



Regional Pest Management Strategy 2012–17: Far West Region

A new approach for reducing impacts on native species and park neighbours

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Cover photos, main: removing African boxthorn (B Norman/OEH); small: feral goats (A Drane); African boxthorn (B Worboys); feral pig (OEH); prickly pear (B Collier).

Summary

Far West Region of NSW covers a range of habitats, from the floodplains of the Culgoa River in the north-east to mallee spinifex communities in the south-west. The total area of national park estate is over 1.2 million hectares. Darling River parks include Toorale and Gundabooka, Paroo–Darling National Park and State Conservation Area, and Kinchega on the Menindee Lakes. Sturt National Park in the north is the biggest park in the Region and shares borders with Queensland and South Australia. Diverse landscapes bring a wide range of issues regarding pest animals and weeds.

The Region has recently come out of a decade-long drought with significant rainfall in 2010 and 2011. Good seasons bring new challenges with considerable increases in feral pig numbers and abundance of weed species.

While wild dogs have been an issue in the north-west of the state for many years, more widespread reports of wild dog sightings have been received. For many parks this is a new issue and requires community-wide programs and plans that all landholders and managers can contribute to.

Weed species have responded to recent rains, as have native species. Control programs to tackle existing weed species and identify new and emerging threats is ongoing. Communication with neighbours and other agencies is paramount in a cross-tenure approach to control.

Removal of foxes and feral goats has been an ongoing challenge. The use of multiple contractors has seen significant increases in goats removed from parks and reserves (46,000 in 2009–10 and nearly 20,000 in 2010–11). While fox baiting has been restricted by reduced access to many areas, it continues with ongoing trials of M44 ejectors proving to be a valuable tool for fox control.

Recent pest management achievements in Far West Region include:

- 4,558 pigs removed during 2010–11
- 19,687 goats removed during 2010–11
- 23,202 wild dog and fox baits laid during 2010–11: very low wild dog activity and low fox activity detected
- curly bark wattle (*Acacia curranii*) exclosures completed and monitoring commenced at Gundabooka National Park
- *Xerothamnella parvifolia* (endangered plant at Mt Poole, Tibooburra Area) recovering following installation of grazing exclusion mesh in 2009–10.
- yellow-footed rock-wallaby survey completed, with population increasing in response to above-average rainfall conditions and continuous fox baiting
- goat research project on Paroo-Darling National Park (diversionary fencing and water point management) completed
- M44 1080 fox bait ejector trial completed
- 'Hog hopper' 1080 bait dispenser trial commenced
- removal of all horses from Kinchega National Park
- bitou bush control with support from Lower Murray–Darling Catchment Management Authority, Department of Sustainability and Environment Victoria and Corrective Services NSW.

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Abbreviations

BPWW	Biodiversity Priorities for Widespread Weeds (BPWW CC1-6 refers to control categories within BPWW Statewide Framework ¹)
CAP	catchment action plan
CMA	catchment management authority
DECCW	Department of Environment, Climate Change and Water NSW
DPI	Department of Primary Industry NSW
DSE	Department of Sustainability and Environment Victoria
EEC	ecological endangered community
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
KTP	key threatening process
LCA	Local control area
LHPA	Livestock Health and Pest Authority
NP	national park
NR	nature reserve
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	NSW National Parks and Wildlife Service
OEH	Office of Environment and Heritage
OSCU	Operations Support and Coordination Unit
PDNP	Paroo–Darling National Park
SCA	State conservation area
TAP	threat abatement plan
TSC Act	<i>Threatened Species Conservation Act 1995</i>
WoNS	Weed of National Significance

¹ http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/publications/cmases/cma_statewide-framework-web.pdf

1 Introduction

Pest management within the Office of Environment and Heritage (OEH) is guided by two core planning instruments:

NSW 2021 – A Plan to Make NSW Number One sets out performance targets, including a specific priority action within *Goal 22 Protect Our Natural Environment* which is to *address core pest control in National Parks through the delivery of NPWS Regional Pest Management Strategies and improve educational programs and visitor access.*

NSW Invasive Species Plan provides specific goals, objectives and actions in relation to invasive species management.

This document is the Far West Region Pest Management Strategy and contains regionally specific components including prioritised pest programs.

The state strategy, *Managing Pests in NSW National Parks*, provides the broader planning framework for the management of pests by NPWS. It documents the policy and organisational context and describes the logic used for identifying, prioritising and monitoring pest management programs. It also establishes state-wide pest management goals, objectives and actions.

This regional strategy describes the local circumstances within the Region and applies the corporate framework from the state strategy to prioritise specific pest management programs. These priorities will be included in regional operations plans and implemented through the NPWS Asset Maintenance System. It also broadly identifies pest distribution and associated impacts across the Region.

2 Regional overview

Location

Far West Region includes parks and reserves spread over more than one-third of NSW. It borders Queensland, South Australia and Victoria, and has 27 reserves covering 1,242,633 hectares, nine bioregions and six local government areas, plus the unincorporated area of NSW.

Regional context

Land use in the Far West Region is primarily broad-scale pastoral enterprises, followed by mining in and around centres such as Broken Hill. Tourism brings visitors from around Australia and overseas. Parks and reserves represent approximately 4% of Far West Region.

Park management

The Region consists of six management units: West Darling Area, Bourke Area, Lower Darling Area, Mutawintji National Park, the Willandra Lakes World Heritage Unit (based at Buronga) and the Regional Operations Support and Coordination Unit (based at Broken Hill). Area Offices are located at, Bourke, Broken Hill (including Mutawintji) and Buronga. The regional office is located in Broken Hill. The Region is situated within the Western Branch, with the branch office at Dubbo.

Community engagement

A memorandum of understanding with Corrective Services NSW serves to develop and complete programs with inmates on park estate. Previous programs have included the removal of bitou bush from Kinchega NP and boxthorn in Paroo – Darling NP. Stronger ties with the local community will be essential in the identification of new and emerging weeds species across the Region.

In mid 2012, the NSW Government announced a new initiative to involve volunteer shooters in pest animal management on National Parks and Reserves. This initiative has been developed by NPWS into the Supplementary Pest Control (SPC) program, which is being trialled in 12 reserves across NSW. All volunteers involved in the program will be supervised by NPWS staff and will be trained to the equivalent levels as NPWS staff. All shooting will be conducted according to an approved NPWS shooting operations plan, which includes a Job Safety Analysis (JSA) and a Job Safety Brief (JSB). As part of this process, the program will only take place in sections of reserves that have been closed to the general public. The trial program will help to refine how this additional pest control option can further engage this sector of the community while complementing the programs detailed in the Regional Pest Management Strategies.

Pest management highlights

Recent pest management achievements in Far West Region include:

- 4,558 pigs removed during 2010–11 (six aerial shooting programs conducted)
- 19,687 goats removed during 2010–11 (primarily by the 11 goat removal contractors) following over 46,000 in 2009–10
- 23,202 wild dog and fox baits laid during 2010–11: very low wild dog activity and low fox activity detected

- curly bark wattle (*Acacia curranii*) exclosures completed and monitoring commenced at Gundabooka National Park
- *Xerothamnella parvifolia* (an endangered plant at Mount Poole, Tibooburra Area) is recovering following installation of grazing exclusion mesh in 2009–10; monitoring shows significant growth of existing plants as well as new recruitment, with two 8 x 10 m grazing exclosures established to monitor possible germination events
- yellow-footed rock-wallaby survey completed; the population is increasing in response to above-average rainfall conditions and continuous fox baiting
- a goat research project on Paroo-Darling National Park (diversionary fencing and water point management) has been completed
- M44 1080 fox bait ejector trial completed
- 'Hog hopper' 1080 bait dispenser trial commenced
- removal of all horses from Kinchega NP
- bitou bush control with support from Lower Murray–Darling CMA, DSE and Corrective Services NSW

