

13. PREDATOR CONTROL PLAN

13.1 INTRODUCTION

This Predator Control Plan describes the predator control programs for the protection specifically of great spotted kiwi (*Apteryx haasti*) and the local snail (*Powelliphanta* “patrickensis”) in and around the upper Waimangaroa Valley. Other bird, reptile, invertebrate and plant species will also benefit from these programmes.

The Kiwi Management Plan and *Powelliphanta* “patrickensis” Management Plan provide details of the management of these species.

Prior to this plan becoming operational the details will be confirmed with the Department of Conservation and Ngati Waewae. Consultation with the Department of Conservation is required if there are proposed changes to this plan, and the Consent Holder will be advised of any changes that are made.

13.2 OBJECTIVES

The predator control programme is designed to achieve the following objectives:

- To enhance the survival rates of great spotted kiwi and other endemic species (including plants) in a 1000 hectare treatment area near the site of the proposed mine for 30 years.
- To protect a population of the giant land snail *Powelliphanta* “patrickensis” in a 17 hectare fenced predator-free enclosure in the upper Waimangaroa Valley for 30 years.
- To increase survival rates and population size of *Powelliphanta* “patrickensis” over an approximate area of 19.9 square kilometres in the core part of its range by reducing impacts from possums, rats and, if necessary, other predators over a period of 30 years.
- To protect vegetation on the rehabilitated mine surfaces from browsing mammals.

13.3 PERFORMANCE STANDARDS / CONDITIONS

The requirement to prepare a Predator Control Plan is set out in Condition C41 of Land Use Consent No. RC03/164 as follows:

“A Predator Control Plan shall be prepared in consultation with the Department of Conservation which sets out the practices and procedures to be adopted to ensure compliance with the conditions of this consent and to ensure that all aspects of great spotted kiwi and Powelliphanta "patrickensis" management and habitat enhancement are carried out in an integrated manner and at the necessary stage of mining, to maximise the benefits of the programme for both species. The plan shall ensure that flexibility is retained in relation to the use of predator control methods such as poisons and other enhancement components to ensure that best practice methods are adopted to achieve the required outcomes.”

As set out in Condition C41 this Predator Control Plan is to include, as a minimum, the following matters:

- a. *The control of predators on kiwi, principally stoat and possum, within the treatment area shown on Attachment 3. Flexibility shall be retained in relation to the methods adopted to achieve the required outcome, such as but not limited to, the final location and boundaries of the treatment area.*
- b. *The control of predators within the mine site, including the rehabilitated areas and the 400 metre buffer surrounding the mine site.*
- c. *The means by which the predator free enclosure required by condition C39b shall be constructed, including details of fence design, location, construction and maintenance.*
- d. *The means by which any predators within the predator-free enclosure will be eradicated.*
- e. *The means by which predators on snail (principally possum, rat and if necessary, thrush) will be controlled in that area shown on Attachment 4.*
- f. *The monitoring that will be undertaken to assess progress towards the objectives of the management plan.”*

These matters are all addressed below.

Reporting:

General Condition A.17.2 requires reports on the activities and monitoring carried out under this plan as follows:

A17.2 The Consent Holder shall prepare and submit to the Consent Authority and to the Peer Review Panel an Annual Environmental Monitoring Report one month prior to each anniversary of the commencement of these consents. The monitoring period to be included in each report shall be for the 12-month period ending two months prior to the anniversary of the commencement of these consents. A copy shall also be provided to the Department of Conservation.

In addition, the Department of Conservation will be provided with a six-monthly update on any monitoring carried out in relation to this plan since the last Annual Environmental Monitoring Report was provided.

Prior to implementing this plan the Consent Holder will obtain all necessary approvals under the Wildlife Act 1957.

13.4 MANAGEMENT PROCEDURES

In brief, the proposal is to run four separate pest control programmes simultaneously, each targeting a different suite of pests in different areas, and each involving a different mix of techniques. All four programmes have to be flexible, so that they can evolve over time to accommodate new developments in control techniques. In addition, all of them must minimise harm to non-target species, since they will be undertaken in the presence of a diverse mix of protected wildlife, including weka. The proposed programmes are described in the following sections. Appendix 1 provides two figures (Attachments 3 and 4 of the resource consent conditions) which show the locations of the predator control areas.

