



**Northern Australia
Environmental
Resources
Hub**

National Environmental Science Programme



2017 Annual Report



Australian Government



**National
Environmental
Science
Programme**

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Cover photographs

Front cover: Daly River (photo Patch Clapp).

Back cover: Fitzroy River night sky (photo Patch Clapp).

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Annual Progress Report 3

Northern Australia Environmental Resources Hub

National Environmental Science Program

Annual Progress Report 3

1 January 2017 – 31 December 2017

Hub Name: Northern Australia Environmental Resources

Host organisation: Charles Darwin University

Key Contact: Professor Michael Douglas (UWA)

Contact email address: michael.douglas@uwa.edu.au

Other consortium partners/subcontractors/research organisations:

- University of Western Australia
- James Cook University
- Griffith University
- CSIRO
- NAILSMA
- NT DNRM
- Qld DES
- Qld DAF
- WA DBCA

Hub Leader certification

- As hub leader, I certify that I have taken adequate steps to reasonably assure myself that:
 - each required report component is attached;
 - the contents of each component of the report is complete and accurate in all material respects;
 - funds have been used for the purpose for which they were provided and all funding conditions have been met, Recipient and Other Contributions have been received, and appropriate oversight has been maintained of hub projects, their progress, performance and budgets during the reporting period;
 - all relevant risks to project delivery have been notified to the Department in this and previous reports and that appropriate steps are being taken to manage those risks;
 - the Hub and its sub-contractors have current workers compensation and public liability insurances, as required under the Funding Agreement; and
 - any carryover of project funds have been allocated to projects in the next reporting period or financial year in accordance with the approved Research Plan or funds identified for refund to the Department.

Signed: 

Hub Leader Name: Professor Michael Douglas

Date: 28 May 2018

Hub Steering Committee Chair Certification:

As steering committee chair, I certify that any issues of concern or matters raised during steering committee meetings where the draft progress report was discussed have been adequately resolved, amended or incorporated into the final report submitted to the department.

Signed: 

Hub Steering Committee Chair Name: John Childs

Date: 28 May 2018

Letter from the Hub Leader

It is with much pleasure that I submit this Annual report for the NESP Northern Australia Environmental Resources Hub for 2017. The Hub is now entering into the third year of a six-year program and this marks a significant transition period from research planning and shorter term projects, into research action, field work and a greater focus on delivering outputs for our policy and management partners.

Engagement with Commonwealth Government Departments is impressive across a large proportion of projects, including with the Departments of Environment and Energy, Prime Minister and Cabinet, and Agriculture and Water. We have scoped the majority of our projects with a direct line of communication to relevant policy areas of Commonwealth, State and Territory Governments, and this is starting to have a significant impact in the take up of research outputs. In particular I would like to highlight the mapping of Littoral Rainforest in North Queensland, new Carbon sequestration knowledge for the Emission Reduction Fund, and work on Indigenous land and sea management in support of Indigenous advancement.

In 2017 the Hub had 15 projects underway across northern Australia, in the Kimberley, Top End, Gulf of Carpentaria and Cape York Peninsula. In WA's Fitzroy River catchment, six teams worked to finalise research agreements with native title holders and complete fieldwork and workshops for social and ecological research projects. In the Top End, teams also ran field activities, one supporting water planning in the Daly River and another investigating savanna invaded by gamba grass in the Darwin and Daly regions. In Queensland, teams completed fieldwork and data analysis to support water allocation planning in the Mitchell, Flinders and Gilbert Rivers, and another team collected and modelled data on the impacts of feral pigs in the Archer River catchment. More information is available on the project pages on [our website](#).

Our Knowledge and Adoption (K&A) team is delivering an impressive array of communication materials, supporting events and developing an impressive web site that combines outputs from the previous NERP and TRaCK programs. We have recently added a third part-time communications officer to the team based in Darwin, have a regional research coordinator working in the Kimberly, and in early 2018 will have new regional research coordinators in far north Queensland and Kakadu National Park.

