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## Logic the key to Lake Eyre Basin clean-up

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**Australia's Lake Eyre Basin is as big as Italy, Germany and France combined. It's one of the world's largest internally draining basins, drained by one of the world's most variable river systems – the Georgina, Diamantina and Cooper. Rich in Indigenous culture, the Basin is also home to some of the rarest, least exploited ecosystems on the planet.**



Credit: Jennifer Firm

This huge tract of land is changing as a result of mining and petroleum extraction, irrigated agriculture, tourism and climate change.

Another major threat for environmental managers – identified in the 2009 [Lake Eyre Basin Rivers Assessment Implementation Plan](#) – is the rapid establishment and spread of exotic plants.

Until now, a basin-wide assessment had not been completed showing whether investments in weed control are making the best use of scarce conservation dollars to provide tangible biodiversity outcomes for the Basin. With limited resources to manage all invasive species over the Basin's 120 million hectares, prioritisation of management strategies is essential.

With the aid of National Environmental Research Program (NERP) funding, a team from the CSIRO, Queensland University of Technology, University of Queensland and Environmental Decisions Group brought together key experts and stakeholders – including policy makers, managers, scientists and community representatives – to identify and prioritise the most cost-effective weed control strategies using a decision-analysis approach.

CSIRO has just published [the work](#), which effectively provides land managers with a cost-effective framework for

investing in weed prevention and control across Lake Eyre Basin.

The experts and stakeholders agreed on 12 possible strategies that could be applied to managing invasive plants in the Basin.<sup>1</sup>

These strategies focused on the 10 weeds most likely to significantly disturb natural ecosystems in the next 50 years and for which feasible management strategies existed. The weeds are mesquite, parkinsonia, rubber vine, bellyache bush, cacti, mother of millions, chinee apple, athel pine, buffel grass and prickly acacia. Seven of these 10 are [Weeds of National Significance](#).



Credit: Jennifer Firm

One of the 12 strategies proposed eradicating all invasive plants – not just the 10 ‘weeds of interest’ – from the mound springs of the Great Artesian Basin. Mound springs are recognised as threatened ecosystems.

The total cost of implementing all 12 strategies over the next 50 years was estimated at \$1.7 billion. This would result in 17 million ha of land being reclaimed from weed dominance, either by reducing current invasions or avoiding future spread of invasions. This is a 32 per cent reduction from 50 year projected coverage, and an area equivalent to 14 per cent of the Lake Eyre Basin.

However, if only strategies targeting Weeds of National Significance were adopted, the total cost would come down to \$113 million over the next 50 years.

If the Great Artesian Basin Mound Springs were the key priority, \$2.3 million would be required over the next 50 years to eradicate all invasive plant species from these threatened ecological communities.

Our analysis showed that the top five most cost-effective strategies for the entire Lake Eyre Basin were those aimed at controlling parkinsonia, chinee apple, mesquite, rubber vine and bellyache bush.

While chinee apple and mother of millions are not Weeds of National Significance, they have comparatively small populations in the Queensland portion of the Lake Eyre Basin. Our experts saw an opportunity to eradicate these weeds before they had the chance to develop into high-impact species. Eradication of prickly acacia was estimated to have one of the highest benefits, but because the costs of the strategy were high, it was ranked sixth overall.



Credit: Jennifer Firm

This research showed the risks of not undertaking these management strategies include the likely conversion of 14 per cent of the entire basin to weed domination, and a high likelihood of the mound springs ecosystems being lost forever.

Reducing the dominance of an invasive plant species and increasing native species diversity can have added benefits for many key ecosystem services including nutrient cycling, carbon sequestration, drought tolerance, hydrological flows and resilience to changing perturbations such as the ability of a plant community to recover after a fire.

The research also identified a number of important co-benefits of weed control, particularly for pastoralists and Indigenous communities.

Grazing is the major land-use in the Basin, at 82 per cent of the total land area. Weed control is estimated to cost more than A\$300 million per year in Australian livestock industries, but despite this substantial expenditure, yield losses attributed to weeds continue to be more than A\$1.5 billion in this industry. Therefore investing in invasive plant control for biodiversity benefits will have co-benefits for the livestock industry.

Another major benefit is the opportunity for Indigenous employment, often through Indigenous rangers, for weed control.

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1 The 12 strategies and actions are: a prevention and monitoring program for all weeds; targeting mesquite; targeting parkinsonia; targeting rubber vine; targeting buffel grass; targeting bellyache bush; targeting cacti (e.g. coral, harissia, devil's rope); targeting mother of millions; targeting chinee apple; targeting athel pine; targeting prickly acacia; and targeting Great Artesian Basin Mound Springs (threatened ecological communities).

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