

# 2010-2011



## 2010-2011 Yearbook

Department of Environment and Conservation



Department of  
**Environment and Conservation**





# Acknowledgments

This yearbook was prepared by the Corporate Communications Branch of the Department of Environment and Conservation.

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## Foreword

The second DEC Yearbook has grown in size and scope from the first, recognising the importance of documenting the department's achievements at all levels. 'Big-ticket' announcements such as the historic release of the Kimberley Science and Conservation Strategy and the inscription of Ningaloo on the World Heritage List are important, but tend to distract from the day-to-day 'to-do' lists that put government policy into practice.

The diversity of activity within DEC is, put simply, quite extraordinary. In Environmental Regulation, for example, steady gains have been made in improving processing times for major resource project licence applications, with the department meeting its 60-working-day target for all such applications in 2010–11, and achieving an average of 32 working days for 20 applications, compared to the preceding year's average of 42 working days for 16 applications. Meanwhile, a small army of volunteers has been engaged in the Herculean task of moving hundreds of thousands of Western Australian Herbarium specimens to the new state-of-the-art facilities at the Western Australian Conservation Science Centre.

Policy officers continue to work on finding ways to address the impact of climate change in Western Australia. Planning professionals consult with the public and other organisations and produce draft and final management plans for conservation lands and waters. Any day of the week, wildlife officers are dealing with hitch-hiker cane toads and rogue crocodiles, scientists are in the field describing new species, and the pollution response unit is always at the ready to don their hazardous materials gear to deal with chemical spills.

Across the state, DEC staff are working on recovery plans for threatened species and communities, but they are also grading roads, fixing roofs, erecting signs, greeting the public and making campers comfortable.

I am pleased to present the 2010–11 DEC Yearbook for the public record, and take this opportunity to thank the many DEC staff and volunteers who continue to strive for the health and sustainability of Western Australia's environment.

A handwritten signature in black ink that reads "Keiran McNamara". The signature is written in a cursive, flowing style.

Keiran McNamara  
Director General



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## PART ONE: OVERVIEW



Above: Eucalypt forest at sunset.

Below: Golden-backed tree rat (*Mesembriomys macrurus*). Photo – Norm McKenzie/DEC

Below right: Prescribed burning operations. Photo – Ed Hatherley/DEC





Northern quoll (*Dasyurus hallucatus*) and Weigel's toad (*Notaden weigeli*). Photos – Lesley Gibson/DEC

## Key events and issues 2010–11

### Kimberley strategy unveiled

In a historic announcement, the state government's *Kimberley Science and Conservation Strategy* was released by Premier Colin Barnett and Environment Minister Bill Marmion in June 2011.

The announcement included a pledge of \$63 million over five years to implement the strategy, making it one of the most significant conservation initiatives in Western Australian history.

Mr Barnett said the strategy acknowledged that the Kimberley was a spectacular place, renowned for natural and cultural significance as well as its raw beauty.

"It holds a special place for many people, locally, in Western Australia, Australia and across the world," the Premier said.

He said the strategy recognised the Kimberley's significance, the challenges facing the region and its economic importance, and had set a path to conserve its important natural and cultural values.

"This major investment in conserving the Kimberley will provide opportunities for Aboriginal involvement and employment in land management, and will promote nature- and culture-based tourism," he said.

The strategy has been founded on major themes raised through an extensive community consultation process led by former Senator the Hon Chris Ellison, and is being delivered through partnerships with traditional owners, landholders, industry, government and non-government organisations.

A centrepiece of the *Kimberley Science and Conservation Strategy* is the Kimberley Wilderness Parks, announced in October 2010. These parks will include the state's biggest interconnected system of marine and terrestrial parks.

Four new Kimberley marine parks are proposed at Camden Sound, the North Kimberley, Roebuck Bay and Eighty Mile Beach. These parks will protect 48 per cent of Kimberley coastal waters, and almost treble the area of marine parks and reserves in Western Australia, from approximately 1.5 million hectares to 4.1 million hectares. New *Kimberley Science and Conservation Strategy* initiatives include:

- a \$14 million Kimberley marine science program to increase knowledge of the region's unique marine habitats and wildlife
- investment of a further \$7.7 million in landscape-scale fire, feral animal and weed control partnerships. This will support voluntary partnerships underpinning the conservation reserve corridor linking the Prince Regent and Drysdale River national parks, the establishment of island conservation reserves to protect the most significant island refuges along the Kimberley coast, and other new conservation partnerships
- a \$1.2 million investment in partnerships with the Australian Wildlife Conservancy to deliver conservation projects in collaboration with traditional owners, including Aboriginal jobs and training
- a major boost to nature- and culture-based tourism with new funding of \$7 million for upgrades to visitor facilities at popular sites; the promotion of tourism corridors including four-wheel-drive trails; promotion of the aerial highway to link major attractions by air; and assistance for Aboriginal communities to develop opportunities in tourism
- allocation of \$1.8 million to return barramundi to Lake Kununurra through a restocking program, and to establish a marine education program for recreational fishers and charter operators
- a \$200,000 online science portal to make information on the region more accessible
- a \$3 million geochemical and geophysical survey program to improve knowledge of the region's geology, and inform and complement land-use planning, science and conservation.



Right: Unprecedented: Premier Colin Barnett unveiled the *Kimberley Science and Conservation Strategy* in June 2011.  
Background: Mudflats, west of Wyndham. Photo – Ed Hatherley/DEC

Environment Minister Bill Marmion said the state government had met the challenge of conserving the Kimberley for generations to come.

Mr Marmion said the *Kimberley Science and Conservation Strategy* had a 'connectivity conservation' approach, with threats such as fire, feral animals and weeds managed cooperatively across property boundaries to increase the resilience of ecosystems across the whole landscape.

"I'm pleased to report that seasonal fire management, feral animal and weed control projects have already commenced on the ground with the increased investment under the strategy," Mr Marmion said.

"It is our strong intention that these programs be carried out in partnership with traditional owners, Aboriginal rangers and pastoralists, to maximise conservation outcomes across different land tenures.

"The resources available for this landscape conservation initiative have been increased to a total of \$21.5 million over five years, with ongoing funding of \$5.5 million per year.

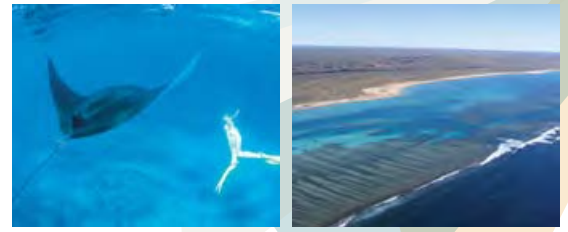
"Substantial progress has also been made in implementing some key initiatives, including the creation of Prince Regent National Park—Western Australia's 99th national park. This new class 'A' national park provides the highest level protection to this internationally recognised area, home to more than half of the mammal and bird species found in the whole Kimberley region and more than 500 species of plant.

"Site improvements have also commenced at Geikie Gorge and Tunnel Creek national parks, with support from the Bunuba people, to upgrade visitor facilities at these popular attractions.

"Works to protect the Mermaid Boab Tree, through the construction of a boardwalk, have already been completed with assistance from the Unguu rangers.

"The involvement and employment of Aboriginal people in conservation and land management is central to the strategy. The state government has submitted legislation to Parliament to allow for joint management of land between the Department of Environment and Conservation and other parties, including traditional owners."

The full *Kimberley Science and Conservation Strategy* is available at [www.dec.wa.gov.au/kimberleystrategy](http://www.dec.wa.gov.au/kimberleystrategy).



## Ningaloo joins World Heritage List

The Ningaloo Coast was given the highest level of international recognition, with its inscription on the World Heritage List for its natural beauty and biological diversity.

The World Heritage Committee endorsed the nomination at its meeting in Paris on 24 June 2011.

The Ningaloo Coast had been nominated for World Heritage listing by the federal government with the support of the state government.

The listing covers an area of 604,500 hectares and includes Ningaloo Marine Park and Cape Range National Park, as well as the Learmonth Air Weapons Range, Bundegi and Jurabi coastal parks, the Muiron Islands and Muiron Islands Marine Management Area.

The World Heritage listing of the Ningaloo Coast recognises the striking natural landscapes of Cape Range and Ningaloo Reef and the high biological diversity of the reef, including one of the world's largest aggregations of whale sharks (*Rhincodon typus*), as well as marine mammals, turtles and manta rays and many rare and diverse plants and animals found in the area.

Ningaloo Reef is widely acknowledged as one of the most beautiful and accessible coral reefs in the world, ranking seventh on the world's list of coral reef biodiversity 'hot spots' and second in terms of the number of species found within a limited range.

Cape Range peninsula emerged from the sea over a period of 26 million years and is essentially built from the skeletons of ancient marine creatures. Today, the Ningaloo Coast presents visitors with the opportunity to encounter whale sharks, the world's largest fish, together with internationally significant populations of distinctive marine life.

Ningaloo is one of the most accessible reefs in the world.





Cape Range, the hinterland bordering the Ningaloo Coast, features spectacular rocky gorges and abundant wildlife.

World Heritage listing also recognises the comprehensive management arrangements in place for the area, based on a network of marine and terrestrial conservation reserves.

Environment Minister Bill Marmion said World Heritage listing is the highest global recognition of a site's importance. The listing presents an opportunity for the community and governments to work together, to ensure the area is protected and the benefits of sustainable nature-based tourism flow to the community.

"The listing of the Ningaloo Coast means the area ranks alongside sites such as the Great Barrier Reef, the Grand Canyon, Egypt's pyramids, Yellowstone National Park, Stonehenge and Tanzania's Serengeti National Park," Mr Marmion said.

Ningaloo Marine Park and Cape Range National Park attract more than 250,000 visits a year, with visitors injecting about \$141 million into the Gascoyne region's economy, according to the Sustainable Tourism Cooperative Research Centre.

Shark Bay World Heritage area, Purnululu National Park and Fremantle Prison are the only other Western Australian sites which are World Heritage listed.





With their rich russet colour and glossy texture, the distinctive stems of gimlet trees (*Eucalyptus salubris*) are a striking example of the character of the Great Western Woodlands.

## Great Western Woodlands strategy released

A *Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands* was released by then Environment Minister Donna Faragher in Kalgoorlie in November 2010. The area is a region of great biological richness in the state's south-east.

The Department of Environment and Conservation's (DEC's) then Project Coordinator for the Great Western Woodlands Ian Herford said the strategy had been developed to ensure the long-term conservation of the area's unique natural and cultural values, establishing a vision for the region and principles which will guide its future management.

"The Great Western Woodlands extends across 16 million hectares and is a globally unique example of extensive, healthy woodland ecosystems," Ian said.

The region contains some 3,000 species of flowering plant—about one-fifth of the nation's known flora—as well as a diverse range of mammals, reptiles, frogs and birds.

Its human history dates back at least 22,000 years and it has great cultural significance to Aboriginal people. The area is also steeped in European history, with pastoralism having been carried out since the 1860s and mining since the gold rush days of the 1890s.

Ian said the document— *A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands*—focused on improving coordination and management of the Great Western Woodlands for the next 10 years.

"It marks the beginning of a new era for conserving the region's natural and cultural values as well as ensuring sustainable development of resources, tourism and other industries, including pastoralism," he said.

The strategy's key priorities include creating greater public awareness of the area, creating voluntary partnerships to coordinate on-ground activities across the many land tenures of the region, implementing an integrated fire management program, and establishing a Great Western Woodlands Reference Group to provide advice on management and implementation of the strategy.



Other key priorities include joint management of conservation reserves, creating training and employment opportunities for local Aboriginal people, better control of weeds and pest animals, and research to increase the knowledge base to guide management and use of the woodlands and their resources.

DEC has been allocated \$3.8 million across the next three years for the development and initial implementation of the strategy, with \$3 million for on-ground operations through the department's nature conservation program and \$800,000 on capital works.

For more information about the strategy, visit DEC's website [www.dec.wa.gov.au/content/view/6115/2391](http://www.dec.wa.gov.au/content/view/6115/2391).

A salmon gum woodland (below) and eucalypt crown (above) in the Great Western Woodlands.



## Other organisational highlights

### New technology tracks entangled whale

Satellite technology was used for the first time in Australian waters to follow an entangled whale in late May 2011.

DEC's marine mammal rescue team tracked the 11-metre humpback whale (*Megaptera novaeangliae*), first seen near Rottneest Island on Tuesday 17 May. It was tracked for more than five days across a distance of 718 kilometres.

When spotted, the whale had material crossing its back and around both pectoral fins, and several metres of rope trailed behind its tail.

DEC wildlife officers attached a tag to craypot lines trailing from the animal.

Technical expertise was provided throughout the rescue attempt by Bob Bowman in Maine, USA, a long-time mentor to DEC staff on entanglement issues.

DEC Supervising Wildlife Officer Doug Coughran said that without the satellite technology, DEC staff would have relied on guesswork and sightings of the whale, which would have severely reduced any chances of locating the animal and assisting its disentanglement.

"Initially it was not safe to attempt disentanglement because of an electrical storm and rough conditions. We waited for favourable weather and for the satellite indication that the whale was in shallow waters before attempting to approach the animal," he said.

The whale gradually moved north-east towards the Abrolhos Islands, where DEC mounted a rescue operation from Geraldton, supported by the Department of Fisheries.

Doug said the rescue team was attempting to locate the whale off the coast of Geraldton, when the satellite data began to suggest the whale was no longer attached to the tag.

"The satellite data began to show that the tag was stationary and floating above the surface, and when we located the tag it was attached to about 50 metres of rope and there was no whale in sight," he said.

"This is the best possible outcome, because we were not placed in a risky situation nor caused distress to the animal.



Satellite images of the humpback whale tracked for 387.69 nautical miles (718 kilometres) from Rottneest Island to Geraldton.

"It is likely the satellite tag, which weighed about 10 kilograms, caused the rope to pull against the whale and this would have assisted in dislodging the ropes.

"This technology is used in the USA, where the satellite tags have assisted in disentanglement of 30 per cent of satellite-tagged whales, so we were hoping this would be the case here.

"This technology has taught us a lot about the behaviour of entangled whales and provided us with the information we needed to plan a strategy with the appropriate risk management for the team."

People who see an entangled or beached whale should keep a safe distance from the animal and contact DEC's Wildcare Helpline on 9474 9055.



## DEC future leaders show the way

DEC's annual Graduation and Awards Ceremony was held in May 2011 at the Western Australian Conservation Science Centre, with Environment Minister Bill Marmion and Director General Keiran McNamara on hand to congratulate the deserving and committed recipients.

The ceremony marked the achievements of participants in the department's *Graduate Recruit Program*, *Mentored Aboriginal Training and Employment Scheme (MATES)*, *School-based Traineeship Program*, *Regulatory Training Program*, *Pathways Program*, *Scholarships Program* and, for the first time, *Fire Management Services*.

Mr Marmion said the future management of the state's natural environment had been strengthened following the graduation of 12 people from DEC's *Graduate Recruit Program*.

"It was extremely encouraging to see so many young West Australians expressing an interest in the management of our precious environment," he said.

"The *Graduate Recruit Program* is a wonderful initiative that seeks to develop the skills of people working in the areas of environmental management and conservation as well as developing future leaders within DEC.

"This year also marked the graduation of the first participants in DEC's specialist firefighting training for employees who were engaged in prescribed burning and fire suppression activities.

"This qualification recognises the skills and knowledge of firefighting personnel working predominantly as crew members across the state."

**Graduate Recruit Program**—the majority of graduating recruits were appointed into DEC professional entry level positions throughout the state. All graduate recruits were invited to attend 10 weeks of training including 11 core courses during the training program.

This was the final group of graduates completing the current program. In 2012, a new *Graduate Development Program* will be underway.

This year's graduates were Tina Bowers, Robert Campbell, Wendy Chow, Kasey Darts, Nicholas Detchon, Jessica Donaldson, Christine Fleay, Tegan Gourlay, Bree Phillips, Michael Raykos, Samara Rogers and Lauren Strumpher.

Two awards are presented to *Graduate Recruit Program* graduates—the *Keynes Memorial Award* which went to State Salinity Strategy Project Officer Wendy Chow, and the *Director General's Merit Award* which was awarded to Flora Conservation Officer Bree Phillips.

**MATES**—MATES is an important part of DEC's commitment to increasing the number of Aboriginal employees in the department through a range of strategies including a traineeship program.

Eleven employees graduated with Certificates II, III and IV in Conservation and Land Management in 2011, and were recognised at the ceremony. They were Douglas Gerrard, Jeremiah Hester, Vincent Kennedy, Leslie Moore, Gordon Reid, Chris Retsas, Simon Harrington, Dorothy Wallam, Ryan Bellotti, Michael O'Dene and Louise O'Reilly.

Louise O'Reilly received the *Aboriginal Trainee of the Year Award*. Community Programs Manager from the Fremantle Football Club Wade Spilcker presented the award, which recognised Louise's outstanding work as a trainee in the Goldfields Region.



DEC Director General Keiran McNamara (left) and Environment Minister Bill Marmion (centre), pictured with MATES trainees and representatives from the Miriuwung-Gajerrong Park Council and the Reserve Committee, at the DEC Graduation and Awards Ceremony.

The *Aboriginal Trainee Supervisor of the Year* is awarded to the supervisor within the MATES program who has demonstrated the highest level of support and commitment to the development of trainees under their supervision. The recipient of the *Aboriginal Trainee Supervisor of the Year* was Parks and Visitor Services Operations Officer Nick Evans who supervises Simon Harrington and Dorothy Wallam.


'Kwabalitch' is a Nyoongar word that means 'excellent' or 'good'. The *Kwabalitch Award* has been established to recognise a MATES trainee with dedication, perseverance and a commitment to personal and professional development. Leslie Moore was chosen as the recipient of the *Kwabalitch Award* for his love for country and the dedication he shows DEC, his co-workers and his fellow MATES.

**School-based traineeships**—school-based traineeships are an initiative to promote the department to a younger demographic and provide an employment pathway for school students. The traineeship is undertaken during Years 11 and 12, with the trainee working two days per week.

The 2011 graduates, who have completed Certificate II in Conservation and Land Management, were Mitchell Bennett and Cohen Smith.

**Regulatory Training Program**—the *Regulatory Training Program* provides a competency-based training framework for environmental enforcement and investigation officers. These qualifications are the best practice standard for environmental regulators and other staff involved in regulatory activities.

Graduates in 2011 were Maxine Birkin, Cliff Bliss, Cameron Craigie, John Hall, Kevin Hughes, Jason Nelson, Richard Petty, Andrew Richardson, Darren Winterbine, Luke Bentley, Alex Bite, Alex Bowlay, Steve Campbell, Allan Madgwick, Kate McConigley, Cameron Oxford and Mathew Swan.



**Fire Management Services**—DEC provides specialist firefighting training to employees who are engaged in prescribed burning and fire suppression activities. This work is critical to DEC's land management objectives and recognises the skills and knowledge of firefighting personnel working predominantly as crew members across the state.

Graduates for 2011 were Wayne Aggiss, Kevin Barnsby, Lloyd Bentink, Ross Bernardin, Matthew Corlett, Paul Dunstan, Trevor Dye, Jason Fletcher, Julian Harrison, David Hulcup, Alan Johnson, George Laws, Ernest Love, Shaun McHenry, Thomas Powell, Michael Raykos, Alan Rhodes, Wayne Rhodes, Terrance Roberts, David Rule, Steve Rule, Michael Sawyer, Stephen Tate, Shane Tyler and Timothy Wellstead.

**Pathways Program**—DEC has a proud and strong culture of encouraging its staff on a path of continuous learning. The program aims to recognise the skills and knowledge of conservation employees, and expand their professional experience and expertise.

*Pathways Program* graduates in 2011 were Zsi Cockman and Michael Rose.

**Scholarships**—each year, the department awards a number of scholarships to encourage DEC staff to expand their skills and qualifications through higher education. This year the *Science Scholarship*, in memory of Dr George Malajczuk, was awarded to Melissa Cundy and Sean Walsh.

The *Leadership Scholarship*, in memory of Seamus Mulholland, was received by Winston Kay, David Rawet and Tammie Reid, while the *Women's Scholarship*, in honour of June Craig, was awarded to Teagan Johnston and Joanne O'Connor.

The Director General's *Career Development and Study Assistance Scholarship* provides support for undergraduate and postgraduate study, and was received by Ben Ansell, Belinda Catcheside, Amanda Fairs, Lauren Fox, Craig Jaques, Cherie Kemp, Jelena May, Mark Neilson, Lucinda Peters and Gail Ritchie.



DEC Principal Fire Operations Officer and Australian Fire Service Medal recipient Terry Maher (right) is congratulated by Environment Minister Bill Marmion.

## Firefighter recognised in Australia Day honours

DEC Principal Fire Operations Officer Terry Maher was awarded the *Australian Fire Service Medal* on 26 January 2011, in recognition of more than four decades of firefighting service in Western Australia.

The *Australian Fire Service Medal* recognises distinguished service by members of Australian fire services.

Humble in his acceptance of the award, Terry said a lot of the credit was due to the support of his colleagues.

"I believe that I have been fortunate enough to spend my whole career working with very articulate and professional land managers," Terry said.

"The support that I have received to date in my career is outstanding.

"I have also enjoyed my involvement in development, training and work with volunteer bushfire brigades and staff.

"Similarly, I have been involved in aviation since the early 1970s and again enjoyed the people that I have worked with."

The *Australian Fire Service Medal* is awarded by the Governor General on the recommendation of the responsible federal, state and territory ministers.

Fire Management Services Branch Manager Murray Carter said he was not surprised that Terry was bestowed the honour during the Australia Day announcement.

"Terry's recognition was well deserved after 43 years of bushfire management service with the Forests Department, Department of Conservation and Land Management and DEC, and I hope there are a few more chapters to be written yet," he said.

"Terry is nationally recognised as an operational expert in fire and has been involved in several international deployments reflecting this status.

"As Principal Fire Operations Officer, Terry currently fills a critical role in the management and coordination of DEC's highly regarded fire resources."

Terry's first experience fighting fire came at the age of 16 alongside forestry crews in his home town of Pemberton.

Since then, Terry has worked in fire operations throughout the south-west until taking on his current statewide role in 1993.

Terry's expertise has also taken him overseas—he was deployed to assess how Australia could assist with the bushfires in Greece, and led the first team of Australian firefighters to work in North America.

On 28 February 2011, Terry notched up a total of 44 years of firefighting service.



Green Skills—Regional Program 1989 to 2010 took out the top prize at the WA *Environment Awards*. Pictured here are organisation representatives Louise Duxbury (left) and Dorothy Redreau (centre) with then Environment Minister Donna Faragher, who presented the award.

## Environment champions celebrated

Those leading the way in environmental initiatives in Western Australia were celebrated at the 2010 *WA Environment Awards* in November.

An awards presentation dinner was held at the Hyatt Regency Hotel, where the overall *Environment Award* was taken out by Green Skills—Regional Program 1989 to 2010.

This not-for-profit organisation operates a diverse range of environmental sustainability programs, employment programs and environmental skills training in metropolitan and regional areas, from its Murdoch, Albany and Denmark offices.

Green Skills has four social enterprises—Ecojobs, Green Skills Projects, Green Skills Training and Centre for Sustainable Living—and is a leader in innovative environmental projects, generating community awareness on environmental issues, encouraging community involvement in on-ground activities, and generating environmental career opportunities.

The overall Highly Commended prize went to Woolworths—*Zero Food Waste by 2015*. This project grew from the company's objective of diverting all food waste from landfill for beneficial uses by 2015. To realise this ambitious target, Woolworths works with its suppliers, employees, customers, the national charity Foodbank, local charities, farmers, zoos, and local and national governments.

The winners of the 2010 *WA Environment Awards* were:

- **Small Business Leading by Example Category**—Australian Native Nursery
- **Government Leading by Example Category**—Department of Health—Fiona Stanley Hospital Project
- **Biodiversity Conservation Category**—Care for Hedland Environmental Association—Hedland Community Flatback Turtle Monitoring Program
- **Bush, Land and Waterways Category**—Helena River Catchment Group—Helena River Rehabilitation Project
- **Resource and Waste Management Category**—South East Regional Energy Group—Switched on Business and Industry
- **Community Energy Efficiency Category**—Western Australian Council of Social Services—Climate Change Readiness for Community Services
- **Rivers, Estuaries and Wetlands Category**—South Coast Natural Resource Management—Saving Lake Warden and Lake Gore
- **Environmental Education and Communication**—Australian Association for Environmental Education WA—Engaging the Community in Every Sense
- **Corporate Business Leading by Example Category**—Woolworths Limited—*Zero Food Waste by 2015*
- **Community Achievement**—Regional Category—Green Skills—Regional Program 1989 to 2010
- **Community Achievement**—Metropolitan Category—Canning River Regional Park Volunteers Inc—20 Years of work in the Canning River Regional Park.

The 2010 *WA Environment Awards* were sponsored by the Waste Authority, Office of Energy, Western Power, Swan River Trust, Publishers National Environment Bureau, Packaging Stewardship Forum, *Royalties for Regions*, Rheem and Whiteman Park.





Oblong turtles (*Chelodina oblonga*) have natural coping mechanisms for extreme conditions.

## Record public concern for heat-stricken turtles

In the brutal heat of the 2010–11 summer, DEC received numerous calls from Perth residents reporting seeing sick turtles in and around dried-out lakes.

Wildlife Officer Matthew Swan said the oblong turtle was a common native species in the metropolitan area, and the extreme weather of the Perth summer had had an impact on them.

“The high temperatures and lack of rainfall over the past year have caused many lakes to dry up, but fortunately most oblong turtles are quite hardy and able to adapt to conditions by either burying themselves or searching for nearby wetlands,” he said.

“The ability to go into a sleep-like state to survive during long hot summers when water disappears is known as aestivation, and this involves burying themselves in mud or under leaves or logs to conserve body fluids until conditions improve.

“If people aren’t familiar with seeing turtles behave in this way, they may think that the animal is struggling and pick them up, and in some instances even take them home.

“We strongly urge people to refrain from handling or disturbing turtles buried in the mud.”

Matthew acknowledged that there may be some cases in which turtles were obviously sick or in search of water but said this should not be confused with female turtles seeking areas in which to nest.

As a native species, the oblong turtle is protected under the *Wildlife Conservation Act 1950* (WC Act). Oblong turtles cannot be collected from wetlands to take home and be kept as pets.

Anyone who finds a turtle that they believe is sick or injured should contact DEC’s Wildcare Helpline for advice on 9474 9055.



Pollution Response Officer Peter May at work and the mystery item. Photo courtesy of FESA (inset) and Chemistry Centre WA.

## Unusual find by quick-thinking Pollution Response

In August 2010, DEC's Pollution Response Unit (PRU) made an unusual find when contacted by the Fire and Emergency Services Authority (FESA) to help deal with a glass cylinder with rusted metal ends and a Nazi swastika engraved into the glass.

The sinister-looking artefact had been found on a lunchroom table of an industrial premises near Perth. The cylinder contained orange liquid and looked like a World War II relic. The concern was that the liquid was a chemical warfare agent. The area was evacuated and hazardous materials ('HAZMAT') and anti-terrorism protocols invoked.

FESA called DEC Environmental Hazards Manager Ken Raine for assistance after the bomb squad, Chemistry Centre, military and other agencies had exhausted their options and equipment to identify the possible contents of the cylinder:

Ken set about contacting his peers in the United States Environmental Protection Agency and tasked senior Pollution Response Officer Peter May with additional research.

Within about 10 minutes, Peter identified the cylinder as potentially a movie prop.

Ken said he contacted a Perth movie prop company and sent them a photo of the cylinder:

"After convincing the manager of the company that I was not a 'prank caller', I asked him a few questions," Ken said.

"The manager of the company immediately identified the cylinder as a prop (one of about 24) created for a mini-series that was filmed in Perth several years ago.

"The movie was about a sunken German World War II submarine that had been en route to Japan during the war, carrying these toxic liquid cylinders that were going to be used to poison Allied water supplies.

"The movie revolved around divers who were investigating dolphin deaths and found the sunken submarine. A full-sized replica of the bow of a German submarine was built and sunk off Point Peron for the diving scenes.

"He advised that the orange liquid was food colouring in water."

FESA was immediately contacted and advised of the situation, and the incident was brought to a close. The prop company manager was required to go to the scene and positively identify the cylinder prior to incident closure.

Ken said that often the answer to a complex hazmat problem comes not from monitoring equipment, but lateral thinking and quick and focused research under pressure.

"Peter definitely came through in this incident and, as a result, a significant amount of resources and potential business interruptions were averted," he said.

"The company advised that there were more of these cylinders in existence and I recommended that they be tracked down and the contents drained to prevent similar occurrences in the future."

Ken said that anyone coming across suspicious items like this should contact FESA on 000 and keep people away, up-wind.

"This incident ended happily with a few chuckles, but could have been a different story if the item was the real deal," he said.



Above: Miriuwung-Gajerrong rangers with feed for the marooned wallabies.  
Above right: An agile wallaby feeding.

## Hundreds of marooned agile wallabies saved

Hundreds of agile and northern naitail wallabies became stranded in March after taking refuge from record flooding in the Lake Argyle catchment on areas of high ground that later became small islands, isolated by several kilometres of water.

Kimberley Regional Manager Daryl Moncrieff said 335 wallabies were successfully trapped and relocated to the mainland during March and April, until only a manageable number of wallabies remained on the islands.

“DEC continued to have supplementary food delivered by boat to these remaining wallabies for four months, when it was deemed there was enough natural food on the island to easily sustain the small group of remaining wallabies,” he said.

“All up, DEC staff and volunteers made 36 boat trips to the islands to feed, trap, relocate and monitor the wallabies.

“This was a huge effort by all involved, including DEC’s Miriuwung-Gajerrong rangers, DEC Kimberley and Perth staff, the Kimberley Vet Centre, local boat and aircraft operators, and volunteers.”

Daryl said DEC staff had learnt a lot from the experience.

“We are now in a position where we have a clear response if something like this happens again, and we are aware of what level the lake should be at to trigger such a response,” he said.

“Wallabies were trapped in static traps or hand nets and relocated, and the success of the operation is testament to the dedication of the people involved, most of whom had never encountered a wildlife rescue of this type and magnitude.”

Agile wallabies (*Macropus agilis*) and northern naitail wallabies (*Onychogalea unguifera*) are found across northern Australia.

## Hitchhiker toads reach the south-west

Two hitchhiking cane toads (*Bufo marinus*) made their way into the state's south-west in 2011. A contract worker discovered a cane toad near Collie, south of Perth, in February, and a second toad was spotted in a suburban garden in Rockingham, the southern reaches of the Perth metropolitan area, in April.

Authorities were notified after the male cane toad in Collie was captured and killed where it was found at Mornington Village accommodation camp, near the Worsley Alumina Refinery.

DEC Wildlife Officer Allan Madgwick said the animal was then transported to the WA Department of Agriculture and Food in Bunbury where it was confirmed to be a cane toad.

"This is the first time that a hitchhiker cane toad has been found near Collie," he said.

"We conducted an extensive search of the area to locate any other possible cane toads. We also set up cane toad traps on the site which were checked daily for around four weeks."

They also investigated how the individual cane toad may have arrived in the area.

"It is possible that the cane toad may have been inadvertently transported here by a vehicle that has passed through a toad-infested area either interstate or in northern Western Australia," Allan said.

"Cane toads are very good at hiding in small spaces so it's important for people to remain vigilant and do thorough checks of their vehicles, caravans and camping equipment if they are heading over from areas where cane toads are known to live.

"We would also advise people to take care when travelling or receiving commercial freight from infested areas."

Meanwhile, the Rockingham toad was thought to have 'hitched' a lift in the back of a furniture removal van from Queensland.

"The homeowner had recently moved to Rockingham from Queensland," Allan said.

"The furniture removal company had packed and unpacked the container, and the owners had had little to do with it.

"When a neighbour told the homeowner there was a toad in her front yard, she immediately covered it with a cardboard box."

Allan said cane toad traps were set around the property as a precautionary measure, as the house was near a drain and it was critical to monitor the area and ensure there were no other toads.

"DEC commends the quick actions of the neighbour and the homeowner in capturing and reporting the toad. DEC encourages people not to kill suspected cane toads in case the animal turns out to be a harmless native frog," he said.

Allan said the department applauded the vigilance and quick response of the people who alerted authorities to the finds.

He said the discovery and prompt action by authorities to the hitchhiker cane toads reflected the continuing work that was being delivered through the *State Cane Toad Strategy for Western Australia*—not just through the front line work in the Kimberley but also through educational activities across the state.

In Western Australia, cane toads are now in and around Kununurra, with breeding occurring in irrigation areas. The invasive species is now moving west of Kununurra and into the central Kimberley.

Anyone who suspects they may have found a cane toad should isolate the live animal and report the sighting to the cane toad hotline on 1800 084 881 (free call).

**For more information about cane toads visit [www.dec.wa.gov.au/canetoads](http://www.dec.wa.gov.au/canetoads).**



A cane toad that found its way to Rockingham was a stowaway on a furniture van from Queensland.



DEC Wildlife Officer and cane toad specialist Allan Madgwick with a cane toad trap.

## Safe haven for woylies

The chances of survival for the endangered woylie (*Bettongia penicillata*) were boosted late in 2010 by the release of 16 of the marsupials into a new 420-hectare predator-free enclosure in Western Australia's south-west.

DEC's Warren Region Nature Conservation Regional Leader Brad Barton said that 11 months of construction culminated when the electric hot-wire fence surrounding the enclosure was switched on in early November 2010.

"Prior to completing the fence, a muster was conducted to remove large macropods. More than 150 staff and volunteers assisted on the day, walking in a line through the sanctuary to successfully move kangaroos and emus out in front of the line," Brad said.