Far West Region reserves

Reserve name	Area	Area (hectares)
Culgoa NP	Bourke	35,240
Gundabooka NP	Bourke	63,903
Gundabooka SCA	Bourke	25,430
Ledknapper NR	Bourke	47,864
Nocoleche NR	Bourke	74,728
Toorale National Park	Bourke	30,866
Toorale SCA	Bourke	54,385
Kinchega National Park	Broken Hill	44,259
Kinchega (lakebed and channels)	Broken Hill	18,000
Paroo-Darling NP	Broken Hill	178,053
Paroo-Darling SCA	Broken Hill	41,521
Euston Regional Park	Lower Darling	3,274
Kemendok National Park	Lower Darling	9,874
Kemendok Nature Reserve	Lower Darling	1,043
Lake Victoria IPA	Lower Darling	4,318
Mallee Cliffs National Park	Lower Darling	57,969
Moorna IPA	Lower Darling	3,076
Mungo National Park	Lower Darling	121,007
Mungo SCA	Lower Darling	5,700
Nearie Lake Nature Reserve	Lower Darling	4,347
Tarawi Nature Reserve	Lower Darling	33,573
Wangumma IPA	Lower Darling	1,632
Mutawintji Historic Site	Mutawintji	486
Mutawintji National Park	Mutawintji	68,912
Mutawintji Nature Reserve	Mutawintji	6,688
Sturt National Park	Tibooburra	325,329
Pindera Downs Aboriginal Area	Tibooburra	11,433
Total		1,272,910



3 Regional prioritisation

The following key factors are considered when determining priorities for pest management within the Region. However, a precautionary approach using risk management will be applied where there is uncertainty about the impacts of the pest on the asset. The feasibility of effective control will also be a consideration.

Critical priority

C-TSC (Threatened Species Conservation)

Programs targeting pests which are, or are likely to be, significantly impacting on threatened species, populations or communities. These include the highest priorities identified in the threat abatement plans (TAPs), Priorities Action Statements (PAS) and Biodiversity Priorities for Widespread Weeds (BPWW). For example, undertake fox control at the Mutawintji Nature Reserve priority site for Yellow footed rock wallaby as identified in the Fox TAP.

C-HD (Health and Disease)

Programs that target pests which impact significantly on human health or are part of a declared national emergency, for example outbreak of foot and mouth disease or control of feral pigs in the catchment area of a domestic water supply reservoir.

C-EC (Economic)

Programs targeting pests that impact significantly on economic enterprises, for example wild dog control where there is potential for significant stock losses as identified in wild dog management plans.

C-NE (New and Emerging)

Programs addressing new occurrences or suppressed populations of highly invasive pest species with potential for significant impacts on park values (subject to risk/feasibility assessment), and programs to control Class 1 and 2 noxious weeds.

High priority

H-IH (International Heritage)

Programs that target pests that impact significantly on world heritage or international heritage values. For example, control of rabbits impacting on World Heritage values of Mungo NP and pest control in Ramsar wetlands.

H-CH (Cultural Heritage)

Programs targeting pests that impact significantly on important cultural heritage values, for example control of feral goats where they are inhabiting an area containing Aboriginal rock art; control of rabbits undermining an historic building.

Medium priority

M-WNH (Wilderness and National Heritage)

Programs that target pests that impact significantly on wilderness, wild rivers, national heritage values or other important listed values, for example control of athel pine along a declared Wild River or within a Wilderness area.

M-RA (Recreation and Aesthetic values)

Programs that target pests that impact significantly on recreation, landscape or aesthetic values, for example control of weeds on the margins of camping areas or roadsides, where applicable; control of weeds in an area of natural beauty that is visited frequently.

M-CP (Cooperative Programs)

Cooperative programs (not covered in higher priorities above) targeting pests that impact significantly on park values or agricultural production (including the control of Class 3 noxious weeds or implementation of other endorsed state or regional plan), for example control of bitou bush across boundaries as part of a regional control plan prepared by a regional weeds advisory committee and supported by NPWS.

M-II (Isolated Infestations)

Programs addressing isolated infestations of highly invasive pest species, widely distributed in other parts of the Region, with high potential for future impacts on park values.

Lower priority

L-LP (Localised Programs)

Programs targeting pests that have localised impacts on natural ecosystems or agricultural lands that promote community skills, awareness and involvement with parks, for example participation in a new bush regeneration project with a local community group for control of Class 4 noxious weeds.

L-PP (Previous Programs)

Previous programs targeting pests that have localised impacts on native species and ecosystems, and that can be efficiently implemented to maintain program benefits, for example the maintenance of areas treated previously for serrated tussock to continue keeping them weed free.

In some circumstances, new programs may be introduced, or priority programs extended to target pests where a control window of opportunity is identified. These may arise where burnt areas become more accessible for ground control of weeds, where drought makes control of feral pigs and feral goats more efficient because they congregate in areas where water is available, or when a new biocontrol agent becomes available.

Future priorities for pest control will need to reflect changes in the distribution, abundance or impacts of pests that may occur in response to environmental changes, including climate change. NPWS is supporting research to understand the interaction between climate change, pests and biodiversity.

4 Prioritised regional pest programs

Live versions of this table will be kept on the OEH intranet and updated annually over the five year period of the strategy. Sites are listed in order of priority category, management area, target species and then reserve.

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Bourke	Toorale NP	2609 – Red sand hills and floodplain	African boxthorn	Mulga association - <i>Acacia aneura</i> , <i>Astrebla lappacea</i> and Coolibah community (BPWW – CC2)	Asset protection	Foliar spraying, physical/mechanical control	C-TSC
Bourke	Ledknapper NR	2586 – Gidgee Brigalow woodland	African boxthorn, spiked Malvastrum	Gidgee Brigalow woodland EEC (TSC-e) (BPWW – CC2)	Asset protection	Foliar spraying, physical/mechanical control	C-TSC
Bourke	Culgoa NP	Culgoa	Feral goat	<i>Capparis loranthifolia</i> var. <i>loranthifolia</i> , <i>Euphorbia sarcostemmoides</i> , Brigalow-Gidgee Woodlands EEC	Asset protection	Mustering, trapping, water point management, fencing	C-TSC
Bourke	Gundabooka NP	Gundabooka	Feral goat	Curly-bark wattle EEC	Asset protection	Mustering, trapping, water point management, fencing	C-TSC
Bourke	Ledknapper NR	Ledknapper	Feral goat	Leopard ctenotus, Mallee slender blue-tongue lizard	Asset protection	Mustering, trapping, water point management, fencing	C-TSC
Bourke	Nocoleche NR	Nocoleche	Feral pig	Terrestrial wetland birds (brolga), Ramsar wetland	Asset protection	Aerial shooting, trapping, baiting	C-TSC
Bourke	Nocoleche NR	Nocoleche	Fox	Terrestrial wetland birds (brolga), Ramsar wetland	Asset protection	Baiting, monitoring	C-TSC
Bourke	Nocoleche NR	2598 - Momba Swamp	Noogoora burr	Freshwater wetland, aquatic threatened plants, Ramsar, CAMBA/JAMBA, national register of significant wetlands (BPWW – CC2)	Asset protection	Foliar spray, chipping	C-TSC

