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Feral Herald

Newsletter of the Invasive Species Council, Australia

working to stop further invasions

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Contents

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Peak Weed Body Killed

Farmer groups, agronomists and environmentalists are stunned by news that Australia's peak weed organisation, the Cooperative Research Centre for Australian Weed Management (Weed CRC) will lose funding after mid-2008. (See www.weeds.crc.org.au/main/weeds_crc_to_end.html).

Prickly acacia - one of the many major pests the Weeds CRC has worked on.

The CRC failed in its bid for third term funding (as the 'Invasive Plants Cooperative Research Centre') because it has not met strict commercialisation criteria. The Weed CRC delivers enormous benefits to Australia through research and education, but does not produce much in the way of saleable products, and it was for this narrow reason that its application failed.

The CRC estimates that it delivers a benefit to cost ratio of 55:1, much higher than most government spending. Australia will be left without a national organisation to coordinate weed research and delivery.

We find it unbelievable that the CRC could be left to die at a time when our weed problems are growing rapidly and awareness is also growing. The Minister for Fisheries, Forestry and Conservation, Senator Eric Abetz, was also disappointed, writing to the minister responsible, Julie Bishop, saying: 'I would be grateful if you could urge those responsible for this decision to reconsider'.

The Invasive Species Council has also written to Julie Bishop, the Minister for Education, Science and Training, expressing regret at this short-sighted decision.

The Weed CRC became a vocal critic of the Weed Risk Assessment loophole, and one may wonder whether this made it unpopular in some sections of

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Tim Low signs on as campaigner for ISC...

President Barry Traill introduces Tim Low as ISC's new Project Officer.

(**see page 3**)

government. CEO Dr Rachel McFadyen hopes the CRC can be kept alive by some alternative funding arrangement.

One of the CRCs that has won funding ($34 million) is the Future Farm Industries CRC, which will develop out of the current Salinity CRC. According to the Department for Education, Science and Training website:

> *'The Future Farm Industries CRC will develop innovative farming systems and new regional industries, based largely on perennial plants, to transform dryland agriculture across southern and eastern Australia. These perennial plant based systems will provide profit advantage over existing systems, substantial natural resource benefits both within and beyond the boundaries of farms, and greater adaptability to Australian conditions. The research which will be conducted in partnership with producers, will deliver new perennial plant species and cultivars.'*

New farming systems that use new plants often create new weed problems as some of the new plants escape from cultivation. Rather than funding a CRC that will reduce our weeds the government has funded one that may well worsen them.

To be fair, the current Salinity CRC does recognise that new plants may pose a weed threat. Some of the plants they promote will probably be Australian plants, but promoted for use outside their native ranges, because Australia's most salt-tolerant plants do not occur naturally in the regions where salinity is an emerging problem.

- Tim Low

To learn more about the activities of the Weed CRC, see www.weeds.crc.org.au.

A report on *An Economic Evaluation of the Research Benefits and Returns on Investment in the Invasive Plants Cooperative Research Centre* can be found on their website at www.weeds.crc.org.au/documents/tech_series_12.pdf

Over the Garden Fence and Far Away - Communities' Actions on Weeds

Thursday 19 April 2007
Burrinja Community Centre & Gallery
Matson Road, Upwey

- ❒ What are the problems that face community groups attempting to clear an area of weeds?
- ❒ What can they do to clean up a weedy area so that it doesn't become a sea of weed seedlings?

9.00 am - Seminar
1.30 pm - Field Trip
4.30 pm - Weed Society of Victoria AGM

Presented by
Weed Society of Victoria
phone: 03-9576 2949
www.wsvic.org.au
secwssv@surf.net.au

"Not all of the 225 exotic bird species held in captivity have been assessed for their capacity to establish in the wild, and the security of high-risk birds seems inadequate"
- From *The State of Australia's Birds 2006*.
see report, page 6

Join the ISC...

Keep informed, and lend your weight to our important campaigning efforts on Invasive Species.

See the **membership form** at the back of this newsletter.

In this issue...

This issue highlights the federal government's astonishing decision to cease funding of the Weed Management CRC. (**page 1**)

On **page 4,** we report on the coverage of invasives in the new federal State of Environment report.

Lauren Barrow of Parks Australia North updates us on research and management of the Crazy Ant threat on Christmas Island. (**page 5**)

Elsewhere, we introduce a new report on the impact of invasives on native bird populations; and the creation of the new 'Biosecurity Queensland' agency. (**page 6**)

The downplaying of the significant proportion of weeds attributed to government introductions of potential pasture grasses and legumes is the conclusion of a new CSIRO report, introduced on **page 7**.

