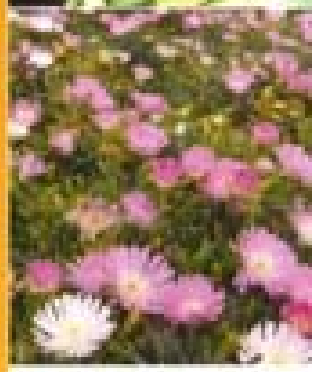

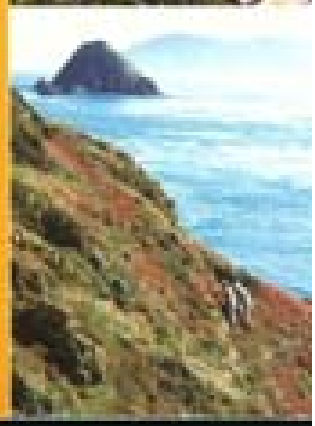

Bio-Protection & Ecology Division

Proceedings of the Banks Peninsula Biodiversity Workshop

Compiled by

Mike Bowie, Rachel Barker and Christina Troup

Lincoln University Wildlife Management Report No. 30

CHRISTCHURCH
NEW ZEALAND

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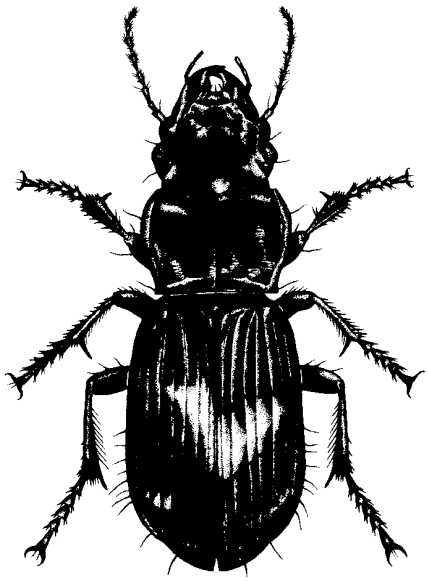

Prepared for:
Participants of the workshop held on 8th October 2009

April 2010

Banks Peninsula Biodiversity Workshop, Akaroa

FREE INVITATION

Thursday 8th October, 9 am- 7 pm
At the Gaiety Theatre, Rue Jolie, Akaroa

A free workshop, open to all interested in enhancing biodiversity, especially suitable for farmers and landowners

Hosted by
Banks Peninsula Conservation Trust
and Lincoln University

To assist us with catering please register your interest before FRIDAY 2 OCTOBER.
Contacts details and programme on reverse.

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Hosted by Banks Peninsula Conservation Trust and Lincoln University

Start	Topic	Speaker
8.30 -9am	Registration at Gaiety Theatre - Please register before 9am start	
9.00	Welcome & purpose of the forum	Rick Menzies, BPCT; Mike Bowie, Lincoln Uni
9.15	Natural history of Banks Peninsula	Hugh Wilson, manager of Hinewai Reserve
9.50	BOOK LAUNCH: Hugh Wilson's new book, *Natural History of Banks Peninsula*	Josef Langer Trust representatives, Simon Mortlock & Robin Burleigh

10 -10.30 am MORNING TEA

10.30am	Farming & conserving biodiversity	Francis Helps, Pohatu/ Flea Bay
10.50am	Conserving weta and other invertebrates: the forgotten fauna	Mike Bowie, Lincoln University
11.10am	Sooty shearwater/titi at Stony Bay – why build a predator fence?	Anita Spencer, Department of Conservation
11.30am	Native fish: research on Banks Peninsula	Phil Jellyman, University of Canterbury
12.00- 12.30pm	QUESTIONS AND ANSWERS from the morning's presentations	

12.30- 1.30pm LUNCH- check out posters and chat with experts followed by 'FIELD SESSIONS' (outside Gaiety Theatre if weather is fine)

1.30pm	Community Conservation, Akaroa	John Thom & John McIlroy
1.50pm	Christchurch City Council trapping programme- what, where and why?	Council rangers: Paul Devlin & Phil Crutchley
2.10pm	Mapping/ discussion of traplines in the south east Banks Peninsula bays	Department of Conservation, Wayne Beggs

2.30pm RETURN TO HALL FOR AFTERNOON TEA

2.40pm	Threatened plants - their habitats and mitigating threats	Nick Head, Department of Conservation
3.00pm	Looking after our local lizards	Marieke Lettink, lizard consultant
3.20pm	Kereru: monitoring & what landowners can do to assist their conservation	Heidi Stevens, Kaupapa Kereru
3.40pm	Bush birds: 5-minute bird counts, early findings from surveys	Frances Schmechel, ECAN & Sue Lovett
4.00pm	Tui: recent translocation & monitoring of tui on Banks Peninsula	Laura Molles, Lincoln University
4.20-4.40pm	QUESTIONS AND ANSWERS from the morning's presentations	
4.40-5.05pm	DISCUSSION: Building on success - what can be done to continue improving biodiversity on Banks Peninsula.	Facilitated by Wayne McCallum, Regional Biodiversity Coordinator
5.05 -5.20pm	Workshop summary	Kerry-Jayne Wilson, Lincoln University

5.20pm DRINKS (BYO to have at the venue or buy your own drinks at local bar)

5.45- 6.45pm	GUEST SPEAKER, Dr Simon Pollard, Canterbury Museum. "Spiders: lifestyles of the small and hairy"

DINNER a simple dinner will be available while the guest speaker gives his presentation - (minimum gold coin donation)
7 pm FINISH

Workshop proceedings will be made available to all participants after the workshop.

Please register your interest to assist us with catering.
Register before FRIDAY 2 OCTOBER by providing your name, email address and phone number to: Rachel Barker, Banks Peninsula Conservation Trust Coordinator
At rachel.barker@bpct.org.nz or tel: (03) 329-6340

Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH•NEW ZEALAND

Proceedings of the Banks Peninsula Biodiversity Workshop
Held at the Gaiety Theatre, Akaroa on Thursday 8th October 2009

Hosted by Banks Peninsula Conservation Trust & Lincoln University

1. Karakia given by Iaean Cranwell, and welcome by Rick Menzies –

- **Thanks to sponsors - Josef Langer Charitable Trust as well as Christchurch City Council and Environment Canterbury**

2. Introduction and overview (Mike Bowie, Lincoln University)

A satellite view showing the many bays of Banks Peninsula is a reminder of how every bay is different. We will be hearing about the geological history, and the Peninsula's partial isolation – which helps explain why Banks Peninsula has so many endemic species (found nowhere else).

In recent human history devastation of forest (between 1840 and 1920), 95% of Banks Peninsula's remaining forest was lost, taking fauna as well as flora. Introduced predators (including hedgehogs) are vacuum cleaners of fauna, including invertebrates and lizards as well as birds and bats. When we lost forest on Banks Peninsula, we probably also lost many invertebrates we've never known we had.

A recent e-mail from John Hurley serves as a reminder of how Banks Peninsula was in the past. John quotes from the diary of his grandfather, Oliver Hunter of Church Bay, an amateur naturalist who replanted Church Gully (now known as Hunter Reserve). He talked of bats flying out of caves in the gully; of pink geckos and large skinks. Once his sister had come home from Church Gully frightened by something she had seen, which she later identified from a picture as a tuatara! He describes thousands of kereru and colourful kaka, lots of wood hens (weka) and many smaller birds. Kaka were so tame and easy to catch, their feathers were used to make mattresses! He laments that so many birds were burnt out, shot taken by predators.

Exciting things are happening now on Horomako / Banks Peninsula – we're going to hear about some of them today. We must remember that farming provides the core income, and conservation needs to be compatible with normal farming practices. We have many conservation minded people on Banks Peninsula - some farms are living working sanctuaries. I was very inspired by a talk Mark Armstrong gave years ago called something like Penguins in the Pantry. Flea Bay is a cracking example of what can be done. On Banks Peninsula, conservation seems to be infectious – passing from one neighbour to the next – which is why Banks Peninsula is so special. Many of the bays have adopted a mainland island approach to pest management – they are a leading light to other communities.

3. **The Natural History of Banks Peninsula** (Hugh Wilson, Hinewai Reserve)

We all love Banks Peninsula, and understanding the background story can add to our appreciation for this place. To summarise the last 220 million years in 20 minutes:

- 220 million years is the age of the oldest rocks on Banks Peninsula, much older than the volcanic rocks that form most of the surface landscape of Banks Peninsula. These late Triassic and Jurassic rocks are part of the great sedimentary tract that forms the backbone of New Zealand, especially the South Island, including the Southern Alps. You can find those basement rocks at Gebbies Pass, where the more recent layers of volcanic rock have worn away.
- There was volcanic activity in the BP region 80 million years ago (mya) – and some remnants of this rock have also been uncovered by erosion at Gebbies Pass.
- After this, for many millions of years the New Zealand region was a low-lying archipelago, with very little land above water. The Banks Peninsula region was probably under water from about 65 mya at the end of the Cretaceous (when the dinosaurs died out) to 20 mya. Plants and animals isolated on these scattered islands would have spread out again later once more land was above sea level. The climate was subtropical for a lot of this time.
- 15 mya, in the late Miocene, the first stirrings of the Kaikoura Orogeny (a mountain building phase resulting from the collision of the Australian and Pacific tectonic plates) pushed land up in the Banks area and went on to form the Southern Alps and other areas of uplift.
- 11 million years ago saw the beginning of a new period of volcanic eruptions in a progression from the west to the east, then back to the west. The westward Lyttelton volcano started erupting; then while it was still underway the Mt Herbert eruptions began (9.5 mya); at about the same time the Akaroa volcano began (9 mya).
- The Lyttelton volcano peaked at around 1,800 metres (twice Mt Herbert's current height). By the time the Akaroa volcano ceased activity, the Lyttelton volcano was extinct and already deeply eroded. The Akaroa volcano was 2,000 m high, at a time when there had been very little uplands in the rest of NZ. The sea level climate was warm at this stage – probably coconuts, casuarinas, eucalypts, kauri – a completely different landscape – but this new higher land was of course cooler.
- The Akaroa volcano started to slow after ~ 2 million years – but the last flickering 5.8 mya formed the Ahuriri lava flows.
- Note that the Banks Peninsula volcanoes were formed by successive lava flows – there was no catastrophic eruption that blew the craters out. It was erosion that sculpted valleys and harbours in a radiating pattern, and the last of the lava flowed down over well-eroded surfaces. By the time eruptions ceased, erosion was taking the upper hand; softer rock in some of the craters had eroded out, and the sea had come in.
- By this time the Southern Alps were rising - but only reached their present height about 1 million years ago – so these volcanos are much older.
- During the Pleistocene, starting around 2 ½ million years ago but peaking in the last million years, repeated glaciations caused the sea level to go down and up. The Southern Alps were rising, and glaciers and rivers poured immense quantities of shingle eroded from the rising Alps and emptied it out the eastern plains. In the height of each major glaciation, when a lot of water was locked up as ice on land around the world, the sea level was 130 metres below its present level. What had earlier been "Banks Island" was now a big bump sitting in the middle of a flat plain, with the coast around 45 km to the east.

