Beyond possums: the next pest species.

A workshop hosted by the OPBG at the Bowling Club, Portobello, 15 May 2015

Prepared by Ian Turnbull (OPBG Trustee)

The Otago Peninsula Biodiversity Group (OPBG) has, since 2011, been removing possums as the first step toward the strategic goal of making the Peninsula pest-free by 2050. While the possum programme is on-going, the Group is also looking forward to the next step – what other predators or pests should be targeted, in order to achieve the greatest improvements in biodiversity, land productivity, and people's lifestyles? To this end, a panel of invited experts in the fields of predator and pest control were given a background briefing and a series of questions to think about, along the lines of "where to for the OPBG, once possums are under control". At this Portobello Workshop, these experts each spoke for about 15 minutes in the morning, at an open, public session, with short Q&A sessions afterwards. In the afternoon, the experts and OPBG trustees and managers had a more general discussion, expanding on some of the ideas presented in the morning session, and various OPBG members also asked some targeted questions.

These notes summarise the presentations and the discussions, and are intended as a record of the proceedings, but do not include any resulting action plans or work programmes. These remain to be developed by the OPBG, in consultation with the wider Otago Peninsula community, scientific advisors, and pest control experts. The OPBG intends their action plan for "beyond possums" to be finalised by the end of 2015.

Attendees and Expert Panel

The following organisations were represented in the audience at the morning session: Dunedin City Council, Otago Peninsula Community Board, Department of Conservation (DoC), Save the Otago Peninsula (STOP), Yellow-eyed Penguin Trust (YEPT), Landcare Research, Wildlands Consultancy, Landscape Connections Trust, and Elm Wildlife. Several OPBG volunteers and some Peninsula residents also attended.

The experts invited were Deb Wilson (Landcare Research, Dunedin), Andy Cox (Island Eradication Advisory Group of DoC, Christchurch), Steve Horn (DoC Invercargill), Darren Peters (DoC Head Office, Wellington), Lindsay Wilson (DoC, Te Anau), Bruce McKinlay (DoC, Dunedin), Henrik Moller (Ecosystems Consultants, Dunedin), Justine Ragg (Ragg Consultants, Dunedin). Rebecca Bell (Predator Free NZ), Robbie van Dam (Goodnature Traps) also attended for part of the day.

Contributors to these notes were David Chalmers, Moira Parker, Bev Dickson, Brendon Cross, Cathy Rufaut and Mo Turnbull. These notes are not a verbatim report, and should not be taken as accurate or exhaustive. There is also a video record of the entire proceedings, courtesy Bev Dickson.

*Key: b/d = biodiversity; OP = Otago Peninsula; **??** = question from floor; **A** = answer; **C** = comment – mostly anonymous as speaker not recorded or identified.*

Andy Cox, *IEAG, DoC, Christchurch. Andy is "the guru" on island pest eradication in New Zealand, and had input into the OPBG's first possum control programme so is familiar with the area and the problems.*

"Targeting possums was the correct choice for the OPBG, and the programme has achieved good results, as well as giving the OPBG essential experience both in control, and in sustaining the project.

The next target is much more complex. Need to decide what you want to achieve, what are the biodiversity and social outcomes you want? What will it take? Killing predators is not the objective, but it needs to be framed in terms of biodiversity and social gains. Predator control is only a means to an end.

Look at what you want to achieve. Need to consider opportunity cost: what else would you do with the money? Need to identify what it will take. May need to change objectives, or revisit objectives, if can't afford the project – but need to avoid going round and round. What will it take in terms of money, time, resources?

Project must be sustainable. Need ongoing funding, and a whole-of-life budget. Need to include depreciation (often overlooked, and a major cost in a long-term project). Costs of replacement traps or fences has to be built in. Be ready to adapt methods to meet pest control targets, as pests adapt (e.g. population density differences mean different behaviour). Next project needs good planning and good ongoing monitoring to recognise and cope with need for adaption.

Stoats and rats will re-invade the OP. Urban areas are not a 100% buffer. Eradication not possible yet – control is. Rats have been with humans forever and cannot be eradicated, so sustained control is the widely recognised way forward. Zero density of rats can't be currently sustained with available technology (so OPBG project is going to be an experiment). Options are to target achieving a low density, or to control to lower standards – or control only in selected areas? Stoats – there are good stoat control methods, but would be expensive. Stoat control will also involve feral cats, rabbits, ferrets. Control of stoats will need control of cats (not just in a physical trapping sense) because of prey switching problems. There will be a public response when involving cats!

