The Natural News

Central North Field Naturalists Inc.

No. 65 ~ January 2017

THE DIFFICULTIES OF NATURE CONSERVATION IN AOTEAROA NEW ZEALAND AND HOW A COMMUNITY IS RISING TO THE CHALLENGE. *June Hilder*

This article discusses why many of Aotearoa New Zealand's ecosystems are in trouble and outlines an ambitious project to restore the ancient indigenous biodiversity of eastern Otago within and beyond the confines of a designated eco sanctuary.

New Zealand's native biota is unique and fragile because when the land broke free and drifted away from Gondwana some 80 million years ago, it took with it a community of amphibians, reptiles, birds, insects and many species of trees and other plants, but no browsing or predatory mammals except for two species of bat. The birds and insects gradually adapted and occupied ecological niches which were filled by mammals elsewhere in the world; several bird species became flightless and ground dwelling. The flora is distinctive with around 80 percent of endemic plants.

Isolated by vast stretches of ocean, the flora and fauna remained largely undisturbed until the arrival of humans around 700 years ago. From that time and especially during the last 200 years the number of species plummeted as vast swathes of the natural landscape were destroyed and native animals were hunted sometimes to extinction. Introduced plants and animals were deliberately released or escaped into the wild and proliferated, outcompeting the native plants and animals which were poorly equipped to cope.

As far back as 1892 New Zealanders began to realise they were in danger of losing many natural treasures and they started to implement measures to halt the decline. The Land Act allowed the creation of flora and fauna reserves and offshore islands were gradually cleared of invasive pests and used as lifeboats for threatened species. However, the restoration of biodiversity especially in settled parts of the main islands proved far more difficult; it

Orokonui Ecosanctuary. Photo: Greg Hilder.


Predator-proof fence. Photo: Greg Hilder.

was necessary to create sanctuaries by enclosing areas within predator proof fences.

During the last twelve months I have spent several weeks staying with family at their home close to the Orokonui Ecosanctuary about 20 km north of Dunedin. The idea of a sanctuary was first conceived in 1982 when the Otago Natural History Trust was formed. However, the idea did not come to fruition until several years later when the Zealandia Wildlife Sanctuary opened in Wellington and the Trust ran a fundraising campaign to help get the project under way. This was well supported with an enthusiastic local Dunedin community backing schemes such as 'sponsor a fencepost'. In just a few years, progress has been made and many opportunities are now available for education, research and recreation.

Orokonui is a north facing valley through which the Orokonui stream flows, emptying eventually into the Orokonui estuary, an important area for wading birds. The sanctuary was enclosed in 2007 by a fence 8.7 kilometres long and 1.9 metres high protecting an area of around 307 hectares of regenerating native forest. The mesh of the fence is small enough to exclude baby mice, a layer of gravel outside the fence covers a skirt at ground level that keeps out burrowing animals and a stainless steel hood keeps out climbing animals. The potential for overhanging trees permitting access is reduced by a road on both sides of the fence and a solar-powered electric wire on top of the fence sets off an alarm if touched. Visitor access is via an airlock style double gate.

While the fence keeps pests out, those already in the valley had to be eradicated before any threatened species could be released. Eradication commenced in August 2007 with goats and possums shot and poison baits scattered from aircraft. In addition, local volunteer workers continued to support the project by removing many weedy plants and planting native seedlings raised at a nearby nursery. Rock piles were made to create habitats for lizards.

The Robin Valley track. Photo: Greg Hilder.

Infrastructure at the sanctuary includes a visitor centre, an aviary to house birds prior to release, bird feeding stations, an enclosure for Otago skinks which had become locally extinct and a viewing pen for two young tuatara. The tuatara is the sole survivor of an ancient line of endemic reptiles which became extinct elsewhere about 100 million years ago. Several walking tracks meander through a variety of habitats including native grasslands, podocarp and fuchsia forests, an area with host and food plants to attract native butterflies and another planted with rare plants of Otago. Visitors are provided with a brochure incorporating maps and information on tracks, habitats, plants and birds. Information panels placed along the tracks assist with plant identification.

The Robin Valley Track, extends the full length of the sanctuary following the Orokonui stream almost as far as the estuary. Ten species of native fish including four

New Zealand's tallest tree. Photo: Greg Hilder.

galaxids are found in the stream, the southern end of which flows through tree ferns and native forests. Towards the northern end exotic forest persists and visitors are able to view New Zealand's tallest tree, an 81 metre high *Eucalyptus regnans*! An information panel here states that while this tree is native to Australia, eucalypts did grow in New Zealand prior to the last ice age. Fossilised eucalyptus leaves have been found in Frasers Gully in Dunedin.

Sadly, during the winter of 2015 the sanctuary experienced a set back when an unusually heavy snowfall on the perimeter fence provided an opportunity for one pregnant female stoat to get in. Many traps were set, but this stoat was trap shy; footprints were seen leading up to the traps, but the stoat never entered.

Twelve young kiwi were immediately relocated to safe havens. Prior to the breach, 50 to 60 rare South Island Saddlebacks, birds that are particularly vulnerable to stoat attack, were known to live in the sanctuary, but it appears they are now extinct in the reserve. On the 5th November 2015 a stoat detector dog located a stoat den in the base of a Totara tree (*Podocarpus totara*), the female stoat and her kits were caught and destroyed. It is estimated that this breach cost well over $10,000.