In 2017 the K&A team produced:

- 5 final project reports
- 25 Project factsheets
- 5 case studies on research impact
- The Hub 2016 Annual Report
- 2 Hub newsletters
- 42 news articles
- 11 North Australia News Round-ups
- 91 Facebook posts
- 98 Tweets
- 2 Hub newsletters circulated

Our Hub Steering Committee (HSC) continues to provide strong support and guidance to the Program. In 2017 the HSC met on three occasions, including twice in person, and once by teleconference to discuss projects proposed under Research Plan Version 4. I would particularly like to thank Greg Claydon, who retired this year, for his support and welcome Susan Worley representing the WA Department of Water. Stephenie Hogan also joined the HSC this year representing the Qld Government and we are fortunate to have someone senior who is a strong supporter of taking our research into the Qld policy environment.

Research Plan Version 4 was a major effort in research planning and engagement; it included twelve new projects and nine extensions to existing projects. In May 2017 the Commonwealth revised our research priorities, which resulted in minor amendments to the text, but with some significant changes to the relative priorities that we were able to address in Research Plan Version 4. I was particularly pleased that we were able to fund projects associated with the Minister's priority around assessing the causes of mangrove dieback in the Gulf of Carpentaria (coordinated across three Hubs, ourselves Water Quality and Marine); a project on Assessing Environmental Accounts, a Commonwealth priority that we had not previously had a project focussed on; as well as a package of three projects that will support the closure and rehabilitation of the Ranger Uranium mine within Kakadu National Park, NT. The program has now allocated research funds of \$18.7 million with just over \$400,000 (approx. 2% of total program funds) remaining to be allocated to emerging priorities over the final three years of the program. I believe that we have shown sound budgeting and financial management in committing this level of funding at this stage of the Program's lifecycle.

On 18 July 2017 the Hub finalised changes to a number of clauses in the Head Agreement between the Commonwealth and CDU. These clauses were aimed at clarifying and streamlining financial reporting and auditing. While our Hub initiated them, the benefits subsequently flowed through to all of the other Hubs, an outcome that was positively received for our Hub. We have also reviewed administrative arrangements within CDU in 2017, to ensure that partner sub-contracting, financial reporting and Hub support services are provided efficiently and to a high standard. Some challenges continue to exist with the timely establishment of research agreements with regional partners who we are working with, although I expect that these will be fully resolved during 2018.

In mid 2018, CSIRO is due to report on the Northern Australia Water Resources Assessment (NAWRA). This has significant implications for our catchment based projects in the Fitzroy and Mitchell Rivers. In some cases some components of projects have been delayed pending access to the data that underpins NAWRA, which has been embargoed until release of the final reports, as we had planned on gaining access to this data earlier than has been possible. Nevertheless NAWRA will provide a major boost in water resource assessment knowledge for three priority regions in northern Australia in which it has been working Fitzroy catchment, Western Australia; Darwin catchments (Finniss, Adelaide, Mary, Wildman), Northern Territory; and Mitchell catchment, Queensland.

Other opportunities and highlights over the next twelve months include conducting a series of Regional workshops with government research users, Commonwealth workshops and policy briefings, the Launch of Research Plan Version 4 projects, a second year of our program of field research, new projects underway in Kakadu National Park developed in partnership with Traditional Owners; and presenting our project outcomes at national conferences.

It is with pleasure that I submit to you the 2017 Annual Report for the Northern Australia Environmental Resources Hub.



Michael Douglas
Hub Leader

Research

Progress towards outcomes

Over 2017 the Northern Australia Environmental Resources made substantial progress towards meeting its objectives and outcomes as outlined in the Head Agreement signed between the Commonwealth and Charles Darwin University, and most recently varied on the 18th July 2017. Section 1.3 to Schedule 2 of the Head Agreement includes:

As stated in the Northern Australia Environmental Resources research scope, Activity Outcomes include:

- *Managing and monitoring terrestrial and aquatic ecosystems and biodiversity;*
- *Catchment and coastal land and water planning for urban, agricultural and infrastructure development;*
- *Indigenous land management including Indigenous Protected Areas, and;*
- *Kakadu and tropical rainforests.*

