

A National Environmental Prediction System for Australia

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(and David Lemon, Paul Box, Nick Car)

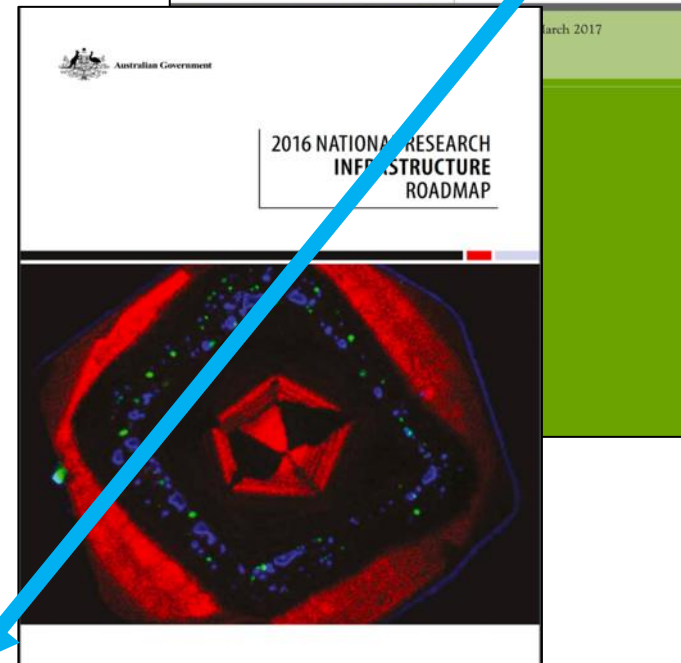
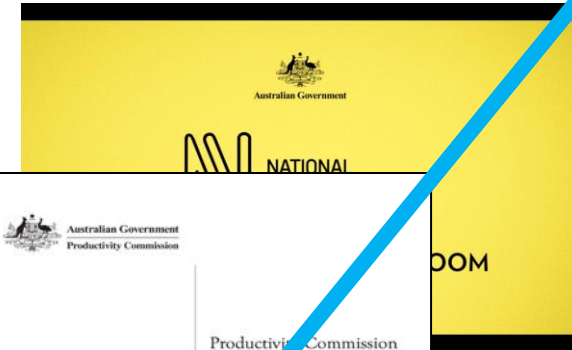
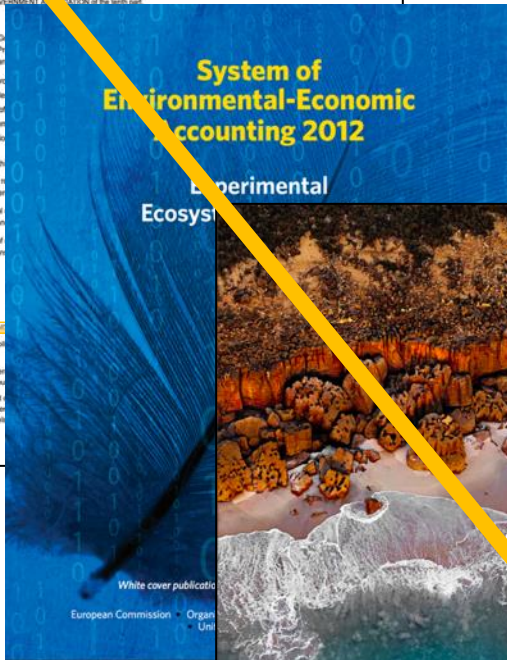
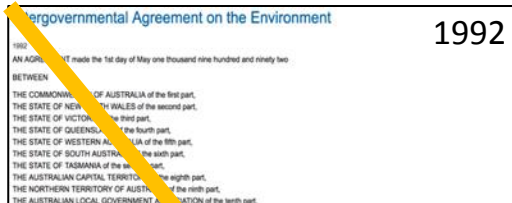
*Enhance capability for new infrastructure integrated with eResearch to
enable existing and new data with new technologies and modelling to
build an Environmental Prediction System for Australia*