Evidently, more work was needed not only to ensure the ongoing protection of the sanctuary but also to improve the situation beyond the perimeter fence. In recognition of these needs and inspired by the successes and lessons learned at the Orokonui Ecosanctuary, the Dunedin based Landscape Connections Trust developed and now coordinates a new project, 'Beyond Orokonui', in an area covering 55,000 hectares between north Dunedin and Waikouaiti including all the land immediately surrounding the Sanctuary. The community led project has a vision to repair, extend and link remnant native habitats and improve ecosystem health. As a result, it is envisaged that the wellbeing of the human population will also be enhanced through the delivery of improved ecosystem services, the encouragement of responsible stewardship of the land and an increased connection to the natural environment.

A key focus of the Beyond Orokonui Project is the Halo Project which will prioritise long term pest control in the area surrounding the sanctuary. This will protect the integrity of the sanctuary and also the safety of the flighted birds not confined within the fence. My family's house and land is located within the Halo and in the spring of 2015 they and other residents in the area received letters seeking expressions of interest from those willing to participate in the project. The community response was favourable and in May 2016 a community consultation and information session was held. The attendance was over-

whelming and it was standing room only for many of the late comers. I was fortunate to be able to attend this meeting—and even arrived early enough to grab a seat!

In a speech in 2012 one of New Zealand's leading scientists, Paul Callaghan called on New Zealanders to strive to eradicate all introduced predators. At our information session, predator control on a landscape scale was explained by two speakers, the Orokonui ranger and a pest management professional. While it was recognised that it is unlikely that New Zealand will ever get rid of every pest, it was considered that a concerted and ongoing community effort would be able to reduce numbers to a level low enough to give rare and threatened species a chance to reestablish in the wild.

Subject to obtaining sufficient funding, the Halo Project aims to employ a part time project manager and a full time field officer. The first priority will be to reduce stoat, possum and rat numbers by organising the activities of groups of volunteers who will defend patches called 'Community Controlled Pest Sites (CCPS)' along roadsides, tracks, beaches and streams. They will strategically install and monitor traps and bait stations, monitor wildlife and collect data. A trainee program will facilitate the building of skills through theoretical and practical training in pest management. Residents, especially those living very close to the sanctuary will be encouraged and assisted with trapping and baiting on their properties.

In addition to helping wildlife, the Halo Project will also contribute to a resilient community. Controlling pests and restoring and protecting biodiversity over the long term will increase agricultural productivity. As new skills are gained through the training programs, it is envisaged that opportunities for employment will be created in nature conservation, pest management, small scale food production and ecotourism. This should encourage the local community to continue to support the project. It seems that nature conservation in New Zealand will depend on projects such as these and communities which will remain motivated and vigilant for a very long time.

The ecosanctuary is open to the public between 9.30 and 4.30 daily for guided or self guided tours. If you ever find yourself in the Dunedin area, it is well worth a visit.

(This article with references is on the CNFN website.)

Celmesia hookeri at the Rare Plants Garden, Orokonui. Photo: Greg Hilder.

Stoat trap. Photo: Greg Hilder.

Text and photographs ~Sarah Lloyd

Introduction

Before the 13th century Aotearoa New Zealand had a plethora of mainly endemic birds and reptiles, but no mammals apart from two species of bat. This changed dramatically when the country was settled by people from Polynesia. They brought with them a type of dog called kuri (now extinct) and the kiore pacific rat (*Rattus exulans*). Unusually, they did not bring pigs or chickens and initially small hunting bands in the North Island lived on seal and flightless moa. The border collie-sized kuri were excellent hunters that caught kiwi, pukeko and other birds. The nocturnal kiore fed on the fruits of native plants as well as on lizards (e.g. tuatara), frogs, insects and eggs and chicks. Thus, even before Europeans arrived many species had been severely depleted or, in the case of the nine species of moa, exterminated.

Finding native birds

The story goes that when Captain Cook approached Aotearoa in 1769 his crew described the dawn chorus as deafening. But birds with no natural predators are easy game and they began to disappear soon after people and associated animals arrived. Now, of the 91 species of terrestrial birds that once inhabited New Zealand, 40 are extinct and many of the surviving species are in such low numbers that special measures are undertaken on offshore islands and mainland reserves to ensure their survival.

Apart from a Royal Spoonbill feeding on the mudflats as we drove to Auckland from the airport, it was three days before we saw a native bird. Blackbirds and sparrows frequent Auckland's suburbs, and other populated areas are dominated by Starling, Chaffinch, Redpoll, Goldfinch, Yellowhammer, Greenfinch, Myna, Ground Thrush, and even Barbary Dove; Eastern Rosella, Australian Magpie, Masked Lapwing, Welcome Swallow and Silvereye are self introduced from Australia. To see native species it is necessary to visit areas of reasonably intact native forest or reserves with expensive fences designed to exclude stoats, weasels, ferrets, rats, mice, possums, dogs and cats (see previous article). When you do see native species chances are they will be endemic.

