

**Review of Terrestrial Fauna
in the Ngakawau, Millerton, Stockton and upper
Waimangaroa areas**

In regard to

**The proposed Managatini hydro-electric power
scheme**

Prepared for

Hydro Developments Ltd

**by Wildlife Surveys unlimited and Waybacks
Ltd**



Kereru in coastal forest

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1.0 Introduction

Hydro Developments Ltd (HDL) has been established to investigate and promote the development of a run-of-the river hydro-electric generation scheme on the water catchments draining the Stockton Plateau, Buller. The area contains numerous coal mines, both current and historic. Leachate from these mines contaminates the streams that flow off the plateau with various acids and heavy metals. Currently these streams flow into the Ngakawau River and then on to the Tasman Sea. The scheme's proposed construction route (as of September 2007) traverses The Stockton Plateau and forested coastal slopes, beginning at St Patricks Dam and terminating 2 kilometres south of the Ngakawau River mouth (Figure 1.) Although the impact area of the proposed scheme is relatively small (136 ha), some parts of it will be inundated, resulting in the localised loss of some terrestrial habitats. The proposed scheme lies within the Ngakawau Ecological District.

The proposed development traverses a wide range of habitats including pakahi grassland, coal-measure scrub, rock platform and podocarp/beech forest. Some of these habitats contain diverse fauna, including several species of giant land snails endemic to the region. Bats have been recorded in the general locality, as well as a range of threatened birds such as great spotted kiwi, western weka, kereru and fernbird (Buckingham 1998a, b & c; Kingett Mitchell & Associates Ltd. 1997a & b; Kingett Mitchell & Landcare Research 1997; Overmars *et al.* 1998; Sustainability Solutions Ltd. 2005; Thomas & Toft 1997; Thomas *et al.* 1997; Wildlife Surveys 2002).

The flora and fauna of the general area are well described, chiefly because of investigations undertaken by Solid Energy NZ Ltd. This document reviews the previous surveys that have been undertaken in and around the impact zone, and provides a brief description of the fauna present in each of the main habitat types. The detailed results of a recent survey (November-December 2007), aimed at describing the wildlife in the habitats between the coastal slopes and St Patricks Stream, are reported elsewhere (Waybacks Ltd & Wildlife Surveys 2008).

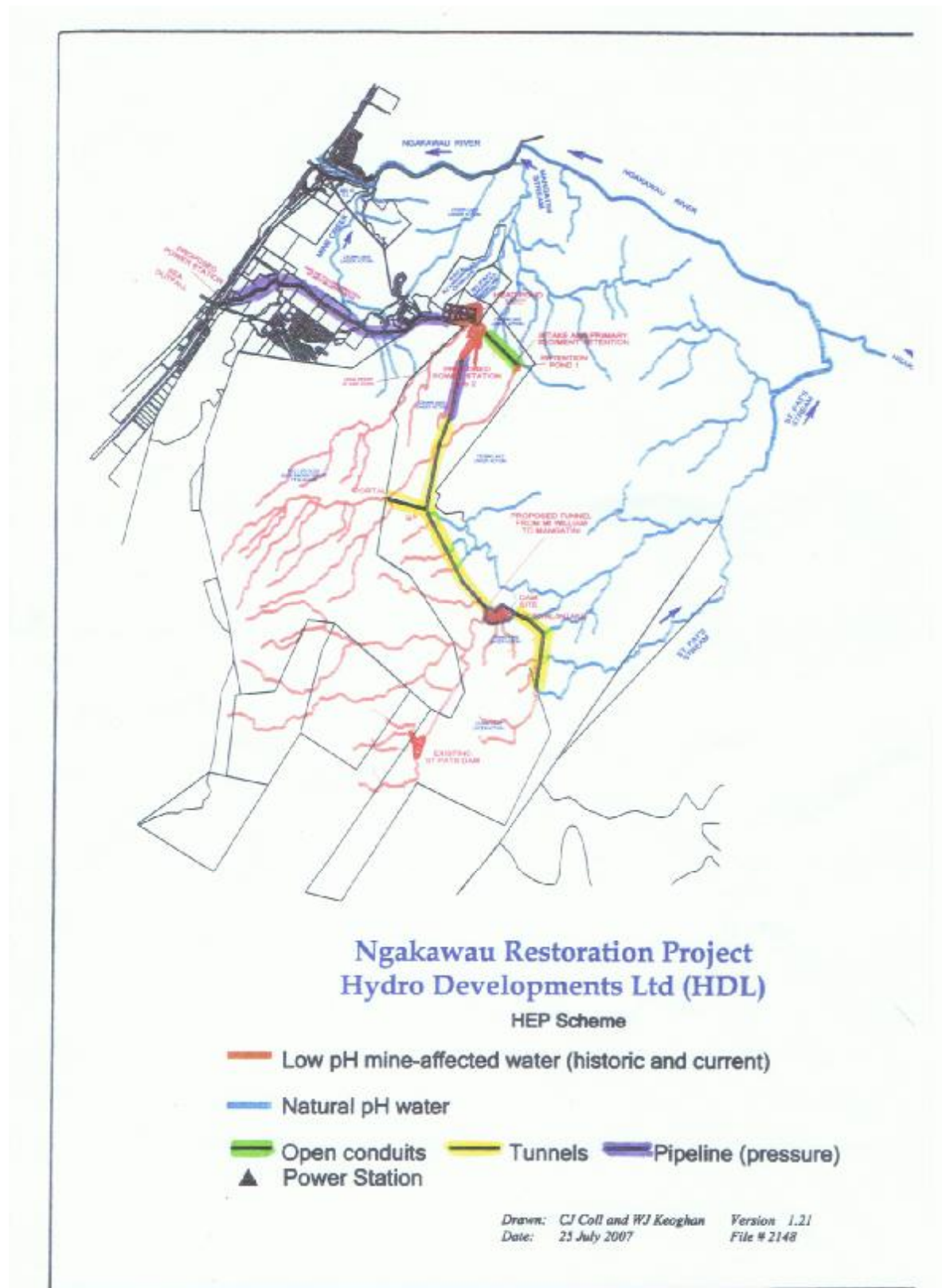


Figure 1: Proposed Mangatini hydro-electric power scheme plan (Dec 2007).



