Service 6: Conserving Habitats, Species and Ecological Communities
Responsibilities

This service is responsible for developing and implementing programs for the conservation and improved management of the State’s biodiversity including plants, animals, genes and ecosystems, based on best practice science.

The desired outcome of the service is that plants and animals are conserved and habitat, ecosystem and landscape-scale conservation utilises evidence-based science.

The priorities of this service in 2018-19 were:

- continuing to develop and implement a legislative and policy framework that effectively supports biodiversity conservation
- continuing to establish and effectively manage a comprehensive, adequate and representative conservation reserve system to protect biodiversity and social values
- maintaining viable, intact and healthy ecological communities and populations of species, especially those that are threatened, significant or iconic, while allowing the sustainable use of natural resources
- reducing impacts of key threatening processes, including altered fire regimes and hydrology, climate change, and priority pest animals, weeds and plant diseases, on biodiversity, ecological processes and sustainable land uses
- undertaking scientific investigations that are effectively targeted to improve biodiversity knowledge and integrate science knowledge into biodiversity conservation and land management
- effectively collecting, storing and managing data and information so they are available and used to improve biodiversity conservation and land management
- promoting public and stakeholder awareness, understanding and support for biodiversity conservation, including through being involved in conservation programs.
The following strategies and key activities guided the delivery of the service’s priorities in 2018-19. The service is delivered by multiple divisions and Statutory Authorities across the Department.

1. Developing and implementing a legislative and policy framework that effectively supports biodiversity conservation, through:
   - developing and implementing regulations and other supporting mechanisms for the *Biodiversity Conservation Act 2016*
   - developing strategic documents and programs prioritised to support policy implementation
   - developing a new framework for the nine regional nature conservation plans.

2. Continuing to establish and effectively manage the conservation reserve system, by:
   - continuing to establish the formal terrestrial and marine conservation reserve system, with priority for:
     - Fitzroy River valley, Buccaneer Archipelago, and Wellington National Park expansion
     - lands purchased for conservation
     - proposals in the *Forest Management Plan 2014–2023*
   - Interim Biogeographic Regionalisation for Australia (IBRA) regions with less than 10 per cent in conservation reserves
   - progressively implementing priority conservation and science actions in marine reserve management plans
   - progressively implementing priority conservation and science actions in terrestrial reserve management plans or taking action to effectively manage terrestrial reserves through other appropriate mechanisms
   - continuing to effectively manage World Heritage listed areas through the implementation of collaborative conservation management programs across various tenures
   - continuing to implement the WA marine monitoring program in marine parks and reserves, and monitoring and research programs in the Swan Canning Riverpark
supporting and participating in audits and assessments undertaken by the Conservation and Parks Commission.

3. Maintaining viable, intact and healthy ecological communities and populations of species, especially those that are threatened, significant or iconic, while allowing the sustainable use of natural resources, through:

- developing and implementing approved biodiversity management programs including recovery plans for threatened species and ecological communities
- continuing to maintain, review and update, as necessary, the lists of threatened and priority species and threatened and priority ecological communities
- developing, refining and implementing processes for listing critical habitat
- continuing to ensure the sustainable use of flora and fauna, hobby keeping of fauna and the trade in wildlife are appropriately regulated and managed
- maintaining an effective system for monitoring and compliance with legislation for biodiversity conservation and land management
- managing wildlife interactions to protect life and property and responding to nuisance and damage caused by wildlife
- implementing programs to improve the management of sandalwood.

4. Reducing impacts of key threatening processes, by:

- developing and implementing processes for listing key threatening processes
- ensuring appropriate monitoring and reporting is conducted to meet the ecosystem health and biodiversity key performance indicators in the Forest Management Plan 2014–2023 and other key strategic documents
- reviewing and determining priorities for pest animal management, developing and conducting training, and undertaking actions to achieve conservation and protection of native fauna and other values, including through the Western Shield program and the Cane Toad Strategy for Western Australia 2014-19
- reviewing and determining priorities for weed management, developing and conducting training, and undertaking actions including surveys to determine weed distribution and abundance, to achieve conservation and protection of native flora and other values
- reviewing and determining priorities for plant disease management, developing and conducting training, and undertaking actions to achieve conservation and protection of native flora and other values, including through programs to manage Phytophthora dieback, with a focus on identified protectable areas
- continuing to manage the threats of foxes and feral cats to native fauna in Western Shield areas, including integration of the Eradicat® feral cat bait, as appropriate
- implementing priority and targeted actions to reduce the impacts of altered hydrology (e.g. climate variability, secondary salinity, acidification and eutrophication) on biodiversity and other values on CALM Act and other lands managed by the Department
- implementing strategic actions to improve the resilience of threatened terrestrial and marine species and ecological communities under predicted climate change settings
- continuing to provide effective, consistent and timely advice to industry, regulatory agencies and the Minister on land use, resource extraction and industrial development proposals to protect the conservation reserve system and key species and ecological communities.

