Oceana Gold Ltd

Deepdell North III Lizard Management Plan DRAFT

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Cover page: View south across location of the reported cryptic skink sighting, PIA, Horse Flat Road.

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1. Overview and Scope

The following Lizard Management Plan seeks to manage the lizard values (lizard populations and their habitat) of the 225 ha PIA so as to achieve a no net loss outcome of these values over the wider area, post project. For the purposes of this LMP, the 'wider area' refers to the Macraes Ecological District (Figure 1). This LMP will firstly describe the potential lizard values of the 225 ha PIA, and then describe a set of actions, the so-called 'mitigation package', that will be undertaken to avoid, remedy or mitigate adverse effects generated by the project on the resident lizard values. For effects that are unable to be avoided, remedied or mitigated; residual adverse effects will be addressed through compensation actions, rather than offset actions, for the reasons detailed below in Section 5, Planning Context. In this way, this LMP stands alone and seeks to manage adverse effects generated by the project on lizard values independently of any other ecological actions to be undertaken; e.g. actions planned for botanical values of the PIA (see Ahika, 2019b[1] and 2020[2]). Related to this, the LMP seeks additional actions to those already put forward for botanical values.

2. Goals and Objectives

The primary goal of this LMP is to document planned and implemented actions to avoid, remedy and/or mitigate the actual and potential effects of the Deepdell North III project on the lizard values present. Compensation, the last component of the mitigation package, will be employed to address residual adverse effects for the reasons described below (Section 5). This LMP also describes anticipated outcomes of the mitigation package, that when fully and effectively implemented, will ensure a 'no net loss' in lizard values (habitat and lizard population-values combined) occurs over the Macraes Ecological District as a result of the project. With this in mind, the 'mitigation package' that combines all avoidance, remediation, mitigation and compensation actions, are focused locally where at all possible. A no-net-loss outcome is broadly consistent with Otago Regional Council Policies 3.2.1 and 3.2.2 of the Partially Operative Otago Regional Policy Statement 2019: Changes as a result of Appeals) relating to habitat of Indigenous fauna; and consistent with DOC advice relating to lizard species, all of which are absolutely protected under the Wildlife Act (1953).

3. Proposed Works: The Project PIA

Details of proposed works are described in detail elsewhere[3]. The Deepdell North III Project, made of 12 components, is anticipated to affect at least 127.45 ha of land in the Macraes Ecological District (Table 1; Figures 1 and 2). To determine the actual and potential effects of the Deepdell North III Project (the "project") on resident indigenous lizards and their habitat, a *c*. 100 m buffer was applied to the 127.45 ha footprint following Ahika (2019a[4]). The addition of the *c.* 100 m buffer extended the construction footprint to its maximum size of 225 ha (Figure 2); it is this 225-ha construction footprint that is considered in this Lizard Management

[1] Deepdell North III project Impact Management Report (IMR, Ahika, dated December 2019).
[2] Ahika, May 2020. Redbank Ecological Enhancement Area Management Plan.
[3] OCEANA GOLD (NZ) LTD DEEPDELL NORTH STAGE III PROJECT Assessment of Environmental Effects 29 January 2020.
[4] Ahika, 2019. Deepdell North III project Impact Assessment Report (dated 5 December 2019).

Plan (LMP) as the Principal Impact Area (PIA) for the project. Moreover, it is assumed here that all lizard habitat and lizard populations within will be removed/destroyed during works, irrespective of the component description (Table 1). This approach is consistent with a precautionary approach to managing adverse effects.

Note: The effects of the DDNIII project on lizards' values over the buffer area are expected to relate only to noise, dust and vibration, and be temporary effects.

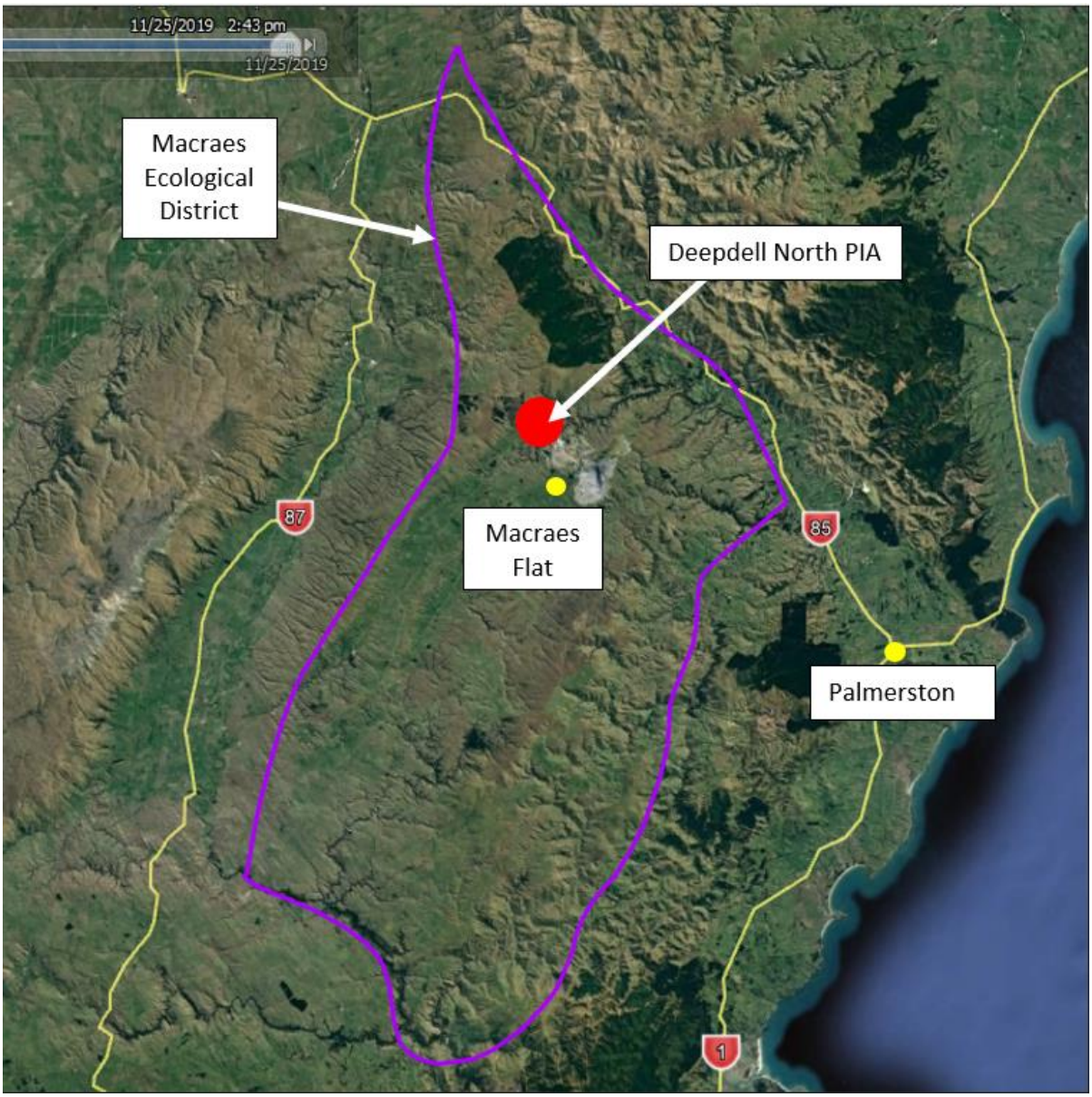


Figure 1: Macraes Ecological District (purple line; 113, 547 ha) and the location of the Deepdell North III PIA (red circle).

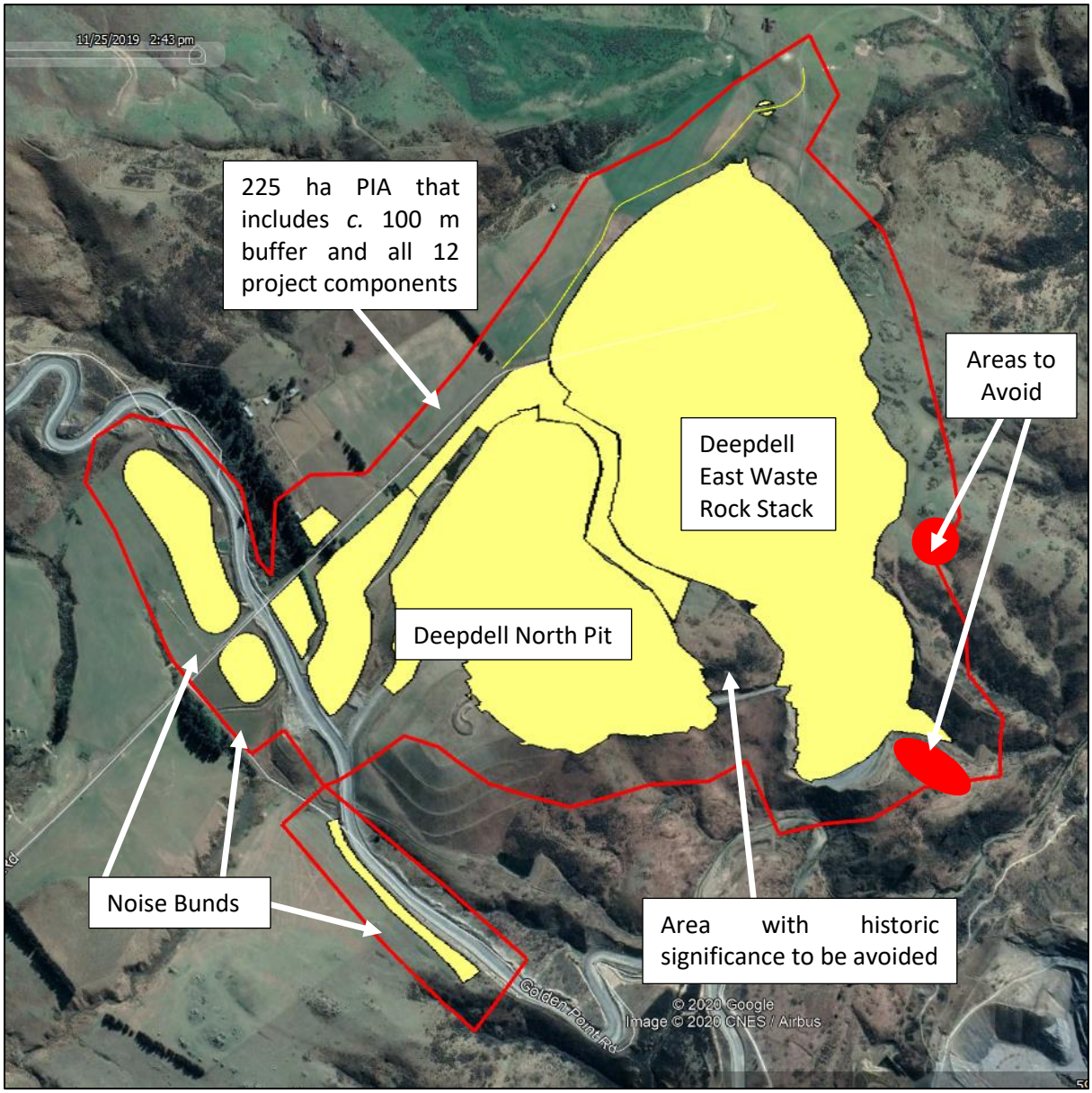


Figure 2: Extent of the anticipated Deepdell North III footprint (12 yellow polygons and lines) of 127.45 ha and 1.1 km road, and the *c*. 100 m buffer applied (red line) extending the Principle Impact Area (PIA) to 225 ha. Source: Oceana Gold Ltd (OGL) July 2020.

Table 1: Data sourced from Oceana Gold Ltd (OGL), July 2020 showing the 12 components of the Deepdell North III footprint (no buffer) and their size.

Component Description	Size (ha)	Length (km)
Deepdell North Pit	35.7	
Deepdell East Waste Rock Stack	70.7	
Infrastructure – Noise Bund	5.24	
Infrastructure – Noise Bund	1.59	
Infrastructure – Noise Bund Extension	1.39	
Misc. Infrastructure	5.48	
Misc. Infrastructure	1.15	
Park up, Fuel & Ablutions	0.47	
DDWRS East Infrastructure		1.1
DDWRS East Infrastructure	0.0281	
Silt Pond	0.0283	
Top Soil Stockpile	5.67	

4. Ecological Context

The project PIA is situated in the 113, 547 ha Macraes Ecological District (ED) (Figure 2). This ED is renowned for its high diversity in lizard species, and abundant lizard populations due in large part to the nature of the schist which tends to form horizontal crevices and large flat pancake-like stacks of rock slabs. At least seven species occur over the district including strong-hold populations of the nationally vulnerable grand and Otago skinks (*Oligosoma grande* and *O. otagense*, respectively).

According to McEwan, 1987, the vegetation of the district is characterised as follows:

"*montane short tussockland grading into subalpine tall tussockland (snow tussock, fescue and silver tussock), with some areas of coprosma-flax scrub, some hardwood forest with minor podocarp element (broadleaf, kohuhu, tarata, rare Hall's totara) and kanuka forest. Modifications: Grazed (extensive sheep and cattle*)."[5]

5. Planning Context

The project PIA sits within both the Otago Regional Council boundary and the Waitaki District Council jurisdictions, and is therefore subject to Rules in the Partially Operative Otago Regional Policy Statement; and rules within the Waitaki District Plan (2010).