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Bourke	Nocoleche NP	Nocoleche	Feral goat	<i>Aponogeton queenslandicus</i> , <i>Simoselaps fasciolatus</i> , Ramsar wetland EEC	Asset protection	Mustering, trapping, water point management, fencing	C-TSC
Lower Darling	Tarawi NR	Lower Darling Area	Feral goat	Malleefowl	Asset protection	Mustering, trapping, water point management, diversionary fencing	C-TSC
Lower Darling	Mallee Cliffs NP	Mallee Cliffs	Fox	Malleefowl, chestnut quail-thrush, southern scrub-robin	Asset protection	Baiting, monitoring	C-TSC
Lower Darling	Mungo NP/SCA	Mungo	Fox	Western blue-tongued lizard, chestnut quail-thrush, southern scrub-robin	Asset protection	Baiting, monitoring	C-TSC
Lower Darling	Tarawi NR	Tarawi	Fox	Malleefowl, western blue-tongued lizard, chestnut quail-thrush, southern scrub-robin	Asset protection	Baiting, monitoring	C-TSC
Lower Darling	Wamberra	Wamberra	Fox	Malleefowl	Monitoring	Monitoring	C-TSC
Lower Darling	Mungo NP/SCA	Lower Darling Area	Rabbit	<i>Acacia loderi</i> (Nelia) and <i>A. melvillei</i> (Yarran) shrublands.	Asset protection	Ripping, blasting and poisoning, spotlight surveys	C-TSC
Mutawintji	Mutawintji NP and NR	Mutawintji	Feral goat	Yellow-footed rock-wallabies	Asset protection	Trapping, mustering	C-TSC
Mutawintji	Mutawintji NP and NR	Mutawintji	Fox	Yellow footed rock wallabies	Asset protection	Baiting, monitoring	C-TSC
West Darling	Paroo-Darling NP	2607 - Peery Lake - Ramsar site	African boxthorn, Athel pine, peppertree	Mound spring complexes - The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin EEC (EPBC-e), <i>Eriocaulon carsonii</i> (EPBC-e; TSC-e) (BPWW – CC2)	Asset protection	Foliar spraying, physical/mechanical control	C-TSC

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
West Darling	Paroo-Darling NP	PDNP North	Feral goat	Artesian mound springs EEC, <i>Schoenoplectus pungens</i> , <i>Eriocaulon carsonii</i>	Asset protection	Mustering, trapping, water point management, fencing	C-TSC
West Darling	Paroo-Darling NP	PDNP	Feral pig	Terrestrial wetland birds (brolga), Ramsar wetland	Asset protection	Aerial shooting, trapping, baiting	C-TSC
West Darling	Sturt NP	Sturt	Feral pig	Aesthetic values	Asset protection	Shooting, baiting	C-TSC
West Darling	Paroo-Darling NP	Peery Lake	Fox	Terrestrial wetland birds (brolga), Ramsar wetland	Asset protection	Baiting, aerial shooting, monitoring	C-TSC
West Darling	Sturt NP	Sturt	Fox	Long-haired rat, Australian bustard, flock bronzewing, squatter pigeon, centralian blue-tongue lizard, collared whip-snake, narrow-banded snake, Stimson's python	Asset protection	Baiting, monitoring	C-TSC
West Darling	Sturt NP	Sturt	Rabbit	<i>Xero parvifolia</i> , <i>Grevillea kennedyana</i>	Asset protection	Ripping, blasting and poisoning, exclusion fencing	C-TSC
Bourke	Toorale NP/SCA	Toorale	Feral pig, feral goat	Neighbouring agriculture	Asset protection	Aerial pest survey	C-EC
Bourke	Culgoa NP	Culgoa	Feral pig	Neighbouring agriculture	Asset protection	Aerial shooting, trapping, baiting	C-EC
Bourke	Gundabooka NP	Gundabooka	Feral pig	Neighbouring agriculture	Asset protection	Aerial shoot, trapping, baiting	C-EC
Bourke	Ledknapper NR	Ledknapper	Feral pig	Neighbouring agriculture	Asset protection	Aerial shooting, trapping, baiting	C-EC
Bourke	Toorale NP/SCA	Toorale	Feral pig	Neighbouring agriculture	Asset protection	Aerial shooting, trapping, baiting	C-EC
Bourke	Culgoa NP	Culgoa	Spiny burr grass		Containment	Foliar spraying/burning	C-EC

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Bourke	Toorale, Gundabooka, Ledknapper, Culgoa, Nocoleche	Bourke Area	Wild dog	Neighbouring stock	Asset protection	Baiting as part of a coordinated program across tenure.	C-EC
West Darling	Paroo-Darling NP	PDNP South	Wild dog	Neighbouring stock	Asset protection	Baiting, trapping, shooting, aerial shooting	C-EC
West Darling	Paroo-Darling NP	PDNP North	Wild dog	Neighbouring stock	Asset protection	Baiting, trapping, shooting, aerial shooting	C-EC
West Darling	Sturt NP	Sturt NP	Wild dog	Neighbouring stock	Asset protection	Ground baiting, trapping	C-EC
Bourke	Culgoa NP	Culgoa	<i>Opuntia</i> spp.		Containment	Foliar spraying	C-NE
Bourke	Toorale NP/SCA	Toorale	Parkinsonia		Eradication	Monitoring, physical removal, cut/swab	C-NE
West Darling	Kinchega NP	Kinchega	Bitou bush		Eradication	Foliar spray, hand pull, mechanical	C-NE
West Darling	Kinchega NP	Kinchega	Spiny burr grass		Eradication	Foliar spray, hand pull, mechanical	C-NE
Mutawintji	Mutawintji NP and NR	Mutawintji	Rabbit	Aboriginal artefacts, river red gum community, chenopod shrublands	Asset protection	Harbour destruction, ripping and spotlight surveys	H-CH
West Darling	Kinchega NP	Kinchega	Rabbit	Aboriginal artefacts, river red gum community, chenopod shrublands	Asset protection	Harbour destruction, ripping and spotlight surveys	H-CH
West Darling	Kinchega NP	Kinchega	Feral pig	Ramsar wetland	Asset protection	Aerial shooting, trapping, baiting	H-IH
Lower Darling	Mungo NP	Leaghur, Joulni homestead and Mungo tip	Prickly Pear	Aesthetic values	Asset protection	Foliar spray, cut/swab and record	M-RA

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Lower Darling	Mallee Cliffs NP	Lower Darling Area	Rabbit	Aesthetic values	Asset protection	Ripping, blasting and poisoning, spotlight surveys	M-RA
West Darling	Paroo-Darling NP/SCA	PDNP South	Feral goat	Aesthetic values	Asset protection	Mustering, trapping, water point management, fencing	M-RA
West Darling	Sturt NP	Sturt	Feral goat	Aesthetic values	Asset protection	Shooting, trapping	M-RA
West Darling	Kinchega NP	Kinchega	Giant reed (bamboo)	Aesthetic values	Asset protection	Mechanical methods	M-RA
Bourke	Toorale	Toorale	Feral goat	Biodiversity, neighbouring agriculture	Asset protection	Mustering, trapping, water point management, fencing	M-CP
Bourke	Culgoa NP	Culgoa	Fox	Neighbouring stock, biodiversity	Asset protection	Baiting, monitoring	M-CP
Bourke	Gundabooka NP	Gundabooka	Fox	Neighbouring stock, biodiversity	Asset protection	Baiting, monitoring	M-CP
Bourke	Ledknapper NR	Ledknapper	Fox	Neighbouring stock, biodiversity	Asset protection	Baiting, monitoring	M-CP
Bourke	Toorale	Toorale	Fox	Neighbouring stock, biodiversity	Asset protection	Baiting, monitoring	M-CP
Lower Darling	Tarawi NR	Lower Darling Area	Rabbit	Biodiversity, neighbouring agriculture	Asset protection	Ripping, blasting and poisoning, spotlight surveys	M-CP
West Darling	Kinchega NP	1141 - Old Homestead Precinct	Athel pine, giant reed, African boxthorn, bitou, spiny burr grass	River red gum community, chenopod shrublands EEC (BPW – CC4)	Asset protection	Foliar spraying, physical/mechanical control, stem injection, cut/swab	M-CP
West Darling	Paroo-Darling NP	PDNP South	Fox	Neighbouring stock, biodiversity	Asset protection	Baiting, aerial shooting, monitoring	M-CP