- The new flat lowlands expanded the area available for plants to colonise. The natural timber line at its lowest was about 300 metres above then sea level – so above that there was an expanded area of alpine vegetation, such as narrow-leafed snow tussock, thin barked totara, and dracophyllum. Beech would have reached Banks 'Bump' once sea levels were low enough for a land connection to the South Island, as it's very difficult for beech to cross a sea gap. (Podocarps and other bird-dispersed plant species would have arrived long before, carried across the sea while this was still an island).
- During the cold phases, warm climate species including nikau, kawakawa, ake ake, and pigeonwood would have retreated to the far north or to the relatively temperate Chathams, and recolonised Banks Peninsula from far away when conditions became warmer.
- Likewise, in the warmest phases alpine vegetation would have retreated to high altitude refuges or been wiped out. After each glaciation, forests spread rapidly. In just thousands of years forest re-cloaked almost the entire Peninsula except for coastal bluffs and steep outcrops, where some higher altitude vegetation hung on – but not true alpine species, which had nowhere high enough to survive – they were wiped out by global warming.
- In these warm interglacial periods the sea level rose, at one stage to 6m above its current level.
- We know of six or seven plants endemic to Banks Peninsula now (i.e. found nowhere else) – there may well have been more that would have been swamped by subsequent invasions. Similarly, endemic invertebrates such as *Hemideina ricta* (Banks Peninsula tree weta) have to adapt now to the eastwards encroachment of *H. femorata*, the Canterbury tree weta. And nowhere else does the nikau palm coexist with the fragrant tree daisy. This is how complex patterns of living things are reshuffled under the influence of natural processes such as climatic variation, geological processes and evolution, giving rise here to unique networks that reflect Banks Peninsula's rich story – different from anywhere else in the cosmos (so far as we know).

One truly remarkable thing about New Zealand is the relatively very recent arrival of our human species here. Polynesian settlement began around 700 years ago. Compare this with Australia, where Aboriginal settlers arrived some 60,000 years ago!

The Maori ancestors arrived in a landscape and ecosystem which had no evolutionary experience of humans. Fire destroyed about a quarter of the virtually continuous forest and at least 20 bird species became extinct – among them several species of moa, giant eagle, adzebill, owlet nightjar, etc – along with an unknown number of reptiles, fish and invertebrates. However it's probable that the Maori impact brought <u>no</u> plant species to extinction. They introduced the dog and the Polynesian rat (kiore) with dire consequences for the fauna but with less impact on the flora.

Europeans arrived to settle some 200 years ago. The impact of this second wave of human invasion was even more dire. By 1900 immense fires had overtaken logging and stripped virtually all the forest from the Peninsula – until less than one percent of old growth forest remained. By the early 20th Century about half the total number of species of breeding birds present before Maori arrival were either locally or completely extinct.

The good news is that surviving native plants and animals are remarkably resilient. The Peninsula still has a very rich and varied biodiversity, eager to reassert itself against all odds

given the slightest chance. Some 550 vascular native plant species, for example, make up the present native flora of Banks Peninsula. Since the nadir of forest cover around 1900, native forest has been regenerating steadily – more than 15% of the 100,000 hectares that make up the Peninsula is now under native forest of one sort or another. Some bird species (e.g. scaup, black oystercatcher, tomtit) have recovered good populations from previous perilously low numbers.

Increasing conservation initiatives demonstrate powerfully how we can make up for some of our destructiveness and increase the chance for a wonderful recovery of the unique landscape and biodiversity of Banks Peninsula. All is far from lost.

4. Farming and Conserving Biodiversity on Banks Peninsula

(Francis Helps, Flea Bay)

Introduction:

- Since 1969, Frances and Shireen Helps have owned a 700 ha farm at Pōhatu / Flea Bay jointly with Francis's brother and his wife, farmed as a breeding and fattening unit. Pōhatu / Flea Bay is on Banks Peninsula's "Wild Side", south-east Banks Peninsula. The Helps also have land on the Akaroa side.
- As well as farming, the Helps look after penguins – the white-flippered form of the little (blue) penguin nests there in ever-increasing numbers, and the rare yellow-eyed penguin is also there most years. These birds have benefited from the Helps commitment to large-scale pest control, assisted now by other agencies.

The farms

- The Akaroa property is quite intensively farmed by Banks Peninsula standards, but does have 6 ha of original podocarp forest in a Banks Peninsula Conservation Trust covenant.
- However the main focus of this talk is the Flea Bay property. Initially there was a lot of gorse, with regrowth forest doing well. As keen young farmers, we put up fences and got rid of the gorse – but looking at the farm we decided to be pragmatic. Some areas were deemed good for pastoral faming, and others considered best left as they are. Side gullies with bush were kept ungrazed – keeping stock out of the streams, and stopping the topsoil going out to sea.
- After a few years we had a better understanding about special areas of the property, and worked out the best way to protect them.
- There is an area of red beech forest, and we could see that the edges were regenerating. In August 1975 there was devastation in the big nor'wester, but it sprang back again. Cattle used to get in – it was hard getting them back out, and they could do damage – so we donated the area to the Department of Conservation to create the Tutukakahikura Scenic Reserve. The Department fenced it off, and now it's looking absolutely brilliant – 400- to 500-year-old trees with wonderful regrowth underneath – and there's a walking track through it.
- We have protected other areas with covenants – a Banks Peninsula Conservation Trust covenant over a hillside with 200 year old regrowth – large matais, a huge milkwood, fierce lancewoods, and ½ a hectare of hillside wetland with toetoes and cabbage trees.
- Two big side gullies above Flea Bay are in a QEII covenant – one comes down in a series of waterfalls and has many interesting things – kawakawa, yellow masses of flowering kowhai, and two big old kahikatea at the bottom of the last waterfall. Photos taken in the 1920s (of this bushy area) show that apart from them this place was so bare then; but woody shrubs are constantly itching to come back.
- The other gully is narrow and steeply eroded. The covenant runs up towards the council's Misty Peaks reserve. Again this has regrowth coastal forest, with some very interesting plants – 20 or 30 huge mamaku tree ferns (Flea Bay has five species of tree ferns – typical of Banks Peninsula, where a great range of species can grow).
- We have reduced our stock units by 33% since 1990, but to retain grazing for the remainder, we do some clearing of kanuka and coprosma. We don't do it by cutting and burning, which is probably the worst method by today's terms – but by aerial spraying. The pilot is clearly

instructed to leave the designated vegetation areas intact, and to stay off steeper slopes and waterways. For example a steep area of totara etc. – home for weta and geckos – gets no spraying.

Archaeological and historic sites in Pōhatu / Flea Bay

People have lived on Banks Peninsula for 600 to 800 years, and like all humans have left their mark on the landscape. We have a 10 ha QEII 'Open Space' covenant that covers several archaeological and historic sites at Flea Bay.

- There were Ngāi Tahu gardens here. The name Pōhatu (meaning 'place of stones') relates to growing kumara this far south – the soil had to be modified to get it to grow here, close to the kumara's southern limit for cultivation. Beach stones were carried up and laid in the gardens to absorb the sun's heat, and charcoal was mixed into the soil to darken it and raise the temperature. On the hillside there were drainage ditches and totara posts.
- There is also the site of an earlier Mamoe pā within this covenant.
- The beach front has been eroding away, exposing some of the human history of Pōhatu / Flea Bay. You can see typical South Island garden walls here, as you can in many of the bays around Banks Peninsula when the light angle is right.
- The first European house at Pōhatu was a cob house in the late 1830s – this is in the QEII covenant as well.

Penguins

- We have the white-flippered penguin, and the yellow-eyed penguin is also there most years.
- The white flippered penguin is a distinctive form of the Australasian little (blue) penguin found in Australia and New Zealand. But birds from other parts of NZ that drop into Pōhatu end up pairing with local birds. Motanau Island about 50 km away is the nearest breeding site to the north of Banks Peninsula.
- Banks Peninsula is about as far north as yellow-eyed penguins come these days. Bushy Beach near Oamaru about 200 km away is the closest colony. Our birds are probably transients that come from elsewhere, and they have rather transient behaviour – they'll stay in one place for a while, then suddenly up and move to somewhere else – they might turn up in Gough's Bay to nest after a period of courtship in Flea Bay. Otago Peninsula (about 250 km south) birds tend to stay in the same place. At the moment we've got three pairs plus their juveniles, and there's a bit of a triangle going on there at the moment.
- Penguin habitat at Pōhatu covers 90 ha (of which 30 ha is under covenant). They have nests as far back inland as 700 m or up to 200 m altitude. That's back to how I can remember when I was a kid. We had 10s of thousands of little penguins when I was a kid – and lost most of them in the last 30 years; to cats ferrets and stoats. The predators nibble at the edges of the colony for a while, not having much effect, then suddenly you realise the colony has got smaller and they're on their way to extinction.
- There are now over 2,000 pairs of white-flippered penguins left on Banks Peninsula in 68 colonies. We've got 1100 pairs at Pōhatu / Flea Bay, where they're nesting all over the hillsides. They like to go up the hill and spread out. Some species nest just two flipper-lengths apart to stay out of pecking range – but these bad-tempered little penguins need 10 m between them.

- Grazed shrubland seems preferred – dense ungrazed cocksfoot 1m tall is quite a barrier - native grasses wouldn't have been such a problem, but the abundant grass seeds attract mice, which attract stoats which then predate on penguins.

Predator control

- We put in trap lines in 1991 – using traps donated through NZ Forest and Bird Society, we worked the waterways and ridgelines within 2 km of the penguin colony.
- Now the Department of Conservation have added in a trap line behind ours; Christchurch City Council have a trap line through the adjacent Misty Peaks; and ECAN have come up with money for the ridgelines and have been filling in the gaps. The Josef Langer Trust have funded most of the ones that we set up, and we still do 30 traps.
- It's a great example of a community and agency effort. Now there's virtually no penguin predation here. No ferrets have been caught now for 5 years; and just 6 cats per year, down from 40 to 50. When you remove the big predators you get lots of little predators – we are getting about 30 stoats a year, down from about 100, and rats are currently in big numbers so we're doing pulse poisoning.

Nest boxes

- Little penguins fight and squabble quite a lot. They only produce one or two chicks per pair in a season, so if other birds interfere with them, the parents are off back to sea again with no chicks. So to increase the breeding success we've been putting in nest boxes – state houses for penguins. They often find good sites under buildings –they want somewhere cool, safe and dark. We've got about 300 out now – people donate timber, and volunteer to come and help make them.

Other biodiversity conservation initiatives at Pōhatu / Flea Bay

- Shireen monitors lizards in the area, including photo ID work.
- There are weta motels to monitor the Banks Peninsula tree weta in collaboration with Lincoln University
- Our farm backs on to the only Marine Reserve on the East Coast of the South Island.

Farming / conservation trade offs?

Doing what we do has costs and benefits. The costs could exceed $100,000 in time and resources, lost grazing etc. But there are very many benefits as well as enormous biodiversity benefits:

- we have shelter for stock so they're healthy
- we keep our topsoil
- we've got tourism opportunities

The benefits far outweigh the costs.

5. Conserving weta and other invertebrates: the forgotten fauna

(Mike Bowie, Department of Ecology, Lincoln University)

Introduction

I'll be talking about the invertebrates of BP and why they are so important, and talking in particular about the Banks Peninsula tree weta.