Page 8 has Updates on the Biofuels and Bumblebee issues, raised in earlier *Feral Heralds*.

On **page 9,** the Weeds CRC discusses the new role of NRM Regions, or Catchment Management Authorities, in managing weeds at the landscape scale.

On **page 10,** new ISC Councillor, Emilie-Jane Ens introduces us to research on bitou bush invasion ecology at the University of Wollongong.

From the President...

We have been most fortunate in getting Tim Low to sign as part-time Project Officer for the ISC. Tim is well known to members as the person who more than anyone else has increased public understanding of invasives to the Australian public - through his book *Feral Future*, and through an enormous amount of voluntary work giving talks, talking to journalists and writing articles on the invasives threat to Australia.

Tim has already contributed enormously to ISC through a multitude of work such as submission writing and providing a prolific flow of articles for the *Feral Herald*.

We are very pleased that Tim applied for the campaigner position. Tim was of course a stand out candidate with his great depth of knowledge on invasives of all types in Australia, his well known public face on invasive issues, his exceptional networks of people working on the issue, and his great passion and energy to stop further invasives getting established.

Taking on the position will give him extra time to focus on getting wins on the invasives front. Tim's first job is to sort through where he can make the biggest difference with the project time he has. He has already identified invasive 'tramp ants' as potentially deserving much more action, to stop species such as the crazy ant and electric ant from becoming established here (see *Feral Herald 1:13*).

Welcome Tim!

Barry Traill
President,
Invasives Species Council

WRA Loophole Now Closed

The loophole in Weed Risk Assessment - by which half the world's plant species could be introduced to Australia without undergoing any assessment - has now been closed (see *Feral Herald 1:8* and *1:3*). In December, Biosecurity Australia completed its 'permitted seeds list review'.

We thank those ISC members who responded to our call by writing to ministers Warren Truss and Ian Campbell.

ISC broke the news about the existence of the loophole in its April 2003 newsletter. WWF and the Weeds CRC later became involved in the campaign to have it closed.

New State of Environment Report

Previous State of Environment Reports have under-rated the problem posed by invasive pests, and Australia's third SOE report, released on 6 December 2006, has continued this tradition.

The introduction to the section on Biodiversity, under the heading Pressures on Biodiversity, has this to say:

> *'While clearing has been one of the main pressures, it is likely that climate change and urban development, infrastructure, and water extraction will soon dominate. For aquatic systems, the two main pressures are water extraction and habitat loss.'*

'Weeds and Feral Animals' are covered after sections on Clearing, Changed Fire Regimes, and Total Grazing Pressure. The relevant text is superficial and disappointing.

Given that invasive pests have been the main cause of vertebrate extinctions in Australia so far, it is inexplicable that urban development and infrastructure could be proposed as greater threats. This distorted view presumably reflects the urban bias of the authors.

A supporting theme commentary on Biodiversity, by Steven Cork, Paul Sattler and Jason Alexandra, provides a more interesting read. It was published along with the SOE report but is not part of it. Here is an extract:

> 'Since SoE2001, increased attention has been given to protecting Australia from the threat of new invasive plant species, with a focus on the routes of invasions and integrated legislation, policies, plans and processes that aim to enhance national biosecurity. A recent analysis of weed introductions concluded that ornamental horticulture (the gardening industry) exceeds all other industries in terms of introducing new plants species, including many agricultural and environmental weeds (Australian Biosecurity Group 2005).
>
> 'A number of gaps in Australia's suite of responses to invasive organisms have been identified, including: gaps in quarantine laws; inadequate early warning surveillance; mismatches between laws in different states; inadequate contingency plans for environmental weeds, pests and diseases; inadequate approaches to integrated control of agricultural and environmental pests; inadequate funding for controlling environmental invasive species; inadequate protocols to decide priorities and who pays; poor sharing of information; and lack of community awareness. (Australian Biosecurity Group 2005)
>
> 'The deliberate spread of some aggressive introduced pasture species and the lack of protocols for their use as part of pastoral development remains a key biodiversity issue.
>
> 'It has been noted that public resources committed to invasive organisms appear to be small, particularly compared with expenditure on other natural resource management issues, the economic and environmental impacts of invasives compared with other issues, and the relatively high benefit-cost ratios reported from analyses of research and development on invasive organisms (Agtrans Research and Dawson 2005)…
>
> 'In early 2005, the Australian Government agreed to remove 4000 known weeds not yet present in Australia from the permitted list under the Quarantine Proclamation 1998. Because of the costs of invasive organisms and the risks they could pose to Australia's diversity of ecosystems, it would be prudent to go further and place the burden of proof on proponents of any new introductions, with new species planned for introduction being considered potentially invasive until proven benign.'