The Northern Australia Environmental Resources Hub will partner with governments, communities and industry to improve the capacity to manage and monitor Australia's unique northern environments. The Hub's research will support sustainable development in northern Australia and inform practical solutions to the region's major environmental challenges. Research will deliver new knowledge, tools and partnerships for a sustainable northern Australia. Research will focus on:

- *landscape-scale studies covering savanna, rainforest and aquatic ecosystems and biodiversity;*
- *land and water planning for urban, agricultural, and infrastructure development; and*
- *Indigenous land management including Indigenous Protected Areas.*

From the Kimberley to Kakadu and across to Cape York, the Hub is undertaking research to support the sustainable development of Australia's unique northern environments. The Hub's research is delivering new knowledge, tools and partnerships to inform practical solutions as the region responds to the northern development agenda.

The Hub's research is focusing on landscape scale studies for savanna and aquatic ecosystems and biodiversity, and providing new knowledge to support land and water planning and environmental sustainability during infrastructure development. In partnership with Traditional Owners, researchers are exploring aspects that help improve and support Indigenous land management and develop better understanding of tropical rainforests. A key priority for the Hub is research across a range of disciplines to underpin management effectiveness in Kakadu National Park.

Our research priorities have been organised under 6 broad research themes, including 2 cross-cutting themes.

Theme 1 Ensuring that the development of northern Australia minimizes the risks to the region's environmental resources focuses on research that will help decision makers assess and plan for development in northern Australia in ways that will ensure that development likely to occur is undertaken in a way that minimises the risks to the regions environmental resources. The overarching focus of the Hub is on research to support sustainable development. Therefore, much of the Hub's research will be focussed in areas where development is likely to occur, so that research can help predict likely consequences of

development and inform planning and management practices that will minimise the risks to environmental resources.

Theme 2 Improving the management of threats to environmental resources in northern Australia recognises that large areas of northern Australia are unlikely to be suitable for intensive development, but these areas still face major threats to environmental resources and research can help to improve how we manage and respond to those threats. In these areas, research is needed to determine the impact of natural stressors (e.g. climate) and current management regimes (e.g. fire, weed and feral animal management) to underpin improvements in on-ground management, to better understand how we can predict ecosystem failure (to help avoid it from occurring). Targeted research will also be undertaken on specific management issues related to waste and debris in remote locations and extreme weather events on rainforests.

Theme 3 Developing practical approaches for managing threatened species and threatening processes in northern Australia is focussed on developing practical approaches to manage threatened species and threatening processes in northern Australia. Research is needed to help identify high-priority areas to target threat abatement and species recovery investments and to develop and trial practical methods for on-ground management for the recovery of identified threatened species. This research applies across northern Australia, but will include research focussed in Kakadu National Park and adjacent Indigenous Protected Areas.

Theme 4 Developing approaches for monitoring environmental resources in the northern Australia recognises that an important part of the management of environmental resources is being able to monitor changes and trends in their condition. Northern Australia presents some novel challenges for monitoring given the remoteness and limited specialist skills base within the region, an research is needed to demonstrate better ways to measure environmental drivers, pressures, stressors and responses in northern Australia, including approaches to environmental accounting and the measurement of changes in soil carbon.

Theme 5 Supporting Indigenous natural resource management in northern Australia Aboriginal people own and manage vast parts of northern Australia. Recent increases in the National Reserve System are largely due to the inclusion of new Indigenous Protected Areas and northern Australia has seen a rapid expansion of the Indigenous ranger movement. Research is needed to help support the management of IPA's and Indigenous natural resource management more broadly. Outside of IPA's there is a need to support the management of Indigenous Land Management Programs more broadly. Kakadu National Park, which operates under joint management, is another specific priority of the Commonwealth. This theme includes specific research on the lessons learned from the incorporation of Top End Indigenous fire knowledge into fire management and on Indigenous Protected Areas. In addition, participation of Indigenous people in environmental management across northern Australia represents a cross-cutting research activity that intersects with all other themes and may include research in Indigenous participation in development planning, management of threatening processes and threatened species and monitoring of environmental resources.