13.4.1 Predator Control in the 1000 Hectare Treatment Area

This programme targets stoats, possums and rats, and aims to:

- Provide young kiwi less than 800 g in weight with year-round protection from stoats.
- Protect forest birds (kaka, kakariki, robin, tomtit, weka, tui, bellbird and kereru) during their breeding season (spring and summer) from the combined impacts of rats, possums, and stoats.

The specific management target is to ensure that an average of nine chicks survive each year in the treatment area to the safe-size of 800 g. As set out in the Kiwi Management Plan the number of kiwi will be monitored and adjustments to the methods and or boundaries will be made should monitoring indicate that the target is not being achieved.

Stoat Control

Stoats will be controlled mainly by intensive kill-trapping. Eight hundred kill-traps (Fenn traps or equivalents) will be positioned at an average density of one trap per 1.25 hectare throughout the entire treatment area, mainly at 100 m spacings, along major ridgelines. At each trap site, a single kill-trap will be set under a protective wooden cover, with a double mesh entrance to exclude weka. The traps will be baited with domestic hen eggs and operated continuously throughout the year, with fortnightly inspections in spring and summer, and monthly inspections in autumn and winter. Later on, different baits and lures will be tested and compared against hen eggs as new and possibly better alternatives become available. The traps will also take rats as by-catch.

Rats and Possums

Ground-based poisoning will be undertaken in the treatment area twice a year. Cereal baits with 1080 (or some other approved poison) will be used initially, but other Department of Conservation-approved poisons (such as cholecalciferol, cyanide paste, and perhaps 1080) will be substituted from time to time to reduce the chances of pests becoming 'bait shy'. Cholecalciferol and 1080 require permits for use on land administered by the Department of Conservation. Rodenticides with intermediate persistence will be used when (and if) they become available to maximise secondary poisoning of stoats.

The first poison operation will be in early October each year, to reduce rats (and possums as by-kill) to low densities during the breeding season of forest birds. The second operation will follow some eight weeks later to coincide with the period when stoats are most likely to reinvade the treatment area. The poison will be supplied in bait stations set out on a 100 m x 100 m grid. Each bait station will be positioned at least one metre above the ground, out of reach of weka. After each operation, uneaten bait will be collected and removed from the treatment area.

13.4.2 Predator Exclusion Area

Introduction

A predator exclusion area will be set up to cover an area of approximately 17 hectares to the west of the Cypress Mine site. The area will be securely fenced to a standard that will exclude possums, rats and stoats and will enclose snails.

The aim of fencing is to exclude all introduced mammals that either prey directly on snails, or indirectly increase predation rates by removing protective cover. Over time, the snail population within the exclusion plot should increase. When numbers reach high levels, some individuals will be moved out of the protected area to found new populations on the rehabilitated mine surfaces.

The advantages of this “crècheing” procedure in comparison with predator control without fencing include the following:

- Predator fencing provides a more secure, immediate protection for snails and other fauna as it is the only means available for maintaining sizeable parts of the mainland in an entirely pest-free state. Conventional pest control, using traps and poisons, cannot guarantee pest eradication and needs to be repeated regularly and perpetually to reduce pests to low levels.
- Intensive management such as supplementary feeding snails is possible in a predator-excluded area but problematical in a predator-controlled area where supplemented food may benefit predators and reduce the success of trapping or poisoning them. The decision as to whether to provide supplementary food will be discussed with the Department of Conservation
- Fencing will also exclude weka which could otherwise limit the recovery of snail populations in the protected area.
- Predation by song thrush may be more easily controlled (e.g., by removing anvil stones) within the fenced area than within a larger predator control area.

Fence Location

The fence will encircle an area of approximately 17 hectares in which a population of *Powelliphanta* “patrickensis” is known to be present. The proposed location of the enclosure is Whirlwind Rise in the Cypress Stream catchment. This area takes in almost the entire upper west catchment of Cypress Stream and comprises granite and coal measures geology and habitat with areas of red tussock, manuka scrubland and herbfields, including wetland herbfield associations of local and regional interest. It is immediately west of the planned north pit location.

