

### State Plan target

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

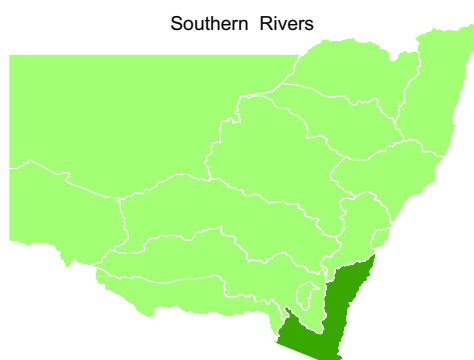
### Background

'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](http://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
<b>New invasive species</b>				?	L
Marine pests		1		?	L
Weeds		8		?	M
<b>Emerging invasive species</b>				?	M
Marine pests		6		?	L
Pest animals		2		?	M
Weeds		25		?	M
<b>Widespread invasive species</b>				↓	M
Foxes			decreasing	↓	M
Wild dog losses		2106		?	L



***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 Southern Rivers region are being sampled and the data will be included in future reporting.

### Marine pests

There is one new marine pest species reported in the Southern Rivers region.

**Table 2 New marine pest species reported in the Southern Rivers region by I&I**

Scientific Name	Common Name
<i>Maoricolopus roseus</i>	New Zealand screwshell

### Pest animals

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

### Weeds

There are eight new weed species reported in the Southern Rivers region.

**Table 3 New weed species reported in the Southern Rivers region by local government**

Scientific Name	Common Name
<i>Alternanthera philoxeroides</i>	alligator weed
<i>Arundo donax</i>	giant reed/elephant grass
<i>Equisetum</i> spp.	horsetail
<i>Hyparrhenia hirta</i>	coolatai grass
<i>Salvinia molesta</i>	salvinia
<i>Solanum seaforthianum</i>	Brazilian nightshade
<i>Sporobolus pyramidalis</i> ( <i>S.natalensis</i> )	giant rat's tail grass
<i>Tamarix</i> spp.	athel pine

### 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 Southern Rivers region are being sampled and the data will be included in future reporting.

**Marine pests**

There are six emerging marine pest species reported in the Southern Rivers region.

**Table 4 Emerging marine pest species reported in the Southern Rivers region by I&I**

Scientific Name	Common Name
<i>Caulerpa taxifolia</i>	caulerpa
<i>Codium fragile tomentosoides</i>	broccoli weed
<i>Tridentiger trigonocephalus</i>	chameleon goby or Japanese goby
<i>Acanthogobius flavimanus</i>	yellowfin goby
<i>Sabella spallanzanii</i>	European fan worm
<i>Carcinus maenas</i>	European green shore crab

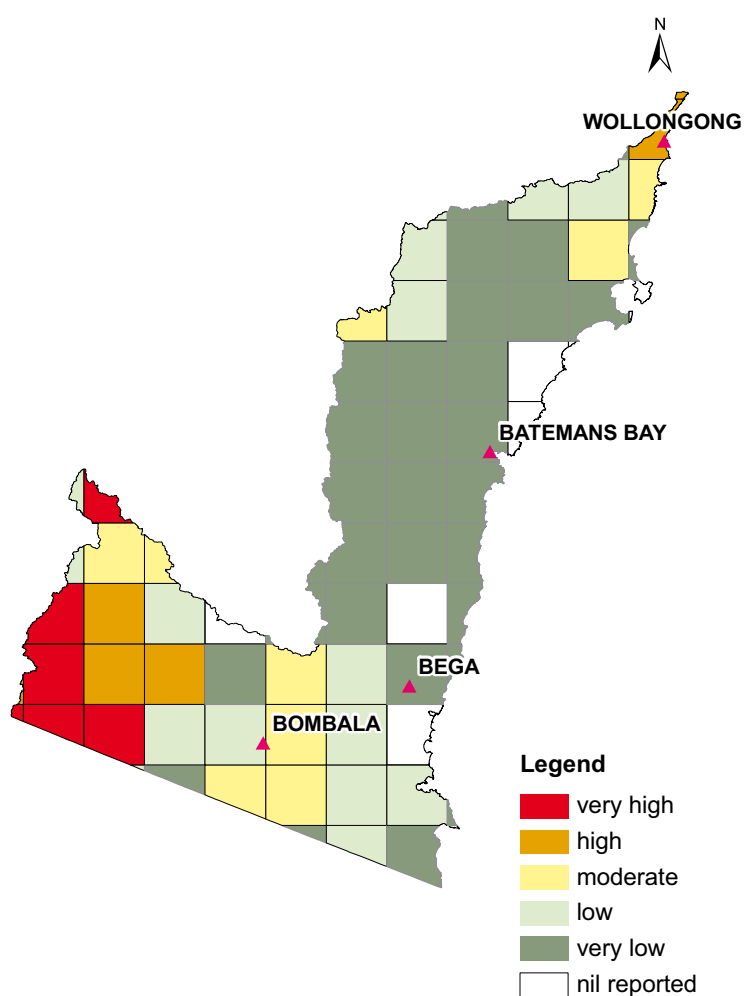
**Pest animals**

There are two emerging pest animal species reported in the Southern Rivers region.

