

Research Infrastructure Investment Plan

National Environmental Prediction System Scoping Study

Discussion Paper V1

[Final version, 8 February 2019]

Background

The 2016 *National Research Infrastructure (NRI) Roadmap*¹ identified that investment is needed to establish a National Environmental Prediction System (NEPS). The proponents for a NEPS argued that the integration of environmental observations with predictive modelling would ultimately lead to improved environmental management and knowledge and consequent benefits for the nation.

Informed by and in response to the 2016 Roadmap, the Australian Government released the 2018 *Research Infrastructure Investment Plan*² (2018 Investment Plan) that outlined future research infrastructure projects against current emerging Government priorities. The 2018 Investment Plan recommended the undertaking of a scoping study to articulate a value proposition and establishment plan for the proposed National Environmental Prediction System.

The Australian Government Department of Education and Training has commissioned the *NEPS Scoping Study* to provide technical assessments and requirements analysis for a NEPS, and to define implementation costs and timeframes to establish and manage a NEPS as national research infrastructure to meet researcher and operational user needs. The *NEPS Scoping Study* involves undertaking targeted consultations with key experts and stakeholders, including relevant areas of the existing National Collaborative Research Infrastructure Strategy (NCRIS) network.

The Australian Government has established an Expert Panel to conduct the *NEPS Scoping Study*. The Chair of the Panel is Professor Rob Vertessy and the members are Professor Bronwyn Harch, Dr Andrea Hinwood, Dr Adam Lewis, Dr Phil McFadden AO, Mr Warwick McDonald and Dr Steve Morton. The Terrestrial Ecosystem Research Network (TERN), an NCRIS-funded initiative headquartered at the University of Queensland, provides support to the Expert Panel.

The *NEPS Scoping Study* has two key objectives, namely to:

- obtain broad agreement from key stakeholders regarding the focus of a NEPS; and
- develop a detailed establishment plan, including identification of stakeholder co-investments and actions necessary to support the development and maintenance of a NEPS.

Improving environmental, social and economic outcomes through better decision making

Australia is endowed with precious natural assets and sustaining them requires on-going monitoring, assessment and foresighting of changes in environmental conditions. The necessary field of view is large, encompassing the atmospheric, marine, terrestrial and hydrologic domains. We have strong foundations, comprised of institutions, expert teams, data sets and supporting analytic tools. Yet, end-users and providers of environmental information both see the need to build on those foundations so that better environmental management decisions can be made.

The *NEPS Scoping Study* needs to decide why a NEPS is necessary, what it is to produce, where to focus effort, and who should be involved in building and maintenance. In other words, the study must be selective, realistic and specific when it comes to proposing the scope for a NEPS.

Although this is a research-driven initiative, the NEPS value-proposition hinges on whether we can define clear end-user requirements that, when met, will change decision making and yield a significant benefit to Australia. Equally important is defining the scientific and technological capabilities that can be deployed to effectively address the environmental management questions of concern. The ultimate goal of the scoping study is to match requirements to capabilities in order to maximise the benefits.

Initial consultation

Through 2019, the *NEPS Scoping Study* will involve consultation with a wide range of stakeholders with a potential interest in the NEPS. Stage 1 of the consultation process will be undertaken in Q1 of 2019 and involves the Expert Panel consulting with an initial representative group of stakeholders to refine our consultation approach. Both potential end-users and

¹ https://docs.education.gov.au/system/files/doc/other/ed16-0269_national_research_infrastructure_roadmap_report_internals_acc.pdf

² https://docs.education.gov.au/system/files/doc/other/ed18-0069_-_he_-_research_infrastructure_investment_plan_-_public_version.pdf

potential providers of environmental and supporting information will be consulted. Those consulted will be asked a series of questions to frame the discussion. Input from the representative group engaged in Stage 1 will be used to shape the *NEPS Scoping Study Consultation Strategy* and subsequent updates of this Discussion Paper. We envisage that the next stage of consultation will commence in Q2 of 2019 and be conducted over a 6-month period.

Stage 1 consultation questions for potential end-users of a NEPS

The focus of our engagement with potential end-users will be to ascertain where the demand for and expectation of a NEPS might lie. In governments, industries and communities, decisions are made regularly regarding the way we use, protect and remediate our natural and managed environments. We seek to identify where better environmental, social and economic outcomes can result from the stronger use of information about past, present and future state(s) in decision making. Questions we will test with this group in the Stage 1 consultation include:

Purposes

1. How often do you make decisions that affect environmental outcomes, or that are dependent on the state of the environment, and what are the consequences of those decisions?
2. What are the most important environmental management or policy questions you are challenged by that urgently demand better information?
3. What, if any, expectations would you have of a NEPS? What would your priorities be for developing a NEPS? Is there 'low hanging fruit' for a NEPS?

Information Priorities

4. In making those decisions, what environmental variables are of most interest to you and how satisfied are you with the present availability of information on them?
5. Thinking about the information you need most or would be most beneficial to your decision making, what proportion is historic data, very recent data, short-term forecasts or long-term predictions?
6. At what level of spatial and temporal detail (granularity) do you require that information?

Use and Adoption

7. What are the factors that lead you to trust and use that information?
8. Thinking about a trusted environmental information source that you currently use in decision making, tell us about its positive and negative attributes.
9. What could be done to improve the connection between end-users and providers of environmental information?

Consultation

10. Thinking about the NEPS consultation strategy, what engagement modalities do you favour?
11. Who are the other important potential end-users of environmental information that we should consult?

Stage 1 consultation questions for potential providers of a NEPS

The key goal of our engagement with potential providers will be to ascertain where the state-of-the-art environmental science, monitoring, prediction and informatics lies, with a view to identifying the challenges and opportunities of developing a system, the potential roles of the providers, and areas where more effort will be required. Our level of scientific understanding in environmental processes is strong in some areas and weak in others. Also, the availability of environmental data of different kinds varies significantly. Recent technological developments are rapidly changing our ability to capture data and improve understanding through modelling to support better decision making. Questions we will test with this group in the Stage 1 consultation include:

Priority Applications

1. Reflecting on your experiences with end-users of environmental information, where do you think they need more support? Do you see areas of particular expectation from end-users for a prediction system?
2. In what areas do you feel that we have useful environmental information that is yet to be harnessed in decision making?
3. In what areas do you see a need to build information?

Information Base and Infrastructure

4. Thinking about trusted existing environmental information sources being used in decision making, what do you see as their strengths and weaknesses?
5. What new data sources, analytic methods or tools do you see arriving in the next five years that are potential game changers for environmental management?
6. What environmental information infrastructure do you have (or plan to have) that would be necessary to implement the NEPS?

Use and Adoption

7. What are the issues involved in getting end-users to trust and use that information?
8. What more needs to be done to evolve that information into a state that satisfies end-user requirements?

Consultation

9. Thinking about the NEPS consultation strategy, what engagement modalities do you favour?
10. Who are the other important potential providers of environmental information that we should consult?

Enquiries

For enquiries, please email tern.office@uq.edu.au.