But first I want to talk about biodiversity – the diversity of life. Looking at the diversity of everything around the world, here are the numbers of described species globally in various categories:

- Trees – 250,000
- Mammals – 4,000
- Birds – 9,000
- Fish – 20,000
- Insects – 1,000,000 described species, plus many that have not been described

(N.B. That number does not include invertebrates that are not insects, such as worms, spiders, mites, millipedes, molluscs (e.g. snails and slugs), crustaceans etc.)

New Zealand has 10,000 named insects, and probably 10,000 unnamed; 95% are endemic, not found anywhere else.

Invertebrates on Banks Peninsula:

- how many are there?

- During a survey on Quail Island in Lyttelton Harbour we found 667 species of invertebrate, of which 77% were native; 13 species were endemic to Banks Peninsula. (Bowie *et al.* 2003)
- On Hinewai Reserve, 885 invertebrate species were found (Ward *et al.* 1999) There were a large number of stoneflies, of which 14% were endemic to Banks Peninsula!
- Peter Johns did a survey a few years ago and found 1416 species on Banks Peninsula, including 31 known to be Banks Peninsula endemics (2.2% to 4%) – so there could easily be more than 2,000 invertebrate species here.

Ground beetles (Carabids)

- 31 species known on Banks Peninsula, of which 10 endemic to the Peninsula, including a large one named *Mecodema howitti* that is up to 32 mm long.
- Ground beetles need places to get away from hedgehogs and rats so they don't get eaten. A good way to provide protection if you haven't got logs lying about is to place discs or slices of wood on the ground as a refuge – macrocarpa or pine discs are fine. Around western Banks Peninsula I've found 14 species of carabids (ground beetles) under discs I'd placed. So discs are useful both for surveys and for conservation.
- The fallen totara / broadleaf logs across a slope below Mt Sinclair show that what was once a glorious forest is now a forest cemetery – but at least the logs are still useful to beetles such as *Mecodema* and other invertebrates.

Ecological roles of invertebrates

Invertebrates have value in terms of farming, and for the whole ecosystem.

- Many are pollinators (butterflies, native bees, honey bees etc.)
- Nutrient cycling – as they say, if we didn't have flies we'd be knee deep in carcasses; other invertebrates recycle dead plant material, so we're not knee deep in that either
- Some larger species including tree weta disperse seeds
- Many become food for other species – spiders, frogs, birds, lizards
- Biological control – by eating prey, or laying eggs in hosts, etc.
- Some even do cleaning – at night the leaf vein slug consumes the black sooty mould that develops in the presence of honey dew, as on for instance, *Macropiper excelsus* kawakawa leaves.

Other examples of plant-invertebrate symbiosis

- You could be surprised by what lives on some plants. *Muehlenbeckia complexa* has a native aphid that feeds on it – *Aphis cotterii* – but it's not destructive like the aphids that feed on your roses!
- There's also a copper butterfly that lays its eggs on *Muehlenbeckia*, and the caterpillars feed on the leaves
- Another example is Ongaonga, the native nettle (*Urtica ferox*) – considered a weed to be destroyed by most people – but entomologists love it. The native Red admiral butterflies lay their eggs on it, and their caterpillars are dependent on it for food; there's nothing else they can live on.

Species endemic to Banks Peninsula include:

- The Banks Peninsula trap-door spider (*Cantauria borealis*)
- Banks Peninsula cicada (*Kikihia* n. sp.)
- Banks Peninsula cockroach (*Celatoblatta* sp.)
- False fireworm beetles (*Mimopeus granulosis*)
- A millipede (*Icosidesmus schenkeli*)
- A six-eyed spider (*Perigops suteri*) which has also been found in Riccarton Bush, the only place outside Banks Peninsula - so it's not absolutely endemic to the Peninsula – but is quite rare.

The rarest weevil in New Zealand (or maybe the world) – the Canterbury knobbled weevil, *Hadramphus tuberculatus*, was discovered in Burke's Pass a few years ago, after being thought extinct (like the takahe). Its host plants are two species of *Aciphylla* or speargrass (also known as Spaniard). There were records suggesting they were on Banks Peninsula, so look out for this large weevil on *Aciphylla* plants, especially when they're flowering.

Threatened invertebrate species on Banks Peninsula

There are a number of nationally threatened invertebrate species on Banks Peninsula. In the Department of Conservation ranking system, Category 1: nationally critical species on Banks Peninsula include a caddisfly *Tiphobiosis hinewai*; a nematode worm, and a *Scythris* moth. The katipo spider *Latrodectus katipo* is in Category 4: serious decline; and the Banks Peninsula tree weta *Hemideina ricta* is in Category 7: range restricted. The Banks Peninsula ground weta

Hemiandrus horomaka is Category 8: Data deficient. So there are some very special fauna on Banks Peninsula.

Banks Peninsula tree weta

- In the last few years we've set up a network of willing people we called Weta Watchers. We've been placing wooden "weta motels" on trees and bushes on their places. It's a very successful way of monitoring what species are where. There are two species on Banks Peninsula – the Canterbury and the Banks Peninsula tree weta, and we believe there could be some hybridisation happening, so we want to know whether that is the case.
- Shireen Helps is monitoring weta and other invertebrates on her place using her purpose built extra-large weta motel with a perspex cover.
- Our motels have a single hole in the bottom so the weta can get in, but mice and rats cannot. There is a hinged inspection door on the front.
- Results to date show that the Banks Peninsula tree weta is mainly at higher elevation than the Canterbury tree weta, and there is a cut-off line through Pigeon Bay and Akaroa Harbour – they're not found west of there. The Canterbury tree weta seems to be moving into that area, but they're mainly at lower elevations.

What does the Banks Peninsula tree weta need to survive?

- Safe hiding holes – cracks and holes, including those created by other invertebrates. Trees that tend to have suitable holes or crevices include kanuka, fuchsia, hoheria, ribbonwood, mahoe, mountain holly, totara, and broadleaf. Weathered broadleaf and totara logs, stumps and fenceposts are excellent sites, as well as rock stacks.
- Good quality food sources – they eat foliage of native plants, berries flowers, and also small invertebrates.
- They need soft soil so females can lay their eggs into the ground – heavily compacted ground creates problems for them.
- They are vulnerable to predation, especially by introduced mammals.
- Bush fenced from stock is ideal, so there is a varied understorey with variety of seasonal foods, and minimal physical disturbance and soil compaction. Light grazing is next best.
- If conditions are good for weta, they will also benefit other less visible but equally important species. If you've got tree weta in your forest, it's likely you've got other things that are surviving well too – in other words, it's a good indicator species.

Endemic Banks Peninsula tree weta (Photo: Mike Bowie)

6. Sooty shearwater at Stony Bay – why build a predator fence?

(Anita Spencer, Biodiversity Ranger, Department of Conservation)

Introduction / Background

- Sooty shearwater are also known as tītī or muttonbirds (*Puffinus griseus*).
- They nest in the southern hemisphere circumpolar region
- Now the main New Zealand colonies are on Codfish, Big South Cape, Snares (the biggest colony but declining - estimated at 2 million birds), Chathams, Auckland and Campbell island groups.
- In the past tītī would have bred on mainland New Zealand in tens of thousands or millions. There are small remnant colonies in Otago, Oamaru and West Coast.
- Stony Bay is probably the last colony in Canterbury (previously common on Banks Peninsula)
- The Department of Conservation lists them as declining
- World population approximately 20 million but falling
- Reasons for decline include fishery by-catch, climate change, as well as marine pollution, and on-land predation at mainland sites

Breeding and migration

Sooty shearwaters nest in burrows, which can be 0.5 to 3 m long. They lay one egg in late November, and the egg hatches in mid January. Average time from laying to fledging is 150 days. During this time adults travel long distances to forage for food to feed the growing chick. As chick-rearing ends, New Zealand tītī adults, then the fledglings, migrate to the north Pacific in April - May to feed during the northern summer. Adults return to breed in September. Breeding begins at around five years of age.

Sooty shearwaters are capable of diving to 60 m or more in search of prey (probably deeper than any other flying birds). They also fly very long distances in little time, using the wind.

Stony Bay tītī

Mark and Sonia Armstrong noticed a big decline in sooty shearwaters around their farm and on Banks Peninsula generally in the late 1980s. Realising the few that remained at Stony Bay – at the top of a sea-cliff – could be the last Peninsula colony, Mark and Sonia designed, funded and built a fence in 1998 to keep predators at bay (before Karori!). Without their intervention, the colony would almost certainly no longer exist.

Since 1998, Kerry-Jayne Wilson from Lincoln University has been monitoring nests with a burrowscope (a tube with camera on the end). There was just one breeding pair in 1998, but numbers have climbed back up to 15 pairs in 2008. Especially of note is that there is a lot of non-breeding activity – young adults practising digging out burrows – so it seems to be building up well. These birds won't all be chicks that fledged from here, but from rock stacks off the coast where there are so many burrows that there is no room for more.

Monitoring in 2004 revealed that a stoat had invaded the fenced area and killed every chick. Predator trapping was increased in the surrounding area, and repairs made to the fence. These measures prevented further attacks until 2007 when another stoat intrusion wreaked havoc in the colony. A decision was quickly made to take the project to the next level and build a new

professional predator proof fence. Funding was secured and the fence is being built at present (the fence was completed by March 2010).

Some key factors that have enabled the fencing project to succeed are:

- A clear case for the necessity of a high quality fence
- A proven commitment by the team of over 10 years work protecting this colony
- A vision for the site, expanding the project beyond the single-species sooty shearwater focus to include restoration of a coastal ecosystem that will support other rare species including lizards and plants
- A collaborative approach to the project was crucial; a partnership was formed with the Banks Peninsula Conservation Trust, and their staff's fundraising, management and organisational skills kept the project on track.
- Decisive financial support of the project from the Josef Langer Trust, Christchurch City Council and Environment Canterbury enabled us to succeed with a New Zealand Lotteries bid.

What makes predator fences particularly suitable for seabird colonies is that the birds nest close together, so a small area of fenced land can protect large numbers of birds. At this colony, just 300 m of fence is required, some on very steep cliff forces.
When planning predator-proof fences there are multiple factors to consider, chiefly

- is a fence the best method for what are you protecting, and
- do you have the resources to maintain and monitor the fence into the future?

Sooty shearwater (tītī) chick in burrow (Photo: Anita Spencer)

7. Native Fish – Research on Banks Peninsula
(Phil Jellyman, University of Canterbury)

Overview

- Many native freshwater fish are diadromous – meaning they live at sea for the early stage of their life cycle, then return to streams as juveniles (whitebait)
- Issues facing native fish on BP include:
  - Impacts of predators
  - Threats to habitat
  - Barriers to migration
- Recent research has investigated some of the problems – results highlight practical solutions for farmers and landowners wanting to help improve native fish communities

Native galaxiid life cycle (Galaxiidae are Southern Hemisphere, scaleless freshwater fish)

Eggs of the galaxiid fish species are deposited along stream banks at the fresh water / salt water interface during spring tides, in dense vegetation above the normal water level. Eggs require shade and humidity as they develop. The next spring tide sweeps hatched larvae out to sea. For four to five months they feed and grow at sea, then return to fresh water as juveniles, when many are caught as whitebait. The survivors migrate upstream – as long as access is possible – where they feed and grow for two to three years before spawning.

Native fish species on Banks Peninsula

Migratory galaxiids (whitebait species)

- Koaro (good climbers)
- Inanga (the main whitebait species)
- Banded kokopu

The giant kokopu and shortjaw kokopu are missing on Banks Peninsula, but may have been here in the past.