5. Undertaking targeted scientific investigations and integrating science knowledge into
biodiversity conservation and land management, through:

- ensuring that science programs prioritise and address gaps in knowledge in order to deliver improved management strategies implemented by the Department for effective conservation, protection and management of flora, fauna, ecological communities and conservation reserves
- continuing to undertake terrestrial and marine biological surveys to systematically address gaps in knowledge and increase understanding of biodiversity components and patterns to better inform wildlife and conservation reserve management including joint management with Aboriginal traditional owners
- determining priorities for, and undertaking research relating to, priority weeds, plant diseases and pest animals and related conservation and management actions
- better understanding the factors influencing the effectiveness of fox and feral cat control and developing more effective control regimes
- continuing to plan and implement translocations focusing on high priority threatened flora and fauna and the development of success criteria
- continuing to use spatial analysis based approaches, including remote sensing to support biodiversity conservation and management
- undertaking fire science to support protection of life and property and the conservation of biodiversity in a changing climate and ensuring continuous improvement in knowledge and application of fire to support conservation and land management
- managing and curating the Western Australian Herbarium to improve representation of rare and poorly known taxa on and off the conservation estate, and conducting and supporting taxonomic research on WA plants, algae and fungi
- assisting the Western Australian Museum and other research institutions with research into faunal taxonomy, particularly in poorly known groups such as terrestrial and marine invertebrates, and taxa of conservation concern, such as short-range endemics
- managing the State’s native seed collection to improve conservation of threatened taxa and restoration of degraded lands, and undertake research in seed biology
- undertaking research on population genetics, demography, eco-physiology and reproductive biology to improve management and conservation of threatened flora and fauna
- undertaking research to support restoration of disturbed and degraded land
- continuing to build partnerships and facilitating the development of models to determine the effects of human-induced climate change on biodiversity
- maintaining detection, diagnostic and mapping services for Phytophthora species.

6. Effectively collecting, storing and managing data and information to improve biodiversity conservation and management, by:

- providing core services and information on all plants, algae and fungi in WA
- continuing to develop and support the implementation of a survey database to provide access to information on biodiversity
- developing a geographical database to deliver information on the distribution and management of weeds, pests and diseases that may affect conservation values, in order to measure management effectiveness and better target works programs
- reviewing and implementing improvements to information management and licensing systems.

7. Promoting public and stakeholder awareness, understanding and support for biodiversity conservation including through being involved in conservation programs, by:

- strengthening the Department’s internal and public communications to enhance community understanding about the value of biodiversity and its conservation requirements and the positive
contribution that biodiversity makes to people’s lives
- improving communication with stakeholders to ensure that conservation funding is targeted towards programs and actions that will provide high value conservation outcomes
- facilitating conservation actions on land not managed by the Department.

### Table 3: Service 6 performance summary

<table>
<thead>
<tr>
<th></th>
<th>2018-19 target</th>
<th>2018-19 actual</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenses by service</td>
<td>$65,828,000</td>
<td>$64,439,000</td>
<td>($1,389,000)</td>
</tr>
<tr>
<td><strong>Key efficiency indicator</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Average cost per hectare</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of wildlife habitat</td>
<td>$2.08</td>
<td>$2.04</td>
<td>($0.04)</td>
</tr>
<tr>
<td><strong>Key effectiveness indicators</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of critically</td>
<td>72.00%</td>
<td>73.20%</td>
<td>1.20%</td>
</tr>
<tr>
<td>endangered and endangered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>taxa and ecological communities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>that have a recovery plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of land baited for</td>
<td>4,347,107 hectares</td>
<td>4,110,063 hectares</td>
<td>(237,044 hectares)</td>
</tr>
<tr>
<td>introduced predators</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

More information on DBCA’s Outcome Based Management Structure can be found in the *Disclosures and Legal Compliance* section under *Key performance indicators*
Wildlife legislation, policy and strategic programs

- The Department finalised development of regulations to support full proclamation of the Biodiversity Conservation Act 2016. The Biodiversity Conservation Regulations 2018 were published on 14 September 2018 and came into effect on 1 January 2019 at which time the Wildlife Conservation Act 1950 and Sandalwood Act 1929 were repealed. The Department has made significant progress in preparing supporting guidance documents to implement the regulations and continues to focus on education and awareness for those in the community affected by changes. Progress has been made on the development of a new online licensing system that will integrate the issue and management of licences, other authorisations and CEO approvals that relate to licences.