(Question time): If rat control will be an experiment, maybe it isn't worth worrying about rats? ***A -*** Yes, have a go, but managing the project will be more important than actually running it. ***C -*** Will removing rabbits be seen to give financial gains for agriculture? ***?? -*** what species should be next and what methods are available? **A** - Need more homework on removing mustelids and cats. **C -** Could exterminate rabbits, with work. **C -** Rats are being controlled around Dunedin with bait stations . **C** (A.C.) - new second generation anti-coagulants have problems with residues and persistence in food chain. May not be able to use some poisons repeatedly (e.g. Brodicafoum) in future, as it has been found in trout, penguins, ? harriers (i.e. adopt new methods). **C -** (AC) There is no good methodology for rats, but could remove stoats and ferrets from the OP.

Henrik Moller (*now Ecosystem Consultants, much engaged with farming community)*

Questions: what do you gain or lose with more pest/predator control? Current programme is working well; possums were a good choice of first target, good monitoring is in place, and are getting good biodiversity benefits. It is a "biocultural" habitat restoration project: this gives biodiversity as

well as social benefits. Current programme is a good example of DOMA: direction - opportunity - motivation - ability.

BUT:

OPBG needs to link [pest control] programme to a higher goal(s). Think about why do you want to control pests? There is risk of "overkill" – what is the optimal level of control? Need to do just enough so as to save resources for other goals. Need to know what you can't do based on technology, feasibility, resource availability, capacity.

Costs: low investment will give low levels of control (and presumably low returns): highest costs will be incurred with eradication. So need to reduce pests to an ecological threshold where the biodiversity is holding its own – a sort of halfway house.

Eradication is probably not worth it: on the other hand, low investment in control means extinction and that seems to be the NZ default position. But need to be aware of opportunity costs, and costs and risks of increased predator management. If over-reach (targets too ambitious, fail to meet them) get loss of confidence. Need to know what can't you do, if you get into more predator control.

Habitat enhancement predator control

Community capital building

Habitat enhancement example is weed control; still end up with ecosystem enhancement.

What else could be done in terms of biodiversity? Weeds! Also look at forest patches; intertidal environments, riparian strips. Shelter belts on OP are great wildlife corridors but could be more diverse with higher native plant content – protect shelter belts and keep macrocarpas! Wildlife corridors are very good for invertebrates (as well as predators).

Wait a while before getting into the next pests? Maybe concentrate on localised predator control, while developing plans for wider focus [see *OPBG strategic plan*]

(Question time): C – YEPT is benefitting from the wider (OPBG) possum project. **C** - (Lala Fraser STOP) Rabbits need to be a focus for revegetation projects. **C** - Local predator control would be of benefit, but then lots of small islands of control are a problem in themselves. For penguins, both stoats and cats need control. **C** (Peninsula Board rep.) - From a DCC perspective, landscape zones give a clue: district planning can protect shelter belts, so use planning to conserve and protect some local areas. Easier than predator control. **C** (Ali Campbell!) – eucalypts aren't all bad: need a range of species in wildlife corridors. **C** (Rod Morris) - macrocarpas are "honorary podocarps"

Bruce McKinlay (*DoC Dunedin)*

Next phase needs to have good objectives, and needs to be sustainable for its duration. OPBG also needs to be sustainable! Need to keep on top of management of the Group, and look at succession planning. OPBG is a very good example of getting external advice, and not inventing a new wheel: use external advice whenever possible.

Monitoring vs. trapping: the ratio varies. We need to be clear on role of monitoring – reduce if using standard methods of control [know what results are likely to be] but increase monitoring if using new methods. Adaptive management (cf. Andy Cox) – need to have good monitoring in order to be able to adapt (or see need for it).

Can we remove exotic plants from OP, as a way to increase biodiversity? Yes: weeds best dealt with by targeted control.

Community needs to see the results of whatever you do. Are the results benefitting the community? In a new programme, when will they see the results? (Eg. In the Battle for the Birds, need to wait till next nesting season to see results). A long time is required to see ecological responses – need to point this out to the community.

Rats – we may have to live with them. Need to be clear about objectives, and make them obvious to the community.

Deb Wilson (*Landcare Research Dunedin: expert on pest/prey interactions in some ecosystems)*

Expect the unexpected. Prey switching happens. Consequences of a control programme are variable; anticipate and avoid if possible.

Experiments have been run (Nth Island) with several variables:

1: no control 2: stoat control 3: possum control (1080) 4: possum and rat control (1080 + bait)

After 3, rats increase. Mice also increase after 3 and 4. All three species compete for food.