The SOE report and theme commentaries are available at http://www.deh.gov.au/soe/2006/index.html

by Tim Low

Risk Assessment Pays

A new paper published in December shows that risk assessment, when applied to new plant imports, saves Australia many billions of dollars.

The paper, written by Americans Dr Reuben Keller and Professor David Lodge from the University of Notre Dame in Indiana, appearing in the *Proceedings of the National Academy of Sciences* in December, was written to help persuade the United States government to introduce a similar system.

Christmas Island Crazy Ant Update

Lauren Barrow,
Yellow Crazy Ant Project Officer,
Parks Australia North, Christmas Island

Ants are globally recognised as among the world's worst invaders. Having survived as a group for more than 100 million years, they are older than most living orders of mammals and birds.

More than 150 species are recognised as invasives, having the potential to disrupt both ecosystems and economies. In its attempts to control the spread of invasive ants the Australian Government has invested more than $245 million.

Christmas Island, located 2600 km north west of Perth, is home to 53 species of introduced ants, more than any other island and most biogeographical regions in the world. Whilst the majority of these ants are unlikely to affect ecosystem integrity, three are highly invasive pests: the yellow crazy ant or long legged ant *(Anoplolepis gracilipes),* big-headed ant *(Pheidole megacephala)* and tropical fire ant *(Solenopsis germinata).*

Crazy ants were introduced to Christmas Island in the early 19th Century and an explosion of supercolonies in the mid nineties has resulted in 'invasional meltdown' of rainforest across the island.

Crazy ants displace populations of a keystone species, the endemic red land crab *(Gecarcoidea natalis),* causing a cascade of ecological impacts. Extermination of the herbivorous red crabs and local reduction of canopy trees due to exploding scale insect populations, which the ants protect, is changing the structure of rainforest across the island. In 2002 it was estimated that crazy ant supercolonies covered more than 20 per cent (2500 ha) of the Island.

Over the past seven years, the Australian Government has spent $2.5 million on the control of crazy ants on Christmas Island. In 2002, Parks Australia conducted a highly successful aerial baiting campaign. Twelve tonnes of Fipronil, a non-specific neuro-toxin, in a fish meal matrix was used to bait more than 2400 ha of ant supercolonies. Ant densities within baited areas were reduced by up to 98 per cent.

Since 2002, a ground baiting team has continued to monitor and bait developing supercolonies, baiting more than 1000 ha over the past four years. Despite this, supercolony expansion rates are always 200-300 ha ahead of the ground baiting team. Crazy ant supercolonies are expanding exponentially; currently they are spreading at a rate of 400 ha per annum, covering more than 4 per cent of the island.

In addition to this, many of the inaccessible limestone cliffs along the island's coast baited during the aerial campaign are becoming reinfested with supercolonies.

This uncontrollable rate of expansion, re-colonisation of baited areas and increased concerns about the non-target impacts of fipronil, has raised questions about the long term viability of the use of such a non-specific neuro toxin. It has become clear that without the development of a more effective bait and method of dispersal, control of crazy ants on Christmas Island will remain an unrealistic management objective.

In September this year, Parks Australia began bait trials using two invertebrate toxins, Indoxacarb and Hyrdamethylnon and Pyriproxyfen, an insect growth regulator. These trials focused on the effectiveness of baits as well as their possible non-target impacts on invertebrate diversity, including land crabs.

Whilst all of these baits have been used successfully in the control of other pest organisms, these are the first trials using these baits in control of crazy ants. In addition to this, samples of the ants have been sent to Germany for genetic analysis in an attempt to understand more about its origin and historical introductions.

In a recent study on *A. gracilipes* from Borneo, the authors suggested that the species has gone through a genetic bottleneck since its introduction, or has an unusual mode of reproduction. This preliminary study suggests that crazy ant populations in Borneo have the ability to mate with siblings without suffering from inbreeding.