Otago RPS

Waitaki District Plan

Skink Management Area

The Waitaki District Plan has a mapped area over Rural Zones in and around Macraes Flat

[5] McEwan, W.M. 1987. ECOLOGICAL REGIONS AND DISTRICTS OF NEW ZEALAND. NEW ZEALAND BIOLOGICAL RESOURCES CENTRE Publication No. 5, Part 4. Department of Conservation, Wellington, New Zealand June 1987

called the "Skink Management Area[6]". This area encircles important habitat of grand and Otago skinks (*Oligosoma grande* and *O. otagense* respectively), both of which are nationally threatened (nationally vulnerable[7]). The mapped area is made up of 6 non-contiguous sections and can be found in Appendix 1 of this LMP. Rules relating to this area are found in Chapter 4 Rural Zones of the operative Waitaki District Plan. The Skink Management Area does not cover the project PIA, but does cover the Redbank EEA (discussed in Section 8).

6. Potential Lizard Values of the PIA

Lizard Habitat Mapping

The recent independent Ryder Environmental Ltd[8] review raised concerns, following a brief site visit by the author of this LMP, that the lizard habitats of the PIA had not been sufficiently described in the AEE; this concern was supported by DOC and WDC consultant ecologists. By way of a remedy, DOC suggested lizard habitat of the PIA was accurately mapped by an experienced herpetologist[9], and as far as possible, an assessment of relative habitat quality be made simultaneously. DOC maintained that although not an ideal proxy for additional lizard survey of the PIA, habitat mapping would fully align with consenting timelines set down by Council, and any additional survey imposed by DOC (or Council), would only be effective if carried out over spring-summer months of 2020/21. For this LMP, therefore, information on the lizard habitat of the PIA was derived from lizard habitat mapping carried out by the author over 2 days during July 2020, combined with cursory lizard searches to estimate relative habitat quality for each of the lizard species known to be present. A full description of the extent and relative quality of lizard habitat over the PIA is essential to understand the scale and significance of effects, and to then ensure the mitigation package is commensurate with the effects, thus ensuring a no net loss outcome.

Methods Employed

A walk-through survey of the entire PIA was carried out over two days in July 2020 where the extent of each lizard-habitat type of the PIA was mapped and described, including a brief commentary on condition (Figure 3, and below for descriptions [Section not yet drafted]). All photographs in this report, unless otherwise stated, were taken in July 2020 (Table 2). Based on the authors experience studying indigenous lizard communities in the Macraes ED (*c.* 10-years), the extent of each mapped habitat (shown in Figure 3) that was actually usable by each species was then estimated using a 7-point scale: 100 %; 75 %; 50 %; 25 %; 5 %; 1 % and 0 %. For example, 75 % of the mapped shrubland habitat (18.44 ha; Table 2), was estimated as habitat for korero gecko and it was this amount (*c.* 13.83 ha of shrubland; Table 2) that was deemed korero gecko habitat and used in the effect's assessment (see Section 7). Where habitat was severely degraded and offered very little cover for any lizard, the habitat scored

[6] https://www.waitaki.govt.nz/our-services/planning-and-resource-consents/districtplan/Documents/Appendices/SkinkmanagementArea.pdf

[7] Hitchmough *et al.* 2015. Conservation status of New Zealand reptiles, 2015. New Zealand Threat Classification Series 17. Department of Conservation.

[8] Ryder Environmental Ltd, June 2020. Deepdell North III Lizard Management Review. Independent report prepared for Oceana Gold Ltd.

[9] DOC meeting July 9th 2020 with LMP author, Karina Sidaway and Lynn Adams.

0 % for all species; this was the case for the degraded red tussock land even though this habitat could potentially support 2 species of lizards under a different (less severe) grazing regime (Table 2). Note: the lizard habitat mapping confirmed the presence of cryptic skink habitat over the PIA (see Table 2).

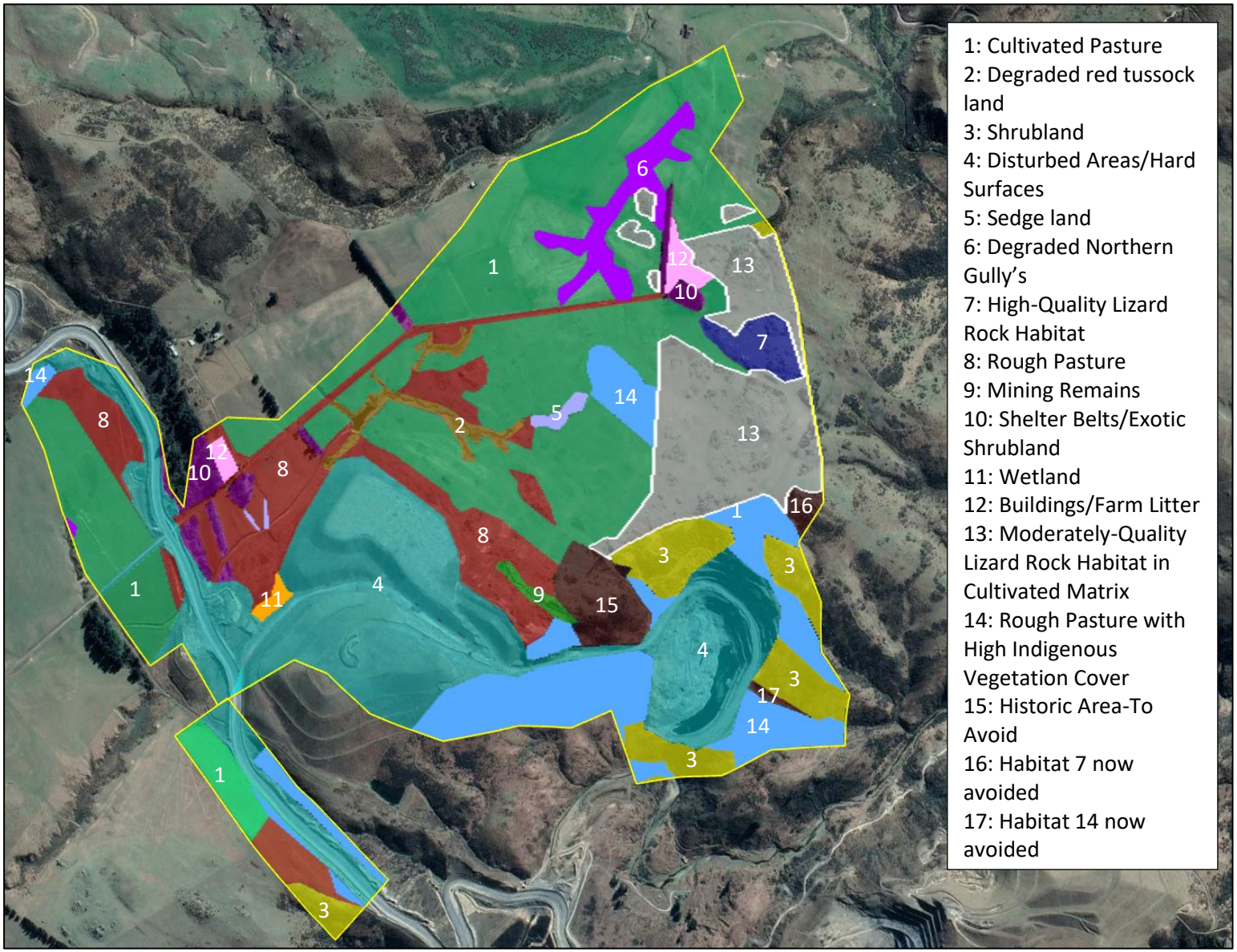


Figure 3: Mapped lizard habitat over the PIA and buffer area (not shown). See Table 2 for areas mapped and estimates of usable lizard habitat.

Table 2: Habitats and extent of habitats over the PIA, and shown in Figure 3, based on lizard habitat mapping carried out over July 2020. For each species and habitat an estimate of the percentage of area mapped that was useable habitat was made using a 7-point score: 100 %; 75 %; 50 %; 25 %; 5 %; 1 % and 0 %. For example, 100 % was given when all mapped habitat was usable for a given species. Condition relates to existing state as lizard habitat not potential condition under, for example, a reduced grazing regime. Condition does not take into consideration exotic predator loading, which is unknown for all habitats. A, "- " means the habitat was considered not suitable for that species, whereas 0 % means habitat suitable but the condition of it meant none of it was deemed usable at the time of assessment.

Habitat # (as per Figure 3)	Description: Condition	Colour Ref in Figure	Total Area over the PIA (ha)	Species Likely to be present			
				korero gecko (% habitat usable)	Southern grass skink (% habitat usable)	cryptic skink (% habitat usable)	McCann's skink (% habitat usable)
1	Cultivated Pasture: Not Good Habitat	green	63.04	1% (*c*. 0.63 ha)	1% (*c*. 0.63 ha)	-	1% (*c*. 0.63 ha)
2	Degraded red tussock land: Not Good Habitat	orange - opaque	2.65	-	0 %	0 %	-
3	Shrubland: Good	yellow	18.44	75% (*c*. 13.83 ha)	75% (*c*. 13.83 ha)	1% (*c*. 0.18 ha)	75% (*c*. 13.83 ha)
4	Disturbed Areas/Hard Surfaces: Not Good Habitat except roadsides in places.	teal	53.19	1% (*c*. 0.53 ha)	1% (*c*. 0.53 ha)	1% (*c*. 0.53 ha)	5% (*c*. 2.66 ha)
5	Sedge land: Not Good Habitat	mauve - solid	0.76	-	1% (*c*. 0.01 ha)	0 %	-
6	Degraded Northern Gully's: Not Good Habitat	purple	3.85	5% (*c*. 0.19 ha)	0 %	0 %	5% (*c*. 0.19 ha)
7	High-Quality Lizard Rock Habitat: Very Good	dark blue	2.25	100% (*c*. 2.25 ha)	1% (*c*. 0.022 ha)	-	100% (*c*. 2.25 ha)
8	Rough Pasture: Good in places	red	24.90	25% (*c*. 6.23 ha)	25% (*c*. 6.23 ha)	-	25% (*c*. 6.23 ha)
9	Mining Remains: Very good	Bright green	0.74	50% (*c*. 0.37 ha)	5% (*c*. 0.04 ha)	-	100% (*c*. 0.74 ha)
10	Shelter Belts/Exotic Shrubland: Not Good Habitat	magenta	3.99	-	-	-	1% (*c*. 0.04 ha)

Habitat # (as per Figure 3)	Description: Condition	Colour Ref in Figure	Total Area over the PIA (ha)	Species Likely to be present			
				korero gecko (% habitat usable)	Southern grass skink (% habitat usable)	cryptic skink (% habitat usable)	McCann's skink (% habitat usable)
11	Wetland: Very Good	solid orange	0.49	-	100 % (*c*. 0.49 ha)	100 % (*c*. 0.49 ha)	-
12	Buildings/Farm Litter: Very good	pink	1.44	25% (*c*. 0.36 ha)	1% (*c*. 0.01 ha)	-	25% (*c*. 0.36 ha)
13	Moderately-Quality Lizard Rock Habitat in Cultivated Matrix: Good	white	21.08	100% (*c*. 21.08 ha)	25% (*c*. 5.27 ha)	-	100% (*c*. 21.08 ha)
14	Rough Pasture with High Indigenous Vegetation Cover: Very Good	light blue	22.62	75% (*c*. 16.97 ha)	100 % (*c*. 22.62 ha)	1% (*c*. 0.23 ha)	75% (*c*. 16.97 ha)
	Totals for Area (ha)		**219.44**	**62.44**	**49.682**	**1.43**	**64.98**
	% of 225 ha PIA			**28%**	**22%**	**0.64%**	**29%**
15	To Avoid. Historic Reserve	brown	4.51	n/a	n/a	n/a	n/a
16	To Avoid. Habitat 7	brown	0.89	n/a	n/a	n/a	n/a
17	To Avoid. Habitat 14	brown	0.29	n/a	n/a	n/a	n/a

Mapped Lizard Habitat Descriptions

[Section Not Complete but see Figure 3 and photographs in Figures 4-35]

Cultivated Pasture (Habitat 1)

Figure 4: Habitat 1, cultivated pasture on the left-hand side of the fence and Habitat 8, rough pasture, on the righthand side of the fence, within the OGL Operations area for Coronation North.

Figure 5: Habitat 1, cultivated pasture, showing low-quality rock habitat with only the hardiest of indigenous plants remaining, in this case, grazed *Melicytes alpinus* with some hard tussock, *Festuca novae-zelandiae.*

Figure 6: Habitat 1, cultivated pasture in the foreground with low-value rock habitat; and Habitat 5 Carex/*Juncus* spp. sedge land beyond truck.

Degraded red tussock land (Habitat 2)

Figure 7: Habitat 2, Degraded tussock land with Red tussock and occasional *Juncus* sp. Red tussocks still retain their stature presumably because they are relatively unpalatable; also see frontispiece photograph taken in June, 2020.

Shrubland (Habitat 3)

Figure 8: Habitat 3, Shrublands showing north-facing rock tor habitat present in places.