"The Science Division cat control team undertook two weeks of monitoring and cat control within the sanctuary, with no sign or capture of cats to report. This monitoring will be ongoing through use of remote cameras and sand pads."

Forty-five woylies were captured throughout 90 kilometres of transects and 1,800 trap nights throughout the South West. Of the 45 animals, 16 were deemed suitable for translocation to Perup Sanctuary, while six were sent to a disease research centre in Malaga and one to the Perth Zoo. Woylies deemed not suitable were released at their capture site.



Translocations continued over a period of five weeks.

The woylies translocated into the sanctuary were joined by a number of others to form the basis of a prime population, expected to breed to about 400 animals over the next six to 11 years.

It is expected the new 'insurance' population will not only be protected from feral predators but will also enable scientists to gain a better understanding of what has caused the woylies to decline, and to help bring them back from the brink of extinction.

The \$1.5 million in state government funding to establish the woylie insurance population at Perup Sanctuary includes \$500,000 from the government's Natural Resource Management program as well as \$100,000 from Perth Zoo to support both the Perup and Perth Zoo captive population breeding programs.

Key collaborators in the project include experts at Murdoch University, Perth Zoo, Australian Wildlife Conservancy, South Australian Department of Environment and Heritage, and The University of Western Australia.

DEC Senior Technical Officer Chris Vellios with one of the woylies released into the enclosure.

## Mine worker convicted of smuggling protected fauna

A fly-in fly-out mine worker was fined a total of \$3,700 and ordered to pay \$119 in court costs after being convicted of illegally possessing five native reptiles in May 2011.

The worker was apprehended by WA Police at Perth Domestic Airport on 8 September 2010 when he arrived on a flight from Newman and officers seized two Stimson's pythons (*Antaresia stimsoni*) and a broad-banded sand swimmer skink (*Ereniascincus richardsonii*).

During the execution of a search warrant on his residence in Welshpool on the same day, wildlife officers from DEC located a third Stimson's python and a pygmy python (*Antaresia perthensis*) inside a terrarium.

The man was charged under the WC Act for unlawful possession of the pygmy python and skink. He was also charged under the Wildlife Conservation Regulations for illegally keeping three Stimson's pythons in captivity.

DEC Wildlife Officer Matthew Swan said at the time of the offence the man was working at a Pilbara mine site.

"The 29-year-old stated that he had taken the skink from his workplace and he purchased the four pythons from a man who advertised online," he said.

"These animals are protected species in WA and it is illegal to take protected fauna from the wild without a licence. It is also illegal to purchase reptiles from anyone other than a licensed reptile dealer.

"On this occasion the skink was able to be returned to its natural habitat. However, the Stimson's pythons were not able to be released due to the risk of introducing disease to the wild population.

"Wildlife smuggling is a serious problem and DEC takes the unlawful possession of protected reptiles and reptile trafficking very seriously. My advice to anyone tempted to capture reptiles they encounter in the wild is to leave them alone."

Under the WC Act, the maximum penalty for taking or possessing protected fauna is \$4,000, and the maximum penalty for keeping fauna in captivity is \$2,000.

Anyone who has information about the illegal removal of reptiles or notices any suspicious activity suggesting that reptiles are being illegally moved should call DEC's Wildcare Helpline on 9474 9055.

Stimson's pythons (below) and a broad-banded sand swimmer skink (below right).





Peter Hewett with wife Beverley at the northern terminus of the Bibbulmun Track. Photo courtesy Peter Hewett Jr.

## Vale Peter Hewett

### 'Father of Forest Recreation' saw the forest for more than the trees

The funeral of long-serving leader and mentor Peter Hewett in July 2010 gave friends and colleagues occasion to pause and reflect on a life well lived and a career that helped lead a transformation of a society's understanding of the value of forests.

When Peter first joined the WA Forests Department in the 1950s, the forests of the south-west were an economic asset, managed and conserved to provide a continual supply of timber to a state on the move—a living store of raw materials feeding a hunger for construction and manufacturing both locally and overseas. Over the following three decades this perception was to change dramatically as more people came to understand that forests had an intrinsic value in their own right, as natural heritage and a place to enjoy the outdoors. From his appointment as Divisional Forest Officer in Mundaring in 1957, Peter was at the front of this trend, and would establish himself as a pioneering strategist in opening forests up for nature-based recreation.

It was a philosophical position he would take into the newly created position of Chief of Division of Extension Services and Recreation in the 1970s, and the depth of his commitment and professionalism in this new generation of public interface was an inspiration to others. Close colleague and friend Wayne Schmidt, speaking at Peter's funeral, paid tribute to him as "a consummate professional and one of Western Australia's and indeed Australia's truly outstanding foresters ... who took to his new role with relish and began building what in time would become one of the most effective forestry extension programs in Australia".

He was both figuratively and literally a 'trail-blazer'. The early commitment to canvassing the opinions of forest visitors in planning and developing recreation facilities was to lead to one of Peter's greatest achievements—successfully negotiating the planning and construction of the Bibbulmun Track. The official opening of the track in 1979 as part of WA's 150th anniversary celebrations was the culmination of seven years of Peter's skilful management of relationships as well as considerable logistical challenges, with a high degree of community involvement. By the time the onset of Parkinson's disease forced Peter to take early retirement in 1990, walking the Bibbulmun Track had become a world-renowned experience, attracting thousands of local, interstate and international trekkers a year. Most importantly, true to Peter's vision, the track to this day sustains a profound sense of community ownership, run by a well-organised not-for-profit foundation governed by volunteers.

Along the way, Peter left a lasting impression on many young foresters moving through the ranks. Tammie Reid remembers being inspired and a little overawed by him when she came to work in the Extension Branch in the early 1980s. In her first job after graduating from the Australian National University's forestry program, Tammie



found her natural passion for interpretation and community outreach had the full if somewhat daunting support of a powerful man and a lateral thinker.

“To a young, inexperienced forester just starting out, he was a little scary,” she recalled. “He was tall, imposing, calculating, different in his thinking. But inspiring. You felt in the presence of a man who enabled big things to happen.”

He stood tall both in physique and influence. Paul Jones worked closely with Peter as his scientific advisor when he was appointed Director of Forests in the newly formed Department of Conservation and Land Management in 1985, and remembers him first and foremost for his leadership qualities.

“The thing I learned most from observing Peter was that it is not so much how hard you work yourself, but how effectively you can get other people working for your goals,” Paul said.

“Peter was a great observer of human nature and able to understand what made people tick, and as a consequence, how to deal with them. He was a great relationship-builder and had contacts throughout Australia as a consequence of his departmental and volunteer work with the various bodies he was involved in.”

Paul says the other attribute that most stood out about Peter was his generous interest in life in general—but within that, a particularly unabating dedication to the pursuit of knowledge about forestry.

“As the progression of Parkinson’s disease made movement and speech laboured, he did not shrink back and give up, but was still actively pursuing interests and would ring me periodically to get publications for him or to check some fact,” Paul said.

“Despite struggling to make himself understood, he persisted against all odds until he got what he needed. Peter was above all a decent and caring human being.”

It’s an observation echoed by Wayne Schmidt, who recalled his visits with Peter in the advanced stages of his disease.

“Remarkably, Peter never lost his keen interest in our native flora, and liked nothing more than to collect leaf, bark and fruit samples during our outings along the river foreshore in Rossmoyne,” he said.

“In the end, I think he began to despair at my inability to identify all but a small handful of tree species and garden specimens. For on my last visit, he provided a sketch pad and showed me a series of pencil drawings that he had made of assorted eucalypt leaves and seed capsules we had previously collected. Each was correctly labelled ... quite an achievement on his part, not to mention a rather blunt reminder that in spite of my years of training as a forester and landscape architect, I was still the pupil.”

But while the Bibbulmun Track may remain his most celebrated achievement, Peter never stopped being a forester, and daughter Penni, who followed in his footsteps, said she would always be proud of the way he maintained an unwavering commitment to a sustainable forest industry.

“Dad showed great leadership in the development of an extension program encompassing recreation and visitor services, farm forestry advisory service and landscape planning, as well as actively driving for the use of our forests for timber production alongside conservation, water production, and recreation,” Penni said.

“When he believed in something, he didn’t back away from trying to achieve it—through thoughtful negotiation, intelligence and dry humour.

“Even as Parkinson’s disease robbed him of his ability to communicate easily, he stayed very involved in the Institute of Foresters, in recent years helping to organise a field visit to Araluen Botanic Park where the Institute members identified many of the trees for the Araluen Foundation.”

As a loving father and grandfather who took immense pride in his family, Peter is sadly missed by wife Beverley, children Mandy, Carolyn, Penni and Peter and their partners, and nine grandchildren. But they can take some comfort from knowing he will be remembered with admiration for generations to come, for having given Western Australians enduring ways to experience and love their natural heritage.



## PART TWO: SERVICE AREAS



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).

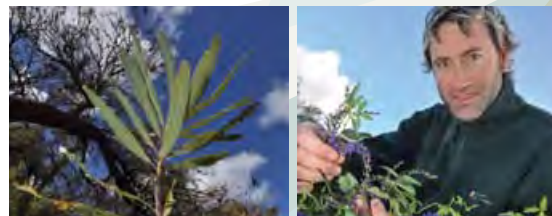
DEC is the lead agency for the coordination of biotic and abiotic data for wetlands, including the mapping of wetland type, extent and distribution in the landscape using the geomorphic wetland classification system. Wetland mapping in the state's midwest was completed over 460,000 hectares in the 'Cervantes-Eneabba'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

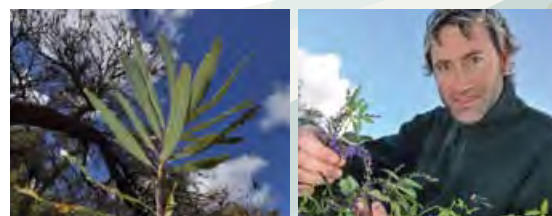
“While this is of concern, there is some good news. Ningaloo has an exceptionally high diversity of corals with more than 300 species and it is this diversity that will provide some resilience to bleaching as different corals have different tolerance levels to bleaching.

“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 hornworts	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.

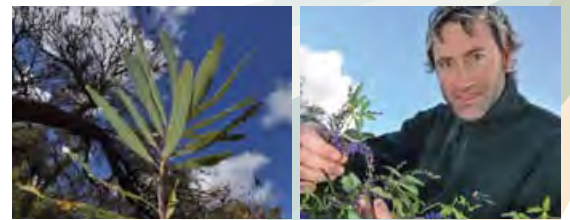
*Dicrastylis* sp. Ilkurlka was collected east of the roadhouse, with the small shrub consisting of purple flowers. Just one population with several hundred plants was found growing on a sandy flat between dunes.

"*Grevillea ilkurlka* ms is currently being formally described at the Western Australian Herbarium, and *Dicrastylis* sp. Ilkurlka has been listed as Priority I 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/](http://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/](http://www.dec.wa.gov.au/content/view/104/1931/)

Marine: [www.dec.wa.gov.au/content/category/40/886/1621/](http://www.dec.wa.gov.au/content/category/40/886/1621/) and [www.dec.wa.gov.au/content/category/40/298/1623/](http://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/](http://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.

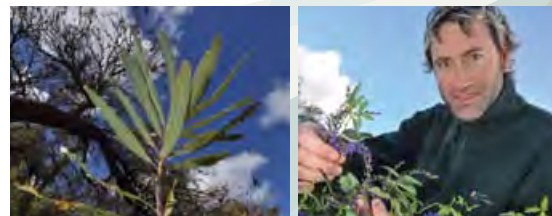
Five species of flora (*Leucopogon spectabilis*, *Pityrodia axillaris*, *Ricinocarpos brevis*, *Scaevola macrophylla* and *Verticordia apecta*) and one species of fauna (Australasian bittern, *Botaurus poiciloptilus*) were listed under the EPBC Act, while three species of flora (*Conospermum toddii*, *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 pruinosis*, *Commersonia adenothalia*, *Gastrobium 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 laricina*, *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 drummondi*, *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 tammar wallabies (*Macropus eugenii*), woylies (*Bettongia penicillata*), 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 (*Isoodon 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 clamosus*), 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 trialled 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 Yancheep 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	Waychincup 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	Loma 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 Waychincup National Park	Angove
Dibbler	Perth Zoo	Norman's Beach, Waychincup 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.

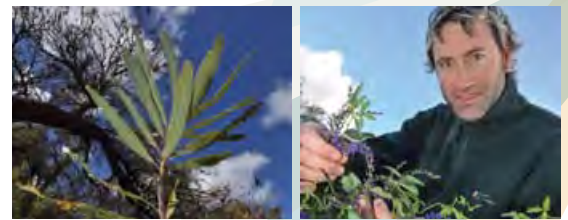
"We will continue to monitor the progress of the tortoises as they mature."

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 fimbrilepis* subsp. *fimbrilepis*.

Further information on recovery planning is available on the DEC website: [www.dec.wa.gov.au/content/view/full/842/2007/](http://www.dec.wa.gov.au/content/view/full/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/](http://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 LuclD 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](http://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/](http://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 Yalgroop 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/](http://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/](http://www.dec.wa.gov.au/content/view/3503/1936/) and [www.dec.wa.gov.au/content/view/3477/1943/](http://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

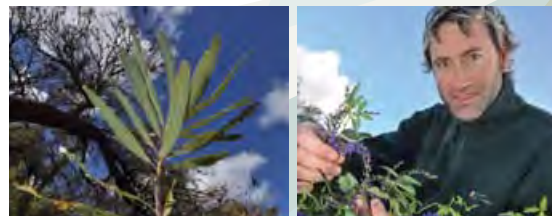
Three hundred of the most serious environmental weeds in the Swan Region were added to the department's *Florabase* website. Information is provided on the biology and management of environmental weeds, as well as photos and distribution.

### 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, Booloogoro 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/](http://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](http://www.dec.wa.gov.au/content/view/864/1992).

Flora licensing: [www.dec.wa.gov.au/content/view/863/2002/](http://www.dec.wa.gov.au/content/view/863/2002/).

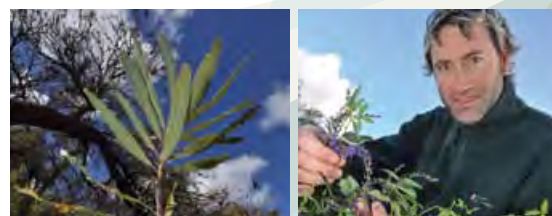
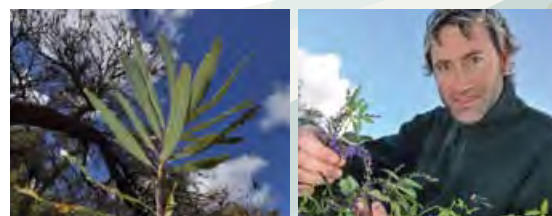


Table 4: Wildlife licences issued in 2010–11

Fauna licences		No. of licences issued
<b>Scientific</b>		
Scientific collection (Reg 17)		598
Bird/bat banding (Reg 23)		137
<b>Education and Public</b>		
To take (Reg 15)		
Marine interaction		263
Other		148
<b>Education And Public</b>		
To hold (Reg 16)		139
<b>Avian Fauna</b>		
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>Platycercus icterotis</i> )	106	
Galah ( <i>Eolophus roseicapilla</i> )	22	
Little corella ( <i>Cacatua sanguinea</i> )	24	
<b>Fauna</b>		
Keep in captivity (Reg 12A)		87
<b>Herpetofauna</b> (reptiles and amphibians)		
Keeping		2,252
Dealing		27
Farming		2
Taking		6
Removing		689
<b>Emus</b> ( <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
<b>Crocodiles</b>		
Crocodile farming (Reg 14)		2
Skin dealing (Reg 10)		0
Processing (Reg 7)		2
<b>Kangaroo</b>		
Take kangaroos for sale (Reg 6)		421
Deal in carcasses (Reg 8)		18
Skin dealing (Reg 10)		8
Processing (Reg 7)		22

<b>Fauna Licences</b>		<b>No. of licences issued</b>
<b>Exports Interstate</b>		
Skins of fauna (or other dead fauna)		34
Fauna (live)		324
Herpetofauna (reptiles and amphibians)		22
<b>Exports Overseas</b>		
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
<b>Imports Interstate</b>		
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
<b>Total Fauna Licences</b>		<b>8,978</b>

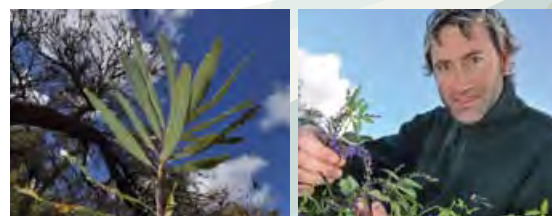
<b>Flora Licences</b>		<b>No. of licences issued</b>
Commercial purposes		285
Sandalwood ( <i>Santalum spicatum</i> ) (from Crown land)		0
Forest produce (from Crown land)		1
Commercial producers		241
Sandalwood (from private land)		29
Scientific/prescribed purposes		1,148
Permits to take declared rare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



Damage Licences	No. of licences issued	Total no. of each species authorised to be taken
<b>Other Avian Fauna</b>		
Australian raven ( <i>Corvus coronoides</i> )	7	destroy 106
Australian white ibis ( <i>Threskiomis 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>Threskiomis spinicollis</i> )	1	destroy 2
	1	scare 1
Twenty-eight parrot	16	destroy 1,980
Welcome swallow ( <i>Hirundo neoxena</i> )	1	trap & relocate 100
<b>Waterfowl</b>		
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
<b>Mammals</b>		
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 breviceuda*) 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	2010–11
	reported offences	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
<i>Wildlife Conservation Act 1950</i>									
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
<i>Wildlife Conservation Regulations</i>									
Offences relating to the acquisition, possession, control and disposal of fauna	78	2	\$1,500	\$119		1	64	3	8
<i>Wildlife Conservation Reptile and Amphibian Regulations</i>									
Offences relating to reptiles and amphibians	4						2		2
Totals	188	11	\$8,400	\$715		7	130	7	33

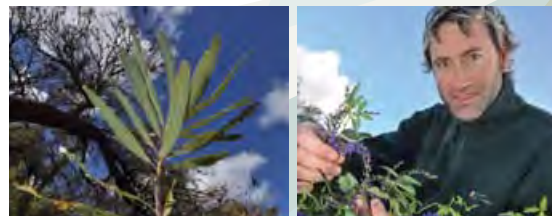


Table 7: Offences under the Conservation and Land Management Act 1984 and Regulations and Sandalwood Act 1929 that occurred in 2010–11

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.

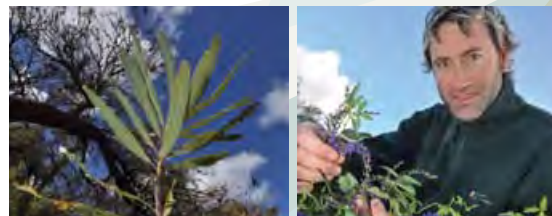
Jurien Bay Marine Park Coordinator Matt Dasey highlighted the importance of DEC's ongoing support for the University of Tasmania to conduct long-term monitoring in the marine park.

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 *Barny*. 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](http://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/](http://www.dec.wa.gov.au/content/category/25/301/1620/).

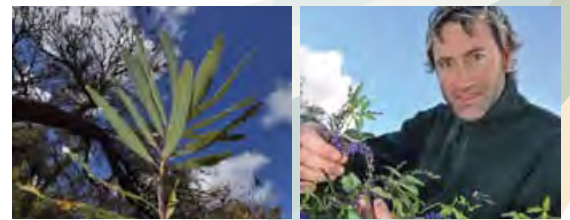
### Natural diversity recovery catchments

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.

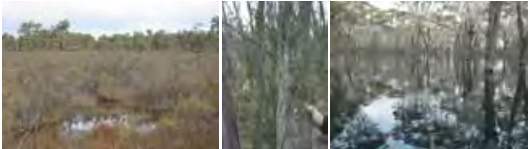


In the Lake Warden natural diversity recovery catchment, the Lake Wheatfield gravity pipeline has been in operation for two years, during which there has been more normal annual rainfall. Initial indications of a positive altered hydrological regime have been confirmed, with target water levels in the 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-Gurruup 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-Gurruup given the dry conditions. A full analysis and ranking of the biodiversity assets of Muir-Unicup is proposed for the next financial year.

**Natural Diversity Recovery Catchment Program**



2010 Review




 Department of Environment and Conservation
 

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/](http://www.dec.wa.gov.au/content/view/449/949/).

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](http://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

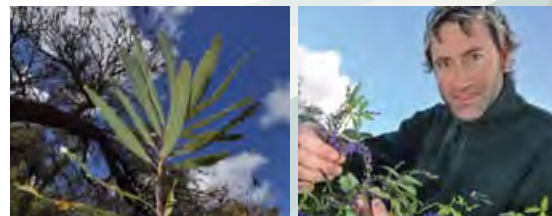
Feral goat control activities continued with the aim of minimising the impacts of these animals on vegetation communities and fauna habitat. An aerial control program on Dirk Hartog Island National Park destroyed 2,503 feral goats, and 154 goats were culled in Cape Range National Park through opportunistic 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](http://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 (*Lachenalia 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/](http://www.dec.wa.gov.au/content/category/31/936/2275/).



## *Phytophthora* dieback management

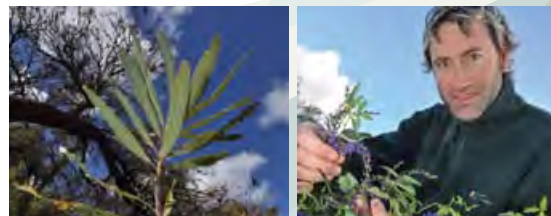
The following achievements were made in 2010–11 in the management of *Phytophthora* dieback (also refer to the *Priority nature conservation projects* section, page 48):

- 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.



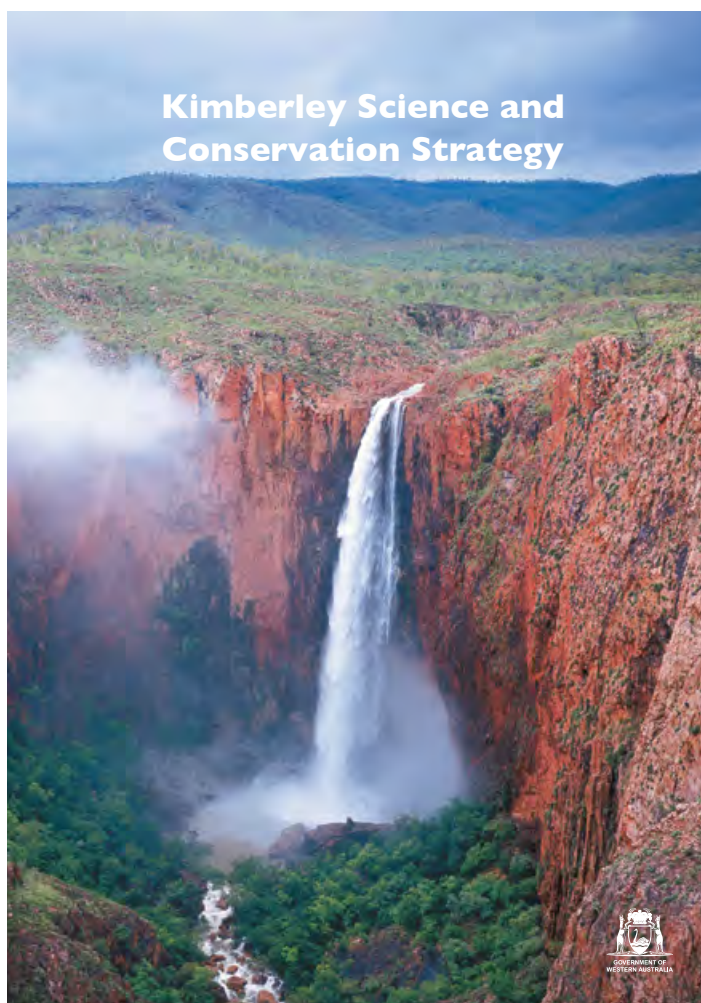
## *Kimberley Science and Conservation Strategy*

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.

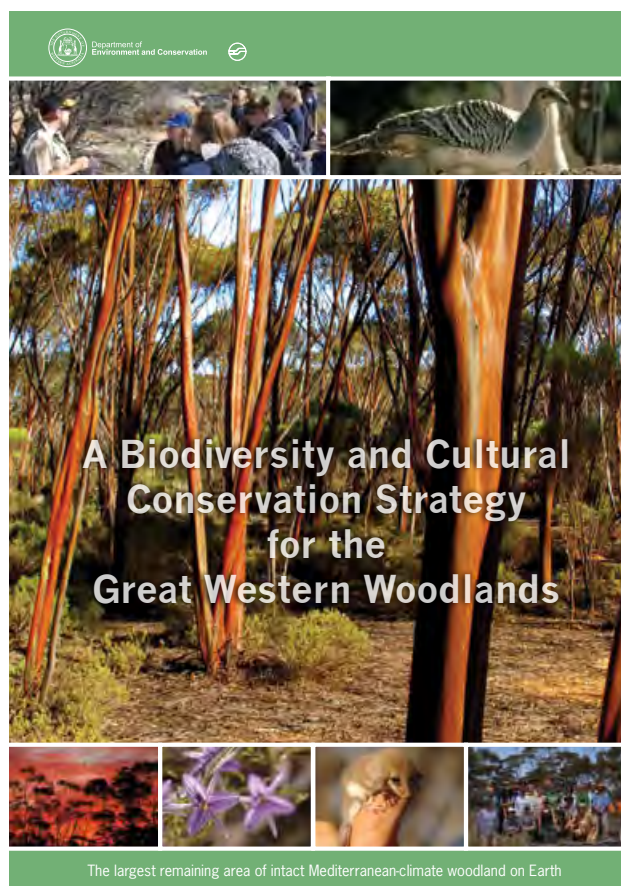


Miriwung-Gajerrong rangers (top) and cane toad management by DEC.

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

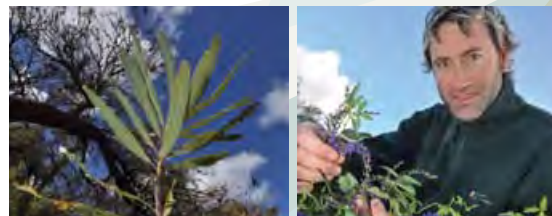


*A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands* and further information are available on the DEC website at [www.dec.wa.gov.au](http://www.dec.wa.gov.au) under Management and Protection/Land/Major Initiatives.

## 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.

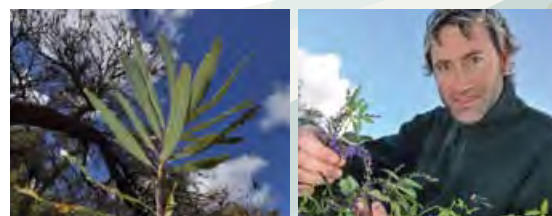
Table 8: Performance in relation to provision of advice for tasks subject to formal time limits for the 2010–11 reporting year<sup>1 & 2</sup>

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

<sup>1</sup>Based on advice provided between 1 July 2010 and 30 June 2011.

<sup>2</sup>Table 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 year<sup>1</sup>

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

<sup>1</sup>Based 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.



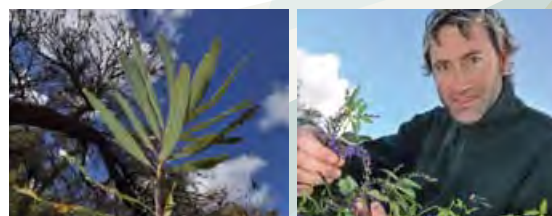


Table 11: Permit areas granted to clear under Section 51C of the EP Act

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/5234/2196/](http://www.dec.wa.gov.au/content/view/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.

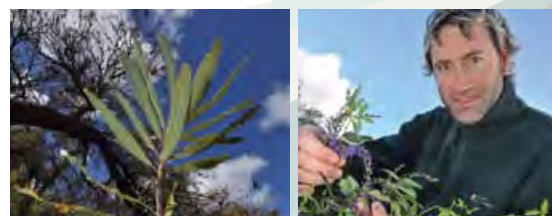


Table 13: Timeframes for DEC decisions on clearing permit applications/decisions

	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.

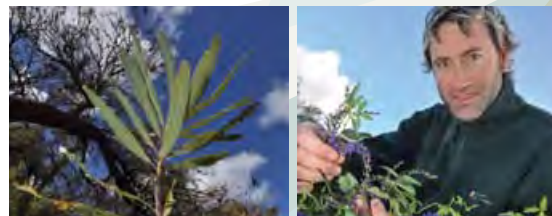
Especially in low annual rainfall years, the intensity of competition from unharvested mallees with adjoining crops is causing concern among farmers. It has therefore become paramount to begin harvesting of at least the older trees. Various small-scale mallee biomass processing options are being examined 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 Eco-region 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 Eco-region 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/full/5135/2274/](http://www.dec.wa.gov.au/content/view/full/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](http://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/](http://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](http://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/](http://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/](http://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.



# Sustainable Forest Management



## Sustainable Forest Management

Sustainable Forest Management ensures the provision of economic, social and cultural benefits from State forest and timber reserves, while conserving biodiversity, maintaining soil and water values, and sustaining health, vitality and productive capacity of the forest for current and future generations.

Consistent with the statutory purpose of State forest and timber reserves as defined in the CALM Act, under this service DEC provides for forest management on an ecologically sustainable basis. This includes implementing government policies, and providing for the harvesting, regeneration and growth of forest products in accordance with the *Forest Management Plan 2004–2013* (FMP).

In 2010–11, this service:

- completed a number of guidance documents, including a guideline for selecting the final location of fauna habitat zones
- undertook the evaluation, approval and monitoring of over 80 disturbance operations totalling more than 7,000 hectares within State forest and timber reserves to ensure compliance with the environmental outcomes sought in the FMP
- implemented effective fire management for the protection of values on State forest and timber reserves within the south-west
- undertook preliminary work on 19 indicative fauna habitat zones, and designed and established the final locations of eight fauna habitat zones associated with planned disturbance, covering a gross area of more than 1,700 hectares of State forest
- undertook the detection and mapping of *Phytophthora* dieback disease on over 17,000 hectares of DEC-managed land to inform the planning and management of disturbance operations and the prioritisation of disease treatments
- initiated work to improve modelling of the rate of spread of *Phytophthora* disease in south-west landscapes
- undertook an internal review of the silviculture guidelines and an expert panel review of silvicultural policy and practices
- undertook a range of activities to promote the United Nations International Year of Forests, *Forests for People*.

Further information about the FMP 2004–2013 is available on the DEC website:  
[www.dec.wa.gov.au/content/view/2835/1839/](http://www.dec.wa.gov.au/content/view/2835/1839/).

## Implementation of approved forest management plans and government policies and programs

### Forest Management Plan 2004–2013

The FMP sets times for the development of a number of guidelines. A guideline for selecting the final locations of fauna habitat zones was completed in November 2010.

The remaining land category changes that are proposed in the FMP continued to be implemented. It is proposed to create the new reserves through legislation.

DEC continued to develop protocols for collecting data and reporting on key performance indicators of the FMP, with a range of protocols completed during the year.

The mid-term audit of the FMP process was completed with the release of the EPA's report and recommendations in August 2010. The EPA identified issues that should be considered in preparing the next FMP, which is scheduled to commence in 2014.

DEC continued to maintain the spatial and measurement datasets required to sustainably manage State forest and timber reserves.

An annual strategic assessment of forest health using remote sensing technology was introduced. Monitoring of utilisation standards, as an input to compare the forecast strategic timber yield versus actual timber yield, was undertaken. A risk-based framework of monitoring and reporting of disturbance activities on State forest and timber reserves was developed.

DEC continued to facilitate the implementation of the *Wungong Catchment Environment and Water Management Project* for the Water Corporation.

## Preparing the next forest management plan

The next FMP is scheduled to commence in 2014. DEC will prepare the plan on behalf of the Conservation Commission of Western Australia.

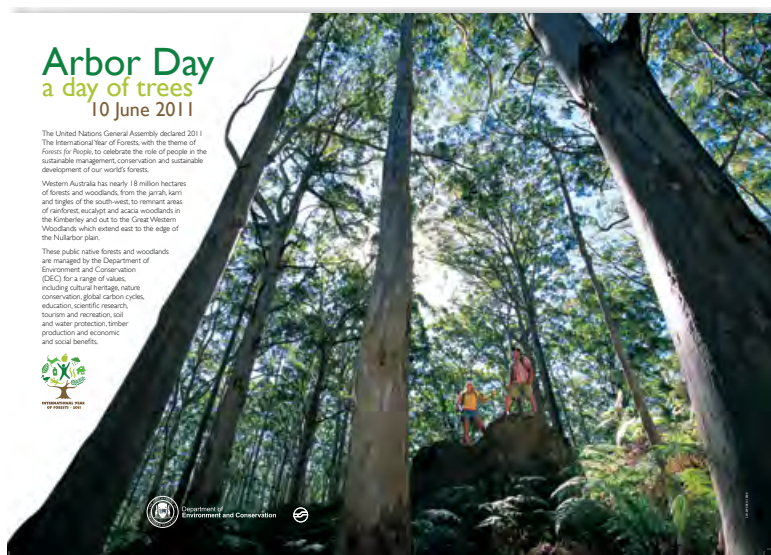
Preliminary background work commenced on this plan, with DEC undertaking updates of wood inventory and systems to calculate sustained yield, and initiating work on an end-of-term audit of the FMP.

## Community forest inspection program

Community forest inspections provide community representatives with the opportunity to inspect first-hand the systems and processes that are in place to manage the harvest of native forest trees from State forest, and to note compliance with existing management systems and processes.

Members of the voluntary conservation movement, representatives from local government, and staff from the Forest Products Commission (FPC) and DEC inspected harvesting in the Warren Region in December 2010.

