Session Six : Control of Animal Pests

SESSION CHAIR – Dr Ken Hughey, Chief Science Advisor, DOC

CONTROL OF PESTS IN LAKE CATCHMENTS – THE DEPARTMENT OF CONSERVATION'S PERSPECTIVE

Dr Alastair Fairweather
Technical Advisor, Transformation and Threats Group, DOC, Hamilton
afairweather@doc.govt.nz

Alastair began his career working as a Science Technician for the Ecology Division, DSIR, after getting a degree in biology from Waikato University. He then went overseas, working as a wildlife ranger in Scotland and as a Wildlife Biologist for Raleigh International in Chile while studying for a PhD in ecology at the University Of Aberdeen. On returning to New Zealand, he joined the Department of Conservation. Alastair is currently a Technical Advisor in the Transformation and Threats Unit providing advice on animal pest issues. The work includes developing best practice for pest control, registration and use of pesticides, and advice to staff conducting pest control operations.

ABSTRACT
A key part of the Department of Conservation's (DOC) work is to ensure the diversity of New Zealand's natural heritage is maintained and restored. However, is a huge task and DOC's resources cannot stretch to do everything everywhere. DOC therefore has to make decisions about what work to do and not do, juggling limited resources while meeting both biodiversity and community needs.

To help make these decisions, DOC has developed the Natural Heritage Management System (NHMS) Programme which identifies the highest priority sites (both terrestrial and freshwater) that need to be protected and where work needs to be done. For NHMS to correctly identify the priority sites and what work it needs to be done at the sites, it relies on good information. For the freshwater sites, the data came out of the Freshwater Ecosystems of New Zealand (FENZ) dataset. This data set describes the environmental and biological patterns in NZ's freshwater ecosystems (rivers, lakes and wetlands). Once priority sites have been identified, it is important to understand what pressures the sites face and what activities, including pest control, need to be undertaken to reduce these pressures.

In this presentation, the Rotorua lakes, with particular reference to Lake Okataina, will be placed in the context of this prioritisation process, the pressures they face and pest control activities DOC has identified as necessary to ensure the priority lakes are protected.

TRANSCRIPT
My presentation will give the Department of Conservation's (DOC) perspective on when terrestrial pest control may be an appropriate management activity in lake catchments to improve the lakes' ecosystems. However before deciding on undertaking pest control in lake catchments a decision is made on whether the lake is a priority and whether pest control is really needed.

I have therefore divided this presentation into three parts. Firstly I will provide context around how DOC selects lakes for management and how it prioritises the work that needs to be undertaken at those sites. Then I will talk about when pest control in the catchments may be an appropriate management activity to address the lakes issues and finally we will use Lake Okataina as a case study.

The Government and the public have increased demands for accountability on Government Departments, therefore DOC like all other Government agencies is required to work within the Managing for Outcomes framework. This means DOC's work focus is on achieving long term results that have clear outcomes. DOC's overarching Outcome Statement is that:

> *New Zealanders gain environmental, social and economic benefits from healthy functioning ecosystems, recreational opportunities and living our history.*

Sitting under this overall outcome are what we call five intermediate outcomes and these relate to how DOC intends to do its work in the areas of natural heritage, history, recreation, engagement with the public and business opportunities. The key one relating to the protection of lakes and other ecosystems is:

> *The diversity of our natural heritage is maintained and restored.*

To maintain and restore New Zealand's natural heritage DOC has identified six things that need to be achieved:

1.1) A full range of New Zealand's ecosystems is conserved to a healthy functioning state
1.2) Nationally threatened species are conserved to ensure persistence
1.3) Nationally iconic natural features are maintained or restored
1.4) Nationally iconic species are managed to ensure their populations are maintained or restored
1.5) Locally treasured natural heritage is maintained or restored as partnerships
1.6) Public conservation lands, waters and species are held for now and future generations

The first two objectives 1.1 and 1.2 are about preserving representative functioning examples of ecosystems and preventing the extinction of threatened species. These are decided at a national level on cost-effectiveness and I will explain later how lake ecosystems fit into this. Objectives 1.3 and 1.4 are about nationally iconic features and species and what New Zealanders as a whole value. They will be prioritised based on input from the public. That is still to be done, but it is anticipated that a lot of the nationally iconic features are going to be in National Parks or big scale landscape features.

