LAND FOR WILDLIFE
South East Queensland

Newsletter of the Land for Wildlife Program South East Queensland

OCTOBER 2007
NEWSLETTER

Mammal Identification using Remains and Traces

Finding some of our shy and elusive native animals can be very tricky. It often requires specific skills, lots of patience and possibly traps and associated ethics permits. As a result, many native animals, such as small nocturnal mammals, are put in the too hard basket to find and identify.

Earlier this year, Land for Wildlife Extension Officers attended a workshop at the Queensland Museum in Brisbane to learn about the identification of South East Queensland's small mammals. The Museum contains remarkable collections of skulls, scats, bones, whole specimens and other remains such as bark chewings, nests and owl pellets.

If you are lucky enough to have an owl nesting on your property, then you have a great resource to find out about prey species through the examination of owl pellets. Owls swallow their prey whole or in large chunks and have to regurgitate pellets of indigestible material such as fur and bones. Pellets are found around nests and roosting sites and often contain identifiable bones, as shown in these photographs of Powerful Owl pellets. This pellet shows that Powerful Owls at Mt. Coot-tha had snacked on a Sugar Glider.

Small mammals can also be identified by their scats, diggings, chewings and other marks. For example, some gliders make identifiable marks on trees to extract sap whereas Koalas have identifiable scratch marks from their strong, sharp claws.

If you do come across bones or skulls of a relatively common mammal, you may be able to identify it yourself using a reference book. The easiest bones to identify are skulls, jaws, humerus (upper arm bone) and femur (thigh bone). However, if you don't have access to a reference book, or if the animal is unusual to your area or rare, then you may have to contact an expert to obtain a correct identification. Your Land for Wildlife Extension Officer should have a copy of a reference book if you wanted to do your own research, otherwise you may wish to contact the Queensland Museum and ask for their assistance.

Top image: Humerus (upper arm bone) and lower jaw of a Sugar Glider. These bones were found in the Powerful Owl pellet (middle image) and identified by referring to "Tracks, Scats and Other Traces" (lower image from page 307).

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Article and photos by Deborah Metters.

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editorial

Welcome to the Land for Wildlife newsletter for South East Queensland

September and October are wonderful months to live in SEQ. Migratory birds return from their winter breeding and feeding grounds in the north. Morning and dusk you hear the return of Channel-billed Cuckoos, Rainbow Bee-eaters and Common Koels. If you visit some beaches and mudflats you may see the return of migratory shorebirds such as Bar-tailed Godwits, Great Knots and Eastern Curlews. Combined with all the wildflowers, emerging reptiles and increased invertebrate activity, you know that summer is nearly here. Hopefully, the recent storms have bought some spring rain to your property.

This newsletter edition contains numerous contributions from Land for Wildlife members, which is great. Such a diversity of activities and ideas such as controlling foxes and Dingoes, keeping Brush Turkeys out of your garden, photographing our seven local kingfisher species and theorising on symbiotic relationships between rainforest plants. These articles confirm the diverse interests and nature conservation activities undertaken by Land for Wildlife landholders. It is inspiring to read your articles.

In a milestone for the Land for Wildlife program, we recently celebrated the registration of 2000 Land for Wildlife properties in SEQ. Although, it wasn't just one property that was credited with being the 2000th, but three! All three properties were registered on the same day taking the total from 1999 to 2002 Land for Wildlife properties. So instead of picking out one, we decided to recognise all three. See the article on pages 4-5 about these new properties with some informative quotes from the landholders as to why they joined Land for Wildlife. Local media also provided some further recognition of this milestone.

There has been some other success stories around the region too. Firstly, Kilcoy Shire Council, in partnership with the Brisbane Valley Kilcoy Landcare Group, have recently re-affirmed their support for Land for Wildlife. An article on the backpage discusses the high ecological values of Kilcoy and how Land for Wildlife will be able to support new and existing landholders in this shire. A local, knowledgeable Kilcoy landholder, Michelle Ledwith, has welcomed the role as Land for Wildlife Extension Officer.

Secondly, Martin Bennett has recently started as Land for Wildlife Extension Officer for Gatton Shire. Martin brings a wealth of local knowledge to this position. I am sure that landholders will greatly appreciate his botanical skills, especially dry vine scrubs, ecological knowledge, cultural history and his commitment to the local community.

Thirdly, Caloundra City Council has recently appointed a new officer, Alan Wynn, in response to growing demands on the Land for Wildlife and Voluntary Conservation Agreements programs. Alan will be focussing on new Land for Wildlife registrations and revisits. Alan's ecological knowledge and bush regeneration skills will be much appreciated by landholders.

Josh Birse has stepped into the position previously held by Stephanie Reif at Maroochy Shire Council. Josh will be working on both the Land for Wildlife and Voluntary Conservation Agreement programs in Maroochy Shire.

Welcome to all the new Land for Wildlife Officers. Please contact your local officer if you need any nature conservation information or advice. I hope you enjoy this newsletter and I welcome any contributions or comments that you may have.

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Forward all letters to:

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Landholder Registrations, Land for Wildlife SEQ - 01/10/2007

Registered Properties	Working Towards Registration	Total Area Retained	Total Area under Restoration
2051	428	40,624 ha	2,719 ha

fauna profile

Red-bellied Black Snakes have Rapidly Evolved Since Cane Toad Arrival

Article by Garry Sippel and Rob Preston
Operators of Dreamtime Reptiles

The Red-bellied Black Snake (*Pseudechis porphyriacus*) is one of the iconic native animals found in South East Queensland. It has an unmistakable shiny black body with red or bright orange sides and a dull red or pink belly. This snake inhabits local bushland and favours habitats with creeks, swamps, lakes or other watercourses.

This preference of a watery environment reflects the red-bellies main food source, with frog species making up more than 60% of their diet. They also feed on rats, mice, lizards and birds. Red-bellies are good swimmers and can catch eels and fish to supplement their diet.

