Submission
2016 National Research Infrastructure Roadmap
Capability Issues Paper

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Questions

Question 2: Are these governance characteristics appropriate and are there other factors that should be considered for optimal governance for national research infrastructure.

Q2. a) Governance systems need to be designed appropriately in relation to the nature of the infrastructure, to account for the differences in managing, for example, an instrument at one location compared with a network of different projects at different locations across the continent.

b) National research infrastructure should include the complete supply chain of information, including data collection, storage, integration and utilization, and the workforce skills to implement all these components. The value of the research infrastructure is greatly enhanced when all these components are supported so that the project can deliver outcomes. Attracting, maintaining and enhancing workforce skills is critical for successful long-term projects.

Question 5: Should research workforce skills be considered a research infrastructure issue?

Q5. Workforce skills are a critically important component of research infrastructure. Maintaining a skilled workforce with long-term continuity of skills and projects is the greatest issue for Australian research. The problem is not attracting students; the problem is poor career prospects. This means that many students will not pursue science, and particularly not research, and many students who start in research are forced to move out of the field or out of the country because of the lack of jobs. Outcomes from research will not be achieved with the technology alone; research requires people.

Environment and Natural Resource Management

Question 18: Are the identified emerging directions and research infrastructure capabilities for Environment and Natural Resource Management right? Are there any missing or additional needed?

Q18.   6.1.1 Emerging directions should include synthesis and application, as well as integration. Integration refers to the adding together or amalgamation of data. Synthesis refers to the deriving meaning from the data to produce an outcome. Application, in this context, refers to using the data to answer specific questions. These components of synthesis and application require understanding of ecosystem processes, and are not just a generic technological capability.

6.1.2 This capability should be expanded to encompass sustainable use of natural resources under conditions of climate change and greater resource demand. The issues of data requirements and scientific evidence to inform decisions about resource use is common to many resources: water, soil and vegetation.

Both general systems to synthesise data into useful formats for decision-making, and studies of specific resource issues are emerging capability needs.

An additional capability need is a system to use existing and future environmental data to support Australia's international obligations under international agreements, such as those under the UN Framework Convention on Climate Change and the Sustainable Development Goals. Systems such as environmental accounts can be used to integrate and synthesise data to identify the condition of ecosystems, their change over time, and impacts of external factors.

6.2.3 Terrestrial systems - Additional capability needs related to:
(i) defining the sustainable limits of resource use to inform decisions about economic development versus sustainable environments
(ii) quantifying ecosystem services to incorporate their value to human well-being into assessments of resource use trade-offs.

6.3 Desirable new capabilities
(i) Workforce skills require good understanding of ecosystem processes and the Australian environment to interpret and make use of the data. It is not only skills in data analysis and technology that are required.
(ii) Research infrastructure should be aligned to applications, such as informing current or potential problems, or testing theoretical hypotheses.

6.3.1 Automation is not the only solution to data collection, particularly on the ground. Understanding of field situations, differences between environments, and ecological processes is critical for collecting and interpreting high quality data.

6.3.2 National model systems – One of the national systems required is that of environmental accounting that will link environmental benefits into economic analysis to assess benefits for human well-being. This is a general system that can be adapted to suit specific natural resources, regions and issues. A system of environmental accounting will contribute to decision-

making about conflicting land uses; an issue that will become increasingly important with greater demand for resources and greater impacts from global change.

Examples of potential new infrastructure:
- Application of E&NRM data into a system of environmental accounts that can be integrated with the system of national economic accounts