



Premier of Western Australia

Our Ref: 24-134891/MG



Ms Sophie Dunstone
Committee Secretary
Standing Committee on Environment and Communications
PO Box 6100
Parliament House
CANBERRA ACT 2600

Dear Ms Dunstone

Thank you for your letter dated 8 November 2012 inviting submissions to the Senate inquiry into the effectiveness of threatened species and ecological communities' protection in Australia.

Western Australia covers one-third of Australia's land area, and has biodiversity that is world-renowned for its richness and endemism, including a significant number of threatened species and ecological communities. Western Australia also has a range of programs aimed at conserving the State's threatened species and ecological communities.

I draw your attention to the 2009 Western Australian Auditor General's Report No. 5: *Rich and Rare: Conservation of Threatened Species*, which investigated a range of issues relevant to the inquiry. This report is available at: http://www.audit.wa.gov.au/reports/pdfreports/report2009_05.pdf.

Also of relevance are the most recent lists of Western Australia's threatened species and ecological communities, which can be found on the Department of Environment and Conservation's (DEC) website at: <http://www.dec.wa.gov.au/management-and-protection/threatened-species/listing-of-species-and-ecological-communities.html>.

While threatened species and ecological communities conservation is supported by the work of a number of State agencies including the WA Museum, Perth Zoo and the Botanic Gardens and Parks Authority, the lead agency is DEC. I have enclosed two DEC documents that describe much of the conservation work that is taking place in Western Australia and will be of assistance to the inquiry:

- Pages 25 – 79 of DEC's 2010-2011 Yearbook (the 2011-2012 Yearbook is in preparation); and
- Pages 16 – 20 of DEC's 2011-12 Annual Report.

The preparation and implementation of recovery plans for threatened species and ecological communities is a key strategy for their conservation in Western Australia. For those species and communities listed in the State, there are recovery plans for 191 critically endangered species and communities (86 per cent), 76 endangered species and communities (42 per cent) and 89 vulnerable species and communities (28 per cent).

Programs of action are also in place for the major threatening processes such as *Phytophthora* dieback, feral predators and salinity. Native vegetation clearing controls, introduced in 2004 under the *Environmental Protection Act 1986*, regulate another key threatening process.

A National Threatened Species Listing Reform Project Group is currently investigating the development of a single national threatened species list. As part of the group's work, the listing processes operating in each jurisdiction have been collated. The Commonwealth Department of Sustainability, Environment, Water, Population and Communities would be able to provide this information to the Standing Committee.

There are a variety of activities undertaken by the Commonwealth, states and territories, and communities to conserve flora and fauna species and ecological communities, to prevent them becoming threatened in the first place, and recover those that are threatened.

In Western Australia advances in threatened species conservation have been achieved through both species focused initiatives and landscape-scale conservation treatments, for example the Western Shield (predator control) program. In Western Australia's experience, balancing these two scales of investment and effort is important to successfully conserve threatened species and communities. The Western Australian Government has undertaken many successful programs to re-establish threatened fauna and flora populations across the State through the control of threats, including in both conservation reserves and on private lands.

It has also been demonstrated that relatively simple actions, such as formally protecting species under threat from primary production damage mitigation efforts, can be successful. On 6 November 2012 the latest State threatened species lists were published in the *Government Gazette*. Muir's corella was removed from the list as it had been successfully recovered. This species had been reduced to an estimated population of less than 100 individuals by the early 1900s, but is now estimated to number over 15, 000. Working with landholders on the development and implementation of alternative damage strategies to lethal control proved successful in achieving for species recovery.

The State has recognised the need for increased legislative recognition of threatened species and communities. On 31 October 2012 the Minister for Environment, Hon Bill Marmion MLA, and I announced a commitment to update the State's biodiversity conservation legislation by replacing the *Wildlife Conservation Act 1950*, should the Government win the State election in March 2013. The new legislation is to be introduced as a matter of priority.

This Government is committed to providing greater levels of protection for Western Australia's unique flora and fauna, in particular our threatened species.

Under the proposed new Act, penalties of up to \$500, 000 for harming a critically endangered species and \$50, 000 for harming a non-threatened species will apply. These are significant increases given the current maximum penalty in the Wildlife Conservation Act is \$10, 000. The new Act will have a strong focus on encouragement for positive conservation actions as well as reparation of significant conservation damage. The new Act will also provide clarification and standardisation of assessments, processes and decision making relating to threatened species and other wildlife, including timelines, and will specifically address the issues identified in the 2009 Auditor General's Report referred to above.

I also draw the Standing Committee's attention to major initiatives undertaken by this Government, including the \$63 million Kimberley Science and Conservation Strategy, which is working to protect and conserve the rich biodiversity of the Kimberley and prevent the wave of threatening processes that has swept across the rest of Australia from having similar impacts in this region. This program is in addition to the landscape-scale management of the Great Western Woodlands covered by the *'Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands'* and our ongoing program for marine park creation off the Kimberley coast and in other State waters.

I would be happy for the Standing Committee to approach the Director General of DEC directly if you require any further detail in relation to its threatened species and ecological communities' conservation activities, including those carried out in cooperation with other groups.

Thank you once again for the opportunity to provide the Western Australian Government's views.

Yours sincerely

Colin Barnett MLA

PREMIER

8 JAN 2013

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Nature Conservation



Nature Conservation

The conservation of Western Australia's rich biodiversity is strategically coordinated through DEC's Nature Conservation Division, overseeing a range of programs and activities. These services are built on scientific and technical knowledge, accumulated over many decades, which continues to develop and grow strategically. 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 which supports representative ecosystems, managing areas for their conservation values, and promoting public awareness of the value and vulnerability of Western Australia's natural areas.

Building biodiversity knowledge

Biological inventory

The terrestrial biological survey of the banded iron formation ranges continued with field work being undertaken on three ranges within the Yilgarn Craton.

A range of surveys of threatened and priority flora, fauna and ecological communities was undertaken or coordinated by the department, and is detailed in the threatened species and ecological communities recovery section of this report (see page 34).

DEC is the lead agency for the coordination of biotic and abiotic data for wetlands, including the mapping of wetland type, extent and distribution in the landscape using the geomorphic wetland classification system. Wetland mapping in the state's midwest was completed over 460,000 hectares in the 'Cervantes-Eneabba' and 'Cervantes South' areas, and is underway over a further 100,000 hectares in the 'Cervantes-Coolimba Coastal' area.

Three priority and three threatened microbial communities in lakes in the state's south-west were sampled to examine their composition. Water quality samples were also collected to provide a snapshot of microbes that are adapted to different conditions. Sampling will provide data about how species composition relates to water quality, and will help guide future management of the catchments of the lakes in which they occur.

DEC Marine Science

Marine Science continued to focus on the development and progressive implementation of the *Western Australian Marine Monitoring Program* (WAMMP), a partnership between DEC's Marine Science Program and Regional Services Division. WAMMP is determining the status and trends in the condition of the key biodiversity assets, human pressures on these assets, and DEC's management responses to these pressures, with particular respect to Western Australia's statewide system of marine parks and reserves and threatened marine fauna, such as turtles and dugong (*Dugong dugon*). The main objective of WAMMP is to obtain the information that is necessary to assess the efficiency (value for money) and effectiveness (achieving outcomes) of DEC's marine management programs so as to promote continuous improvement through an active adaptive management cycle. Systematic monitoring of coral, seagrass, invertebrate, mangrove and fish communities is an example of some of the work that has begun in Western Australia's marine parks.

DEC is the lead agency for the major marine research program of the Western Australian Marine Science Institution Node 3: managing and conserving the marine state. DEC marine scientists are coordinating this research program which is focused on Ningaloo Marine Park and complements the CSIRO *Wealth from Oceans* flagship program: Ningaloo Collaboration Cluster. The program includes research into the biophysical and social environment of Ningaloo and is being undertaken by external science providers (such as CSIRO, the Australian



Institute of Marine Science and local universities) to provide an enhanced knowledge base to facilitate more effective management of Ningaloo Marine Park and other coral reef marine parks and reserves in Western Australia. There are more than 30 major research programs involving over 150 projects undertaken by more than 100 scientists.

Marine Science staff are also conducting a number of research projects in marine parks and reserves around the state. All projects are priority research strategies in approved marine park management plans. Studies have also been undertaken into the interaction of fishing and climate change on reef fish populations in Ningaloo Marine Park which will provide a better understanding of some of the changes that are likely to occur over the next few decades. Research is also underway to document the regional bleaching of coral reefs along Western Australia's coastline, with the aim of better understanding this disturbance to coral reefs. Assessments of coral reef and fish community condition (or 'health') in the Montebello Islands and Barrow Island marine parks are being undertaken to assess the effects of nearby dredging operations.

The sediment in-fauna of Walpole and Nornalup Inlets Marine Park is being assessed for the first time, revealing a diverse and unique assemblage of animals. Investigations into the distribution and patterns of the marine biodiversity of the intertidal reefs along the metropolitan marine parks and in the mangrove communities in Shark Bay Marine Park are well advanced and will help DEC to better manage these important areas.

Gathering data in biological surveys in Rowley Shoals Marine Park Photo – John Huisman/DEC.





Coral bleaching at Ningaloo Marine Park.

Coral bleaching observed at Ningaloo

Coral bleaching was discovered by DEC marine rangers at Ningaloo Reef as a result of higher-than-average water temperatures recorded in October 2010.

DEC Marine Science Program Leader Dr Chris Simpson, said the department used satellite technology to assess water temperatures through spring and summer 2010–11 as part of DEC's marine monitoring program for Ningaloo Marine Park.

Chris said temperatures were about three degrees Celsius above long-term monthly averages from October 2010, but in February, temperatures were recorded above 29 degrees Celsius—the trigger level for bleaching to occur in the most susceptible coral species.

"By continually monitoring the reef, we can look at changes over time and determine the significance of temperature-induced bleaching events," he said.

Chris said most corals lived in a symbiotic relationship with single-celled algae, which live within the coral tissue, providing an array of colours to the coral form.

"Coral bleaching is a phenomenon which results in the expulsion of these algae because of stress, leaving the coral's bright white skeleton behind," he said.

"Initial reports related to sea surface temperature indicate that water temperatures in the Ningaloo area have been elevated to levels that may cause bleaching in some coral species.

"These temperatures did not drop for at least two to three weeks because of cyclonic activity over the Pilbara and Kimberley, restricting flushing and causing the heating of lagoon waters.

"While this is of concern, there is some good news. Ningaloo has an exceptionally high diversity of corals with more than 300 species and it is this diversity that will provide some resilience to bleaching as different corals have different tolerance levels to bleaching.

"So there will still be many colourful displays of coral all along its 300-kilometre length.

"Coral reefs can recover from bleaching events although it can be a decade or two before full recovery occurs.

"One of the important things for recovery is the presence of source reefs to generate new larvae along with good water quality, suitable substratum for new coral recruits and strong herbivorous fish populations to prevent algae colonising the reef."

DEC is asking all Ningaloo Marine Park visitors to be on the lookout for coral bleaching. If bleaching is spotted, people are asked to note the location of the coral and, if possible, take a photograph. People with reports of coral bleaching can contact DEC's Exmouth Marine Park Coordinator on 9947 8000.



Taxonomy and biotic collection management

A total of 3,826 specimens was added to the Western Australian Herbarium collection, which now stands at 726,545, an increase of 0.5 per cent during the year. This is a low number compared with the average annual rate of increase, a reflection of disruption to the Herbarium's operations caused by the move to the new Western Australian Conservation Science Centre.

During the year, 4,394 specimens were loaned to other institutions and 1,663 specimens were received on loan from other herbaria. The Western Australian Herbarium received 324 exchange specimens and distributed 531 exchange specimens to other Australian and international herbaria.

The reference herbarium of vascular plants, which has over 14,000 specimens representing more than 11,000 taxa, was used by more than 2,000 visitors during the year. At June 2011, the collection at the Western Australian Herbarium comprised the following specimens, from all major groups of plants, algae and fungi (Table 1).

Table 1: Specimens held at the Western Australian Herbarium

Taxonomic group	Number of specimens (June 2011)	Increase since June 2010	
		number	percentage
Myxomycetes	755	1	0
Fungi	22,938	111	0.01
Lichens	16,273	5	0
Algae	23,073	280	0.03
Liverwort and homworts	1,961	1	0
Mosses	6,676	30	0
Ferns and fern allies	3,601	9	0
Gymnosperms	2,013	6	0
Flowering plants	649,255	3,383	0.46
Total number	726,545	3,826	0.5

Western Australian Herbarium Specimen Database

Records of all specimens incorporated in the Western Australian Herbarium are entered into the Western Australian Herbarium Specimen Database (WAHerb). During the year, 3,826 specimen records were added to WAHerb, including 268 priority flora and 61 threatened flora. The total collection of priority and threatened flora comprises 44,376 specimens.

Flora data for Western Australia

Western Australia's vascular flora (flowering plants, ferns, cycads and conifers) now comprises 13,430 species, subspecies and varieties (12,212 native and 1,218 alien). The census of Western Australian plants maintained by the Western Australian Herbarium as the authoritative reference for all plants of the state contained 22,550 names at the end of the year, representing 16,793 currently recognised species, subspecies and varieties of plants, algae and fungi (14,345 native and 1,223 alien). The figures include names for the vascular flora as well as the bryophytes, algae and fungi. Additions in 2010–11 comprised 397 published names and 53 unpublished new phrase names.



DEC Conservation Officer Jennifer Jackson with the newly discovered *Grevillea ilkurlka* ms.

Desert survey finds new species

Two plant species not previously known to science were discovered during a flora survey in the Great Victoria Desert.

The two species, *Grevillea ilkurlka* ms and *Dicrastylis* sp. Ilkurlka, were collected as part of a survey in the Ilkurlka area, a relatively unknown region about 150 kilometres west of the Western Australian border. The survey was carried out by DEC and the Spinifex People, in partnership with the Western Australian Museum, Adelaide Zoo and Museum Victoria.

DEC Conservation Officer Jennifer Jackson said, despite just 30 collections existing at the Western Australian Herbarium for the Ilkurlka region, the survey established that there were more than 200 species of plant growing in the area.

"This survey demonstrates that desert flora in Western Australia is amazingly diverse, yet we know so little about what is actually out there in the western desert, and no doubt there are many more new species to science that are yet to be discovered," she said.

"It has helped us establish an inventory of the biological assets of the area, which is still one of the most pristine and undisturbed regions in Australia."

Grevillea ilkurlka ms is a prostrate shrub with large golden flowers, and was found growing in several populations on sand dunes within a five-kilometre radius, south of the Ilkurlka Roadhouse.

Dicrastylis sp. Ilkurlka was collected east of the roadhouse, with the small shrub consisting of purple flowers. Just one population with several hundred plants was found growing on a sandy flat between dunes.

"*Grevillea ilkurlka* ms is currently being formally described at the Western Australian Herbarium, and *Dicrastylis* sp. Ilkurlka has been listed as Priority 1 flora, which means it is in urgent need of further survey," Jennifer said.

A further two species are currently being studied by botanists at the Western Australian Herbarium, and are also expected to be new species.

Two species that were previously only known to exist outside Western Australia were collected, and several species known in Western Australia were collected in the Great Victoria Desert for the first time.



Western Australian Herbarium Technical Officers Skye Coffey and Phil Spencer in the move to the new building in 2010–11.

Herbarium volunteers

An extensive volunteer program at the Western Australian Herbarium sees volunteers provide important skills and assist in many curation activities. During the year, volunteer participation was significantly reduced, as preparation of the specimens for the move to the Western Australian Conservation Science Centre by staff saw the temporary closure of the volunteer program. Nevertheless, volunteers still contributed 3,557 hours to the Herbarium, equivalent to two full-time staff.

Resource condition monitoring

Under contract to Wheatbelt Natural Resource Management (NRM), DEC continued the condition monitoring component of the previous 'baselining' project to collate, interpret and present biodiversity data in the wheatbelt.

The 1977–2009 report on depth, salinity and pH trends of 101 wetlands included in the *South West Wetlands Monitoring Program (SWWMP)* was completed. Continuous water level recorders and rain gauges were installed in several high conservation value wetlands under threat, as a precursor to salt and water balance modelling. A preliminary report on multi-decadal changes in waterbird use and habitat condition of several SWWMP wetlands was completed, and further field assessments of current usage were undertaken.

A research project continued on the ecological condition of wetlands of the agricultural zone, including monitoring groundwater, wetland water levels and water quality, and flora and fauna for 25 wetlands in relation to threats, such as secondary salinisation, climate change and 12 years of catchment land-use practices.

A report describing depth, salinity and temperature profiles of wetlands in the Vasse-Wonnerup system for the period 1998–2000 was published.

Establishment of the terrestrial and marine conservation reserve system

The formal conservation reserve system comprises national parks, nature reserves, conservation parks, miscellaneous conservation reserves, marine parks, marine nature reserves and marine management areas under the *Conservation and Land Management Act 1984* (CALM Act).

Full information about DEC-managed lands and waters is available in DEC's Annual Report 2010–11: www.dec.wa.gov.au/content/view/6708/1954/.

Effective management of the conservation reserve system

Management planning for conservation reserves

An indicative management plan to support the establishment of the proposed Camden Sound Marine Park in the Kimberley Region was released for public consultation in October 2010. The management plan outlines strategies for the proposed marine park, including conserving one of the world's biggest humpback whale nurseries and breeding areas. The final management plan will be released following the formal gazettal of the marine park.

Management plans are being drafted under the Yawuru Indigenous Land Use Agreements for the joint management of Yawuru conservation lands in and around Roebuck Bay and Broome.

