Submission 053
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ABS SUBMISSION - INQUIRY INTO AUSTRALIA'S BIODIVERSITY IN A CHANGING CLIMATE

HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON CLIMATE CHANGE, ENVIRONMENT AND THE ARTS

The Australian Bureau of Statistics (ABS) appreciates the opportunity to contribute to this new inquiry into Australia's biodiversity in a changing climate. This document forms the ABS submission to the inquiry.

The ABS is capable of contributing to information needs related to managing Australia's biodiversity in a period of changing climate. In particular, the decision-maker's imperative that information be spatially explicit; comparable across multiple time periods; and linked to relevant socio-economic data. Among the stated Terms of Reference to the inquiry, the following are especially relevant to the charter and capacity of the ABS:

- *How climate change impacts may flow on to affect human communities and the economy.*
- *Strategies to enhance climate change adaptation, including promoting resilience in ecosystems and human communities.*
- *Mechanisms to promote the sustainable use of natural resources and ecosystem services in a changing climate.*

It is a well-known axiom of information systems that phenomena that remain unmeasured cannot be fully understood and therefore cannot be reliably predicted. If we cannot predict change, then our capacity to manage this change is constrained largely to the application of reactive measures[1]. These observations are especially relevant to the management of biodiversity in Australia, where various impacts of climate change are expected to pose significant challenges. [2]

The ABS is established in legislation[3] as the central statistical authority for the Australian government, and by arrangement with the State and Territory governments. In this role the ABS collects, compiles, analyses and disseminates statistics and related information, including statistics related to environmental issues. The role also requires the ABS to ensure statistical coordination across Government to avoid duplication while maximising the utility, compatibility and integration of statistics compiled by official bodies. To undertake this coordination the ABS is required to formulate and ensure compliance with statistical standards and conceptual frameworks.

The ABS brings extensive experience in measurement of economic, social and environmental matters. In particular, to the development of integrated information systems so that, for example, data on environmental performance can be linked to the various socio-economic factors that affect ecosystems, and which are themselves impacted by changes in biodiversity. The ABS is also at the forefront of international developments to establish agreements on integrated information systems linking ecosystem health to socio-economic factors.

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[1] Coughlan, M., and Vertessy, R., Australian Government Bureau of Meteorology, 2008

[2] Action 6.2.2 of Australia's Biodiversity Conservation Strategy 2010–2020, even called for the inclusion of biodiversity and ecosystem services into national accounts. In the absence of better price discovery this work is best undertaken through the integration of physical and socio-economic data.

[3] Australian Bureau of Statistics Act 1975

The Environmental Information System

It is widely recognised that the information used to support policy development and decision-making in relation to Australia's environment is inadequate. The Commonwealth State of the Environment Report 2006 reported that:

> *"The current environmental data reporting system has a plethora of players with little or no incentives for agencies and organisations to collaborate in the collection, management and sharing of specific data. The 2006 Australian State of the Environment Committee advised two Ministerial Council Standing Committees in September 2005 of the lack of access to environmental data that was hindering their attempts to report on the state of Australia's environment. The committees found that for many environmental domains, data are still patchy or only available at either local or regional scales. The standing committees, comprising the chief executives of environment and heritage agencies, agreed that the system for environmental reporting did need to be improved."*

Since then, others such as the Hawke Review of the Environment Protection and Biodiversity Conservation Act 1999, the ANAO and the Wentworth Group[4] have also noted fundamental problems with the current environmental data system.

Because Australia faces numerous environmental issues across a range of domains, there are many individuals and organisations collecting environmental information, often with a particular scientific, regulatory or administrative purpose in mind. This results in highly fragmented sets of data which suffer from a range of problems including:

- inconsistent definitions and standards;
- independence from any framework facilitating data linkage and interconnectivity;
- inconsistent frequency and timing of produced data;
- poor spatial representation;
- low levels of visibility, discoverability and accessibility;
- lack of time series and therefore lack of stability over time; and
- poor capacity to support modelling and forecasting.

Accordingly, there is significant frustration when trying to articulate the state of the environment, or in trying to address particular environmental issues spanning jurisdictions and regions. It also becomes extremely difficult to understand, model or forecast the impact of a policy intervention collectively across the environment, economy and society.

In order to address our environmental concerns it is essential to have relevant, comprehensive, high quality information. Information about the state of the environment, including changes to the state, is a vital component. The state of the environment relates to the bio-physical attributes of environmental domains and is essentially scientific in nature.