Objective 1.5 is about local treasures which are what communities value in their area, and it will depend on community interest and involvements. For example if a community values a lake that is not considered a national priority this is where the community can engage with DOC to protect it. What is still to be decided is the priority for resources in this area and the ones chosen may partially depend on their ability to draw on external funding.

Finally there is Objective 1.6. This covers the rest of DOC managed land. These sites will get basic management, for example, biosecurity, fire, legal protection and maybe fencing,

but not much else. This sounds really bad but it is not dissimilar to the current situation for much of public conservation land.

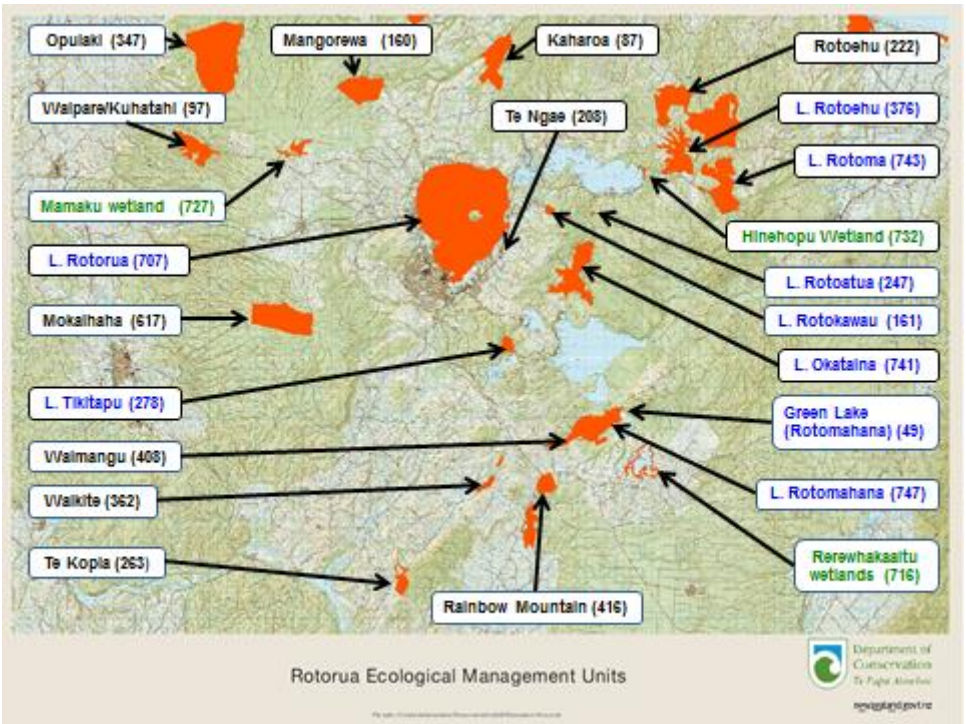
Addressing the first 5 objectives is a huge task. DOC's resources cannot stretch for everything everywhere. DOC therefore has to make decisions about what work to do and what not do, juggling limited resources or meeting both diversity and community needs.

How do we juggle these resources? Returning to Objective 1.1 'protecting national ecosystems', to help make decisions on which nationally important ecosystems need protection, and to identify the most cost effective projects at these sites, DOC has developed a national process called the Natural Heritage Management System, NHMS for short. It aims to maximise the conservation returns within a given budget and management constraints. It identifies the highest priority sites, both terrestrial and freshwater, that need to be protected and what work needs to be done at these sites.

To ensure that there was a full representative set of lakes in the best ecological condition included in NHMS, an expert working group considered information on about 3,800 lakes throughout New Zealand. The information used came from a number of sources including the Freshwater Ecosystems of New Zealand's data set. The type of lake, how pristine it is, its biodiversity and potential for recovery were all important considerations when making recommendations on which lakes should be included into NHMS.