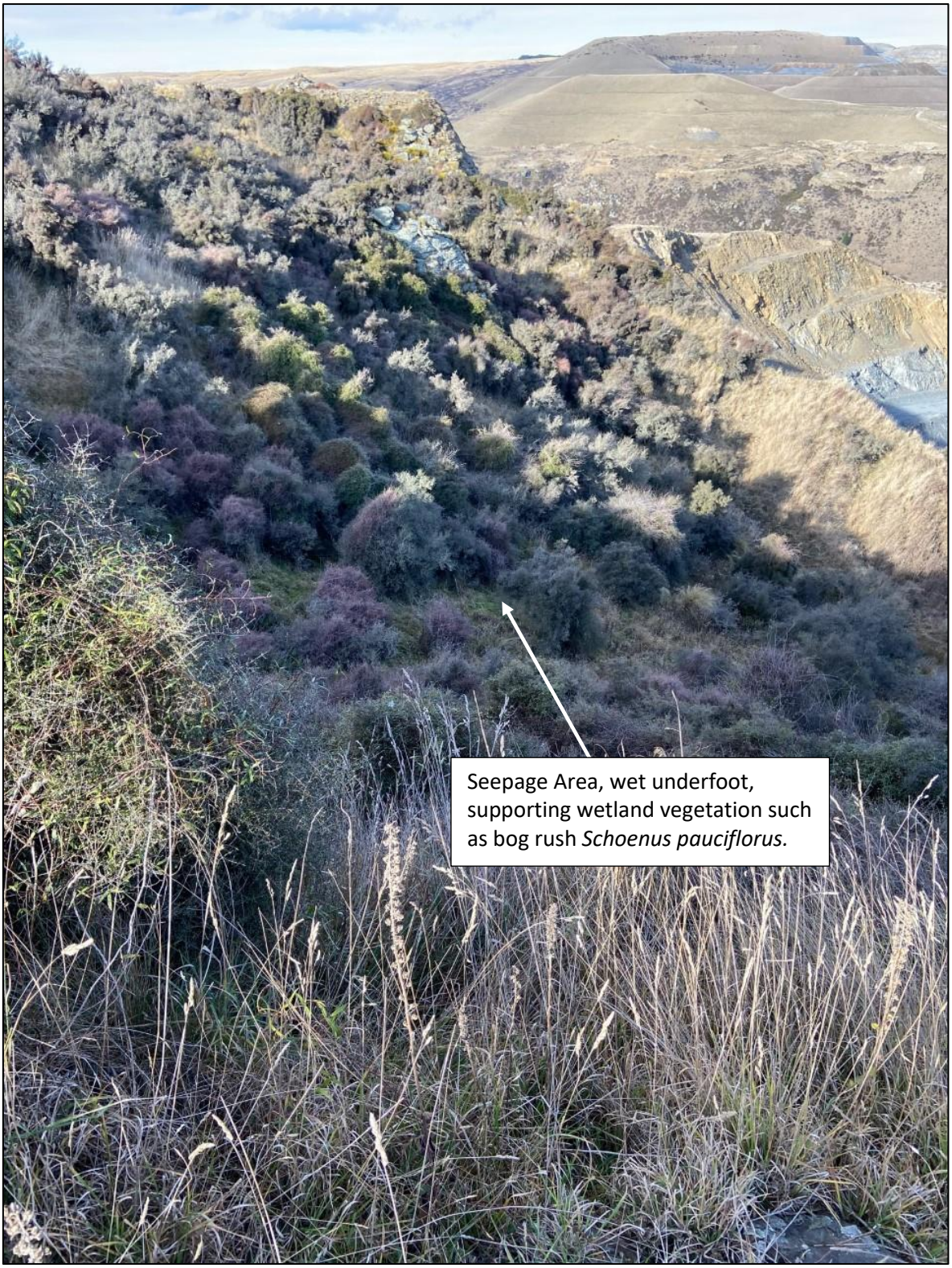


Figure 9: Habitat 3, Shrublands showing areas of rank grass (usually dense cocksfoot *Dactylis glomerata*, in fertile areas and browntop *Agrostis capillaris* over rocky/bony areas); and a seepage area in the middle of the photograph, common across the slope leading down to the pit.

Disturbed Areas/Hard Surfaces (Habitat 4)

Figure 10: Habitat 4, disturbed areas, showing an area within the existing pit where talus has accumulated. Lizard sign was found here.

Figure 11: Habitat 4, disturbed areas near the existing pit showing areas of exposed north-facing rock where lizard sign was found.

Figure 12: Large areas of Habitat 4, disturbed areas within and adjacent to the existing pit. Much of the area shown is not suitable for lizards being too active and disturbed.

Sedge land (Habitat 5)

Figure 13: Habitat 5, *Carex*/*Juncus* spp. sedge land in the middle of the Principle Impact Area (PIA). Assuming some cover had always been available over the last decade or more, this particular site (0.56 ha) had sufficient cover on the day of assessment to allow survival of a low-density grass skink population (see Table 1).

Figure 14: Heavily chewed out Habitat 5, *Carex*/*Juncus* spp. sedge land at 453977.43 m E 4978759.97 m S, near and within a man-made ditch that runs parallel with Horse Flat Road.

Degraded Northern Gully's (Habitat 6)

Figure 15: Habitat 6, pugged, chewed out northern gullies, with remaining matagouri (*Discaria toumatou*) shrublands and occasional hard tussock (*Festuca novae-zelandiae*).

Figure 16: An area of Habitat 6, pugged, chewed out northern gullies, with residual indigenous vegetation of *Juncus* sp. and very occasional *Carex secta* (out of shot to the left in a steep gully section partially protected by a fence).

High-Quality Lizard Rock Habitat (Habitat 7)

Figure 17: Quality lizard rock habitat located inside Habitat 6, pugged, chewed out northern gullies; with associated *Melicytus alpinus*. Lizard sign, presumably korero gecko and/or McCann's skink, was observed in this area of outcropping.

Figure 18: Habitat 7, high-quality lizard rock habitat, over the eastern PIA showing lichen encrusted, horizontally fissured schist outcropping of good height, associated with indigenous vegetation.

Figure 19: Habitat 7, high-quality lizard rock habitat that forms part of a prominent series of tor-habitat inside the 100 m buffer area over eastern PIA. Note: This area is now avoided (marked as Habitat 16 in Figure 3).

Rough pasture (Habitat 8)

Figure 20: Habitat 8, rough pasture within the OGL operational area near to the haul road. Areas such as this may have been cultivated in the past, but have not been grazed or cultivated since being locked inside the operational area.

Figure 21: Habitat 8, rough pasture, showing a man-made ditch at western extreme of the PIA near the existing haul road (shown at the top of the photograph). A heavily grazed *Juncus* sp. reed land lines the ditch in a heavily grazed pasture setting.

Figure 22: Man-made drainage ditch in Habitat 8, rough pasture, showing occasional Juncus sp. and red tussock (*Chionochloa* sp.).

Mining Remains (Habitat 9)

Figure 23: Habitat 9, historical mining site (outside of area to be avoided) with north-facing rock habitat suitable for korero gecko and McCann's skink (sighted during July 2020 assessment).

Shelter Belts/Exotic Shrubland (Habitat 10)

Figure 24: Habitat 10, shelter belts/exotic shrubland near to existing woodshed and buildings (Habitat 13 below.

Figure 25: Habitat 10, shelter belts/exotic shrubland, near to existing haul road. In this case, a stand of Scots broom, *Cytisus scoparius.*

Wetland (Habitat 11)

Figure 26: Habitat 11, wetland with *Carex tenuiculmis* (orange plants in mid and fore-ground) near haul road.

Figure 27: Habitat 11, wetland with *Carex tenuiculmis* and a range of other wetland plants were noted near haul road.

Buildings/Farm Litter (Habitat 12)

Figure 28: Habitat 12, buildings/farm litter in the north-eastern area of the PIA near existing woolshed.

Figure 29: Habitat 12, buildings/farm litter in the north-eastern area of the PIA near existing woolshed where two indigenous leaf-veined slugs (*Athoracophorus bitentaculatus*) with eggs were found under farm litter.

Figure 30: Habitat 12, buildings/farm litter in the north-eastern area of the PIA near existing woolshed where a very inactive McCann's skink (*Oligosoma maccanni*) was found under rocks.

Moderately-Quality Lizard Rock Habitat in Cultivated Matrix (Habitat 13)

Figure 31: Habitat 13, good quality lizard rock habitat in cultivated matrix, showing rock habitat of moderate stature in association with a moderate diversity of indigenous vegetation.

Figure 32: Habitat 13, good quality lizard rock habitat in cultivated matrix, showing five korero geckos found under a single rock slab.

Figure 33: Habitat 13, good quality lizard rock habitat in cultivated matrix.

Figure 34: Habitat 13, good quality lizard rock habitat in cultivated matrix.

Rough Pasture with High Indigenous Vegetation Cover (Habitat 14)

Figure 35: Habitat 14, rough pasture with high indigenous vegetation cover amongst exotic grasses. This habitat type was prevalent over the south-eastern part of the PIA, on sloping ground, and had much cover for lizard species such as Southern grass skink.

Calculation of Extent of Habitat Affected by the Project

A total of 62.44 ha of korero gecko habitat; 49.68 ha of Southern grass skink habitat; 1.43 ha of cryptic skink habitat and 64.98 ha of McCann's skink habitat will be affected by the project (Table 2). These values cover a range of habitat-types for each of the 4 affected species (Table 2). It is important to note, however, that the effects assessment, that ultimately leads to the mitigation packages (Sections 7 & 8) considers lizard species by lizard species, rather than habitat by habitat which is an approach commonly employed for areas of indigenous vegetation. Areas of indigenous vegetation are synonymous with ''habitat'' and therefore the habitat by habitat approach seems appropriate for vegetation. For fauna habitats, however, and to provide for the protection of habitats of indigenous fauna (i.e. 'habitats' as opposed to areas of habitats); a species by species approach has been adopted below.

This fauna approach aligns well with the protective intent of the Wildlife Act (1954), and in addition, is consistent with the drafting of the fauna (second) clause of Section 6 (c) RMA, 1991). Adopting this approach, however, does not mean that the various actions proposed in the mitigation package have considered areas of habitat entirely separately for each species. For example, over all four species Table 2 shows that 13.83 ha + 13.83 ha + 13.83 ha + 0.18

ha of shrubland habitat is considered habitat for all four species. This totals 41.67 ha of shrubland which at first glance significantly overestimates the amount of lizard habitat within the shrubland mapped unit (the entire unit is only 18.44 ha) that will be adversely affected by the project.

The first point to make is that although there is some overlap between species in habitat use within the shrubland mapped unit, not all species use habitat that is also used by another species. This means that although 3 of the 4 species have an estimated area of habitat of 13.83 ha over the shrubland unit, the exact same 13.83 ha is not used by all 3 species. The second and most important point is that when designing the mitigation package described below, some consideration was given to 'discounting' the scale and significance of effects where habitat overlap amongst species occurred. Moreover, to help balance the loss: gain calculation that informed the mitigation package; the extra benefits to a particular species that occupies the same habitat as another species for which a specific mitigation action is planned, was not considered (but is noted when this occurs below in Section 8). As an example, predator control from year 5-10 is planned at the OGL Cranky Jim's Covenants (Cranky Jim's Shrubland Covenant and the Cranky Jim's Wetland Covenant) primarily for the benefit of resident korero geckos; indeed, this mitigation action is the primary action planned for korero geckos (see summary Tables in Appendix 3). That said, any McCann's, cryptic and Southern grass skinks resident at the OGL Cranky Jim's Shrubland Covenant will also benefit from this predator control which is additional to that planned from year 1-5 for species other than korero geckos. This additional benefit to McCann's, cryptic and Southern grass skinks is not considered in the mitigation actions proposed for these 3 skink species (Section 8).

Habitat Significance Assessment

Otago RPS Schedule 4 Criteria (relating to Section 6(c) RMA 1991)

The DDNIII project will result in significant adverse effects on the habitat of 4 species of indigenous lizards including 3 species classified as at risk declining[10]. Under the Otago RPS significance criteria, habitat for at risk declining species is significant under Section 6 (c) of the RMA (1991).

DOC Guidelines for Assessing Significant Ecological Values

The PIA site triggers the DOC 'Rarity and special features' criterion by containing habitat for the at-risk declining Southern grass, korero gecko and cryptic skink.[11]

Lizard Species and Populations

The recent independent Ryder Environmental Ltd[12] review of the lizard values and effects assessment[13], raised concerns relating to the very low numbers of lizards reported in the AEE

[10] Hitchmough *et al.* 2015. Conservation status of New Zealand reptiles, 2015. New Zealand Threat Classification Series 17. Department of Conservation.

[11] M. Davis, N.J. Head, S.C. Myers and S.H. Moore 2016. Department of Conservation guidelines for assessing significant ecological values. Published by Publishing Team, Department of Conservation, PO Box 10420, The Terrace, Wellington 6143, New Zealand.

[12] Ryder Environmental Ltd, June 2020. Deepdell North III Lizard Management Review. Independent report prepared for Oceana Gold Ltd.

[13] Deepdell North Stage III Project Assessment of Environmental Effects (AEE, Oceana Gold Ltd, dated 29 January 2020.

for the PIA, and the lack of information on survey effort over the habitats present. On the face of it, it was not clear that a thorough lizard survey of the PIA had been carried out that covered all potential habitats present. These concerns were broadly supported by DOC and the WDC ecologists, who suggested that values reported in the AEE appeared to be underestimates.

For this LMP, therefore, information on the lizard species and number of individuals affected by the project were collated and prepared from the two sources:

1. Cursory lizard searches, July 2020, carried out whilst lizard habitat mapping was carried out.
2. Results of a 2-day lizard survey carried out by Luke Bovill, January 2018 (Appendix 2).

