

12. POWELLIPHANTA “PATRICKENSIS” MANAGEMENT PLAN

12.1 INTRODUCTION

Powelliphanta “patrickensis” is a threatened land snail endemic to the Denniston-Stockton Plateau. Its distribution extends to Mount Rochfort in the south-west, Mount Frederick in the west, St Pat’s Dam in the north and the crest of the Mount William range in the east. However, the largest populations of this snail are in the upper Waimangaroa valley where Brunner Coal Measures strata meet the Kaiata Formation mudstones (Walker 2003). Cypress Mine is located in an area where the snail is relatively common (Buckingham 1998, Thomas *et al.* 1997).

The Cypress Mine project will remove snails and their habitat within the areas to be stripped and mined. Some may survive within areas of direct transfer, however the snail population will be diminished and approximately 10% of its habitat will be removed. The mine site will be rehabilitated and rehabilitation is required by a condition of the resource consent (A14.4 (i)) to address the recreation of snail habitat (refer to the Rehabilitation Management Plan).

Snails within the mine area will be removed ahead of mining, transferred to a fenced predator-free enclosure and then transferred back into the rehabilitated mine area once habitat conditions there become suitable. The fenced area will be maintained for 30 years. In addition predators will be controlled over a 19.9 square kilometre area of core *Powelliphanta* “patrickensis” habitat for 30 years. The locations of the predator control area and predator exclusion (fenced) area are shown on the attached figure (which is Attachment 4 of the resource consent conditions). The predator control to be carried out is described in the Predator Control Plan.

This *Powelliphanta* “patrickensis” Management Plan describes the means by which snails will be removed from the mine area ahead of mining activities and the means by which the species will be monitored. It also describes the translocation of snails back to the mine area at the end of mining.

Prior to this plan becoming operational, the details will be confirmed with the Department of Conservation and Ngati Waewae and should any changes to this plan be necessary further consultation with these parties will take place.

12.2 OBJECTIVES

- To ensure the successful translocation of *Powelliphanta* “patrickensis” from the mine site ahead of mining activities and replacement in appropriate habitat once the site has been rehabilitated.
- To restore *P.* “patrickensis” populations by appropriate predator management.
- To ensure that appropriate monitoring is carried out within the areas to which snails are translocated and within the mine area once they have been translocated back.

12.3 CONDITIONS

Buller District Council Land Use Consent No. RC03/164 has the following requirements relating to *Powelliphanta "patrickensis"*:

Powelliphanta Management

- "C35. *The Consent Holder shall undertake a programme of Powelliphanta "patrickensis" management, the objective of which is to increase the population of Powelliphanta "patrickensis" in the vicinity of Cypress Mine while mining operations are in progress, and for a period of 20 years following cessation of coal extraction from the site.*
- C36. *Prior to undertaking any activities authorised by this consent the Consent Holder shall undertake a study which has the objective of removing as many Powelliphanta "patrickensis" as practicable from the proposed mining development area prior to mining and relocating them to the predator-free enclosure required by condition C39b, and/or if practicable and desirable (having regard to the genetic integrity of the Powelliphanta population in the receiving area) into the extended predator control areas, as referred to in condition C39c.*
- C37 *A Powelliphanta "patrickensis" Management 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.*
- C38 *The plan shall, as a minimum address the following:*
- (a) Methods to be adopted in an annual Powelliphanta "patrickensis" "search and collect" programme which shall be prepared with reference to the study required by condition C36, including details of habitat data collection, and the methods by which Powelliphanta are to be translocated to the predator exclusion area. The capture and relocation of Powelliphanta shall be undertaken in a staged manner in consultation with the Department of Conservation and Ngati Waewae. An annual average of two weeks "search and collect" time per year by a team of five people (10 days each) shall be undertaken, in a manner which enables the concurrent collection of habitat data for Powelliphanta.*
 - (b) The timing and means by which Powelliphanta will be translocated back into the rehabilitated mine area.*
 - (c) The monitoring that will be undertaken to assess progress towards the objectives of the management plan and predator control programme."*

Reporting:

As set out in General Condition A.17.2 reports on the activities and monitoring carried out under this plan are required 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.

12.4 CONTEXT

The development of Cypress Mine will remove a proportion of *Powelliphanta* habitat that is estimated at approximately 10% of the species' total habitat area. The localised distribution of this species, which is endemic to the Stockton and Denniston Plateaux, and the threats to it from loss of habitat and introduced predators, are such that mitigation of habitat loss and predator impacts are required.

12.5 MITIGATION PROPOSED

12.5.1 Pre-Mining Survey

Objectives

- To evaluate the distribution, relative abundance and habitat preferences of *Powelliphanta* "patrickensis" within the mine footprint and proposed exclusion fence area.
- To provide a pre-mining *P.* "patrickensis" sampling method that can be replicated after mining has finished.
- To investigate the feasibility of using nocturnal snail searches as an appropriate sampling and translocation method.