A 10-year assessment of the implementation of the *Marmion Marine Park Management Plan* is being undertaken by the Marine Parks and Reserves Authority Audit Committee with support from DEC.

Work continued on the development of the new recovery plan for the Toolibin Lake natural diversity recovery catchment. The review of recovery actions from the current recovery plan is being completed.

A list of approved management plans is available on the DEC website:

Terrestrial: www.dec.wa.gov.au/content/view/104/1931/

Marine: www.dec.wa.gov.au/content/category/40/886/1621/ and www.dec.wa.gov.au/content/category/40/298/1623/.

Good Neighbour policy

The implementation of the department's *Good Neighbour* policy continued during 2010–11, including weed control, introduced animal control programs and fire management.

Fences adjoining DEC-managed land is one of the main focuses of the *Good Neighbour* policy in the Great Southern District. Five new fence lines were erected by neighbours following the *Good Neighbour* policy process.

Kangaroo management on private property through the open season and the damage licence process continued, and land management and environmental regulation issues were discussed with local authorities.

The \$993,000 three-year *Caring for our Country* project funding rabbit control to encourage regeneration and recovery of threatened flora continued through the year, with strategic rabbit baiting on private property and adjacent to DEC-managed lands.

A number of joint nature conservation programs were also undertaken with Aboriginal groups, including involvement in biological survey, fire management, predator control and other fauna management programs.



Fire and biodiversity research projects

A review paper summarising current knowledge of the linkages between fire regimes and biodiversity declines in tropical savanna ecosystems of northern Australia was published in *Conservation Science Western Australia*.

Findings from a study of fire regimes and biodiversity in open forests and shrublands in the Walpole Wilderness area were published in *Forest Ecology and Management* and made accessible to fire practitioners in the form of a fire management guideline for the southern forest and shrubland mosaic. This research has shown that ecosystems in the south-west of Western Australia are resilient to a range of fire regimes and that occasional short intervals between fires do not necessarily have adverse effects.

A postgraduate study of fire regimes in semi-arid woodlands around Lake Johnson (Goldfields Region) undertaken in collaboration with The University of Western Australia was completed. This research has demonstrated that spatial patterns of fire in the landscape and fire return intervals are strongly influenced by vegetation type and regional climatic patterns. Knowledge gained from this study contributed to the development of fire management programs in the Great Western Woodlands.

Several scientific papers describing vegetation dynamics following fire in mallee and mallee-heath communities on nature reserves in the south-western wheatbelt were published. This research also investigated the effects of fuel modification by chaining, and the potential for weed invasion of bushland following fire. Weed invasion was limited by the low nutrient status of the soils. Fuel modification by chaining temporarily alters the mallee-heath plant community, with an increase in the abundance of plants regenerating from soil-stored seed and a reduction in the abundance of plants regenerating from capsule-stored seed.

Further information on fire and the environment is available on DEC's website:
www.dec.wa.gov.au/content/category/49/864/1868/.

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

Threatened Species Council

The Threatened Species Council, established by the Minister for Environment, continued to operate as a collaboration between DEC, Perth Zoo, Botanic Gardens and Parks Authority, the WA Museum and the state's Chief Scientist.

The council's aims include taking stock of current activities to identify gaps and opportunities in threatened species conservation, and establishing expert threatened species working groups to fast-track the existing formal recovery plan development process to enable swift identification of key conservation actions.

The council met twice during 2010–11 and ran a threatened species research forum. The council also developed an awareness campaign to increase community understanding about threats facing native species, as well as nature conservation efforts and opportunities for people to become involved.

Recovery of threatened species and ecological communities

The Threatened Species Scientific Committee's recommendations for changes to the lists of threatened flora and fauna under the WC Act were endorsed by the Minister for Environment and gazetted on 17 August 2010.

DEC continued a joint project with the federal government to prepare information sheets as the first stage in nominating changes to the list of threatened species under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and entered into a memorandum of understanding (MOU) with the federal Department of Sustainability, Environment, Water, Population and Communities to facilitate changes to the respective threatened species lists. This will facilitate the alignment of the threatened species lists under the EPBC Act with the state lists under the WC Act.

Five species of flora (*Leucopogon spectabilis*, *Pityrodia axillaris*, *Ricinocarpus brevis*, *Scaevola macrophylla* and *Verticordia apecta*) and one species of fauna (Australasian bittern, *Botaurus poiciloptilus*) were listed under the EPBC Act, while three species of flora (*Conospermum toddii*, *Eucalyptus blaxellii*, and *Pleurophascum occidentale*) were delisted. Information sharing between DEC and the federal government has so far resulted in 80 changes to the list of nationally threatened species under the EPBC Act.

Flora

Ten species of flora—*Asterolasia* sp. Kalgan River (S. Barrett 1522), *Banksia cataglypta*, *B. rufa* subsp. *pumila*, *Calochilus pruinosus*, *Commersonia adenothalia*, *Gastrolobium vestitum*, *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982), *Myoporum velutinum*, *Petrophile nivea*, and *Stylidium* sp. Yalgoo (D. Coultas et al. Opp 01)—were added to the state list of threatened flora. One species—*Conospermum toddii*—was deleted from the list as it was no longer considered to be threatened but was retained on the priority 4 list for monitoring purposes. *Acacia awestoniana* was upgraded from 'vulnerable' to 'critically endangered'. *Hypocalymma longifolium* was downgraded from 'endangered' to 'vulnerable'. The ranking of *Eucalyptus steedmanii* was reviewed but remained as 'vulnerable'. Six nomenclature changes were also endorsed.

A further 220 taxa were added to DEC's priority flora list, and 38 taxa were deleted from the list on the basis of further survey and taxonomic review. At 30 June 2011, there was a total of 402 extant threatened flora and 13 listed as presumed to be extinct, and 2,875 taxa were listed as priority flora.

The number of priority flora listed in the Kimberley Region continued to increase through a joint project with Western Australian taxonomists who are recording new taxa and reviewing existing records of taxa that are



restricted to, or predominantly distributed in, the Kimberley Region. More than 150 dicotyledonous plant species were added to the list, making a total of 488 priority flora listed in the Kimberley.

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

- A total of 218 species of threatened and priority flora was surveyed or monitored (totalling 458 populations), and 18 new populations or sub-populations of threatened flora and 77 new populations of priority flora were located (of note was the discovery of new populations of the critically endangered *Acacia aprica*, *Banksia brownii* and *Daviesia microcarpa*). In addition, new populations of the priority I species *Acacia diaphana*, *A. websteri* and *Stylidium korijekup* were located. The priority I species *Gastrolobium humile*, previously known from a single 1967 collection, was rediscovered.
- Recruitment trials were conducted for several species including *Boronia capitata* subsp. *capitata* and *Verticordia pityrhops*.
- Phosphite applications were carried out to control *Phytophthora* dieback for 30 threatened flora species including the critically endangered *Lambertia echinata* subsp. *echinata* and *L. fairallii*.
- Fencing to protect plants from grazing was put in place for a number of threatened flora species including *Banksia montana*, *Caladenia winfieldii*, *Darwinia collina*, *Grevillea acropogon*, *Leucopogon gnaphalioides*, *Lechenaultia loricata*, *Persoonia micranthera* and *Reedia spathacea*. Rabbit-proof fences were repaired, erected, or had mesh added to protect several threatened flora including *Banksia oligantha*, *B. cuneata* and *Gastrolobium lehmannii*.
- Weed control was undertaken for many threatened flora species including *Apium prostratum* subsp. *phillipsii*, *Daviesia cunderdin* and *Eremophila scaberula*. Weed control involving application of bridal creeper rust was implemented for *Banksia oligantha*, *Adenanthos pungens* subsp. *effusus*, and *Conostylis drummondii*. Rabbit control was also conducted for many threatened flora species including *Adenanthos pungens* subsp. *effusus*, *Boronia capitata* subsp. *capitata*, *Caladenia drakeoides*, *Calectasia pignattiana*, *Conostylis drummondii*, *C. setigera* subsp. *dasys*, *Daviesia euphorbioides*, *Eremophila subteretifolia*, *Goodenia integerrima*, *Grevillea scapigera*, *Tribonanthes purpurea*, and *Verticordia fimbriolepis* subsp. *fimbriolepis*.
- 'Have you seen this plant?' posters and postal flyers were developed for several threatened flora species to promote awareness and encourage the reporting of new populations. A poster featuring recruitment trials was presented at two conferences.
- Fire ecology plots were set up to collect fire response and ecological data to improve future management for a range of species, including *Eremophila ciliata*, *Marianthus aquilonaris* and *Reedia spathacea*.

Table 2: Flora translocations undertaken as part of the implementation of recovery and interim recovery plans in 2010–11

Species	Translocated to
<i>Acacia aprica</i>	Infill/enhancement plantings on private property east of Coorow
<i>Acacia cochlocarpa</i> subsp. <i>cochlocarpa</i>	Infill/enhancement plantings at translocation site near Gunyidi
<i>Acacia imitans</i>	Infill/enhancement plantings on the Australian Wildlife Conservancy's Mount Gibson Station
<i>Acacia unguicula</i>	Infill/enhancement plantings on the Australian Wildlife Conservancy's Mount Gibson Station
<i>Daviesia glossosema</i>	Infill/enhancement plantings at seed orchard on DEC-managed land east of Kamballup
<i>Daviesia pseudaphylla</i>	Infill/enhancement plantings at seed orchard on DEC-managed land east of Kamballup
<i>Eremophila nivea</i>	Infill/enhancement plantings at West Perenjori Nature Reserve
<i>Gastrolobium luteifolium</i>	Infill/enhancement plantings at seed orchard on DEC-managed land east of Kamballup

Threatened Flora Seed Centre

A total of 74 new seed collections was banked at the Threatened Flora Seed Centre during the year, the majority collected under state NRM program funding, of which 52 were from threatened flora and 22 from priority-listed flora. Banked or newly collected seeds of 14 critically endangered species were provided for DEC translocation projects.

The entire conservation seed collection was moved at the beginning of 2011 from the old Western Australian Herbarium building to its new location at the Western Australian Conservation Science Centre. The centre currently has seeds of 75 per cent of the state's threatened flora and 24 per cent of the state's priority-listed flora in protective storage.

The partnership with the Royal Botanic Gardens, Kew, United Kingdom, in the *Millennium Seed Bank Project* was extended for another year. A total of 81 collections was duplicated for safekeeping at the Millennium Seed Bank, including collections of 32 threatened species and 13 priority-listed species.

Research into the effectiveness of seed storage conditions and germination protocols continued through the year, as did work on the temperature profiling of obligate seeding *Banksia* species from south-western Western Australia.

Fauna

One species of fauna, the tree-stem trapdoor spider (*Aganippe castellum*), was deleted from the state list of threatened fauna, and one species, the Australasian bittern (*Botaurus poiciloptilus*), was upgraded from 'vulnerable' to 'endangered' following a national review of its status. There were 209 extant threatened fauna and 18 presumed to be extinct, and the priority list included 195 taxa at 30 June 2011.

Recovery actions were implemented for many threatened fauna. Highlights include:

- Key conservation projects were funded by the state NRM program, including projects for the conservation of Carnaby's cockatoo (*Calyptorhynchus latirostris*); integrated cat and fox baiting of critical habitat and establishment of a captive colony of western ground parrots (*Pezoporus wallicus flaviventris*); the completion of Lagoon Point enclosure, a 1,100-hectare fenced 'island' within François Péron National Park, to support



release of captive-bred threatened species of Shark Bay World Heritage area marsupials; and translocations of 10 threatened and priority fauna species including tamar wallabies (*Macropus eugenii*), woylies (*Bettongia pencillata*), red-tailed phascogales (*Phascogale calura*), Gilbert's potoroos (*Potorous gilbertii*), dibblers (*Parantechinus apicalis*) and bilbies (*Macrotis lagotis*) to new sites across the state.

- As part of the fauna management plan for the Gorgon gas development on Barrow Island Nature Reserve, boodies (*Bettongia lesueur*), golden bandicoots (*Isodon auratus*), spectacled hare-wallabies (*Lagorchestes conspicillatus*), brushtail possums (*Trichosurus vulpecula*), Barrow Island black and white fairy-wrens (*Malurus leucopterus edouardi*) and spinifex birds (*Eremiornis carteri*) were translocated to sites on Hermite Island and at Cape Range National Park and Lorna Glen.
- The recovery program for Gilbert's potoroo, the world's rarest marsupial, continued during the year, with a supplementary translocation from Bald Island releasing animals into the 380-hectare predator-free enclosure on the mainland at Waychinicup National Park.
- Captive breeding of 33 western swamp tortoise (*Pseudemydura umbrina*) hatchlings by Perth Zoo from 17 females was successfully achieved, and 15 captive-bred tortoises were translocated to swamps within Moore River National Park in July 2010.
- Recovery actions for south coast threatened birds, the western ground parrot, noisy scrub-bird (*Atrichornis clamorus*), western bristlebird (*Dasyornis longirostris*) and western whipbird (western heath) (*Psophodes nigrogularis nigrogularis*) continue to be implemented successfully. Noisy scrub-bird censuses were completed for the Mount Gardner, Waychinicup, Mermaid Point and Bald Island sub-populations—the number of territories recorded on Mount Gardner continued to decline, and for the first time a plateau appears to have been reached in the Bald Island sub-population. Mapping of the critical habitat for the western ground parrot and noisy scrub-bird was updated during 2010. Further mapping of western bristlebird historic data was completed during 2010.
- Nine chuditch (*Dasyurus geoffroi*) were introduced to François Péron National Park in May 2011.
- Fauna surveys of Bernier and Dorre Island nature reserves continued to provide current population estimates for boodies, banded hare-wallabies (*Lagostrophus fasciatus*), western barred bandicoots (*Perameles bougainville*), Shark Bay mice (*Pseudomys fieldi*) and rufous hare-wallabies (*Lagorchestes hirsutus*).
- A census of Muir's corella (*Cacatua pastinator pastinator*) surveying 53 properties found that the population is continuing to increase, from around 100 in 1920 to 16,000 in 2011.
- Monitoring of marine turtle nesting activity and satellite tracking continued at key locations on the north-west coast, and the state turtle tagging database was launched for the 2010–11 turtle nesting season.
- The annual monitoring program for the orange-bellied frog (*Geocrinia vitellina*) and white-bellied frog (*G. alba*) occurred in spring 2010 and included a translocation of captive-reared *G. alba* metamorphs and young animals. Field assistance was provided by DEC to Perth Zoo's captive frog breeding program for the release.
- Surveys for the endangered graceful sun-moth (*Synemon gratiosa*) were carried out by DEC staff and volunteers across the Swan Coastal Plain and southern midwest regions from February to April 2011. The translocation of *Lomandra maritima*, host plant of the graceful sun-moth, was trialed and will be evaluated as a mitigation measure for loss of critical habitat for this species due to urban developments.
- Recovery actions for the conservation of Carnaby's cockatoo continued, with funding provided through state and federal offset requirements, and additional funding through the state NRM program and federal threatened species funding. Projects undertaken during the year included:
 - A survey of artificial hollows (nest boxes), with the first evidence of an artificial hollow being used for breeding. Information has been prepared for the public through three new information sheets on the DEC website: 'How to design and place artificial hollows'; 'When to use artificial hollows'; and 'How to monitor the artificial hollows for Carnaby's cockatoo'.

- In collaboration with Birds Australia and more than 550 volunteers, a repeat of the 'Great Cocky Count', first undertaken in 2010 in the south-west from Yanchep to Esperance. A further reduction in the estimated number of birds was recorded but 12 new roost sites were identified. Follow-up surveys are planned to assess whether the reduction in cockatoo numbers was an artefact of poor weather during the April 2011 survey.
- An Edith Cowan University masters research project to investigate plant species and areas favoured by Carnaby's cockatoos across the Swan Coastal Plain. This project will reveal food resource availability of native proteaceous plants on the Swan Coastal Plain and examine how threatening processes (for example, altered fire regimes and disease) influence the availability of these resources.
- A revegetation flora species selection tool, completed and launched by the Minister for Environment. This tool is now publicly available through the DEC website and allows the user to choose a species list for revegetation projects that will benefit Carnaby's cockatoo.
- Strategic land purchases of habitat areas on, and adjacent to, the Swan Coastal Plain.

Table 3: Fauna translocations undertaken as part of the implementation of recovery and interim recovery plans in 2010–11

Species (common name)	Translocated from	Translocated to
Numbat	Perth Zoo	Batalling Block and Boyagin Nature Reserve
Gilbert's potoroo	Bald Island via captive facility at Two Peoples Bay Nature Reserve	Waychinicup National Park, Mermaid Point and Norman's Beach
Bilby	Return to Dryandra and François Péron National Park breeding facilities	Tone-Perup Nature Reserve
Boodie	Barrow Island and Return to Dryandra breeding facility	Lorna Glen (ex pastoral lease) purchased by the government for conservation
Chuditch	Julimar Conservation Park and Bindoon Army training area	François Péron National Park
Noisy scrub-bird	Bald Island and Waychinicup National Park	Angove
Dibbler	Perth Zoo	Norman's Beach, Waychinicup National Park, proposed Peniup Nature Reserve
Red-tailed phascogale	Dryandra Woodland and various wheatbelt nature reserves, Pingeculling, East Yomaning and Boyagin nature reserves	Kojonup Reserve (Bush Heritage Australia)
Tammar wallaby	Tutanning Nature Reserve and The University of Western Australia	Kalbarri National Park
Woylie	Tone-Perup Nature Reserve; Kanyana Wildlife Rehabilitation Centre, private wildlife carer	Perup enclosure, Land for Wildlife property, Margaret River and Whiteman Park
Western swamp tortoise	Perth Zoo	Moore River National Park
White-bellied frog	Perth Zoo	Witchcliffe forest block, south-west



DEC officer Stephanie Hill (right) with Gilbert's Potoroo Action Group volunteers Bev Davis and Ken Blechynden setting traps and radio-tracking at the Waychinicup enclosure.