Theme 6 Determining the economic values and benefits of environmental resources in northern Australia is also a cross-cutting research theme, as consideration of the economic contribution of environmental resources across northern Australia is important for supporting effective policy and planning decisions across all of the other research themes.

Progress against research priorities

With the addition of the projects approved under Research Plan Version 4 the Hub will have either completed, or be undertaking, projects that address each of the sixteen research priorities, as revised by the Commonwealth in May 2017.

Research projects

[Attachment A](#) lists the projects funded under the Northern Australia Environmental Resources Hub and provides information on the project status, information on outputs and links to products for all projects (where available). Exceptions to the NESP Data Management and Accessibility Guidelines are also noted there.

Performance against milestones

Performance against Funding Agreement Milestones

All milestones for the period (and to date) have been met as per Funding Agreement Milestones 14 to 17, including the delivery and acceptance of the 2016 Annual Report and the delivery and acceptance of the final Research Plan Version 4. The most recent milestone was the acceptance by the Commonwealth of Research Plan Version 4, on the 14th December 2017.

Performance against the Research Plan milestones

Information on project progress and performance is provided in Attachment A. Three projects have reported delays in achieving milestones in the current reporting period, although this is not likely to affect overall project delivery. Any proposed changes in project end dates or outputs will be incorporated into Research Plan Version 5, and will be re-submitted for approval.

Measuring success

The National Environmental Science Program (NESP) is a long-term commitment to support environmental and climate research. The key objective of the NESP is to improve our understanding of Australia's environment through collaborative research that delivers accessible results and informs decision making. The focus of NESP is on practical and applied research that informs on-ground action and that will yield measurable improvements to the environment.

The Program will build on its predecessors --the National Environmental Research Program and the Australian Climate Change Science Program – in securing for decision makers the best available information to support understanding, managing and conserving Australia's environment.

The NESP is delivered through multi-disciplinary research Hubs or consortia, hosted by Australian research institutions.

The NESP seeks to achieve its objective by supporting research that:

- is practical and applied and informs on-ground action
- addresses the needs of the Australian Government and other stakeholders by supporting and informing evidence-based policy and improving management of the Australian environment
- is innovative and internationally recognised
- enhances Australia's environmental research capacity
- is collaborative and builds critical mass by drawing on multiple disciplines, research institutions and organisations to address challenging research questions
- produces meaningful results accessible to government, industry and the community
- includes synthesis and analysis of existing knowledge
- builds relationships between scientists and policy-makers to encourage collaborative problem solving on environmental issues.

NESP end-users will be a broad range of stakeholders whose decisions may impact on the environment, and include the Australian Government, state governments, industry, business, community groups and Indigenous land managers (or Indigenous Communities).

The intended outcomes of the NESP are:

- Enhanced understanding of, and capacity to manage and conserve Australia's environment.
- Improved climate and weather information for Australia through a greater understanding of the drivers of Australia's climate.
- Timely research that is used by policy and decision-makers to answer questions and provide solutions to problems.
- Research outcomes that are communicated clearly to end-users and the general public, and stored in a manner that is discoverable and accessible.

