

Department of Parks and Wildlife
2015–16 Yearbook



Department of
Parks and Wildlife



Acknowledgement

This yearbook was prepared by the Public Information and Corporate Affairs Branch of the Department of Parks and Wildlife.

For more information contact:

Department of Parks and Wildlife
17 Dick Perry Avenue
Technology Park, Western Precinct
Kensington Western Australia 6151

Locked Bag 104, Bentley Delivery Centre
Western Australia 6983

Telephone: (08) 9219 9000
Email: info@dpaw.wa.gov.au

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About the Department's logo

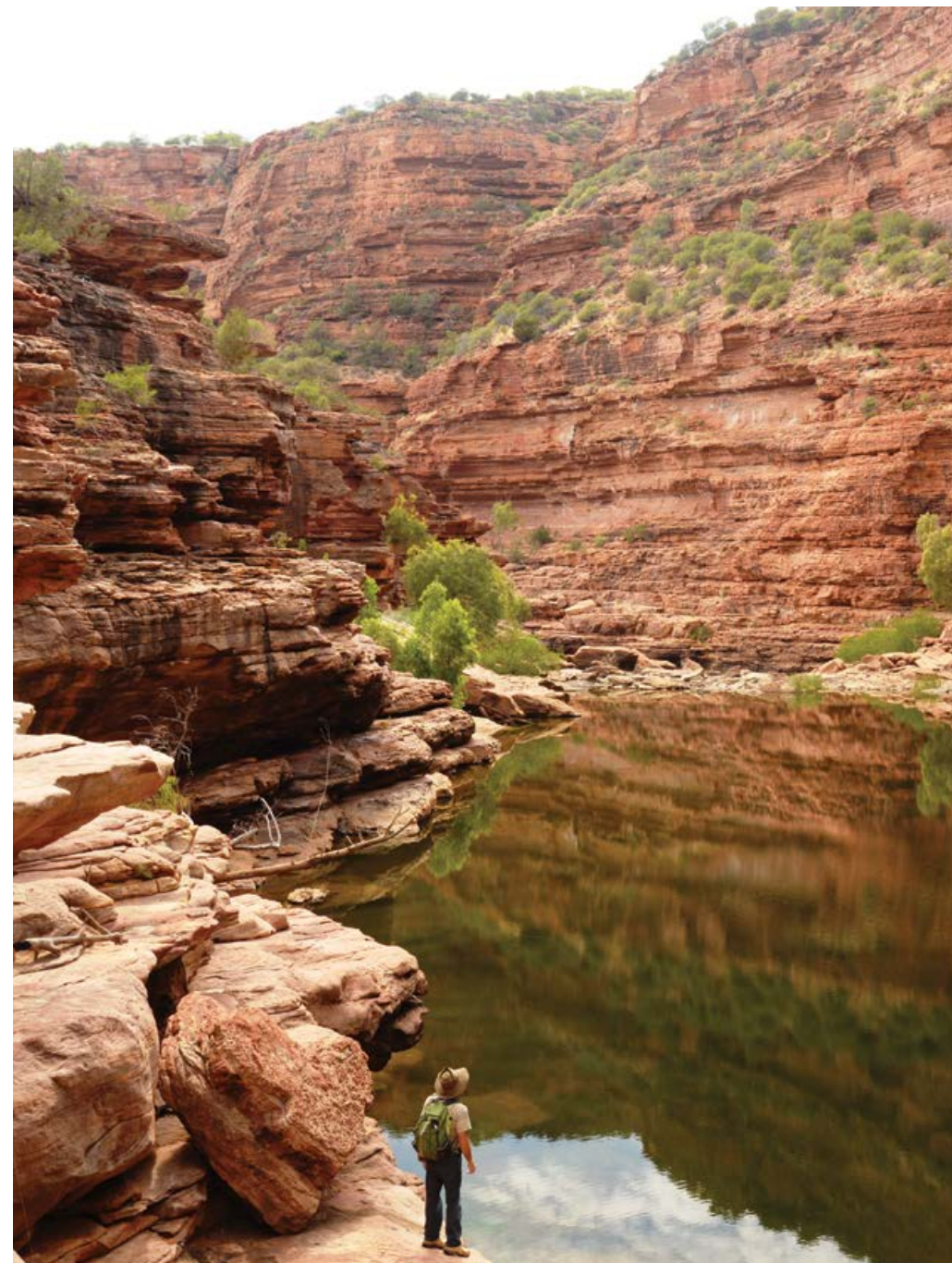
The design is a stylised representation of a bottlebrush, or *Callistemon*, a group of native plants including some found only in Western Australia. The orange colour also references the WA Christmas tree, or Nuytsia.

WA's native flora supports our diverse fauna, is central to Aboriginal people's idea of country, and attracts visitors from around the world. The leaves have been exaggerated slightly to suggest a boomerang and ocean waves. The blue background also refers to our marine parks and wildlife. The design therefore symbolises key activities of the Department of Parks and Wildlife.

The logo was designed by the Department's senior graphic designer and production coordinator, Natalie Curtis.

Front cover: The Gap lookout at Torndirrup National Park, Albany. *Photo – Peter Nicholas/Parks and Wildlife*

Back cover: Aerial view of a Kimberley river system. *Photo – Peter Nicholas/Parks and Wildlife*



Murchison River Gorge, Kalbarri National Park. *Photo – David Pearson/Parks and Wildlife*



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Department of Parks and Wildlife 2015–16 Yearbook

Planning officer Michael Roberts ignites a prescribed burn at Millstream Chichester National Park. *Photo – Judy Dunlop/Parks and Wildlife*

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Flannel flower (*Actinotus leucocephalus*).
Photo – Mark Brundrett/Parks and Wildlife

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Director General's year in review



Prince Frederick Harbour in the proposed North Kimberley Marine Park. *Photo – Anna Smith/Parks and Wildlife*



The diversity and scope of the Department of Parks and Wildlife's work has never been more prominent than in 2015–16.

This Yearbook, a companion to the Annual Report, provides more detail about the projects and services carried out by the Department on the 29 million hectares of conservation estate it manages on behalf of the people of Western Australia.

The year began with the amalgamation of Parks and Wildlife with the former Swan River Trust to create a single conservation agency managing all of the State's national parks, reserves, State forests and marine parks, along with the rivers and estuaries of the Swan Canning Riverpark.



Millstream Chichester National Park. *Photo – Peter Nicholas/
Parks and Wildlife*



Regional Development Minister Terry Redman, Premier Colin Barnett, Member for Bunbury John Castrilli and Environment Minister Albert Jacob breaking ground at the new Bunbury Parks and Wildlife site. *Photo – Parks and Wildlife*



Osprey, Swan Canning Riverpark. *Photo – Mark Kleczkowski*



Anemone in the Swan Canning Riverpark. *Photo – Mark Kleczkowski*



Gilbert's potoroo mother and pouch young. *Photo – Parks and Wildlife*



Premier Colin Barnett with Yawuru traditional owners, including park representatives and rangers, Parks and Wildlife District Manager Alan Byrne and Kandy Curren from Roebuck Bay Working Group meet in Broome to sign new 10 year management plans for Yawuru Nagulagun / Roebuck Bay Marine Park and adjacent Yawuru Birragun Conservation Park. *Photo – Parks and Wildlife*



Western ground parrot. *Photo – Jennene Riggs*

There was another milestone with Koombana Drive, Bunbury, named as the site of the new Parks and Wildlife headquarters.

Among the year's highlight achievements was the introduction to Parliament of the Biodiversity Conservation Bill 2015, created to improve and modernise the conservation of Western Australia's world-renowned plants, animals and ecosystems. It will replace Australia's oldest surviving conservation legislation, the *Wildlife Conservation Act 1950* and *Sandalwood Act 1929*.

Protection of the natural environment was highlighted with the Department releasing draft management plans for the North Kimberley Marine Park and Lalang-garram / Horizontal Falls and North Lalang-garram marine parks, and Oomeday National Park. This work under the *Kimberley Science and Conservation Strategy* included extensive work with traditional owner groups, fostering

partnerships and creating employment opportunities. In addition final management plans were released for Kalbarri National Park, conservation reserves on the Swan Coastal Plain's south and Esperance Recherche parks.

Enabling and encouraging people to connect with our parks and natural areas remained a high priority, supported by new and upgraded facilities in regional areas through the *Parks for People* initiative, funded by *Royalties for Regions*.

We saw the opening in April of spectacular infrastructure at The Gap and Natural Bridge in Torndirrup National Park. The Gap received more than 93,000 visits in the first three months following its official reopening. Around 80 new campsites were delivered at new campgrounds at Credo in the Goldfields and Gnaala Mia at Dryandra Woodland, and at expanded and upgraded campgrounds:

Lucky Bay (Cape Le Grand National Park), Miliyanha (Millstream Chichester National Park) and Belvidere (Leschenault Peninsula Conservation Park). The \$20 million *Royalties for Regions Kalbarri Skywalks and Tourist Infrastructure* project also began.

Native animal conservation included implementation of recovery actions for the State's most at-risk species, such as woylies, numbats, Gilbert's potoroos and western ground parrots, along with fox and cat baiting carried out under *Western Shield*. Our staff continued to lead the way in plant conservation and recovery of critically endangered species.

In a severe summer bushfire season in the south-west, the Department responded to a number of serious incidents and was part of a multi-agency response to the Waroona-Yarloop bushfire, which tragically resulted in two deaths and the loss of many properties.

Our work and partnerships with the community remain integral to achieving our goals and it is noteworthy that 638,750 hours were contributed in 2015–16 from almost 5200 volunteers, a record high.

I would like to thank them for their support and also Parks and Wildlife staff for their ongoing work managing the natural values cherished by the community.

Jim Sharp
Director General
Department of Parks and Wildlife

Highlight

Tradition and science merge in joint management arrangements

A series of joint management arrangements and Indigenous Land Use Agreements (ILUAs) in the north of Western Australia will merge traditional knowledge with contemporary land management practices as part of the State Government's \$103 million *Kimberley Science and Conservation Strategy*. These partnerships between Parks and Wildlife and traditional owners are resulting in the protection of natural and cultural values and new employment and business opportunities for local Aboriginal people.

A highly successful example can be found at Eighty Mile Beach, a remote coastal stretch between Port Hedland and Broome, which has resulted in ILUAs being reached with the Karajarri, Ngarla and Nyangumarta people for the creation of new parks and reserves, the employment of traditional owners as rangers and the development of fee-for-service employment arrangements.

The Eighty Mile Beach Marine Park was created in 2013 and covers about 200,000ha. An important habitat area for shorebirds, turtles and marine mammals, it also has immense cultural significance for the traditional owners who have called the area home for thousands of years. The park is the first in WA to include special purpose cultural heritage zones, which will provide a focus for increased education and interpretive information about the protection of Aboriginal culture in this area.

Parks and Wildlife has employed traditional owners as rangers at Eighty Mile Beach who have been involved in turtle and shorebird monitoring, biological surveys, community education and working with elders and other traditional owners to share information on sites of cultural significance. The rangers are completing units towards a Certificate II in Conservation and Land Management that will ultimately see them graduate with a Certificate IV in Conservation and Land Management.

Joint management bodies for the parks at Eighty Mile Beach have been established to allow traditional owners to make decisions about their land, consistent with the park management plan. This recognises the wealth of knowledge, skills and insight of traditional owners in the management of country.

In 2015–16, progress under the *Kimberley Science and Conservation Strategy* included negotiating and creating new joint management arrangements, including signing the Indigenous Land Use and Joint Management Agreements with Karajarri native title holders, and amendments to the CALM Act to provide for joint vesting of national parks, conservation parks and nature reserves. Within the Kimberley region alone, the Department engaged the services of nearly 200 Aboriginal rangers and traditional owners.

Beyond Eighty Mile Beach, the Department already has joint management arrangements for the Lalang-garram / Camden Sound Marine Park, Yawuru Conservation Estate and Murujuga National Park. Six conservation areas in and around Kununurra are jointly managed with the Miriuwung Gajerrong people and the Department is continuing to develop new joint management arrangements for other existing and new parks across the Kimberley.



Traditional owners provide a wealth of insight into management of the spectacular Eighty Mile Beach area. *Photo – Colin Ingram/Parks and Wildlife*



Nyangumarta elders sharing their knowledge of cultural sites within Eighty Mile Beach Marine Park. *Photo – Jesse Murdoch/Parks and Wildlife*



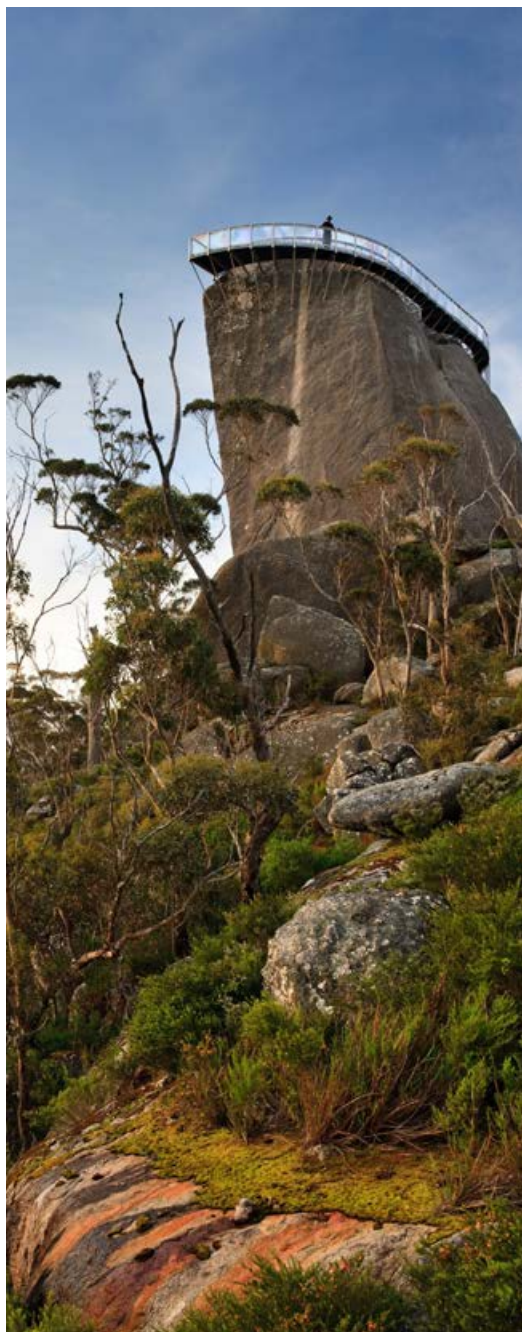
Traditional rangers monitor turtles on Eighty Mile Beach Marine Park. *Photo – Sara McAllister/Parks and Wildlife*



Parks and Wildlife's Eighty Mile Beach Marine Park Ngarla and Nyangumarta rangers (left to right) Augustine Badal, Jeffrey Brown, Nathan Hunter and Stephen Brown. *Photo – Miecha Bradshaw/Parks and Wildlife*



Scarlet banksia at Normans Beach looking towards Waychinicup National Park, part of the area covered under a draft management plan for the Albany coast. *Photo – Libby Sandiford/Parks and Wildlife*



Granite Skywalk, Porongurup National Park.
Photo – Andrew Halsall

Operational highlights

Parks Management

Public involvement, visitation and appreciation of the natural environment on Parks and Wildlife-managed lands and waters is coordinated through the Department's Parks Management Service. The provision of parks and visitor services includes:

- preparing and implementing management plans in accordance with the *Conservation and Land Management Act 1984* (CALM Act)
- preparing and implementing recreation site development plans
- providing, managing and maintaining appropriate access, recreation opportunities and visitor facilities
- protecting natural areas, visitors and facilities from bushfire
- training Departmental staff and volunteers
- working with local visitor centres and commercial tour operators
- involving Aboriginal people in park management in order to protect the value of the land to the culture and heritage of Aboriginal people
- involving Aboriginal people in the provision of visitor facilities and services
- providing visitor information, and designing and initiating educational

and interpretive activity programs that enrich visitor experience and help develop greater community awareness and support for parks, natural areas, astronomy, nature-based tourism, and recreation services and policies

- undertaking scientific, visitor and social research in cooperation with other research institutions
- providing services to the Conservation and Parks Commission (formerly the Conservation Commission).

This work is carried out by staff around the State, with the support of thousands of volunteers as well as local visitor centres, tourism operators and local community organisations.

Planning for management

During 2015–16, the Environment Minister released the final management plans for Kalbarri National Park, Esperance and Recherche parks and reserves, and Swan Coastal Plain South.

A further eight terrestrial management plans were in preparation. These were for:

- Albany coastal reserves
- proposed Oomeday National Park
- proposed Kimberley National Park

- Kurriji Pa Yajula Nature Reserve, Walyarta Conservation Park and Eighty Mile Beach coastal reserves
- Wheatbelt Region
- Yawuru Birragun Conservation Park
- Yawuru Northern Intertidal Area
- Yoorrooyang Dawang proposed conservation parks.

Three marine park management plans were also in preparation:

- proposed Lalang-garram / Horizontal Falls and North Lalang-garram marine parks
- proposed Roebuck Bay Marine Park
- proposed North Kimberley Marine Park.

The indicative management plans for the proposed Lalang-garram / Horizontal Falls and North Lalang-garram and North Kimberley marine parks were released for public comment in 2015–16.

The community contributed to the content of management plans through public and stakeholder workshops and meetings, newsletters and invitations to comment. Aboriginal traditional owners were engaged through the involvement of Aboriginal native title representative bodies and Aboriginal park councils.

Operational highlights

Parks Management

Acquisition and administration of protected areas

Reserve acquisition

The formal process of adding land to the State's system of protected areas continued throughout the year. The Department acquired 10 parcels of freehold land of high conservation value covering 5182ha for future addition to the conservation reserve system. Details of these acquisitions and how they were funded are recorded in the *Department of Parks and Wildlife 2015–16 Annual Report*, which is available on the Department's website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.

The Department's priorities for purchases were areas containing ecosystems not adequately represented in existing conservation reserves, areas containing threatened species and ecological communities, or additions to existing reserves that would greatly improve their diversity or facilitate their management. Other programs and processes can lead to the acquisition of lands suitable for inclusion in the conservation reserve system, including land ceded to the State as a condition of subdivision, land acquired from negotiated exchanges and reserves no longer required by other agencies and organisations. Work continued on the implementation of tenure changes proposed in the Department's management plans.

The Department also continued to provide advice on land proposals referred from other organisations such as the Department of Lands, and advised on issues including the use or disposal of unallocated Crown land and surplus Crown reserves.

Leasing activities

Lease arrangements are maintained for a wide range of purposes. At 30 June 2016 there were 273 formal arrangements for various uses on Parks and Wildlife-managed land including recreation, tourism accommodation, utilities and sawmills. The formal arrangements comprised 205 leases, 42 licences and 26 other types of arrangements such as sawmill site permits, written agreements and memoranda of understanding between the Department and various parties.

The Department entered into 93 formal agreements in 2015–16. Major achievements were:

- issuing of 43 hut occupation leases in D'Entrecasteaux National Park
- issuing of a lease to Canopy Adventure Pty Ltd for a high ropes course in Lane Poole Reserve
- renewal of the Matilda Bay Kiosk at Matilda Bay Reserve and the issuing of a new lease for a kiosk at Wellington Dam in the Wellington National Park

- issuing of a licence to the Shire of Collie for a shared use recreation path traversing Westralia Conservation Park
- renewal of the John Forrest Tavern and Tea Rooms lease in John Forrest National Park
- creation of a new reserve and lease for Australian Craftwood and Timbers Pty Ltd to facilitate a sub-leasing arrangement with Australian Peat Technology Pty Ltd to manufacture organic peat as an alternative to chemical fertilisers for farming
- issuing of a new communications lease within Leeuwin-Naturaliste National Park to enable the National Broadband Network to service Yallingup.

During the year, a number of other formal arrangements expired and, at 30 June 2016, were at various stages of renewal.

Apiary site management

At 30 June 2016, there were 3682 apiary site permits, of which 1843 were on Parks and Wildlife-managed lands (see Table 1).

During 2015–16, 1068 apiary site permits were processed, comprising:

- 234 authorities transferred between beekeepers
- 300 site permits from applications to occupy new or previously cancelled sites
- 41 site permit relocations

Table 1: Apiary site permits at 30 June 2016 on Parks and Wildlife-managed lands by land category

Land category	Apiary sites
State forest	1022
Timber reserves	80
National parks	410
Nature reserves	234
Conservation parks	59
Other lands vested in the Conservation and Parks Commission	38
Total	1843

- 489 site permit renewals
- four site permit cancellations.

Park presentation and resource protection

The Department aims to provide high-quality visitor services and facilities that are planned, designed, developed and managed in a sustainable way.

During 2015–16, the Department coordinated the investment of \$17.3 million of capital funding in parks and reserves around Western Australia. This included an investment of \$6.6 million through the State Government's *Parks for People Caravan and Camping* initiative.



Environment Minister Albert Jacob tests out a suspended skateboard at the new Trees Adventure Park, Lane Poole Reserve. *Photo – Ewen MacGregor/Parks and Wildlife*



Safety improvements this year included the construction of a new access path at Fortescue Falls in Karijini National Park. *Photo – Parks and Wildlife*

Capital park improvements

The Parks and Visitor Services Division capital works program continued to improve and maintain recreation and tourism assets in national parks, conservation parks, State forest and other reserves across the State.

Works were typically associated with the construction, upgrade and maintenance of roads, trails and camping facilities. Works were also undertaken to ensure visitor safety and to protect environmental, social and landscape values at recreation sites.

During 2015–16, the Department's capital works program focused on the following key areas:

- Addressing visitor risk management issues such as completing the Fortescue Falls walk trail upgrade in Karijini National Park, completing Monkey Mia boardwalk deck repairs and starting the replacement of picnic area pedestrian bridges at John Forrest National Park and repairing the Penguin Island jetty boardwalk.
- Continuing the remote parks housing improvement program in Purnululu, Stirling Range, Cape Le Grand, Karijini and Cape Range national parks.

- Upgrading visitor facilities in King Leopold Ranges Conservation Park, Ngamooowalem Conservation Park and Nambung National Park.
- Improvements to long trails such as the Bibbulmun Track and Munda Biddi Trail, with a focus on replacing and repairing camping huts, bridges and other trail structures damaged or destroyed in bushfires in 2015.
- Continuing to develop partnership projects with mountain bike and four-wheel-drive groups.
- Continuing to develop the off-road vehicle area at Pinjar in the City of Wanneroo.

A description of projects undertaken in each of the Department's nine regions is provided in the *Regional activities* section (see pages 35 to 43).

Operational highlights

Parks Management

Royalties for Regions park improvements

Work under the Department's *Royalties for Regions*-funded initiatives continued to improve and expand recreation and tourism facilities in national parks, conservation parks, State forest and other reserves across the State.

The \$20 million *Conservation Parks Visitor Infrastructure and Roads* initiative which started in 2010–11 was concluded in 2016, with completion of the The Gap and Natural Bridge redevelopment in Torndirrup National Park. The \$6.1 million *Torndirrup National Park Visitor Infrastructure* initiative was officially opened in April 2016, with funding contributions from the Department as well as the *Royalties for Regions Torndirrup National Park Visitor Infrastructure and Conservation Parks Visitor Infrastructure and Roads* initiatives. This redevelopment delivered two new world-class lookout structures including a grated see-through platform over The Gap that rises 40m above the ocean and extends 4m out from the cliff face, a new pathway network with full wheelchair access, new interpretation, and upgrades to day-use and parking areas. The Gap attracted more than 93,000 visits in the first three months following its official reopening, improving ecotourism in the region and helping support local businesses. This compared to more than 47,000 visits during the same three-month period in 2014 prior to the start of the project.

Significant progress was also made during 2015–16 to implement the \$21.05 million *Parks for People Caravan and Camping* initiative, with more than 340 camp sites now available.

New campgrounds were completed at the former Credo Station (proposed Credo Conservation Park) and Gnaala Mia (Dryandra Woodland), and campgrounds were expanded and upgraded at Lucky Bay (Cape Le Grand National Park), Miliyanha (Millstream Chichester National Park) and Belvidere (Leschenault Peninsula Conservation Park). These projects contributed about 80 new camp sites to the 340 now available.

Four tourism commercial accommodation leases have been upgraded at Wharncliffe Mill (Bramley National Park), Coalmine Beach (Walpole-Nornalup National Park), Dwellingup (Dwellingup State forest) and Lions Dryandra Village (Dryandra Woodland).

Now in its final year of implementation, work under the *Parks for People Caravan and Camping* initiative will focus in 2016–17 on completing new campgrounds at Jarrahdene (Leeuwin-Naturaliste National Park), Big Lagoon (Francois Peron National Park), Potters Gorge (Wellington National Park) and accommodation at Thundelarra homestead in the Murchison. Work is also continuing on the expansion and upgrade of the Shannon campground in Shannon National Park.

The \$20 million *Royalties for Regions Kalbarri Skywalks and Tourist Infrastructure* project began in 2015–16 and will improve tourist access and provide world-class tourism attractions and experiences in Kalbarri National Park. Construction of the sealed roads, skywalks and other infrastructure will begin in the 2016–17 financial year.

A description of projects undertaken under the *Royalties for Regions* initiatives in each Departmental region is provided in the *Regional activities* section (see pages 35 to 43).

Roads

During 2015–16, the Department's capital works *Tourist Road Improvement Program* focused on repairing and upgrading the access road to Geikie Gorge National Park, including the construction of new floodways.

The Department continued to classify roads and undertake road inspections and condition assessments for its 37,000km road network. During 2015–16, this work focused on the Kimberley, Pilbara, Midwest, Goldfields and Wheatbelt regions. The project assists in identifying high priority road improvement works, planning strategic road requirements, managing road hazards, and identifying present and future funding requirements.

In collaboration with Landgate, the Department continued rectifying road data stored in databases from Landgate and Main Roads Western Australia to ensure its accuracy. Collaborative work with local government authorities and Main Roads Western Australia on inter-regional road construction and maintenance work across agency boundaries also continued.

A \$1 million Main Roads Western Australia grant under the *State Roads Fund for Local Government Agreement* was directed towards the annual road maintenance program in parks and reserves across the Department's nine regions.

The *Fire Related Bridge Maintenance and Replacement Program* continued in 2015–16 with more than \$1.6 million invested. Many of the bridges on the Department's road network were constructed of timber between the 1960s and 1980s and are reaching the end of their life span. The Department replaced 12 timber bridges with modular, kit concrete bridges on Jolly, Whetherly, Bengier Swamp, Honeymoon, Murray, Coronation, Randall, Patens, KTC, Nelson, Tom and Elsey Brook roads. Timber bridges on Lennard and White roads were replaced with large culverts. Watercourse crossings were repaired and upgraded at Bobs Crossing in Lane Poole Reserve. Work started on several other bridges across the south-west.

Recreation planning and design

The Department prepared visitor services plans, master plans, concept plans and site development plans for many projects across the State. These documents guide government decision-making, assist with strategic planning decisions and funding applications, and enable capital works projects to be built to a high standard.

Planning for development of campgrounds funded by the *Parks for People Caravan and Camping* initiative continued in 2015–16, with planning and design works undertaken for campgrounds in Shannon, Leeuwin-Naturaliste, Millstream Chichester, Cape Le Grand, Francois Peron and Wellington national parks, as well as the Baden Powell day-use area in Lane Poole Reserve.

Construction of The Gap and Natural Bridge in Torndirrup National Park, completed in April 2016, was a notable achievement for the Department's Recreation and Landscape team. The new facilities and infrastructure are providing a significant drawcard to the South Coast Region and Torndirrup National Park.

The Swan Canning Riverpark Interpretation Nodes at Bicton Baths, Point Walter and Heathcote were completed, construction of the Brentwood node began and planning for a node in Adenia Park (Canning River Regional Park) is progressing.

Detailed design and documentation of small structures including toilets, camp shelters, and stair and boardwalk access was also undertaken and many were constructed including new stairs in the Yawuru (Broome) in-town parks. Master planning was undertaken for the Karara former pastoral leases, Ningaloo Coast pastoral lease exclusion area, Wedge and Grey shack settlements, and Murujuga and Millstream Chichester national parks, as well as recreation planning in de-proclaimed water catchments at Lane Poole, Wellington Dam and Harvey Dam.

Planning, training and design advice was provided on a range of leases, licences and projects associated with the Department, including projects dealing with implementing the Department's semi-permanent site guidelines. Staff also represented the Department on working groups including assessing the Coastwest Grants technical assessment group.

Visual impact assessment, recommendations, guidelines and specialist advice were provided for a number of proposals throughout the year, including new communication towers in the South Coast and Midwest regions.



Walpole Nornalup Inlet in the Walpole and Nornalup Inlets Marine Park. *Photo – Michael Hemmings*



Joffrey Gorge, Karijini National Park. *Photo – Rick Dawson/Parks and Wildlife*



John Forrest National Park. Photo – Gooitzen van der Meer/Parks and Wildlife



Osprey Bay campground, Cape Range National Park. Photo – Sally Bostwick/Parks and Wildlife



Wildflowers, Mt Elvire Conservation Park. Photo – Miranda Jackson/Parks and Wildlife

Operational highlights

Parks Management

Enriching the visitor experience

Interpretive planning and design

Work continued on providing information to visitors to help interpret, understand and appreciate WA's parks and reserves. During 2015–16, interpretation plans were prepared for major site developments including The Gap in Torndirrup National Park and Lucky Bay campground in Cape Le Grand National Park.

Other interpretive and sign projects of particular note included:

- Sign plans were developed for Logue Brook, Credo Station (proposed Credo Conservation Park), Gnaala Mia (Dryandra Woodland), Conto (Leeuwin-Naturaliste National Park), Nanga Brook (Lane Poole Reserve) and Osprey Bay (Cape Range National Park) campgrounds and Leschenault Peninsula Conservation Park.
- The Department continued installing or updating signs and displays to enrich visitors' experiences of parks and reserves. In 2015–16, 3335 signs were developed to final production, including 245 interpretive signs, 262 directional/identification/fee signs, 766 safety risk signs, 1499 management signs and 563 other products.

- Interpretation signage was upgraded at Toolibin Lake, Korrelocking, Yorkrakine Rock and Totadgin nature reserves in the Wheatbelt and the Helms Arboretum east of Esperance. New interpretive signage was developed for Torndirrup National Park, Logue Brook campground (Dwellingup State forest), Lane Poole Reserve sites, Jurien Bay foreshore and Jingamia Cave in Watheroo National Park.
- Sign planning for new and redeveloped campgrounds was provided to ensure all wayfinding, directional and identification signage met visitor and management needs.
- Directional, wayfinding and identification signs were produced and installed throughout John Forrest, Avon Valley, Cape Le Grand and Torndirrup national parks, Lane Pool Reserve, Credo Station and Potters Gorge campground.
- Trail heads were provided for Rabbit Hill, Slippery Rocks, Ngilgi Cave, Torpedo Rocks and Smiths Beach around the Yallingup community.
- Point Ann Heritage Trail signs were installed in Fitzgerald River National Park and five trails in Cape Arid National Park had new trailheads provided.
- Interpretive signage projects were completed with community groups at Brixton Street Wetlands and Lake McLarty.
- A variety of workshops and meetings were conducted to help community groups create interpretive signage on trails on Parks and Wildlife-managed land. These included Friends of the Porongurup Range, South Coast Natural Resource Management, South West Aboriginal Land and Sea Council and Newton Moore Senior High School.

Community liaison, consultation and advisory services

Consultation with special interest groups, agencies, individuals and Aboriginal communities is a key aspect of site developments and their interpretation on and off Parks and Wildlife-managed areas.

Advice was provided to local authorities, special interest groups and consultants on the planning, design and production of signs and displays.

Guided interpretive programs

Guided interpretive programs continued to be provided regularly in major areas throughout the State. These included the *Nearer to Nature* program provided at the Perth Hills Discovery Centre and Yanchep National Park. Educational programs were also run at Penguin Island and the Perth Observatory.

In the regions, guided tours and/or interactions were provided at Geikie Gorge National Park in the Kimberley, Monkey Mia Reserve in the Shark Bay World Heritage area, Cape Range National Park in the Ningaloo Coast World Heritage area, Roebuck Bay Marine Park, Valley of the Giants and Coalmine Beach near Walpole, Barna Mia in Dryandra Woodland and Perup – Nature's Guesthouse near Manjimup. Regional staff also continued to respond, where appropriate and available, to requests for specific presentations and guided experiences in local areas.

Operational highlights

Parks Management

Aboriginal liaison, consultation and heritage

A high priority is placed on liaising, consulting and working with Aboriginal elders, traditional owners and other stakeholders to enhance management of Parks and Wildlife-managed lands and waters.

In 2015–16 the Department undertook a wide range of work including:

- working with traditional owners including elders in local Aboriginal communities regarding cultural land use and protocols
- liaising with elders conducting Welcome to Country for Department events
- advice on traditional owners for Parks and Wildlife-managed lands and waters
- assisting inter-agency engagement in the regions to support heritage protection
- organising and participating in NAIDOC community activities
- advising on the use of Aboriginal images in the Department's marketing material
- ensuring Aboriginal news, events and achievements were promoted in the Department and at external forums
- providing advice on the cultural content of newsletters, publications and reports for both internal and external stakeholders

- supporting conservation groups/agencies to engage and develop relationships with the Aboriginal community
- facilitating and providing employment and economic opportunities for Aboriginal people.

Planning and relationship-building

Building relationships with Aboriginal and other Australian people as well as organisations remained a priority for the Department in 2015–16. During the year this included:

- providing ongoing cultural advice and assistance to Department staff regarding Aboriginal consultation and involvement on Parks and Wildlife-managed lands and waters
- providing links between regional and district staff and Aboriginal communities
- maintaining ongoing relationships with a range of agencies and organisations such as natural resource management groups
- participating and providing executive support to the Department's Aboriginal Employee Reference Group, Access and Diversity Committee and Reconciliation Action Plan Committee
- implementing the Department's *Reconciliation Action Plan*

- providing opportunities for Departmental staff to participate in key Aboriginal and Torres Strait Islander events and dates of significance including NAIDOC Week and National Reconciliation Week
- developing guidelines for the recruitment of Aboriginal staff to the Department
- participating in public sector forums focusing on Aboriginal employment
- presenting at community forums on specific Aboriginal strategies
- developing economic opportunities for Aboriginal people through commercial tourism
- providing partnership opportunities for Aboriginal and other Australian businesses
- the development of joint management under the *Kimberley Science and Conservation Strategy*
- development of policy and guidelines around customary activities for Aboriginal people.

Education and training

During the year the Department continued efforts to increase awareness of the culture, history and diversity of Aboriginal people. In 2015–16 this was done through:

- the *Nearer to Nature* program, which provided cross-cultural education

programs to 206 schools and community groups totalling almost 9000 people

- training and assistance for Departmental staff organising Welcome to Country ceremonies for events, and providing advice on protocols for acknowledgment of traditional owners at Department meetings and events
- delivering the Department's mandatory Aboriginal cross-cultural awareness training to more than 600 staff throughout the State, as well as to volunteer campground hosts
- exploring further learning and training opportunities for Departmental staff in the areas of heritage, native title, cultural immersion and engaging with Aboriginal people
- supporting workplace opportunities for Aboriginal university students, cadets and school-based trainees
- contributing to the Department's community education strategy and presenting information to staff and the Aboriginal community on changes to the CALM Act in relation to customary activities
- providing opportunities for traditional owners to have input into the development of cultural and historical interpretation materials installed on Parks and Wildlife-managed lands and waters.

Cultural heritage

Parks and Wildlife supported the third and final field season of the Australian Research Council-funded *Barrow Island Archaeology Project* at Barrow Island Nature Reserve. The project involves an international research team led by The University of WA and is examining 'deep time' maritime societies in northern Australia, dating back more than 45,000 years. Climate and ecological records are being reconstructed from the contents of the caves on Barrow Island. The more recent labour history of people and pearling on the island is also being profiled. This is one of the largest and most comprehensive island surveys to have been carried out in Australia, providing unique and valuable data on the archaeology and climate history of the island and the north-west shelf.

Sample surveys have been conducted on the island with more than 30 occupation sites recorded. These show the transport and trade of stone artefact materials from the Pilbara and Ashburton regions and include wood working tools, processing implements and basal seed grinding stones. Most are thought to be Pleistocene in age (more than 10,000 years old). The study located 10 rockshelters/ cave sites, with two of these, Boodie Cave and John Wayne rockshelter, excavated.

These have shown early and repeated use of estuarine environments – even during times of lower sea level. Records of human occupation and use of marine and terrestrial resources have been documented from more than 50,000 years ago to about 7500 years ago.

The work on Barrow Island will prove invaluable to understanding and managing earlier human-landscape records on the Australian mainland.



Nearer to Nature education officer Zac Walker with students from Mundaring Primary School.
Photo – Jennifer Eliot/Parks and Wildlife



Cultural experience at Yanchep National Park with Noongar Elder and educator Leonard Thorn.
Photo – Parks and Wildlife



Petroglyphs, Murujuga National Park. Photo – Rick Dawson/Parks and Wildlife

Operational highlights

Parks Management

Business management

Providing accurate park information, promoting responsible behaviour by visitors and providing services to the tourism industry are important functions of the Department.

The Commercial Business Unit provided guidance and assistance in identifying new opportunities on Parks and Wildlife-managed lands. In 2015–16, three restricted 'E' class licences were allocated via a publicly advertised call for expressions of interest to conduct fly-drive tours in Purnululu National Park.

A publicly advertised call for expressions of interest for a commercial operations licence to develop and operate a nature-based tourism operation from Monkey Mia, Shark Bay Marine Park was also released. Applications are being assessed.

A registration of interest has been released to operate John Graham Recreation Reserve kiosk in Woodman Point Regional Park. A lease is being negotiated with a proponent.

Park passes and fees

National park passes are distributed at 86 locations around the State including 36 Department offices and selected national parks, and 50 independent retail outlets.

In 2015–16, the Department approved 435 new requests for entry fee waivers. The value of foregone revenue was approximately \$371,428 based on estimated visitor numbers of 77,032 (see Table 3). The Department offers fee waivers to support aged and infirm visitors, groups with disability, carers, educational groups, community service groups and not-for-profit organisations.

Table 2: Breakdown of park pass distribution 2015–16

Type of park pass	Number distributed	Change from 2014–15
Holiday	9360	Increase 1347 (or 17%)
Annual Local	9312	Increase 5073 (or 120%)
Annual All	6547	Increase 175 (or 3%)
Annual All Concession	4484	Increase 394 (or 10%)
Goldstar	931	Increase 194 (or 26%)

Note: includes passes invoiced to retail outlets and distributed to Department offices that may not yet be sold.

Table 3: Fees waived – estimated visitors by region

Region	Swan	Midwest	Pilbara	Kimberley	Warren	South Coast	Total
Number of visitors	39,711	13,673	10,229	65	5286	8068	77,032

In September 2015 the Royal Automobile Club of WA (RAC) began offering annual and holiday park passes to members for a 50 per cent discount. These passes can only be purchased through their website. Sales of RAC passes are shown in Table 4.

Table 4: Breakdown of RAC park pass sales 2015–16

Type of park pass	Number sold
RAC Holiday	403
RAC Annual All	2419
RAC Annual All Concession	1046

Commercial operations and events

Commercial operations licences

Commercial operations are licensed to monitor and manage the commercial use of Parks and Wildlife-managed lands and waters in accordance with Conservation and Land Management Regulations 2002.

At 30 June 2016, 379 commercial operations licences were current for activities in marine and terrestrial reserves, an increase from 322 licences at 30 June 2015. These comprised 338 general 'T' class licences, and 41 'E' class licences for operations where the numbers of licences granted are restricted.

During the year, 27 two-month licences were granted. Two-month licences are used by seasonal and interstate operators for short-term tours or one-off commercial events.

Filming permits

Commercial filming and photography on lands and waters managed by the Department can make a significant contribution towards raising awareness of conservation issues, and promoting the appreciation and use of parks and reserves.

The Department does not charge for commercial filming or photography applications considered to have a major tourism or other benefit to the State, or likely to increase appreciation, awareness and understanding of parks and reserves. In these cases, applicants are granted permits by the appropriate regional staff. Where it is deemed that a commercial filming or photography application has no such benefits, charges are applied on a set scale and a commercial filming licence is issued. In 2015–16, 116 commercial filming or photography applications were assessed and approved, of which 10 were filming licences.

Naturebank

The *Naturebank* program involves the identification and preparation of suitable sites on Parks and Wildlife-managed lands for sustainable ecotourism initiatives. This program is a partnership between Tourism WA and Parks and Wildlife.

In 2010, the State Government announced *Royalties for Regions* funding over four years to support the preparation of *Naturebank* sites. At 30 June 2016, nine sites had been identified as *Naturebank* or potential *Naturebank* sites. These were:

1. Purnululu National Park World Heritage area (Kimberley)
2. Windjana Gorge National Park (Kimberley)
3. Francois Peron National Park, Shark Bay World Heritage area (Midwest)
4. Wharncliffe Mill, Bramley National Park (South West)
5. Cape Le Grand National Park (South Coast)
6. Millstream Chichester National Park (Pilbara)
7. Mount Hart Wilderness Lodge, King Leopold Ranges Conservation Park (Kimberley)
8. Ngamoowalem Conservation Park, Aboriginal land close to Kununurra (Kimberley)
9. Icy Creek, Lane Poole Reserve (Swan).

Naturebank sites at Kurrajong in Purnululu National Park, Mt Hart Wilderness Lodge in King Leopold Ranges Conservation Park and Wharncliffe Mill in Bramley National Park are fully operational.

The Francois Peron National Park site was advertised via an expression of interest but this did not result in a preferred proponent being identified and direct discussions with a potential developer in collaboration with Tourism WA are ongoing. Following the release of the site prospectus for the Ngamoowalem Conservation Park site and subsequent discussions with potential developers, it was decided to 'bank' this site and await further advice from the traditional owners as to how they wish to proceed. The proposed Windjana Gorge National Park and Cape Le Grand National Park sites were discontinued due to environmental and cultural issues. The Icy Creek site in Lane Poole Reserve assessment was completed and the investment attraction process seeking potential developers is progressing.

An investment prospectus for the Millstream Chichester National Park site was developed and released and a number of proponents registered their interest. A third site in the park was identified for possible inclusion in the *Naturebank* program and discussions with the Department of Water are ongoing about the site's inclusion.

Operational highlights

Parks Management

Legislation and policy

Legislation

During 2015–16, Parks and Visitor Services Division progressed various amendments to the Conservation and Land Management Regulations 2002. These included adjustments to fees to enact increases of regulated fees, in line with annual reviews of government tariffs, fees and charges. Other regulatory changes were made to amend local parks pass groupings, to restrict foot access to certain areas of marine reserves for the purposes of protecting and conserving the values of the land to the culture and heritage of Aboriginal people, and to improve the capacity of the Department to manage moorings in marine parks and reserves. Amendments were also made to the CALM Act. More information on these amendments are available on page 48.

Policy

During 2015–16, the finalisation, development or review of policies continued, with policies endorsed in areas such as use of moorings, road management, negotiating commercial development and activities, volunteers and community involvement, commercial filming, acknowledgment of traditional owners, burial of Aboriginal people on CALM Act land, commemorative memorials and protection and management of caves and karst. Development and review of policies continued in areas such as apiary management, Aboriginal heritage and culture, non-Aboriginal heritage and recreation, tourism and visitor services (including updating information on the use of remotely piloted aircraft on CALM Act land).

More information about legislation and policy is available on the Department's website www.dpaw.wa.gov.au/about-us/36-policies-and-legislation.



Cape to Cape Track, Leeuwin Naturaliste National Park. Photo – Peter Nicholas/Parks and Wildlife



A rider tests out a new mountain bike trail at Bramley National Park. New trails will be built across the south-west as part of the *South West Mountain Bike Master Plan*. Photo – Rod Annear/Parks and Wildlife

Recreation activities and trails

During 2015–16, the Department continued to coordinate the management of outdoor recreation activities consistent with the protection of natural and cultural values on the lands and waters it manages.