A survey of the proposed fence area was carried out in November 2004 by Xcluder™ Pest Proof Fencing Company. This survey confirmed that the fence can be constructed with reasonable ease along the ridges of the catchment, mainly on open ground or in light scrub cover, requiring only minor clearance of vegetation. Specialised fence construction will be required along some parts of the fence-line and Xcluder

has experience in such construction (refer to Appendix 1 of this plan). Maintenance of the fence will be carried out via regular inspection. At the time of fence construction Xcluder's recommendations as to the monitoring and maintenance programme will be provided.

Presence of Snails

An abundance of snail shells was found in the enclosure area in 1998 (Buckingham 1998a). The presence of snails was confirmed in November 2004 when a time-based survey was carried out (Buckingham 2004 – summary report). This survey found 14 live snails in 12 120 minute plot surveys (1.17 live snails per plot) and 54 shells in the same plots (4.5 shells per plot). This compares favourably with the results found using the same technique within the mine-site. There the survey found 18 live snails in 29 120 minute plot surveys (0.62 live snails per plot) and 83 shells in the same plots (2.86 shells per plot).

Eradication of predators in the enclosure

Predators in the enclosure will be eradicated with a one-off aerial application of brodifacoum. Weka and adult kiwi (if any) will be removed from the enclosure before poison is applied. The bait will be distributed by hand along the inside margin of the fence to prevent spill-over into surrounding areas. The operation will be undertaken by licensed operators after the appropriate consents have been obtained from local authorities.

Pest monitoring and maintenance control operations

Routine monitoring and maintenance control programmes will be established within the enclosure after the initial eradication programme is completed. These will detect and remove residual animals (if any) and new ones that invade at some later time (almost a certainty). A network of 80 foot-print tracking tunnels, 40 wax chew-tags, 80 rodent snap-traps, 10 Fenn traps or approved equivalent (for stoats), and 10 bait stations (with encapsulated cyanide for possums) will be operated continuously in the enclosure, with inspections and bait replacement occurring at monthly intervals. The perimeter fence itself will also be inspected each month to trim overhanging vegetation, remove fallen branches and make repairs if necessary. Additional checks will be made after storms and heavy snowfall.

Song thrushes will also be removed from the enclosure (by shooting) if there is evidence that they are preying on *Powelliphanta "patrickensis"*. Likely anvil stones inside and around the enclosure will be inspected in spring, when thrush predation is most likely, and control will be initiated if shell remains are found nearby.

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Monitoring of snails and juvenile kiwi in the enclosure

At the time the fence is established a survey will be carried out to ascertain the density of snails within the protected area. Follow up surveys will be carried out at five-yearly intervals to assess the effectiveness of predator exclusion.

The enclosure will also be used as a site for rearing juvenile kiwi, provided that it is compatible with the *Powelliphanta* restoration programme. Kiwi could potentially eat *Powelliphanta* eggs and juveniles but they appear to seldom prey on adults, possibly because they cannot break open the large shells (Walker 2003). Juvenile kiwi will be relocated into the enclosure only during stoat plague years (about one year in four) and no more than 12 juvenile kiwi will be held in the enclosure at any one time. Droppings will be collected and examined to determine if they contain *Powelliphanta* remains. If evidence of significant predation is found, the enclosure will cease to be used as a kiwi crèche. The birds will instead be raised in captivity, or in a predator free enclosure somewhere else if there is one available.

13.4.3 Possum Control Elsewhere in the Range of *Powelliphanta* “patrickensis”

Preamble

Walker (2003) reports that *Powelliphanta* “patrickensis” has a patchy distribution within a range of about 1500 ha. However, additional surveys by Solid Energy New Zealand Ltd (Buckingham, 1998) and the Department of Conservation suggest a more extensive distribution of perhaps 3000 - 5000 ha. Counts of shells suggest densities are highest near the middle of its known range, in a more-or-less rectangular area of about 1200 hectare area straddling both sides of Deep Stream, on the eastern flanks of Mt Frederick State Forest. This appears to be the core habitat of the species, and where predator control is most likely to benefit the greatest number of snails. Shell counts also suggest that possums are the single most important predator of *Powelliphanta* “patrickensis” accounting for 31% of fatalities in a sample of 320 shells, and 64% of all predation losses (Walker, 2003).

