Wetland research at *eriss*

eriss has a particular interest in wetland research, and in making research results available to managers in a form that will assist them in their management planning. The ***eriss*** Wetland Protection and Management Program aims:

To conduct research and provide information for the conservation and sustainable development of wetlands in tropical Australia

In the wet-dry tropics there are large information gaps, where the information base needed for effective wetland management is not available. ***eriss*** conducts research on wetlands to fill those gaps, using internationally-recognised procedures.

The ***eriss*** Wetland Program is multi-disciplinary and holistic. The program is divided into three broad areas:

1 Understand the ecology of wetlands

- develop techniques to classify wetlands and to enhance, at a national and regional scale, the collection of ecological and sociological information for management
- identify and quantify the value and role of wetland components, processes, functions, products and attributes
- develop data and information management systems to assist wetland managers

2 Identify and assess threats to wetlands

- develop and apply a risk assessment framework for assessing the ecological and sociological impacts of threats to freshwater, estuarine and coastal ecosystems
- develop and refine techniques appropriate for assessing the extent of threats, including mining, to freshwater, estuarine and coastal ecosystems
- develop criteria and standards for assessing the extent of threats to wetlands

3 Provide advice on the wise use, protection and restoration of wetlands

- develop procedures to monitor and assess the extent of changes to freshwater, estuarine and coastal ecosystems
- collate information and provide advice on management planning and implementation of wetland monitoring programs
- develop procedures to assess and audit the effectiveness of wetland management actions and planning processes

These goals and research activities overlap and reflect the complex, interactive nature of wetland management. ***eriss*** is keen to develop partnerships and demonstrate that research can play a greater direct role in ensuring protection and effective management of wetlands. These partnerships involve other research and land/water management agencies and, importantly, local wetland owners, users and managers.

Tropical wetlands can undergo dramatic change throughout the year. Dry creekbeds become raging torrents during the wet season, when waterfalls thunder over the escarpment, flooding the creeks and rivers and bringing the floodplains 'alive' (M Saynor).

eriss *carries out scientific research for the protection of people and the environment in places that are highly valued by the Australian community.*

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WETLANDS IN AUSTRALIA'S WET-DRY TROPICS

The wet-dry tropics

About one quarter of the world's tropical land mass is classified as wet-dry. The wet-dry tropics are characterised by two broad seasons – a cool/warm dry season and a warm, humid wet season. The climate is strongly seasonal and most rainfall occurs over just three months of the year. Australia's wet-dry tropics extend across the north of the continent and south-east along part of the Great Dividing Range (see map).

The wet seasons are spectacular, with dramatic lightning displays, extensive flooding and lush vegetation growth. There is a high risk of cyclones along the coast at this time of year. It is a time for many animals to breed, including crocodiles, fish, water birds and frogs. In the dry season that follows, many floodplains and waterholes dry up and annual burning begins in the savanna woodlands. The few permanent creeks, rivers and billabongs become important refuge areas for many animals in these warm, dry months.

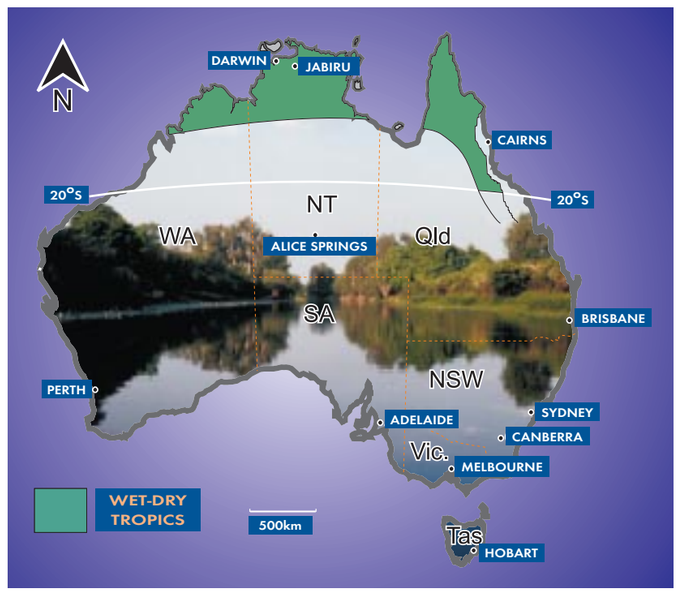
Wetlands

Rivers, billabongs, seasonally-flowing streams and floodplains are wetlands. So are mangrove forests, coastal salt flats and man-made dams or sewage ponds. The Ramsar Convention for Internationally Important Wetlands defines wetlands as 'areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, brackish or salt, including areas of marine water the depth of which does not exceed six metres'.

