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

- 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—especially managers of water supplies for towns, irrigation, and the environment.

STATEMENT FOR USE OF POPULATION PROJECTIONS

1. Do not use projections to plan for a specific purpose or to influence decisions.
2. Use projections to consider a range of possible future scenarios.
3. Use projections to support strategic planning and decision-making.

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—especially 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 river flow. Forecasts are provided as the likelihood of high, near median, or low streamflows.

WHAT IS THE BUREAU’S ROLE?

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

WHAT ARE THE BENEFITS?

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

- Water allocations
- Reservoir operations
- Water market planning
Integrated understanding of environmental, economic and societal response to plausible futures
We have many of the working parts...
• 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:

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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 thereal-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 ← → 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?