

State of the catchments 2010

Invasive species

Northern Rivers region

State Plan target

By 2015 there will be a reduction in the impact of invasive species.

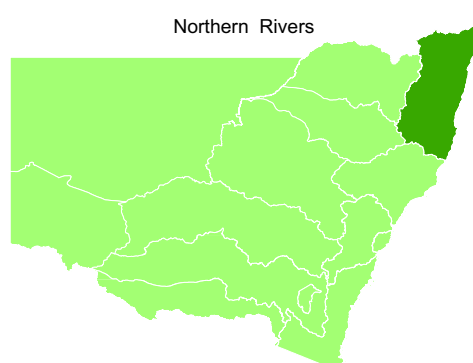
Background

'Invasive species' is the collective term used to describe weed, pest animal, aquatic pests or invertebrate pest species. These species have been assessed as likely to have significant impacts – or are already impacting significantly – on the environment, production, human health or amenity. Invasive species impact (act as a pressure) on natural resource condition.

A detailed technical report describes the methods used to derive the information contained in this report. At the time of publication of the *State of the catchments (SOC) 2010* reports, the technical reports were being prepared for public release. When complete, they will be available on the I&I website: www.industry.nsw.gov.au/info/mer.

Note: All data on natural resource condition, pressures and management activity included in this SOC report, as well as the technical report, was collected up to January 2009.


Map of the catchment



Assessment

Pressures

Invasive species' impact as a pressure on biodiversity themes

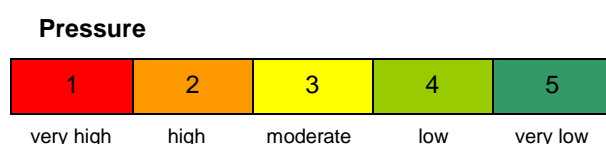
Overall assessment across indicators	Trend	Confidence
 Moderate	?	Medium

The overall assessment is an average of the three indicators: new, emerging and widespread.

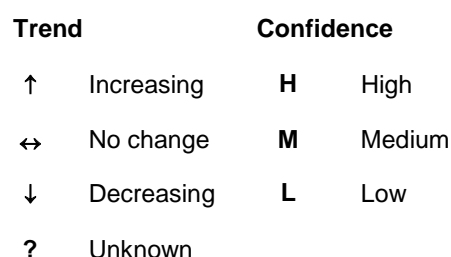
While not all invasive species are monitored across New South Wales, these indicators represent some of the highest impacting species. The level of impact assessment (moderate) is unlikely to change in the short term, but the trend for overall impact of the species monitored can show the level of success of invasive species management to exclude and eradicate new threats, protect biodiversity at selected sites from established invasive species, and lessen the negative socio-economic impacts of established invasive species.

Table 1 Indicator summary

	Pressure	Baseline data	New data	Trend	Confidence
New invasive species				?	M
Marine pests		nil		?	L
Weeds		7		?	M
Emerging invasive species				?	M
Marine pests		nil		?	L
Pest animals		3		?	M
Weeds		31		?	M
Widespread invasive species				↓	L
Foxes			decreasing	↓	M
Wild dog stock losses		5807		?	L



 No data



New invasive species

Indicator 1 – Number of new invasive species; definitions and measurement

New invasive species are any introduced species that have not been recorded in NSW previously and whose impacts are likely to be significant; alternatively, they are species previously recorded in NSW that have since exhibited invasiveness.

This indicator is measured as the change in number of new invasive species in the region relative to the number reported 12 months previously. Table 1 shows baseline data only, as recorded at the date of this first report. Data is being collected on new priority weeds, new marine pests, new pest animals, and new freshwater pests.

Freshwater pests

Data on freshwater pests is being collected by Industry & Investment NSW (I&I). Sites in the Northern Rivers region have been sampled and will be included in future reporting.

Marine pests

There are no new marine pest species reported in the Northern Rivers region.

Pest animals

There are no new pest animal species reported in the Northern Rivers region.

Weeds

There are seven new weed species reported in the Northern Rivers region.

Table 2 New weed species reported in the Northern Rivers region by local government

Scientific Name	Common Name
<i>Equisetum</i> spp.	horsetail
<i>Hygrophila polysperma</i>	East Indian hygrophila
<i>Hymenachne amplexicaulis</i>	olive hymenachne/hymenachne
<i>Ludwigia peruviana</i>	ludwigia
<i>Psidium cattleianum</i>	cherry guava
<i>Thunbergia laurifolia</i>	laurel clock vine
<i>Tipuana tipu</i>	rosewood or tipuana tree

Emerging invasive species

Indicator 2 – Distribution and abundance of emerging invasive species; definitions and measurement

An emerging species is a newly established species whose distribution and abundance is increasing.