Frogs being the first choice of diet has caused trouble for the species as the poisonous pest, the Cane Toad, invaded the ecosystem. The Red-bellied Black Snake would not resist a feed of the plentiful toad, and therefore many of these native snakes died as a result of ingesting toxic toads. The Red-bellied Black Snake's population declined rapidly, and it's only been recently that the numbers have started to re-develop to substantial levels. Reasons for this may include evidence gained from recent studies involving the red-belly's morphological adaptations.

Snakes are gape-limited predators. The maximum size of their prey depends on the size of their head and gape. The ability of snakes to poison themselves by eating toads is dependent on their head size relative to their body mass. A snake with a smaller head and gape relative to its body mass will face a smaller risk of dying as a result of eating a toad.

Researchers have observed that Red-bellied Black Snakes currently have longer bodies and smaller heads than specimens found 50 years ago. Smaller heads being an advantage, limiting the snake to ingest smaller size toads (less venom ingested) and larger bodies to be able to compensate the toxins affect on the body.

This research has showed rapid evolutionary changes in Red-bellied Black Snakes as a result of direct interactions with Cane Toads. These changes have occurred in a relatively short timespan with at least 20 generations of Red-bellied Black Snakes living since the initial exposure to toads in some areas.

The distinctive Red-bellied Black Snake.

The Red-bellied Black Snake is certainly not a bad snake to have around, having a far better reputation than the Eastern Brown Snake. Black snakes are not so aggressive and far less venomous. There have been no recorded adult deaths from this species. The Red-bellied Black Snake venom is a tissue destroying venom and bites can be excruciating.

As with any snake bite, if you are bitten, the pressure and immobilisation method of first aid is recommended. This method stops the venom from spreading through the body and gives you time to seek medical attention. Most Australian hospitals have snake venom detection kits to ascertain the correct antivenom.

The Red-bellied Black Snake usually reaches about 1.5 metres in length, but individuals up to 2.5 metres have been recorded. Young are born live (viviparous) in broods of between 10-20 neonates (baby snakes).

The authors are both registered as licensed snake catchers which enables them to release certain "unwanted" red-bellies on to suitable properties. After monitoring populations of these fantastic animals, it's so pleasing to observe them building up numbers once again. If you have them in your area, appreciate their presence as an important part of the natural biodiversity. They are quite majestic to watch gliding through grass and gracefully taking to the water.

Relocation of a Red-bellied Black Snake by Rob Preston.

Dreamtime Reptiles offer a reptile catch and release service and also conduct educational snake demonstrations. They can be contacted on 0407 681 131.

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property profiles

2000 Land for Wildlife Registrations in South East Queensland

On the 21st March 2007, a milestone for the Land for Wildlife program was reached. On this day, three properties were registered as Land for Wildlife. Rather than single out one property, they have been collectively identified as the 2000th Land for Wildlife registration in South East Queensland (SEQ).

Land for Wildlife started in Queensland in 1998 and has been welcoming about 220 properties each year, with an additional 50 properties listed as 'Working Towards' registration annually.

These three milestone properties reflect the diversity of landscapes across SEQ from Spotted Gum forests in Beaudesert to rainforest gullies on the Sunshine Coast hinterland. This article celebrates these landholders and the 2000 landholders that have come before them.

Jennifer Saunders (right) was congratulated by local Councillor, Virginia West, for joining Land for Wildlife.

Spotted Gums on rocky rhyolite soils form this Endangered Regional Ecosystem on the Saunders' Land for Wildlife property in Beaudesert. Photos by Lisa Martin.

One of the best things that Trevor and Jennifer Sanders gained from their Land for Wildlife property assessment was learning that their property contains an Endangered Regional Ecosystem of Spotted Gums on rhyolite (volcanic rocks). This means that less than 10% of this ecosystem remains in the SEQ Bioregion compared to its pre-clearing extent.

The Sanders' are pleased that their 4.3 ha property features an Endangered ecosystem as well as being home to a host of wildlife including Echidnas and Red-necked Wallabies.

"It's an honour to be the 2000th landholder to sign up for this program in South East Queensland. One of the main reasons we got involved was because we could see the degradation in the environment that has happened over the last 150 years and we wanted to make our contribution to retain some semblance of natural bushland," Jennifer said.

"Land for Wildlife is an excellent way to gain an understanding of the flora and fauna on your block. I'd encourage anyone interested on giving the environment a helping hand to get involved," she said.

"It's important to be environmentally aware due to climate change. I truly believe the more trees we remove, the less chance there is of rain. We need to continue to plant more native trees and preserve the ones we have" Jennifer Saunders.

Michael Parr looking out over the portion of his property where he has removed lantana and privet and is now revegetating the rainforest edge. Photos by Nick Clancy.

Michael and Paddy Parr own a 6 hectare property at Booroobin which contains a small intact patch of rainforest. As a result of Michael and Paddy removing weeds, there is now good natural regeneration occurring around the existing vegetation.

"We are both retired and we enjoy restoring the habitat on our land. It provides us with a good goal" Michael said.

Michael used to be a farmer in New Zealand and when he came to this property, he recognised the limitations of the land for production purposes. Instead of farming they decided to "join Land for Wildlife to put back the native bush".

"The best part of the Land for Wildlife assessment was the advice and encouragement as well as the plant ID" Michael Parr.

Sandee Burnell and her two sons, Jake and Danny, have been living on this 10 hectare property in Eerwah Vale, Maroochy Shire for the past 12 years.

"Our property has always been land for wildlife, but we joined the program to make it official and give our efforts some recognition" Sandee said.

Sandee is considering setting aside part of her property as a Voluntary Conservation Agreement to protect it even more. Her property backs onto a conservation park and connects to other areas of core vegetation.

It is not surprising that Jake and Danny are "real wildlife boys" on this property. They love to check out scorpions and have taken snakes such as Carpet Pythons and Green Tree Snakes into show-and-tell at their school. The Burnells also rescue wildlife such as turtles off the roads.

Sandee believes that the Land for Wildlife workshops and newsletters will be useful

The Burnell family (Sandee, Jake, Danny and Steven) on their healthy and diverse Land for Wildlife property. Photos by Amanda Ozolins.

to learn about weeds and other issues. The Land for Wildlife assessment made Sandee more aware of weeds and more inspired to control them.