Meso-predator release: cats and mustelids: results of studies in Central Otago. Mice are a meso-predator. If take out the top predators, then mice will increase, so you don't get key endangered species (e.g. lizards) increasing, as mice take over position of top predator. Prey switching: stoats eat more birds if rats are reduced. Ferrets eat more lizards when rabbits are controlled. If remove rabbits, you also remove ferrets if there is no other food. Rabbits also influence numbers of stoats and cats: and if remove rabbits, this has a huge impact on skinks (by ferrets and cats, initially).

On the OP, need to know rat abundance. OPBG monitoring is aimed at this. Do rats increase after possum removal? Or do mice? Or mustelids? Do we control mice as well as rats? Will we then get increased cat predation of birds, lizards?

Predator removal benefits native species but not rabbits: **predators can only control rabbit numbers after control programmes when rabbit numbers are down** (otherwise, climate, disease are greater population controls: predators are just harvesting the top of the rabbit crop).

SO: need to weigh up potential consequences of individual species control and generally better to do multi-species programmes. Do feral cats, do rabbits and predators. Monitor, monitor, monitor! Also need to improve bird counting methodology, and also monitor lizards, invertebrates.

(Question time): C (Bruce McK) - Cats on OP are coming from city: need social pressure for feral and domestic cat control. **C -** What is mouse influence on predators? Are pukekos (in dune swamps) a predator? **C** (Henrik) - Dunes are a special environment and need different methods of control. **??** (Bev Dickson) - If remove rabbits, what is lag time before predators decrease? **A** - 1-2 yrs. **??** - (Rod Morris) Are the OP rats ship rats or brown rats? **A** - Nobody knows. **C** - Ship rats are most common round the harbour – and restaurants. Stoats prefer brown rats to ship rats, so will need to know how to target the different species. **C** (Cathy) - To improve bird monitoring, need 5 minute counts as well as line counts, and more lines. **C** (Justine) - Ferrets can be reduced to very low levels by removing rabbits. **C** (Andy Cox) - on Stewart Island have all 3 species of rat, separated by habitat.

Steve Horn (*DoC Invercargill – experience from multi-species extermination on Macquarie Island)*

On Macquarie, took feral cats off first and got huge increase in rabbits (being partly controlled by mixo). Rabbits, and all other predators and pests now gone, with multiple tools: poisons, trapping, dogging, night shooting. Very intensive and expensive. Feral cats also took years to exterminate.

Next project: social aspect is most important: need to encourage social investigation (how do people see the project?), and record successes. Whatever is done on OP will be a template for the rest of NZ.

What other species? Choice will be outcome driven. The scale of the project is important: localised or regional? Once chosen, is the choice feasible? Need to look at the cost (including long-term); management, and community support. Small control projects, or small urban areas, are much harder to manage.

What exactly are the impacts of pests (and which ones?) on the outcomes? Are they actually a problem? Are key blocks or areas of high biodiversity a target, rather than a species? What are we protecting – vegetation, invertebrates [we don't even know what we've got!] or birds? Need to prioritise in terms of feasibility, and resources.

Invertebrates are a good monitor tool in themselves – use moths as key indicator species? Prey/predator relationships are very complex. Food webs – what eats what? Hedgehogs! Mice – are they a problem? Don't want to create problems we don't want by targeting an unnecessary species.

Goals: future vs. immediate. Balance social support against feasibility (e.g. feral cats). Will eradication be feasible in future, with new tools (i.e. leave that species till later). Will you need new tools to overcome bait shyness? Mice are a key factor in the food web.

Feral cats – regardless of social issues, they <u>are</u> an important target. Will they be a one-off or a long term programme? 10 years cf. a blitz? (Macquarie and Rangitoto islands as examples). If long-term, need whole-of-life costs: but need to ensure no re-infestation if a one-off programme. Mustelid/rodent control: side effect of secondary poisoning for mustelids. Then need to ensure site integrity (to prevent re-infestation).

Need a lot of data! E.g . may need dogs to assess hedgehog population. Need partnerships to help cover costs which can be considerable: costs of training species dogs $10,000 per year. Can use chew cards cf. tracking tunnels to reduce costs.

Justine Ragg *(Ragg Consultants to Animal Health Board (TB Free NZ))*

What is unique and challenging about the OP in terms of pest control? - lots, so need to adapt strategies for the OP environment. Physical features – is Dunedin City a barrier to invasion/re-invasion? Can (and probably will) get over-water re-infestation. There isn't [and won't be] a predator-proof fence.

So do you look at fragmented urban and forest areas? The OP is about 11000 ha - large area but about the same as TB Free target areas. There are also difficult topographic areas - cliffs. OP would be a very challenging and ambitious multi-pest project for TB Free NZ. OP has the full suite of predators, but also high conservation values and high profile species (including seabirds) so stakes are quite high.