Work continued with key stakeholders, including the Department of Sport and Recreation, Outdoors WA, Trails WA, Westcycle and the WA Mountain Bike Association on important recreation initiatives including the development of an outdoor strategy for WA, the Trails WA website and the implementation of the *WA State Mountain Bike Strategy*.

Trails WA

The Department continued to support Trails WA, the not-for-profit peak trails body for the State. The Department now provides administrative support to Trails WA in a partnership arrangement with the Department of Sport and Recreation.

The Department continued to support the Trails WA website (launched in 2013), with staff and volunteers uploading Parks and Wildlife-managed trails across the State. Of about 300 walk, drive, cycle, paddle and snorkel trails described on the site, over half are managed by the Department.

Building on the website, the Department funded and managed the development of the Trails WA smartphone app released in December 2015. Since its public release, the app has been downloaded more than 3400 times, with popularity steadily growing.

Bibbulmun Track

The Department continued its strong partnership with the Bibbulmun Track Foundation during the year. Foundation volunteers continued to show their support for the much-loved Bibbulmun Track, contributing almost 22,000 hours to assist in the maintenance and management of the 1000km walk trail.

In January 2016 lightning sparked several fires south of Dwellingup. This resulted in the large and devastating Waroona fire, which burnt out 12km of the trail including the Murray camp site. Losses weren't as significant as the 2015 fires, and the track was reinstated on the original alignment. The Murray camp site is due to be repaired ready for the spring walking season.

Substantial work was undertaken to repair the damage sustained in the 2015 bushfires, with the Brookton and Possum Springs camp sites rebuilt with new rammed earth and steel shelter and toilet design. Camp shelters and toilets at Gardner and Dog Pool camp sites are under construction and due to be completed in spring 2016. A new bridge was

built adjacent to the Dog Pool camp site to replace the one lost in the 2015 fire.

A new 70m suspension bridge has been designed to replace the Long Gully Bridge, with a new suitable location identified downstream of the previous crossing. Subject to final approvals, construction is due to start in late 2016 when water levels have subsided.

Staff and Bibbulmun Track Foundation volunteers undertook significant work along the burnt out track alignments from the 2015 and 2016 fires, rebuilding the track and installing new trail markings.

A Bibbulmun Track user survey covering the 2014–15 period was published in early 2016, highlighting the high level of satisfaction and personal, social and economic values of the track. The survey demonstrated an average walker satisfaction of 92 per cent, and an estimated \$13.1 million of annual direct expenditure associated with use of the trail. Ninety-seven per cent of respondents would walk the track again and 98 per cent would recommend it to others.

More information on the Bibbulmun Track is available on the Department's Explore Parks WA website parks.dpaw.wa.gov.au/know/bibbulmun-track.

Cape to Cape Track

The Department continued its long partnership with the Friends of the Cape to Cape Track, with Friends volunteers contributing significant time to the ongoing maintenance of the track.

The Department completed an end-to-end audit of track signage, with the data collected being used by the Department and Friends of the Cape to Cape Track to improve signage standards and track marking. Improvement works will be progressively implemented in future years as part of a process of continual improvement.

The construction of the previously planned track realignment near Joey's Nose in Leeuwin-Naturaliste National Park was completed, and will provide walkers with a safer route away from the four-wheel-drive track previously used by walkers and four-wheel drivers.

Mountain biking

Parks and Wildlife staff continued working closely with the Department of Sport and Recreation, Westcycle and the WA Mountain Bike Association in the management of mountain biking across the State.

In November 2015, the *South West Mountain Bike Master Plan* was officially launched by the WA Environment Minister in conjunction with the opening of a new mountain bike trail in Bramley National Park.

Operational highlights

Parks Management

Planning was completed for a further 10km of new mountain bike trail in Bramley National Park, with construction due to start in August 2016. Trail planning has also continued in high priority locations of Wellington National Park and Arklow State forest near Collie.

Parks and Wildlife continued to work with the steering group on the development of the *Perth and Peel Mountain Bike Master Plan*, which will identify and prioritise the future development of mountain bike trails in the Perth and Peel regions. An initial draft of the master plan has been reviewed by key stakeholders and a consultation draft is due to be released for public comment in September 2016.

After a period of public comment, the *WA Mountain Bike Management Guidelines* have been completed by the working group, with the final guidelines due to be available in October 2016. The guidelines will provide guidance to the community, mountain bikers and land managers, including Parks and Wildlife, on best practice management of mountain bike activities.

The Department continued working in partnership with various mountain bike clubs and groups in managing their local trail networks, including the Kalamunda Collective, Collie Mountain Bike Club, South West Mountain Bike Club and the Margaret River

Off Road Cycling Association. A trail renewal program has been developed, where existing trails are audited and improvements planned and implemented to provide improved riding experience and long-term sustainability to minimise impacts and maintenance requirements.

More information on mountain biking in parks is available at parks.dpaw.wa.gov.au/know/mountain-biking.

Munda Bididi Trail

The Waroona fire in January 2016 impacted heavily on the Munda Bididi Trail south of Dwellingup, with 43km of trail affected including the Bidjar Nouglin campground. While the campground toilet was destroyed, the shelter was only damaged and is repairable. Given the significant damage to the trail and camp site, the trail is currently diverted while repair works are completed.

Repairs to the 70km of affected trail burnt out in the 2015 fires was completed, including significant repairs to the Yirra Kartta campground which involved completely replacing the shelter, bike shelter, toilet cladding and roofs.

The Department continued its partnership with the Munda Bididi Trail Foundation, which is now co-located and supported by Westcycle. The number of foundation volunteers is slowly rising, with the volunteers contributing almost 2000 hours towards the maintenance and management of the trail in 2015–16.

More information on the Munda Bididi Trail is available at parks.dpaw.wa.gov.au/know/munda-bididi-trail.

Motorised recreation

During 2015–16, the Department worked with the WA 4WD Association, Track Care WA, the Recreational Trailbike Riders' Association of WA and Motorcycling Western Australia to promote responsible use of public lands by four-wheel drivers and trail bike riders.

The Department's *Track Adoption Program*, developed in partnership with Track Care WA and the WA 4WD Association, has continued to see volunteers working alongside staff on projects across the State, including:

- a third clean-up on Dirk Hartog Island National Park undertaken by members of Track Care WA, the WA 4WD Association and the Shark Bay District in support of the *Return to 1616* ecological restoration project

- the Toyota Landcruiser Club of WA continuing to assist the Great Southern District in the management of the Congelin campground and Dryandra Woodland
- the Land Rover Owners Club continuing to assist Donnelly District in the maintenance of the Yeagerup Beach Track
- the Armadale 4WD Club adopting and assisting the Perth Hills District in the repairs and maintenance of the Fawcett Track in Lane Poole Reserve
- a clean-up of the Wilbinga Conservation Park in the Swan Coastal District.

The Department also continued to work alongside the Recreational Trailbike Riders' Association in managing the Metro Road Trail Bike Trail in the Perth Hills District, along with starting planning for future new trail developments in the area. The Swan Coastal District has continued to work alongside volunteers to maintain the gazetted off-road vehicle areas at Pinjar and Gnangara.

More information on four-wheel driving in parks is available at parks.dpaw.wa.gov.au/activity/4wd-adventure-motorcycling.



Stirling Range National Park.
Photo – Karla Graham/Parks and Wildlife



Gnaarla Mia campground, Dryandra. *Photo – Peter Nicholas/Parks and Wildlife*



Wilderness Lookout, Mount Frankland National Park. *Photo – Michael Hemmings*



Boranup karri forest. *Photo – Tourism WA*

Operational highlights

Parks Management

Community involvement

Volunteers are highly valued by the Department because they build communication links and understanding between the Department and the community.

Volunteers continue to make a significant contribution to the management of parks and reserves and to a range of conservation programs throughout the State. During 2015–16, the Department recruited 1717 new volunteers to meaningful and interesting opportunities in conservation and recreation activities. A total of 5189 volunteers contributed 638,747 hours to projects across WA, the highest volunteer contributions the Department has seen.

Volunteer awards and activities

An annual Volunteer of the Year and Outstanding Service awards function is held to acknowledge the important support provided by volunteers. A campground host couple received the Volunteer of the Year award in 2015. There were 10 Outstanding Service awards, and for the first time five Highly Commended awards issued. There were also 10 Long Service awards given to volunteers who had provided more than 20 years of continual service to the Department.

Table 5: Register of volunteer numbers and contribution

Year	Total number of volunteers registered since 1999	*Current registered volunteers	New volunteers	New projects	Number of volunteers contributing	Total number of hours worked	Average hours per volunteer
2004–05	7600		1500	28	4000	422,000	106
2005–06	8230		630	6	3882	470,600	121
2006–07	9726		1496	8	3250	406,000	125
2007–08	7784		-1942	9	3439	424,500	123
2008–09	9558		1774	7	4004	426,200	106
2009–10	11,082		1524	23	3038	451,040	148
2010–11	12,759		1677	27	3602	436,216	121
2011–12	14,604		1845	51	3838	457,557	119
2012–13	16,446	9090	1842	28	4717	564,350	120
2013–14	18,327	10,910	1881	25	4345	506,285	117
2014–15	20,078	12,549	1751	22	4636	614,475	133
2015–16	21,795	13,737	1717	15	5189	638,747	123

* These figures only available since new database introduced in 2012.

Ongoing volunteer programs and projects such as the Campground Host program, Bibbulmun Track Foundation, *Reptile Removalists*, *Wildlife Rehabilitators*, Wildcare Helpline and the WA Herbarium continued to contribute to the conservation, protection and care of the environment and the Department's recreation goals. At 30 June 2016, the Department had 302 volunteer projects listed as active across the State.

General interest in the Department's volunteer program continued, with the webpage (www.dpaw.wa.gov.au/get-involved/volunteering-opportunities) receiving 14,797 unique visits between 1 July 2015 and 30 June 2016.

The Campground Host program continued to attract volunteers in 2015–16, with 98 new hosts joining the program. During the year, 235 campground hosts spent 158,837 volunteer hours collecting site fees, welcoming visitors and helping to manage 50 hosted campgrounds around the State.

The Wildcare Helpline's 39 office and home-based volunteers fielded 11,836 calls in 2015–16 from members of the public to assist with sick, injured or orphaned wildlife. The Helpline greatly assists the Department's Nature Protection Branch by filtering and responding to wildlife-related calls, allowing staff to focus on on-ground operations.

In addition to calls, the Wildcare Helpline webpage www.dpaw.wa.gov.au/about-us/contact-us/wildcare-helpline – which contains basic first aid for wildlife and other wildlife-related information – received 10,046 unique page visits in the same period.

The quarterly volunteer newsletter continued to be well received and has assisted in recruiting volunteers by promoting volunteering opportunities, advertising new projects and highlighting volunteer achievements.

The newsletter's look has been updated and is now available to view or download online on the Department's volunteer pages www.dpaw.wa.gov.au/get-involved/volunteering-opportunities. Distribution through the volunteer database reached around 8500 individual emails each quarter.

Across the State, 15 new volunteer projects were registered with the Department during 2015–16. New projects included:

- Kalbarri National Park fauna recovery
- *Reel it in* fishing line bin project
- Swan Coastal Wetlands conservation
- northern quoll cat bait uptake trial in the west Pilbara.



Environment Minister Albert Jacob with 2015 Volunteers of the Year Kevin and Barbara Cooper.
Photo – Parks and Wildlife

The Department provided face-to-face training for more than 334 volunteers and online training programs for 477 volunteers, with support from specialist services within the Department and external agencies. Training included the Campground Host workshop, safe work practices as part of the Department's corporate induction, risk management, basic fire awareness, first aid, cross-cultural awareness, and metropolitan and regional basic courses in wildlife rehabilitation. Customer service training was provided for Wildcare Helpline advisers in June 2016.



A River Guardians volunteer planting in the Swan Canning Riverpark. Photo – Parks and Wildlife

Operational highlights

Parks Management

Tourism and marketing

Key tourism and marketing activities focused on the *Parks for People Caravan and Camping* initiative. This included:

- Working closely with Tourism WA to initiate a media campaign aimed at promoting camping holidays. The campaign included features in *The Sunday Times* and *The West Australian* newspapers.
- Supporting the Caravan Industry Association of Western Australia with brochures for distribution at caravan and camping shows in Sydney, Melbourne and Adelaide.
- Attending the annual Perth Caravan and Camping Show at Claremont Showgrounds.
- Supporting a community partnership with Pemberton Discovery Tours to establish WA Wilderness Glamping at Warren National Park.

The Department distributed about 30,000 copies of the free booklet *National, marine and regional parks in Western Australia – a visitor's guide to the State* during the year. A more effective brochure distribution system was implemented resulting in more than 100 additional distribution points throughout the metropolitan area.

The Department continued to support and engage the recreation and tourism industries through a variety of activities, including:

- regular meetings with the Tourism Industry Reference Group to assist with communication between the Department and the nature-based tourism industry
- expanding the publication of *Touring Western Australia*, an electronic newsletter with more than 11,000 subscribers that features articles, information and opportunities for visitors to enjoy parks.

The provision of new and improved park facilities would not be complete without improved information and services. This year, two new smartphone apps – Trails WA and Camping Mate – were developed, wi-fi connectivity was installed at Conto campground, Leeuwin-Naturaliste National Park and significant improvements were made to the Park Stay WA and Explore Parks WA websites.

Following the successful opening of the *Torndirrup National Park Improvement Project*, the Department has partnered with Australia's South West regional tourism organisation to support increased exposure to the travel trade and travel media through an onsite program of familiarisation tours. In addition, the Department finalised plans for a cooperative marketing partnership with the City of Albany and Discovery Bay to create a tourism

package offering visitors entry to the Valley of the Giants Tree Top Walk, National Anzac Centre, Albany Whaleworld and local parks (such as Torndirrup and West Cape Howe national parks, and Two Peoples Bay Nature Reserve where entry fees have recently been introduced).

Campground booking and information system

Known as Park Stay WA, the campground booking and information system continued to be upgraded and improved. During 2015–16, the number of site nights booked increased by 41 per cent from 2014–15, to 107,325 site nights.

Visitor research

During 2015–16 a number of visitor research projects were undertaken, including:

- ongoing camper visitor satisfaction monitoring in association with the *Parks for People Caravan and Camping* initiative, funded by *Royalties for Regions*
- continuing involvement and support of the Kimberley Marine Research program in investigating human use, values and aspirations for Kimberley coastal waters
- ongoing involvement with Murujuga National Park assisting with the selection and implementation of visitor monitoring equipment (for example vehicle classifiers)

and a survey tool to determine visitor characteristics

- ongoing involvement in monitoring campers along the Ningaloo Coast to determine facility requirements
- continued involvement and support of the Wheatstone Pilbara Inshore Islands human use survey in collaboration with Murdoch University
- establishment of a collaborative project with Murdoch University to evaluate the in-water humpback whale interaction trial from a visitor and commercial operator perspective in Ningaloo Marine Park
- establishment of the Pluto Offset Dampier Archipelago human use marine monitoring project
- completion of long trail use and visitor profile monitoring for the Bibbulmun Track
- completion of a survey to determine the forms of digital communication used by campers for trip planning
- completion of a survey at The Gap in Torndirrup National Park to obtain visitor satisfaction and impressions of the new structures and other facilities.



Aerial adventures, Lane Poole Reserve. *Photo – Trees Adventure Park*



Camping at the new campground in Coalseam Conservation Park. *Photo – Peter Nicholas/Parks and Wildlife*



King George canyon. *Photo – Ryan Scott/Parks and Wildlife*

Operational highlights

Parks Management

Visitor use monitoring

In 2015–16, visitor use was monitored at 395 sites using a variety of methods including traffic classifiers and counters, pedestrian counters, observation surveys and ticket sales in national parks, State forest and other reserves throughout the State. The total reportable visitation to Parks and Wildlife-managed lands and waters during the year was 19.75 million, which was an increase from 18.67 million in 2014–15. More information is available in the [Department of Parks and Wildlife 2015–16 Annual Report](#).

Visitor satisfaction survey program

As part of the visitor satisfaction survey program, a benchmark visitor satisfaction index has been adopted to compare visitor satisfaction levels each year. This benchmark has been set at 85 per cent.

The 2015–16 visitor satisfaction index, averaged from visitor responses to surveys at selected parks, reserves and forest areas around the State, was a record high of 91.4 per cent. More information is available in the [Department of Parks and Wildlife 2015–16 Annual Report](#).



An in-water humpback whale interaction trial began in Ningaloo Marine Park in 2016. *Photo – Rick Dawson/Parks and Wildlife*



The Perth Observatory. *Photo – Matthew Woods*



Canoeing, Warren River. *Photo – Parks and Wildlife*



Hamelin Pool, Shark Bay World Heritage area.
Photo – Peter Nicholas/Parks and Wildlife



Logue Brook campground. *Photo – Parks and Wildlife*

Astronomy

In June 2016, following a very successful first year agreement, the Department signed a community partnership agreement with the Perth Observatory Volunteer Group Inc. (POVG) for a further 10 years to manage operations at the Perth Observatory in Bickley. Initial 2015 'seed funding' was extended, on a five-year diminishing scale, to enable POVG to consolidate and expand the running of a public education and outreach program for the community to learn and experience nighttime and daytime optical astronomy, space science and astrophotography. The group will also continue to catalogue and maintain the historically valuable equipment and buildings at the observatory site.

Operational highlights

Parks Management

Formal management arrangements with Aboriginal people

The Department made significant progress negotiating and creating new joint management arrangements under the provisions of the CALM Act, as well as implementing existing agreements. Amendments to the CALM Act which provide for the joint vesting of certain CALM Act land were gazetted, and this enabled implementation of the joint vesting commitments within various Indigenous Land Use Agreements (ILUAs).

Karajarri

The ILUA with Karajarri native title holders was signed in June 2015 and implemented throughout 2015–16. It provides for the creation and joint management of the Karajarri parts of the Eighty Mile Beach Marine Park, Walyarta Conservation Park, Jinmarnkur Conservation Park and Jinmarnkur Kulja Nature Reserve. The Department is working with the Karajarri people and the Karajarri Ranger program to deliver on-ground management operations.

Ngarla

In August 2014 the second ILUA for Eighty Mile Beach was signed with the Ngarla people, marking significant progress in building and formalising partnerships with traditional owners in the Kimberley. The ILUA provides for the creation and management of the Ngarla parts of Eighty Mile Beach Marine Park and the Jarrkurnpang Nature Reserve. The agreement also allows for the employment of two members of the Ngarla native title group in full-time equivalent positions in the day-to-day management of the Eighty Mile Beach Marine Park and associated reserves.

Nyangumarta

The Department continues to implement the new joint management arrangement with the Nyangumarta people arising out of the ILUA reached between the State and Nyangumarta in May 2014, enabling the creation and joint management of the Nyangumarta parts of Eighty Mile Beach Marine Park and Walyarta and Kujungurru Warrarn conservation reserves within Nyangumarta country.

The Department had already established good working relationships with Nyangumarta people through the marine planning process and ongoing on-ground works such as turtle monitoring, fencing, conservation and cultural interpretive signage works. The agreement formalises this partnership and provides for the employment of Nyangumarta Rangers.



Dambimangari ranger Kieran Bangmorra.
Photo – Parks and Wildlife



Yawuru Ranger Curtis Robinson, Yawuru Nagulagun / Roebuck Bay Marine Park.
Photo – Chris Nutt/Parks and Wildlife



Murujuga National Park. Photo – Rick Dawson/Parks and Wildlife

Dambimangari

Joint management arrangements with the Dambimangari Aboriginal Corporation over the Lalang-garram / Camden Sound Marine Park, which started in November 2013, entered their third year. This is the first joint management agreement for a marine park in WA. The park will ultimately cover more than 7000km² and will protect the southern hemisphere's largest humpback whale calving ground, and conserve habitats for flatback and green turtles, snubfin and Indo-Pacific humpback dolphins, dugongs, saltwater crocodiles and several species of sawfish. The State Government is also negotiating an ILUA with the Dambimangari Aboriginal Corporation in relation to the joint management of the other areas of their traditional country.

Miriuwung Gajerrong

The Department has a central role in implementing the Ord Final Agreement ILUA, in partnership with the Yawoorroong Miriuwung Gajerrong Yirrgab Noong Dawang Aboriginal Corporation (Miriuwung Gajerrong Corporation) and other partners. Both the Department and the Miriuwung Gajerrong Corporation have joint responsibility for developing management arrangements for six new conservation reserves (totalling 150,000ha) in the east Kimberley.

Yawuru

An ILUA was signed on 25 February 2010 with Yawuru native title holders over land in and around Broome. The agreement enabled the creation of terrestrial and marine conservation reserves, to be jointly managed by Yawuru people, Parks and Wildlife and, within the Broome town site, the Shire of Broome. These areas include terrestrial reserves around and to the north of Broome and a marine park at Roebuck Bay.

Burrup (Murujuga)

In January 2013 the 4913ha Murujuga National Park was created, covering about 86 per cent of the Dampier Archipelago National Heritage place gazetted on the Burrup Peninsula. The area has immense heritage significance and the highest concentration of petroglyphs in the world. The Murujuga National Park is held freehold by the Murujuga Aboriginal Corporation (MAC), leased to the State and jointly managed with Parks and Wildlife as a national park. The Murujuga Park Council, the joint management body, comprises representatives from MAC, Parks and Wildlife and the Minister for Aboriginal Affairs.

Work continued with MAC and the Murujuga Ranger team, which undertakes on-ground land management activities. During the year, the Department worked with MAC to support training and capacity building of Murujuga Rangers to strengthen their operational

management functions in the park. The Department and MAC worked cooperatively to undertake joint operations with the Murujuga Rangers for sand dune rehabilitation and graffiti removal, as well as recreation and heritage protection planning.

South West Native Title Settlement

In 2015 the State and Noongar native title parties concluded the South West Native Title Settlement ILUA negotiations and the Government will now move towards implementation of the settlement. The South West Native Title Settlement is a comprehensive settlement with the six key native title groups covering the south-west, and includes the establishment of a 'future fund' for the Noongar community, creation of a Noongar land base, a community development and economic development framework and funding support, a capital works program for a cultural centre and office accommodation, and a standard heritage protection regime.

The Department will play a key role in the settlement through the provision of joint and cooperative management agreements over the conservation estate. The joint management framework will involve two tiers of formal engagement with Noongar Regional Corporations:

1. Cooperative Management Committees (providing general advice for each Regional Corporation area)
2. Joint Management Bodies (formal joint management bodies under the CALM Act.)

Other joint management arrangements currently in negotiation

The Department continues to roll out increased engagement with traditional owners across the State to implement formal joint management agreements and to allow for the creation of new jointly vested lands. The latter includes negotiations with native title holders in the Kimberley to achieve joint management outcomes under the *Kimberley Science and Conservation Strategy*, and with the Gnulli native title claimants in relation to the creation of conservation estate and joint management outcomes along the Ningaloo Coast.

In 2015–16 within the Kimberley region alone, as part of the \$103 million *Kimberley Science and Conservation Strategy*, the Department engaged the services of approximately 197 Aboriginal rangers and traditional owners, delivering conservation and employment outcomes on country.

Operational highlights

Parks Management

Support to the Conservation and Parks Commission

The Department of Parks and Wildlife provides support to the Conservation and Parks Commission of Western Australia in accordance with the CALM Act and the 2011 Operational Relationship Agreement.

During 2015–16 this support included provision of corporate services to the Conservation and Parks Commission Service Unit. This helped the Conservation and Parks Commission to achieve:

- the delivery of the Commission's statutory responsibilities in management planning under the CALM Act, through the Management Plan Review Committee
- release of the final report *Periodic Assessment Key Performance Indicators* which outlines the Commission's comprehensive approach to the assessment of key performance indicators in terrestrial management plans
- finalisation of management plans for Kalbarri National Park, Swan Coastal Plain South and Esperance Recherche parks and reserves.

Support was provided to the former Marine Parks and Reserves Authority (MPRA) in accordance with the CALM Act and a memorandum of understanding. During 2015–16, the Department assisted the former MPRA by providing policy advice, developing indicative and final management plans for proposed marine parks and reserves, and executive support services.

Highlights for the year included:

- release for public comment of indicative joint management plans for the proposed Lalang-garram / Horizontal Falls and North Lalang-garram marine parks and proposed Oomeday National Park, and proposed North Kimberley Marine Park
- an annual performance assessment report for WA marine parks and reserves.

Other initiatives

Memoranda of understanding

A longstanding MOU continued with the Department of Corrective Services, allowing prisoners to make a valuable contribution to Departmental projects and the community.

The MOU between the Department and Leave No Trace Australia is also ongoing, with a number of projects promoting visitor behaviour that has minimal environmental impact.

During 2015–16, the successful partnership between Parks and Wildlife, Conservation Volunteers Australia, the Department of Education and Rio Tinto continued to grow through Rio Tinto's Earth Assist program. Primary schools are now becoming engaged under this program, as well as servicing an increasing number of secondary schools. The program won a 2015 Premier's Award for Excellence Public Sector Management.

The partnership between the Department and Fairbridge Western Australia Inc. continued to provide opportunities for cooperation between the two organisations on training outcomes for young Aboriginal people.

World and national heritage

- The Department continued to provide day-to-day management of the Shark Bay, Ningaloo Coast and Purnululu National Park World Heritage areas, including providing executive support to three property-specific advisory committees.
- On 24 June 2016, the Ningaloo Coast World Heritage area celebrated its fifth year since inscription on the World Heritage list. The event was celebrated with a night market in Federation Park attended by about 500 people featuring live music, free face painting and a World Heritage-focused sculpting activity facilitated by the Exmouth Cultural Arts Centre. The water splash park

was converted into World Heritage-themed interactive stations representing key values of the World Heritage area. There was also free entry into Cape Range National Park and an art display at Yardie Creek.

- The establishment of the Purnululu World Heritage Area Advisory Committee was endorsed by Cabinet in December 2014, with two meetings held in 2015–16.
- The Department provided information to inform the State's response to the proposed National Heritage listing and assessment of the Lesueur-Coomallo and Fitzgerald River-Ravensthorpe areas, which were gazetted on the National Heritage List on 4 May 2016.
- The Department also continues to jointly manage the MAC.



Matuwa (Lorna Glen) forms part of a new Indigenous Protected Area in the Goldfields.
Photo – Jennifer Eliot/Parks and Wildlife



Cape Domett. Photo – Peter Nicholas/Parks and Wildlife

Regional activities

Goldfields Region

- Matuwa (Lorna Glen) and Kurrara Kurrara (Earaheedy) (MKK) have been determined as exclusive possession native title and an Indigenous Protected Area was created. Parks and Wildlife attended management team meetings and formal joint management arrangements are being progressed.
- The current joint management project with the Wiluna Martu and the local community continued at the MKK Indigenous Protected Area. Activities included flora and fauna management, research, fence maintenance, erosion control, road maintenance and fire management contract work.
- Joint management activities with the Tjuntjuntjara Aboriginal community in the Great Victoria Desert and Spinifex native title determined area included the construction of a shed tank, weed control, biological survey, planning for fire management and reserve management. Parks and Wildlife staff joined the Tjuntjuntjara Aboriginal community for the determination of the Pilki exclusive possession native title area adjoining the Spinifex determined lands. Joint management arrangements are being progressed.
- Joint management for conservation and multiple-use of the Adelong pastoral lease adjacent to Goongarrie was progressed with the Menzies Aboriginal Corporation and Goldfields Land and Sea Council. Fencing and track work for fire management was completed.
- The Credo Working Group continued to meet progressing Aboriginal involvement and joint management of former Credo station (proposed Credo Conservation Park). A number of meetings were held on country and in Kalgoorlie. Rangers have continued to participate in land management activities, including cultural site management, recreation site preparation and installation of a new accommodation centre at the Credo Homestead complex.
- The new campground at Credo under the *Parks for People Caravan and Camping* initiative was completed and opened in December by Wendy Duncan MLA. The event was attended by Aboriginal rangers and Parks and Wildlife staff involved in design and construction of the site as well as a number of stakeholders and interest groups such as the Eastern Goldfields Historical Society and Kalgoorlie Boulder Urban Landcare Group.

Operational highlights

Parks Management

- Campground hosts and volunteer caretakers contributed more than 8000 volunteer hours at Matuwa, 5500 hours at Credo, 100 hours at Lake Mason and 2500 hours at Goongarrie former pastoral stations.
- Work continued on the Credo homestead recreation site, including landscaping works and the construction of a new accommodation block at the field study centre.
- Two *Remote Regions Nature Conservation and Parks Program* projects were conducted at Credo. Work included erosion management and rehabilitation, and upgrading the shearing shed interpretation area and finalising other infrastructure upgrades at the homestead complex.
- The access roads to Rowles Lagoon Conservation Park, Goongarrie station and Cave Hill recreation site were upgraded.
- Inspections were undertaken at all recreation sites to assess visitor risk. Quarterly and annual reviews were carried out to monitor progress on actions taken to mitigate hazards.

Kimberley Region

- Negotiations continued with the Bunuba Dawangarri, Williggin, Dambimangari, Wunambal Gaambera, Miriuwung

Gajerrong and Balangarra Aboriginal corporations in relation to an ILUA and joint management agreement for native title-determined lands.

- Engagement continued with native title and other Aboriginal groups to facilitate the implementation of the *Kimberley Science and Conservation Strategy*. This included fee-for-service arrangements with numerous Aboriginal Ranger groups.
- Joint management of Miriuwung Gajerrong (MG), Ngarla, Nyangumarta, Karajarri, Dambimangari and Yawuru lands and waters continued.
- Funding specifically for the Bunuba Ranger program continued under the *Kimberley Science and Conservation Strategy*.
- A school holiday program and community events were conducted to focus on marine and terrestrial reserves within Yawuru conservation estate.
- A guided walk entitled 'Unlocking Mirima' was hosted during the Ord Valley Muster week in Mirima National Park.
- A new carpark at Bells Gorge in King Leopold Ranges Conservation Park was completed.
- A new 6.5km cattle fence was constructed along the eastern side of Ngamoowalem

to keep cattle away from visitor facilities at Middle Springs and Black Rock Falls.

- MG Rangers were involved in the flat-back turtle survey at Cape Domett. The survey involved measuring and tagging adult turtles and counting hatchlings as they emerged from the nests. The Cape Domett rookery is one of the most important flatback turtle nesting sites in WA.
- During the 2015–16 wet season the MG Rangers undertook bellyache bush control along Grotto Creek in Parry Lagoons Nature Reserve. While spraying the known infestation, the rangers located a second infestation and managed to treat both before they seeded, which will make their job easier in the coming years.

Midwest Region

- Work has started on the \$20 million *Royalties for Regions Kalbarri Skywalks and National Park Tourist Infrastructure Project* in collaboration with the Mid West Development Commission and Tourism WA. The project includes completing the sealing of the Loop / Z Bend Road, construction of two cantilevered lookouts over Murchison Gorge and upgrading the West Loop, Z Bend and Meanarra Hill recreation sites.
- As part of the *Kalbarri Skywalks and National Park Tourist Infrastructure Project*, two Aboriginal ranger assistants have been employed by the Department for two years,

and an art project has been initiated with the Nanda community and Yamatji Marlpa Aboriginal Corporation.

- The Hawks Head Lookout platform in Kalbarri National Park was replaced.
- Under the *Parks for People Caravan and Camping* initiative, planning progressed to create opportunities for camping and recreation at the Karara Complex of six former pastoral properties. In Francois Peron National Park, the majority of roadworks and infrastructure at Big Lagoon campground were completed to create new camp sites and day-use facilities.
- An Aboriginal heritage survey was completed for Kennedy Range National Park and one started for Mt Augustus National Park.
- Two entrance information stations were completed for Mt Augustus National Park and signage was installed for the Kennedy Range Loop Drive.
- In the Shark Bay World Heritage area, remedial works were undertaken on the Monkey Mia boardwalk.
- Construction was completed on sheds at Steep Point and Dirk Hartog Island National Park to provide work facilities for staff in these remote locations.

- A community engagement strategy continued to be implemented for the *Return to 1616* ecological restoration project at Dirk Hartog Island National Park.
- Work implemented included a third Dirk Hartog Island National Park community open day, facilitating an island clean-up with community involvement, presentations to the Malgana Native Title Working Group, development of a new brochure on island protection and biosecurity and design of three new pages for the Shark Bay World Heritage area website www.sharkbay.org.
- Significant planning and support for the Department of the Premier and Cabinet was provided for the October 2016 celebration of the 400th anniversary of Dirk Hartog's landing in Shark Bay.
- The implementation of the Government-endorsed *Wedge and Grey Preliminary Planning Report* continues with the ongoing development of a final plan for the two settlements.
- The Department appointed consultants to deliver two reports to assist in the planning process for Wedge and Grey regarding coastal hazard assessment and asbestos management.
- Operations continued to be refined to improve efficiency at the Pinnacles Desert Discovery Centre in Nambung National Park and the Monkey Mia Visitor Centre.



Entrance road to Temple Gorge campground in Kennedy Range National Park. *Photo – Janine Guenther*

- Holiday activity programs were conducted at the Pinnacles Desert Discovery Centre and Monkey Mia Visitor Centre.
- The power system at the Pinnacles Desert Discovery Centre was upgraded with an extra 20kW of solar panels installed along with a new inverter and generator.
- Planning for an upgrade of picnic facilities at Kangaroo Point in Nambung National Park began with the development of a concept plan.
- Planning and implementation of the Mount Peron Walk Trail in Lesueur National Park continued and a pedestrian bridge was installed over Cockleshell Gully at the start of the trail.
- New interpretive panels and visitor facilities were installed/constructed at Jingemias Cave in Watheroo National Park. Work was completed in partnership with the Moore Catchment Council, Lotterywest and the Wheatbelt Development Commission.

Operational highlights

Parks Management

Pilbara Region

- The Pilbara Region continued to work closely with key stakeholder organisations including the Pilbara Development Commission, Pilbara Regional Council, local shires, Australia's North West, Australia's Coral Coast and other community groups and organisations.
- Regional inclusion on the Pilbara Development Commission's implementation committee has led to the *Pilbara Tourism Product Development Plan* (and subsequent implementation plan) nominating the expansion and ongoing development of the three main national parks in the region (Karijini, Millstream Chichester and Murujuga) and other associated nature-based activities as the most pressing tourism priority developments for the region.
- The information manual and training seminars for the in-water humpback whale interaction trial at Ningaloo Marine Park in 2016 were developed and delivered to tourism operators participating in the trial.
- Construction of the steel fabricated Fortescue Falls access path and lookout rest points within Karijini National Park were completed to a high standard and received favourable media coverage throughout the north-west.
- Construction of a disabled access boardwalk along the foreshore at Bills Bay (Coral Bay) was completed. Although Parks and Wildlife provides a free-of-charge 'sand wheelchair' for visitors in Coral Bay, the boardwalk provides another opportunity to access the coast and bay. The site is also becoming very popular for wedding ceremonies.
- Toilet replacement at Gnaraloo Station at the popular surf spot known as Tombstones was completed.
- Stage 2 of Milyering Discovery Centre improvements were completed with new interpretive banners and displays erected.
- School holiday activity programs were undertaken, with activities ranging from World Heritage talks to sandcastle competitions.
- The *Jurabi Turtle Centre Interaction Program* continued throughout the turtle season providing visitors with a high quality interpretive experience along beaches adjacent to the Jurabi Coastal Park.
- Rationalisation and standardisation of moorings at the Tantabiddi boat ramp began with three additional public moorings installed.



Kalamina Gorge, Karijini National Park. Photo – Rick Dawson/Parks and Wildlife



Granite Skywalk, Porongurup National Park. Photo – Andrew Halsall

- In Karijini National Park, further important structural and safety improvements were made to Oxers Lookout and walkway as well as an extension to the Fortescue Falls walk trail. Upgrades to Weano Gorge and Mount Bruce recreational areas and Dales campground were also completed.
- Replacement of the Joffre and Kalimina lookouts in Karijini National Park incorporating the new design developed in consultation with structural engineers and stakeholders is underway.
- Significant road damage to remaining unsealed roads within Karijini National Park was repaired.
- Improvements to staff housing in Millstream Chichester National Park were completed, with fencing, sheds and other basic living structures built.
- Ngurrawaana Aboriginal Rangers completed a number of projects in Millstream Chichester National Park, such as facility maintenance, erosion control works and various other fee-for-service arrangements.

South Coast Region

- The *Torndirrup National Park Improvement Project* was completed and opened to the public in April 2016.
- Under the *Parks for People Caravan and Camping* initiative, the civil works for the Lucky Bay day-use area and campground redevelopment were completed and the campground reopened to the public for Easter 2016. Construction of the associated facilities are due for completion in 2016–17.
- Works to improve visitor facilities in Gull Rock National Park were undertaken, with a staircase to Boiler Bay and a picnic site at Ledge Beach designed and built by local staff.
- The stairs to Salmon Holes damaged during a storm in 2014 were repaired and reopened for public use.
- The annual Art in the Park event run by the Friends of the Porongurup Range was held in April 2016 at the Castle Rock day-use area.
- Engagement with traditional owners continued on a range of matters in Esperance and Albany, which resulted in visits to parks across the South Coast to undertake customary activities.
- The Albany District held two family information days at Two Peoples Bay

Nature Reserve and one in the Stirling Range National Park to provide information on conservation and encourage discussion about Aboriginal connection to country.

- Visitor numbers continued to increase in all major national parks during peak and off-peak periods.
- A staff housing refurbishment project at Two Peoples Bay Nature Reserve was completed with the upgrade of the senior ranger's house.
- Three additional electronic fee entry stations were installed on the South Coast at Castle Rock in the Porongurup National Park, Two Peoples Bay Nature Reserve and The Gap in Torndirrup National Park.
- Entry fees were introduced in three parks across the region during the year, with entry fees applying at West Cape Howe National Park and Two Peoples Bay Nature Reserve from 4 April 2016 and fees applying at Torndirrup National Park from 23 May 2016.
- Thomas River Shire Reserve campground was relinquished by the Shire of Esperance to the Department to include in Cape Arid National Park.
- The biennial inspection of the caves and reserves on the Nullarbor was undertaken to conduct visitor risk management assessment and undertake priority maintenance.

South West Region

- Under the *Parks for People Caravan and Camping* initiative, the new campground and day-use facilities at Potters Gorge in Wellington National Park neared completion. This project has three camping loops, which will provide more than 30 new camp sites including areas for larger groups, six toilet blocks and five barbecue shelters. Planning for the new Jarrahdene campground at Boranup in Leeuwin-Naturaliste National Park was completed and construction of access roads, parking areas and camp sites began.
- Local staff continued to work with South West and Peel mountain bike clubs to plan development of trails in Wellington National Park and Arklow State forest near Collie.
- Working with the Blackwood District, the Margaret River Off Road Cycling Association completed detailed trail design and construction of the first of 16km of trails in Bramley National Park and adjoining State forest. This is the first trail to be built under the auspices of the *South West Mountain Bike Master Plan*.
- At Logue Brook Dam, improvements to facilities continued with the upgrade of Saddlebank day-use area, including a new toilet block, gas barbecues and shelter and park furniture.

Operational highlights

Parks Management

- A new toilet block was completed at Stockton Lake near Collie.
 - A new footbridge across the Harvey River was completed at Hoffman Mill campground.
 - Working partnerships continued with the South West 4WD Club and Wellington Region 4WD Care Group. Under the Department's *Track Adoption Program*, the clubs worked with Parks and Wildlife staff to repair erosion, rehabilitate damaged areas and remove car bodies and other rubbish along Lennard Track in Wellington National Park and at Bob's Hill in Brunswick Plantation.
 - *Nearer to Nature* school programs continued to be delivered at Wellington Discovery Forest and Wharncliffe Mill as well as new locations including the Margaret River mouth and Conto campground. A total of 3245 students participated in 121 *Nearer to Nature* – South West excursions and incursions.
 - Following the 2015–16 bushfire season there was a strong interest in bushfire education and a significant number of Living With Fire incursions were held at primary schools through the autumn months.
 - Displays and activities were organised at a range of events to promote the *Nearer to Nature* and *Western Shield* programs and to raise awareness of the role of the Department and the importance of biodiversity conservation. These included school holiday programs at local libraries, participation in the Dunsborough Primary School Bay OK Day, biodiversity and marsupial trapping activities at the Margaret River Bioblitz organised by the Cape to Cape Catchments Group and incursions in cooperation with South West Catchment Council to raise awareness of the proposed Preston River to Ocean Regional Park in Bunbury.
 - Abseiling anchors in Leeuwin-Naturaliste and Wellington national parks were load tested to ensure public safety. A consultant geotechnical engineer was engaged to conduct risk assessments at the Huzzas and Hamelin Bay cliffs and at Giants Cave.
 - Tree pruning was undertaken at major recreation sites to minimise risk to visitors. Sites included Honeymoon Pool, Potters Gorge, Logue Brook, Chapman Pool, Sues Bridge, Conto, Boranup and Point Road campgrounds, Hoffman Mill, Leschenault Peninsula and Wellington Discovery Forest.
- ### Swan Region
- Lane Poole Reserve has seen considerable redevelopment largely funded through the *Parks for People Caravan and Camping* initiative. The Baden Powell day-use development tender was awarded and the majority of the project has been completed with a new kayaking launching ramp to be erected in 2016–17.
 - At John Forrest National Park, new management signage was installed, together with installation of a new automatic entry fee pay station.
 - Significant upgrades were undertaken in Matilda Bay Reserve including new park benches, picnic tables, barbecue refurbishment and toilet renovation, together with redevelopment of the Bayside Kitchen café (former Matilda Bay Tea Rooms). These upgrades provide significant improvement to the presentation of one of the most popular parks in the region. Several events were also held in the reserve in partnership with Nature Play WA.
 - The Pinjar Off-road Motorcycle Area was further developed with the completion of the 'Short and Curly' advanced skills area. Other developments included track grading and the installation of information shelters, printing of a promotional brochure, improvement of signs, car parks and paths. The Pinjar facility continues to grow in popularity as demonstrated by increasing visitors and use.
 - At the Metro Road Off-road Vehicle Area, a stakeholder steering group was formed with the Department of Sport and Recreation, Recreational Trail Bike Riders' Association and Motorcycling Western Australia to develop a framework for formal trails in the area.
 - Under the Department's *Track Adoption Program*, the Swan Region worked with the Recreational Trail Bike Riders' Association to provide regular maintenance and clean-up programs for the Pinjar and Metro Road off-road motorcycle areas.
 - Recreation master planning for Wilbinga Conservation Park began. In addition, track directional/boundary signage was installed, and vehicle access analysis and several clean up events were conducted with the Wilbinga 4x4 Shacks Crew.
 - In partnership with Nature Play WA, Outdoors WA and the Caravan Industry Association of WA, Parks and Wildlife held the popular Great Aussie Camp Out event at Yanchep National Park during Outdoors October 2015. Participant feedback was extremely positive for these events with the Swan Region planning to expand similar events in future.