"Having a Land for Wildlife sign makes you remember that you are a carer for wildlife" Sandee Burnell.

pest profile

Dingo and Fox Impacts on Native Ground-dwelling Animals

Article by Wal Mayr
Land for Wildlife landholder
Mudgeeraba, Gold Coast hinterland

Wal and Heather's property at the head of Mudgeeraba Creek.

It was 2003 and things were looking good. We had been regenerating for ten years on our isolated property in upper Mudgeeraba Creek. The rainforest was developing a healthy understorey with virtually no evidence of the once dominant weeds. Habitat was forming, and trees were starting to fruit, which was bringing in more birds. The whole ecological process seemed to be in the preliminary stages of revival.

But something wasn't quite right. Although bird activity seemed to be improving, we were seeing virtually no activity on the ground. No macropods, no bandicoots, fewer pythons and fewer Land Mullets (*Egernia major*).

We raised our concerns with Gold Coast City Council and they engaged PhD student, Amber Hooke, to conduct extensive sand pit monitoring surveys. This monitoring indicated that we had a very significant fox and dog problem.

Through this process we learnt that Dingoes and foxes are extremely opportunistic feeders. Their diet includes worms, snakes, insects, frogs, native fruits, avocados, bananas and our beloved native ground-dwelling animals.

Amber recommended possible 1080 baiting and a change in practices with our small fruit orchard as she thought that fallen fruit might be attracting the pest animals. We now collect fruit scraps and ensure that no animals have access to them. We carried out some baiting and trapped one fox. However, we had no long-term plan and these activities gradually ceased.

In August 2006, Michael Dickinson, a respected spotter-catcher, took an interest in our problem.

Over the last year, Mike has set up a network of infra-red triggered cameras around our 25 hectare property. The cameras have given us some fascinating results. Initially we photographed the odd fox and Dingo. However, by summer we were monitoring an incredible seven Dingoes and four foxes with regular photographs of each.

From the outset Mike has taken an objective "evidence" based approach to the work. He advocated gaining a full understanding of the behaviour and activities of the pest animals before carrying out any management actions.

A fox with a Mountain Brushtail Possum in its mouth and a Dingo caught on infra-red triggered cameras set up on Wal's property to monitor pest animal numbers.

A few things we have discovered about Dingoes and foxes in our area:

- Activity peaks in summer and drops off in winter
- Photographs show that foxes and Dingoes co-exist, with images taken 10 minutes apart
- They tend to follow set paths through the bush
- Despite our change in management, avocados remain a significant part of their diet
- Foxes can take on animals almost as large as themselves such as Mountain Brushtail Possums
- They are numerous and very active.

A recent four day fauna survey of the property by consulting ecologist, Boyd Essex, confirmed our suspicions that there is a healthy arboreal (tree-dwelling) animal population of gliders, Koalas, possums and birds. In contrast, there is a relatively low population of ground-dwelling animals. Clearly if we were to meet our objectives of developing a functioning ecology in the area we needed to manage the pest animals.

Management needs to be ongoing because as soon as one fox is taken out of the system another replaces it. The key is to maximise the time without foxes by eliminating those soon after they arrive.

With the financial help of SEQ Catchments we are now embarking on a trapping program on our property and at other strategic locations in Upper Mudgeeraba Creek. Initially, we will trap only foxes as we are maintaining an open mind on the Dingo as a possible manager of fox numbers, even though our monitoring has not shown any evidence of this.

The traps will be large, non-threatening and will be triggered by infra-red sensors. They will also allow the release of non-target animals without inflicting injury.

It is hoped that this management and our increased understanding of fox behaviour will enable us to start managing these rampant vacuum cleaners of the bush and we encourage the return of our native ground-dwelling animals.

practicalities

Water Tube - Trialling New Technology

Article by Gavin Hammermeister
Land for Wildlife Extension Officer
Redland Shire Council

Water Tube. What is that I hear you ask?

Water Tube is a polyethylene tube welded to form ribs that are capable of holding 20 litres of water. Placed around a tree with three wooden stakes it offers the same protection as a standard tree guard however its advantage is its ability to deliver the water to the plant via a specially made coil dripper from the bottom of the tube. The 20 litres of water can last up to 2 weeks, assisting the plant during the initial establishment phase. The Water Tube is then refilled after 30 days from the date of planting for another 2 weeks of drip watering. The Water Tube can be reused, is 100% recyclable and should last up to 2 years in the field.

Here at the Redlands IndigiScapes Centre we have been trialling the Water Tube since mid July 2007 using Celerywood (*Polyscias elegans*) as the demonstration species. As a comparison we also planted a variety of other native species including Eprapah wattle (*Acacia perangusta*), Pointed-leaf Hovea (*Hovea acutifolia*) and Small-leafed Lillypilly (*Syzygium leuhmanii*) with standard tree guards around them.

Within 6 weeks of planting, the Water Tube Celerywood had doubled the growth rate of the other natives with the standard tree guards. Having 40 litres of water being delivered over 4 weeks within the 6 week period via the coil dripper greatly assisted the establishment and growth rate of the Water Tube Celerywood. Particularly given the fact we had very little rainfall during this period.

Another advantage was that we didn't have to continually check to see if the Celerywood was under water stress and needed a top up as we had to with the standard tree guard natives. We planted it, set up the Water Tube and walked away for the next 2 weeks knowing full well it wouldn't be under water stress.

Water Tube was very easy to install. As mentioned previously it is placed around the tree with 3 stakes (need to supply your own) like a standard tree guard. Once in position fill up the tube with 20 litres of water and then insert the coil dripper at the bottom of the tube and position near the newly planted tree. Literally, easy as one, two, three.

We have been impressed with the results of the trial at IndigiScapes that we have purchased another 20 Water Tubes and started to replace the standard tree guards with them.

Water Tube isn't that cheap with an individual one costing $8 or $7.50 each when a bundle of 50 are purchased. This compares to roughly 50 cents for a standard tree guard including the 3 tomato stakes when purchased in bulk.

So I guess the decision to purchase Water Tube will be dependent on the number of trees being planted or the depth of your pockets. For further information about this product go to www.watertube.com.au or phone (02) 9956 7768. Distributors in South East Queensland include Land for Wildlife member Vera Robb at Mt. Cotton on 3206 6676, or Green Harvest on 1800 681 014.