Methods & Species Encountered- July 2020 survey

Lizard surveys cannot be conducted effectively over the winter months when lizards enter torpor and/or hibernation. None the less, during a walk-through survey of the PIA over two days in July 2020, where lizard sign was observed or a lizard was captured, it was georeferenced (Figure 36).

For the July 2020 survey, gecko sign was the most conspicuous of lizard sign encountered being oftentimes observed located in sheltered, sunny ledges in front of deep (horizontal) crevices. Korero gecko sloughed skins were also found in dry retreats e.g. under farm litter. Skink sign, in contrast, was found in fewer locations having been presumably washed away by the rain, or blown away by the wind in rocky-habitat. In grassed areas, a walk-through survey over winter is not expected to detect either Southern grass skink and cryptic skink. As a result, lizard sign observed during the habitat mapping was heavily biased towards the sign of korero geckos (*Woodworthia* aff. "Otago/Southland large), and was widespread across the PIA (Figure 36). Very limited handsearching was carried out during the July 2020 survey, and was limited to lifting only material that could easily be replaced, for fear of disturbing hibernating lizards and endangering their survival. Handsearching over the PIA confirmed the presence of nationally at-risk declining[14] korero gecko (8 were captured); nationally at risk declining Southern grass skink (*Oligosoma* aff. *polychroma* clade 5) where 1 juvenile was captured (Figure 37), and 7 captures were made of McCann's skinks (*O. maccanni*; not threatened) (Figure 36).

Of note, the Southern grass skink that was found resulted from very little searching implying this species is present in good numbers over the PIA; and korero gecko were very conspicuous, sighted within crevices, and 5 geckos were found under a single slab in habitat 13 (Figure 3 and Figure 32). No other reliable inferences can be drawn regarding populations of the other 2 species, however, especially cryptic skink. As noted above, the July 2020 search did, however, confirm the presence of nationally at risk declining cryptic skink habitat (Table 2).

Methods and Species Encountered Bovill/Thorsen surveys

[14] Hitchmough *et al.* 2015. Conservation status of New Zealand reptiles, 2015. New Zealand Threat Classification Series 17. Department of Conservation.

To inform the project Assessment of Environmental Effects and the Impact Management Report (IMR)[15], lizard values of the PIA were documented over multiple site-visits by Dr Mike Thorsen, and a more extensive survey by Luke Bovill. Surveys were described as "expert walk-through surveys", and were as follows:

1. 169.81 ha of the PIA was surveyed by Luke Bovill on 16 & 17 February 2018 (report provided in Appendix 2).
2. Dr Mike Thorsen carried out several walk-through lizard surveys of the Deepdell East Waste Rock Stack (WRS) over 2019.

Search effort for the Bovill (2018) survey included 20.5 km of the PIA traversed in 10 hours (Appendix 2). The additional searches carried out by Dr Thorsen were not included in the 20.5 km/10-hours search effort reported; search effort over the PIA by Dr Thorsen remains unquantified and is additional to that reported for Bovill. Weather conditions were unsuitable for half of the Bovill survey but lizards were detected by lifting rocks, a technique that was used by Bovill and is relatively insensitive to weather conditions over summer (see Appendix 2). Bovill located 4 lizard species from the PIA: korero gecko, McCann's skink, Southern grass skink and the cryptic skink (*O. inconspicuum*) (see Figure 36).

The AEE, although reporting a single sighting of cryptic skink in multiple places of the report, regards the habitat where the sighting occurred as "anomalous", and records the sighting as "potentially sighted". As noted elsewhere, the confirmation of cryptic skink habitat over the PIA in July 2020, and near to the reported sighting, provides some further support to this sighting. Catch per unit effort data were also collected and presented in AEE as a single value for all species; these data are not regarded further in this LMP.

Estimates of Population Size over the PIA

Based on extent of each mapped habitat (shown in Figure 3) that was deemed usable by each species (data shown in Table 2), a realistic upper estimate was made of potential population size of each species, over each habitat. This subjective assessment was based largely on the authors experience of these habitat and these species in the Macraes ED; and from observations made in the field during July 2020. These data, which are subject to numerous assumptions/caveats that are detailed below, indicate that a maximum number of 750 korero geckos; 750 McCann's skinks; 204 Southern grass skinks and 40 cryptic skinks could be directly affected by the project (Table 3)[16]. Because exact population numbers affected are not known, these figures formed a starting point to design a 'sliding scale' mitigation package under three scenarios, each with a different set of population-size estimates for each species (Table 4 and see Section 8).

[15]Deepdell North III project Impact Management Report (IMR, Ahika, dated December 2019).
[16] The WDC ecologist located *c*. 52 korero gecko and *c.* 30 McCann's skinks "within a few hours on site".

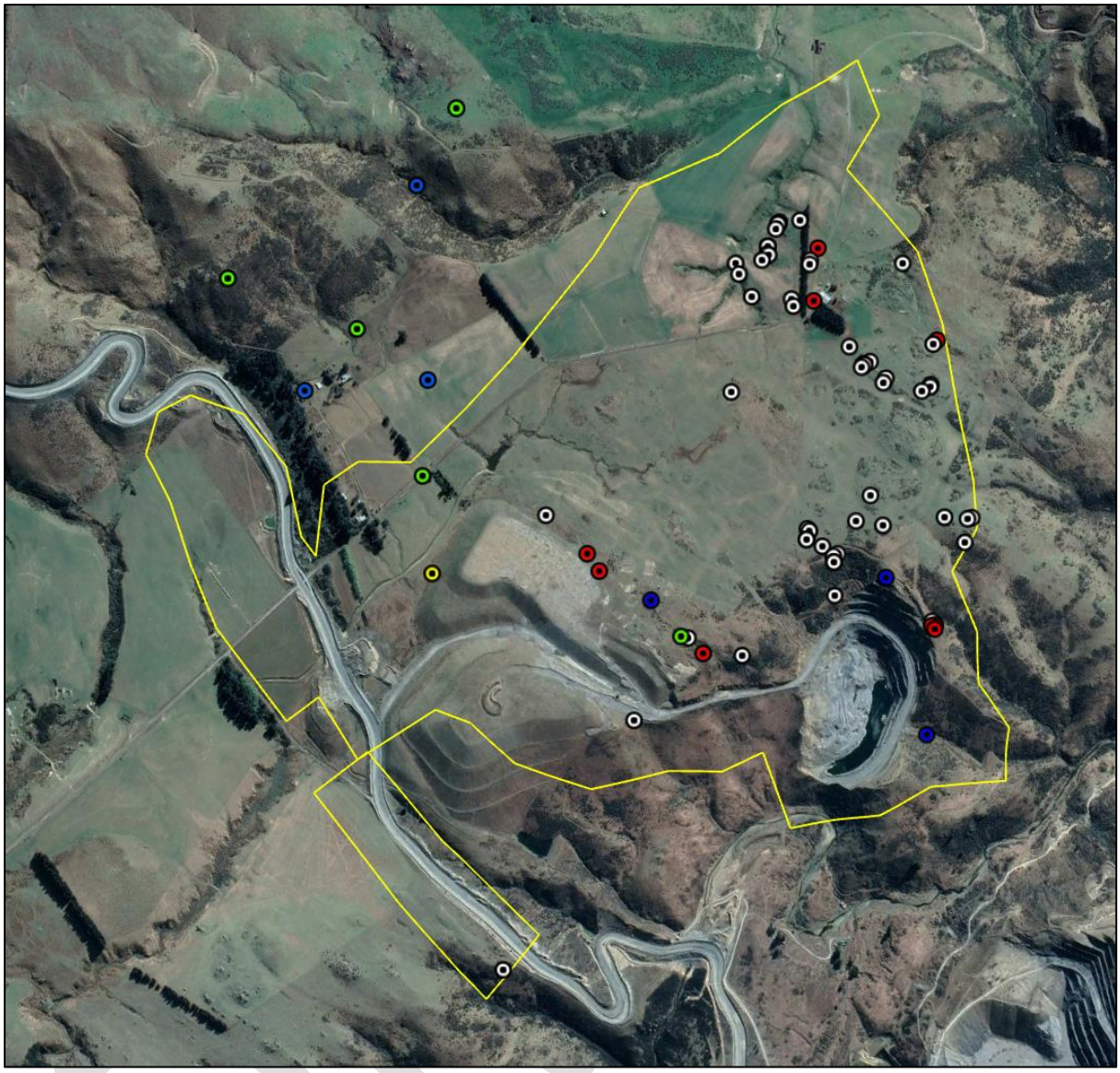


Figure 36: Lizard sightings made by Bovill, 2018 and lizard observations and korero gecko sign observed by author over July 2020 over the PIA and buffer area (yellow line). Blue symbol=unidentified skink; red=McCann's skink; white=korero gecko; yellow=cryptic skink and green= southern grass skink. Note: the Bovill (2018) survey extended to the hill country north-west of the PIA where he saw 6 skinks.

Figure 37: Southern grass skink juvenile, July 2020.

Table 3: Lizard numbers estimated from lizard habitat mapping in Table 2. These inform the realistic scenario in Table 4 below.

Habitat #: Description	Colour in Figure 3	Area (ha)	#Korero gecko	#Southern grass skink	#cryptic skink	#McCann's skink
1: Cultivated Pasture	green	63.04	25	15	0	25
2: Degraded red tussock land	orange - opaque	2.65	0	0	0	0
3: Shrubland	yellow	18.44	150	50	20	150
4: Disturbed Areas/Hard Surfaces	teal	53.19	20	20	5	20
5: Sedge land	mauve - solid	0.76	0	2	0	0
6: Degraded Northern Gully's	purple	3.85	20	0	0	15
7: High-Quality Lizard Rock Habitat	dark blue	2.25	150	20	0	150
8: Rough Pasture	red	24.90	25	5	0	25
9: Mining Remains	Bright green	0.74	30	10	0	30
10: Shelter Belts/Exotic Shrubland	magenta	3.99	0	0	0	5
11: Wetland	solid orange	0.49	0	10	5	0
12: Buildings/Farm Litter	pink	1.44	30	2	0	30
13: Moderately-Quality Lizard Rock Habitat in Cultivated Matrix	white	21.08	150	20	0	150
14: Rough Pasture with High Indigenous Vegetation Cover	light blue	22.62	150	50	10	150
15: To Avoid.	brown	4.51	n/a	n/a	n/a	n/a
16: To Avoid. Habitat 7	brown	0.89	n/a	n/a	n/a	n/a
17: To Avoid. Habitat 14	brown	0.29	n/a	n/a	n/a	n/a
Totals		**219.44**	**750**	**204**	**40**	**750**

Population Size Assumptions (all Scenarios)

When estimating the population size for each species over each habitat (Table 3), assumptions made included:

- For korero gecko, the number of geckos present in each habitat type were directly proportional to the amount of lizard sign observed in sheltered, sunny, generally north-facing crevices;
- Korero gecko are only found in rocky habitat, and in greater numbers on larger complex rock outcropping with good indigenous plant cover;
- McCann's skinks are widespread where rocky habitat exists, and tend to occupy similar habitats to korero gecko and in similar numbers;
- Southern grass skinks sometimes co-exist with McCann's skinks, but are more numerous in rank grass, with or without a good ground cover of indigenous grasses;
- Cryptic skinks are confined to wetter areas of the PIA; seepages, flushes and wetlands and the grassland surrounding such areas;

- Korero gecko, Southern grass skink and McCann's skink make use of the intervening matrix between patches of rocky habitat, except where patches are clearly cultivated and regularly disturbed;
- For both cryptic and Southern grass skinks, the habitat condition at the time of assessment was typical and representative of condition over other years and seasons; and
- Predator loading, not known for any habitats, did not affect estimates for any habitat or species.

7. Anticipated Adverse Effects on Lizard Values

Updated Effects Assessment: Section not complete but will include mention of cumulative effects. Note: The project AEE does adequately address all likely impacts of the project on lizard values, except cumulative effects.

Note: The effects of the DDNIII project on lizards' values over the buffer area are expected to relate only to noise, dust and vibration, and be temporary effects.

8. Mitigation Packages

Overview of Approach

Following the lizard habitat mapping described in Section 6, sufficient information is available on the amount of lizard habitat affected by the project (summarised in Table 3, and again here in Table 4). What is not known with certainty, is the population size affected for each species. For this reason, a sliding-scale approach has been adopted to the design of three mitigation packages, that differ only in the number of lizards affected. In this LMP, a mitigation package includes all actions to avoid, remedy, mitigate and compensate the adverse effects of the project, on each lizard species, to achieve a no net loss outcome.

The 'realistic scenario' is just that: the scenario that seems to best match the habitat quality and incidence of lizard sightings over the PIA (Table 3 and 4). The 'worse-case scenario' mitigation package is based on high population estimates for all 4 species; and the 'least impact' scenario is based on the lowest population estimates. These packages are summarised in Appendix 3 for 'worse-case', 'realistic' and 'least impact' scenarios. Note: further commentary on how the assessment was made for the mitigation packages is provided on Section 6: Calculation of Extent of Habitat Affected by the Project.

Population Size Estimates for Mitigation Packages

For each lizard species, the upper population level in Table 3 (considered a realistic metric of population size affected by the project) was halved to get the lower level of population range for the 'realistic scenario' in Table 4. For example, it was considered realistic that 375-750 korero geckos could be affected by the project, and the proposed mitigation package for korero gecko was then designed to manage adverse effects on between 375 and 750 geckos (Table 4).