Other native fishes

- Torrentfish
- Lamprey
- Common smelt
- Longfin eel
- Shortfin eel
- Upland bully (non-migratory)
- Redfin bully
- Common bully
- Giant bully
- Bluegill bully

Issues facing native fish on Banks Peninsula

- **Predators –**
- Human harvesting
- Rodents and invertebrates (e.g. slugs) known to be predators of eggs on banks
- In rivers and lakes (e.g. Lake Ellesmere) – brown trout, rudd and tench

- **Threats to habitat**
- Historic deforestation of native forest, leading to major reduction in forest cover
- Riparian grazing and physical damage to banks by trampling, causing:
  - High sediment inputs, hence less insects
  - Poor water clarity
  - Reduced habitat availability
  - High water temperatures due to lack of shading

- **Barriers to migration**
- River or lake mouth closure
- Whitebaiters' nets
- Culverts with overhangs or steps higher than 10 –20 cm

Research findings on Banks Peninsula

- **Commercial eeling on Lake Ellesmere** since 1975 led to huge reduction of larger sized eels after three years. Only the largest eels are close to breeding – females that survive to the age of around 100 years migrate to waters around Tonga to spawn – so taking out large eels may have a big impact on future populations.

- **Impact of mice and slug predation**
  Predation was not found to be significant at two study sites

- **Threats to habitat**
- Wooden 'cages' built at Goughs Bay to exclude stock from several sections of the riverbank were compared with controls. Survival of eggs on banks inside the cages was considerably higher (70%) than at the control sites (20%) where stock had access. As well as preventing trampling by stock, the cages allowed grass to grow long, so eggs were more protected from overheating and drying out.

- **Barriers to migration**
- Physical barriers such as overhanging culverts prevent fish from migrating upstream. Whitebait sized inanga can only get up a 5 cm fall, whereas adults can get up a 20 cm drop. On Banks Peninsula barriers near sea level may prevent them from utilising a substantial area of their potential habitat, including the more pristine forested areas higher in the catchment.

Practical solutions to improve native fish communities on Banks Peninsula

- **Excluding stock from streams**

It's tempting to leave streams accessible to stock for easy drinking water, but excluding stock has many advantages:

- leads to bank stabilisation and allows plant regeneration
- reduces bank erosion, siltation and nutrient overload
- valley floors important as spawning areas
- higher reaches important adult fish habitat
- fencing makes riparian planting possible

- **Riparian planting – many benefits**

- reduces overland erosion and topsoil loss
- filters overland flow
- denitrifies groundwater
- enables riparian processes
- reduces bank erosion
- plant roots buffer banks from flood impacts, especially on steep country

Restores instream processes:

- reduced sediment
- water clarity
- instream food
- improved habitat for aquatic life

Shading by vegetation means

- more even water temperatures
- reduced light discourages algae overgrowth

- **Small streams are most productive**

Within any catchment, small streams provide some of the best habitat and spawning areas, so their importance should not be overlooked.

Koaro (*Galaxias brevipinnis*) (Photo: Phil Jellyman)

8. Questions and discussion – morning sessions

Question: Is there any supplementation of whitebait stocks on Banks Peninsula or anywhere, as Charlie Mitchell is doing in the North Island?
Answer: (Phil Jellyman) Emphasis here has been on artificial spawning substrates - attempting to provide suitable spawning substrate material such as onion bags, hay bales etc. on the edges of streams that whitebait can use if the banks are heavily grazed, to try and increase the numbers of whitebait throughout the region.

Question: What is the origin of the loess on Banks Peninsula? – The mountains seem a long way away.
Answer: (Hugh Wilson) The loess originated from the Southern Alps, and is probably still arriving in significant quantities. Most of it came during the peaks of the glaciations when there was so much exposed, unvegetated rock – and huge areas of unvegetated riverbed because of the huge outwash gravels brought down from the Alps. So a lot of it would have blown from the plains, but it originated from the erosion of the Alps by glaciers and rivers. It came in enormous quantities – forming deposits of many metres depth – and it tends to redistribute from the ridges down to the valley floors. So some of the upper soils have very little loess, whereas the valley floors are mostly loess with not much lava content.

Question: Anita – are you using loud speakers of bird sound to attract sooty shearwaters to the fenced area?
Answer: (Anita Spencer) No – sooties are already using the area and seem to be coming in by themselves. But I didn't mention that we may also reintroduce fairy prions (*Pachyptila turtur*), a small seabird currently nesting densely out on nearby rock stacks – so speakers are a possibility for attracting excess birds that currently have nowhere safe to go.

Question: Any news about work on katipo spiders on Kaitorete Spit?
Answer: (Mike Bowie) Yes, some work is underway by international students at Lincoln University and by the Department of Conservation, using artifical covers to provide safe habitat (similar to lizard lodges used by Marieke Lettink) – the work isn't finished yet, but I can say they do use these. There will be information in due course.

Question: A request for science projects to be reported back to landowners whose land or catchments where work is happening.
Answer: (Phil Jellyman) Apologies if there have been failures in this regard. Some of the stream work is still incomplete, so there are no final results to report so far. And sometimes it has been hard to work out who to contact as the landowners along different sections of a stream (for example for an eel migration study). Any help with working out who to contact would be useful!
Comment: The Banks Peninsula Conservation Trust could help with that.
(Other general comments about the importance of communication between scientists and landowners.)

Question: Has there been any work on the impact of black shags and stoats on freshwater fish populations?

Answer: (Phil Jellyman) I don't know if stoats have a major impact. Certainly black shags can take freshwater fish. From what I understand they aren't a big problem if catchments are forested, which gives a lot of protection for those fishes. As native fish are nocturnal and tend to hide under cover during daylight, shags wouldn't be as much of a problem to adult native fish as they are to diurnal species like introduced trout, which are out actively feeding during the day – small trout can be vulnerable at times. However I couldn't comment specifically on the effect black shags might be having on native fish on Banks Peninsula. I wouldn't expect it to be as important as the effect of human harvesting of whitebait, for example, or habitat degradation.

Question: Francis, have you had yellow-eyed penguins breeding in Flea Bay?
Answer: (Frances Helps) Yes, we've currently got three pairs breeding – they've been breeding there for a number of years. They're quite slow when it comes to pairing up – the little penguins get on with it, and the parentage of chicks is quite doubtful - but yellow-eyed penguins take a little bit longer. The courtship might happen at Flea Bay or off somewhere else, so you can get worried about whether you're going to see them again. But we have got three pairs breeding, and their juveniles are coming back too.

Question: Do Canada geese cause damage? And are they still protected? There are lots of them at Robinson's Bay.
Answer: (Anita Spencer) They are a game bird species (hence hunting is limited). But there is a review underway at the moment, to determine whether Canada geese will remain classified as game birds or be able to be controlled at any time of the year – but the decision isn't determined yet. I don't know if there is co-ordinated Canada goose control on Banks Peninsula.

Comment: (Pam Richardson) I'm a member of the Banks Peninsula pest liaison committee, and Canada geese are spoken about at every meeting. There is real concern about the numbers that are around, nesting round the coastline at Kaitorete, and on the Peninsula, causing problems. They are in Pigeon Bay and everywhere – we are very concerned about them. As a community we won't want them to come off the game bird list because at the moment Fish and Game control them; but if farmers would have to control them it's going to be even more difficult for farmers to get together and provide the funding to control them. So there are very mixed feelings as to who should be controlling them. There are some areas that are being managed – around Lake Forsyth, there is a group of farmers that work with Fish and Game and maybe DoC ; and round Lake Ellesmere too. Some people like seeing them around Akaroa Harbour – they're a lovely fluffy bird, but they are causing a lot of problems both to pasture and to the foreshore, where the pollution is considerable.

Comment: (Hugh Wilson) Just by way of background – the Canada goose is not a close relation to the extinct native goose; the Cape Barren goose of Australia is much more closely related. However the native swan for years was thought of as extinct and a different species from the black swan here today. But there's a growing realisation that our native swan is identical to the Australian black swan – which had been reintroduced as well as probably reintroducing itself. So for that reason I would regard the black swan as a native, but certainly not the Canada goose – but we did have a goose once (which was very large, slow breeding and flightless).

Question: Hugh, could you please comment on threats and conservation management of plants on rocky outcrops on Banks Peninsula – specially threatened and endemic plants?
Answer: (Hugh Wilson) There was a Landcare Research study on rocky outcrops on Banks Peninsula with quite a lot of detailed research that has been published (Wiser and Buxton, 2009). Author Susan Wiser referred to the rocky outcrops as bastions of biodiversity - they do have a refuge function, being relatively safe from sheep and cattle; but not from goats – there has been a lot of damage by feral goats in the past to plants that survive on rocky outcrops. People talk of gorse as a threat – and it can be – but I think more damage can done to native biodiversity by attempting to control gorse on rocky outcrops than if it was left alone. It's okay to remove gorse when it's young, in the early stages of colonisation, but it would be better left once it's established, and eventually native trees will replace it. Most of those rocky outcrops were forested. The only thing that takes gorse seed up on to rocky outcrops is animals, and often rocky outcrops are protected just by that fact – gorse seed goes down, but doesn't readily go up.

Question: What kind of tree is the milk tree?
Answer: (Hugh Wilson) The milk tree – it's the only member on Banks Peninsula of the fig family, Moraceae. The botanical name is *Streblus heterophyllus*, the Maori name is Turepo. It has a small-leafed juvenile stage but the adult is has quite a small leaf too. It tends to have a lovely columnar trunk. There's a beautiful one in the Helps's covenant … (FH) – yes, that's one of the reasons we decided to covenant that area – we could see the tree was getting old, and there was absolutely no regeneration beneath with stock there. Nothing was coming back to replace it.

Question: Phil – how many streams on Banks Peninsula are fenced, and what sort of priority is / should the Trust be giving to fencing streams?
Answer: (Phil Jellyman) Of the streams I've sampled on Banks Peninsula, three out of 11 had a fenced riparian strip. On the Canterbury Plains, as a result of the Dirty Dairying campaign, a significant proportion of streams have been or will be fenced, with stock crossing bridges – so things are definitely looking up from native fishes' point of view.
Answer: (Frances Helps) That's why on our farm we were keen to fence all the way, from the bush gullies right down to the sea. Speaking for the Banks Peninsula Conservation Trust - one of the criteria for applications for covenants is stream protection. Currently we have an application that for its bush alone wouldn't meet the criteria, but it's at the head of a catchment with three streams coming down into a bush gully. We're applying to ECAN for stream fence funding. The landowner is keen to covenant so it will be interesting to see how that application fares. That's an example of a covenant application we've put through primarily for stream protection.

Comment: (Pam Richardson) I'll put on my Federated Farmers hat. There are a number of landowners fencing streams – in Port Levy soon there will be a fence almost all the way from the top to the coast – it's part of a partnership programme with Te Runanga o Koukourarata. There are a number of farms in the Little River area that have had funding from Environment Canterbury for stream fencing; another one in Kaituna that's done it; a landowner adjacent to us in Holmes Bay / Pigeon Bay has done it – there is a lot of fencing going on. It's very difficult to fence on Banks Peninsula! And it's difficult to walk up to someone's gate and say "you've got

to do something". It's about sowing seeds, being at shows, being part of farmers' groups. It's a bit like the covenanting process – when you have one in a catchment you can leverage off it and get others. Looking at the covenants on BP, most of them do start at the headwaters of streams, making the most of natural barriers. We've had an ecological survey on our place, and it commented on the number of fenced areas – they include full-time streams and part-time streams that flow after a rainfall. We need fencers that can make good solid fences, as the fences have to last for a long time; on Banks Peninsula they are exposed to wind, trees falling over them, heavy rainfall, snows, so they don't last a lifetime – the terrain is very difficult. We need more money to do it, more assistance, people to champion it, talk about it and get people involved – and that's why Banks Peninsula is so special – it's a place where people talk about these things.