- The Department prepared Biodiversity and Conservation Science Program Plans 2018–21 that identify research activities and key deliverables to achieve the goals of the Science Strategic Plan 2018–21 and support the Department’s Strategic Directions 2018–21.

- The Department provided information to the Department of Water and Environmental Regulation (DWER) on protecting biodiversity for a climate change issues paper for the State.

- The Department continued to provide assistance to the Department of the Premier and Cabinet on the Strategic Assessment of the Perth and Peel Regions, particularly in relation to biodiversity conservation.

- The Department is developing an integrated species and ecological communities data management system to facilitate improved management of threatened species and communities. Phase 2 of the system was completed in June 2019.

- Biodiversity survey data continues to be added to BioSys, which is the primary repository for new biodiversity data sets within the Department. Legacy data sets are also being migrated to the new system, including important historical regional surveys, surveys of targeted areas, and a wide range of other data sets.
Establish and manage the conservation reserve system

- During 2018-19 three new conservation reserves were established and other conservation reserves had land added resulting in an increase in the State's conservation reserve system to 25,006,717 hectares.
- The Plan for Our Parks initiative commenced, whereby five million hectares of new and expanded parks and reserves will be created over the next five years, expanding the State's conservation estate by 20 per cent.
- Consultation commenced with traditional owners, conservation groups, the resource sector, pastoralists, neighbours, commercial and recreational fishers, local government authorities and other key stakeholders as part of preparing a refined Plan for Our Parks.
- Work also continued towards establishing new and expanded parks, including working to create a marine park and island national parks at the Buccaneer Archipelago, a Fitzroy River National Park, expansion of Wellington National Park, a Preston River to Ocean Regional Park and Leschenault Regional Park, additions to Beeliar Regional Park and proposed national parks at the Abrolhos Islands and along the Ningaloo Coast.
- Biodiversity conservation projects commenced to eradicate the Golden Crown Beard (*Verbesina enceliodes*), monitor Australian sea lion (*Neophoca conerea*) population and to recover the Abrolhos painted button-quail (*Turnix varius scintillans*) in the proposed Abrolhos Islands National Park.
- The Department’s marine monitoring program continued to collect and report on the condition of key ecological values in WA’s marine parks and reserves, and the pressures on them. During 2018-19, planning and implementation of long-term monitoring in the Kimberley marine reserves continued, assessing ecological assets including coral communities, water quality, dolphins, turtles and crocodiles. Monitoring data was also collected for various ecological values including fish, coral, invertebrate fauna, seagrass, little penguins (*Eudyptula minor*) and deep reef communities at Rowley Shoals Marine Park, the Ningaloo Marine Reserves, Shark Bay Marine Reserves, Jurien Bay Marine Park, metropolitan marine reserves, Ngari Capes Marine Park, and Walpole and Nornalup Inlets Marine Park.

Threatened species listing

- The Department is a member of a national working group to implement a Memorandum of Understanding for a common assessment method for listing threatened species in a consistent manner between the Australian Government and States and Territories, with the objective of developing a single national threatened species list.
- Twenty-five species of flora and fauna had their status under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) changed as part of the process to align threatened species listed under the EPBC Act with threatened species listed under the *Biodiversity Conservation Act 2016*. This brings the total number of species with changed EPBC Act status under this process to 74.
- The recommendations of the 2018 meeting of the WA Threatened Species Scientific Committee were endorsed by the Minister for Environment and the new threatened species lists were gazetted on 11 September 2018.
- On 1 January 2019 the *Wildlife Conservation Act 1950* threatened species lists (Specially Protected Fauna and Rare Flora as gazetted on 11 September 2018) were transitioned to be the *Biodiversity Conservation Act 2016* lists of Threatened, Extinct and Specially Protected Species (Fauna and Flora).
Threatened animals

