

State of the catchments 2010

# Invasive species

## Sydney Metropolitan region

### State Plan target

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

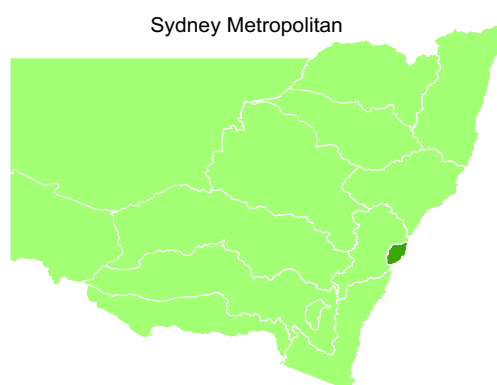
### Background

'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](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*

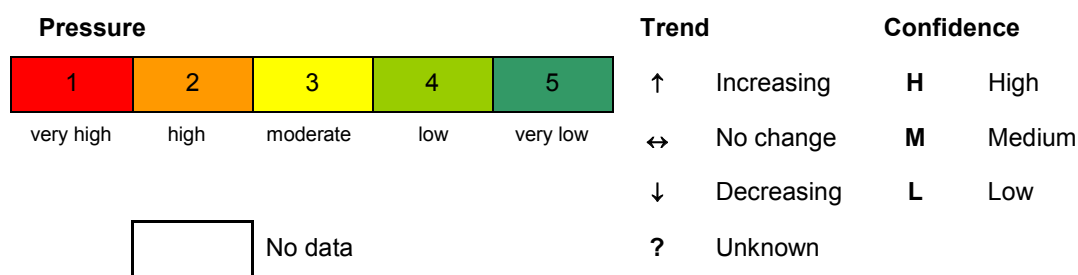
| Overall assessment across indicators   | Trend | Confidence |
|--|-------|------------|
|  Moderate | ?     | Medium     |

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>        |          |               |            | ?     | M          |
| Weeds                              |          | 3             |            | ?     | M          |
|                                    |          |               |            |       |            |
| <b>Emerging invasive species</b>   |          |               |            | ?     | M          |
| Marine pests                       |          | 4             |            | ?     | L          |
| Pest animals                       |          | 1             |            | ?     | M          |
| Weeds                              |          | 36            |            | ?     | M          |
|                                    |          |               |            |       |            |
| <b>Widespread invasive species</b> |          |               |            | □     | M          |
| Foxes                              |          |               | decreasing | □     | M          |
| Wild dog losses                    |          | 30            |            | ?     | 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 Sydney Metropolitan region have been sampled and the data will be included in future reports.

### Marine pests

There are no new marine pest species reported in the Sydney Metropolitan region.

### Pest animals

There are no new pest animal species reported in the Sydney Metropolitan region.

### Weeds

There are three new weed species reported in the Sydney Metropolitan region.

**Table 2 New weed species reported in the Sydney Metropolitan region by local government**

| Scientific Name              | Common Name          |
|------------------------------|----------------------|
| <i>Ludwigia repens</i>       | red ludwigia         |
| <i>Senecio glastifolius</i>  | holly leaved senecio |
| <i>Thunbergia laurifolia</i> | laurel clock vine    |

### 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 has been collected by I&I. Sites in the Sydney Metropolitan region have been sampled and the data will be included in future reporting.

### Marine pests

There are four emerging marine pest species reported in the Sydney Metropolitan region.



**Table 3 Emerging marine pests reported in the Sydney Metropolitan region by I&I**

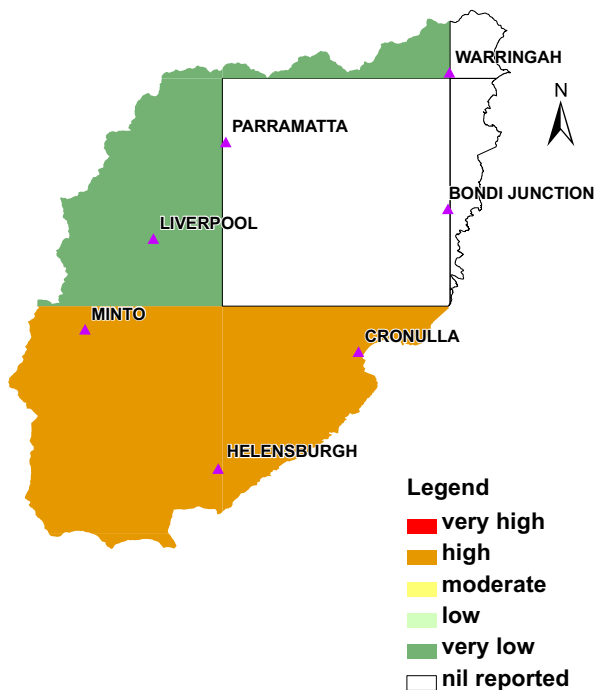
| Scientific Name                     | Common Name                     |
|-------------------------------------|---------------------------------|
| <i>Caulerpa taxifolia</i>           | caulerpa                        |
| <i>Codium fragile tomentosoides</i> | broccoli weed                   |
| <i>Tridentiger trigonocephalus</i>  | chameleon goby or Japanese goby |
| <i>Acanthogobius flavimanus</i>     | yellowfin goby                  |

**Pest animals**

There is one emerging pest animal species reported in the Sydney Metropolitan region.

