consultation with relevant government managers and data custodians to explore available data and refine account categories and metrics. Draft accounts were then populated before once more being reviewed and modified appropriately.

In most instances this process resulted in accounts that followed SEEA practices and methodologies. However, novel datasets were available, experimental designs and methodologies not previously explored in EEA were developed. The format of this paper does not provide room to cover the detailed creation of the accounts. However, Table 1 provides a summary of the different themes and each of the accounts created. Nonetheless, given their novel data and account format, below we provide a brief description of the experimental account, Ecosystem Condition.

Environmental Condition Accounts

Three environmental domains were covered in the experimental environmental condition accounts: Terrestrial (land) Condition, Water Condition, and Atmosphere Condition. These accounts were largely experimental, sourcing data that was not previously explored in SEEA but also offering considerable insight into environmental trends not previously examined in this application.

The Terrestrial Condition Account was developed using the experimental Environmental Condition Score (ECS). The ECS was calculated as the average of six indicators developed from tree cover, soil exposure, leaf area, river inflow, inundation and carbon uptake (Fig. 2). The underlying data behind these indicators were created using satellite remote-sensing and landscape modelling and are available through Australia's Environmental Explorer (Van Dijk and Summers, 2017). A comprehensive explanation of the ECS and the data used to calculate it can be found at Australian Environmental Explorer (Van Dijk and Summers, 2017).

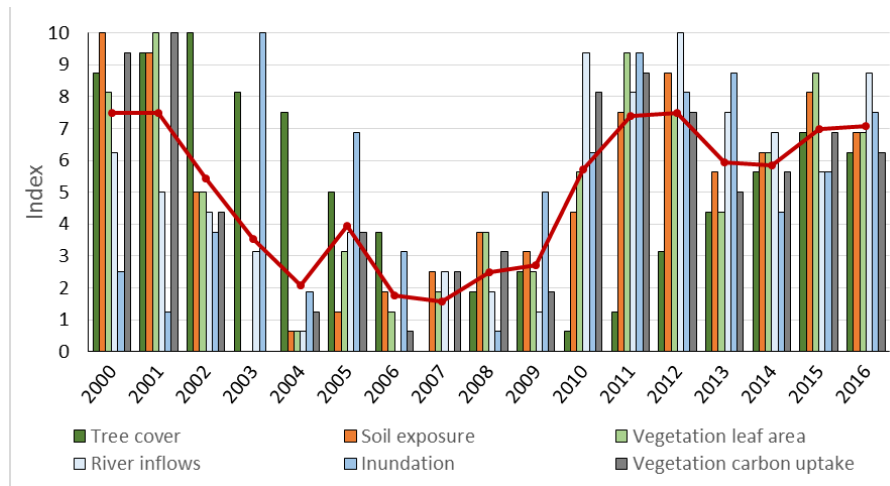


Fig 2: Environmental Condition Score and individual indicators for the Australian Capital Territory, 2000-2016.

Table 1: ACT Environmental-Economic Accounts for State of the Environment reporting accounts summary