**Table 5 Emerging pest animal species reported in the Southern Rivers region by Livestock Health and Pest Authorities**

Scientific Name	Common Name
<i>Equus caballus</i>	feral horses
<i>Dama, Cervus, Axis spp.</i>	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 6) 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 6 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 25 emerging weeds reported in the Southern Rivers region.

**Table 7 Emerging weeds reported in the Southern Rivers region**

Scientific Name	Common Name
<i>Araujia sericifera</i>	moth plant/moth vine
<i>Baccharis halimifolia</i>	groundsel bush
<i>Cestrum parqui</i>	green poisonberry/green cestrum
<i>Chrysanthemoides monilifera</i>	bitou bush(1)/boneseed(2)
<i>Cynoglossum creticum</i>	blue hound's tongue
<i>Dipogon lignosus</i>	dipogon
<i>Eichhornia crassipes</i>	water hyacinth
<i>Gleditsia triacanthos</i>	honey locust
<i>Gloriosa superba</i>	glory lily
<i>Heliotropium amplexicaule</i>	blue heliotrope
<i>Hieracium</i> spp.	hawkweed/orange hawkweed
<i>Moraea</i> spp.	cape tulips
<i>Nassella hyalina</i>	cane needle grass
<i>Nassella neesiana</i>	Chilean needle grass

Scientific Name	Common Name
<i>Pennisetum setaceum</i>	fountain grass
<i>Pennisetum villosum</i>	long-style feather grass
<i>Phyla</i> spp.	lippia
<i>Phyllostachys</i> spp.	rhizomatous bamboo
<i>Pyracantha</i> sp.	firethorn
<i>Sagittaria platyphylla</i>	sagittaria
<i>Salpichroa organifolia</i>	pampas lily of the valley
<i>Schinus</i> species other than <i>S. terebinthifolius</i>	peppercorn
<i>Solanum elaeagnifolium</i>	silver-leaf nightshade
<i>Sorghum halepense</i>	Johnson grass
<i>Ulex europaeus</i>	gorse

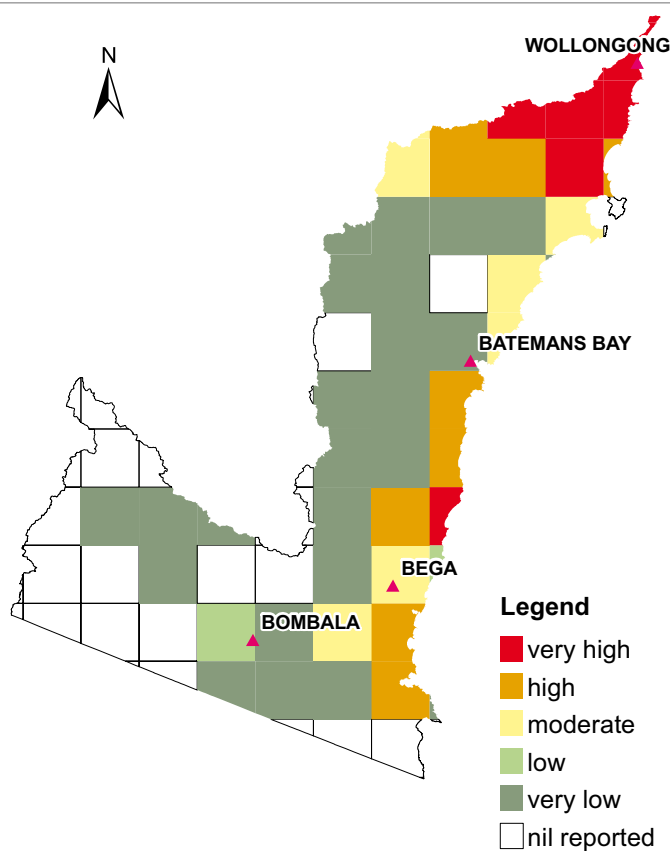


Figure 2 New and emerging weeds index (aggregation of weeds data for indicators 1 and 2)



The index is measured by adding the density scores (see Table 6) 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 and 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 8 Threatened species protected in the Southern Rivers region by fox control**