We visited several reserves, including the island of Tiritiri Matangi, a 220-hectare wildlife sanctuary in the Hauraki Gulf north of Auckland. It claims to be one of the world's most successful volunteer conservation projects and is truly inspiring. Between 1984 and 1994 almost 300,000 shrubs and trees were planted transforming 60% of the island from cleared farmland to forest. When the project began its only mammalian predator, the kiore, was in such large numbers—200 per hectare—that it was decided to aerially poison them. Once the predators were eradicated, rare birds were translocated with successful species eventually colonising nearby mainland reserves such as Tawharanui Regional Park and Shakespear Regional Park.

The Keruru (New Zealand Pigeon) was one of the first native species we saw. This plump bird was favoured by Maori, particularly in autumn and winter when the main component of its diet was miro berries. (Miro *Prumnopitys taxifolia* is one of New Zealand's 15 species of Podocarps). It was unpalatable in other seasons when ingested bitter leaves or resinous fruits tainted its flesh. The Maori hunted the pigeons with 7-metre long spears and the early British settlers regarded it as an excellent game bird and shot it by the bag full. Keruru rapidly

declined. Shooting was restricted in 1864 and the bird has been fully protected since 1921.

The Kokako (p.8) has baffled scientists for years and its taxonomic relationships remain uncertain. It was one of the first birds we saw on Tiritiri and its unusual behavior was immediate apparent: it 'ladders' through the vegetation and feeds mostly on leaves.

Captive bred Takahe (see front cover) are present at several reserves. The Takahe is a much larger version of its commonly seen relative the Pukeko, a bird resembling our Purple Swamphen. Takahe were considered extinct until 1948 when several birds were found in the wilds of the South Island. (The North Island Takahe is extinct.) Its survival is now entirely dependent on captive breeding efforts.

We had an excellent guide at Tiritiri Matangi although the commendable policy of using the birds' Maori names made it particularly challenging. We frequently had to check our field guides for the common names, while also trying to learn unfamiliar plant names.

The Keruru (New Zealand pigeon) is important to the health and structure of forests because it is able to feed on large fruits and berries and spread seeds away from parent plants. This important ecological role would also have been filled by Moa.

Sixty percent of Tiritiri Matangi is now vegetated thanks to the efforts of volunteers who planted nearly 300,000 shrubs and trees between 1984 and 1994.

The inquisitive nature of the locally common Weka (a member of the Rallidae family) does not endear it to local human residents who share its territory. One person was surprised to learn that we had travelled great distances just to see this bird.

Like other threatened species, there is a multitude of factors leading to the decline of the North Island Kokako. Black rats and possums predate the eggs, chicks and sitting females; habitat destruction and competition for food almost sealed its fate.

The Pateke (brown teal) is believed to have arrived at Tawharanui Regional Park from Tiritiri Matangi.

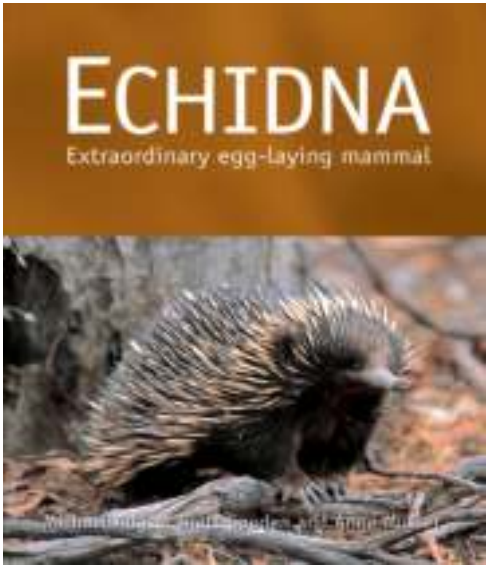
This Weweia (New Zealand Dabchick) was sheltering in a marina at Kinloch near Lake Taupo.

The locally common endemic Tuturiwhatu (New Zealand Dotterel) is a large plump member of the Scolopacidae family. It gradually moved towards us as we walked along the beach, its apparent lack of fear may have contributed to its decline.

Toutouwai (North Island Robin) is another inquisitive bird that will closely approach intruders in its territory—especially if the ground is disturbed and invertebrate food is exposed.

Since Kiore were eradicated from Tiritiri Matangi the Kakariki (Red-crowed Parakeet) has thrived and spread to mainland reserves.

Feathers of the rare endemic Hihi (Stitchbird) were incorporated into Maori ceremonial cloaks, a practice that required an enormous number of feathers.



ECHIDNA Extraordinary egg-laying mammal by Michael Augee, Brett Gooden & Anne Musser. (CSIRO Publishing - Out of print) Reviewed by Sue Gebicki, Birralee.

It would be very hard not to have a soft spot for this inoffensive little animal. They appear occasionally, trundling along at their own pace, completely harmless—unless you are an ant—and turning into a seriously spiky ball that can rapidly disappear underground when upset. I knew the barest minimum about echidnas, so it was with great delight that I found this book in my local library.

There are 5 subspecies of short-beaked echidna *Tachyglossus aculeatus* in Australia and New Guinea. Tasmania has only one subspecies, the endemic, *T. a. setosus,* which is distinguished from the other subspecies by its relatively shorter, fewer spines and soft thick fur. The other echidna species, the endangered long-beaked echidna *Zaglossus bruijni* that lives only in highlands in New Guinea, is briefly described in the book.