**Table 4 Emerging pest animal species reported in the Sydney Metropolitan region by Livestock Health and Pest Authorities**

| Scientific Name                | Common Name         |
|--------------------------------|---------------------|
| <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 5) 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 5 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 36 emerging weeds reported in the Sydney Metropolitan region.

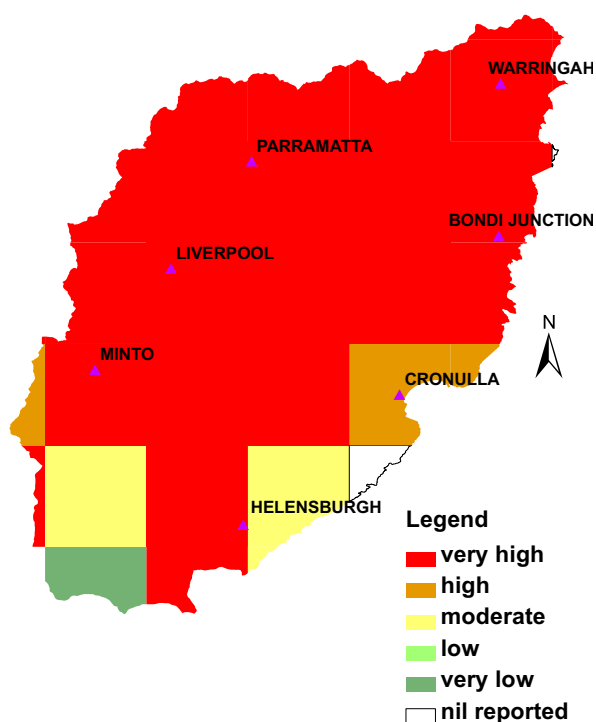
**Table 6 Emerging weeds reported in the Sydney Metropolitan region**

| Scientific Name               | Common Name                       |
|-------------------------------|-----------------------------------|
| <i>Cabomba caroliniana</i>    | cabomba                           |
| <i>Caesalpinia decapetala</i> | mysore thorn                      |
| <i>Celtis sinensis</i>        | Chinese celtis                    |
| <i>Cytisus scoparius</i>      | Scotch, English and Spanish broom |
| <i>Dipogon lignosus</i>       | dipogon                           |
| <i>Eichhornia crassipes</i>   | water hyacinth                    |
| <i>Equisetum</i> spp.         | horsetail                         |
| <i>Gleditsia triacanthos</i>  | honey locust                      |



| Scientific Name                   | Common Name                    |
|-----------------------------------|--------------------------------|
| <i>Gloriosa superba</i>           | glory lily                     |
| <i>Gymnocoronis spilanthoides</i> | temple plant/Senegal tea plant |
| <i>Heliotropium amplexicaule</i>  | blue heliotrope                |
| <i>Hygrophila costata</i>         | yerba de hicotea/hygrophila    |
| <i>Hyparrhenia hirta</i>          | coolatai grass                 |
| <i>Hypericum perforatum</i>       | St John's wort                 |
| <i>Lantana montevidensis</i>      | lantana (creeping)             |
| <i>Ludwigia longifolia</i>        | long-leaf willow primrose      |
| <i>Ludwigia peruviana</i>         | ludwigia                       |
| <i>Moraea</i> spp.                | cape tulips                    |
| <i>Nassella neesiana</i>          | Chilean needle grass           |
| <i>Nassella trichotoma</i>        | serrated tussock               |
| <i>Paspalum quadrifarum</i>       | tussock paspalum               |
| <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>Pistia stratiotes</i>          | water lettuce                  |
| <i>Pyracantha</i> sp.             | firethorn                      |
| <i>Sagittaria platyphylla</i>     | sagittaria                     |
| <i>Salpichroa origanifolia</i>    | pampas lily of the valley      |
| <i>Salvinia molesta</i>           | salvinia                       |
| <i>Solanum elaeagnifolium</i>     | silver-leaf nightshade         |
| <i>Solanum seafortianum</i>       | Brazilian nightshade           |
| <i>Sorghum halepense</i>          | johnson grass                  |

|                                    |                     |
|------------------------------------|---------------------|
| <i>Sorghum</i> sp. hybrid cultivar | silk forage sorghum |
| <i>Tecoma stans</i>                | yellow bells        |
| <i>Toxicodendron succedaneum</i>   | rhus tree           |



**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 5) 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 the NSW 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 7 Threatened species protected in the Sydney Metropolitan region by fox control**

| Threatened species    | Population numbers at fox control sites |
|-----------------------|---|
| little tern           | increasing                              |
| piebald oystercatcher | increasing                              |