- A new campground host location was introduced at Yanchep National Park.
 - The Swan Region continued to work closely with key regional stakeholder organisations including the Peel Development Commission, Alcoa of Australia, the cities of Wanneroo and Swan, Outdoors WA, the WA 4WD Association, TrackCare, the WA Mountain Bike Association, the Recreational Trail Bike Riders' Association of WA, Canoeing WA and Motorcycling WA.
 - Trees Adventure Park, an innovative new tourism attraction in the popular Lane Poole Reserve near Dwellingup, opened in December 2015 and offers visitors the chance to swing through the treetops on trapezes and flying foxes. The facility is operating under a lease issued to Canopy Adventure Pty Ltd for a high ropes course.
 - Mountain biking continued to be a major focus and popular activity. The draft *Perth–Peel Mountain Bike Master Plan* was completed for public comment and upgrade works continued at the Kalamunda Circuit and Langford Park in Jarrahdale and other mountain bike circuits.
 - The Swan Region continued to manage more than 250 recreational events including the Oxfam TrailWalker at Mundaring, Hot Rods in the Park at Yanchep National Park and the Dwellingup 100 mountain bike event which won a national award for the best organised mountain bike event in Australia.
 - Visitor risk management continued to be a key focus for the region. Several key assets were replaced due to risk issues including upgrades of Bobs Crossing in Lane Poole Reserve and boardwalk replacement in Penguin Island Nature Reserve. Planning also began to replace several pedestrian bridges in John Forrest National Park.
 - Structural engineering reports were obtained for a range of structures and arboricultural inspections assessed tree hazards across the region. The Swan Region set up an arboriculture panel contract with four businesses.
 - Implementation of the Penguin Island coastal risk assessment report recommendations continued with new signage installed and geotechnical surveys were undertaken to assess cave and cliff risks on the island and in the surrounding Shoalwater Islands Marine Park.
- Warren Region**
- Under the *Parks for People Caravan and Camping* initiative, recreation master planning for the expansion and upgrade of Shannon campground was undertaken. Stage one installation of new reticulated water and gas supplies was completed.
- Tendering for the construction of the new road network, camping bays and associated infrastructure is underway with construction planned for spring/summer 2016–17. This project will provide new camp sites for tents, camper trailers, caravans and campervans, and additional amenities including toilets and shelters.
- Construction of the new canoe launch area on the Frankland River in Nornalup near Walpole-Nornalup National Park began and is nearing completion. This will provide a sustainable launching area for canoeists and user separation from existing boat launching facilities nearby. The site also incorporates interpretation of the significant Aboriginal heritage values of the area. This work has been jointly funded by the Department and the Shire of Denmark.
 - Repair and reconstruction works started and were largely completed at sites impacted by the February 2015 Northcliffe fire including the reconstruction of two Bibbulmun Track huts, the replacement of the Bibbulmun Track pedestrian bridge at Dog Pool, and decking at the Point D'Entrecasteaux lookouts and the Karri Forest View Lookout in the Boorara Gardner National Park. Updating and replacement of fire-damaged interpretative signage at various sites including Boorara Tree was also completed.
 - More than 150 recreation sites were formally inspected for risks and hazards, and treatments carried out on a priority basis.
 - Maintenance grading was completed on about 400km of recreation site access roads.
 - Coastal stabilisation and rehabilitation works were undertaken at several sites within the D'Entrecasteaux National Park in conjunction with volunteer groups.
 - Trail improvement and maintenance work was carried out on the Bibbulmun Track and included the construction of a 36m-long suspension bridge over the Donnelly River at One Tree Bridge. This was a joint Donnelly District, Shire of Manjimup and Bibbulmun Track Foundation project with the aim of improving walker and other user safety. Other works included the oiling of timber infrastructure and installation of and repairs to steps, small bridges, shelters and toilets.

Operational highlights

Parks Management

- Four strategic road bridges were replaced and one partially completed. In addition to this, maintenance work including decking repairs, termite control, kerbing, improved signage and vegetation management was undertaken.
 - Management of horse riding and the provision of bridle trails within the Warren Region continued with detailed planning for the Bridgetown to Broke Inlet long distance horse trail occurring in conjunction with the Warren Blackwood Alliance of Councils. Planning and community engagement has progressed on the development of bridle trails within Shannon National Park in line with the *Shannon and D'Entrecasteaux National Parks Management Plan 2012*.
 - Warren Region approved and monitored several large events including motorised recreation (enduro) and a yachting regatta on the Walpole Nornalup Inlet.
 - More than 1000 students participated in Outward Bound recreation-based camping activities within the Walpole-Nornalup and D'Entrecasteaux national parks.
 - More than 100 non-commercial recreation event applications were approved.
 - Parks and Wildlife staff conducted regular *Go with a Guide* and *Nearer to Nature* activities, as well as daily tours of the Valley of the Giants throughout the year.
 - More than 25 interpretive projects were completed, including site interpretive and management signage projects, park notes and publications, displays for community events and collaborative signage projects with other organisations.
- Wheatbelt Region**
- There has been continued engagement with the Noongar community throughout the Wheatbelt Region, including strong engagement with the Pingelly/Brookton Noongar community to protect Boyagin Rock while day-use facilities were upgraded, as well as working with the Narrogin Noongar Trainee Ranger Program to undertake site protection projects such as Wolwolling Pool.
 - Now in its 13th year, Barna Mia nocturnal tours continued to provide a distinctive wildlife encounter experience to visitors to Dryandra Woodland. It also provided an opportunity for visitors to learn more about the Department's *Western Shield* program.
 - A Wheatbelt eco education program run at Dryandra Woodland during 2015–16 attracted 500 participants.
 - Under the *Parks for People Caravan and Camping* initiative the Gnaala Mia (a Noongar word for 'our home') campground was completed, providing additional camping and caravan sites including facilities for visitors to Dryandra Woodland.
 - The Toyota Land Cruiser Club of WA continued to assist with volunteer maintenance work in Dryandra Woodland, installing a 3km loop walk trail that departs from the new Gnaala Mia campground.
 - In conjunction with the Lions Club of Narrogin, new site signage and a lookout were installed at Contine Hill day-use site in Dryandra Woodland.
 - General road maintenance works occurred throughout Dryandra Woodland including maintenance grading, culvert replacement works, minor road realignments and resheeting works.
 - Access to the Kokerbin Nature Reserve recreation site was upgraded to improve visitor access to the historic well.
 - New interpretation shelters were constructed for Yorkrakine and Korrellocking nature reserves and Totadgin Conservation Park. These are to be installed in July 2016.
 - New picnic tables are ready for installation at all recreation sites in the Central Wheatbelt District.
 - The Lions Club of Narrogin installed two short walk trails at the Contine Hill day-use site to link with the interpretive shelter installed the previous year.
 - The Great Southern District provided representation on a local tourism and development committee to progress a cultural walking trail on a nature reserve near Pingelly, in partnership with the community.
 - A cover for the historic well at Namelcatchem Nature Reserve in the Shire of Dowerin was installed and interpretation provided to describe the history of the feature.
- Regional Parks**
- Regional Parks Branch continued to liaise with the Department of Planning and WA Planning Commission regarding the establishment of the proposed Peel, Preston River to Ocean and Northern Leschenault regional parks.
 - Liaison with the Department of Lands and the City of Canning was undertaken to progress the land assembly for Canning River Regional Park. Land assembly tasks are underway for Herdsman Lake Regional Park to enable the creation of the proposed Herdsman Lake Nature Reserve and Herdsman Lake Conservation Park.
 - Work continued on riparian rehabilitation works at Greenfields and Masons Landing in the Canning River Regional Park, in partnership with the Department's Rivers and Estuaries Division.

- Post-fire weed control works, rehabilitation and repair of damaged infrastructure was undertaken at the Taylor-Gibbs block and Shirley Balla Swamp in Jandakot Regional Park following the Banjup fire of February 2013.
- Work continued on the rehabilitation of land in Beelii Regional Park associated with the Fiona Stanley Hospital and Health Precinct.
- Work continued on rehabilitating large areas of Yellagonga Regional Park as part of an offset package for the Eglinton Estate project.
- The water supplementation program continued at Thomsons Lake Nature Reserve in Beelii Regional Park. The program is being undertaken in conjunction with the Water Corporation to maintain water levels and improve waterbird habitat.
- Twenty-six cygnets were released from Thomsons Lake into Lake Kogolup in Beelii Regional Park. Thomsons Lake often dries up before the cygnets have fledged meaning they need assistance to find another water source.
- Work was undertaken to manage the impacts of coastal erosion at Cape Peron in Rockingham Lakes Regional Park.



Spider orchid, John Forrest National Park.
Photo – Parks and Wildlife



Gnaala Mia campground, Dryandra. *Photo – Peter Nicholas/Parks and Wildlife*

- The 2010–15 midge management partnership for Yellagonga Regional Park continued to be implemented in conjunction with the cities of Joondalup and Wanneroo. During the past year a new partnership agreement for 2015–20 was developed.



Paddleboarding in the Swan Canning Riverpark. *Photo – Mark Kleczkowski*

Highlight

New canopy adventure for WA reserve

An innovative business venture pitched directly to Parks and Wildlife has resulted in a new tourism attraction in Lane Poole Reserve south-east of Perth.

Trees Adventure Park allows visitors to swing, climb and balance among the forest canopy through a series of high rope obstacles, moving from tree to tree via rope bridges, flying foxes, trapezes and tarzan swings.

It is a new type of adventure offering for WA's tourism industry, but the way the project developed was also distinctive.

In July 2014 the Department received a proposal and business plan to operate a commercial high ropes course.

This led to the Department working directly with the proponent through the assessment and approvals process, without a publically advertised call for expressions of interest. This protected the proponent's intellectual property and streamlined approvals for the project. During development, the Department also helped to identify a suitable site for the venture near Nanga Mill.

Trees Adventure Park was opened on 20 December 2015 by Environment Minister Albert Jacob and has already proved popular with visitors, complementing an extensive investment by the State Government through *Royalties for Regions* to expand and upgrade campgrounds and visitor facilities in Lane Poole Reserve. It has also created two full-time and five part-time jobs for the local community.

The Department assisted with promoting the venture through its Facebook and website platforms, and is ensuring the health of the forest through the requirement for an annual inspection by a qualified arborist to check tree condition. The obstacles are built around trees to minimise impact with timber clamped to trees, rather than drilled into them, and decking mounted to it.

The project demonstrates the Department's commitment to supporting initiatives that will grow tourism in WA, and encouraging people to come forward with business proposals that will bring more people to WA's natural areas.



Trees Adventure Park owner Florent Lore. Photo – Lauren Emmerson/Parks and Wildlife



Tackling one of the high rope obstacles at Trees Adventure Park. *Photo – Lauren Emmerson/Parks and Wildlife*



Florent Lore. *Photo – Lauren Emmerson/Parks and Wildlife*



Obstacles are built around trees to minimise impact, with timber clamped to the trees rather than drilled into them. *Photo – Lauren Emmerson/Parks and Wildlife*



Trees Adventure Park allows visitors to travel through the forest canopy. *Photo – Lauren Emmerson/Parks and Wildlife*

Operational highlights

Wildlife Management

The conservation, protection and management of Western Australia's rich biodiversity is strategically coordinated through the Conserving Habitats, Species and Ecological Communities Service and Conservation Partnerships Service, which oversee a range of wildlife programs and activities. Programs delivered through these services are built on scientific and technical knowledge accumulated over many decades, which continues to develop and grow.

Ongoing processes of biological survey, specimen collection and classification are complemented by developing and implementing recovery plans for species and ecological communities under threat, identifying and acquiring land that supports representative ecosystems, managing areas for their conservation values, managing broadscale threats to conservation, ensuring native plants and animals are used sustainably, and continuing to promote public awareness of the value and vulnerability of WA's natural assets.

The Wildlife Management program is divided into the following areas:

- development and implementation of legislation, key policies and strategic plans
- establishment and effective management of the terrestrial and marine conservation reserve system

- maintenance of intact and healthy ecological communities, including wetlands, and viable populations of species, especially those that are threatened or iconic, while allowing the sustainable use of flora and fauna
- reducing impacts of key threatening processes
- effectively targeting scientific investigations to improve biodiversity knowledge and integrating scientific discoveries into improved wildlife management
- effective collection, storage, custodianship and long-term management of information and data
- promoting public and stakeholder awareness and understanding of wildlife conservation issues, and engaging and encouraging people to be involved in the conservation and management of wildlife
- developing, negotiating and improving partnerships with other research bodies, such as universities, the Western Australian Marine Science Institution (WAMSI) and the Western Australian Biodiversity Science Institution (WABS), other government agencies, natural resource management (NRM) bodies, local government, non-government organisations and community groups to leverage additional funding to support Government and Departmental priorities.

Legislation, policy and plans

Biodiversity conservation legislation

The Biodiversity Conservation Bill 2015 was introduced to Parliament by Environment Minister Albert Jacob on 25 November 2015.

The Bill has been drafted to replace the *Wildlife Conservation Act 1950* (WC Act) with modern conservation provisions, including protection of threatened ecological communities and critical habitat. It includes greatly increased penalties for significant impacts to threatened species, whales and dolphins, from a current maximum of \$10,000 to \$500,000 for a person and \$2 million for a body corporate.

The Bill also includes provisions that provide for greater flexibility and certainty for private landowner conservation initiatives with a focus on encouragement, while removing unnecessary regulatory barriers. The Bill will also repeal the *Sandalwood Act 1929* (Sandalwood Act) and introduce modern provisions for the management of native sandalwood from the point of harvesting to export. The Bill includes significantly increased penalties for illegal taking of this valuable resource of up to \$200,000 for an individual and \$1 million for a body corporate, up from \$200 in the Sandalwood Act.



Dawson's burrowing bee, one of Australia's largest bees, in Kennedy Range National Park.
Photo – Janine Guenther



Perentie, Barrow Island. Photo - Misty Shipway/Parks and Wildlife



Spiny-tailed Gecko (*Strophurus spinigerus*) on Dirk Hartog Island National Park. Photo - Parks and Wildlife



Nesting black swan. Photo - Rick Dawson/Parks and Wildlife

Operational highlights

Wildlife Management

The *Conservation and Land Management Amendment Act 2015* (the Amendment Act) was passed by Parliament and received Royal Assent on 19 October 2015. The Amendment Act has amended the *Conservation and Land Management Act 1984* (CALM Act) to include the following initiatives:

- combining the Conservation Commission with the Marine Parks and Reserves Authority into a single Conservation and Parks Commission
- enabling joint vesting of national parks, nature reserves and conservation parks between the Conservation and Parks Commission and native title parties
- zoning schemes in marine parks, including special-purpose and recreation zones, that allow some forms of fishing to operate while imposing restrictions on others, as intended in approved marine park management plans
- the roles of regional park coordination, management planning and management to be legislated functions of the CALM Act Chief Executive Officer (CEO)
- legislated recognition that fire management, including prescribed burns, is an integral part of the land management functions of the CALM Act CEO

- extending the maximum term of CALM Act leases for recreation, tourism and other purposes from the current 21 years, with a possible 21-year extension, to a maximum of 99 years, consistent with the periods available under the *Land Administration Act 1997*
- miscellaneous amendments to address several minor anomalies and omissions in the CALM Act.

The Amendment Act has been proclaimed in two parts (on 12 December 2015 and 6 May 2016), and all amendments to the CALM Act are now in force.

Regional nature conservation plans

Each of the nine Parks and Wildlife regions operates under a five-year nature conservation regional plan. This collectively provides the basis for improved integration and coherence of Departmental activities and functions aimed at conserving WA's biodiversity at a regional scale. These plans provide guidance on priority areas for biodiversity conservation. Four were finalised in 2015–16, with further substantial progress on others.

Kimberley Science and Conservation Strategy

The State Government's *Kimberley Science and Conservation Strategy* was released in June 2011, with an initial budget of \$63 million over five years and a commitment to ongoing funding for key initiatives. An additional \$18.5 million was committed in 2013 to create the proposed Kimberley National Park, marine and national parks at Horizontal Falls and to extend the proposed North Kimberley Marine Park to the Western Australian/Northern Territory border. A further \$22.1 million was allocated in 2016 for the establishment and management of the Great Kimberley Marine Park, Kimberley National Park and Yawuru Nagulagun / Roebuck Bay Marine Park, taking the total investment under the strategy to more than \$103 million. The strategy provides the framework for the conservation of the Kimberley's spectacular natural values and opportunities for Aboriginal employment and nature-based tourism. It is being delivered through partnerships with traditional owners, landholders and non-government organisations.

The strategy takes a landscape-scale approach to conservation, and delivers increased resources to manage threats caused by fires, feral animals and weeds irrespective of land tenure through the *Landscape Conservation Initiative*. A dedicated monitoring program reports on conservation resource condition, principally

in the North Kimberley bioregion. Better management of fire has shifted the majority of fires from late to early dry season, with late season fires being reduced by nearly 50 per cent. Nearly 25,000 feral herbivores (mostly cattle, but including donkeys, horses and pigs) have been removed since 2011, and the size of high priority weed infestations has more than halved. This has improved vegetation condition and habitat value for wildlife. In particular, this initiative has been successful in maintaining the abundance and diversity of threatened mammals in the North Kimberley. Mammals detected during annual monitoring included the northern quoll (*Dasyurus hallucatus*), golden bandicoot (*Isoodon auratus*), golden-backed tree-rat (*Mesembriomys macrurus*), brush-tailed rabbit rat (*Conilurus penicillatus*), scaly tailed possum (*Wyulda squamicaudata*) and monjon rock wallaby (*Petrogale burbidgei*). Key functional fire mosaic and habitat attributes have been identified through ongoing research and monitoring and the results published, including the *North Kimberley Landscape Conservation Initiative – 2013–14 Monitoring, Research and Evaluation Improvement Report*.

More information on the *Kimberley Science and Conservation Strategy* is available on the Department's website www.dpaw.wa.gov.au/management/kimberley-strategy.

Strategic Assessment of the Perth and Peel Regions/Perth and Peel Green Growth Plan for 3.5 Million

In 2015–16, the Department continued to provide assistance to the Department of the Premier and Cabinet in the preparation of the *Strategic Assessment of the Perth and Peel Regions*, particularly in relation to biodiversity conservation matters including the protection of threatened species and communities.

The *Perth and Peel Green Growth Plan for 3.5 Million (draft Green Growth Plan)* was released in December 2015, and includes a strategic assessment of the impact of development on matters of national environmental significance, under the *Federal Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Impacts of future development on State environmental values are considered in the draft plan, which aims to provide up-front approval for development under the EPBC Act and to promote more efficient environmental assessment in the Perth metropolitan and Peel regions under the *State Environmental Protection Act 1986*.

The draft *Green Growth Plan* includes a conservation program for protection of threatened species and communities, bushland, rivers and wetlands including 170,000ha of new and expanded conservation areas in the Perth and Peel regions and immediate surrounds. More information can be found on the Department of the Premier and Cabinet’s website www.dpc.wa.gov.au.



Golden-backed tree rat. Photo – Norm McKenzie/Parks and Wildlife



Hooded plover. Photo – Christine Fleay/Parks and Wildlife



Parks and Wildlife officers guide a stranded Gray’s beaked whale to deeper water in Mangles Bay near Rockingham. Photo – Craig Olejnik/Parks and Wildlife



The Biodiversity Conservation Bill 2015 will enhance special protection for marine mammals including humpback whales. Photo – Grant Griffin/Parks and Wildlife

Operational highlights

Wildlife Management

Establishment of the conservation reserve system

The formal conservation reserve system comprises national parks, nature reserves, conservation parks, marine parks, marine nature reserves, marine management areas and miscellaneous conservation reserves referred to in the CALM Act.

In 2015–16, the State Government continued to progress the establishment of parks and reserves under the *Kimberley Science and Conservation Strategy*. As a first step towards creating the proposed Kimberley National Park, the Government reached agreement with Rio Tinto and Alcoa of Australia to terminate the *Alumina Refinery (Mitchell Plateau) Agreement 1971* for bauxite mining at the Mitchell Plateau. The Alumina Refinery (Mitchell Plateau) Agreement (Termination) Bill 2015 was enacted on 2 November 2015 to enable about 175,900ha of the Mitchell Plateau to be included in the Kimberley National Park. The addition of this land to the proposed national park is subject to agreement by native title holders. Draft management plans for the proposed Yawuru / Nagulagun Roebuck Bay and Lalang-garram / Horizontal Falls marine parks and Oomeday National Park (Horizontal Falls) were released for public comment in 2015. A draft plan for the proposed North Kimberley Marine Park was released in 2016. Planning and

implementing long-term monitoring across existing and proposed Kimberley marine parks has commenced.

Following the proclamation of the 2015 CALM Act amendments and finalisation of Indigenous Land Use Agreements, work has begun to create jointly vested and jointly managed conservation reserves along the terrestrial coastal strip of Eighty Mile Beach and parts of Walyarta (Mandora Marsh). The joint vesting arrangement will be between the Nagarla, Nyangumarta and Karajarri traditional owners and the Conservation and Parks Commission. The existing Dragon Tree Soak Nature Reserve is proposed to be jointly vested and jointly managed with the Karajarri native title holders.

Work continued to implement tenure proposals outlined in the *Dryandra Woodland Management Plan 2011*, *Lane Poole Reserve and Proposed Reserve Additions Management Plan 2011*, *Parks and Reserves of Yanchep and Neerabup Management Plan 2012* and the *Forest Management Plan 2014–2023*.

More information about lands and waters managed by the Department is available in the *Department of Parks and Wildlife 2015–16 Annual Report* on the website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.



Numbats, Dryandra Woodland. Photo – John Lawson



Western Shield coordinator Ashley Millar releases a numbat at Dryandra Woodland. Photo – Parks and Wildlife





Aerial view of Mitchell River, Mitchell River National Park. Photo – Tourism WA

Effective management of the conservation reserve system

Management planning

During 2015–16, three final terrestrial management plans were released, while a further 11 terrestrial and marine management plans were in preparation. See page 11 for details. A five-year periodic audit of the implementation of the *Rowley Shoals Marine Park Management Plan 2007–17* was completed by the former Marine Parks and Reserves Authority, with assistance from the Department.

A list of approved management plans is available on the Department's website www.dpaw.wa.gov.au/parks/management-plans/approved-management-plans.

Management action

The Department undertook a wide range of management actions across the State to protect biodiversity and more detail is provided in the sections below. Some actions include:

- Collaboration with neighbours, traditional owners, and natural resource management and community groups to undertake prescribed burns, weed control and removal of introduced animals on conservation reserves, unallocated Crown land and former pastoral leases recently placed under the Department's

management as part of the 2015 pastoral lease exclusion process, to improve land condition and reduce impacts on threatened plants and animals.

- Continuing trials to integrate the *Eradicat*[®] feral cat bait with fox baiting to develop improved baiting regimes to protect native animals from feral cat and fox predation in different environments.
- Post-fire monitoring and recovery actions (including intensive introduced predator control and translocations) for threatened wildlife on the south coast after bushfires removed up to 90 per cent of the known habitat for several species.
- The *Return to 1616* ecological restoration project at Dirk Hartog Island National Park has eradicated sheep from the island, and it is anticipated that goats and feral cats will be eradicated in the next 12 months. Weed monitoring and control is also underway.
- Enhancing threatened species and communities habitat along a regionally significant corridor in the Perth Hills through a coordinated approach including weed control, revegetation and threatened species surveys in collaboration with Jane Brook Catchment Group and the Shire of Mundaring.
- Continued engagement with non-government organisations, such as WWF Australia and BirdLife Australia to conduct citizen science projects to monitor threatened and priority fauna and increase community awareness of these species.
- Further development of a model to select areas for prescribed burning in important conservation reserves in the Wheatbelt Region, including Tutanning Nature Reserve. The model is currently being adapted for the Tarin Rock Nature Reserve complex to assist the fire planning for these important conservation areas.
- Continuation of the *Tutanning Adaptive Management Project* to maintain at least 90 per cent of the alpha and beta flora diversity of the kwongan by establishing an appropriate fire regime and controlling the encroachment of sheoak.
- Strong engagement with the community, including Aboriginal ranger groups, and collaboration with scientists to survey biodiversity ahead of the cane toad frontline and investigate mechanisms to mitigate their impact on native wildlife.

Operational highlights

Wildlife Management

Good Neighbour Policy

The implementation of the Department's Good Neighbour Policy continued during 2015–16, including weed control, introduced animal control programs and fire management.

In the Kimberley Region, work continued with traditional owners, pastoral lease holders and non-government organisations to implement prescribed burning, feral animal and weed management programs across property boundaries.

A second three-year grant agreement was signed in 2015 with the Australian Wildlife Conservancy under the *Kimberley Science and Conservation Strategy* to enable continuation of the *Ecofire* fire management program as well as for other conservation works and traditional owner engagement.

In the Pilbara Region, a 24km cattle-proof fence was constructed between the Parks and Wildlife-managed former Nanutarra pastoral lease (part of the Cane River conservation reserve complex) and the remainder of the Nanutarra pastoral lease, to prevent cattle from straying on to the conservation area. A joint muster of stray and feral cattle was undertaken in collaboration with the Water Corporation in the catchment of the Harding Dam, near Karratha, which included areas within Millstream Chichester National Park.

Work continued with the Martu Traditional Owners, living in the communities of Parrngur and Punmu in Karlamilyi National Park, in joint management activities including introduced predator and herbivore control and fire and threatened species management in the park and at adjacent high value cultural and conservation sites. The rangers from the Ngurrawaana community adjacent to Millstream Chichester National Park have been engaged in joint management activities in the park including fire, weed and introduced herbivore control.

With funding from a Rio Tinto Iron Ore offsets package and *Pilbara Corridors*, the Pilbara Region conducted a significant number of cross-tenure prescribed burns in and adjacent to Karijini National Park and Millstream Chichester National Park, aimed at creating a patch burn mosaic to reduce large scale, high intensity fires and their associated environmental impacts.

The Exmouth District undertook aerial goat control operations, aerial and ground baiting for introduced predators and weed control operations across Department of Defence tenure neighbouring Cape Range National Park and Ningaloo Marine Park.



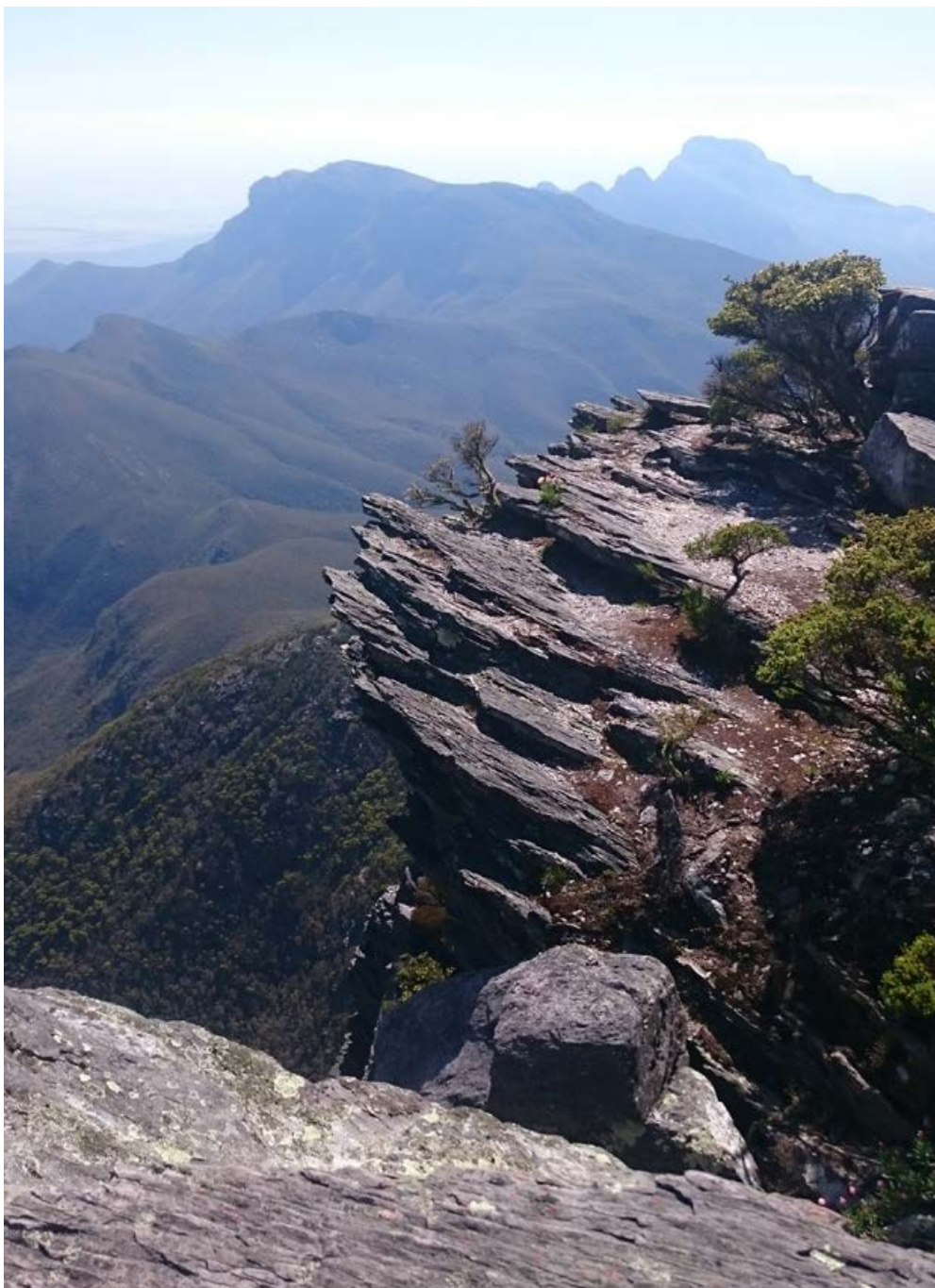
Western Shield coordinator Ashley Millar with aerial baiting contractors.
Photo – Peter Nicholas/Parks and Wildlife

In the Midwest Region, fencing was installed between adjoining properties to prevent cattle straying on to conservation estate in the Murchison rangelands. Seven kilometres of fencing was installed between the Parks and Wildlife-managed former Thundelarra pastoral lease and Oudabanna pastoral lease and 12km of fencing between the former Dalgara pastoral lease and Meka pastoral lease.

Parks and Wildlife worked with neighbouring stations to muster stock from the Parks and Wildlife-managed areas of Booloogooro, Mooka, Mount Phillip and Wanna former pastoral leases.



Feral goat, Kalbarri National Park.
Photo – David Pearson/Parks and Wildlife



Bluff Knoll, Stirling Range National Park. Photo – Karla Graham/Parks and Wildlife

Recovery and management of threatened species and ecological communities, significant species and ecosystems

Recovery of threatened species

The Threatened Species Scientific Committee's recommendations from 2015 for changes to the State lists of threatened native plants and animals under the WC Act were approved by the Environment Minister and gazetted on 3 November 2015.

The Department participated in a national working group to develop a common assessment method for listing threatened species, with the objective of establishing a single national threatened species list aligning the threatened species lists under the Commonwealth EPBC Act with the State lists under the WC Act. The Environment Minister signed a Memorandum of Understanding with the Federal Minister for the Environment agreeing to implement the common assessment method. As at 30 June 2016, the MOU had also been signed by the Northern Territory, Australian Capital Territory and Tasmania.

The common assessment method is based on the International Union for Conservation of Nature Red List categories and criteria, with assessments being undertaken at the national scale. These categories and criteria are already applied in WA so the common assessment method will reflect current practice in this State. The Department continued to be represented on a working group to develop policies and guidelines for the implementation of the common assessment method. Progress was also made in commencing the transition of legacy species (species currently misaligned between the national and WA lists) on to the single national list.

The Department finalised two corporate policies: *Conserving Threatened Species and Ecological Communities* and *Management of Wildlife Utilisation* to replace outdated documents, and supporting guidelines for *Listing and Recovery of Threatened Species and Ecological Communities* and *Recovery of Threatened Species Through Translocation and Captive Breeding or Propagation*.

Operational highlights

Wildlife Management

Native plants

The format of the State list of extant threatened flora was changed to align with the Federal EPBC Act threatened species lists and now contains four schedules: critically endangered, endangered, vulnerable and presumed extinct species. Five flora species were added to the list: *Grevillea thelemanniana* subsp. *thelemanniana* and *Stylidium coroniforme* subsp. *amblyphyllum* as critically endangered, *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) as endangered, and *Hypocalymma* sp. Cascade (R. Bruhn 20896) and *Tetratheca spenceri* as vulnerable. Two species were removed from the list, *Lepidium catapycnon* and *Myoporum turbinatum*, and added to the priority flora list. *Typhonium* sp. Kununurra was upgraded from vulnerable to endangered. Five nomenclature changes were also endorsed.

A further 93 taxa were added to the Department's priority flora list, and 29 taxa were deleted from the list after survey and taxonomic review demonstrated their adequate conservation status.

At 30 June 2016, there were 425 extant threatened flora species listed (164 critically endangered, 123 endangered and 138 vulnerable), with 15 listed as presumed to be extinct, and 3014 taxa listed on the Department's priority flora list.

During 2015–16, 381 new records were added to the Threatened and Priority Flora database, of which 116 were records of new populations.

Recovery actions were implemented for a suite of threatened flora. Highlights included:

- A total of 223 species of threatened and priority flora comprising 357 populations were surveyed or monitored and 23 new populations of threatened flora and 82 new populations of priority flora were located. Of particular note was the discovery of new populations of the critically endangered *Latrobea colophona* and *Grevillea brachystylis* subsp. *grandis* and three new populations of the endangered *Androcalva perlaria*.
 - Volunteers from the Department and the Western Australian Native Orchid Study and Conservation Group collaborated on the *Adopt an Orchid* project to survey and monitor 30 threatened and priority orchid species, with 96 populations monitored and 13 new populations discovered. Volunteers in the Swan and Warren regions and Albany and Geraldton districts assisted in conducting surveys for many threatened flora species. A volunteer in the Warren Region relocated the Kulikup population of *Grevillea acropogon*, which has enabled recovery actions to be implemented.
 - Phosphite applications were carried out to control *Phytophthora* dieback, targeting 18 threatened flora taxa including 12 critically endangered taxa in Stirling Range National Park and the Albany coastal area and populations of *Lambertia echinata* subsp. *echinata* in Cape Le Grand National Park near Esperance.
- A study investigating the effects of long-term phosphite application on health and survival of susceptible species was extended to *Daviesia glossosema* and *Andersonia pinaster* habitat.
- Aerial canker monitoring continued for Albany banksia (*Banksia verticillata*) and round-leaf honeysuckle (*Lambertia orbifolia*) populations as part of a larger south coast aerial canker research project.
 - Fencing to protect plants from grazing and trampling was constructed for eight threatened flora species, including the critically endangered *Andersonia annelsii*, *Darwinia collina*, *Grevillea bracteosa* subsp. *howatharra*, *Eucalyptus cuprea*, *Leucopogon colophona* and *Leucopogon gnaphalioides*, the endangered *Reedia spathacea* and the vulnerable *Gastrolobium graniticum*. Fencing was repaired after a bushfire at a critically endangered *Hemigenia ramosissima* translocation site in the Wheatbelt Region, enabling previously heavily grazed plants to regrow and set seed. Monitoring of fenced areas on Bluff Knoll showed significant increases in plant growth and reproduction for critically endangered *Darwinia collina*, *Leucopogon colophona* and *Leucopogon gnaphalioides*.
 - Infra-red motion sensing cameras used in the Albany District identified kangaroos as the cause of grazing damage to critically endangered *Calectasia cyanea*

and endangered *Androcalva perlaria*, and quokkas (*Setonix brachyurus*) as grazers of the critically endangered *Andersonia axilliflora* and *Darwinia collina*. Seeds of four species of conservation significance were also detected in quokka scats, including two threatened flora (*Darwinia collina* and *Leucopogon gnaphalioides*).

- New Holland honeyeater (*Phylidonyris novaehollandiae*) and honey possum (*Tarsipes rostratus*) were documented as pollinators for the critically endangered *Banksia anatona* and the translocated *Banksia montana*.
- Staff from the Department's Warren Region were involved in an externally funded project carried out by the Walpole-Nornalup National Parks Association to rehabilitate damaged peat within a population of the endangered *Reedia spathacea*. This project has been accepted for presentation at the 2016 International Peat Congress.
- Rabbit control was undertaken to protect many threatened flora species, including the critically endangered *Adenanthos pungens* subsp. *effusus*, *Banksia ionthocarpa* subsp. *chrysophoenix* and *Conostylis setigera* subsp. *dasy*. Rabbit control included the fumigation of rabbit warrens and baiting of threatened flora habitat.

- Goat control was undertaken in Watheroo, Lesueur and Pinjarrega national parks, reducing grazing and providing habitat protection for species of threatened and priority flora as well as occurrences of the bentonite lakes threatened ecological community.
- Weed control was undertaken to protect a number of threatened flora species, including *Androcalva perlaria*, *Banksia oligantha*, *Calectasia cyanea*, *Diplolaena andrewsii*, *Eucalyptus cuprea*, *Grevillea bracteosa* subsp. *howatharra*, *Gyrostemon reticulatus* and *Schoenia filifolia* subsp. *subulifolia*.
- Recruitment burns were carried out to stimulate new growth of populations of the critically endangered *Acacia cochlocarpa* subsp. *cochlocarpa* and *Stylidium wilroyense*, the endangered *Grevillea involucrata* and the vulnerable *Verticordia fimbriolepis* subsp. *fimbriolepis*. Two populations of *Gastrolobium graniticum*, which were burnt in April 2015 to encourage germination, have responded well to the burn, with more than 600 plants counted at one population, and thousands at the other population. A prescribed burn in the Midwest Region in June 2015 to investigate the response of a translocated population of *Acacia cochlocarpa* subsp. *cochlocarpa* to fire resulted in more than 750 seedlings by April 2016.
- Post-fire monitoring was carried out for 21 threatened flora species: *Acacia cochlocarpa* subsp. *cochlocarpa*, *Acacia insolita* subsp. *recurva*, *Banksia verticillata*, *Boronia capitata* subsp. *capitata*, *Brachyscias verecundus*, *Caladenia christineae*, *Caladenia dorrienii*, *Caladenia graniticola*, *Caladenia harringtoniae*, *Caladenia winfieldii*, *Calectasia pignattiana*, *Diuris drummondii*, *Daviesia microcarpa*, *Diplolaena andrewsii*, *Eremophila lucida*, *Guichenotia seorsiflora*, *Kennedia glabrata*, *Lambertia echinata* subsp. *echinata*, *Reedia spathacea*, *Rhacocarpus rehmannianus* var. *webbianus*, *Stylidium amabile*, *Stylidium applanatum* and *Verticordia fimbriolepis* subsp. *fimbriolepis*.
- Infill planting at four translocation sites previously established for four critically endangered taxa was undertaken. Additionally, 61 established plant translocation sites containing 40 taxa were monitored.
- Environmental impact assessment advice was provided for 100 projects with the potential to affect threatened or priority flora across WA.



Wildflowers at Mt Lesueur, Lesueur National Park. Photo – Bert and Babs Wells/Parks and Wildlife

Operational highlights

Wildlife Management

Threatened Flora Seed Centre

The Department's Threatened Flora Seed Centre is an active member of the Australian Seed Bank Partnership, a national network of conservation seed banks working towards conserving Australia's plant species and building and sharing knowledge to support restoration.

During the past year, 278 seed collections representing 137 species were banked at the seed centre. Of these collections, 130 were from conservation-listed flora, with 90 of these from critically endangered, endangered or vulnerable taxa (declared rare flora). Fifteen collections (13 taxa) were made under the Millennium Seed Bank fieldwork fund and 11 collections made for the *Global Trees Project*, with funding obtained through the Australian Seed Bank Partnership from the Garfield Weston Foundation, in collaboration with the Royal Botanic Gardens, Kew. Four collections were made through funding from Main Roads WA, while Departmental flora conservation officers were responsible for making 48 collections. Seven collections (five critically endangered taxa) were made for translocations.

Assistance continued to be provided to the Swan Region's *Banksia Woodland Restoration Project* for processing, germinating and researching seed from a range of species for use in direct seeding. All remaining seed not used in restoration has now been

banked. The *Banksia Woodland Restoration Project* established a major seed resource for restoring banksia woodland on the Swan Coastal Plain. Collections of 163 species have been stored at the Threatened Flora Seed Centre. Many of these collections have been sent to nurseries or used in direct seeding for the project, or have been provided to other restoration projects or community groups.

Native animals

An extensive review was conducted of the WC Act specially protected (threatened) fauna lists to align with the Federal EPBC Act threatened fauna list and assess the recommendations of the recently published national *Action Plan for Australian Mammals 2012*. The list now contains seven schedules: critically endangered; endangered; vulnerable; presumed extinct; migratory birds protected under international agreements; conservation dependent fauna; and other specially protected fauna.

At 30 June 2016, there were 245 extant threatened fauna species (49 critically endangered, 47 endangered and 149 vulnerable), 23 presumed to be extinct, six listed as conservation dependent, seven listed as otherwise specially protected and 103 migratory birds protected under international agreements, with a further 203 species on the Department's priority fauna list.

Eight species were added to the WC Act list of specially protected (threatened) fauna: little pygmy perch (*Nannoperca pygmaea*) as endangered, and sperm whale (*Physeter macrocephalus*), Australian sea lion (*Neophoca conerea*), sub-Antarctic fur seal (*Arctocephalus tropicalis*), northern brushtail possum (*Trichosurus vulpecula arnhemsis*), Pilbara leaf-nosed bat (*Rhinonictis aurantia* (Pilbara)), ghost bat (*Macroderma gigas*) and flesh-footed shearwater (*Puffinus carneipes*) as vulnerable. Four species were added to the list of presumed extinct fauna: desert bettong (*Bettongia anhydra*), inland boodie (*Bettongia lesueur graii*), rufous hare-wallaby (south-western) (*Lagorchestes hirsutus hirsutus*) and Gould's mouse (*Pseudomys gouldii*).

Ten species were removed from the list of threatened fauna: crest-tailed mulgara (*Dasyercus cristicauda*), golden-backed tree-rat, northern marsupial mole (*Notoryctes caurinus*), southern marsupial mole (*Notoryctes typhlops*), orange leaf-nosed bat (*Rhinonictis aurantia*), Shark Bay boodie (*Bettongia lesueur lesueur*), Barrow Island boodie (*Bettongia lesueur* subsp. (WAM M10733)), greater stick-nest rat (*Leporillus conditor*), humpback whale (*Megaptera novaeangliae*) and red-tailed phascogale (*Phascogale calura*). The latter five of these removed species were considered to be still dependent on conservation programs and added to the list of conservation-dependent fauna.

Six threatened species were moved to a higher threat category (from vulnerable to endangered): sei whale (*Balaenoptera borealis*), fin whale (*Balaenoptera physalus*), black-footed tree-rat (*Mesembriomys gouldii gouldii*), numbat (*Myrmecobius fasciatus*), black-flanked rock-wallaby (*Petrogale lateralis lateralis*) and West Kimberley rock wallaby (*Petrogale lateralis* subsp. (WAM M15135)). One species, western barred bandicoot (*Perameles bougainville bougainville*), was moved to a lower threat category (from endangered to vulnerable). One nomenclature change was also endorsed.

The list of migratory birds protected under an international agreement was reviewed and amended to align with recent changes to the EPBC Act listed migratory birds, resulting in 21 additions, 20 deletions and 16 nomenclature changes.

During 2015–16, 100,203 new records were added to the Threatened and Priority Fauna database and/or the Fauna Survey Returns system, with 11,812 of those for threatened or priority fauna species.



Woylie being released to Perup Sanctuary.
Photo – Peter Nicholas/Parks and Wildlife



Greater stick nest rat. Photo – Kim Branch/
Parks and Wildlife



Pilbara leaf-nosed bat. Photo – Mark Cowan/Parks and Wildlife

In July 2015, the Federal Government announced a new national *Threatened Species Strategy*, which included lists of 20 mammal and 20 bird species for which conservation status is to be improved by 2020. Of the 20 mammals identified, 10 occur in WA, including numbat, mala (*Lagorchestes hirsutus*), bilby (*Macrotis lagotis*), brush-tailed rabbit rat, chuditch (*Dasyurus geoffroyi*), Gilbert's potoroo (*Potorous gilbertii*), western ringtail possum (*Pseudocheirus occidentalis*), black-flanked rock-wallaby (*Petrogale lateralis lateralis*) and woylie (*Bettongia penicillata olgibyi*). Five of the 20 bird species are found in this State, including western ground parrot (*Pezoporus flaviventris*), malleefowl (*Leipoa ocellata*), hooded plover (*Thinornis rubricollis tregellasi*), eastern curlew (*Numenius madagascariensis*) and Australasian bittern (*Botaurus poiciloptilus*). Key action areas identified in the strategy, including tackling feral cats, providing safe haven on islands and in fenced enclosures, improving habitat and emergency intervention to prevent extinction, are also being implemented in WA.