Contrary to their absent-minded appearance, echidnas exhibit a learning ability similar to a rat or cat. They can store, classify and integrate visual and touch information, characteristic of a highly organised nervous system. They are possibly capable of much more than we are currently able to understand, for in the same way that we cannot imitate a bird's ability to find an exact spot a thousand kilometres away, we don't have the same capabilities as the echidna.

Far from having poor eyesight, the chapter about the echidna's senses reveals that the shape of the lens in their eyes would enable a clear view of distant objects, and their eyeballs can be elongated in such a way as to permit viewing close objects. Research suggests that they have a visual capability equivalent to that of the brown rat (*Rattus norvegicus*). Their ears are structured in such a way that they have only a narrow frequency range of detection, which is inefficient at detecting airborne sounds but they are rich in gravity sensors—very useful for knowing which way is up when burrowing and using the burrows of other animals.

A truly amazing feature of the echidna is its snout comprising 17 per cent of the total body length which acts as a sensory organ, a mechanical probe and a water conserving device. The sense of smell is very important for males when locating females during the breeding season, for both sexes for finding ants and termites, and possibly for hatchlings to find the milk patch on their mothers. The snout is rich in mechanoreceptors and electroreceptors allowing echidnas to detect weak electric fields as low as 1.8 mV/cm—1000 times smaller than humans. The functional significance of these is uncertain, although they may give the echidna information about prey types that produce electrical fields in the soil when they move. When the snout touches the ground it

can apparently pick up mid-frequency sounds around 5000 Hz emanating from ant and termite colonies, possibly some distance away.

Due to the echidnas' anatomy, they are able to move stones weighing up to 13.5 kg, twice their own weight. One unwary zoologist who left an echidna in his kitchen overnight found that the echidna had moved the refrigerator towards the centre of the room!

The tongue, which shoots out of the mouth at up to 100 times per minute, gives the echidna its name. What else could they be called but 'fast tongue'—*Tachyglossus.*

I would love to see echidnas swimming in hot weather. They have been observed swimming in dams, across streams and even in the ocean. They hold their snout in an upright position and use it as a snorkel, and have been seen diving to avoid humans.

These facts are a very small fraction of the information revealed in this hugely interesting book. It has ten chapters ranging through evolution, physiology, behaviour, food and conservation. All aspects are covered in great detail, with plenty of diagrams, black and white photographs and coloured plates in the centre. It explores history and evolution, recent research and points out spaces in knowledge. And I am sure the authors reveal their affection for these bearers of the 'fast tongue' when they entertain the possibility that echidnas, when lying around in their burrows, use their massive frontal cortex to think about things.

Ants scurry from the 'fast tongue' of a Short-beaked Echidna as it delves in to a crack in a eucalypt stump. Photo: S. Lloyd.

TASMANIA'S ONLY TREE ORCHID—THREATENED?

Ian Ferris and Philip Milner

The only Tasmanian species of arboreal orchid, Gunn's Tree Orchid (*Sarcochilus australis*), is described as being widely distributed throughout the low to middle altitudes up to approximately 600 m, in most coastal areas north of about Freycinet. It generally occurs in shady, moist riparian areas, as it appears to be sensitive to solar radiation and desiccation and is intolerant of fire. It is described in literature from the mainland of Australia (it also occurs in near coastal areas from Victoria into southern Queensland) as a "twig epiphyte", in that it grows mainly on branches or tree trunks in contrast to other arboreal orchids that nestle in cracks and hollows or joins to take advantage of accumulated leaves and bark.

Twig orchids survive by clinging onto the bark of trees. They are not parasitic, but are epiphytic, in that they do not rely on nutrients from their host but obtain water and nutrients from the moisture and dust that flows around them. Consequently, they often have quite extensive root systems. They do not have a tuber or bulb for moisture storage, as do many terrestrial orchids; the name orchid derives from "orchis", Greek for "testicle" from the shape of the tuber of many orchids.

The perfumed flowers attract native bees for pollination. Their seeds are distributed aerially and this can result in quite rapid spread of the plant into the surrounding area. In general, it is common to find clusters of plants within a 50–100 m radius, within their preferred damp/shady habitat. That means that they will extend upstream or downstream in a narrow riparian zone, rather than laterally into the drier, less shady and often higher elevation slopes.

The anecdotal generalisations that relate to Gunn's Tree Orchid are mostly centred on the species of tree they prefer. Most people familiar with the species will look closely for it on

A typical occurrence of Gunn's Tree Orchid (*Sarcochilus australis*). Photo: Philip Milner.

Dogwood (*Pomaderris apetala*) and especially if it is associated with Native Currant (*Coprosma quadrifida*), as this appears to be a favoured host. Is this valid?

Examination of a number of occurrences in north and northwest Tasmania, and reference to the limited literature on this species, has found that it will colonise a wide range of plants. However, there is a distinct preference which may relate to bark type and habitat rather than species.

Gunn's Tree Orchid has tiny seeds that issue from quite a large seed capsule with dimensions relating to the plant size. Larger plants that occur in the wetter areas, such as the Sumac south of Smithton, can have capsules 6 cm long, whereas smaller plants in drier areas have capsules of less than 2 cm. When ripe, the capsules split lengthways, and the many thousands of seeds float about to be caught by

chance on appropriate substrates.