[4] The Wentworth Group of Concerned Scientists is an independent group of Australian scientists concerned with advancing solutions to secure the long term health of Australia's land, water and biodiversity

The need to integrate information on ecosystems and the socio-economic domain

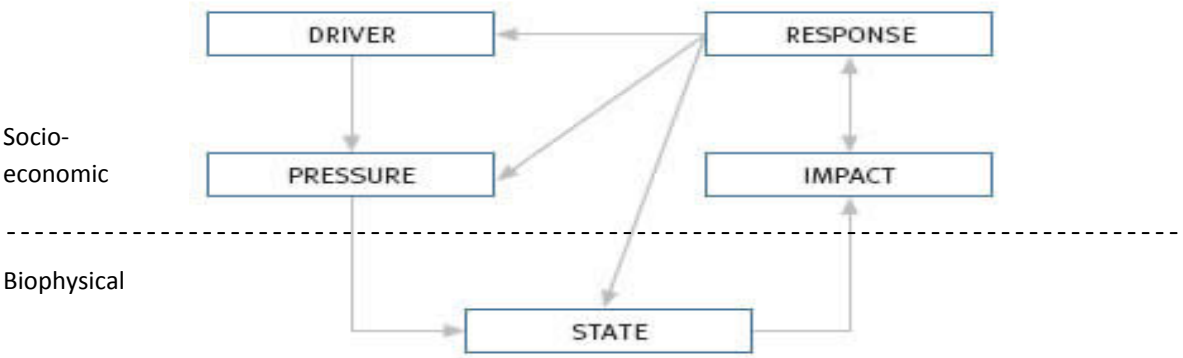
In Australia, the quality and extent of bio-physical information on environmental issues varies greatly. Comprehensive and good quality information exists for some aspects, such as temperature and rainfall. However, in other areas, particularly those relating to ecosystems, the scientific information base is patchy, lacks cohesion and 'national' data sets are typically unavailable. As a result, the Australian Government has identified a high priority need for additional investments in bio-physical information, and has commissioned its Bureau of Meteorology (BoM) to develop a National Plan for Environmental Information (NPEI) as an initial step towards improved monitoring of the state of Australia's land, ocean, air and water resources.

Although responsibilities for managing natural resources and protecting the environment are institutionally separated from the economy, in reality these domains do not exist in isolation. Fundamental socio-economic forces drive human activities, which leads to pressures on the state of the environment. Conversely, the state of the environment impacts on human well-being, and responses to manage the state of the environment have socio-economic consequences.

Therefore, a comprehensive analysis of environmental issues, and their policy responses, must be informed by socio-economic information about drivers, pressures, impacts and responses. This information should also be integrated with the associated bio-physical information so that relationships and linkages can be properly understood.

A comprehensive national environmental information system should therefore be built on two pillars—first, the essential bio-physical information pertaining to the state of the environment, and second, the complementary socio-economic information on drivers, pressures, impacts and responses. The pillars should be 'integrated' to ensure that the bio-physical and socio-economic dimensions of environmental issues can be considered concurrently in policy formulation and other decision making. Integration is achieved by the use of common definitions, concepts, classifications and frameworks. The information in each pillar should be organised so that, for the environmental domain of interest, users could seamlessly move from the bio-physical aspects to the socio-economic aspects and vice versa.

Figure 1: The DPSIR framework



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The System of Environmental and Economic Accounting

The conceptual model adopted by the ABS and the international statistical community for environmental-economic accounts is the United Nations' System of Environmental and Economic Accounting (SEEA). Accounts produced under the SEEA bring environmental and economic information together within a common framework. This allows for consistent analysis of the contribution of the environment to the economy, the impact of the economy on the environment, and the efficiency of the use of environmental resources within the economy. The central framework of the SEEA is scheduled for elevation to an international statistical standard in 2012. In 2013, the second volume of the SEEA—dedicated to ecosystem accounting—will be endorsed by the United Nations' Statistical Commission.

The work on the SEEA volume dedicated to ecosystem accounting is now in progress and the ABS is heavily involved in international forums leading this work. The ABS is therefore contributing to the development of practical standards for understanding and measuring ecosystem accounts. It is clear that among the statistical agencies and research bodies involved, there is now a degree of convergence in the concepts and the approaches taken.

For example, it is recognised that spatially referenced environment and economic data are essential for ecosystem accounting. Defining the units and areas of spatial reference for these units is a key issue and the notion of socio-ecological landscape units (SELU) is emerging as the preferred building block. The governance, peer review and operationalization of this work are well established and are managed by the United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA).

ABS Land Accounts

Land accounting measures the changes taking place on land (and its attributes e.g. land cover, land use, and potentially biodiversity) resulting from the impact of human and natural activity. Land accounts can consistently measure these attributes by examining stocks at different points in time to support policy around sustainable development and environmental management.

Land accounts are currently being developed by the ABS. They have the capacity to integrate information already held by different levels of government to:

- enable the relationships between the land (cover, use, biodiversity etc.) and the economy to be identified, analysed and understood;
- present data using a framework that is consistent with broader economic data, such as the System of National Accounts (SNA);
- examine the effectiveness or efficiency of private and public environmental protection and natural resource management expenditures;
- support more targeted policy development by showing how land is used by different parts of the economy and how different economic activities may deplete or degrade the productive capacity of land;
- show how land use and land cover affects the availability of water;

- provide a system into which monetary valuations of land assets and environment related flows can be incorporated with physical data, to assess the monetary implications of environmental actions;
- identify critical gaps and deficiencies in land data; and
- identify which industries currently own or manage land that has significant carbon storage and / or exchange.