Recovery actions were implemented for many threatened native animal species during the year. Highlights included:

Return to 1616 ecological restoration project at Dirk Hartog Island National Park

This project is supporting the progressive removal of pest animals including goats, sheep and feral cats and invasive plant species before reintroducing native animals. The ambitious and groundbreaking project to restore Dirk Hartog Island to its former state is supported by \$11.54 million from the Gorgon Barrow Island Net Conservation Benefits (NCB) program.

During 2015–16, cat eradication efforts via aerial baiting and trapping focused north of a cat proof fence installed early in the project to facilitate staged eradication work. In July, a team of detector dogs and their handlers were employed, and monitoring has shown that no cats remain south of the fence and few, if any, remain north of the fence. Monitoring will continue for a further two years before eradication is confirmed.

Since 2010, the Department has conducted 16 aerial shooting and monitoring programs on the island to remove goats and sheep. During 2015–16, five goats were removed from the island leaving 14 radio collared 'Judas' goats to attract and reveal remaining goats. No new goats or sheep have been detected.

Other activities include weed monitoring and control and vegetation monitoring using remote sensing to identify changes in vegetation cover change since destocking began. Results suggest that by 2016, 35 per cent of Dirk Hartog Island experienced a significant increase in vegetation cover, an increase from 28 per cent in 2015. Community engagement activities to raise awareness and foster support for the project included a community open day held in partnership with the Yadgalah Aboriginal Corporation in Denham, attended by about 100 people.

Surveys of three threatened bird subspecies endemic to Dirk Hartog Island: rufous fieldwren (*Calamanthus campestris hartogi*), southern emu-wren (*Stipiturus malachurus hartogi*), white-winged fairy-wren (black and white subspecies) (*Malurus leucopterus leucopterus*) and one threatened reptile, the western spiny-tailed skink (*Egernia stokesii badia*), continued during 2015–16. Planning has started for the second stage of the ecological restoration project, which will involve the translocation of 12 mammal species that once occurred on the island, or are being introduced for conservation reasons.

Operational highlights

Wildlife Management

Decision support system for island biosecurity

The NCB-funded project to develop a tool for prioritising and implementing biosecurity actions on Pilbara islands has developed a database containing information on the biophysical attributes, biodiversity values, levels of use and threats on more than 600 islands. Pilbara island habitat maps are being developed, biosecurity risks are being calculated for each island and estimates of implementation costs are being determined. The model to assist decision-making has been developed by James Cook University (JCU) researchers and a prototype is being tested and refined. Ultimately, it will be used to identify the most cost-effective biosecurity actions for high priority islands. Once released publicly, the model can be used for other island groups or mainland areas to help prioritise management actions.

Operation Rangelands Restoration

The *Operation Rangelands Restoration* project continued at Matuwa (Lorna Glen), as part of an environmental offset funded by the Gorgon Gas Project. Reintroduced populations of greater bilbies (*Macrotis lagotis*) and northern brushtail possums outside the fenced enclosure, and mala, golden bandicoots and boodies inside the fenced enclosure were monitored and all are persisting and breeding well. Baiting for feral cats in 2015 was 60 per cent effective and this allowed a translocation of golden

bandicoots from the enclosure to sandplain habitat outside the enclosure. This is the first time golden bandicoots have been free-ranging in the arid zone for 150 years and initial monitoring indicates that they are persisting and spreading to other suitable habitat. Native title (exclusive possession) was declared over Matuwa and adjacent Karrara Karrara (Earaheedy) properties in 2014 and an Indigenous Protected Area (IPA) agreement and management plan was finalised in 2015 to allow the dedication of the IPA. Martu Traditional Owners and Parks and Wildlife will continue to manage this rangeland property together for conservation and cultural purposes. Martu Rangers have been trained in fauna monitoring.

Threatened mammal recovery

Work to conserve and maximise the genetic diversity of the remaining wild woylie populations was boosted with a translocation from Upper Warren to Dryandra Woodland to increase the size and genetic diversity of the Dryandra population. Fifty woylies from Perup Sanctuary and surrounds were put into the Australian Wildlife Conservancy's Mt Gibson Sanctuary and have survived very well. Integrating feral cat baiting (using *Eradicat*®) into *Western Shield* fox control programs to improve feral cat control has been initiated to protect the two key woylie populations at Dryandra and Upper Warren with funding from the Federal Government.

The third transfer of chuditch to the Flinders Range in South Australia was undertaken in May 2016. A further 15 chuditch were collected from various sites in WA and released at Flinders Range as part of the reintroduction program for this species. More than 100 chuditch have now been provided for this highly successful project. A review of the population trends and conservation status of the chuditch was undertaken and presented to the WA Threatened Species Scientific Committee in June 2016.

Offset funding and corporate sponsorship from Pilbara resources projects was used to progress the implementation of recovery actions for the northern quoll in the Pilbara. These will improve understanding of the ecology, abundance and distribution of this endangered species throughout Pilbara habitat, where it faces threats such as industrial development, pastoralism, altered fire regimes and introduced predators. Elsewhere in Australia, northern quolls are threatened by cane toads, so habitat modelling for northern quolls in the Pilbara has been completed and compared to the likely distribution of cane toads in the next 10–20 years. Standardised monitoring of northern quoll populations across the Pilbara has been undertaken, focusing on Departmental tenure and pastoral land that is historically under-surveyed. A trial was also undertaken to examine if northern quolls were at risk from poisoning following

an aerial application of *Eradicat*® feral cat baits. None of the radio-collared quolls died from toxic bait consumption indicating no adverse effects of the bait; however, 10 per cent were predated by feral cats.

Workshops to set research priorities for the northern quoll and introduced predators in the Pilbara were undertaken with corporate sponsorship from Roy Hill. Both workshops were attended by an audience of key stakeholders who reviewed existing knowledge and set priorities for future works that would inform on-ground landscape-scale management actions.

Offset funding from the Fortescue Metals Group, Roy Hill and Millennium Minerals was used to continue the implementation of recovery actions for the greater bilby in the Pilbara. New techniques to monitor bilbies using scat transects and DNA techniques have been developed and implemented as a standard monitoring tool at several Pilbara sites. Discussions have also started with traditional owner groups in the desert and western Kimberley to use these techniques to monitor bilbies in their traditional lands. Scoping and consultation on the delivery of a similar project for bilby on the Dampier Peninsula was initiated, supported by offset funds from Main Roads WA.

The national recovery team for the greater bilby was revived in 2015, with representation from Parks and Wildlife, to better coordinate bilby recovery programs across Australia. Parks and Wildlife also participated in a three day *Indigenous Bilby Knowledge Festival* run in the remote western desert community of Kiwirrkurra in June 2016. The festival celebrated the cultural significance of the bilby, collated information from Aboriginal ranger groups and provided training on monitoring and threat management.

Ongoing introduced predator (feral cat and fox) control continues to be a focus of the numbat recovery program. Integrating feral cat baiting (using *Eradicat*®) into *Western Shield* fox control programs to improve feral cat control has been initiated for the two wild numbat populations at Dryandra and Upper Warren with financial support from the Federal Government. Engaging neighboring landholders and the local community has also resulted in increased fox and cat control on properties surrounding Dryandra Woodland. Numbats population monitoring continues at Dryandra, Boyagin and Tutanning in WA. The second of two reinforcement releases of numbats to Dryandra Woodland from the Perth Zoo captive breeding program was carried out in late 2015 with high survival rates. The captive breeding colony at Perth Zoo was strengthened genetically by the addition of six new animals from the wild.

With assistance from South Coast NRM, a new population of dibbler (*Parantechinus apicalis*) was established on Gunton Island off the south coast with animals captive bred at Perth Zoo. Monitoring indicated good evidence of persistence and dispersal of animals on the island. Monitoring of the dibbler populations on Boullanger and Whitlock Islands (off Jurien Bay) showed that both have recovered from recent declines.

A small population of black-flanked rock wallabies was rediscovered in Kalbarri National Park, 20 years since they were last sighted. In May 2016, Parks and Wildlife and WWF Australia undertook a translocation of 23 black-flanked rock wallabies from the Wheatbelt to Kalbarri National Park to supplement the population. All translocated rock wallabies are being monitored using radio tracking, with excellent survivorship to date.

Pilbara regional staff and the Kanyirninpa Jukurrpa (KJ) Rangers located previously unrecorded populations of black-flanked rock wallabies in the Little Sandy Desert through camera monitoring and scat surveys. Monitoring of the rock-wallaby population at Kaalpi in 2015 indicated that the source population of the animals translocated to Jilikurru in 2013 is healthy and has recovered to pre-translocation numbers, indicating good levels of recruitment. Appropriate fire management and baiting of introduced predators continues to be implemented in collaboration with KJ to protect these two populations.



A woylie being released at Dryandra Woodland, one of 64 translocated from Parks and Wildlife's Perup Sanctuary. Photo – Astrid Volske/Parks and Wildlife



Bilby receiving a pre-release health check. Photo – Parks and Wildlife



Honey possum. Photo – L Bell

Operational highlights

Wildlife Management

Long-term monitoring by the Exmouth District has identified the expansion of black-flanked rock wallabies into many new gorges and gullies in Cape Range National Park and Learmonth Air Weapons Range, with most groups showing evidence of active breeding. The expansion of populations into new habitat coincides with the success of local introduced predator and herbivore control programs.

In the Perth Hills District, camera and cage monitoring was undertaken to collect genetic material and assess population dynamics of a population of black-flanked rock wallabies, which has declined in recent years in Avon Valley National Park.

In the Esperance District, remote camera monitoring of black-flanked rock wallabies in Cape Le Grand National Park confirmed the persistence of known populations at New Island Bay and Mt Le Grand, and rock wallaby activity was also identified at a third new location.

The Gilbert's potoroo recovery program was greatly impacted by a bushfire in November 2015, which burnt more than 90 per cent of the Gilbert's potoroo habitat in Two Peoples Bay Nature Reserve. Post-fire actions included emergency introduced-predator control and relocating seven of the survivors as it was considered that the remaining habitat had limited capacity to support them. These animals were relocated to Michaelmas

Island near Albany and unburnt habitat at Two People's Bay. Monitoring of the other two populations on Bald Island and within the Waychinicup National Park fenced enclosure continued along with investigations to identify another island location for the species. Community support through the Gilbert's Potoroo Action Group provided funding to Parks and Wildlife for field equipment and post-fire recovery actions.

Western ringtail possums from the upper Warren/Manjimup area were translocated into Perup Sanctuary to augment the previously translocated population sourced from the Busselton area. A citizen science survey of western ringtail possums, the *Ringtail Tally*, was carried out in partnership with the Geographe Catchment Council (GeoCatch), during April and May 2016. A total of 549 sightings of possums were generated by 43 observers across 45 sites.

Research and monitoring was a large focus of the quokka recovery program. A PhD research project on the ecology of quokkas in the southern forest was completed and another on the demographics of the quokkas on Rottneest Island continued. The Northcliffe fire in February 2015 had a severe impact on known quokka subpopulations in this area and surveys and monitoring have been implemented in partnership with WWF Australia, along with additional introduced predator (fox) control.



Perup Sanctuary. Photo – Bron Anderson/Parks and Wildlife



Mainland quokka. Photo – Kimberley Page/Parks and Wildlife



Searching for signs of western ground parrots in Nuytsland Nature Reserve. Photo – Sarah Comer/Parks and Wildlife



Western ground parrot being measured. Photo – Alan Danks/Parks and Wildlife

Of the 125 sites surveyed to determine the presence of quokkas post-fire, 28 were known to have quokkas prior to the fire and only 10 sites retained quokkas post-fire, most within 1km of the fire edge. Parks and Wildlife hosted a representative from San Diego Zoo Global, which expressed interest in contributing to the project.

The Forest Products Commission has instigated a fauna monitoring program prior to harvest in karri coupes which will provide further information on quokkas and allow targeted control of pest species (feral pigs, foxes and feral cats).

With funding from the Great Victoria Desert Biodiversity Trust, a research plan and survey design guidelines were developed for the threatened sandhill dunnart (*Sminthopsis psammophila*). This information will be used to guide the investment of funds in subsequent projects that aim to quantify the distribution and abundance of the species within the western parts of the Great Victoria Desert.

The Shark Bay Marsupial Recovery Team oversees the recovery programs for western barred bandicoot (*Perameles bougainville bougainville*), Shark Bay burrowing bettong or boodie, Barrow Island burrowing bettong, banded hare-wallaby (*Lagostrophus fasciatus fasciatus*), Shark Bay rufous hare-wallaby (*Lagorchestes hirsutus bernieri*), Tanami rufous hare-wallaby (*Lagorchestes hirsutus* subsp. (NTM 2430)), Shark Bay mouse

(*Pseudomys fieldi*) and greater stick-nest rat, wopilkara. The focus of the recovery program remains on monitoring and translocations to introduced predator-free sites. These species have all demonstrated a lack of ability to persist in the presence of any introduced predators so their recovery remains limited to island and fenced locations. Both subspecies of boodies and the greater stick nest rat were downgraded to Conservation Dependent under the WC Act in 2015–16, as they no longer met the criteria for threatened but require ongoing management and monitoring given their proven susceptibility to introduced predators.

Threatened bird recovery

The South Coast Threatened Birds Recovery Team incorporates recovery actions for five threatened south coast birds: western ground parrot, western bristlebird (*Dasyornis longirostris*), noisy scrub-bird (*Atrichornis clamosus*), western whipbird (western heath) (*Psophodes nigrogularis nigrogularis*), western whipbird (western mallee) (*Psophodes nigrogularis oberon*), and one presumed extinct species, rufous bristlebird (western) (*Dasyornis broadbenti litoralis*). Ongoing recovery actions focused on addressing the impacts of introduced predators, particularly feral cats, with *Eradicat*[®] baiting completed over 521,000ha in collaboration with *Western Shield* at Cape Arid and Fitzgerald River national parks and Two Peoples Bay and Mount Manypeaks nature reserves.

Survey and monitoring protocols continue to be developed and surveys undertaken for western ground parrots, noisy scrub-birds and western bristlebirds.

In late 2015, bushfires impacted on approximately 90 per cent of known western ground parrot habitat. Post-fire recovery actions included emergency introduced predator control and surveys to locate dispersed birds, involving substantial volunteer participation and community support via the Friends of the Western Ground Parrot Inc. A workshop was convened in March 2016 by Parks and Wildlife and the recovery team, and facilitated by the International Union for Conservation of Nature Species Survival Commission, inviting about 40 experts from around Australia and New Zealand to discuss future management options for the western ground parrot. Five western ground parrots continue to be housed at the Perth Zoo providing information about husbandry, behaviour and breeding.

Operational highlights

Wildlife Management

The restoration of Carnaby's cockatoo (*Calyptorhynchus latirostris*) habitat continued through the efforts of Parks and Wildlife, WWF Australia, BirdLife WA and regional natural resource management groups. The *Banksia Woodland Restoration Project* established 50ha of banksia woodland through topsoil transfer, planting and direct seeding to provide new Carnaby's feeding habitat. Further protection of habitat also occurred with three new land parcels totalling 262.25ha purchased in the south-west through offset funding. The draft *Green Growth Plan* proposes a suite of land purchases, targeting Carnaby's cockatoo breeding, feeding and roosting habitat. Long-term monitoring at Carnaby's cockatoo breeding sites resulted in a record 87 new chicks banded. Specifically designed artificial breeding hollows have proven to be extremely effective in improving breeding success, and an additional 101 artificial hollows are being erected in a joint project between Parks and Wildlife and BirdLife WA, with funding from offsets and a State NRM community grant. A target has been set to achieve 500 artificial hollows throughout Carnaby's cockatoo breeding habitat.

The eighth Great Cocky Count was coordinated by BirdLife WA and undertaken by volunteers in April 2016, with financial and in-kind support from Parks and Wildlife. The Great Cocky Count expanded to collect sightings, roost and flock information for all three black cockatoo species across the greater south-west. A population viability

analysis for Carnaby's cockatoo has been carried out to assist in the assessment of the impacts on the species. This analysis identifies adult survival and breeding success as important factors influencing population persistence.

Recovery actions for the forest black cockatoos (Baudin's cockatoo *Calyptorhynchus baudinii* and forest red-tailed black cockatoo *Calyptorhynchus banksii naso*) included research projects with Murdoch University to track rehabilitated black cockatoos, and with The University of Western Australia to investigate habitat requirements. An important forest black cockatoo breeding area (Myara site) was identified as a Fauna Habitat Zone under the *Forest Management Plan 2014–2023* and Alcoa of Australia has agreed to exclude the site from mining. Parks and Wildlife and the Department of Agriculture and Food continued the three-year trial to demonstrate a business case for netting orchards, with positive findings in relation to protection from bird damage (particularly Baudin's cockatoo), hail damage and heat stress, and reduced water use and sunburn.

Under the *Black Cockatoo Rehabilitation Program*, a joint initiative between Parks and Wildlife and Perth Zoo, 229 sick and injured wild black cockatoos were assessed and treated. Of these, 132 were assessed as suitable for rehabilitation and subsequent release back into the wild.



Carnaby's cockatoos. Photo – Rick Dawson/Parks and Wildlife



Forest red-tailed black cockatoos. Photo – Barbara Knot



Hooded plover chick. Photo – Christine Fleay



Western swamp tortoise. Photo – Bert and Babs Wells/Parks and Wildlife

Parks and Wildlife was commissioned by the Great Victoria Desert Biodiversity Trust to collate malleefowl records within the region, resulting in the creation of an active database specifically for malleefowl records. The Department, along with community groups and mining companies, continues to contribute to the National Malleefowl Monitoring Program Database by surveying long-term monitoring sites, and has been involved in a national adaptive monitoring project led by Melbourne University titled *Applying Adaptive Management Principles to Malleefowl Conservation*. Parks and Wildlife is a representative on the National Malleefowl Recovery Team.

A new and significant breeding site for fairy terns (*Sterna nereis nereis*) in the Bunbury area was identified and monitored by Parks and Wildlife, with 140 adult birds recorded. The Moora District supported the *South West Fairy Tern Conservation Strategy*, which is a citizen science project initiated by the Conservation Council of WA engaging the community to gather information on local breeding colonies of fairy terns in the Northern Agricultural Region. Community workshops and field days identified key locations and threats which will inform conservation and management of the species.

Parks and Wildlife staff and many local volunteers monitored hooded plover populations throughout the 2015–16 breeding season along the Leeuwin-Naturaliste National

Park and Ngari Capes Marine Park coastline. Activities included surveying for birds and protecting nests via installation of temporary fencing and signs, resulting in the most successful breeding season recorded to date, with the most juveniles (19) and a further 30 adults recorded for the Leeuwin-Naturaliste population during the BirdLife Australia annual census in February.

Threatened reptile recovery

Western swamp tortoise (*Pseudemydura umbrina*) monitoring continued at Ellen Brook, Twin Swamps, Mogumber and Moore River nature reserves. Six hatchlings and four juveniles that had not been seen previously were captured in 2015 at Ellenbrook Nature Reserve, which demonstrates ongoing strong recruitment. Twenty tortoises bred in partnership with Perth Zoo were released into Twin Swamps Nature Reserve. Planning for a trial translocation in the South West and Warren regions, outside of the tortoises' known historic range, progressed and is scheduled for winter 2016.

Work continued on a Western Australian Marine Science Institution project in the Kimberley to map the distribution and abundance of nesting marine turtles, understand climate change impacts to turtle nesting, determine genetic stock units and incorporate traditional Aboriginal knowledge. This project is led by Parks and Wildlife and is being undertaken by a consortium of researchers and Aboriginal groups.

Operational highlights

Wildlife Management

In the Kimberley, flatback turtle (*Natator depressus*) nest monitoring continued at Eighty Mile Beach Marine Park in partnership with traditional owners, pastoralists and volunteers. Flatback turtle populations were also monitored at Cape Domett to determine population viability in conjunction with Miriuwung-Gajerrong and Balanggarra traditional owners.

At Dirk Hartog Island National Park, ongoing monitoring of nesting loggerhead turtles (*Caretta caretta*) continued, assisted by a remote camera system. The extended monitoring period showed that Dirk Hartog Island supports one of the world's largest nesting loggerhead turtle populations.

Parks and Wildlife and Cape Conservation Group delivered the 14th season of the *Ningaloo Turtle Program*, with additional funding support from Woodside and BHP Billiton. Forty-nine volunteers contributed 2937 hours identifying nests using a track count method along key Ningaloo coast beaches. During 2015–16, 1357 nests were identified, with 56 per cent of nests from green (*Chelonia mydas*), 38 per cent from loggerhead and five per cent from hawksbill turtles (*Eretmochelys imbricata*). Less than one per cent of nests were recorded as disturbed. While a lower-than-average nesting season was recorded, a three-yearly trend analysis showed predicted annual nesting abundance levels remain stable, with no significant trends detected.

The Dampier Archipelago supports the largest hawksbill turtle rookery in the Indo-Pacific and one of the biggest in the world. Turtle monitoring on Rosemary Island, which lies within the archipelago, focuses primarily on hawksbill turtles and continues to add to knowledge of spatial trends, turtle mortality and growth rates. Rosemary Island has been a focus for hawksbill turtle tagging and monitoring research since the mid-1980s, with the assistance of many volunteers.

The *West Pilbara Turtle Program*, funded by Rio Tinto, is a cooperatively managed, community-based program that monitors flatback turtles at Wickham beaches. Volunteers from Karratha and Wickham monitored nesting, hatching and nest interference by predators and humans. Volunteer numbers continued to increase, reflecting the value of this program to the local community.

Monitoring of the flatback turtle rookery on Mundabullangana Station in the Pilbara to determine the impacts of predation by feral cats and foxes continued. Physical and remote camera monitoring was undertaken from egg laying until after hatching. The predation rate was 26 per cent, with foxes being the primary predator of turtle nests with a preference for preying on late-term nests. Parks and Wildlife is collaborating with a PhD student from Murdoch University to conduct further research into fox abundance, home range in coastal arid regions, landscape use and response to mitigation measures.



Loggerhead turtle, Dirk Hartog Island National Park. Photo – Parks and Wildlife



Ningaloo Turtle Program volunteers. Photo – Parks and Wildlife



Loggerhead turtle hatchlings, Dirk Hartog Island National Park. Photo – Parks and Wildlife



Euros on Barrow Island. Photo – Misty Shipway/Parks and Wildlife



Australian sea lions on Beagle Island. Photo – Parks and Wildlife

At Barrow Island Nature Reserve, monitoring of local marine turtle populations continued. Adult male and female and juvenile green turtles and adult flatback turtles were tagged, mostly while basking on the extensive intertidal flats on the east and southern coasts. Regular re-sights of tagged green turtles throughout the year suggest a local resident population.

At Locker Island Nature Reserve near Onslow, eight flatback turtles were tagged with satellite tags in November 2015. Results to date indicate that most of the females remain in nearshore Pilbara waters throughout the year.

Aquatic and invertebrate species recovery

With funding assistance from South West Catchments Council, Parks and Wildlife undertook surveys at 57 sites containing white-bellied (*Geocrinia alba*) and orange-bellied frogs (*Geocrinia vitellina*). The captive rearing program at Perth Zoo continues to be successful, with a total of 100 captive-reared white-bellied frogs released at two sites in Witchcliffe forest to augment the existing populations, while 113 captive-reared orange-bellied frogs were released at two sites – one new site and one augmentation of an existing population in tributaries along the Blackwood River. Monitoring at a previous translocation site for white-bellied frogs indicates that the population is relatively stable and monitoring at a previous translocation site for orange-bellied frogs indicates the population is experiencing

natural recruitment. Field investigations located 15 potential future release sites for orange-bellied frogs, and these sites are being assessed to determine their suitability.

Following negotiation on access, monitoring was undertaken at sites known to contain white-bellied frogs on a large property in the Forest Grove area. Five previously known sites were monitored and surveys for new occurrences in two creek systems completed. Frogs were detected at three of the historic sites, including one site with more than 50 individuals, representing a significant population for the species.

Recovery actions for the hairy marron (*Cherax tenuimanus*) continued, with trapping efforts removing 2500 competing smooth marron (*Cherax cainii*) from three pools where hairy marron are present. The captive breeding program for hairy marron continues, with the captive population remaining stable at more than 400 individuals. A recovery plan for the species has been drafted by the Hairy Marron Recovery Team.

Operational highlights

Wildlife Management

A recent research project titled *Conserving Freshwater Fish in South West Western Australia* identified that water points constructed for firefighting may play an important role as summer refuges for aquatic fauna. As part of an *Enhanced Prescribed Burning Project*, the Warren Region is improving the capacity of and access to water points constructed in key strategic locations, to assist with management of prescribed fire. Prior to any alterations to the water points, the Murdoch University Freshwater Fish Group was engaged to assess the water points for aquatic fauna and determine water point attributes including size, depth, shade and water quality that made them suitable refuge sites for aquatic fauna. Balston's pygmy perch (*Nannatherina blastoni*), listed as vulnerable under the Federal EPBC Act, was present in one water point and plans are in place to cater for the population during renovation of the site.

The conservation of the critically endangered arid bronze azure butterfly (*Ogyris subterrestris petrina*) has been assisted through a negotiated outcome with the Shire of Mukinbudin and Main Roads WA to realign the road bisecting Barbalin Nature Reserve in the Wheatbelt, which is the only known habitat for this species. The old road has been rehabilitated, facilitating natural dispersal of the butterfly to the adjacent Wundowlin Nature Reserve.

The South Coast Threatened Invertebrates Recovery Team has drafted a recovery plan outlining recovery actions for numerous invertebrate species including threatened millipedes, trapdoor, cave and assassin spiders, snails and bees. A recent taxonomic review has had implications for several threatened spiders, including the formal naming of the threatened Stirling Range pygmy trapdoor spider, renaming of the threatened tingle trapdoor spider and the identification and naming of five new trapdoor spider species. The conservation status of the five new species is under consideration.

In October 2015, the inaugural meeting of the Wheatbelt Trapdoor Spider Conservation Group took place. Parks and Wildlife and the WA Museum are collaborating to address the increasing levels of local extinction of trapdoor spiders in the south-west and, in particular, the Wheatbelt.

Native animal translocations were undertaken for 11 species during 2015–16 (Table 6).

Table 6: Native animal translocations undertaken as part of the implementation of recovery and interim recovery plans and other conservation initiatives in 2015–16

Species	Translocated from	Translocated to
Chuditch (<i>Dasyurus geoffroii</i>)	Lake Magenta, Dryandra, Ravensthorpe	Flinders Range, South Australia
Dibbler (<i>Parantechinus apicalis</i>)	Perth Zoo	Gunton Island
Numbat (<i>Myrmecobius fasciatus</i>)	Perth Zoo	Dryandra Woodland
Numbat (<i>Myrmecobius fasciatus</i>)	Scotia Sanctuary	Mt Gibson Sanctuary
Orange-bellied frog (<i>Geocrinia vitellina</i>)	Perth Zoo	Blackwood River area
Western ground parrot (<i>Pezoporus flaviventris</i>)	Cape Arid	Perth Zoo
Western swamp tortoises (<i>Pseudemydura umbrina</i>)	Perth Zoo	Twin Swamps Nature Reserve
White-bellied frog (<i>Geocrinia alba</i>)	Perth Zoo	Witchcliffe forest
Woylie (<i>Bettongia penicillata ogilbyi</i>)	Perup Sanctuary	Mt Gibson, Karakamia, Dryandra
Woylie (<i>Bettongia penicillata ogilbyi</i>)	Kanyana	Perup Sanctuary
Gilbert's potoroo (<i>Potorus gilbertii</i>)	Two Peoples Bay Nature Reserve	Michaelmas Island
Golden bandicoots (<i>Isodon auratus</i>)	Matawa fenced enclosure	Matawa outside fence
Black-flanked rock wallabies (<i>Petrogale lateralis lateralis</i>)	Wheatbelt	Kalbarri National Park



Bee on triggerplant. Photo – Bron Anderson/Parks and Wildlife



A golden bandicoot is released at Matawa (Lorna Glen) as part of the Operation Rangelands Restoration project. Photo – Jennifer Eliot/Parks and Wildlife



Blue swimmer crab in the Swan Canning Riverpark. Photo – Mark Kleczkowski



Conservation officer Abby Thomas with one of 29 dabbler chicks released on Gunton Island off WA's south coast. Photo – Parks and Wildlife

Operational highlights

Wildlife Management

Recovery of threatened ecological communities

The Threatened Ecological Communities Scientific Committee met twice during the year and considered 47 nominations for changes to the lists of threatened ecological communities (TECs) and priority ecological communities (PECs). At 30 June 2016, there were 66 extant TECs, three listed as 'totally destroyed' and 388 PECs listed by the Department.

A total of 87,549 occurrences of TECs or PECs were added to the Department's Threatened and Priority Ecological Community database. New occurrence information was added or boundary mapping revised for eight TECs and 21 PECs, assisting in resolving their status and providing improved information for land-use planning. This included 212 occurrences of 12 PECs in the Kimberley Region, 55 occurrences of a PEC in the Midwest Region and 87,224 occurrences of the 'Eucalypt woodlands of the Western Australian wheatbelt' PEC, which is listed as a TEC under the Federal EPBC Act.

Site visits were made to 118 occurrences of TECs and PECs and data was collected about habitat, composition, condition and threats leading to the development or improvement of recommended recovery actions.

Environmental impact assessment advice was provided for 110 projects, with the potential to affect TECs or PECs across WA.

In December 2015 the Commonwealth proclaimed the 'Eucalypt woodlands of the Western Australian wheatbelt' as a TEC (Critically Endangered). The vast majority of this TEC occurs in the Avon Wheatbelt 1 & 2 IBRA subregions, with smaller portions extending into the western mallee and edges of the jarrah forest. Boundaries of areas likely to contain the TEC were added to the TEC database.

Work in the East Kimberley District focused on the management of the 'Organic mound spring sedgeland community of the North Kimberley Bioregion' and 'Black Spring organic mound spring community' TECs. All occurrences of these springs were surveyed, fencing requirements determined and photo monitoring sites were installed. A rapid assessment of representative springs was completed to document the biological values of the springs including aquatic invertebrates, aquatic and wetland vegetation, and water chemistry. A detailed biological survey was completed at one spring including a flora and fauna survey, and permanent vegetation quadrats were established at four springs. Work in the east Kimberley also included wet season control of the weed grader grass (*Themeda quadrivalvis*) by Aboriginal rangers.

In West Kimberley District, a detailed scope of works was developed for the Roebuck Bay mudflats TEC. Weed control was continued by traditional owners in the monsoon vine thicket TEC, and five new occurrences of the TEC were confirmed and added to the TEC database. Detailed biological surveys were completed in the Walcott Inlet rainforest swamps TEC, including a fauna survey and establishment of three permanent quadrats. A detailed survey was completed in the Mandora Mound springs TEC and Salt Creek PEC, including hydrological and peat studies, aquatic invertebrate surveys, comprehensive flora lists and establishment of flora quadrats. The West Kimberley Threatened Flora and Communities Recovery Team was established and the inaugural meeting was held in February 2016.

In the Pilbara Region, surveys were undertaken for 'Coastal dune native tussock grassland dominated by *Whiteochloa airoides*' occurrences and adjacent '*Triodia angusta* dominated creekline vegetation' PECs on Barrow Island. The development of a research, monitoring and rehabilitation program was facilitated for the *Themeda* grasslands TEC as a requirement prior to disturbance of the TEC. The broad-scale program to reduce the impact of donkeys, horses and camels on the Fortescue Marsh PEC was continued and was complemented by a collaborative partnership in which populations of the weed *Parkinsonia aculeata*

were treated upstream of Fortescue Marsh. Cattle were removed from the Coolibah-lignum flats PEC on Coondewanna Flats PEC to reduce grazing impacts.

In the Midwest Region, goat control was completed at Watheroo and Lesueur national parks and Pinjarrega Nature Reserve to reduce grazing and provide habitat protection for the bentonite lakes TEC. Reserve inspections were completed to assess management effectiveness for four TECs and three PECs in nature reserves and national parks. A property adjoining Lesueur National Park containing a critically endangered TEC and three PECs was incorporated into the conservation reserve system, providing extra protection for these communities.

In the Swan Region, operational works to map and control weeds, map dieback and introduce hygiene conditions, establish and repair fences and gates, upgrade and install reserve signage and an information shelter, remove rubbish and revegetate degraded areas were undertaken in 21 reserves to benefit 15 TEC and four PEC occurrences. For example, in the Brixton Street wetlands that contain claypan and marri woodland TECs, woody weeds were mapped and controlled, fences and signage were repaired, a new information shelter was installed, rubbish was removed, rehabilitation areas planted, research plots established and volunteer work facilitated. Rabbit proof fencing was repaired and weeds controlled in

a Forrestfield reserve as part of revegetation of a banksia woodland TEC. Fencing was maintained, drainage remediation works completed, and grass and broad-leaf weeds were controlled in Drummond Nature Reserve to protect an EPBC listed TEC and a claypan PEC. Control of perennial grasses and woody weeds was completed in Talbot Road Bushland to protect banksia and marri woodland TECs. Assessment of the effectiveness of up to 10 years of management in two woodland TECs and two claypan TECs was assessed, indicating *Watsonia* sp. weed control has been very effective and the invaded floristic communities are recovering.

In the Wheatbelt Region, vegetation monitoring, pest and native animal surveys, rabbit control and culling of kangaroos was undertaken at Toolibin Lake. Infill planting on land purchased by the Department (Miller's Reserve) continued as well as planting on a private property located upslope of Toolibin Lake. Groundwater monitoring and management continued (see page 90 for further details). Interpretive walk trail panels about the TEC and recovery actions were upgraded and refurbished. At the Lake Bryde TEC, vegetation condition was monitored, rabbit control undertaken, and a review of groundwater monitoring completed. Fire interval studies were continued in the Wongan Hills PEC to assist development of appropriate fire regimes.

In the South West Region, weed control was completed in the Busselton ironstone TEC. A large herbivore exclusion fence was completed around an important occurrence of this TEC to protect the suite of component rare flora from excessive herbivore grazing and pig damage. More than 1000 seedlings were planted at two occurrences of the ironstone TEC to progress rehabilitation. Floristic surveys were completed in claypan TECs at Manea Park and a strategic survey of the Leeuwin Block granites including PECs was commenced.

In the Warren Region, dieback surveys were undertaken within the Mt Lindesay – Little Lindesay TEC and Phytofighter footbaths were installed to help protect the TEC and component threatened flora from dieback disease. A new occurrence of 'Coastal *Melaleuca incana* / *Taxandria juniperina* shrubland closed forest' (South Coast) PEC was recorded and boundaries mapped. Post-fire monitoring was completed and fencing installed around the *Reedia spathacea* swamps PEC. The Ridge Road quartzite PEC was surveyed and boundaries mapped.

In the South Coast Region, the coastal saltmarsh TEC around Alexander Bay/River was surveyed, and the Russel Range TEC (Mt Ragged area) was monitored. Fencing for track rehabilitation for sections of the ridge walk was completed on East Bluff and Coyanerup Peak within the 'Montane thicket of the eastern Stirling Range' TEC.

Aerial phosphite was also applied to this TEC, and to two PECs (Montane mallee thicket PEC and '*Banksia coccinea* shrubland / *Melaleuca striata* / *Leucopogon flavescens* heath' PEC). Rabbit baiting was also implemented twice at two sites covering 25ha within the Montane thicket TEC. Seed was collected from several component flora of the Montane thicket TEC and Montane mallee thicket PEC.

More information on threatened flora, native animals and ecological communities is available on the Department's website www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities.

Restoration

The *Banksia Woodland Restoration Project* is undertaking restoration of natural habitats in the Perth metropolitan region as an offset for vegetation clearing at Jandakot Airport. This project aims to create and restore habitat for Carnaby's cockatoo and grand spider orchid. New banksia woodland has been established through topsoil transfer and planting (40ha) and direct seeding (12ha) at Forrestdale Lake, and at Anketell Road in Jandakot Regional Park. About 160 species of native plants are growing in these areas and perennial native plant cover has reached 12 per cent. The project has also funded more than 600ha of weed control and 12km of fencing to protect banksia woodland at 25 sites. A monitoring program has been established to measure the impacts of weed management and fire in banksia woodland.

Recovery planning

Recovery plans were published for the numbat and drafted for Gilbert's potoroo, and a wildlife management program published for Muir's corella (*Cacatua pastinator pastinator*). One interim recovery plan was approved for the 'Clay pans of the Swan Coastal Plain', which covers four threatened clay pan communities and one PEC. Interim recovery plans were approved for eight species of threatened flora in 2015–16.

More information on recovery planning is available on the Department's website www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities.

Operational highlights

Wildlife Management

Wetland conservation

Ramsar and nationally significant wetlands

Twelve WA wetlands are listed under the International Convention on Wetlands (Ramsar Convention) (Table 7). In 2015–16, condition assessments were completed for Ramsar wetlands at Becher Point, Peel-Yalgorup, and Forrestdale and Thomsons Lakes, and a rapid condition assessment conducted of the mound springs within the Eighty Mile Beach Ramsar site and the proposed Walyarta (Mandora Marsh) Conservation Reserve. Further progress was achieved in drafting management plans for these areas. The Ramsar information sheet for the Ord River Floodplain Ramsar site was updated in 2015–16 using the new online Ramsar Sites Information Service. It has been endorsed at State and Federal levels and adopted by the Ramsar Convention Secretariat.

In the Muir-Byenup System Ramsar site, a project continued to investigate the hydrogeochemistry of peat wetlands to assess the risks of further acidification, particularly in light of continued declines in rainfall and increased fire vulnerability. Field investigations began in 2014, involving collection of peat cores and analysis of physical and chemical properties. This work will also inform fire management around peat wetlands and contribute to a better understanding of the hydrology of this

important wetland suite and other similar wetland areas. Wetlands within this suite previously sampled for aquatic invertebrates 10 and 20 years ago were resampled to determine the effects of declining rainfall and groundwater tables on this element of the Muir-Byenup wetlands.

In 2015, a study of water sources sustaining the fresh to brackish mound springs (a TEC) and saline perennial surface water flows and lakes within the Mandora (Walyarta) Ramsar site began. The water source is generally thought to be artesian waters under pressure, released along geological fault zones. This study aims to understand these fault structures and their influence on lateral continuity and behaviour of water, and therefore location and persistence of the springs and wetlands, as a contribution to sustainably managing water resources.

The Department continued to work with other states and the Federal Government in developing a national wetlands policy regarding the implementation of international agreements. Toolkits for identifying, classifying and managing high ecological value aquatic ecosystems were finalised and made publicly available.

More information on internationally and nationally significant wetlands is available on the Department's website www.dpaw.wa.gov.au/management/wetlands.

Wetlands mapping and evaluation projects

Parks and Wildlife continued to monitor groundwater and the biological responses of fringing and wetland vegetation at a representative selection of Wheatbelt wetlands to threats, such as salinisation and climate change, with the focus on high conservation value wetlands, including those in recovery catchments and Ramsar sites. Summary analyses of aquatic invertebrates and waterbirds from the fauna component of this program continued and analyses of vegetation and groundwater began.

A report on depth, salinity and pH status and trends of 104 wetlands included in the *South West Wetlands Monitoring Program* monitored between 1977 and 2014 highlighted wetlands in national parks and nature reserves where changes were of particular interest or concern, such as Crackers Swamp (altered hydrology and rising salinity), Lake Jasper (rising salinity) and Yarnup Swamp (acidification). Water level and rainfall were also continuously monitored at nine high-value wetlands, including key breeding sites for the threatened Australasian bittern, to help develop an improved understanding of likely consequences of predicted climate change, particularly rainfall decline, on wetlands of south-western Australia.

Work continued on a survey of aquatic invertebrates inhabiting the Muir-Byenup Ramsar wetlands, previously sampled in 1995–96 and 2004–05, to determine responses to changes in hydrology and chemistry over the past 20 years and provide the Warren region with advice on where to focus management actions.

More information, including published reports, is available on the Department's website www.dpaw.wa.gov.au/management/wetlands/127-mapping-and-monitoring/223-surveying-monitoring-wetlands.

Table 7: Management plans for Ramsar wetlands in WA

Ramsar site	Ramsar information sheet	Ecological character description	Management plan
Ord River Floodplain	2016	2008	<i>Ord River and Parry Lagoons nature reserves management plan 77 2012</i>
Lakes Argyle and Kununurra	2016 (in progress)	2010	
Roebuck Bay	2009	2009	Final in preparation: Proposed Yawuru Nagulagun / Roebuck Bay Marine Park indicative joint management plan 2015 Final in preparation: Yawuru Birragun Conservation Park draft management plan 2015 <i>Roebuck Bay Ramsar Site management plan</i> (Roebuck Bay Working Group 2009)
Eighty Mile Beach	2009	2009	<i>Eighty Mile Beach Marine Park management plan 2014–2024</i> Walyarta, Kurriji Pa Yajula and Eighty Mile Beach reserves management plan in preparation Draft plan covering Mandora Marsh section of the site in preparation
Forrestdale and Thomsons Lakes	2016 (in progress)	2009	<i>Thomsons Lake Nature Reserve management plan 2005</i> <i>Forrestdale Lake Nature Reserve management plan 2005</i>
Peel–Yalgorup System	2016 (in progress)	2007	<i>Peel–Yalgorup System Ramsar Site management plan</i> (Peel–Harvey Catchment Council 2009) <i>Lake McLarty Nature Reserve management plan 60 2008</i> <i>Swan Coastal Plain South management plan 85 2016</i>
Toolibin Lake	2014	2006	<i>Toolibin Lake Recovery Plan</i> (Toolibin Lake Recovery Team and Technical Advisory Group 1994)
Vasse–Wonnerup System	2014	2007	<i>Busselton Wetlands Conservation Strategy</i> (WAPC 2005) <i>Swan Coastal Plain South management plan 85 2016</i> <i>Tuart Forest National Park management plan 79 2014</i>
Lake Warden System	2009	2009	<i>Esperance and Recherche parks and reserves management plan 84 2016</i>
Becher Point Wetlands	2014	Draft 2014	<i>Rockingham Lakes Regional Park management plan 2010</i>
Lake Gore	2009	2009	<i>Esperance and Recherche parks and reserves management plan 84 2016</i>
Muir–Byenup System	2009	2009	<i>Perup management plan 72 2012</i>

Operational highlights

Wildlife Management

Management of marine wildlife

During 2015–16, 29 whale and dolphin incidents were reported to the Department (Table 8). These involved 29 individual animals from seven species: humpback whale, pygmy sperm whale (*Kogia breviceps*), bottlenose dolphin (*Tursiops truncatus*), killer whale (*Orcinus orca*), Gray's beaked whale (*Mesoplodon grayi*), minke whale (*Balaenoptera acutorostrata*) and an Australian snubfin dolphin (*Orcaella heinsohni*).

Five humpback whales were reported entangled in fishing gear and marine debris during this period making nine cases for the migratory season. Unfortunately, prevailing weather conditions and the distance offshore of several of these entangled animals prevented the Department from attending all but one of the five reported entanglements. As such, one whale was successfully disentangled, with the fate of the others unknown.

There were 11 bottlenose dolphin incidents during the period, ranging from entanglements to strandings and one animal trapped inside a shark-netted swimming area.

There were 14 reported pinniped incidents (Table 9) involving four species: Australian sea lion, New Zealand fur seal (*Arctocephalus forsteri*), sub-Antarctic fur seal, and southern elephant seal (*Mirounga leonine*). There was an increase in the number of fur seal sightings reported by the public. The majority of seal and sea lion sightings were healthy animals basking or resting on beaches and these animals moved away of their own accord.