Figure 2: Looking over the proposed Lake William retention pond area in the foreground and down the path of the proposed pipeline towards the Mangatini Stream.

Source of relevant literature

General

- Earlier wildlife surveys carried out by New Zealand Wildlife Service (Morse 1981).
- Ngakawau Ecological District surveys (Overmars *et al.* 1998).
- Fauna surveys for Solid Energy Ltd (Buckingham 1998a, b & c, 2005b, c & d; Kingett Mitchell & Landcare Research 1997; Thomas & Toft 1997; Thomas *et al.* 1997; Wildlife Surveys 2002, 2005).
- Fauna surveys for Timberlands West Coast Ltd (Buckingham 1999, 2002a, 2005a).
- Fauna surveys for Restpine Ltd, Whareatea West Exploration Permit, Denniston Plateau (Buckingham 2002b).
- Fauna surveys and review, Department of Conservation (Bockett 2001; Walker 1987, 2003).
- Cypress Mine: Resource Consent applications and assessment of environmental effects document for Solid Energy New Zealand Ltd. 2003.
- Cypress Mine Environment Court evidence for Solid Energy New Zealand Ltd, 2005, and other evidence.
- Environmental assessment, Millerton Road for Maunsell, Hamilton (Sustainability Solutions Ltd 2005).

Specific

- Fauna surveys for Solid Energy Ltd (Buckingham 1998a, b & c; Kingett Mitchell & Landcare Research 1997; Thomas & Toft 1997; Thomas *et al.* 1997; Wildlife Surveys 2002).
- Distribution and status of *Powelliphanta* land snails. NZ Wildlife Service (Walker 1982).
- Lizards in the Buller region (Whitaker & Lyall 2004).
- Threatened fauna database (Department of Conservation, Hokitika).

2.0 Review of Terrestrial Fauna

The proposed hydro-electric power scheme traverses coastal hills and the northern part of the Stockton plateau within the Ngakawau Ecological District (Figure 1). This area contains a diverse assemblage of habitats and fauna including nationally threatened species, some endemic to the area (Table 1). A substantial proportion (c. 40%) of the intended development passes through coal-measure habitat that is becoming rare in its natural state. However, coal mining, roads and other developments have modified much of this area.

Several threatened birds including great spotted kiwi, western weka and South Island fernbird are known to be present in the general area. Also present are a range of other threatened fauna including four *Powelliphanta* land snail taxa, the West Coast green gecko and the long-tailed bat. The fauna is described in more detail below.

2.1 Mammals

2.1.1 Indigenous mammals (Bats)

Bats (probably long-tailed bats) have been recorded in the Ngakawau Ecological District in the upper Waimangaroa River (Thomas *et al.* 1997) and in other nearby locations (Buckingham 2006a; Morse 1981). The bats recorded by Landcare Research in the upper Waimangaroa Valley in March 1997 have not been detected again (Buckingham 1998b; Wildlife Surveys 2002). During February-March 1998 and February 2002, no bats were detected in a total of 654.5 hours of automatic detection at a range of habitat sites within the upper Waimangaroa valley area. These results suggest that bats visit the area infrequently, in low numbers. In general, bats appear to be less common in the Ngakawau Ecological District than in other parts of the West Coast (Buckingham 1999, 2002a). The author (RB) has not detected bats at any site between the Mokihinui River gorge and the lower Inangahua River valley, despite sampling extensively in a number of different places, and in a number of different habitats. Short-tailed bats have not been recorded in the Ngakawau Ecological District, the nearest known population being in the Oparara valley near Karamea (Lloyd 2001).

2.1.2 Introduced mammals

Red deer, possums, hares, stoats, feral cats, rats and mice are present in the area (Bockett 2001; Thomas & Toft 1997; Thomas *et al.* 1997). Localised populations of pigs and goats are also present (Overmars *et al.* 1998; M. Bygate, pers. comm, February 2008).

The primary threats to indigenous fauna are possums, stoats and rats. Possums and rats prey on *Powelliphanta* land snails (Bockett 2004; Walker 2003), while stoats (and feral cats) are a threat to young kiwi (McLennan *et al.* 1996) and other birds. From a large collection of *P. "patrickensis"* shells collected in 1998, 31 % of shells in which predator damage could be assessed showed sign of possum damage. Possums were also found to be a significant threat to *Powelliphanta lignaria johnstoni* at Charming Creek (Walker 1982, 2003). In general, possums are the main predator of *Powelliphanta* snails at higher altitudes while rats can be significant predators of

snails at lower altitudes (Walker 2003). Stoats are the main threat to kiwi and probably weka, while stoats, possums and rats impact on a wide range of other birds. The Department of Conservation (DoC), West Coast Regional Council (WCRC) and SENZ regularly carry out possum control in parts of the area proposed for development. Rat and stoat control is currently being carried out in local areas in the Stockton Plateau area (Mike Bygate, pers. comm., August 2007).

2.2 Birds

Up to the recent survey in November 2007, formal bird surveys have been carried out only in the upper part of the proposed development (i.e. upper Waimangaroa/St Patricks Stream area). Bird abundance and distribution varies considerably throughout the proposed development area due to the range of habitats present. The area from the Ngakawau River mouth to near Millerton is largely forested whereas high-altitude areas are extensively pakahi tussock and scrubland, and rock-pavement habitat. Numbers of bird species and abundance of individuals are also likely to vary seasonally, with changes in food availability (e.g. flowering rata) and arrivals of migrant species (e.g. shining and long-tailed cuckoo). Highest concentrations of birds are typically found in forest habitat.