With such a broad definition the wet-dry tropics are literally awash with wetlands!

eriss includes this broad spectrum of wetland habitats in its research program. In this program we aim to provide information that can be used to protect and manage wetlands on a catchment basis. Wetland habitats in the wet-dry tropics include:

- escarpment streams
- waterfalls and plunge pools
- lowland permanent or seasonally-flowing streams
- permanent billabongs or lagoons
- flood basins and plains
- estuaries and seagrass beds
- tidal reaches of streams
- mangroves and salt flats



*The confluence of Magela Creek and the East Alligator River, Kakadu National Park. As Ranger uranium mine is located in the catchment of Magela Creek, **eriss** carries out long-term research and monitoring of its ecosystem in order to detect potential mining impacts (M Saynor).*

Why are wetlands important?

To flora and fauna

Wetlands are highly productive areas and support plants and animals, big or small. Crocodiles, fish, turtles and a great many bird species feed, breed and live in the wetlands all year round. The lifecycles of many insects and frogs are intimately linked to the temporary existence of puddles and pools in the wet season. Migratory birds feed in wetlands along their migration paths and many visit the Top End of Australia annually.

Barramundi (*Lates calcarifer*) is a good example of the importance of protecting all types of wetlands, as they live in the upper reaches of rivers and streams until maturity, and then travel down to the sea to breed in the estuaries. Many other fish migrate upstream to breed. Magpie geese and egrets are just two of the bird species that breed in the wetlands.

To people

Wetlands are also important to people. Australia's indigenous Aboriginal people have strong cultural ties with wetlands and their flora and fauna. People hunt and gather food on the wetlands, and lilies, fish and turtles etc are depicted in Aboriginal art. Unique plants found in the wetlands have valuable medicinal qualities.

Tourists from Australia and all over the world value the wetlands of Australia's Top End, demonstrated by high visitor numbers to the spectacular wetlands of Kakadu National Park, Litchfield National Park and the Mary River.

The complex relationship between water flow, flora and fauna within wetlands filters water, absorbing wastes and pollutants. Mining companies actually build artificial wetlands to act as filters of mine wastes.

In the wet-dry tropics, pastoralists graze cattle on the floodplains during the dry season, taking advantage of the high productivity of tropical wetlands.

Wetlands also act as a buffer zone in the case of tidal surges and flooding, especially during cyclones in the wet season.

Floodplains are a rich source of food for indigenous people throughout the wet-dry tropics. Water lily stems and seedheads are favourite traditional foods collected by Aboriginal people in Kakadu National Park (M Saynor).

Worldwide

Wetlands are also important on a worldwide scale. Increasingly threatened by drainage, pollution, introduced pest species and economic development, wetlands are fast disappearing. As each wetland is different, its unique biodiversity is often lost when it is destroyed. Global climate change could have a serious impact upon coastal areas and, in particular, the coastal wetlands that provide a buffer against sea level rise and tidal surge. Recognition that destruction of wetlands is a serious worldwide problem has resulted in the formation of various international treaties which aim to protect wetland flora and fauna. wetlands of high natural and/or cultural value can be listed under the World Heritage and the Ramsar Wetland Convention. These treaties encourage governments and land managers to use the principles of wise use and ecological sustainability when managing wetlands.

Escarpment wetlands such as Baroalba Springs in Kakadu National Park often support unique, rare or endemic species (M Saynor).

Threats to wetlands

Wetlands in the wet-dry tropics of Australia face a number of increasingly serious threats including:

- invasion by exotic plant species, eg salvinia (*Salvinia molesta*), mimosa (*Mimosa pigra*) and para grass (*Brachiara mutica*)
- damage from feral animals, eg buffalo, pigs and horses
- drainage, vegetation clearance and development
- saline intrusion and rising sea levels associated with climate change
- inappropriate or altered fire regimes
- inappropriate pastoral practices
- potential impacts from mining, eg gold, bauxite, uranium
- decreased water quality and interruption of natural flow regimes, eg ponded pastures, mining, irrigation.

As wetlands are important and dynamic areas, subject to natural and human influences, it is vital that action is taken to preserve their biological diversity and productivity. Research is needed to determine the functions and biodiversity of wetlands in the wet-dry tropics, so this information can then be used to plan the wise use of the wetlands.

Management plans can be drawn up, with the overall agreement of owners, occupiers and interested parties, to help juggle the management options yet keep the unique character of a wetland intact.

Salt water intrusion has severely degraded vast areas of the Mary River floodplain, adjacent to Kakadu National Park. In the past, large numbers of feral buffalo trampled natural barriers along the coast that had protected the floodplain from saline intrusion. This area is now extremely vulnerable to sea level rise due to climate change (CM Finlayson).