Comment: (Mark Armstrong) I'd like to say one or two things on behalf of the fish. One of the first conservation lessons my father taught me was that you can't have freshwater fish and black shags. Black shags probably introduced themselves to New Zealand relatively recently. In my opinion the freshwater fish haven't been able to adapt to their hunting methods, and they get a real hammering. In the last 15 years I decided not to attempt to control black shags, and in our stream we've gone having from many thousands of inanga in the ponds to virtually none. There are only one or two black shags, and when the whitebait come into the lower ponds and are still too small to get up the rapids into the higher ponds, the shags just hunt them there, so they never make it to the higher ponds. The numbers just go down, down, down. So I've decided what Dad says is absolutely right – you can't have both.
Another thing is stoats. As the population of native fish has gone down, the stoats go after them, especially the native climbing fish (koaro) – the stoats must swim after them or something. We found a stoat nest recently with six fish tails. The other day we caught a stoat red-handed carrying a fish up the paddock – we did actually nail that stoat and put the fish back in the stream. So I think farmers are not causing the total problem through not fencing off their habitat – predation has a role too – I think it's a two-pronged thing.
Response: (Phil Jellyman) The stoat eating koaro – that's very interesting. I guess birds will prey upon native fish, and what you're seeing is indicative of what's happening. But we should also bear in mind that a large larval stock goes out to sea each year from around the bay, and mixes with others, and various things happening at sea – maybe food is in short supply – so that means fewer fish to come up your stream. There's a general decline in numbers east coast wide. We don't know what happens when they go out to sea – the distances they travel, what happens when they get entrained in sea currents etc; nor exactly where they get to. If there are less of them out there to come back into the streams, these multiple stressors that could all be contributing to their reduction.

9. Pest Control (Outdoor session)

Community conservation – Upper Harbour Trappers
Richard Lovett

The Upper Harbour Trappers are a group of 29 people based from Robinson's Bay round to Wainui (recently calling ourselves "Whakaroa"). Their focus is conservation of biodiversity, and so far their main efforts have been focussed on pest control and on bird monitoring. They operated 170 traps in 2008, and keep a tally of pests caught. This season they have constructed predator-proof nest boxes for rifleman.
The group interacts with Landcare Research, Department of Conservation and others in terms of information, monitoring and evaluation of methods and results.

What was once considered a fringe activity is now becoming mainstream.

Monitoring the effectiveness of pest control
(John McIlroy)

The key point is not how many pests are removed, but how many remain. It is important to determine this by monitoring before and after each operation. For possums this can be done by putting out chew tags – so for example you might have a result of 40/50 chewed pre-control and 5/50 post-control.
Tracking tunnels on Onawe Peninsula in Akaroa Harbour are not picking up any rats, but traps are catching between 1-7 per month.
Another approach to monitoring the effectiveness of pest control is to monitor species impacted by pests – for example in Robinsons Bay, nest boxes put out for rifleman will be monitored from year to year.
Have a target or aim; on Onawe Peninsula, the aim is for residual levels with an index of < 5% for rats; currently they are at 27%.

Monitoring the effectiveness of rat control using camera traps
(Shona Sam, Lincoln University PhD student)

A multi-species bait aimed at attracting rats, mice (and hedgehogs) is being trialed. A camera is set up on bait stations to observe which bait is visited by target and non-target species (including feral cats).

Christchurch City Council trapping programme – what, why, when and where?

(Phil Crutchley, Christchurch City Council)

Stoats

Stoats can take animals up to the size of a yellow-eyed penguin – much bigger than their own size. Their prey includes rodents, rabbits, hares, lizards, weta and other invertebrates.

Rats

If stoat numbers are reduced, rat numbers can increase. The proliferating rats can have an impact on the nestlings of birds up to the size of kereru chicks. Possum control can also lead to an increase in rats.

Multi-species approach is best

- at Kennedy's Bush, multi-species pest control since 2006 has resulted in decreased possums and rats, and an 125% increase in bellbirds, increase in kereru.

- At Misty Peaks, stoats, possums, rats and cats have been targeted. In particular, possums and rats are targeted in late winter – early spring, before birds begin nesting.

Predator control takes commitment, perseverance and passion!

There are lots of people with pest control experience who are willing to give advice – Robin Burleigh, John Thom, John McIlroy, Frances Helps, etc.

Setting up traplines

- Stoats tend to follow watercourses or move along contours, fencelines, bush margins etc. Best spacing for traps is 200 m, and no more than 1000 m. Their home range is 50-100 ha.
- Avoid setting traps in human-frequented sites
- As bait, fresh meat is best, and on a small scale you could use possum or rabbit meat. However, depending on your frequency of visits, it can be better to use something with a longer shelf-life.
- Ideally, visit traps once per week or even twice a week; but every 2-3 weeks is still okay.
- Number each trap, and keep a record of its catch history. If a trap hasn't caught anything in two years, move it to another location.
- Record whether male or female (look for nipples or penis bone – make sure the animal is dead first!). Females have smaller home ranges.
- Record which species – on weasels, the demarcation between brown and pale colours is not straight, and they have a brown patch under the mouth. Stoats have a black tail tip.
- Fenn traps need to have springs cleaned and oiled once a year.
- DoC 250 traps need less maintenance, but should be cleaned occasionally.
- If you find the trap has been sprung but has no remains, search around for body parts. If this is a frequent occurrence, review your setting procedure.

Traplines in the south-east Banks Peninsula bays

(Wayne Beggs, Department of Conservation)

The trapping programmes at Flea Bay and Stony Bay are great examples of programmes that have been effective for biodiversity enhancement. Recently the Department of Conservation has introduced "back lines" checked monthly in winter and fortnightly in summer. In the last four years the number of penguin nests has gone from 700 to 1,000. Being able to show positive results helps the case for future funding. The programme is very much a group effort.

Questions

Q. How are yellow-eyed penguins doing?

A. They are hanging on better with predator protection, but they're at the limit of their range. They are susceptible to disease and lack of food.

Q. Are there plans to extend the trap lines?

A. There have been financial contributions from the Josef Langer Trust and Antarctic Trust.

Q. Is it possible to get every stoat?

A. You get optimum results by having well set-up traps, good fresh bait, eg Canada goose. It's a good idea to scent your traps by dragging through a dead stoat, so the scent glands leave behind stoat odour.

Q. What is the best trap to use?

A. DoC 200 traps have a lot of research behind them, and are the best known. They cost about $25 each. Otherwise a self-resetting trap is coming soon, and new toxins are under trial that look promising for stoats – previously there has been little success with toxins.

A useful website for information pest management and eradication is:
http://www.sanctuariesnz.org

10. Threatened plants of Banks Peninsula – their habitats and mitigating threats.

(Nick Head, Department of Conservation)

Introduction

Banks Peninsula has 66 plant species that are threatened or at risk of extinction, including six that are nationally critical – a lot for a region of this size. Of the 66, there are 26 herbs, 13 shrubs, nine grasses, five lianas, four ferns, three parasites, three sedges, two rushes and one tree.

Why are there so many threatened species on Banks Peninsula?

1. Banks Peninsula is very botanically rich:

- It has more than 550 vascular plant species
- There are major environmental gradients – wet to dry, and from sea level to above 900 m.
- There is much habitat variation – coasts, base rich volcanic bluffs, wetlands, forests, shrublands and grasslands
- It has been isolated as an island for much of its history, giving rise to species endemism (about 10 species that are found nowhere else); and has provided refugia enabling species to survive the glaciations
- It includes rare ecosystems with their own rare collections of species – for example Kaitorete Spit, which has a collection of very distinctive plant species and is a highly unusual ecosystem; and Wairewa Lake Forsyth which is also a unique ecosystem with very distinctive plant species

2. Habitat loss and degradation:

- Severe habitat loss (down to below 1% of old growth forest)
- Fragmentation and edge effects – habitats containing rare plants have been reduced in size and become isolated. As habitats become smaller they are more vulnerable, more exposed to wind and are more easily invaded by weeds and pests.

3. Weed and animal pests:

- Introduced animals threaten the survival of species, either directly by browse and trampling, or indirectly by spreading weeds and causing habitat degradation and disturbance.
- Introduced weeds threaten plants by competition.

4. Survey effort:

- A lot of survey work has been carried out on Banks Peninsula, which means we have a better idea of what is present, including rare species

Threatened plant habitats
The habitats on Banks Peninsula with the most threatened species are coasts, bluffs and wetlands. Scrub, forest and grassland also have threatened species.

- **Coasts**

Banks Peninsula has fifteen threatened coastal plants. Cooks scurvy grass, thought extinct here in the 1860s, was found about 10 years ago on top of a rock stack. In the past it had been reasonably common; Captain Cook had harvested it elsewhere in NZ by the boatload to feed his crew to ward off scurvy. It is very rare now on the mainland. One reason is its very close association with seabird colonies, which have declined dramatically on the mainland with the introduction of mammalian predators. So it should be no surprise that this plant would turn up on a little islet covered in active seabird burrows.

Sonchus kirkii (sow thistle) is nationally rare, but relatively common on Banks Peninsula. Its habitat is very specific – it occupies seeps on coastal cliffs.

Kaitorete Spit is a nationally significant coastal ecosystem. It has the largest intact area of pingao (*Desmoschoenus spiralis*), and with it a number of very rare species – the sand tussock *Austrofestuca littoralis* (one of the last strongholds for that species);
Craspedia "Kaitorete" (a woollyhead) – a very rare species. It is a site of outstanding value.

- **Forests**

There are nine threatened forest species on Banks Peninsula. Totara forests have some important rare species - *Tupeia antarctica* (an insect-pollinated green mistletoe) which grows parasitically on a number of native species and several exotic species too. It has been affected by habitat loss and by possum browse – they love it.
Brachyglottis sciadophila (climbing groundsel) is not uncommon on Banks Peninsula, but rare elsewhere – it climbs on trees at the edges of forests.

- **Bluffs**

There are 14 threatened species on bluffs. Bluffs are important to biodiversity on Banks Peninsula, for two main reasons – they provide a small islands that contrast to the rest of the mainly forested Peninsula, and have distinctive conditions. Being volcanic, they have a high mineral content; and provide a range of specific microhabitats that are occupied by a number of rare species, some of which are Banks Peninsula endemics.
The *Heliohebe lavaudiana* is found only on Banks Peninsula bluffs.
The Banks Peninsula forget-me-not, *Myosotis lytteltonensis*, is an extremely rare endemic that is known from just one or two populations.
Anogramma leptophylla (Jersey fern) is relatively common on the Port Hills, which is probably its national stronghold.
Some species that aren't strictly bluff species have survived on bluffs, where they have been protected from browse, fire or modification that has happened elsewhere. That includes *Leptinella nana*, which is very rare and known from just three places – the Port Hills, a site in northwest Nelson and one in Wellington; and *Carex inopinata* (unexpected sedge) which was found recently – a very rare sedge.