2016 National Research Infrastructure Roadmap

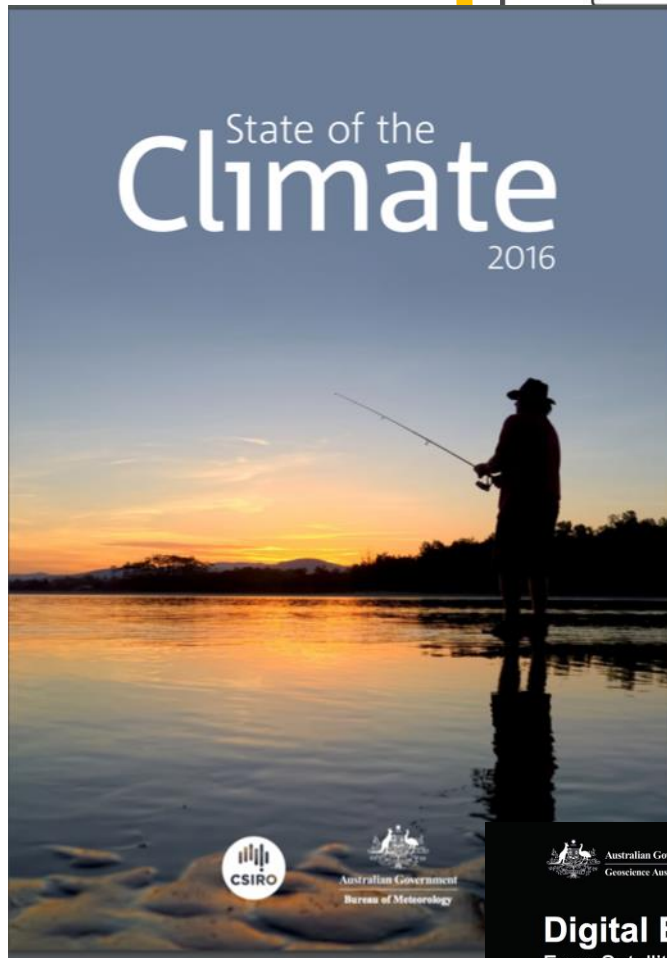
CONTEXT is IMPORTANT:

Timing, capability and circumstances are now right for...

TRANSFORMATIONAL ENVIRONMENTAL INFORMATION INFRASTRUCTURE & SUPPLY CHAINS IN AUSTRALIA



Operational prediction infrastructure



POPULATION PROJECTIONS FACT SHEET

POPULATION PROJECTIONS?

Population projections illustrate how the Australian population would change in the future if specific assumptions about births, deaths and migration were to occur. These potential scenarios are based on current trends according to recent and long-term demographic trends. As we do not know what the future will bring, different assumptions are used to illustrate a range of possible outcomes. The characteristics such as population level, growth, distribution and composition.

POPULATION PROJECTIONS USED FOR?

Population projections are used by governments, policymakers, planners, the private sector and the community. They are commonly used to estimate future demand for products, services and infrastructure. For example, a high growth area with a young population may require more schools and hospitals. Currently, population projections are important for estimating the future Australian population.

DIFFERENCE BETWEEN A PROJECTION AND A FORECAST?

Population projections do not predict or forecast how the population of Australia will change. They are based on non-demographic factors which influence population change, such as changes in health treatment or the occurrence of natural disasters. Projections illustrate what might happen, so projections illustrate possibilities.

HOW DOES THE ABS USE TO PRODUCE POPULATION PROJECTIONS?

The method that involves making assumptions about future levels of fertility, migration and mortality. These are applied to a starting (or base) population (in June 2012), split by sex and single year of age, to obtain a projected population. These are then applied to this new (projected) population to obtain a projected population to the end of the projection period.

WHAT IS COVERED?

Population projections for Australia as at 30 June 2012 is used as the base for the projection series. The series extend to 30 June 2101 for Australia, and 30 June 2101 to 30 June 2101 for the rest of state/territory regions.

WHAT FACTORS OF POPULATION CHANGE ARE CONSIDERED IN ABS POPULATION PROJECTIONS?

Population growth and demographic information is taken into account in the creation of population projections.