For the least-impact scenario, the lower value has been arbitrarily set at 1 for cryptic skink, the rarest skink of the 4 species in the Macraes ED; 10 for the not-threatened McCann's skink, and 5 for both korero gecko and Southern grass skink. Should such small populations of these species occur over the PIA, it is considered that the project will have a very minor adverse effect on populations. All other values are self-explanatory, with values derived from values already explained (Table 4).

Table 4: Estimated range in lizard population-size across 3 scenarios, each with a unique mitigation package proposed in Section 8. Upper population numbers for the realistic scenario are estimated from lizard habitat mapping in Tables 2 & 3.

Lizard Species affected (habitat affected, ha)	Sliding Scale Scenarios				
	Least Impact		Realistic		Worse-case
	Lower	Upper	Lower	Upper	
# korero gecko (62.44)	5	<375	375	750	>750
# Southern grass skink (49.68)	5	<102	102	204	>204
# McCann's skink (64.98)	10	<375	375	750	>750
# cryptic skink (1.43)	1	<20	20	40	>40

Choice of Scenario

In order to determine which of the three scenarios fit best with the actual lizard populations over the PIA, index counts will be carried out for McCann's skink and korero geckos over September-October 2020. These counts will be carried out by an experienced observer. For Southern grass skinks and cryptic skinks, salvage forms part of the mitigation package (see below); this method will use best practice trapping and capture techniques to rescue lizards from the PIA ahead of works. The salvage itself, therefore, will inform the best-fit mitigation scenario from tables in Appendix 3.

Should a single package not suit all species, the tables in Appendices 3 are designed to allow selection of 'hybrid scenarios' whereby a set of actions for any given species in one Table, can be implemented in isolation from entries for other species in the same table. In other words, the mitigation package for korero gecko, as an example, can be selected from any of the three tables that best represent the population size affected. The table selected for korero gecko need not be the same table that best suits any other species.

Avoidance Actions (All Scenarios) [section in draft]

Southern grass skink

The most substantial avoidance action benefits southern grass skink. Section 7 of the project AEE details the assessment of alternatives, including an action relevant to Southern grass skink: Waste Rock Disposal Location. The original location of the WRS was selected from the four options shown in Figure 38. Analysis of these alternatives determined that Option A would result in significant noise and visual impacts on adjoining (and well established) sensitive land use activities, that could not be readily mitigated, offset or compensated. Option A also affected a significant area of land that was not owned by Oceana Gold Ltd. Option C would result in significant additional costs to allow for stable and appropriate disposal of waste rock in a valley with higher water flows, and it was identified that there

would likely be significant adverse effects on heritage features, ecological features and water quality. For these reasons, further analysis of Options A and C were not conducted.

Option B was initially selected and consultation revealed significant adverse effects to terrestrial and freshwater ecology including; loss of habitat of the Taieri flathead galaxias, and loss of a large, mature specimen of *Olearia fimbriata*. Further, option B would necessitate loss of a portion of the Bellfield Homestead and sections of a water race, both being heritage features. Although not included in the AEE commentary, by avoiding Option B, areas of Southern grass skink habitat were also avoided, as shown in Figure 39 by the sightings of Bovill (2018) over the option B footprint. Although Bovill (2018) only encountered 3 Southern grass skinks and 2 unidentified skinks over the option B footprint, google earth imagery of the area indicates that the central portion of the habitat is much more suitable for Southern grass skink, that the majority of the habitat over the PIA.

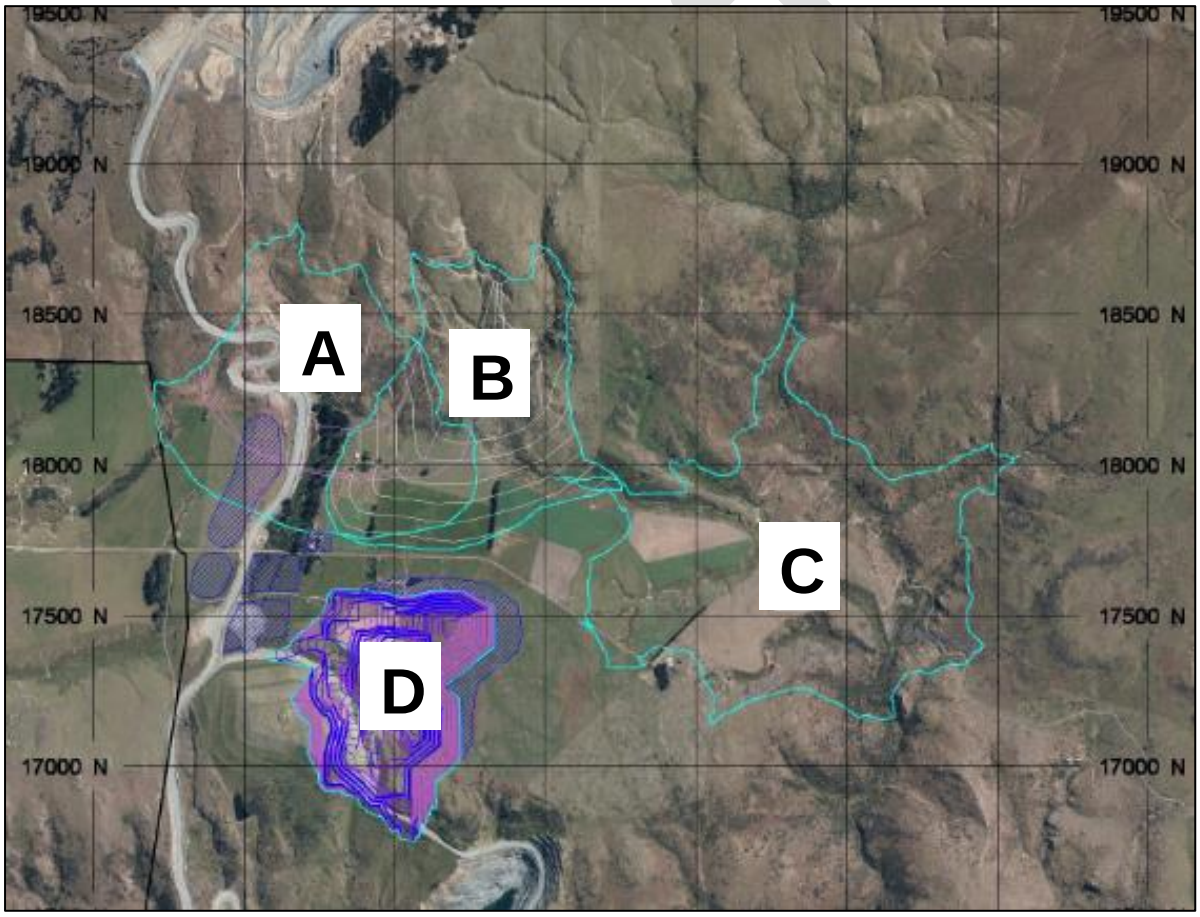


Figure 38: Four options explored for the location of the Deepdell North project WRS which is proposed for location D (also see Figure 2).

In addition to moving the WRS from option B to D, a 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) will be avoided specifically for its potential as Southern grass skink habitat (mapped as habitat #17 in Figure 3). Both avoidance actions for Southern grass skink are included in the summary mitigation tables of Appendix 3, and both actions may also benefit cryptic skink.

Korero gecko and McCann's skink

An area of 0.89 ha high-quality lizard rock habitat, mapped as habitat 7, will now be avoided. The area comprises castle-like tors amongst an area of diverse indigenous vegetation; the site provides habitat for both korero geckos and McCann's skinks. This area is mapped as habitat # 16 in Figure 3 and is shown in Figure 19. This avoidance action is included in the summary mitigation tables of Appendix 3.

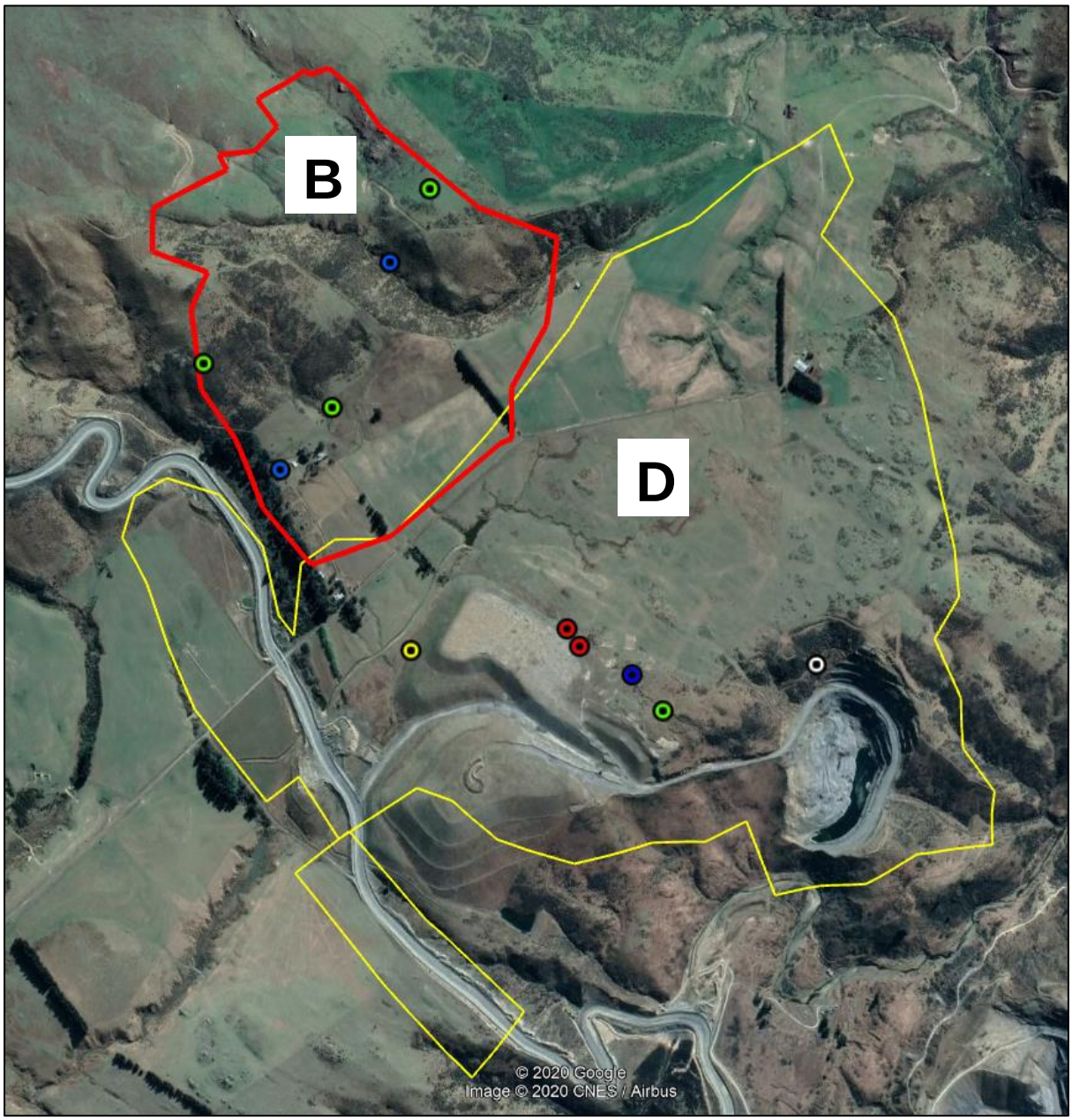


Figure 39: Options B and D for the project WRS showing lizard sightings of Bovill. Option D is the option proposed (see Figure 36 for all lizard sightings across option D, the Deepdell East Waste Rock Stack).

Remedial Actions (All Scenarios) [section in draft]

McCann's skink- Rehabilitation of the Deepdell East Waste Rock Stack (WRS) or the Deepdell South Pit

For McCann's skink under all scenarios, 10 ha of the WRS will be rehabilitated, post works, to a very high standard using quality schist rock slabs extracted from the PIA and stockpiled until needed for the rehabilitation. Rehabilitation will be guided by a lizard-habitat specific rehabilitation plan, drafted in collaboration with an experienced herpetologist, and the plan will be approved by DOC (referred to in this LMP as Plan #5). Rehabilitation if the WRS is the ***primary action*** proposed for the not threatened McCann's skink (Appendix 3). Implementation of the Rehabilitation Plan will occur under the supervision of a herpetologist. The plan will detail, but not be limited to the following:

- Methods to extract weathered, lichen-encrusted rock slabs from the PIA, ahead of works, to be stockpiled nearby on bare ground with no existing ecological value
- Quantities of rock required.
- Methods to install a lizard drift fence around the rock stock pile to ensure lizards do not colonise the pile ahead of its use in rehabilitation.
- Location of the 10-ha rehabilitation area; area must connect with existing habitat e.g. the Historic Area (Habitat #15 in Figure 3).
- A plan to ensure the WRS drains do not impede lizard passage.
- Detail of the orientation and configuration of the rock to be placed; rock placement to mimic 'natural' rock tors/stacks and follow best practice derived from research of Dr Cathy Rufaut.
- Some planting will be carried out to replicate what is there now.
- The 10-ha lizard habitat will be fenced to exclude stock.
- A monitoring plan, to monitor the passive migration of lizards into the area for 5-years.
- A pest woody weed control programme.
- Annual reporting requirements. Reports will be made to DOC on progress made in implementing the Rehabilitation Plan objectives.

Southern grass skink, cryptic skink, korero gecko

No specific remedial actions are planned for these 3 species (Appendix 3). That said, there is some limited information that korero geckos may benefit in the longer term from the rehabilitation of the footprint planned for McCann's skink.