This indicator is the net change in species trends. For example, 34 species increasing distribution and abundance compared to 11 species decreasing equates to a net increasing trend for this indicator. Data is being collected on emerging priority weeds, emerging marine pests, emerging pest animals and emerging freshwater pests.

Freshwater pests

Data on freshwater pests is being collected by I&I. Sites in the Northern Rivers region have been sampled and will be included in future reporting.



Marine pests

There are no emerging marine pest species reported in the Northern Rivers region.

Pest animals

There are three emerging pest animal species reported in the Northern Rivers region.

Table 3 Emerging pest animal species reported in the Northern Rivers region by Livestock Health and Pest Authorities

Scientific Name	Common Name
<i>Bufo marinus</i>	cane toads
<i>Equus caballus</i>	feral horses
<i>Dama, Cervus, Axis</i> spp	feral and wild deer

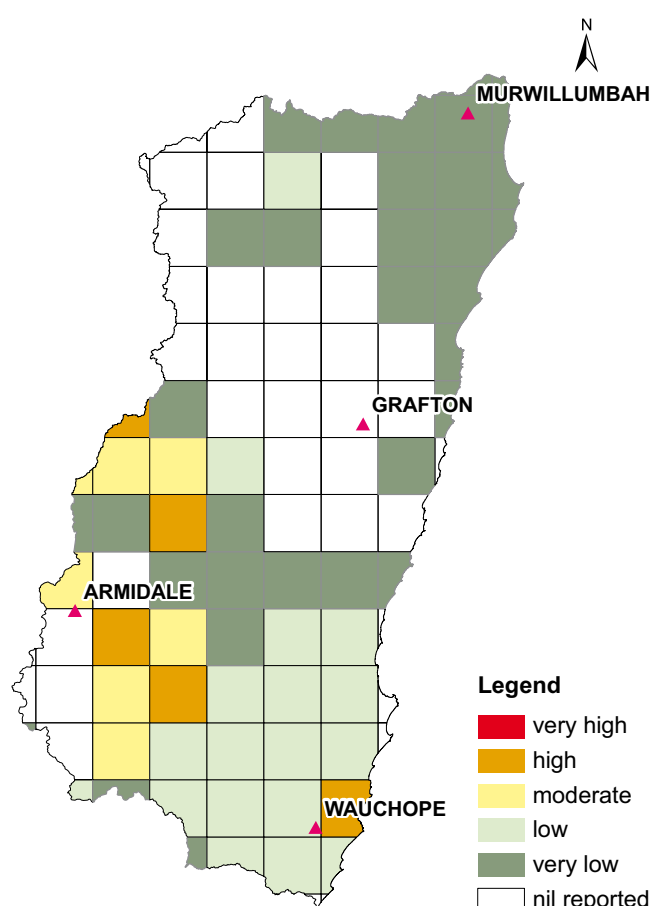


Figure 1 New and emerging pest animal index (aggregation of pest animal data for indicators 1 and 2)

The pest animal index is measured by adding the density scores (Table 4) for all pest animals monitored for each grid square. Species monitored are camels, horses, donkeys, deer and cane toads.

The index classes are:

Very high	8–10
High	6–7
Moderate	4–5
Low	2–3
Very low	1

Table 4 Density classes for pest animal and weed scores

Density classes	Score	Density
Present-occurrence unknown	1	?
Occasional and localised	1	<1%
Occasional and widespread	2	1% to 10%
Common and localised	3	11% to 50%
Common and widespread	4	11% to 50%
Abundant and localised	5	>50 %
Abundant and widespread	6	>50 %

Weeds

There are 31 emerging weeds reported in the Northern Rivers region.

Table 5 Emerging weeds reported in the Northern Rivers region

Scientific Name	Common Name
<i>Alternanthera philoxeroides</i>	alligator weed
<i>Asparagus asparagoides</i>	bridal creeper
<i>Cytisus scoparius</i>	Scotch, English and Spanish broom
<i>Gymnocoronis spilanthoides</i>	temple plant/Senegal tea plant
<i>Heliotropium amplexicaule</i>	blue heliotrope



