



National Environmental  
Research Program

NORTHERN AUSTRALIA HUB

# PROTECTING BUSH TUCKER

RESEARCH BY SAMANTHA SETTERFIELD, SUE JACKSON AND COLLEAGUES HAS IDENTIFIED KEY STRATEGIES TO PROTECT BIODIVERSITY AND BUSH TUCKER BY TURNING BACK THE CLOCK ON INVASIVE PLANTS IN THE FLOODPLAINS OF KAKADU'S NATIONAL PARK.

Kakadu National Park is globally recognised as a living cultural landscape. To this day, it continues to provide opportunities for Indigenous people to fish, hunt and gather bush tucker. Much of these traditional resources are found in the Park's spectacular floodplain wetlands. A major drawcard for tourists, these unique ecosystems are bursting with wildlife and hold great cultural significance for Indigenous landowners.

Two invasive plants are, however, posing a threat to these wetlands and the way of life they support. Para grass (*Urochloa mutica*) and olive hymenachne (*Hymenachne amplexicaulis*) are historical legacies of previous land use that Kakadu is dealing with. These exotic grasses have spread extensively in the Park's freshwater communities. With so much at stake, a team

of researchers, Kakadu staff and Traditional Owners have been working to determine the most effective strategies to manage the weed threat. The research team includes experts from Charles Darwin University, Griffith University and the CSIRO, funded by the Australian Government's National Environmental Research Program, in collaboration with the Northern Territory Government.

## Unwelcome tourists

Para grass and olive hymenachne were first planted in, or near Kakadu in the 1940s and 1980s respectively. The highly invasive, semi-aquatic species were promoted as effective grasses to feed livestock, but their introduction has come at a significant cost to the World Heritage listed park.



Kakadu has been working to minimise the impact of these invasive weeds, which can choke out native grasses, destroying aquatic habitat and reducing food for native fauna in the process. For example, the grasses can take over areas of water chestnut (*Eleocharis*), an important food for magpie geese, as well as areas of wild rice where the geese feed and nest.

“These invasive grasses also have different fuel characteristics to the native grasses they replace. Para grass produces about twice the dry season fuel of wild rice. This threatens turtles that nest in the floodplain soil during the dry season,” said Associate Professor Samantha Setterfield.

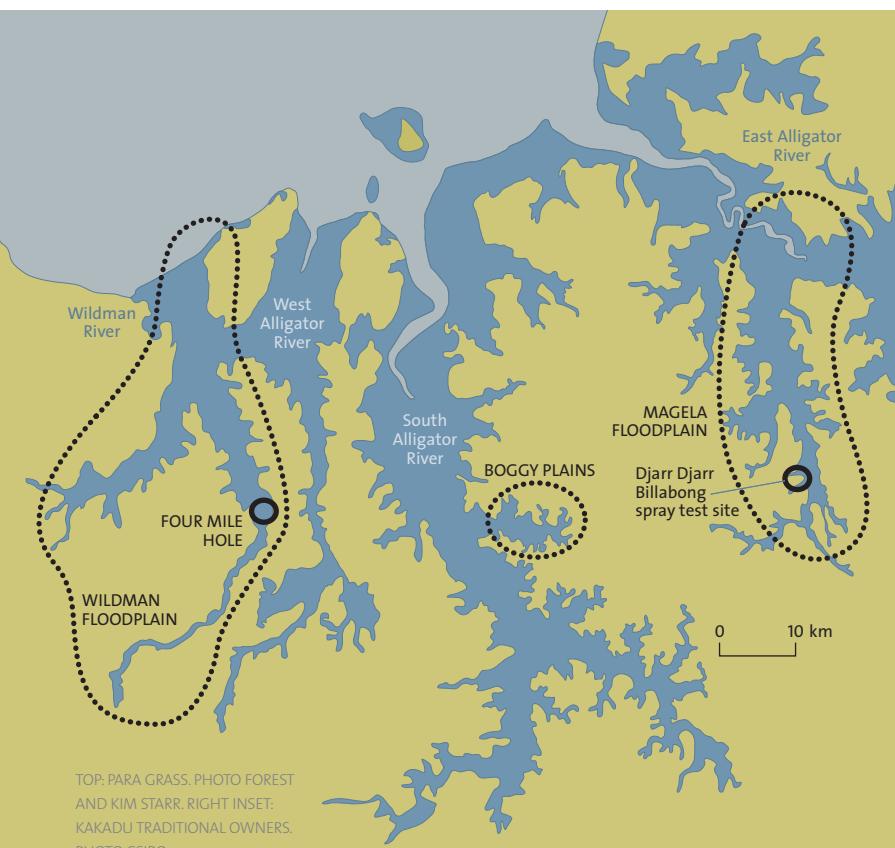
The important initial step of the research was to determine the extent of the weeds and how quickly they were spreading. The team undertook helicopter-based aerial surveys of all of Kakadu’s floodplain area. This showed that para grass now covers more than 3200 hectares of Kakadu, mainly in the Magela and Wildman floodplains, and new populations are continuing to be reported. Some of the patches are large and dense, while other infestations are still scattered and small. Olive hymenachne, which was first recorded in Kakadu in 2001, also occurs in scattered infestations across Kakadu’s floodplains, with a large infestation on the Wildman floodplain.