This and other in house research into the life history traits of *A. gracilipes* will help increase our limited understanding of this invasive species and develop the most effective method for monitoring and control of their spread on Christmas Island.

Pests & Birds

Pests are the focus of an important new report by Australia's leading bird organisation, Birds Australia. *The State of Australia's Birds 2006: Invasive Species,* released last December, highlights the various impacts of invasive species on birds.

Introduced predators threaten some 95 bird taxa (species and subspecies), and about one quarter of Australia's nationally threatened birds are at risk, or potentially at risk, from predation or habitat alteration by just six invasive animal species.

The report is broad in scope, looking at the impacts of flammable pasture grasses, exotic disease, rats and seabirds, honeybees and nestholes, bumblebees, rabbits on Macquarie Island, risk assessments for exotic birds, and weed spread by birds.

The report notes that 'Barbary Doves, potentially a highly invasive species, have become established in the wild since 1980 – the first feral bird to establish in the Northern Territory – and no effort is being made to eliminate them.'

Issues of concern include foxes in Tasmania, starlings establishing in Western Australia, and the lack of risk assessment of the 225 exotic bird species held in captivity in Australia. The report also considers native problem species, including noisy miners, pied currawongs, galahs, and expanding cypress pines.
The birding community has played a pivotal role in some past conservation campaigns, the recent woodlands campaign providing an outstanding example. We can only hope that this report motivates bird-lovers to do more campaigning on this issue.

Many birders are very worried by the ongoing spread of common mynas into new regions, but that concern has yet to translate into a broader interest in new invasive species. The report, compiled by Penny Olsen, Andrew Silcocks and Michael Weston, can be downloaded at http://www.birdsaustralia.com.au/soab/index.html

Biosecurity Queensland

To fulfil a promise made before the last state election, the Queensland government is moving to set up a single agency to manage all biosecurity issues.

Biosecurity Queensland will bring together the pest prevention and control functions of the Department of Primary Industries (DPI) and Department of Natural Resources and Water (DNRW). It will also plug present-day gaps, whereby no department is currently responsible for managing pest birds or amphibians.

At present, the DPI is eradicating fire ants (mainly an agricultural pest) and the DNRW is trying to eradicate crazy ants and electric ants (because they are mainly environmental pests), two activities that will come together under the new agency.

The creation of a single biosecurity unit is a very good idea, but what gravely concerns ISC is that it will become a unit within the Department of Primary Industries. At present the DNRW invests significantly in environmental pests, for example the eradication of slider turtles, whereas the DPI, as an economic development agency, does not pursue environmental goals.

Our fear is that environmental pests will receive less attention under the new arrangement. ISC will monitor the new agency to help ensure this does not happen.

Invader Mistaken for Terrorist Attack

A hundred beachgoers were taken to hospital on the Italian Riviera after infection by a tropical toxic dinoflagellate last August. The bathers suffered nausea, vomiting, breathing difficulties, fever, stomach cramps and irritation of the eyes.

A ban on swimming was imposed along a 15 km stretch of beach, from Genoa to Bogliasco. *La Republica* newspaper reported that the police and local authorities first suspected that terrorists had released a poison. But the culprit proved not to be Osama bin Laden, but *Ostreopsis ovata,* a dangerous dinoflagellate.

It was No Accident

While the garden trade is the main source of new weeds, plants imported for pasture and land reclamation are close behind. Garry Cook and Lesley Dias of CSIRO Sustainable Ecosystems have written a major review of government plant introductions, published recently in the Australian Journal of Botany.

By consulting the Commonwealth Plant Introduction (CPI) program they show that the number of weed introductions attributable to the CSIR0 and other agencies has been greatly under-estimated. For example, in a *Flora of Australia* volume published in 2002, the claim is made that most of Australia's 374 weedy grasses were introduced accidentally, yet more than 220 of these species are recorded as Commonwealth Plant Introductions.

Cook and Dias explore the cultural background behind these introductions: the acclimatisation societies; the desire to populate the empty north of Australia by boosting productivity; and the distorted belief, which lives on to this day, that '*The role of plant introduction during Australia's history has been one of outstanding success'.*

The Queensland Acclimatisation Society was growing 500 lines of pasture grasses and legumes by 1905, and they were quick to note that one plant they imported for fibre, paddy's lucerne *(Sida rhombifolia)* was becoming a troublesome weed, although they seemed untroubled by this.