The South West and Swan regions' resources continue to be applied to addressing community concerns associated with harvesting at Arcadia, west of Collie and Mundlimup, near Jarrahdale.



A special Arbor Day poster was produced by the department to commemorate the International Year of Forests.



## Inventory, assessment and modelling of natural resources

A wide range of technical services related to the inventory, assessment and modelling of natural resources was provided within DEC and to the FPC, Conservation Commission and external clients. Major areas of activity were:

- the acquisition and analysis of timber inventory data to assist the FPC, DEC and the Conservation Commission in the planning, managing and monitoring of timber production in State forest and timber reserves
- the acquisition of digital images across a further 200,000 hectares of State forest to map forest characteristics and stratify areas for timber inventory
- updating of the existing jarrah (*Eucalyptus marginata*) inventory with measurement of a selection of inventory plots
- undertaking vegetation mapping to inform silvicultural decisions, old-growth forest assessments, disease impact predictions and the protection of poorly represented vegetation complexes
- undertaking field measurement programs to monitor the yields and silvicultural standards realised in timber harvest operations, with enhanced data processing
- providing specialist services to DEC divisions, the FPC, other government agencies, natural resource management groups and external clients (services included aerial photography, photo-interpretation, photogrammetry, vegetation and disease mapping surveys, and database design and development)
- acquiring and deploying modelling software and developing natural resource models in preparation for the next FMP
- upgrading and developing forest resource inventory systems.

## Maintenance and enhancement of biodiversity and other values of forests

This service undertakes measures to sustain, or where possible enhance, biodiversity and other forest values. Staff delivered information services and the mapping of *Phytophthora* dieback occurrence to enable operations to be undertaken with the lowest risk of spreading the disease *Phytophthora*. Staff were also responsible for implementing an approvals, monitoring and compliance management system, and setting standards for the management of a range of forest values.

DEC's Regional Services Division delivers other sustainable forest management outcomes, and the Science Division undertakes research to enhance management of biodiversity, ecosystem health and vitality, and soil and water values.

### Health and vitality in natural landscapes

Mapping the presence of symptoms of the plant disease caused by *Phytophthora cinnamomi* was carried out by accredited interpreters to determine areas suitable for protection. Hygiene requirements were specified for activities likely to result in the movement of soil (and, as a consequence, *Phytophthora cinnamomi*) on lands managed by DEC. A total area of 14,395 hectares was mapped to assist the planning of roads and timber harvesting operations undertaken by the FPC. This included 4,988 hectares of previous mapping that was checked for further spread. Mapping and hygiene planning were undertaken on a further 1,147 hectares for DEC's purposes, and 1,777 hectares for external parties. Training programs were carried out in disease mapping and hygiene management.



## Integrated planning support

The maintenance and enhancement of biodiversity and other values across landscapes requires a high level of integrated planning within DEC. This outcome was supported through:

- planning support to Regional Services Division to guide the selection and management of public firewood and flora harvesting areas
- monitoring and collation of the areas burnt by bushfire and prescribed fires across the forest to support integrated fire planning and reporting
- assisting Regional Services Division to evaluate the biodiversity assets at risk from disturbance associated with proposals for the construction of roads, utilities and other infrastructure.

## Management of soil disturbance in timber harvesting

The FMP provides for increased protection of soils during timber harvesting by introducing soil damage risk periods based on a trafficability index and prescribing measures to be applied in each risk period to protect soil during timber harvesting. The department continued to manage an approvals process for access during moist soil conditions. Access to harvest areas was authorised during winter and spring based on consideration of risk associated with soil attributes. Access was not granted to areas with an inherently high risk of soil disturbance. During the 2010 wet season, continued attention was placed on the management of hygiene associated with access into protectable areas.

## Implementation of fauna habitat zones

A major initiative of the FMP is the introduction of approximately 280 indicative fauna habitat zones of a minimum of 200 hectares each in State forest and timber reserves. Design, analysis, survey and liaison work were undertaken for 19 indicative fauna habitat zones adjacent to proposed disturbance activities, and the location of eight fauna habitat zones was finalised, covering a gross area of more than 1,700 hectares of State forest. The *Guidelines for selection of fauna habitat zones* were approved in November 2010. The guidelines are published on the department's website at: [www.dec.wa.gov.au/content/category/47/869/1827/](http://www.dec.wa.gov.au/content/category/47/869/1827/).

## Management system for approvals, monitoring and compliance

All operations in State forest require consideration and approval from DEC.

Departmental staff monitored the compliance of operations with the conditions of approval and with environmental management standards. Where non-compliance in timber harvesting operations is identified, DEC may issue the proponent with an incident report (IR) for minor issues, a works improvement notice (WIN) if the non-compliance can be rectified by further field operations, or a management letter (ML) if it cannot. In 2010–11, staff issued three WINs, two MLs and one IR. One WIN, two MLs and the IR related to soil and water issues, and the remaining two WINs related to systems and process issues. Of the three WINs and two MLs issued in 2010–11, two have been closed with satisfactory outcomes, and three are yet to be closed. Of the WINs and MLs issued in 2009–10, all those that remained open at the end of 2009–10 still remain open.



Jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophyllal*) woodland, with wild plum (*Podocarpus drouynianus*), *Leucopogon capitellatus*, prickly moses (*Acacia pulchella*), bracken (*Pteridium esculentum*) and snottygobble (*Persoonia longifolia*) forming an open heath on the upper slope of fauna habitat zone Solai.

## Managing fauna habitat zones

State forests and timber reserves are important to the social and economic fabric of the south-west. These areas provide camp sites and walking trails, and the opportunity to escape the suburbs and reconnect with nature. They produce unique wildflowers and timbers from jarrah and karri (*Eucalyptus diversicolor*), which are sent all over the world.

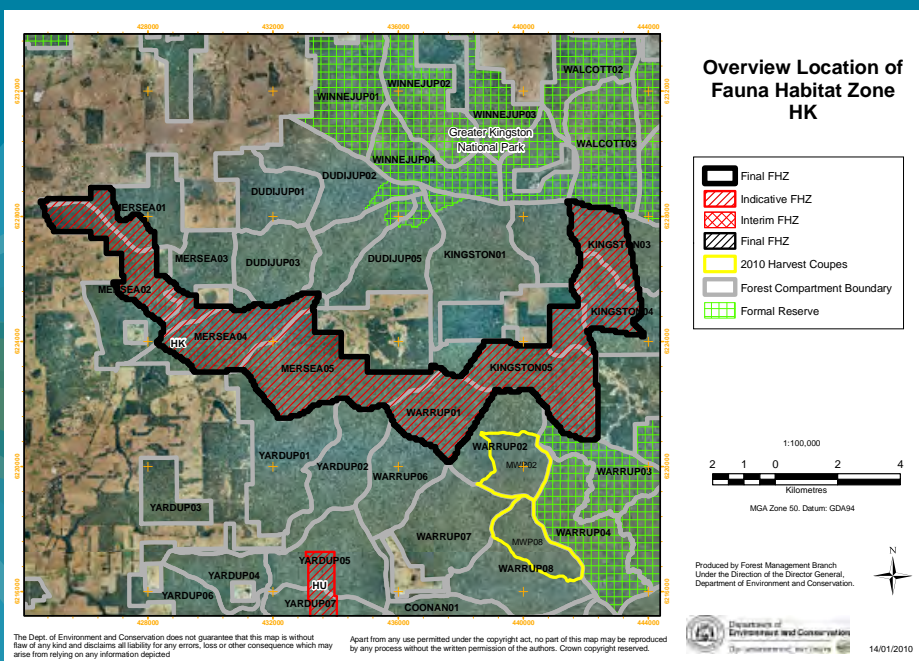
As the manager of this land, DEC is always seeking to balance the needs of the community with protecting the unique plants and animals of the south-west forests. The FMP outlines a range of initiatives and strategies with the principal purpose of protecting forest-dwelling species.

A strategy introduced in the FMP is fauna habitat zones. The objective of these zones is to ensure animal populations recover from one timber harvesting rotation to another. The zones are designed to provide an extensive network of forest left undisturbed during timber harvesting. The network of zones is applied at a landscape level and is implemented, zone by zone, at the forest block or coupe level.

Since the FMP commenced in 2004, 283 indicative zones have been mapped out, with over 90 locations progressively finalised to the end of 2010. These zones will exclude 52,042 hectares of forest from timber harvesting, providing a refuge for animal populations and a source for recolonising nearby areas after timber harvesting.

The 'super' fauna habitat zone traversing a number of forest blocks adjacent to Greater Kingston National Park is just over 4,000 hectares. This area is a living research laboratory continuing to provide the department with vital long-term data on the impact from disturbance on forest-dwelling species.

The location of fauna habitats zones in the three forest regions (final and indicative) can be found on the department's website at [www.dec.wa.gov.au/content/view/907/1827/](http://www.dec.wa.gov.au/content/view/907/1827/).



## Forest monitoring

Ten *ForestCheck* monitoring grids in the Wellington District were assessed in 2010–11 to provide information about the response of biodiversity to timber harvesting in the eastern jarrah forest. Results from the first five years of *ForestCheck* monitoring were prepared for publication as a series of scientific papers.

Aquatic macro-invertebrates were sampled at 50 sites in spring 2010 as part of a project to provide information on trends in aquatic biodiversity in response to management activities and climate variability. This project addresses key performance indicator 20 of the FMP. Streamflow during 2010 was very low and insufficient for sampling at a number of sites. A detailed report analysing data collected for the project from 2005 to 2008 was prepared.

An outbreak of gum-leaf skeletoniser (*Uraba lugens*) was detected north of Manjimup in February 2010, with distinct centres of activity in Yanmah/Wheatley, Dingup/Kinkin and Quillben forest blocks. Canopy sampling at sites previously monitored for gum-leaf skeletoniser population activity during the 1980s was reactivated in December 2010 and additional plots were established to supplement the original plot locations. A total of 61 tree plots was assessed for gum-leaf skeletoniser. Aerial surveys showed that more than 250,000 hectares of forest had been defoliated, and remote sensing techniques were also used to map the extent of the outbreak. A trial examining the effectiveness of pheromone lure traps developed in New Zealand was successful.

Several silvicultural experiments were remeasured during the year including a thinning experiment in high site quality karri forest at Warren block, and a planting trial near Quininup testing the effect of initial spacing on the survival, growth and form of karri. Data from thinning experiments were made available for validation of tree growth models used for timber yield scheduling. DEC continued to support a PhD study investigating factors affecting regeneration of jarrah in stands harvested by the shelterwood method. This included periodic measurement of survival and growth of seedlings in eastern jarrah forest.

Results from a study of streamflow and groundwater response to timber harvesting in experimental catchments in the intermediate rainfall zone of the jarrah forest were published in the *Journal of Hydrology*. Groundwater monitoring bores in experimental catchments in the southern jarrah forest were remeasured to provide information about regional patterns of change in groundwater depth.

## Forest auditing

The department undertakes audits of forest management practices and operations to ensure compliance with the FMP and associated guidance documents.

Two audits were undertaken during 2010–11 relating to managing the associated disturbance from native forest harvesting. These were landing rehabilitation, and coupe management and environmental protection.

### Native forest harvesting—landing rehabilitation audit

The FPC produces annual programs for landing rehabilitation for coupes harvested in the three forest regions: Swan, South West and Warren. The FPC has identified all coupes harvested from 2000 onwards and is progressively assessing all landings in these coupes for rehabilitation.

Landings identified as having inadequate vegetation cover are added to the annual programs for remedial action. The landing rehabilitation program is driven by the silviculture burn. Landings will not be rehabilitated until these burns are completed.

The landing rehabilitation audit assessed the system the FPC has in place to manage rehabilitation of landing areas. It focused on the landing preparation, landing revegetation, monitoring and records maintenance.





### Landing preparation

Initial landing preparation in jarrah coupes is undertaken by the harvesting contractor. Residue logs of poor quality and unable to be sold are stacked to the side and at the front of the landing.

Cording and matting laid on the landing to reduce soil compaction should be removed and heaped at the rear of the landing in preparation for burning.

Harvesting operations in some of the coupes generated large stockpiles of unsaleable logs, preventing the ripping of a considerable area of some landings. This could be avoided by using a central landing to stockpile all the unsaleable logs, allowing all other landings in the coupe to be adequately rehabilitated.

Where cording and matting are used, it is critical that this material is removed. If this material is left *in situ* it will prevent the landing being rehabilitated. Residue bark left on landings can also impede adequate regeneration.

Cording and matting had not been removed from four landings sampled in the audit.

Form FPC 105, *Harvesting Inspection and Action Sheet*, is used to assess and record that specific aspects of the harvesting operation have been completed to the required standard before each feller's block is certified. The form currently does not contain a section dealing with the removal of cording and matting material and residue bark from landings. A section dealing with this issue could be added to the form to ensure this material is removed before the blocks are certified as completed.

### Landing revegetation

In the Swan and South West regions, prepared landings in jarrah coupes are broadcast-seeded with both understorey and overstorey species, and fertilised. Karri landings in the South West Region are planted with karri and seeded with understorey species. In the Warren Region, prepared landings are planted with jarrah and broadcast seeded with understorey species, and karri landings are planted but not seeded with understorey species.

The current guidelines are open to interpretation, which has led to different methods being applied to revegetation, but this should be standardised across the three forest regions.

Details of the completion of annual programs are maintained by silvicultural staff of the FPC. These should also be made available to the department's senior silviculturist to enable the work to be adequately tracked.

### Monitoring

The FPC usually monitors landing revegetation 18 to 24 months after seeding or planting. Any landings that are not adequately revegetated are placed back on the annual program for remedial treatment. The monitoring program also includes landings in the backlog coupes.

Monitoring forms for each landing assessed are maintained by the FPC. These should also be made available to the department's senior silviculturist.

### Records maintenance

Records of landing rehabilitation and monitoring are maintained by the FPC. Once the landing rehabilitation process for each coupe has been successfully completed and the landings have been adequately revegetated, they are entered into the department's silvicultural recording system (SILREC) as completed.

## Native forest harvesting—coupe management and environmental protection

The FPC conducts harvesting operations on land managed by the department where compliance is required with a range of environmental aspects, as detailed in the FMP and associated guidance documents. This audit assessed a sample of these environmental management and protection elements in selected current and completed coupes in jarrah and karri forest:

### Planning/pre-harvest checklists

Table 14: List of coupes sampled

Coupe	Status	Species	Rainfall zone
Beaton	Complete	Jarrah	Intermediate/high
Mungalup	Complete	Jarrah	Intermediate
Ernest	Complete	Jarrah	Intermediate/high
George	Dormant	Jarrah	Low
Nelson	Active	Jarrah/karri	Intermediate
Iffley	Active	Jarrah/karri	High
Boyndaminup	Dormant	Jarrah	Low
Chandler	Complete	Jarrah	High
Channybearup	Complete	Karri	High

All coupes sampled had a correctly completed pre-harvest checklist covering the relevant harvesting operation.

### Coupe demarcation

Management boundaries, including coupe, river, stream, travel route and diverse ecotype zones, must be identified and demarcated prior to commencing harvesting.

Table 15: Summary of coupe demarcation

	Stream zone	Diverse ecotype zone	Other reserves	Total
Length assessed (m)	14,304	811	5,676	20,791
Length correctly marked (m)	14,161	811	5,676	20,648
Percentage correct	99	100	100	99

### Protecting water—informal reserves

Informal reserve boundaries should be protected during all phases of the harvesting operation.



Table 16: Summary of incidents

	Stream zone	Diverse ecotype zone	Other reserves	Total
Length assessed (m)	14,304	811	5,676	20,791
No. of minor incidents	8	1	0	9
Length of minor incidents (m)	67	5	0	72
No. of major incidents	1	0	0	1
Length of major incidents (m)	143	0	0	143
Percentage of edge protected intact	98.5	99	100	99

Nine coupes were sampled for compliance with demarcating management boundaries, including informal reserves. There were eight minor incidents in four coupes, totalling 67 metres, where disturbance activity crossed the stream zone boundary. No incidents were recorded in five coupes. The stream zones were demarcated at or above the prescribed width requirement. One minor incident was recorded in a diverse ecotype zone.

It was concluded that the identified minor incidents had minimal impact on soil disturbance and on related zone vegetation.

A single major incident was identified. A WIN was issued by the department in response to the incident, requiring the damage to be repaired and explained, and measures/responses to prevent a recurrence to be outlined.

#### Phased logging

In all second-order catchments in the intermediate and low rainfall zones of multi-use jarrah forest subject to harvesting, at least 30 per cent of each second-order catchment has a retained basal area of greater than 15 square metres per hectare for a period of at least 15 years after harvesting of the remainder of the catchment.

Areas were sampled in the field and had been retained as specified in the plans.

#### Identifying habitat retention

To ensure continued availability of suitable refuge hollows for fauna following timber harvesting, two types of habitat trees and one example of ground habitat per hectare are retained. The two types of habitat trees are:

- five primary habitat trees per hectare—trees that have a moderate to high probability of bearing hollows, and
- six to eight secondary habitat trees per hectare—trees that have a lower probability of bearing hollows at the time of tree marking, but provide for the sustained availability of hollows over time (these trees also contribute to structural diversity in a coupe).

Table 17: Habitat retention

<b>Habitat trees</b>						
No. of coupes assessed	Area sampled (ha)	No. of primary habitat trees	No. of secondary habitat trees	Average no. of primary habitat trees / ha	Average no. of secondary habitat trees / ha	Average no. of all habitat trees / ha
8	48	368	304	7.7	6.3	14

<b>Ground habitat</b>			
No. of coupes assessed	Area sampled (ha)	No. of habitat logs	Average no. of habitat logs / ha
8	48	45	0.9

In the eight coupes sampled, the required level of primary and secondary habitat trees was achieved. In regard to ground habitat requirements, four coupes recorded at or above the retention rate of one example of ground habitat per hectare, with four coupes recording below this requirement.

#### Protecting crop trees

Marked crop trees are required to be protected from damage during harvesting operations. Damage is defined as:

- exposing more than 100 square centimetres of the cambium on the bole of a crop tree
- felling, breaking or uprooting of a crop tree, or
- removing more than 30 per cent of the crown.

Table 18: Crop trees assessment

No. of coupes assessed	No. of crop trees assessed	No. of crop trees undamaged	No. of crop trees damaged
8	830 (100%)	805 (97%)	25 (3%)

All of the coupes assessed were below the allowable five per cent limit for crop tree damage. The highest level of damage recorded was four per cent and the lowest level was one per cent.

As well as avoiding physical damage, all debris created by a harvesting operation should be removed from the base of crop trees. This task is commonly known as 'tops disposal' and is designed to protect crop trees from fire damage; that is, all woody material greater than 75 millimetres in diameter must be removed at least one metre from the bole of the crop tree.

Table 19: Crop trees tops disposed and not disposed

No. of crop trees assessed	No. of crop trees tops disposed	No. of crop trees not tops disposed
830 (100%)	737 (87%)	93 (13%)

Only one coupe achieved the compliance level of 95 per cent. The highest level of completed tops disposal in the eight coupes assessed was 97 per cent and the lowest level was 85 per cent.

#### Protecting soil

When extraction is completed in any feller's block, and prior to machinery leaving, interceptor banks and drains must be constructed across all extraction tracks and disturbed firebreaks with exposed soil to minimise the risk of erosion. The minimum size and angle of banks is set, and the prescribed spacing is dependent on the slope and soil type.



Table 20: Erosion control

No. of coupes assessed	No. of coupes meeting specification	Length of extraction track assessed (m)	Length of track meeting specification (m)	Length of track not meeting specification (m)
8	6 (75%)	9,066 (100%)	8,312 (92%)	754 (8%)

Of the eight coupes assessed, six coupes had 100 per cent compliance with erosion control measures. The remaining two coupes had compliance levels of 57 per cent and 80 per cent. This was a result of a major extraction track in a feller's block in each coupe being missed when erosion control barriers were being installed.

### Rehabilitating landings

There is an annual program in place to rehabilitate landings. At the completion of harvesting, landings are ripped and scarified, and then seeded and fertilised when conditions are right.

Preparation work for landing rehabilitation, ripping/scarifying, had been undertaken in most completed coupes sampled, except where products still remained on the landings.

A separate audit was undertaken on landing rehabilitation and the results have been reported at the beginning of this section (see page 86).

### High salt risk catchments

The proponent is required to identify second-order catchments with a high salt risk. Within each catchment identified, the proponent shall retain additional river and stream buffers, and locate areas temporarily reserved during phased logging operations.

Parts of two coupes assessed in the audit were located within high salt risk catchments. Stream zone widths in these areas had been increased and temporary exclusion zones of uncut forest were also located across the landscape to meet this requirement.

Form FPC 517, *High Salt Risk Catchment Compliance Survey*, which details the area to be reserved to meet this requirement, had been completed for both coupes.

### Protecting threatened flora

Before undertaking any activity on DEC-managed land resulting in the clearing of native flora, field searches must be conducted to determine whether threatened flora are present.

Records of field searches for the presence of threatened flora populations were available for all coupes assessed.

### Protecting threatened fauna

Areas planned for harvesting are assessed in a desktop study against a matrix which determines the probability of habitats of threatened fauna occurring, supplied from the fauna distribution information system (FDIS). Databases containing records of known habitats, populations and sightings are also consulted.

Printouts from the FDIS database were available for all coupes sampled.

## Adaptive management

DEC contributed to the coordination and implementation by the Water Corporation of the *Wungong Catchment Environment and Water Management* project. This adaptive management trial in the 12,845-hectare Wungong Catchment aims to increase water availability by managing vegetation density.

The project has re-treated some sections of native forest to more stringently reflect silvicultural management objectives in the two sub-catchments of Cobiac and Chandler, an area of approximately 1,000 hectares of State forest.

Twenty-five hectares of clear fall has been conducted in areas of minesite rehabilitation planted with exotic eucalypts, with the objective of converting these areas back to a native species mix of overstorey and understorey within three years.

Two hundred hectares of thinning treatment in exotic/native mix eucalypt stands of minesite rehabilitation within the Chandler sub-catchment to selectively remove the exotic component has been completed. An additional 250 hectares have been tree-marked in anticipation of continued work.

Information sessions were presented to a range of stakeholders and community groups.

The Water Corporation sought approval from the Conservation Commission to apply a more stringent silvicultural regime to a restricted area of the catchment. This adaptive management proposal required significant liaison and input from DEC through 2010–11. Dieback interpretation was conducted on the eastern section of this area, and a prescribed burn was undertaken in May 2011.

During 2010–11, a care and maintenance program was implemented on these areas of forest treated in the initial stage of the project.

The clearfell minesite rehabilitation area was slash-burnt, and continued control of woody weeds has been undertaken with the objective of converting this area back to its native forest structure. The Cobiac sub-catchment was treated by removing all non-retained trees and stump coppice on stumps greater than 30 centimetres with the objective of maintaining a shelterwood silvicultural outcome.

## Provision for harvesting, regeneration and growth of forest products

### Silviculture guidelines

Review of the silviculture guidelines has continued at a number of levels. Preparation of reference material for the jarrah guideline was completed, and the reference material for the karri and wandoo guidelines started to provide a clearer understanding of silvicultural practices. Monitoring procedures to assess protection levels for growing stock and habitat trees, and for the assessment of tree marking, were implemented and improved following feedback from field operational staff. The review of the regeneration survey procedure was completed to ensure the data collected led to the correct application of silviculture at the patch level.

Training continued through the delivery of briefings and through informal coaching in the application of silvicultural practices and the implementation of monitoring procedures.

### Monitoring of areas subject to timber harvesting and associated treatments

Monitoring was undertaken in areas subject to commercial timber harvesting, silvicultural treatments and forest disturbance activities under the direction of the FPC. In the 12 months to December 2010, 7,390 hectares of native forest were harvested with the following silvicultural or management objectives.

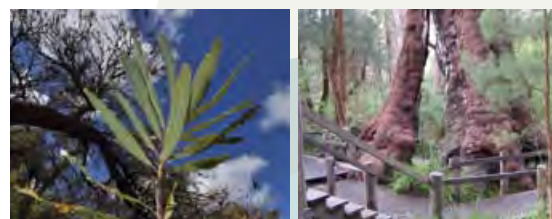


Table 21: Silvicultural objectives

Forest type	Silvicultural objective	Area cutover (ha)
Jarrah ( <i>Eucalyptus marginata</i> )	Release of regeneration (gap)	180
	Establishment of regeneration—eastern jarrah (shelterwood)	140
	Establishment of regeneration—western jarrah (shelterwood)	1,110
	Promote growth on retained trees (thinning)	620
	Single tree selection (retention in <i>Phytophthora</i> dieback areas)	1,330
	Selective	1,140
	Subtotal	4,520
Karri ( <i>E. diversicolor</i> )	Establish jarrah/karri regeneration	30
	Establish regeneration (clearfall karri)	370
	Establish regeneration (partial karri clearfall)	0
	Promote growth on retained trees (thinning)	1,220
	Subtotal	1,620
Wandoo ( <i>E. wandoo</i> )	Establishment of regeneration	0
	Promote growth on retained trees (thinning)	0
	Subtotal	0
Other/any forest type	Other (mining and clearing for utilities)	1,250
Total		7,390

Jarrah silvicultural objectives for 470 hectares harvested in this or previous years were achieved by follow-up treatment during the year. Karri regeneration was completed on 560 hectares harvested in either this or previous years.

## Regional harvest plans

DEC reviewed the 2011 *Indicative timber harvest plan* submitted by the FPC to ensure consistency with the settings adopted in the FMP. Work was undertaken on the preparation of the *Three-year timber harvest plan (2011–2013)*.

## Partnerships

Throughout the year, communication and interaction continued with the community and stakeholders (including volunteer projects on vegetation condition and multi-resource inventory), other state agencies and authorities, and federal agencies.

Through the Sustainable Forest Management Division, DEC contributed to the work of the Dieback Working Group, Primary Industries Ministerial Council, NRM Ministerial Council, the National Forest Inventory and to other national forums on ecologically sustainable forest management.

Collaboration with research teams located at CSIRO and various local and interstate universities included projects on forest disease, native forest silviculture, modelling of the hydrological consequences of changes in vegetation extent or condition, and forest growth.

Table 22: Trends in the area of native forest harvested

	Jarrah forest (ha)	Jarrah/wandoo forest (ha)	Karri forest	
			Clearfelled or cut to seed trees (ha)	Thinned (ha)
1976–77	32,320	1,170	2,610	-
1977–78	26,020	740	4,450	-
1978–79	25,540	530	2,710	-
1979–80	25,150	860	2,110	60
1980–81	22,930	1,440	2,080	180
1981–82	24,680	610	2,180	320
1982–83	23,740	330	990	190
1983–84	21,540	580	1,490	260
1984–85	20,010	1,440	2,360	500
1985–86	22,640	650	1,590	340
1986	19,340	1,150	1,090	490
1987	17,180	1,380	1,310	700
1988	23,400	490	1,180	840
1989	15,130	200	1,510	910
1990	12,960	100	1,560	340
1991	10,910	-	1,920	230
1992	13,990	30	1,540	310
1993	14,250	40	1,630	80
1994	14,050	50	1,440	-
1995	17,830	30	2,410	-
1996	22,320	50	1,300	60
1997	18,240	60	1,870	60
1998	19,250	60	1,970	320
1999	14,200	50	1,890	360
2000	20,570	10	1,310	70
2001	15,760	*	1,380	120
2002	13,260	30	700	350
2003	8,520	-	720	485
2004	8,860	-	330	920
2005	6,220	30	460	1,070
2006	8,440	300	400	1,130
2007	8,120	60	560	1,000
2008	7,280	0	390	660
2009	8,990	10	740	920
2010	4,520	0	400	1,220

\*Total includes small areas of other forest types cleared for mining or landings.





# Parks and Visitor Services



## Parks and Visitor Services

Public involvement, visitation and appreciation of the natural environment on lands and waters managed is a major responsibility of the department. This includes:

- preparing and implementing management plans in accordance with the CALM Act
- preparing and implementing recreation site development plans
- providing, managing and maintaining appropriate access, recreation opportunities and visitor facilities
- protecting natural areas, visitors and facilities from bushfire
- training departmental staff and volunteers
- working with local visitor centres and commercial tour operators
- involving Aboriginal people in park management
- involving Aboriginal people in the provision of visitor facilities and services
- providing visitor information, and designing and initiating educational and interpretive activity programs, that enrich visitor experience and help develop greater community awareness and support for parks, natural areas, astronomy, nature-based tourism and recreation services and policies
- undertaking scientific, visitor and social research, in cooperation with other research institutions
- providing support to the Conservation Commission of Western Australia.

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

## Planning for management

During 2010–11, the Minister for Environment approved the management plans for Cape Range National Park, Jandakot Regional Park and Rockingham Lakes Regional Park. This brings the total number of current management plans prepared under the CALM Act to 61.

A further 10 terrestrial management plans are currently being prepared for Shannon and D'Entrecasteaux national parks, Shark Bay World Heritage area terrestrial reserves and proposed reserve additions, Millstream Chichester National Park and Mungaroona Range Nature Reserve, Lane Poole Reserve and proposed reserve additions, Murujuga (Burrup Peninsula) National Park, Yanchep and Neerabup parks and reserves, Leeuwin-Naturaliste capes area, Ord River and Parry Lagoons nature reserves, Yoorrooyang Dawang proposed conservation parks, and Perup. Amendments to the Dryandra Woodland and Fitzgerald River National Park management plans are also being finalised.

During 2010–11, draft management plans for Ord River and Parry Lagoons nature reserves, Leeuwin-Naturaliste capes area, Yoorrooyang Dawang proposed conservation parks, and Perup were released for public comment. A further eight terrestrial draft management plans are in various stages of preparation.

The public contributed to the content of these management plans through public and stakeholder workshops and meetings, formal advisory committees, newsletters and invitations to comment on draft plans. Aboriginal people were also engaged through the involvement of Aboriginal native title representative bodies and Aboriginal park councils.

DEC's website continued to enable people to make submissions electronically as well as download information about management planning including issues papers, *Have your say* brochures, final and draft management plans, and analysis of public submission reports.

At 30 June 2011, there were:

- 61 statutory management plans in place
- 12 final terrestrial management plans in preparation
- eight draft terrestrial management plans in preparation.

Further information about management planning is available on the DEC website:

Terrestrial: [www.dec.wa.gov.au/content/category/31/876/1887/](http://www.dec.wa.gov.au/content/category/31/876/1887/).

Marine: [www.dec.wa.gov.au/content/view/3547/2418/](http://www.dec.wa.gov.au/content/view/3547/2418/).





DEC staff, descendants from the 1910 ministerial party and spouses, and representatives from the Royal Western Australian Historical Society, Walpole-Nornalup National Parks Association and WOW Wilderness EcoCruises celebrate the 100th anniversary of Walpole-Nornalup National Park.

## Century for Walpole-Nornalup

One hundred years ago, a small area of land located along the Frankland River was set aside for conservation by the Minister for Lands and Agriculture, Sir James Mitchell.

Mitchell and his ministerial party made their way to the south-west in search of land to develop for agriculture, timber production and dairying. However, upon boating up the Frankland River, he was said to be overcome by the grandeur and beauty of the river and surrounding karri forest, which led him to the decision to set aside 370 hectares as class 'A' reserve.

One hundred years later, the park has grown to more than 19,000 hectares, and Mitchell's granddaughter, great-granddaughter and descendants of members of his ministerial party commemorated the centenary milestone by making the same trip up the Frankland River in his honour.

The Walpole-Nornalup National Park centenary celebration was held on Saturday 2 October 2010 at Nornalup Settlers Park. Descendants of Sir James Mitchell, Harry F Johnston, Neil McNeil and Tom Yeo, along with representatives of the Royal Western Australian Historical Society, made their way to Monastery Landing where a new interpretive panel was unveiled by Hon Barry House MLC.

DEC District Interpretation Officer Christie Mahony said over 140 people were estimated to have attended the community celebration which followed at the Nornalup Community Centre.

"The event was coordinated by DEC staff who've worked closely with members of the Walpole-Nornalup and Districts Historical Society, the Walpole-Nornalup National Parks Association and several other community representatives. Planning for the event started several months prior and culminated in a fantastic day of celebration," she said.

"Official proceedings started with a *Welcome to Country* by local Nyoongar representative Wayne Webb, who acknowledged both ancestors and current custodians of the land.

"The story of the founding of Walpole-Nornalup National Park was told through a slideshow put together by the Walpole-Nornalup and Districts Historical Society, accompanied by old-time music played on a gramophone.

"Judith Crossland, granddaughter of Sir James Mitchell, and Berta Von Bibra, granddaughter of Harry Johnston, paid tribute to their grandfathers, who have had great influence on our state. The speeches were followed by performances by Walpole Primary School students and the 'Circle of Song' choir."

DEC Frankland District Manager Allison Donovan said the national park centenary was a great success and a fantastic celebration of community.

"The event displayed great passion and pride for our national park and was a great tribute to the foresight of our state's forefathers," she said.

"It was an incredible honour to have the direct descendants of the original 1910 ministerial party attend the event and be involved in the park's celebration.

"A great amount of gratitude goes to all involved."

## Acquisition and administration of protected areas

### Reserve acquisition

The formal process of adding land to the state's system of protected areas continued throughout the year.

DEC's program of buying land for addition to the conservation reserve system resulted in the finalisation of purchases of three freehold properties.

Details of these acquisitions are available in the department's *2010–11 Annual Report*: [www.dec.wa.gov.au/content/view/full/6139/2345/](http://www.dec.wa.gov.au/content/view/full/6139/2345/).

Other programs and processes led to the acquisition of lands (such as land ceded to the state as a condition of subdivision, land acquired from negotiated exchanges, and reserves no longer required by other agencies and organisations) that are suitable for inclusion in the conservation reserve system.