Social and economic factors are significant – and complex. Tourists are in the pot as well – some tourist operators are doing predator control. This will be new ground in terms of predator control in urban/city society. There will be restricted options for control, particularly in regard to poisons. Will need a risk assessment for different control methods.

Strategic questions need to be asked – and answered. Examples: is widespread control going to help? What are the target species? (wide open at moment). Is eradication possible? Are current methods good enough? There is a need for baseline information on predators – abundance, prey, distribution. Existing data (from the possum project) may not be very good, or good enough. How will you manipulate targets – prey or predator first? Do you do a widespread programme or target small areas? Or seasonal programmes? What are the issues with prey switching? And will there be any adverse consequences? The predator guild phenomenon – reducing ferrets may cause an increase in feral cats, and v.v. Specialist predators – rogue individuals may do "surplus" killing, behave in ways that generally their peers don't. Can get changes in reproduction rates when reduce (or change balance of) prey which may have an adverse effect. With ferrets, numbers may remain constant in spite of control programmes. But on the OP, the features that make it challenging are the features that make predator/pest control worthwhile.

(Question time): ??'s - Weasels – are there any? **A** - Don't really know but numbers likely to be low. Will need to tune the trap network if numbers very low, but may be more than you realise out there. **C** - There are more on dairy farms after riparian planting. Ferrets aren't having a great impact on small native bird populations – only stoats and weasels.

Lindsay Wilson *DoC Te Anau – experience on multi-predator and mainland/island programmes*

Need to get outcomes and strategies organised. Key issues are: having the right mind-set; the right people; being focussed on outcomes not just killing things; consistency; quality assurance; and support.

Examples of Fiordland projects: Resolution Island, 21,000 ha of stoat eradication (no rats on Resolution). "Scale" of eradication programmes is changing all the time; DoC now has 100,000 ha under stoat control in Fiordland, and 5,000 ha of rat control in the Eglinton Valley. With low density of stoats, fernbird and rock wren have reappeared, SI robins have been introduced. One stoat in 7 years on 5 Fingers Peninsula (Resolution Is.). Anchor Is. at 1,500 ha is stoat free, no incursions; Indian Is. also stoat free. These use proven techniques but accept innovations (adaptive management) – the biggest advance is conceptual.

Rat control on Kepler Track (Harts Hill): started with 100m x 50m grid of Goodnature traps covering 200 ha, now expanding to 100m x 100 m grid and 600 ha. Works for rats – 68% in tracking tunnels down to 0%. Traps also get stoats. Several small islands trapped, up to 1,500 ha. One stoat trap per 10 ha: same density on Resolution and Secretary Islands, aim is not eradication but very low density. Secretary is being re-invaded from the mainland. Programmes are working: have rock wrens on both islands. N. Island Kokako introduced to Secretary – not very successful.

Hawaii example, had 12.5m grid [of traps] to get rid of mice, with a very good predator-proof fence across a small peninsula. Bait stations were no closer than 25m: this project was very constrained by legislation, but made it work. Murchison Mountains (Takahe) – 50,000 ha, now 3500 stoat traps, checked 8 times a year, aim is to go from "harvesting" to very low density. In the Eglinton, objectives were to protect bats, mohua (decimated after a beech masting in 2001). Rats are targeted by 100m grid of bait stations covering 4,800 ha using pindone. A "mainland island" in the Urewera of 50,000 ha had 80-90% rats in monitoring tunnels, and 6 pairs of kokako. Now have 100 pairs. Urewera utilised the "core area" concept: blanket control of possums over whole area, stoats over some of it, and rats controlled in 5 kokako breeding sites (the cores). Bait stations and poisons now replaced with 9000 snap traps on a 150m x 25m grid: programme gives good results for the kokako, and whio.

??'s. **C -** Stoat population expansion can be very dramatic from low numbers (fast breeders) so re-infestation may be a big problem. Mice on Resolution are not being monitored, so don't know if they can support rapid stoat population increase. **C** - Techniques used must be socially acceptable, so DoC can use some techniques on islands which would not be an option on O.P. **C** - Multi-species approach is best for target areas only – cost is prohibitive for regional blanket (e.g.) rat control. The Urewera project was kokako-specific and may not be applicable on O.P.

Robbie van Dam, *Goodnature*

O.P. is a challenging environment, so may need more tools as most of the country can't use them (poisons may be unacceptable; traps unaffordable). NZ will be watching to see how OPBG gets on! Goodnature will use O.P. results to help develop new techniques. Goodnature aim is to have a replacement for the DOC 200 trap able to be used by anyone. The better the tools the more they will be used. Focus is on dealing with the animal at the trap, humanely. Getting the animal to the trap is also target of research – baits and lures. Have a new bait/attractant for stoats and rats – longlife rat smell. Very good data management for Rimutaka Forest Park.