POPULATION PROJECTIONS, AUSTRALIA 2012 (BASE) TO 2101 - 3222.0



Australian Government
Geoscience Australia



Digital Earth
AUSTRALIA

Digital Earth Australia (DEA):
From Satellites to Services



Australian Government
Bureau of Meteorology

Seasonal Streamflow Forecasts

Each month, the Bureau forecasts likely streamflow volumes for the next three months for more than 140 locations across Australia. These forecasts inform decisions made by those who use rivers and water storages—in particular, managers of water supplies for towns, irrigation and the environment.

How does the seasonal streamflow forecast service work?

The service applies a statistical approach, using the relationship between climate indicators, past catchment conditions and historical rainfall and streamflow at a location to forecast its total streamflow volume for the following three-month period. Forecasts are provided as the likelihood of high, near-median or low streamflows (also known as tercile forecasts).

Information on forecast accuracy is provided with each forecast. This includes the typical forecast quality for that particular time of year, comparing past forecast volumes with actual observed volumes.

The forecasts are issued early in each month at locations with economic, environmental and social significance. These are generally key water management locations and water control infrastructure including water storages.

What are the benefits?

Together with other information and planning tools, seasonal streamflow forecasts can influence important decisions such as:

- Water allocations
- Cropping strategies
- Water market planning

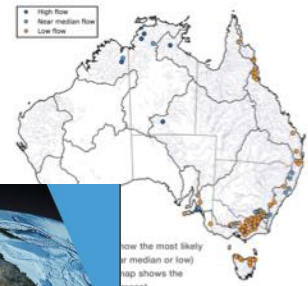
Who can use it?

The seasonal streamflow forecasts are available to everyone via the Bureau's web page. Organisations responsible for managing water, such as storage and river operators, can use forecasts to assist decision-making and scenario planning for the months ahead. Irrigators, farmers and local government can use it to plan water use into the future. Recreational users may also consult forecasts when planning activities.

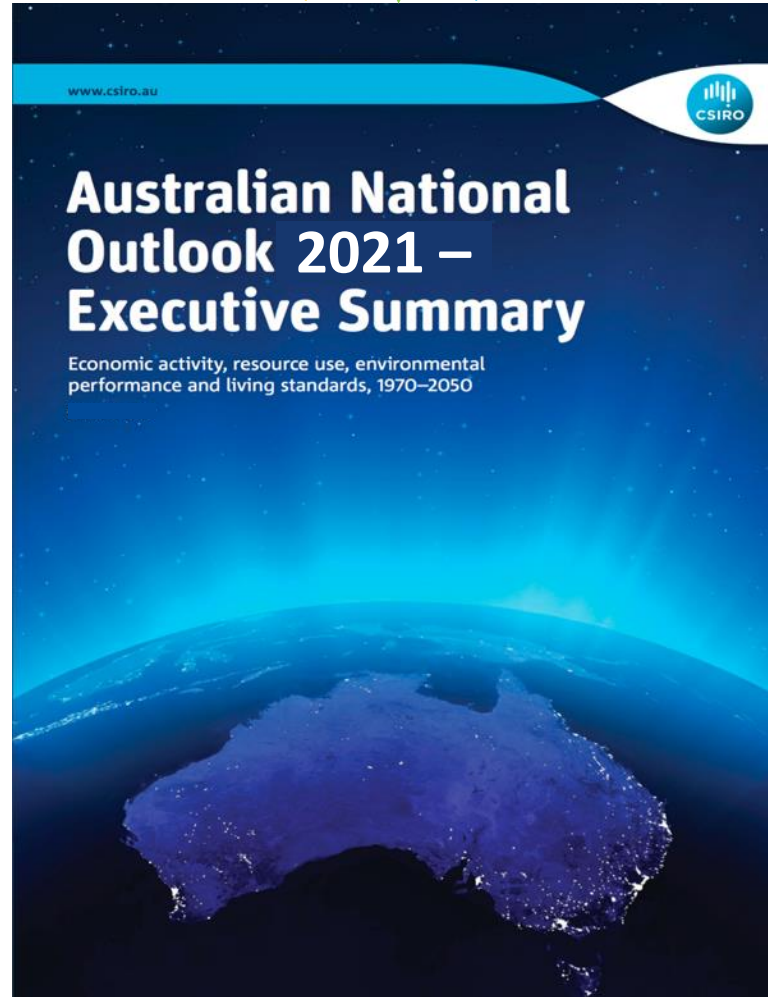
What is the Bureau's role?