Table 8: Cetacean incidents

Species	Location	Outcome
Minke whale (<i>Balaenoptera acutorostrata</i>)	Tamala Station	Deceased, carcass ashore – Department attended
Pygmy sperm whale (<i>Kogia breviceps</i>)	Middleton Beach, Albany	Live stranding – Department attended – animal euthanised
Humpback whale (<i>Megaptera novaeangliae</i>)	Lancelin	Entangled in commercial fishing gear – Department response not possible – outcome unknown
	Dongara	Entangled in commercial fishing gear – Department response not possible – whale freed itself
	Broome	Vessel strike – Department response not possible – outcome unknown
	North-west of Exmouth	Entangled in commercial fishing gear – Department response not possible – outcome unknown
	Myalup Beach	Deceased, carcass on beach – Department responded – Shire removed carcass
	Port Hedland	Deceased, carcass ashore – Department responded
	Flinders Bay, Augusta	Entangled in unidentified gear – Department response not possible – outcome unknown
	Bremer Bay	Deceased, carcass ashore – Department attended
	Moses Rock	Deceased, carcass ashore – Department attended
	East of Thompson's Bay, Rottneest Island	Entangled in commercial gear – Department responded – failed to relocate whale – outcome unknown
	Walpole	Deceased, carcass ashore – Department attended

Table 8: Cetacean incidents (continued...)

Species	Location	Outcome
Gray's beaked whale (<i>Mesoplodon grayi</i>)	Leeman town beach	Live stranding – Department attended – animal released
	Point Peron	Live stranding – Department attended – animal released
	Yallingup	Deceased, carcass ashore – Department attended – carcass removed
Australian snubfin dolphin (<i>Orcaella heinsohni</i>)	Broome	Live stranding – Department attended – animal died shortly after arrival
Killer whale (<i>Orcinus orca</i>)	Bunbury	Live stranding of juvenile – Department attended – animal died
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Busselton	Dead calf on beach – Department attended
	Swan River, Burswood	Deceased in river – Department attended – carcass removed for post mortem, had severe multi-organ bacterial infection
	Swan River, Como	Entangled in nylon fishing line – Department attended – dolphin freed itself
	Bunbury Harbour	Live stranding of calf – Department attended – animal euthanised
	Harvey Estuary, Mandurah	Live stranding – Department attended – animal released
	Old Dunsborough Beach	Trapped inside shark netted enclosure – animal released
	Near Mandurah water tower	Entangled in fishing line – Department attended – animal freed
	Cheynes Beach, Albany	Deceased, carcass ashore – Department attended – animal removed

Species	Location	Outcome
Bottlenose dolphin (<i>Tursiops truncatus</i>) continued....	Elizabeth Quay, Swan River	Adult and calf deceased in river – Department attended – carcasses removed for post mortem, adult female had heart disease and calf had pneumonia with underlying sepsis and parasite infection
	Shoalwater Marine Park	Live animal observed with laceration to its side – Department attended – monitoring ongoing
	Becher Point, Secret Harbour	Deceased, floating carcass – Department attended – carcass removed for post mortem



Bottlenose dolphin in the Swan Canning Riverpark. Photo – Mark Kleczkowski

Operational highlights

Wildlife Management

Table 9: Pinniped incidents

Species	Location	Outcome
New Zealand fur seal (<i>Arctocephalus forsteri</i>)	Exmouth	Resting, good body condition – scars on left lateral – Department monitored – self-released
	Walpole	Deceased
	Quinn's Rocks	Resting, no obvious injuries – Department monitored – self-released
Sub-Antarctic fur seal (<i>Arctocephalus tropicalis</i>)	Albany	Resting, good condition – Department monitored – self-released
	Hamelin Bay	Resting, poor body condition – Department monitored – self-released
	Carnac Island	Resting, possible eye injury – Department monitored – self-released
Southern elephant seal (<i>Mirounga leonine</i>)	Myalup	Resting, good condition – Department monitored – self-released
	Redgate	Resting, good condition, moulting – Department monitored – self-released
	Kilcarnup	Resting, good condition, moulting – Department monitored – self-released
Australian sea lion (<i>Neophoca cinerea</i>)	Port Denison	Deceased
	Geraldton	Deceased
	Carnac Island	Deceased
	Cottesloe Beach	Resting, possible shark attack with lacerations to body and rear left flipper. Re-sighted at same location three months later with declining body condition – Department monitored – self-released

Management of commercial activities involving native animals and plants

The Department ensured that wildlife-based activities occurring during the year were licensed and managed in accordance with the WC Act and associated regulations, and were investigated to ensure compliance with legislation and the licences issued.

Quotas and commercial harvests for kangaroos for 2015 were:

- western grey kangaroo (*Macropus fuliginosus*) – quota: maximum of 173,500; harvest: 93,958
- red kangaroo (*M. rufus*) – quota: maximum of 54,600; harvest: 15,171
- euro (*M. robustus*) – no commercial harvest during 2015.

Under a nationally approved kangaroo management plan, aerial population surveys of kangaroos were undertaken in the Central Zone and the South West Zone in 2015. The aerial surveys provided the basis for setting commercial harvest quotas for 2016.

Improved trends in regional rainfall in the South East Zone during 2014–15 resulted in the zone being reopened in 2016 to allow for the commercial harvest of western grey and red kangaroos.

The Department continued to implement the management plan for the commercial harvesting of protected flora, which was approved by the Federal Government under the EPBC Act in July 2013. The downturn previously reported in this industry appears to have slowed with a minor increase in the number of flora licences issued during 2015–16.

Regulation

Flora and fauna licensing

In 2015–16, there were 1886 flora licences and permits issued, increasing by 4.3 per cent from the previous year. This included 286 commercial purposes licences, 155 commercial producer and nurseryman licences, 1208 scientific or other prescribed purposes licences, 23 sandalwood licences, two Crown land forest produce licences and 212 permits to take Declared Rare Flora (Table 10). The Department also issued 8780 fauna licences (other than damage, but including non-commercial), an increase of 9.8 per cent from the previous year (Table 11).

The interest in keeping pet herpetofauna (reptiles and amphibians) increased slightly (3.6 per cent), with 2603 keeper's licences issued or renewed during the 2015–16 period. The number of people currently licensed for periods of up to three years is 4741.

Incidents of prohibited reptiles being brought into or kept illegally in WA or being illegally exported from WA continued to increase. Wildlife officers joined forces with detectives from WA Police for an operation in May 2016 in which search warrants were executed at two residences in the metropolitan area. The warrants resulted in the apprehension of two persons and the seizure of 20 Australian and 12 exotic reptiles, including corn snakes, boa constrictors, ball pythons and Burmese pythons, which had been illegally imported into the country. Another incident involved the apprehension of two persons in the Midwest region who when stopped by police for a vehicle-related matter, were found to be in possession of 11 reptiles, including central netted dragons, geckos and a pygmy python, which were believed to have been taken unlawfully.

Investigations are ongoing into four consignments containing 15 reptiles, including frilled dragons, pythons and a brown tree snake that were posted from Queensland to an address in the metropolitan area. A number of other parcels containing spiny-tailed geckos (*Strophurus* sp.), western bearded dragons (*Pogona minor minor*) and thorny devils (*Molloch horridus*) were intercepted and seized at the Perth international mail centre after being consigned to a recipient in Germany.

A total of 135 WA reptiles were seized during 2015–16, including south-west carpet python (*Morelia spilota imbricata*), rough scaled python (*Morelia carinata*), olive python (*Liasis olivaceous*), water python (*Liasis fuscus*), black headed python (*Aspidites melanocephalus*), woma python (*Aspidites ramsayi*), Stimson’s python (*Antaresia stimsoni*), pygmy python (*Antaresia perthensis*), tiger snake (*Notechis scutatus*), dugite (*Pseudonaja affinis*), mulga snake (*Pseudechis australis*), brown tree snake (*Boiga irregularis*), shingleback skink (*Tiliqua rugosa*), western blue tongue (*Tiliqua occipitalis*), spiny tailed skink (*Egernia* sp.), knob tailed gecko (*Nephurus levis* subsp.), spiny-tailed gecko (*Strophurus* sp.), western velvet gecko (*Oedura fimbria*), western bearded dragon, long-nosed water dragon (*Gowidon longirostris*), side barred delma (*Delma grayii*), thorny devil and oblong turtle (*Chelodina colleri*).

Prohibited species seized included central carpet pythons (*Morlia bredli*) from the Northern Territory, jungle pythons (*Morelia spilota cheynei*) from Queensland, scrub python (*Morelia oenpelliensis*) from Queensland, coastal carpet pythons (*Morelia spilota mcdowelli*) from New South Wales and Queensland, a carpet python hybrid (*Morelia spilota* sp. X *Morelia spilota* sp.) from Victoria, eastern long-necked turtle (*Chelodina longicollis*) from Victoria, Murray River turtle (*Emydura macquarii*) from New South Wales and an eastern water dragon (*Intellagama leseureii*).

Table 10: Flora licences issued in 2015–16

Type of flora licences	Number issued
Commercial purposes	286
Commercial producers	155
Sandalwood (from Crown land)	2
Sandalwood (from private land)	21
Forest produce (from Crown land)	2
Scientific/prescribed purposes	1208
Take declared rare flora	212
Total flora licences	1886



Banksia (*dryandra*). Photo – Mark Brundrett/Parks and Wildlife

Operational highlights

Wildlife Management

Table 11: Fauna licences issued in 2015–16

Type of fauna licences	Number issued
Collection (Reg 17)	577
Bird/bat banding (Reg 23)	158
Education and public	
To take marine interaction (Reg 15)	245
To take other (Reg 15)	229
To hold (Reg 16)	158
Avian fauna	
Keep and breed in captivity (Reg 12)	2997
Keep in captivity (Reg 12A)	83
Deal (Reg 13)	21
Breed for commercial purposes (Reg 14)	0
Herpetofauna (reptiles and amphibians)	
Keeping	2628
Dealing	32
Farming	1
Taking	5
Removing	377
Emus (<i>Dromaius novaehollandiae</i>)	
Processing (emu eggshells) (Reg 7)	1
Dealing (Reg 8)	0
Dealing (emu eggshells) (Reg 13)	2
Farming (Reg 14)	6

Type of fauna licences	Number issued
Crocodiles	
Processing (Reg 7)	0
Skin dealing (Reg 10)	0
Farming (Reg 14)	1
Kangaroos	
Take for sale (Reg 6)	429
Processing (Reg 7)	24
Deal in carcasses (Reg 8)	25
Skin dealing (Reg 10)	7
Export interstate	
Skins of fauna (or other dead fauna)	47
Fauna (live)	198
Herpetofauna (reptiles and amphibians)	39
Export overseas	
Skins of fauna (or other dead fauna) from WA	6
Emu eggs or products (personal items) from WA	0
Fauna from WA (live)	3
Import from interstate	
Skins of fauna (or other dead fauna) into WA	6
Australian fauna (live)	273
Live exotic birds and other animals	142
Herpetofauna (reptiles and amphibians)	60
Total fauna licences	8780



St Andrew Island. Photo – Lesley Gibson/Parks and Wildlife

Damage and dangerous fauna licences

The Department received 35 reports of potential problem crocodiles within crocodile risk management areas in the West Kimberley District during 2015–16. Four dangerous fauna licences were issued authorising the removal of saltwater crocodiles from the wild that posed a threat to the public. This resulted in five crocodiles being removed and relocated to a crocodile park. There were three crocodile attacks in the East Kimberley District during the same period, two involving saltwater crocodiles (*Crocodylus porosus*) and one involving a freshwater crocodile (*Crocodylus johnsoni*). Reports were also received of a further four problem saltwater crocodiles. Two dangerous fauna licences were issued in the East Kimberley,

which resulted in the destruction of four problem saltwater crocodiles, one of which was removed from the Parks and Wildlife-managed crocodile risk mitigation area in Lake Kununurra. A fifth saltwater crocodile was relocated to the Broome Crocodile Park. No action was taken in relation to the sixth saltwater crocodile due to the remoteness of the location or in relation to the freshwater crocodile, which was not considered a serious threat.

Fourteen dangerous fauna licences were issued for aggressive magpies (*Cracticus tibicen*), 16 for kangaroos and euros, three for Australian ravens (*Corvus coronoides*) and one for a kookaburra (*Dacelo novaeguineae*) (Table 12). A number of dangerous fauna

licences were issued to mitigate the risk of aircraft strike at Perth, Jandakot and regional airports. These licences applied to a range of mostly bird species, but also included red kangaroos and western grey kangaroos.

A total of 497 licences (an increase of 2.2 per cent) were issued for the control of animals causing damage (Table 13), including 11 licences for emus (*Dromaius novaehollandiae*), 374 licences for western grey kangaroos (a slight increase of three per cent in licence numbers and an increase of 6.7 per cent in the number taken), seven licences for red kangaroos, two licences for euros, nine licences for agile wallabies, 27 licences for little corellas (*Cacatua sanguinea*), one licence for western long-billed corellas

(*Cacatua pastinator*), eight licences for eastern long-billed corellas (*Cacatua tenuirostris*), five licences for ringneck parrots (*Barnardius zonarius*) and eight licences for galahs (*Eolophus roseicapilla*). Twenty-one licences were also issued to scare, trap and relocate or destroy waterfowl causing damage. In total, 105 damage licences were issued for birds, a decrease of 2.7 per cent from 2014–15.

More information is available on the Department's website www.dpaw.wa.gov.au/plants-and-animals/licences-and-permits.

Operational highlights

Wildlife Management

Table 12: Dangerous fauna licences issued in 2015–16

Dangerous fauna licences	Number of licences issued	Authorisation
Agile wallaby (<i>Macropus agilis</i>)	1	destroy 250
Australian bustard (<i>Ardeotis australis</i>)	1 3	destroy 3 scare only
Australasian shoveler (<i>Anas rhynchos</i>)	1 1	*destroy scare only
Australian hobby (<i>Falco longipennis</i>)	1 1	*destroy scare only
Australian kestrel (<i>Falco cenchroides</i>)	1 1	*destroy scare only
Australian magpie (<i>Gymnorhina tibicen</i>)	13 1	destroy 13 scare only
Australian magpie lark (<i>Grallina cyanoleuca</i>)	3 1	*destroy 7 scare only
Australian pelican (<i>Pelecanus conspicillatus</i>)	1 1	*destroy scare only
Australian raven (<i>Corvus coronoides</i>)	2 1	*destroy scare only
Australian shelduck (<i>Tadorna tadornoides</i>)	1 1	*destroy scare only
Australian white ibis (<i>Threskiornis molucca</i>)	2 1	*destroy 20 scare only
Australian wood duck (<i>Chenonetta jubata</i>)	1 1	*destroy scare only
Banded lapwing (banded plover) (<i>Vanellus tricolor</i>)	4 1	*destroy 120 scare only
Barn owl (<i>Tyto alba</i>)	1 1	*destroy scare only

Dangerous fauna licences	Number of licences issued	Authorisation
Baudin's cockatoo (<i>Calyptorhynchus baudinii</i>)	1	scare only
Black kite (<i>Milvus migrans</i>)	2	destroy 70
Black-shouldered kite (<i>Elanus axillaris</i>)	1 4	*destroy scare only
Black swan (<i>Cygnus atratus</i>)	1 1	*destroy scare only
Brown falcon (<i>Falco berigora</i>)	1 1	*destroy scare only
Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>)	1	scare only
Collared sparrowhawk (<i>Accipiter cirrocephalus</i>)	1 1	*destroy scare only
Common tern (<i>Sterna hirundo</i>)	1	destroy 100
Crested pigeon (<i>Ocyphaps lophotes</i>)	1 1	*destroy scare only
Emu (<i>Dromaius novaehollandiae</i>)	1	*destroy 1
Estuarine (saltwater) crocodile (<i>Crocodylus porosus</i>)	2 5	destroy 6 trap & relocate 24
Eurasian coot (<i>Fulica atra</i>)	1 1	*destroy scare only
Euro (<i>Macropus robustus</i>)	2	destroy 6
Freshwater (Johnston's) crocodile (<i>Crocodylus johnstoni</i>)	1	trap & relocate 10

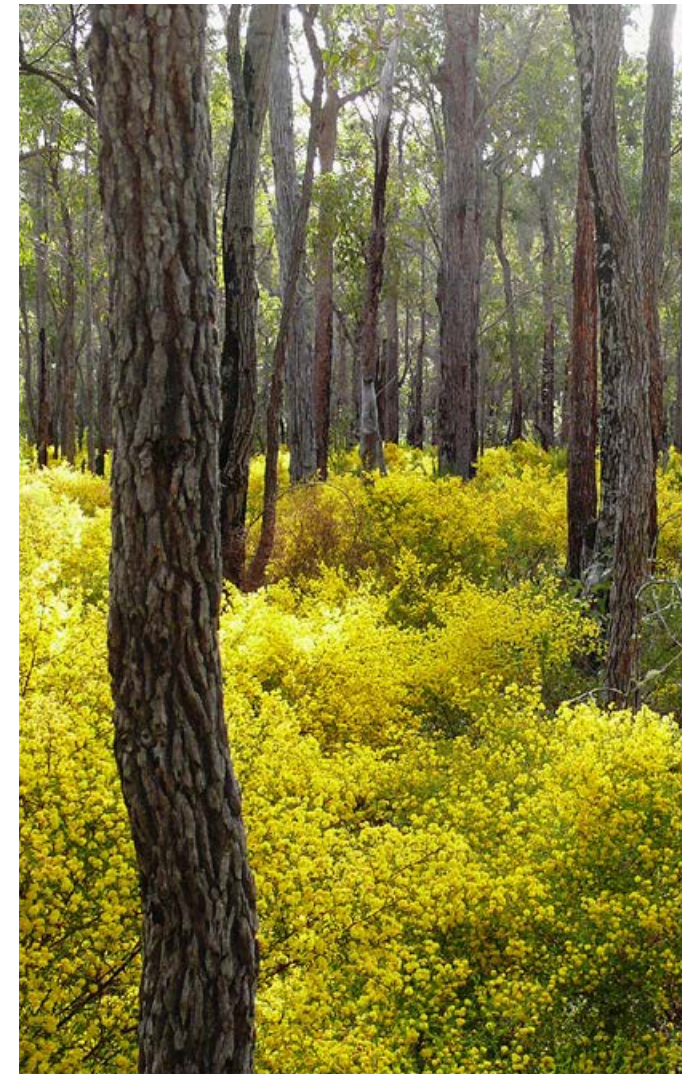
Dangerous fauna licences	Number of licences issued	Authorisation
Galah (<i>Eolophus roseicapilla</i>)	4 4	destroy 270 scare only
Great cormorant (<i>Phalacrocorax carbo</i>)	1 1	*destroy scare only
Great egret (<i>Ardea alba</i>)	1 1	*destroy scare only
Grey butcherbird (<i>Cracticus torquatus</i>)	1	destroy 1
Grey teal (<i>Anas gracilis</i>)	1 1	*destroy scare only
Laughing kookaburra (<i>Dacelo novaeguineae</i>)	1 1	*destroy scare only
Little black cormorant (<i>Phalacrocorax sulcirostris</i>)	1	*destroy scare only
Little corella (<i>Cacatua sanguinea</i>)	3 4	*destroy 320 scare only
Little eagle (<i>Hieraaetus morphnoides</i>)	1 1	*destroy scare only
Long-billed corella (western) (<i>Cacatua pastinator</i>)	1 1	*destroy scare only
Long-billed corella (eastern states species) (<i>Cacatua tenuirostris</i>)	1 1	*destroy scare only
Osprey (<i>Pandion haliaetus</i>)	1 1	*destroy scare only
Pacific black duck (<i>Anas superciliosa</i>)	1 1	*destroy scare only

Table 12: Dangerous fauna licences issued in 2015–16 (continued...)

Dangerous fauna licences	Number of licences issued	Authorisation
Peregrine falcon (<i>Falco peregrinus</i>)	1 1	*destroy scare only
Pink-eared duck (<i>Malacorhynchus membranaceus</i>)	1 1	*destroy scare only
Purple swamphen (<i>Porphyrio porphyrio</i>)	1 1	*destroy scare only
Red kangaroo (<i>Macropus rufus</i>)	1	*destroy
Red-tailed black cockatoo (<i>Calyptorhynchus banksii</i>)	1	scare only
Richard’s pipit (<i>Anthus novaeseelandiae</i>)	1 1	scare only
Square-tailed kite (<i>Lophoictinia isura</i>)	1 1	*destroy scare only
Straw-necked ibis (<i>Threskiornis spinicollis</i>)	3 1	*destroy 20 scare only
Swamp harrier (<i>Circus approximans</i>)	1 1	*destroy scare only
Torresian crow (<i>Corvus orru</i>)	1	destroy 2
Tree martin (<i>Petrochelidon nigricans</i>)	1	*scare only
Twenty-eight parrot (<i>Barnardius zonarius</i>)	1 1	*destroy scare only
Wedge-tailed eagle (<i>Aquila audax</i>)	1 1	*destroy scare only

Dangerous fauna licences	Number of licences issued	Authorisation
Welcome swallow (<i>Hirundo neoxena</i>)	1	scare only
Western brush wallaby (<i>Macropus irma</i>)	1	destroy 5
Western grey kangaroo (<i>Macropus fuliginosus</i>)	12 1	destroy 109 relocate 6
Whistling kite (<i>Haliastur sphenurus</i>)	2 4	destroy 20 scare only
White-faced heron (<i>Egretta novaehollandiae</i>)	1 1	*destroy scare only
Willie wagtail (<i>Rhipidura leucophrys</i>)	1	scare only
Yellow-billed spoonbill (<i>Platalea flavipes</i>)	1 1	*destroy scare only

* Indicates the species authorised to be taken under dangerous fauna licences issued to disperse/remove birds that are a danger to aircraft landing and taking off at Perth and other airports. While these licences cover a wide variety of species, only 62 birds were actually taken. These included Pacific black duck (17), Australian wood duck (32), white-faced heron (1), banded lapwing (88) and Australian shelduck (4).



Greater Kingston National Park. Photo – Bron Anderson/
Parks and Wildlife

Operational highlights

Wildlife Management

Table 13: Damage licences (fauna) issued in 2015–16

Damage fauna licences	Number of licences issued	Total number of each species authorised to be taken
Birds		
Australian white ibis (<i>Threskiornis molucca</i>)	1	scare only
Emu (<i>Dromaius novaehollandiae</i>)	11	destroy 295
Galah (<i>Eolophus roseicapilla</i>)	7 1	destroy 4107 scare only
Little corella (<i>Cacatua sanguinea</i>)	25 1 1	destroy 4935 scare only trap and euthanase 400
Long-billed corella (central west) (<i>Cacatua butleri</i>)	20 1	destroy 14,200 scare only
Long-billed corella (Lake Muir) (<i>Cacatua pastinator</i>)	1	scare only
Long-billed corella (eastern states species) (<i>Cacatua tenuirostris</i>)	8	destroy 1850
Red-capped parrot (<i>Purpureicephalus spurius</i>)	1	destroy 20
Straw-necked ibis (<i>Threskiornis spinicollis</i>)	1	scare only
Twenty-eight parrot (<i>Barnardius zonarius</i>)	5	destroy 130

Damage fauna licences	Number of licences issued	Total number of each species authorised to be taken
Waterfowl		
Australian shelduck (<i>Tadorna tadornoides</i>)	1 2	destroy 20 scare only
Eurasian Coot (<i>Fulica atra</i>)	1	trap and relocate 4
Maned duck (<i>Chenonetta jubata</i>)	6 2 2	destroy 200 scare only trap and relocate 30
Magpie goose (<i>Anseranas semipalmata</i>)	1	destroy 50
Pacific black duck (<i>Anas superciliosa</i>)	1 2 2	destroy 50 scare only trap and relocate 30
Purple swamp hen (<i>Porphyrio porphyrio</i>)	1	trap and relocate 4
Mammals		
Agile wallaby (<i>Macropus agilis</i>)	9	destroy 3400
Euro (<i>Macropus robustus</i>)	2	destroy 40
Red kangaroo (<i>Macropus rufus</i>)	6 1	destroy 500 scare only
Western grey kangaroo (<i>Macropus fuliginosus</i>)	374	destroy 16,831

Wildlife interaction licences

At 30 June 2016, 100 whale watching boat tour operators were licensed in WA. While these tours were primarily focused on humpback whales, southern right whales (*Eubalaena australis*) were also part of whale watching activity in the lower south-west, particularly at Albany, Augusta and Esperance. Pygmy blue whales (*Balaenoptera musculus brevicauda*) continue to be encountered adjacent to Cape Naturaliste.

Parks and Wildlife issued one beach-based and 82 boat-based dolphin interaction licences, three in-water dolphin interaction licences and two boat-based dugong (*Dugong dugon*) interaction licences. Thirty-nine boat-based Australian sea lion and New Zealand fur seal interaction licences were issued. Two wildlife interaction licences were also issued to film marine wildlife for documentaries.

Offences

The Department provided guidance to members of the public visiting Parks and Wildlife-managed land regarding the legal requirements of parks and conservation legislation. During 2015–16, 364 caution notices were issued for minor offences. The number of infringement notices issued during the year increased from 501 to 561 (Table 14). Written reports were prepared for 390 offences under the WC Act and its Regulations (Table 15), and the CALM Act and its Regulations (Table 16).

Action in 72 matters under both statutes was completed, with prosecution pending in 222 others.

The unlawful taking of black cockatoos from the wild continues to pose a serious threat to the conservation of these birds, particularly Baudin's cockatoo, which has suffered significant losses in fruit growing areas of the south-west. While the number of reports of alleged illegal shooting declined during the past 12 months, this was thought to be due to seasonal conditions, which resulted in increased availability of the birds' natural food sources, reducing the attraction for the cockatoos to feed in orchards.

The keeping of pet herpetofauna (reptiles and amphibians) continues to be a popular activity, but unfortunately the number of investigations regarding the unlawful taking, possession and keeping of reptiles continues to rise with 45 persons apprehended for 80 alleged offences and the seizure of 135 reptiles that were either illegally taken, imported, or kept.

The Department's management of the sandalwood industry and the detection of illegal or unsustainably harvested sandalwood from the wild continued. Parks and Wildlife again joined forces with the WA Police and the Federal Department of Agriculture to investigate reports of illegal sandalwood harvesting. This resulted in the interception of four illegal consignments of sandalwood in 2015–16, totalling 14.6 tonnes and worth an estimated \$292,000. As a result of these seizures, charges are pending against two people and investigations are continuing. Investigations are also ongoing into the major syndicate identified during 2014–15 that is believed to have been involved in the illegal take and export of more than 100 tonnes of sandalwood overseas, worth an estimated \$2 million.

Table 14: Number of reported offences in 2014–15 and 2015–16

	2014–15 reported offences	2015–16 reported offences
	*Finalised figures	At 30 June 2016
Total offences reported	1351	1315
Court convictions	177	72
Court dismissals	103	55
Infringement notices	501	561
Letters of warning	12	6
Caution notices	530	364
No further action	14	1
Pending	11	222
Withdrawn	3	34
Restitution		
Total court fines	\$50,020	\$22,000
Total court costs	\$8,355	\$7,747.70
Infringement penalties	\$62,040	\$43,205

* 2014–15 figures have been finalised since the 2014–15 Yearbook was published.

Operational highlights

Wildlife Management

Table 15: Offences under the *Wildlife Conservation Act 1950* and Regulations that occurred in 2015–16

Charge	Reported offences	Convictions	Fines \$	Costs \$	Dismissed	Withdrawn	Letter of warning	Caution notice	No further action	Pending
Wildlife Conservation Act 1950										
Illegal taking or possession of protected fauna	206	44	8200	1352.80		28		9	1	124
Illegal importation, selling or taking for sale of fauna	28	4	1650					22		2
Illegal device	1									1
Illegal taking of protected flora	12	1	600	169.10	8		1			2
Illegal taking of rare declared flora	4						4			
Illegal selling of protected flora	33									33
Offences against wildlife officers	4	1	300	169.10				1		2
Failing to comply with licence conditions	51							51		
Wildlife Conservation Regulations										
Offences relating to the acquisition, possession, control and disposal of fauna	39	5	1500	507.30		2		23		9
Wildlife Conservation Reptile and Amphibian Regulations										
Offences relating to reptiles and amphibians	4							4		
Total	382	55	12,250	2198.30	8	30	5	110	1	173

Table 16: Offences under the *Conservation and Land Management Act 1984* and Regulations and the *Animal Welfare Act 1929* that occurred in 2015–16

Charge	Reported offences	Convictions	Fines \$	Costs \$	Withdrawn	Infringement notice	Letter of warning	Caution notice	No further action	Pending	Dismissed
<i>Conservation and Land Management Act 1984 and Regulations</i>											
Illegal taking or possession of forest produce	26	2	5000	169.10		15		9			
Offences against officers											
Offences relating to marine parks and reserves											
Offences relating to disease risk areas											
Occupy CALM land											
Offences relating to activities on State forest, nature reserves and national parks	900	14	45,955	5380.30	3	546	1	242		47	47
<i>Animal Welfare Act 2002</i>											
Cruelty to animals	7	1	2000		1			3		2	
Total	933	17	52,955	5549.40	4	561	1	254		49	47

Operational highlights

Wildlife Management

Managing system-wide threats

Invasive species control

Western Shield

During 2015–16, the *Western Shield* wildlife recovery program continued to implement integrated broadscale fox and feral cat baiting for native animal conservation. About 3.8 million hectares of conservation reserve and State forest was baited using more than one million baits. Departmental staff and volunteers continued to monitor native animals across 30 *Western Shield* wildlife research sites and work also continued to establish predator monitoring at some sites.

In July 2015, the WA and Federal Governments announced \$1.7 million in funding under the National Landcare Programme for Parks and Wildlife to assist threatened animal recovery. The funding will be used to integrate the new *Eradicat*[®] feral cat bait with current fox baiting in four WA environments under the banner of the *South West Fauna Recovery Project*. The project will focus on *Western Shield* sites to protect species identified in the national *Threatened Species Strategy* and align with Parks and Wildlife's current fauna recovery programs in the south-west of WA.

Following the reinvigoration of the *Western Shield* program in 2015, a sponsorship package was developed with a new sponsorship drive. Corporate sponsorship was provided to the program in 2015–16 by Alcoa, Tronox and Western Areas Ltd.

The *Western Shield Action Pack* was launched in February 2016. The Action Pack is an education resource for students in years 4 to 6, developed by Parks and Wildlife's *Nearer to Nature* program to raise awareness of WA's threatened species, the need to conserve biodiversity and the *Western Shield* program's work to protect native animals.

In the Exmouth District, the second year of a project aiming to integrate, test and refine a baiting prescription to a level that will facilitate the successful reintroduction of native mammals was undertaken in Cape Range. Feral cat activity reduced by 46 per cent following *Eradicat*[®] baiting in 2015, while no foxes were detected before or after baiting. The absence of foxes has been attributed to the success of the inaugural *Eradicat*[®] baiting event in 2014. Further refinements to the program are planned to improve bait uptake by feral cats, along with the integration of other control methods in a strategic manner.

In the Midwest Region, ground and aerial baiting of foxes continued at Kalbarri National Park. Target sites included black-flanked rock wallaby translocation sites and remote cameras were installed to monitor introduced predator activity.

With sponsorship support from Tronox, an operational trial began integrating feral cat baiting using *Eradicat*[®] with fox management using *Pro bait*[®] in the northern coastal sand plains of Nambung National Park and surrounding conservation reserves to promote recovery of native animals. Monitoring of both native and introduced animals using remote cameras started in April 2015. Preliminary results suggest that while fox control alone has had a positive impact on some native species (for example, echidna were more abundant in areas managed for foxes), feral cats are more abundant in areas of fox management emphasising the need for integrated pest management.

Monitoring of feral cats and foxes continued in the northern jarrah forest. This involved collecting information about predator activity in baited and unbaited areas with the help of more than 5000 volunteers using the *Western Shield* – Camera Watch webpage hosted by Zooniverse.

In the Wheatbelt Region, work continued on the enhanced introduced predator control program at Dryandra Woodland using a range of operational measures, including baiting (using *Eradicat*[®] with existing fox baiting under *Western Shield*), trapping, camera monitoring and engaging with neighbours to implement control measures. Woylies and numbats were translocated, aiming to increase their populations while active feral animal control is undertaken and to provide an opportunity for people to see these species in the wild. The Barna Mia Nocturnal Animal Sanctuary at Dryandra continued to provide visitors with a unique opportunity to see nocturnal animals in natural surroundings, contributing to the educational objectives of *Western Shield*.

In the South West Region, *Western Shield* monitoring recorded an increase in the number of woylies and chuditch trapped in the Centaur forest block near Collie. Eighty per cent of the woylies captured were new females with pouch young, and 93 per cent of chuditch captured were new individuals.

In the South Coast Region, the *South Coast Integrated Fauna Recovery Project* continued to test the effectiveness of *Eradicat*[®] in the south-west high rainfall zone in the habitats of a suite of threatened and priority native animals, including the critically endangered western ground parrot and Gilbert's potoroo at Cape Arid, Fitzgerald River and Waychinicup national parks, and Two Peoples Bay and Mount Manypeaks nature reserves. Feral cats and native animal species were monitored as part of this adaptive management project that is refining methods for potential long-term operational use of the bait at these *Western Shield* sites. Results are beginning to indicate environmental benefits with positive response evident in fauna, such as quenda (*Isoodon obesulus*) in Cape Arid National Park.

Training in native animal management, handling and the safe and effective use of 1080 baits continued to be provided to Parks and Wildlife and Parks Australia staff and volunteers.

More information on *Western Shield* is available on the Department's website www.dpaw.wa.gov.au/management/pests-diseases/westernshield.



Loading 1080 baits on an aerial baiting plane.
Photo – Peter Nicholas/Parks and Wildlife



Technical officer Sean Garretson releases a northern quoll. Photo – Judy Dunlop/Parks and Wildlife



Waychinicup National Park. Photo – Parks and Wildlife



Gilbert's potoroo. Photo – Dick Walker/Potoroo Action Group

Operational highlights

Wildlife Management

State Cane Toad Initiative

Cane toads (*Rhinella marina*) are a declared pest under the *Biosecurity and Agriculture Management Act 2007*. Parks and Wildlife is the lead agency in WA for cane toad management and since 2005 has undertaken a range of actions.

The *Cane Toad Strategy for Western Australia* identifies key actions for the management of cane toads in the State, with a focus on quarantine, research, education, communication and mitigating the impact of this pest animal on WA's native wildlife.

To implement the strategy, the Department engages with the community, including Aboriginal ranger groups, and works collaboratively with scientists undertaking research that aligns with the goals of the strategy.

Key activities during 2015–16 included:

- Inventory surveys were conducted in advance of the cane toad frontline in the Kimberley Region to provide information on areas proposed for joint management with traditional owners under the *Kimberley Science and Conservation Strategy*. The surveys involved Aboriginal ranger groups, *Bush Ranger* cadet units, primary school students, volunteers, the Western Australian Museum, universities and Parks and Wildlife staff.

- The cane toad detector dog has been working from freight depots and tourism locations and travelling the Kimberley to promote the 'check your load for a toad' message to help reduce numbers of hitchhiker toads.
- A three-year operational plan is in preparation for the Kimberley islands with a focus on research to reduce breeding success of cane toads on islands and mitigate their impact on native animals.
- More than 20 live cane toad drop-off points were maintained throughout the east Kimberley at various locations, including tourist sites at El Questro Station, Home Valley, Parry's Farm and Purnululu National Park.
- Ongoing support and assistance was provided to cane toad-related research projects. A collaborative project between the Department and the University of Sydney, with the involvement of Balanggarra Rangers, on the Forrest River floodplain has revealed that goannas exposed to small non-lethal toads survived longer when toads invaded their habitats. Work on northern quolls in Mitchell River National Park in the north Kimberley has indicated that taste aversion learning has a role in mitigating the impact of cane toads on quolls in the area. Research continues to determine how long wild quolls remember the training and to examine effective field application techniques.



State Cane Toad Initiative school-based trainee Andrew Rethus with Reggie the cane toad detector dog inspecting goods. Photo – Parks and Wildlife

- The Department, with Rangelands NRM and the University of Sydney has investigated the field application of chemicals, naturally produced by cane toads, that impact on cane toad development and disrupt and/or mutate cane toad metamorphosis. This work will continue to investigate strategies for mitigating cane toad breeding success under a new Australian Research Council linkage project with the University of Sydney for the next three years.
- Databases of sightings and cane toad distribution continued to be maintained, with the Department's cane toad webpage updated regularly.
- Information was distributed to the community via newsletters, social media, brochures, signs, posters and media events to raise awareness about cane toad identification and hitchhiker toad risks.
- Cane toad and biodiversity information sessions were presented to schools and community groups using the *Cane Toad Education Manual*.
- The Department continued to provide the community with cane toad identification, reporting and sighting services via email and phone response. The Department has a rapid response strategy to positively identify and destroy cane toads found in the south-west.

More information on cane toad management is available on the Department's website www.dpaw.wa.gov.au/management/pests-diseases.

Introduced pest animal management

Parks and Wildlife collaborated with the Department of Agriculture and Food WA (DAFWA) and the Recognised Biosecurity Groups (RBGs) to implement coordinated broadscale feral donkey, camel, horse, cattle and pig control programs. Fencing of priority biodiversity areas was undertaken in the Kimberley and Pilbara to reduce the impact of these pest animals through exclusion.

Parks and Wildlife provided representation on the State Wild Dog Action Planning Steering Group and participated in the development of a draft *Western Australian Wild Dog Action Plan*. Wild dog control efforts by RBGs and the pastoral industry across the rangelands continued to be supported by the Department. The Midwest and Pilbara regions assisted with bait manufacture and distribution on former pastoral leases managed by the Department. The Goldfields and Wheatbelt regions continued to contract licensed pest management technicians and undertake contract management work through the RBGs to manage wild dogs and feral predators on unallocated Crown land and Parks and Wildlife-managed land adjacent to pastoral leases and farmland.

The South Coast Region continued to provide support through resource contribution to the Northern Mallee Declared Species Group in Ravensthorpe and Esperance to assist with wild dog control programs, as well as advice to inform the environmental assessment of the State Barrier Fence extension. The Wheatbelt

Region provided support to the Eastern Wheatbelt Declared Species Group and the Central Wheatbelt Declared Species Group, in conjunction with DAFWA.

The Kimberley Region continued with its large feral herbivore program focusing on Drysdale River National Park, Mitchell Plateau, King Leopold Range Conservation Park, Purnululu National Park and the Ord River Regeneration Reserve. More than 7800 cattle were removed from these areas, as well as 119 donkeys, 26 horses and 46 pigs. For the first time the region also undertook an aerial control program specifically for camels in the Mandora Marsh area, with 164 camels and 12 donkeys removed.

In the Pilbara Region, aerial and ground control operations have removed significant numbers of introduced herbivores, with approximately 500 animals removed from Karijini and Millstream Chichester national parks, and in collaboration with the Martu traditional owners, almost 1000 camels were removed from Karlamilyi National Park.

Large introduced herbivore control continued on and in proximity to the Fortescue Marsh, in collaboration with the Pilbara RBG and DAFWA. This included continuing the Judas donkey control program, as well as the implementation of a similar Judas program to control feral horses after data from satellite collars provided a greater understanding of feral horse movement patterns, home ranges, demography and social structure.

Aerial shooting of feral goats was carried out in national parks and nature reserves in the Pilbara and Midwest regions. Strategic ground shooting removed more than 100 feral goats from Cape Range National Park throughout the year while an aerial shoot removed a further 86 goats and one feral cat from the more inaccessible areas of the heavily dissected karstic range. Ongoing goat removal operations continued within the former Karara pastoral lease and trapping facilities at strategic locations were improved to reduce the impacts of grazing.

Throughout the year, the Department continued to take part in cooperative management of feral pigs across the South West, Midwest and Warren regions. The Midwest Region carried out feral pig control operations using 1080 baits in Moresby Range Conservation Park and a number of sites associated with Declared Rare Flora, and liaised with adjacent landowners to ensure coordinated management and to increase the effectiveness of control measures. The Warren Region and Murdoch University continued to collaborate on thermal imagery trials to detect the presence of feral pigs. Satellite tracking devices were fitted to feral pigs to determine home ranges and occupancy as well as give locational information during the thermal imagery flights.

The Great Southern District continued to control rabbits by baiting and fencing at sites where threatened flora has been determined to be at risk from grazing by this pest animal.

Successful baiting programs for rabbits were undertaken at Burma Road Nature Reserve and Moresby Range Conservation Park in the Midwest Region.

Pilbara Region staff continued to implement the *Fortescue Marsh Baiting Plan*. The project is delivering a feral cat control program to this high value conservation area and completed the fourth year of implementation in 2015. A trial was also undertaken to examine if northern quolls were at poisoning risk following an aerial application of *Eradicat*[®] cat baits on Yarraloola pastoral lease and adjacent unallocated Crown land. *Western Shield* staff provided operational support to these programs.

The Department contributed to the Federal Government's feral cat eradication program being conducted on Christmas Island, which is having success using the *Eradicat*[®] bait. A project trialling a hybrid feral cat bait, known as *Hisstory*, in the Kimberley was initiated with funding from the Federal Government's National Landcare Programme.

The Department developed policy and processes for using recognised hunting and shooting groups following a Parliamentary enquiry into recreational hunting on public lands. This will enable a consistent, formal approach to engagement of recognised groups to assist in the control of invasive pest animals on Parks and Wildlife-managed lands.

Operational highlights

Wildlife Management

Management of environmental weeds

A species-based prioritisation of weed species is being undertaken in each of the Department's nine regions, where weeds are assessed based on their invasiveness, impacts, potential and current distribution and feasibility of control. Work began on the development of regional lists identifying priority weed species and locations, a process that included consideration of biodiversity and other values at risk from these weeds. This process aims to maximise the efficiency and effectiveness of weed control efforts so each region can apply appropriate management actions. Research began into the development of a Statewide database and associated mobile field data capture software for weed management within the Department.

The main environmental weeds targeted for management by Parks and Wildlife in 2015–16 included introduced *Acacia* species, kapock (*Aerva javanica*), gamba grass (*Andropogon gayanus*), calotrope (*Calotropis procera*), pigface (*Carpobrotus edulis*), gallons curse (*Cenchrus biflorus*), buffel grass (*Cenchrus ciliaris*), red valerian (*Centranthus ruber*), skeleton weed (*Chondrilla juncea*), rubber vine (*Cryptostegia grandiflora*), boxing glove cactus (*Cylindropuntia fulgida* var *mamillata*) and other cactus species, dolichos pea (*Dipogon lignosus*), hyptis (*Hyptis suaveolens*), bellyache bush (*Jatropha gossypifolia*), *Juncus acutus*, Victorian tea-tree (*Leptospermum laevigatum*), African boxthorn

(*Lycium ferocissimum*), mimosa (*Mimosa pigra*), parkinsonia (*Parkinsonia aculeata*), stinking passionflower (*Passiflora foetida*), mission grass (*Pennisetum polystachion*), date palm (*Phoenix dactylifera*), mesquite (*Prosopis* sp.), blackberry (*Rubus* sp.), tamarisk (*Tamarix* sp.), taro (*Colocasia esculenta*), grader grass (*Themeda quadrivalvis*) and verbesina (*Verbesina encelioides*).