It would be intuitively expected that seeds would be preferentially caught on coarser barked species, rather than smooth barks, for simple physical reasons. Orchid seeds require a suitable substrate containing quite specific biological associations, before they can germinate. A tiny seed would seem to need something to catch and hold onto, prior to being able to react with whatever might be at the site. Coarser barks would be logical. However, nature does not seem to operate with our logic.

Our observations and research have indicated:

There is a clear preference for riparian sites, but this is not exclusive. Occurrences have been located hundreds of metres away from creek lines, or on the sides of steep slopes, albeit in very moist areas. Specimens have been located within a few metres of tidal water.

It is unusual, but not impossible, to find just one specimen. If you find one, you will probably find others nearby.

Plants in very moist locations are likely to be significantly more robust and more likely to flower than plants in drier areas. This is well illustrated by the small plants near Port Sorell, compared to the very robust plants in the Tarkine.

There is a distinct preference for smooth barked trees, and certainly for trees that are not pyrophyllic e.g. most of the eucalypts. However, several specimens have been found growing on rough barked trees, such as Prickly Box (*Bursaria spinosa*) and even on Sweet Scented Paperbark (*Melaleuca squarrosa*) with papery bark. Host species that have been observed include:

Blackwood (*Acacia melanoxylon*), Horizontal (*Anodopetalum biglandulosum*), #Prickly Box, #Pinkwood (*Beyeria viscosa*), #Native Currant,

Mature plant with a 5 cm seed capsule similar in appearance to a pea pod. Photo: Philip Milner.

Velvet Correa (*Correa backhouseana*), #Leatherwood (*Eucryphia lucida*), #Swamp Paperbark (*M. ericifolia*), Sweet Scented Paperbark, Satinwood (*Nematolepis squamea*), #Musk (*Olearia argophylla*), #Dogwood and #Stinkwood (*Zieria arborescens*). (The species marked # are supported by our own observations)

Of these, almost all have smooth bark. The rough or papery barked species are:

Prickly Box, Blackwood, Sweet Scented Paperbark, Swamp Paperbark and Musk.

Of course, what appears to us as smooth might be rough at the micro level. The seeds are about 0.5 millimetres or less, and are able to float in a light breeze with their "wings".

A favoured location is between 1.5 m and 3 m off the ground, although heights of 4–5 metres is not uncommon. A higher location is obviously more efficient for greater seed dispersal, but the penalty for the plant is lower humidity. Specimens in the Tarkine region appeared to be generally higher than those in drier country. Some of this might be due to that serious threat, the orchid collector, but

the observation holds for isolated occurrences.

There is a preference for mossy trees, at least for established specimens. The trees (usually dogwood) that are old enough to have a thin moss covering appear to be preferred, although this often results in plants falling off during high winds (or drying out) as they are not tightly rooted onto the branch, but just onto the moss and collected detritus. It may be that the moss grows AFTER the orchid has developed from the seed. Moss would assist the orchid's moisture retention, and the orchid roots collect moss and debris.

Seedlings on Stinkwood. Photo: Philip Milner.

The plants that are observed growing in native currant are possibly the result of these falls, rather than colonisation. The plants are mostly in the branches but have been observed growing on the trunks. Most of these specimens are depauperate i.e. thin and gangly, and are unlikely to be successful. It was conjectured that because they are the result of falls that have been unable to remain tied onto their original root site, and native currant, being a common, prickly understorey associate of dogwood, is a common recipient. However, very small plants have been observed growing on native currant.

In some areas orchids are frequently seen on the ground, but these will not survive. In addition specimens are often found on dead branches and trees. These will also not survive, especially with the first hint of fire that may sweep through, or from host fall.

Smith (2008) determined that the fruiting rate for the orchid in Tasmania, that is, the rate of fruiting capsules to flower spikes, is less than 1%, and many old plants have no seed pods or capsule remnants. This indicates that the seed pod must have a high number of seed (it does, millions), for the plant to survive as a species. The rate of successful attachment and germination also appears to be low, based on an example of germinations seen on a single branch of Stinkwood, and subsequent attrition from falls, dislodgement, predation, death of host, and exposure to light must be very high.

Tremblay (2006) postulated a link between flowering and length of leaves, in that plants with leaves less than 80 mm have a low chance of flowering. As length (and number) of leaves is clearly related to moisture level, and to the particular location on the host tree, moisture (rainfall, humidity, etc) will effect a plant's survival. Climate change, where the east coast of Tasmania is becoming drier, will have an effect on its population and distribution.

The habitat for Gunn's Tree Orchid is restricted by moisture and canopy cover. It poorly tolerates bright sunlight or extended dry periods—it has no tuber to act as a moisture store, instead using its extensive root system. It is clear that riparian zones are suitable habitats because they retain moisture and usually have good canopy coverage. Other areas that retain moisture and are well shaded might also be suitable, but the potential for dispersion is lessened as the potential for drying out (and fire) is increased.

A threatened species?

Gunn's Tree Orchid is not listed as a threatened species. Unfortunately listing only occurs

once a species is found to be under threat by a long process of deterioration in numbers, or loss of habitat. As it is not listed, it is also not monitored, so we do not know if it is under threat. The loss of habitat is the greatest threat as the existing riparian zones so conducive to their existence are being threatened widely by forestry, urban spread and agriculture.