The Bureau's Improving Water Information Programme is building a comprehensive and reliable picture of Australia's water resources to support policy and planning. It collates and manages water information as part of its responsibilities under the Water Act 2007.

- High flow
- Near median flow
- Low flow



potential prediction system outcome



Integrated understanding of environmental, economic and societal response to plausible futures

We have many of the working parts...



INVESTMENT CASE – August 2017

- In August 2017, information templates developed for each of the 36 elements identified in the Roadmap
- NEPS template prepared by Steve Morton (independent), David Lemon and Paul Box (CSIRO)
- Extensive consultation undertaken in short time

Growing a National Environmental Prediction System (capability)

Vision

- **Networked infrastructure** allowing integration of environmental observations with predictive modelling for evidence-based advice to boost our economy through improved environmental risk management
- **Viewing environmental outcomes through the windscreen**, not the rear-view mirror

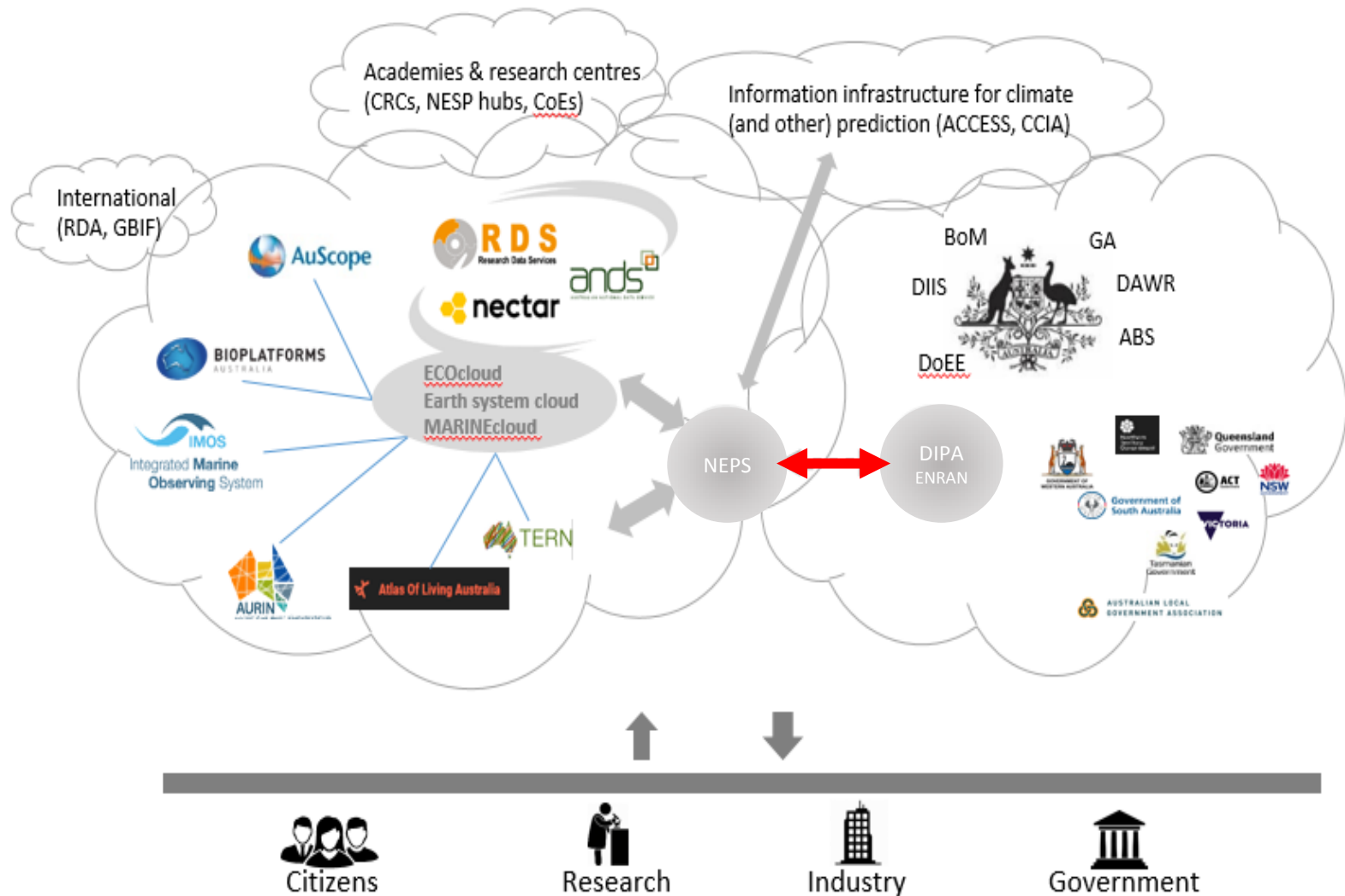
Drivers

- **Accelerating requirements** from decision-makers for predictive advice on environmental risks
- **Growing maturity** of existing infrastructure for environmental assessment
- **Rapid technical advances** in sensors and in data integration, and in research capacity for predictive synthesis

PRINCIPLES

- **ADOPT–ADAPT–(INVENT)**: Construct the NEPS through networking of existing infrastructure, where possible
- **ENHANCE–ACCELERATE**: Invest in the strengthening of existing NCRIS infrastructure elements to enhance their accelerating abilities in inter-operability
- **USER–CENTRED**: Grow the NEPS by prioritising early developments in innovative, valued information products for users
- **COLLABORATIVE**: Prepare for medium-term integration with relevant environmental information systems outside NCRIS, such as ACCESS and Data Integration Partnerships for Australia
- **INTEGRATED**: Plan for inter-operability with economic and social system models

Where does NEPS fit?



IMPLICATIONS

The NEPS will be a **nodal Facility** with small staffing and one which exists mostly in its network

The Facility will be responsible in the short-term for:

- a) designing the NEPS in proactive collaboration
- b) engaging collaborators to enhance inter-operability