Across the Kimberley, Parks and Wildlife nature conservation officers and the Miriuwung-Gajerrong, Yawuru, Bunuba, Wilinggin, Balangarra and Wunambal Gaambera Aboriginal native title groups implemented weed control programs for a range of species, including mission grass, hyptis, prickly acacia (*Acacia nilotica*), stinking passionflower, bellyache bush, grader grass, mimosa, parkinsonia, taro, calotrope, gamba grass and gallons curse. Rubber vine has been specifically targeted in a collaborative program involving government departments, community and industry groups, pastoralists and members of the public. The *Aquila Project*, coordinated by the Friends of the Fitzroy volunteer group and part of the broader *West Kimberley Rubber Vine Eradication Project*, is using members of the public to review aerial photos posted on a website to locate rubber vine infestations in the Fitzroy River Valley. Eradication of rubber vine, mimosa and gamba grass infestations remain as the target for these Weeds of National Significance. The Kimberley Region

continued to use *CyberTracker* software on hand-held devices for mapping and recording weed data with great success.

Mount Gibson Mining, Pilbara Corridors and Parks and Wildlife continued to fund work being undertaken by CSIRO at several Kimberley sites and Millstream Chichester National Park in the Pilbara to investigate the ecology and quantification of the threat posed by stinking passionflower to natural vegetation. Through support from the National Environment Science Program's Northern Australian Environmental Hub, the research collaboration between CSIRO and Parks and Wildlife on this invasive weed was extended to include impacts the weed is having on riparian habitats along the Fitzroy River, in particular habitats used by freshwater crocodiles for egg laying.

In the Pilbara, work continued on the *Chichester and Fortescue Catchment Weed Strategy*, a collaboration between Pilbara Corridors, Atlas Iron, CSIRO and Parks and Wildlife. With the support of Roy Hill, this strategy has now been expanded to cover the entire Pilbara bioregion. A concerted effort to capture weed records held by environmental consultants, resource companies and other government agencies was extremely successful with more than 37,000 additional weed records being obtained.

Control of priority weed species in Millstream Chichester National Park wetlands was undertaken as an ongoing collaborative effort between Parks and Wildlife, Rangelands NRM, *Pilbara Corridors*, Ngurrawaana Rangers, Yindjibarndi Aboriginal Corporation and traditional owners. Rangers from the Murujuga Aboriginal Corporation continued to map the distribution of priority weed species in Murujuga National Park near Karratha, with a strong focus on the management of stinking passionflower.

In collaboration with the Pilbara Mesquite Management Committee, the Pilbara Region has undertaken extensive treatment of the parkinsonia infestation on the former Karratha pastoral lease.

Parks and Wildlife Barrow Island reserves officers started a collaborative project with Chevron Australia investigating methodologies aimed at eradicating buffel grass from Barrow Island Nature Reserve through a combination of vegetation clearing, residual herbicides and artificial watering. On-ground works also started aimed at eradicating buffel grass on Double Island within the Boodie, Double and Middle Islands Nature Reserve.

Exmouth District staff treated more than 9440ha to control weeds within the district. This included a program that commenced in 2011 to remove and prevent reinvasion of kapok into Cape Range National Park, where the amount of herbicide and time required for control of kapok outbreaks reduced by up to 90 per cent and 80 per cent, respectively.

In the Midwest Region, mesquite and tamarisk control was undertaken on One Tree Point Nature Reserve with the *Remote Regions Conservation and Parks Program* and Carnarvon Land Conservation District Committee. Mesquite control was also undertaken on the former Boologooro pastoral lease and follow up control of date palms was undertaken at Kennedy Range National Park. The Shark Bay District continued to control isolated infestations of verbesina on South Peron unallocated Crown land and buffel grass on Bernier Island with the intention of eradicating them before they become established. African boxthorn control continued on Beagle, Fisherman's, Milligan, Lipfert, Favorite and Boullanger Island nature reserves, with more than 200 mature plants removed from Beagle Island, WA's largest Australian sea lion breeding colony, with the assistance of volunteers. The Moora District also controlled isolated verbesina infestations, *Juncus acutus* at Lake Thetis and skeleton weed in Watheroo National Park.

Swan Region continued research into environmental weeds invading native plant communities. The results of three years of post-fire monitoring at Paganoni Swamp showed that fire can facilitate invasion of pigface and that post-fire grazing by kangaroos, while impacting native plant recovery, also significantly reduces weed cover post-fire. Weed management trials that started in 2014 in the coastal shrublands on Penguin Island continued in 2015 and results indicate that reestablishing *Rhagodia* shrublands through brushing and direct seeding could be a very effective method of displacing annual weeds and restoring native vegetation cover. Implementation of weed management and restoration plans continued across 23 reserves extending over 600ha. A monitoring framework using ground-based and remote sensing data continued to assess the long-term effects of weed control and bushfire on banksia woodland biodiversity and condition. Weed management notes on FloraBase were updated.

As a part of the *Banksia Woodland Restoration Project*, weed management action plans were implemented with a major focus on veldt grass control in banksia woodland. Monitoring was undertaken to investigate the impact of weed management on plant recovery and diversity after fire in banksia woodland.

The Goldfields Region continued to work closely with the Goldfields-Nullarbor Regional Biosecurity Association, Rangelands NRM and DAFWA through a cactus working group to target the eradication of Weeds of National Significance cactus species within the Great Western Woodlands and Goldfields Region. Parks and Wildlife continued to engage with local governments and the community regarding the control of cactus species, major infestations of which are outside lands managed by the Department. In 2015–16, the focus was on areas around Kalgoorlie and in the Shire of Menzies.

The Department's South Coast Region continued to work in partnership with the Friends of the Porongurup Range to control weeds in and around Porongurup National Park. The long-running project targeted species such as blackberry, red valerian, dolichos pea and introduced acacias. Weed control also occurred in key reserves near Albany and Esperance, including Victorian tea tree control in Warrenup Nature Reserve in partnership with South Coast NRM. The Warrenup area experienced a significant bushfire in 2016 which may have killed Victorian tea tree seed across a substantial area. Further control work is ongoing.

More information on invasive plant species control is available on the Department's website www.dpaw.wa.gov.au/management/pests-diseases.

Plant disease management

Phytophthora dieback

In 2015–16, the Ecosystem Health Branch began the review and revision of Parks and Wildlife's processes and procedures for *Phytophthora dieback* management to bring them in line with the new *Corporate Policy Statement No. 3 Management of Phytophthora Disease* (August 2015).

The new system, launched in September 2014, for registering *Phytophthora dieback* interpreters and monitoring standards of interpretation is now well established. At 30 June 2016, there were 14 registered *Phytophthora dieback* interpreters employed in the Department and 14 operating in the private sector. The system is ensuring that consistent, high-quality information on disease occurrence is available to land managers and underpins management of *Phytophthora dieback* on and off Parks and Wildlife-managed land.

The Parks and Wildlife Vegetation Health Service (VHS) continues to support the efforts of *Phytophthora dieback* interpreters and land managers through the analysis of soil, plant and water samples for presence of *Phytophthora* species. In 2015–16, the VHS processed more than 1893 samples from across the State's south-west. *Phytophthora cinnamomi* accounted for 90 per cent of all positive recoveries. Five other *Phytophthora* species were identified in association with

Operational highlights

Wildlife Management

dying native flora, with *P. multivora* being the most common after *P. cinnamomi*, but accounting for less than five per cent of all positive recoveries. The VHS continued to work in partnership with the Centre for Phytophthora Science and Management at Murdoch University to DNA-sequence recent and historical WA isolates from the VHS culture collection.

At 30 June 2016, 691 Parks and Wildlife, Department of Environment Regulation and Forest Products Commission staff and contractors had received green card level 1 training in awareness and basic *Phytophthora* dieback hygiene and myrtle rust awareness. In addition, 131 Parks and Wildlife staff had undertaken a one-day refresher course in hygiene management planning.

The Department continued its collaboration with the *Western Australian State Phytophthora Dieback Management and Investment Framework* (Project Dieback), which was funded by State NRM and administered by South Coast Natural Resource Management Inc. Project Dieback identified an indicative top 100 areas for priority protection against the threat of *Phytophthora* dieback of which 75 per cent are on Parks and Wildlife-managed land. Dieback protection works included track realignment, upgrades and closures, drainage control works, and installation of green bridges, gates to control seasonal traffic access, stations for cleaning footwear, and interpretative signage.

Treatment of critically endangered flora and ecological communities with phosphite was undertaken to protect susceptible plants from the impacts of *P. cinnamomi*. In 2015–16, aerial phosphite spraying over 293ha was undertaken treating ‘Eastern Stirling Range montane heath and thicket’ (a Threatened Ecological Community listed under the Federal EPBC Act) and declared rare flora (listed under the WC Act) in the Stirling Range, coastal areas and Millbrook Nature Reserve.

In the South Coast Region, innovative *Phytophthora* control techniques continued to be employed at two infestations in Fitzgerald River National Park. Impermeable barriers installed in the soil around the Bell Track infestation, designed to prevent the physical movement of the *P. cinnamomi*, were successful in preventing further westward spread of the disease.

Myrtle rust

Myrtle rust (also known as eucalyptus and guava rust) is a fungus of South American origin that arrived in New South Wales in 2010 and has since rapidly spread along the eastern seaboard and into northern Australia. It affects plants from the Myrtaceae family, of which more than 1500 species occur in WA. WA and South Australia remained free of myrtle rust in 2015–16.

In April 2016, the Department was invited to participate in a national workshop on myrtle rust in Brisbane. Myrtle rust is significantly

affecting natural ecosystems in Queensland and northern New South Wales where it is predicted that the pathogen will cause extinctions of susceptible plants species in the future, and may lead to currently common and widespread plant species becoming rare and threatened. These findings reinforce the need for biosecurity vigilance in WA to keep the pathogen out of the State.

Altered hydrology and salinity

In the Drummond catchment in the north-eastern Swan Region, further on-ground works focused on managing roadside drainage and bunding to address the threat of surface water wash from heavy summer rainfall events bringing weeds and stubble mulch into the reserve and the south-western claypan. Feral pigs were successfully removed and monitoring was undertaken to assess any re-invasion. Effective weed control adjacent to the south-western claypan was undertaken and groundwater bores in Drummond Nature Reserve continued to be monitored.

At Lake Bryde in the Wheatbelt, significant progress was made towards developing a draft recovery plan. Recovery actions during the past year included 96,000 seedlings planted on 68ha of public and private land, in partnership with the Department’s *Remote Regions Nature Conservation Program*. Monthly and biannual bore monitoring is ongoing, with landholders now able to request data for bores located on their property.

Surveys have been conducted to identify new populations of the endangered flora species *Duma horrida* subsp. *abdita* within the catchment. Development started on a conceptual design for the Lake Bryde inlet to divert the first saline/eutrophic winter flows away from the lake but to allow entry of subsequent fresh water flows. Review of hydrology data collected over the past 10–15 years started and groundwater and surface water monitoring programs were rationalised to suit the Department’s future water management requirements. Two newsletters were distributed to stakeholders and landholders providing information on management actions.

At Toolibin Lake in the Wheatbelt, the recovery catchment planning process was completed, with a recovery plan in the final stage of development. Monitoring of catchment hydrology and biodiversity continued with vegetation and groundwater monitoring. Summer saw the lake partially fill with daily salinity levels and flow readings recorded over a week. Regular works and maintenance to the groundwater pumping system on the floor of the lake have contributed to greater pumping volumes and 8000 native seedlings were planted on conservation reserves and private property situated upslope of Toolibin Lake to manage surface water flows and connect conservation reserves. High resolution topographic data has been acquired and quality assured to assist in

managing surface water, while a three-dimensional hydrogeological model is being developed to optimise the groundwater pumping program.

In the Muir-Unicup recovery catchment, a rationalised groundwater monitoring program was continued, in part to provide data for the peat wetlands project that is investigating hydrogeochemistry to assess acidification risks (see page 70).

Surface water depth and quality monitoring is undertaken monthly for the Lake Warden system including monthly lake depth measurements, increased to fortnightly and then weekly when trigger levels for operating the Lake Wheatfield pipeline are approached. During 2015–16, the Lake Wheatfield gravity pipeline remained closed due to below average rainfall for the catchment. The Lake Warden and Gore Technical Advisory Group continues to meet quarterly.

More information on salinity management work conducted in Parks and Wildlife collaborative projects under the Future Farm Industries Cooperative Research Centre can be found on the Department's website www.dpaw.wa.gov.au/management/salinity.

Assessment of land and resource use impacts on public reserves and biodiversity conservation assets

During 2015–16, the Department continued its significant role in providing advice to proponents and decision-making authorities on a range of major resource and other development proposals affecting Parks and Wildlife-managed lands and waters, other areas of conservation value and significant species and ecological communities. The aim was to guide the effective management of development projects and activities so as to maintain or improve nature conservation outcomes for lands and waters managed under the CALM Act and species protected under the WC Act.

Advice was provided on a range of mining and petroleum exploration and development projects, primarily on land managed by the Department, such as the Cyclone Mineral Sands Project in Great Victoria Desert Nature Reserve, seismic survey in Beekeepers Nature Reserve, Ocean Reef marina proposal in Marmion Marine Park, proposed iron ore mining in Mount Manning – Helena-Aurora Ranges Conservation Park, uranium mining projects in the Goldfields and basic raw material extraction and road infrastructure proposals in State forests at Gngangara.

The Department also provided significant input to about 2000 land-use proposals, including town planning schemes, structure plans, subdivisions, development applications and native vegetation clearing permits across the State. The Goldfields Region hosted several visits to the Helena-Aurora range area by interested groups.

Parks and Wildlife provided support in implementing the responsibilities of the Environment Minister and statutory authorities in considering and providing advice under sections 24 and 24A of the *Mining Act 1978* and section 15A of the *Petroleum and Geothermal Energy Resources Act 1967* on access to lands and waters managed under the CALM Act. The Department provided advice and recommendations on whether, and under what conditions, access (mining tenements and 'entry on to land') to areas of CALM Act-managed lands and waters should be granted.

Parks and Wildlife also fulfilled various responsibilities for advice and decision-making under the provisions of State Agreement Acts for resource development projects affecting land managed by the Department, in particular bauxite mining and rehabilitation activities in State forests of the south-west by Alcoa of Australia and Worsley Alumina, coal mining and rehabilitation activities by Yancoal Australia and Lanco Griffin Coal and Talison's lithium and tantalum mining operations at Greenbushes.

Parks and Wildlife provided advice on relevant clearing principles to the Department of Environment Regulation and Department of Mines and Petroleum for the assessment of applications to clear native vegetation under Part V of the *Environmental Protection Act 1986*. Advice was provided on biodiversity values, threatened and priority flora, fauna and ecological communities, wetlands and adjacent conservation areas.

Operational highlights

Wildlife Management

Building biodiversity knowledge

Biological inventory

Terrestrial inventory

The Department, with a number of partners, undertakes regional surveys of key areas to provide information on the biodiversity assets in these areas. The outcomes of two large, multi-disciplinary surveys were released in 2015–16. The hardcover book (*Records of the Western Australian Museum, Supplement 81*) with papers arising from the Kimberley Islands Biodiversity Survey was officially launched. For the Pilbara Biological Survey, the two volumes (*Records of the Western Australian Museum, Parts 1 and 2 of Supplement 78*) were also launched, a further 3000 plant voucher specimens were lodged with the Western Australian Herbarium and four reptile taxonomic papers, including two revisions, were published.

Through a partnership with the Terrestrial Ecosystem Research Network (TERN), 28 AusPlots Rangeland sites were established and sampled in the Pilbara, Victoria Bonaparte, Central Kimberley, Dampierland and Great Sandy Desert bioregions. Nineteen of these sites were in the Pilbara and were funded through a collaboration with *Pilbara Corridors*. Plant species collected during the 2014–15 campaign were identified by the Western Australian Herbarium and a large volume of soil and vegetation data was provided to the TERN Aekos facility and the

National Soils Archive in Canberra. For the *South-Western Australia Transitional Transect* project, further data analysis was undertaken to better understand patterns in sandplain vegetation beta diversity and complementarity with patterns in the Yilgarn banded ironstone formations.

To inform conservation planning on the Swan Coastal Plain, vegetation complex mapping continued, surveys of flora south of Bunbury at Ippollo Road and Harrisdale Swamp were undertaken, a survey of flora in Lambert Lane Nature Reserve was published and other papers are nearing completion.

Analyses were completed for the Fortescue Marsh floristic and vegetation mapping project, which is supported by Fortescue Metals and BHP Billiton Iron Ore. Identification of 2976 collections from 128 permanent plots has documented 352 taxa, including two new species with one recently described (*Dysphania congestiflora*), new populations for 14 taxa of conservation significance (four are new records for Fortescue Marsh), and recorded major range extensions for 19 taxa. The analysis has resolved 20 floristic communities occurring on the Marsh, including unique gypsum outcrop communities not previously known from the marsh. The mapping of these communities is nearing completion and will be a valuable conservation planning tool for this nationally important wetland.

Four biological surveys of selected island nature reserves within the *Pilbara Islands Project*, funded by a Wheatstone Project offset, were completed. These surveys identified 65 bird species, three native mammals including the pale field rat (*Rattus tunneyi*), little red kaluta (*Dasykaluta rosamondae*) and Lakeland Downs mouse (*Leggadina lakedownensis*), nine species of terrestrial reptile and four species of nesting marine turtle. Vegetation mapping has been undertaken and flora specimens from 20 islands lodged with the WA Herbarium. A total of 193 plant species from 43 families have been recorded across the project islands to date, including two new records for priority species (*Lepidium biplicatum* and *Corchorus congener*) and a range extension (*L. biplicatum*). Invasive species present a risk to islands located close to the mainland, with evidence of black rats, foxes, cats and house mouse detected on some islands. Weed mapping has started, and two introduced mesquite plants were removed from Potter Island. The intensity and nature of public visitation has been recorded, with minimal visitation impacts observed to date. Marine debris surveys have started, and geological, cultural and archaeological surveys have been undertaken in collaboration with The University of Western Australia, Curtin University and the WA Museum.

A number of small scale survey projects have filled knowledge gaps on biodiversity distribution. A report on the flora component of a 2014 survey of the Peterswald 1:100,000 map sheet area (northern Great Victoria Desert) was produced. This is one of a number of map sheets identified by the Federal Government through the *Black Spot* program as areas where little biodiversity information exists. A total of 381 plant species were identified, of which 18 per cent were new records for the Great Victoria Desert, seven are priority flora and two may be previously unknown species.

In September 2015, a similar survey in a remote part of the northern Nullarbor was undertaken (Colville 1:100,000 map sheet) and a report on the results of the vertebrate survey was produced. In total, 83 species of vertebrate fauna were recorded, including 40 birds, 27 reptiles, 12 native mammals and four introduced mammals, of which 14 had not previously been recorded in the survey area and three had not previously been recorded in the Nullarbor Northern-Band subregion. Flora identifications for this survey are underway.

A survey of reptiles and mammals was undertaken over two weeks in the Kiwirrkurra Indigenous Protected Area in September 2015. This work was a collaboration between traditional owners, the Commonwealth's *BushBlitz* program, the Western Australian Museum and consultants. This is a poorly

surveyed region of the State and from the more than 300 captures and observations a total of 67 species of native vertebrates, including one frog, 48 reptiles and 18 mammals were identified. At least five of the reptiles and eight of the mammals (one dasyurid and seven bats) were new records for the area. A number of Aboriginal rangers were directly engaged in the survey resulting in a high level of exchange of traditional and science knowledge between participants. Voucher material and more than 270 genetic samples were collected.

Survey and monitoring guidelines for the sandhill dunnart and a baseline survey design in the Great Victoria Desert were completed on behalf of the Great Victoria Desert Biodiversity Trust. This will ensure standardised and effective data collection for this endangered marsupial and help to better define their distribution in WA. An intensive camera trapping trial continued at Dryandra Woodland to refine and improve the use of this technology for mammal surveys, for both native and introduced animals. This work has broad application for biological survey, establishment of baseline monitoring data, assessing the effectiveness of introduced predator control and could be used in programs such as *Western Shield* and *FORESTCHECK*. Camera traps are now being incorporated into operational fauna monitoring programs at Dryandra and other sites.

Survey data of wetland associated flora along the Jurien coast is being analysed. These data will inform conservation planning in reserves such as Beekeepers Nature Reserve, including assessment of gypsum mining proposals and sustainable water resource planning. A survey of flora and fauna in the Waylarta (Mandora Marsh) area was undertaken in spring 2015 with support from BHP Billiton. This will inform current conservation planning and on-ground management of this new addition to the conservation estate. Analysis of a 2014 partial survey of wetland invertebrates in the Goldfields region undertaken in response to a rare rainfall event and published in *Conservation Science Western Australia* revealed a large number of significant range extensions and some new species.

The Department continued to take the lead in the coordination of biotic and abiotic data for wetlands, including mapping wetland type, extent and distribution in the landscape using the geomorphic wetland classification system. During the year, the Department assessed the accuracy of the wetlands mapping layer for the Swan Coastal Plain (Geomorphic Wetlands Swan Coastal Plain dataset) at 13 sites over the 364,960ha of the dataset.

Surveys of threatened and priority flora, native animals and ecological communities were undertaken or coordinated by the Department. Details are provided in the threatened species and ecological communities recovery section on page 53.



Animal Science Program leader Keith Morris leads volunteers to monitor golden bandicoots in Matawa (Lorna Glen). Photo – Jennifer Eliot/Parks and Wildlife

Operational highlights

Wildlife Management

Marine inventory

The Department continued long-term ecological monitoring to inform the adaptive management of WA's marine parks and reserves and threatened marine fauna. The Department's marine scientists and regional management staff work with external collaborators at the Australian Institute of Marine Science, CSIRO and the University of Tasmania to deliver the marine monitoring program. During 2015–16, fieldwork in temperate marine reserves focused on seagrass, fish and algal communities at Ngari Capes, Shoalwater Islands, Jurien Bay and Shark Bay marine parks, and benthic invertebrates at Walpole and Nornalup Inlets Marine Park. Little penguin (*Eudyptula minor*) monitoring continued at Shoalwater Islands Marine Park and Penguin Island. In northern regions, surveys on fish and coral communities were undertaken at Ningaloo Marine Park and the Barrow and Montebello islands marine reserves, with a particular focus on monitoring coral recruitment, while mangrove monitoring was undertaken at Shark Bay and Ningaloo marine reserves. Updated monitoring reports were provided to marine park managers in late 2015. In early 2016, Department marine scientists participated in collaborative surveys of Kimberley and Pilbara marine reserves to detect coral bleaching before and during periods of predicted elevated ocean temperatures in the region during March–April. Coral bleaching was observed

along the Kimberley coast north of Broome and at some offshore atolls, such as Scott and Seringapatam reefs. Only limited coral bleaching occurred at Rowley Shoals Marine Park during this period, and none was seen further south at the Ningaloo and Barrow and Montebello islands marine reserves.

The Department hosts the node leadership and science coordination of the Western Australian Marine Science Institution's (WAMSI) \$12 million *Kimberley Marine Research Program*. This research initiative will inform and support the planning and management of new marine parks and reserves in the Kimberley, through 25 integrated science projects, supported by an estimated \$18 million co-investment by WAMSI partners. The research is providing new knowledge on marine habitats, biodiversity and ecological processes across the Kimberley, including information on human use and values, with final findings planned for publication in 2017. Parks and Wildlife staff work on some WAMSI projects, including a survey of marine turtle nesting beaches in partnership with traditional owners and research into key ecological processes associated with fish and coral recruitment.

The Department's marine scientists continue to implement collaborative research projects that address key management-related knowledge gaps in WA's marine parks and reserves. During 2015–16, research on the

ecological significance of macro-algae as a key habitat for juvenile fish in coral reef ecosystems continued at Ningaloo Marine Park, while research on intertidal reef communities at Ngari Capes Marine Park and benthic invertebrate communities at Walpole and Nornalup Inlets Marine Park also progressed. These studies are being used to establish suitable indicator species and a baseline assessment of reef condition for ongoing monitoring, evaluation and reporting. Research on mangrove communities in Shark Bay Marine Park found stands to be diverse in structure and complexity and supporting unique algal assemblages, and a new research project that will examine the invertebrate and fish assemblages associated with temperate seagrasses is being developed.

Implementation of research and monitoring associated with industry offset programs continued during 2015–16. Funded through a Gorgon Gas Project offset, the *North West Shelf Marine Turtle Conservation Program* aims to increase the conservation and protection of the North West Shelf flatback turtle population. Several impact studies progressed during 2015–16, including research on the influence of artificial light on hatchling behaviour, fox predation on turtle hatchlings and eggs and the impacts of climate change on marine turtle incubation. In addition, the program focused on establishing long-term monitoring sites and identifying the distribution of marine turtles.

More than 20 adult female flatback turtles were satellite tracked from nesting sites in the Pilbara and the Kimberley to foraging areas in WA, Northern Territory and Commonwealth waters, some up to 1300km away and in water depths of over 100m.

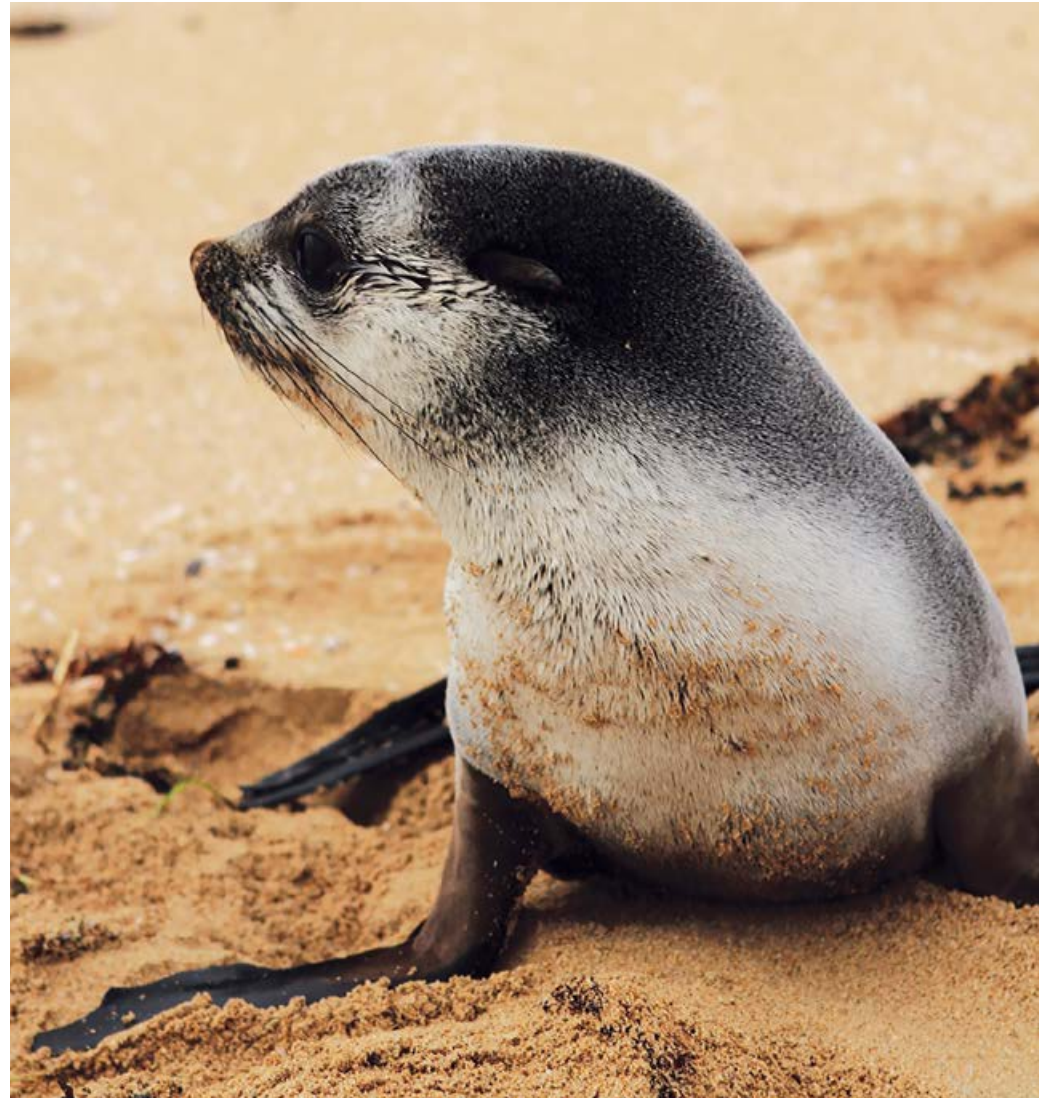
Marine fauna research funded by the Wheatstone and Pluto development offsets during 2015–16 involved boat-based field surveys and an extended aerial survey to determine the abundance and critical habitats of dolphins and other large marine fauna in coastal Pilbara waters. An extensive field program associated with a Wheatstone development offset-funded regional-scale study of the connectivity and recovery potential of Pilbara marine ecosystems following natural and human-induced disturbance concluded during 2015–16. This project will focus on data analyses and reporting during the next year. A program funded by the Pluto development offset to establish long-term monitoring in the proposed Dampier Archipelago marine reserves progressed, with monitoring sites established and baseline data collected for benthic habitats and fish communities.



Aerial view of the winter-nesting flatback turtle rookery at Cape Domett, north of Kununurra, taken as part of the Western Australian Marine Science Institution turtle research project.
Image – WAMSI Turtle Project



Rowley Shoals Marine Park. *Photo – Suzanne Long/Parks and Wildlife*



Subantarctic fur seal on Garden Island. *Photo – Rick Dawson/Parks and Wildlife*

Operational highlights

Wildlife Management

Taxonomy and biotic collection management

The number of plant specimens held at the Department's Western Australian Herbarium increased by 1.26 per cent (a net increase of 9596 specimens), bringing the total number of specimens held to 769,256.

At 30 June 2016, the collection at the WA Herbarium comprised specimens from all major groups of plants, algae, mosses, lichens and fungi (Table 17).

During the year, 881 specimens were loaned to other institutions and 1277 specimens were received on loan from other herbaria. The WA Herbarium forwarded 1303 specimens to and received 294 exchange specimens from other Australian and international herbaria.

The reference herbarium of vascular plants has 14,899 specimens representing 11,764 taxa and was used by 1272 visitors during the year.

Records of all specimens incorporated into the WA Herbarium are entered into the WA Herbarium specimen database, WAHerb. During the year 9596 specimen records were added to WAHerb, including 1095 priority flora and 220 threatened flora. The total collection of priority and threatened flora comprises 49,702 specimens.

Table 17: Number of specimens in different taxonomic groups in the WA Herbarium collection

Taxonomic group	Number of specimens	Increase since June 2015	
	(June 2016)	Number	Percentage
Myxomycetes	943	3	0.32
Fungi	25,792	416	1.64
Lichens	18,279	211	1.17
Algae	23,972	473	2.01
Liverworts and hornworts	2139	31	1.47
Mosses	6940	28	0.40
Ferns and fern allies	3811	59	1.57
Gymnosperms	2090	22	1.06
Flowering plants	685,290	8353	1.23
Total	769,256	9,596	1.26



Dragon orchid. Photo – Mark Brundrett/Parks and Wildlife

Fire and biodiversity research projects

Parks and Wildlife partnered with the Biodiversity Fund, Charles Darwin University (CDU) and Australian National University to investigate the impacts of fire regimes on breeding success of the Gouldian finch (*Erythrura gouldiae*) in the Kimberley. This joint project is investigating whether finch declines are related to reduced sorghum seed quality due to impacts of fires on soil nutrient status. Detailed spatial fire maps derived from GIS remote sensing imagery (2006–15) were used to stratify seed collections across the full fire frequency gradient to look at the effects of fire on seed quality. Analyses to date reveal that breeding finches prefer recently burnt sites and sites that are burnt by many small fires, while they avoid frequently burnt sites and sites burnt in extensive fires. This suggests that finches benefit from nutritional flushes in soils and edible grass seeds after fire, but that too frequent fires degrade soil nutritional status. In addition, fine grain fire mosaics resulting from multiple small fires allow the finches to access a range of perennial grass seeds in the lead up to the breeding season.

A joint Parks and Wildlife, Melbourne University and CDU project has been initiated to investigate the role of fire mosaics and tree hollow distributions in determining abundance patterns among threatened arboreal mammals. This project is being undertaken in the north Kimberley and the Northern Territory in conjunction with the *Kimberley Science and Conservation Strategy* and Northern Territory

monitoring programs. GIS techniques using remote sensed fire data and on-ground tree-hollow surveys will be used to link fire with mammal distributions. Artificial nest boxes will also be used to test for nest hollow limitations in areas with higher fire frequency and lower mammal abundance.

A joint Australian Research Centre project between Parks and Wildlife, University of Tasmania and CDU, based in the Kimberley and northern Australian savannas, studied the effect of feral cats on small mammal persistence, use of fire mosaic landscapes by critical weight range (CWR) mammals, distribution of genetic variation in northern quoll populations, and habitat use and occupancy of feral cats in structurally complex versus simple habitats. These studies all contribute to an increased understanding of how predator (feral cat) and prey (CWR mammals) species ecology is influenced by the effects of fire mosaics and feral herbivores (for example cattle, horses, donkeys) on vegetation and the habitat structure that support them. The results emphasise the importance of small patchy fires and low grazing pressure in maintaining threatened mammal populations. They also improve knowledge of the mechanisms leading to population declines among threatened mammals under regimes of heavy grazing and extensive late dry season fires, which make mammals open to enhanced predation rates by feral and native predators.



Gouldian finch. Photo – Babs & Bert Wells/Parks and Wildlife



Northern quoll. Photo – Judy Dunlop/Parks and Wildlife

Operational highlights

Wildlife Management

The Department's Central Wheatbelt District continued to provide assistance for the Wongan Hills State NRM-funded threatened flora fire management project, which included collecting seed from critically endangered and endangered plant species, analysing soil seed banks, and quantifying and testing the viability of canopy-stored seed from common serotinous species under threat of becoming locally extinct in long unburnt areas. The project is also testing the viability of old seed collections of common species stored under less than ideal conditions to gain some understanding of potential seed bank longevity of threatened species in the same genera.

A joint research program involving the Department and CSIRO has continued to improve the understanding of fire regimes and ecological responses to fire in the Great Western Woodlands (GWW). Stands of gimlet (*Eucalyptus salubris*) were sampled at 100 plots systematically located across the GWW to estimate stand-class structure, and via linking with models estimating tree age from tree size and woodland age-class distribution. A methodology to sample tree and shrub, woody debris and litter carbon pools was evaluated at pilot sites.

The adaptive management project continued in Quarram Nature Reserve in the Warren Region, with the aim of protecting and promoting the structure and ecological

integrity of a native grassland PEC through the introduction of experimental fire. It is considered that the existing infrequent fire regime has promoted the encroachment of shrubs into the PEC by allowing them additional time to mature and store large amounts of seed in the soil, and then rapidly outcompete grasses. Two monitoring plots have been established in the PEC; the first area to be exposed to fire on a two to three-year rotation, and the second to be exposed to a 'normal' six to eight-year rotation. Fences were erected around half of the plots, to exclude native herbivore grazing and determine the impact of post-fire grazing by herbivores in grasslands.

The plots are monitored annually during the flowering period, recording flora species and an estimate of abundance. Monitoring from a 2014–15 prescribed burn was undertaken in 2015–16 and analysis of results is underway.

Findings from a nine-year study of tree recovery and seedling regeneration following a 2001 bushfire in forest of red tingle (*Eucalyptus jacksonii*) and karri (*Eucalyptus diversicolor*) at Walpole were published, suggesting that tall open eucalypt forests in south-west Western Australia rarely experience complete stand replacement even following intense fires, and that multi-aged stands are common. Knowledge gained from this study informed management actions taken following the large O'Sullivan bushfire near Northcliffe in February 2015.

After the completion of a prescribed burn at Dryandra Woodland, further investigations started to improve the processes for the restoration of *Gastrolobium* thickets, which are important for the persistence of healthy populations of native animals in this area.

Monitoring of kwongan heath in Wheatbelt reserves continued and recovery activities at Wongan Hills were implemented to prevent further loss of diversity in the short term. Optimal fire return intervals for critically endangered flora and their associated vegetation types were determined, ensuring the long-term health and resilience of the ecosystem.

More information on fire and the environment is available on Department's website www.dpaw.wa.gov.au/management/fire/fire-and-the-environment.

Information and data management

NatureMap provides access to high-quality biodiversity data through a publicly visible web portal. In 2015–16 many new datasets were added, including *Bush Blitz* surveys from Cane River and Credo Station, a rakali community survey and the Threatened Flora Seed Centre database. In particular, *NatureMap* now hosts collections and observations of WA taxa held in many external systems courtesy of the *Atlas of Living Australia*. Combined with existing holdings, *NatureMap* now provides the

most comprehensive data warehouse available of WA plants and animals. Occurrence records now total around 4.2 million, a 24 per cent increase during the year. Industry and private individuals continue to dominate user registrations for access to *NatureMap*, with total registrations increasing by 12 per cent to 2184.

Redevelopment of the Fauna File database, used to manage native animal survey and monitoring data, continued. The upgraded system will make information easier to access and improve analysis and reporting capacity.

Development has continued on the Department's biological survey database, BioSys. Starting initially with data from the Landscape Conservation Initiative undertaken under the *Kimberley Science and Conservation Strategy*, data from the recent Kimberley Islands survey has been incorporated. Work is continuing on data import and curation.

Encouraging public understanding and support for biodiversity conservation

The Credo Field Study Centre and Supersite near Kalgoorlie, which opened in October 2013, continued to be used for research and seminars. The focus of the research and Supersite is the OzFlux climate station at Credo former station that will monitor the energy, water and carbon balance of mature eucalypt woodland. The Supersite also links with the AusCover initiative of TERN (led in WA by Curtin University), which develops calibrated and value-added remote-sensing products using ground-based measurements in the Great Western Woodlands and other supersites.

The Department continued to work with the Goldfields Land and Sea Council in the Kalgoorlie area, providing casual employment opportunities for Aboriginal rangers during bushfire mitigation operations, cactus control and reserve management activities.

In the Kimberley, about 200 traditional owners were engaged through direct employment and on a fee-for-service basis in 2015–16 under the *Kimberley Science and Conservation Strategy*. This included joint management meetings, consultations on management plans, and participation in scientific monitoring and environmental programs such as fire management and weed control.

The Pilbara Region continued to work in partnership with Rangelands NRM and Greening Australia to undertake activities with landscape-scale benefit for the *Pilbara Corridors* project. This five-year project is funded through the Federal Government's Biodiversity Fund. The project is a collaboration with people in the Fortescue River catchment of the Pilbara region (pastoral and mining land managers and the Aboriginal community) through shared knowledge and best practice. It focuses on landscape-scale activities that connect across management boundaries providing coordinated responses to biodiversity threats, including fire management and mitigating the spread of invasive weeds and feral animals through mapping, data management and targeted on-ground control.

Provision of biodiversity conservation support and advice for private land

Roadside conservation

Parks and Wildlife's administration of the Roadside Conservation Committee (RCC) continued, with funding support from Main Roads WA. The RCC seeks to facilitate best practice management of remnant vegetation in transport corridors through raising awareness, liaison and cooperation. The RCC met four times during 2015–16.

A training workshop on best practice roadside vegetation management was delivered to senior staff and the work crew of the Shire of York, and a presentation on roadside vegetation survey was made to the Shire of Kalamunda.

In conjunction with Parks and Wildlife's Geographic Information Systems (GIS) Branch, development and testing of a smartphone app for volunteers to survey roadside vegetation began. The app will enable survey data transfer to GIS programs to generate maps and data for shire reports.

Nominations were prepared for three new Flora Roads in the Shire of Ravensthorpe.

A range of activities to raise awareness of roadside conservation and engage with stakeholders were undertaken. This included the RCC executive officer attending the WA Transport and Roads Forum run by the Western Australian Local Government Association (WALGA), which was an opportunity to engage a range of stakeholders and follow developments in the transport industry, and presenting about services available from the RCC at the NRM forum in Nungarin in October 2015, where about 15 shires were represented. Site visits were also made to inspect proposed roadworks.

Work continued to improve public access to RCC's conservation value mapping data through WALGA's Environmental Planning Tool (an online spatial data viewer used by many local governments) to make data on weeds and habitat values available through a GIS application for the first time. This is timely with the impending move to GIS-based collection of field data.

The RCC prepared several publications on a range of topics relating to roadside vegetation management and continued to respond to enquiries and concerns from local governments and individuals regarding roadside conservation matters.

More information about roadside conservation and the RCC is available on the Department's website www.dpaw.wa.gov.au/management/off-reserve-conservation/roadside-conservation.

Operational highlights

Wildlife Management

Healthy Wetland Habitats

Healthy Wetland Habitats is a voluntary off-reserve conservation program that provides technical and financial assistance to private land managers for the management of wetlands of high conservation value on the Swan Coastal Plain, funded through a Main Roads WA environmental offset. Management action planning and funding of up to \$10,000 are offered to eligible landholders. Since the program began in 2006–07, 112 expressions of interest have been received and 30 agreements signed. Under these agreements, landholders have collectively committed to revegetation works on 67ha of wetland, weeding on 187ha of wetland and the installation of 7.5km of fencing to protect wetlands from stock.

Four voluntary management agreements were signed in 2015–16. These included:

- A property in the Shire of Harvey where 2.4km of fencing is being installed to protect 50ha of high ecological value wetlands. This property provides habitat for the vulnerable *Diuris drummondii*.
- A property in the City of Swan at which 8.5ha of weed control and 4.8ha of revegetation is planned to protect 6.6ha of high ecological value wetlands. This property provides complementary habitat to nearby reserves that support the critically endangered 'Communities of Tumulus Mound Springs (organic mound springs, Swan Coastal Plain)' TEC.

- A property in the Shire of Capel where 190m of fencing and 0.4ha of weed control and revegetation is planned to protect 2.9ha of high ecological value wetland. This property contributes to a regionally significant ecological linkage and provides potentially important habitat for the vulnerable western ringtail possum.
- A property in the City of Cockburn at which 95m of fencing and 1.2ha of weed control and revegetation is planned to protect 1.2ha of high ecological value wetland.

More information about *Healthy Wetland Habitats* is available on the Department's website www.dpaw.wa.gov.au/management/off-reserve-conservation.

Urban Nature

The *Urban Nature* program provides technical advice and on-ground support to land managers working to protect, manage and restore biodiversity in the Swan Region and beyond.

Working with stakeholders from community groups, private landholders, local government, State agencies and universities, *Urban Nature* conducted on-ground activities to facilitate best-practice bushland management and provided technical advice to land managers across the region. Much of the work involved adaptive management and research trials, and liaison with land managers to implement the results of the trials in 20 high-priority sites.

Technical support continued for managers of clay-based wetlands TECs, with an annual workshop and field day at Wandoo National Park. The workshop focused on addressing the threats of off-road vehicles to the significant values of the seasonal wetlands in the park. A research program focused on informing management of the 1312ha of remnant banksia woodland at Lowlands Nature Reserve was established.

Training and technical support for bushland management included workshops and field days, nine lunchtime seminars, presentations, newsletter articles and two peer-reviewed scientific publications. About 1900 copies of the quarterly newsletter *Bushland News* were distributed to support community involvement in bushland conservation and management.

Work with the Friends of the Shoalwater Islands Marine Park continued on the restoration of plant communities on Penguin Island, and in 2015 populations of Australian hollyhock (*Malva preissiana*) re-established through a series of direct seeding trials flowered and set prolific amounts of seed. Endemic to offshore islands, the Australian hollyhock became extinct from the island in the 1970s. The results will be used to guide reestablishment of hollyhock on the Shoalwater Islands and findings were presented at the *Natural history and management of the Shoalwater Islands and Marine Park* workshop organised by *Urban Nature* at Point Peron in July 2015.

Parks and Wildlife is coordinating the *Perth Banksia Woodland Community Restoration Grants* program to support community efforts to restore and manage banksia woodland. The *Urban Nature* program continued to support 20 community conservation projects in banksia woodland restoration by providing technical support and administering \$300,000 in *Perth Banksia Woodland Community Restoration Grants*.

The Department's *Find a Conservation Group* web application (www.dpaw.wa.gov.au/find-a-conservation-group) helps people locate and get in touch with groups actively working to protect and manage bushland in their local area. There are 152 groups that work to conserve and manage 32,000ha of bushland, wetlands and natural areas across the Swan Region.