Work continued on the implementation of tenure changes proposed in the *Forest Management Plan 2004–2013* and towards the implementation of outstanding tenure recommendations in other management plans.

DEC also continued its role of providing advice on land proposals referred from other organisations, such as the Department of Regional Development and Lands, and advised on issues including the use or disposal of unallocated Crown land and surplus Crown reserves.

### Leasing activities

DEC has lease arrangements for a wide range of purposes. At the end of the financial year there were 231 current formal arrangements for uses on lands managed by DEC including recreation, tourism accommodation, utilities and sawmills. The formal arrangements comprise 173 leases, 24 written agreements, 11 licences, 18 memoranda of understanding and five sawmill site permits.

DEC entered into 39 formal agreements in 2010–11, which mainly involved the renewal of agreements for existing uses.

Major achievements were:

- receiving six properties from Western Australian Planning Commission and working through the management of each of these properties
- negotiating new lease for Moondyne Convention Centre (proposed addition to Avon Valley National Park)
- negotiating leases to Kimberley Wilderness Adventures for two camp sites in Purnululu National Park
- negotiating lease to East Kimberley Tours for a camp site in Purnululu National Park
- negotiating new lease to Pickering Brook Sports Club for its golf fairway
- negotiating new lease to Simcoa for processing of timber residue for production of silicon
- facilitating three leases to Sustainable Forest Management Division to enable them to set up mallee trials.

During the year, a number of other formal arrangements expired and, by 30 June, were at various stages of being renewed.



## Apiary site management

As of 30 June 2011, there were 3,405 current apiary site permits issued on Crown land throughout the state. Of these, 1,695 (49.7 per cent) were on lands managed by DEC, with 880 located on State forest, 105 on timber reserves, 384 on national parks, 226 on nature reserves, 63 on conservation parks and 37 on other lands vested in the Conservation Commission.

During the year, 1,353 apiary site permits were processed, comprising:

- 88 permits transferred between beekeepers
- 34 permits from applications to occupy new or previously cancelled sites
- 1,204 permits renewed
- 27 permit cancellations.

The Beekeeping Consultative Committee met twice during the year to discuss issues including DEC's pool of sites; feral bee baiting program; feral bee strategy; use of chemicals by beekeepers on Crown land; fast tracking applications; size and site plan of an apiary; beekeepers handbook; surveillance program; code of conduct; lands vested in other agencies; *Beekeeping Policy 41*; access strategy; maps to be provided to beekeepers on CD-ROM; clearing permits; beekeeper alert e-newsletter; new apiary forms; updated DEC apiary web pages; draft management plans for public comment; apiary sites at Mount Gibson; dieback; and DEC's district apiary assessment form.

The committee is convened by DEC and comprises industry, government and beekeeping groups.

Further information about apiary management and permits is available on the DEC website: [www.dec.wa.gov.au/content/category/43/117/1993/](http://www.dec.wa.gov.au/content/category/43/117/1993/).

## Park presentation and resource protection

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

### Capital works

The capital works program for Parks and Visitor Services aims to improve and maintain recreation and tourism assets located in national parks, conservation parks, State forest and other reserves across the state. Works are typically associated with the construction, upgrading and maintenance of roads, day-use and camping facilities, and with ensuring visitor safety. In addition to maintaining and improving visitor experiences, the program also seeks to protect environmental, social and landscape values at these sites.

During the year, capital works funding was spent on park improvements and roads. A more detailed description of capital works projects undertaken within each region is provided under *Regional activities* (see page 126).

### Roads

DEC has now completed the task of collecting all inventory-related information and condition assessments for all strategic roads and bridges as the initial stage in developing a comprehensive corporate road asset management system. During 2010–11, DEC continued the process of rectifying road data against databases from Landgate and Main Roads WA to ensure DEC road information is accurate.

DEC continues to work closely with other agencies, such as Landgate, Main Roads WA, WALGA and the FPC, in developing policies and inter-agency agreements to ensure that appropriate standards and user requirements are met and the road information flow is logical and efficient. DEC will continue its collaborative work with local government authorities and Main Roads WA on inter-regional road construction and maintenance work across agency boundaries.

During 2010–11, DEC trialled the application of road operational guidelines in the Warren and Kimberley regions.

DEC has continued to progress the development of a road asset management system to manage its road network of about 38,000 kilometres. This project will assist DEC to identify high priority road improvement works, plan its strategic road requirements, manage identified road hazards, and better identify present and future funding requirements.

## Recreation planning and design

DEC prepared visitor services plans, master plans, concept plans and site development plans for many projects around the state. These plans assist with strategic planning decisions and funding applications, and enable capital works projects to be built to a high standard. Some examples include plans for upgrading visitor access and facilities at Kalbarri and Torndirrup national parks, and Credo and Goongarrie stations in the Goldfields. Detailed design was also prepared for Langford Park near Jarrahdale, and for upgrading facilities at Hamersley Gorge and Fortescue Falls in Karijini National Park, and Shell Beach in the Shark Bay World Heritage area. Design continued on upgrading visitor facilities at Hangover Bay in Nambung National Park, Donnelly Boat Landing, Lake Jasper and Black Point in D'Entrecasteaux National Park, and Yardie Creek in Cape Range National Park. Planning for visitors commenced for Edel Land in the Shark Bay World Heritage area.

Site assessment was undertaken and design guidelines are being developed for nominated *Naturebank* sites around the state.

Master planning and site development planning continued on the *Fitzgerald River National Park Improvement Project* on the south coast. Detailed design was prepared for 15 sites in the park in preparation for the implementation of this program.

Design and/or construction documentation drawings were prepared for many small structures such as boardwalks, toilets, steps and lookouts, including a new toilet at Geikie Gorge, a new boardwalk at Mirima National Park, and a new fee collection pillar and small structures as part of the *Fitzgerald River National Park Improvement Project*.

Planning, training and design advice for recreation were provided as needed and the recreation planning and management course was delivered in November 2010. Advice was given on numerous projects associated with DEC, and staff represented the department on working groups including the Coastwest Technical Assessment Group.

Visual impact assessment, recommendations, guidelines and specialist advice were provided for a number of proposals throughout the year. Expert advice continued to be provided on visual landscape planning matters related to the development proposals for Location 413, Smiths Beach, Yallingup.



## Visitor communication and management

### Interpretive planning

DEC provided strategic communication directives into the preparation of management plans, visitor services plans, recreation site development plans and interpretive projects. Interpretation project plans were prepared for all major site developments with interpretive facilities. Of particular note are the interpretation plans as part of the *Fitzgerald River National Park Improvement Project*.

### Interpretive design

DEC continued to meet regional needs for signs and displays in managing visitors to DEC-managed areas. Designs were prepared for 281 projects, with the majority now installed in parks and reserves throughout the state.

Interpretive projects of particular note were Lake Richmond shelter panels and trailside signs for Rockingham Lakes Regional Park; Boorabbin National Park Memorial; Stokes Heritage Trail in Stokes National Park; and Torndirrup National Park sign system implementation. Work in partnerships with other agencies included the design and installation of the Port Kennedy plaza panels supported by Mirvac Holdings; Curtin University student projects with a travelling display including banners for Whiteman Park; Austen Bay Panels with the City of Mandurah; *Interpretation Australia* magazine WA Special Edition design and printing; and Forum Advocating Cultural and Ecotourism (FACET) newsletter design.

### Community liaison, consultation and advisory services

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

DEC staff worked with the Miriuwung-Gajerrong Park Council towards the development of a sign system and interpretation of jointly managed lands. Sign concept planning was commenced for the Yawuru lands and waters around Broome. Consultation with Aboriginal people associated with Fitzgerald River National Park entailed a field visit to discuss the interpretation of sites within the park.

DEC worked with the Heritage Council of Western Australia, Curtin University, Whiteman Park, Edith Cowan University, WA Museum, FACET and the Interpretation Australia Association in networking, conference and workshop planning, and the facilitation of training and professional development opportunities in heritage interpretation.

Advice was also given to local authorities and various 'Friends' groups across the state on the planning, design and production of signs.

### Guided interpretive programs

Guided interpretive programs continued to be provided regularly in major areas throughout the state. These included the *Nearer to Nature* program, which is provided in Perth's regional parks and at the Perth Hills Centre near Mundaring, Yanchep National Park, Penguin Island Conservation Park and the Perth Observatory. Regional guided experiences were provided at Geikie Gorge National Park, Monkey Mia Reserve in the Shark Bay World Heritage area, the Valley of the Giants and Coalmine Beach near Walpole, Barna Mia in Dryandra Woodland, Perup – Nature's Guesthouse near Manjimup and at Leeuwin-Naturaliste National Park. DEC divisional and regional staff also continued to respond, where appropriate and available, to requests for specific presentations and guided experiences in local areas.

Further information about park presentation, facilities and activities is available on the DEC website: [www.dec.wa.gov.au/content/section/33/1558/](http://www.dec.wa.gov.au/content/section/33/1558/).





DEC interpretation officers (from left) Tania Marchesani and Erin Biggs and Penguin Island volunteers Maureen and David Toon-Poynton with then Environment Minister Donna Faragher (second from left) on the new boardwalk.

## Boardwalk a breeze for visitors

A new boardwalk, officially opened by then Environment Minister Donna Faragher in September 2010, has improved access for visitors to Penguin Island Conservation Park.

The boardwalk offers visitors breathtaking views from the island's southern lookout and allows east-west pedestrian access on the southern end of the island.

Swan Coastal District Parks and Visitor Services Coordinator Shawn Debono said planning for the \$305,000 boardwalk began in 2008, following recognition of a range of environmental and visitor risk issues.

"There was no existing boardwalk—only a sand walk trail—and this was creating erosion issues, dune blowouts and sand slippage," Shawn said.

"The vegetation was being impacted on, and seabird nesting habitat was also at threat of disturbance.

"The new boardwalk provides safe access to the southern lookout which offers 360 degree views of the island, back to the mainland and out across the spectacular seascapes of the surrounding marine park."

The boardwalk is approximately 180 metres long. The decking is made of fibreglass reinforced plastic, which is a relatively new product to be used by the department—it is extremely durable and low maintenance.

A number of DEC staff were involved in the design and construction of the boardwalk.

"Particular recognition should go to District Landscape Architect and Project Manager Sara Padgett who designed the boardwalk and was instrumental in leading and coordinating the construction," Shawn said.

"The construction team from Jarrahdale was also fantastic, especially given the significant logistical challenges of the project. Working on a small and environmentally sensitive island required careful planning and unique material transportation techniques—such as delivering construction materials by helicopter."

The project also included an interpretive component, with new signage being installed on the boardwalk as well as elsewhere around the island.

Penguin Island supports the largest colony of little penguins (*Eudyptula minor*) on the west coast of Australia and is one of the state's premier ecologically sustainable nature-based tourism destinations, with some 90,000 visits to the island during the 2010–11 tourist season.



## Aboriginal liaison, consultation and heritage

DEC places a high priority on liaising, consulting and working with traditional owners, elders and other interested stakeholders to enhance management of DEC-managed lands and waters. It has established an Aboriginal Heritage Unit to support such activities. During the year DEC liaised or worked with:

- elders in local Aboriginal communities, regarding traditional land use and protocols
- RAW 100 (an Aboriginal youth group), where a relationship has been established with DEC that could potentially lead to a training and mentoring partnership
- the Kojonup Aboriginal Corporation and elders at Koja Place, Kojonup to establish community programs
- women from Dumburtung Aboriginal Corporation to help develop cultural programs for customary activities on country
- elders from the metropolitan area on Swan River Iconic Trails at the Canning Eco Centre
- Swan Catchment Council regarding sites that have been disturbed in Walyunga National Park
- Bassendean Cultural Committee regarding heritage, site and community consultation
- Swan River Trust to provide cultural information.

## Planning and relationship building

DEC places a high priority on building external and internal relationships with Aboriginal and non-Aboriginal groups, individuals and organisations. This included:

- contributing to the development and implementation of Policy 69: *Acknowledgment of Aboriginal traditional custodians* (policy, guidelines, training for DEC staff and brochure)
- coordinating the 2011 DEC Aboriginal Staff Conference and initiating the inaugural *Eugene Winmar Award for Excellence*
- providing ongoing cultural advice and assistance to DEC staff regarding Aboriginal consultation and involvement on DEC-managed lands and waters
- providing ongoing links between DEC regional and district staff and Aboriginal communities
- maintaining ongoing relationships with other state and local government agencies such as DAFWA, the cities of South Perth and Canning, as well as other organisations such as National Green Jobs Corps, South Metropolitan Youth Link, Community Services, Peedac (an organisation that trains and provides employment opportunities for Aboriginal people) and Clontarf Aboriginal College regarding potential training and employment partnerships for Aboriginal people
- continuing to build on a positive working relationship with the South West Aboriginal Land and Sea Council through its memorandum of understanding with DEC
- working with Marr Mooditj (Aboriginal Health Training College) on women's issues to assist them with cultural training
- developing partnerships with Community Arts Network on the *Gnarojin Creek Revitalisation Project* with the aim of providing training and employment for local Nyoongar people
- maintaining representation on the DEC Aboriginal Employee Reference Group
- carrying out ongoing work with the Department of Corrective Services to deliver Aboriginal programs at Acacia, Bunbury and Albany prisons
- continuing to liaise with the Gnulla Maaman Moort Boodjah men's group to progress joint land management initiatives with DEC

- developing a working relationship with Maaman Mia Mia men's group in Armadale to progress joint land management initiatives with DEC
- continuing to assist in mentoring, when required, community groups and schools such as Culunga Aboriginal Community School and the Miller Beeliar Aboriginal Corporation.

## Education and training

DEC continues to deliver quality Aboriginal educational programs to schools (day-care to secondary), community groups and special interest groups. During 2010–11 DEC provided:

- 46 visits to schools, community and special interest groups with a total of 2,643 participants
- four cultural protocol workshops at Walyunga National Park for 48 DEC staff and 20 campground hosts
- mentoring to Aboriginal trainees through the MATES program and support to other Aboriginal staff in DEC where required
- a central coordination point of information, assistance and advice on professional development opportunities available to DEC's Aboriginal staff (such as scholarships and leadership programs)
- ongoing assistance to DEC staff in organising 'Welcome to Country' ceremonies for events
- the facilitation of a two-day *Cross Cultural Awareness and Aboriginal Heritage Site* training course for DEC staff and local government employees
- exploration of further learning and training opportunities for DEC staff in the areas of heritage site training and native title as well as further cross cultural awareness courses
- training for 61 DEC staff on the correct protocol for Nyoongar acknowledgment at meetings.

## Business management

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

### Communication and promotion

During 2010–11, DEC distributed an updated version of the booklet *National, marine and regional parks in Western Australia—a visitor's guide to the state* throughout the state and at selected interstate events. The brochure outlines the features, facilities and activities available at more than 100 DEC-managed parks and reserves, and other important visitor information.

In November 2010, DEC attended the *Perth 4WD and Adventure Show* and presented information about parks and visitor facilities and wildlife rehabilitation.

In March 2011, a DEC display at the *Perth Caravan and Camping Show* encouraged Western Australians to visit and rediscover parks and other protected areas of the state with particular emphasis on the Tree Top Walk. Many questions about camping were answered using on-site access to the new DEC Campgrounds website.

DEC continued to be involved in tourism industry activities by providing information and services, including:

- quarterly meetings with DEC's Tourism Industry Reference Group to assist with communication between DEC and the nature-based tourism industry
- provision of editorial assistance to Tourism WA as well as various independent organisations in the park-related content of their publications to ensure accuracy and provision of a wider range of information
- participation in planning for the addition of the Great South West Edge to Tourism Australia and Parks Australia's *National Landscapes* program.



DEC Parks and Visitor Services Project Officer Glenn Willmott discussing *Rediscover Parks* with Ken and Heather Shuffle-Botham of Woodvale.

## *Rediscover Parks* message for caravan show

DEC took the opportunity of a display at the 2011 *Caravan and Camping Show* held at Claremont Showgrounds to broadcast its *Rediscover Parks* message to an appreciative audience.

*Rediscover Parks* is the name of DEC's campaign to improve and upgrade facilities around its national, regional and marine parks, and to promote the positive visitor experiences to be enjoyed in DEC-managed natural areas.

DEC mounted displays at the *Caravan and Camping Show* which highlighted Western Australia's national parks and the Tree Top Walk to the 35,000 visitors to the five-day show, and provided them with information that could improve their holiday experiences across the state.

"Visitors to the show were introduced to the new DEC Campgrounds website which highlights more than 110 camp sites, of which 12 are now bookable online," Tourism and Recreation Education Officer Kevin Smith said.

"With the system now up and running, the public were given the opportunity to interact with the new campgrounds website.

"In addition, the display provided information about parks, trails, volunteer programs and park passes."

Business Manager Julie Ross said the Tree Top Walk also played a key role within the display and created much interest among the visitors.

"The event provided a valuable opportunity to promote the Tree Top Walk and increase awareness of the broader Walpole Wilderness," she said.

"Research has shown that more recreational vehicles are being purchased, and with tourist numbers on open roads increasing, it was appropriate for us to have a presence at the show and talk to one of our key target audiences.

"The positive feedback from the public about the Tree Top Walk was overwhelming with many having visited numerous times with friends and relatives, so much so they said it was a very memorable part of their lives."



## Rediscover Parks

- A new visual identity for *Rediscover Parks* was created for use in communication with visitors and broader tourism industry stakeholders.
- A rolling series of *Free Park Days* was initiated, with free public entry into selected parks including Beedelup, Cape Le Grand, Cape Range, D'Entrecasteaux, Gloucester, Kalbarri, Nambung, Walyunga and Yanchep national parks. A flyer was produced to facilitate community promotion of *Free Park Days*.
- Planning began on a new parks-focused website that includes community engagement through the use of social media and upgraded e-commerce capability. Development began on smartphone applications including numerous *EveryTrail* electronic park guides.
- The DEC Campgrounds website was launched ([www.dec.wa.gov.au/camgrounds](http://www.dec.wa.gov.au/camgrounds)) detailing more than 110 camp sites around the state. In March, a 10-month trial commenced on pre-bookable camp sites, with automated revenue distribution. Bookings were taken at selected popular sites in Cape Range, Purnululu and Beelu national parks, and at Lane Poole Reserve, Dwellingup.

Further information about *Rediscover Parks* is available on the DEC website: [www.dec.wa.gov.au](http://www.dec.wa.gov.au).

## Park passes and fees

Park passes were distributed at 81 points around the state including DEC offices, selected national parks and 43 independent retail outlets.

Decreases in the distribution of passes are consistent with trends in the tourism industry due to the downturn in the world economy and the high value of the Australian dollar.

Table 23: Breakdown of pass distribution 2010–11

Type of park pass	Number distributed	Change from 2009–10
Holiday	6,932	Decreased 24%
Annual local	5,479	Decreased 27%
Annual all	4,040	Decreased 11%
Annual all concession	2,345	Increased 0.08%
Goldstar	1,054	Increased 128%

Note: includes sales and passes sent to DEC offices but not yet sold.

In 2010–11, DEC approved 249 requests for entry fee waivers. The value of foregone revenue is approximately \$69,334 based on estimated visitor numbers of 13,580 (see Table 24). DEC approves fee waivers to support aged and infirm visitors, people with disability, carers, educational and research groups, community service groups and not-for-profit organisations.

Table 24: Fees waived 2010–11—visits by region

Region	Swan	Midwest	Pilbara	Kimberley	Warren	South Coast
Number of visitors	8,015	2,692	768	214	132	1,759

Further information about park passes and fees is available on the DEC website: [www.dec.wa.gov.au/content/view/214/549/](http://www.dec.wa.gov.au/content/view/214/549/).



## Commercial operations and events

DEC licenses commercial operations to monitor and manage the commercial use of DEC-managed lands and waters pursuant to the CALM Regulations. *The Tour Operator Handbook* details licence conditions applicable to commercial operators conducting such activities.

At 30 June 2011, 324 commercial operations licences were current for activities in marine and terrestrial reserves, comprising 287 general 'T' class licences, and 37 'E' class licences for operations where the numbers of licences granted are restricted. The number of commercial operations licences decreased from 337 licences at the end of 2009–10.

Two tour operator accreditation programs are currently recognised and strongly encouraged by DEC to assist in raising standards in the tourism industry. There are 38 operators that have accreditation through Ecotourism Australia (Eco Certification with business and environmental components) which is a decrease from 81 in 2009–10, and 89 operators that are accredited with Australian Tourism Accreditation Program (business certification), a decrease from 144 in 2009–10.

In October 2009, the Ministers for Environment and Tourism announced the government's response to the *Review of Nature Based Tourism*, accepting in part or whole 43 of the 49 recommendations of the review. These included the lengthening of commercial operations licences from the previous 10-year duration to periods of up to 15 years and a requirement for all licence holders to achieve recognised tourism accreditation. Tourism concessions granted by way of a lease or a licence will also have key performance indicators that can be audited to demonstrate a commitment to best practice standards. Since Cabinet's endorsement of the review, 22 of the 43 recommendations have been implemented and 21 are currently being progressed.

The *Naturebank* program involves the identification and preparation of sites within DEC-managed lands for appropriate sustainable ecotourism accommodation development. This program is a partnership between Tourism WA and DEC. Eight sites have been identified within DEC estate as potential *Naturebank* sites. These are:

1. Purnululu National Park, World Heritage area (Kimberley) \*
2. Windjana Gorge National Park (Kimberley) \*
3. François Péron National Park, Shark Bay World Heritage area (Midwest) \*
4. Wharnclyffe Mill, Bramley National Park (South West) \*
5. Cape Le Grand National Park (South Coast) \*
6. Millstream Chichester National Park (Pilbara)
7. Mount Hart Wilderness Lodge (King Leopold Ranges Conservation Park, Kimberley)
8. Yoorooyang Dawang Regional Park (Aboriginal land close to Kununurra, Kimberley).

\* *Naturebank* site assessments and clearances funded through *Royalties for Regions* program.

In 2010, the state government announced *Royalties for Regions* funding of \$5.2 million over four years to support the preparation of five of the eight *Naturebank* sites and, in some cases, the provision of infrastructure to assist in the development of commercial eco tourism accommodation facilities.

Further information about commercial operation on DEC-managed lands and waters is available on the DEC website: [www.dec.wa.gov.au/content/category/33/782/1582/](http://www.dec.wa.gov.au/content/category/33/782/1582/).

## Legislation and policy for parks and visitor services

### Legislation

The Conservation Legislation Amendment Bill 2010 aims to meet legal obligations under the Burrup and Maitland Industrial Estate Agreement, the Ord Final Agreement and the Yawuru Agreement. It also aims to fulfil long-standing aspirations of Aboriginal people to be involved in the management of land, and to carry out traditional activities 'on country' which is in conservation reserves. The legislation was introduced into Parliament in November 2010 and passed in the Legislative Council in March 2011. On 30 June 2011, it was tabled in the Legislative Assembly for consideration and debate.

The Bill provides for changes to the CALM Act and the WC Act to support management objectives to meet three main aims:

1. to protect and conserve the value of the lands and waters to the culture and heritage of Aboriginal people
2. to enable Aboriginal people to undertake certain acts for customary purpose on reserves and other lands managed under the CALM Act and WC Act
3. to enable joint management of lands and waters between the department and other landowners, or those with a vested or other interest in the land, including Aboriginal people.

Amendments to the CALM Regulations and the WC Regulations to support the changes proposed in the Bill are being drafted. These amendments will focus on managing activities undertaken by Aboriginal people for customary purposes.

Work continued on the development of a new set of regulations relating to the administration of apiary site permits and licences. The new CALM Regulations were gazetted on 3 September 2010 and replace Part 11 of the Forest Management Regulations 1993 relating to apiary sites. The latter were repealed on the same date.

Miscellaneous amendments to the CALM Regulations were gazetted in December 2010. These amendments related mainly to the management of visitors on land managed by the department. The changes included introducing fees for Dirk Hartog Island National Park; increasing maximum daily parking charges; introducing aircraft landing fees; allowing dog, horse and abseiling areas to be designated by signs; expanding powers for authorised officers to direct extinguishment of fires; amending requirements for fee signage at parks; introducing provisions for management of vessel storage facilities; and increasing licence periods for commercial operations.

### Policy

During 2010–11, the *Acknowledgment of Aboriginal Traditional Custodians* policy was approved, while development or review of policies in the following areas continued:

- memorials, merchandising, organised group activities
- cave and karst
- commercial filming
- mooring.

Further information about legislation and policy is available on the DEC website: [www.dec.wa.gov.au/content/view/full/3401/2141/](http://www.dec.wa.gov.au/content/view/full/3401/2141/).



## Recreation activities and trails

DEC coordinates the management of outdoor recreation activities consistent with the protection of natural and cultural values on the lands and waters it manages.

During 2010–11, DEC continued to work closely with the Department of Sport and Recreation, Outdoors WA and other key stakeholders on important recreation initiatives.

DEC continued to work with the Department of Corrective Services with crews from Bunbury and Pardelup regional prisons assisting in the development of the Munda Biddi Trail.

### Bibbulmun Track

DEC continued its strong partnership with the Bibbulmun Track Foundation in 2010–11. Foundation volunteers have contributed almost 13,000 hours towards maintenance and support of the Bibbulmun Track, including working with DEC staff in repairs and upgrades to camp sites along the length of the trail.

In the 2010 *Western Australian Tourism Awards*, the Bibbulmun Track was a finalist in the Tourism Attraction category and the Bibbulmun Track Foundation was a finalist in the Adventure Tourism category.

DEC completed the development of a group-use camp site in the Perth Hills District, jointly funded by DEC and ALCOA. Construction also commenced on two additional group-use camp sites in the Wellington District, due to be finished in late 2011.

DEC continued with maintenance and improvements along the Bibbulmun Track as part of the capital works program. Some major accomplishments included:

- refurbishment of eight camp sites (Tom Road, Blackwood, Torbay, Boarding House, Beavis, Dog Pool, Lake Maringup and Gardiner)
- installation of sealed vaults to the toilets at Murray and Mount Dale camp sites
- construction of a new and improved alignment at Glen Mervyn Dam
- construction of numerous bridges
- erosion control at numerous locations.

Further information about the Bibbulmun Track is available on the DEC website: [www.dec.wa.gov.au/content/view/27/792/](http://www.dec.wa.gov.au/content/view/27/792/).

### Munda Biddi Trail

The partnership between DEC and the Munda Biddi Trail Foundation continued to strengthen throughout the year. The Munda Biddi Trail Foundation was also a finalist in the Adventure Tourism category of the 2010 *Western Australian Tourism Awards*. The trail has also been gaining increased media exposure in the United Kingdom, including a full-page article in the *UK Sunday Times*.

Munda Biddi Trail Foundation volunteers, who have contributed about 2,000 hours of maintenance and support, are now regularly inspecting the complete length of the trail.

DEC has completed a trail counter trial on the Munda Biddi Trail to determine the most suitable trail counters for use to monitor trail usage, along with conducting a survey of users.

Two new sections of trail have been constructed and opened, including the extension of the trail between Nannup and Manjimup (83 kilometres), and a section of rail trail in Torbay near Albany (eight kilometres). The Nannup to Manjimup section includes a new dedicated Munda Biddi Trail camp site, called 'Karta Burnu', meaning 'hill of trees' in the Nyoongar language.



Planning and development for the remaining length of the trail between Manjimup and Albany have continued, including planning for another four dedicated camp sites between Northcliffe and Denmark, funded by DEC and the *Royalties for Regions* program. The foundation has commenced their community development program, assisting local communities to become 'cycle friendly' in preparation for the trail's completion through to Albany.

DEC continued to carry out work along the Munda Biddi Trail, which included a new bridge in the Collie area and trail maintenance in various locations.

Further information about the Munda Biddi Trail is available on the DEC website:  
[www.dec.wa.gov.au/content/view/159/793/](http://www.dec.wa.gov.au/content/view/159/793/).

## Motorised recreation

During the year, DEC continued to work with the Western Australian Four-wheel Drive Association, Track Care WA and the Recreational Trail Bike Riders Association of WA, and Motorcycling Western Australia to promote the responsible use of public lands by four-wheel drivers and other motorised visitors. DEC has formed a Motorised Recreation Working Group, with members of these groups, with the aim of developing motorised recreation management guidelines for DEC-managed lands.

DEC completed a regional off-road vehicle land-use study, which will assist the department and local government in identifying potentially suitable areas for motorised recreation along the Darling Scarp between the Shire of Swan in the north and the Shire of Collie in the south.

Track Care WA and the Western Australian Four-wheel Drive Association actively supported DEC through a track and rangelands adoption program. This has resulted in a number of successful partnership projects including track stabilisation, clean-up projects and other environmental care initiatives across the state.

In conjunction with the Recreational Trail Bike Riders Association, DEC has begun developing trails for family and novice riders in the gazetted off-road vehicle area at Pinjar, along with planning a pilot trail network in the Perth Hills District.

Further information on four-wheel driving and DEC is available on the DEC website:  
[www.dec.wa.gov.au/content/view/174/849/](http://www.dec.wa.gov.au/content/view/174/849/).

Volunteers enjoying Karta Burnu camp site on the Munda Biddi Trail.





Director General Keiran McNamara welcomes guests before introducing the Hon Bill Marmion, Minister for Environment, who made the announcement about the three-year funding program.

## Funding boost for Bibbulmun Track

Funding of \$1.2 million over three years for DEC's *Long Trails Maintenance Capital Program* was announced in 2011.

The announcement was made in March, when 25 representatives of the Bibbulmun Track Foundation and DEC, including Director General Keiran McNamara and Member for Kalamunda Hon John Day, walked into Hewett's Hill camp site, the most northerly of 48 along the track, as guests of Environment Minister Bill Marmion at a morning tea.

Most of the funds will be spent on improvements to the Bibbulmun Track and its facilities.

With the current alignment opened in 1998, and the latest survey indicating more than 430,000 visits each year, much of the track infrastructure is scheduled for repair or replacement.

Work along the Bibbulmun Track—which stretches nearly 1,000 kilometres from Perth to Albany—will include erosion control along the trail, while many of the camp sites will receive major upgrades with new toilets, water tanks, gates and signage.

While the assembled guests enjoyed tea and scones, the Minister examined the work already completed at Hewett's Hill.

In his announcement, Mr Marmion congratulated the officers and volunteers of DEC and the Foundation, those present and the many others, on the improvements and on the continued success of the track.

He acknowledged the key contribution of the Department of Corrective Services, whose crews carry out much of the work under DEC supervision, and the consistent support of the local member John Day.

Also at the event—and at the opposite end of the technology scale to a Bibbulmun Track camp site—the Minister announced some new ways to discover Western Australia's national parks.

The DEC Campgrounds website went live in March 2011, and soon afterward the first six DEC *EveryTrail* guides were made available to view online and to download to smartphones or GPS devices.

The DEC Campgrounds website is available at [www.dec.wa.gov.au/campgrounds](http://www.dec.wa.gov.au/campgrounds) and the *EveryTrail* guides can be downloaded from [www.everytrail.com/partner/dec](http://www.everytrail.com/partner/dec).

## Community involvement

DEC continued to enlist community support as well as provide meaningful and interesting opportunities for volunteers to take part in conservation activities.

In 2010–11, a total of 12,793 volunteers contributed 368,949 hours of support to projects across Western Australia.

Table 25: Community involvement volunteers

Year	Number registered	New projects	Number of volunteers contributing	Number of hours
1999–00	3,800	12	1,400	121,000
2000–01	4,499	26	1,600	190,000
2001–02	5,683	20	2,500	217,000
2002–03	5,160	32	3,150	264,000
2003–04	6,100	30	2,700	355,000
2004–05	7,600	28	4,000	422,000
2005–06	8,230	6	3,882	470,600
2006–07	9,726	8	3,250	406,000
2007–08	7,784	9	3,439	424,500
2008–09	9,558	7	4,004	426,200
2009–10	11,082	23	3,038	451,040
2010–11	12,793	27	2,615	368,949

## Volunteers

The annual Volunteer of the Year and Outstanding Service awards function to acknowledge the important support DEC receives from its volunteers was held in November 2010 at the Western Australian Conservation Science Centre. This celebration continues to reinforce the excellent contribution that DEC volunteers make to the management and delivery of projects on DEC-managed reserves.

Ongoing projects such as the Campground Host Program (CHP), the Bibbulmun Track Foundation (office support and track maintenance), the Wildlife Rehabilitators program, the Wildcare Helpline, honorary CALM officers and projects at the Western Australian Herbarium, all contribute to the protection and care of the environment in all its facets. The CHP has continued to attract volunteers to the program with 41 new hosts joining this year, making a total of 448 across the state. In addition, research has shown that volunteer activity in a 'green' setting contributes positively to the physical and mental health of participants.

Other major groups such as Conservation Volunteers Australia (CVA), the Department of Corrective Services and four-wheel-drive clubs continued to work closely with DEC field staff to provide training opportunities as well as to rehabilitate and enhance the natural environment. In particular, the CVA *Earth Assist* project, sponsored by Rio Tinto and supported by DEC and the Department of Education, has demonstrated a remarkable collaborative effort, especially beneficial to young people.



Across the state, 18 new projects were registered with the Community Involvement Unit during 2010–11. New projects included:

- development of recovery plans for TECs
- the West Pilbara Turtle Program
- National Parks Beach Clean-up
- Golden Valley Tree Park
- Friends of Darlington Brook.

During 2010–11, DEC continued to provide training programs to DEC volunteers with support from specialist services in DEC and external agencies. Training included the campground host forum; safe work practices as part of DEC's corporate induction; risk management; basic fire awareness; first aid; cross cultural awareness; the basic wildlife rehabilitators' course (at regional and metropolitan locations); advanced and special topics for wildlife rehabilitation; and Wildcare Helpline evaluation and training. Volunteers attended training in various locations including Perth, Albany, Busselton, Kununurra, Bunbury and Broome.