- c) helping to fund new components where inter-connections promise the greatest value-addition
- d) ensuring that both technical and institutional aspects of inter-operability are incorporated into planning

In the medium to long-term, the Facility will be responsible for:

- a) leading effective intersection with:
 - Data Integration Partnerships for Australia
 - ACCESS
 - other non-NCRIS environmental information systems
- b) design and plan for linkage with economic and social system models

STAGED INVESTMENT

Staged investment over 10 years to:

- a) create a central Facility with about six staff
- b) boost current advances in interoperability of data systems among existing NCRIS facilities
- c) create early wins by identifying and funding development of innovative synthetic products in sought-after domains
- d) implement interoperability investment fund

Proposed investment of \$35m over 10 years, phased:

2017-18	2018-19	2019-20	2020-21	2021-22	2022-27
\$2M	\$5M	\$5M	\$5M	\$3M	\$15M

START-UP

1. Define and set up governance
2. Establish a NEPS office
3. Review current facilities to understand institutional and technical arrangements limiting ability to inter-operate
4. Work with stakeholders in research, government and industry to understand priorities for inter-operability
5. Start investment program – in co-investment and technical expertise – to address priority challenges

Initial Questions from Albert

- What discussion and planning have happened?
 - *This presentation*
- What're the prospects and process from here on
 - **Prospects** – 05/12 “the decision whether an investment in NEPS will be made by the Department of Education and Training or that the proposal as submitted is in any way supported by DET is unknown”
 - **Processes** – last slide

Initial Questions from Albert

- What are the main (preliminary) conclusions and open questions?
 - **Conclusions**
 - now is the time for wider integration
 - technical and policy align
 - **Open Questions**
 - Willingness and ability of facilities to change, if needed
 - What are the real-world requirements for interope
 - Specific products or general capacity
- What can the community (OzEWEX) do to promote, engage and influence NEPS?
 - Let's start discussion now!

OzEWEX \leftrightarrow NEPS

- Where does OzEWEX sit on spectrum of users/suppliers?
 - Can OzEWEX define prediction products?
- Can OzEWEX identify things that they wish to do now but which non-interop only is holding back?
- What would an ideal world look like?