A total of approximately 42 species of birds have been recorded in the wider area from the Mokihinui River, through the Stockton and Denniston plateaux to Mt Rochfort (Buckingham 1998c, 2002a & b, 2005b, c & d; Kingett Mitchell & Landcare Research 1997; Thomas & Toft 1997; Thomas *et al.* 1997; Wildlife Surveys 2002, 2005) including 30 indigenous species and 12 species classified as threatened (Hitchmough *et al.* 2007) (Table 1). Of these threatened species, great spotted kiwi, western weka and fernbird are perhaps of most conservation concern regarding the proposed development (in terms of threat status and numbers that would be affected). Most impact on these species would occur during the construction phase, but the provision of appropriate mitigation (e.g. avoiding construction during the peak breeding seasons of threatened birds) would reduce overall impacts.

Threatened species that may be adversely affected by the proposed development (at least in the construction phase) are detailed below.

Great spotted kiwi

The bird species of most conservation importance in the proposed development area is the great spotted kiwi, though within this area, kiwi are likely to be relatively uncommon (Buckingham 2002a, 2005a; Kingett Mitchell & Landcare Research 1997). Kiwi are relatively numerous in the nearby Mt William Range, and in the Stockton Plateau coastal ridge/escarpment area (Kingett Mitchell & Landcare Research 1997; Wildlife Surveys 2002; pers. obs.). Relatively few kiwi have been recorded between the Mount William Range and the western escarpment (Kingett Mitchell & Landcare Research 1997) probably because of limited habitat available to them there. Kingett Mitchell & Landcare Research (1997) found higher kiwi call rates at the Mount William Range and Blackburn Pakahi than at the upper Waimangaroa valley and Ngakawau River (2.5 and 2.93 cf. 0.94 and 1.50 respectively). Low numbers of kiwi have been recorded in the Mokihinui River catchment (Barnett & Stilwell 1993; Buckingham 2002a) and no kiwi were recorded in coastal forest near Ngakawau on a recent survey (Waybacks Ltd & Wildlife Surveys 2008). Thus the

proposed hydro scheme appears to be within the transitional zone between moderately dense and sparse (presumably declining) kiwi populations.

Table 1: Threatened fauna and distribution known to be present in the general area of the proposed development

Common Name	Scientific Name	Distribution	Threat status
Long-tailed bat (Sth Is.)	<i>Chalinolobus tuberculata</i>	Widespread	Nationally Endangered
Great spotted kiwi	<i>Apteryx haastii</i>	Regional	Gradual Decline
Black shag	<i>Phalacrocorax carbo</i>	Widespread	Sparse
Grey duck	<i>Anas superciliosa</i>	Widespread	Nationally Endangered
NZ falcon (bush)	<i>Falco novaeseelandiae</i>	Widespread	Nationally Vulnerable
Western weka	<i>Gallirallus a. australis</i>	Widespread	Serious Decline
Kereru (NZ pigeon)	<i>Hemiphaga novaeseelandiae</i>	Widespread	Gradual Decline
South Island kaka	<i>Nestor m. meridionalis</i>	Widespread	Nationally Endangered
Kea	<i>Nestor notabilis</i>	Widespread	Nationally Endangered
Yellow-crowned Kakariki	<i>Cyanoramphus auriceps</i>	Widespread	Gradual Decline
Long-tailed cuckoo	<i>Eudynamys taitensis</i>	Widespread	Gradual Decline
Rifleman	<i>Acanthisitta c. chloris</i>	Widespread	Gradual Decline
South Island fernbird	<i>Bowdleria p. punctata</i>	Widespread	Sparse
Nelson green gecko	<i>Naultinus stellatus</i>	Regional	Gradual Decline
West Coast green gecko	<i>Naultinus tuberculatus</i>	Regional	Sparse
Speckled skink	<i>Oligosoma infrapunctatum</i>	Widespread	Gradual Decline
Brown skink	<i>Oligosoma zelandicum</i>	Widespread	Sparse
Koura (freshwater crayfish)	<i>Paranephrops planifrons</i>	Widespread	Gradual Decline
Giant land snail	<i>Powelliphanta lignaria</i> 'millertoni'	Highly localized	Nationally Critical
Giant land snail	<i>Powelliphanta</i> "patrickensis"	Local & limited	Nationally Endangered
Giant land snail	<i>Powelliphanta lignaria</i> <i>johnstoni</i>	Mod. Widespread	Nationally Endangered

Note: threat classification after Hitchmough *et al.* 2007

Although low in numbers, kiwi are probably present throughout the proposed development area. They are also probably present at low altitudes near the Ngakawau River as they inhabit coastal forest elsewhere in the vicinity (Buckingham 2005b; Dan MacKinnon, pers. comm., 2000). Records of great spotted kiwi are known from near Millerton, and at Mine Creek (Sustainability Solutions Ltd. 2005).

Kiwi live mainly in forested areas though they sometimes feed in open habitats at night. It is probable kiwi will be using most of the habitats in the project footprint (Figure 1) and will lose access to some of them if development proceeds. Mitigation for kiwi will therefore be required (e.g. allowing kiwi access across pipelines and predator control protection).

Great spotted kiwi are most vocal in mid-summer (McLennan & McCann 1991). They lay most eggs between July and December (Heather & Robertson 1996).

Black shag

Black shags are present in low numbers throughout wetlands in the general area. They have been recorded at St Patricks Dam (Overmars *et al.* 1998; Thomas & Toft 1997; Thomas *et al.* 1997).

Western weka

Weka are present throughout the proposed development area in relatively low numbers compared to their stronghold areas (e.g. Reefton to Hokitika) (Buckingham 2002a; Thomas & Toft 1997; pers. obs.). In both the Charming Creek area (north of the Ngakawau River) and upper Waimangaroa valleys where most bird surveys have been carried out, weka have been found to be widespread though not particularly abundant (Buckingham 2002a; Thomas & Toft 1997; Thomas *et al.* 1997).