Similar to these trial results at IndigiScapes, some Land for Wildlife landholders near Ipswich have also used Water Tube and have reported excellent results. They used Water Tube while away on holidays and found that plants received water for about 3 weeks from a full Water Tube.

Demonstration of Water Tube at Redlands IndigiScapes Centre.

Demonstration of several Water Tubes filled with water.

Close up of coil dripper inserted into the bottom of Water Tube and positioned near the base of a Celerywood seedling.

practicalities

Frills, Drills and 'Weed Tree' Kills

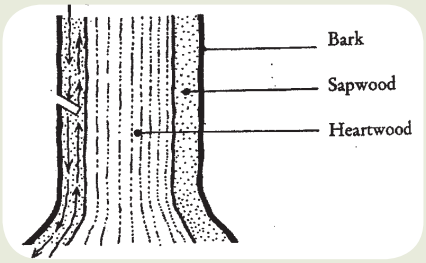
Article and photographs by Nick Clancy
Land for Wildlife Extension Officer
Caloundra City Council

There are numerous species of 'weed trees' that are invasive in natural areas throughout SEQ. Some of the most commonly encountered species include Camphor Laurel (*Cinnamomum camphora*), Chinese Elm (*Celtis sinensis*), Broad-leaved Privet (*Ligustrum lucidum*) and Small-leaved Privet (*Ligustrum sinense*).

Felling a large weed tree can be a major task that drops large amounts of potentially damaging debris, often requiring removal or mulching. For this reason poisoning tree weeds in-situ is often recommended as a cost effective and less labour intensive solution.

All of these species listed will sucker back if they are simply cut down. In order to prevent suckering and to kill the tree it requires treatment with herbicide. This technique retains the structure of the tree as habitat for the period that the dead tree remains standing. In rainforest situations the treated trees tend to decompose quite quickly aided by saprophytic fungi.

A number of different 'in-situ stem injection' methods are described in this article. All of these methods involve cutting or drilling through the bark of the trunk into the sapwood (the cambium growth layer) of the weed tree. Herbicide is then inserted into the hole or cut where it is transported via the cambium layer throughout the plant.



Within a few weeks of treatment the treated weed tree will generally drop its leaves. This defoliation adds leaf litter to the forest floor. It also increases light levels, warming the soil and stimulating the soil seed bank. In most instances there will be a large germination of undesirable seedlings from the parent tree. Depending on the landscape context (ie proximity to a mature phase seed source) germination of native plants will also commence in the first (wet!) summer.

These stem injection methods are only suitable for situations where the dead tree does not pose any safety risks if they fall.

Frilling

'Frilling' is another effective technique that substitutes a drill with a small axe or tomahawk. A series of cuts are made at regular intervals (3 cm apart) around the entire trunk close to the base of the tree. These cuts should be about 30-60 mm deep and angle downwards at 60 degrees. The herbicide is applied by leaning the axe blade outwards to create a pocket for the herbicide to pool, if it is all absorbed apply a second application. A second row of cuts can then be made below the gaps in the first row. A variation on this method is to use a hammer and chisel to make the cuts.

Frilling technique.

A dead Broad-leaved Privet tree that has been poisoned in-situ. About a year later the dead tree continues to provide perches and habitat for fauna. It is also covered with saprophytic fungi that aid with the decomposition process. By the time branches fall they are usually rotten and cause little damage to surrounding understorey plants.

What is saprophytic fungi?

Fungi that feeds on material that is already dead is called saprophytic. These fungi are commonly found on dead wood, leaf litter and animal dung. Saprophytic fungi play a crucial role in the breakdown and recycling of dead plant and animal material.

Other fungi include mycorrhizal fungi which forms beneficial relationships with plants, and parasitic fungi which attacks living plants, animals and even some other fungi. Some fungal species first attack and kill a host plant as a parasite and then live as a saprophyte on the dead wood.

Ring-barking
Ring-barking – using a chainsaw is a technique that has gained popularity especially amongst bush regenerator contractors on the Sunshine coast. It is commonly used for treating Broad-leaved Privets. A cut is made into the sap wood with a chainsaw around the entire circumference of the trunk, close to the base of the tree. This creates a shallow 'trench' that is then treated with a 1:1 herbicide solution.

This Broad-leaved Privet has been ring-barked with a chainsaw and treated with 1:1 Glyphosate. A small 'arborists' chainsaw was used to make the task easier and safer. This style of saw is lighter, has a shorter bar and reduced kick back potential.

This Broad-leaved Privet dominated regrowth at Maleny has been stem-injected with Glyphosate resulting in nearly a 100% kill. Regrowth of privet seedlings are now being controlled and the area monitored for natural regeneration.

Existing native species amongst the regrowth are benefiting from the reduction in competition and taking advantage of canopy gaps. This patch is close to a rainforest remnant so the soil seed bank and ongoing seed input is likely to be sufficient to result in good natural regeneration and to avoid the need to replant.

Drill and Fill
The 'Drill & fill' technique is done by drilling holes (using approximately 10 mm drill bit) into the tree trunk on a downward 45 degree angle into the sap wood and filling them with herbicide. To achieve the best results the holes need to be drilled around the entire circumference of the tree trunk (approximately 5 cm apart) including on each 'stem' of growth on a multi-stemmed specimen. Exposed roots can also be treated.

As with the cut and paint technique the herbicide needs to be applied quickly, as soon as the drill bit is withdrawn, for this reason a two person operation is worth considering. Squeeze sauce bottles with a narrow nozzle are a useful tool for the herbicide injection. Glyphosate is generally effective in all instances at a rate of 1:1. For large Camphor Laurels it may need to be applied neat. Results also tend to be better when the tree is actively growing.

Holes were drilled into the base and exposed roots of this Broad-leaved Privet tree and were then filled with Glyphosate herbicide at a rate of 1:1 with a pink marker dye to make it easier to see which trees have been treated.