Table 1. Quantitative performance measures

Key Performance Indicator	Hub result for 12-mth period (numerical only)	Explanation (if any)
1. Percent of projects (active or completed in the reporting period) for which there is a research-user actively engaged in the project?	100%	To better ensure that project outputs meet the needs of research users, and are incorporated into policy and/ or management, each project is required to enter into a research user agreement that will be signed off by project leaders and the principal research users. The Research User Agreement specifies the outputs that will be produced by the project and the timeline and format for delivery of those outputs. The principal research user commits to making use of the outputs for specific policy and planning objectives. The Agreement also specifies the preferred method of engagement of the research users in the project.
2. Percent of projects approved under RPV4 in which research-users were actively involved in project design?	100%	In preparing Research Plan Version 4 we consulted widely and held a number of meetings with the Commonwealth and in every State and Territory. We ensured that in the drafting of each project plan research-users were explicitly identified and consulted.
3. Number of research outputs provided to end users on time ¹ and as identified in the Research Plan	15	This is a collation from Hub project milestone reports where they have reported research outputs completed on time.
4. Proportion of research outputs provided to end users on time and as identified in the Research Plan	100%	The projects that have been completed under the program have all completed their outputs, and these are available on our website, or through other on-line sources.
5. Number of instances of where the hub has used NESP-generated information from another NESP hub.	2	Projects 3.3 and 5.3 reported using NESP generated information from another Hub, predominantly the TSR Hub.
6. Number of peer reviewed NESP-funded publications during the reporting period	5	Projects 5.3 and 5.4 reported publications. Because the majority of research projects rely on new data collection, and most active projects have only two fieldwork seasons completed, it is not expected that there will be a significant number of research papers published until the latter years of the program.
7. Number of NESP research citations in other researchers' publications during the reporting period	1	Project 5.4 reported literature reviewed for NAER project on Lessons from Top End Fire has been used for the literature review in this project. It is not expected that there will be a significant number of research papers published until the latter years of the program, therefore citations in other researchers' publications are currently low.

¹ On time – delivered on the date the outputs were expected to be delivered

Key Performance Indicator	Hub result for 12-mth period (numerical only)	Explanation (if any)
8. Number of researchers, including PhD and Post-Doc positions engaged as a result of NESP (total, Full-time equivalent) during the reporting period	30.6 FTE	There are an additional 111 researchers engaged in research projects in an in-kind capacity (totalling an additional 29 FTE)
9. Number of data sets provided to the Hub, or made publicly available, by third parties for the purposes of informing NESP research	Nil	New KPI. Data to be available for next annual report. In the next reporting period we expect to be provided with a number of data sets from CSIRO under the Northern Australia Water Resource Assessment (NAWRA).
10. Percentage of data sets made publically available under open licence by the Hub	95%	Our project leaders and researchers have been advised of their obligations in relation to data management. We have prepared a Hub protocol titled <i>Ensuring Open Access</i> that has been included in orientation workshops held in Qld, WA and the NT.
11. Percentage of NESP research outputs (including publications, data and metadata) that are discoverable and accessible in accordance with NESP data accessibility requirements and the funding agreement.	87%	Our project leaders and researchers have been advised of their obligations in relation to data management. We have prepared a Hub protocol titled <i>Ensuring Open Access</i> that has been included in orientation workshops held in Qld, WA and the NT. A number of outputs (see projects 1.3.2, 1.3.3, 1.5, 2.1, 2.3, 5.3 and 5.4 at Attachment A) are yet to be made publicly available.
12. Number and FTE of Indigenous people employed in a project (separate into full and part time positions).	8.59 FTE	68 individuals including permanent, casual and one off engagements
13. Number of Indigenous researchers/graduates/post-graduate/PhD/Post Doc Positions in projects.	1	Project 5.3 reported an Indigenous PhD candidate.
14. Number of Indigenous people trained in the use of environmental management tools and techniques.	80	Projects 1.3.2, 1.3.3, 2.5, 5.3 and 5.4 reported Indigenous people trained.
15. The number of management tools for Indigenous waters and land that benefitted from NESP research and outcomes (including but not limited to Plans of Management for IPAs, Co/Joint managed parks, Marine Park Plans of Management, Conservation Agreements).	2	Project 2.5 reported supporting APN to contribute to the IPA plan of management and case studies for the IPA plan of management that is currently being produced for the Wik Native Title Area, and also supporting APN to develop a 10 year Healthy Country Plan.