Studies by the Department of Conservation indicate that possums have to be reduced to very low densities to protect snails, perhaps to levels that are barely detectable using standard residual trap-catch (“**RTC**”) procedures. The aim of this programme is control possums throughout the 19.9 square kilometre core area of *Powelliphanta* “patrickensis” to levels that promote snail recovery. An RTC rate of 3% is within the RTC range targeted in Department of Conservation programmes elsewhere and shown to be effective (Bockett 2004). This RTC will be adopted here.

Possum Control Programme

The possum control programme will take place over an area of approximately 19.9 square kilometres as shown on the attached figure. The programme will have three elements: a system to control possums; a system to index possum abundance; and a system for measuring the response of snails to possum control. The systems for monitoring possums and snails may have to be developed on site as techniques that are used for these animals elsewhere in New Zealand may not work well on sparse populations typical of those on the Stockton Plateau. Night-time counts will be evaluated as a way of monitoring snails; and wax tags will be tested as a way of assessing changes in possum numbers at low levels of abundance.

The treatment area will be treated with an aerial 1080 operation once every three to five years. It is almost certain to be effective if it is carried out in winter during fine weather. Possums will slowly re-invade the treatment area following initial knockdown, and maintenance control will be undertaken to suppress them at this time. A line of permanent bait stations (at 100 m spacings) along the 11 km perimeter of the treatment area will help to keep possums out. These will be loaded at all times, with bait replacement being undertaken every month. Cholechalciferol (Ferecol) and cyanide paste will be used in the bait stations, but other poisons may be used from time to time, provided that they are approved for use on possums by the Department of Conservation.

Maintenance control within the treatment area will be carried out with permanent bait stations along fixed transect lines approximately 500 m apart. Eight lines with a total length of 22 km will be established. About half of the bait stations will be permanently loaded with poison with the remainder being loaded with cyanide paste whenever possum densities exceed the critical threshold for control. At least one cyanide paste and kill-trapping operation will be undertaken inside the treatment area each year (encapsulated cyanide will not be used to avoid harming weka). Kill traps will be placed on raised sets (>700 mm above ground level) to prevent the accidental capture of flightless birds. During these annual operations the ground based hunters will concentrate on forest patches within the pavement habitats, and on other sites where fax chew tags have indicated the possums are present. Song thrushes will be controlled at the same time if sign at anvil stones suggests that they are having a significant impact on snails.

To achieve the desired RTC of less than or equal to 3% the programme will evaluate the surrounding terrain and vegetation types and will determine the trigger for any additional control. To ensure that animals are prevented from reinvading along the boundary a poison line will be set along the boundary and another line 500 m - 1 km outside the predator control target area and this will be permanently maintained. Experienced personnel will undertake this work and will adjust the programme boundaries if necessary to maintain the predator control area at the RTC target adopted. Annual monitoring of the RTC will be carried out as part of the programme.

13.4.4 Possum and Hare Control to Protect Vegetation in and Around the Mine Site

This programme aims to protect vegetation on the rehabilitated surfaces by reducing possum numbers to less than 3% RTC in the mine area itself, as well as in a 400 m wide buffer zone around it (i.e., over an area of about 300 ha). An intensive ground-based operation will be undertaken to achieve the initial knockdown, and thereafter periodic maintenance control with an anticoagulant or cyanide paste (in permanently mounted bait stations) will be undertaken at intervals of 6-18 months to keep RTC values below the 3% threshold.

Hares will be controlled by night shooting, in and around the open spaces of the mine, as required. Hares browse selectively on nutrient-rich foliage, and will be 'baited' to certain areas by applying fertiliser.

13.5 REFERENCES

Bockett, F 2004. Is possum control protecting *Powelliphanta* snails on the West Coast? Internal Department of Conservation Correspondence WAM 0113.

Buckingham, R.P. 1998. Surveys for *Powelliphanta* land snails in the upper Waimangaroa Valley, Blackburn-Orikaka pakihi, Mount Stockton and Mount Rochfort localities, South Island West Coast, New Zealand. Contract report No. 24/1 prepared for Solid Energy International by Wildlife Surveys. 11 pp. Plus maps.

Walker, K. 2003. Recovery plans for *Powelliphanta* land snails. 2003-2013. *Threatened species recovery plan 49*. Department of Conservation, Wellington.