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
Bourke	Culgoa NP	Culgoa	Noogoora/Bathurst burr, Patersons curse, boxthorn, Mexican poppy		Containment	Foliar spray, chipping	M-II
Bourke	Gundabooka NP	Gundabooka	Noogoora/Bathurst burr, Patersons curse, boxthorn, Mexican poppy		Containment	Foliar spray, chipping	M-II
Bourke	Ledknapper NR	Ledknapper	Noogoora/Bathurst burr, Patersons curse, boxthorn, Mexican poppy		Containment	Foliar spray, chipping	M-II
Bourke	Nocoleche NR	Nocoleche	Noogoora/Bathurst burr, Patersons curse, boxthorn, Mexican poppy		Containment	Foliar spray, chipping	M-II
Bourke	Toorale	Toorale	Noogoora/Bathurst burr, Patersons curse, Mexican poppy		Containment	Foliar spray, chipping	M-II
Lower Darling	Mallee Cliffs NP	Mallee Cliffs	African boxthorn, Patersons curse, Bathurst burr, onion weed, horehound, thornapple, Mexican poppy, Ward's weed.		Containment	Foliar spraying, physical/mechanical control, cut/swab	M-II
Lower Darling	Mungo NP/SCA	Mungo	Patersons curse, Bathurst burr, onion weed, horehound, thornapple, Mexican poppy		Containment	Foliar spraying, physical/mechanical control	M-II
Lower Darling	Tarawi NR	Tarawi NR	Patersons curse, Bathurst burr, onion weed, Mexican poppy		Containment	Foliar spraying, physical/mechanical control	M-II
Mutawintji	Mutawintji NP and NR	Mutawintji	Athel pine, African boxthorn, thornapple, Patersons curse, Noogoora burr and Bathurst burr, Mexican poppy		Containment	Foliar spray, chipping, mechanical puller, slashing, stem injection, cut/swab	M-II

Area	Reserve	Site name	Target pests or weeds	Asset at risk	Aim of control	Action	Priority
West Darling	Paroo-Darling NP	PDNP	Athel pine, African boxthorn, devils claw, Patersons curse, Noogoora burr and Bathurst burr		Containment	Foliar spray, chipping, mechanical puller, slashing, stem injection, cut and swab	M-II
West Darling	Sturt NP	Sturt	Noogoora, Bathurst burr, Tobacco bush		Containment	Foliar spray	M-II

5 Consultation

Stakeholder consultation forums were carried out in each of the 14 regions. Stakeholders were identified as individuals, boards and government departments that NPWS regularly works with in regard to pest management across the Region. Attendees included CMAs, local councils, State Water, NPWS Advisory Committee members, pest control contractors, LHPAs, state and federal government representatives, the Pastoralists Association, Wild Dog Destructions Board, some range care groups, Paroo Progress Association and Mutawintji Board of Management.

The Far West Region Stakeholder Consultation Forum was held in Broken Hill on 18 August 2011.

A total of nine stakeholders from organisations including the Western Livestock Health and Pest Authority (LHPA), Western Catchment Management Authority (WCMA), Department of Primary Industry (DPI), NPWS Local Advisory Committee, Bourke Shire Council and Brewarrina Shire attended this meeting. The outcomes of this forum were used to provide feedback to a state consultation forum held following the completion of all regional consultation forums.

A presentation was also provided to the Western Lands Advisory Council.

The stakeholder consultation noted the following key issues:

Pest animals

Feral pigs

Significant increases in pig numbers in recent years.

Wild dogs

Emerging as a much wider issues across the entire Far West Region.

Foxes

On going commitment to cross tenure control programs with all land Managers.

Goats

On going approach to control with water management options.

Emerging (E) species include tilapia, cane toads, deer and camels.

Pest plants

Mesquite (A)

Huge potential for widespread infestations requires stringent uniform approach to early detection.

Parkinsonia

One known infestation on park currently monitored.

Bitou bush

Eradication possible.

Athel pine

Historical plantings vs. potential for significant germination on watercourses.

African boxthorn

Significant problem with restricting access to water and feral harbour.

Parthenium (A)

Huge potential for widespread infestations requires stringent uniform approach to early detection.

Spiny burr grass

Issues at Culgoa National Park and Kinchega National Park.

Salvinia (A)

Could be potentially devastating to aquatic species in Warego and Darling river systems.

Cactus spp.

Case by case for control considering biocontrol history.

Water lettuce (E) (A)

Could be potentially devastating to aquatic species in Warego and Darling river systems.

Tropical soda apple (E) (A)

Huge potential for widespread infestations requires stringent uniform approach to early detection.

Other emerging (E) species included Coolatai grass and Chilean needle grass.

(E) *emerging threat, a species with high potential for significant infestations*

(A) *species believed to be absent from Park estate within the Far West Region*

Stakeholder consultation also covered stakeholder views on strategies and outcomes including:

Pest Animals**Feral Pigs**

Communications between all land managers and Authorities, to allow planning for cross tenure control programs, “more bang for your buck”. Continued trials of Hog hoppers for toxic bait dispensing.

Wild dogs

Communications between all land managers and Authorities, to allow planning for cross tenure control programs. Continue trialling of innovative control techniques such as M44 ejectors.

Foxes

Communications between all land managers and Authorities, to allow planning for cross tenure control programs. Continue trialling of innovative control techniques such as M44 ejectors.

Goats

Use of exclusion fencing and control of on and off park watering points in conjunction with other agencies especially CMA's. Continued use of multiple contractors where applicable.

Conclusion and next steps

The forum was a positive step in the consultation process and all participants were given the opportunity to provide their views and suggestions. Stakeholders focused on weed issues slightly more than vertebrate pests, although both pests and weeds were covered. This initial process also allowed NPWS to provide data on pest management programs carried out on park estate in Far West Region since the last regional pest management strategy. The provision of past program data resulted in valuable discussion during the meeting.

The forum outcomes were recorded and used to inform the regional pest management strategy. The outcomes of all regional forums within the state were also used to provide feedback to the state forum to assist consideration of pest management strategies for NSW parks and reserves. NPWS staff have also provided input to this document prior to its being made available to the public for further comment and submissions. This regional pest management strategy is reliant on the ongoing input of staff and the general public.

Far West Region will continue to engage with stakeholders, and it is imperative that constant communication is maintained with all parties, including neighbours, other government departments and the wider community. Informing these stakeholders of programs and general information especially on trial control techniques can only improve pest management within the Region.

6 Pest species overviews

Information about high profile pests for this region is summarised below. More details regarding the distribution, impacts and management options for these and other pest species can be found in other reference documents, including on the internet.²

Wild dogs (*Canis lupus* spp.)

Distribution and abundance

Wild dog refers to any wild-living dog in NSW, including feral dogs (*Canis lupus familiaris*), dingoes (*Canis lupus dingo*) and their hybrids. Populations of wild dogs occur mainly along the Great Dividing Range, coastal hinterlands and in north-western NSW. Wild dog populations in Far West Region have been limited to the far north-west of the state in recent history, restricted by the dog fence on both the Queensland and South Australian borders. More recent rains and the build-up of wild dog populations in south-west Queensland has seen a significant increase in wild dog reports across the majority of the Region. Wild dog sightings have increased in the areas north of Bourke and adjacent to the Paroo River with the Darling River appearing to restrict movement further south.

Impacts

Wild dogs can have significant impacts on livestock, especially sheep. As a result, wild dogs have been declared as a pest under the *Rural Lands Protection Act 1998*. Under the Act, managers of controlled land have an obligation to eradicate wild dogs by any lawful method. All land in NSW is identified as controlled land under the current Pest Control Order for Wild Dogs.³

Wild dogs can have both positive and negative impacts on biodiversity. Predation by wild dogs can suppress the abundance of herbivores (both native and exotic) which may be important in reducing over-grazing across much of arid and semi-arid Australia. Wild dogs may also suppress smaller exotic predators (cats and foxes) with potential benefits for a broad suite of small- to medium-sized ground-dwelling mammals and ground-nesting birds. Conversely, predation by wild dogs may have significant direct impacts on threatened species (e.g. koalas).