Gilbert's potoroo thriving on Bald Island

A monitoring trip to Bald Island off the state's south coast in August 2010 revealed a thriving population of critically endangered Gilbert's potoroos (*Potorous gilbertii*).

Gilbert's potoroo—the world's rarest marsupial—has been the subject of a recovery program since the discovery of the only known wild population of about 40 animals at Two Peoples Bay Nature Reserve near Albany in 1994.

Between 2005 and 2007, DEC translocated 10 potoroos from the original colony at Two Peoples Bay to predator-free Bald Island, as insurance against the loss of the tiny mainland population.

Earlier in 2010, nine potoroos were released into a specially built 380-hectare enclosure in Waychinicup National Park, 25 kilometres east of Albany, with six of the animals coming from Bald Island and three from Two Peoples Bay.

DEC Principal Research Scientist Dr Tony Friend said efforts to boost the two tiny translocated populations of Gilbert's potoroos were proving successful, following the latest monitoring results.

"During the two-week trip to Bald Island, we captured 49 adult or young independent potoroos, nine of which were original founder animals, which is a big increase over the previous record in November 2009, when 29 independent potoroos were captured," Tony said.

"The condition of the animals was good, and 12 of the 19 females captured were carrying pouch young, while three others were suckling young out of the pouch."

Tony said a survey in mid-May 2011 revealed eight of the nine animals introduced into the predator-proof fenced enclosure at Waychinicup National Park had survived.

"Unfortunately, we lost one young male, which had been rescued at Two Peoples Bay and hand-reared after becoming separated from his mother, as he apparently had trouble finding food," he said.

"One of the recaptured Bald Island females at Waychinicup had a young animal in its pouch, which would have been conceived in the fenced enclosure, and this is an extremely positive sign that the animals are adapting well to their new environment."



Swan Coastal District Conservation Officer Melissa Okely with a western swamp tortoise.

Safety in numbers for world's rarest tortoise

The western swamp tortoise (*Pseudemydura umbrina*)—one of the world's rarest tortoises, and Australia's rarest reptile—was given new hope of surviving extinction when 30 captive-bred animals were released into habitat at Moore River National Park in July 2010.

The tortoises were reintroduced to the wild as part of the western swamp tortoise recovery plan, after a similar exercise in August 2009 showed promising signs.

Leader of the recovery team, Craig Olejnik, said DEC was pleased with the results of the previous Moore River translocation.

"Fifteen of those animals were fitted with radio transmitters and have recorded growth of 1.4 per cent every week, which is considered above average," he said.

"We will continue to monitor the progress of the tortoises as they mature."

Craig said western swamp tortoises took seven to 12 years to reach reproductive maturity and had a lifespan similar to humans.

"This means progress can be relatively slow," he said.

"However, thanks to the efforts of many people and many organisations, we now have a good chance of bringing this species back from the brink of extinction."

The western swamp tortoise recovery program is coordinated by DEC in partnership with Perth Zoo, the federal government, Perth Region NRM Group, WWF-Australia and the Friends of the Western Swamp Tortoise.



Recovery planning

A national fauna recovery plan has been approved for the heath mouse (*Pseudomys shortridgei*) to guide efforts to conserve this species across its range.

A new national draft recovery plan was prepared for the woylie (*Bettongia penicillata*) which will prove important in guiding the recovery of this species given its significant decline over the past decade.

Twelve interim recovery plans for flora species, developed with funding assistance from the federal government, were approved:

- yellow-leafed gastrolobium, *Gastrolobium luteifolium*
- *Grevillea althoferorum* subsp. *fragilis*
- hairy phalanx grevillea, *Grevillea dryandroides* subsp. *hirsuta*
- *Hibbertia abyssa*
- fringed keraudrenia, *Keraudrenia exastia*
- *Latrobea colophona*
- ironstone beard-heath, *Leucopogon spectabilis*
- Bremer marianthus, *Marianthus aquilonaris*
- underground orchid, *Rhizanthella gardneri*
- *Scaevola macrophylla*
- *Stylidium semaphorum*
- southern shy featherflower, *Verticordia fimbriolepis* subsp. *fimbriolepis*.

Further information on recovery planning is available on the DEC website:

www.dec.wa.gov.au/content/view/842/2007/.

Threatened ecological communities

The Threatened Ecological Communities Scientific Committee met once during the year and recommended that communities be added or deleted from the state list of threatened ecological communities (TECs) and the informal list of priority ecological communities (PECs). There are currently 66 listed extant TECs, three listed as 'totally destroyed', and 284 listed PECs.

Highlights of actions that were implemented for TECs and PECs are listed below. Some actions such as weed control and fencing were completed with funding assistance from the federal government's *Caring for our Country* program.

- Three priority and three threatened microbial communities in lakes in the state's south-west were sampled. Water quality samples were also collected to provide a snapshot of microbes that are adapted to different conditions. Sampling will provide data about how species composition relates to water quality, and will help guide future management of the catchments of the lakes in which they occur.
- Advice was provided with regard to environmental impact assessments for 86 projects with potential to impact threatened or priority ecological communities in locations throughout the state.
- Five hundred occurrences of threatened or priority ecological communities were added to the corporate TEC and PEC database. This assisted in resolving the status of 20 priority ecological communities through collation of biological data and boundary mapping. Data included 244 occurrences of four PECs identified through the Albany Regional Vegetation Survey that provided a local and regional overview of the native vegetation of the area. Nineteen occurrences of the Roebourne Plains gilgai grasslands PEC were also added to the database.

- Hydrological and flora monitoring continued in the following TECs or PECs to determine management requirements: 'Unwooded freshwater wetlands of the southern wheatbelt dominated by *Muehlenbeckia horrida* subsp. *abdita* and *Tecticornia verrucosa* (Lake Bryde)'; 'Perched wetlands of the wheatbelt region with extensive stands of *Casuarina obesa* and *Melaleuca strobophylla* (Toolibin type wetlands)'; and the 'Wandoo woodland over dense low sedges of *Mesomelaena preisii*'.
- Report forms were completed following site visits to 99 occurrences of four different TECs to provide background data to prepare recovery plans. Data collected about habitat, composition, condition, threats and recommended recovery actions were added to the TEC database.
- Nine newly located occurrences of the 'Unwooded freshwater wetlands of the southern wheatbelt dominated by *Muehlenbeckia horrida* subsp. *abdita* and *Tecticornia verrucosa*', 'Wandoo woodland over dense low sedges of *Mesomelaena preisii*', and 'Sedgeland in Holocene dune swales' were surveyed and added to the database.
- Detailed hydrological investigations were carried out in conjunction with the Department of Water on several threatened ecological communities including 'Ferricrete floristic community (Rocky Springs type)', 'Assemblages of organic mound springs of the Three Springs area' and 'Stromatolite community of stratified hypersaline coastal lake—Lake Thetis'. Invertebrate surveys were also completed in the community 'Organic mound springs in the Three Springs area'. Results will help guide the future management of these groundwater-dependent ecosystems.
- In the Warren Region, the PEC 'Epiphytic cryptogams of the Karri forests' was mapped across the landscape within the Dombakup and Warren forest blocks, with 544 locations scored for developmental stage. Potential protectable reserves were identified for exclusion from prescribed burning. Baseline monitoring data will be used to determine effects of prescribed burning and harvesting operations on the community. Six new occurrences of the PEC '*Reedia spathacea*-*Empodismia gracillimum*- and *Schoenus multiglumis*-dominated peat paluslopes of the Warren biogeographical region' were mapped.
- In the Swan Region, flora species were monitored to obtain data for floristic analysis of TECs present and to determine vegetation condition. Four transects and eight quadrats were monitored to establish the effects of fire on flora species composition in a PEC on granite outcropping, and in a banksia woodland TEC. Transects previously established within Moore River National Park were monitored for ongoing assessment of impacts of bunding to control the flow of water within the boundary of the TEC 'Herb-rich saline shrublands in clay pans'.
- Information brochures were published for the TECs 'Sedgeland in Holocene dune swales of the southern Swan Coastal Plain' and 'Stromatolite-like microbialite community of coastal freshwater lakes (Lake Richmond)'.
- In the Swan Region, weed mapping was completed for the TECs '*Eucalyptus calophylla* – *Kingia australis* woodlands on heavy soils', '*Eucalyptus calophylla* – *Xanthorrhoea preissii* woodlands and shrublands', and 'Communities of tumulus springs (organic mound springs, Swan Coastal Plain)'. Fences were installed or repaired for 10 bushland areas that contain TECs. Dieback disease caused by *Phytophthora* species was mapped to help determine on-ground management requirements for seven areas containing four different TECs.

Further information on threatened flora, fauna and ecological communities is available on the DEC website: www.dec.wa.gov.au/content/view/5379/2231/.



Project Officer Christine Groom with a Carnaby's cockatoo chick. Photo – Rick Dawson/DEC

Online tool helps Carnaby's

Finding suitable plants for Carnaby's cockatoos (*Calyptorhynchus latirostris*) is just a mouse-click away thanks to a new online tool developed by DEC.

Plants for Carnaby's Search Tool is one measure being taken to assist the recovery of the endangered bird. The program enables users to describe their site, purpose for planting or desired plant characteristics. It then compares this information to the features of plants used by Carnaby's cockatoo for feeding, night roosting or nesting and recommends a list of matching species from more than 130 records.

Director of Nature Conservation Gordon Wyre said home gardeners, land managers and developers now had easy access to information on which species to plant that will provide feeding, night roosting and nesting habitat for Carnaby's cockatoos.

"The search tool can also be used to help landowners or managers identify preferred plant species that are important to the cockatoos that might occur on their land that should be protected," he said.

"In this way, the tool will also assist people involved in the assessment of development projects that might affect Carnaby's cockatoos and allow for more informed conditions to be written for development approvals."

Gordon said the innovative use of existing software had resulted in a significant cost saving to the project, which was funded through state NRM funds.

The search tool's creator, DEC Carnaby's cockatoo recovery Project Officer Christine Groom said it was constructed using LucID version 3.5.

"The project involved input from a number of people, including DEC staff and people from the WA Museum, Murdoch University and the University of Queensland's Centre of Biological Information Technology," she said.

The Plants for Carnaby's Search Tool can be found at www.dec.wa.gov.au/plantsforcarnabys.

Western Shield

During 2010–11, more than 3.9 million hectares of conservation lands and State forest were baited to control foxes and feral cats, using nearly 1.1 million poison baits under the *Western Shield* program. Corporate sponsorship was provided by ongoing sponsors Alcoa Australia Limited, Tiwest Pty Ltd, First Quantum Minerals, BHP Billiton, Worsley Alumina Pty Ltd, Tectonic Resources NL and Western Areas NL.

Development of a new toxin and bait delivery mechanism for cat control also continued in collaboration with the Victorian Department of Sustainability and Environment and the federal Department of Sustainability, Environment, Water, Population and Communities.

Redevelopment of database systems used to manage fauna survey and monitoring data, as well as data on 1080 use, progressed during 2010–11 and is due for completion by December 2011. These systems will provide improved information access, analytical and reporting capacity.

Further information on *Western Shield* is available on the DEC website:
www.dec.wa.gov.au/content/category/45/299/1631/.

Management of marine fauna

DEC attended 40 whale and dolphin incidents requiring a management response throughout the year, involving 45 individual animals of nine species—humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera bonaerensis*), Gray's beaked whale (*Mesoplodon grayi*), sperm whale (*Physeter macrocephalus*), false killer whale (*Pseudorca crassidens*), common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), Risso's dolphin (*Grampus griseus*) and bottlenose dolphin (*Tursiops* spp.). There were no mass strandings recorded within this reporting year.

Ten humpback whales were reported entangled in fishing gear and marine debris. DEC's disentanglement team disentangled four of the whales and the fate of the others is unknown. Four of these incidents occurred in the latter half of the 2010 migration season and six occurred in the early stages of the 2011 migration season. One of the entangled humpback whales was satellite-tagged off Rottnest Island by the DEC disentanglement team and tracked for five days over a tracking distance of 718 kilometres. The whale disentangled itself between Geraldton and Pelsart Island in the southern group of the Abrolhos Islands and the fishing gear and satellite tag were recovered. This is the first time satellite technology has been used in a disentanglement operation in the southern hemisphere (see page 9).

A vessel collided with a humpback whale off Broome. The vessel sustained no substantial damage. The fate of the humpback is unknown.

Fourteen humpback whales beached during the year. Three were ashore alive but in poor body condition and were euthanased.

There were 12 reported pinniped incidents, involving four species: Australian sea lion (*Neophoca cinerea*), New Zealand fur seal (*Arctocephalus forsteri*), sub-Antarctic fur seal (*Arctocephalus tropicalis*) and southern elephant seal (*Mirounga leonine*). One Australian sea lion had packing tape encircling its body. A DEC team disentangled this animal successfully. Two New Zealand fur seals were found dead. One sub-Antarctic fur seal was euthanased due to its advanced debilitated condition.



Wetland conservation

Ramsar wetlands

Twelve Western Australian wetlands are listed under the International Convention on Wetlands (Ramsar Convention). In 2010–11, the work of completing ecological character descriptions for all 12 Ramsar sites continued with final editing now required only for the Becher Point Ramsar site to complete the coverage of all sites in Western Australia. The Ramsar information sheets for these wetlands were also revised.

Management plans exist for the following Ramsar wetlands: Toolibin Lake (*Toolibin Lake recovery plan 1994*), Forrestdale and Thomsons lakes (*Forrestdale Lake management plan 2005* and *Thomsons Lake management plan 2005*), Lake Warden System (*Esperance Lakes nature reserves 1999–2009*), and Lake McLarty (a part of the Peel Yalgorup System Ramsar site; *Lake McLarty Nature Reserve management plan 2005*).


The Vasse-Wonnerup wetland system at Busselton supports approximately 35,000 waterbirds each year and, on this basis, is listed as a Ramsar wetland. There is a long history of mass fish deaths during summer in the lowest reaches of the system. The frequency and severity of these incidents can be reduced by timely openings of the Wonnerup Inlet sandbar and two sets of Water Corporation floodgates on the estuary's exit channels. Careful management of seawater inflows and estuary water levels is needed to prevent adverse impacts on fringing vegetation, waterbirds and adjoining low-lying properties.

The Vasse Estuary Technical Working Group arranges for summer opening of the sandbar at the wetland system mouth; for water level, water quality and fish monitoring; and for floodgate openings to release fish and manage water levels. DEC collaborated with the Department of Water and Geocatch NRM and other stakeholders in conducting a community wetlands forum in 2011 to discuss wetland management issues for the Vasse-Wonnerup Ramsar system. As a result, it is envisaged that DEC will be involved in improving ecological outcomes for the systems by introducing adaptive management processes that involve all stakeholders in education, on-ground management and targeted monitoring programs.

DEC has been an active partner with other states and the federal government in the development of national wetlands policy regarding the implementation of international agreements. Significant work has been progressed in developing guidelines for identifying 'High Ecological Values Aquatic Ecosystems' and guidelines for identifying linkages between aquatic systems.

DEC conducted the first *Wetlands Climate Change* symposium in July 2010. As a result of bringing together wetland researchers, managers and policy experts, details have been reported for the first time on what is known about the impact that climate change has already had on wetland systems in Western Australia, and the policy and management programs that may assist in adaptation. Outcomes from the symposium have led to funding applications for collaborative research into adaptive measures to reduce the known and future impacts of climate change through the National Climate Change Adaptation Research Facility.

In 2010–11, DEC prepared a draft management plan for the Eighty Mile Beach Ramsar site, which was recognised as a wetland of international importance under the Ramsar Convention in 1990. The recognition of this area was made principally on the basis of the vast numbers of migratory birds utilising the beach, but also for the geomorphic and hydrological values of Mandora Salt Marsh. Funding for the development of this draft plan was received from BHP Billiton Iron Ore Pty Ltd as part of a 12-month pilot project called the *Ngalpa Warran Conservation Program*. The draft plan for the Ramsar site aims to complement the indicative management plan for the proposed Eighty Mile Beach Marine Park and maintain the ecological character described in the 2009 ecological character description of the Eighty Mile Beach Ramsar site.



DEC continued to be the lead agency in coordination of proposals for possible nomination of nine wetlands for listing under the Ramsar Convention. Candidate areas are Lake MacLeod, Lake Gregory, the Cape Range Subterranean Waterways, Lake Ballard, the Millstream Pools, Shark Bay World Heritage area East–Hamelin Pool, the Ellen Brook Swamps System, tributaries of the Lower Blackwood River (formerly Spearwood Creek) and Fortescue Marshes. DEC undertook work to progress ecological character descriptions, information sheets and management plans for these wetlands.

Further information on Ramsar wetlands is available on the DEC website:
www.dec.wa.gov.au/content/view/3504/1938/.

Wetlands mapping and evaluation projects

During the year, the department conducted a major update of the statewide wetlands database—WetlandBase—including the addition of data for 314 wetlands and new wetland mapping for Darkan-Duranillin area and four priority areas of the wheatbelt. This database enables DEC to distribute wetland mapping and management information to assist in improving the management of privately owned wetlands.

