

## Preface

The Environmental Research Institute of the Supervising Scientist (*eriss*) is part of the Supervising Scientist Division (SSD) of the Australian Government's Department of Environment, Water, Heritage and the Arts (DEWHA). *eriss* provides specialist technical advice to the Supervising Scientist on the protection of the environment and people of the Alligator Rivers Region from the impact of uranium mining. A major part of its function is to conduct research into developing best practice methodologies for monitoring and assessing the impact of uranium mining on water and air (transport pathways) and soil, and on the bushfoods that are consumed by the local indigenous people. This research spans the operational, decommissioning, and post rehabilitation phases of uranium mining in the ARR.

*eriss* also applies its expertise to conducting research on the sustainable use and environmental protection of tropical rivers and their associated wetlands, and engaging in a limited program of contract research on the impacts of mining elsewhere in the northern tropics.

The Supervising Scientist series of reports (SSRs) has documented the evolution of the uranium research program and the broader scientific activities of the Institute since 1995. The SSRs are subject to a rigorous technical review (including formal external peer review) and editorial process and are produced by SSD's publications section. They complement publication of the Institute's work in peer-reviewed journals.

The first SSR (number 101) was published in 1995. This latest SSR (number 200) represents a major milestone in the life of the Institute, not simply because it is the 100<sup>th</sup> SSR, but much more importantly because it documents a major evolution in the scope and nature of the physico-chemical and in situ biological monitoring components of the water quality monitoring program being conducted adjacent to Ranger mine. This evolutionary change is the culmination of many years of research into the development and validation of new approaches that aim to provide a more robust level of environmental assurance.

The balance and strategic prioritisation of work within the uranium component of *eriss*'s project portfolio is defined by Key Knowledge Needs (KKNs) originally developed in 2004 through consultation between the Alligator Rivers Region Technical Committee (see ARRTC membership and function in Appendix 2), the Supervising Scientist, Energy Resources of Australia and other stakeholders. The KKNs comprise six thematic areas based primarily on geographic provenance (Appendix 3). The content of the research programs developed for each of these areas is assessed and reviewed annually by ARRTC in consultation with stakeholder groups.

At the time the original KKNs were formulated in 2004, Ranger mine was planned to close in 2011. However, following substantial increases in the market price of uranium and the identification of additional resources, it is now expected that processing will extend to at least 2020, with rehabilitation to 2026. As a result of this extension in mine life and the conduct of three years of research since the original KKNs and timeline priorities had been established, as well as the Jabiluka project now being in care and maintenance for an indefinite period, it was judged by ARRTC that a revision of the KKNs should be conducted in 2007–08. This was done and a revised list of KKNs approved by the committee.

The original (2004–2006) KKNs are listed in Appendix 3A and the new (2008–2010) KKNs are listed in Appendix 3B so that the updates that have been made can be clearly identified. The KKN numbers that are used in this report correspond to those in Appendix 3A since the

2007–08 projects were initiated when these KKN numbers were extant. From 2008–09 onwards the KKN numbers in Appendix 3B will apply.

Not all of the KKN research areas are able to be covered by *eriss*, since not all of the required disciplines are available within the Institute. To address these gaps, collaborative projects are initiated with researchers from other organisations. KKN projects related to the detailed hydrogeology or tailings management on the Ranger lease are conducted and reported separately by consultants engaged by Energy Resources of Australia Ltd.

This report documents research projects undertaken by *eriss* over the 2007–08 financial year. In contrast to the preceding wet seasons of 2005–06 and 2006–07, both of which had well above average rainfall and extreme events (a cyclone and 800 mm in three days, respectively), the 2007–08 wet season rainfall of 1658 mm was only slightly above the average of 1500 mm. This ‘normal’ wet season provided the opportunity to finish several important projects that had been put back by the damage done to monitoring systems infrastructure by the extreme events.

The uranium mining related section of the research summary has been structured under six main headings, consistent with the KKN framework:

- 1 Ranger – Current Operations
- 2 Ranger – Rehabilitation
- 3 Jabiluka
- 4 Nabarlek
- 5 General Alligators Rivers Region
- 6 Knowledge Management and Communication

Three maps (following this Preface) provide the regional context for the locations that are referenced in the research papers. Map 1 shows Kakadu National Park and the locations of Ranger mine, Jabiluka project area, the decommissioned Nabarlek mine, and the South Alligator River Valley. A schematic of the Ranger minesite is provided for reference in Map 2. Map 3 shows the locations of waterbodies and atmospheric monitoring sites used in the SSD environmental monitoring programs for assessing impacts from Ranger mine.

The final section of the report contains a list of the non-uranium mining related external projects.

For additional information, readers are referred to the annual publications list (Appendix 1) that details all of the material published, and conference and workshop papers presented by *eriss* staff in 2007–08.

**Dr DR Jones**

*Director, Environmental Research Institute of the Supervising Scientist*