



Productivity Commission Inquiry into Data Availability and Use - *Ecosystem Science Council submission*

The Ecosystem Science Council of Australia (ESC) represents the ecosystem science community in Australia. Our community collects, stores, integrates, analyses and distributes data and information on Australia's ecosystems to produce research and data resources that shape data-driven policy, management and investment in the environment and natural resource management. The Council welcomes the opportunity to provide a submission to the Productivity Commission on data availability and use of ecosystem science data and information.

The ESC arose from the ecosystem science community's strategic planning process across 2013-2014, which resulted in *Foundations for the future: a long-term plan for Australian ecosystem science* (attached, and see also www.ecosystemscienceplan.org.au). This strategic plan was formed from extensive national consultation across the research, industry and government sectors that clearly showed the extent to which industry, agriculture, tourism and resource extraction depend on functioning natural and managed ecosystems. Indeed, the importance of functioning ecosystems is recognised directly in three of Australia's Science and Research priorities: food, soil and water, and environmental change.

To implement the plan and provide leadership to enable consistent and balanced oversight for ecosystem science policy, infrastructure provision and funding settings, the Council has five transdisciplinary working groups (see: www.ecosystemscience.org.au/Key-Directions-pg29371.html). These working groups are translating the plan's key directions into operational frameworks. One of these is the Data Resources Working Group.

The priority of the Data Resources Review Working Group is to deliver a review that assesses the existing and future data infrastructure requirements essential to enable the ecosystem science community continue to implement data workflows (collect, store/archive, publish, discover and intelligibly reuse) for all types of data produced from decades of research (key directions 2) and surveillance monitoring (key direction 3). Figure 1 describes the workflow that produces the ecosystem data supply chain necessary to build capacity in research to share data and have effective data provision to inform management and policy.

The Working Group's main responsibilities are to:

- Produce a data infrastructure strategy for realistic investment in state-of-the-art data infrastructure capabilities that provides progressive data governance, the best technologies and attractive incentives that catalyse and evolves data workflows to build extended capacity in ecosystem research, environmental change analysis and to inform future environmental policy and management
- Advocate the recommendations of the review and the data infrastructure strategy for ecosystem research in the long term to appropriate public and private sectors
- Influence private and public sector investment in data governance and infrastructure to build extended capacity for ecosystem research.

The Working Group is responsible for delivering within specified timeframes:

- A community-inspired review of the present and future data infrastructure requirements essential to extend the research capacity of the ecosystem science community.



- A brief and informative synopsis of recommendations needed to inform a national data infrastructure strategy outlining data governance and infrastructure essential to extend capacity to sustain data workflows critical for ecosystem research
- Terms of Reference for a new working group to deliver a national data infrastructure strategy.
- Annual financial reports for 2015/16 and 2016/17
- Annual reports to the Council on activities of the Working Group

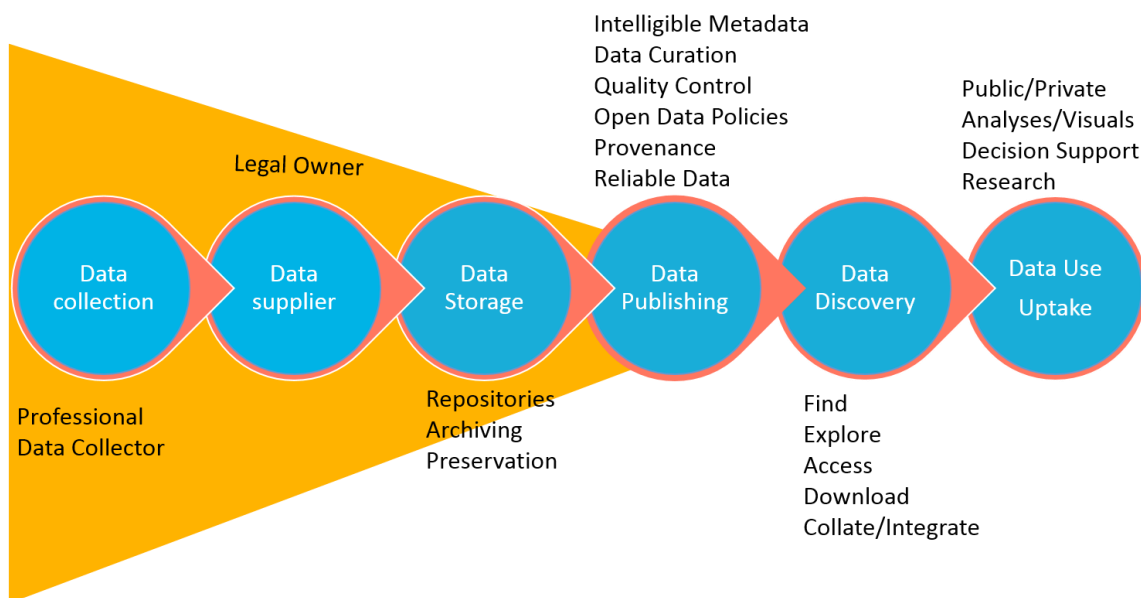


Figure 1. Ecosystem data workflows from data collection to data use and uptake that support a data supply chain for decision making. Key drivers of progress are listed above each stage. The yellow area indicates historical levels of attention in decreasing order of activity before the revolution of open science and open data.

The ecosystem data supply chain involves many actors and interdependencies. It starts with ecosystem scientists using collection infrastructure to capture essential observations on ecosystem phenomena and processes. The supply of data are governed by the data policies of their university, research organisation or employer; commonly referred to as the legal owners of the data. Often, it is stored within suppliers' institutional repositories but where suppliers adopt an open data policy, the data are deposited in open repositories for access via online data portals. The portals enable users to find, explore, understand, access and download data for offline processing. This processing involves subsetting, collation, integration, analyses and visualisations of data to create knowledge for decision making and build greater capacity in ecosystem research.

Considerable and essential attention has been devoted to the hard infrastructure for collection-archive-publish infrastructure in response to investments in small scientific research projects, government biodiversity surveys and the revolution of open data. However, less attention (but



equally important) has been given to intelligible reuse of data in terms of data governance, data curation, data transparency and data analytics/visualisations – all of which would increase use and reuse. More concerning, the data generators (and corporate suppliers) who are the experts in ecosystem science data and its contextual information are often forgotten after authoring and depositing data despite having world class expertise that can aid intelligible reuse. Much highly-valued data is not being used because of poor data transparency of metadata in online portals. Although it is a responsibility of data generators to publish high quality data descriptors with the data, it is critical infrastructure technologists build systems which make the metadata more transparent and easy to understand for effective re-use or to inform decision making.

The Data Resources Working Group is currently undertaking a national review of ecosystem science data infrastructure and services to assess fitness-for-purpose to extend and build greater capacity in ecosystem research. We plan to complete the review this financial year. We do welcome an opportunity to present the recommendations of the review to the Productivity Commission's data availability review team when completed.

I look forward to providing a copy of the review in the coming months.

Yours faithfully,

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Chair, Ecosystem Science Council

WEB: www.ecosystemscienceplan.org.au