LUNCH: at the Woolshed, and a road trip round a foggy and wet Otago Peninsula.

AFTERNOON: General Discussion round the table, facilitated by Cathy Rufaut (OPBG Project

Manager): where to next, and why?

Hoani: rodents are increasing as result of possum reduction – a "mast" issue as more food available due to possum (and rabbit) numbers dropping.

Moira (STOP): responding to are pest plants a next target, as they affect native biodiversity ? Answer - Controlling weeds isn't very rewarding for the community, but necessary.

Andy Cox: must keep on top of the possums, don't let them get away. Deb Wilson: are we monitoring possum population changes?

Henrik: highlighted database management – who is doing it, and where? How well is this done? Cost of data bases may be ¼ of the entire budget [***ouch***]. May need to upgrade our data input, with autonmation – dataloggers etc. [See Steve Horn for backup on methodology, technology – using Macquarie experience]

Darrren Peters: are Otago Harbour islands part of the programme? Concrete suggestions: OPBG could design and plan projects to eliminate/control mustelids - and all other pests/predators - without even having to do anything. Do a plan per species, and have them ready to implement once the community decides which is the most important. Include possibility of pre-feeding; and include weeds. The best projects are the best planned.

Bruce McKinley: how do you present the information to the community? Hold out a bird, how will it benefit?

Bruce Kyle (OPBG Operations Manager): community feedback says rats should be the next target in urban areas; maybe rabbits in the rural environment.

Andy Cox: suggest mapping the problem areas (and biodiversity hotspots) first. This may take a major effort.

Brendon: rats are an on-going problem and control will be ever-lasting. The community would prefer a "finite" project vs. on-going. [*Discussion*] May not be possible in the O.P. environment, as even offshore islands are re-invaded. Would be costly. **C** (Robbie) Planning is free [is it?]

Deb: the objectives (e.g. increase population of bush birds) will also govern pest targets.

Henrik: may need to make hard decisions, e.g. go for rats (cf. planning for all species; disagrees with Darren).

Brendon: technology is there, but the social aspect (e.g. acceptability) is harder. Presenting the programme may be a problem – how to convince the community (Bruce McK).

Robbie: finance may be a deciding factor; iconic species are easier and can attract sponsorship.

Cathy: the social aspect is partly covered as already have a lot of communuity support.

Andy Cox: don't over-extend yourselves: is the next [pest/pests/predator] target going to be

sustainable? Will poisons we use or can use still be useable in future? Probably not – brodicafoum may not always work well. Success is much larger than just our lifetimes. It is a complex environment so need to adapt to one-off changes. Need to identify the benefits on the map as well as targets.

Steve Horn: need to map habitats first, so as to identify targets. Sustainable harvesting (of pests) may be sufficient to achieve objectives.

Andy: are the habitats themselves endangered? Are they a high priority, in more danger than any individual species? If enhance habitats, can do predators next: the habitat response time is much slower. Predation is harvesting, so all species can cope with some predation. If increase populations, this is the same as reducing predation.

Steve: could trial areas, such as Cape Saunders, or outer peninsula with (e.g.) rabbit-proof fences.

Much discussion: Hedgehogs – very difficult to eradicate but could trap to extinction (with dogs – Rangitoto). They can climb trees! A much under-rated predator.

Andy: some preliminary costings of traps, can run from thousands to millions. Costs for a similar project on Stewart island may be available in a few weeks. The SPCA is now looking with less disfavour on control of wild cats? Hawkes Bay Regional Council are dealing with cats. The Spitfire "trap" (which squirts poison onto passing pests, who lick it off to absorb it) is a long way from implementation, due to technical bugs. A wide variety of traps is available and may need to be used to get rogue individuals. Survivors behave differently.

Meeting ended at 4:30.

Summary

The expert presentations not only focussed on the science relating to control methods for particular species and likely outcomes, but also gave a breadth of advice on many other aspects, such as project sustainability and the social environment of the Otago Peninsula. It was apparent that the OPBG is recognised as a pioneering and highly successful group, and is well regarded by the experts who participated in the workshop. The amount of support the group is receiving from the "conservation community" is very pleasing.

The importance of maintaining community support for the objectives and operations of OPBG was emphasised by most speakers. The importance of maintaining the effort on possums was also emphasised: all that effort will be for nothing if that focus is lost. There will be positives and negatives around any future predator or pest project, but whichever project we undertake will benefit the biodiversity on the Otago Peninsula.