- One extinct fauna species, Douglas’s broad-headed bee (*Hesperocolletes douglasi*), was rediscovered and transferred to the list of threatened (critically endangered) fauna. There were no other additions to the list of threatened fauna. Seven species of threatened fauna were moved to a higher threat category to align with the national status, one species had a change in listing criteria, and one species was added to the specially protected list of migratory fauna.
- Taxonomic revision resulted in two mammal species being added to the extinct fauna list - marl (*Perameles myosuros*) and Nullarbor barred bandicoot (*Perameles papillon*), neither species has been recorded alive in approximately 100 years.
- One additional species, Gould’s mouse (*Pseudomys gouldii*), was removed from the extinct list due to re-identification of museum specimens as an extant (alive) species.
- A summary of the changes to the Fauna Notice and the gazette notice are available on the Department’s website.
- At 30 June 2019, there were 249 threatened fauna species (57 critically endangered, 58 endangered and 134 vulnerable), 23 extinct fauna species, 110 specially protected fauna species (seven conservation dependent, seven otherwise in need of special protection and 74 migratory) and 219 species on the Department’s priority fauna list.
- There were 2690 records of sightings, captures or evidence of threatened and priority fauna added to the Threatened and Priority Fauna database.
- A recovery plan was approved for the Australasian bittern (*Botaurus poiciloptilus*) in WA. Research into their populations and habitat use continued and investigations commenced into the feasibility of trapping and satellite tagging to understand movements and ranges. A recovery team was formed to support implementation of the plan, research was undertaken to identify key habitat requirements and to determine the implications and potential responses to declining water depths in wetland habitats as a result of climate change.
- The national *Wildlife Conservation Plan for Migratory Shorebirds* (Commonwealth of Australia 2015) was adopted as an interim recovery plan for eight species of threatened migratory shorebirds visiting WA. Two multi-jurisdictional recovery plans, for the brush-tailed rabbit-rat (*Conilurus penicillatus*) and the central rock-rat (*Zyzomys pedunculatus*), prepared by the Northern Territory in consultation with the Department were endorsed and adopted as national recovery plans under the EPBC Act.
- The Department collaborated with DWER and the Department of Primary Industries and Regional Development (DPIRD) for further conservation of the critically endangered Margaret River hairy marron (*Cherax tenuimanus*).
- The Department coordinates fauna recovery teams to guide recovery actions for fauna species.
- With guidance from the western ringtail possum (*Pseudocheirus occidentalis*) recovery team, Main Roads WA has undertaken a regional context survey for this critically endangered species to improve the understanding of its conservation status.
- Five additional western ground parrots (*Pezoporus flaviventris*) were captured to augment the captive populations at Perth Zoo and increase the chances of breeding success. Radio tracking of western ground parrots in the wild was undertaken concurrently, and will improve knowledge of this critically endangered bird’s biology.
- The Department initiated a long-term monitoring program of the health of the Rottnest Island quokka (*Setonix brachyurus*) population. The monitoring program will be undertaken annually for three years to determine the required frequency for longer term monitoring.

Threatened plants

- One species of flora was added to the *Wildlife Conservation Act 1950* list of specially protected (threatened) flora under the category of critically endangered, and three species have moved to a
lower category of threat. A summary of the changes to the Rare Flora Notice and the gazette notice are available on the Department’s website.

- At 30 June 2019, there were 429 extant threatened flora species (160 critically endangered, 140 endangered and 129 vulnerable), 15 listed as presumed to be extinct and 3279 taxa on the Department’s priority flora list. One species listed as extinct was rediscovered and is now regarded as a threatened species under the *Biodiversity Conservation Act 2016* until formally considered for listing.

- A total of 842 populations, comprising 396 species of threatened and priority flora, were surveyed or monitored, and 69 new populations of threatened flora and 151 new populations of priority flora were located. Of the 556 records added to the Threatened and Priority Flora database, 116 were for new populations.

- A recovery plan was approved for one species of threatened flora and interim recovery plans were approved for five species of threatened flora.

- Management actions including weed control, fencing, signage, feral and pest animal control, vegetation management, habitat restoration, recruitment stimulation, dieback control, fire management, and investigations into fire response, pollinators, disease and population dynamics, were undertaken to protect 288 populations of 198 species of threatened and priority flora across the State.

- The number of plant specimens held at the Western Australian Herbarium increased by 1.37 per cent (a net increase of 10,862 specimens), bringing the number of specimens held to 802,107. A total of 423 names were added to the WA Plant Census. Names for 53 taxa were published in the Western Australian Herbarium journal *Nuytsia*.