Themes	Account	Notes and data sources
Land	Land cover Land use	Geoscience Australia Dynamic land cover dataset (Lymburner et al., 2011) (Fig. 1) ACT Territory Plan land use zoning (ACT Government, 2017)
Environmental condition	Terrestrial condition Water condition Atmospheric condition	Environmental Condition Score (ECS) (Van Dijk and Summers, 2017) Catchment Health Indicator Program (CHIP) developed by the Upper Murrumbidgee Waterwatch Program (Upper Murrumbidgee Waterwatch, 2016) Atmospheric carbon dioxide concentration and National Environment Protection Ambient Air Quality Measure (AAQ NEPM) substances; carbon monoxide (CO), ozone (O ₃), total volatile organic compounds (TVOC) and particulate matter at 10 µm (PM10) and 2.5 µm (PM2.5) (Department of Environment and Energy, 2016)
Biodiversity	Threatened species	ACT Government legislative instruments that outline conservation policy for species and threatened communities
Water	Physical supply and use Water asset	Australian Bureau of Statistics (ABS) Water Account (ABS, 2016) and the Australian Bureau of Meteorology (BoM) National Water Account (BOM, 2016) Australian Bureau of Statistics (ABS) Water Account (ABS, 2016) and the Australian Bureau of Meteorology (BoM) National Water Account (BOM, 2016)
Air emissions	Greenhouse gas emissions Air pollution emissions	A range of greenhouse gases recorded as carbon dioxide equivalents (CO ₂ ^e): carbon dioxide (CO ₂), methane (CH ₄) nitrous oxide (N ₂ O), sulphur hexafluoride (SF ₆) and hydrofluorocarbons. Sourced from ACT Government reports (Pitt and Sherry, 2015) and National greenhouse gas reporting Based on the actual emissions of AAQ NEPM substances including; CO, oxides of nitrogen, total volatile organic compounds (TVOC), PM10 and PM2.5 (Department of Environment and Energy, 2016)
Solid waste	Physical supply and use	Australian Bureau of Statistics (ABS) Water Account (ABS, 2016) and the Australian Bureau of Meteorology (BoM) National Water Account (BOM, 2016)
Environmental expenditure	Environmental expenditure Value of volunteering	Developed to identify and measure the ACT Government activity with regard to environmental protection and natural resource management services. The account is based on the Classification of Environmental Activities (CES) outlined in the SEEA. Estimates of the value of volunteer labour to environmental protection and natural resource management. This extension beyond the SEEA is consistent with general national accounting principles and gives important insights into the ways environmental policy objectives may be advanced

The Water Condition Account was developed using the data from the Catchment Health Indicator Program (CHIP) developed by the Upper Murrumbidgee Waterwatch Program (Upper Murrumbidgee Waterwatch, 2016). The CHIP methodology assesses water quality (pH, electrical conductivity, turbidity, phosphorus, nitrates and dissolved oxygen), macro-invertebrates, and riparian condition through time and at numerous sampling sites across the ACT water catchment areas.

The Atmosphere Condition Account consisted of two separate metrics. The first measured the changing concentration of CO₂ in the atmosphere, while the second measured air quality standards that relate to human health. Specifically National Environment Protection Ambient Air Quality Measure (AAQ NEPM) substances; carbon monoxide (CO), ozone (O₃), total volatile organic compounds (TVOC) and particulate matter at 10 µm (PM10) and 2.5 µm (PM2.5) were used. The metric was based on the number of days that quality standards were exceeded.

Decoupling

A fundamental goal in implementing EEA within the SoE is to better link environmental information with environmental policy development and decision-making. Smith et al. (2017b) identified opportunities for decoupling as a key way to achieve this. Using socio-economic data from the Australian Bureau of Statistics we were able to observe decoupling trajectories across a number of sectors for the Proof of Concept. For example, of particular interest to the ACT Government are waste, energy, water use and greenhouse gas emissions. Fig. 6 shows a dramatic increase in waste to landfill relative to gross state product (GSP) and waste to landfill, while greenhouse gas emissions (CO₂e) from industry and households and government have been relatively stable, and distributed water use has declined slightly over the last three years.

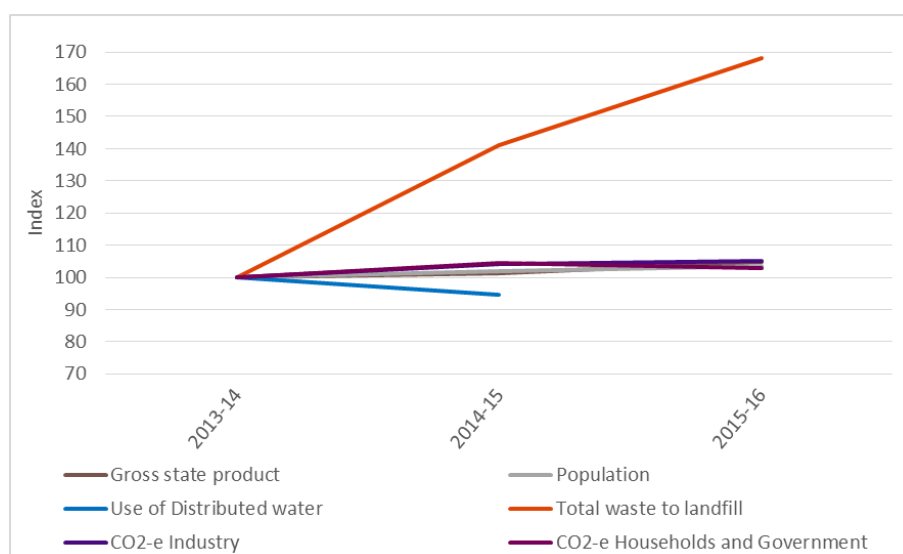


Fig. 6: Select socio-economic and environmental indicators for the ACT from 2013-14 to 2015-16

Achievements and Lessons

This initial set of ACT EEA was developed as a first pass to explore the opportunities and challenges of EEA for the ACT SoE reporting. Identifying achievements and lessons through this process is particularly important in operationalising the accounts within regular environmental reporting.