*Minimum Standards for Wildlife Rehabilitation in Western Australia*, a document outlining the minimum standards for welfare of native animals in all stages of the wildlife rehabilitation process, has become the definitive resource for the field. The publication continues to assist in returning native animals into the wild.

Further information about community volunteers and DEC is available on the DEC website: [www.dec.wa.gov.au/content/category/16/183/341/](http://www.dec.wa.gov.au/content/category/16/183/341/).

## *Healthy Parks, Healthy People*

The *Healthy Parks, Healthy People* program remains a significant component of raising community awareness of the health benefits of parks. It also provides focus for public participation and community involvement strategies on DEC-managed lands. Cross-promotional opportunities with non-government health organisations continue to be consolidated as follows:

- The *Healthy Parks, Healthy People* program, in partnership with the Heart Foundation, continued the Park Walks program until its completion in September 2010.
- DEC supported *Walk Week* in November 2010, with walks being offered in Yanchep National Park. *Walk Week* is a state government initiative that aims to encourage Western Australians to walk more for leisure, transport, health and the environment.
- DEC continued its partnership with Mentally Healthy WA's *Act-Belong-Commit* campaign, Keep Australia Beautiful's *Adopt-a-Spot* program and *Grow a Healthy Outlook* resource.
- With funding assistance from the Department of Health's Fiona Stanley Hospital project, planting days with community groups continued in Beeliar Regional Park, and the *Spectacles Star Story* flyer was produced to promote Aboriginal culture and the Spectacles wetlands in Beeliar Regional Park.



## Regional parks

Major achievements in managing Perth's regional parks during 2010–11 were as follows.

### Planning and estate management

The Jandakot Regional Park and Rockingham Lakes Regional Park management plans were finalised and approved by the Minister for Environment.

DEC provided significant input into the Establishment Plan proposal for the Preston River to Ocean Regional Park in Bunbury.

The provision of advice on land-use planning and development proposals affecting regional parks continued. Major projects included the proposed Roe Highway extension (Stage 8) affecting Beeliar Regional Park, the proposed Keane Road strategic link affecting Jandakot Regional Park, the proposed Mangles Bay tourist precinct, and the proposed Rockingham Regional Hospital/Woodbridge Estate second access road affecting Rockingham Lakes Regional Park.

DEC commenced management of Araluen Botanic Park for a three-year period effective 1 July 2010. A management agreement has been prepared with the Western Australian Planning Commission as the land owner, which enables DEC to manage the land under Section 16 of the CALM Act. A management contract with the Araluen Botanic Park Foundation for the delivery of park management and visitor and ancillary services has been finalised.

### Conservation works

- DEC's works continued relating to the rehabilitation of land in Beeliar Regional Park and community-based conservation programs associated with the Fiona Stanley Hospital and Health Precinct.
- Prescribed burning was completed at Churchman's Bushland in Wungong Regional Park, Paganoni Swamp in Rockingham Lakes Regional Park, and Woodman Point Nature Reserve in Woodman Point Regional Park.
- Major fire rehabilitation works occurred at Anstey Swamp in Rockingham Lakes Regional Park, North Lake in Beeliar Regional Park, and across Banyowla Regional Park following the February 2011 Perth hills bushfire.
- Landscape enhancement works and access control measures were commenced along Port Kennedy Drive in Rockingham Lakes Regional Park.
- The water supplementation program at Thomsons Lake Nature Reserve in Beeliar Regional Park continued to be implemented in conjunction with the Water Corporation to maintain water in the lake for a longer period in early summer, thereby improving waterbird habitat.
- DEC contributed significantly to environmental restoration works associated with the installation of the Gnangara branch sewer by the Water Corporation in Yellagonga Regional Park.
- The five-year midge management partnership for Yellagonga Regional Park continues with the City of Joondalup and City of Wanneroo for 2010–15.
- The upgrade of fire access tracks and installation of boundary fencing was completed within the bushland area of Araluen Botanic Park.
- Conservation works continued throughout the regional park networks including the removal of introduced animals and other pests.



- Numerous weed control and revegetation projects across the regional park network were undertaken, including:
  - Beeliar Regional Park at North Lake, Thomsons Lake Nature Reserve, the Spectacles wetlands and Mount Brown
  - Canning River Regional Park at the Greenfield Street Bridge, Masons Landing, Urban Forest and the Billabong
  - Herdsman Lake Regional Park at Popeye Lake and Glendalough South
  - Rockingham Lakes Regional Park at Port Kennedy Scientific Park, Paganoni Swamp, Lake Cooloongup, Lake Walyungup and Cape Péron
  - Woodman Point Regional Park at O’Kane Court and John Graham Reserve
  - Yellagonga Regional Park at the Luisini Winery (in conjunction with the National Trust) and Drovers Place.

### On-ground park improvements

- Capital improvements were undertaken in the recreation area at Lesmurdie Falls in Mundy Regional Park. The works completed included picnic shelters and a feature survey of the existing walk trail from Palm Terrace to the base of the falls.
- Car park upgrade works were completed at the headland in Woodman Point Regional Park and near the wildlife centre at Herdsman Lake Regional Park. A range of other car park improvements including landscaping, barriers and line marking were completed throughout the regional parks network.
- Pathway upgrade works were completed at Yellagonga Regional Park and Herdsman Lake Regional Park to improve visitor access and drainage, and to mitigate visitor risks.
- A culvert constructed to provide improved vehicle access was completed at Stoney Brook, Banyowla Regional Park.
- Improvements to the Cockburn Road frontage of Woodman Point Regional Park were completed, including landscaping and removal and replacement of fencing.
- An asbestos structure was removed and rehabilitation works were successfully completed at a previously leased site at Rockingham Lakes Regional Park.
- A roof was installed over the Mary Hargreaves Pergola at Araluen Botanic Park.
- A park concept plan was prepared to guide the implementation of capital works within Araluen Botanic Park over the next two financial years.

### Community liaison and participation

The Regional Parks Branch continued to administer eight community advisory committees for regional parks, meeting on 40 occasions during the year.

The Regional Parks *Environmental Community Grants* program was again successfully administered. A total of \$105,000 was offered to volunteer groups to undertake works in regional parks, with \$30,000 of this funding being provided by the Department of Health through the Fiona Stanley Hospital and Health Precinct project. Eighteen community groups were successful in securing funding for a variety of projects including rehabilitation and weed control works and enhancement of Carnaby’s cockatoo habitat.



Project Manager Renee Evans and General Manager Araluen Botanical Park Foundation Rod Ross.

## Araluen joins DEC-managed lands

From 1 July 2010, DEC accepted management responsibility for Araluen Botanic Park. The three-year transitional management arrangement with the Western Australian Planning Commission recognises DEC's expertise in managing parklands with a variety of landscapes, uses and stakeholders.

Araluen Botanic Park straddles the ancient Darling Scarp in Roleystone and consists of 45 hectares of natural bushland and 14 hectares of landscaped gardens, terraces, water features and buildings, some of which are listed on the State Heritage Register.

Since 1995, and prior to the transfer to DEC, the park was leased to the Araluen Botanic Park Foundation (ABPF). Over this time, the ABPF worked to restore the buildings, develop and maintain the eclectic gardens and features of the park, and conduct community events.

As part of the new management arrangements, the ABPF is contracted by DEC to provide management services for the 14 hectares of landscaped areas in the park over the next three years.

Renee Evans was appointed project manager for the three-year period.

"I am looking forward to working collaboratively with the ABPF, and the challenge of managing this diverse botanic garden and natural landscape," Renee said.

"The new management arrangements are groundbreaking for both DEC and ABPF. I'm sure I will learn a lot about managing gardens and the community's passion for the area.

"Much of the bushland in Araluen Botanic Park is in excellent condition and is representative of the vegetation communities found on the weathered granite and laterite soils of the Darling Plateau.

"The acquisition of this bushland will create further ecological corridors for the conservation estate as it is adjacent to Stinton Cascades Nature Reserve and is in close proximity to Wungong Regional Park and Midgegoroo National Park."



## Social and visitor research

During 2010–11, several projects were undertaken through collaboration with various branches and divisions within DEC, tertiary institutions and other agencies. Projects included:

- involvement in an Australian Research Council (ARC) linkage project 'Promoting and managing national parks into the 21st century' that will improve our understanding of the place that parks occupy in Australian society
- completion of a collaborative project with the Munda Biddi Trail Foundation and Curtin University to assess trail usage and trail user characteristics, expenditure, satisfaction and experience of the trail
- ongoing involvement in a study determining visit and visitor characteristics, satisfaction and reasons for visiting the Tree Top Walk
- ongoing collaborative project with whale shark tour operators in Ningaloo Marine Park to obtain data about the whale shark experience and visitor satisfaction with whale shark tours
- ongoing involvement in a survey to determine visit and visitor characteristics, activities, knowledge of marine parks, and satisfaction with services and facilities at Shoalwater Islands and Marmion marine parks
- continued involvement in a study of visit and visitor characteristics, activities and satisfaction with services and facilities at Matilda Bay Reserve.

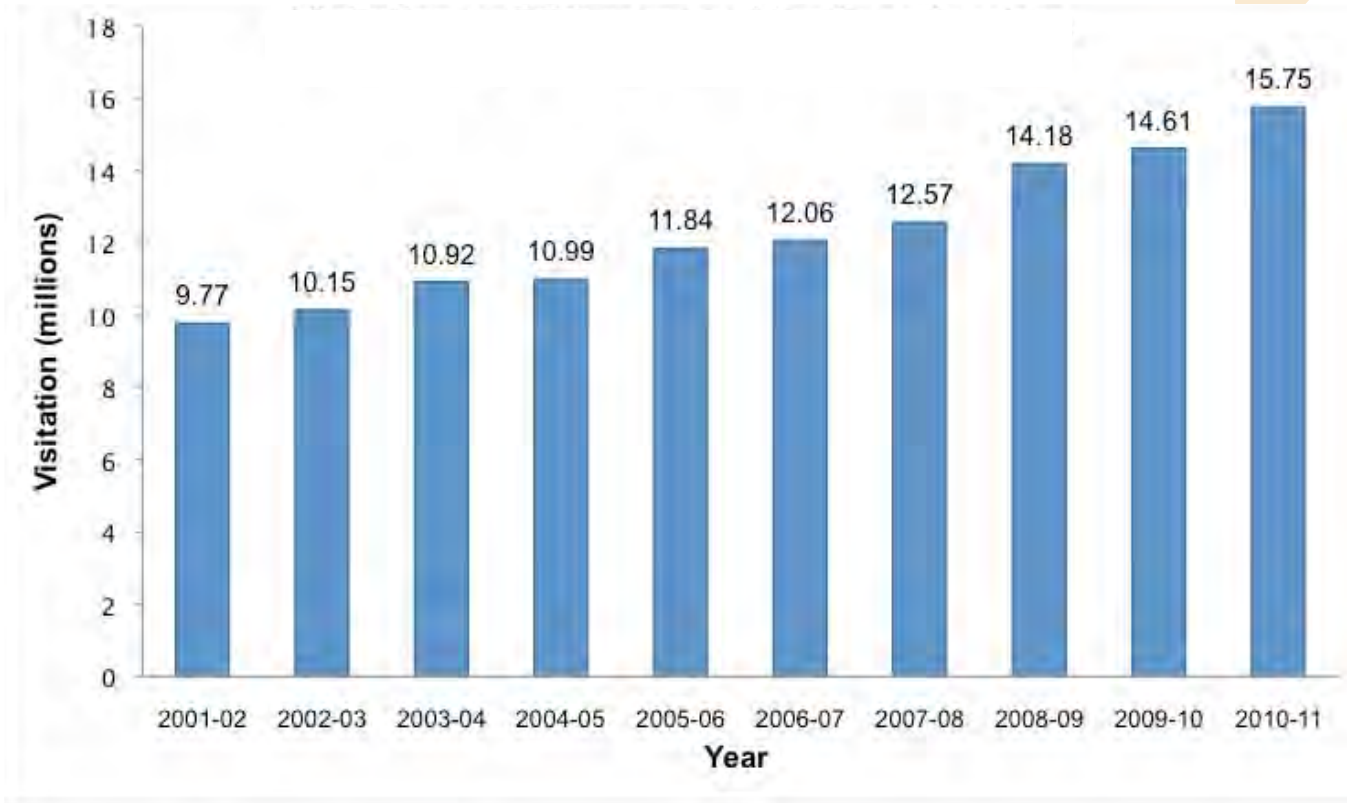
DEC continued to work closely with Western Australia's major tertiary institutions via the Nature Based Recreation and Tourism Research Reference Group, comprising academic staff from all five Western Australian universities as well as DEC staff and representatives from Tourism WA. This group provides funding to honours, masters and PhD students and projects. The project funded for 2010–11 was a study of community and socio-economic impacts of the world heritage inscription of Shark Bay.

### Visitor-use monitoring

Visitor use was monitored at 406 sites utilising a variety of methods including traffic classifiers and counters, pedestrian counters, observation surveys, and ticket sales in national parks, State forest and other reserves throughout the state. The total reportable visitation to lands and waters managed by DEC during the year was 15.75 million, an increase from the 14.61 million visits reported during 2009–10 (see Figure 1). Although an apparent increase in visitation has occurred, a portion of the increase in total reportable visitation is due to improved monitoring across DEC-managed lands and waters.



Figure 1: Total reported visits to lands and waters managed by DEC



DEC also continued to upgrade the Visitor Information and Statistics and Visitor Survey databases contained within the Recreation and Tourism Information System database and the hardware required to monitor visitor use.



## Visitor survey program

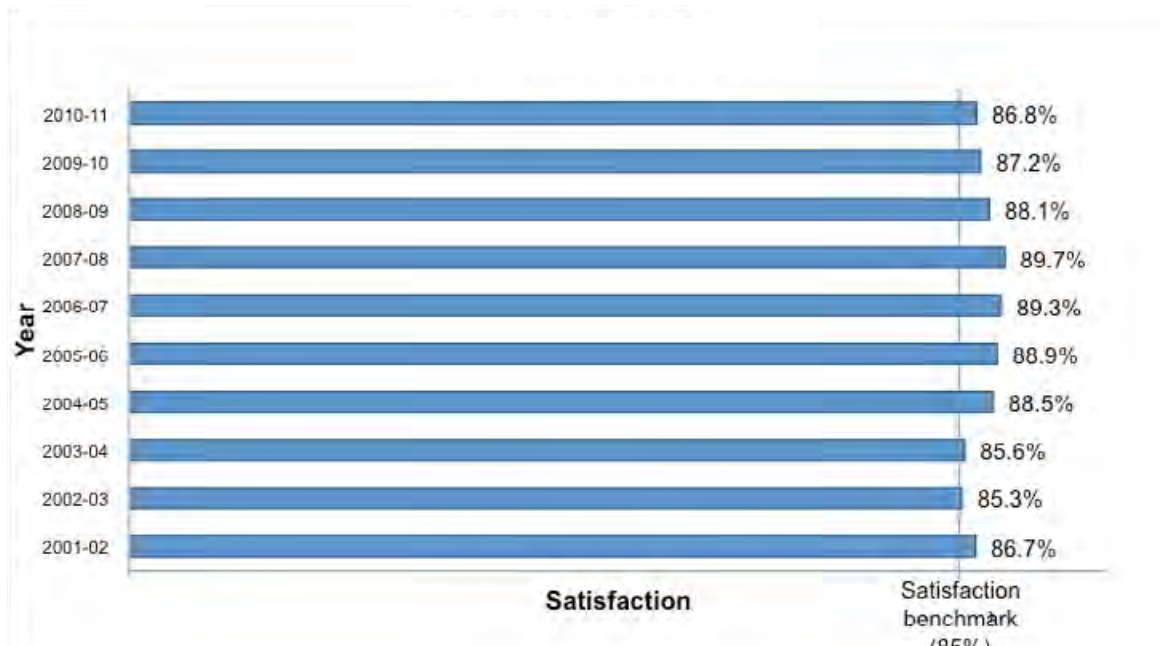
DEC's visitor survey program continued to provide visitor feedback that was used to assess visitor needs and expectations, as well as gauge visitor satisfaction with recreation and tourism facilities and services provided by DEC.

Respondents to the 2010–11 visitor survey program (n=1159) displayed the following characteristics:

- Of the sampled visitors, the majority indicated they were residents of Australia (90.4 per cent), and of these approximately half indicated that they were a Western Australian resident.
- The majority of respondents indicated that they were travelling with family/partner (73.6 per cent).
- Overall, 97.7 per cent of respondents would recommend the park they were surveyed at to friends who shared their interests.

As part of the program, a benchmark visitor satisfaction index has been adopted to compare visitor satisfaction levels each year. This benchmark has been set at 85 per cent. The 2010–11 index, averaged from visitor responses to the survey at the selected parks, reserves and forest areas around the state, was 86.8 per cent. This outcome, with results from previous years of the visitor survey program, is illustrated in Figure 2.

Figure 2: A comparison of annual visitor satisfaction levels within DEC-managed lands and waters





DEC Senior Ranger Gilbert Stokman at Leeuwin-Naturaliste National Park.

## Record visitor numbers test Leeuwin-Naturaliste National Park

Leeuwin-Naturaliste National Park broke the 2.3 million visits a year mark at the end of 2010, and DEC Parks and Visitor Services Coordinator for the Blackwood District Brian O’Hehir said DEC rangers had to step up their patrols throughout the national park to keep visitors safe.

“We have simple rules in place to protect visitors and the national park itself, which stretches 120 kilometres along the coastline from Bunker Bay in the north, to Augusta in the south,” he said.

“Protecting the park’s natural assets is essential and while most visitors to the park are overwhelmingly doing the right thing, there are some who choose to ignore the rules, and regrettably, we’ve had to issue 442 on-the-spot fines for offences such as lighting illegal fires, bringing dogs into the national park or damaging vegetation.”

Brian said between November 2010 and May 2011, DEC rangers attended 13 illegal fires within the national park which could have easily got out of control.

“Visitors are the lifeblood of the national park but there are times when DEC rangers need to use their powers under the CALM Act to deal with anti-social activities like the riding of unlicensed motorbikes or itinerant campers who have set up outside designated camp sites,” he said.

“These selfish actions not only cause tensions with other visitors but also impact on the national park’s vegetation, leading to erosion and site degradation.”

A draft management plan for the Leeuwin-Naturaliste Capes area was released for public comment in early 2011. The plan was prepared by DEC in consultation with the Capes Parks Community Advisory Committee, on behalf of the Conservation Commission of Western Australia.

Public submissions on the draft management plan are currently being analysed.

“The new management plan will focus on protecting key values and addressing cross-boundary issues such as feral animals, fire, weeds and recreation management,” Brian said.



## Astronomy

Astronomy activities are conducted at DEC's Perth Observatory in Bickley. The Observatory provides a range of opportunities for public viewing and public participation. The Observatory also contributes to scientific research in astronomy by cooperating with national and international institutions in the acquisition, analysis, interpretation and dissemination of information.

### Public viewing and participation

Throughout the second half of 2010, the Perth Observatory continued to organise and take part in events that supported the International Year of Astronomy. The International Year of Astronomy is a worldwide public outreach program that is sanctioned by the General Assembly of the United Nations and coordinated by the International Astronomical Union.

Perth Observatory participated in *Astrofest*, a festival run by the local astronomical community and held at Curtin University. The Observatory had a display stand, and staff facilitated star viewing using the Observatory's portable 30-inch telescope. An estimated 3,000 people attended the event.

International speaker Professor Miller Goss delivered the Observatory's Summer Lecture on Ruby Paine-Scott. Ms Paine-Scott was a CSIRO researcher who was a pioneer of modern radio astronomy and campaigned for better working conditions for female scientists in the 1940s.

The Perth Observatory Volunteer Group (POVG) ran the star viewing nights for the first time this year. This was done under the supervision of the Observatory's Outreach Coordinator. The POVG also increased their role in training new volunteers and assisted staff at *Astrofest*.

Public awareness of the Observatory remains high. The number of visitors who attended star viewing nights and daytime guided tours was 3,896 in 2010–11. Customer satisfaction showed 98 per cent were satisfied with their visit or the service provided by the Observatory and 98 per cent were satisfied with the educational quality of the services in which they participated. The number of people who attended talks or astronomy field nights in 2010–11 was 3,170.

Observatory staff informed the public of astronomical events in 112 newspaper articles, four radio interviews and answered 998 email queries. The Observatory also provided information via its website, which received more than 260,643 page viewings.

### Research activities

The *Probing Lensing Anomalies Network* collaboration continued throughout the year to observe changes in brightness caused by the gravitational focusing of light from a star. This lensing effect occurs when two stars are aligned, when viewed from the Earth. This year, three refereed papers have resulted from this collaboration. They included the discovery of another extra-solar planet orbiting a low mass star. The mass of this extra-solar planet is approximately 2.5 times the mass of Jupiter. A second paper estimates the frequency of stars that have an outer planetary system that resembles our solar system. The paper estimates that if a star is known to have at least one giant gas planet or one giant ice planet then that star has a one-in-six chance of having an outer planetary system that is solar-like.

During the year, a member of staff was involved in the development of software and electronics for the Murchison Widefield Array (MWA) radio telescope. This radio telescope is one of two pathfinder telescopes being built at the proposed Western Australian site for the square kilometre array radio telescope. A worldwide consortium of universities including The University of Western Australia and Curtin University is building the MWA. This consortium published two refereed papers. The first paper describes the real-time techniques used to produce a 20-degree radio image from MWA data. The second paper describes low radio frequency spectroscopic observations of the sun made by the MWA.

## Support to the Conservation Commission

DEC supports the Conservation Commission of Western Australia in accordance with the CALM Act and the 2006 *Operational Relationship Agreement*. Support during the year was provided by various individuals and branches in DEC. During 2010–11, DEC assisted the Conservation Commission with:

- staffing of the Conservation Commission Service Unit, which supported the Conservation Commission in:
  - facilitating liaison within DEC for the delivery of the Conservation Commission's statutory responsibilities in relation to management planning
  - providing guidance and comment on draft management plans
  - undertaking management plan performance assessments, including reviewing the implementation of the Water Corporation's *Wungong Catchment Environment and Management Project* (as part of the Forest Management Plan Performance Assessment); the Albany parks region pilot study assessment; and the assessment of *Phytophthora* dieback management on lands vested in the Conservation Commission
  - assessing old-growth forest in the Yornup, Iffley and Collins forest blocks, and reporting on community nominated old-growth forest in the Arcadia, Coonan and Warrup forest blocks
- providing advice and information relating to the statutory functions of the Conservation Commission regarding leases, licences and permits, land tenure, mining proposals and ecologically sustainable forest management
- preparing of management plans for lands vested in the Conservation Commission.



## Other initiatives

### Memoranda of understanding

DEC continues to maintain a number of significant partnerships that are formalised through a memorandum of understanding (MOU). A review of MOUs commenced in June 2011. The primary purpose of the review is to confirm best-practice relationships are maintained with increased benefits for all parties.

Long-standing MOUs include one with the Department of Corrective Services where prisoners continue to provide a valued contribution to DEC projects and the community through maintenance and construction of walk trails and other facilities including the Bibbulmun Track, the Munda Biddi Trail and the Cape to Cape Track. Prisoners also assist with signage work, construction of picnic tables and benches, weed control, maintenance of firebreaks, and cleaning and repair of campground facilities in many parks and reserves around the state including Mirima, Millstream Chichester, Porongurup and Leeuwin-Naturaliste national parks and Coalseam Conservation Park.

The MOU between DEC and *Leave No Trace* Australia continued, with further projects to promote minimal impact visitor behaviour. *Leave No Trace* messages have been included in DEC publications and signs and *Leave No Trace* continued its involvement in the completion of the Adventure Activity Standards and other government and community initiatives.

The successful partnership between DEC, CVA and Rio Tinto continued during 2010–11. The Department of Education, as an additional partner in Rio Tinto's *Earth Assist* conservation program, allowed volunteering opportunities to be enjoyed by schoolchildren in Perth and regional Western Australia. The program promotes environment-based volunteering to secondary school students.

The MOU between DEC and Track Care Western Australia and the West Australian Four-wheel Drive Association continued, with further projects to promote minimal impact use of four-wheel-drive vehicles. The MOU seeks to clarify and maintain the highest standards of cooperation and understanding between all three organisations and includes a volunteer adoption program. The track and rangelands adoption program has resulted in a number of successful partnership projects across the state.

The successful partnership approach with the four-wheel-drive community is being mirrored with the trail bike riding community, with the development of several projects including the gazetted off-road vehicle area at Pinjar, along with planning a pilot trail network in the Perth Hills District. An MOU is also being developed with the peak bodies being the Recreational Trail Bike Association of WA and Motorcycling Western Australia.

### World and national heritage

The state government agreed to support the Ningaloo Coast World Heritage nomination, and a joint announcement by the federal and state Environment Ministers was made on 6 January 2010. DEC assisted the federal government in hosting the International Union for Conservation of Nature (IUCN) for the IUCN's technical evaluation of the nomination, which involved a field trip to the Ningaloo Coast in October 2010. An officer from DEC was part of the Australian delegation to the World Heritage Committee's 35th meeting held in Paris, France in June 2011. Following consideration of the nomination and the assessors' report, the Committee elected to inscribe the Ningaloo Coast into the list of World Heritage places.

DEC has continued to provide advice in relation to national heritage.

## Formal management arrangements with Aboriginal people

### Miriuwung-Gajerrong

DEC and the Yawoorroong Miriuwung-Gajerrong Yirrgeb Noong Dawang Aboriginal Corporation (Miriuwung-Gajerrong Corporation) are jointly responsible for developing management arrangements for six new conservation reserves (totalling 150,000 hectares) in the east Kimberley.

Following on from previous work that produced a cultural planning framework and joint planning guidelines, major progress was made with preparation of a draft management plan that was released for public comment in early 2010–11.

Five Miriuwung-Gajerrong trainee rangers have been employed to work on the new conservation reserves. In addition to continuing their training, projects achieved in 2010–11 include an assessment of visitor sites for future development; flora and fauna research; cultural connection to country visits by elders; and fire planning and management. The West Kimberley District office also underwent a significant extension in early 2011 to accommodate new staff employed under the agreement.

In June 2011, a business planning workshop for tourism initiatives was held. The formal research proposal, undertaken by Tourism WA, investigated the tourism and recreation economic development potential of the reserves.

### Yawuru

An Aboriginal land-use agreement was signed on 25 February 2010 with Yawuru native title holders over 5,297 square kilometres of land in and around Broome. This will enable the creation of terrestrial and marine conservation reserves to be jointly managed by the Yawuru people, DEC and, within the Broome townsite, the Shire of Broome. These areas include a coastal park covering the intertidal area, terrestrial reserves around Broome and its north, and a marine park from Gantheaume Point to Cape Villaret.

In early 2010–11, coordinators and trainees were employed to assist in the management of these lands and waters. A total of \$5.5 million over five years has been allocated to joint management of these areas.

### Burru

The state government entered into the Burru and Maitland Industrial Estates Agreement Implementation Deed (the Burru Agreement) with three Aboriginal groups on 1 November 2002.

The Burru Agreement allows for industrial development to progress across southern parts of the Burru Peninsula, provides for the development of areas for conservation, and ensures the protection of Aboriginal heritage.

DEC continues to work towards having an approved management plan and a management agreement in place, and has progressed amendments to the CALM Act and WC Act to allow for joint management arrangements to be implemented on the Burru Peninsula, in accordance with the agreement.



## Regional activities

### Goldfields Region

- Implementation of the visitor master plan for Credo and Goongarrie stations commenced with the improvement of road access at Credo Station and Rowles Lagoon. A professional structural assessment of the infrastructure on both stations was completed. Removal of unsightly scrap metal behind Credo homestead was also completed.
- The 'working together' project with the Wiluna native title claimants, involving the local community, continued at Lorna Glen with a fencing project and fire management. Camping facilities at Lorna Glen for the local community were further improved with the installation of showers.
- DEC conducted a biological survey at Ilkurlka as part of a joint management effort with the Spinifex Aboriginal community. Two meetings have been held with the community to initiate further joint management activities.
- DEC continued with joint management efforts with the Patjarr Aboriginal community, which is surrounded by Gibson Desert Nature Reserve, involving the implementation of works and fire management activities with community members in Gibson Desert Nature Reserve.
- Three local Aboriginal trainees continue to receive training under MATES as part of a three-year joint land management project with Cliffs Asia Pacific Iron Ore Pty Ltd.
- The car park in the Kalgoorlie Arboretum was completed, including line marking, one-way access and installation of parking bollards. The existing trails were upgraded and the overland drainage flow improved. New signage has been ordered to replace the outdated signs.
- DEC is developing an MOU with the Shire of Menzies for a \$30,000 project to redesign the visitor site and upgrade facilities at Ullaring Rock.
- The development of the memorial site at Boorabbin townsite for the families who lost relatives in a fire in December 2007, which began in Boorabbin National Park, was completed in December 2010.

### Kimberley Region

- Restoration works were completed to protect the historic Mermaid Tree in Prince Regent National Park.
- Works commenced to improve visitor facilities at Piccaniny recreation site in Purnululu National Park.
- Works to upgrade visitor access at Mirima National Park commenced.
- A new walk trail and lookout were completed at Lennard Gorge within King Leopold Ranges Conservation Park.

### Midwest Region

- Operations at the Pinnacles Desert Discovery in Nambung National Park and Monkey Mia Visitor Centre in Shark Bay World Heritage area were refined, focusing on improving operational efficiency. A four-year business plan for Monkey Mia was prepared.
- In response to increased visitation associated with the completion of Indian Ocean Drive between Lancelin and Cervantes, a new lookout site and visitor facilities were developed in Nilgen Nature Reserve. Works have commenced on the expansion and redevelopment of the Hangover Bay day-use site in Nambung National Park, and five roadside rest areas were developed by Main Roads WA in consultation with DEC. Management effort on coastal reserves has increased significantly due to increased visitation, and incidence of



illegal camping and unlicensed off-road vehicles, particularly in the vicinity of the shack communities of Wedge and Grey.

- DEC staff attended meetings with the Wedge and Grey community associations to investigate management issues.
- DEC completed redevelopment of the Coomallo rest area on Brand Highway in liaison with Main Roads WA with the construction of an interpretive walk trail.
- DEC completed the upgrade of visitor sites in the Shark Bay World Heritage area as part of a \$593,000 federal government *Jobs Fund* program, including refurbishment of the walk trail and associated facilities at the Péron Heritage Precinct; upgrading of the walk trail and interpretive signage at Monkey Mia; and construction of two toilets, three shelters and car parking at Little Lagoon.
- DEC was awarded \$429,000 over three years under the *Caring for our Country* program to continue implementation of the *Shark Bay World Heritage Area Communication Strategy*.
- Within François Péron National Park, DEC completed the upgrade of visitor facilities at Bottle Bay campground, and undertook Aboriginal heritage surveys for clearance of works to redevelop Gregories, South Gregories, Cape Péron and Big Lagoon.
- Planning commenced for the redevelopment of visitor facilities at Shell Beach Conservation Park and the proposed Edel Land National Park.
- Structural repairs of buildings in the Péron Heritage Precinct were completed consistent with maintaining the precinct's heritage values.
- Planning and assessment of a potential *Naturebank* site in François Péron National Park was undertaken, including a geotechnical assessment, visual landscape assessment, marine assessment and flora and fauna surveys.
- Geotechnical assessments of coastal cliffs were undertaken for Kalbarri National Park and the proposed Edel Land National Park.
- Priority tasks included the incorporation of further visitor risk information into the booking permit and [www.sharkbay.org](http://www.sharkbay.org) website, and production of a rock fishing fact sheet, also available on the website.
- Additional signage was developed and installed for the Loop Trail in Kalbarri National Park to emphasise the visitor risks and notify visitors of trail closures during river flooding.
- A heritage assessment for Warriedar homestead precinct was prepared and a consultancy got underway to assess heritage values on other midwest rangeland properties in liaison with the Heritage Council of Western Australia.
- Negotiations commenced with three Aboriginal groups to arrange heritage surveys at Coalseam Conservation Park as part of the implementation of the park's recreation master plan.
- Liaison with trail planning consultants was undertaken to facilitate a multi-shire project to establish a wildflower drive trail that includes sites on three nature reserves.
- The Minister for Environment launched the *Royalties for Regions* conservation parks infrastructure and roads initiative at Kalbarri National Park in October 2010, which includes \$6.5 million for Kalbarri National Park road and infrastructure initiatives.
- On behalf of the Shire of Northampton, DEC prepared a \$6.8 million funding application that was submitted to Regional Development Australia to continue the *Royalties for Regions* Kalbarri road and infrastructure initiatives.
- DEC participated in the Midwest and Gascoyne Regional Planning Committees convened by the Western Australian Planning Commission to prepare 20-year regional planning frameworks.