The dingo was introduced into Australia from Asia prior to European settlement and hence is eligible to be listed as a threatened species under the NSW *Threatened Species Conservation Act 1995* (TSC Act). Although the dingo has not been listed as

² www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/general-information/pest-animal-survey
www.environment.gov.au/biodiversity/invasive/publications/humane-control.html
www.invasiveanimals.com/
www.environment.gov.au/biodiversity/invasive/ferals/index.html
www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm
www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles
www.weeds.org.au/WoNS/
www.rirdc.gov.au/programs/national-rural-issues/weeds/weeds_home.cfm
www.weeds.gov.au/

³ www.gazette.nsw.gov.au/pdfs-09/11th_September.pdf

a threatened species, predation and hybridisation by feral dogs (*Canis lupus familiaris*) has been listed as a key threatening process (KTP) under the TSC Act.

In order to balance the need for wild dog control with the conservation of dingoes, the Pest Control Order for Wild Dogs allows the general destruction obligation for lands listed under Schedule 2 of the Order to be satisfied through the preparation of a wild dog management plan with both control and conservation objectives. Within Far West Region there are no Schedule 2 parks.

Priorities for Control

There is an ongoing strategic wild dog control program undertaken in Sturt National Park. Participation in the Ledknapper Wild Dog Action group by NPWS staff will continue with collaborative control programs. Reactive control will be undertaken where necessary to protect neighbouring stock.

Control

Control methods include coordinated 1080 baiting, trapping, shooting and use of M44 ejectors.

The wild dog fence along the northern and western boundaries of Sturt NP (maintained by the Wild Dog Destruction Board) limits the movement of wild dogs into that park from South Australia and Queensland.

Monitoring

Reduced incidence of wild dog problems adjoining park estate as indicated by a reduction in the number of reports or complaints. Increased neighbour participation in wild dog control programs.

Feral pig (*Sus scrofa*)

Distribution and abundance

The greatest densities of feral pigs occur in the floodplain areas of Toorale, Gundabooka NP, Culgoa NP, Nocolleche NR, Kinchega NP and Paroo–Darling NP. Feral pigs are also known to occur in small populations in Sturt NP and Kemendok NR.

Impacts

Feral pigs can cause severe environmental degradation by:

- selective feeding on plant communities
- creation of drainage channels in swamps
- soil erosion and fouling of watering points by wallowing and rooting
- direct predation on frogs, reptiles, ground-nesting birds and small mammals
- competition for foods with some species (e.g. broilgas)
- as an agent for the spread of weeds, particularly Noogoora and Bathurst burr.

Feral pigs can kill and eat lambs under two weeks of age, and as such can have an adverse impact on sheep breeding enterprises. They also compete with domestic livestock for pasture forbs and drought feed, and damage fences. Feral pigs are a major potential host of a number of exotic diseases such as foot and mouth, African

swine fever and rinderpest, as well as viruses to which humans are susceptible, such as Murray Valley encephalitis and Ross River fever.

Priorities for control

The highest priority for control of feral pigs is where they impact threatened species and international heritage wetlands at Nocolèche, Peery Lake, Toorale and Culgoa. Other high priorities include the protection of neighbouring agriculture at Gundabooka and Ledknapper.

Control

- Aerial shooting.
- 1080 baiting (hog hopper trials in 2011).
- Live panel trapping.
- Programmed ground shooting.

Monitoring

Reduced feral pig populations as indicated by reduced evidence of pig activity and damage in reserves where they occur. Review survey program data at Toorale.

Red fox (*Vulpes vulpes*)

Distribution and abundance

Foxes are widespread throughout Far West Region.

Impacts

The introduction of foxes into Australia has had a devastating impact on native fauna, particularly among medium-sized (450–5000 g) ground-dwelling and semi-arboreal mammals, ground-nesting birds and freshwater turtles. Fox predation has been implicated in limiting habitat choice and population size of a number of medium-sized marsupials. Even at low densities foxes can eliminate remnant populations and jeopardise species recovery programs. Foxes have also caused the failure of several attempts to reintroduce native fauna into areas of their former range. Predation by the European red fox is listed as a KTP under the TSC Act and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The NSW Threat Abatement Plan for Predation by the Red Fox (Fox TAP) identifies priority sites to measure the response of priority species to fox control.

Foxes also contribute to the dispersal of weeds such as Bathurst burr and Noogoora burr and are a potential carrier of exotic diseases. Predation by foxes on farm livestock can have serious economic effects.

Priorities for control

The Fox TAP sets the priorities for fox control for the conservation of biodiversity. Fox TAP sites in Far West Region include:

- Mutawintji for the protection of yellow-footed rock-wallabies
- Mallee Cliffs and Tarawi for the protection of malleefowl
- nocolèche and peery lake for the protection of terrestrial wetland birds
- Sturt and Mungo for the protection of threatened birds and reptiles.

Control

Fox control should be undertaken in the peak dispersal period (autumn) and more frequently in relation to predation on threatened species. The principal methods used in Far West Region include:

- 1080 ground baiting (including M44 ejectors)
- den fumigation
- programmed ground shooting
- aerial shooting.

Monitoring

- Increased recovery of threatened species (yellow-footed rock-wallaby and malleefowl).
- Reduction in fox numbers as measured by bait uptake, spotlight surveys and use of remote cameras.

Rabbit (*Oryctolagus cuniculus*)

Distribution and abundance

Rabbits occur in scattered populations throughout the Region. The size of populations varies throughout NPWS-managed lands and are more common in areas of disturbance or adjacent to agricultural lands. They are found in Kinchega, Mungo, Mallee Cliffs, Mutawintji and Sturt national parks and most other reserves.

Impacts

Rabbits cause environmental damage in the following ways:

- soil erosion
- grazing on native vegetation and reducing regeneration
- competition with native animals for suitable habitat
- impacts on historic sites through foundation disturbance.

Priorities for control

The highest priorities for control are where rabbits are impacting threatened species, such as at Sturt National Park where they are impacting *Xero parvifolia* and *Grevillea kennedyana*. Other high priorities are when they impact Aboriginal historic sites such as at Kinchega and Mungo national parks.

Control

Rabbit control involves a combination of techniques including baiting, fencing, fumigation, trapping, shooting, warren ripping and biological agents.

Programs also make use of natural outbreaks of myxomatosis and calicivirus to further suppress populations.

Monitoring

A reduction in rabbit activity as indicated by spotlight surveys, vegetation monitoring exclosures and ground inspections. To date, monitoring has shown that populations have been reduced in Kinchega, Mallee Cliffs, Mungo and Mutawintji national parks.

Feral goat (*Capra hircus*)

Distribution and abundance

Feral goats occur in most reserves in the Region.

Impacts

Feral goats compete with native animals for water, food and shelter. They are a major contributor to soil erosion and compaction, and can have substantial impacts on vegetation structure through overgrazing, and on cultural heritage sites. They may also carry exotic diseases, especially footrot and ovine Johne's disease.

Priorities for control

The highest priorities for control of feral goats are where they are impacting threatened species. Examples include:

- Mutawintji for the protection of yellow-footed rock-wallabies
- Gundabooka for the protection of curly bark wattles
- Tarawi for the protection of malleefowl
- Culgoa for the protection of *Capparis loranthifolia* var. *loranthifolia*, *Euphorbia sarcostemmoides*, and the Brigalow-Gidge Woodlands EEC
- Nocoche for the protection of *Aponogeton queenslandicus*, *Simoselaps fasciolatus*, and the Ramsar wetland EEC.

Control methods

Control methods include contract mustering, trapping and aerial shooting.

Monitoring

Monitoring programs include:

- visual assessments via ground and aircraft surveys
- vegetation monitoring
- annual endangered species surveys.

Feral cat (*Felis catus*)

Distribution and abundance

Feral cats are known to occur throughout the Region but their abundance is unknown.

Impacts

Feral cats predate on small mammals, reptiles, frogs and birds, and act as a reservoir for diseases and parasites that can be transferred to native fauna, domestic livestock and humans.

Priorities for control

Cat control is only undertaken opportunistically during the course of shooting and trapping programs targeting other pest species.

Control methods

No pesticide is currently licensed for use on feral cats. The only control methods available are trapping and programmed ground or aerial shooting, however these methods are largely ineffective. Feral cats are a difficult pest animal to control and major advances in their control will depend on further progress in the development of new cat-specific baiting systems.