The superphosphate revolution boosted interest in exotic pasture plants because they responded better than native plants to fertiliser. There was a belief among soil experts that erosion could easily be fixed by introducing the right plants. The hope was even held that Australia's spinifex grasslands could be replaced by productive pastures.

Of about 10 000 grass species found worldwide, the CPI program introduced more than 2200, or 22 per cent of the world's species, to Australia, representing about twice the number of grass species native to Australia. For legumes, about 18 per cent of the world's species were introduced, also representing about twice the number of native species.

Grasses were imported mainly from Africa, in what has been described as an 'Africanisation' of the landscape, and legumes mainly from the Mediterranean Basin. New species were imported at the rate of about 120 per year from 1930 until the early 1990s.

The belief that 'A New Australia' could be created by completely replacing native vegetation across much of Australia has since been exposed as a delusion. The superphosphate revolution relied on subsidised and finite supplies of fertiliser imported from an external territory (Nauru). And according to the authors:

> *'In the early 1990s, the whole rationale of broadscale pasture improvement based on legumes was being questioned. Criticism was aimed at the contribution of improved pasture development in Australia to both salinity through altered catchment hydrology and soil acidification through increased nitrogen fixation…*
>
> *In the tropics, with the dominance of soil with pH-dependant charge, declining soil pH under leguminous pastures would decrease soil fertility, increase aluminium and manganese toxicity and change the whole soil chemistry. Dr J. Williams (Chief CSIRO Land & Water 2001-2004) saw the ultimate cause of the problem arising from the assumption that results of short-term, small-scale pasture research could be applied long-term to entire landscapes and regions across Australia.'*

One pasture agronomist, L.R. Humphreys, has responded recently to criticisms by writing articles attacking the 'adherents of the primitive', and praising the role of exotic pasture plants in carbon sequestration, biodiversity conservation and landscape function.

Cook and Dias call for a '*thorough investigation of old plant-introduction trial sites across the continent'* to see if new weeds are spreading from them. They see little place for future pasture introductions because, *'For grasses and legumes, most species likely to be introduced probably already have been'*. The closure of the Weed Risk Assessment loophole is very important in this respect, because many of the permitted genera were of grasses imported by agronomists.

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The Cook and Dias paper, *'It was no accident: deliberate plant introductions by Australian government agencies during the 20th century*, appeared in the *Australian Journal of Botany 54: 601-625*, and deserves to be widely read. Copies can be obtained from the lead author at garry.cook@csiro.au

One can only hope that those agronomists who become part of the new Future Farm Industries CRC read this article carefully.

Examples of weeds imported under the Commonwealth Plant Introduction Program

- ❒ Whisky grass *(Andropogon virginicus)*
- ❒ Indian bluegrass *(Bothriochloa pertusa)*
- ❒ Great brome *(Bromus diandrus)*
- ❒ Skeleton weed *(Chondrilla juncea)*
- ❒ Tambookie grass *(Hyparrhenia hirta)*
- ❒ Bird's foot trefoil *(Lotus corniculatus)*
- ❒ Hexham scent *(Melilotus indicus)*
- ❒ Giant sensitive plant *(Mimosa invisa)*
- ❒ Common sensitive plant *(Mimosa pudica)*
- ❒ Texas Needle grass *(Nasella leucotricha)*
- ❒ Chilean Needle grass *(Nasella neesiana)*

Scary Numbers

Records show that 27, 388 exotic plant species have been introduced to Australia. This is about 40 per cent more than the number of native plant species.

About 3,000 of the introduced exotic species have become naturalised (weedy), but there are another 4,565 plant species introduced into Australia, that are recorded as weeds elsewhere, but not (yet) in Australia.
- From the *Weed CRC Annual Report 2005-6*

Updates...

The Biofuel Risk

In the last issue of *Feral Herald* we warned about the weed risk posed by physic nut (*Jatropha curcas*), which is a major world weed attracting interest in Australia as a biofuel crop. In a recent article in *Science,* seven biologists, headed by S. Raghu, warn about the wider issue of biofuel crops becoming weeds.

'Balancing costs and benefits of species introductions is a key contemporary challenge,' they note. They conclude their article by saying that: 'Experts must assess ecological risks before introducing biofuel crops, to ensure that we do not add biofuels to the already raging invasive species fire.'

Their article, 'Adding Biofuels to the Invasive Species Fire?', appeared in volume 313 of *Science* on 22 September 2006.