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fauna profile

Kingfishers of South East Queensland

Article by Katie Hawton
Environment Officer
Logan City Council

All photographs by Tom Tarrant
Land for Wildlife landholder, Samsonvale
Australian Bird Image Database
http://www.aviceda.org/abid/index.php

As the weather warms up for spring we will see increased activity in the seven species of kingfisher that call South East Queensland (SEQ) home. From mangroves to mountains and drier western habitats, there is a kingfisher at home in each of these ecosystems. The spring breeding season is a great time to keep an eye out for these jewels of the Australian landscape.

The name 'kingfisher' was first given to an English kingfisher in reference to its royal colouring of brilliant blue to purple and its diet of fish.

Two kingfisher species (Red-backed Kingfisher and Laughing Kookaburra) are endemic only to Australia, with another eight species being found here.

Kingfishers nest in three places - earth banks, termite mounds and tree hollows. Their preference for nest sites depends on the natural abundance of these. Northern kingfishers generally use arboreal termite nests, southern kingfishers utilise tree hollows and western ones use dry creek banks or abandoned mine shaft walls. All kingfisher nests:

- are horizontal or have a slight rise;
- can be up to a metre long; and
- have a chamber at the end, large enough for the kingfisher to turn around in.

In the cooler months many species will migrate north as warmer weather helps ensure a good food supply. SEQ's population of the Azure Kingfisher, Sacred Kingfisher and Laughing Kookaburra are sedentary. During spring and summer latitudinal migratory birds, including kingfishers, return to SEQ.

Although all kingfisher species are not under serious threat, they are less common in SEQ than in their northern Queensland habitat ranges due to decreased habitat.

Kingfishers are split into two sub-families; river and forest kingfishers.

The **Azure Kingfisher** (*Alcedo azurea*) is found along coastal northern and eastern Australia including Tasmania. In Queensland they are located east of the Great Dividing Range around fresh water rivers, streams, billabongs and lagoons with overhanging low branches.

Size: 17-19 cm

Diet. Fish, insects and crustaceans such as crabs and yabbies.

Breeding. Nests are tunnels up to 1 metre long in stream banks.

River kingfishers specifically fish for aquatic species of food and have long slender bills and short tails. River Kingfishers need clear water with a reasonable abundance of fish making them a good indicators of water quality. The Azure Kingfisher is the only river kingfisher in SEQ.

Forest kingfishers eat a wide variety of prey including small reptiles, amphibians, insects, larvae and sometimes crustaceans and small fish.

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The **Laughing Kookaburra** (*Dacelo novaeguineae*) is the most famous Kingfisher and is endemic to Australia. It prefers open areas with exposed perches including open Eucalypt forest, rainforest, parks, suburban gardens and paddocks. The Laughing Kookaburra is often found around barbeque and picnic areas.

Size: 40-47 cm

Behaviour: The distinctive laugh is a territorial announcement that an area is claimed by a family of Laughing Kookaburras.

Breeding: The nest is a shallow horizontal hollow of a tree or a hole in an arboreal termite nest. The breeding pair is assisted by offspring of previous years. These offspring are kept in a sub-dominant breeding status for up to 4 years.

The **Blue Winged Kookaburra** (*Dacelo leachii*) is more common in Northern Australia; however they can be found in SEQ. They prefer creeks in tropical woodland areas and swampy Melaleuca forests. Their range overlaps with the Laughing Kookaburra, however the Blue-winged Kookaburra prefers coastal habitats.

Size: 40-46 cm

Similar Species: Laughing Kookaburra which lacks the bright blue wing and has a dark eye-stripe.

Behaviour: Found in family groups, but wary of humans.

Breeding: Nest is usually a hollowed out arboreal termite nest.

The **Forest Kingfisher** (*Todiramphus macleayii*) is found along the north and north east coast of Australia in open woodlands and forests, mangrove and swamps with riparian vegetation. It is often seen around mudflats hunting in shallow pools left by the retreating tide.

Males have a full white collar. Females have only a partial front collar. Wings, back and tail are royal blue with a blue-green tint. Underneath the body, wings and tail is white. In flight there is a prominent white patch on the outer wing.

Size: 18-23 cm

Similar Species. Collared Kingfisher which is larger and greener. Sacred Kingfisher which is larger with buff-brown underparts. Neither species has the white wing patch.

Behaviour. Migrates north in winter after the summer breeding season.

Breeding. Males have established territories with permanent mates, requires forest or woodland for breeding, uses an arboreal termite nest (occasionally in a tree hole). The young are raised by both sexes and sometimes helpers from previous seasons.

The **Sacred Kingfisher** (*Todiramphus sanctus*) is found over most of Australia due to its high reproduction rate and its ability to adapt to most environments. It favours tall open eucalypt forest, Melaleuca forests, mangroves, parks and golf courses.

Sacred Kingfishers have a turquoise back with a blue rump and tail; an off-white to orange breast and belly; a broad cream collar and a black eye stripe.

Size: 19-23 cm

Similar Species. Forest Kingfisher which is smaller and brighter. Collared Kingfisher which is larger and has a white belly and breast.

Behaviour. Migrates north in winter. Solitary when not breeding.

Breeding. Nest sites are usually a burrow in a termite mound, hollow branch or river bank. Males and females both excavate the nest.

The **Red-backed Kingfisher** (*Todiramphus pyrrhopygia*) is an endemic species of drier inland Australia. They are found in deserts, dry scrubs and mulga woodlands, moving closer to the coast in drier times. The species is generally solitary and nomadic in winter. The Red-backed Kingfisher is only an occasional visitor to SEQ during winter.

Size: 19-24 cm

Breeding. Nests found in cliffs, cuttings, creek banks, quarries and old mine shafts. Each year a new nest is started, generally near the old one.

The **Collared Kingfisher** (*Todiramphus chloris*) is found along the north and north east coast of Australia mainly in mangroves and the lower reaches of rivers and creeks.

Collared Kingfishers have bright green back and wings, a blue tail and a bright green cap. They have a thick black eye stripe with a white collar and under parts. Large bill and small white spot either side of the bill.

Size: 23-29 cm

Similar Species. Sacred Kingfisher which is smaller, lighter colouring, off-white below and has a proportionally shorter bill.