The department completed two wetland mapping projects for the vicinity of Cervantes, Jurien Bay, Greenhead and Eneabba in DEC's Midwest Region, equating to an additional 460,000 hectares of mapped wetland extent. Funding was from Department of Water through the National Water Commission's groundwater action plan. These datasets are publicly available on WetlandBase and Landgate's WA Atlas. These mapping datasets will contribute to a larger project by the Department of Water looking at potential groundwater-dependent ecosystems in the Midwest.

The department has also initiated a project to refine wetland mapping and data in addition to conducting wetland evaluation for approximately 100,000 hectares of the coastal area from Cervantes to Coolimba. This will enable more accurate environmental impact assessments to be completed for the area. Funding is through an offset package for the Jurien Bay gypsum mining operation. This project is due for completion in 2012.

Further information on wetland management and inventory is available on the DEC website:
www.dec.wa.gov.au/content/view/3503/1936/ and www.dec.wa.gov.au/content/view/3477/1943/.

Maintenance of wetlands mapping and evaluation datasets

Aware that wetland values or areas can change, either through natural or anthropogenic processes, the department maintains the boundaries, classifications and evaluations of wetlands mapped in its *Geomorphic Wetlands Swan Coastal Plain* dataset. The department receives requests from external proponents such as environmental consultants, landholders and state and local government agencies, to modify wetland mapping in the dataset (management category, classification, or boundary reviews).



Environmental Officer Jarrod Abrahams desperately seeking water.

Testing times for wetland

A new round of groundwater and sediment sampling was conducted in autumn 2011 at Lake Mealup—part of the Ramsar-listed Peel-Yalgorup system south of Perth.

Environmental officers from DEC's Contaminated Sites Branch carried out the investigation as part of a recovery program for the lake which is valued for its waterbirds and surrounding bushland.

Declining rainfall since the mid 1970s has affected the lake's capacity to maintain water levels on a permanent basis. Since 1993, Lake Mealup has dried out each summer, resulting in extreme acidification. The lake recorded a pH of 2.9 in November 2010.

DEC Environmental Officer Steve Clohessy said the lake's deterioration was exacerbated by an extensive agricultural drainage network that was designed for flood mitigation.

"Some of these drains appear to intersect the watertable and impede groundwater flow towards the lake," he said.

The Lake Mealup recovery program involves the construction of a weir at the Mealup Main Drain, south of Lake Mealup, in order to restore some natural groundwater flow into the lake.

It is a joint initiative between the federal government, DEC, Department of Water, Lake Mealup Preservation Society and Peel-Harvey Catchment Council.

Steve said DEC carried out soil, groundwater and surface-water investigations between 2008 and 2010 in an effort to characterise the acidity risk associated with acid sulfate soils and declining groundwater levels.

"The seasonal drying out of the lake over the past 17 years has exposed pyritic minerals including monosulfidic sediments that had accumulated in the system, creating an acid store capable of causing extensive soil and water acidification," he said.

Further groundwater and surface-water monitoring will be undertaken in order to assess changes in water quality following construction of the weir, due to be completed in early 2012.

Priority nature conservation projects

In 2010–11, DEC allocated \$3.75 million to 38 priority projects across the key themes of invasive animal control, environmental weed control, threatened species and ecological communities' recovery, *Phytophthora* dieback management, biological survey and research, rangelands management and the *State Cane Toad Initiative*. Highlights for the year included:

Invasive animal control

- 1,223 cattle were removed from the Mitchell Plateau and Karijini National Park.
- 1,124 goats were removed from Kalbarri and Cape Range national parks.
- 295 horses, 110 donkeys and 45 camels were removed from Karijini National Park and surrounding unallocated Crown land.
- Nine pigs were removed from Kalbarri National Park and 45 pigs were removed from the Warren Region.
- 1,447 pest rainbow lorikeets and 1,039 corellas were removed from the metropolitan area, and 113 corellas were removed from Busselton.
- Surveys for feral pigs were undertaken within Toolibin Lake natural diversity recovery catchment, Lake Bryde natural diversity recovery catchment, Dongolocking reserve complex, Lake Magenta Nature Reserve within the Great Southern District, and within Warren Region.

Environmental weed management

Three hundred of the most serious environmental weeds in the Swan Region were added to the department's *Florabase* website. Information is provided on the biology and management of environmental weeds, as well as photos and distribution.

Threatened species and ecological communities' recovery

- Genetic analysis was carried out on 500 individual graceful sun-moths (*Synemon gratiosa*).
- Maintenance was carried out on 15 kilometres of the Gilbert's potoroo fence within Waychinicup National Park, and 500 baits were laid along tracks and the fence boundary.
- Seed from 50 threatened flora plants was collected and 527 seeds were germinated for translocations. A total of 859 and cuttings were planted to establish new populations of threatened plant species.
- Twenty-six numbats (*Myrmecobius fasciatus*), 23 woylies (*Bettongia penicillata*) and 11 Gilbert's potoroos (*Potorous gilbertii*) were radio collared and monitored.
- Twelve recovery plans were updated.

Phytophthora dieback management

- Aerial surveys were conducted of 30,000 hectares, and 160 hectares were ground surveyed for dieback.
- A total of 513 field soil/tissue samples was taken.
- Wash-down bays were installed and drainage controls were upgraded to improve hygiene at Fitzgerald River, Cape Le Grand and Cape Arid national parks.
- Ongoing monitoring was conducted of the research trials into the efficacy of high-intensity phosphite application at three field sites in the South Coast Region.



Rangelands management

- A total of 22,500 baits was laid for wild dog control in the rangelands.
- Improved renewable power systems were installed for the management facilities on DEC-managed former pastoral properties (Doolgunna, Karara, Woolgorong), purchased by the government for conservation.
- Homestead infrastructure was upgraded at Karara, Muggon, Thundelarra and Pimbee.
- Interim management guidelines were drafted for Pimbee, Wanna, Boologooro and Yaringa and the greater Mount Augustus area.
- Thirty-eight signs were installed in Kennedy Range and Mount Augustus national parks.
- Twenty-two kilometres of boundary fencing was erected by DEC in partnership with neighbours (Barnong/Gabyon boundary, Mooka/Mardathuna boundary, Mooka/Doorawarra boundary, Lochada/Brunschot boundary and Kadji Kadji/Broad boundary).

State Cane Toad Initiative

Cane toads (*Bufo marinus*) are a declared pest under the *Agriculture and Related Resources Protection Act 1976*. The Cane Toad Strategy for Western Australia was released by the Minister for Environment in October 2009, with DEC as the lead agency responsible for cane toad management, supported by the Department of Agriculture and Food Western Australia (DAFWA) and the Agriculture Protection Board in the areas of quarantine and biosecurity. The Regional Cane Toad Team was maintained during 2010–11 with four positions comprising a program coordinator, team leader and two technical officers. The team achieved the following:

- spending 274 nights trapping cane toads
- carrying out 2,547 kilometres of surveillance for cane toads
- conducting 21 freight inspections by cane toad sniffer dog
- carrying out five biodiversity surveys
- contributing to a reduction in the number of toads at the front line (moving from the Northern Territory) through cooperative field work with the community groups Kimberley Toad Busters and Stop the Toad Foundation, and providing funding support to the Kimberley Toad Busters
- gathering increased knowledge about cane toad behaviour
- identifying high-risk freight and establishment zones
- supporting the Cane Toad Stakeholder Reference Group
- presenting cane toad information sessions to schools and community groups
- assisting with cane toad-related research projects, including University of Sydney projects looking at freshwater crocodiles in Lake Argyle and taste aversion projects on blue-tongue lizards, yellow spotted monitors, crocodiles and northern quolls (research by the University of Sydney in cooperation with DEC to evaluate the potential role of nematode lungworms in control of cane toads is complete and is currently in publication)
- maintaining databases of sightings and distribution of cane toads
- producing quarterly *WA Cane Toad Update* newsletters
- distributing cane toad identification information and advice for managing cane toads in backyards in the east Kimberley
- maintaining live cane toad drop-off points throughout the east Kimberley
- carrying out east Kimberley biodiversity surveys in conjunction with the Miriuwung-Gajerrong people, DEC's Science Division and regional nature conservation officers
- operating the *Kimberley Bush Ranger Cadet* program, with five units coming online by the end of 2011 to help with cane toad busting, and working with community groups.

Further information on cane toad management is available on the DEC website:
www.dec.wa.gov.au/content/category/43/906/2154/.

Management of commercial activities involving wildlife

DEC ensured that wildlife-based activities that occurred during the year were licensed and managed in accordance with the WC Act, and were maintained and investigated to ensure compliance with legislation and the licences issued.

As part of nationally approved kangaroo management plans, aerial population surveys of kangaroos continued in June 2011 and were to be completed by October 2011. The south-west forest areas will be surveyed to provide a current population estimate for western grey kangaroos (*Macropus fuliginosus*). These surveys and submissions will provide information to assess the potential commercial harvest quotas for 2012.

Quotas approved for 2011 were:

- western grey kangaroos—maximum of 150,000
- red kangaroos (*Macropus rufus*)—maximum of 100,000
- euros (*M. robustus*)—no commercial harvest during 2011.

Under the management plan for the commercial harvest and farming of crocodiles in Western Australia, the following maximum annual quotas apply (though these are seldom filled, especially for freshwater crocodiles):

- estuarine crocodiles (*Crocodylus porosus*)—520 eggs/hatchlings, 50 non-hatchlings
- Australian freshwater crocodiles (*C. johnstoni*)—1,900 eggs/hatchlings, 200 non-hatchlings.

Regulation

Flora and fauna licensing

There were 8,978 fauna licences (other than damage, but including non-commercial) issued during the year, an increase of nine per cent from the previous year. Continued interest in pet herpetofauna (reptiles and frogs) resulted in a 13 per cent increase in licences issued this year, with more than 3,802 people currently licensed to keep reptiles as pets. There was a 16 per cent increase in avian fauna licences. Overall, there was an eight per cent increase in the number of licences issued. The total number of flora licences and permits issued was 1,937, an increase of more than three per cent from the previous year. DEC issued 285 commercial purposes licences, 241 commercial producer licences and nurseryman licences, and 1,148 scientific or prescribed purposes licences in 2010–11.

Damage and dangerous fauna licences

The department received reports of problem crocodiles in several parts of the Kimberley and the Pilbara regions. Seven licences to remove saltwater crocodiles from the wild were issued because they threatened public safety. Twelve dangerous fauna licences were issued for aggressive magpies (a decrease of more than 58 per cent); 14 dangerous fauna licences were issued for western grey kangaroos, which included aggressive kangaroos as well those at risk of aircraft strike at various airports; and seven dangerous fauna licences were issued for a range of bird species to mitigate the risk of aircraft strike at Perth, Jandakot, Busselton, Albany, Karratha and Kununurra airports.

Licences issued for the control of fauna causing damage included 10 licences for emus; 408 licences for western grey kangaroos (a 12 per cent increase); 12 licences for little corellas (a decrease of 45 per cent); 14 licences for western long-billed corellas (a decrease of 63 per cent); 16 licences for twenty-eight parrots; three licences for galahs; and seven licences for Australian ravens.

Eight damage licences were issued for agile wallabies. Ninety damage licences were issued for birds, a decrease of more than 57 per cent from 2009–10.

Further information is available on the DEC website:

Fauna licensing: www.dec.wa.gov.au/content/view/864/1992.

Flora licensing: www.dec.wa.gov.au/content/view/863/2002/.



Table 4: Wildlife licences issued in 2010-11

Fauna licences	No. of licences issued
Scientific	
Scientific collection (Reg 17)	598
Bird/bat banding (Reg 23)	137
Education and Public	
To take (Reg 15)	
Marine interaction	263
Other	148
Education And Public	
To hold (Reg 16)	139
Avian Fauna	
Keep and breed in captivity (Reg 12)	3,265
Deal (Reg 13)	32
Breed for commercial purposes (Reg 14)	0
Trap (Reg 11)	2
Species trapped commercially	Number
Twenty-eight parrot (<i>Barnardius zonarius</i>)	208
Red-capped parrot (<i>Purpureicephalus spurius</i>)	130
Western rosella (<i>Platyercus icterotis</i>)	106
Galah (<i>Eolophus roseicapilla</i>)	22
Little corella (<i>Cacatua sanguinea</i>)	24
Fauna	
Keep in captivity (Reg 12A)	87
Herpetofauna (reptiles and amphibians)	
Keeping	2,252
Dealing	27
Farming	2
Taking	6
Removing	689
Emus (<i>Dromaius novaehollandiae</i>)	
Emu farming (Reg 14)	5
Dealing (Reg 8)	1
Dealing (emu eggshells Reg 13)	4
Processing (emu eggshells Reg 7)	1
Crocodiles	
Crocodile farming (Reg 14)	2
Skin dealing (Reg 10)	0
Processing (Reg 7)	2
Kangaroo	
Take kangaroos for sale (Reg 6)	421
Deal in carcasses (Reg 8)	18
Skin dealing (Reg 10)	8
Processing (Reg 7)	22

Fauna Licences	No. of licences issued
Exports Interstate	
Skins of fauna (or other dead fauna)	34
Fauna (live)	324
Herpetofauna (reptiles and amphibians)	22
Exports Overseas	
Skins of fauna (or other dead fauna) from WA	9
Emu eggs or products (personal items) from WA	0
Fauna (avian) from WA (live)	1
Imports Interstate	
Skins of fauna (or other dead fauna) into WA	13
Australian fauna (live)	281
Live exotic birds and other animals	150
Herpetofauna (reptiles and amphibians)	13
Total Fauna Licences	8,978

Flora Licences	No. of licences issued
Commercial purposes	285
Sandalwood (<i>Santalum spicatum</i>) (from Crown land)	0
Forest produce (from Crown land)	1
Commercial producers	241
Sandalwood (from private land)	29
Scientific/prescribed purposes	1,148
Permits to take declared rare flora	233
Total Flora Licences	1,937



Damage Licences	No. of licences issued	Total no. of each species authorised to be taken
Other Avian Fauna		
Australian raven (<i>Corvus coronoides</i>)	7	destroy 106
Australian white ibis (<i>Threskiornis molucca</i>)	1	scare 100
Baudin's cockatoo (<i>Calyptorhynchus baudinii</i>)	1	scare 100
Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>)	1	scare 100
Emu	10	destroy 510
Galah	3	destroy 220
Little corella	11	destroy 3,220
	1	scare 1
Long-billed corella (western) (<i>Cacatua pastinator</i>)	14	destroy 10,300
Long-billed corella (eastern states species) (<i>Cacatua tenuirostris</i>)	3	destroy 425
Pied cormorant (<i>Phalacrocorax varius</i>)	1	destroy 10
Red-capped parrot (<i>Purpureicephalus spurius</i>)	3	destroy 90
Straw-necked ibis (<i>Threskiornis spinicollis</i>)	1	destroy 2
	1	scare 1
Twenty-eight parrot	16	destroy 1,980
Welcome swallow (<i>Hirundo nepxena</i>)	1	trap & relocate 100
Waterfowl		
Eurasian coot (<i>Fulica atra</i>)	4	trap & relocate 800
Maned duck (<i>Chenonetta jubata</i>)	4	destroy 130
	1	scare 1
	4	trap & relocate 800
Pacific black duck (<i>Anas superciliosa</i>)	1	destroy 50
	1	scare 1
Mammals		
Agile wallaby (<i>Macropus agilis</i>)	8	destroy 3490
Euro (<i>Macropus robustus</i>)	1	destroy 50
Red kangaroo (<i>Macropus rufus</i>)	1	destroy 50
Western grey kangaroo (<i>Macropus fuliginosus</i>)	408	destroy 18,053

Dangerous Fauna Licences	No. of licences issued	Total no. of each species authorised to be taken
Australian bustard (<i>Ardeotis australis</i>)	1	destroy 1
	1	scare 1
Australian magpie (<i>Gymnorhina tibicen</i>)	11	destroy 14
	1	trap & relocate 1
Australian magpie-lark (<i>Grallina cyanoleuca</i>)	1	destroy 1
	1	trap & relocate 2
Australian raven	3	destroy 121
	1	trap & relocate 1
Australian shelduck (<i>Tadorna tadornoides</i>)	1	destroy 20
Australian white ibis	1	destroy 50
Banded lapwing (banded plover) (<i>Vanellus tricolor</i>)	2	destroy 25
Black kite (<i>Milvus migrans</i>)	1	destroy 3
Estuarine (saltwater) crocodile (<i>Crocodylus porosus</i>)	3	destroy 3
	4	trap & relocate 8
Euro	1	destroy 50
Galah	2	destroy 350
Grey butcherbird (<i>Cracticus torquatus</i>)	1	destroy 1
Laughing kookaburra (<i>Dacelo novaeguineae</i>)	3	destroy 9
Little corella	2	destroy 350
Long-billed corella (eastern states species)	1	destroy 100
Maned duck	1	destroy 300
Pacific black duck	1	destroy 200
Red kangaroo	1	destroy 50
Red wattlebird	1	destroy 1
Straw-necked ibis	1	destroy 50
Western grey kangaroo	14	destroy 235
Whistling kite (<i>Haliastur sphenurus</i>)	1	3
Willie wagtail (<i>Rhipidura leucophrys</i>)	1	destroy 2



Wildlife interaction licences

At 30 June 2011, 117 whale watching boat tour operators were licensed in Western Australia. While these tours were primarily based on humpback whales (*Megaptera novaeangliae*), southern right whales (*Eubalaena australis*) were also a focus of whale watching activity in the lower south-west areas, particularly at Albany, Augusta and Esperance. Pygmy blue whales (*Balaenoptera musculus brevicauda*) are also regularly encountered adjacent to Cape Naturaliste.