More information about the *Urban Nature* program, publications and a list of grant recipients are available on the Department's website www.dpaw.wa.gov.au/management/off-reserve-conservation/urban-nature.

Land for Wildlife

The *Land for Wildlife* (LFW) program is a non-binding voluntary management agreement between the Department and private land managers. A total of 2081 properties are registered with the program. During 2015–16, five new properties were registered with LFW and at 30 June 2016, the total area of LFW sites was 286,615ha.

In May 2016, a partnership agreement was signed with NRM WA to provide regional support to *Land for Wildlife* registrants. This will be followed by discussions with each of the seven regional NRM groups to determine how the partnership may best operate in each region to support current and potential LFW members to protect local biodiversity.

A desktop property assessment method has been developed to combine use of spatial datasets with text and visual information provided by the landholder applying for registration. This has been successfully trialled and is now being applied. LFW organised a display at the Parks and Wildlife *Engaging with the Community* conference, and produced an edition of *Western Wildlife*. LFW's Facebook following almost doubled and posts were shared widely by like-minded individuals and organisations. Enquiries about the program from potential new members continued to be consistent indicating successful 'word of mouth' promotion by registrants.

More information about LFW is available on the Department's website www.dpaw.wa.gov.au/management/off-reserve-conservation/land-for-wildlife.

Nature Conservation Covenants

The *Nature Conservation Covenant* program assists private landowners with the conservation of bushland of high nature conservation value by placing a protective covenant on the land's title and providing management advice and assistance through incentives and a stewardship program.

At 30 June 2016, 266 covenants had been cumulatively established over 19,294ha of land, which support several threatened species and ecological communities, as well as wetlands (including Ramsar-listed wetlands), *Bush Forever* sites and registered Aboriginal sites. A further 31 covenants were in negotiation.

Since 2014, the majority of covenants prepared and registered by the Department's covenant program have been as a result of a subdivision condition. The south-west and south coast of WA have been a large focus of the covenants being put forward and continue to be key focus areas.

More information about the *Nature Conservation Covenant* program is available on the Department's website www.dpaw.wa.gov.au/management/off-reserve-conservation/nature-conservation-covenant-program.

Animal ethics

The *Animal Welfare Act 2002* prohibits the use of animals for scientific purposes without a licence issued under the provisions of the Act. The Department holds a licence to use animals for scientific purposes and Department staff are required to comply with licence conditions and abide by the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes, 8th Edition, 2013*. Under the code, the Department has operated an Animal Ethics Committee since 1990 to ensure that all staff involved in any aspect of the care and use of animals for scientific purposes act in accordance with the code, which promotes the ethical, humane and responsible care and use of animals.

In 2015–16, the Animal Ethics Committee comprised 11 members made up of Department staff and external individuals, including veterinarians, scientists, those with a commitment to the welfare of animals and community members. The Animal Ethics Committee met six times to review project documentation. Applications are assessed by the Animal Ethics Committee using the principles set out in the code of the three Rs: reduction, refinement and replacement.

The Animal Ethics Committee assessed and approved more than 300 items in 2015–16, consisting of new applications, amendments to existing projects, renewals for existing projects, annual reports and adverse event reports. Active projects covered broad areas of research including native animal monitoring, biological research, translocations, surveys and education.

The Department's Animal Ethics Committee also assesses projects on behalf of the Centre for Whale Research, Australian Wildlife Conservancy and the WA Museum.

In order to ensure conditions of licences are being adhered to, members of the Animal Ethics Committee also conduct periodic inspections of physical facilities for the care and use of animals. Currently, there are eight animal housing facilities approved by the Animal Ethics Committee, although not all currently contain animals. During 2015–16 inspections were carried out at five of these facilities.

Highlight

Education pack puts focus on threatened species

A new education resource is teaching students about the State's threatened species and the Department's important role in protecting them.

The *Western Shield Action Pack* was launched in February 2016, and is a resource for upper primary school students to raise awareness of threatened species in WA, the need to conserve biodiversity, the threat of introduced species, and the Department's work through *Western Shield* to protect native animals.

One of the biggest and most successful wildlife recovery programs ever undertaken in Australia, *Western Shield* is working to recover native animal populations through baiting to reduce the threat of foxes and feral cats.

In 2015–16, 5338 students participated in *Western Shield* educational activities, engaging them with the State's natural environment and promoting actions they can take to help protect native species.

Developed by the Department's *Nearer to Nature* program, the *Western Shield Action Pack* includes teacher notes, class activities and worksheets and is linked to curriculum learning outcomes.

The Department has been working to reinvigorate *Western Shield* since 2013–14, with updating education resources associated with the program a key initiative.

Western Shield was developed in 1996 in response to Australia's extinction record – one of the highest in the world with more than 12 species becoming extinct and another 30 declining significantly since European settlement.

It's now the Department's flagship wildlife program, protecting some of the State's most threatened animals including the bilby, quokka, numbat and western swamp tortoise. Baiting activities are carried out across more than 3 million hectares of Parks and Wildlife-managed lands.

Its achievements include protecting more than 30 wild populations of threatened species from the threat of introduced predators, and establishing another 37 new populations through its translocation program. It has also led to the tamar wallaby and quenda being removed from the State's threatened species list.

Educating the next generation through the *Western Shield Action Pack* will promote understanding of the importance of this program in conserving our native animals.



Numbats are just one species *Western Shield* is working to protect. Photo – Doug Coughran/ Parks and Wildlife



Parks and Wildlife's *Western Shield* excursion for schools at the Perth Hills Discovery Centre. Photo – Jennifer Eliot/ Parks and Wildlife



Wildlife officer Emma Lipianin with Mundaring Primary School students, learning about a woma python at the Perth Hills Discovery Centre. *Photo - Karla Graham/Parks and Wildlife*



Brushtail possum. *Photo - Mitzi Vance/Parks and Wildlife*



Woylie with students at the launch of the Western Shield Action Pack. *Photo - Mitzi Vance/Parks and Wildlife*



Peter Moyes Anglican Community School students, pictured with Environment Minister Albert Jacob, met a Pilbara olive python at the launch of the Western Shield Action Pack. *Photo - Mitzi Vance/Parks and Wildlife*

Operational highlights

Forest Management



Phytophthora dieback north-east of Harvey. Photo – Parks and Wildlife

The two forest management services, *Implementing the Forest Management Plan 2014–2023* and the *Provision of services for commercial forestry*, provide for economic, social and cultural benefits to be derived from State forest and timber reserves, while conserving biodiversity, maintaining soil and water values and sustaining the health, vitality and productive capacity of the forest for current and future generations. The desired outcome of these services is the conservation and sustainable utilisation of forests.

The provision of services to commercial forestry service is responsible for developing and implementing programs to directly support commercial forest production activities on State forests and timber reserves. The desired outcome is the efficient provision of services to support the sustainable utilisation, effective regeneration and management of forest products.

Consistent with the purpose of State forest and timber reserves as defined in the *Conservation and Land Management Act 1984*, forest management is provided for on an ecologically sustainable basis. This includes implementing Government policies, and providing for the harvesting, regeneration and growth of forest products in accordance with the current forest management plan.

Implementation of approved forest management plans and government policies and programs

Forest Management Plan 2014–2023

The *Forest Management Plan 2014–2023* (FMP 2014–2023) came into effect on 1 January 2014. The plan was prepared by the former Conservation Commission (Conservation and Parks Commission)

through the agency of the Department and was released by the Environment Minister on 6 December 2013.

Implementation of the FMP 2014–2023 includes a range of management activities designed to deliver ecologically sustainable forest management. It includes regulation and monitoring of native forest harvest operations, preparation of three-year harvest plans, development of guidance documentation and standards for silviculture, soil and water management, the management of basic raw materials, and protection of biodiversity values during forest disturbance operations.

Implementation focuses on ensuring timber harvesting operations are compliant with the plan's requirements, including meeting modified silvicultural guidelines to retain additional habitat elements such as large, senescent marri trees.

During 2015–16, working arrangements were further developed between Parks and Wildlife and the Forest Products Commission (FPC) to clarify the roles and responsibilities of each agency. A trial of interagency working arrangements to improve the efficiency and effectiveness of access authorisation, timber harvest planning, compliance monitoring, shared information technology, disease management and roading arrangements was progressed in the Department's three south-west forest regions – Swan, South West and Warren. The outcomes of the trial and a performance assessment will help refine the working arrangements before final sign-off by each agency.



After the O'Sullivan fire near Northcliffe. Photo – Forest Products Commission



Habitat log. Photo – Parks and Wildlife

Twenty-four key performance indicators (KPI) were developed to determine how successfully the plan's objectives are being met. These will be reported to the Conservation and Parks Commission and Environmental Protection Authority in 2018, which marks the half-way point of the plan. In 2015–16 work continued on refining protocols for 18 KPIs.

The plan provides economic opportunity for the industry to access an allowable cut of jarrah sawlogs of 160,000m³, should markets eventuate. Accessing this upper limit requires approval by the Environment Minister. All old-growth forests continue to be protected under the FMP 2014–2023. In 2015–16 the old-growth forest status of areas proposed for disturbance was reviewed, and an updated map showing old-growth forest areas was published on the Department's website in May 2016. Data and advice was

also provided to the Conservation and Parks Commission on community nominations of old-growth forest areas.

More information on forest management and the FMP 2014–2023 is available on the Department's website www.dpaw.wa.gov.au/management/forests/managing-our-forests/161-a-plan-for-managing-our-state-s-south-west-forests.

Regional Forest Agreement for the South West Forest Region of Western Australia

The *Regional Forest Agreement for the South West Forest Region of Western Australia* (WA RFA) is part of a national blueprint for balance, certainty and sustainability in forest management. It is a 20-year agreement between the State and Federal governments on the use and management of the forests of Western Australia's south-west.

It meets the three main objectives of the national regional forest agreement process:

- to protect environmental values in a world-class comprehensive, adequate and representative system of national parks and other reserves, based on nationally agreed criteria to manage forests' biodiversity, old-growth forest and other natural and cultural values
- to encourage job creation and growth in forest-based industries, including wood products, tourism and minerals
- to manage all native forests in a sustainable way.

The WA RFA requires the preparation of five-yearly progress reports. A joint Period 3 report for 2009–14 with the Federal Department of Agriculture and Water Resources is in preparation. The Period 3 progress report will be released for public comment and independently assessed. Its successful completion is anticipated to assist the process for extending the duration of the WA RFA, and to negotiate appropriate minor amendments to the agreement. More information on the *Regional Forest Agreement for the South West Forest Region of Western Australia* is available on the Department's website www.dpaw.wa.gov.au/management/forests/managing-our-forests/161-a-plan-for-managing-our-state-s-south-west-forests.

Operational highlights

Forest Management

Maintaining partnerships and community involvement

To meet the objectives of each service and ensure forest management practices employs the best available information, the Department seeks to develop partnerships with universities and affiliated centres of excellence to maximise the expertise of staff and students undertaking research in forest-related disciplines.

Key to this work is engaging with:

- the community and key stakeholder groups (including universities and volunteer projects)
- other State agencies and authorities
- Federal Government agencies.

During 2015–16 the Department contributed to a Federal Government review to modernise the *National Forest Policy Statement 1992*, and an efficiency assessment of performance reporting against the Montreal Process Criteria used to compile the five-yearly *Australia's State of the Forest Report*.

In 2015–16, the South-West Sustainable Forest Management team worked collaboratively with the Friends of Wellington Discovery Forest to facilitate a trial silvicultural harvesting operation in the Wellington Discovery Forest (WDF). More information on the silvicultural harvesting operation can be found on page 116.

The WDF was conceived in 1990 to promote community awareness and understanding of jarrah forest values and management. It is intended as an open air classroom, where Year 11 and 12 students can learn about sustainable forest management and teachers can attend professional development field trips. The in-forest experience is complemented by a range of supporting material. Excursions and educational activities can be found on the Department's website www.dpaw.wa.gov.au/get-involved/nearer-to-nature/schools/excursions/item/1285-sustainable-forestry.

The Department continued to work with the Australian Forest Growers to present the Australian Master TreeGrower program supporting landholders seeking to manage or establish trees on their land.

Research

Support was provided to an honours student from The University of Western Australia investigating the initial recovery of understorey and overstorey vegetation in karri forest burnt by the 2015 O'Sullivan bushfire near Northcliffe.

The Department facilitated studies of litter accumulation and coarse woody debris in karri and tingle forest by researchers from the University of Tasmania as part of the AusPlots Forests project of the Terrestrial Ecosystems Research Network. The project aims to establish a continental-scale plot-based

monitoring network improving understanding of tree growth, forest productivity and carbon dynamics in tall eucalypt forests in relation to continental-scale environmental gradients.

The Department, in partnership with the Water Corporation, University of Sunshine Coast, FPC and local plantation companies, will assist with trials to explore mechanical fuel reduction as a potential tool for fire risk mitigation, particularly near population centres.

Inventory, assessment and modelling of natural resources

Good forest management requires knowledge of the type, quantity and spatial distribution of forest resources. The Department undertakes inventory and assessment of forest resources, and maintains and enhances a wide range of datasets on south-west native forests and plantations, including records of the spatial extent of old-growth forest, *Phytophthora* dieback and past management activities.

A wide range of technical services related to this inventory, assessment and modelling was provided within the Department and to the FPC, Conservation and Parks Commission, natural resource management groups and external clients. Major areas of activity included:

- gathering and analysing wood inventory data to assist the FPC, Parks and Wildlife and the Conservation and Parks

Commission in planning, managing and monitoring timber production in State forest and timber reserves

- undertaking vegetation mapping to inform silvicultural decisions and old-growth forest assessments and to protect poorly represented vegetation complexes
- performing field measurements and data analysis to monitor harvest removals and silvicultural standards associated with timber harvest operations, and maintain current and accurate data
- providing specialist services, including aerial photography, photo-interpretation, photogrammetry, database design and development
- upgrading, deploying and integrating modelling software for forest resource management systems to support the FMP 2014–2023
- extensive vegetation condition mapping and modelling of impacts of major bushfires at O'Sullivan near Northcliffe, Lower Hotham near Boddington and Waroona-Yarloop to inform planning for potential timber salvage, as well as projections of native forest timber resources available under the FMP 2014–2023 to inform market development options for the forest products industry and regeneration and reconstruction operations

- new applications of high-resolution digital imagery and LiDAR (Light Detection and Ranging) data developed to refine harvest coupe design, silvicultural planning and conformance reporting in tall native forests
- continual updating of the jarrah (*Eucalyptus marginata*) inventory with measurement of a selection of inventory plots
- inventory of the standing timber remaining in pine plantations following thinning operations to perform projections of future growth and yield
- updating databases to record native forest harvesting activities and removal of timber resources to use in reporting FMP 2014–2023 and FPC KPIs and to support audit processes.

Maintenance and enhancement of biodiversity and other forest values in State forest and timber reserves

Resources focus on addressing issues posing the greatest threat to ecological sustainability, particularly weeds, pest animals and disease management (including *Phytophthora* dieback).

Measures undertaken to sustain or enhance biodiversity and other forest values included:

- *Phytophthora* dieback surveys to interpret and map the presence of the disease and formulate impact predictions
- the provision of *Phytophthora* dieback maps to enable operations to be undertaken with the lowest risk of spreading the disease
- monitoring areas burnt by bushfire and prescribed burning to support landscape-scale planning and reporting, and helping evaluate biodiversity assets at risk from infrastructure construction or threatening processes by providing planning support to guide the location of fauna habitat zone selection.

The Department's Regional and Fire Management Services Division delivered other ecologically sustainable forest management outcomes, and the Science and Conservation Division undertook research to inform management of biodiversity, ecosystem health and vitality, and soil and water values.

Health and vitality in natural landscapes

Mapping the presence of *Phytophthora* dieback symptoms was carried out during the year to determine its occurrence. Hygiene requirements were specified for activities

likely to result in the movement of soil (and potentially, as a consequence, *Phytophthora* dieback) on lands managed by Parks and Wildlife. An area of 27,950ha was mapped to assist the planning of roadworks, timber harvesting and other disturbance operations. This included rechecking 8150ha that had been previously mapped.

Other work carried out during 2015–16 included:

- Undertaking an annual field survey program to map the occurrence of *Phytophthora* dieback disease in native vegetation prior to disturbance to inform measures to prevent the spread of the disease. Over the past two decades approximately 20,000ha of vegetation has been intensively mapped each year.
- Delivering *Phytophthora* dieback information and mapping, and evaluating disease hygiene standards to minimise spread through planned disturbance operations. Dieback interpretation by Departmental interpreters to inform current or future native forest timber harvesting and roading operations was completed for 17,060ha during 2015.
- Prevention of the potential spread of *Phytophthora* dieback during soil disturbance operations continued to

be managed through the preparation of hygiene management plans. Refined approaches to risk assessment and plan preparation were developed with input from a Departmental advisory group comprising specialists from plant disease, fire management, field operations and regional groups.

- Silvicultural burns were conducted under appropriate weather conditions to regenerate areas within coupes where jarrah and karri harvesting operations had been completed in this or previous years.
- Maintenance of fire access roads, water points and firebreaks was completed for priority areas within pine plantations across four districts.
- Aerial image capture of some prescribed burns was undertaken to determine if this method can objectively measure burn outcomes against burn objectives. Planned burns have a range of objectives including community protection, biodiversity and silviculture. In addition, these areas can comprise a mosaic of soil and vegetation types and ages all behaving differently when fire is applied. The images proved useful and showed that burnt areas were comprised of a range of burn intensities including unburnt patches which support landscape diversity.

Operational highlights

Forest Management

Management of soil disturbance in timber harvesting

The protection of soil during timber harvesting and other disturbance operations improved considerably under the FMP 2014–2023. The plan carried forward a trafficability index and operational requirements to be applied in different risk periods to protect soil during timber harvesting. The Department continued to manage an approvals process for access during moist soil conditions. Access authorisation to 27 forest coupes for potential harvesting areas during winter and spring was granted based on consideration of the risk associated with soil attributes. Access was not granted to areas with an inherently high risk of soil disturbance.

With more than a decade of implementing soil disturbance initiatives from the *Forest Management Plan 2004–2013*, it was recognised that the approval and monitoring process was well established. An administrative review was carried out in 2015–16 and as a result moist soil approvals and monitoring processes were streamlined. Regions and districts were given broader autonomy acknowledging their on-ground understanding of coupes that can be harvested during winter without jeopardising soil conditions.

A review of soil disturbance monitoring conducted from 2005–14 led to the development of a revised soil disturbance monitoring procedure with increased focus on identifying and mapping tracks created by heavy vehicles. During 2015, 44 formal surveys of soil disturbance were conducted and results in the form of an extraction track map and summary of disturbance levels were provided to Parks and Wildlife operations staff and the FPC to help improve on-ground work.

Implementation of fauna habitat zones

The FMP 2014–2023 introduced fauna habitat zones in State forest and timber reserves. These zones are created to help maintain biodiversity values in areas subject to timber harvesting. Since the plan started in January 2014, design, analysis, survey and liaison work was undertaken for fauna habitat zones adjacent to proposed disturbance activities, and the location of five fauna habitat zones was finalised.

In 2015–16 analysis of the potential location of 12 fauna habitat zones was carried out, six of which (comprising a gross area of 7270ha) were finalised in accordance with the FMP 2014–2023. An updated map of fauna habitat zone locations was published on the Department's website in April 2016 www.dpaw.wa.gov.au/management/forests/about-our-forests/171-protecting-our-biological-diversity.

Forest monitoring and research

The Department undertakes scientific research and monitoring to support the ongoing delivery of ecologically sustainable forest management, including administration of a native forest products industry in WA.

Research findings are applied to forest practices and processes and help refine operational procedures to enhance the management of biodiversity, productive capacity, ecosystem health and vitality, and soil and water values. These findings are also used to assess the effects of timber harvesting and inform regeneration and silvicultural practices.

The *FORESTCHECK* monitoring program is a long-term study of the impacts of disturbance activities in jarrah forest. During 2015–16 *FORESTCHECK* continued to monitor the effects of timber harvesting on biodiversity. The program samples macrofungi, cryptogams, vascular plants, invertebrates, terrestrial vertebrates, birds, forest structure and coarse woody debris.

Seven *FORESTCHECK* monitoring grids burnt in February 2015 by the Lower Hotham bushfire near Boddington were re-measured to determine the impacts on tree mortality, woody debris consumption and the composition of plant and invertebrate communities in the jarrah forest.

A report on *FORESTCHECK* sites sampled in 2014 in the eastern Blackwood and Perth Hills districts was compiled. This will inform future harvest planning and monitor the impacts of current harvesting practices on biodiversity. In 2015–16 the analysis of data from 2002–12 was completed and associated scientific papers are in preparation. The 2014 *FORESTCHECK* report is available on the Department's website www.dpaw.wa.gov.au/about-us/science-and-research/landscape-conservation-research/183-forestcheck.

Research to inform silvicultural practices and potential adaptation strategies under a drying climate continued, with the re-measurement of groundwater boreholes in catchments in the Warren Region and maintenance on a long-term thinning experiment in high-quality jarrah regrowth forest near Dwellingup.

The Department contributed to a project led by the University of New South Wales to develop high-resolution maps and a biomass library for woody vegetation across the continent. These products were derived using data from a range of satellite sensors and ground measurements to improve forest structure, biomass and standing carbon estimation for forests within the FMP 2014–2023 area.



Forest marked for thinning, habitat trees and dieback line. Photo – Parks and Wildlife

Providing for harvesting, regeneration and growth of forest products in accordance with the *Forest Management Plan 2014–2023* and guided by the principles of ecologically sustainable forest management

Other service responsibilities include implementing an approvals, monitoring and compliance management system for disturbance operations in State forests and timber reserves, and setting standards for the management of a range of values. Ninety-five disturbance operations in the 2015 calendar year, covering 7550ha of State forest and timber reserves, were evaluated and monitored for compliance with the environmental outcomes sought in the FMP 2014–2023.

Forest management services provide for the harvesting, effective regeneration and growth of forest products in accordance with the

FMP 2014–2023 and guided by the principles of ecologically sustainable forest management. This is achieved by:

Integrated planning support

The Department provided specialist advice on implications of proposed developments and planned operations, including timber harvesting, mining, utilities and infrastructure work, on ecologically sustainable forest management.

The Department provides planning and technical support to the FPC. Services include the preparation of annual harvest plans, old-growth forest field surveys and *Phytophthora* dieback interpretation and mapping to service the annual harvest plans and specialist hardwood and plantation inventory.

On-ground works by regional and district staff aid with regeneration of harvested areas in native forest and plantations, including conducting silvicultural burns, planting, and weed and pest animal management activities.

For 2015–16 key work focused on:

- implementing processes authorising the hand-over to, and hand-back from, proponents operating on State forest and timber reserves, including a monitoring and compliance management system
- reviewing silviculture, soil and water management, and other relevant guidance documents
- conducting training for silvicultural and soil protection practices
- providing coupe-level harvest planning, field surveys, dieback interpretation and resource evaluation to the FPC
- preparing three-year regional timber harvest plans and reviewing annual regional timber harvest plans submitted by the FPC
- monitoring areas subject to timber harvesting and associated silvicultural treatments
- ensuring harvested areas are regenerated in a timely manner (where this is the primary silvicultural objective), and appropriate fire management and protection activities are implemented following harvest
- providing planning support to Regional and Fire Management Services to guide the selection and management of public firewood and licensed flora harvesting areas, and assisting to evaluate biodiversity assets at risk from disturbance when assessing proposals for roads, utility corridors and other infrastructure
- monitoring and collating information about areas burnt by bushfire and prescribed fires across native forest areas to support fire planning and reporting.

Operational highlights

Forest Management

Management system for approvals, monitoring and compliance

The Department delivers regulatory oversight of native forest timber harvesting processes, and sets and implements management activities relating to setting silvicultural standards, monitoring and yield regulation.

All operations in State forest require consideration and approval. Departmental staff monitored how well operations met approval conditions and environmental management standards. The planning checklist for disturbance activities, which was reviewed and updated to include additional requirements of the FMP 2014–2023, is used for this purpose.

Monitoring of the conformance of timber harvesting operations with the FMP 2014–2023 was streamlined using image processing software in conjunction with aerial photo acquisition and stereo mapping platforms to record silvicultural outcomes and boundaries of exclusion areas (such as old-growth forest).

Where non-conformance in timber harvesting operations is identified, the Department has a formal notification and follow-up process. This has been in place for 10 years under the *Forest Management Plan 2004–2013* and was reviewed in 2015–16.

Where potential non-conformance is identified, Department staff prepare a notification report for the relevant District Manager. If the non-conformance is considered to require formal communication, investigation and response by the proponent, a works improvement notice may be issued. In 2015, 35 notification reports and six works improvement notices were issued. Of the values affected and notification reports prepared, six related to biodiversity, 13 to soil and water, seven to ecosystem health and vitality and nine to productive capacity. Of the works improvement notices issued, three related to soil and water, one to ecosystem health and vitality, one to biodiversity and one to productive capacity.

Forest auditing

A range of forest management activities were audited in 2015–16. These examined processes for monitoring native forest timber harvesting operations in the Swan, South West and Warren regions for compliance with FMP 2014–2023 requirements.

Table 18: List of coupes sampled

Coupe	Region	Status	Species
Mowen	South West	Dormant	Jarrah
Beaton	South West	Complete	Karri
Yarragil	Swan	Complete	Jarrah
Hoffman	South West	Complete	Jarrah
Warner	South West	Complete	Jarrah
Channybearup	Warren	Complete	Karri
Helms	South West	Dormant	Jarrah
Big Brook	Warren	Complete	Karri

Monitoring of native forest harvesting

Timber harvesting operations in State forest and timber reserves continued to be approved and monitored in accordance with guidance documents that specify a range of requirements including silvicultural practices, protection of soil and water values and demarcation of informal reserves not available for timber harvesting. Field monitoring of these operations was undertaken by regional Parks and Wildlife staff.

Coupe management and environmental protection

The FPC conducts harvesting operations in State forest and timber reserves where compliance is required with environmental standards. This audit assessed a sample of these environmental management and protection elements in selected active jarrah and karri forest coupes and two dormant jarrah forest coupes.

Planning checklists

Planning checklists must be completed by the FPC and approved by the Department before timber harvesting can begin. All coupes sampled had correctly completed planning checklists for each relevant harvesting operation. Each section of the checklist had been addressed and approval signatures were in place.

Coupe demarcation

Management boundaries, including the coupe, and informal reserves such as river and stream zones, areas of old-growth forest, and travel route and diverse ecotype zones must be identified and demarcated before approved timber harvesting operations begin. The management boundaries of each coupe were assessed and all required boundaries were correctly demarcated.

Protecting water

Effective water protection is primarily met by demarcating and retaining informal reserves adjacent to river and stream zones prior to harvesting operations. The reserves range in width from 60–400m depending on stream order.

The river and stream reserve zones of each coupe were sampled for compliance. Of the 9374m assessed, one minor incident totalling 10m was recorded in one coupe. This incident involved machine activity crossing into a reserve boundary. No other incidents were recorded.

All river and stream zones assessed met the prescribed width requirement.

Table 19: Summary of coupe demarcation

	Stream/river zone	Other reserves	Total
Length assessed (m)	6068	3306	9374
Length correctly marked (m)	6068	3306	9374
Percentage correct	100	100	100

Table 20: Summary of incidents

	Stream/river zone	Other reserves	Total
Length assessed (m)	6068	3306	9374
Number of minor incidents	0	1	1
Length of minor incidents (m)	0	10	10
Number of major incidents	0	0	0
Length of major incidents (m)	0	0	0
Percentage of edge protected intact	100	99.7	99.9

Operational highlights

Forest Management

Habitat retention

To ensure the availability of suitable refuge for native animals after timber harvesting, habitat trees and ground logs are marked and retained. The requirements for habitat trees and ground logs in jarrah forest are:

- five primary habitat trees that have a moderate to high probability of bearing hollows
- six to eight secondary habitat trees that have a lower probability of bearing hollows at the time of tree marking, but provide for the sustained availability of hollows through time. These trees also contribute the structural diversity in the coupe
- one large ground log per hectare.

In the five jarrah and three karri coupes sampled for standing habitat, and the five coupes sampled for ground habitat, the average number of primary and secondary habitat trees met the required retention rate.

Protecting crop trees

Marked crop trees are required to be protected from damage during harvesting operations. Damage was defined as:

- exposure of more than 100cm² of cambium
- felling, breaking or uprooting of a crop tree
- removal of more than 30 per cent of the crown.

Table 21: Habitat retention

Standing habitat						
Number of coupes assessed for habitat trees	Area sampled (ha)	Number of primary habitat trees in samples	Number of secondary habitat trees in samples	Average number of primary habitat trees/ha	Average number of secondary habitat trees/ha	Average number of all habitat trees/ha
8	40	362	287	9	7.2	16.2

Ground habitat			
Number of coupes assessed	Area sampled (ha)	Number of habitat logs in samples	Average number of habitat logs/hectare
5	28	45	1.6

Table 22: Crop tree assessment

Number of coupes assessed	Number of crop trees assessed	Number of crop trees undamaged	Number of crop trees damaged	Compliance
5	561	540	21	96%

Table 23: Crop tree tops disposed and not disposed

Number of crop trees assessed	Number of crop tree tops disposed	Number of crop tree tops not disposed	Compliance
561	527	34	94%

All of the five jarrah coupes assessed were below the allowable five per cent limit for crop tree damage. The highest level of damage recorded was four per cent and the lowest three per cent.

All debris created by a harvesting operation should be removed from the base of crop trees. This task is commonly known as 'tops disposal' and is designed to protect crop trees from fire damage. All woody material greater than 75mm in diameter must be removed at least 1m from the bole of the crop tree.

Of the five jarrah coupes assessed, two achieved, or were above, the compliance level of 95 per cent, with the remaining three just below. The highest level of completed tops disposal was 97 per cent and the lowest level 90 per cent.

Protecting soil

When log extraction is completed in any feller's block, and prior to machinery leaving, spreader banks must be constructed across all extraction tracks and disturbed firebreaks with exposed soil to minimise the risk of soil erosion. The minimum size and bank angle is set, with the prescribed spacing dependent on the slope and soil type.

The five jarrah coupes assessed all complied with erosion control measures.

Rehabilitating landings

There is an annual program in place to rehabilitate log landings. At the completion of harvesting, landings are ripped and scarified before being seeded and fertilised when conditions are right. Preparation work for landing rehabilitation, ripping and scarifying was undertaken in most completed coupes sampled, except where products still remained on the landings.

Protecting threatened flora

Before any activity is undertaken on State forest and timber reserves resulting in the removal of native flora, field searches are required to determine whether threatened flora is present. Records of field searches for the presence of threatened flora populations were available for all coupes assessed.

Protecting threatened native animals

All coupes planned for harvesting were assessed in a desktop study against a matrix that determined the probability of threatened native animals habitats occurring, which was incorporated into the *Fauna Distribution Information System*.

Table 24: Erosion control

Number of coupes assessed	Length of snig track assessed (m)	Length of track meeting specification (m)	Length of track not meeting specification (m)	Compliance
5	5512	5512	0	100%

Audit assessment and improving processes

Audit findings during the past decade under the *Forest Management Plan 2004–2013* have resulted in a steady improvement in conformance to the benchmark for protecting crop trees. However, results continued to show conformance just below the required mark in a small number of instances.

During 2015–16 a review of parameters and monitoring methods was undertaken by the Department. This resulted in amendments to relevant guidance documents, reflecting a more appropriate survey routine and audit methodology, and strengthening the compliance level for monitoring crop tree damage and tops disposal in native forest harvesting operations. These amendments will be incorporated into the 2016–17 audit program.

Operational highlights

Forest Management

Provision for harvesting, regeneration and growth of forest products

Silvicultural guidance

A suite of supporting documentation continued to be developed and published in 2015–16, including procedures for jarrah and karri silviculture and supporting reference material for jarrah forest silviculture. Copies of the guidelines and supporting documents are available by emailing forest.info@dpaw.wa.gov.au.

Staff training in the application of silvicultural practices and implementation of monitoring procedures continued.

Monitoring of areas subject to timber harvesting and associated treatments

Monitoring was undertaken in areas subject to commercial timber harvesting, silvicultural treatments and forest disturbance activities under the direction of the FPC.

In the 12 months to December 2015, 7500ha of native forest were harvested with silvicultural objectives outlined in Table 25.

Table 25: Silvicultural objectives

Forest type	Silvicultural objective	Area cutover (ha)
Jarrah	Release of regeneration (gap)	560
	Establishment of regeneration (shelterwood)	1740
	Promote growth on retained trees (thinning)	890
	Single tree selection (retention in <i>Phytophthora</i> dieback areas)	1060
	Selective	1210
	Subtotal	5460
Karri	Establish jarrah/karri regeneration	30
	Establish regeneration (clearfall karri)	210
	Establish regeneration (partial karri clearfall)	–
	Promote growth on retained trees (thinning)	660
	Subtotal	900
Wandoo	Establishment of regeneration	–
	Promote growth on retained trees (thinning)	–
	Subtotal	–
Other forest type	Other (mining and clearing for utilities)	1140
Total		7500

Jarrah silvicultural objectives for 1480ha harvested in 2015–16 or previous years were achieved by follow-up treatment during the year. Karri regeneration was completed on 320ha harvested in either 2015–16 or previous years.



A primary habitat tree that will be retained.
Photo – Parks and Wildlife

Table 26: Trends in the area of native forest harvested

	Jarrah forest (ha)	Jarrah/wandoo forest (ha)	Clearfelled or cut to seed trees (ha)	Karri forest Thinned (ha)		Jarrah forest (ha)	Jarrah/wandoo forest (ha)	Clearfelled or cut to seed trees (ha)	Karri forest Thinned (ha)
1976–77	32,320	1170	2610	-	1996	22,320	50	1300	60
1977–78	26,020	740	4450	-	1997	18,240	60	1870	60
1978–79	25,540	530	2710	-	1998	19,250	60	1970	320
1979–80	25,150	860	2110	60	1999	14,200	50	1890	360
1980–81	22,930	1440	2080	180	2000	20,570	10	1310	70
1981–82	24,680	610	2180	320	2001	15,760	-	1380	120
1982–83	23,740	330	990	190	2002	13,260	30	700	350
1983–84	21,540	580	1490	260	2003	8520	-	720	485
1984–85	20,010	1440	2360	500	2004	8860	-	330	920
1985–86	22,640	650	1590	340	2005	6220	30	460	1070
1986	19,340	1150	1090	490	2006	8440	300	400	1130
1987	17,180	1380	1310	700	2007	8120	60	560	1000
1988	23,400	490	1180	840	2008	7280	0	390	660
1989	15,130	200	1510	910	2009	8990	10	740	920
1990	12,960	100	1560	340	2010	4520	0	400	1220
1991	10,910	-	1920	230	2011	*6120	30	740	850
1992	13,990	30	1540	310	2012	6760	0	370	650
1993	14,250	40	1630	80	2013	5880	0	290	560
1994	14,050	50	1440	-	2014	5070	0	290	480
1995	17,830	30	2410	-	2015	5460	0	210	660

Total includes small areas of other forest types cleared for mining or landings.

* The figure given in the *Parks and Wildlife 2011–12 Yearbook* (7500ha) was incorrect as it included clearing for mining.



Wellington Discovery Forest harvest area. Photo – Troy Mennen/Parks and Wildlife

Highlight

Forest management on display

Forest management techniques have been trialled and put on public display in a living classroom in the State's south-west.

Wellington Discovery Forest was conceived in 1990 to allow the Department to demonstrate forestry practices while promoting community understanding of jarrah forest management. It encompasses 350ha of managed forest and teaching space 40km south-east of Bunbury.

In 2015–16, the Department embarked on a silvicultural treatment to thin trees in a 34ha area of the forest, mirroring forest management techniques employed in other south-west jarrah forests. The area was harvested before the 1920s to supply timber for the nearby Wellington Mill, and received a section cut in the 1960s.

The treatment shows how harvesting techniques can improve a regrowth forest and accelerate its growth to a mature structure in a much shorter time than without treatment. Other benefits that can be demonstrated including improving the water table and run-off.

It also fulfilled requests from the community-led Friends of Wellington Discovery Forest to conduct demonstration forest treatment in the area, and met a recommendation of the 2008 *Wellington National Park, Westralia Conservation Park and Wellington Discovery Forest Management Plan*.

The treatment gleaned 1900 tonnes of timber and was subject to the same robust planning approvals processes which are applied to other native forest timber harvesting operations, including preparation of a planning checklist and hygiene management plan.



Students from Sacred Heart College learn about sustainable forest management at Wellington Discovery Forest. *Photo – Julie-Anne Oliver/Parks and Wildlife*



Sustainable forest management is offered as a curriculum-linked excursion by the Department's Nearer to Nature program at Wellington Discovery Forest. *Photo – Julie-Anne Oliver/Parks and Wildlife*



Friends of Wellington Discovery Forest tour the harvest area. *Photo – Brad Barr/Institute of Foresters of Australia*



Prescribed burn at Cape Range National Park to protect the campground to the south. *Photo – Lyn Irvine*

Operational highlights

Fire Management

Bushfire season

The 2015–16 bushfire season was marked by significant bushfires including the Esperance complex, Mount Solus, Muchea, Waroona-Yarloop and Myalup incidents.

In total, Parks and Wildlife staff attended and monitored 720 bushfires throughout the State in 2015–16, which burnt about 1,887,954ha. For details about the number of bushfires attended and area burnt, see Tables 27 and 29.

About 32 per cent of all bushfires attended by the Department were caused by lightning and about 37 per cent were deliberately lit or arson-caused, both of which were below their respective 10-year averages. For more details about the causes of bushfires attended by the Department, see Table 28.

Parks and Wildlife's pre-formed incident management teams were deployed either in part or as full units to five bushfires during the 2015–16 bushfire season, being Mount Solus, Waroona-Yarloop, Myalup, Esperance Cascades and Minninup Pool bushfires.

Table 27: Bushfires by land category from 2013–14 to 2015–16

Land category	Number of bushfires *			Area burnt (ha) **		
	2013–14	2014–15	2015–16	2013–14	2014–15	2015–16
State forest						
– native hardwood	104	186	177	426	56,736	41,707
– softwood plantation	78	76	81	196	5507	101
National parks	121	154	131	1,537,710	938,621	655,480
Nature reserves	58	68	74	92,389	569,982	344,574
Other Department reserves	57	92	67	247,181	167,012	223,658
Other Crown lands	45	36	39	164,429	393,467	179,792
Private property	113	179	102	25,056	65,456	19,779
Unallocated Crown land	31	34	49	142,232	372,914	422,863
Total	607	825	720	2,209,619	2,569,695	1,887,954

* Number of bushfires that started in the tenure type.

** Area (ha) burnt by bushfires in the tenure type.

Operational highlights

Fire Management

Table 28: Bushfire causes from 2013–14 to 2015–16

All regions	Number of bushfires *			Per cent		
	2013–14	2014–15	2015–16	2013–14	2014–15	2015–16
Deliberately/illegally lit	223	304	267	37	37	37
Escapes – Department burns	5	8	4	1	1	<1
Escapes – non-Department burning	23	51	26	4	6	4
Accidental – timber industry	6	3	4	1	0	<1
Accidental – other industries	26	39	35	4	5	5
Accidental – recreationists	97	78	37	16	9	5
Lightning	141	200	233	23	24	32
Unknown	61	120	91	10	15	13
Other causes	25	22	23	4	3	3
Total	607	825	720	100	100	100

* Number of bushfires that started by each cause.

Table 29: Bushfires attended and monitored by Parks and Wildlife in 2015–16

Region		State forest native hardwood	State forest softwood plantation	National parks	Nature reserves	Other Department reserves	Other Crown lands	Private property	Unallocated Crown land	Total
South-west forest regions										
Swan	Area (ha) *	40,446	69	2203	5472	9059	32,806	1561	3	91,619
	Number **	103	69	23	24	23	13	44	7	306
South West	Area (ha) *	947	32	36	58	170	1	978	7	2229
	Number **	57	12	17	1	14	7	32	7	147
Warren	Area (ha) *	314		220	1135	18		633	55	2375
	Number **	17		14	9	0		10	0	50
Subtotal	Area (ha) *	41,707	101	2459	6665	9247	32,807	3172	65	96,223
	Number **	177	81	54	34	37	20	86	14	503
Other regions										
Kimberley	Area (ha) *			74,268	213,155	180,196	14		9869	477,502
	Number **			16	11	20	1		2	50
Pilbara	Area (ha) *			401,942	64,543	32,063	26,793	11,938	179,928	717,207
	Number **			40	6	6	2	3	16	73
Midwest	Area (ha) *			332	2794	<1	116,292	1,992	30,680	152,090
	Number **			5	8	1	11	4	3	32
Goldfields	Area (ha) *			3	17,165	1036	2767		1748	22,719
	Number **			2	4	1	2		4	13
Wheatbelt	Area (ha) *				382		1	1847	11,132	13,362
	Number **				3		1	3	1	8
South Coast	Area (ha) *			176,476	39,870	1116	1118	830	189,441	408,851
	Number **			14	8	2	2	6	9	41
Subtotal	Area (ha) *	0	0	653,021	337,909	214,411	146,985	16,607	422,798	1,791,731
	Number **	0	0	77	40	30	19	16	35	217
Grand total (all regions)	Area (ha) *	41,707	101	655,480	344,574	223,658	179,792	19,779	422,863	1,887,954
	Number **	177	81	131	74	67	39	102	49	720

* Area (ha) burnt by bushfires in the tenure type.

** Number of bushfires originating in the tenure type.

Operational highlights

Fire Management

Prescribed burning

Parks and Wildlife has legislative responsibility for bushfire preparedness on the land it manages (including parks, reserves and State forest), and unallocated Crown land (UCL) and unmanaged reserves (UMR) outside metropolitan and town site areas. Bushfire preparedness activities can include the preparation and implementation of an annual prescribed burning program, other fuel management activities and access maintenance work.

In 2015–16, the Department achieved 154,149ha of prescribed burning in the south-west forest regions, including about 5147ha burnt for pine plantation protection. Thirteen per cent of the planned burn activities were undertaken in winter (July and August 2015), 33 per cent in the spring and early summer period (September to December 2015), five per cent in summer (January to March 2016) and 49 per cent in autumn conditions (April to June 2016).

Prescribed burning on Parks and Wildlife-managed lands throughout the State is undertaken to reduce the occurrence and impacts of large, intense bushfires, to protect and conserve community assets and biodiversity values, and to regenerate and protect forest ecosystems following harvesting operations or other disturbances. In many cases these outcomes are achieved together within a prescribed burn.

The indicative burn target for 2015–16 in the south-west forest regions was 200,000ha. To meet this objective, the Department's burn planning process identified potential areas in excess of 200,000ha as available for prescribed burning. The identified burn area provided the flexibility to safely take advantage of favourable burning conditions as they occur in different parts of the south-west.

Figure 1 shows prescribed burning achievement in the south-west forest regions from 2002–03 to 2015–16. The relatively low level of prescribed burning for several years during this period reflects the impacts of reduced rainfall and often unfavourable weather conditions experienced in those years. In 2015–16, the Department's south-west prescribed burning program began well with favourable conditions in spring 2015 providing many opportunities for successful prescribed burning. However, the early onset of autumn rain in 2016 curtailed prescribed burning operations across the south-west and prevented the achievement of the 200,000ha target. The average area of burning achieved by the Department in the south-west forest regions during the previous 10 years has been about 132,892ha per annum.

Figure 2 shows the number of years since fire previously occurred in south-west forest regions areas that were prescribed burnt in 2015–16. Approximately 97 per cent of the area burnt had not been subject to fire for at least six years and 82 per cent of burns



Igniting a prescribed burn at Cape Range National Park. *Photo – Sally Bostwick/Parks and Wildlife*

contained some fuel that had not been subject to fire for six years or more.

