Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The 2021 Roadmap used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

Q22.

Food and Beverage

Q23.
Medical Products

Q24.
Defence

Q25.
Recycling and Clean Energy

Q26.
Space

Q27.
Environment and Climate

Increasingly long duration acoustic recording (Ecoacoustics) is being used to scale fauna monitoring. However, much of the new data is homeless - there is no central or federated repository for information despite its generic value to answer different research questions. A central repository could coordinate the collection and sharing of data, facilitate the development and use of standardized practices for data collection, storage and description and promote FAIR data. By providing a coordinated and supported repository, data collected by different agencies can be usefully aggregated and reused to provide a national fauna observatory. This will provide a valuable resource for researching, understanding and monitoring environmental change and to better evaluate management actions and support green accounting measures. A dual platform and infrastructure, and community building and training approach is needed to support both the data and the people collecting the data. The majority of environmental acoustic data are being collected by third parties such as state and local governments, NGOs, farmers, mining sector and Traditional Owners, and the techniques and protocols for collection are new and still being established hence the need for training and community building.

Q28.

Frontier Technologies and Modern Manufacturing

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.
Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

Q31.

Supporting healthy and thriving communities

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

There are many opportunities to provide First Nations communities with tools and agency to monitor their country and to combine scientific environment monitoring with traditional knowledge systems. As First Nations people are increasingly involved in environmental restoration the combination of tools, techniques and data for scientific monitoring and First Nations knowledge is vital. Ecoacoustics is one particular area where there are many opportunities to do this and to combine traditional and western knowledge to give agency to First Nations land managers.

Q33.

Protecting and restoring Australia’s environment

The protection and restoration of Australia's environment requires better data to understand the effect of climate and land use change and the effectiveness of interventions such as pest control, controlled burning, planting etc. Monitoring fauna at scale is hard. Acoustics provides an efficient, objective and scalable way to monitor vocal terrestrial fauna. Australia is an international leader in ecoacoustics and there is great potential to transform fauna monitoring through acoustics. Many organizations are already collecting data but there is nowhere to put this big data. A national facility to support the collection, analysis, aggregation and sharing of ecoacoustic data is required along with support for training and standardisation of monitoring protocols.

Q34.

Building a secure and resilient nation

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.
If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

The Need There is a need for a National EcoAcoustics Facility (NEAF). This would provide infrastructure and training for large scale acoustic fauna monitoring. Currently we have a poor understanding of faunal biodiversity across Australia; this facility will collate and share data enabling new research which was hitherto impossible, yet vital for Australia's future. Ecoacoustics uses sensors which continuously record sound to provide a direct and permanent record of the environment, of vocal fauna. Off the shelf recorders are available and AI tools for analysing sound recordings to find vocal species in recordings are now available. Together these enable scalable fauna monitoring which will transform our understanding of the environment in much the same way that remote sensing has enabled large scale vegetation monitoring. Large long duration acoustic recordings provide a new way to research and understand the effects of climate change, land use change, bush fires, threatened and invasive species, and to understand the effectiveness of environmental management actions and restorations, such data can also feed into green accounting mechanisms. Many organisations including all levels of government and NGOs are collecting ecoacoustics data for a variety of purposes. However, data is unavailable, not shared nor aggregated nor is it reusable, it is not FAIR. There is a need for infrastructure to store and analyse data, to provide a fauna observatory from all these datasets currently being collected, and there is a need for training and standardisation of data collection, analysis and interpretation. No commercial solutions exist. Through the ARDC we have built a platform for storing and analysing data (open Ecoacoustics https://openecoacoustics.org/), we have collected 1 Petabyte of data, and we have over 1800 users of our data. We have over 50 partners interested in contributing datasets, and we would like to grow our data collection to 10 Petabytes. Data is being collected for monitoring, we want to maximise its use and utility through aggregation and reuse, and to drive adoption of common collection protocols and FAIR data use, permitting data reuse and data aggregation to form a national observatory from existing data collections. In addition to traditional research and monitoring there are opportunities to partner with First Nations communities to provide communities with tools to monitor, understand and report on their land and to combine this with Indigenous knowledge. There are also opportunities for a facility to be used commercially by industry, mining, developers and farmers for environmental assessments, environmental auditing and green accounting schemes. This facility would extend and enhance an existing capacity, provide a much-needed repository of ecological data and enable new ways to understand our environment. It builds on existing projects including ARDC Open Ecoacoustics and an ARC LIEF project Australian Acoustic Observatory https://acousticobservatory.org/) The project team are international leaders in this area and have an existing large network of researchers and land managers who wish to partner, continue to and use such a facility. The Proposed Infrastructure Capability The NEAF capability would comprise a platform and associated promotion, support, training and standardisation. Platform: ecoacoustics data is big and this is why existing data collectors are not making their datasets available online: one recorder can easily collect 2TB per annum. The existing open ecoacoustics projects already have in excess of 1 PD of data. The following figures represent estimates based on our partners needs: • Web servers to provide web frontend and web API interfaces to data • 10PD of hot data storage • HPC for data (call) analysis using AI deep learning tools (BirdNet and Google Perch) • Citizen science services for data validation • Raw data ingest facilities: o Upload services – interfaces and APIs o Manual data ingest from SD cards o Streamed data ingest from sensors • Analysed data egest into downstream data services including: o Data export to ALA, BDR and other biodiversity databases o Data export to downstream processing services including Ecocommons and ARDC Planet interfaces o TERN and other partner facilities o Stakeholder web sites and reporting Promotion, support, training and standardisation: the facility would be promoted to data producers and data consumers, including using co-design to ensure users needs are met, production of support and training materials including face to face and online workshops (we have successfully done this in the past) and the development and adoption of standardised monitoring and data protocols. The Medium Term Goals The medium terms goals of the facility are to: • Collect, unite and share disparate data sets to create a fauna observatory (FAIR data), from state governments, Parks Australia, DCCEEW, Bush Heritage Australia, Australian Wildlife Conservancy, BirdLife Australia. • Analyse data to provide fauna call data for monitoring, modelling, reporting and research and to make the analysed data easily available for researchers and other users • Generate and curate long term monitoring datasets enabling understanding of long-term changes associated with environmental change • Development and adoption of standards and protocols for acoustic monitoring • Development and provision of support and training materials Impacted Research Communities The following research communities would be impacted: • University researchers interested in biology, ecology, environmental monitoring, conservation management, ecoacoustics and computer science • Government and NGOs undertaking monitoring and research on their lands • ALA, TERN, ARDC • Public, schools, university students and citizen scientists • First Nations communities The Timeframe We propose to establish the facility in 2027 with an initial duration of 4 years

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the 2021 Roadmap related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

- ◯ Yes
- ◯ No

Q38.

3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

This question was not displayed to the respondent.

Q39.

3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

This question was not displayed to the respondent.

Q40.

3.4 If you answered no, please indicate your (one or more) primary reasons:

This question was not displayed to the respondent.

Q41.

Part 4: Other comments

4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.

Q49.

4.2 Optional Document Attachment.

Note: Our strong preference is that answers are provided against the relevant questions in the survey. However, this file upload option is available for submissions in file format, where needed. Please ensure the document includes your name or organisation.