Figure 40: Cranky Jim’s Covenants (Cranky Jim’s Shrubland Covenant and the Cranky Jim’s Wetland Covenant) situated along the Dunback-Macraes main Road.

Mitigation Actions [section in draft]

Cryptic skink & Southern grass skinks

For both cryptic skinks and Southern grass skinks, mitigation actions are the same across all three scenarios (Appendix 3), but compensation actions differ (next Section). Actions for all scenarios are as follows:

- Carry out a lizard survey of Cranky Jim's Covenants (144 ha; Figure 40 and Section 9) to ensure cryptic skink/Southern grass skink habitat is present. Map location and extent of cryptic skink/Southern grass skink habitat within the covenant. This work will inform the selection of the release site for salvaged lizard (Section 10).
- Carry out cryptic skink/Southern grass skink salvage of PIA pre-works and release skinks into Cranky Jim's Covenants, following methods detailed in LMP (Section 10) for both cryptic skink and Southern grass skink.
- Include cryptic skink/Southern grass skink habitat mapping of Cranky Jim's covenants in the final LMP, with explicit explanatory text justifying the selection of the cryptic skink/Southern grass skink release site/s, and in particular, why the site/s can support 40+ cryptic skinks and/or 204+ Southern grass skinks (worse-case scenarios; Appendix 3).
- Report on results of cryptic skink/Southern grass skink salvage to DOC.
- Undertake predator control for 5-years at Cranky Jim's (referred to in this LMP as Plan #1; see Section 11); predator control to be implemented prior to cryptic skink/Southern grass skink release into Cranky Jim's (Section 11).
- Report annually on progress towards implementing Plan #1 (predator management) objectives.
- Develop a post-release monitoring plan for cryptic skink/Southern grass skink at Cranky Jim's covenants, with SMART objectives, if >20 individuals are released of either species into Cranky Jim's from the PIA (referred to in this LMP as Plan #6).
- Carry out post-release monitoring of cryptic skink/Southern grass skink at Cranky Jim's covenants for 2-years beyond duration of predator control planned for the site, but only if >20 individuals of either species are released into Cranky Jim's from the PIA.
- Report biennially on progress towards implementing Plan #6 objectives.

Note: residual effects are anticipated following the successful implementation of avoidance and mitigation actions for all scenarios for Southern grass skink and following the worse-case scenario for cryptic skink (Appendix 3). [but see Section 12]

McCann's skink

No mitigation actions are planned for McCann's skink (see Appendix 3).

Note: residual effects are anticipated following the successful implementation of avoidance and remedial actions for the worse-case scenario for McCann's skink (Appendix 3). [but see Section 12]

Korero gecko

For korero gecko, mitigation actions are the same across all three scenarios (Appendix 3), but compensation actions differ (next Section). In addition, a research for mitigation action is planned for korero geckos. Mitigation actions for all scenarios are as follows:

- Carry out a lizard survey of Cranky Jim's Covenants (144 ha; Figure 40 and Section 9) to ensure a korero gecko population is present. Collect baseline population index measures over spring 2020/2021. Map location and extent of korero gecko habitat within the covenant.
- Develop a Predator Management Plan for Cranky Jim's Covenants, in collaboration with DOC (Plan #1; Section 11).
- Seek DOC approval for Plan #1, and ensure it is implemented at Cranky Jim's covenants before November 1st 2020.
- Undertake predator control for 5-years at Cranky Jim's in addition to 5-years already planned for other species (i.e. 10-years total).
- Report annually on progress on implementing Plan #1 objectives.
- Research for Mitigation: Develop a robust, novel index monitoring method for korero gecko; include SMART monitoring objectives for 10-years. Develop plan in consultation with DOC and other herpetologists experienced with monitoring *Woodworthia* sp. in the South Island (referred to in this LMP as Plan #2).
- Include results of baseline index monitoring undertaken over spring 2020/2021, into Plan #2.
- Carry out robust outcome monitoring at Cranky Jim's Covenants as per Plan #2.
- Report biennially on korero gecko population response to predator control.

Note: residual effects are anticipated following the successful implementation of avoidance and mitigation actions for the worse-case and realistic scenarios for korero geckos (Appendix 3). [but see Section 12]

Compensation Actions [section in draft]

Cryptic skink

The primary compensation action planned for cryptic skink under a worse-case scenario where >40 skinks are found to occur over the PIA involves removing grazing (by stock exclusion fencing) from a degraded site at the Redbank EEA and robustly monitoring the population response for 7-years (Appendix 3). There are no compensation actions planned under the realistic and least impact scenarios, relying instead on mitigation actions described above (see Appendix 3).

Note: for cryptic skink, there are no left-over residual effects requiring additional actions (see Section 12 and Appendix 3). [but see Section 12]

Southern grass skink

The compensation action planned for Southern grass skink under a worse-case scenario, where >204 skinks are found to occur over the PIA involves removing grazing (by stock exclusion fencing) from 3 degraded sites at the Redbank EEA and robustly monitoring the population response for 7-years, or for 5 years at 6 sites including 3 reference sites (Appendix

3). The response to the grazing release by rodents and hedgehogs will also be monitored at all 3 sites.

Under a realistic scenario, where between 102-204 Southern grass skinks are affected; and the least impact scenario where less than 102 skinks are affected, the action will be the same as for the worse-case scenario, but the need to monitor rodents and hedgehogs is not imposed (Appendix 3).

Note: for Southern grass skink under the worse-case scenario, left-over residual effects require additional actions to be considered (see Section 12 and Appendix 3). [but see Section 12]

McCann's skink

No compensation actions are planned for McCann's skink (see Appendix 3).

Note: for McCann's skink under the worse-case scenario, left-over residual effects require additional actions to be considered (see Section 12 and Appendix 3). [but see Section 12]

Korero gecko

Research for Mitigation forms the compensation action planned for korero geckos under the worse-case and realistic scenarios only (Appendix 3). Research is planned to investigate artificial cover object supported translocations of korero gecko into man-made rock habitat. Key elements may include:

- Use a selection of korero geckos from PIA.
- Select animals with existing scars/tail loss etc. instead of toe clipping.
- Release adults and juveniles into new rock habitat created in existing vegetation (i.e. 'food ready').
- Ensure no existing values will be adversely affected by the research.
- Design of new rock habitat (size, configuration, height etc. to follow best practice as directed by Dr Cathy Rufaut); i.e. this research builds on existing research that is underway as part of mitigation for OGL Coronation North.
- Giant ACOS, stacked 4 high, to provide instant thermally appropriate habitat, and a method to detect released geckos.
- Two paired sites: 1 with and 1 without ACO support.

Note: for korero gecko under the worse-case scenario and least impact scenario, left-over residual effects require additional actions to be considered (see Section 12 and Appendix 3). [but see Section 12]

9. Pre-Works Survey's [section in draft]

A number of surveys are planned to establish release sites for salvaged lizards (Southern grass skinks and cryptic skinks); to ensure Cranky Jim's covenants support habitat and populations of korero gecko, Southern grass skinks and cryptic skinks; and to collect baseline population metrics (Cranky Jim's covenant and Redbank EEA) (see Table 5).

Table 5: Pre-works surveys required as either mitigation actions or compensation actions (see summary tables in Appendix 3).

Lizard Species	PIA	Cranky Jim's	Redbank EEA
Korero gecko	Index counts to inform selection of mitigation scenario	Determine if this species is present; obtain baseline population metric	
Southern grass skink	-	Map habitat; obtain baseline population metric; detail a suitable release site	Select grazing release research sites (3 or 6 depending on design agreed with DOC) and obtain baseline population metric
Cryptic skink	-	Map habitat; obtain baseline population metric; detail a suitable release site	Select grazing release research sites (1) and obtain baseline population metric
McCann's skink	Index counts to inform selection of mitigation scenario	-	-

10. Salvage and Release Methods [section in draft]

Salvage Effort

No salvage will be carried out for korero geckos and McCann's skink (see Appendix 3 for other actions planned for these two species). Southern grass skinks and cryptic skinks will be salvaged from all habitats where they could occur (shown in Table 3) using primarily baited gee's minnow traps, supported by hand searching and a mix of baited pitfall traps (e.g. 1.1 L pitfall traps), and single layered Artificial Cover Objects (ACOs; layered pieces of Onduline™, a roofing product, cut to c. 40 x 40 cm). At each of the habitat areas, traps will be concentrated over the best habitat and spaced at 3-5 m spacing (depending on the configuration and extent of the habitat). The number of traps to be used will be dependent on the extent of the suitable trapping-habitat at each site.

Hand searching will be carried out over all areas to capture species that will avoid/not use traps (e.g. korero geckos in some habitat), but also in an attempt to capture any skinks sighted but not captured in the traps (some skinks are naturally trap-shy). Salvage will be carried out for up to 5-days of trapping over fine weather (daily maximum temperatures above 15°C). Handsearching will be conducted irrespective of weather, and salvage will continue until no grass skinks or cryptic skink are captured over a habitat area for at least one field day when weather allows lizard activity (i.e. air temperatures above 15°C), by either hand-searching, trapping or both. It is expected at least 1-week of trapping over suitable whether will be required to complete the salvage.

Note: Actions to salvage will be limited to habitat that will be modified or destroyed. If parts of the PIA buffer are not proposed to be affected, then salvage will not be undertaken over these areas, as it would constitute unnecessary destruction of habitat and effects on lizards.

Lizard Capture and Handling

During the salvage and release, lizards captured will be handled and held following best practice methodology and will be released as soon as practicable into the appropriate release site. Upon capture, each lizard will be placed inside an individual cloth bag and stored in a chilly bin (placed in the shade) until 'processing'. 'Processing' will include taking snout-vent length, vent-tail length, and recording sex/scars (data will inform a salvage report).

No individual lizard will be kept for more than 24-hours before being released (unless weather is not suitable for release). If weather conditions deteriorate to the point where released lizards would be unable to move to find a safe place, lizards will be slowly warmed in the hands of releaser, until they can perform a righting response when turned over, before being released.

Selection of Release Site

[Dependent of lizard survey and habitat mapping of the Cranky Jims covenants (see Figure 40).

11. Predator Management Cranky Jim's Covenants

[Section under Development. Consultation underway with predator control contractor. Predator plan to be developed in collaboration with Patrick Liddy DOC. Predators (except mice) to be controlled using best practice: a range of trap types, variety of baits. Agreement in principle received from DOC on July 31st to begin predator trapping ahead of lizard salvage]

12. Anticipated Residual Effects (following proposed Compensation)

Awaiting further comment from DOC on sufficiency of the actions within the sliding scale mitigation packages.

13. Contingency Mitigation

Awaiting further comment from DOC on sufficiency of the actions within the sliding scale mitigation packages. Any contingency mitigation will be advised by DOC, but resourced and managed by OGL.

14. Accidental Discovery

Should lizard species other than Southern grass skinks, korero gecko, cryptic skink or McCann's skinks be found during the implementation of this plan, works will stop until DOC advises on how best to proceed.

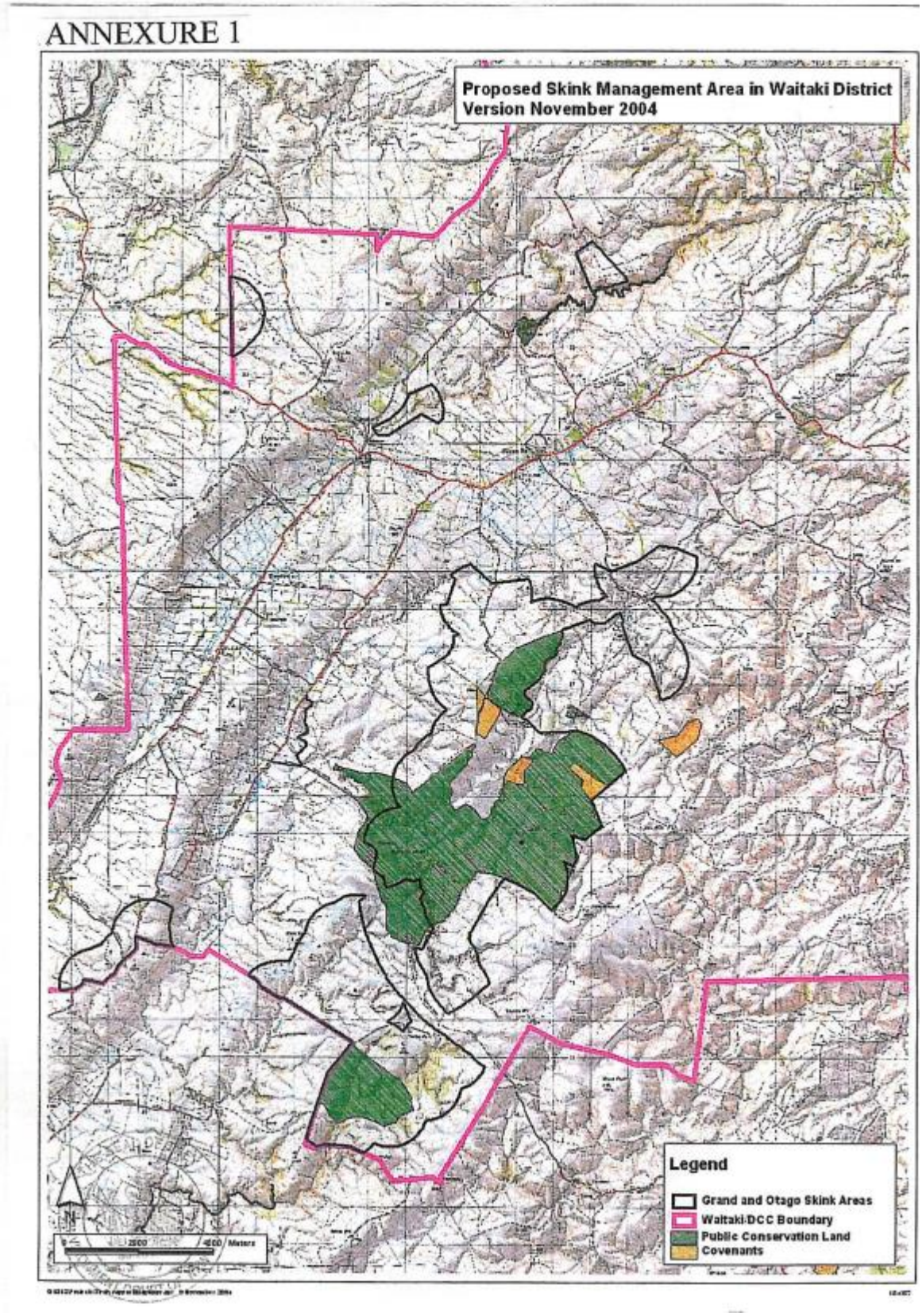
15. Reporting

[Section to be completed]

16. Consultation with Kai Tahu

Oceana Gold Ltd plan to begin consultation with Kai Tahu, over various matters including lizard management, over early August 2020.

