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Capability Issues Paper

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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?

The Terrestrial Ecosystem Research Network (TERN), funded by NCRIS, is providing world-class research infrastructure and strong leadership by setting the national agenda for an evidence base for monitoring and managing Australia's terrestrial ecosystems. This work needs to be fully supported now that momentum is building and there is a significant body of infrastructure (in the field as well as data and modelling infrastructure) in place and fully operational.

Evidence for the success of creating TERN through NCRIS is emerging. TERN has made possible a range of national networks and collaborations among top terrestrial ecologists and made large collaborations and open data publication the norm, which provides resource opportunities for all researchers including students and early career researchers. The evidence base for managing Australia's terrestrial environment is becoming standardised thanks to TERN in terms of both quality of data collection and curation but also national compatibility of datasets, which was previously a major limiting factor for ecological research because each organisation and jurisdiction collected and stored data with different protocols.

The new national standardised field datasets in conjunction with the availability of a range of spatial data products through TERN is enabling new research at larger scales and with greater ease and speed than was possible just a few years ago. Examples of these products are the AusPlots field monitoring capability and the spatial mapping layers that have come out of the Soil and Landscape Grid of Australia. These products can now we compared with data from satellites (e.g. through the TERN AusCover facility) for a range of novel applications.

TERN not only provides datasets to catalyse critical research on the trajectory of Australian ecosystems, it provides the infrastructure for researchers to publish, share and promote their own research datasets as well as data products synthesised with open access TERN data (e.g. the AEKOS data portal). This open access model and practical support tools for researchers is part of a new era in data sharing and standards.

TERN is already providing data and promoting research at continental scales. But the real value of the TERN infrastructure will only be fully realised with the long-term funding base to move from predominately collecting baseline data to providing longitudinal data on the long-term trajectory of ecosystems at small to large spatial scales, based on detailed field measurements up to large scale

assessments of ecosystem function and vegetation cover from satellite and remotely sensed data plus modelled synthesis products of these.

TERN has already made possible some major contributions towards understanding the Australian terrestrial environment in a management context, both published and not yet published in the literature. For example, the field based infrastructure and analysis capability of TERN has enabled a continental-scale accuracy assessment for a groundbreaking international stock-take of forests in global drylands, the results of which are expected support an increase to estimates of total global forest stocks. This is significant for carbon accounting and climate change mitigation as well as from a biodiversity perspective.

One area that is missing from the national infrastructure program in the Environment and Natural Resource Management capability area is support for institutions that house biological collections. Although the Atlas of Living Australia (funded by NCRIS) provides collections data services, many institutions such as museums and herbaria are struggling to maintain base operations due to funding cuts. The physical management of biological collections is critical for both taxonomic and ecological sciences into the future and without adequate funding, services such as maintaining inter-institutional loan facilities, providing up to date specimen determinations, mounting and housing new collections (such as from ecological monitoring programs) may suffer. These institutions deserve a funding base that allows long-term maintenance of physical storage infrastructure, services to users and the associated specialist work force of technicians and biologists.