Weka occupy a range of habitats including indigenous forest, exotic forest and shrubland. They are relatively quiet during their peak breeding season, August to January (Beauchamp 2000; Heather & Robertson 1996). Weka live within the project footprint (Figure 1) in a range of habitats (Waybacks Ltd & Wildlife Surveys 2008).

Kereru

Kereru (New Zealand pigeon) are most common in the lowland, forested part of the proposed development area. They are not often recorded in the upper part of the scheme area (Buckingham 1998b; Thomas *et al.* 1997; Waybacks Ltd & Wildlife Surveys 2008), but do visit it seasonally. Kereru typically move out of the forest habitat in late winter or early spring and may be seen in groups feeding on willow, broom, lucerne or kowhai. Kereru breeding is closely linked to food availability though the main breeding season begins in spring and ends in late summer (Heather & Robertson 1996).

South Island kaka

Kaka are generally encountered only occasionally in the Ngakawau River area (Charming Creek) and upper Waimangaroa valley area (Buckingham 1998c, 2002a; pers. obs.) though they were very conspicuous in January 1996 on the forested upper slopes of the Mt William Range (Thomas & Toft 1997) when groups of up to 10 individuals were seen. Surveys indicate that kaka are more common in other parts of the Buller region such as at Orikaka Forest and the Inangahua valley near Reefton (Buckingham 1999, 2002a; Crook *et al.* 1977).

Kaka are usually found in tall forest, Kaka usually lay between September and January, but breed only in years of high food abundance (e.g. beech masting) (Wilson *et al.* 1998).

Kea

Kea have been occasionally recorded in the Mt William Range and upper Waimangaroa Valley in low numbers (Thomas & Toft 1997).

Kakariki

Yellow-crowned kakariki (parakeets) are present in the area but are not common. Kakariki, like kaka, are mainly recorded in taller forest habitat. Within the upper Waimangaroa valley area, kakariki are most commonly recorded on the east side of the Mt William Range and in the Blackburn/Orikaka valley area (Buckingham 1998c). Kakariki were encountered moderately frequently in the Charming Creek area (Mokihinui Forest) in 2001 (Buckingham 2002a).

The kakariki breeding season is variable and related to food availability. During beech mast or podocarp mast years they can breed throughout the year (Elliott *et al.* 1996). Kakariki, during nesting, are highly vulnerable to stoat predation.

Rifleman

Riflemen are becoming rare and isolated in lowland forests of Buller and north Westland (Buckingham 1999, 2002a) and have recently been given a threat status ranking (Hitchmough *et al.* 2007) (Table 1). Although riflemen are relatively common in higher-altitude forest on the Mt William Range (Buckingham 1998c; Thomas *et al.* 1997) and western escarpment, they are uncommon and possibly absent altogether in the area proposed for hydro development (Waybacks Ltd & Wildlife Surveys 2008).

South Island fernbird

Fernbirds are found throughout coal measure shrubland, semi open pakihi, swampy areas and forest margins on the Stockton Plateau, and more widely in similar habitat throughout the Ngakawau Ecological Area (Buckingham 1998c, 2002a & b; Kingett Mitchell & Landcare Research 1997; Thomas & Toft 1997). Particularly high densities of fernbirds were noted in Blackburn pakihi, parts of the Denniston Plateau, and the Rome Ridge area between the Stockton Haul Road and the Ngakawau Gorge (Buckingham 1998c; Kingett Mitchell & Landcare Research 1997; pers. obs.). Fernbirds were also found to be common throughout suitable habitat within and around the proposed development area, particularly pakahi scrubland in the Mangatini Stream area (Waybacks Ltd & Wildlife Surveys 2008).

Fernbirds are most conspicuousness in early spring when call rates increase. Seasonal changes in conspicuousness need to be considered when interpreting the results of different surveys



Figure 3: A visually inconspicuous South Island fernbird

Non-threatened birds

Tomtits, grey warblers, fantails, bellbird, and tui are present throughout the general area, with higher numbers of individuals in lower altitude forest areas. Tui and bellbird are particularly conspicuous when rata is flowering. Introduced chaffinches, redpolls, song thrushes, blackbirds and dunnocks (hedgesparrows) are also common or moderately common throughout. Less common, and often patchy in distribution, are robins and brown creepers.

Blue penguin are known to be present at low levels along the foreshore area between the Nagkawau and Waimangaroa river mouths (Blyth et al 2006).

2.3 Lizards and amphibians

Whitaker & Lyall (2004) summarised existing distribution records for lizards in Westland. Records for the greater Stockton area include the speckled skink (*Oligosoma infrapunctatum*, at several coastal sites), the Denniston skink (*Oligosoma* aff. *infrapunctatum*, Denniston Plateau); the brown skink (*O. zelandicum*, at several coastal sites); the forest gecko (*Hoplodactylus granulatus*, on the Denniston Plateau); common gecko (*Hoplodactylus maculatus*, just north of Mokihiui); and the West Coast green gecko (*Naultinus tuberculatus*, at several sites along the coast and on the Denniston Plateau). The Denniston skink is no longer regarded as being distinct from *Oligosoma infrapunctatum* (Tony Whitaker, pers.comm., 2007).

Landcare Research carried out comprehensive surveys for lizards in the upper Waimangaroa valley during 1995-1997 (Thomas & Toft 1997; Thomas *et al.* 1997). These surveys involved a total of 120 lizard pitfall trapping days and more than 45 person-hours of search effort by experienced herpetologists. Despite this effort, few lizards were found indicating low population densities. The only lizard positively identified was a female forest gecko found under a loose thin slab of sandstone on 1 November 1995. West Coast green geckos are also known from the area, and an unidentified brown skink was seen in March 1997 in tussock at Happy valley (Thomas *et al.* 1997).