A second threat of unknown level is from collectors. Because the reproduction rate is low, and the area of suitable habitat limited and becoming more so, the loss of any healthy plant is potentially disastrous for the survival of the species in that location. Hearsay evidence is that these orchids are "popular" as they survive when collected. However, they are unlikely to be placed in a location that allows seed dispersion, so their reproduction capacity is lost. Millions of propagation opportunities are gone for every stolen plant.

The impact of collectors—the plant is attractive, and is readily collected as it grows at low levels—should not be underestimated. Of course there is little factual data on theft of this (and many other) species. There is a risk that count data by "citizen scientists" although highly valuable and probably the only research being done, might result in populations being found and pillaged as this data becomes publicly available. Examples of this are known.

In the 2008 survey by Smith, using a range of sources, a total of less than 1000 plants were counted for Tasmania. Our approximations just in north western Tasmania indicate about 300 specimens. Assuming that there are 10 times this number, there may be 3000 plants, many of them small, and most well separated from surrounding populations. According to Tremblay (2006), genetic sustainability for this plant requires about 50 plants per colony, but a "colony" might be very widespread.

Many cases of riparian zones being "protected" have shown that an inadequate width is reserved leading to a failure to retain sufficient moisture—the zone needs to be quite wide to retain a suitably moist atmosphere. It is not sufficient to retain 3 m or even 10 m from the creek line, as this will lead to long term drying out of the zone and loss of orchid habitat.

The degree of clearing of the riparian zones in the coastal lowlands that form the habitat for this plant is well documented to be very high. Clearing for pivot irrigation, increases in dairy production, logging by clearfell and burn, and the regular burning for "fuel reduction" in areas remote from population centers will all have a negative effect on the orchid.

Climate change is well under way, and the frequency of fires and the decreases in the area of moist gullies and valleys where this plant could thrive may be a major threat to its survival. Significant losses of this species in Victoria's fires have been well documented, with the conclusion being that "it is hoped that they may repopulate from surrounding areas" (Duncan 2012), a barely adequate solution.

This plant, Tasmania's only arboreal orchid, has limited numbers and a specialised habitat. We consider that its survival is under threat, not only from human activity, but human induced climate changes.

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HABITAT CONSERVATION FOR THE TASMANIAN GIANT FRESHWATER LOBSTER

Text and photographs by Todd Walsh

The Tasmanian Giant Freshwater Lobster *Astacopsis gouldi* (yes it is a freshwater crayfish) has been under threat for many years. Habitat restoration and protection is now a major issue for the lobster and is the key to its recovery and ongoing survival. Much has been documented about its habitat requirements, but we still find that most people have little understanding of the workings of a freshwater ecosystem. This article will delve a little deeper into why we continually ask for upstream riparian protection as the major issue facing lobsters today.

Tasmanian streams are generally well shaded, cool and have a substrate of varying sized rocks. Rock size is critical to lobster populations as it is the rocks which protect juveniles and their food for the first seven years of their lives. Cobbles and boulders are rocks which range from cricket ball to basketball size and they tend to be the preferred habitat for juveniles, although small logs and any stable appropriate cover is suitable. Juvenile lobsters are about the size of a thumbnail when they first begin foraging for themselves. They are easy prey for just about everything—blackfish, trout, eels, birds, water rats, large invertebrates and other lobsters—so it is vital that they have a shelter in the early years. The shelter can also provide a close available food source such as detritus, macro-invertebrates and any vegetation that may be wedged under or near the shelter.

The largest impact to the shelters is sedimentation. It is really quite simple: fine sediment permeates all available nooks and crannies of a shelter and renders it useless. Lobsters can and do excavate, but sediment tends to be like digging a sandpit, it all just falls back in. This means the juveniles are forced into the open. The sediment then has another effect: juveniles are extremely difficult to spot amongst non sedimented habitat, but add a layer of grey sand and they become conspicuous. The food sources are also blanketed by the sediment, so juvenile lobsters either starve or are eaten, and that is where the population crash begins.

The first step in rehabilitation and protection of lobster habitat must be preventing sedimentation. The rocks and logs remain in the waterway, but they get covered. Sediment is constantly moving, therefore if you stop

Natural habitat at the Flowerdale River.

Sedimented habitat at Great Forester River.

the source, it moves on. Unfortunately for waterways like the Great Forester River in the northeast, this could take centuries, such is its level of sediment. Preventing sedimentation is relatively simple in theory—stop it entering the stream. In practice it is much more difficult. You have to contend not only with your own patch, but every upstream feeder as well. That is our biggest issue.

In undisturbed habitats, sediment (eroded soil etc) is filtered by vegetation. The rain slows and spreads it as it falls through leaves, branches etc. It then hits more vegetation on the ground and finally a filter bed of leaf litter. Any mud etc. is slowed and deposited at the base of plants or leaf litter, and most doesn't reach the stream. Planting trees, shrubs and anything else that slows movement of potential sediment is therefore one of the best ways to improve lobster habitat. Rocks can be placed at erosion points. It really is a site by site issue, not one rule fits all.