- A total of 116 seed collections for 39 threatened species and 18 priority species were banked at the Western Australian Seed Centre; 97 of these collections were listed as critically endangered, endangered or vulnerable; four collections were made for a species presumed to be extinct following discovery of an extant population. The Department continued to provide technical advice and assistance for projects involving seed collection and use. Collections of 10 critically endangered, three endangered and two vulnerable species were withdrawn from the seed bank and germinated for use in Department translocation projects. The seed bank now contains collections of 386 threatened flora and 877 priority flora.

- New populations of threatened plants continue to be established in areas free or largely free of key threats, with planting and monitoring at 13 translocation sites for ten species.

- The Department completed several prescribed burns to stimulate recruitment of threatened flora populations and regenerate senescing habitat in the Wheatbelt. Follow-up monitoring is being undertaken to determine their fire response and population dynamics, and the recovery of habitat.

- Genomic analysis of *Banksia biterax* was undertaken to inform conservation management of the very small Busselton populations.

### Threatened ecological communities

- At 30 June 2019, there were 65 extant ecological communities listed as threatened through a non-statutory process (20 critically endangered, 17 endangered and 28 vulnerable), and four listed as collapsed. Another 393 ecological communities were on the priority list.

- The relevant sections of the *Biodiversity Conservation Act 2016* have now been proclaimed and provides the capacity for statutory listing of threatened ecological communities (TECs) in WA. The existing non-statutory list will be considered for listing under the *Biodiversity Conservation Act 2016*.

- New occurrence information was added to the Threatened and Priority Ecological Communities database for 179 occurrences of TECs and priority ecological communities (PECs) distributed across the State, helping resolve the status of the PECs and providing improved information for land use planning. Surveys were completed in 53 occurrences of TECs and PECs throughout the
State.

- Management actions including weed mapping and control, fencing, signage, feral and pest animal control, hydrological investigations, monitoring, revegetation, dieback control and fire management were undertaken to protect 20 TECs and 10 PECs across the State.
- The *Rottnest Island Woodland Experience* (Management Plan) for the conservation and expansion of the Rottnest Woodlands (*Melaleuca lanceolata* and *Callitris preissii*) threatened ecological community was developed. The plan also aims to develop a woodland visitor attraction and a sustainable tourism funding initiative that generates income for implementation of the plan and maintenance of the Rottnest Woodlands.
- The effects of threatened flora translocation and vegetation burning on a priority banksia woodland community were investigated in a Wheatbelt nature reserve.
- Biological survey and mapping of a West Kimberley mound spring priority ecological community was completed, to help resolve its status and inform management.

**Managing threats**

- The Department continued to implement the *Cane Toad Strategy for Western Australia 2014–19*, with a focus on protecting native wildlife. The strategy also encompasses education and public awareness, and quarantine strategies to prevent the establishment of new satellite populations ahead of the frontline. The Department has refocused the cane toad program to implement research outcomes, including taste aversion training of threatened northern quolls (*Dasyurus hallucatus*) and other vulnerable taxa.
- The Department continued to support a coordinated corella control project to manage introduced white corellas in the Perth metropolitan and south-west areas. The project is overseen by the Corella Coordination Working Group, chaired by the WA Local Government Association with representatives from local government, DPIRD and BirdLife WA.
- Critically endangered flora and ecological communities were treated aerially with phosphite to protect them from the impacts of *Phytophthora cinnamomi*, including the critically endangered Busselton ironstone threatened ecological community. Barriers around an infestation on the Bell Track have prevented the spread of *P. cinnamomi* to date.
- The Department continued to enhance its dieback management capacity with:
  - training delivered to support deployment of the Phytophthora Dieback Management Manual;
  - Green Card training for 98 DBCA and Forest Products Commission staff, and external proponents; since 2014, 1038 people have undertaken Green Card training; and
  - Dieback Management Planning training for 12 DBCA staff, private sector dieback interpreters and personnel from natural resource management groups. The total number of people who have completed this training is now 165.
- The Department’s Vegetation Health Service (VHS) continued its collaboration with the Murdoch University Centre for Phytophthora Science and Management on the identification of Phytophthora species. The VHS tested 1235 samples.
- The Department partnered with Main Roads WA on three projects to improve options for access to uninfested basic raw materials for road building to minimise the spread of Phytophthora dieback.
- The Department sponsored the annual Dieback Information Group Conference organised by the Dieback Working Group, and continued to provide annual point data for Phytophthora dieback samples to maintain the Dieback Information Delivery and Management System (a system to aid in education and inform dieback management across tenures) developed under Project Dieback.
- DBCA collaborated with DPIRD on biosecurity preparedness for possible myrtle rust (a fungal plant pathogen) incursion into WA, by participating in training and undertaking surveillance.
- In February 2019, DBCA partnered with Plant Health Australia to host the Enhancing Biosecurity to Protect Western Australia’s Forests seminar to kickstart work for the National Forest Biosecurity Surveillance Strategy.
Staff from Kimberley Region and Biodiversity and Conservation Science conducted an annual landscape scale adaptive management program (prescribed fire, introduced herbivore cull and weed control) combined with monitoring and evaluation, to improve conservation outcomes for threatened iconic critical weight range mammals in the Kimberley.