Four forest geckos and numerous speckled skinks were found in late November 2007 (Waybacks Ltd & Wildlife Surveys 2008). Three of the forest geckos were found at the proposed Lake William area under rock slabs in stony habitat while the other was found at night between the proposed Lake Weka and the Coast. Speckled skinks were found on the beach near the mouth of the Ngakawau River. In early 2007, Landcare Research carried out comprehensive lizard surveys for Solid Energy NZ Ltd (SENZ) in the Mt Frederick area of the Stockton Plateau but no lizards were found (report in preparation).

Other recent (2007) records include three specimens of gecko, tentatively identified as the common gecko, found within the Stockton Mine area. Each was found beneath a rock or a sheet of corrugated roofing iron in open rocky or tussockland habitat (M. Hamilton and S. Woodcock, pers. comm., November 2007). Two geckos found on the Stockton Plateau (Mark Hamilton, pers. comm., November 2007) were identified from photographs as forest geckos by Tony Jewell. A West Coast green gecko was found between the upper Waimangaroa River and Stockton mine in 2006 (R.Buckingham & J. McLennan pers. obs.).

Common name	Scientific name	Distribution	Threat status	Local record
West Coast green gecko	<i>Naultinus tuberculatus</i>	Regional	Sparse	Confirmed
Forest gecko	<i>Hoplodactylus granulatus</i>	Widespread	Not threatened	Confirmed
Common gecko	<i>Hoplodactylus maculatus</i>	Widespread	Not threatened	Unconfirmed
Speckled skink	<i>Oligosoma infrapunctatum</i>	Widespread	Gradual decline	Confirmed
Brown skink	<i>Oligosoma zelandicum</i>	Widespread	Sparse	Unconfirmed

Table 2: Lizard species that are known or likely to be present in the Stockton Plateau area.



Figure 4: A speckled skink found at Denniston

The **West Coast green gecko** has been found (Thomas & Toft, 1997; R. Buckingham, personal observation) on the Stockton/Denniston Plateau and on the forested and scrubby slopes leading up to it. Again, they are a species difficult to detect and are very likely to occur within the area of the proposed hydro scheme as similar habitat present.



Figure 5: A West Coast green gecko

The only frog species found in the area was the introduced tree frog, *Litoria ewingii*, which is moderately common and widespread. The large introduced green tree frog *L. raniformis* may also be present though it was not found in the upper Waimangaroa valley during a fauna survey in 1997 (Thomas *et al.* 1997) nor more recently (Waybacks Ltd & Wildlife Surveys 2008). Native frogs are unlikely to occur in the area though sub-fossil bones are known from the Oparara caves, some 50 km north (Thomas & Toft 1997).

2.4 Terrestrial invertebrates

There have been few surveys for invertebrates (other than *Powelliphanta* land snails) in the Ngakawau Ecological District but they show that parts of the Denniston and Stockton plateaux support a rich and diverse invertebrate fauna, including unusual communities normally associated with higher altitudes. Overmars *et al.* 1998; Thomas & Toft 1997; Thomas *et al.* 1997). Because the area is on the periphery of the Northwest zone of endemism (Walker 1987) a high degree of endemism in the invertebrate fauna is possible (Overmars *et al.* 1998).

Other than *Powelliphanta* snails, there is little or no information on the conservation status of invertebrates within the Ngakawau Ecological District (Overmars *et al.* 1998). A limited survey for beetles in the area (where?) in 1998 revealed 12 species of carabid and 2 species of scarabaeid species plus a number of other beetles that were not identified to species level., (Overmars *et al.* 1998).

Landcare Research carried out a more comprehensive invertebrate survey in the upper Waimangaroa valley in 1995 and 1996 (Thomas & Toft 1997; Thomas *et al.* 1997). They found that the invertebrate communities of the red tussock opens and coal-measure vegetation comprised a range of species associated with wetlands, or normally found at higher altitudes. The fauna was typical of north Westland and

north-west Nelson with an abundance of tree weta (both *Hemideina crassidens* and *H. broughi*), an undescribed large leaf-veined slug (*Amphikonophora* sp.), and large flightless beetles such as *Zeadelium gratiosum* and *Dorcus helmsi*.

Other species known to be present in the general area of the proposed development are koura (*Paranephrops planifrons*), giant yellow and black dragonflies (*Uropetela carovei*) and alpine grasshoppers (*Alpinacris crassicauda*) (Overmars *et al.* 1998; Thomas *et al.* 1997).

Several comprehensive surveys for *Powelliphanta* land snails have been carried out in areas within and adjacent to the proposed development (e.g. Buckingham 1998a, 2005c; Newburry 2007; Walker 1982; Wildlife Surveys 2005). The results of these surveys and other information on *Powelliphanta* found in the general area are described below.

***Powelliphanta* land snails**

The proposed route of the hydro scheme appears wholly or largely to avoid areas where *Powelliphanta* are known to be present and all areas where these snails are concentrated (Buckingham 1998a, 2006b; Newburry 2007; Sustainability Solutions Ltd. 2005). No *Powelliphanta* snails were found during recent surveys within the impact area near St Patrick Stream ('Lake William'), 'Lake Weka', 'Lake AJ' and the Millerton settlement (Waybacks Ltd & Wildlife Surveys 2008). *Powelliphanta* 'patrickensis' and *Powelliphanta lignaria* 'millertoni' occupy habitats immediately alongside the impact area; and a small population of *Powelliphanta lignaria johnstoni* may also live within 2 km of the proposed impact area in coastal forest and scrub at the mouth of Mine Creek (Sustainability Solutions Ltd. 2005; Walker 2003).