No Word on Bees

We were expecting the Minister for the Department of Environment & Heritage, Senator Ian Campbell, to have made a decision by December about whether to allow the Australian Hydroponics and Greenhouse Association to import European Bumblebees to the Australian mainland. No decision has yet been made. We will keep members informed.

(see *Feral Herald* 1:11 & 1:13)

Bumblebees Turning Plants Into Pests?

Research by Dr Andrew Hingston from the University of Tasmania indicates bumblebees may be turning garden plants into invasive pests.

Research into the effect of the bumblebee invasion on the spread of South African agapanthus in bush surrounding Hobart, shows bumblebees are major pollinators of agapanthus and may be increasing the plant's seed set.

more at:
http://www.abc.net.au/news/newsitems/200701/s1829006.htm

Weeds a Catchment Priority

Weed control is a top priority for managers of Australia's 56 new NRM (natural resource management) regions. This was one of the key messages to emerge from the National NRM Workshop held on the Gold Coast last week.

This follows recent survey results from the Australian Bureau of Statistics showing that weed management is now the single largest cost for most agricultural enterprises, exceeding $4 billion per year nationally.

'The 56 NRM regions have been given a huge responsibility by federal and state governments to look after an enormous area of Australia at the local level', says Weeds CRC CEO Dr Rachel McFadyen.

'The concept of NRM regions is a correct, holistic response to the challenge of sustainable natural resource management', says Dr McFadyen.

'There's not a farm fence in the land that will stop weeds or water. We must look across farm and other property boundaries, and consider issues such as weeds and water at the catchment scale.'

Dr McFadyen said that all NRM regions recognise weeds as a major natural resource issue, and they urgently need good advice and weed management techniques.

According to the CRC, the three big weed challenges for NRM regions, also known as Catchment Management Authorities in some states, are:

- to identify and prioritise their worst local weed threats so they can allocate their resources efficiently,
- to apply the latest and most effective scientific strategies for weed control,
- to help train their staff in the latest weed control techniques.

Despite the Federal Government's decision earlier this month not to continue the Weeds CRC past June 2008, Dr McFadyen said the CRC will continue to deliver its scientific advice to state agriculture departments, farm advisers and farm groups until then. In the meantime the existing Weeds CRC has begun working with NRM regions in Tasmania, South Australia, New South Wales and Victoria to determine their precise needs for effective weed control, says the CRC's Kathryn Galea.

"Many of these bodies are a bit isolated from one another and get their information in different ways. There is also a risk of duplication, so we're trying to ensure they all have access to the latest in weed science and on-ground strategies to make the most effective control decisions for their region", she says.

"We are also trying to help them integrate weed control with the other things they are doing in their catchments to restore land and water quality.

"For example, some anti-salinity strategies can result in weed problems over time if the wrong plants are used in revegetation schemes. We can help them to avoid this."

Ms Galea says that many NRM groups lack knowledge of what to do in the event of invasion by a new pest plant.

The Weeds CRC is using pilot groups in several existing catchment areas to build awareness of what is available to combat weeds and also build confidence that the latest anti-weed approaches work.

"Regional areas rely heavily on volunteers and bushcare groups to deliver weed control - if it proves ineffective, they can become discouraged and lose interest," Dr McFadyen adds. "It is vital to use the best weed control techniques and for groups to see visible results for all their hard work."

Dr McFadyen says that in its final 18 months the Weeds CRC will seek to provide the expertise and information that NRM regions require to manage weeds at a landscape scale. The CRC will also be talking to stakeholders and partner organisations to see if and how any of the skills and products generated by the CRC could remain available after June 2008.

More information:
Dr Rachel McFadyen, CEO, Weeds CRC
Phone: 0409 263 817

www.weeds.crc.org.au

Biting Back at Bitou Bush

by Emilie-Jane Ens (PhD candidate), Institute of Conservation Biology and Law, University of Wollongong

A report of research on bitou bush invasion ecology and mechanisms at University of Wollongong.

Bitou bush (*Chrysanthemoides monilifera spp. rotundata*) is a South African shrub in the Asteraceae family that was first found in Australia near Newcastle in 1908 (Gray 1976) where it is assumed to have been introduced via the dumping of ballast water (Cooney *et al.* 1982).

Bitou bush was extensively planted on the NSW coast and inland from 1946-1968 to stabilise the sand dunes and following sand mining (Mort & Hewitt 1953; Barr 1965). Unfortunately the invasive capacity of bitou bush has promoted its spread and it was recently estimated to have invaded approximately 80 per cent of the NSW coast (DEC 2004).