Based on knowledge about the history of invasion and maps of the current pattern of invasion, the researchers were able to build a model that predicts future patterns of spread. This provides an important tool for determining the long-term threat of these weeds to Kakadu’s biodiversity and cultural resources.

## Indigenous participation

To respond to concerns from Traditional Owners and better understand the impacts weeds were having on Indigenous livelihoods, the researchers sought input from Traditional Owners affiliated with the floodplains of Kakadu. Thirty-seven Traditional Owners helped to describe and map areas of cultural and economic importance, such as sites used for hunting and fishing. The results showed that almost a quarter of the floodplains were being used for hunting and gathering. Many of the participants were able to describe the harmful impacts of these weeds first-hand. One Traditional Owner told researchers para grass has damaged a highly valued river system.

“I go to Four Mile Hole—beautiful turtle place, nearly every year and to Boggy Plains. Para grass changes it. It’s like a spring, a mat. Turtle sits underneath, harder to get them out. Donkeys, pigs, spread it. One day it’s going to be over-run. There were never any weeds here until they started to bring feed in for the cattle,” she said.





## Comparing weed management strategies

Kakadu has a weed management strategy in place, and a strong focus on floodplain health as part of its Threatened Species Strategy. This research adds an extra layer of data to that work, providing models to help the Park tailor its weed control work to have the greatest impact.

To assist Park managers to make strategic decisions about protecting floodplain resources from weeds, the researchers developed a model that could compare the future patterns of invasion if different weed management activities were undertaken. The project team evaluated the performance of several strategies in Kakadu over a 20-year period.

“We considered three management scenarios, as well as associated costs and benefits,” said postdoctoral researcher Dr Vanessa Adams. “The first was simply no additional management, which was used as a base from which to compare the other scenarios. The second involved a strategic weed management approach to contain and control infestations. The last scenario considered the same management approach, with the addition of actions to help Traditional Owners regain access to important bush tucker sites, which have become overrun by weeds.”

The final strategy that both supported weed management and Indigenous values delivered the greatest cultural and biodiversity benefits. “Under this scenario, significant progress can be made in slowing the spread of weeds, protecting the habitats of key species and in achieving the recovery of many hunting sites. For example, our results showed that without weed control, about a fifth of magpie geese hunting sites and one-third of turtle hunting sites would be impacted,” Vanessa said.

### FOR FURTHER INFORMATION

Samantha Setterfield—[samantha.setterfield@cdu.edu.au](mailto:samantha.setterfield@cdu.edu.au)  
[www.nerpnorthern.edu.au/research/projects/32](http://www.nerpnorthern.edu.au/research/projects/32)

The final scenario was the most costly—almost double the budget of the second scenario for an initial management period, however, Associate Professor Sue Jackson says further cultural benefits could outweigh these initial costs.

“These costings can help Park managers plan their weed management activities and make strategic choices about investments in weed control over many years. In Kakadu, Traditional Owners have a widely recognised role in environmental management and this strategy presents further opportunities to employ Aboriginal rangers and maintain connections to country.”

## Lessons from a fine example

While controlling these two invasive grasses will be an ongoing battle, action taken by Park staff and Traditional Owners to manage the threat from the alien shrub *Mimosa pigra*, has been widely used as a case study of best practice.

The shrub was first discovered in Kakadu in 1981 and a strong management approach was implemented soon after. A team of four people dedicated to its eradication has been operating for almost 30 years—locating, mapping and destroying new populations. Samantha warns, however, that the gains made by eradicating mimosa from floodplains will be lost if those same floodplains become invaded by alien grasses, and urgent decisions need to be made about protecting the floodplains’ key biological and cultural assets.

“This research will help Park management, including Traditional Owners, plan strategies that not only prioritise the management of weeds, but deliver additional biodiversity and cultural values,” she said.

“It is critical that these values are protected. Floodplains outside of Kakadu are being degraded by many threats, including weeds and feral animals, and facing the impact of sea level rise. Future research will consider the current health of all of the region’s floodplains and we will apply the modelling approach developed by NERP to improve strategic management at the regional scale.”



ABOVE: HYMENACHNE. PHOTO ROCHAE CAMERON.

MAIN: MIMOSA PIGRA. PHOTO NORTHERN TERRITORY GOVERNMENT, WEED MANAGEMENT BRANCH.

INSET: MAGPIE GOOSE. PHOTO BENJAMINT444 (WIKIMEDIA COMMONS).