## Pilbara Region

- Fortescue Falls car park in Karijini National Park was redeveloped to accommodate a greater number of vehicles including cars with trailers, buses, and motor homes.
- Site signage and enhanced interpretation panels were installed at various roadside and recreation sites in Karijini National Park.
- Handrail and safety improvements were carried out to the top and bottom of Fortescue Falls walk trail (handrail and steps) in Karijini National Park.
- Development of Warlu Loop was completed, with an additional 44 camp sites at Dales Campground in Karijini National Park.
- Preliminary discussions and planning were undertaken for the Banjima Drive upgrade in Karijini National Park.
- Hamersley Gorge car park and day-use area redevelopment in Karijini National Park began in May 2011.
- A recreation master planning review and update was completed for Millstream Chichester and Karijini national parks.
- Karlamilyi National Park's *Niminjarra Road* project continued, with the final route established and costs for heritage and biological surveys obtained.
- Deep Reach day-use area redevelopment was completed in Millstream Chichester National Park.
- The upgrade of Yardie Creek day-use area in Cape Range National Park was completed, including toilets, car parks and signs.
- Road maintenance was completed in Millstream Chichester National Park, including new culverts in degraded roads, under an MOU between DEC and the Shire of Ashburton.
- Road maintenance continued at Karijini National Park under an MOU between DEC and the Shire of Ashburton.
- *Naturebank* site preliminary discussions and planning were conducted with traditional owners, Tourism WA and the Pilbara Development Commission for Millstream Chichester National Park.
- The Coral Bay foreshore plan was completed and approved, with a tender awarded and shelter fabrication underway.
- Funding through the *Western Australian Natural Disaster Relief and Recovery Arrangements* enabled road repairs to be carried out for all roads at Cape Range National Park following cyclone and rain damage.
- The Coral Bay visitor information stand operated on a volunteer basis similar to the campground host program for seven days a week from April to September.
- Jurabi Turtle Centre upgrades were completed, including shade sails, repainting, and oiling of timber decking.
- The 10-year anniversary of the Karijini Visitor Centre was recognised in June 2011, with a special event held at Karijini National Park involving a range of stakeholders from the Pilbara as well as past employees and contributors to the centre.
- The new online camp site booking system was trialled at selected sites in Cape Range National Park.
- A *Free Park Days* free entry day was coordinated at Cape Range National Park on 7 March 2011 as part of the *Rediscover Parks* campaign.
- DEC campground hosts continued to volunteer at Karijini, Millstream Chichester and Cape Range national parks during the peak visitation season (April–September).
- The mooring and anchoring plan for the Montebello and Barrow Islands marine conservation reserves continued to be implemented.

- Consultations continued with the Dampier Archipelago Recreation Dwellers Association and Kingfisher Bay Fishing Club members and committee, resulting in a new six-year licence term for shacks, with a range of conditions to enhance enjoyment and protection of the Dampier Archipelago.
- Commercial tour operations in Ningaloo Marine Park continued to be monitored. Whale shark tour operations in the park continued to be monitored using electronic logbook returns via black box technology.

## South Coast Region

- Fitzgerald River National Park's \$40 million improvement project made good progress, with construction of the first section of the new roadworks from the ranger station to East Mylies. Roadworks on the western side of the park have also commenced. Planning is underway for the improvement of the recreation sites and the first major tenders have been let. Walk trail planning was progressed.
- One hundred and fifty metres of rubber belting were replaced on the Trigalow beach access in Fitzgerald River National Park.
- Three wash-down stations and additional water tanks were installed at the ranger stations in Fitzgerald River National Park.
- A draft recreational master plan was developed along with initial concepts designs for the *Royalties for Regions* project at Torndirrup National Park.
- Single coat bitumen seal on 12 kilometres of the entrance road to Cape Le Grand National Park was completed.
- Site plans were finalised at Peak Charles National Park focusing on the campground and day-use area.
- Redevelopment of Benwenerup Inlet campground and Stokes Inlet day-use area in Stokes National Park was completed, including reinstatement of four kilometres of the heritage walk trail, two viewing platforms and a staircase, and installation of new interpretive panels.
- Fourteen kilometres of Fanny Cove track were upgraded in Stokes National Park to allow for access to recreational sites.
- Formal annual inspections were carried out at all recreation sites to assess visitor risks including quarterly and annual reviews to monitor progress on implementation of risk mitigation actions. Visitor risk management related maintenance was undertaken at remote sites at Nuytsland Nature Reserve, Eucla and Peak Charles national parks.
- A site for the *Naturebank* project at Cape Le Grand National Park was identified at New Island Bay. A pre-feasibility study and initial concepts for access were completed.
- One hundred metres of 'track pad' were installed on the Dunsky track, with further rehabilitation being done along the track for stabilisation in West Cape Howe National Park.
- Audiovisual displays were upgraded at the visitor centre in Two Peoples Bay Nature Reserve.
- Restoration work was undertaken on the two lighthouse keepers' houses, jetty and lighthouse on Breaksea Island as part of a *Jobs Future* funded project. A study of the tourism potential of Breaksea Island was undertaken with co-funding from the Great Southern Development Commission.
- Planning and construction of a Munda Biddi Trail section from Albany to Denmark was progressed, with the section between Elleker and Torbay opening at the end of June 2011.
- Redevelopment of Castle Rock lookouts in Porongurup National Park was completed by providing two new upper and lower lookout structures. The site opened in April 2011.
- Maintenance was carried out on eight kilometres of walk trails in Voyagers Park and an unnamed reserve (Crown Reserve number 33308) referred to as 'Mount Martin Botanical Reserve', including the replacement of all trail signage and an interpretation board.



## South West Region

- Formal annual inspections were conducted at all recreation sites to assess visitor risks including quarterly and annual reviews to monitor progress on implementation of risk mitigation actions.
- Work continued with local fishing groups to encourage safe fishing practices, and to install warning signs and 13 new anchor points at Boranup and Skippy Rocks along the Leeuwin-Naturaliste coast.
- Thirty-seven previously installed fishing anchors and 32 abseiling anchors were load-tested to ensure ongoing suitability for use.
- In Leeuwin-Naturaliste National Park, a consultant geologist was engaged to conduct inspections of the cliff sites at Huzzas, Hamelin Bay, Wilyabrup, Bob's Hollow and Giant's Cave.
- Tree pruning was carried out at several recreation sites to minimise the risk to visitors from falling branches, including Honeymoon Pool, Contos, Boranup and Point Road campgrounds, Hoffman Mill, Leschenault Peninsula, Barrabup Pool, Sue's Bridge, Wellington Discovery Forest, Wharncliffe Myalup Forest Cottages, Lake Brockman Tourist Park, Crooked Brook Forest, Old Coast Road rest area, Wrights Bridge, Malbup and Tuart Discovery Walk.
- EcoEducation programs continued to be delivered at Wellington Discovery Forest and Margaret River Eco Discovery Centre. Two new programs were delivered in 2010–11.
- A number of community education programs were run. *Leave No Trace* training, which introduces students to minimal impact camping skills, was delivered at the Margaret River Eco Discovery Centre. A new sustainable forestry excursion that looks at sustainable forest management and native timber as a renewable resource was well received by geography teachers. An Aboriginal culture program was again offered in the region from early 2011. EcoEducation programs were delivered to 2,760 children through 119 excursions. The total number of students and teachers who attended the Wellington Discovery Centre was 1,728, and 1,408 attended the Margaret River Eco Discovery Centre.
- Improvements to the River's Edge Path at Honeymoon Pool in Wellington National Park continued, including the completion of two viewing platforms and river access stairways.
- At Logue Brook dam, visitor management focused on restricting camping to managed areas, providing day-use facilities and controlling off-road vehicles. This continues to encourage more family-friendly use of the area. Improvements to picnic facilities began, with provision of information signs, and a new toilet block under construction.
- New toilet blocks were constructed at Buffalo Beach and Belvidere day-use area in Leschenault Peninsula Conservation Park. Dune rehabilitation was carried out by brushing and by planting native species, with more than 3,000 seedlings planted by four-wheel-drive clubs, volunteers and DEC staff. Approximately 500 metres of rehabilitation fencing were constructed, and weed and feral animal control was carried out.
- Improved access continued to be provided for people with disability through realignment and hard surfacing of the Cape to Cape Track between Cape Naturaliste and Sugarloaf Rock, with a further 100-metre section of boardwalk completed and 100 metres of trail prepared for sealing.
- In Tuart Forest National Park, interpretation signs explaining the natural and cultural history of the forest were installed at Malbup, Membenup and Higgins Road. At Higgins Road, members of the Leschenault Timber Industry Club worked with DEC to establish an interpretive trail and shelter for educational activities.
- In Bramley National Park, the Ten Mile Brook Trail footbridge across Margaret River was replaced.
- At Hamelin Bay, a stairway from the caravan park to the beach access paths was completed.
- Working partnerships continued with the South West Mountain Bike Club and West Australian Mountain Bike Association at Wellington National Park and throughout the Blackwood District, and with the Mitsubishi Four-wheel Drive Club at Leschenault Peninsula Conservation Park.



Staff from DEC's Walpole District in the south-west work on upgrading the Mount Minnie homestead as part of the *Remote Regions Nature Conservation Program*.

## New facilities in the Pilbara

In November 2010, DEC opened 44 new camping bays at Karijini National Park as part of ongoing upgrades to conservation and tourism infrastructure in the Pilbara.

The new camping bays at Warlu Loop are connected by paths to the popular camp site at Dales Recreation Area, where facilities include toilets, picnic areas and barbecues.

The addition of Warlu Loop, which forms part of six existing loops, caters for large vehicles and group campers who, until now, had to use an overflow camp site 12 kilometres away.

DEC has also recently upgraded the homestead at Mount Minnie, a former pastoral lease near Onslow that was purchased by the government for conservation.

The improved caretaker facilities include a new homestead roof, verandah, ceilings, internal walls and doors.

The caretaker carries out various activities on behalf of DEC, including fire management and feral animal control at Mount Minnie and Cane River Conservation Park, which enhances the department's ability to uphold its management and good neighbour responsibilities in this remote area.

Both Pilbara projects were part of the *Remote Regions Nature Conservation Program*, where DEC employees with primary roles in the south-west visit remote regions to help implement on-ground parks and visitor services, nature conservation and infrastructure initiatives.

Four conservation employees from DEC's Walpole District worked at Mount Minnie for three weeks, while the Warlu Loop work was completed by four conservation employees from DEC's Swan Region over a two-week period.



- Construction of the Wellington 'Spur Trail', a link from the Bibbulmun Track to the Wellington National Park trails network, is well underway with 16 kilometres of trail, three foot bridges, two camp sites (including toilet, shelter and camping areas), signage and trail markers nearing completion.
- At Glen Mervyn Dam, a new toilet was installed on the western side of the dam, adjacent to the Bibbulmun Track.
- As part of the four-wheel-drive track and mountain bike trail networks in Wellington National Park, new toilets and access stairs to the Collie River were installed at the Lennard Track picnic area along with interpretation panels at Sappers Bridge.
- After being closed for several years, while the Water Corporation completed major infrastructure works, the redeveloped Stirling Dam picnic area was reopened. The picnic area now has new toilets, gas barbecues and interpretation, and is universally accessible. Works on the parking area and walk trail are due to be completed in 2011–12.
- In collaboration with the Crooked Brook community, new universal access facilities including seating, a footbridge, interpretation, trail surfacing, trail markers and another gas barbecue were installed at Crooked Brook Forest picnic area.

## Swan Region

- In partnership with the Western Australian and Perth mountain bike community, development continued on the Goat Farm Mountain Bike Park in Greenmount National Park to internationally recognised standards. Revegetation, planting works and the development of a new skills park have been this year's focus.
- The *Access for All* sealed pathways project is now complete at Fred Jacoby Park and new interpretive signs have been installed. Planning for the construction of a railway platform at this site and accompanying interpretive signage has been completed.
- At Lane Poole Reserve, the new online campground booking system has been trialled and is proving to be an effective tool for the public and management. Redevelopment of the day-use and camping areas at Baden Powell also commenced.
- Two off-road vehicle trails (Pee Wee and Family) were constructed, with signage, at the Pinjar off-road vehicle area. Detailed designs for access roads, car parks and collector paths have been created, and these areas have been surveyed and pegged ready for construction.
- The Yanchep and Neerabup management plan has been sent out for public comment. The final plan is expected to be in place in 2011–12.
- The Yanchep National Park volunteers group won an Outstanding Services Award at the 2011 DEC *Volunteer of the Year Awards*. The park also received the Bronze Award in the 2010 *Tourism Awards Category 2—Significant Tourism Attraction*. In addition, DEC employee James Spurgeon was announced as Western Australia's Young Tourism Professional.
- The Disability Services Commission *You're Welcome* initiative continued to be implemented, with five sites uploaded on the [www.accesswa.com.au](http://www.accesswa.com.au) website. Further sites will be assessed.
- Formal annual visitor risk management inspections were carried out at all recreation sites across the region to assess visitor risks including quarterly and annual reviews to monitor progress on implementation of risk mitigation actions.

## Warren Region

- Replacement of the Cascades boardwalks and pedestrian bridge crossing was completed.
- The Donnelly Boat Landing site toilets and boat launch facility were completed.
- The realignment of the Mount Frankland–Beardmore roads intersection was completed. This eliminates a significant visitor risk to the travelling public on both these roads.
- The boardwalk section of the Mount Frankland Wilderness View lookout was completed.
- Stage one of the Coalmine Beach small boat facility, jointly funded by DEC and the Department of Transport, was completed.
- Upgrading of access and visitor facility improvements continued at both Black Point and Lake Jasper sites in the northern end of D'Entrecasteaux National Park.
- Maintenance grading of approximately 180 kilometres of recreation site access roading was completed.
- Maintenance of long trail infrastructure was undertaken on the Bibbulmun Track including the replacement of bunks, water tanks, roofing and minor water crossings.
- Twenty-four interpretive projects were completed, including site interpretive and management signage, publication reviews, and displays for community events.
- Over 60 days, a total of 36 different educational activities was run with 1,629 participants.
- The Munda Biddi camp site in the Donnelly Valley at Foresters Wood was constructed, and planning of the alignment was undertaken.
- The draft of the Perup management plan was released for public comment.

## Wheatbelt Region

- The Congelin campground project at Dryandra Woodland was completed to reduce environmental degradation and improve visitor facilities, access roads, car parks, interpretation panels, fencing, picnic tables, fire rings and toilets.
- Planning commenced for a new camping area at Dryandra Woodland. A South West Aboriginal Land and Sea Council (SWALSC) Aboriginal Survey commenced in June 2011.
- Barna Mia Nocturnal Visitor Centre, located in Dryandra Woodland, continued to provide a unique experience for visitors to Dryandra Woodland and the Wheatbelt Region.
- The Toyota Land Cruiser Club of WA continued to assist with volunteer maintenance work at Dryandra Woodland and Emu Rocks on the Holland Track.
- Well covers were constructed and installed over historic wells at Emu Rocks along the Holland Track.
- Redevelopment continued at Kokerbin Rock Nature Reserve and Kwolyin townsite in partnership with the Shire of Bruce Rock. To complement the two interpretation shelters, which were installed at Kokerbin Rock and at Kwolyin townsite, interpretation signs were designed and trail markers were installed. Two viewing platforms were installed at the wave formation at Kokerbin Rock in May 2011 to finalise this project. The triple unit toilet block was constructed and installed by a Bruce Rock shire works team in June 2011.
- Work has been carried out in collaboration with the Wongan Hills community to develop a walk trail and parking infrastructure at Gathercole Nature Reserve, and to maintain the Mount Matilda walk trail in Wongan Hills Nature Reserve. Concept plans are close to completion and interpretation content is now in draft form, awaiting distribution and approval.
- Consultation has continued with the Hyden-Kondinin communities to develop a plan for recreational facilities and access at Lake Cronin Nature Reserve.



# Environmental Regulation





## Environmental Regulation

DEC's responsibilities include protecting and conserving the state's environment on behalf of the people of Western Australia. Under the EP Act the department is empowered to do this through industry regulation, including licensing and registration of prescribed premises, licensing of controlled waste transporters, and administration of the EP Regulations, ensuring emissions and discharges meet acceptable criteria, and pollution incidents are responded to effectively. Monitoring ambient air quality and developing air quality management plans for priority airsheds contributes to achieving these goals. Under the *Contaminated Sites Act 2003*, the department has responsibility to ensure that contaminated sites are appropriately managed.

In an Australian first, a sequenced permeable reactive barrier groundwater treatment system was installed in Bellevue to protect the Helena River from two migrating chlorinated hydrocarbon plumes. A project was established to ensure consistent, efficient and legally sound delivery of industry regulation work systems, and all State Development portfolio project approvals were processed within target timeframes.

### Controlled waste

Table 26: Number of controlled waste licences issued in 2009–10 and 2010–11

Type	2009–10	2010–11
Carrier	327	338
Vehicle	475	503
Driver	1,005	927

The review of the EP (Controlled Waste) Regulations 2004 is progressing. The preliminary impact assessment is currently being completed.

The total volume of controlled waste tracked during 2010–11 was 678,660 kilolitres (compared to 719,931 kilolitres in 2009–10) in a total of 79,000 loads (compared to 81,531 loads in 2009–10). These comprised:

- 66.30 per cent biological
- 5.00 per cent alkalis
- 0.22 per cent acids
- 17.70 per cent waste oils
- 10.00 per cent low-strength waste waters
- 0.78 per cent other.

Further information on controlled waste is available on the DEC website: [www.dec.wa.gov.au/content/category/32/756/1580/](http://www.dec.wa.gov.au/content/category/32/756/1580/).

## Approvals processing

DEC continued to improve its processing times in 2010–11 for major resource project licence applications. The department met the 60-working-day target for all major resource project licence applications, achieving an average of 32 working days for 20 applications. In 2009–10 the average was 42 working days for 16 applications.

This year, DEC issued 150 major resource project works approvals, double the number granted in 2009–10, with 97 per cent issued within the target timeframe. A reduction in processing time for works approvals has been achieved, with the average approval time being 41 working days. In 2009–10, the average approval time was 44 working days.

During 2010–11, two *Bulletins*, six *Officer Guides* and eight regulatory maps were completed and published for internal use. In addition, numerous standard templates and letters were produced as supporting documentation for the newly created licensing workflow system which has been built into the industry licensing system.

Further information on regulatory performance and reporting is available on the DEC website: [www.dec.wa.gov.au/content/view/5234/2196/](http://www.dec.wa.gov.au/content/view/5234/2196/).

## National Pollutant Inventory

DEC implements the National Pollutant Inventory (NPI) program in Western Australia on behalf of the federal government. In 2010–11, reports of substance emissions and transfers of substances in waste from 753 industrial facilities were submitted to the federal government for publication on the NPI website ([www.npi.gov.au](http://www.npi.gov.au)). Eighty-seven per cent of facilities in Western Australia now use the online reporting system to submit their reports.

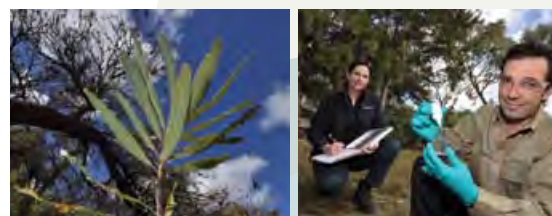
## Industry regulation

### Regulation of prescribed premises

During 2010–11, 895 premises held licences under Part V of the EP Act, compared with 907 in 2009–10. Two hundred and nineteen works approvals were issued in 2010–11, compared with 141 in 2009–10. Sixty-five new licences were issued in 2010–11 compared with 55 in 2009–10. The very significant increase in the number of works approvals is primarily related to increased activity in the resources sector in the Pilbara and Goldfields regions.

Table 27: Prescribed premises

Region	New works approvals issued 2010–11	New licences issued 2010–11	Active licences 2010–11
Goldfields	40	10	91
Kimberley	11	2	34
Midwest	16	7	104
Pilbara	100	14	127
South Coast	9	2	37
South West	13	6	137
Swan	21	18	286
Wheatbelt	9	6	79
Total	219	65	895



## Industry regulation compliance strategy

DEC continued to implement the statewide industry regulation compliance strategy during 2010–11. The strategy focused resources on risk-based prescribed premises inspections, specific industry sectors inspection, and special risk industries inspections.

The strategy set performance targets for high to low priority premises, special risk premises and 10 industry sector programs: controlled waste, metal finishing/abrasive blasting, landfill sites, boatbuilders, wastewater treatment, oil and gas processing, asphalt manufacturing, abattoirs, concrete batching, and chemical blending.

Compliance actions were managed in line with DEC's *Enforcement and Prosecution Policy* and through educative industry sector reports.

Table 28: Industry regulation compliance strategy performance outcome

Program area	Inspection target	Inspections undertaken	Performance outcome (% compliant)
Industry sector (excluding controlled waste)	85	27	31.76
Industry sector—controlled waste	430	336	78.14
Special risk	30	23	76.67
Priority of prescribed premises inspections undertaken 2010–11			
High	23	19	82.61
Medium high	87	61	70.11
Medium	125	96	76.80
Low	170	107	62.94

Further information about industry regulation is available on the DEC website: [www.dec.wa.gov.au/content/category/32/757/1578/](http://www.dec.wa.gov.au/content/category/32/757/1578/).

## Southern Metropolitan Regional Council's Canning Vale waste composting facility

The Southern Metropolitan Regional Council's (SMRC) Canning Vale waste composting facility continued to be the subject of odour complaints from the community. Independent consultants were engaged to conduct a review of the operations and develop an improvement plan. SMRC completed the improvement plan in July 2010. At the same time, DEC completed a review of SMRC's licence and has imposed additional conditions to ensure appropriate odour management. Between January and April 2011, DEC coordinated odour surveys in the Leeming area. The odour survey will assist in correlating information regarding any ongoing odour emissions from SMRC.

## Indian Ocean Territories

DEC continued to provide environmental regulatory services for Christmas Island and Cocos (Keeling) Islands as part of a formal arrangement with the federal government.

The Water Corporation is commissioning a newly constructed waste water treatment plant that services the majority of Christmas Island. The plant should be fully operational in the third quarter of 2011.

## Noise regulation

DEC provides noise technical advice to the Office of the EPA, and to planning and local government authorities, as well as policy, technical, enforcement and training support for DEC, WA Police and local government officers.

During 2010–11, DEC provided 87 reports on a total of 57 projects in response to requests for environmental impact assessment. Three variations of the noise emission standard under Regulation 17 of the EP (Noise) Regulations 1997 were gazetted: Horizon Power Carnarvon power station, Millennium Inorganic Chemicals finishing plant in Australind, and Auswest timber mill in Pemberton. EPA advice has been completed for three other Regulation 17 variation proposals: Alcoa Wagerup refinery, Western Power substations and Verve Energy Pinjar power station. DEC has substantial involvement on issues such as Perth and Busselton airports noise and the Northbridge noise study, and has input into the work of the Port Hedland Dust and Noise Taskforce.

The proposed amendments to the EP (Noise) Regulations 1997 were released for public consultation and a report on the submissions is in preparation.

Further information about noise regulation is available on the DEC website:  
[www.dec.wa.gov.au/content/category/32/760/1575/](http://www.dec.wa.gov.au/content/category/32/760/1575/).

## Environmental hazards management

### Emergency management

DEC continued to provide statewide emergency response for pollution incidents, as well as emergency advice and on-scene detection and monitoring of emissions at hazardous materials incidents managed by FESA under the state emergency plan for hazardous materials (WESTPLAN HAZMAT). DEC worked with FESA to develop a HAZMAT emergency management package for all Western Australian local governments, which was rolled out in early 2011.

Major incidents attended by DEC during 2010–11 included:

- responding to suspected lead pollution at Fremantle Port, Geraldton Port, Leonora and Wiluna, and carrying out on-site monitoring with an X-Ray fluorescence analyser and sampling
- emergency response to a number of serious hazardous materials incidents including a fuel tanker explosion in Perth; industrial fires in Mandurah, Perth and Bunbury; a major pesticide spill on Tonkin Highway; and a tyre fire and oil spill into a wetland in Ascot (in each case, emergency actions were taken to protect the environment and ensure thorough clean-up)
- response to a number of clandestine drug laboratories where pollution of the environment had occurred that required decontamination and clean-up
- response to numerous chemical spills including pesticides and corrosive substances into drains and creeks (where offenders were able to be identified, enforcement action was taken and remedial actions were implemented to clean up the pollution and prevent recurrences)
- carrying out 174 risk-based inspections where environmental hazards were suspected, such as the storage of large numbers of used tyres or chemical drums (in each case, joint actions were initiated with other relevant agencies to reduce the risk and prevent environmental harm).

Further information on pollution incidents and pollution response is available on the DEC website:  
[www.dec.wa.gov.au/content/view/3367/1917/](http://www.dec.wa.gov.au/content/view/3367/1917/).



## Local government support and training

DEC continued to provide training courses and technical support for local government environmental health officers to address environmental as well as health issues. Courses in complaint handling, unauthorised discharges investigations and the use of enforcement tools were provided in both metropolitan and regional areas. DEC also provided training to an Aboriginal community in the Kimberley.

## Environmental health training

DEC contributed to the development of the national *enHealth* environmental health officers' skills and knowledge matrix, setting out skills and knowledge requirements for local government environmental health officers to address environmental, as well as health, issues.

## Regulation of contaminated sites

One hundred and forty-nine new reports of known or suspected contaminated sites were received under the *Contaminated Sites Act 2003* in 2010–11.

DEC classified 539 sites during the year, bringing the total number of sites classified under the Act to more than 1,842. Soil and groundwater investigations confirmed the presence of contamination at 427 of these sites (made up of more than 2,568 individual lots), which are listed on the publicly available database on DEC's website at [www.dec.wa.gov.au/content/view/5627/2295/](http://www.dec.wa.gov.au/content/view/5627/2295/). DEC continued systematic follow-up of sites requiring remediation or identified as a high priority for further investigation, with generally positive response to DEC's inquiries regarding investigation or clean-up works in progress or planned.

Almost \$1.2 million was provided from the Contaminated Sites Management Account for the investigation or remediation of state sites in Bayswater, Kalbarri, Katanning, Kewdale, Manjimup, Mount Claremont, North Coogee, Ravensthorpe and Southern Cross.

Specialist technical advice was provided to external parties such as community groups, land developers, industry, and state and local government, in relation to the assessment and management of contaminated sites and areas affected by acid sulfate soils or water.

The department reviewed and provided advice on 960 technical reports relating to contaminated sites, and 209 technical reports relating to acid sulfate soils and water. These reports were submitted to comply with planning and Ministerial conditions, dewatering licence requirements, or as part of the investigation or remediation of reported contaminated sites.

Further information on acid sulfate soils is available on the DEC website: [www.dec.wa.gov.au/content/category/31/790/2328/](http://www.dec.wa.gov.au/content/category/31/790/2328/).



## Regulatory Training Program

In 2010, the department's regulatory training program was a finalist in the *Premier's Awards for Excellence in Public Sector Management* in the category 'Improving Government'. This category recognises projects that aim to strengthen existing systems or develop strategies to enhance efficiency, accountability, workforce capacity or community confidence in the public sector. Developed in partnership with WA Police, the program has been tailored to meet the needs of environmental officers, and to ensure DEC meets the increasing demands and heightened government focus on preserving and protecting the state's environment.

During 2010–11, 150 officers participated in the program, significantly increasing DEC's workforce capacity.

### **External funding for regulatory training—*Enterprise Based Productivity Places* program**

Early in 2011, DEC was successful in an application for \$200,000 in funding through the federal government's *Enterprise Based Productivity Places* program for financial assistance to provide staff with opportunities to increase their qualification levels, in this case, *Certificate IV in Government (Statutory Compliance)* and *Certificate IV in Government (Investigation)*.

Fifty departmental officers were enrolled in the program at 30 June 2011. The completion date for this project is 28 February 2014.



Above: Senior Environmental Health Officer Paul Newell and a colleague decant 10 litres of methylamphetamine and hypophosphorous acid reaction mixture at a 'clan lab' in Kenthurst, NSW, in 2008.

Right: Highly purified crystal methylamphetamine, known as 'ice'.

## Contaminated Sites Branch helps reduce risk from clandestine drug laboratories

Contaminated Sites Branch's Paul Newell has been a key part of an inter-agency team looking at how to deal with the chemical contamination associated with clandestine drug laboratories (clan labs) in Western Australia.

The senior environmental officer has been working in conjunction with the Department of Health and other key stakeholders to provide practical assistance for local government environmental health officers who are called in by police to deal with the clean-up of suspected clan labs.

Paul, who has also been involved in developing draft national guidelines for managing health and environmental hazards associated with clan labs, said it was an increasing problem throughout Australia.

"In Western Australia alone, the number of clan labs discovered rose from 17 in 2000 to more than 125 in 2009," he said.

He said the locations being used for the illicit manufacture of drugs in Western Australia were almost exclusively residential dwellings, including rental premises and even hotel rooms.

"This trend of small-scale laboratories being operated in residential dwellings poses a potential risk of harm to public health and the environment which must now be addressed by public health and environmental agencies," Paul said.

The most common drug being manufactured in these small, addiction-based laboratories in Western Australia is methylamphetamine.

"This drug manufacturing process is waste intensive," Paul said.

"For every kilogram of methylamphetamine produced, up to 12 kilograms of waste is generated.

"Waste generated by illegal drug manufacturers, or 'cooks,' is often dumped or stored on-site, posing both a public and environmental health risk."

In addition, Paul said that when drugs were manufactured in a dwelling, residues containing both the drug itself as well as hazardous by-products, could be spread throughout, coating surfaces and contaminating soft furnishings such as carpet and curtains.

"These residues can remain on surfaces for years and represent a very real risk to human health, particularly to young children who may live in these contaminated dwellings in the future," he said.

The new interim guidance addresses contamination issues both inside and outside a dwelling.

Paul said signs of dumped clan lab waste included white/caustic residues or oil type staining on the ground, areas of disturbed earth/pits with evidence of deposited waste, areas of dead grass or vegetation, disused gas cylinders, and discarded chemical containers or batteries.

"One of the most important things for us, as regulators, is to ensure that houses and properties used for the manufacture of illicit drugs are dealt with appropriately to reduce the risk of harm to human health and the environment."



*CleanRun* Program Manager Karl Carrabotta with the RSD computer, which stores vehicle emissions data collected at the RSD testing site, and a vehicle travelling on Clayton Street, Midland, which has just registered 'poor' on the smart sign, which means it is producing excessive air pollution and is running inefficiently.

## Random breath test for vehicles

DEC's Air Quality Management Branch carried out random vehicle emissions testing at various locations throughout Perth late in 2010, to determine the emission performance of vehicles on the city's roads.

*CleanRun* Program Manager Karl Carrabotta explained the objectives of the testing program and how the remote sensor device (RSD) equipment worked, during a live ABC Radio broadcast from a Midland testing site.

"As a vehicle is driven through the RSD, a number of sensors are triggered to record the vehicle's speed and acceleration," Karl said.

"Exhaust emissions are measured as a vehicle drives through the infrared and ultra-violet light beam being produced by the RSD main unit. The light beam is absorbed by pollutants in the exhaust plume.

"From the light beam measurement, we are able to measure the levels of carbon monoxide, hydrocarbons, nitrogen oxides and smoke being emitted by the vehicle. The RSD measures 50 samples in just half a second. However, only samples with more than 10 per cent valid readings are included in the calculations.

"The driver receives instant feedback from a variable message sign located further down, giving the driver information on whether their vehicle was a 'good', 'fair' or 'poor' performer. At the same time, the RSD camera takes a photo of the rear licence plate.

"In a few months, we will receive information about the vehicles tested and their specifications from the Department of Transport. The vehicle emissions data collected will then be analysed against the Department of Transport data including vehicle age, fuel type and engine size.

"By understanding the emission performance of a range of vehicles in our fleet we can develop programs aimed at reducing vehicle emissions. We are also trying to inform the community about vehicle emission performance and what can be done to help reduce their vehicle emissions."

The *CleanRun* program purchased the RSD in 2008 and while it has been widely used in the USA, Western Australia is the only Australian jurisdiction to have purchased the equipment for use on our roads.

The *CleanRun* program, funded in part by the Australian Government Department of Sustainability, Environment, Water, Population and Communities, is the key initiative for the National Environment Protection (Diesel Vehicle Emissions) Measure (Diesel NEPM) implementation in Western Australia.





## Perth air quality management plan

The *Perth air quality management plan* (AQMP) aims to steadily improve Perth's air quality by reducing the emission of air pollutants in order to protect the environment and the health of the community. During 2010–11, DEC continued to focus on strategies to address vehicle emissions, haze from domestic wood heaters, air quality investigations and environmental regulation.

### Vehicle emissions

*CleanRun* is a key motor vehicle emissions management initiative by DEC, which aims to fulfil the objectives of the Perth AQMP and the Diesel National Environment Protection Measure. The program features a range of targeted initiatives to reduce the impact of motor vehicle emissions, with a primary focus on the Perth airshed.

During 2010–11, *CleanRun* continued to focus on vehicle emissions testing and driver behaviour. A remote sensing device (RSD) has been used to conduct, 26 days of on-road testings at 13 locations.

As part of the remote sensing program, *CleanRun* ran two community education days. These were held in December 2010 and March 2011 at Kings Park. Community members and local businesses were invited to have their vehicle emissions checked using the RSD. Approximately 140 vehicles were tested across both days. Participants were able to find out what factors may be influencing their vehicle's emission performance via the RSD smart sign and printout of individual pollutant readings. Qualified Royal Automobile Club of Western Australia mechanics and DEC staff were on hand to provide participants with information and advice on how to maintain and improve their vehicle's emission performance. A free information kit was provided to participants and included a printout of their vehicle's test results and other information on how to reduce vehicle emissions. Also included in the package was a tyre pressure gauge and a car-visor reporting pad with the smoky vehicle hotline number.

The *CleanRun* behaviour change initiative aims to reduce diesel emissions through encouraging driver behaviour change. As part of this initiative, the Minister for Environment launched *CleanRun* EcoDrive in May 2011. EcoDriving incorporates a number of safer, smarter driving techniques that maximise fuel economy by operating the engine as efficiently as possible.

The ideal target market for this initiative is heavy vehicle fleets, such as transport companies; however, most EcoDrive principles can be applied by all drivers.

The launch of EcoDrive has prompted interest from the transport industry, industry bodies, local government associations and interstate agencies. This interest suggests there will be significant uptake of this resource, which has been distributed to users and is available free of charge on DEC's website ([www.dec.wa.gov.au/airquality](http://www.dec.wa.gov.au/airquality)). Fleet operators implementing the program can expect the associated benefits: reducing fuel costs, reducing emissions, and improving health and safety.