Powelliphanta lignaria 'millertoni', discovered in 2003, is known only from one localised site (a 0.5 ha triangular area) on the southern side of Millerton settlement (Sustainability Solutions Ltd. 2005). It is one of New Zealand's rarest *Powelliphanta* and as such is classified as "Nationally Critical" (Hitchmough *et al.* 2007). Although it was not found during recent surveys along the proposed hydro route near Millerton (Waybacks Ltd & Wildlife Surveys 2008), it could still be present in low numbers. Absence is always much harder to confirm than presence.

Another recently discovered "Nationally Critical" taxa in the Stockton mine area is *Powelliphanta* 'Mt Augustus', which has a localised distribution about 4 km south of the proposed development. Extensive surveys for this snail failed to find it outside windswept sub-alpine scrub and herbfields on the skyline ridge near Mt Augustus (Buckingham 2005c; SENZ unpublished information; DoC unpublished information) though the snail may once have had a wider distribution. *P.* 'Mt Augustus' is considered unlikely to be found within the proposed hydro development area because of these survey results, and a lack of the snail's specific habitat type.

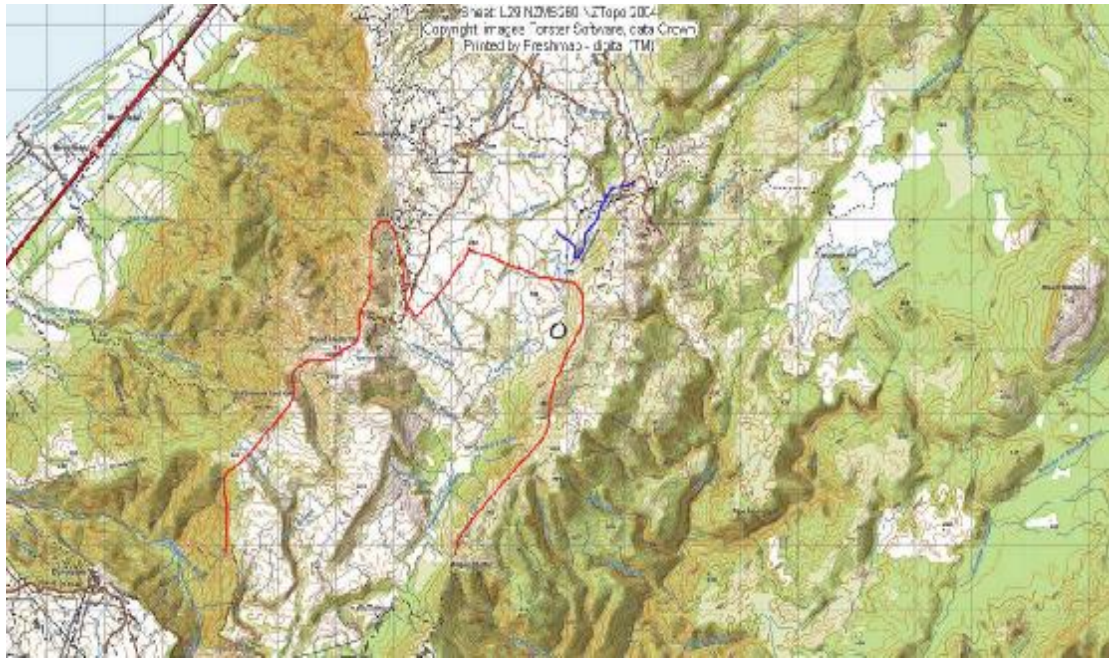


Figure 6: A foraging *Powelliphanta 'patrickensis'*

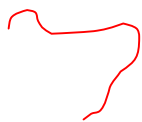
Powelliphanta 'patrickensis' is relatively widespread extending from Mt Rochfort in the south to the headwaters of St Patrick Stream in the north, and from the Mt William range in the east to Mt Frederick in the west (Walker 2003). The snail occupies a range of scrub and forest habitats, occurring most frequently in coal-measure scrub dominated by stunted manuka, wire rush, tanglefern and flax.

The type locality for *Powelliphanta 'patrickensis'* (formerly *Powelliphanta rossiana patrickensis*) lies relatively close to the upper part of the proposed development near St Patricks Dam (Figure 4). When first described in 1948 its type locality was recorded as Sheet 23-24 circa 356795, on the then used 1:63,000 map grid (Powell 1949). Converting this to New Zealand Map Grid provides a reference of NZMG 2417863 5944290 (noting that overall errors of the 1:63,000 grid system and conversion to NZMG are likely to be in the vicinity of +/- 200 m) (Cypress Environment Court evidence for Solid Energy New Zealand Ltd).

Powelliphanta 'patrickensis' shells have been found at or near the car park near St Patricks Dam, but humans or vehicles may have carried these shells there (Wildlife Surveys 2005). No sign of snails was found in the immediate vicinity of St Patricks Dam or north of it during a reasonably intensive survey in 1998 (Buckingham 1998a). From observations of *P. 'patrickensis'* habitat elsewhere, they are unlikely to be found in a tussock and rock platform dominated landscape with little shrub cover. No sign of *Powelliphanta* was found during a recent survey in the upper Mangatini Stream area (Buckingham 2006b; M. Newburry, pers. comm.). There are no known populations of *Powelliphanta* between the headwaters of the Mangatini Stream and the mouth of the Ngakawau River apart from the sparse population of *Powelliphanta lignaria johnstoni* near the mouth of Mine Creek (Sustainability Solutions Ltd 2005; Walker 2003). All species of *Powelliphanta* on and around the Stockton Plateau are threatened by predators, especially possums; and *P. 'patrickensis'* is threatened by mining in parts of its range. *P. 'patrickensis'* and *P. l. johnstoni* are "Nationally Endangered" (Hitchmough *et al.* 2007).



Legend



Approximate boundaries of *Powelliphanta 'patrickensis'* distribution



Approximate location of proposed hydro development near the St Pats dam area (closest part to snail's range).