Mine Footprint Area

Within the mine footprint area a time-based plot survey for live snails was carried out in November 2004 along approximately east –west transects 250 m apart, with the plots 200 m apart. Extra plots have been put in place where habitat is restricted. The plot size is 10 m x 10 m.

Exactly two person hours were spent searching for live snails per plot, stratified into quarter hour blocks per person, with three to four observers present.

Within the plot all empty shells were collected and labelled, (permit obtained from Department of Conservation). These shells are to go to Kath Walker or to another Department of Conservation nominee.

Live snails were measured and kept moist, then put back into the location at which they were found.

Details of habitat have been recorded, including:

- Date, time, weather conditions.
- Grid reference.
- Habitat type, vegetation, notes on plant species.

In addition to the day-time surveys, nocturnal surveys have been carried out using a transect based approach, walking a line at night with torches with a two person (minimum) team. Counts were made along marked 200 m transects established within the site. All live snails were counted within 2 m each side of the transect line with distance measurements made to enable density to be estimated. The snails were measured to evaluate age structure of the population. Weather conditions are recorded at the permanent weather station in Happy Valley. In addition, basic weather conditions (min/max temperature, wind direction, rainfall) were recorded during each day of survey.

A total of 33 live snails found on 21 nocturnal surveys suggests that the method may be useful both for monitoring population trends and translocating snails.

Exclusion Area

Within the proposed exclusion fence area west of Cypress Stream a similar time-based plot survey has been carried out. This survey used the same methodology as above, with the exception that plots were more closely spaced to allow sufficient sampling over a 15-20 ha area - plots approximately 150 m apart. This has established the presence of snails within the area, at apparently higher densities than in the proposed mine footprint area.

12.5.2 Translocation of Snails

Moving snails from the proposed development area prior to mining will require an intensive “hands-on” search involving staff trained in searching for and handling live snails. This will include nocturnal searches on appropriate nights in relation to weather conditions.

Annual collections will be undertaken within the mining area with the aim of removing as many live snails as possible from the area to be mined over the ensuing year. Collection will involve at least two weeks “search and collect” time, utilising a team of at least five people (a total of 50 person days per year as required by resource consent condition C38).

All translocation operations will be undertaken in consultation with the Department of Conservation and Ngati Waewae.

In parallel to the “search and collect” operations, data will be collected pertaining to the habitat of *Powelliphanta patrickensis* as set out in 12.5.1 above, and in general accordance with resource consent condition C38.

The snails will be collected by hand and placed into damp, dark conditions on Sphagnum or similar substrate, within a weatherproof container lined with cardboard.

Litter and soil will be removed from the collection sites and placed in the containers to provide cover and food for the snails being moved. They will be moved as quickly as possible to the target site and placed into habitat as similar as possible to the area from which they were removed.

Other species of *Powelliphanta* snails have been artificially translocated and have successfully re-colonised (Walker 2003). Of the seven known cases described in Walker (2003, Appendix 4) most transfers have survived as low-density populations limited by predators or stock. However, a population of *P. gilliesi* (*subfusca*?) transferred from an unknown location to Kings Park Reserve, Greymouth (believed to have been in the 1930s) have formed a substantial population. Providing care is taken in transferring the fragile-shelled *P. "patriciensis"*, and predators are eliminated at the restoration site, colonisation should be successful based on these records.

12.5.3 Re-establishment of Snails to Rehabilitated Sites

As part of the sequential rehabilitation process after mining and subject to approval by the Department of Conservation, snails will be relocated to the restored areas of the pits.

Similar methods to those used in the initial capture and relocation exercise will be adopted when they are returned to the rehabilitated mine area.

Management of the rehabilitated area after relocation will include continued predator control and weed control, the details of which are provided in the Predator Control Plan and Weed Management Plan.

It will be important to ensure rehabilitated habitat retains similar conditions as original habitat (especially relating to drainage, water and soil quality, litter depth etc.) to maintain snail populations. A contingency/response plan to protect the area from the risk of fires is also very important.

Translocation of snails back to the rehabilitated site will be carried out when the rehabilitated vegetation has developed reasonable cover and litter layers (likely to be 15+ years).

The Rehabilitation Management Plan contains specific provisions to ensure that rehabilitation methods will be developed to provide and maintain habit types that are suitable for this species. The surveys carried out show that the habitats within which the species is found naturally include low shrubland, forest and tussock vegetation generally with a well-developed litter layer providing shelter. Gahnia, flax wire-rush and tanglefern are favoured habitat, with the snails being found around the base of the plants, so these plant species will be encouraged in rehabilitation.