### Haze from domestic wood heaters

The haze initiative of the Perth AQMP continued, with the implementation of a *smoke patrol* program in collaboration with the City of Canning. *Smoke patrol* programs are a targeted community education tool designed to provide information to wood heater users on how to better operate their heater and to minimise the impacts of domestic wood smoke on the environment and community.

DEC provided support to local government authorities in assisting with smoke nuisance complaints and other wood heater-related inquiries. Responses and support were also given to community members contacting DEC regarding smoke nuisance complaints and firewood complaints.



## Wetland saved from oil spill

Quick action by DEC pollution response officers prevented about 4,000 litres of oil reaching a wetland adjoining the Swan River in Ascot in late December 2010.

DEC Environmental Hazards Manager Ken Raine said the oil was released into a drain leading to the wetland as a result of a factory fire at Tyre Plus.

“The oil was in plastic containers in a premises next door to Tyre Plus. The containers were burnt and released the oil,” he said.

“Two pollution response officers attending the incident found that the drain led to a nearby wetland on Hay Road and immediately constructed a coffer dam with sandbags to prevent the oil from reaching the wetland.

“The oil would have had a major impact on the wetland and possibly on the Swan River.

“The oil was then removed by sucker truck and the area cleaned up to minimise any adverse effects from the spill on the wetland.”



Above: Pollution Response Officer Grant Hymus building a dam to stop oil getting into the wetland.

Left: Environmental Hazards Manager Ken Raine surveying contaminated run-off water that was dammed to prevent it getting into street drains.



Audits were undertaken of several firewood yards to ensure that firewood with a moisture content of greater than 20 per cent was not being offered for sale, in compliance with the Regulations.

DEC provided feedback on a wood heater regulatory impact statement being developed by the national Wood Heater Working Group.

Haze alerts continue to be issued by the Bureau of Meteorology, on advice from DEC, between June and September each year. Eleven alerts were issued during the winter of 2010.

### Background air quality study—Midland

DEC began the *Midland background air quality study* in August 2007 to characterise air quality in Midland and surrounding suburbs, where there is a diverse range of air emission sources. As a follow-up to this study, DEC purchased a Fourier Transform infra-red spectrometer (FTIR) to monitor hydrogen fluoride and hydrogen chloride over shorter periods to further investigate the concentration of these compounds. In May 2011, DEC commenced a 12-month campaign study with the intention of siting the FTIR at a number of locations to target both background and peak concentrations.

### Background air quality study—Kwinana

The *Kwinana background air quality study* commenced in 2005 to collect baseline data on concentrations of ambient air toxics in Kwinana. Most recently, 15 months of campaign monitoring were undertaken for particles and nitrogen oxides at Hillman Child Health Centre and Calista Primary School. This monitoring concluded in August 2010 and the monitoring data for all phases are being compiled into one report. The air quality data from Hillman Child Health Centre and Calista Primary School have also been used in the Telethon Institute for Child Health Research *Kwinana children's respiratory health study*. The report associated with this epidemiological analysis is due for completion in late 2011.

### Regional air quality investigations

DEC continued to investigate ambient air quality in regional areas, including Port Hedland, Kalgoorlie and Collie. DEC is actively engaged in managing air quality issues resulting from high particulate concentrations in Port Hedland through environmental assessments and supporting the implementation of the *Port Hedland air quality and noise management plan* (March 2010).

### Fixed ambient air quality monitoring network

DEC operates an ambient air monitoring network throughout the Perth metropolitan region. Fixed ambient air monitoring stations are also located in selected regional centres. The operation of the monitoring network and the results measured against National Environment Protection (Ambient Air Quality) Measure standards are used to produce annual 'efficiency' and 'effectiveness' indicators.

## Monitoring stations

During 2010–11, DEC maintained and operated 10 metropolitan (including two temporary sites established for the Kwinana Child Health Study) and five regional air quality monitoring stations in Western Australia. The location and period of operation of these sites are listed below.

Table 29: Summary of monitoring stations

	Parameters measured	Period of operation
Albany	PM <sub>10</sub> & Met	July 2010 to June 2011
Bunbury	PM <sub>10</sub> , PM <sub>2.5</sub> & Met	July 2010 to June 2011
Busselton	PM <sub>2.5</sub> & Met	July 2010 to June 2011
Calista (C)	NO, NO <sub>2</sub> , PM <sub>10</sub> & Met	July 2010 to August 2010
Caversham	CO, NO, NO <sub>2</sub> , O <sub>3</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> & Met	July 2010 to June 2011
Collie	PM <sub>10</sub> & Met	July 2010 to June 2011
Duncraig	CO, NO, NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> & Met	July 2010 to June 2011
Geraldton	PM <sub>10</sub> & Met	July 2010 to June 2011
Hillman (C)	NO, NO <sub>2</sub> , PM <sub>10</sub> & Met	July 2010 to August 2011
Quinns Rocks	NO, NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub> & Met	July 2010 to June 2011
Rockingham	NO, NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub> & SO <sub>2</sub>	July 2010 to June 2011
Rolling Green	NO, NO <sub>2</sub> , O <sub>3</sub> & Met	July 2010 to June 2011
South Lake	CO, NO, NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> & Met	July 2010 to June 2011
Swanbourne	NO, NO <sub>2</sub> , O <sub>3</sub> & Met	July 2010 to June 2011
Wattleup	SO <sub>2</sub> & Met	July 2010 to June 2011

CO—carbon monoxide, NO—nitric oxide, NO<sub>2</sub>—nitrogen dioxide, PM<sub>10</sub>—particles measuring less than 10 microns, PM<sub>2.5</sub>—particles measuring less than 2.5 microns, SO<sub>2</sub>—sulfur dioxide, Met—meteorological parameters, C—Child Health Study site

The stations monitor a range of pollutants including carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide and particles as PM<sub>10</sub>. Particles as PM<sub>2.5</sub> are also monitored at selected sites as part of a nation-wide program.

## DEC's air quality laboratory

The air quality laboratory is a vital part of a general network upgrade as air quality monitoring progresses toward National Association of Testing Authorities (NATA) certification. The majority of the hardware needed is currently in place with the bulk of the remaining NATA certification work to be focused on establishing standard operating procedures, recordkeeping systems and equipment certification processes.



## Public access to air quality data

The air quality data web page ([www.dec.wa.gov.au/content/view/full/3420/2292/](http://www.dec.wa.gov.au/content/view/full/3420/2292/)) was maintained throughout the year, providing twice-daily updates to ambient air quality data from all air quality monitoring stations operated by DEC. The public can download hourly averaged graphs for CO, NO<sub>2</sub> and SO<sub>2</sub> and 24-hour averaged data for PM<sub>10</sub> and PM<sub>2.5</sub> monitored in DEC's air quality network. Ambient air quality data obtained from Collie, Kalgoorlie and Kwinana industries monthly, in accordance with their respective licence conditions, are also included on the website.



An ambient air quality monitoring station.



# Environmental Sustainability



## Environmental Sustainability

DEC has the responsibility to develop and implement policies and strategies that promote environmentally sustainable practices in industry, government and the community in Western Australia.

### Strategic Policy

A new Strategic Policy Branch was established in December 2010 with responsibility for leading and coordinating high level strategic policy and promoting good environmental sustainability policy outcomes including amendments to the EP Act, the *Litter Act 1979*, and the Waste Avoidance and Resource Recovery (WARR) Acts and Regulations.

#### Participation in Environment Protection and Heritage Council projects

DEC also participates in inter-jurisdictional working groups to implement Environment Protection and Heritage Council projects and provides policy advice to the Minister for Environment on related issues. Western Australia is currently represented on seven National Waste Policy implementation working groups.

As part of the implementation of the Australian Packaging Covenant and its predecessor the National Packaging Covenant, DEC administers associated funded projects. The National Environment Protection (Used Packaging Materials) (NEPM-UPM) Measure is implemented in Western Australia through enforcement of the Environment Protection (NEPM-UPM) Regulations 2007.

## Waste management

### Legislation and regulations

DEC has responsibility for administering the *Waste Avoidance and Resource Recovery Act 2007* (WARR Act), *Waste Avoidance and Resource Recovery Levy Act 2007*, WARR Regulations 2008, and the WARR Levy Regulations 2008 to minimise generation of waste and manage its storage and recycling.

Under this legislation, landfills in the Perth metropolitan area, and landfills anywhere in the state which receive waste from the metropolitan area, must pay a landfill levy on the waste disposed to landfill. The amount of levy due is conditional on the type of landfill and the quantity of waste.

### Office of the Waste Authority

The Office of the Waste Authority provides secretariat services to the Waste Authority and manages key activities including policy, strategic partnerships and communications.

### Delivery of programs on behalf of the Waste Authority

The department's Waste Management Branch provides program delivery support to the Waste Authority, in accordance with a service level agreement established in 2009. The Waste Management Branch manages the administration of various funding programs, such as the *Strategic Waste Initiatives Scheme*, *Community Grants Scheme*, *Regional Funding Program*, *Household Hazardous Waste Program* and *WA Transitional E-waste Program*. It also provides policy advice to government and other stakeholders on waste and recycling issues.



Environment Minister Bill Marmion took time out of his inspection of Tamala Park to announce the funding boost for e-waste management.

## E-waste program gets funding boost

In February 2011, Environment Minister Bill Marmion visited one of the state's busiest recycling facilities, Tamala Park, to announce that the state government would inject \$1.5million into the recycling and disposal of electronic and products nearing the end of their useful life, or 'e-waste'.

The funds will go to the *Western Australian Transitional E-Waste Program*, set up to subsidise e-waste recycling and disposal costs.

"Australians are among the fastest adopters of new technology in the world," the Minister said.

"With increasing production and demand for electronic products such as televisions and computers, e-waste is growing three times faster than any other waste stream.

"With the implementation of a national e-waste strategy up to three years away, the government is providing \$1.5 million now to subsidise up to 50 per cent of e-waste disposal costs for metropolitan depots and up to 50 per cent of disposal and transport costs for non-metropolitan depots."

Electrical retailers can also apply for funding to hold one-off collection days.

"E-waste contains a wide range of potentially hazardous chemicals that can pose a threat to wildlife and human health," Mr Marmion added.

"Anything we can do to remove such items from the waste stream is important and this will make a real difference in how we dispose of e-waste in the metropolitan area."





Coordinating  
Western Australia's  
Response to Climate Change



# Coordinating Western Australia's Response to Climate Change

## Taking action on climate change

DEC is charged with providing leadership across government, industry and the community in the development and implementation of policies and strategies to reduce greenhouse gas emissions and adaptation initiatives to reduce the impact of climate change for Western Australia. This is achieved through the department's Climate Change Unit (CCU).

Further information about the CCU is available on the DEC website:  
[www.dec.wa.gov.au/content/view/3435/2332/](http://www.dec.wa.gov.au/content/view/3435/2332/).

## Low Emissions Energy Development fund

In February 2010, the government called for applications for funding under the third round of *Low Emissions Energy Development* (LEED) funding with up to \$10 million available. In September 2010, the state government announced that it would invest almost \$8 million in three new low-emissions energy projects in Perth, Kalgoorlie-Boulder and Karratha.

A funding agreement was entered into with Aurora Biofuels for \$2 million to construct an algae biofuel facility at Karratha and this project made good progress during that period. Discussions with the other two proponents, Green Rock Energy (\$5.4 million to construct a geothermal cooling facility at The University of Western Australia) and the City of Kalgoorlie-Boulder (\$559,000 to install a ground source heat pump paired with photovoltaic panels at its swimming pool), were ongoing.

Good progress was made over this period by the first and second round LEED projects, namely, the development of an oil mallee harvester (Future Farm Industries CRC) and construction of a demonstration wave energy facility (Carnegie Wave Energy Ltd).

Applications for a fourth round of LEED funding were called for in May 2011, with 31 applications received before the closing date at the end of June.

Further information about the LEED fund is available on the DEC website:  
[www.dec.wa.gov.au/content/view/6499/2369/](http://www.dec.wa.gov.au/content/view/6499/2369/).

## Climate change adaptation and mitigation strategy

The CCU developed a working draft of the *Climate change adaptation and mitigation strategy* and commenced consultation with state government agencies. The strategy will provide a long-term framework to reduce greenhouse gas emissions, adapt to climate change and ensure Western Australia is prepared for the impact of a carbon-constrained future. It will provide a framework for action to reduce climate change risks to the community, natural environment and economy of Western Australia, and to capture the social, economic and environmental opportunities of climate change.

Further information about climate change adaptation and mitigation is available on the DEC website:  
Adaptation: [www.dec.wa.gov.au/content/view/5170/2188/](http://www.dec.wa.gov.au/content/view/5170/2188/).  
Mitigation: [www.dec.wa.gov.au/content/view/5171/2190/](http://www.dec.wa.gov.au/content/view/5171/2190/).



## Indian Ocean Climate Initiative Stage 3

Research continued into the nature and impacts of climate change on Western Australia. The *Indian Ocean Climate Initiative* (IOCI) is supported by a \$4 million investment by the state government in partnership with CSIRO and the Bureau of Meteorology to provide basic climate research in Western Australia. Stage 3 is building on the existing work completed by IOCI to provide better understanding of the current and future climate and the impact of changes, particularly in north-west Western Australia. This investment will enable the development of better projections of regional weather to allow people and businesses, as well as state government agencies, to plan and adapt to a changing climate.

Further information on the *Indian Ocean Climate Initiative* is available on the project website: [www.ioci.org.au/](http://www.ioci.org.au/).

## Electric vehicles trial

DEC signed an MOU to participate in a trial of electric vehicles managed by The University of Western Australia and CO2Smart Pty Ltd. An electric vehicle was delivered in May 2011 and has been added to the DEC vehicle fleet.

## System for accounting and reporting of government emissions

The CCU continued to administer the *System for accounting and reporting of government emissions* (SARGE), assisting 26 government agencies to account for and report their greenhouse gas emissions and reductions for 2009–10.

Further information about SARGE and greenhouse reporting is available on the DEC website: [www.dec.wa.gov.au/content/view/3402/1919/](http://www.dec.wa.gov.au/content/view/3402/1919/).

## Enabling local government adaptation

The CCU continued to support local government climate change risk and vulnerability assessments and adaptation planning initiatives.

The CCU completed a partnership project with WALGA to prepare advice for local governments regarding incorporating climate change adaptation into their planning policies.

Further information about climate change adaptation for local government is available on the DEC website: [www.dec.wa.gov.au/content/view/5170/2188/1/1/](http://www.dec.wa.gov.au/content/view/5170/2188/1/1/).

## Partnering with Tourism WA

The CCU partnered with Tourism WA to develop tools and resources to enable tourism operators to adapt to climate change impacts. This resulted in the development of Tourism WA climate change web pages and fact sheets.



Electric Vehicle Trial Manager Charles Crouch with the new addition to DEC's fleet.

## Electric vehicle goes on trial

DEC staff welcomed the chance to reduce emissions and noise when driving on business, with the addition of an electric vehicle to the DEC driving fleet in May 2011.

The converted Ford Focus four-cylinder car has been made available to DEC staff for official use, once they have completed an induction, as part of the first-ever Australian trial of fully electric fleet cars.

Electric Vehicle Trial Manager Charles Crouch said while the new vehicle was very easy to drive, there were a few minor alterations that warranted the introductory course.

"The first stage is an overview of the trial and how to drive the vehicle, followed by a brief drive in the car under the direction of a qualified electric vehicle driver," he said.

DEC's electric vehicle is an automatic, best used for regular trips that do not exceed a total return of 80 kilometres. All safety features such as ABS and airbags function normally.

The two-to-three-year trial will assess the suitability of the vehicle for meeting specific operational requirements for the department. The trial is also a public demonstration of operating characteristics and environmental benefits of electric vehicles.



# Fire Management Services 2009–10 and 2010–11

## Fire Management Services 2009–10 and 2010–11

Note: Fire management information was not included in DEC's 2009–10 Yearbook. This section summarises information from both the 2009–10 and 2010–11 reporting periods. Information on bushfires from 2007–08 to 2010–11 is summarised in Table 31.

### Fire season 2009–10

The 2009–10 fire season in southern parts of Western Australia experienced different fire weather conditions in the first and second halves of the year. Regular rainfall during the spring months restricted the prescribed burning days in the southern forests. The summer months and the autumn burning period were again abnormally dry. Prescribed burning in autumn commenced in early April, resulting in a successful prescribed burning achievement in the south-west forest regions (Swan, South West and Warren). DEC also completed significant areas of prescribed burning in the Kimberley, Pilbara, Goldfields, Midwest, Wheatbelt and South Coast regions.

The total area of the 603 bushfires attended and monitored by DEC throughout the state in 2009–10 was about 2.6 million hectares. Of this area, about 116,969 hectares occurred in the Pilbara Region, 230,491 hectares in the Goldfields Region, 1.68 million hectares in the Kimberley Region, 417,096 hectares in the South Coast Region, 106,564 hectares in the Midwest Region, 2,222 hectares in the Wheatbelt Region and about 47,380 hectares in the south-west forest regions (Swan, South West and Warren).

Lightning-caused fires represented about 27 per cent of all bushfires attended by DEC. This is above the 10-year average of about 23 per cent. Deliberately lit or arson-caused fires started 36 per cent of all fires. This is below the 10-year average of about 44 per cent.

Other causes of bushfires included accidental fires (11 per cent), escapes from private burns (six per cent) and unknown (18 per cent). Eleven bushfires were the result of escapes from DEC-prescribed burns in the south-west forest regions. These escapes represented two per cent of all bushfires attended by DEC.

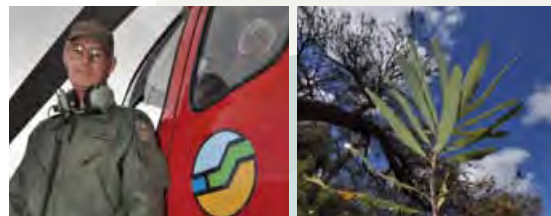
DEC staff attended 403 bushfires in the three south-west forest regions. These fires burned about 39,836 hectares of DEC-managed land and an additional 7,545 hectares of non-DEC-managed lands. Five of the biggest fires (in the forest regions) accounted for a total of 39,643 hectares (84 per cent). Ninety per cent of all fires were contained to less than 20 hectares due to the early detection and rapid fire suppression response by DEC. In many cases, the fires were rapidly contained where they burned into low fuels within previously prescribed burned areas.

The extremely dry summer conditions that have prevailed since 2006 continued to affect most of the state, and resulted in numerous large bushfires. The most serious bushfires attended by DEC crews occurred in DEC's Midwest and Swan regions. Significant assistance was provided to local government and FESA at fires burning on private lands in the vicinity of Badgingarra, Arrowsmith and Mary Springs, and at fires in the vicinity of Moore River and Toodyay. Other fires of interest occurred at Cornwall Block near Harvey and in Leeuwin-Naturaliste National Park near Prevelly Park. Large fires also occurred in the South Coast Region where assistance was provided to local government and FESA at fires in the Sand Patch area, near Albany, as well as two fire complexes east of Lake King and south-east of Balladonia.

During summer, DEC crews also contained several fires in the Swan, Warren, Midwest, Kimberley and Pilbara regions.

Departmental pre-formed incident management teams were engaged at two fires during the year. These teams consist of departmental personnel who train together and are ready during the bushfire season to respond to large incidents. The mobilisation of teams to these large, complex fire incidents proved very effective.

Details on the bushfires attended by DEC staff are provided in Table 32.



## Fire season 2010–11

The dry winter season that occurred during 2010, the third in 10 years, saw rainfall in the south-west reduced to unprecedented levels. The lack of rainfall restricted the suitable prescribed burning days in the south-west forests because fuels quickly became too volatile to burn safely under prescribed conditions. The summer months' burning period was also abnormally dry. Autumn prescribed burning commenced in early April and resulted in a successful autumn burning program in the south-west forests, as well as the Kimberley, Pilbara, Goldfields, Midwest, Wheatbelt and South Coast regions.

DEC attended and monitored 629 bushfires throughout the state in 2010–11, which burnt about 645,505 hectares. Of this area, about 38,862 hectares occurred in the Pilbara Region, 55,710 hectares in the Goldfields Region, 470,885 hectares in the Kimberley Region, 14,744 hectares in the South Coast Region, 22,906 hectares in the Midwest Region, 14,209 hectares in the Wheatbelt Region and about 28,189 hectares in the south-west forest regions (Swan, South West and Warren).

Lightning-caused fires represented about 11 per cent of all bushfires attended by DEC, well below the 10-year average of about 23 per cent. Deliberately lit or arson-caused fires started 51 per cent of all fires, above the 10-year average of about 44 per cent.

Other causes of bushfires included accidental fires (15 per cent), escapes from private burns (six per cent) and unknown (15 per cent). Two per cent were the result of escapes from DEC prescribed burns.

The most serious bushfires attended by the department occurred in the Midwest and Swan regions. Significant assistance was provided to local government authorities and FESA at fires at Lake Clifton, Red Hill, Roleystone and Kelmscott.

Other fires of interest occurred at Yeagarup Block near Pemberton and in Lesueur National Park near Jurien Bay. Large fires also occurred in the South Coast Region near Norseman and Salmon Gums in Dundas Nature Reserve, and in Cape Arid National Park.

DEC pre-formed incident management teams were deployed five times during the 2010–11 fire season.

Details on the bushfires attended by DEC staff are provided in Table 32.



Table 30: Bushfires in all regions 2007–08 to 2010–11  
 Number and area by land category  
 Number and per cent by cause

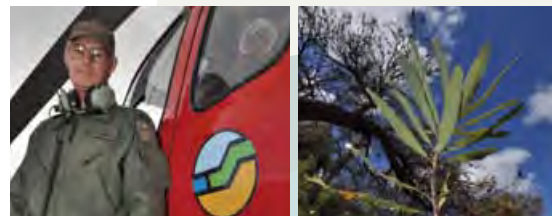
Category	Number **					Area burnt (ha) *				
	2007–08	2008–09	2009–10 <sup>1</sup>	2010–11 <sup>2</sup>		2007–08	2008–09	2009–10 <sup>1</sup>	2010–11 <sup>2</sup>	
<b>All regions</b>										
State forest										
native hardwood	76	150	118	99		5,426	4,663	14,357	1,954	
softwood plantation	64	138	94	114		325	3,191	136	192	
National parks	73	112	99	111		100,425	454,481	450,384	226,625	
Nature reserves	41	35	56	68		691,258	321,140	961,010	143,322	
Other DEC-managed reserves	50	57	48	62		314,908	497,419	202,605	78,695	
Other Crown lands	13	19	33	38		83,721	243,598	136,311	63,120	
Private property	87	100	104	100		5,139	51,364	23,132	7,162	
Unallocated Crown land	40	37	51	37		224,603	167,134	814,831	124,436	
<b>Total</b>	<b>444</b>	<b>648</b>	<b>603</b>	<b>629</b>		<b>1,425,806</b>	<b>1,742,991</b>	<b>2,602,767</b>	<b>645,505</b>	
<b>Cause</b>										
<b>All regions</b>										
Deliberately/illegally lit	217	371	216	321		49	57	36	51	
Escapes – DEC burns	6	9	11	11		1	1	2	2	
Escapes – non-DEC burning	26	31	35	36		6	5	6	6	
Accidental – timber industry	3	6	2	7		1	1	0	1	
Accidental – other industries	20	24	37	30		5	4	6	5	
Accidental – recreationists	21	35	32	54		5	5	5	9	
Lightning	82	76	166	72		18	12	27	11	
Unknown	51	57	27	63		11	9	13	10	
Other causes	18	39	77	35		4	6	5	5	
<b>Total</b>	<b>444</b>	<b>648</b>	<b>603</b>	<b>629</b>		<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	

<sup>1</sup> 2009–10 information includes data from 12-6-2009 to 15-6-2010

<sup>2</sup> 2010–11 information includes data from 8-6-2010 to 30-6-2011

\* Area (ha) burnt by bushfires in the tenure type \*\* Number of bushfires that started in each tenure type and fire cause




 Table 31: Area and number of bushfires attended and monitored by DEC for all regions 2009–10<sup>1</sup>

Region	State forest native hardwood	State Forest Softwood Plantation	National parks	Nature reserves	Other DEC reserves	Other Crown lands	Private property	Unallocated Crown land	Total
<b>Southwest Forest Regions</b>									
Swan	Area (ha) *	832	1,209	261	149	12	3,812	3,156	9,564
	Number **	64	23	11	13	10	44	6	254
South West	Area (ha) *	11,711	197	79	335	19	349	13	12,706
	Number **	45	14	2	13	2	21	6	112
Warren	Area (ha) *	1,814	22,967	129	17	0	159	25	25,111
	Number **	9	10	3	2	1	9	2	37
Subtotal	Area (ha) *	14,357	24,373	470	500	31	4,320	3,194	47,380
	Number **	118	47	16	28	13	74	14	403
<b>Other Regions</b>									
Kimberley	Area (ha) *	0	377,813	655,929	188,207	48,983	0	411,387	1,682,318
	Number **	0	9	7	4	2	0	8	30
Pilbara	Area (ha) *	0	44,127	0	12,643	20,621	151	39,154	116,696
	Number **	0	16	0	5	4	1	2	28
Midwest	Area (ha) *	0	3,144	18,523	0	45,630	16,506	22,761	106,564
	Number **	0	11	3		10	13	3	40
Goldfields	Area (ha) *	0	75	35,928	211	20,000	0	174,278	230,491
	Number **	0	1	11	1	1	0	5	19
Wheatbelt	Area (ha) *	0	0	298	34	1,044	766	79	2,222
	Number **	0	0	5	3	1	3	4	16
South Coast	Area (ha) *	0	853	249,863	1,010	2	1,388	163,979	417,096
	Number **	0	15	14	7	2	13	15	67
Subtotal	Area (ha) *	0	426,012	960,541	202,105	136,280	18,812	811,638	2,555,387
	Number **	0	52	40	20	20	30	37	200
Grand Total (All regions)	Area (ha) *	14,357	450,384	961,010	202,605	136,311	23,132	814,831	2,602,767
	Number **	118	99	56	48	33	104	51	603

<sup>1</sup> 2009–10 information includes data from 12-6-2009 to 15-6-2010

\* Area (ha) burnt by bushfires in the tenure type \*\* Number of bushfires originating in the tenure type

Table 32: Area and number of bushfires attended and monitored by DEC for all regions 2010–11<sup>1</sup>

Region	State forest native hardwood	State forest softwood plantation	National parks	Nature reserves	Other DEC-managed reserves	Other Crown lands	Private property	Unallocated Crown land	Total	
<b>South-west forest regions</b>										
Swan	Area (ha) *	312	169	837	1,390	667	10	2,702	1,476	7,562
	Number **	56	105	52	22	29	22	51	15	352
South West	Area (ha) *	1,618	6	1,225	346	144	1	621	102	4,063
	Number **	32	9	32	3	15	4	29	7	131
Warren	Area (ha) *	10	0	14,100	366	44	22	135	1,887	16,564
	Number **	10	0	7	4	2	1	5	2	31
Subtotal	Area (ha) *	1,940	175	16,162	2,102	855	33	3,458	3,465	28,189
	Number **	98	114	91	29	46	27	85	24	514
<b>Other regions</b>										
Kimberley	Area (ha) *	0	0	193,285	64,484	45,745	56,718	0	110,653	470,885
	Number **	0	0	8	8	4	5	0	3	28
Pilbara	Area (ha) *	0	0	1,460	0	32,092	5,210	0	100	38,862
	Number **	0	0	3	1	7	3	0	1	15
Midwest	Area (ha) *	0	0	8,467	11,495	3	680	1,046	1,215	22,906
	Number **	0	0	5	9	3	1	7	3	28
Goldfields	Area (ha) *	0	0	0	55,240	1	0	0	469	55,710
	Number **	0	0	0	13	1	1	0	1	16
Wheatbelt	Area (ha) *	0	0	0	8,197	0	0	58	5,955	14,209
	Number **	0	0	0	3	0	0	2	3	8
South Coast	Area (ha) *	14	17	7,251	1,804	0	480	2,599	2,579	14,744
	Number **	1	0	4	5	1	1	6	2	20
Subtotal	Area (ha) *	14	17	210,463	141,220	77,840	63,088	3,704	120,971	617,316
	Number **	1	0	20	39	16	11	15	13	115
Grand total (all regions)	Area (ha) *	1,954	192	226,625	143,322	78,695	63,120	7,162	124,436	645,505
	Number **	99	114	111	68	62	38	100	37	629

<sup>1</sup> 2010–11 information includes data from 8-6-2010 to 30-6-2011

\* Area (ha) burnt by bushfires in the tenure type \*\* Number of bushfires originating in the tenure type



## Prescribed burning

Each year the department plans and implements prescribed burning on DEC-managed lands throughout the state for three primary purposes: to protect and conserve biodiversity values and community assets; to reduce the occurrence and impacts of large, intense bushfires; and to regenerate and protect forest ecosystems following harvesting operations or other disturbances. In many cases these outcomes are achieved together within a prescribed burn.

The indicative burn target for the south-west forest regions in the 2009–10 and 2010–11 financial years was 200,000 hectares annually. In order to meet this objective, the department’s master burn planning process identified in excess of 300,000 hectares as available for prescribed burning in the south-west forest regions for each of the 2009–10 and 2010–11 burning seasons. This available burn area, which is in excess of the annual target, provided the flexibility to take advantage of any favourable burning situations throughout the south-west.

In 2009–10, DEC achieved this target for the first time since 2004–05. In the south-west forest regions, the prescribed burn program for 2009–10 achieved a total of about 212,017 hectares, including about 8,299 hectares that were burnt for pine plantation protection. Approximately 49 per cent of all burns were undertaken in the spring–early summer period (September to December 2009), 45 per cent in autumn (April to June 2010), and six per cent in winter (July and August 2010).

In the south-west forest regions in 2010–11, DEC achieved a total burn area of about 136,746 hectares, including about 9,570 hectares burnt for pine plantation protection. The department also completed its largest ever program of about 3.1 million hectares of prescribed burning on DEC-managed lands in the Kimberley, Pilbara, Goldfields, Midwest, Wheatbelt and South Coast regions, as well as on unallocated Crown land and unmanaged reserves.

Figure 3 shows the achievement of prescribed burning in the south-west forest regions from 2000–01 to 2010–11. The relatively low level of burning for a number of years throughout this period, including 2010–11, reflects the impacts of drought and unfavourable burning conditions that prevailed in these years. The average annual area of burning achieved in the past eight years since 2003–04 has been about 173,000 hectares.

Figure 3: Prescribed burning 2000–01 to 2010–11—south-west forest regions

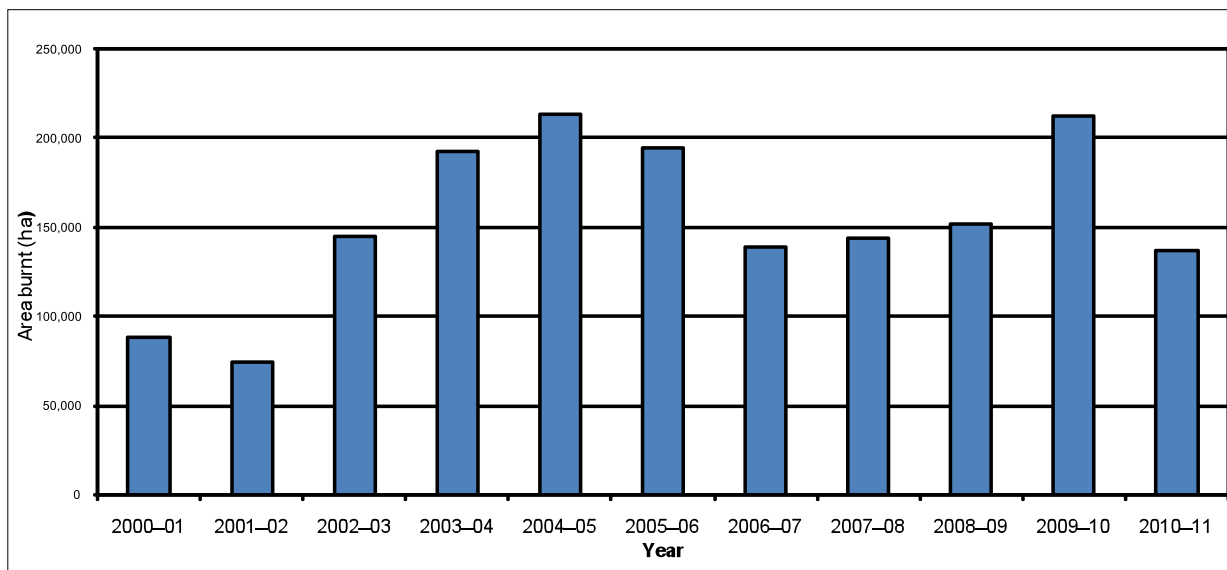
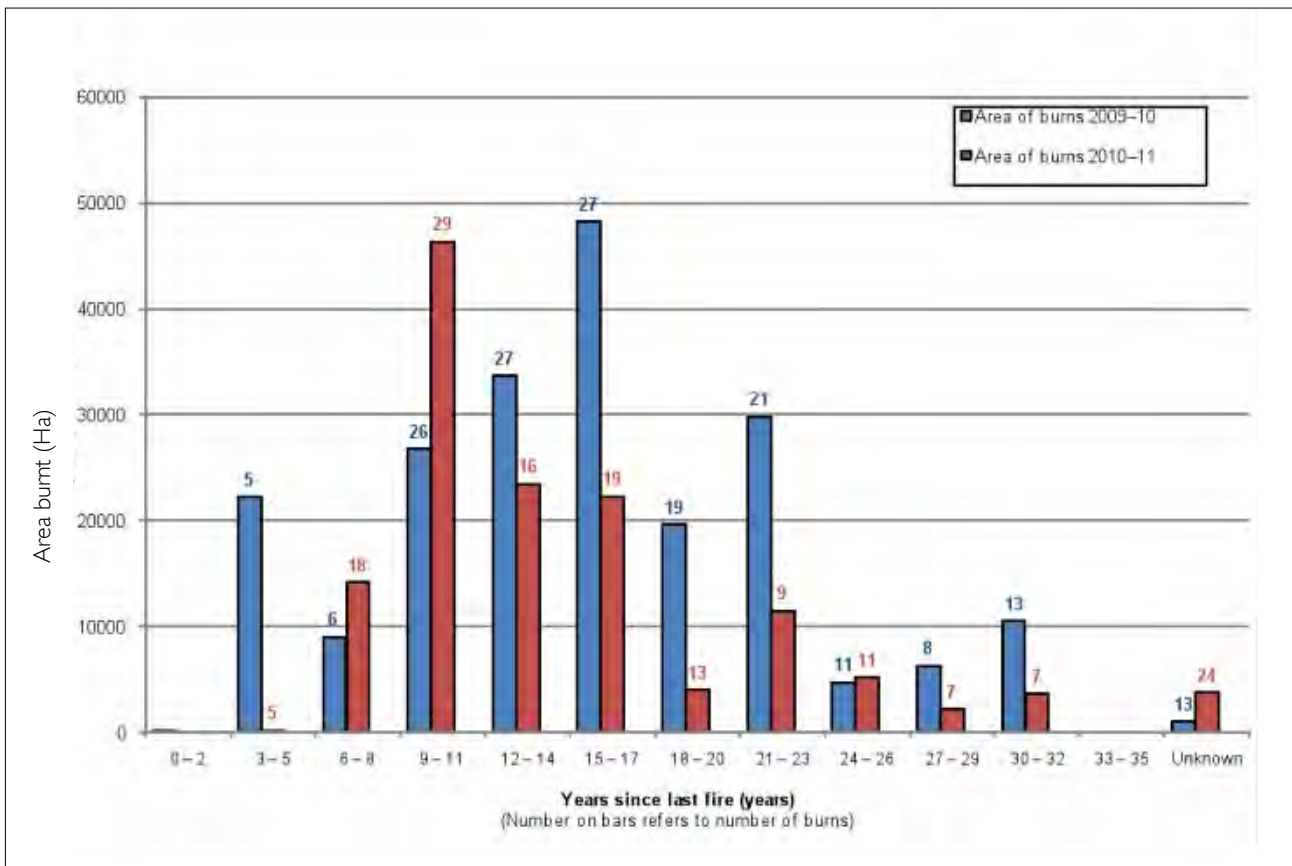


Figure 4 shows the year of last burn of the vegetation/fuel within all the prescribed burns conducted in the south-west forest regions in 2009–10 and 2010–11. Approximately 82 and 79 per cent of the burns contained fuels that had not been previously burnt for at least 10 years in 2009–10 and 2010–11 respectively.