In NHMS there are just over 1,000 terrestrial and freshwater sites that have been identified as important. Approximately 140 of these sites are lakes. All the sites were ranked as a whole, not separately for terrestrial sites and freshwater. For all the sites that are within NHMS DOC has looked at what pressures each site faces, what work needs to be done to address those pressures and a potential cost of the work. Currently DOC is at the point of prioritising which sites will have work undertaken. Unfortunately the amount of public funding will not extend to all of these 1,000 sites. There is going to be some hard decisions on what is the most cost effective work at which sites.

Slide 1



To give you a local flavour **Slide 1** shows the 23 ecosystems within the Rotorua Lakes area that are considered a national priority in NHMS. Nine of these are lakes and their national rankings range from 49 for Green Lake at Rotomahana to 747 for Lake Rotomahana itself. Admittedly there needs to be more fine tuning and over time some sites may be added and others dropped.

Once the lake has been identified as a national priority, or a local priority, it is important to understand what pressures the lake faces and decide on what work is required to address these pressures. There is no point undertaking work that will not address the problems that the lake actually faces.

Some examples of pressures identified for different lakes around New Zealand include:

- Loss of native catchment vegetation resulting in higher run offs, turbidity and declining water quality
- Invasive species such as macrophytes, pest fish and pioneer plants such as willows surrounding the catchment which in turn affects biodiversity, water turbidity and water quality
- Damming, inflow/outflow diversion altering the lake's hydrology and impeding fish passage
- Urbanisation, agriculture and animal pests surrounding the catchment altering water quality by increasing nutrient loadings in the lake

Leading on from this, DOC has identified what work is required to address the pressures. Examples here are:

- Advocacy through the RMA process whether it is submissions on regional plans or resource consents
- Riparian plantings
- Changing water management regimes for the lake
- Stakeholder education around pest species and surveillance control of pest species
- Fencing off water ways
- Pest control in lake catchments.

When might terrestrial pest control on a catchment scale be important for the lake? There are 4 potential areas where pest control may benefit the lake:

- Soil erosion and sediment yield may be affected by pest control
- Potential water run off rates into a lake
- Water quality
- As a holistic catchment based management approach.

While historical New Zealand science literature suggests pest animals were a significant contributor to erosion at a large catchment scale, much of it was anecdotal and non-quantitative. It is now considered largely incorrect. Natural influences such as tectonics, storm intensity and soil geological features have a far greater influence over erosion rates and animal pests at a catchment scale. The largest non-natural influence on erosion rates and sediment yield has been deforestation by humans.

The impacts of pests have largely been discounted when compared to other processes, so animal pest control for catchment scale is unlikely to address erosion issues and reduce sediment yield in a lake.

Deforestation can lead to increased water run off during rain fall events by up to 30-40%. However research indicates that there are unlikely to be detectable changes in water yield unless more than 20% of the catchment is deforested. So the effect of browsing on water yield is unlikely to be significant unless there is large scale canopy collapse and the forest is replaced by grass vegetation.

There is also some minor increase in run off rates as a result of animal pests significantly removing the understorey. However, it is probably not enough to affect lake water levels. Therefore if water yields are key, pressure on the lake pest control is unlikely to be effective in managing this and resources would be better directed to, say, re-vegetation.

The impact of animal pests on water quality is potentially important, however wild animal density is usually 2 to 3 orders of magnitude less than livestock. Their low biomass compared to livestock generally makes it a relatively minor factor in the overall catchment context. Therefore there is probably little point in undertaking pest control in catchments where a large part is under agriculture if you are trying to influence water quality levels in the lake. However, in catchments that are predominately in native forest the impacts of animal pests on water quality may become important and at that point pest control could help. There is also the issue of faecal contamination from pest animals but again magnitude between pest animals and livestock means it is probably going to be fairly minor.