12.5.4 Monitoring Snails

Objectives

- To evaluate population trends of *Powelliphanta* “patrickensis” and the effectiveness of predator exclusion and control management.
- To monitor the effects of translocation and re-colonisation on snail populations

Monitoring the effects of predator exclusion and control on snails

Prior to translocation from the proposed mine site, the predator exclusion area will be surveyed using standard 10 m x 10 m permanent plots (Walker 1997) to estimate the number of resident snails present. The number of plots to be used is based on work carried out by Department of Conservation elsewhere (Bockett 2004). The same method will be used to estimate densities of snails in a paired non-treatment area (i.e. an area of similar habitat and topography where snails are present outside the exclusion fence). Following discussion with Department of Conservation in October – November 2004 it was agreed that monitoring will be carried out both before and after predator control. Thus the effects of predator control on *Powelliphanta* populations will be evaluated using data from before and after the commencement of predator control. Additional plots will be monitored in an area where no predator control is carried out (such as on the Denniston Plateau) at five yearly intervals, consistent with snail reproductive and growth rates.

Monitoring will be carried out both within the enclosure area at Whirlwind (upper western Cypress Stream catchment) and in a comparative area nearby (either on the southern side of Whirlwind rise or on “little Whirlwind Rise” which lies slightly to the north). Predator control will be carried out over the comparative area as part of the broader pest control programme covering 19.9 square kilometres. The monitoring in the pest control area outside the enclosure will allow statistical comparison of the results of the two different intensities of control.

The monitoring is summarised as follows:

Before the predator controls and eradication procedures begin: survey 15 10 m x 10 m permanent plots which will be established within the enclosure area at Whirlwind Rise and 15 10 m x 10 m plots which will be established in a similar area nearby.

Annually for five years thereafter: resurvey to establish that the results of the surveys are consistent and assess annual variability if this exists.

Three-yearly for six years thereafter: resurvey to evaluate changes in the population. Results from other snail recovery programmes indicate that population recovery should be evident by 11 years after commencement of predator control.

Five yearly thereafter: resurvey until 30 years after the predator control began.

At 5 yearly intervals survey shells and live snails in 15 10 m x 10 m plots in an area where no predator control is being carried out.

Monitoring the effects of translocation of snails to rehabilitated mine areas

After mining ceases, **habitat inspection** will be periodically carried out within the rehabilitated area to evaluate habitat conditions considered suitable for snails to be translocated back to the site. Once appropriate habitat has developed a **trial transfer** of snails from the predator exclusion area will be carried out. **Monitoring** of these snails will be carried out six monthly for a year (twice) in the transfer trial locations and then the results assessed. This monitoring will be via 10 m x 10 m plots as per accepted methods and the number of these will be determined when the scale of transfer has been decided at the time of the trial transfer, in consultation with the Department of Conservation.

Should survivorship be similar to that recorded in the predator control area then the transfer of snails will become operational. Otherwise further transfers will be delayed until a further trial (or trials) has been carried out.

Once the habitat has developed sufficiently to allow **operational transfer** then snails will be translocated back to the rehabilitated mine site in a staged manner over a period of three years, with annual **monitoring** (permanent plot surveys, and possibly nocturnal surveys) carried out to evaluate densities and age structures of translocated (and re-colonising) snails. The monitoring will involve permanent plot surveys in 10 m x 10 m plots that will be established when the snails are transferred back to the rehabilitated area. Monitoring will thus target the survivorship of snails translocated back to the pit and will allow a picture of the population recovery to be built up over time. The frequency of monitoring would be annually for the three years of transfer and then five yearly, timed to run in tandem with the five yearly surveys being carried out in the enclosure and predator control areas nearby.

Monitoring methods

Monitoring snails to evaluate the effects of predator exclusion (and control if possible) will involve establishing permanent grid plots to provide a reliable estimate of live snail density (as described in Walker 1997). Mark and recapture methods have much to offer and will be implemented subject to permission from the Department of Conservation and the National Animal Ethics Advisory Committee). Monitoring *Powelliphanta* would be considerably advantaged if the snails to be relocated from the mine site to the fenced enclosure are suitably marked (e.g., a minute metal or plastic tag glued to the outer surface of the shell). As described above, monitoring the success (or failure) of re-colonisation of snails to rehabilitated sites is best achieved through a time-based plot survey and nocturnal survey as currently being carried out in the mine footprint area (see 12.5.1).

12.6 REFERENCES

- Bockett, F undated. 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.

- Thomas, B; Toft, R.; Mason, R. 1997. Fauna of the proposed Northern Opencast Development, Waimangaroa Valley, Buller Coalfield. Landcare Research Contract Report LC9798/41 prepared for Kingett Mitchell and Associates Ltd, Auckland. 33 pp.
- Walker, K. 1997. Techniques for monitoring populations of *Powelliphanta* land snails. *Ecological management No. 5*. 81 pp.
- Walker, K. 2003. Recovery plans for *Powelliphanta* land snails. 2003-2013. *Threatened species recovery plan 49*. Department of Conservation, Wellington.

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