Key Performance Indicator	Hub result for 12-mth period (numerical only)	Explanation (if any)
16. Number and type of communication products that have been used to communicate research with Indigenous people.	16	<p>A selection of communication products is outlined below:</p> <p>(1.3.2) Community poster on Tracking project;</p> <p>(1.5) S. Laborde attended the co-planning workshop organised on 26-27 July 2017 in Fitzroy Crossing by Dr. Ro Hill for project 1.6. S. Laborde gave a presentation of project 1.5 to Traditional Owners from Walmajarri, Bunuba, Gooniyandi, Kija, Jaru, and Willinggan groups who were present.</p> <p>(2.3) Presentation on flammable grassy weeds to Mimal rangers and NT Bureau of Meteorology severe weather forecasting staff, Bachelor, NT (Sept 2016). Part of this presentation has been subsequently produced into a YouTube video by the Mimal Land Management Aboriginal Corporation. NESP is specifically acknowledged in this video.</p> <p>Mimal Land Management Aboriginal Corporation (2017). Gamba grass – A weed that's killing country (20 mins)</p> <p>https://www.territorynrm.org.au/single-post/2017/07/05/VIDEO-Gamba-grass---A-weed-thats-killing-country</p> <p>(1.3.3) A summary of the field work has been completed and shared with the Indigenous people we work with.</p> <p>(2.4) An information sheet has been drafted. The results of work to date was provided at the savanna fire forum in Darwin on 27 Feb 2018 at the invitation of DoEE.</p> <p>(5.3) Ewamian project partners used several face-book and twitter posts to advertise picnics, catered by the project, where people could simply come to meet, or (if desired) agree to be interviewed for our project.</p> <p>A project update was sent to partners in and around Fitzroy Crossing</p> <p>(5.4) Summary Report from the December Workshop has been for Indigenous communication.</p>
17. Number of research, knowledge sharing and communication events held with Indigenous communities.	67	Ten of the fifteen projects had a significant number of communication events with Indigenous communities.
18. Number of public events, conference presentations, jointly authored/published papers with Indigenous participants/contributors.	10	Projects 1.3.2, 1.3.3, 2.3, 2.5 ,5.3 and 5.5 held events with Indigenous participants/ contributors.

NESP impact stories

NESP impact stories are provided in Attachment B. These stories showcase the contribution of NESP funded research to the environment, the economy, society, culture, public policy, quality of life, beyond contributions to academia.

NESP impact stories are particularly useful to demonstrate:

- how the research conducted by the hub has been used to inform on-ground action or policy
- how the hub has collaborated with research users to better understand decision-makers' needs or the key question research needs to address
- how the hub using innovative approaches to connect science with policy/decision making
- how the hub is successfully including Indigenous Australians in the work of the hub
- how the hub has improved the national environmental information base

The following impact stories are outlined in Attachment B:

1. [Wiltma Nargun Lahan: Walking on Wagiman Land](#)
2. [Science and community collaboration achieving results in feral animal management](#)
3. [Valuing Indigenous Protected Areas \(IPAs\) and other complex social and environmental goods and services](#)
4. [Identifying lessons for fire management in Northern Australia](#)
5. [Remote environmental monitoring in Northern Australia](#)
6. [Working with Government staff to help maximise research impact](#)
7. [Managing North Queensland's endangered tropical littoral rainforest](#)

Hub-level risk management

All risks identified in the Hub risk management plan are being actively managed. Management processes are in place for the ongoing management of risk, through the Hub Leadership Group, Research Executive Committee, Hub Steering Committee and at the project leadership level.

Actions identified in the Risk Assessment and Treatment Plan have been implemented as appropriate. The most significant actions in 2017 have occurred around the following risks:

- Loss of key personnel (has required replacement personnel)
- Difficulties attracting and retaining Indigenous partners to engage in work on their land (some delays have occurred in finalising Research Agreements)

These risks have all been effectively managed and processes are in place to ensure that they are effectively managed in 2018 and beyond. There have been no new risks identified in the Hub Risk Management Plan since the approval of RPV4 in December 2017.

Financial information

Annual financial reporting

Financial information for the Northern Australia Environmental Resources Hub is provided at Attachment C and includes:

- Income and expenditure statement
- Recipient and Other contribution statement
- Asset Schedule
- Audit report



National Environmental Science Programme

www.nespnorthern.edu.au

The Hub is supported through funding from the Australian Government's National Environmental Science Program.



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