Monitoring

Increased community awareness of responsible cat ownership. Better understanding of abundance and distribution of feral cats. Removal of identified problem cats using available techniques.

Athel pine (*Tamarix aphylla*)

Distribution and abundance

There is a small population in Kinchega NP along the edge of Lake Cawndilla outlet channel. Athel pine is also found near old homesteads in Sturt and Kinchega NPs, and in Paroo-Darling NP and Bourke Area parks.

Impacts

This species has the potential to invade sandy areas adjacent to creek lines and compete with native species.

Priorities for control

Priorities for the control of Athel pine are Kinchega and Paroo-Darling National Park.

Control methods

Herbicide application using basal bark spraying and cut stump treatment.

Monitoring

Ground inspections indicating a reduction in the area of infestation.

Bitou bush (*Chrysanthemoides monilifera ssp. rotundata*)

Distribution and abundance

Bitou bush is confined to the eastern foreshore of Menindee Lake including the northern sections of Kinchega NP.

Impacts

Bitou bush is a highly competitive weed that displaces native vegetation in most environments. In disturbed areas bitou bush has the capacity to become a monoculture.

Priorities for control

The priority for control of bitou bush is the eradication of the only population in the Region at Kinchega National Park.

Control methods

Control involves an integrated approach using herbicide application, burning and manual removal.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density. Increase in cooperative response from neighbours. Success of the cross-border program with CMAs and Victorian government departments.

Spiny burr grass (*Cenchrus* spp.)

Distribution and abundance

Spiny burr grass is commonly found in drier regions with annual rainfall of 250–600 mm. It is an annual summer grass that infests parts of Culgoa NP and, more recently, Kinchega NP. It has a sharp and clingy burr that enables its seed to spread easily on foxes, kangaroos and other animals.

Impacts

Spiny burr grass has the ability to spread rapidly and form dense infestations, particularly on disturbed soils. It also establishes readily on roadsides, creeks and riverbanks (but generally avoids heavy soils). Its impacts are primarily agricultural; however, its sharp burr can cause discomfort for people and animals alike. It can quickly outcompete native pastures and is difficult to combat.

Priorities for control

The priorities for control are at Culgoa National Park and Kinchega National Park.

Control

Control is difficult and is generally achieved through a combination of methods over a three to five-year period. Good hygiene is essential and may involve:

- cleaning vehicles and machinery before entering and leaving infested areas
- restricting access and alerting those people who may be accessing the infested site
- fencing to exclude wildlife. This not only restricts the spread of seed, but the lack of browsing and grazing allows plant competition to inhibit growth and germination of spiny burr grass. Application of non-selective knockdown herbicides will kill existing plants with follow-ups required to control subsequent germination. In suitable conditions, burning of dead plants will destroy seed heads.

Monitoring

All infestations in Far West Region reserves will be mapped and recorded. Recording of control programs that are implemented each season will provide information on increases or decreases in infestations. Ground inspections will continue to monitor the effectiveness of control programs and any new incursions.

Giant reed (*Arundo donax*)

Distribution and abundance

Giant reed grows around the Menindee Lake foreshore and isolated plants are found along banks of the Darling River in Kinchega NP.

Impacts

It outcompetes native pasture species and threatens the conservation and recreational value of affected areas (e.g. causes a visual barrier and may impede boat launching).

Priorities for control

The priorities for control are in Kinchega National Park.

Control methods

Mechanical removal and herbicide application via the cut stump method under off label permit approval.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

African boxthorn (*Lycium ferocissimum*)

Distribution and abundance

African boxthorn occurs as scattered plants in Kinchega, Mutawintji, Sturt and Mallee Cliffs national parks. High plant numbers occur along some ephemeral watercourses on Paroo-Darling NP.

Impacts

African boxthorn is an invasive species that occurs mostly in watercourses and in areas of soil disturbance. It provides ideal cover for feral pigs and rabbits, outcompetes native vegetation and threatens the conservation and recreational values of NPWS estate. Soil reserves of dormant seed can germinate under ideal conditions.

Priorities for control

The critical priorities for control of African boxthorn is where it impacts threatened species and EECs, including in Toorale, Ledknapper Nature Reserve and Peery, Paroo–Darling NP.

Control

Basal bark application of registered herbicide-diesel mix is used in conjunction with physical removal of large plants (using a tractor) via stump grubbing.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

Castor oil plant (*Ricinus communis*)

Distribution and abundance

There is a minor infestation along Menindee Lake foreshore in Kinchega NP.

Impacts

It outcompetes native species. The seeds are toxic to humans, it is reported to poison humans and livestock, and may poison native animals.

Priorities for control

The priority for control is at Kinchega National Park.

Control

- Basal bark treatment and physical removal of mature plants.
- Foliar spraying or pulling of seedlings.

Monitoring

Ground inspections indicate a containment of, or a reduction in, the degree of infestation, both in area and plant density.

Paterson's curse (*Echium plantagineum*)

Distribution and abundance

Paterson's curse is present in all reserves in the Region along roadsides, walking tracks, flood out areas, campgrounds and tracks.

Impacts

It is a winter–spring growing invasive weed of overgrazed and degraded areas that competes with all native pasture species. It threatens the conservation and recreational values of affected areas.

Priorities for control

The priorities for control are where it threatens the recreational and aesthetic values of the Region's reserves.

Control

- Integrated control using herbicides and slashing.
- Biological agents include the leaf-mining moth, crown weevil, root weevil, stem boring beetle and tap root flea beetle. Root weevil has been released at Mutawintji, Kinchega and Mungo NPs.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

Bathurst burr (*Xanthium spinosum*)

Distribution and abundance

Minor infestations occur on all reserves across the Region.

Impacts

Bathurst burr is a summer-growing invasive weed of disturbed areas, such as along roadside drains, around natural and man-made water points and in flood out areas. The burrs of this species have a spoiling effect on wool. Each burr contains two seeds, one of which may not germinate for several seasons after the first seed has germinated. Mature burrs are readily dispersed by animals and flowing water.

Priorities for control

The priorities for control of Bathurst burr are where it may impact neighbouring wool-producing enterprises.

Control

Control involves an integrated approach using high volume handgun (spot) spraying, boom spraying of herbicides using target specific herbicides, mechanical slashing and some chipping and hand pulling.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

Noogoora burr (*Xanthium occidentale*)

Distribution and abundance

Noogoora burr is found on most reserves across the Region

Impacts

It is a highly invasive weed of flood out areas on a range of soils, from sandy clay loams to heavy self-mulching grey clays, and is a vigorous competitor against all native pasture species.

The burrs of this species have a spoiling effect on wool. Each burr contains two seeds, one of which may not germinate for several seasons after the first seed has germinated. Mature burrs are readily dispersed by animals and flowing water. Consequently, very dense and extensive stands occur along river and creek floodplains and flats after late spring or summer flooding, with masses of seedlings establishing and crowding out other species of plants.

Priorities for control

The highest priority for control of Noogoora Burr is at Momba Swamp in Nocoleche, where it impacts threatened aquatic plants and the Ramsar listed wetland. Other priorities for control are where it may impact neighbouring wool-producing enterprises.

Control

Control involves an integrated approach using high volume handgun (spot) spraying and boom spraying of herbicides using target specific herbicides, mechanical slashing and some chipping and hand pulling.

Epiblema (a stem-galling moth) has previously been released on Noogoora Burr in Sturt NP, but did not become established.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density. Success of infestation control cannot be adequately assessed after ideal growing conditions (a series of wet seasons).

Thornapple (*Datura ferox*)

Distribution and abundance

Thornapple grows along roadsides and in isolated areas on Kincheega, Mallee Cliffs, Mungo, Paroo-Darling and Mutawintji NPs.

Impacts

It is a vigorous summer-growing species which produces alkaloids that are toxic to humans. The plant outcompetes native pasture species and threatens the recreational values of affected areas because it is both unsightly and malodorous.