Behaviour. Migrates north in winter. Usually solitary.

Breeding. Arboreal termite nests and tree holes are used. Both parents incubate and feed the young.

bush regeneration

Rainforest Symbiosis

Article by Ian Gasking
Land for Wildlife landholder
Quamby Falls Lodge, Natural Bridge
Photographs by Michael Banks.

This contribution recounts Ian's experience of rainforest regeneration of what works, what doesn't and why. A landholder's perspective is unique, vital and often difficult to replicate through scientific studies. I hope this article generates thoughts and debate among other landholders and may inspire you to write an article about your own bush regeneration experiences - Editor.

Above: This site was lantana 3-5 years ago. Now it is dominated by Toona, Melia, Polyscias, Dendrocnide and Homalanthus species.

Left: A site of lantana removal with low levels of natural regeneration occurring afterwards.

Although the mechanics are not fully understood, chemical releases from roots of rainforest trees provide symbiotic chemical growth that assists neighbouring plants, including plants of different species. Consequently rainforest species do not grow well in isolated locations distant from neighbours. Yes, they do grow, but not as well.

Red Cedars (*Toona ciliata*) do not do well out in the open paddock. Likewise, the Flame Tree (*Brachychiton acerifolius*) grows up to 35 metres high in its natural rainforest habitat and flowers only after drought or stress, but in parks and garden settings it is much smaller, even when mature, and flowers profusely. Prolific flowering is an indication in many species of stress, the need to reproduce desperately, to ensure survival of the species against threats by nature.

In my experience in eradicating lantana along rainforest margins, rainforest tree seeds germinate in profusion in the newly cleared soil. I have seen 20-100 seedlings in just one hand-span size area. Seedlings include Red Cedar, White Cedar, Bleeding Heart, Sandpaper Fig, Celerywood and many more species.

In contrast, the survival rate away from adjacent shade canopy, or more importantly root spread zone, is next to zero. Except for White Cedar (*Melia azedarach*) which unlike many rainforest species germinates and survives well after fire.

Conventional wisdom credits the shade canopy with survival criteria. While there is no doubt regeneration does occur much better under the canopy of neighbouring mature trees, my observation is that in many cases where due to orientation and angle to the sun, no shade benefit is provided, survival still occurs. It appears to me that these successful seedlings are responding to symbiotic chemical releases from the immediate root zone. It is distinctly noticeable that immediately outside the shade and root zone that natural regeneration is minimal.

I am fortunate that in suitable areas regeneration of some species, particularly Red Cedar, endemic, and prior to pioneer logging very prolific, grow in such profusion and density that reaching maturity is obviously impossible. These seedlings, even up to 2 metres high, can be uprooted by merely pulling by hand and transplanted with no more hole preparation than opening a slot with a shovel and stamping the transplant into place. This is best done during or after good rain, but artificial watering also works.

White Cedar recruitment in a site where lantana has been removed.

I average removal, relocating and transplanting one tree every 3 minutes, ie. 60 trees in 3 hours. Smaller trees (eg. 300 mm high) also transplant well, but the survival rate is not as good because of weed crowding and over-shading during the summer rain growth period. This is also a problem for naturally occurring and regenerating seedlings.

Weed profusion can shade out all but the most opportune survivors. Hopefully, as the transplants develop a shade canopy and their roots claim the soil below, other native species will naturally regenerate.

Regeneration along rainforest margins does occur naturally, sometimes taking hundreds of years. But who has the patience or even longevity for such perseverance, especially when weeds can take over in a matter of weeks, and lantana seemingly as soon as you turn your back? Given time, the encroaching rainforest canopy shades them out allowing seedlings to advance at a painfully and incrementally slow pace.

I should point out that my observations, above, are based on my personal experience living in a rainforest and with my hands and feet in the fertile soil. A scientific study investigating this premise would be interesting. I wonder if other readers have similar experience, or can add their food (seedlings) for thought?

book reviews

Habitat Fragmentation and Landscape Change.

by David Lindenmayer and Joern Fischer

Habitat loss and degradation as a result of human activity is the single biggest threat to biodiversity in the world today. There are many topics associated with the term 'habitat fragmentation' - habitat loss, degradation, edge affects, landscape mosaics, wildlife corridors, species-area relationships and island biogeography. The amount of information available on these topics is enormous and evolving rapidly. Nearly one million results come up on a website search for Australian pages on habitat loss or habitat fragmentation, and a few million results worldwide!

Pulling much of the current information together, along with lots of case studies, is a recent book titled Habitat Fragmentation and Landscape Change – An ecological and conservation synthesis. In compiling the large amount of the current information, the book aims to demonstrate the threats these processes pose, and to highlight opportunities to conserve as much of the world's biota as possible within human-modified landscapes.

Habitat loss, degradation and isolation have many complex and interrelated impacts on flora and fauna due to landscape factors such as land cover change, reduced patch sizes, deterioration of the physical environment, edge effects, reduced connectivity and reduced species richness.

Five broad management strategies focusing on landscape pattern, particularly vegetation cover, are discussed in regards to mitigating the negative effects of human landscape change on species. These are:

1. Maintain/restore large and structurally complex patches of native vegetation.

2. Maintain/restore a matrix (surrounding areas) that is structurally similar to native vegetation.

3. Maintain/restore buffers around sensitive areas.

4. Maintain/restore corridors and stepping stones.

5. Maintain/restore landscape heterogeneity and capture environmental gradients (meaning provide diversity of habitats that are useful to a range of different species, and distribute different land-use intensities across natural gradients in climate, topography and primary productivity).

Each of the above landscape pattern-based strategies in important, however some individual species will not be adequately conserved by them and some key threatening processes will remain unmitigated. Additional approaches may be required and these are also addressed along with lots of fantastic specific examples from around the world.

Example provided from Australia include the Eastern Bristlebird and its sensitivity to frequent fire; promoting habitat connectivity for the Sugar Glider, Common Brushtail Possum, and Mountain Pygmy Possum; and specific predation control, habitat expansion and rehabilitation for the Western Swamp Tortoise.