The lack of direct evidence linking animal pests to changes in large scale catchment water quantity and quality does not suggest that they have no impact. All it shows is that their impact is smaller than other influences such as tectonics, large storms, deforestation and intensive agriculture. Therefore one cannot rule out completely pest control in catchments because accumulative impacts could still occur that

currently cannot be measured.

Environmental quality may be changing at a local or small scale that could be locally important, particularly to small lakes. There may be biodiversity benefits for native species that use the lake ecosystem. For example, terrestrial pest control in the Lake Hauroko catchment has been undertaken to protect mottled petrels that breed on the islands in the lake. Of course pest control will benefit the health of the forest ecosystem and the surrounding lake in an holistic approach.

What does this mean for Lake Okataina? It is a good example of a volcanic deep oligotrophic lake that has been ranked 741 in NHMS. It has a 6,290 hectare catchment and between 81% and 89% of the catchment is in native vegetation. While the lake itself is ranked in NHMS the surrounding catchment is not because the vegetation has been so highly modified through extensive logging. Additionally, pest numbers are high and the understory is in a poor state.

DOC staff have identified 3 main pressures that could affect Lake Okataina:

1) Lake macrophytes: lagarosiphon is present and hornwort is being controlled at the moment. But if other aquatic weeds are introduced they would alter the ecosystem.
2) Invasive fish: none, excluding trout, are present, but could have a significant impact if introduced.
3) While the water quality is high, phosphorus levels have increased which could potentially lead to a decline in water quality. I suspect that DOC staff may have talked to staff of both Bay of Plenty Regional Council and Rotorua Lakes Council when determining the pressures Okataina faces as these are the ones that have been identified through the LakesWater Quality Symposium and in council documents.

DOC has identified work required at Lake Okataina to address the pressures. For lake macrophytes and pest fish there are two key management tools. Advocacy work through education and stakeholder involvement is essential. It is far better to keep the invasive species out of Lake Okataina as it will be difficult to eradicate them if they become established. Hand in hand with the advocacy work there needs to be ongoing surveillance and if necessary control to prevent any more invasive species establishing.

There are two areas of work that have been identified to maintain and improve water quality. DOC sees advocacy work as critical to maintaining water quality. DOC has identified that promoting covenance and private forest remnants in the catchment, education, stakeholder involvement and engaging in the RMA process are particularly important. Secondly, since the majority of the catchment is native vegetation pest control in the surrounding catchment may help improve water quality at Lake Okataina.

An Animal Control Plan has been written, Cam Speedy is going to talk about that later, but if pest control is going to occur at Okataina to address water quality there needs to be ongoing monitoring to confirm that the pest control is effective at achieving the improvements required. In addition pest control has linkages to a region wide management of wallabies as part of a holistic approach, and Dale Williams will be talking about this in the next presentation.

In funding the work at Lake Okataina, the advocacy, and ongoing surveillance and control work is seen as a Rotorua Lakes' wide issue and will continue to be supported by DOC.

However a decision is yet to be made on whether DOC has the resources to undertake pest control in the lake's catchment as part of the NHMS process. Unfortunately the lake's ranking of 741 suggests there will be insufficient national funds available to do the work. However there is the ability to move the lake and its catchment into DOC's 1.5 Local Treasures priorities. The concept is that DOC would rate the lake highly under Objective 1.5 if there was significant community interest in it, including a willingness to contribute to the management costs.

In summary DOC has a process for prioritising where work will be done to achieve maximum benefits to New Zealand's natural heritage. Nine Rotorua Lakes including Lake Okataina have been identified as nationally important. DOC also recognises that even if lakes are not considered nationally important they may have local importance. While the impact of animal pests on water quality is generally considered small there may be a case for pest control in catchments that are predominately in native forests and where a holistic approach has been taken.

Finally DOC has identified pest control may be necessary in the Lake Okataina catchment if the lake's water quality is to remain high. What needs to happen now is a discussion between the Department of Conservation and the various Lake Okataina stakeholders on how to fund that control.