



Camera traps have significantly improved wildlife detection rates

The challenge

Effective understanding of land, water and biodiversity changes over time, are essential to manage northern Australia's environmental resources. Environmental monitoring in the region is challenged by vast distances and remote areas, a small population base and variable site access particularly in the wet season. Crocodiles, cyclones and flooding add to the region's complexities. These constraints often lead to the restricted design of research data collection, limited sample sizes and reduced geographic coverage. They can result in limited ability to track environmental change, particularly in timeframes suitable for regional natural resource managers.

This project will bring together researchers and environmental managers to assess the usefulness of new and emerging remote monitoring techniques for northern Australia, and to prioritise future research needs.

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Environmental monitoring in northern Australia is challenged by many resource and logistical constraints; including the large spatial scale, limited and variable site access (e.g. limited all weather road and infrastructure, wet season inaccessibility), environmental hazards to field-based studies (including crocodiles, cyclones and harsh climate) and 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.

Emerging solutions

A number of new remote sampling or surveillance technologies have emerged in recent years that may assist environmental data collection in northern Australia and these include:

- airborne drones and wireless airboats, capable of photographing and mapping vegetation, and collecting water samples
- use of environmental DNA (eDNA) for detecting rare or invasive species, and increasingly studies on biomass and distribution of biota
- camera-based field detection techniques for terrestrial and aquatic species
- remote listening stations for detecting and identifying audio calls of birds and frogs
- remote sensing techniques for monitoring landscape scale changes using satellite imagery of key change drivers at finer data and imagery resolutions
- underwater sonar-based imagery of fish and habitats
- telemetry approaches for tracking animal movements of rapidly increasing sophistication and capability.



Drones will be used by researchers to monitor remote and hard to reach areas of the north



This miniboat monitors aspects of water quality

While these techniques may be applicable for some monitoring requirements in northern Australia; their utility, appropriate sampling design, limitations, and their cost-effectiveness relative to other conventional techniques in northern Australian conditions requires further attention.

People

There are also opportunities in northern Australia to work with skilled and non-skilled people to help collect environmental data. There is potential to partner with Indigenous land managers and rangers dispersed across the landscape who are experienced in collecting detailed qualitative and quantitative environmental data through programmes such as (<http://www.nailsma.org.au/hub/programs/i-tracker>).

Approach

This study will bring together relevant experts and natural resource managers to explore and prioritise key research needs in the development and refinement of tools to improve environmental monitoring in remote areas. The project will gather information from desktop reviews about decision making and policy requirements for northern Australia-specific monitoring. The research will also explore the barriers and potential solutions to successful implementation in remote locations, including data storage, management and access systems.

Outcomes

Concluding in mid 2016, the project will:

- summarise our understanding of current needs and requirements for remote monitoring in northern Australia
- summarise existing tools and technologies, and their potential applicability, benefits and limitations in the northern Australia context
- document key research areas for the development, refinement and implementation of remote monitoring techniques.

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