DEC issued 87 boat-based and one beach-based dolphin interaction licences, three in-water dolphin interaction licences and two boat-based dugong (*Dugong dugon*) interaction licences. Thirty-eight boat-based Australian sea lion (*Neophoca cinerea*) and New Zealand fur seal (*Arctocephalus forsteri*) interaction licences were issued.

Fourteen whale shark (*Rhincodon typus*) interaction licences were current for the year.

Offences

During the year, DEC staff provided guidance regarding the legal requirements of parks and conservation legislation. There were 334 caution notices for minor offences and 791 infringement notices issued during the year (Table 5). Written reports were prepared for 63 offences under the WC Act and its Regulations, and the CALM Act and its Regulations. Action in 25 matters under both statutes was completed.

The unlawful taking of black cockatoos from the wild continued to be of concern. There are indications that the threatened Baudin's and Carnaby's cockatoos are frequently shot on private property. The unlawful taking, possession and keeping of reptiles continued to be an issue.

Table 5: Number of reported offences in 2009–10 and 2010–11

	2009–10 reported offences	2010–11 reported offences
	As at 30.06.10	As at 30.06.11
Total offences reported	1,438	1,192
Court convictions	54	11
Court dismissals	0	0
Infringement notices	690	791
Letters of warning	12	10
Caution notices	634	334
No further action	25	13
Pending	19	33
Withdrawn	4	0
Restitution		
Total court fines	\$16,875	\$8,400
Total court costs	\$3,802	\$715
Infringement penalties	\$53,440	\$58,845

Table 6: Offences under the Wildlife Conservation Act 1950 and Regulations and Agriculture and Related Resources Protection Act 1976 that occurred in 2010-11

Charges	Reported offences	Convictions	Fines \$	Costs \$	Dismissed	Letter of warning	Caution notice	No further action	Pending
Wildlife Conservation Act 1950									
Illegal taking or possession of protected fauna	25	9	\$6,900	\$596		2	6	2	6
Illegal importation, selling or taking for sale of fauna	8						7		1
Illegal taking of protected flora	2					1	1		
Offences relating to the sale of protected flora	1						1		
Taking declared rare flora without the Minister's consent	4					3		1	
Offences against wildlife officers	3								3
Failing to comply with licence conditions	63						49	1	13
Wildlife Conservation Regulations									
Offences relating to the acquisition, possession, control and disposal of fauna	78	2	\$1,500	\$119		1	64	3	8
Wildlife Conservation Reptile and Amphibian Regulations									
Offences relating to reptiles and amphibians	4						2		2
Totals	188	11	\$8,400	\$715		7	130	7	33



Table 7: Offences under the Conservation and Land Management Act 1984 and Regulations and Sandalwood Act 1929 that occurred in 2010-11

Charges	Reported offences	Convictions	Fines \$	Costs \$	Dismissed	Infringement notice	Letter of warning	Caution notice	No further action	Pending
<i>Conservation and Land Management Act 1989</i>										
Illegal taking or possession of forest produce	13		\$800			4		6	3	
Offences relating to marine parks and reserves	1							1		
Offences against officers	1							1		
Offences relating to disease risk areas	6							6		
Offences relating to activities on State forest, nature reserves and national parks	982		\$58,045			787	3	190	2	
<i>Sandalwood Act 1929</i>										
Illegal taking of sandalwood	1								1	
Totals	1,004		\$58,845			791	3	204	6	



Jurien Bay staff (from left) Suzie Glac, Keith Hockey and Matt Dasey with Marine Policy and Planning Branch Manager John Lloyd during the Annual Marine Program meeting.

Workshop marks marine achievements

A one-day workshop organised by the Marine Parks and Reserves Authority (MPRA) in October 2010 enabled DEC staff to provide an overview of achievements in relation to marine park and reserve management plans.

Marine Coordinator for the Walpole and Nornalup Inlets Marine Park Darren Stevens showcased interpretive boat ramp signage as well as recent research outcomes of a survey conducted with Dr John Huisman on the benthic algae and seagrass in the marine park, which has increased the known number of species from 14 to 98.

Community participation was on the agenda for Shoalwater Islands, Swan Estuary and Marmion marine parks Marine Conservation Officer Pam Sutton who previewed the development of a Marine Community Monitoring Program which will enable greater community participation in research and monitoring in the marine parks.

Jurien Bay Marine Park Coordinator Matt Dasey highlighted the importance of DEC's ongoing support for the University of Tasmania to conduct long-term monitoring in the marine park.

Marine Park Coordinator for Shark Bay Marine Park and Hamelin Pool Marine Nature Reserve Dave Holley reported on vessel improvements made to *Sirenia III* to increase the patrol capability of the Shark Bay World Heritage area District office.

Ningaloo Marine Park and Muiron Islands Marine Park Coordinator Heather Taylor focused on education as she presented activities coordinated by the Exmouth District office, including holiday programs and a series of public seminars on marine values.

Marine Policy and Planning Branch Senior Marine Conservation Officer Barb Green spoke on behalf of Dr Cath Samson, former Regional Marine Coordinator for Montebello Islands Marine Park, Barrow Island Marine Park and Barrow Island Marine Management Area. A major achievement for the region and marine reserves has been the delivery of the patrol vessel *Sousa* and its tender *Barry*. The vessels will enable a significant increase in DEC presence in the marine reserves.

Marine Conservation Officer for Rowley Shoals Marine Park Teresa Coutts highlighted the excellent working relationship that the West Kimberley District office has with marine tourism operators visiting the marine park. Marine tourism operators work closely with DEC in monitoring use of the marine park. The data collected by operators help to ensure DEC has an ongoing understanding of potential impacts on marine park values.



Conserving landscapes and seascapes; integrating off- and on-reserve conservation and managing threatening processes

Biodiversity conservation strategy

The department continued to participate in finalising an updated national biodiversity conservation strategy. The national strategy was published in 2010, through the NRM Ministerial Council.

Biodiversity conservation legislation

The department continued to provide advice to the government on the proposal for a Biodiversity Conservation Bill.

Native Vegetation Framework

The *National Framework for the Management and Monitoring of Australia's Native Vegetation* (the Native Vegetation Framework or NVF) was published in 1999 to guide policies, programs, legislation and activities related to native vegetation conservation throughout Australia. The NRM Ministerial Council directed that the NVF be reviewed and revised. The revised NVF will link under the national biodiversity conservation strategy.

The department continued to participate in revising the NVF, with the draft document being revised following the receipt of public comments. The revised NVF was submitted to jurisdictions for endorsement, and is scheduled to be released by the end of 2011.

Regional nature conservation plans

Each DEC region has prepared a five-year *Nature Conservation Service* regional plan that collectively provides the basis for greater integration and coherence of departmental activities and functions towards achieving the goal of conserving Western Australia's biodiversity at a regional scale. These plans will allow resources to be better focused to address major biophysical and socioeconomic threats to biodiversity, enabling funding opportunities to be more targeted. The regional plans are intended to be five-year 'rolling' plans, which are annually reviewed and updated.

Regional marine planning

In September 2010, the draft *South Coast Regional Marine Strategic Plan* was released for a three-month public comment period. The strategic plan applies to state waters between Cape Leeuwin and the South Australian border. DEC is the lead agency and has been working closely with other agencies, including the departments of Fisheries, Mines and Petroleum, Planning and Transport, and Tourism WA.

At the state level, the government has received feedback on the draft plan from the former Marine Policy Stakeholder Group composed of representatives of peak non-government organisations with interests in marine planning and management. The government has also received advice from a scientific panel, comprising three independent and highly regarded scientists, about the role of marine sanctuaries.

Further information about regional marine planning is available on the DEC website:
www.dec.wa.gov.au/content/view/3547/2418.

Managing system-wide threats

Salinity management

During 2010–11, DEC continued its collaboration with the Future Farm Industries Cooperative Research Centre (CRC). Work with this organisation on the ecophysiology of sheoaks (*Casuarina obesa*) and paperbarks (*Melaleuca strobophylla*) growing on the Toolibin Lake floor is helping to explain the variability in recovery and ecology of these plants, which is vital information for adapting management. In addition, publication of work on revegetation trials established in 1995 has shown the contribution of revegetation to groundwater control, and underlines the importance of long-term trials and monitoring.

Further information on salinity management is available on the DEC website:
www.dec.wa.gov.au/content/category/25/301/1620/.

Natural diversity recovery catchments

A review of the natural diversity recovery catchment program was completed. The program continued to slow degradation and recover high value biodiversity assets in the south-west at further risk from altered hydrology, particularly salinity. Key activities for 2010–11 included planting 8,000 seedlings, and planning for revegetation and surface water management on recently purchased farmland at Toolibin. Major electrical works have also begun to ensure that the groundwater pumping system functions effectively in this recovery catchment. This is a matter of increasing importance given that ecophysiological research, conducted in partnership with the Future Farm Industries CRC, has emphasised the importance of lowering groundwater to greater depths than originally anticipated to ensure downward flushing of salts, and to prevent saline water rising into the root zones of plants during wetland fill events.

The program continued at Buntine-Marchagee, Drummond, Lake Bryde, Lake Muir-Unicup, Lake Warden and Toolibin Lake to slow degradation and recover high value biodiversity assets at risk from altered hydrology. Improvements as a result of the gravity pipeline installed in the Lake Warden wetland complex have been one of the more notable results in 2010–11. 2010 was the driest year on record for much of the central agricultural zone, and impacts on wetland and riparian vegetation were anticipated. To date, the most severe impacts have been on a yate swamp in the Lake Bryde complex; however, the full impacts cannot be assessed until after winter. Following implementation of a wide range of works over the past few years, ranging from surface water management in Buntine-Marchagee and Lake Bryde to the gravity pipeline at Lake Warden, the program is now entering a period of monitoring, evaluation and planning. DEC's work with the Future Farm Industries CRC on the ecology and ecophysiology of wetland plants continues to improve our understanding of the life strategies of wetland plants.

At Lake Bryde, works on the main waterway continued and it is anticipated that these will be completed in 2011–12. At the same time, earthworks commenced on the western boundary of Lakelands Nature Reserve, part of the Lake Bryde wetland complex, with the aim of counteracting run-off from farmland that is causing degradation on the reserve. Some 140,000 seedlings were also planted in the winter of 2010 under extremely dry conditions. These conditions also resulted in significant decline in tree health in an important yate swamp wetland—an investigation of the causes has begun, but cannot be finalised until recovery can be assessed following winter rains.

Activities at Buntine-Marchagee natural diversity recovery catchment continue to be centred on large-scale integrated water management works on farmland, including revegetation. This multi-year project is aimed at decreasing salt, nutrient and sediment export to the naturally saline braided wetland channel and the gypsum wetland complex. In 2010–11, a total of \$230,000 of externally funded on-ground works was expended within two sub-catchments covering 4,500 hectares. Revegetation works (20 hectares) were also targeted directly adjacent to the fresh-brackish wetland complex, as was stock exclusion fencing of all adjacent remnant vegetation.



In the Lake Warden natural diversity recovery catchment, the Lake Wheatfield gravity pipeline has been in operation for two years, during which there has been more normal annual rainfall. Initial indications of a positive altered hydrological regime have been confirmed, with target water levels in the central wetland suite remaining within the optimum minimum and maximum levels for the first time in more than a decade. In addition, this has removed some of the pressure from Lake Warden, exposing shores and root zones of dead fringing vegetation. As a result, there has been significant *Melaleuca* recruitment on the southern shore, while threatened shorebirds have been observed breeding on the lake again. The Lake Warden recovery plan is under review, and environmental impact assessment is continuing to evaluate phase 2 of the recommended engineering interventions.

Completion of the recovery plan for the Drummond natural diversity recovery catchment was delayed, and significant new material added into the targets and monitoring section. Following completion of hydrological investigations, a more active phase of management will begin.

Muir-Unicup experienced its driest year in the past 30 years and, based on records available, probably the driest in more than 100 years. All wetlands, with the exception of Byenup, Tordit-Gurrup and Kulunilup Lake, have dried. Survey of waterbird species continued with some notable records. More than 4,000 sharp-tailed sandpipers (*Calidris acuminata*—a species only ever recorded in the area in ones and twos) took up residence in late spring/early summer for reasons unknown, and low water levels resulted in no Australasian bitterns (*Botaurus poiciloptilus*) being recorded in the area. Bathymetric surveys were readily carried out for Lake Unicup and Tordit-Gurrup given the dry conditions. A full analysis and ranking of the biodiversity assets of Muir-Unicup is proposed for the next financial year.

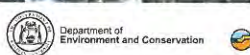
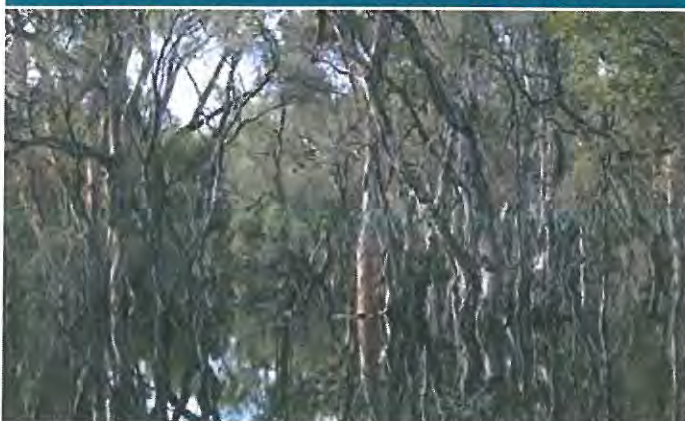
The department continued to be involved in running a postgraduate course in hydrogeology at The University of Western Australia. This significantly added to our hydrogeological and hydrological knowledge of recovery catchments as well as threatened species and TECs. Initial development of the Hydstra database as a repository for all hydrological information generated under the salinity initiative is nearly complete, and data are now being sent to the Bureau of Meteorology.

Further information on natural diversity recovery catchments is available on the DEC website: www.dec.wa.gov.au/content/view/449/949/.


Natural Diversity Recovery Catchment Program



2010 Review



A review of the department's natural diversity recovery catchment program was completed in 2010. The review is available on the DEC website at www.dec.wa.gov.au under Management and Protection/Land Salinity.



Invasive species control

Feral pigs

Throughout the year, DEC took part in cooperative management of feral pigs in the south-west. DEC conducted feral pig control activities, including monitoring, trapping and poisoning, in the forests of the south-west and in the midwest. Feral pig control programs continued in conjunction with DEC's Great Southern District and DAFWA and landholders bordering the Toolibin Lake natural diversity recovery catchment, and DEC's Warren Region with three community groups. A feral pig control program was initiated in Lesueur National Park with ground baiting occurring during the summer months of 2010. This program proved successful, with good bait uptake and decreasing signs of pig activity.

The effectiveness of feral pig control efforts continued to be hindered by illegal hunting, transport and release of pigs by recreational shooters.

Feral goats

Feral goat control activities continued with the aim of minimising the impacts of these animals on vegetation communities and fauna habitat. An aerial control program on Dirk Hartog Island National Park destroyed 2,503 feral goats, and 154 goats were culled in Cape Range National Park through opportunistic shooting efforts. A feral goat trapping program was also undertaken within the Capamauro and Pinjarrega nature reserves and Watheroo National Park with the assistance of local volunteers.

Donkeys, camels and invasive birds

Feral donkey and camel control operations in the Pilbara and northern Meekatharra Shire continued in partnership with DAFWA under the *Judas Collar* program. DEC collaborated with DAFWA and the Martu traditional owners to destroy 5,145 camels and 906 donkeys in aerial shoots in desert country along the pastoral fringe.

A program for the control of invasive rainbow lorikeets continued in the Perth metropolitan region to reduce competition with native species for nest spaces and food resources, and to prevent the risk of disease to native bird species. The program was implemented by the department, with assistance from fruit growers and other affected land managers. During the year, 681 birds were taken by departmental staff, bringing the total for the program to 27,919 birds. Little and long-billed corellas (not native to the Perth metropolitan area) were also controlled through the program, with 1,152 birds taken during the year.



Management of environmental weeds

Weed management actions on DEC-managed lands were prioritised in each region according to the policy outlined in the *Environmental Weed Strategy of WA* (1999). During 2010–11, work continued on a weed risk management project that aimed to prioritise weeds in each of Western Australia's 26 interim biogeographical regionalisation of Australia (IBRA) bioregions. The project enables weeds to be assessed for their invasiveness, impacts, potential and current distribution, and feasibility of control across each of the bioregions. The results from these assessments will assist other land managers, and are available on the DEC website (www.dec.wa.gov.au/content/view/6295/2358/1/1).

In addition to the IBRA-based weed risk assessments, a database of 300 of the most serious environmental weeds in the Swan Region has been developed and is available online via the department's *Florabase* website. Funding for this project has come from DEC, Perth NRM and the state NRM program.

The use of a state-wide asset-protection-based process to determine the values at risk from environmental weeds is being further investigated. This process ultimately aims to maximise efficiency and effectiveness of weed control through a consideration of biodiversity values at risk from environmental weeds, and availability of resources, so that appropriate management actions can be applied by each of the DEC regions.

Weed mapping is recognised as an integral part of managing the threat of weeds in natural ecosystems. DEC's Swan Region has developed a standard operating procedure (SOP) relating to techniques for mapping weed distribution and density in bushland and wetlands. This document will provide DEC staff with the appropriate standard for weed mapping for land management purposes, and will assist in ensuring associated data are maintained and accessible.


During 2010–11, a PhD project was commenced which will work toward understanding the cause of blackberry decline in the south-west of Western Australia. This project is a collaboration between Murdoch University, CSIRO and DEC, and aims to investigate the organisms causing blackberry decline, and to ascertain what risks might be involved and the potential for using these organisms for biological control of this weed. The thesis is anticipated to be finalised in early 2013.