Appendix 1: Skink Management Area from WDC District Plan 2010



Appendix 2: Herpetofauna Survey report by Luke Bovill, 16th January and 17th January 2018.

Note the Northing of the cryptic skink is incorrect and the survey took in an area much larger than the PIA; see Appendix 5 for the location of lizard sightings within the PIA itself.

Deepdell North Reptile Survey
Luke Bovill

Lizard communities were surveyed between the 16th January and 17th January 2018. The first day had very warm temperatures while the second featured consistent rain throughout the day. Surveys ran from roughly 9.30am until 4pm both days. Three sites; Horse Flat Dump, Open Pit and Deepdell South Backfill Dump were surveyed. Rock outcrops were sought out and scanned with binoculars from a distance, they were also approached and some rocks were turned to look for lizards. When a lizard was disturbed the surveyor retreated slightly and waited for a period of ten to fifteen minutes for any re-emergence.

Horse Flat Dump

The lower pasture area was scarcely populated, one southern grass skink was observed near a fallen tree in the field adjacent to Horse Flat Road. There are several former farm sheds nearby and a McCann's Skink was observed in this dry area.

Further up the hill directly behind the farmhouse there were Southern Grass Skinks, possibly a McCann's Skink and faeces recorded. These observations were centred on individual rock tors among dense scrubland.

On the north side of the valley above the farmhouse which is bisected by a road there was a number of tors positioned in a way that would have received a large amount of sun. Some faeces were found here but no recorded sightings.

Some clustered rocks that overlook the valley at a sharp S shaped turn in the road also featured faeces but no skinks, there have been sightings in this area previously and another surveyor photographed a McCann skink in this area the next day. I observed one feral cat and two hedgehogs in nearby proximity indicating the presence of predators.

Along the eastern side of the survey section of Horse Flat Dump there were no other significant observations. A hedgehog was seen down towards the river at the bottom of the valley towards where it joins with farm pasture. No geckos were observed at Horse Flat Dump.

This section was surveyed over two days. The first day was very hot and may have resulted in Otago and Grand Skinks going into the cooler shelter of their Tors as the day progressed reducing visibility. The second day focused on the area above the farmhouse in the top left part of the survey site, the weather was cooler and there was a higher number of skink observations.

Open Pit

There were no recorded sightings along the road to the left of the pit area that approaches the infrastructure area or along its surface towards the backfill dump. The steep area at the bottom left of this survey site had a Cryptic Skink among the rocks that lined the road.

Middle areas of the Open Pit that were surveyed showed no evidence of skinks or faeces, there were various mining pieces around that showed possible movement of works through this otherwise flat rocky area. The top and top right parts of the open pit that were nearer to Horse Flat Road had adult and smaller subadult or juvenile McCann's skinks, suggesting breeding activity. These were located along the access road as it meets the steep faces of the open pit.

The right hand side of the Open Pit site towards Deepdell South Backfill Dump contained several Tors which looked like suitable habitat but no evidence of skinks was found here.

The pit was surveyed in one day with several circles around the area, the presence of skinks may have been hindered by consistent rain throughout the day. There was limited entry to the very centre of the site as there was a digger and another separate piece of machinery working in the area. No geckos were observed at the proposed open pit site.

Deepdell South Backfill Dump

There was no evidence of reptiles along the road leading into the Backfill Dump. The area above the dump on the steep slopes has few rock outcrops limiting lizard habitat. I saw no skinks in this area or the space between the backfill dump and the open pit survey area. There was one rocky outcrop overlooking the road in the middle of the survey site that looked like suitable habitat and faeces were found nearby. Another surveyor the same day observed a UNID smaller skink species in the grass as she surveyed in this area. In the gully on the top side of the survey area I observed faeces and an adult Otago-Southland Large Gecko. In this gully area there are several schist rocks protected by overhanging trees that remained dry despite the moderate increasing to heavy rain occurring in this area while I surveyed. The backfill dump was surveyed in one day and has less than ideal lizard habitat.

Easting		Northing	Waypoint Observation
2306746	1	5538253	16/1/18 Survey start location, top of Horse Flat Dump
2306643	2	5538371	Faeces on Tors
2307043	3	5538562	Feral Pig Den
2307085	4	5538444	Feral Cat
2307090	5	5538482	Faeces on Tors
2307242	6	5538398	Hedgehog
2307238	7	5538425	Southern Grass Skink
2307040	8	5538367	Faeces on Tor
2307145	9	5538250	UNID smaller skink species
2307298	10	5538126	Hedgehog
2307020	11	5537896	Southern Grass Skink
2307196	12	5537785	UNID smaller skink species
2307476	13	5537841	17/1/18 Survey start location, bottom of Horse Flat Dump
2306691	14	5538017	Faeces on Tor
2306718	15	5537989	Southern Grass Skink, missing tail
2306900	16	5537741	McCann's or Southern Grass Skink
2307741	17	5537138	Faeces on Tor
2307556	18	2307090	Cryptic Skink
2307608	19	5537388	One Adult and one Subadult or Juvenile McCann's Skink basking close together
2307640	20	5537348	McCann's Skink
2307769	21	5537285	McCann's or Southern Grass Skink
2307847	22	5537202	Southern Grass Skink
2308216	23	5537409	Faeces on Tor
2308218	24	5537322	Otago-Southland Large Gecko

Appendix 3: Lizard Sliding Scale Mitigation Packages

Summary of the mitigation package for lizard populations of the Deepdell North III PIA **under Scenario 1: Worse-Case**. Areas of habitat used by each species are shown in Table 3. Figures given for habitat, for each species, are summed across mapped habitat units that provide habitat for the species. SMART= simple; measure able, achievable, realistic and timebound.

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
Korero gecko >750 individuals	0.89 ha of high-quality lizard rock habitat (Habitat 7) to be avoided.	nil	• Carry out a lizard survey of Cranky Jim's Covenants (144 ha) to ensure a KG population is present. Collect baseline population index measures over spring 2020/2021. Map location and extent of KG habitat within the covenant. • Develop a Predator Management Plan for Cranky Jim's Covenants, in collaboration with DOC. (Plan #1). • Seek DOC approval for Plan #1, and ensure it is implemented at Cranky Jim's covenants before November 1st 2020. • Undertake predator control for 5-years at Cranky Jim's in addition to 5-years already planned for other species (i.e. 10-years total).	nil	Yes *Note: predator control at Cranky Jim's Covenants for SGS and CS from year 1-5 will assist any KG present while it lasts and monitoring for KG anticipates this.* *Note: the planned rehabilitation of the WRS for McCann's skink may benefit this species over the long-term.*

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			• Report annually on progress on implementing Plan #1 objectives. • Research for Mitigation: Develop a robust, novel index monitoring method for korero gecko; include SMART monitoring objectives for 10-years. Develop plan in consultation with DOC and other herpetologists experienced with monitoring *Woodworthia* sp. in the South Island (Plan #2). • Include results of baseline index monitoring undertaken over spring 2020/2021, into Plan #2. • Carry out robust outcome monitoring at Cranky Jim's Covenants as per Plan #2. • Report biennially on KG population response to predator control.		
Korero gecko *c*. 62.44 ha habitat		nil	nil	• Research for Mitigation: Develop Research Proposal "Giant ACO supported translocations of KG". Plan #3. Develop	

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
				plan in consultation with DOC and other herpetologists experienced with monitoring *Woodworthia* sp. in the South Island. Key elements may include: • Use a selection of korero geckos from PIA. • Select animals with existing scars/tail loss etc. instead of toe clipping. • Release adults and juveniles into new rock habitat created in existing vegetation (i.e. 'food ready'). • Ensure no existing values will be adversely affected by the research. • Design of new rock habitat (size, configuration, height etc. to follow best practice as directed by Dr Cathy Rufaut); i.e. this research builds on	

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
				existing research that is underway as part of mitigation for OGL Coronation North. • Giant ACOS, stacked 4 high, to provide instant thermally appropriate habitat, and a method to detect released geckos. • Two paired sites: 1 with and 1 without ACO support.	
Southern grass skink >204 individuals	• Original WRS was moved to HFR from an area with higher quality SGS habitat than that present over the PIA. • 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) to be avoided.	nil	• Carry out a lizard survey of Cranky Jim's Covenants (144 ha) to ensure SGS habitat is present. Map location and extent of SGS habitat within the covenant. • Carry out SGS salvage of PIA pre-works and release skinks into Cranky Jim's Covenants, following methods detailed in LMP. • Include SGS habitat mapping of Cranky Jim's covenants in the final LMP, with explicit explanatory text justifying the selection	nil	Yes *Note: predator control at Cranky Jim's Covenants for KG from year 5-10 will assist any SGS present while it lasts.*

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			of the SGS release site/s, and in particular, why the site/s can support >200 SGS. • Report on results of SGS salvage to DOC. • Undertake predator control for 5-years at Cranky Jim's (Plan # 1); predator control to be implemented prior to SGS release into Cranky Jim's. • Report annually on progress on implementing Plan #1 objectives. • Develop a post-release monitoring plan for SGS at Cranky Jim's covenant, with SMART objectives, if >20 individuals are released into Cranky Jim's from the PIA. Plan #6. • Carry out post-release monitoring of SGS at Cranky Jim's covenant for 2-years beyond duration of predator control planned for the site, but only if >20 individuals are released into Cranky Jim's from the PIA.		

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			• Report biennially on progress towards implementing Plan #6 objectives.		
Southern grass skink *c*. 49.68 ha habitat		nil	nil	• Carry out spring lizard survey of Redbank EEA to identify 3 sites, each between 1-3 ha, where SGS are present in good numbers over degraded habitat (to allow recovery). • Collect baseline index data from the selected SGC sites within the Redbank EEA. • Remove grazing from the 3 identified SGS sites at Redbank EEA, by fencing to exclude stock. • Develop a monitoring plan to measure response of SGS to release from grazing, with SMART objectives that includes the results of spring survey. Plan #4. • Monitor recovery of SGS at three sites for 7 years, in response to grazing	

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
				release; or alternatively, monitor 3 sites plus 3 control sites, all within the Redbank EEA for 5-years. • Include into Plan #4 methods to passively monitor the response of grazing release by rodents and hedgehogs at all 3 sites. for 7 years. Plan #4. • Report annually on progress on implementing Plan #4 objectives.	
Cryptic skink >40 individuals	nil	nil	• Carry out a lizard survey of Cranky Jim's Covenants (144 ha) to ensure CS habitat is present. Map location and extent of CS habitat within the covenant. • Carry out CS salvage of PIA pre-works and release skinks into Cranky Jim's Covenants, following methods detailed in LMP. • Include CS habitat mapping of Cranky Jim's covenants in the final LMP, with explicit explanatory text justifying the selection of the CS release site/s, and in	nil	No *Note: some of the 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) to be avoided may include CS habitat*

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			particular, why the site/s can support >40 CS. • Report on results of CS salvage to DOC. • Undertake predator control for 5-years at Cranky Jim's (Plan #1); predator control to be implemented prior to CS release into Cranky Jim's. • Report annually on progress towards implementing Plan #1 (predator management) objectives. • Develop a post-release monitoring plan for CS at Cranky Jim's covenants, with SMART objectives, if >20 individuals are released into Cranky Jim's from the PIA. Plan #6. • Carry out post-release monitoring of CS at Cranky Jim's covenants for 2-years beyond duration of predator control planned for the site, but only if >20 individuals are released into Cranky Jim's from the PIA. • Report biennially on progress towards		

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			implementing Plan #6 objectives.		
Cryptic skink *c*. 1.43 ha habitat	nil	nil	nil	• Carry out spring lizard survey of Redbank EEA to identify a site, between 1-3 ha, where CS are present in good numbers over degraded habitat (to allow recovery). • Collect baseline index data from the selected CS site within the Redbank EEA. • Remove grazing from the identified CS site at Redbank EEA, by fencing to exclude stock. • Develop a monitoring plan to measure response of CS to release from grazing, with SMART objectives that includes the results of spring survey. Plan #4. • Monitor recovery of CS at one site for 7 years, in response to grazing release. • Report annually on progress on implementing Plan #4 objectives.	