A Land account is a powerful decision-making tool that can be used for planning by industry, government and the community. It can be used to inform debate on a wide range of issues as shown in the following examples:

Example 1

With Australia's population projected to be between 31 and 43 million people by 2056 *(Population Projections, Australia 2006 to 2101, cat. No. 3222.0)* and further impacts from climate change forecasted, land use changes such as the loss of agricultural land to urban growth or the clearance of native forests for agriculture will become a key policy and planning issue for some locations. Land accounts would provide information for policy makers to make informed decisions about the economic and environmental impact of the location of new suburbs, towns and cities.

Example 2

Land accounts will present the ownership of land (in both dollars and hectares) broken down by industry and region and importantly, track changes over time. This information would allow for comparison between different regions across time to understand the impacts and effectiveness of government policies and investments as well as assessing the impact these have on environmental trends.

Example 3

Responding quickly and effectively to natural disasters is an important role of government especially as these may become more frequent with the potential impact of climate change. Information from a Land account will show a wealth of information for small regional levels by integrating ABS data with information from other government agencies. From one source, information will be available on social (e.g. household composition and demographics, disabilities, income), economic (e.g. industry of businesses, land use, land value, number of people employed, agricultural output, business income) and environmental concerns (e.g. land cover, forest and vegetation cover).

Land Management Practices in the Great Barrier Reef Catchments, 2008-09

http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/806905D2C1CCC77ECA25770D0016CF60?OpenDocument

This study provides an insight on how to combine spatial information with economic information (land use, land management practices etc.). Information of this nature provides valuable input into

what is driving change to our ecosystems; as well as the likely implications of proposals to improve ecosystem health.

The following component of this work is relevant to climate change adaption–it was used by Queensland emergency services during recent extreme weather events in North Queensland to anticipate the impact of an expected water surge across the Cairns coastal region. It could equally provide a map of anticipated sea level rises.

http://www.abs.gov.au/AUSSTATS/abs@.nsf/productsbyCatalogue/E3B69DD549BA80A8CA2578420010FC34?OpenDocument

ABS Water Accounts and climate change

Water accounts make an important contribution to our understanding of impacts of climate change through their ability to facilitate comparisons of the effects of changing water use patterns across time, across industries, across sectors and across regions. For example, if Australia's biodiversity is threatened by insufficient water flow through its major rivers, it is important to understand where human water use is focussed and to therefore understand where reductions in human water use could occur. This understanding is all the more important in a future likely characterised by increases in temperature and atmospheric carbon dioxide, decreases in rainfall over much of temperate Australia, and increased frequency of extreme weather events such as droughts, fires and flooding[5]. Any impacts are likely to be complex, both physically and socio-economically, and will vary greatly across ecosystems and across production activities.

For example, while all industries require water to a greater or lesser degree, for agriculture the availability of water is a key determinant of the output and value added of this industry. In a period of climate change, pressures are likely to be felt on both ecosystems and industry and the solutions to these respective pressures may be in conflict. Integrated information systems such as the ABS Water account provide a much clearer picture for policymakers.

Water and the Murray-Darling Basin – A Statistical Profile

This study is essentially a Water account which focuses on the Murray-Darling Basin (MDB). It provides a detailed picture of the major users and uses of water, as well as analysis of the relationships between rainfall, water storage and water use in the MDB.

http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/6E43CB17E51B6681CA2574A500154A05?OpenDocument

The MDB has been described as vulnerable to adverse effects of climate change[6]. The ABS report describes the reliance Australia places on this region for food production and therefore highlights the impact of, say, a choice made by the Australian community to maintain or increase flows through the rivers of the MDB.

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[5] Australian Government, Department of Climate Change, *Climate Change Impacts and Adaptation*

[6] http://www.mdbc.gov.au/nrm/risks_to_shared_water_resources#Climate_Change

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Key Messages

1. **The active management of Australia's biodiversity in a period of changing climate requires appropriate information on ecosystems. Without good information it is impossible to predict change to ecosystems and our management of biodiversity therefore becomes a series of reactions to events.**

2. **Managing biodiversity in a changing climate requires a commitment to a lengthy time series of comparable data.**

3. **Australian ecosystems are experiencing a range of pressures which threaten biodiversity. These pressures are largely human-driven i.e. socio-economic in character. A successful response to ecosystem pressures must therefore reflect an understanding of what these socio-economic factors are. E.g. If river flows are currently inadequate for river ecosystem health, who and what must change to improve these flows?**

4. **The UN is currently leading a key international initiative to standardise ecosystem reporting. The emerging unit of measurement is socio-ecological and therefore land accounts are emerging as a critical tool in the management of ecosystems.**

5. **The ABS is a key player in contemporary international developments aimed at understanding and measuring ecosystems. The ABS has extensive practical experience in measurement and integration of a range of environmental and socio-economic phenomena.**

The ABS would welcome the opportunity to further discuss this submission with committee members.