Operations to prioritise, review and manage priority environmental weeds continued throughout the State, including through collaborative efforts with traditional owners and community, and other groups.

Mobile mapping software applications were implemented to standardise and improve the capture and management of weed occurrence and treatment data, and work continued to develop a weed management course to cover the requirements for weed identification, integrated weed management and the safe use of chemicals.

The Department continued to negotiate with recognised recreational hunting and shooting groups to undertake pest animal control work to complement strategic management and conservation outcomes. The Department worked with groups to manage pest animals in Avon Valley National Park, Walyunga National Park and Rockingham Lakes Regional Park. The Regional Parks Unit is currently undertaking work on feral deer with the Sporting Shooters Association of Australia.

The Department continued to participate in wild dog management in the eastern and central Wheatbelt through declared species groups, and in the rangelands with recognised biosecurity groups, to ensure a coordinated landscape-wide approach to minimising the impact of wild dogs on pastoral production and biodiversity.

The Department collaborated with the Commonwealth Department of Environment and Energy to develop draft National Light Pollution Guidelines that will reduce impacts to sea turtles and birds.

Technical information was provided by the Department on reserves, species, ecosystems and landscapes to facilitate environmental impact assessment, regulation of land clearing and land use planning.

The Department continued to monitor water quality of ground and surface waters associated with the Environmental Protection Act 1986 Operating Licences for the wastewater treatment plant and Forbes Hill landfill on Rottnest Island.

Detailed site investigations for the Forbes Hill Landfill were completed to determine the nature and extent of groundwater and receiving water bodies, update site conceptual model, determine any risks to human and ecological receptors under the current land use and identify potential future monitoring priorities.

The Department continued revegetation of a Salt Lake bank to improve quality of fringing vegetation and provide a buffer function to priority microbial and coastal saltmarsh ecological communities on Rottnest Island.

A long-term prescribed burn program to regenerate senescing vegetation and maintain biodiversity was developed for several nature reserves at Tarin Rock. The process was completed using the Wheatbelt Region’s Fire Regime Optimisation Planning System tool. The long-term absence of fire from many Wheatbelt reserves is an emerging consideration in managing biodiversity.

**Western Shield**

The Western Shield wildlife recovery program continued to implement broadscale fox and feral cat control for native animal conservation across a network of sites in WA. About 3.7 million hectares of conservation reserves and State forest were baited as part of the core program. The total area baited for foxes and feral cats as part of Western Shield and related projects (externally funded) was about 4 million hectares involving the use of approximately 584,000 fox baits and 572,000 Eradicat® feral cat baits.

Regular monitoring of baited areas continued to track the recovery of native species.

There are currently more than 5000 volunteers registered on the Western Shield – Camera Watch webpage, hosted by Zooniverse. Collectively volunteers have provided more than one million...
classifications, contributing substantially to our ability to understand the activity of native and introduced species in the northern jarrah forest.

