



Fixed-wing drone. Photo: ERISS.



**Northern Australia
Environmental
Resources
Hub**

National Environmental Science Programme

Remote environmental monitoring in northern Australia: Scoping key research needs

Wrap-up factsheet

Outcomes of this project

Through a survey, literature review and workshop, this project:

- summarises what we know about emerging technologies and techniques applicable to environmental monitoring in northern Australia,
- identifies the current use and potential future use of emerging technologies and techniques,
- discusses the potential for their use, including positive attributes and limitations, and
- identifies the research needed to more fully utilise these techniques.

New technologies are key to the future of environmental monitoring in northern Australia

Northern Australia is a vast and environmentally significant region at a global level. While the region is in very good environmental condition, there are still significant threats to its biodiversity values, including climate change influences, altered fire regimes, land use and river flow changes, and incursions of non-native species. Accurate, cost-effective and well-designed environmental monitoring of the region is therefore critical to regional development that maintains environmental values and services.

However, environmental monitoring in northern Australia is complicated by many resource and logistical constraints including the sheer size of the region, limited and variable site access (e.g. limited all-weather roads and infrastructure, wet season inaccessibility), environmental hazards to field-based studies (including crocodiles, cyclones and harsh climate), relatively small population base, and limitations on technical capability. These constraints often lead to restricted sampling designs, with limited sample sizes, reduced spatial coverage, and poor power to track environmental change, particularly in timeframes suitable for managers. A number of emerging technologies may mitigate these constraints and improve environmental monitoring, and these were the focus of this research.



Emerging technologies were discussed at a workshop held in May 2016. Photo: Briena Barrett.

Key emerging technologies

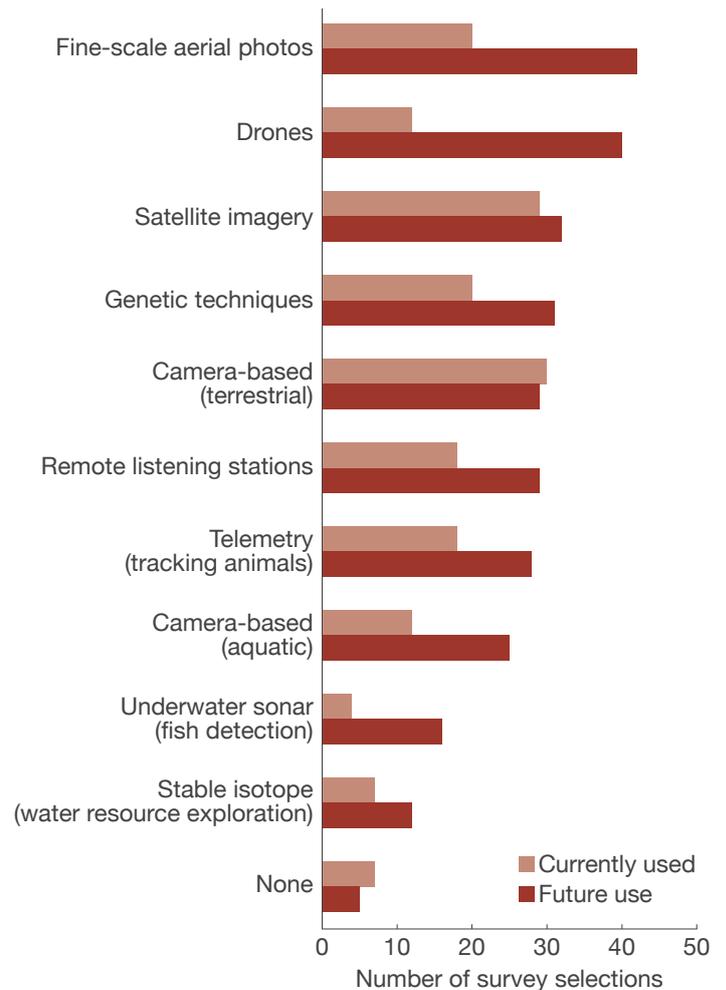
Of the nine key emerging technologies that were discussed during the workshop, seven were identified as having a high relevance: research effort ratio, meaning that they are very relevant for use in northern Australia despite, in some cases, the significant research required before they can be put to widespread use. These seven technologies are:

- Satellite and airborne remote sensing technologies,
- Unmanned vehicles (drones) as platforms,
- Environmental DNA (eDNA),
- DNA-based methods for estimating population size and individual body condition,
- Using biochronology for measuring fish production,
- Using animal audio for species detection, and
- Aquatic camera trapping.



eDNA techniques are proving to have a wide range of applications in both marine and freshwater systems. Photo: NESP.

Current and potential future technologies were identified



According to the survey, research users anticipate that fine-scale aerial photos and drones will be the most useful for the future of environmental monitoring.

Further information

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This factsheet and the full report 'Remote Environmental Monitoring in Northern Australia: Scoping Key Research Needs' are available from: <http://www.nespnorthern.edu.au/projects/nesp/remote-environmental-monitoring-techniques/>



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