This is probably the most thorough and readable synthesis of information on this topic ever produced, and may interest those landowners who want to understand the landscape scale processes which their property and vegetation fit within, and how to best mitigate these. Easy to read, and set out like a text book with useful summaries, case studies and further reading within each chapter.

Review by Amanda Ozolins.

Published by CSIRO Publishing, 2006.
Soft cover, 344 pages, black & white.
ISBN: 978 0 643093 90 4
RRP $69.95.

Wildlife of Greater Brisbane 2nd edition.

by Queensland Museum

Since its first release in 1995, Wildlife of Greater Brisbane has become a much-loved and well-used companion to those wishing to identify and learn about our local wildlife.

The cute Tawny Frogmouths on the front of the earlier edition have been replaced by an equally cute Sugar Glider but there are huge additions and improvements to the content as well. There are many more full-colour photos and line drawings to aid identification.

The book is very comprehensive, covering larger vertebrates like mammals, reptiles, frogs and freshwater fish. In addition, the coverage of commonly encountered invertebrates including ants, spiders, beetles, moths and butterflies should help clear up many questions.

The only limitation is that it was not possible to include all 370 bird species of the greater Brisbane region in a book this size. So you will still need a bird book.

Additional articles discuss ecology, conservation and habitats. Introduced animals like the Asian House Gecko and Red Deer are also described.

If you can buy only one field guide to fauna of South East Queensland, this is probably the one to choose.

Review by Darryl Larsen.

Published by Queensland Museum, 2007.
Soft cover, 428 pages, full colour.
ISBN: 9 780 9775 94 313
RRP $32.95

fauna profile

How Brush Turkeys can Determine the Gender of their Chicks

Article and photographs by Deborah Metters
Land for Wildlife Regional Coordinator
SEQ Catchments

A male Brush Turkey scratches up leaf litter to build an incubation mound.

Two female Brush Turkeys investigate the completed incubation mound as a suitable egg-laying site.

Living in urban Brisbane, I appreciate any wildlife that ventures into my backyard, including Brush Turkeys. Although they create havoc with my mulch, I do admire the male turkey's dedication to building the best mound in the neighbourhood. As a recent study has shown that the turkey mound and their reproduction traits are a lot more complicated than a pile of leaf litter.

Many birds have the ability to manipulate the sex ratio of their chicks. Apparently, some female birds have the ability to control the sex of the embryo they produce whereas other birds simply give more food to their preferred offspring thus manipulating their offspring's chance of survival.

All birds require specific temperatures to incubate their eggs successfully. Most birds choose to do this by incubating their eggs with their own body heat. However, one group of birds, the Megapodes, are unique in that they use external sources of heat for incubating their eggs.

The Australian Brush Turkey is a Megapode and uses the heat produced from decomposition in mounds of leaf litter to incubate their eggs.

Laboratory studies have shown that artificial incubation of Brush Turkey eggs at different temperatures affects the sex ratio of chicks. Incubation at 34°C resulted in similar numbers of male and female chicks, however at 36°C more females hatched and at 32°C more males hatched.

A recent study likewise proved that Brush Turkeys in the wild can influence the sex ratio of their chicks by regulating the temperature of their incubation mounds. Female chicks hatched out of mounds with higher temperatures. Eggs incubated at lower temperatures produced more male chicks.

Male Brush Turkeys spend a lot of time and energy building, maintaining and defending their incubation mounds. Male turkeys are virtually unstoppable once they start building a mound. They will scratch out mulch from pot plants and patiently scratch leaf litter through wire fences with the goal of creating an incubation mound that is attractive to female turkeys. Each incubation mound contains about 2-4 tonnes of organic material. The mound needs to have a specific size, composition and location to ensure that temperatures are appropriate for egg incubation.

The size of an incubation mound is crucial as an addition of only 1 cm of leaf litter can increase the temperature by 1.5°C. The turkey in my backyard built his mound last year and has revamped it with more organic material for this breeding season. Unfortunately, the old mound generates very little heat and as such a big mound does not necessarily imply an adequately heated incubation site.

Similarly, if the mound is composed of fresh, damp leaf litter, it will decompose quicker and create higher temperatures than if the mound is built with dry leaf litter, sticks, bark and rocks.

Males reshape their mounds regularly. They do this to regulate the temperature. Brush Turkeys have temperature sensors in their palate allowing them to measure the temperature inside the mound. If the mound is too hot, males scratch off material and flatten the top surface area of the mound. If it is too cold, they pile more material on top of the mound.

It appears that some male turkeys are better at regulating temperatures than others. In some mounds egg temperatures differed by 9°C. In other birds, studies have shown that nest quality is strongly related to the age of the bird that is building the nest. Older birds build better nests. This is probably also true with Brush Turkeys.

So why do turkeys go to all this effort to build a mound? Why not just sit on their eggs like other birds? It seems that the main advantage in adopting an external incubation source is that female Brush Turkeys can lay an egg every 2-5 days over several months, and don't have to invest any time or energy in incubation or rearing of chicks. Female turkeys lay eggs in many different mounds with several females laying their eggs in one mound. Up to 53 eggs have been found in one incubation mound.

Given that South East Queensland is predicted to be hotter and drier with climate change, I wonder if more female turkeys will hatch, or if male turkeys will be smart enough to regulate their mounds and maintain a healthy sex ratio balance of their offspring.

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Brush Turkeys and our Gardens

Article and photograph by Joan Dillon
Land for Wildlife landholder
Palmwoods, Maroochy Shire

Brush Turkeys. Love them or loathe them, we do live with them. There's also absolutely no doubt that they are hard-wired to scratch up every bit of loose material they can reach. A well mulched open garden bed is turkey heaven!

One way to reduce their depredations is to create a garden which simply doesn't suit them. This type of garden uses dense ground covers and low dense shrubs. Observation indicates that since they are large birds, they have trouble moving underneath low foliage which sweeps the ground. Semi-prostrate Callistemons and Leptospermums, Midyim Berry (*Austromyrtus dulcis*), native grasses, Lomandras and even larger shrubs will deter them so long as the foliage is dense at ground level. Scaevolas, Goodenias and Billy Buttons (*Helichrysum ramosissimum*) will cover the ground and keep it cool but not provide materials for the nesting mound. They don't even seem to scratch amongst the leaves for food.