Approximate location of *Powelliphanta 'patrickensis'* type locality

Figure 7: Approximate distribution of *Powelliphanta 'patrickensis'* in relation to proposed hydro development

3.0 Discussion

The literature review shows that most of the impact area of the proposed hydro-electric development and its wider surrounds has been well surveyed over the past decade, and a reasonably comprehensive data set now exists for birds, mammals (introduced and indigenous) and *Powelliphanta* snails. The least well known part of the impact area is the lower coastal section from the mouth of the Ngakawau River to the Millerton-Stockton Plateau, but this too was covered during a recent survey (Waybacks Ltd & Wildlife Surveys 2008).

Probably the species of most concern within the general vicinity of the proposed impact area are great spotted kiwi and *Powelliphanta* snails, though both of them seem to be either rare and/or absent altogether within the impact area itself (Waybacks Ltd & Wildlife Surveys 2008). The possible presence of *Powelliphanta lignaria* 'millertoni' is of special importance as it is designated "Nationally Critical" due to its very localised and small population (Hitchmough *et al.* 2007). The known population is within approximately 750m of the proposed hydro footprint. Low densities of snails can be easily missed on short surveys thus more intensive surveys will be required once the route to be developed is finalised.

Overall impacts on terrestrial fauna by the proposed development are predicted to be relatively low given:

- That *Powelliphanta* snails appear to be extremely scarce and perhaps absent altogether in the footprint area. ;
- The low density of kiwi, weka, and kereru within the proposed hydro footprint;
- That the potential impacts on fernbirds – the most abundant species of conservation significance within the footprint area – are small and unlikely to have any measurable effect on the local population of fernbirds on the Stockton Plateau.
- That there appears to be no species of vertebrate or invertebrate that is confined entirely to the footprint area. The relatively small footprint of the proposed development, the use of underground pipelines, and other means of reducing impacts on the natural environment (e.g. following existing roads and developing areas already modified);
- That most of the disturbed areas will revegetate naturally over the following 5-15 years, allowing recolonisation by weka, fernbird, and kiwi.
- That the abundance and diversity of aquatic fauna in the lower catchment of the Ngakawau River should increase when water contaminated with mine leachate is prevented from entering the catchment and piped directly to the Tasman Sea.

Despite the predicted relatively low impact on fauna by development, care will be required to avoid disturbance to sensitive ecological areas and reduce impacts on fauna. Some mitigation will also be required to offset the losses of habitat caused by this development. Options for mitigation are described in detail in Waybacks Ltd & Wildlife Surveys (2008).

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References

- Barnett, S.; Stilwell, J. 1993. Mokihinui River catchment kiwi survey: February–April 1993. Unpublished report for the Threatened Species Trust. Department of Conservation, Hokitika. 4 pp. plus map.
- Beauchamp, A.J. 2000. Count survey technique use for western weka on the West Coast, South Island: June 2000. Unpublished report for Department of Conservation, Hokitika. 11 pp.
- Blyth, R; Mazzagetti, D; Sutton, P; Wilson, K-J; Molles, L; Chambers, H; Cotton, J. 2006. Timing of the breeding season and survey of blue penguin (*Eudyptula minor*) between the Taramakau and Mokihinui Rivers, West Coast, South Island, New Zealand. Lincoln University Wildlife Management Report No. 36. 36pp.
- Bockett, F. 2001. Conservation asset/threat assessment: Indigenous transition forests, West Coast Conservancy and St Arnaud Area. Unpublished report, Department of Conservation, Hokitika. 117pp.
- Bockett, F. 2004. Is possum control protecting *Powelliphanta* snails on the West Coast? Unpublished Internal Correspondence report, Department of Conservation, West Coast Conservancy, Hokitika. 8 pp.
- Buckingham, R.P. 1998a. 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.
- Buckingham, R.P. 1998b. Surveys for endemic bats in the upper Waimangaroa Exploration Permit Area, and surrounding areas, South Island West Coast, New Zealand. Contract report No. 24/2 prepared for Solid Energy International by Wildlife Surveys. 4 pp. Plus maps.
- Buckingham, R.P. 1998c. Distribution of birds in the upper Waimangaroa Exploration Permit Area, and surrounding areas, South Island West Coast, New Zealand. Contract report No. 24/3 prepared for Solid Energy International by Wildlife Surveys. 14 pp. Plus maps.
- Buckingham, R.P. 1999. A survey for birds and bats in Inangahua Working Circle (Beech Working Circle 2). Wildlife Surveys contract report No. 25/2 for Timberlands West Coast New Zealand Limited, Greymouth. 146 pp plus maps.
- Buckingham, R. P. 2002a. Survey of the distribution and relative abundance of birds, bats and *Powelliphanta* snails within Timberlands West Coast Ltd exotic