**Wildlife sanctuaries and translocations**

- Monitoring of woylies (*Bettongia penicillata*) and numbats (*Myrmecobius fasciatus*) continued inside the Dryandra Woodland Sanctuary, a 1000-hectare predator-proof enclosure in the proposed Dryandra Woodland National Park. This indicated high survivorship of founders and ongoing breeding inside the sanctuary. Five malleefowl (*Leipoa ocellata*) were also released into the sanctuary. Remote camera surveillance has not detected any incursions by feral cats or foxes.
- The Operation Rangelands Restoration project continued at Matuwa (Lorna Glen former pastoral station). Reintroduced populations of bilby (*Macrotis lagotis*), brushtail possum (*Trichosurus vulpecula*), mala (*Lagorchestes hirsutus*), golden bandicoot (*Isodon auratus*) and boodie (*Bettongia lesueur*) continue to be monitored. All species are breeding and golden bandicoots are persisting outside the fenced enclosure. Martu traditional owners and the Department will continue to jointly manage this property on the Matuwa Kurrara Kurrara Indigenous Protected Area for conservation and cultural purposes.
- Perup Sanctuary continued to support robust populations of threatened woylies, numbats, chuditch (*Dasyurus geoffroii*) and western ringtail possum (*Pseudocheirus occidentalis*). Ongoing monitoring of recent western ringtail possum translocations show signs of recruitment.
- Nangeen Sanctuary, located in Nangeen Hill Nature Reserve, continued to protect an important population of the black-flanked rock-wallaby (*Petrogale lateralis lateralis*) in the Wheatbelt.
- A translocation of noisy scrub-birds (*Atrichornis clamosus*) from Bald Island to Mondrian Island was conducted to trial establishment of a second predator-free island population.
- The Perth Zoo breeding program continued to produce numbats, dibblers (*Parantechinus apicalis*) and western swamp tortoises (*Pseudemydura umbrina*) for wild release at sites in WA. A program to rear orange-bellied frogs (*Geocrinia vitellina*) and white-bellied frogs (*Geocrinia alba*) was also undertaken to supplement wild populations near Margaret River.
- Seventeen critically endangered western swamp tortoise were translocated from Perth Zoo to Meerup (D’Entrecasteaux National Park) in stage two of an assisted colonisation trial.
- In August 2018, 12 western swamp tortoises, fitted with data loggers to record behavioural information for researchers, were released into the Ellen Brook Nature Reserve. The trial is enabling researchers to compare tortoises of similar age, genetics and history to tortoises being released at other nature reserves containing populations of the species.

**Marine science**

- Research to address key management-related knowledge gaps regarding ecological processes, key pressures, along with biological surveys were carried out in marine reserves at Ningaloo, Shark Bay, Ngari Capes and in the Perth metropolitan area.
- The *Dolphin Watch* app was expanded to include Roebuck Bay, and a dolphin fin identification book was published to facilitate community participation in the monitoring of dolphin species in the Yawuru Nagulagun Roebuck Bay Marine Park. Structured dolphin surveys were also conducted in Roebuck Bay and Prince Regent River.
- Research into resident flatback turtles at their foraging grounds began to investigate how environmental drivers influence turtle distribution, movement and foraging ranges.
- The Rottnest Seagrass Monitoring Program was implemented by the West Australian Divers for
Diversity Inc, which aims to develop a benchmark to enable long term monitoring and reporting on the viability of seagrass meadows in the Rottnest Island Reserve.

- The Rottnest reef fish surveys continued to be implemented by Reef Life Survey to provide for a long-term monitoring program for reef fish in the waters around Rottnest Island.

**Rivers and estuaries science**

- The Department continued to partner with the University of Western Australia to address key data requirements of the Swan Canning Estuarine Response Model and develop a virtual observatory for the estuary.
- The 2018 condition assessment of the Swan and Canning estuary based on the fish community index identified an improvement in ecological condition compared with 2017, when the estuary was impacted by atypical summer river flows. The Swan Canning Acoustic Array (30 acoustic receivers deployed throughout the estuary) continued to provide valuable information on fish movement relative to water quality and major in-river barriers.
- Stock assessment of western school prawns indicated success of restocking and confirmed the decimating effects of unseasonal weather conditions in 2016-17.
- Non-nutrient contaminants in water, sediments and biota continued to be investigated to inform management of the river system and provide consumption guidance for recreational fishers.
- Water quality and biotic sampling was conducted in response to a toxic algal bloom in the Swan estuary. The *Alexandrium* bloom, led to the Department of Health issuing a health warning to advise the public to not consume fish, crabs or shellfish from the affected areas of the estuary. Investigations of algal control approaches were undertaken and new tools for water quality assessment were investigated.
- Scientific support was provided for hydrological and nutrient remodelling of coastal catchments. Investigations were undertaken to provide management advice on water releases for the Helena River.

**Wetlands**

- The Department is collaborating with the Peel-Harvey Catchment Council to assess suitability of Crown land buffering the Peel-Yalgorup System Ramsar site as a boundary extension.
- Preliminary assessments to determine the status of the Muir-Byenup System and the Lake Gore Ramsar sites have been completed, and a draft report has been completed for the Vasse-Wonnerup System Ramsar site.
- In the Muir-Byenup System Ramsar site, a project continued to investigate the resilience of peat wetlands under a drying climate and assess risks from acidification. This work will inform fire management around other peat wetlands and contribute to a better understanding of the hydrology of this important wetland suite and other similar wetland areas.
- A waterbird survey report was completed for the Ord River Floodplains Ramsar site over the dry season of 2018. This was the area's first comprehensive waterbird survey since the 1980s.
- At Toolibin Lake, monitoring of catchment hydrology and biodiversity continued. 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. 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 help assess the groundwater pumping program.
- Following a filling event at Toolibin Lake in 2017, waterbirds and aquatic invertebrates were surveyed to determine the wetland’s ability to support these values after 20 years of drought. A report on the hydrology of the 2017 filling event was completed and an investigation into the effects of this event on salt storage in the lake’s sediment profile was commenced.
• A report on the 2017 biological survey and mapping of springs supporting priority ecological communities in the Kimberley Region was completed and will assist with decision-making around groundwater resource management.
• Monitoring of littoral vegetation spatial cover, shore birds, water quality and frogs on Rottnest Island wetlands continued.