The successful development of the suite of accounts was an important step in itself.

The accounts were created by a small multi-disciplinary collaboration of government agencies and academics, demonstrating that it is both practical and feasible to build the accounts with available data. Furthermore, the ACT EEA and the Proof of Concept provide examples that can be used to establish and maintain dialogue with potential users of the accounts (government, business and community decision makers) as well as the data custodians who are critical for ongoing data collection and account design.

High-level officials have uniformly recognised the importance of delivering environmental data in a form which invites treasury and potentially Chief Minister interest. Discussions to build these relationships have continued throughout the development of the ACT EEA and prompted a clearer understanding of the benefits of data sharing in this form. A meeting with ACT Chief Financial Officers was productive, and there was wider engagement and briefings about the Proof of Concept, provided to ministers and ministerial advisers. These discussions have generated further interest in how the accounts might be deployed in decision-making and policy contexts. Further briefings have been scheduled.

Through developing the accounts the working group also established constructive relationships with relevant policy and technical stakeholders including field staff, data producers, collators and archivists. The iterative process of creating the accounts built collaborative relationships with these stakeholders who have in turn acquired skills about, and an understanding of, the utility of EEA in improving environmental policy outcomes. It also facilitated dialogue and awareness raising about how data collection can be optimised for future accounting applications. These stakeholders have embraced the prospect of reaching a wider audience and finding greater traction by adopting an accounting methodology.

Case study – Valuing Environmental Volunteering

An important achievement was the incorporation of the value of volunteering in the environmental expenditure account which revealed the importance of this previously unrecognised or quantified contribution. It is clear that environmental volunteering is 'worth' millions of dollars to governments (across the whole country) which increasingly need to service environmental issues (particularly as a result of climate change). The usefulness of this account from a policy point of view is that we know that environmental coordinator positions in Australia – vis Landcare coordinators, Frog and water Watch coordinators – have often been the positions which are lost in times of budgetary constraints. The environmental volunteers account can be used to argue that the paid coordinators' roles must be retained as it is their coordination function which makes the volunteering beneficial.

It is clear that environmental volunteering has even more direct policy implications when we consider the role of organisations such as the 'GreatAussieBirdCount', 'RedMap', 'Friends of the Beware Reef' and 'Waterwatch'. Local and regional volunteers are able to undertake regular surveys and respond quickly to survey windows in ways that are impractical or prohibitively expensive for paid employees. In Gippsland Victoria, for example, Beware Reef volunteers are able to regularly access the reef and carry out fish surveys taking advantage of calm seas when opportunity arises. They then feed the data back to researchers hundreds of kilometres who would otherwise not have been able to collect it.

A key aim for this undertaking was to explore the ability of EEA to help meet the OCSE's statutory reporting obligations for the SoE while also integrating environmental metrics with socio-economic factors. The outcomes of the Proof of Concept are very promising in this regard and ongoing

development is expected to improve strengthen the benefits they bring to SoE. However, it is also clear that not everything provided in previous SoE reporting can be done via accounting. Previous SoE reports contained significant analysis and expert opinion for example which should not be overlooked in the development of the accounts.

Future Directions

While the Proof of Concept has produced an initial set of environmental accounts there is much work to be done before the release of the next SoE. Further research and development is required to extend some of the current accounts and develop new accounts not included in the current release. There is also a need to assess how the data and understanding from previous SoE reports can be integrated into a new framework based on NCA.

To this end, efforts are underway to compare the accounting in the “Proof of Concept” to past reports as well as to improve the accounting already produced and to extend the range of accounts produced. For example, to extent the ecosystem condition accounts to better capture biodiversity and to add monetary and valuation components to the land and water accounts. We also intend to develop an energy account and ecosystem service accounts.

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