- **Wetlands**

The Wairewa wetland is a very unusual ecosystem, with a range of very interesting plant species in the turf zone between the high water line and low water line, which develop as it dries out. It is the national stronghold for *Isolepis basilaris* (pygmy clubrush); *Eryngium vesiculosum* ('sea holly' or coastal eryngo) and *Ranunculus limosella* (mud buttercup). Outside Banks Peninsula these species are just found in the high country.

- **Shrubs**

Muehlenbeckia astonii (shrubby tororaro or wiggy-wig bush), *Coprosma wallii*, *Olearia fimbriata* (small-leaved tree daisy) and *Carmichaelia kirkii* (climbing broom) along with other examples, are reasonably common on Banks Peninsula but are nationally very rare. With the exception of *Muehlenbeckia astonii,* these are elsewhere just found in the high country.

- **Other threatened species**

Tmesipteris aff. Tannensis (a fork fern which grows on tree ferns)
Carex litorosa (sea sedge); *Raoulia monroi*; *Teucridium parvifolium*
- and many others.

Extinct plants

Around 20 plant species are thought to be extinct on Banks Peninsula, although there is a chance of rediscovering some of them. The yellow beech mistletoe *Alepis flavida* was last seen on the Peninsula in the 1970s, and is declining nationally. The herb *Arthropodium cirratum* has only been known on the Peninsula from one site, where the only record was in 1869. *Pittosporum obcordatum*, the hard-leafed kohuhu, was last seen on the Peninsula in 1840, and is nationally vulnerable.

Threatened plant management – it's all about habitat!

Improvements are needed in terms of:

- Habitat quantity (size and number) – the more and the bigger the better!
  - heterogeneity – necessary to protect a full range of habitat types
  - insurance populations needed, so we don't have all the eggs in one basket

- Habitat quality (health and functioning of habitats)
  - kept free from animal and weed pests
  - well buffered from edge effects
  - connectivity with other sites

Seral (intermediate stage or transitional) plant communities tend to be under-valued, especially shrublands and secondary forest, yet they are very important for many rare species.

- Management actions

1. What do we have?

– a population inventory is needed, to understand the size and extent of the population

2. What are the trends / threats?

– need for research and monitoring to see what is going on
3. How to manage the situation?
– threat mitigation by carrying out pest and stock control, habitat restoration, fencing habitat, and encouraging regeneration.

Case study - *Muehlenbeckia astonii*

An endangered shrub. Kaitorete Spit has 90% of the total wild population of *Muehlenbeckia astonii*. It grows behind the dunes in grazed paddocks. No regeneration is occurring, the plants are old so it is functionally extinct. With the co-operation of the landowners, Mike and Annabel Bayley, we need to try and work out how to save the species and understand what are the key threats.
A large trial area was fenced to exclude stock, resulting in recovery of individual plants – increased size and vigour, flowering, and fruit abundance. There is a notable increase in invertebrate life. No seedlings have been detected so far, and more work is needed to understand the factors limiting regeneration – possibly exotic grasses competing with seedlings, or some other factor.

Resource material available soon
- a Department of Conservation publication titled Threatened Plants of Banks Peninsula – a field guide which covers the species of concern and the issues that affect them.

Rare endemic Banks Peninsula lilac *Heliohebe lavaudiana* (Photo: Rick Menzies)

11. Looking after our local lizards
(Marieke Lettink, Fauna Finders)

New Zealand has over 90 species of lizards, of which about half are geckos and half are skinks. They are found from sea level to 2,200 m.

The five lizard species on Banks Peninsula, and their Department of Conservation threat rankings, are:

- McCann's skink (*Oligosoma maccanni*) (not threatened)
- Common skink (*Oligosoma polychroma*) (not threatened)
- Canterbury gecko (*Hoplodactylus* "Canterbury") (threatened)
- Jewelled gecko (*Naultinus gemmeus*) (threatened)
- Spotted skink (*Oligosoma* aff. *lineoocellatum* "Central Canterbury") (nationally endangered – the most threatened on Banks Peninsula)

Two of these have yet to be formally described in full, as more work is needed to define them in relation to other species – so they have interim or "tag" names ("Canterbury" and "Central Canterbury").

The Forest gecko may be on Banks Peninsula too – a skin has been found, but not an animal so far.

Distributions
These lizards can be found at sites scattered right across Banks Peninsula.
There is a database of sightings, and people can help by reporting sightings to the Department of Conservation, ideally with a photograph. See:
http://www.doc.govt.nz/conservation/native-animals/reptiles-and-frogs/species-information/species-sightings/report-a-sighting/

Geckos and skinks
Geckos have loose-fitting velvety skin, and large eyes. Skinks are more sleek and shiny, and look somewhat like snakes with legs.

- **Geckos:**

- The Canterbury gecko is nocturnal and mostly terrestrial (ground dwelling). It is up to 17 cm long. On Banks Peninsula, the most likely place to find them is in rock outcrops where there are deep cracks in which they can keep safe from predators; and being cold-blooded, it's helpful to be in an environment where there is stored heat in rocks. They are also found in shrubland. In a predator-free situation we would find them in all habitats.

- The jewelled gecko is in the green gecko group. They are diurnal (active by day), arboreal (tree dwelling), up to 18 cm long, and inhabit shrubland and bush. Banks Peninsula is a stronghold for this species.

- **Skinks:**

- The common skink – diurnal, terrestrial, up to 16 cm long.
- The McCann's skink – diurnal, terrestrial, up to 16 cm long

- The spotted skink is diurnal and terrestrial. It is often found in association with seabird colonies. Being larger than the others – up to 24 cm long – puts it at greater risk, as it cannot occupy tiny spaces small enough to be inaccessible to predators. Populations are slow to recover from predator impact, as they take longer than the smaller species to reach maturity, and they have fewer young.

Threats to lizards

- Habitat loss or degradation, through various anthropogenic activities (e.g. clearance of shrublands and native bush, intensive grazing, exotic forestry, dairy conversion, quarrying, subdivision etc.) For example, a site near Gebbies Pass with shrublands used by jewelled geckos has been planted in pines. Even if some geckos manage to survive as the pines grow, they won't when the area is logged. A Kaituna site earmarked for a quarry has a good population of Canterbury geckos – a hundred have been captured and moved, but that is not an ideal solution.
- Predation: pest animals (cats, ferrets, stoats, weasels, hedgehogs, rats and mice) and some birds (e.g. magpie and kingfisher) eat lizards. There is a documented case of a cat with 49 lizards in its digestive tract – probably just one day's intake, so we have to imagine the cumulative impact day after day.
- Poaching: international wildlife smugglers target jewelled geckos, with known cases on Banks Peninsula in each of the last three years.

Local conservation initiatives benefiting lizards

- Covenanting and weed control – for example a shrubland area at Birdlings Flat where the Manson family has set up a covenant and the BPCT restoration group with Annelies Pekelharing has been very active in carrying out weed control.
- Lizard surveys of Banks Peninsula and Greater Christchurch area have been conducted in the last ten years by Department of Conservation, Christchurch City Council, Environment Canterbury and Lincoln University in the following places:
  DoC and CCC reserves, Onawe Peninsula Historic Reserve, Quail Island, Travis Wetland, Port Hills and Macleans Island
- Mouse eradication on Quail Island – this will be of great benefit to lizards, as well as to other animals. The island is already free of other pest mammals, and the success of the mouse eradication work is subject to confirmation. Three lizard species are there currently, and the other two Banks Peninsula species could be transferred there. This is the only sizeable island locally where this opportunity exists.
- Restoration plan for Onawe Historic Reserve by Te Rūnanga O Ngāi Tahu – this site has three species, and considerable pest control work is done there.
- Jewelled gecko distribution survey on private land & habitat management advice - funded by the Biodiversity Advice Fund (BAF) with support from DoC & BPCT. **Please report your sightings!**
- Benefits of predator trapping - Predator trapping to protect other wildlife (e.g. penguins) may benefit lizards.

Lizards and restoration

- Lizards can only recolonise from adjacent habitats (it is not legal to transfer lizards from other sites unless conducted by DoC)
- Their small home ranges means slow recolonisation

- They have low breeding rates – two offspring per year
- The response to restoration is slow
- These are all reasons to start sooner rather than later!

What landowners can do

- Record lizard sightings, especially for the threatened species
- Allow grasslands, shrublands and native bush to regenerate; weed control
- Additional plantings and artificial refuges, which can be made from a variety of materials
- Predator control – needs to be continuous and multi-species

Good plants for lizard

- Small-leaved Coprosmas – their extreme branching makes them difficult for predators to penetrate, while lizards can move within them. They provide fruit and attract invertebrates. A good example is *Coprosma propinqua* – mikimiki.
- Pohuehue (*Muehlenbeckia complexa*) – this much-derided plant attracts a great variety of invertebrates, which as well as its fruit makes it ideal for lizards.
- Kānuka (*Kunzea ericoides*) is excellent habitat for jewelled geckos and other lizards.
- Other good plants include: porcupine shrub (*Melicytus alpinus*); tussocks (*Poa* spp); shrubby tororaro (*Muehlenbeckia astonii*); mānuka (*Leptospermum scoparium*) and totara *(Podocarpus totara*).

Further information on lizards

- Field guides:
  - Reptiles and Amphibians of New Zealand – Tony Jewel and Rod Morris
  - New Zealand Frogs and Reptiles – Brian Gill and Tony Whitaker
  - Lizards of Banks Peninsula – Department of Conservation booklet

- Department of Conservation brochures
  - Attracting lizards to your garden – options for Canterbury
  - Jewelled gecko – moko-kākāriki conservation – Banks Peninsula and the greater Christchurch area

Jewelled gecko (Photo: Marieke Lettink)

12. Kererū monitoring, and what landowners can do to assist their conservation

(Heidi Stevens, Kaupapa Kererū/Lincoln University)

Introduction

- Kererū, the New Zealand pigeon (*Hemiphaga novaeseelandiae*) is an endemic fruit pigeon that weighs 600 – 800 g.
- It is widespread, but numbers have declined.
- It is a taonga to Maori and Pakeha.
- Kererū have an important role in native forest restoration, as they disperse the seeds of many native trees. Being the largest forest bird species, they are essential for dispersing seeds of species with fruit too large for smaller birds to swallow, such as miro and karaka.

Kererū on Banks Peninsula

Kererū were once abundant on Banks Peninsula. Numbers have decreased due to:

- habitat loss and degradation
- mammalian predation and competition
- hunting by humans

Kaupapa Kererū objectives

The overall objective is to increase the numbers and range of Kererū on Banks Peninsula, with a three-pronged approach -

- **Community awareness and appreciation**
  - working with schools and groups – talks and practical activities
  - Kaupapa Kererū calendar each year –
  - Oral Histories project – anecdotes have just been published
  - Brochures and a website for information dissemination

- **Management** – pest control and habitat management in:
  - Onawe Peninsula
  - Orton Bradley Park
  - Kakaunui Bush, Port Levy

- **Scientific research**
  - Kererū movements (M.Sc.)
  - Predator impacts (M.Appl.Sc.)
  - Diet and food seasonality (M.Sc)
  - Recommendations for management
  - Effects of cats (M.Sc.)
  - Kererū monitoring (Postdoc)

The Kaupapa Kererū Committee is made up of representatives from Te Rūnanga o Ngāi Tahu, Kā Papatipu Rūnaka o Te Pātaka o Rākaihautū, Lincoln University, the Department of Conservation, Manaaki Whenua Landcare Research, and the Banks Peninsula Conservation Trust.