Priorities for control

Priorities for control are in public areas to reduce dispersion and minimise potentially harmful effects to humans. Specific attention is given to infestations on watercourses that may affect neighbours, such as in Nuntabulla Creek Mutawintji NP.

Control

- High volume and boom spray application of herbicides.
- Mechanical slashing and hand removal of plants and seedpods.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

Onion weed (*Asphodelus fistulosus*)

Distribution and abundance

This weed occurs in most areas within the Region, except Sturt NP.

Impacts

It is a highly invasive weed that grows in disturbed areas, is a vigorous competitor against native pasture species and is difficult to kill.

Priorities for control

Priorities for control are in reserves in the Lower Darling Area. Satellite populations will be given the highest priority for control over all Areas.

Control

- High volume and boom spray using target-specific herbicides.
- Hand removal of small outbreaks.

Monitoring

Ground inspections indicate containment of this species and preferably a reduction in the current area of outbreak.

Horehound (*Marrubium vulgare*)

Distribution and abundance

Minor infestations occur in Kincheega NP, Mallee Cliffs NP and Tarawi, larger infestations are present in Mungo NP.

Impacts

Horehound is a highly invasive weed that is able to grow and persist in very low fertility soils.

This species has the ability to outcompete most native pasture species, thereby slowing regeneration of disturbed areas.

Priorities for control

Mungo is the priority for horehound control; other satellite infestations will be given appropriate attention.

Control

Control is by an integrated approach using spot and boom spray application of herbicides, mechanical and hand removal of isolated infestations, and biological control agents such as plume moth, horehound clearwing moth and horehound weevil.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

Mexican poppy (*Argemone ochroleuca*)

Distribution and abundance

There are small outbreaks in all areas, mostly in disturbed situations, along alluvial flats, ephemeral creek lines and roadsides.

Impacts

This is an invasive weed species that is suspected of causing various disorders in humans.

It is known to produce toxic levels of nitrate and to poison poultry.

Priorities for control

Priorities for control are in high visitation areas in all parks to reduce spread. Creek-lines within Paroo–Darling National Park and Mutawintji require ongoing works.

Control

Control is by high volume and spot spraying, and hand removal of isolated plants.

Monitoring

Ground inspections indicate a reduction in the degree of infestation, both in area and plant density.

Prickly pear (*Opuntia* spp.)

Distribution and abundance

Occurs in small outbreaks primarily in the north east of the Region, i.e. Culgoa NP and isolated patches in Kemendok NR and Mungo NP.

Impacts

Impacts are low due to low densities of infestation, however new plants regenerate readily from segments spread by larger animals.

Priorities for control

Potentially significant infestations in the north east. However, the weed does appear in several reserves at low levels.

Control

There is evidence for low-level infestations of prickly pear by cactoblastis moth and cochineal mealy bugs. Such biological control is the preferred option and it is possible to manually assist the spread of control agents. Some isolated specimens may require manual removal or control by herbicide.

Monitoring

Monitoring will be opportunistic and occur in conjunction with routine park management activities. Ground inspections indicating a reduction in the degree of infestation, both in area and plant density.

Buffel grass (*Cenchrus ciliaris*)

Distribution and abundance

Occurs primarily in the north and east of the Region, well adapted to red earth soils. Occurs in bumble box, mulga and numerous other communities often along roadsides

Impacts

Buffel grass out-competes native species and while young growth is palatable, older growth is less so. Can produce high intensity fires further affecting native species.

Priorities for control

Parks and reserves north of the Barrier highway and in the NE. Smaller isolated infestations on Paroo-Darling National Park.

Control

Foliar spray prior to seeding, using knock down herbicide.

Monitoring

Monitoring will be opportunistic and occur in conjunction with routine park management activities. Ground inspections indicating a reduction in the degree of infestation, both in area and plant density.

Appendix 1 New and emerging pest species

New pest species

Any suspected new pest species in the Region should first be reported to the regional pest management officer, who will then decide if it is necessary to alert the following groups.

Species	Contact	Website
All species	Report sightings to Wildlife Atlas	http://www.environment.nsw.gov.au/wildlifeatlas/about.htm#contribute
All species	Regional Invasive Species Officer (DPI) (see website for contacts)	http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/345280/RWACs-ISO-contacts-map.pdf
Animal diseases	Emergency Animal Disease Hotline (DPI) - Report unusual disease signs, abnormal behaviour or unexplained deaths in livestock. Ph. 1800 675 888	http://www.dpi.nsw.gov.au/biosecurity/animal
Aquatic pests	Aquatic Pest Hotline (DPI) - Report suspected aquatic pests or weeds. Ph. 02 4916 3877	http://www.dpi.nsw.gov.au/biosecurity/aquatic
Insects and plant pests/diseases*	Exotic Plant Pest Hotline (DPI) - Report suspect exotic and emergency insects and plant pests/diseases. Ph. 1800 084 881	http://www.dpi.nsw.gov.au/biosecurity/plant
Pest animals	Website - Form available for the reporting of new incursions of pest animals.	http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/other-vertebrate-pests2/pest-reporting/pest-reporting-form
Weeds**	Notify relevant Local Control Authority and Weeds Hotline (DPI) Ph. 1800 680 244 Email - weeds@dpi.nsw.gov.au .	http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/contacts

* Certain diseases and pests are notifiable for the purposes of the *Plant Diseases Act 1924*. For example, red imported fire ant has been made notifiable under this Act. This means that you have a legal obligation to report suspected red fire ant infestations as soon as possible.

** Noxious Weeds in Control Classes 1, 2 and 5 are notifiable weeds under the *Noxious Weeds Act 1993*. This means that you must notify the local control authority within 3 days of becoming aware that the notifiable weed is on the land.

Emerging pest species

In FWR, there are a number of weeds and pest animals that pose a risk of invasion and/or further spread and establishment. Those listed below are not currently known to exist in reserves, exist in small isolated infestations or are only in a small number of reserves. These species, the locations of current infestations and/or possible reserves where infestations may establish are discussed below. Any new occurrences of these pests, outside of the areas on-park mentioned below, should be reported to the Regional Pest Management Officer, who will decide upon the appropriate course of action.

Feral deer

Within FWR, current infestations of feral deer (fallow) are known to occur within Paroo-Darling NP in very small numbers.

Feral deer impact by selective browsing, spreading weeds, wallowing, rubbing trees and other vegetation and causing erosion through scrapes and pads. Their browsing can impact on native vegetation by preventing the establishment of seedlings and reducing seed reproduction of established plants. While some threatened species may be impacted by this selective browsing, it can also lead to changes in vegetation communities with more palatable species being reduced and less palatable species becoming dominant. Furthermore, native animals that rely on native plant species for food or shelter may be impacted through competition with feral deer.

Herbivore and environmental degradation caused by feral deer is listed as a KTP under the *TSC Act 1995*.

In FWR, deer have been opportunistically controlled through aerial shooting programs targeting other pests.

Aquatic weeds

Salvinia is a free floating aquatic fern that grows in still and slow-flowing fresh water. In Australia, it predominantly occurs in streams along the east coast. It has the potential to spread throughout much of Australia where it would impact on waterways and irrigation areas. It is listed as a WoNS.

Water lettuce is a free-floating plant that has an appearance like an open head of lettuce. It grows in still and slow-flowing fresh water. In NSW, there have been a number of infestations identified around the northern coastal areas, and within the Warrego River at Cunamulla. It has the potential to spread in rivers, wetlands, lakes and streams, especially in areas with a sub-tropical climate. It is listed as a Class 1 weed in NSW.

Golden dodder, a native of North America, is parasitic climber with thread-like yellow stems, and can be a significant pest especially in Lucerne crops. It is often associated with floodout country, and is probably challenged in average rainfall years. Golden dodder is distributed from south-east Queensland to south-east South Australia. There are some reports that it is in Bourke Area and roadsides south of Broken Hill.

Water hyacinth is a free-floating perennial water plant that grows in still and slow-flowing fresh water. It occurs along the east coast of Queensland and NSW as well as along the Gingham Watercourse near Moree where it threatens to spread further into the Murray-Darling system.