In 2000, bitou bush was declared a Weed of National Significance by the Federal Government based on its invisibility and impact on the environment (Agriculture and Resource Management Council of Australia & New Zealand et al. 2000). Recently the NSW Department of Environment and Conservation constructed a Threat Abatement Plan (TAP) for bitou bush (and its congener boneseed) which was the first TAP for an invasive plant in NSW (see http://www.nationalparks.nsw.gov.au/pdfs/tap_draft_bitoubush_boneseed.pdf.)

Associate Professor Kristine French and her postgraduate students at the University of Wollongong have been studying the impacts and invasion mechanisms of bitou bush for a decade. They have found that bitou bush alters the ecosystem properties of the coastal dunes by increasing the soil nitrogen and moisture load and decreasing ground incident light (Lindsay & French 2005).

These changes are associated with a change to the invertebrate community structure (French & Eardley 1997) which is typified by a shift towards more decomposers such as millipedes, amphipods, earthworms and isopods (Lindsay & French 2004).

Bitou bush researchers at Catherine Hill Bay

This effect of bitou bush on ecosystem processes is coupled with the likelihood of allelopathic interference by bitou bush (Copeland 1984; Vranjic *et al.* 2000; Ens, French and Bremner unpublished data) which are predicted to be the cause of native seedling recruitment inhibition (Mason 2006; Ens and French unpublished data).

As a consequence of these environmental changes, bitou bush has significantly altered vegetation communities along the NSW coast (Mason 2006; Brewer & Whelan 2003), in some locations forming vast monocultures. Interestingly, bitou bush invasion has been shown to have no significant effect on bird communities (French & Zubovic 1997).

Current bitou bush research being conducted by Kris French's lab include soil seed bank and competition trials in glasshouses and seed addition and weed removal studies in the field. Evaluation of the allelopathic potential of bitou bush is continuing in collaboration with Prof. John Bremner from the Department of Chemistry.

Tanya Mason, a recently appointed post-doc under the supervision of Kris French also hopes to conduct mesocosm studies to further facilitate our understanding of the mechanisms of bitou bush invasion and the subsequent ecosystem effects.

With probably a decade more of work we will

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hopefully understand what makes bitou bush such a successful exotic invader and discover some clues to help us tip the balance in favour of our native plant communities.

We thank the Natural Heritage Trust, Hermon Slade Foundation, the University of Wollongong and the Institute of Conservation Biology for financial assistance.

For further information contact: emilie@uow.edu.au or see Kris French's UoW home page at http://www.uow.edu.au/science/biol/staff/kris/kris.html

Bitou bush

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Invasive Species Council Membership application form

ABN 27101522829

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Membership rates:

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❑ Regular	$22
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I would also like to make a donation [1] _____
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Is this a ❑ new membership or a ❑ renewal?

* Donations of $2.00 or more are tax deductible.

[1] Representing a donation to the Invasive Species Council Fund - a public fund listed on the Register Of Environmental Organisations under item 6.1.1 of subsection 30-55(1) of the *Income Tax Assessment Act 1997*.

Thank you for joining us. Please send this form and a cheque to:

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PO Box 166, Fairfield, Vic. 3078.

Cheques and Money Orders should be made out to the 'Invasive Species Council Inc'.
Sorry we do not have credit card facilities at this stage.

The Invasive Species Council

Invasive species are a growing problem all over the world, and Australia, an isolated island state with a unique fauna and flora, is especially vulnerable. Over the years incredible harm has been done by such pests as foxes, rabbits, toads, carp, prickly pear, blackberries, rubber vine and the tree-killing disease phytophthora. At last count, Australia had 2,700 weed species and more than 200 marine invaders.

Even though the impacts are immense and ongoing, invasive species aren't being tackled seriously. An alarming number of invasive species are still coming in, staying, and spreading in Australia.

The Invasive Species Council is an independent, non-government organisation set up to campaign and advocate to stop further invasions, and to contain invading species already present. If you care about the threat posed to Australia by exotic invaders, please join the ISC. We believe we are the first group in the world created *solely* to lobby against invasive species of all kinds.

We want stronger laws on invasives, tighter quarantine controls, regular monitoring of harbours for marine invaders, and Rapid Response Teams to eliminate new invaders. Join us to help make these a reality.

campaigning **raising awareness** **convincing our governments to act**