Scientific Name	Common Name
<i>Hygrophila costata</i>	yerba de hicotea/hygrophila
<i>Ipomea alba</i>	moonflower
<i>Koelreuteria elegans</i> subsp. <i>formosana</i>	Chinese rain tree/golden rain tree
<i>Lantana montevidensis</i>	lantana (creeping)
<i>Ludwigia longifolia</i>	long-leaf willow primrose
<i>Moraea</i> spp.	cape tulips
<i>Nassella neesiana</i>	Chilean needle grass
<i>Nassella tenuissima</i>	Mexican feather grass
<i>Olea europaea</i> subsp. <i>europaea</i>	feral olive
<i>Parietaria judaica</i>	pellitory
<i>Pennisetum setaceum</i>	fountain grass
<i>Pennisetum villosum</i>	long-style feather grass
<i>Pereskia aculeata</i>	leaf cactus
<i>Phyla</i> spp.	lippia
<i>Phyllostachys</i> spp.	rhizomatous bamboo
<i>Pistia stratiotes</i>	water lettuce
<i>Pueraria lobata</i>	kudzu
<i>Sagittaria platyphylla</i>	sagittaria
<i>Schinus</i> species other than <i>S. terebinthifolius</i>	peppercorn
<i>Schinus terebinthifolius</i>	broad-leaf pepper tree
<i>Scolymus maculatus</i>	spotted golden thistle
<i>Solanum elaeagnifolium</i>	silver-leaf nightshade
<i>Solanum seafortianum</i>	Brazilian nightshade
<i>Triadica sebifera</i>	Chinese tallow tree
<i>Ulex europaeus</i>	gorse
<i>Vachellia farnesiana</i>	mimosa bush

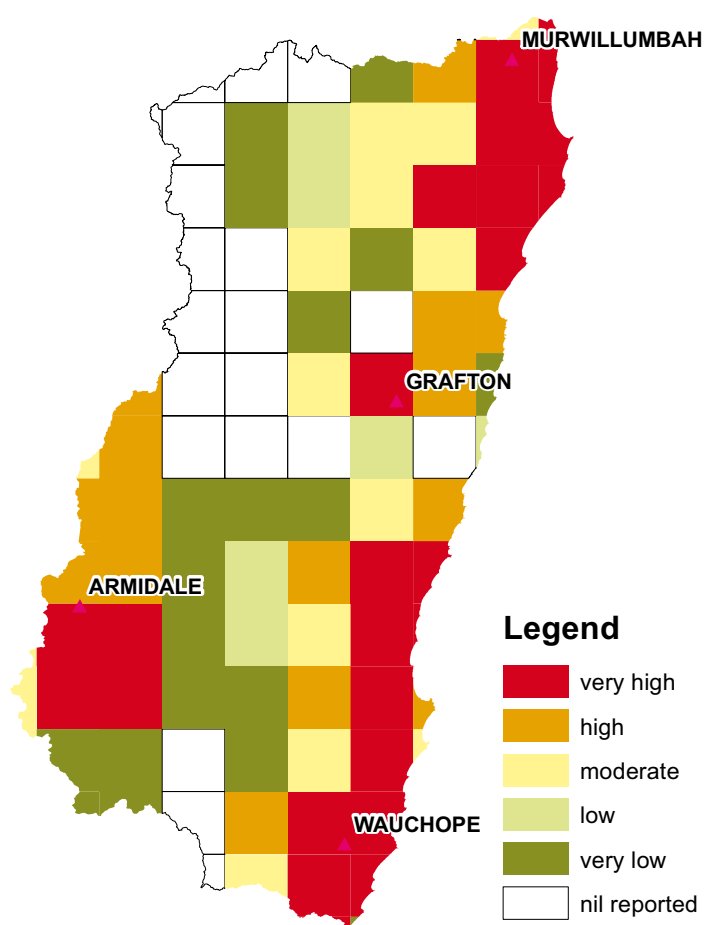


Figure 2 New and emerging weeds index (aggregation of weeds data for indicators 1 and 2)

The index is measured by adding the density scores (see Table 4) for all weeds monitored for each grid square. There were 134 priority weed species mapped across NSW.

The index classes are:

Very high	12+
High	7–11
Moderate	4–6
Low	3
Very low	1–2

Widespread invasive species

Indicator 3 – Impact of widespread invasive species at priority sites; definitions and measurement

A widespread species is any species widely distributed in NSW.

This indicator is measured by the change in impact of all the widespread pest species monitored. Data is being collected on the change in impacts of foxes on threatened species at priority sites, bitou bush on threatened plant species at priority sites, the number of stock losses attributed to wild dogs, and the number of alien fish as a percentage of total fish at sampling sites.

Bitou Bush and Boneseed Threat Abatement Plan (Bitou TAP)

The Bitou TAP is coordinated by DECCW. The planning stage commenced in late 2006. The Bitou TAP has identified 167 species of native flora under threat by bitou bush along the NSW coast. The degree of success of bitou bush control at priority sites will be reported progressively until 2011.