During establishment phase the young plants need to be protected. Try a circle of chicken mesh secured with one or two stakes. These wire guards will also keep hares off the young plants. Casual vandalism along accessible edges of the garden can and probably will occur but once the birds become used to the fact that your garden is not good scratching territory, they'll tend to reduce their visits.

The vegetable garden will need to be fenced. There's really no other option. A 1.1 metre fence with a relatively loose top wire seems to be adequate and if the vegetables are grown in bins rather than beds (essentially above ground gardening) with mown grass in between, then there's very little to attract the birds. The walls of the bins don't need to be high (23 cm will do) and can be constructed from timber, roofing iron, bricks or blocks. Fresh home grown produce is wonderful, does involve some work, and doesn't need to be shared with the turkeys.

A turkey-proof loose wire fence in the foreground with turkey deterrent corrugated iron bins around raised vegetable garden beds.

Letters to the Editor

Birdbath Cleaning with Vinegar

I have three birdbaths and, when the grunge builds up, I use white vinegar to clean them. I cover the base of the birdbath with white vinegar, scrub with a scouring brush, fill with water, cover (so the birds don't drink it), and let it sit for about twenty minutes. I then scour it out again, and use the Jet setting on the hose to empty it of any residual vinegar solution. That seems to keep a birdbath clean for a couple of weeks, with normal daily emptying and refilling.

S. Sewell
Land for Wildlife landholder
Tamborine Mountain

Moths, Powerful Owls and Fire

I write regarding three articles in the August Land for Wildlife newsletter.

Firstly, the fruit-piercing moth on the back cover. These moths can do tremendous damage in commercial crops of soft fruit due to the fact that by their feeding habits they are not vulnerable to usual pest control and in feeding from fruit to fruit, they transmit bacteria which quickly sends the sucked fruit rotten.

Secondly, very interesting to see the Powerful Owl article. I know they are in this area as for years we had a pair nesting in a tremendous old dead Flooded Gum til it fell in the 1974 cyclone. Since then we have heard them and very infrequently seen them as they now seem to reside in a very large area of State Forest / National Park adjoining my property in all but impenetrable mixture of forest and vine scrub with big ancient trees. Regarding the possum tails – when the Owls were nesting in the accessible tree, I found the remains of young foxes and cats, bandicoots, various possums, gliders, small wallabies and assorted rats flung overboard from the nesting branch. They evidently hunted from the open paddock fringes. As more habitat in the form of regrowth on once cleared land becomes available their numbers should increase.

Thirdly, regarding the property profile on the remnant Scribbly Gum Forest and their mention of no fires for 47 years, I offer this suggestion to open up the understorey vegetation and prevent a disaster if a fire were started by lightning or vandals. A series of small fires as soon as the leaf litter and grasses will slowly burn after rain without flaring. I grew up in similar forest country around Beerwah and this burning system was used there. If done as I suggest, it will be a very patchy burn but should fulfil the need.

I like the articles, keep up the good work.

E. McCosker
Land for Wildlife and Nature Refuge landholder
Mapleton

A green-coloured variation of the Southern Angle-headed Dragon spotted in rainforests near Springbrook. These dragons are shy, very well camouflaged and prefer undisturbed rainforest habitat. Consequently they are rarely seen. This dragon was found in a patch of naturally regenerated, but mature, rainforest that was a grassy paddock about forty years ago. Photograph by Darryl Larsen.

Kilcoy Landholders Invited to Join Land for Wildlife

With support from SEQ Catchments, Kilcoy Shire Council have recently joined the Land for Wildlife program. This renewed investment ensures that Kilcoy landholders will have access to Land for Wildlife property assessments, revisits and local advice. A local landholder, Michelle Ledwith, has already started work as the Land for Wildlife Extension Officer for Kilcoy. Michelle manages her property for grazing and conservation in the Sandy Creek catchment area. Recognition is also due to the Brisbane Valley Kilcoy Landcare Group who have promoted Land for Wildlife over the past few years.

Kilcoy Shire has significant biodiversity values, especially in the headwaters of Kilcoy, Sandy, Stony and Sheepstation Creeks. In addition, Jimna, Diaper and Yabba State Forests and Conondale National Park form one of the largest and most significant tracts of continuous native vegetation in the South East Queensland Bioregion. Private land with native vegetation in Kilcoy Shire provides a buffer to these State Forests and reserves and helps contribute to the overall connectivity and health of these core vegetation tracts.

This recognised tract of continuous vegetation supports a high diversity of flora and fauna species and contains numerous threatened species.

Threatened and priority bird species of Kilcoy Shire include the Black-breasted Button Quail, Powerful Owl and Red Goshawk. Significant reptiles include the Common Delma, Elf Skink and Stephen's Banded Snake. Significant mammals of Kilcoy Shire include the Yellow-bellied Glider and Koala. The endangered Giant Barred Frog is also found in Kilcoy Shire.

Kilcoy Shire contains a mapped bioregional wildlife corridor from the Diaper State Forest to Mooloolah.

Some of the ecosystems in Kilcoy Shire that contain significant plants and animals are found on private land. As more people are moving to Kilcoy for the rural lifestyle, an interest in nature conservation is expected to grow. These landholders will now be able to access support and advice through the Land for Wildlife program.

A female Red Goshawk on her nest. The Red Goshawk is listed as Endangered under the Qld Nature Conservation Act. Photograph by David Simpson, see http://www.aviceda.org/abid/index.php for more bird images by David.

A field day for existing Land for Wildlife members and interested landholders will be held in the new year. This field day will aim to showcase some of Kilcoy's nature conservation values and will assist landholders to manage these values and minimise threats such as weeds, pest animals and soil erosion.

Michelle Ledwith can be contacted via the Landcare Hub in Kilcoy on 5497 1253.

Land for Wildlife Southeast Queensland is proudly managed by SEQ Catchments (the accredited regional body for Natural Resource Management in South East Queensland) and proudly delivered by the following 15 Local Governments:

Land for Wildlife Southeast Queensland Regional Coordination is supported by the Australian Government.