The main environmental weeds targeted for management by DEC in 2010–11 included silver wattle (*Acacia dealbata*), ruby dock (*Acetosa vesicarius*), bridal creeper (*Asparagus asparagoides*), tagasaste (*Chamaecytisus palmensis*), rubber vine (*Cryptostegia grandiflora*), rough tree fern (*Cyathea cooperi*), Paterson's curse (*Echium plantagineum*), African lovegrass (*Eragrostis curvula*), Geraldton carnation weed (*Euphorbia terracina*), hesperantha (*Hesperant hectares falcata*), Victorian tea-tree (*Leptospermum laevigatum*), African boxthorn (*Lycium ferocissimum*), Cape tulip (*Moraea flaccida*), date palm (*Phoenix dactylifera*), blackberry (*Rubus* sp.), harlequin flower (*Sparaxis bulbifera*), *Tamarix* sp., verbesina (*Verbesina encelioides*), *Watsonia* sp., arum lily (*Zantedeschia aethiopica*) and Bathurst burr (*Xanthium spinosum*).

DEC's Swan Region has conducted a series of research projects on environmental weeds which are invading native plant communities. The focus of the research ranges from understanding plant biology and system ecology, through to selection of appropriate management actions in order to minimise the threat of environmental weeds to flora and ecosystem values. The species of environmental weeds subject to research include Geraldton carnation weed, *Watsonia meriana*, *Watsonia borbonica*, black flag (*Ferraria crispa*), yellow soldier (*Lachenia reflexa*) and harlequin flower.

In 2010–11, DEC continued efforts to eradicate rubber vine, a weed of national significance, in the west Kimberley. DEC conducts on-ground surveys and control operations, supports extensive volunteer efforts and participates in the West Kimberley Steering Group. Work completed was funded by DEC, Rangelands NRM and Kimberley Zone Control Authority with significant in-kind contributions from DAFWA, Yeeda Station and Broome Contracting.

Further information on control of invasive plant species is available on the DEC website: www.dec.wa.gov.au/content/category/31/936/2275/.



Phytophthora dieback management

The following achievements were made in 2010–11 in the management of *Phytophthora* dieback (also refer to the *Priority nature conservation projects* section, page 48):

- As part of the state NRM program, groundbreaking work was carried out eradicating one *Phytophthora* infestation at Cape Arid National Park and containing another infestation within Fitzgerald River National Park.
- The Vegetation Health Service (VHS) has processed more than 1,800 diagnostic samples collected by the department's disease interpreters, private contractors and land managers from across the south-west of Western Australia. In addition to *P. cinnamomi*, isolates of four previously described *Phytophthora* species and one undescribed species were identified. The VHS have continued to work in partnership with the Centre for *Phytophthora* Science and Management to DNA-sequence more than 520 historical and recent Western Australian isolates from the VHS culture collection. This ongoing program has identified 11 *Phytophthora* taxa that are also known from overseas, and at least 10 previously undescribed *Phytophthora* species, as well as several unique Western Australian isolates now believed to be *Phytophthora* hybrids. Descriptions of eight of the new *Phytophthora* species discovered in Western Australian natural ecosystems were published, bringing the total published to nine.
- The 'green card' hygiene system has continued to be used in the South Coast Region to ensure all operations happening on DEC-managed lands are conducted using appropriate hygiene procedures to prevent accidental introduction or further spread of *Phytophthora* dieback.
- Facilities were upgraded in a number of national parks in the South Coast Region to improve dieback hygiene standards.
- Interpretation was conducted in the South Coast Region around the Cape Le Grand and Fitzgerald River national parks.
- Aerial application of phosphite continued in vegetation in the south-west of Western Australia to protect threatened flora and ecological communities, including the Montane heath and thicket threatened ecological communities in Stirling Range National Park.
- Seed was collected from a number of threatened flora populations under threat from *Phytophthora* dieback.

Fire management and invasive animal control on unallocated Crown land and unmanaged reserves

DEC continued its targeted fire preparedness works on 89 million hectares of non-metropolitan and non-townsite unallocated Crown land and unmanaged reserves through the installation and maintenance of firebreaks, vegetation modification in strategic buffers, and wind-driven open edge prescribed burning and large-scale block ignition using aircraft. A specific focus continued in the Kimberley, Pilbara and Goldfields regions.

Wild dog control and aerial baiting of feral donkeys and camels also continued in the Kimberley, Pilbara and Goldfields regions. Wildlife officers in DEC's Kimberley Region monitored the import and movement of species crossing the Western Australian–Northern Territory borders, including quarantining of birds and reptiles.



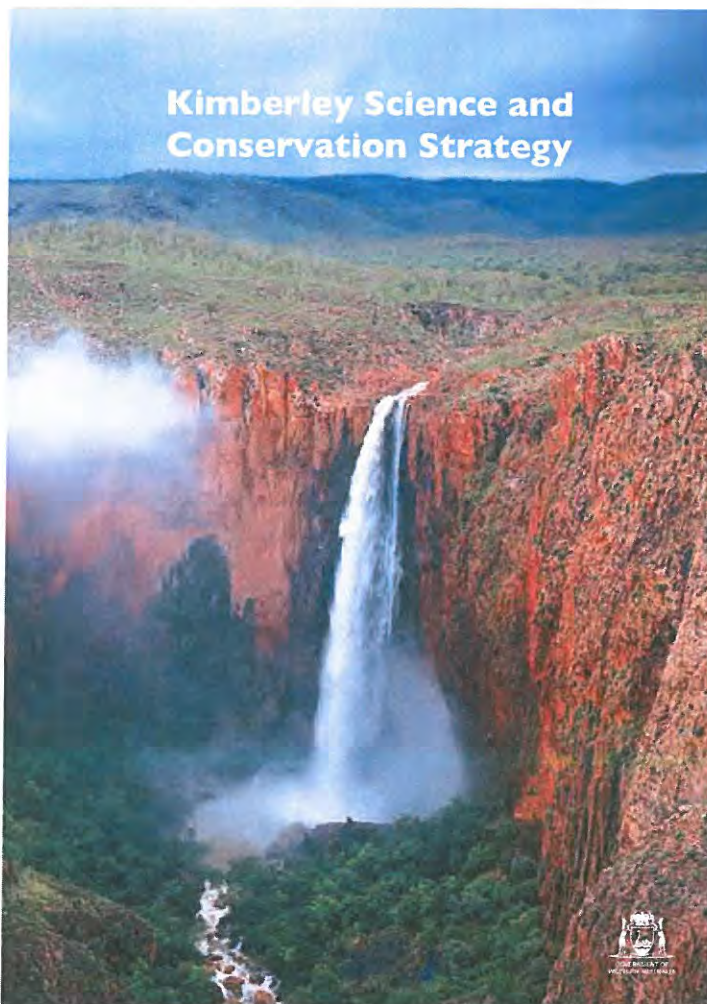
Kimberley Science and Conservation Strategy

The government's *Kimberley Science and Conservation Strategy* was released, with an implementation budget of \$63 million over five years and a commitment to ongoing funding for key initiatives. A centrepiece of the strategy will be the creation of the Kimberley Wilderness Parks, the state's biggest interconnected system of marine and terrestrial parks. This will include new marine parks at Camden Sound, the North Kimberley, Roebuck Bay and Eighty Mile Beach, and new reserves for Kimberley islands.

Other key outcomes include a new landscape approach to conservation to manage threats to biodiversity across property boundaries; training and employment for Aboriginal rangers, as well as Aboriginal involvement in land management; a major marine science program; and investment in nature-based tourism.

The strategy will be delivered through partnerships with traditional owners, landholders, industry, government and non-government organisations.

Under the strategy, the establishment of the four new marine parks is progressing, with Camden Sound Marine Park expected to be the first park gazetted in the coastal waters of the Kimberley bioregion. An indicative management plan for Camden Sound Marine Park was released in October 2010.

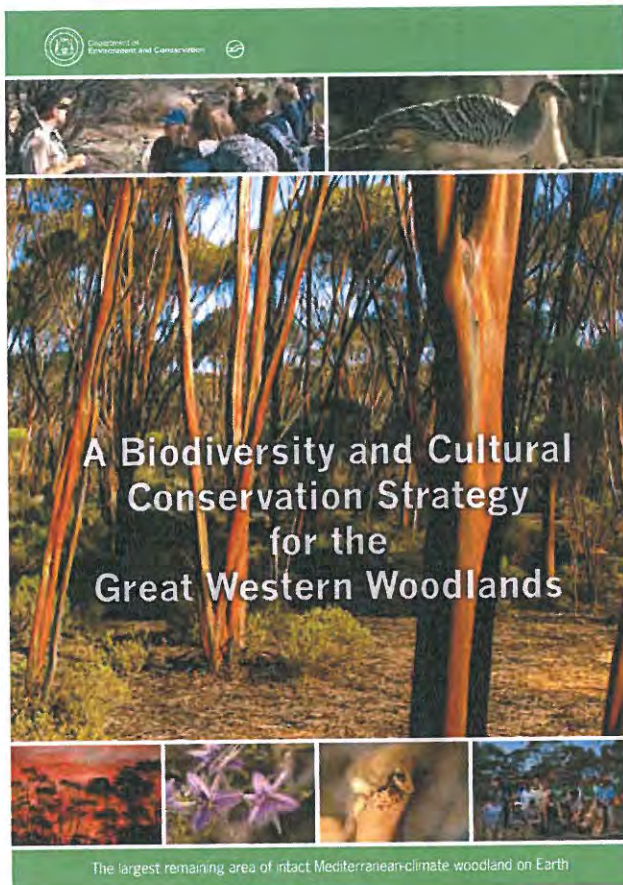


Miriwung-Gajerrong rangers (top) and cane toad management by DEC.

The *Kimberley Science and Conservation Strategy* and further information are available on the DEC website www.dec.wa.gov.au/kimberleystrategy.

Great Western Woodlands

DEC led the development of *A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands* which was released by the Minister for Environment in November 2010. Work commenced on implementation of the strategy using \$3.8 million allocated by the government to better manage and protect the area. A reference group met twice during the year to provide advice to DEC on the management of the Great Western Woodlands and the implementation of the strategy.



A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands and further information are available on the DEC website at www.dec.wa.gov.au under Management and Protection/Land/Major Initiatives.

Assessment of land resource use impacts on biodiversity conservation

As a component of its work in assisting with the assessment of land resource use impacts, the department, in collaboration with the Office of the Environmental Protection Authority, developed a new communication protocol for advice relating to assessment of major development proposals under Part IV of the *Environmental Protection Act 1986* (EP Act). The aim of this new protocol was to provide for greater clarity and consistency of process and definition of responsibilities for advice to the Environmental Protection Authority (EPA). Under the protocol, formal advice from the department is generally provided on a 'whole-of-department' basis, while the authority for provision of other types of advice may be delegated to specifically identified DEC managers.

During 2010–11, the department had a significant role in providing advice to proponents and decision-making authorities on a range of major development proposals affecting DEC-managed lands or proposed conservation areas. These proposals included Bemax's Happy Valley mineral sands project, Polaris Metal's Carina iron ore project, Latent Petroleum's Warro 3-D seismic survey, the Marandoo expansion project, the Roy Hill iron ore project railway, the Cloud Break iron ore mine expansion, the Browse LNG precinct and the Oakajee port and rail project. DEC had an ongoing role in reviewing amendments to management plans and tenure applications



required for the Gorgon gas development on Barrow Island Nature Reserve. Six reserves officers have been based on Barrow Island since August 2010, generally rostered so three are on the island at any time, to provide an operational and regulatory presence.

Advice was also provided on the assessment and ongoing management of a large number of development projects, including a number of new projects in the Kimberley, Midwest, Pilbara, Goldfields and South West regions. Major projects affecting significant conservation values included AngloGold Ashanti's Tropicana project, BHP Billiton's Yeelirrie uranium proposal, Chevron's Wheatstone LNG project, FMG's Solomon project, Cape Lambert Port stage B, the Jack Hills and Weld Range iron ore projects, and the Hope Downs 4 iron ore project. This involvement included contributing to the development and implementation of environmental conditions for several of the mining and port development proposals, and expansions of rail and other infrastructure by mining companies in the Pilbara. This aimed to protect the conservation and other values of DEC-managed lands and to conserve biodiversity while assisting in the timely assessment of proposed developments. DEC also assisted the Conservation Commission and the Minister for Environment by providing advice on mining tenement applications over reserved lands under Section 24 of the *Mining Act 1978*.

In the 2010–11 reporting year DEC, in collaboration with the Department of Mines and Petroleum, undertook a review of conditions imposed on new mineral exploration tenements affecting land managed under the CALM Act, which resulted in a simplification of the number of conditions applied and a more effective and efficient process for ensuring that mineral exploration is carried out on these lands in a manner sensitive to the affected land values. As part of this process, the affected tenement holders now prepare conservation management plans for proposed exploration activities in consultation with DEC, prior to formally submitting their applications to the Department of Mines and Petroleum. DEC then provides advice, at or before the time of application lodgment, on whether the conservation management plan prepared by the applicant suitably addresses the risk to conservation values.

DEC is required to report on its performance in providing conservation-related advice at key stages in the approvals process. Each year, the department responds to a large number of requests, but the performance reporting applies specifically to advice on significant development proposals that fall within the State Development portfolio (chiefly mining, petroleum and major industrial projects) that are subject to agreed time limits for advice. The summary of performance for 2010–11 reported in tables 8 and 9 therefore represents a relatively small proportion of DEC's overall advice workload.

Table 8: Performance in relation to provision of advice for tasks subject to formal time limits for the 2010–11 reporting year¹ & ²

Approval process	Stage	Number of advice tasks completed within period	Average number of days taken to provide advice	Number of advice tasks completed within time limit	Percentage of advice tasks completed within time limit	Average number of days within (-) or outside (+) time limit
EP Act Part IV – PER/ERMP	Advice/comment on environmental scoping document (time limit = 15 days)	3	7	3	100	-6
EP Act Part IV – PER/ERMP	Advice/comment on draft environmental review document (time limit = 20 days)	9	16	7	78	-3.5
EP Act Part IV – PER/ERMP	Advice during public review period (time limit = within review period)	13	30	11	85	-1
EP Act Part IV – ARI/EPS	Advice to EPA on project proposal (time limit = 20 days)	6	15	3	50	-1
EP Act Part IV	Post approval environmental management plan/ issue management plan (time limit = 15 days)	0	NA	NA	NA	NA
Mining Act	Advice on mining proposal (time limit = 20 days)	1	16	1	100	-4
Petroleum Act	Advice on petroleum development proposal (time limit = 20 days)	1	8	1	100	-7
Mean/total		Total 33	Mean NA	Total 26	Mean 79	Mean -4

¹Based on advice provided between 1 July 2010 and 30 June 2011.

²Table includes only tasks that were subject to time limits agreed by the state government in 2005 as a consequence of the implementation of the Keating Review. Tasks relating to exploration, planning, implementation or utility projects not falling under the State Development or Mining and Petroleum portfolios are not included. Overall, DEC responded, in respect of its CALM and WC Act responsibilities, to an estimated 500 requests for advice relating to State Development portfolio development projects and activities.

PER = Public Environmental Review, ERMP = Environmental Review and Management Program, ARI = Assessment on Referral Information, EPS = Environmental Protection Statement.



Table 9: Contributory factors in cases where formal time limits were not met for the 2010–11 reporting year¹

Reason	Number of cases	Percentage of cases
Non-availability of documentation	0	0
Non-availability of expert advice in available timeframe	2	29
Non-availability of staff/time resources	5	71
Administrative error	0	0
TOTAL	7	100

¹Based on advice requests received between 1 July 2010 and 30 June 2011.

Banded iron formation ranges strategic review

The strategic review of the conservation and resource values of the banded iron formation (BIF) of the Yilgarn Craton continues to provide guidance for government agencies and the EPA when undertaking assessments. The Karara Mining proposal, on the Karara/Blue Hills/Mungada Ridge BIF system, was approved in July 2009 under the approvals process from the strategic review. This proposal was approved subject to 995 hectares of the Mungada Ridge being reserved for conservation purposes and protected from any future development. As the implementation of the Karara project has now commenced, DEC has initiated the steps towards establishing the Mungada Ridge area as a class 'A' nature reserve.

The distribution of conservation-significant flora on the BIF ranges is continuing to be demonstrated through further survey effort of BIF and non-BIF habitat associated with development proposals. Further botanical surveys have confirmed that the Mount Manning cluster of BIF ranges has the highest biodiversity conservation significance and landscape complexity of all the BIF ranges within the Yilgarn Craton, in particular the Helena-Aurora Range. The Karara-Mungada-Blue Hills area has been found to support the most significant suite of values in the midwest portion of the Craton (north-east of Geraldton).


Currently, there are five development proposals in the approvals process located on BIF within the Yilgarn Craton, Cliffs Deception Hill and W4 proposals within the Mount Manning area, Cazaly Resources' Parker Range Project, and two in the midwest (the Weld Range and Jack Hills iron ore projects).

Provision of wetlands planning and development advice

The department provides technical advice when a proposal has been identified as potentially affecting a wetland of high conservation value. DEC processes these requests in accordance with land-use planning or environmental impact assessment guidelines and timelines. Requests for technical advice are received from both internal and external stakeholders. Table 10 provides the yearly statistics of requests for technical wetland advice received and processed.