On a larger scale, protection of those remaining areas that are in relatively good condition is the aim. Areas that should have greater protection have been identified for years but with little result. Again the idea is pretty simple: protect the best known populations and habitats including the feeder streams or headwaters. It is pointless protecting a 2 km length of river if the headwaters are cleared and sediment introduced. The areas recommended for protection have been narrowed down, just so it's easily remembered—there are not that many anyway. (Note that the areas nominated don't include private land):

Frankland River: larger buffers from the Blackwater Road bridge upstream into the Arthur Pieman Protected Area.

Flowerdale and Hebe Rivers: conservation area from Lapoinya Rd bridge to the upper Flowerdale and Hebe, including all tributaries.

Dip River: expanded buffers to the headwaters. Dip Range Regional Reserve to be upgraded and expanded to protect the headwaters of the Black, Dip and Hebe Rivers.

Black River: given the highest priority as a lobster catchment, protection of its headwaters. Larger buffers on all streams. Headwaters included in reserve program.

CENTRAL NORTH FIELD NATURALIST LIFE MEMBERS

For the first time in its nearly thirty year history, the executive committee of the Central North Field Naturalists (formerly Deloraine Field Naturalists Group) has decided to recognise three long-term, highly-active members—Jim Nelson, Ron Nagorcka and Sarah Lloyd—for their major contributions to the group and its goals. Congratulations to all of them from all of us! We cannot possibly outline all the contributions Jim, Sarah and Ron have made to the CNFN and community at large. We are privileged to have them in our midst!

Jim Nelson

Deb Kerr

In1987 Jim and a few friends started the Deloraine Field Naturalists Group. Jim's interest had been sparked by attending the Launceston Field Naturalists Club's meetings and outings and he had their support and encouragement when forming the new organisation. The group's name was later changed to Central North Field Naturalists to reflect the wide geographic diversity of members.

Jim's work with Dr Pierre Horwitz along with field research carried out by the field nats raised concerns about the survival of the endemic Giant Freshwater Lobster *Astacopsis gouldi*. The group undertook years of field work and presented much needed conserva-

tion objectives which were constantly opposed by the government. The work helped to list the species as threatened but it was still available for culinary exploitation. A threat to take the matter to the Supreme Court brought the government into line, and while various recovery plans have never been implemented, *A. gouldi* can no longer be consumed. The fight continues to save this marvelous creature.

Jim then became involved with assessing frog distributions and conservation, and along with Dr David Obendorf identified the Chytrid fungus in Tasmania's frogs.

Dr Joanne Connolly's research into the distribution and consequences of the Platypus fungal disease also gained the support of members. Jim assisted by catching diseased animals and his late wife, Claudia, helped raise funds by selling raffle tickets These were used to support laboratory expenses and, more recently, for research in Northwest Tasmania into playpuses and their habitat.

For many years Jim has studied *Engaeus* burrowing crayfish. His passion for this endemic genus has vastly improved the knowledge of species' distribution and has helped to educate the wider community.

Jim has participated in snake research on Chapel Island, Forester Kangaroo monitoring on Three Hummock Island and in the Midlands and mapping the distribution of the endemic tree frog *Litoria burrowsiae*.

Jim has been on the executive committee since the group's inception, and has held several offices as well as a period as newsletter editor. He is the currently the Public Officer, and retains strong interests in community conservation works. Jim's infectious enthusiasm and general knowledge has always made our outings enjoyable as well as educational. Thanks Jim.

Sarah Lloyd and Ron Nagorcka

Martha and Rod McQueen

When Sarah and Ron joined the group in 1989, they quickly but quietly began to play a major role, each serving a stint as President early on. Later, Sarah took on the mantle of Treasurer for 14 years and since 2005 has shouldered the responsibility of editing The Natural News. To her goes the lion's share of credit for making it one of the outstanding publications of its type in Tasmania. They have contributed numerous articles, book reviews, and amazing photographs to the newsletter and website. Also beginning around 2001, Ron began a fifteen year stint as Secretary.

They have enthusiastically shared their considerable knowledge in their areas of interest with fellow CNFNers. Who cannot recognise a lichen from the genus *Usnea* by now, or distinguish a slime mould from a fungus? In addition to his interest in lichens and plants, Ron has a particular fondness for birds, a passion shared by Sarah since she was six years old, partly sparked by visits from an uncle from Swaziland who was a keen birder.

Sarah has diligently pursued a variety of other natural history interests during her association with CNFN including plants, fungi and flies. More recently she has become a local authority on slime moulds, particularly after publication of *Where the Slime Mould Creeps*. The first 88 species in her collection featured in her poster *Myxomycetes* and one species—*Alwysia lloydiae*—was named in her honour. Sarah graciously attributes such a diversity of interests to the infectious influence of other CNFN members.

One of Ron's main contributions has come from his expertise in, and passion for, recording natural sounds. When David Stewart produced his "Nature Sound" CD of Tasmanian birds, half of the recordings came from Ron. When Jim and a few other DFNG luminaries

launched the ambitious *Frogs Tasmania* project over twenty years ago, with the purpose of producing information and calls of all Tasmanian frogs as an educational tool, Ron either recorded or tracked down recordings of all eleven species. He also did the sound engineering. The recording admirably fulfilled its educational purpose and, as a spin-off, gave a healthy boost to the group's coffers.