Community information

Kaupapa Kererū published a book entitled "E kūkū te kererū: Oral histories and recent research into the Banks Peninsula kererū" and also produces calendars which provide interesting information on kererū.

Community counts

In February 2007 and again in 2009, Kaupapa Kererū held Peninsula-wide 'Community Count Days'. These involved getting as many people as possible out on the peninsula to count kererū to raise awareness and appreciation of kererū on the Peninsula, and to give an indication of changes in the number and distribution of kererū on Banks Peninsula over time. Banks Peninsula was divided into 930 grid squares of 1km^2. Participants were given survey forms and instructions, with tips for finding kereru.

In 2007, 120 people participated, and 68 in 2009 – in poor weather, which affected the results somewhat. In 2007, 39 % of grids were surveyed, 25% in 2009. Kererū were seen in 42% of grids in 2007, 38% in 2009. Overall, hundreds of kererū were seen. The average density of kererū was estimated at 1.8 per km^2 in 2007 and 1.6 in 2009 (when results were probably affected by the fact it was raining).

Kererū feeding study

A year-long study investigated kererū feeding at Hinewai and at Charteris and Church Bays (Lyttelton Harbour). Both radiotagged and untagged birds were observed.

Results

Food plant species and plant parts were recorded from February to October.
Results indicate that -

- Kererū use both native and exotic plants
- Prefer native fruits, if available
- Exotic tree lucerne, broom and cherry plum are essential
- In rural habitats, kererū bred while eating newly budded deciduous leaves (not seen in the North Island, where fruit is more readily available)

Recommendations

- For the long term - plant native species
- In the medium term - provide plants that fruits for a greater part of the year
- In the short term - retain important exotic species such as tree lucerne

Impacts of predators on Kererū in urban / rural habitats

Artificial nests with wax eggs which show predator tooth marks
Radio-tracking of Kererū and video surveillance of nests, nest checks have shown:

- Adults killed while foraging on low growing shrubs
- A female killed on nest
- Cats implicated in all events where adults or chicks taken

Egg predation incidents by rats, possums and unknown

Current research

- Movements and foods of domestic and wild cats in Charteris Bay using GPS collars and camera traps
- Monitoring methods for kererū
- Effect of pest control and habitat restoration
- Nest productivity study

What can people do

- Control pests – predators (e.g. cats, rats, possums) and competitors (e.g. rats and possums)
- Plant kererū food species (brochure available – order or download from here: www.kaupapakereru.co.nz
- Report nests: info@kaupapakereru.co.nz
- Help prevent window strike (don't clean your windows!)

Photo: Heidi Stevens

13. Banks Peninsula bird monitoring 2007 – 2009

(Frances Schmechel, Environment Canterbury)

Banks Peninsula is a hotspot for native bird diversity – due in part to the diversity of habitat types, having a long coastline as well as bush and open country through an altitudinal gradient. This makes it a really valuable area, in spite of having lost species such as native parakeets and other species that are still found in bush elsewhere in the South Island.

Biodiversity enhancement

There are many initiatives in the region aiming to improve conditions for native biodiversity, including

- habitat conservation through covenanting
- habitat enhancement through planting
- pest control initiatives

Nearby on the Selwyn Plains:

- efforts by the council to conserve small remnants of native vegetation
- A group called "Te Ara Kākāriki (Greenway Canterbury) fosters biodiversity enhancement with landowners between the Waimakariri and Rakaia rivers, to provide stepping stones for wildlife from the mountains across the plains to Banks Peninsula and the sea.

Biodiversity enhancement programmes on Banks Peninsula include:

- The Upper Harbour Trappers, a group with 28 members based at the head of Akaroa Harbour carrying out pest control at a number of key sites, including Onawe Peninsula. They operate 90 stoat traps and 60 possum traps.
- Wildside (south east corner of Banks Peninsula) – network of landowners, covenants, reserves (including a marine reserve), extensive pest control
- Banks Peninsula community-initiated possum control programme – the Peninsula is divided into four similar-sized areas, each undergoing possum control on a four-year rotation. It has two purposes – TB control and biodiversity enhancement, and is funded by rural rates.
- The feral goat eradication programme is also expected to benefit biodiversity, including bird life.

Monitoring

To monitor the effectiveness of these programmes in terms of the desired outcomes, there are currently two programmes – a small-scale study in Western Valley to monitor five finger recovery in relation to possum control; and the Banks Peninsula bird monitoring programme.

The Banks Peninsula bird monitoring network

- Launched in 2007
- There are now 55 count stations at 23 sites
- There were 94 five-minute counts carried out by 10 observers, spread over the year (but in particular October-November and winter)

The 1st annual report is available, summarising data from the first 16 months.

Some early results:

- Total of 23 species recorded – 11 native, and 12 introduced
- Most commonly detected native species were bellbird (detected in 96% of sites); grey warbler (87%) and silvereye (78%)
- Moderately often detected species were fantail (74%), brown creeper and kereru (both 57%). As kereru are hard to detect in 5-minute bird counts, that is probably an under-representation.
- Least commonly detected were shining cuckoo (22%), rifleman (17%), and tomtit (9%). There are several factors to consider when interpreting data for this group. Shining cuckoo are not present in winter, so none of the winter counts included them. Tomtits are very dependent on larger tracts of bush. Rifleman are not very widely dispersed, but even so are likely to be under-reported as their call is outside the range of some people's hearing.

Recommendations to observers

- Do keep counting – the most valuable counts are those done at the same site at least once a year by the same observer.
- It can be useful to plot birds on a sketch map as you listen, to keep track of each individual bird seen or heard.

Environment Canterbury is now conducting bird counts and rodent monitoring in each of the four possum control areas. It is important to do rodent monitoring in conjunction with possum control, as their numbers can increase as possums decrease, and rodents can have a negative effect on smaller species like rifleman and tomtit. So we are adding 15 extra count sites for each of the four possum areas, along with placing rodent tracking tunnels – to be monitored once a year in October-November. We will be contacting people to see if they are willing to have a site on their land.

Interested in joining the bird count network?

- Contact one of the local co-ordinators for help to get started
  - Sue Lovett
  - Tina Troup
  - Kate Whyte
  - Andrew Crossland

- Please make contact if you are willing to provide bush patches for monitoring. I am particularly interested in monitoring bush sites that are grazed, as many of the other sites are on ungrazed covenants.

Bird monitoring in the community

(Sue Lovett, Banks Peninsula Bird Monitoring Network)

I completed my first ever 5-minute bird count in October 2007 so I can hardly be classed as an expert. However, I am one of the area co-ordinators for bird monitoring on Banks Peninsula, and as well as doing my home patch I monitor Onawe Peninsula.

There is a small but keen group of people monitoring and as Frances has said the data gathered by the same people at the same site at the same time of year over several years will begin to build a picture of what is happening to bird populations.

As volunteers we have an important role to play in the gathering of the data. We are fortunate to have someone who can transfer it to spreadsheets and make some sense out of it.

One message: just do it!
Start with what you know and build on it.

I suggest you write down two lists…one of birds you know by sight and one of birds you know by sound. Alternatively go though the BP Birds list and tick off those you are familiar with.

You will be surprised and pleased with what you do know and will have something to start with. In time you will put pieces of the identification puzzle together. For example, when we first moved here I was pestering people with a description of a smallish, brownish, bird with a curved beak. Last week I worked out, purely by accident, that it was a juvenile bellbird.

You don't have to be a fanatic to do a 5-minute count a few times per year. You don't need special gear and you don't need to sneak around bushes and wetlands armed with scopes and binoculars dressed up like an African Safari hunter or a true twitcher.
You just need enthusiasm and an ability to observe and record those observations on the forms provided.

It may not seem significant now, but eventually someone will be saying "thank goodness those people started doing that".

If you need help getting started just ask one of us to help. I can tell you from experience that getting started is the hardest part.

Identification aids:
What Bird website http://www.whatbird.co.nz
A booklet by Andrew Crossland with photos and identification tips and CD of Peninsula bird calls are available from Banks Peninsula Conservation Trust office.

Question: Are you monitoring only native birds?

A. No, recording everything – but if you just want to get started with a limited number of birds, just pick a few and monitor those – and indicate that on the form.

(Also some discussion about hearing the first shining cuckoo for the season.)

14. Tui transfer to Hinewai

(Laura Molles, Ecology Department, Lincoln University)

Bird abundance in predator controlled areas

I was working in the Dart Valley (upper Wakitipu) recently. We were surrounded by rifleman; there were constantly yellow-fronted parakeets, 50 at once in a flock; and hundreds of yellowheads, often 30 at a time. I mention it because it is a testament to the power of pest control. It is an Operation Ark site, so the area has had intensive pest monitoring, with pest control as soon as numbers get above a certain threshold. I found it inspiring – it's not an offshore island, and doesn't have a predator-proof fence around it, yet even without these it is possible to make a major impact with predator control. The birds were doing fantastically well, and it was a wonderful experience to be surrounded by all those lovely birds.

Tui translocation to Hinewai

Disease screening

- In February 2009 tui were captured on Maud Island for disease screening – looking for external and internal parasites, to avoid introducing anything new and undesirable to Banks Peninsula. Birds did test positive for avian malaria, but a strain that is already present throughout the country, so is not expected to present a risk.

Transfer

- In March tui were captured in mist-nets for transfer – selected for a balance of sexes and a combination of juveniles and adults
- They were all fitted with a unique combination of colour bands to enable them to be individually identified.
- Seventeen of the tui were also fitted with transmitters, attached to their tail feathers, so their movements could be tracked. It wasn't possible to place transmitters on the some birds, as their central tail feathers were still growing.
- Once the birds were processed they were held in an aviary till we accumulated the target number of birds. The aviary had shrubbery so the birds could hide, and they were fed on 5-finger berries and other fruit, along with some artificial food.
- Then we waited for the weather to clear …
- Birds weights were checked to make sure they were fit for the transfer
- Then the tui were transported in cat boxes, loaded into the helicopter
- and released at Hinewai!

30 tui transferred:
- seven adult females three with transmitters)
- seven adult males five with transmitters - one failed)
- 10 juvenile females (five with transmitters)
- six juvenile males (four with transmitters)

Post release

Birds' movements were monitored by telemetry until the end of July, the expected life of the batteries.

- The majority of transmitter locations were in Otanerito Valley (Hinewai and beyond).
- A small number of birds roamed further, in particular one named Hugh, who was detected leaving the reserve four times. Excursions recorded included to Paua Bay, Flea Bay, and a number to Akaroa town and environs. One female called Lightning spent a lot of time in the Garden of Tane in Akaroa.
- 158 visual sightings - banded birds were reported from Wainui, Stony Bay, Flea Bay, Onawe, and Lands End. Further afield, tui were recorded at Monks Spur, two on Quail Island, and one in Yaldhurst – but the identity of some of these could not be confirmed, so they may not all have been Hinewai released birds .

Since their release, 27 of the 30 birds have been located at least once, and 24 have been sighted at least once.