- forest estate. Contract report prepared for Timberlands West Coast Ltd by Wildlife Surveys. 88 pp plus maps.
- Buckingham, R. P. 2002b. Bird and *Powelliphanta* snail survey: Whareatea West Exploration Permit (EP 40 591), Denniston Plateau, Buller. Contract report prepared for Restpine Ltd by Wildlife Surveys. 20 pp plus appendices and maps.
- Buckingham, R.P. 2005a. A survey for great spotted kiwi at Paparoa, Charleston and Mokihinui Forests within the Timberlands West Coast Ltd exotic plantation areas. Unpublished contract report prepared by Wildlife Surveys for Timberlands West Coast Ltd. 11 pp.
- Buckingham 2005b. A survey for birds, bats and *Powelliphanta* land snails at Waimangaroa Exploration Permit Area 40 720: November/December 2005. Contract report prepared for Solid Energy New Zealand Ltd by Wildlife Surveys Unlimited. 8 pp. plus appendices.
- Buckingham, R.P. 2005c. Survey for *Powelliphanta* Mt Augustus, Stockton Plateau, Millerton, Buller District, West Coast, 2004-2005. Unpublished report prepared for Solid Energy New Zealand Limited. 9 pp.
- Buckingham, R.P. 2005d. Assessment of faunal resource and faunal values for Exploration Permit area 40 643, Blackburn pakahi area, Buller District, West Coast. Contract report prepared for Solid Energy New Zealand Ltd by Wildlife Surveys Unlimited. 7 pp.
- Buckingham, R. 2006a. A survey for bats, birds and *Powelliphanta* land snails in the lower and mid Mokihinui River valley, February 2006. Draft contract report prepared for Meridian Energy Ltd. 14 pp plus maps.
- Buckingham, R. 2006b. Survey for *Powelliphanta* land snails at the proposed Mangatini Dam site, Stockton Mine. Contract report for Solid Energy New Zealand Ltd by Wildlife Surveys. 7 pp.
- Crook, I.G.; Best, H.A.; Harrison, M. 1977. A survey of the native bird fauna of forests in the proposed beech project area of North Westland. *Proceedings of the New Zealand Ecological Society* 24: 113–126.
- Elliott, G.P.; Dilks, P.D.; O'Donnell, C.F.J. 1996. The ecology of yellow crowned parakeets (*Cyanoramphus auriceps*) in *Nothofagus* forest in Fiordland, New Zealand. *New Zealand journal of zoology* 23: 249–265.
- Heather, B.D.; Robertson, H.A. 1996. *'The field guide to the birds of New Zealand'* Penguin Books (NZ) Ltd, Auckland. 432 pp.
- Hitchmough, R.; Bull, L.; Cromarty, P. (Compilers) 2007. New Zealand threat classification system lists 2005. Department of Conservation, Wellington. 194 pp.
- Kingett Mitchell & Associates Ltd. 1997a. Vegetation of the upper Waimangaroa area. Contract report prepared for Solid Energy International. 17 pp plus appendices and plates.
- Kingett Mitchell & Associates Ltd. 1997b. Vegetation of the proposed Northern Opencast Coal Mine Site. Contract report prepared for Solid Energy International. 17 pp plus appendices and plates.

- Kingett Mitchell; Landcare Research 1997. Great spotted kiwi survey of the upper Waimangaroa and surrounds. Prepared for Solid Energy International. 14 pp. plus appendices.
- Lloyd, B.D. 2001. Advances in New Zealand mammalogy 1990-2000: Short-tailed bats. *Journal of the Royal Society of New Zealand* 31 (1): 59-81
- McLennan, J.A.; McCann, A.J. 1991. Ecology of great spotted kiwi, *Apteryx haastii* DSIR Land Resources Contract Report No. 91/48 for Department of Conservation, Wellington. 34 p.
- McLennan, J.A.; Potter, M.A.; Robertson, H.A.; Wake, G.C.; Colbourne, R.; Dew, L.; Joyce, L.; McCann, A.J.; Miles, J.; Miller, P.J.; Reid, J. 1996. Role of predation in the decline of kiwi, *Apteryx* spp., in New Zealand. *New Zealand journal of ecology* 20(1): 27-35.
- Morse, P.M. 1981. Wildlife values and wildlife conservation of Buller and North Westland. *Fauna Survey Unit report No. 29*. 185 pp.
- Newbury, M. 2007. Flora and Fauna Survey of 4 West pipeline – June 2007. Survey report for Solid Energy New Zealand Ltd by MBC Ltd.
- Overmars, F.B.; Kilvington, M.J.; Gibson, R.S.; Newell, C.L.; Rhodes, T.J. 1998. Ngakawau Ecological District. Survey report for the Protected Natural Areas Programme. Department of Conservation, Hokitika.
- Powell, A.W.B. 1949. The Paryphantidae of New Zealand. *Records of the Auckland Institute and Museum* 3(6): 347–372.
- Sustainability Solutions Ltd. 2005. Environmental assessment Millerton Road. Unpublished report prepared for Maunsell, Hamilton. 33 pp.
- Thomas, B; Toft, R. 1997. Surveys for fauna in the upper Waimangaroa Valley. Landcare Research Contract Report LC9697/101 prepared for Kingett Mitchell and Associates Ltd, Auckland. 37 pp.
- 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.J. 1982. Distribution and status of *Powelliphanta* land snails in the Mokihinui State Forest, and recommendations for conservation reserves. *Fauna Survey Unit report No. 34*. New Zealand Wildlife Service, Wellington. 6 pp.
- Walker, K. 1987. Wildlife in the Nelson region. *Fauna Survey Unit report No. 42*. 239 pp.
- Walker, K. J. 2003. Recovery plans for *Powelliphanta* land snails. *Threatened Species Recovery Plan 49*. Department of Conservation, Wellington. x+208 pp+64 plates.
- Waybacks Ltd; Wildlife Surveys Unlimited. 2008. Terrestrial fauna survey of the proposed Mangatini hydro-electric power scheme. Contract report in preparation for Hydro Developments Ltd.
- Whitaker, T.; Lyall, J. 2004. Conservation of lizards in West Coast/Tai Poutini Conservancy. Department of Conservation, Wellington. vii plus 93 pp.

- Wildlife Surveys. 2002. Cypress Mine project: Survey for kiwi and bats. Contract report prepared for Solid Energy New Zealand Ltd by Wildlife Surveys. 9 pp. plus maps and appendices.
- Wildlife Surveys. 2005. Solid Energy New Zealand Limited: A survey for the endemic land snail *Powelliphanta* “patrickensis” within the proposed Cypress Mine area and a proposed predation exclusion fenced area. Unpublished report prepared for Solid Energy New Zealand Limited by Wildlife Surveys Unlimited. 36 pp.
- Wilson, P.R.; Karl, B.J.; Toft, R.J.; Beggs, J.R.; Taylor, R.H. 1998. The role of introduced predators and competitors in the decline of kaka (*Nestor meridionalis*) populations in New Zealand. *Biological conservation* 83 (2): 175–185.