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

### **Freshwater pests**

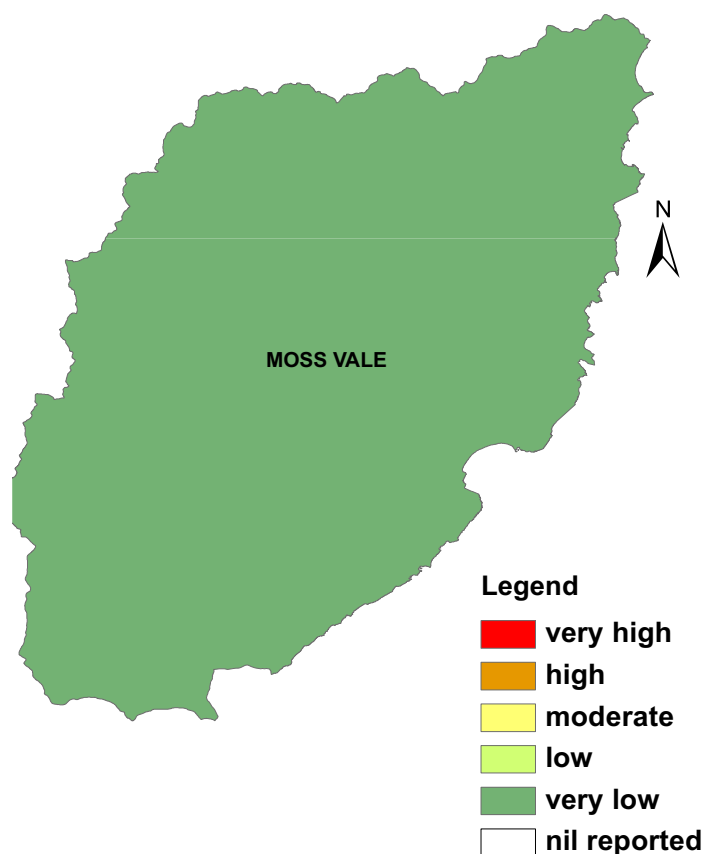
Data on freshwater pests is being collected by I&I. Sites in the Sydney Metropolitan region are being sampled and the data will be included in future reporting.

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 Sydney Metropolitan region, there were 30 stock losses attributed to wild dogs reported to I&I during the period 2004–2007.





**Figure 3 Wild dog stock losses in the Sydney Metropolitan 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 Sydney Metropolitan region. A draft plan for the Sydney Metropolitan 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 and capacity building, including:
  - 'Weed warriors' schools 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 wild dog project
  - pest animal regional strategies (pest plan)
- monitoring, evaluation and reporting (MER), including:

- state of the catchments (SOC) reports - invasive species data collection
- SOC MER data collected as support to DECCW's state of the environment report
- Fox TAP; the monitoring of biodiversity and foxes in response to fox control at priority sites. Priority sites in the Sydney Metropolitan region include conservation reserves and private lands in Towra Point and Garrigal
- Bitou TAP; the monitoring of biodiversity, bitou bush and other weeds in response to control at priority sites. There are four priority sites across all land tenures in the Sydney Metropolitan region, which have site-specific management plans for the implementation of the Bitou TAP
- lantana control; the monitoring of biodiversity, lantana and other weeds in response to control at priority sites identified in a draft lantana plan. There is one priority site in the Sydney Metropolitan region.

## Regional level

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

- a weed strategy, which includes:
  - two workshops conducted for local government and industry on weed management
  - 2 ha of weed infestation controlled
  - assessing information on the locations of a priority weed
  - the collation of weed-related data and maps from local government
  - mapping existing data and identifying gaps in knowledge
- the treatment of 40 ha of bitou bush
- assisting the weeds committees in the collection of baseline data about the extent of the highest priority weeds/suites of weeds in the region
- targeted control and containment of high priority weeds on 1 ha of public land. Councils have matched this with enforced control on private land
- coordinating the development of an action plan for a high priority pest animal species with two regional pest animal committees. This plan will be implemented across four local government areas/NSW National Parks and Wildlife Service regions to manage the pest species population and reduce the amount of affected areas by two per cent (affected areas determined in the action plan).

## Local level

There are a number of other groups undertaking significant work in the region that is contributing to better outcomes for invasive species management. These groups include:

- Sydney North, Sydney Central, Sydney West Blue Mountains and Sydney South West weeds committees, which are undertaking weed control, networking and education
- the Urban Feral Animal Action Group (Sydney North) (including all northern local councils, DECCW, and other land managers), which coordinates an on-ground feral animal control program
- the Sydney South Feral Animal Management Committee (including local councils, DECCW, and other land managers), which coordinates an on-ground feral animal control program

- the Parramatta River Catchment Group Biodiversity Subcommittee, which identifies and prioritises regional invasive species issues in the Parramatta River catchment.

## 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)].

National Land and Water Resources Audit 2007, *Weeds – Ecologically significant invasive species*, [[www.nlwra.gov.au/national-land-and-water-resources-audit/weeds](http://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](http://www.nrc.nsw.gov.au/content/documents/Recommendations%20-%20State-wide%20standard%20and%20targets%20May%202005.pdf)].

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