Feeding sightings
The tui have been seen feeding on the following plant species:

Kahikatea berries
Pohutukawa nectar
NZ myrtle
Fivefinger
Banksia
Albizzia
gum, apple and fig trees
...and others

Behavioural observations
- seen attacking kereru
- seen interacting with bellbirds – chasing them, but apparently not excluding them from food sources

The plan is to fit new transmitters soon to try and track some breeding birds.

Things to do –
- Plant tui foods
- Send sightings, particularly during the breeding season
- Funding has been sought successfully for transfer of another 30 tui in March 2010.

Questions
Q. How do you recognise a tui nest?
A. **-** a messy, open-cup nest, like a blackbird's, with nothing particularly distinctive to say it's a tui's nest – but if you see tui around it that's a good sign!

Q. Why attach transmitters again – won't that disrupt them?
A. They may nest outside the pest control area, so if they have transmitters we can locate the nests and put pest control around it.

Q. Couldn't they have had longer-lasting batteries the first time round?
A. There is a limit to the weight, relative to the bird's weight – so if we had increased the battery capability, that limit would have been exceeded. Anyway the birds recover very quickly from being handled, so it's not a significant disturbance.

Q. Is avian malaria already at Hinewai? What effect does it have?
A. It is throughout New Zealand, with no known problems. Like many viruses, it can be carried without noticeable effect.

Q. When do they moult?
A. After breeding

Kereru / Pests
Q. What about persuading owners to control their cats, or bringing about a change in community attitudes to managing their cats? There could be a condition on new subdivisions regarding cat ownership.
A. (Heidi) A student has been asking people to put collars on their cats, to help distinguish them from feral cats (to avoid killing pet cats). People will assume their cat doesn't kill, but even well-fed cats will kill for the hunt. Cats can travel several kilometres.
- Keeping them inside at night does help, but they can also prey by day.
- Never dump unwanted cats!
- In Le Bons there is a local register of pet cats, and this is well accepted by locals.

Q. How far do kereru travel?
A. Their home ranges are quite small, but they can take long excursions. A kereru with a transmitter flew from Gore to Stewart Island and back twice in one winter.

Q. How can pests be prevented from reinvading Onawe?
A. A fence is problematic because of tides, so a line of traps at the neck to intercept them on arrival would be best.

Photo: Jon Sullivan

15. Banks Peninsula Biodiversity Workshop – Facilitated Discussion
(Wayne McCullum Regional Biodiversity Coordinator, ECAN)

The Exercise (based on time allocation of 40 minutes)

The facilitated discussion came towards the end of the Banks Peninsula Biodiversity workshop and drew on the discussion from, and perspectives of, the event's participants. Behind the workshop was the philosophy that every participant constituted an 'expert' and that their thoughts, ideas and knowledge could make a contribution to ideas for the promotion of biodiversity on the Peninsula. The facilitated discussion provided an opportunity to bring this knowledge forward and to share it with the wider forum.

The following break-out groups were settled for the exercise, with facilitators in brackets (a session expert teamed with a local land owner/manager):

- **Birds** **(Frances Schmechel / Sue Lovett)**
- **Invertebrates** **(Warren Chinn/ Tina Troup)**
- **Native fish** **(Phil Jellyman)**
- **Lizards** **(Marieke Lettink / Mike Bowie)**
- **Plants** **(Nick Head / Kate Whyte)**
- **Bays/valleys/catchments** **(Pam Richardson /Kerry-Jayne Wilson)**

Following questions were discussed by each group, with three minutes allocated for reporting back to the wider group:

1. **What would you like to achieve for your species/topic?**
2. **What are the main challenges?**
3. **What and where on the Peninsula do you consider support is necessary?**

Group	What would you like to achieve for your species/topic?	What are the main challenges?	What and where on the Peninsula do you consider support is necessary?
Native Fish	• Whole ecosystem – protection, fencing out stock, more fences • Habitat enhancement • Protection of young adults – full life cycles • More information/increase knowledge – fact sheets, improved awareness of the importance of streams • Consider ways/techniques of improvement e.g., reduction of fertilisers • Mitigation of farming practices • Stock water troughs and reticulation alternatives • Identify high priority areas for habitat	• Culverts (legally must provide for fish habitat since 1993) • Identify 'poor' culverts in high priority areas • Ramps are expensive to maintain • Retrofitting is an alternative Note – Not even basic monitoring is done – need to do presence/absence; where? How are they doing? What is their distribution? Only by doing this monitoring will we know management actions • Major challenge is communication with landowners (pamphlets are not effective enough) • Extractions of water are an issue for sub-divisions (rather than using water tanks); farming not necessarily a big draw • Over abstraction is an issue	• Fencing. • Funding for fencing and alternative water supplies (people/stock etc) • Communication – offer support to landowners to modify their methods that benefit fish species • Higher profile is needed for native fish and macro-invertebrates • Priority to get asset register for **culverts** location • Prioritise locations [but who has this information? DOC? NIWA? Uni? CCC?] • Need more data on density • Anita Spencer (DoC) is preparing a booklet for landowners • Greater investment in monitoring • Consolidation of agency and research institutions information on fish and macro-invertebrates • Collect, collate and keep long-term records • Need an evening fish monitoring workshop

Group	What would you like to achieve for your species/topic?	What are the main challenges?	What and where on the Peninsula do you consider support is necessary?
Birds	• Cat control • No declines in bird numbers • Increase native birds • Return of native species • Habitat enhancement to benefit birds - nest boxes - pest control (long-term commitment) • Information on anything to support native species and awareness campaign - pests, cats, magpies	• Consistent clear information (food, pests) • Awareness - planting (gardens) - who to contact? • Corridors for bird movement - healthier population (wider gene pool) • Finances- pest control - planting - education • Disposing of trap-killed animals • Logistics of co-ordination (information, resources) • Topography	• Fencing – labour, resources, finances • Permanent funding enabling more action and paid staff • Access to native plants • Clear concise information - where to get traps - information - internet
Lizards	• Increase abundance and range / distribution • Increased awareness - importance of refugia in urban areas - cat owners - illegal to keep as pets - why NZ lizards are special • Part of peoples' experience	• Lack of awareness – value of shrublands • Predators – make predator control methods more accessible – **simple** instructions for community groups – consider cat curfews and other methods used overseas (e.g., Melbourne)	• Simple guidelines for community groups – "How to do pest control" (what to control, when to do it) • Generic cat pamphlet to go out to all rate payers • Education (schools)

Group	What would you like to achieve for your species/topic?	What are the main challenges?	What and where on the Peninsula do you consider support is necessary?
Invertebrates	• How to increase community awareness of invertebrate ecology • How do I maintain my population of cave weta? • How do we encourage more 'public appeal' for invertebrates? • Ecological role awareness	• People's attitudes • Awareness raising • Ecosystem roles • Challenging people's hierarchical approach to life	• Research and information on pesticide use • More information days / interactive sessions • Imaginative ways of encouraging / stimulating invertebrate interest in children / young people
Bays/Valleys/ Catchment	• Large-scale – "Wildside" • Realistic targets • Mutual respect • Linkages, networks – funding information • Landowners working together – common goal	• Integrate farming – forestry etc – with conservation • What can be sustained? • What are the outputs (e.g., socio-ecological?) • Science and community working together • Don't let the unwilling stop progress	• Catchment working groups (catchment undefined) • Conceptual framework for catchment management • Information packs • Public • Time • Coordination
Plants	• Protect the whole range of communities – often not understood (e.g., shrublands) • Building corridors across the whole of Banks Peninsula • Encouraging people to value/love shrublands/wetlands	• Weeds and animal pests • Lack of money to fence • Lack of coordination • Competing land uses	• Support for weed and pest control • Give information • Knowledge, communication and advice • Need people to come out to your own place and give advice/support • List of people in your area who can help • Tapping into volunteers Support from volunteers

16. Summing up the Biodiversity workshop

(Kerry-Jayne Wilson, Ecology Department, Lincoln University)

The global biodiversity crisis is irreversible, and it will take all sectors of society to engage with the problem. It is a far greater problem than the global financial crisis!
No single organisation can solve it alone.

During today people have repeatedly commented on Banks Peninsula's special character (marine too) – and we should keep sight of this. Some species are globally extinct – we can never get those back – but we can repair a lot of the damage.

People, organisations, NGOs. Landowners are a vital key to success – and there are so many examples on Banks Peninsula of people doing their thing on their own land; and others working with landowners to find solutions compatible with making a living off the land.

It is a global biodiversity crisis – but we can't solve the global problem alone. However we can think locally, act locally – kaitiakitanga.
Looking after our own patch - here that can mean anything from looking after Hinewai – a large reserve; or looking after a single species, for example the kereru or tui; a restoration project in a special spot such as the titi colony at Stony Bay; a group of species such as native fish or invertebrates, or predator control. All of these are important; all are part of the big picture.

If we each find a role we can take as ours – there is a role for each of us; something we feel passionate about. We don't all have to do everything. Nothing happens in isolation. The predator-proof fence at Stony Bay was put up to protect titi, without realising there were also spotted skinks there – a threatened species. And it also became obvious after the event that it was an ideal place to plant Cook's scurvy grass. So there we have three major gains from one intervention.

Individually we can achieve a little, and together we can achieve a lot – that has really come through time and again today.

Ongoing research and monitoring is needed so we can identify threats – as was said earlier, killing stoats is not the thing we set out to do – our aim is to protect vulnerable species that stoats eat.

What barriers are there to species becoming more widespread?
- We've heard about barriers to fish – how just one culvert can cut off a large area of potential habitat.
- Barriers to birds – e.g. open spaces separating small habitat refuges are barriers to birds.

Managing threats – we need to monitor so we can determine what are the most effective methods, for example for pest control.

Importance of local knowledge as well as scientific research; scientists don't have all the answers, and need to talk to the locals.

What are we out to preserve on Banks Peninsula?

- Special features
- Natural patterns
- Threatened species, endemic species
- Habitat diversity

Species that are threatened, nationally or locally

Define your goals and search around for the most appropriate solutions - for example, when is a fence appropriate, and when isn't it? Conservation costs money – who pays, and how to get the best results for each dollar?

Work with nature, as Hugh does – give it a chance, a helping hand to do what it will do. Understand the biology of threats and threatened to correctly identify the appropriate actions.

As climate change takes hold, things won't be the same tomorrow as today – we have to think a lot further out into the future.

Successional habitats are important – we need to keep an array of successional habitats, which are especially important for things like lizards.

Banks Peninsula is a highly modified environment, and we can't be purists.
For example, kereru need exotic plants in the absence of full range of native forest species and stages.

Where to go from here?

- More co-ordination between projects, to get optimum results for effort.
- Enhance the value of what others are doing, and look to others to enhance the value of what you are doing. Look for opportunities to build on successes of others. There is a great value of workshops like this, to be able to see what others are doing and to see how to interface or expand out from there.
- Need to integrate economic uses of land – farming, forestry etc. – with the conservation needs – where you should be grazing, and where for example you should be farming penguins as the Helps have done so magnificently.
- Scientists should talk to landowners. There's a lot of science out there that's not easily accessible to landowners. Feedback is needed to and from the community, getting direction from the community as to where our research effort should go.
- Value of talks, information leaflets, articles in the Akaroa Mail.
- Banks Peninsula Conservation Trust is doing a great job, and has the opportunity to act as a coordination centre to help projects build on each other.

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