Forest science

• Monitoring of plant and invertebrate communities continued at seven FORESTCHECK grids burnt in 2015 by the Lower Hotham bushfire. Monitoring of the understorey vegetation was also undertaken on three grids at Dwellingup and nine grids in the southern jarrah forest.
• The effects of timber harvesting and fire history on coarse woody debris (CWD) in the jarrah forest were modelled using data from 48 FORESTCHECK monitoring grids. The accumulated volume of CWD was greater at sites subject to timber harvesting and prescribed burning, and lower at sites that had experienced repeated summer bushfires.
• Research to inform silvicultural practices and potential adaptation strategies under a drying climate continued, with the Yarragil 4L experimental catchment east of Dwellingup being thinned to investigate the effectiveness of silvicultural treatments for maintaining streamflow and groundwater levels under current climate settings. Monitoring of groundwater bores in the Warren Region continued.
• Findings from a 30-year experimental study comparing the response of jarrah forest understorey plants to different regimes of prescribed fire were published in a scientific paper.

Off reserve conservation

• The partnership agreement with Natural Resource Management (NRM) WA for the delivery of the Land for Wildlife conservation program is now well established, and a project to improve access to program information is underway. The program registered 23 new properties, bringing the total area of registered sites managed privately for conservation to 677,037 hectares over 1944 properties.
• The voluntary Nature Conservation Covenant Program registered 13 new covenants (seven conditional and six voluntary). Through the program, covenants have been established on 350 titles covering 27,273 hectares, including habitat for threatened species and ecological communities, a Ramsar-listed wetland and registered Aboriginal heritage sites.
• The Department's Urban Nature work group collaborated with community groups, private landholders, local governments, State Government agencies, schools and universities to facilitate best practice management of urban bushland. Staff held field days, restoration trials, workshops, nature walks, gave presentations and published a quarterly newsletter to support community involvement in bushland conservation.
• The Roadside Conservation Committee met four times during the year and undertook a range of activities to raise awareness of roadside conservation and engage with stakeholders, including providing training for five local governments, attending three WALGA road forums, and speaking to a rural Local Government Professional Association. Four guidance documents and a brochure on Wildflower drives in the south west were drafted and reviewed by the committee.

Sustainable use of natural resources

• The Management Plan for the Commercial Harvest of Kangaroos in Western Australia 2019-2023 was declared as an approved wildlife trade management plan by the Commonwealth Minister for the Environment. The plan applies from 1 January 2019 and will ensure the continued sustainable commercial harvest of western grey and red kangaroos (Macropus fuliginosus and M. rufus) in
WA. Quotas will continue to be set for each management region.

- The Management of commercial flora harvesting continued to be regulated under the State management plan *Management of Commercial Harvesting of Protected Flora in Western Australia 2018 – 2023*, which was also approved by the Federal Government.

- Three prosecutions were initiated. These involved nine charges covering a broad range of offences including the illegal taking or possession of protected and rare fauna and cruelty to fauna. Over the year, 624 offences were reported, with 98 per cent of these dealt with by way of infringement or caution notices.*

**Licensing**

- To support the sustainable use of wildlife, the Department issued 6201 licences to take, collect, keep and breed, deal in, trap, import or export native animals, and 1322 licences to collect native plants. A further 940 licences were issued to either scare, destroy, trap or relocate nuisance wildlife or dangerous wildlife and wildlife causing damage.*

* Reporting of these figures is made under the *Wildlife Conservation Act 1950* or the *Biodiversity Conservation Act 2016* and associated Biodiversity Conservations Regulations 2018 which came into force on 1 January 2019.

For information about prosecutions under the *Wildlife Conservation Act 1950*, the *Conservation and Land Management Act 1984* and associated regulations please see the *Supporting our Department* section under *Legal matters*