Fox Threat Abatement Plan (Fox TAP)

The NSW Threat Abatement Plan for predation by the red fox (Fox TAP) establishes priorities for fox control for the conservation of biodiversity across NSW. In particular, the plan identifies which threatened species are most likely to be impacted by fox predation and the sites at which these impacts are predicted to be most critical. In addition, the plan includes monitoring programs to measure the response of priority threatened species to fox control at these sites.

Table 6 Threatened species protected in the Northern Rivers region by fox control

Threatened species	Population numbers at fox control sites
little tern	increasing
pied oystercatcher	increasing
beach stone-curlew	inconclusive
Alberts lyrebird	inconclusive
Macquarie turtle	analyses incomplete
rufous bettong	analyses incomplete

The net result for the six threatened species is a decrease in the impact of foxes at priority sites.

Freshwater pests

Data on freshwater pests is being collected by I&I. Sites in the Northern Rivers region have been sampled and will be included in future reporting. The freshwater sampling will provide data for an indicator measuring the impact of alien fish (non-native fish) on native fish.

Wild dog stock losses

In the Northern Rivers region, 5807 stock losses attributed to wild dogs were reported to I&I during the period 2004–2007.

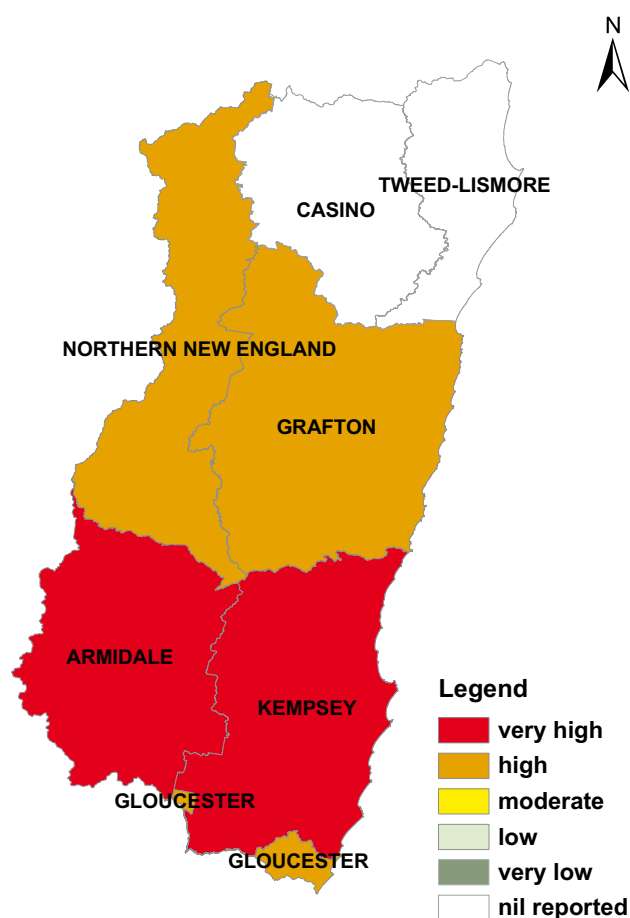


Figure 3 Wild dog stock losses in the Northern Rivers region

The indicator classes are:

Very high	>1000
High	301–1000
Moderate	151–300
Low	51–150
Very low	1–50

Management activity

State level

The invasive species target is being addressed at the state level by the implementation of the NSW Invasive Species Plan. The plan aims to prevent the introduction of new invasive species, eradicate or contain new incursions that have established and to implement control programs to reduce the impacts of widespread species at priority sites.

Some of the state level initiatives include:

- protection and control, including:
 - protecting environmental assets from widespread weeds; prioritising environmental assets at risk from widespread weeds and sites for control in the Northern Rivers region. A draft plan for the Northern Rivers region is being developed to guide investment until 2015
 - participating in a national effort to control *Salvinia molesta*, one of the 20 weeds of national significance. I&I is hosting the Salvinia National Coordinator and staff are rearing the weevil that acts as a biological control (bio-control) agent
 - bio-control of Patterson's curse
 - a lantana rust bio-control project
 - a serrated tussock coordination project
 - the Bitou TAP
 - implementing strategic fencing in national parks to manage feral goats
 - the Fox TAP
- best management practice for:
 - alligator weed
 - cabomba
 - dryland cropping systems (weeds)
 - regional fox control
 - *Phytophthora cinnamomi*
- education, including:
 - 'Weed Warriors' schools project
 - 'What does your garden grow?' community capacity project
 - I&I courses on topics such as vertebrate pest management and planning for pest management. For more information go to www.dpi.nsw.gov.au/agriculture/profarm/courses
- research, including:
 - an early detection program for aquatic weeds
 - vine weed research project (cats claw creeper and madeira vine)
 - determining regional weed management priorities for the conservation of biodiversity
 - a survey of *Phytophthora cinnamomi*, causal agent of the *Phytophthora* dieback of native flora, throughout the region
 - investigation of the susceptibility of 28 species of NSW flora to *Phytophthora cinnamomi*
 - assessing the risks of wild deer in NSW
 - causes in variation of the rabbit haemorrhagic disease virus in wild rabbit populations
 - commercial use of pest animals (production and conservation values)
 - a scoping study for the release of sterility agents for foxes and rabbits
 - improving the management of Australia's pest birds
 - devising pest animal regional strategies (pest plan)
- monitoring, evaluation and reporting (MER), through:

- state of the catchments (SOC) reports – invasive species data collection
- SOC MER data collected as support to DECCW's state of the environment report
- a service for the ongoing identification of invasive weed species provided by the Botanic Gardens Trust. It regularly records new invasive species introductions to NSW and the extension of ranges of particular weed species
- Fox TAP; the monitoring of biodiversity and foxes in response to fox control at priority sites. Priority sites in the Northern Rivers region include conservation reserves and private lands in the following areas: Wolli, Yuraygir, Bellinger River, Sawtell, Nambucca Heads, Bombing Range Beach, Broadwater Beach, Ballina, Clarence River, Glenugie, Grange, Marengo, Ramornie, Tambar and Yabbara
- estimating feral goat numbers
- Bitou TAP; the monitoring of biodiversity, bitou bush and other weeds in response to control at priority sites. Currently there are 39 priority sites across all land tenures in the Northern Rivers region. Control is implemented through site-specific management plans
- draft lantana plan; the monitoring of biodiversity, lantana and other weeds in response to control at priority sites. Currently there are six priority sites in the Northern Rivers region, where control in accordance with the lantana plan is implemented through site specific management plans.

Regional level

At the regional level, the Northern Rivers Catchment Management Authority (CMA) is undertaking the following activities in relation to the invasive species target:

- red fox control at Yabbara to conserve the rufous bettong (1500 ha) and at South Ballina to conserve the pied oystercatcher, which contributed 1732 ha to pest animal management
- actions from weed related strategies
- 20 contracts with a primary focus on weeds, with a total investment of \$1.2 million
- other contracts addressing threats, especially those with on-ground outcomes (eg weed control and pest animal control)
- the investment of \$646,000 through the Lord Howe – War on Weeds Project. The implementation of the Lord Howe Island Weed Management Plan is continuing, leading to the eradication of problem weeds. This is supported by detailed database recording
- one contract focusing on fire management in the Border Ranges.



Further reading

- McNaught I, Thackway R, Brown L & Parsons M 2006, *A field manual for surveying and mapping nationally significant weeds*, Bureau of Rural Sciences, Canberra, [www.weeds.org.au/docs/Weeds_Manual.pdf].
- Murray–Darling Basin Commission 2003, *Fish theme pilot audit technical report – sustainable rivers audit*, [www.mdbc.gov.au/__data/page/64/Web_Summary_Fish_Theme.pdf].
- National Land and Water Resources Audit 2007, *Vertebrate pests – ecologically significant invasive species*, [www.nlwra.gov.au/national-land-and-water-resources-audit/vertebrate-pests].
- National Land and Water Resources Audit 2007, *Weeds – ecologically significant invasive species*, [www.nlwra.gov.au/national-land-and-water-resources-audit/weeds].
- Natural Resources Commission 2005, *Recommendations, state-wide standards and targets*, [www.nrc.nsw.gov.au/content/documents/Recommendations%20-%20State-wide%20standard%20and%20targets%20May%202005.pdf].



Published by: Department of Environment, Climate Change and Water NSW, 59–61 Goulburn Street, PO Box A290, Sydney South 1232.

Ph: (02) 9995 5000 (switchboard). Ph: 131 555 (environment information and publications requests).

Ph: 1300 361 967 (national parks, climate change and energy efficiency information and publications requests).

Fax: (02) 9995 5999. TTY: (02) 9211 4723.

Email: info@environment.nsw.gov.au Website: www.environment.nsw.gov.au

DECCW 2010/421 ISBN 978 1 74232 734 1 November 2010

Cover photo: R Nicolai/DECCW – 'morning glory'