Table 10: Technical wetland advice provided in 2010–11

Type of technical wetlands advice provided	Number received and processed
Wetland management plan review	7
Environmental impact assessment advice	9
Planning and development proposals	8
Drainage advice	10
Native Vegetation Conservation Branch advice	8
Strategic policy development advice	4
Other	7



Applications to clear native vegetation: assessment and activity

Under the EP Act, clearing of native vegetation is an offence unless it is done under the authority of a clearing permit or subject to an exemption.

Under section 20 of the EP Act, the chief executive officer (CEO) has delegated decision-making on clearing applications to the Department of Mines and Petroleum for either of the following activities:

- an activity under an authority granted, or a requirement imposed, under the *Mining Act 1978*, the *Petroleum and Geothermal Energy Resources Act 1967*, the *Petroleum Pipelines Act 1969* or the *Petroleum (Submerged Lands) Act 1982*; or
- an activity under a government agreement administered by the Department of State Development.

DEC's clearing permit system database recorded details of all clearing permit applications and decisions made during the year for both DEC and the Department of Mines and Petroleum, and forms the basis of the published records available on DEC's website.

DEC received 498 applications to clear native vegetation in 2010–11 and made 486 decisions. Under the delegation from DEC, the Department of Mines and Petroleum received 260 applications and made 271 decisions. Tables 11 and 12 provide details on clearing application decisions for 2010–11.



Table 11: Permit areas granted to clear under Section 51C of the EP Act

Purpose	Area (ha)
Mineral production	8,775
Petroleum production	8,243
Horticulture	2,365
State agreement	1,644
Pastoral diversification	1,079
Railway construction or maintenance	807
Geotechnical investigations	668
Timber harvesting	566
Infrastructure maintenance	463
Mineral exploration	361
Road construction or maintenance	347
Extractive industry	289
Cropping	256
Building or structure	231
Plantation	223
Water/gas pipeline installation	157
Industrial	126
Hazard reduction or fire control	84
Grazing and pasture	77
Stockpile	52
Dam construction or maintenance	37
Fence line maintenance	32
Recreation	17
Restoration	16
Miscellaneous	4
Petroleum exploration	3
Drainage	2
Landscaping	1
Firewood collection	1
Bore construction	1
Flora harvesting	<1
Total	26,927

Table 12: Areas refused a permit to clear under Section 51C of the EP Act

Purpose	Area (ha)
Grazing and pasture	1,298
Plantation	780
Cropping	432
Horticulture	59
Extractive industry	33
Industrial	8
Mineral production	6
Fence line maintenance	2
Total	2,618

The total number of clearing permit applications received was relatively consistent at around 600 per year in the first five years of the clearing provisions being contained in the EP Act. However, this number has steadily increased over the past two financial years, with 689 applications received in 2009–10 and 758 applications in 2010–11.

Initially, a target timeframe of 90 days was set for a decision to be made, consistent with the previous 90-day 'notification' process under the *Soil and Land Conservation Act 1945*. Target timeframes are now 80 per cent of applications to be decided within 60 calendar days of receipt, with a decision on the remaining 20 per cent within 90 calendar days.

DEC has progressively reduced its backlog in processing applications since 2007, and since December 2009 has had no applications older than 90 days.

DEC also met its timeframe target for processing clearing applications during 2010–11, with 82 per cent of decisions made in 60 calendar days and the remainder within 90 days. The ongoing timely delivery of decisions by DEC corresponds to the risk-based approach to assessments that is based on sensitivity of the environment, magnitude of impact/s and urgency of the clearing, DEC's ongoing monitoring of its performance and the continual improvements to processes. Quarterly reports are published of DEC's performance in achieving timeframes for all native vegetation clearing decisions.

Further information on approvals performance can be reviewed on the DEC website:
www.dec.wa.gov.au/content/view/full/5234/2196/.

Table 13 shows the number of decisions made by DEC for each quarter in 2010–11 and includes the percentage of applications that were decided within target timeframes. Statistics are also provided on how many decisions were subject to 'stop the clock' and the mean time (in days) that applications were in 'stop the clock'.

'Stop the clock' may only be used where there is legislative power or a requirement to do so, such as where the CEO requires further information from the applicant before making a final decision; where the CEO has been notified by the EPA that a proposal has been referred and that the CEO is constrained in making a decision on the application; or where the applicant has requested in writing that the process be put on hold.



Table 13: Timeframes for DEC decisions on clearing permit applications/decisions

	Jul-Sep 2010	Oct-Dec 2010	Jan-Mar 2011	Apr-Jun 2011
No. of applications carried over from previous periods	92	109	93	102
No. of applications received	146	110	125	115
No. of decisions that were subject to 'stop the clock'	50	50	44	37
Average time in 'stop the clock' for decisions in days	74	65	59	84
Average time for decision in days (excluding time in 'stop the clock')	44	41	41	42
No. of decisions on applications	129	127	115	112
No. of outstanding applications at end of quarter	109	93	102	105
Percentage of applications that were finalised within benchmark timeframe				
60 days (80% of applications finalised)	80	86	78	81
90 days (20% of applications finalised)	20	14	22	19
>90 days	0	0	0	0

Monitoring and compliance of native vegetation clearing

During 2010–11, DEC continued its program of using remote sensing imagery to identify vegetation change and, based on the analysis of this imagery and inspection of the land, determined whether unauthorised clearing was likely to have occurred. Clearing incidents identified as a result of the monitoring program, or complaints received, were investigated and progressed according to DEC's *Enforcement and Prosecution Policy*.

The program focused compliance resources on selected geographic areas. Native vegetation at 355 sites was analysed using imagery to assess compliance with the clearing legislation, which also included an analysis of 201 refused applications. Ground truthing of vegetation change identified from satellite imagery was undertaken in the northern sandplains, the Swan Coastal Plain and mallee bioregions.

In 2010–11, there were 178 new clearing complaints, 287 investigations were completed and 344 remain under investigation. Clearing incidents were given priority for investigation according to the environmental impact and the circumstances of the clearing.

DEC conducted analysis of the clearing permit system database to identify decisions involving offsets, revegetation and fencing. Inspections included audits against permit conditions to determine whether the required actions resulted in the prevention or mitigation of environmental harm. A total of 31 inspections of clearing permit decisions were conducted during 2010–11.

Vegetation conservation notices

Vegetation conservation notices may be given under section 70 of the EP Act if the CEO suspects, on reasonable grounds, that unlawful clearing is likely to take place, is taking place or has taken place on any land. In 2010–11, eight vegetation conservation notices were given, which required the person bound by the notice to undertake specified measures to repair or mitigate the environmental harm caused by clearing.



Native tree crops/revegetation

Development continues of new, broadscale flora industries based on native plants. With initial provenance trials on *Acacia saligna* now complete, the Revegetation Systems Unit will cease work on this species except for a coppice-cutting trial. This will allow the unit to focus on mallee development. A key aim of this work is to encourage broadscale revegetation to better protect important state assets, including biodiversity, from secondary salinisation in the agricultural zone.

DEC is the major contributor to the *Woody Crops* program of the Future Farm Industries CRC. This program aims to overcome the remaining impediments to commercial uptake of woody crops in the wheat growing regions of southern Australia.

The prototype mallee harvester being developed under a grant from the state's *Low Emissions Energy Development Fund* recently completed trials and delivered on key project milestones. Although the machine remains a prototype, it has reached a stage where all the key operational components are effective, and longer periods of continuous harvesting are being achieved. The machine will test its performance through harvesting mallees for CSIRO biomass yield trials in New South Wales, and then shift to Western Australia for further work.

Especially in low annual rainfall years, the intensity of competition from unharvested mallees with adjoining crops is causing concern among farmers. It has therefore become paramount to begin harvesting of at least the older trees. Various small-scale mallee biomass processing options are being examined for potential to purchase biomass and help fund this work. Some recent research shows that harvesting significantly increases the yield of adjoining cereal crops and pastures.

The first major milestone report was submitted for a project sponsored by the federal Department of Resources, Energy and Tourism, for which the major local partner is the Curtin Fuels and Energy Technology Institute. The inputs of DEC and other Future Farm Industries CRC partners to this project involve optimising quantity attributes, especially in relation to water and plant nutrients. These factors not only influence biomass production but, in the case of nutrients, also affect processing.

The biomass supply assessment project has invested in upgrading its financial models while potential major project developers await more definite indications of likely obligations for reduction in carbon emissions.

Economic analysis shows that woody crops such as mallee will not attract significant commercial development in the near future without the introduction of national policies and market mechanisms to favour carbon sequestration and renewable energy as part of a response to climate change. Despite the continuing slow movement in this area, the interest in mallee as a prospective farm crop and source of biomass for bioenergy remains.

The established mallee breeding and seed production program within DEC continued to breed mainly Western Australian species. Some 11.9 million seeds were sold during the year, mostly to carbon sequestration companies and electricity generators, and through regional NRM groups to support farmers involved in regional conservation programs.



Encouraging public understanding and support of biodiversity conservation and other DEC programs and activities

Southwest Australia Ecoregion Initiative

The department continued to be a member and co-chair (with WWF-Australia) of a consortium of government agencies, non-government organisations, and community representatives seeking to develop a biodiversity conservation strategy for Western Australia's south-west. The consortium (the Southwest Australia Ecoregion Initiative) continued to work with James Cook University, Gaia Resources and local scientists to use sound scientific principles to undertake the conservation planning process.

A draft strategic plan was prepared during the year under a *Caring for our Country* program grant, and presented to expert workshops to provide further refinement. A workshop was also held to develop the mechanisms for implementing the strategy at local levels. The final strategic plan and report on the planning process and outcome was prepared for the federal government.

The demonstration implementation project continued with extensive consultation, field workshops and implementation actions being undertaken. The demonstration project requires that conservation work is undertaken on 1,000 hectares of land, 250 hectares of bushland are protected under conservation covenants, and 40 land managers are engaged in conservation action through a conservation management network. This project is centring on the Shire of Chittering.

Public participation programs

Environmental Community Grants

The second round of funding under the Minister for Environment's four-year, \$6 million community grants program was distributed in 2010–11, with 129 grants awarded to community groups and individuals in July 2010. Applications for the third funding round were invited in February 2011.

Further information on the *Environmental Community Grants* program is available on the DEC website: www.dec.wa.gov.au/content/view/5135/2274/.

Healthy Wetland Habitats

Healthy Wetland Habitats is a voluntary program run by the department that provides technical and financial assistance to private land managers for the management of wetlands of high conservation value on the Swan Coastal Plain.

Management action planning and funding up to \$10,000 were offered to eligible landholders with high conservation value wetlands to assist them in managing their wetland habitats under a voluntary management agreement.

During the year, four management action plans and funding agreements were developed for properties in association with their owners. This represented a combined total wetland area of 344 hectares. A total of \$33,900 was awarded for conservation management works across these four voluntary management agreements.

A review of the program defined the future target area within the Swan Coastal Plain that reflects the program funding source.

Further information about *Healthy Wetland Habitats* is available on the DEC website: www.dec.wa.gov.au/hwh.



Roadside conservation

The Roadside Conservation Committee (RCC) is administered through DEC with funding support from Main Roads WA. The RCC met four times during the year and developed a strategic plan for 2010 to provide direction to the program over the next five years. The RCC sought to facilitate best practice management of remnant vegetation in transport corridors through awareness-raising, liaison and cooperation.

During the year the RCC:

- coordinated workshops on roadside vegetation values for the Shires of Toodyay, Northam, Quairading, Cunderdin, York, Brookton, Beverley, Wongan Ballidu and Kellerberrin. RCC staff also delivered training to DEC Native Vegetation Conservation Branch staff on effective decision making on applications to clear roadside vegetation.
- in conjunction with DEC's Geographic Information Services (GIS) section, provided roadside conservation value maps with accompanying reports to local governments. A complete hardware and software upgrade was developed for the RCC survey and mapping program as well as value adding to the data that are collected. Survey and mapping were completed for the shires of Capel, Merredin and Denmark. The results and maps for the shires of Narrogin, Plantagenet and Boddington were presented to the councils.
- worked with DEC's GIS section and DAFWA to make the roadside conservation value maps and reports available through the Landgate Shared Land Information Platform and GIS Viewer. The maps and reports have also been put on the DEC website. Additionally, RCC is working with the Western Australian Local Government Association (WALGA) to support an NRM-funded project to assist local governments in managing roadside corridors strategically.
- held community displays at the Dowerin Field Days and Wagin Woolarama to increase community awareness of roadside conservation and engage with stakeholders.
- undertook a review and promotion of the *Flora Roads* program which resulted in 10 new roads being recommended as flora roads.
- published articles in the Roadside Environment Committee (NSW) newsletters, WALGA's EcoNews newsletter, and the Conservation Council's 'The Greener Times' magazine; published the *Biodiversity Conservation and Fire in Road and Rail Reserves Management Guidelines*; updated the RCC pamphlet and handbook; and developed a series of posters for displays and events.

Further information about the RCC is available on the DEC website:

www.dec.wa.gov.au/content/view/5275/2199/.

Wetlands Coordinating Committee

DEC continued to chair and provide executive officer support to the state's Wetlands Coordinating Committee. The committee was actively involved in the implementation of the *Wetlands Conservation Policy for Western Australia* (1997) and finalised a review of the policy during the year for presentation to the Minister for Environment for endorsement.

The committee also continued to establish, undertake or endorse a range of activities and projects relating to the strategic coordination and implementation of state government conservation and management actions for wetlands in Western Australia. These included finalising a guideline for the determination of wetland buffer requirements; continuing work on a guide to managing and restoring wetlands; and endorsing a number of wetland mapping projects in the Midwest.

Urban Nature program

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



Working with more than 50 stakeholders from community groups, private landholders, local government, DEC, state agencies and universities, *Urban Nature* conducted over 150 on-ground activities to facilitate best-practice bushland management. Much of the work involved adaptive management and research trials, and liaison with land managers to implement the results of those trials across 15 high-priority sites. Work has included the initiation of a collaborative study by *Urban Nature* and the Centre of Excellence for Climate Change and Woodland and Forest Health to examine how the flora and fauna of a long-unburnt tuart woodland responds to fire, and to develop and implement adaptive post-fire management actions. Restoration and weed management plans have been developed for Ellenbrook Nature Reserve and to facilitate the recovery of native wild rose (*Diplolaena andrewsii*) across its range on public and private lands.

Urban Nature and the GIS section developed techniques for mapping weed distribution and cover in bushland and wetlands, which are published on the DEC website. The biennial weed management and natural area restoration four-day training course was delivered to professionals from DEC regions across the state as well as local government. The program covered theory and practical skills in the identification and regional prioritisation of invasive plants, techniques and standard procedures for mapping weeds, case studies in weed management and natural area restoration, and monitoring the regeneration of native plant communities following the removal of a serious weed. Training in global positioning system technologies and weed mapping for bush regeneration was also delivered to community members at three workshops.

Training and technical support for bushland management has been communicated through the delivery of 12 workshops and field days, 20 presentations, 11 newsletter articles, five reports and training workbooks, four conference abstracts and posters, and three scientific publications. Approximately 1,900 copies of the quarterly newsletter *Bushland News* were distributed to support community involvement in bushland conservation and management.

Further information about the *Urban Nature* program is available on the DEC website:
www.dec.wa.gov.au/content/category/45/879/2024.

Provision of private land biodiversity conservation support and advice

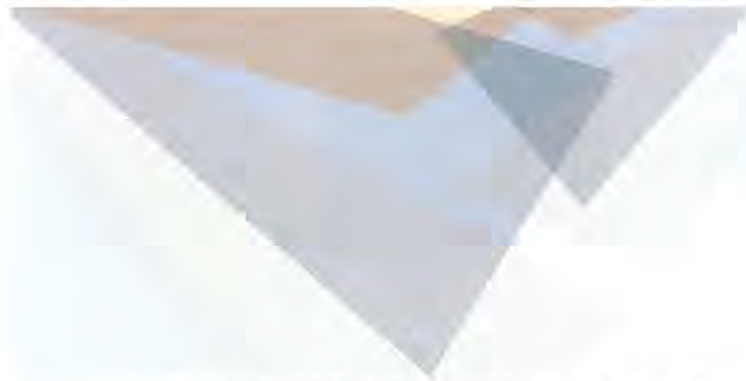
Land for Wildlife

During the year, 75 new properties were registered with *Land for Wildlife* (LFW). DEC staff visited 119 properties, of which 89 were new properties, totalling 36,896 hectares (including 4,784 hectares of dedicated wildlife habitat), and 30 that they formally revisited for stewardship matters. During these visits, staff recorded 108 occurrences of rare or threatened fauna, flora or ecological communities. In addition, *Acacia aprica* (a threatened flora species) was translocated onto a LFW property. Over the life of the LFW program, DEC staff have visited 1,771 properties and an area of 1,245,071 hectares, including 314,406 hectares of land where the primary management purpose is nature conservation. Twenty-three landholders resigned from LFW during the year due to property sales, leaving 1,898 properties registered.

The LFW scheme acts as a non-binding voluntary management agreement, and supported 33 funding applications by landholders. Support included provision of voluntary management agreements, GIS maps, project development and letters of support.

Four editions of *Western Wildlife* were produced, and LFW staff wrote 11 articles for print media, gave one radio interview, organised 16 displays at agricultural shows or similar, and gave 57 talks at workshops, seminars or to schools or other groups.

During 2010–11, all new LFW sites were added to DEC's spatial database which is available throughout the department, and outside the department on request. In addition, the entire LFW spatial database was checked and verified for accuracy.



Two staff worked in collaboration with the Carnaby's cockatoo recovery program to identify suitable habitat throughout the wheatbelt and to ascertain what management conservation assistance is required by landholders.

Further information about LFW is available on the DEC website:
www.dec.wa.gov.au/content/view/118/451/.