Figure 4: Years since last fire distribution for 2009–10 and 2010–11 prescribed burns—south-west forest regions



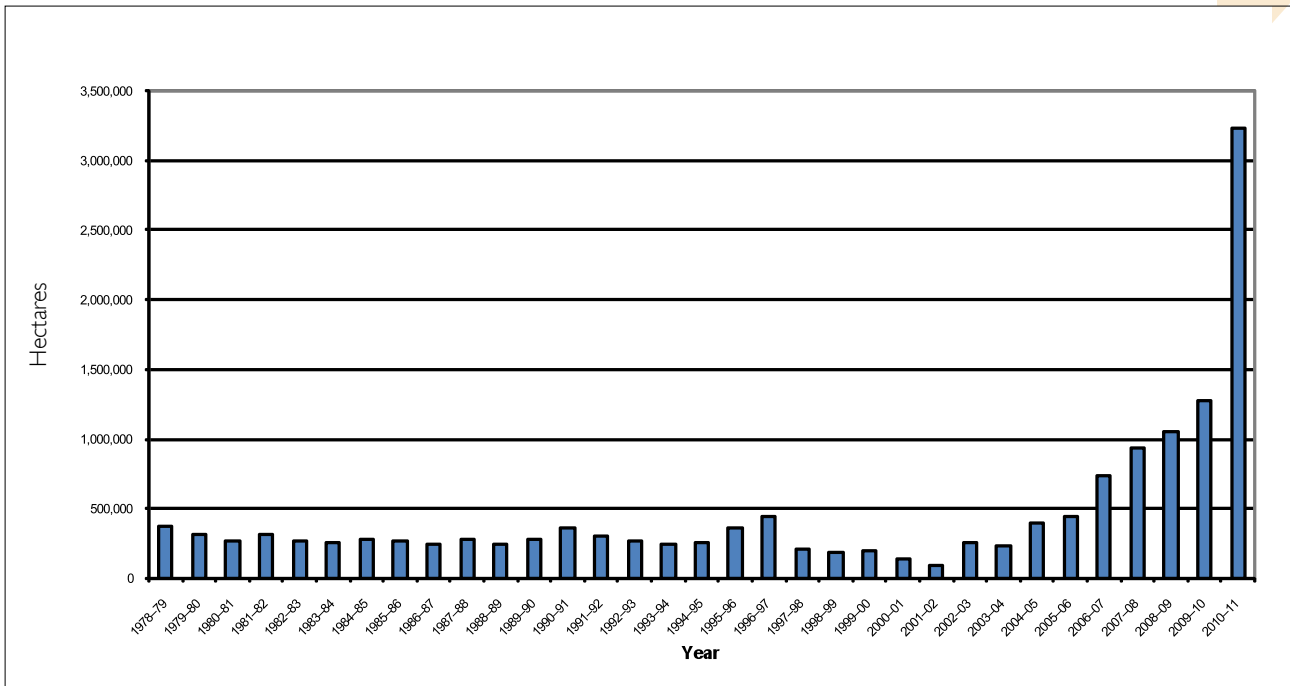
In addition to the burn programs achieved in the south-west forest regions, a total of about 1.06 million hectares of prescribed burning was undertaken by DEC in other regions in 2009–10, and 3.1 million hectares in 2010–11. Many of these burns were open-edge and aerially ignited wind-driven burns that provided the habitat diversity required to conserve biodiversity and protective buffers intended to limit the spread of bushfires. The burns were carried out on DEC-managed lands as well as on unallocated Crown lands and unmanaged reserves within these regions.

In 2009–10, the combined total area of prescribed burning undertaken throughout the state was 1.27 million hectares. The combined total area of prescribed burning undertaken throughout the state in 2010–11 was 3.2 million hectares, the largest figure DEC has ever achieved.

The application of prescribed fire by DEC has increased markedly since 2004 when the department began a proactive program of fire management over large areas of unallocated Crown lands. Significant progress has been made in the Pilbara, Kimberley and Goldfields regions in applying prescribed fire across the landscape to achieve biodiversity conservation outcomes and to minimise the potential extent of damaging bushfires. Figure 5 shows the area prescribed burnt in all DEC regions since 1978.



Figure 5: Prescribed burning—all regions 1978–79 to 2010–11



Details on the prescribed burn areas achieved are provided in tables 33 and 34, and in the Appendix (pages 172–175).



Table 33: Type of prescribed burns for all DEC regions 2007–08 to 2010–11

	2007–08	2008–09	2009–10 <sup>1</sup>	2010–11 <sup>2</sup>
Indigenous vegetation—hand burning (ha)				
State forest	2,434	4,759	5,227	3,804
National parks	8,062	4,483	22,966	15,913
Nature reserves	3,218	4,092	2,092	7,516
Other Crown land and private property *	13,880	3,549	6,724	40,210
Total	27,594	16,883	37,009	67,443
Indigenous vegetation—aerial burning (ha)				
State forest	38,894	23,630	76,509	29,689
National parks	401,143	504,309	377,138	1,146,992
Nature reserves	239,775	208,222	66,218	1,103,496
Other Crown land and private property *	199,854	253,868	690,055	864,849
Total	879,666	990,029	1,209,920	3,145,026
Indigenous vegetation—silviculture burning (ha)				
– Jarrah-dominant forests	17,527	34,007	16,097	5,386
– Karri, karri/marri, marri forests	505	543	466	464
– Other forest	4	426	883	0
Total	18,036	34,976	17,446	5,850
Softwood plantation—burning (ha)				
– Strategic protection	5,199	11,043	3,806	4,036
– Clearing burns	1,688	676	367	640
– Logging debris removal, silviculture	778	39	7,632	5,925
Total	7,665	11,758	11,805	10,601
Grand total	932,961	1,053,646	1,276,180	3,228,920

<sup>1</sup> 2009–10 information includes data from 12-6-2009 to 15-6-2010

<sup>2</sup> 2010–11 information includes data from 8-6-2010 to 30-6-2011

\* Includes other Crown land, other DEC reserves, and private property



Table 34: Area of prescribed burns for all DEC regions 2007–08 to 2010–11

<b>South-west forest regions</b>		<b>2007–08</b>	<b>2008–09</b>	<b>2009–10<sup>1</sup></b>	<b>2010–11<sup>2</sup></b>
Swan	Area (ha)	27,335	33,482	73,902	13,007
	Number	52	39	65	48
South West	Area (ha)	53,152	56,233	56,174	48,651
	Number	51	36	52	56
Warren	Area (ha)	63,194	62,103	81,941	75,088
	Number	51	64	61	54
Subtotal	Area (ha)	143,681	151,818	212,017	136,746
	Number	154	139	178	158
<b>Other regions</b>		<b>2007–08</b>	<b>2008–09</b>	<b>2009–10<sup>1</sup></b>	<b>2010–11<sup>2</sup></b>
Kimberley	Area (ha)	533,454	717,794	725,903	2,946,570
	Number	8	6	10	24
Pilbara	Area (ha)	136,230	62,211	245,749	106,346
	Number	8	12	14	11
Midwest	Area (ha)	942	4,398	6,555	3,102
	Number	14	24	24	12
Goldfields	Area (ha)	115,232	116,224	80,872	25,103
	Number	3	16	9	6
Wheatbelt	Area (ha)	466	22	1,212	2,334
	Number	7	1	13	16
South Coast	Area (ha)	2,956	1,179	3,872	8,719
	Number	20	14	29	31
Subtotal	Area (ha)	789,280	901,828	1,064,163	3,092,174
	Number	60	73	99	100
Grand total (all regions)	Area (ha)	932,961	1,053,646	1,276,180	3,228,920
	Number	214	212	277	258

<sup>1</sup> 2009–10 information includes data from 12-6-2009 to 15-6-2010

<sup>2</sup> 2010–11 information includes data from 8-6-2010 to 30-6-2011

Please note this table counts carryover burns (same burn ID done over multiple seasons) as different records, e.g. a burn started in spring and finished in autumn is counted as two burns.



## Fire preparedness on unallocated Crown land

Since 1 July 2003, DEC has had responsibility for the coordination and on-ground management of fire risk prevention and fire preparedness works on rural unallocated Crown land and unmanaged reserves. This Crown land consists of about 89 million hectares.

Works undertaken included firebreak construction and maintenance, vegetation modification in strategic buffers, and wind-driven open edge prescribed burning and large-scale block ignition using aircraft. The achievements in block burning in the Kimberley, Pilbara and Goldfields regions continued due to increased fire management funding in these regions, and the use of planned fire for developing landscape-scale mosaics for mitigating large, damaging summer bushfires, protecting biodiversity values and achieving designated nature conservation outcomes. Some of these achievements included engagement with Aboriginal communities.

## Aerial fire suppression operations 2009–10

The department contracted eight fixed-wing water bombers during the peak summer months of the 2009–10 fire season to provide rapid aerial suppression capability in the South Coast, Midwest and Wheatbelt regions, and the south-west forest regions, which include the Perth outer-metropolitan area. Two Dromader aircraft were based at Manjimup, two Air Tractor 602 aircraft were based at Albany, and two Air Tractor 802 aircraft were based at Bunbury, with another two Air Tractor 802 aircraft based at Perth. These aircraft provided an aerial rapid-attack capability to assist ground crews in the initial attack on bushfires. In addition to the fixed-wing aircraft, four light helicopters (helitankers) and a Type I Helicopter (Sikorsky) were contracted by FESA to provide coverage for the Perth urban and nearby rural areas. FESA also trialled a Type I helicopter (Sirkorsky) based at Busselton.

The water bombers and helitankers were used successfully in combination on several bushfires that threatened residential areas in the outer metropolitan area of Perth and numerous bushfires across the South Coast, Midwest, Wheatbelt and south-west forest regions.

Water bombers contracted by DEC had staggered commencement dates, beginning with the Bunbury water bombers on 25 November 2009, and all bases ceased operations on 7 April 2010.

Water bombers attended 122 fires from Kalbarri to Esperance. These aircraft dropped 1,121 loads, flew a total of 711 operational hours and dropped a total of 3.8 million litres of product. This compares with 992 loads and 575 hours in 2008–09.

## Aerial fire suppression operations 2010–11

DEC contracted nine fixed-wing fire bomber aircraft from early November 2010 to late April 2011: these consisted of two Air Tractor 602 aircraft based at Manjimup, and two Air Tractor 802 aircraft at each of Albany, Bunbury and Perth, along with an Air Tractor 802 available on ad hoc hire from the Perth base. These aircraft provided rapid aerial suppression capability in the South Coast, Midwest and Wheatbelt regions and the south-west forest regions, including the Perth outer-metropolitan area, and provided significant assistance to ground crews in the initial attack on bushfires.

Fixed-wing fire bombers were used successfully on numerous bushfires that threatened residential areas across the south-west. These aircraft flew 862 operational hours in attending 267 bushfires, and dropped 1,509 loads, delivering a total of 4.2 million litres of product.





## Fire detection

DEC provided an effective fire detection system in the high fire risk zones of the south-west forest regions, based on a combination of single-engine fire detection aircraft and fixed lookout towers. The department's fleet of nine American Champion Scout fire detection aircraft flew 4,128 hours in 2009–10 and 4,600 hours in 2010–11 for aerial surveillance within predetermined circuits in the south-west forest regions at schedules that varied according to the fire danger levels and fire activity. The aircraft also flew approximately 290 hours each year in support of aerial suppression operations. The aircraft were flown by two permanent senior pilots, and pilots in 12 seasonal casual positions.

## Logistics support for bushfire response

DEC has developed a cache of facilities and equipment designed to fully support fire crews and incident management teams (IMT) in the field. The cache was fully deployed on three occasions during 2010–11 to major fires at Lake Clifton (FESA-managed fire), Muchea (FESA-managed fire), and Nilgen, near Lancelin (DEC-managed fire).

At each incident, a DEC State Facilities team was able to transport the components to site and make them fully operational within four to five hours, providing a stand-alone incident control centre (ICC) in an appropriate field-based location close to the fire, where the IMT can operate most effectively. The efficiency of deployment and the effectiveness of the mobile ICC were acknowledged by fire response personnel from DEC, FESA, local government and other agencies.

Some components of the cache are hired and DEC acknowledges the many service providers across the state, without whose support rapid deployment of the mobile ICC facilities and equipment would not be possible. In addition, the Salvation Army has provided catering facilities and services to complement DEC's own capacity.

The DEC mobile cache facilities and equipment include:


- mobile communications facility (Pantech)
- communications buses (five)
- logistics support trailer (Pantech)
- minor logistics support sea containers (two)
- Royal Wolf sea container offices (12).

## Fire training and development

In 2009–10 and 2010–11, Fire Management Services Branch conducted 36 and 25 formal fire training courses involving 224 and 300 participants respectively. In addition, district and regional staff delivered 26 and 16 formal fire training programs to 215 and 230 participants in 2009–10 and 2010–11 respectively.

The formal courses conducted included introduction to the Australasian inter-service incident management system (AIIMS); AIIMS awareness; prescribed burning; fire line construction using machines; basic fire awareness; fire fighting level 1; fire fighting level 2; wildfire suppression 3; structural fire fighting; basic fire fighter; and Western Australian Emergency Radio Network (WAERN) radio training. Advanced incident leadership programs were also delivered in Western Australia and Victoria to senior incident management personnel from fire and land management agencies from across Australia.

Course participants were predominantly from DEC, with additional participants drawn from the FPC, FESA, local government authorities, and the department's campground host volunteers and Bush Ranger cadets. In 2009–10, a small number of Aboriginal rangers and ranger coordinators from the Kimberley Land Council were trained for involvement in incendiary operations, and provided with opportunities for operational experience.



Aviation Section personnel provided training for 125 and 146 aerial operations personnel including fire detection pilots, air attack supervisors, air observers, helitorch operators, incendiary operations supervisors, aerial incendiary bombardiers and incendiary machine operators in 2009–10 and 2010–11 respectively. In addition, 21 courses were provided for 252 participants to support aerial water bombing operations in 2009–10, and 22 courses for 208 participants in 2010–11. The majority of these participants were from volunteer bushfire brigades and local State Emergency Service Units from the south-west. Incendiary bombardier and aerial drip-torch operator training was also provided to the Department of Environment and Natural Resources in South Australia and Bushfires Northern Territory in 2010–11.

The development and promotion of common fire training programs and course materials continued between DEC and FESA through the auspices of the Interagency Bushfire Management Committee (IBMC), and with other agencies in Australia and New Zealand. Of particular note is the development of a course in major incident management jointly between DEC, FESA and WA Police.

## Fire planning and monitoring

In 2010–11, work commenced to redesign and modernise DEC's procedures, tools and information management systems for prescribed fire planning, implementation and reporting. The initial phase of this major project involved reviewing current approaches and scoping the redevelopment works to be undertaken over the next couple of years. This development will build upon DEC's long history of nationally and internationally recognised expertise in prescribed burning.

With the support of federal government funds, DEC purchased thermal and hyper-spectral scanners which were fitted to a department-owned American Champion Scout aircraft in early 2011. This equipment is intended to map burnt and unburnt patches following prescribed burns to be better able to gauge the outcomes and effectiveness of those burns for a range of biodiversity conservation and land management purposes. Calibration and operational testing occurred during autumn 2011.

## Interagency bushfire management

Significant DEC fire management resources were dedicated during 2010–11 to improving interagency bushfire management arrangements through the IBMC and associated sub-committees.

The current sub-committees servicing the IBMC are:

- Bushfire Research (chaired by DEC)
- Fuel Load Management (chaired by FESA)
- Training (chaired by FESA)
- Fire Operations (chaired by DEC)
- Aerial Fire Suppression (chaired by FESA).

## Fire ecology education programs

Fire ecology education programs continued in 2009–10 and 2010–11 through Fire Management Services Branch and DEC's Strategic Development and Corporate Affairs Division. The program educates students and teachers at primary and secondary school levels about interrelationships between fire, flora and fauna, and the role of fire and science in conserving biodiversity and protecting communities and natural values.

A total of 10,913 students, teachers and parents participated in fire related EcoEducation programs held at Perth Hills Centre, Henderson Centre, Wellington Discovery Forest and Margaret River Eco Discovery Centre in 2009–10, and a further 8,053 in 2010–11.



A total of 591 students from 25 different metropolitan schools attended DEC's 'Fire—a force of life' program at the Perth Hills Centre and Henderson Centre, and 99 students attended the program in the regional centres, while 316 participated in the fire-related programs of 'Geography', 'Biology' and 'Our South West' in 2009–10.

In 2009–10, the department conducted a Bush Rangers WA fire awareness course at Dwellingup, which included both theoretical fire course work and field exercises involving the conduct of a small prescribed burn in nearby forest.

In 2010–11, in collaboration with DEC Kimberley staff, approximately 20 teachers attended a fire education symposium led by DEC fire staff during a three-day program in Kununurra. Attendees included the Chief Scientist of Western Australia, Professor Lyn Beazley.

Fire resources were developed in both printed and electronic forms for use in the classroom. These are now available from the DEC website for teachers. Fire information also has been incorporated into new Bush Rangers WA manuals.

Updates were made to the 'Fire—a force of life' program in order to meet with the curriculum requirements of the new geography course. The program covers fire as a natural hazard, so more information on hazard reduction and reasons for prescribed burning, as well as fire behaviour, have been added into the program.

The DEC website was updated to provide easy access for students and the general public to information on a wide range of fire management and fire ecology topics, including current prescribed burns.

## Radio communications and fire information technology services

Responsibility for the operation of radio communications and fire information technology services was transferred to Office for Information Management in 2010–11.

The department owns an extensive radio communications network that provides reliable and flexible communications for fire and other emergency operations as well as normal day-to-day administration. The network includes about 1,300 mobile and portable radios, 125 office radios, more than 75 repeaters and towers, and 12 portable broadband satellite terminals.

DEC is a major stakeholder in WAERN, and the department has continued to commission new radio infrastructure such as towers and repeaters across all regions of the state. The WAERN program will result in the upgrade of the department's current mid band VHF radio network to high band VHF over the next year. This will provide better radio communications interoperability with FESA, volunteer bushfire brigades, local authorities and other agencies during emergency incidents and normal day-to-day operations.

Three additional radio repeater sites have been established in the Kimberley Region at Silent Grove, Kununurra and Broome, which complement the existing seven repeater facilities already installed in the Kimberley Region.

Federal government funding was sought for the implementation of a 'radio over internet protocol' (ROIP), which provides radio repeater access from any internet provider connection. This project is in the final stages of implementation.

DEC worked closely with WA Police on radio infrastructure upgrades across the state and testing of new digital radio technology.

DEC's corporate information management and decision support system for fire management (Fire Support System) has been re-engineered to improve data access, management and interchange between the department and its stakeholders. This work will also facilitate greater functionality of the master burn planning, bushfire threat analysis and resource management systems.

The department has completed the installation of a resource tracking system that provides managers with immediate access to information on the locations and activity of fire management resources such as aircraft, tankers, machinery and transport vehicles that are used at incidents throughout the state. The system is also being utilised to track other DEC resources such as boats. The application currently maps the location of 258 operational resources consisting of 158 fixed installs (21 aircraft, three boats, 107 fire trucks, 27 heavy earthmoving machines), and 100 portable tracking units that can be fitted to other vehicles such as contract machines, WA Police or FESA vehicles. Fifty additional devices will be installed into selected light fleet across the state. Significant effort has been invested to increase the system's robustness and reliability.

DEC has entered into a research partnership with Landgate's Satellite Remote Sensing Services to improve automatic detection and mapping in a digital format of fire using satellite remote sensing technology. This arrangement will provide fire history information across the state that complements the department's extensive fire records for the south-west forest regions.

DEC has worked closely with the Department of Commerce and other government agencies and non-government organisations to acquire federal government funds to improve telecommunications and associated support facilities for emergency management throughout rural and remote areas of Western Australia. This funding has assisted DEC to establish and enhance its statewide radio communications and decision support systems such as ROIP; mobile/portable radio, satellite and information technology (IT); and remote sensor and resource tracking systems. Further work has been done to improve the communications and IT infrastructure in the incident communications vehicle and communication buses.

Fire Management Services Branch has investigated alternative technologies to deliver and monitor prescribed burning programs. A workshop with an interstate expert on unmanned aerial vehicles (UAV) was conducted with a view to exploring the potential for these vehicles as a platform to mount incendiary and remote sensing equipment. This UAV technology has the potential to greatly increase the effectiveness and efficiency of fire management, particularly in remote parts of the state.

## Key effective indicators

Table 35: Prescribed burning in south-west forest regions

Region	10-year rolling average (ha)	Actual 2009–10	Difference (ha)	%
Swan	44,291	73,902	29,612	67
South West	46,881	56,174	9,293	20
Warren	56,346	81,941	25,595	45
Total	147,518	212,017	64,500	44
Region	10-year rolling average (ha)	Actual 2010–11	Difference (ha)	%
Swan	45,623	13,007	-32,616	-71
South West	49,141	48,651	-490	-1
Warren	60,524	75,088	14,564	24
Total	155,288	136,746	-18,542	-12

These statistics compare the 2009–10 and the 2010–11 prescribed burning achievements with the respective 10-year rolling average for prescribed burning.



The fire suppression efficiency indicator is represented by the percentage of all forest bushfires burning under 95 percentile weather conditions, that are attacked with effective DEC suppression forces before these fires exceed five hectares in Priority 1 and Priority 2 areas. These priority areas include high values that may be vulnerable to bushfires or inappropriate fire regimes. The **percentage standard to be exceeded is 95 per cent** of all forest fires requiring suppression by direct attack. The 95 percentile weather conditions include the days when forest fire danger is below 'Very high' as calculated in the department's Forest Fire Behaviour Tables (1998).

Table 36: Fire suppression in south-west forest regions<sup>1</sup>

Region	Priority 1 and 2 (%)				
	Standard	2007–08	2008–09	2009–10	2010–11
Swan	95	97	97	100	95
South-west	95	100	93	100	94
Warren	95	100	91	67	86
DEC average (1 year)				91	
DEC average (5 years)				91	

<sup>1</sup> Includes only records where DEC was first attack agency



Conservation Employee Jordan Cantelo,

## Appendix: Prescribed burning summary data

Area prescribed-burnt within south-west forest regions for 2009–10<sup>1</sup>

Objective	Region	Area (hectares)				Year of last fire*
		Winter	Spring	Summer	Autumn	
Community/strategic protection	Swan	6,071	22,943	-	22,459	1971–2005
	South West	-	10,604	-	19,439	1962–2009
	Warren	-	42,589	-	11,365	1978–2009
Biodiversity conservation	Swan	-	-	-	-	-
	South West	-	5,190	-	2,417	1984–2005
	Warren	-	1,037	-	23,795	1998–2007
Hardwood silviculture	Swan	-	718	-	1,941	1992–1999
	South West	-	10,040	-	1,820	1983–2003
	Warren	-	530	-	1,529	1981–2005
Plantation silviculture/protection	Swan	6,338	-	-	1,902	1980–2002
	South West	-	610	-	2,955	1974–2000
	Warren	-	-	-	-	-
Tourism and recreation/protection	Swan	103	6,291	-	5,136	1979–2006
	South West	-	2,717	-	382	1986–1997
	Warren	-	1,096	-	-	1999
Grand total by season (ha)		12,512	104,365	-	95,140	
Seasonal %		6	49	-	45	
Grand total (ha)		212,017				

<sup>1</sup> 2009–10 information includes data from 12-6-2009 to 15-6-2010

\* Range of vegetation/fuel ages as at July 2009



Area prescribed-burnt within south-west forest regions for 2010–11<sup>1</sup>

Objective	Region	Area (hectares)				Year of last fire*
		Winter	Spring	Summer	Autumn	
Community/strategic protection	Swan	793	80	-	2,846	1971–2001
	South West	590	3,201	-	15,585	1982–2004
	Warren	-	32,310	-	28,962	1980–2008
Biodiversity conservation	Swan	-	-	-	1,605	1981
	South West	-	12,671	-	3,287	1986–2005
	Warren	-	-	8,134	3,418	2001–2002
Hardwood silviculture	Swan	-	-	-	267	2005
	South West	-	1,728	-	3,303	1983–2004
	Warren	-	1,007	-	576	1986–2007
Plantation silviculture/protection	Swan	4,120	332	-	2,017	1980–2007
	South West	-	472	-	2,629	1961–1987
	Warren	-	-	-	-	-
Tourism and recreation/protection	Swan	472	-	-	475	1982–2003
	South West	-	3,038	-	2,147	1969–2006
	Warren	-	553	-	128	2000–2005
Grand total by season (ha)		5,975	55,392	8,134	67,245	
Seasonal %		4	41	6	49	
Grand total (ha)		136,746				

<sup>1</sup> 2010–11 information includes data from 8-6-2010 to 30-6-2011

\* Range of vegetation/fuel ages as at July 2010

Number of prescribed burns conducted within south-west forest regions in each season for various purposes in 2009–10<sup>1</sup>

Objective	Winter		Spring		Summer		Autumn		Total number of burns	Number of escapes	
	Aerial	Hand	Aerial	Hand	Aerial	Hand	Aerial	Hand			
Community/ strategic protection	Swan	3	-	12	6	-	-	7	5	33	1
	South West	-	-	4	8	-	-	6	4	22	2
	Warren	-	-	13	4	-	-	3	16	36	5
Biodiversity conservation	Swan	-	-	-	-	-	-	-	-	-	-
	South West	-	-	1	-	-	-	1	2	4	-
	Warren	-	-	1	-	-	-	2	-	3	-
Hardwood silviculture	Swan	-	-	1	-	-	-	1	-	2	-
	South West	-	-	5	1	-	-	2	1	9	1
	Warren	-	-	1	4	-	-	1	15	21	1
Plantation silviculture/ protection	Swan	1	7	-	-	-	-	-	7	15	-
	South West	-	-	1	1	-	-	2	7	11	-
	Warren	-	-	-	-	-	-	-	-	-	-
Tourism and recreation/ protection	Swan	-	3	3	4	-	-	2	3	15	-
	South West	-	-	-	4	-	-	1	1	6	-
	Warren	-	-	-	1	-	-	-	-	1	-
Total	4	10	42	33	-	-	28	61	178	10	

<sup>1</sup> 2009–10 information includes data from 12-6-2009 to 15-6-2010  
Please note this table counts carryover burns (same burn ID done over multiple seasons) as different records; e.g. a burn started in spring and finished in autumn is counted as two burns.





Number of prescribed burns conducted within south-west forest regions in each season for various purposes in 2010–11<sup>1</sup>

Objective	Winter		Spring		Summer		Autumn		Total number of burns	Number of escapes	
	Aerial	Hand	Aerial	Hand	Aerial	Hand	Aerial	Hand			
Community/ strategic protection	Swan	-	7	1	-	-	1	6	15	2	
	South West	-	1	3	-	-	5	10	22		
	Warren	-	-	11	8	-	-	8	7	34	2
Biodiversity conservation	Swan	-	-	-	-	-	-	3	3		
	South West	-	-	2	2	-	-	2	2	8	3
	Warren	-	-	-	-	1	-	2	-	3	
Hardwood silviculture	Swan	-	-	-	-	-	-	-	1	1	
	South West	-	-	2	-	-	-	3	-	5	
	Warren	-	-	1	2	-	-	-	12	15	1
Plantation silviculture/ protection	Swan	-	7	1	-	-	1	7	16		
	South West	-	-	-	1	-	-	10	12		
	Warren	-	-	-	-	-	-	-	-	-	
Tourism and recreation/ protection	Swan	-	4	-	-	-	1	8	13		
	South West	-	-	2	2	-	-	3	9		
	Warren	-	-	-	1	-	-	1	2		
Total	-	19	21	21	1	-	26	70	158	9	

<sup>1</sup> 2010–11 information includes data from 8-6-2010 to 30-6-2011  
Please note this table counts carryover burns (same burn ID done over multiple seasons) as different records; e.g. a burn started in spring and finished in autumn is counted as two burns.

# Glossary of acronyms

ABPF	Araluen Botanic Park Foundation
AQMP	Air quality management plan
ARI	Assessment on referral information
BIF	Banded iron formation
CALM	Conservation and Land Management (CALM Act= <i>Conservation and Land Management Act 1984</i> )
CCU	Climate Change Unit
CEO	Chief Executive Officer
CHP	Campground Host Program
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVA	Conservation Volunteers Australia
DAFWA	Department of Agriculture and Food Western Australia
DEC	Department of Environment and Conservation
Diesel NEPM	National Environment Protection (Diesel Vehicle Emissions) Measure
DNA	Deoxyribonucleic acid
EBPPP	<i>Enterprise Based Productivity Places</i> program
EP	Environmental Protection (EP Act= <i>Environmental Protection Act 1986</i> )
EPA	Environmental Protection Authority
EPBC	Environment Protection and Biodiversity Conservation (EPBC Act= <i>Environment Protection and Biodiversity Conservation Act 1999</i> )
EPHC	Environment Protection and Heritage Council
EPS	Environmental protection statement
ERMP	Environmental review and management program
ETR	External triennial review
FACET	Forum Advocating Cultural and Ecotourism
FDIS	Fauna distribution information system
FESA	Fire and Emergency Services Authority of Western Australia

FMP	Forest Management Plan
FPC	Forest Products Commission
FTIR	Fourier Transform infra-red spectrometer
GIS	Geographic Information Services
GPS	Global positioning system
HAZMAT	Hazardous materials
IBMC	Interagency Bushfire Management Committee
IBRA	Interim biogeographical regionalisation of Australia
IOCI	Indian Ocean Climate Initiative
IR	Incidence report
IT	Information technology
IUCN	International Union for the Conservation of Nature
LEED	Low Emissions Energy Development
LFW	Land for Wildlife
ML	Management letter
MOU	Memorandum/memoranda of understanding
MWA	Murchison Widefield Array
NATA	National Association of Testing Authorities
NEPM-UPM	National Environment Protection Measure—used packaging materials
NPI	National Pollutant Inventory
NRM	Natural Resource Management
NVF	Native Vegetation Framework
PEC	Priority ecological community
PER	Public environment review
POVG	Perth Observatory Volunteer Group
RCC	Roadside Conservation Committee



ROIP	Radio over internet protocol
RSD	Remote sensor device
SARGE	System for accounting and reporting of government emissions
SILREC	Silvicultural recording system
SMRC	Southern Metropolitan Regional Council
SWALSC	South West Aboriginal Land and Sea Council
SWWMP	South West Wetlands Monitoring Program
TEC	Threatened ecological community
UAV	Unmanned aerial vehicles
VHS	Vegetation Health Service
WA	Western Australia/Western Australian
WALGA	Western Australian Local Government Association
WAMMP	Western Australian marine management program
WARR	Waste Avoidance and Resource Recovery (WARR Act= <i>Waste Avoidance and Resource Recovery Act 2007</i> )
WC	Wildlife Conservation (WC Act= <i>Wildlife Conservation Act 1950</i> )
WESTPLAN HAZMAT	State emergency plan for hazardous materials
WIN	Works improvement notice
WWF	World Wide Fund for Nature (WWF-Australia)