Ron has combined his expertise in recording natural sounds with his unique talents as composer and performer of keyboard and didgeridoo to produce a number of CDs, his best-known being Secret Places and Devils of the Night. In 2004 Sarah and Ron produced a CD and booklet *Rhythms of the Tarkine: a natural history adventure*. Sarah's booklet described much about the origins, human history and her impressions of the natural history of the Tarkine, and Ron's CD combined bird recordings with music inspired by the area.

Concern about the lack of distribution data about Tasmania's bush birds inspired Sarah to initiate *A Sound Idea*. As Sarah said, '*I would never have thought about initiating the project if it had not been for Ron's expertise and knowledge of field recording'*. The project involved volunteers with no bird identification skills recording birds and other natural "noise makers" at various places around Tasmania using digital sound recorders. Sarah compiled a database, held jointly by herself and Birdlife Tasmania, of species at over 100 locations that had not previously been surveyed. CNFN supported the project by paying for postage of recording devices, while Sarah further contributed by producing a dedicated newsletter *Chirp*. More recently, Sarah published *The Feathered Tribes of Van Diemen's Land* which not only is available to the general public but has also been used in conjunction with the Backyard Biodiversity project in Westbury.

The Panatana nature reserve, located on the Rubicon Estuary, is an important site for both Aboriginal cultural heritage and diverse natural values. When the Six Rivers Aboriginal Corporation wanted a flora and fauna survey of the property and a pamphlet published about aboriginal uses of plants and animals, Peter Sims called upon Sarah and Ron, among others, to assist. CNFN administered the funds. (Panatana has recently been purchased for perpetuity by the Tasmanian Land Conservancy and Indigenous Land Council.)

Sarah and Ron have spent countless hours as key organisers of highly-successful Fungimap events and Federation Weekends, the latter involving field naturalists from around Tasmania gathering at different venues for socialising, ex cursions, and lectures. The Fungimap events include talks and fungi forays presented by local, interstate and sometimes international mycologists with the public events often followed by research expeditions by the experts. Sarah and Ron have helped to organize Federation Weekends at Arm River and West Tamar, the Fungimap Conference at Gowrie Park, and Fungimap events at Weldborough, Corinna, and Waratah, the first of which doubled as a Federation Weekend. On at least one occasion they even did the cooking for everybody. Phew! Well done, Sarah and Ron.

CNFN life members (from left) Sarah Lloyd, Ron Nagorcka and Jim Nelson being presented with their certificates by President Patricia Ellison. Photo: Martha McQueen.

CNFN Walks Program February to May 2017

Sun 5th Feb.: Reptiles at North Down near Port Sorell. Bill Flowers will help us search for reptiles on this coastal property owned by Snow Thomas. Our focus will be on a wetland behind the dunes. The wetland is accessible either on foot or by 4WD over a distance of about 1 km. Meet at 10.00 am at the entrance to Snow's property on North Down Lane, which runs north off Port Sorell Road (B75) about 1.5 km west of Ghost Rock Vineyard. (Leader: Bill Flowers)

Sun 5th March: Lapoinya and Myalla. It is planned to spend the morning surveying plants in a regenerating forestry coup at Lapoinya and the afternoon birdwatching at Carol and Richard Donaghey's property at Myalla. Meet at 10.00 am at the junction of Sawards Rd and Myalla Rd (about 1km south of the Myalla Rd (C229) turnoff from the Bass Highway), from where we will proceed along sealed roads to Lapoinya. Look out for the old Sisters Creek school on the corner of the two roads. The Myalla Rd turnoff is approximately 5 km west of Boat Harbour along the Bass Highway. (Leaders: Carol & Richard Donaghey)

Sun 19th March: Karst Field Trip. Deb Hunter, whose article on the impact of the 2016 fires on the Mole Creek karst appeared in Natural News #64, is offering this extra field trip for March to the karst area at South Mole Creek. Deb has a licence to access the road and World Heritage Area there via a locked gate. From the carpark it's then a 1.5 km walk each way along the karst window at the edge of the WHA, including a visit to the transition habitat zone of Sassafras Cave. The walk will include landscape and ecological interpretation. Deb is happy to answer any questions about the trip on 6367 8142 or debhunter8@antmail.com.au. Please let Patricia Ellison know if you are coming (pellison@iinet.net.au or 6428 2062) by Thursday, 16th Mar. Meet at 10.00 am opposite the Mole Creek Hotel in the main street of Mole Creek.

Sun 2nd April: O'Neills Creek Nature Trail at the foot of Mt. Roland. This is a pleasant, easy ramble through some interesting vegetation with the potential to see a good variety of birds. The creek also provides good *Astacopsis gouldi* habitat. For those who wish to explore further, the trail leads to the start of the track to the top of Mt. Roland. Meet at 10.00 am at the O'Neills Creek Picnic Reserve, about 400 m east of Gowrie Park Wilderness Park along Claude Road (C136). (Leaders: Jim & Mariamma Hunter)

Sun 7th May: Black Jack Hill Regional Reserve, south of Exton. An exploratory walk along a track through open forest in the Reserve. Meet at 10.00 am opposite the start of the track at 'Quamby Rock', 234 Bogan Road (C502), Quamby Brook, where we have been given permission to park cars. (Leader: Sue Gebicki)

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