The application of prescribed fire by Parks and Wildlife outside the south-west forest regions has increased markedly since July 2003, when the Department became responsible for bushfire risk prevention and preparedness over large areas of UCL and UMR. Significant progress has been made in the Pilbara, Kimberley and Goldfields regions in applying prescribed burns to achieve biodiversity conservation outcomes and to minimise the potential extent of large-scale, damaging bushfires.

The Department completed about 2.355 million hectares of prescribed burning in 2015–16 in the Kimberley, Pilbara, Midwest, Goldfields, Wheatbelt and South Coast regions. Many of these burns were 'open-

edged' and wind-driven with aerial ignition. These prescribed burns provide the habitat diversity necessary to conserve biodiversity and establish protective buffers to limit the spread of bushfires. The prescribed burns were carried out on Parks and Wildlife-managed lands, as well as on UCL and UMR in these regions.

In 2015–16, the combined total area of prescribed burning undertaken throughout the State was 2,509,846ha. Figure 3 shows the area prescribed burnt in all Parks and Wildlife regions since 1978–79.

Figure 1: Prescribed burning achievement in the south-west forest regions from 2002-03 to 2015-16

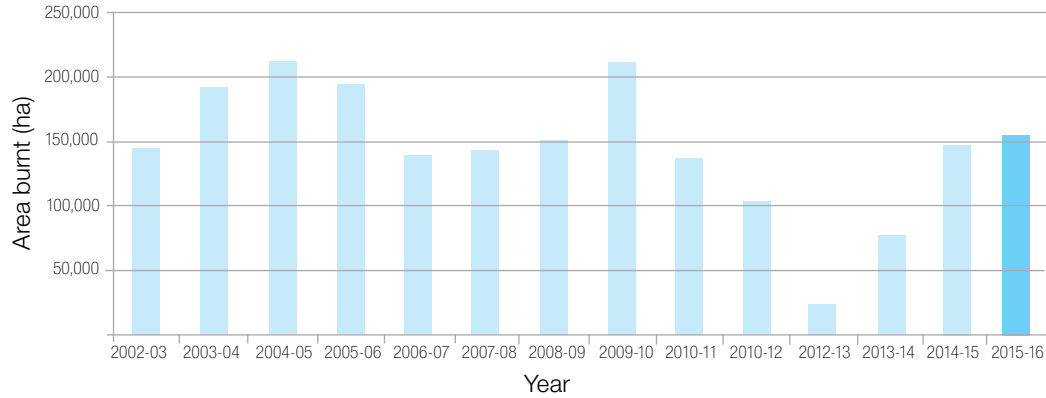


Figure 2: Fuel age in prescribed burns undertaken in 2015-16

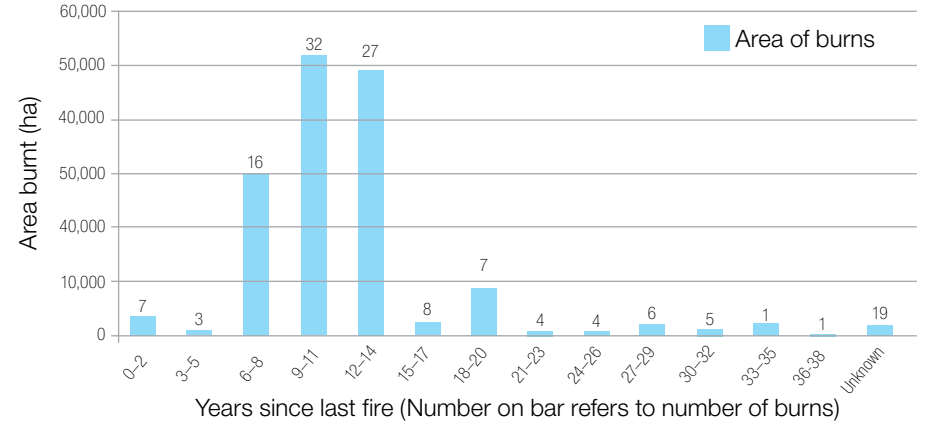
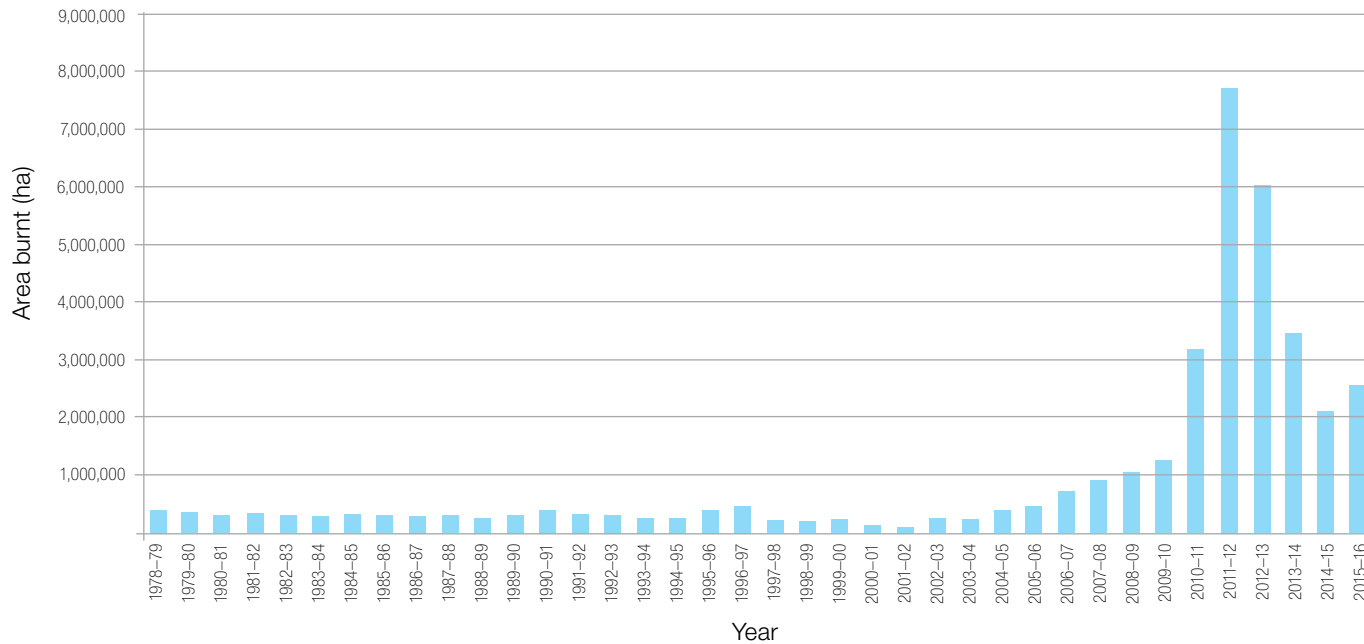


Figure 3: Prescribed burning in all regions from 1978-79 to 2015-16



Operational highlights

Fire Management

Table 30: Prescribed burns conducted by Parks and Wildlife in local government areas in 2015–16

Local government authority	Number	Area (ha)	Local government authority	Number	Area (ha)	Local government authority	Number	Area (ha)
City of Albany	3	1431	Shire of Cranbrook	3	3489	Shire of Northam	3	228
City of Armadale	5	1088	Shire of Dandaragan	2	478	Shire of Northampton	1	257
City of Busselton	3	299	Shire of Dardanup	5	3825	Shire of Pingelly	1	31
City of Canning	1	60	Shire of Denmark	10	18,421	Shire of Plantagenet	5	11,549
City of Kwinana	1	76	Shire of Derby-West Kimberley	1	494,087	Shire of Sandstone	1	100
City of Swan	2	62	Shire of Donnybrook-Balingup	12	9456	Shire of Serpentine-Jarrahdale	5	573
City of Wanneroo	7	2768	Shire of Esperance	2	64	Shire of Three Springs	1	116
Shire of Ashburton	5	150,784	Shire of Gingin	8	4393	Shire of Toodyay	1	827
Shire of Augusta-Margaret River	6	445	Shire of Gnowangerup	1	156	Shire of Victoria Plains	1	409
Shire of Beverley	2	2407	Shire of Halls Creek	1	561,975	Shire of Wandering	2	15,047
Shire of Boddington	2	1333	Shire of Harvey	6	1690	Shire of Waroona	4	703
Shire of Boyup Brook	4	2984	Shire of Kalamunda	7	2396	Shire of Williams	2	38
Shire of Bridgetown-Greenbushes	5	3098	Shire of Kulin	1	59	Shire of Wiluna	2	2299
Shire of Broome	1	0	Shire of Manjimup	27	20,441	Shire of Wongan-Ballidu	1	30
Shire of Capel	1	1441	Shire of Merredin	1	70	Shire of Wyalkatchem	1	17
Shire of Carnamah	1	35	Shire of Mundaring	4	4517	Shire of Wyndham-East Kimberley	10	1,142,415
Shire of Chittering	1	1916	Shire of Murray	5	2334	Shire of Yilgarn	5	1013
Shire of Collie	10	11,661	Shire of Nannup	9	19,586	Shire of York	2	4721
Shire of Coolgardie	1	8	Shire of Narrogin	3	140	Total	217	2,509,846

Note that burns are only included in multiple local government authorities (LGAs) if more than five per cent of their total treated area is within the LGA.

Table 31: Prescribed burns for all Parks and Wildlife regions from 2013–14 to 2015–16

South-west forest regions		2013–14	2014–15	2015–16
Swan	Area (ha)	21,225	62,793	45,205
	Number	52	61	49
South West	Area (ha)	21,975	28,920	44,771
	Number	22	34	42
Warren	Area (ha)	35,034	55,369	64,173
	Number	37	39	49
Subtotal	Area (ha)	78,234	147,082	154,149
	Number	111	134	140
Other regions		2013-14	2014-15	2015-16
Kimberley	Area (ha)	3,308,225	1,967,339	2,198,477
	Number	12	17	13
Pilbara	Area (ha)	61,485	35	150,783
	Number	7	4	5
Midwest	Area (ha)	1897	2091	940
	Number	6	15	5
Goldfields	Area (ha)	19,032	2796	3175
	Number	4	6	5
Wheatbelt	Area (ha)	549	2518	672
	Number	7	18	13
South Coast	Area (ha)	862	2948	1650
	Number	13	13	6
Subtotal	Area (ha)	3,392,050	1,977,727	2,355,697
	Number	49	73	47
Total (all regions)	Area (ha)	3,470,284	2,124,809	2,509,846
	Number	160	207	187

Table 32: Area (ha) of prescribed burns on each tenure type in 2015–16

	Area (ha)
State forest	70,300
National parks	1,447,714
Nature reserves	24,253
Conservation parks	392,620
Softwood plantation	5147
Unallocated Crown land	180,387
Other Crown land and private property *	389,425
Total area (ha)	2,509,846

* Includes other Crown land, other Parks and Wildlife-managed reserve and private property.



Prescribed burning in Millstream Chichester National Park. Photo – Judy Dunlop/Parks and Wildlife

Operational highlights

Fire Management

Operations, planning and interagency cooperation

Aerial bushfire suppression operations

Parks and Wildlife contracted eight fixed-wing water bombers from November 2015 to April 2016. The aircraft provided rapid aerial suppression capability in the South Coast, Midwest, Wheatbelt and south-west forest regions, which includes the Perth outer-metropolitan area, giving significant assistance to ground crews in the initial attack on bushfires, helping to protect lives and property.

These aircraft attended 246 bushfires, with 94 occurring on land managed by Parks and Wildlife, and an additional 152 bushfires on land managed by other agencies. The water bombers dropped 3236 loads, or in excess of 9,700,000L of water, on the bushfires.

More information is available in the *Department of Parks and Wildlife 2015–16 Annual Report* on the Department's website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.

Bushfire detection

Parks and Wildlife provided an effective bushfire detection system in bushfire-prone areas of the south-west forest regions through fixed lookout towers and a fleet of 10 American Scout spotter aircraft. Spotter

aircraft flew 4324 hours for aerial surveillance and 620 hours in support of aerial bushfire suppression operations during the year.

More information is available in the *Department of Parks and Wildlife 2015–16 Annual Report* on the Department's website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.

Bushfire training and development

The Fire Management Services Branch development and education section conducted 27 formal fire management training courses involving 214 participants. Course participants were predominantly from Parks and Wildlife, including campground host volunteers, but also included personnel from the Forest Products Commission (FPC), the Department of Fire and Emergency Services (DFES) and local governments.

Annual mandatory pre-season training was undertaken across the Department in preparation for the 2015–16 fire season. A total of 750 Parks and Wildlife and FPC personnel participated, meeting training requirements in fire management, including the use of two-way radios, storage and use of fire blankets, and 'burnover' drills.

The Branch's aviation operations section also provided training to 270 Parks and Wildlife and other agency aerial operations personnel, including staff from DFES. Training for the roles of incendiary operations supervisor, aerial incendiary bombardier and aerial drip torch operator was also provided to staff from the South Australian Department of Environment, Water and Natural Resources, the SA Country Fire Service and Forestry SA. More than 340 water bomber re-loaders across 40 operational bases were also trained, with the majority of these participants from volunteer bushfire brigades and local State Emergency Service units. This training was also provided to Royal Australian Air Force (RAAF) personnel at RAAF bases Pearce and Gingin.

More information is available in the *Department of Parks and Wildlife 2015–16 Annual Report* on the Department's website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.

Prescribed fire planning and risk management

The Department continued to collaborate with the Office of Bushfire Risk Management (OBRM) in the ongoing pursuit of improvement. An assurance program conducted by OBRM to scrutinise the Department's prescribed burn planning processes again occurred throughout the year in the Goldfields, South West and South Coast regions. The Department has also worked with OBRM on additional annual reporting measures, with an increased focus on the effect of prescribed burning on bushfire risk.

More information on the performance indicators is available in the *Department of Parks and Wildlife 2015–16 Annual Report* on the Department's website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.

Bushfire preparedness on unallocated Crown land

Since 1 July 2003, the Department has had responsibility for the coordination and on-ground management of bushfire risk prevention and bushfire preparedness works on 89 million hectares of UCL and UMR outside the Perth metropolitan area and town sites.

Work undertaken by Parks and Wildlife in 2015–16 included the construction and maintenance of firebreaks, modification of vegetation in strategic buffers, ‘open-edge’ prescribed burning and large-scale aerial ignition.

In the Kimberley, Pilbara, South Coast and Goldfields regions, the Department continued to engage and build partnerships with other stakeholders, including Aboriginal groups and communities and neighbouring farmers and pastoralists. The use of planned fire for developing landscape-scale, ‘mosaic’ patterns of burnt and unburnt patches continued to yield benefits for mitigating large bushfires, protecting biodiversity and cultural values, and achieving designated land management and nature conservation outcomes.

Interagency bushfire management

During 2015–16, significant Parks and Wildlife fire management resources were dedicated to improving interagency bushfire management arrangements through the Interagency Bushfire Management Committee (IBMC) and associated sub-committees.

Outside the IBMC, Parks and Wildlife participated in interagency liaison with DFES, local government and other State, interstate and international agencies on matters related to fire management.

Key efficiency and effectiveness indicators

More information on the efficiency and effectiveness indicators is available in the *Department of Parks and Wildlife 2015–16 Annual Report* on the Department’s website www.dpaw.wa.gov.au/about-us/annual-report-and-yearbook.



Operations officer Frank Bailey at a prescribed burn in the Perth Hills, April 2016.
Photo – Jennifer Eliot/Parks and Wildlife



Senior fire operations officer Richard Reid and district fire coordinator Michael Pasotti planning for a prescribed burn. Photo – Jennifer Eliot/Parks and Wildlife

Highlight

Exchange program builds fire management expertise

The exchange of skills, knowledge and experience is the drive behind the Department's new international fire management exchange program, which got off to a strong start in 2015–16.

The exchange program aims to improve firefighting capabilities and knowledge, providing participants with new perspectives on managing bushfires and prescribed burning. When they return, they bring new skills, technologies and techniques to fire management operations.

Moora District fire coordinator Isaac Hatch travelled to Arizona's Grand Canyon National Park in July 2015 to work with the United States National Park Service (NPS), before Parks and Wildlife welcomed Grand Canyon chief of fire and aviation Jay Lusher in February 2016.

The program builds on the strong ties the Department has with interstate and international fire management agencies, which has seen personnel and resources shared during large scale bushfires.

Jay spent time with fire management staff in several areas of the State including the Perth Hills District, Warren Region and the Department's headquarters in Kensington, while Isaac worked with NPS's fire and

aviation branch, including taking part in several search and rescue operations.

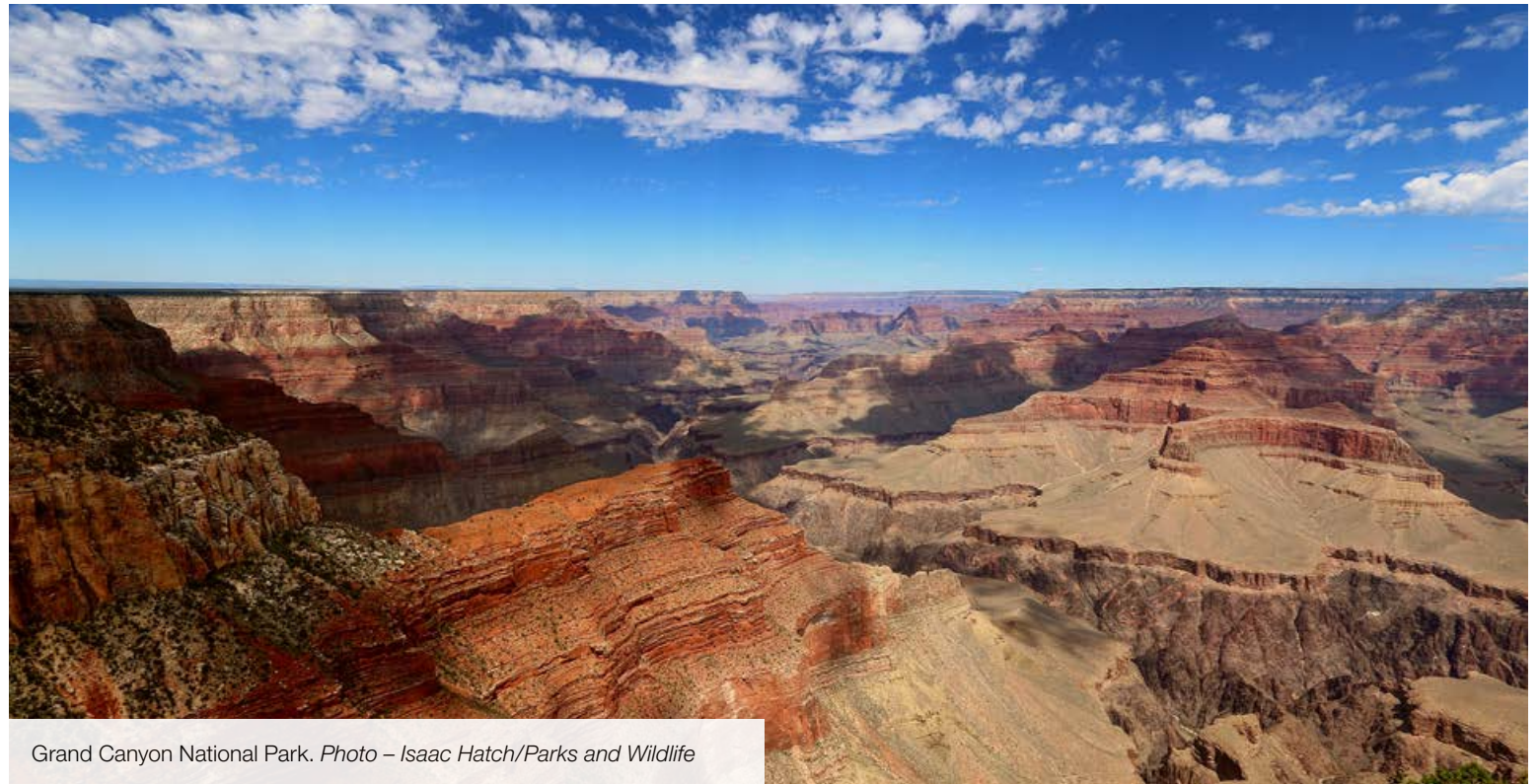
Through the exchange program, mapping systems, recruitment and training, public education and the appointment of a chaplain to help staff deal with high-pressure situations were identified by NPS as key strengths of Parks and Wildlife's fire management processes.

Each year, the program will see one staff member from each agency change places for four to six weeks during the peak of the host location's bushfire season.

The exchange program complements the Department's bushfire training and development program, which in 2015–16 provided pre-season fire management training to 750 Parks and Wildlife and Forest Products Commission (FPC) staff, and conducted 27 formal fire management training courses for 214 participants from the Department, FPC, Department of Fire and Emergency Services and local governments.



Parks and Wildlife Moora District fire coordinator Isaac Hatch inspects the boundary of a managed fire in the Kaibab Forest, which borders the Grand Canyon.
Photo – United States National Park Service



Grand Canyon National Park. Photo – Isaac Hatch/Parks and Wildlife



Grand Canyon National Park's chief of fire and aviation Jay Lusher during his visit to WA. Photo – Parks and Wildlife



Isaac Hatch participated in remote survey work in the Grand Canyon. Photo – United States National Park Service



Wharf Street wetland. *Photo – Parks and Wildlife*



A Swan River dolphin pod. *Photo – Mark Thornley/Parks and Wildlife*



Eric Singleton nutrient stripping wetland. *Photo – Parks and Wildlife*



Ellenbrook wetland. *Photo – Jennifer Eliot/Parks and Wildlife*

Operational highlights

Riverpark Management

The River Management Service works collaboratively with other government agencies, local councils and the community to protect the Swan Canning Riverpark and enhance its ecological and community benefits and amenity.

This service also helps preserve the social, cultural, economic and recreational values of the Riverpark and strives for a healthy river for all, forever which is resilient to climate change, population and development pressures.

The service has significant operational and management responsibilities within the Riverpark and Development Control Area as outlined under the *Swan and Canning Rivers Management Act 2006*.

It manages and provides appropriate planning for the Swan and Canning rivers and associated land to ensure that economic activity is managed in a socially and environmentally responsible manner for the long-term benefit of the State.

Constructed wetland projects

The Department has invested in several large-scale constructed wetland projects to help strip nutrients such as phosphorus and nitrogen from priority sites around the Swan Canning Catchment. This forms part of a treatment train river management approach to improve water quality in the Swan and Canning rivers.

Wharf Street wetland

The *Wharf Street Wetland and Civic Parklands* project was constructed in mid-2008 in partnership with the City of Canning and South East Regional Centre for Urban Landcare.

The wetland intercepts and treats stormwater and groundwater from the Wharf Street main drain, located in the greater Canning Plain catchment – a priority catchment which provides high nutrient loads to the Canning River.

The wetland also provides a passive recreation and education asset and creates a link between the Canning River Regional Park and the Civic Centre Parkland and council offices.

Construction of the wetland involved the removal of a road and infrastructure that separated the City of Canning council offices from the Canning River Regional Park, restoration of 365m of degraded river foreshore and installation of a river access and viewing node. Seasonally saturated grassed areas were replaced with a functional wetland and useable grassed parkland.

The Department funded extensive revegetation at the site with 100,000 local native plants of 37 different species significantly improving the habitat value of the area, particularly for waterbirds.

An independent evaluation of Wharf Street wetland data collected from 2009–14 was completed by the Cooperative Research Centre for Water Sensitive Cities (CRC WSC) in September 2015 to inform further management of the system, refine constructed wetland design and facilitate the use of the site for demonstration purposes.

The 2015 CRC WSC performance assessment showed that since commissioning, the wetland has removed 129kg of 286kg (or 45 per cent) of phosphorus and 1658kg of 2526kg (or 65 per cent) of nitrogen that has flowed through it. Phosphorus removal was enhanced after the subsurface flow wetland basins were brought online in 2012.

In November 2015, the Wharf Street wetland won the Western Australian Stormwater Industry Association award for the Excellence in Research and Innovation category.

Eric Singleton Bird Sanctuary wetland

Construction of the Eric Singleton Bird Sanctuary wetland was completed in 2015 with full commissioning due to occur in October 2016 as the 170,000 new native seedlings planted into the wetland grow and water levels can continue to be raised.

The project has delivered a healthier wetland for local wildlife, and by stripping nutrients and reducing the level of pollutants, the wetland will also help improve water quality in the Swan River. Prior to construction the wetland was in a degraded state and relied on bore water for its viability.

The wetland is expected to prevent 1.3 tonnes of nitrogen, 200kg of phosphorus and 40 tonnes of sediment entering the Swan River each year.

Together Parks and Wildlife and the City of Bayswater have created a new recreational asset for the local community, improved habitat for native wildlife and enhanced the quality of waterways in the local catchment and the Swan River, to which these waterways flow.

Operational highlights

Riverpark Management

Ellen Brook wetland

Of all the sub-catchments on the Swan Coastal Plain, the Ellen Brook catchment is the greatest contributor of both total nitrogen and total phosphorus. To help address nutrient loads to the Swan Canning river system, Parks and Wildlife constructed the Ellen Brook wetland in 2014.

The Ellen Brook wetland is designed to remove nutrients, particularly phosphorus, from the Ellen Brook during the winter/spring flow period when nutrient loads are at their highest in the brook.

The Ellen Brook wetland includes filter media which allows the basin to remove a greater quantity of nutrients than would otherwise be possible. Following construction, the wetland was planted with more than 50,000 native seedlings.

Commissioning of the wetland began in 2015 and will continue in 2016. Initial water quality results have shown the filter media was able to remove 95 per cent of the total phosphorus and approximately 50 per cent of the total nitrogen from the water that passed through it.

Fish array project

Parks and Wildlife is undertaking a study using acoustic technology to determine the effectiveness of the *Swan Oxygenation Program* in providing refuge for fish during periods of low oxygen.

The Swan Canning Acoustic Array was deployed by Parks and Wildlife in March 2016 and consists of 25 acoustic receivers (listening stations) installed throughout the Swan Canning Riverpark, with a particular focus on the reaches of the upper Swan estuary influenced by the *Swan Oxygenation Program*.

In partnership with Murdoch University and Recfishwest, 55 black bream were caught, surgically implanted with acoustic tags and released into the upper Swan River between March and May 2016.

Tagged fish will provide information on fish movement in the estuary, position in the water column and activity levels. These data will be used to relate fish movements to environmental conditions and help inform the management of the *Swan Oxygenation Program* and the Riverpark. Recreational fishers that catch a tagged fish are asked to return these fish to the water and contact researchers so that valuable data can continue to be collected.

An additional five acoustic receivers will be deployed in the Canning River in the lead up to a major upgrade of the Kent Street Weir. This initiative will provide insights into fish movements about the weir during periods of closure and when the weir is open to facilitate fish passage.

Western school prawn restocking and monitoring project

This project addresses the decline of the western school prawn population in the Riverpark. The initiative includes piloting the production and release of western school prawns into the Swan and Canning rivers, engaging community through stock release and monitoring, and evaluating stock status, determining factors affecting the western school prawn recruitment, and survival and release strategies.

Efforts to culture and restock the school prawns began in November 2012 with community volunteers engaged through the Department's *Prawn Watch* citizen science project to catch egg-carrying female prawns in the shallow waters where they congregated to spawn. The result was a world-first in effectively culturing western school prawn eggs. As laboratory techniques were refined, more than 2 million juvenile school prawns

were released during 2015–16. To date 4.5 million juvenile school prawns have been released into the river system during the past three years.

Monitoring of the Riverpark's school prawn population will be extended in 2017 to evaluate stock status and changes over time associated with the project. Preliminary information to date suggests that the restocking has had a positive impact on the school prawn population. Predation investigations show that gobbler fish and not blowfish are a major predator of school prawns.

Investigation of prawn distribution shows peak abundance in the shallow waters is driven by the movement of adults into these areas to spawn during summer, whereas the peak abundance in the deeper waters follows the recruitment of young prawns post-spawning. Breeding generally occurs on either side of December/January, with the extent and duration of the spawning period differing from year to year. Analysis is continuing.

Project partners include Murdoch University, Challenger Institute, Department of Fisheries, Fisheries Research and Development Corporation, WA Fish Foundation and Recfishwest.

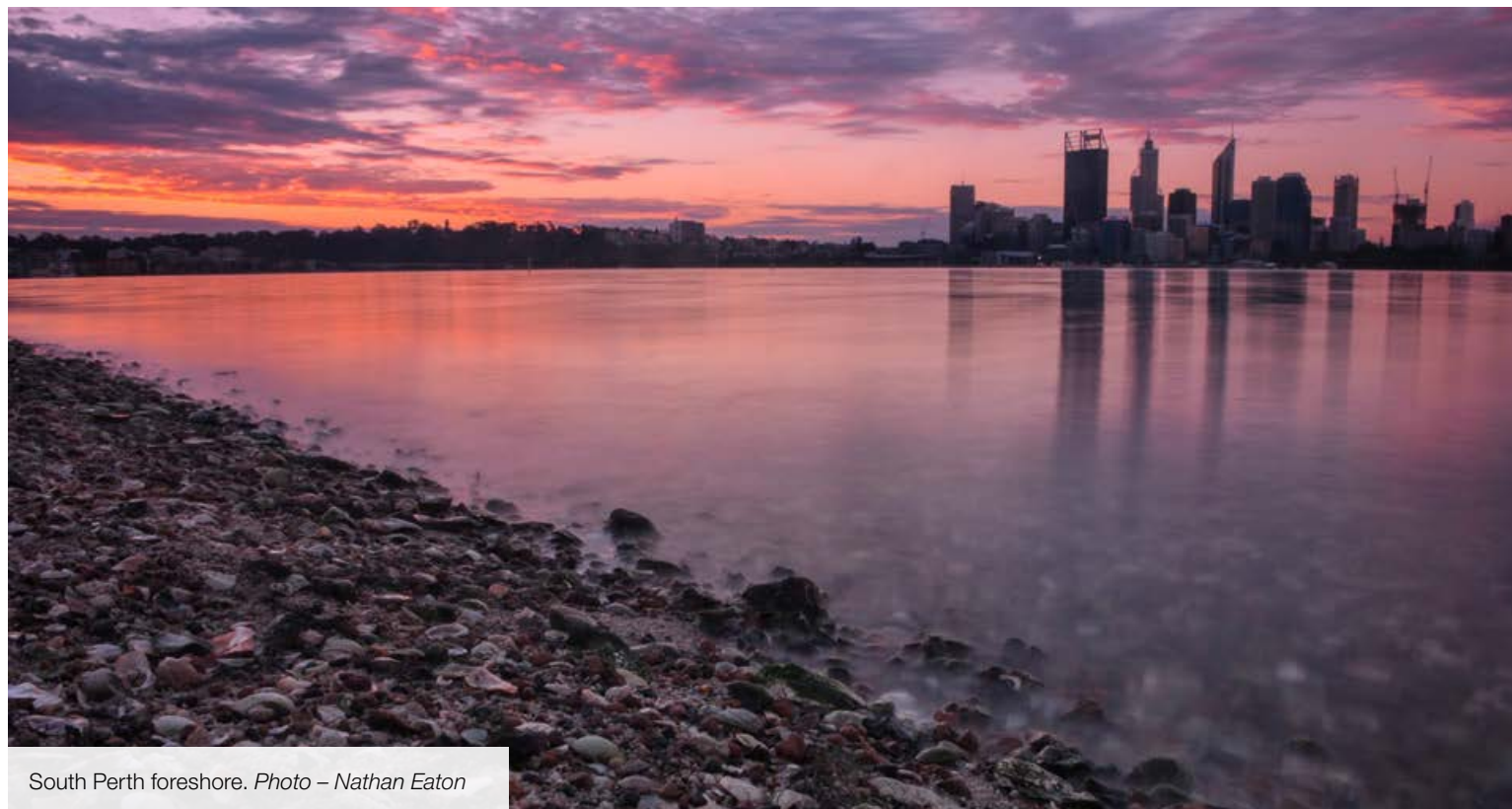
Riverbank Funding

Riverbank Funding is a partnership between the State and local riverfront governments that results in significantly improved river shoreline conditions while providing major benefits to river health.

During 2015–16 \$2 million was distributed by the Department's Riverbank grants scheme for 24 priority foreshore projects addressing erosion control, revegetation, weed control, riverwall repair and preparation of foreshore management plans.

Since 2008, the State Government has invested \$14 million in 156 riverbank projects that have helped protect and stabilise priority river foreshore locations. This has effectively reduced riverbank erosion and improved public access and amenity at popular Riverpark destinations and recreational areas.

The Riverbank program has received \$1 million annually from the Burswood Gaming Levy. As part of a \$3 million State Government *Riverbank Funding* commitment (over three years) the Department received an additional \$1 million in 2015–16 for foreshore protection and rehabilitation.



South Perth foreshore. Photo – Nathan Eaton



Parks and Wildlife River Health program manager Alex Hams releases a tagged fish for the Swan Canning Riverpark fish array project. Photo – Parks and Wildlife



Western school prawn. Photo – Stewart Allen

Operational highlights

Riverpark Management

Fishing line bin project

The *Reel it in* fishing line bin project was started in 2013 to help reduce fishing line entanglements of dolphins, waterbirds and other wildlife in the Riverpark.

During 2015–16, more than 14.7km of fishing line, 2380 hooks and sinkers, 2048 bait bags and 286 other recreational fishing items were collected from the Swan and Canning rivers. Since 2013 more than 23.5 km of fishing line has been collected by the bins.

Swan Alcoa Landcare Program

The *Swan Alcoa Landcare Program* (SALP) is a joint initiative funded by Parks and Wildlife and Alcoa and administered by Perth Natural Resource Management.

In 2015–16 SALP celebrated 18 years of delivering funding to community groups and provided \$390,500 to 24 community groups to implement 41 landcare projects throughout the Swan Canning Catchment.

SALP has provided more than \$6 million to 175 community groups during the past 18 years and offers invaluable funds for small community groups seeking grants of between \$1000–\$50,000 to deliver a variety of crucial landcare and water quality outcomes. This enduring program has delivered more than 800 valuable on-ground projects since its inception in 1999.

These projects help control invasive weeds, revegetate bushland, restore biodiversity and preserve the ecological health of priority waterways that drain into the Swan and Canning rivers.

In 2015–16 Parks and Wildlife invested \$200,000 into community-led SALP projects, including \$50,000 from the Federal Government as part of the National Landcare Program.

Table 33: Swan Canning Catchment sub-regional support and Swan Alcoa Landcare Program funding

	NORTH	NORTH EAST	EAST	SOUTH	TOTALS
Sub-regional support	\$105,000	\$120,000	\$105,000	\$246,000	\$576,000
SALP	\$23,969	\$25,483	\$45,999	\$104,549	\$200,000
Total	\$128,969	\$145,483	\$150,999	\$350,549	\$776,000



Parks and Wildlife Riverbank manager Stephen Lloyd and marine park coordinator Melissa Evans contribute to revegetation efforts around the Riverpark. *Photo – Mark Thornley/Parks and Wildlife*

2015–17 Light Industry Program

More than 340 audits of over 250 light industrial premises were conducted in the Swan Canning Catchment in the first six months of the *2015–17 Light Industry Program*. The Department's *Healthy Catchments Program* has partnered with the Department of Environment Regulation and seven local governments in priority light industry catchments to help reduce industrial contaminants entering the Swan and Canning rivers via stormwater and groundwater.

Relevant businesses were provided with information about environmentally acceptable practices and given advice to help avoid breaches of environmental legislation and applicable local laws, focusing on the use, storage and correct disposal of all types of solid and liquid materials. Follow up audits indicate that the majority of business operators are responding positively and where necessary had made changes to improve their practices.

The program complements current light industrial inspection programs run by a number of local governments, and helps establish sustainable inspection programs for businesses who don't have a program in place.

Fish Communities Index

The Department continues to invest in the application of ecological health indicators for the Swan and Canning rivers through annual monitoring of fish communities and seagrass health. The Fish Communities Index is an established methodology developed and undertaken by Murdoch University, and has been applied since 2012 to report on the waterway.

The 2015 report showed that across the Swan Canning Riverpark, the ecological condition of both nearshore and offshore waters based on fish communities was generally good to fair. The offshore waters of the Canning estuary zone exhibited the poorest score of all zones in 2015. It is unclear whether hypoxic conditions in this zone at the time of sampling were responsible for this result or if other factors were exerting pressure on fish communities in the area.

Fewer fish species (25) were caught in nearshore waters in 2015 compared with the previous year (35 species). This is largely explained by natural salinity changes, with the 'fresher' conditions observed in 2015 limiting numbers of marine species using the river system. A similar number of fish species (21) were caught in offshore waters in 2015 compared with the previous year (20 species).

Great Gardens workshops

The Great Gardens team continued to deliver free behaviour change education on behalf of the Department to the community. In 2015–16, the Department allocated \$80,000 to fund 16 educational events including workshops, festival activations and food theatre that were designed to influence the Western Australian community to adopt *RiverWise* behaviour.

The program includes education on responsible fertiliser and chemical use and turning sand into soil via soil amendments. It reached 2962 people at an average attendance rate of 185 people per event.

Great Gardens has been working with Parks and Wildlife for more than 13 years to deliver community education workshops and events designed to inspire and empower the WA community towards using less water and nitrogen and phosphorus-based fertilisers, and to reduce rubbish left in the Riverpark.

During 2015–16 Great Gardens delivered *RiverWise* education and sustainable gardening activations at major outdoor community events including the Autumn River Festival, Perth Royal Show, King's Park Festival, Garage Sale Trail and Baker's Square Fiesta.

Dolphin Watch

Dolphin Watch is one of Australia's leading citizen science projects, helping identify and profile the approximately 37 Indo Pacific bottlenose dolphins that visit and live in the Riverpark. Data collected by volunteers helps researchers track dolphin movements, identify key behaviour patterns and provides an early warning system for dolphin entanglements.

In 2015–16, volunteer numbers reached 875 and these volunteers spent 2888 hours observing and recording dolphin behaviour from monitored zones.

In June 2015, the project was named a finalist in the INCITE Awards for the *Dolphin Watch* mobile phone app. This app enables volunteers to upload their data and photos in real time.

Junior Dolphin Watch, the school education component of *Dolphin Watch*, engaged with 800 students and 11 schools in 2015–16.

The Department also continued to support the emerging *Estuary Guardians Dolphin Watch* project in Mandurah.

Highlight

Fishing line bin project reeling in fishing waste

The Department's *Reel it in* fishing line bin project continued to expand in 2015–16.

The first of its kind in Perth's waterways, *Reel it in* was developed to reduce fishing line entanglements of dolphins, waterbirds and other wildlife in the Swan Canning Riverpark.

The project has seen fishing line disposal bins installed at popular fishing locations around the Riverpark, including jetties, foreshores and traffic bridges. The bins are made of 100 per cent recycled materials and provide a safe and easy way to dispose of unwanted fishing line and tackle.

In 2015–16, the number of bins reached 50 and collected more than 14.7km of fishing line, 2380 hooks and sinkers, 2048 bait bags and 286 other recreational fishing items.

The project attracted a \$20,000 grant from Recfishwest in June 2016 which will assist in purchasing, promoting and servicing the fishing line bins and expanding the project State-wide including Busselton Jetty, Albany, Rottnest Island, Carnarvon, Shark Bay, Derby and Exmouth.

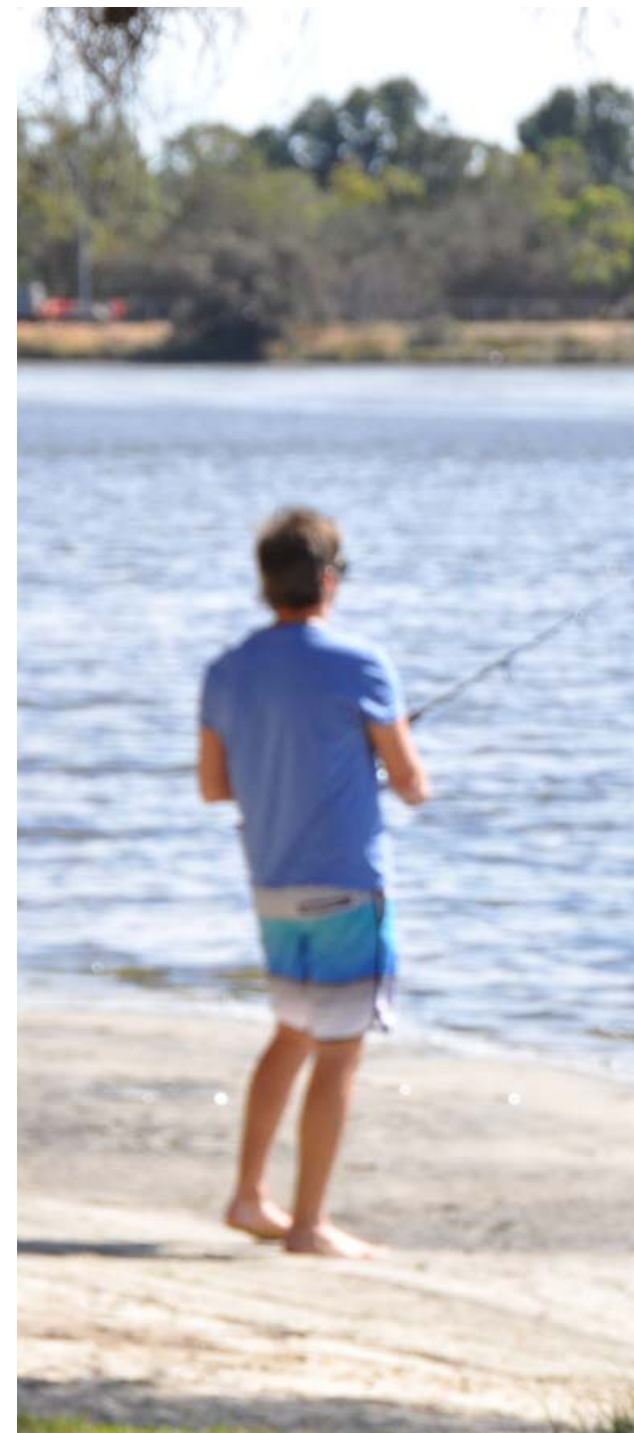
The Department also entered into a two-year collaborative agreement with Native Animal Rescue (NAR) in 2015 to help empty and audit the bins. NAR provides this service as part of its *River Connections* program, which operates in partnership with Youth Policing Operations. *River Connections* works with at-risk youth, providing exposure to an exciting and meaningful environmental project that helps build their skills and self-esteem in an outdoor setting.

Reel it in is delivered in partnership with Recfishwest, NAR, the Keep Australia Beautiful Clean Marine Campaign and nine riverfront councils across Perth. It has also been adopted by Fremantle Ports and the City of Cockburn, with bins at Victoria Quay, North and South Moles and popular fishing locations in Cockburn Sound.

The Department also collaborated with key stakeholder Zoos Victoria and their *Seal the Loop* program, who helped to refine the most effective bin design.

Since its launch in December 2013, the project has been embraced by the general public and recreational fishers, collecting more than 23.5km of fishing line, 4500 hooks and sinkers and 4000 bait bags.

Feedback from NAR and other environmental groups has shown that incidents of waterbirds becoming entangled in fishing line and hook injuries at sites where the bins have been set up, declined in 2015–16.





Reel it in fishing line bins provide recreational fishers with a safe place to dispose of fishing waste.
 Photo – Miranda Jackson/Parks and Wildlife



Fishing tackle collected by a fishing line bin at Garret Road Bridge. Photo – Parks and Wildlife



Fishers making use of the bin at Applecross Jetty. Photo – Stewart Allen



Fishing line bins help prevent injuries to wildlife like this pelican entangled in fishing line. Photo – Halina Burmej



Department of
Parks and Wildlife