Nature Conservation Covenant Program

The *Nature Conservation Covenant* Program assisted private landowners with the conservation of bushland of high nature conservation value by placing a protective covenant on the land's title, and by providing management advice and assistance through incentives and a stewardship program. During the year, the program entered into covenants in perpetuity over 21 titles, and protected an additional 853 hectares of native vegetation. At 30 June 2011, covenants were cumulatively established over 156 titles and 12,027 hectares of land, including a number of threatened species and ecological communities. A further 59 covenants to protect another 10,608 hectares of native vegetation are in negotiation.

The covenant program received funding from *Caring for our Country* for a *Protected Areas on Private Lands* project. This project operated cooperatively with a similar project being undertaken by Wheatbelt NRM and WWF-Australia. The project focused on increasing the number of covenants in the poorly reserved Avon Wheatbelt bioregion, with specific focus on the Wongan Hills Ecoscape Area. Covenant negotiations have been completed with two landowners, and another seven covenants are nearing completion through this project. The project also reviewed existing DEC, National Trust of Australia WA and Soil and Land Conservation (DAFWA) covenants for their eligibility for inclusion in the national reserve system. The review found that while DEC and National Trust covenants are eligible for inclusion, DAFWA covenants are not.

Work has been finalised on stage 2 of the National Conservation Lands Database project, which was coordinated by the federal Department of Sustainability, Environment, Water, Population and Communities. The final products of stage 1 have been distributed to covenant agencies around Australia. These data are available only internally at the federal department and to data contributors.

Further information about the *Nature Conservation Covenant Program* is available on the DEC website:
www.dec.wa.gov.au/content/view/120/453/.

Animal ethics

Under the *Animal Welfare Act 2002*, the department operates as a scientific institution pursuant to corporate licences issued by the Department of Local Government. DEC is required to carry out all activities involving the use of vertebrate animals in accordance with the seventh edition of the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes*.

Applications and annual reports were assessed by the Animals Ethics Committee at six meetings during 2010–11. For the 2010 calendar year, 48 new projects were assessed, resulting in 155 projects being currently active. A total of 185 annual reports was received and assessed by the Animal Ethics Committee in 2010. There were no serious cases of non-compliance with the code during the year.

The Animal Ethics Committee maintained a register of projects in accordance with the conditions of its licence to use animals for scientific purposes. A comprehensive database of applications stores details of the project, staff affiliations and competencies.

In assessing applications, the Animal Ethics Committee ensures that activities that involve native fauna are undertaken to a consistent standard. Standard operating procedures are updated and reviewed as new techniques arise and/or old procedures are improved. As at 30 June 2011, 19 standard operating procedures were endorsed by the Animal Ethics Committee.



In response to a need for more staff to be confident and competent in handling situations where emergency euthanasia of animals might be required (for example, serious injury), four workshops on performing euthanasia of animals by injecting chemicals were held in 2010. The course was jointly developed by DEC and Murdoch University, and held at the university. The one-day workshops consisted of theory and a practical, culminating in a practical skills assessment. A total of 47 participants now has veterinary endorsement of their skills in euthanasing animals by injection. This endorsement may be used to apply for Department of Health poisons permits, and the knowledge and skills gained has better equipped personnel of Animal Ethics Committee-approved projects to deal with serious injury and disease in the field. There has been enough continuing interest in the workshop to warrant further workshops.

The Animal Ethics Committee's second external triennial review (ETR) was conducted in 2010 and completed in early 2011. A copy of this ETR has been provided to both the Director General and the Department of Local Government. The recommendations provided in the ETR have been considered by the Animal Ethics Committee and steps have been, or are being, taken to make the necessary changes to procedures and protocols.



REPORT ON OPERATIONS

Service 1: Nature Conservation

This service develops and implements programs for the conservation of biodiversity, including:

- management of threatened species and ecological communities
- sustainable use of commercially exploited species
- acquisition, conservation and protection of representative ecosystems for the national reserve system and network of marine protected areas
- promotion of public awareness, understanding and support for nature conservation.

The service is delivered through six key strategic directions:

1. Building biodiversity knowledge

The department develops and maintains a biological inventory of the state through strategic regional and area-based biological surveys, ecological and genetic research, taxonomic studies, and the maintenance of biological data management systems, including the maintenance of the state's flora collection.

2. Establishing a terrestrial and marine conservation reserve system

DEC provides expert advice and recommendations to the Minister for Environment, the Conservation Commission and the Marine Parks and Reserves Authority in developing and maintaining a conservation reserve system comprising national parks, nature reserves, conservation parks, miscellaneous conservation reserves, marine parks, marine nature reserves and marine management areas under the *Conservation and Land Management Act 1984* (CALM Act).

3. Effective management of the conservation reserve system

In consultation with stakeholders, including the Western Australian public, the department develops, implements and reviews management plans for conservation reserves, including such operational programs as weed control, introduced animal control and fire management for biodiversity.

4. Recovery of threatened species and ecological communities, and management of other significant species and ecosystems

DEC makes recommendations for changes to the lists of threatened flora and fauna under the state *Wildlife Conservation Act 1950* (WC Act) and the federal *Environment Protection and Biodiversity Conservation Act 1999*, maintains a state list of threatened ecological communities, and develops and implements recovery plans for threatened flora, fauna and ecological communities. The department coordinates responses to whale and dolphin strandings and other incidents of injury or harm to marine fauna, and manages and regulates commercial activities, including the issuing of flora and fauna licences and wildlife interaction licences, and enforces compliance under the WC Act. DEC also takes a lead role for the state in conserving WA wetlands, including through the Convention on Wetlands of International Importance (Ramsar Convention).

5. Conserving landscapes and seascapes: integrating off and on-reserve conservation and managing threatening processes

The department maintains the state's biodiversity through a range of strategies including:

- providing advice on, and implementing, state legislation and policy
- participating in national working groups developing national policies and procedures
- developing and implementing five-year nature conservation plans for guiding biodiversity management in each DEC region
- taking the lead in establishing and promoting a scientifically robust regional marine planning framework

- addressing the system-wide threat of salinity and other impacts of altered hydrology through the management of natural diversity recovery catchments
- implementing strategies to manage feral animals and environmental weeds
- working in partnership with stakeholders to research and implement management measures to contain and counteract the effects of *Phytophthora* disease
- carrying out targeted fire preparedness, and pest and weed control, on unallocated Crown land and unmanaged reserves
- undertaking regional conservation planning activities in the Kimberley and Great Western Woodlands
- implementing provisions of the *Environmental Protection Act 1986* through the processing of applications to clear native vegetation and providing advice on major development projects, including approving associated management plans.

6. Encouraging public understanding and support for biodiversity conservation and other DEC programs and activities

The department promotes public understanding and support through a number of functions, including:

- providing support for the Minister for Environment's *Environmental Community Grants* program, which distributes grant money to community groups and individuals to support local conservation projects
- supporting private landholders on the Swan Coastal Plain by providing technical and financial assistance to manage wetlands of high conservation value through the *Healthy Wetland Habitats* program
- facilitating best-practice management of remnant vegetation in transport corridors through awareness-raising, liaison and cooperation with stakeholders via the Roadside Conservation Committee
- providing technical advice and support to stakeholders and land managers through the *Urban Nature* program
- providing biodiversity conservation support and advice for private land through a range of programs, including *Land for Wildlife* and the *Nature Conservation Covenant* program.

Performance summary

	2011–12 Target \$'000	2011–12 Actual \$'000	Variation \$'000
Expense by service	145,365	125,942	(19,423)
Key Efficiency Indicator	2011–12 Target	2011–12 Actual	Variance
Average cost per hectare of managing wildlife habitat	\$5.25	\$4.45	(\$0.80)

Performance highlights

- The department continued to implement the *Kimberley Science and Conservation Strategy*, which was released in June 2011 with an implementation budget of \$63 million over five years and a commitment to ongoing funding for key initiatives. As part of the strategy, the Camden Sound Marine Park was created to conserve one of the world's biggest humpback whale nurseries and breeding areas, and the indicative management plan for the proposed Eighty Mile Beach Marine Park was released for public comment.



- A total of \$12 million over six years was allocated for a Kimberley marine research program to be led by the department and implemented through the Western Australian Marine Science Institution. A science plan has been developed that will focus research on key information for the management of Kimberley marine parks.
- A partnership agreement was entered into with the Australian Wildlife Conservancy in the Kimberley. The state will provide \$2.15 million over three years for conservation management of the Tableland pastoral lease and the Artesian Range/Charnley River area within the Charnley River pastoral lease, and for the *Ecofire* fire management project.
- On 12 June 2012, Ngari Capes Marine Park was gazetted. The state's 11th marine park extends from Geographe Bay near Busselton to Augusta, covering about 123,000 hectares of one of Australia's most diverse temperate marine environments. *Royalties for Regions* funding of \$8.56 million over four years was allocated to DEC and the Department of Fisheries to manage the new marine park.
- The *Southwest Australia Ecoregion Initiative*, a cooperative program between DEC and WWF-Australia, completed the *Southwest Australia Ecoregion Strategic Framework for Biodiversity Conservation* for the south-west of the state. The framework provides a regional-scale planning structure for targeting investment to achieve the most effective outcomes for biodiversity conservation and will be used to direct project investment.
- Implementation of *A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands* progressed with the support of a reference group and \$3.8 million allocated over three years by the government to better manage and protect the area.
- The department continued to implement a range of programs and strategies for biodiversity conservation across the state, including those in keeping with the national framework set out in *Australia's Strategy for the Conservation of Biodiversity 2010–2030*.
- The government allocated \$23.43 million to four major *Net Conservation Benefits* program projects from funds provided by the Gorgon Joint Venture partners following negotiations with the state government prior to the approval of the Gorgon Project. The funded projects run over five to seven years and are required to deliver long-term biodiversity conservation benefits to Western Australia in areas with similar values to Barrow Island.
- A total of \$3.75 million was allocated to a special biodiversity projects program for 37 projects focusing on invasive animal control, environmental weed control, threatened species and ecological communities' recovery, *Phytophthora* dieback management, biological survey and research, rangelands management and the *State Cane Toad Initiative*.
- Strategic terrestrial biological surveys continued, with an additional 150 sites surveyed on a further three greenstone ranges in the Yilgarn.
- The third round of funding under the Minister for Environment's four-year, \$6 million *Environmental Community Grants* program was distributed in 2011–12, with a record 164 grants awarded to community groups and individuals in July 2011. Applications opened for the fourth funding round in February 2012.
- *NatureMap*, one of DEC's web portals providing access to high-quality biodiversity data, increased its registrations by 30 per cent from 729 to 1,042, with the largest share coming from industry.
- The ecological character descriptions for Western Australia's 12 Ramsar-listed wetland systems, completed during 2010–11, were submitted for endorsement at state and federal level. Wetland mapping for a 100,000-hectare area from Cervantes to Coolimba in the Midwest was completed. Wetland location, boundary, type and values were identified and incorporated into the state wetlands database.
- The *Natural Diversity Recovery Catchment* Program continued at Buntine-Marchagee, Drummond, Lake Bryde, Lake Muir-Unicup, Lake Warden and Toolibin Lake, to slow degradation and recover high-value biodiversity assets at risk from altered hydrology. Improvements as a result of the gravity pipeline installed in the Lake Warden wetland complex have continued in 2011–12, with vegetation recovering in some areas and recent data suggesting that the range of waterbird species and numbers of waterbirds are returning to target levels.

- During 2011–12, a prototype mallee harvester was successfully developed and trialed. This was a significant breakthrough in a cooperative project that DEC has been involved in for many years. The project aimed to develop a new sustainable industry from mallee farming that would benefit biodiversity and salinity management. The development of the prototype harvester removes a major barrier to the development of the mallee industry, which has the potential to play an important role in biodiversity conservation through improved landscape-scale management of the south-west agricultural area. The final stages of this project received funds from the state government's Low Emissions Energy Development initiative.
- The entire Western Australian Herbarium collection was moved during the year to the new premises at DEC's Kensington site. This was an enormous undertaking that coincided with a complete upgrading of the recording system to new, 21st century standards.
- The number of plant specimens held at the Western Australian Herbarium increased by one per cent (7,033 specimens), bringing the total number of specimens held to 733,578.
- A total of 179 vascular plant names was added to the Western Australian Plant Census, representing a net increase of 51 in the number of taxa recognised as occurring in the state, and 61 new names were formally published. Western Australia's vascular flora (flowering plants, ferns, cycads and conifers) now comprises 13,481 species, subspecies and varieties (12,257 native and 1,224 introduced to the state).
- Seven species of flora were added to the WC Act list of specially protected (threatened) flora. Three species were deleted from the list, with two being retained in the Priority 4 list for monitoring purposes. Two species were regraded in threat ranking from endangered to critically endangered, and one species was regraded from endangered to vulnerable. One species was removed from the extant threatened flora species list and listed as presumed to be extinct. At 30 June 2012, there were 405 extant threatened flora species, 14 listed as presumed to be extinct, and 2,935 taxa on the department's priority flora list.
- A total of 24 species of fauna were added to the WC Act list of specially protected (threatened) fauna, with 22 assigned the threat ranking of vulnerable and two of critically endangered. One species was regraded in threat ranking from endangered to vulnerable. At 30 June 2012, there were 233 threatened fauna species (45 critically endangered, 39 endangered and 149 vulnerable), 18 listed as presumed to be extinct, 11 listed as otherwise specially protected, and 192 species on the department's priority fauna list.
- Under the *Threatened Fauna Ark: saving Western Australia's threatened fauna* project, funded by the 2009–10 WA state NRM program, 12 species—more than 350 individuals—were translocated to 17 locations to establish new populations and boost existing populations. The experience gained in carrying out these operations added to the understanding of captive husbandry and monitoring techniques as well as translocation processes and procedures. New partnerships and collaborations were developed between DEC and government and non-government organisations, and community groups.
- In March 2012, the department's new *Threatened and Priority Flora* database was launched, containing information on the populations of threatened and priority flora in the state. The new database has greater querying and reporting functions than its predecessor and includes a 'threats and management actions' section for each population. It also houses the official threatened and priority flora list detailing the conservation status of flora in Western Australia.
- A total of 512 populations, comprising 241 species of threatened and priority flora, were surveyed or monitored, and 34 new populations of threatened flora and 55 new populations of priority flora were located.
- Records for 278 new populations were added to the *Threatened and Priority Flora* database. There were 4,794 records of sightings, captures or evidence of threatened and priority fauna added to the *Threatened and Priority Fauna* database or the *Fauna Survey Returns* system. New occurrence information was added to the *Threatened Ecological and Priority Communities* database for six threatened ecological communities and 30 priority ecological communities (PECs), assisting in resolving the status of the PECs, and providing improved information for land-use planning.



- The department continued to monitor a major *Phytophthora* dieback project implemented by DEC and South Coast Natural Resource Management Inc in 2010–11 that eradicated a *Phytophthora* dieback infestation in Cape Arid National Park and successfully contained an infestation in Fitzgerald River National Park at a cost of about \$450,000.
- In the Albany District, a recovery project to protect nine critically endangered flora species threatened by grazing and dieback was implemented. Recovery actions included the management of grazing by rabbits, quokkas and western grey kangaroos, amelioration of the impact of *Phytophthora* dieback, and seed collection for the future establishment of new protected populations.
- A total of 116 new seed collections were banked at the Threatened Flora Seed Centre. Ninety-nine collections were from threatened flora and nine from priority listed flora. A further 68 collections were incorporated into the seed bank, the majority from the Swan Region. Seedlings of 14 species from 51 collections were provided for DEC translocation projects.
- New seed orchard sites were established for two critically endangered plant species, Stirling Range beard heath (*Leucopogon gnaphalioides*) and Fairall's honeysuckle (*Lambertia fairallii*), and a new translocation site was established for the large-flowered short-styled grevillea (*Grevillea brachystylis* subsp. *grandis*). Infill planting was undertaken at 12 previously established flora translocation sites. Monitoring and maintenance was undertaken of 37 established translocation sites of 26 taxa.
- Twenty-four interim recovery plans for flora and three updated interim recovery plans for threatened ecological communities were approved. Two new fauna recovery plans were approved, for the woylie (*Bettongia penicillata ogilbyi*) and the western spiny-tailed skink (*Egernia stokesii badia*).
- The *Land for Wildlife* scheme registered 81 new properties, bringing the total area of registered sites to 317,863 hectares.
- The voluntary *Nature Conservation Covenant Program* entered into covenants in perpetuity on 22 land titles, which protected an additional 3,653 hectares of native vegetation.
- In 2011–12, nine prosecutions under the WC Act, the CALM Act, and associated regulations were taken to court, with a further 24 matters pending. A further 552 infringement notices and 435 caution notices were issued.

Native vegetation clearing permits

DEC's clearing permit system database records details of all clearing permit applications and decisions made for both DEC and the Department of Mines and Petroleum (DMP), and forms the basis of the published records available on DEC's website.

DEC received 544 applications to clear native vegetation in 2011–12, and made 492 decisions. Under delegation from DEC, DMP received 289 applications and made 296 decisions (some carried over from previous reporting periods).

During the year, 18,413 hectares were approved to be cleared, and 39 hectares were refused.

Seventy five per cent of decisions on applications to clear native vegetation were made within 60 calendar days, a further 23 per cent within 90 days and two per cent of decisions took longer than 90 days.

Flora and fauna licences

In 2011–12, DEC issued 8,920 licences under the WC Act to take, collect, keep and breed, deal in, trap or export native fauna; and 1,958 licences to collect native flora. A further 462 licences were issued to scare, destroy, or trap and relocate nuisance wildlife.