Rangers and pest management staff involved in management of the Darling River basin are aware of these threats. During routine management activities they will continue to look out for these species. If any infestations are identified, control

programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

Mesquite

Mesquite is a WoNS, and is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread and economic and environmental impacts. Areas of concern include Sturt NP and Kinchega NP. Staff are constantly on the lookout for mesquite and respond quickly to any reports on or off park.

Tropical soda apple

Tropical soda apple (*Solanum viarum*) is a prickly perennial shrub up to 2 m high. It has cream-coloured spines, large leaves, white flowers and fruit that looks similar in colour to small watermelons when immature, reaching golf-ball size and turning yellow as it matures. It was first recorded in Australia in August 2010 in the Kempsey area and several other small infestations have since been identified around Wingham, Coffs Harbour and Grafton. It is listed as a Class 2 weed across Northern Plains Region.

Currently there have been no recorded infestations anywhere in the Region. While it appears that this weed would be most suited to a coastal climate, pest management staff across the Region are aware of the threat and will continue to be on the lookout for tropical soda apple and other new threats. If any infestations are identified, control programs will be conducted by NPWS and notification of the infestation to the relevant LCA will occur.

Appendix 2 Threatened species

The conservation of threatened species is of the utmost importance when considering pest management programs. Every effort is made to minimise any disturbance to species, populations and communities when planning pest management programs within Far West Region, on and off park. Pest control programs are undertaken in Far West Region by NPWS to protect those threatened species listed below.

In NSW, the threat abatement planning process is an excellent mechanism for delivering strategic state-wide initiatives to protect threatened species. To date, a TAP has been finalised for foxes, with others in preparation for feral cats, bitou bush and plague minnow.

Threatened species protection programs in Far West Region

Threatened species	Pest	Program	Reserve
Curly-bark wattle <i>Acacia curranii</i>	Rabbit Goat	Y	Gundabooka NP
Purple-wood wattle <i>Acacia carneorum</i>	Rabbit Goat	Y	Kinchega NP
Salt pipewort <i>Eriocaulon carsonii</i>	Pig	Y	Paroo Darling NP
Bladderwort <i>Utricularia spp.</i>	Pig	Y	Paroo Darling NP
Flame spider flower <i>Grevillea kennedyana</i>	Rabbit Goat	Y Y	Sturt NP
Australian bustard <i>Ardeotis australis</i>	Fox	Y	Paroo Darling, Sturt NP, Nocolche NR, Culgoa NP, Ledknapper NR
Malleefowl <i>Leipoa ocellata</i>	Fox	Y	Mallee Cliffs NP, Tarawi NR
Brolga <i>Grus rubicundus</i>	Fox Pig	Y Y	Kinchega, Paroo Darling and Sturt NP, Toorale Ledknapper NR
Freckled duck <i>Stricktonetta naevosa</i>	Fox Pig Cat	Y N	Paroo Darling NP/ SCA, Toorale NP
Blue-billed duck <i>Oxyura australis</i>	Fox Pig	Y Y	Paroo Darling NP/ SCA, Nocolche NR, Toorale NP
Black-breasted kite <i>Hamirostra melanosternon</i>	Cat	N	Paroo Darling NP/SCA
Major Mitchell's cockatoo <i>Cactua leadbeateri</i>	Cat	N	Paroo Darling NP/SCA, Kinchega, Mallee Cliffs and Mungo NP,

			Ledknapper NR, Culgoa NP and Gundabooka NP
Pied honeyeater <i>Certhionyx variegatus</i>	Cat	N	Paroo Darling NP, Nocolleche NR Ledknapper NR
Yellow-footed rock wallaby <i>Petrogale xanthopus</i>	Fox Goat	Y Y	Mutawintji NP and NR
Mallee ningau <i>Ningau yvonneae</i>	Fox Cat	Y N	Mallee Cliffs NP and Tarawi NR
Bolam's mouse <i>Pseudomys bolami</i>	Fox Cat	Y N	Mallee Cliffs NP and Tarawi NR
Kultarr <i>Antechinomys laniger</i>	Fox	Y	Kinchega NP, Gundabooka NP, Ledknapper NR
<i>Solanum karsensis</i>	Rabbit Goat	Y	Kinchega NP
Centralian Ranges Rock Skink <i>Liopholis whitii</i>	Fox Cat Goat	Y N Y	Mutawintji NP
Common Slender Bluetongue <i>Cyclodomorphus branchialis</i>	Fox	Y	Mallee Cliffs NP and Tarawi NR
Western Bluetongue <i>Tiliqua occipitalis</i>	Fox	Y	Mallee Cliffs NP and Tarawi NR, Nocolleche NR, Gundabooka NP, Culgoa NP and Ledknapper NR
Dusky Hopping-mouse <i>Notomys fuscus</i>	Fox Cat	Y Y	Sturt NP
Acacia sp (Yaran) <i>Acacia melvilleii</i> EEC	Goat Rabbit	Y Y	Mungo NP
Nelia <i>Acacia loderi</i> EEC	Goat Rabbit	Y Y	Mungo NP

Appendix 3 Timing of pest control programs

NPWS adopts a strategic approach to pest animal control, while allowing sufficient flexibility to capitalise on windows of opportunity which arise (such as floods, droughts and fire). Similarly, some opportunistic weed control is undertaken in response to local events (such as control of mass germinations following floods or rains). Timing of control activities varies with the method used. For pest animal control, the timings indicated below are general in nature and are influenced by factors such as varying seasonal conditions. Factors that determine timing of herbicide application include growth stage of the plant, time of year, herbicide used, mode of application and weather conditions. Timing for weed species refer to herbicide treatment only. The following table outlines the best time for control of key pest species in Far West Region.

Species	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Feral pig	•	•	•	•	•	•	•	•	•	•	•	•
Wild dog		•	•			•	•	•	•			
Fox	•	•	•	•	•	•	•	•	•	•	•	•
Rabbit				•	•	•	•	•	•	•		
Feral goat	•	•	•	•	•	•	•	•	•	•	•	•
Feral cat	•	•	•	•	•	•	•	•	•	•	•	•
Bitou bush	•								•	•	•	•
Paterson's curse	•	•	•									•
Noogoora burr							•	•	•			
Thornapple							•	•	•			
Onion weed	•	•	•	•							•	•
Horehound		•	•	•								

Appendix 4 Other issues

Mice control

Significant effort and costs have occurred since the last regional pest management strategy in the control of mice across the majority of NPWS estate in the Region. The control has primarily been for domestic purposes and at this point no control has been undertaken in a broader sense.

Coolatai grass

Coolatai grass has not been recorded in Far West Region on NPWS estate, although roadside infestations have been seen between Broken Hill and Wilcannia. This grass is a major problem further east and a concerted effort to identify any outbreaks on parks should be made. Recent good seasons have increased the chances of this species becoming established in the Region. Coolatai grass is an aggressive coloniser that grows rapidly, becomes quickly unpalatable and benefits from fire.

Mesquite

While there are no known infestations of mesquite on park estate in Far West, some historical reports suggest mesquite was controlled on Kinchega NP in the early 1990s and infestations are known in the area. Further investigation is required to obtain accurate data on previous records.

Camels

Camels have not been reported on NPWS reserves, although reports of a small mob (<25 animals) have been seen roadside south of Gundabooka on the Cobar to Bourke road. Sturt NP may potentially begin to see camels as populations increase in northern South Australia, although the existing dog fence may limit their movement.

Widespread weeds

There are issues with weed species such as Ward's weed becoming monocultures across the landscape and there is a need to investigate broad scale control options.

Group projects

There are potential benefits of staff from across an Area or Region working together to carry out pest work at a single location. Examples include the construction of goat exclusion fencing, trap yards, broad-scale spraying operations or survey work for emerging weed species.

Data collection

Pest and Weed Information System (PWIS). All pest management work should be planned and recorded through the Asset Maintenance System, and the results and spatial location of works should be recorded in the Pests Geodatabase.