Threatened species	Population numbers at fox control sites
brush-tailed rock wallaby	stable
southern brown bandicoot	inconclusive



Threatened species	Population numbers at fox control sites
broad-toothed rat	increasing
mountain pygmy possum	inconclusive
little tern	increasing
pied oystercatcher	increasing
hooded plover	inconclusive
smoky mouse	analyses incomplete

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

### **Freshwater pests**

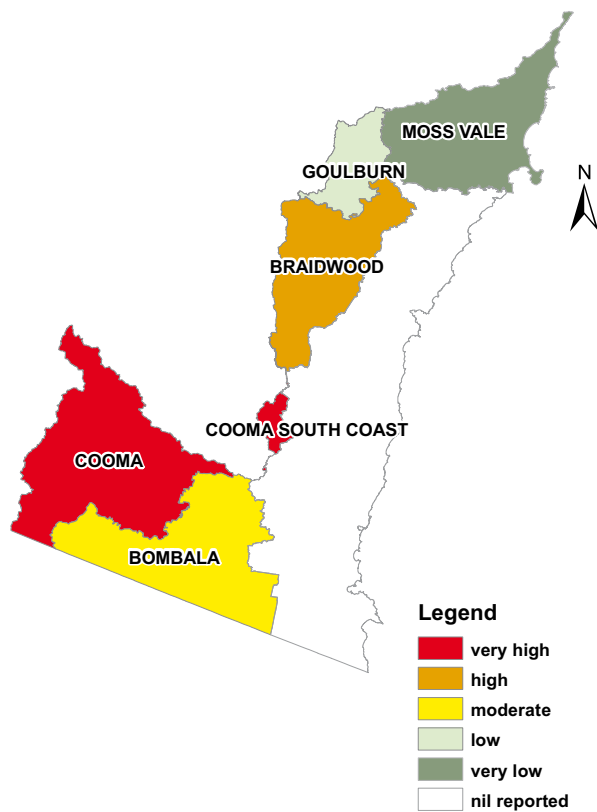
Data on freshwater pests is being collected by I&I. Sites in the Southern Rivers region are being sampled and the data will be included in future reporting.

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 Southern Rivers region, 2106 stock losses attributed to wild dogs were reported to I&I during the period 2004–2007.





**Figure 3 Wild dog stock losses in the Southern 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 Southern Rivers region. A draft plan for the Southern 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
- Bitou TAP
- implementing strategic fencing in national parks to manage feral goats
- 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](http://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
  - conducting a survey of *Phytophthora cinnamomi*, the causal agent of *Phytophthora* dieback in native flora, throughout the region
  - investigating 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
  - South East NSW and Australian Capital Territory (ACT) wild dog project
  - 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 the 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 Southern Rivers region include conservation reserves and private lands in the following areas: Kangaroo Valley, Narooma, Ben Boyd, Lake Conjola, Mimosa Rocks, Moruya, Murramarang, Wallagoot Lake, Lake Wollumbola, Tathra, Windang, Comerong Island, Tilba, Tuross, South East Forests, Nadgee and the Snowy Mountains. The biodiversity response is being analysed as part of the review of the Fox TAP
  - estimating feral goat numbers
  - Bitou TAP; the monitoring of biodiversity, bitou bush and other weeds in response to control at priority sites. There are nine priority sites across all land tenures in the Southern Rivers region. Control is implemented through site-specific management plans
  - lantana control: the monitoring of biodiversity, lantana and other weeds in response to control at priority sites identified in a draft lantana plan. There are two priority sites in the Southern Rivers region, where site specific management plans in accordance with the lantana plan are implemented.

## **Regional level**

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

- pest control programs for populations of deer, European/green shore crabs, foxes, Pacific oysters, rabbits, wild goats and wild pigs
- targeting weeds including African lovegrass, bitou bush, blackberry, briar, bridal creeper, broom, caulerpa, Chilean needle grass, coral tree, fireweed, kikuyu, lantana, madeira vine, privet, sea spurge, serrated tussock, St John's wort and turkey rhubarb
- undertaking extensive willow removal along the Snowy River
- undertaking extensive bitou bush removal along the coastline, working in some endangered ecological communities
- serrated tussock control in native grasslands in the Snowy Monaro region
- broom control in the Braidwood and Bombala areas
- privet removal in areas of priority native vegetation
- removal of coral trees from creek lines in the Illawarra region.

## 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](http://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](http://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](http://www.nlwra.gov.au/national-land-and-water-resources-audit/vertebrate-pests)].

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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](http://www.nrc.nsw.gov.au/content/documents/Recommendations%20-%20State-wide%20standard%20and%20targets%20May%202005.pdf)].

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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](mailto:info@environment.nsw.gov.au) Website: [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

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