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
McCann's skink >750 individuals	0.89 ha of high-quality lizard rock habitat (Habitat 7) to be avoided.	• Develop a lizard-habitat specific rehabilitation plan, in collaboration with an experienced herpetologist approved by DOC, for the WRS (Plan #5). • Extract weathered, lichen-encrusted rock slabs from the PIA, ahead of works, and stockpile nearby works area (on bare ground with no existing ecological value) to use for rehabilitation, post-works. • Install a lizard drift fence around the rock stock pile to ensure lizards do not colonise the pile ahead of its use in rehabilitation. • 10 ha of the footprint of the WRS will be rehabilitated in a way that connects with existing habitat, and mimics present habitat. • Some planting will be carried out to replicate what is there now. • The 10-ha lizard habitat will be fenced to exclude stock. • Monitoring of passive migration into the area for 5	nil	nil	Yes *Note: predator control at Cranky Jim's Covenants will assist any McCann's skinks present while it lasts.*
McCann's skink *c*. 64.98 ha habitat				nil	

Lizard species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
		years- details to be included in the rehabilitation plan. Plan #5. • Woody weed control undertaken. • Report annually to DOC on progress made in implementing Plan #5 objectives.			

Summary of the mitigation package for lizard populations of the Deepdell North III PIA **under Scenario 2: Realistic.** Areas of habitat used by each species are shown in Table 3. Figures given for habitat, for each species, are summed across mapped habitat units that provide habitat for the species. SMART – simple; measure able, achievable, realistic and timebound.

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
Korero gecko 375-750 individuals	0.89 ha of high-quality lizard rock habitat (Habitat 7) to be avoided.	nil	• Carry out a lizard survey of Cranky Jim's Covenants (144 ha) to ensure a KG population is present. Collect baseline population index measures over spring 2020/2021. Map location and extent of KG habitat within the covenant. • Develop a Predator Management Plan for Cranky Jim's Covenants, in collaboration with DOC. (Plan #1). • Seek DOC approval for Plan #1, and ensure it is implemented at Cranky Jim's covenants before November 1st 2020. • Undertake predator control for 5-years at Cranky Jim's in addition to 5-years already planned for other species (i.e. 10-years total). • Report annually on progress on implementing Plan #1 objectives. • Research for Mitigation: Develop a robust, novel index monitoring method for korero gecko; include SMART monitoring objectives for 10-years. Develop plan in consultation with DOC and other	nil	No *Note: predator control at Cranky Jim's Covenants for SGS and CS from year 1-5 will assist any KG present while it lasts and monitoring for KG anticipates this.* *Note: the planned rehabilitation of the WRS for McCann's skink may benefit this species over the long-term.*

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			herpetologists experienced with monitoring *Woodworthia* sp. in the South Island (Plan #2). • Include results of baseline index monitoring undertaken over spring 2020/2021, into Plan #2. • Carry out robust outcome monitoring at Cranky Jim's Covenants as per Plan #2. • Report biennially on KG population response to predator control.		

Korero gecko
c. 62.44 ha habitat
		nil	nil	• Research for Mitigation: Develop Research Proposal "Giant ACO supported translocations of KG". Plan #3. Develop plan in consultation with DOC and other herpetologists experienced with monitoring *Woodworthia* sp. in the South Island. Key elements may include:
				  • Use a selection of korero geckos from PIA.
				  • Select animals with existing scars/tail loss etc. instead of toe clipping.
				  • Release adults and juveniles into new rock habitat created in existing	

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
				vegetation (i.e. 'food ready'). • Ensure no existing values will be adversely affected by the research. • Design of new rock habitat (size, configuration, height etc. to follow best practice as directed by Dr Cathy Rufaut); i.e. this research builds on existing research that is underway as part of mitigation for OGL Coronation North. • Giant ACOS, stacked 4 high, to provide instant thermally appropriate habitat, and a method to detect released geckos. • Two paired sites: 1 with and 1 without ACO support.	
Southern grass skink 102-204 individuals	• Original WRS was moved to HFR from an area with higher quality SGS habitat than that present over the PIA.	nil	• Carry out a lizard survey of Cranky Jim's Covenants (144 ha) to ensure SGS habitat is present. Map location and extent of SGS habitat within the covenant. • Carry out SGS salvage of PIA pre-works and release skinks into Cranky Jim's Covenants, following methods detailed in LMP.	nil	

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
	• 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) to be avoided.		• Include SGS habitat mapping of Cranky Jim's covenants in the final LMP, with explicit explanatory text justifying the selection of the SGS release site/s, and in particular, why the site/s can support 100-200 SGS. • Report on results of SGS salvage to DOC. • Undertake predator control for 5-years at Cranky Jim's (Plan # 1); predator control to be implemented prior to SGS release into Cranky Jim's. • Report annually on progress on implementing Plan #1 objectives. • Develop a post-release monitoring plan for SGS at Cranky Jim's covenants, with SMART objectives, if >20 individuals are released into Cranky Jim's from the PIA. Plan #6. • Carry out post-release monitoring of SGS at Cranky Jim's covenants for 2-years beyond duration of predator control planned for the site, but only if >20 individuals are released into Cranky Jim's from the PIA.		No *Note: predator control at Cranky Jim's Covenant for KG from year 5-10 will assist any SGS present while it lasts.*

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			• Report biennially on progress towards implementing Plan #6 objectives.		
Southern grass skink *c*. 49.68 ha habitat		nil	nil	• Carry out spring lizard survey of Redbank EEA to identify 3 sites, each between 1-3 ha, where SGS are present in good numbers over degraded habitat (to allow recovery). • Collect baseline index data from the selected SGC sites within the Redbank EEA. • Remove grazing from the 3 identified SGS sites at Redbank EEA, by fencing to exclude stock. • Develop a monitoring plan to measure response of SGS to release from grazing, with SMART objectives that includes the results of spring survey. Plan #4. • Monitor recovery of SGS at three sites for 7 years, in response to grazing release; or alternatively, monitor 3 sites plus 3 control sites, all within the Redbank EEA for 5-years. • Report annually on progress on implementing Plan #4 objectives.	

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
Cryptic skink 20-40 individuals	nil	nil	• Carry out a lizard survey of Cranky Jim's Covenant (144 ha) to ensure CS habitat is present. Map location and extent of CS habitat within the covenant. • Carry out CS salvage of PIA pre-works and release skinks into Cranky Jim's Covenant, following methods detailed in LMP. • Include CS habitat mapping of Cranky Jim's covenant in the final LMP, with explicit explanatory text justifying the selection of the CS release site/s, and in particular, why the site/s can support 20-40 CS. • Report on results of CS salvage to DOC. • Undertake predator control for 5-years at Cranky Jim's (Plan #1); predator control to be implemented prior to CS release into Cranky Jim's. • Report annually on progress towards implementing Plan #1 (predator management) objectives. • Develop a post-release monitoring plan for CS at Cranky Jim's covenant, with SMART objectives, if >20 individuals are	nil	No *Note: some of the 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) to be avoided may include CS habitat*

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			released into Cranky Jim's from the PIA. Plan #6. • Carry out post-release monitoring of CS at Cranky Jim's covenant for 2-years beyond duration of predator control planned for the site, but only if >20 individuals are released into Cranky Jim's from the PIA. • Report biennially on progress towards implementing Plan #6 objectives.		
Cryptic skink *c*. 1.43 ha habitat	nil	nil	nil	nil	
McCann's skink 375-750 individuals	0.89 ha of high-quality lizard rock habitat (Habitat 7) to be avoided.	• Develop a lizard-habitat specific rehabilitation plan, in collaboration with an experienced herpetologist approved by DOC, for the WRS (Plan #5). • Extract weathered, lichen-encrusted rock slabs from the PIA, ahead of works, and stockpile nearby works area (on bare ground with no existing ecological value) to use	nil	nil	Yes *Note: predator control at Cranky Jim's Covenant will assist any McCann's skinks present while it lasts.*
McCann's skink *c*. 64.98 ha habitat				nil	

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
		for rehabilitation, post-works. • Install a lizard drift fence around the rock stock pile to ensure lizards do not colonise the pile ahead of its use in rehabilitation. • 10 ha of the footprint of the WRS will be rehabilitated in a way that connects with existing habitat, and mimics present habitat. • Some planting will be carried out to replicate what is there now. • The 10-ha lizard habitat will be fenced to exclude stock. • Monitoring of passive migration into the area for 5 years- details to be included in the rehabilitation plan. Plan #5. • Woody weed control undertaken. • Report annually to DOC on progress made in			

Lizard Species & Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
		implementing Plan #5 objectives.			

Summary of the mitigation package for lizard populations of the Deepdell North III PIA **Scenario 3: Least Impact**. Areas of habitat used by each species are shown in Table 3. Figures given for habitat, for each species, are summed across mapped habitat units that provide habitat for the species. SMART – simple; measure able, achievable, realistic and timebound.

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
Korero gecko <375 individuals	0.89 ha of high-quality lizard rock habitat (Habitat 7) to be avoided.	nil	• Carry out a lizard survey of Cranky Jim's Covenant (144 ha) to ensure a KG population is present. Collect baseline population index measures over spring 2020/2021. Map location and extent of KG habitat within the covenant. • Develop a Predator Management Plan for Cranky Jim's Covenant, in collaboration with DOC. (Plan #1). • Seek DOC approval for Plan #1, and ensure it is implemented at Cranky Jim's covenant before November 1st 2020. • Undertake predator control for 5-years at Cranky Jim's in addition to 5-years already planned for other species (i.e. 10-years total).	nil	Yes *Note: predator control at Cranky Jim's Covenant for SGS and CS from year 1-5 will assist any KG present while it lasts and monitoring for KG anticipates this.* *Note: the planned rehabilitation of the WRS for McCann's skink may benefit this species over the long-term.*

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			• Report annually on progress on implementing Plan #1 objectives. • Research for Mitigation: Develop a robust, novel index monitoring method for korero gecko; include SMART monitoring objectives for 10-years. Develop plan in consultation with DOC and other herpetologists experienced with monitoring *Woodworthia* sp. in the South Island (Plan #2). • Include results of baseline index monitoring undertaken over spring 2020/2021, into Plan #2. • Carry out robust outcome monitoring at Cranky Jim's Covenant as per Plan #2. • Report biennially on KG population response to predator control.		
Korero gecko *c*. 62.44 ha habitat		nil	nil	nil	
Southern grass skink <102 individuals	• Original WRS was moved to Deepdell East from an area with higher quality SGS	nil	• Carry out a lizard survey of Cranky Jim's Covenant (144 ha) to ensure SGS habitat is present. Map location and extent of SGS habitat within the covenant.	nil	No *Note: predator control at Cranky Jim's Covenant for KG*

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
	habitat than that present over the PIA. • 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) to be avoided.		• Carry out SGS salvage of PIA pre-works and release skinks into Cranky Jim's Covenant, following methods detailed in LMP. • Include SGS habitat mapping of Cranky Jim's covenant in the final LMP, with explicit explanatory text justifying the selection of the SGS release site/s, and in particular, why the site/s can support <100 SGS. • Report on results of SGS salvage to DOC. • Undertake predator control for 5-years at Cranky Jim's (Plan # 1); predator control to be implemented prior to SGS release into Cranky Jim's. • Report annually on progress on implementing Plan #1 objectives. • Develop a post-release monitoring plan for SGS at Cranky Jim's covenant, with SMART objectives, if >20 individuals are released into Cranky Jim's from the PIA. Plan #6. • Carry out post-release monitoring of SGS at Cranky		*from year 5-10 will assist any SGS present while it lasts.*

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			Jim's covenant for 2-years beyond duration of predator control planned for the site, but only if >20 individuals are released into Cranky Jim's from the PIA. • Report biennially on progress towards implementing Plan #6 objectives.		
Southern grass skink *c*. 49.68 ha habitat		nil	nil	• Carry out spring lizard survey of Redbank EEA to identify 3 sites, each between 1-3 ha, where SGS are present in good numbers over degraded habitat (to allow recovery). • Collect baseline index data from the selected SGC sites within the Redbank EEA. • Remove grazing from the 3 identified SGS sites at Redbank EEA, by fencing to exclude stock. • Develop a monitoring plan to measure response of SGS to release from grazing, with SMART objectives that includes the results of spring survey. Plan #4. • Monitor recovery of SGS at three sites for 7 years, in response to grazing release; or	

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
				alternatively, monitor 3 sites plus 3 control sites, all within the Redbank EEA for 5-years. • Report annually on progress on implementing Plan #4 objectives.	
Cryptic skink <20 individuals	nil	nil	• Carry out a lizard survey of Cranky Jim's Covenant (144 ha) to ensure CS habitat is present. Map location and extent of CS habitat within the covenant. • Carry out CS salvage of PIA pre-works and release skinks into Cranky Jim's Covenant, following methods detailed in LMP. • Include CS habitat mapping of Cranky Jim's covenant in the final LMP, with explicit explanatory text justifying the selection of the CS release site/s, and in particular, why the site/s can support <20 CS. • Report on results of CS salvage to DOC. • Undertake predator control for 5-years at Cranky Jim's (Plan #1); predator control to be implemented prior to CS release into Cranky Jim's.	nil	No *Note: some of the 0.21 ha of rough pasture with high indigenous vegetation cover (Habitat 14) to be avoided may include CS habitat.*

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
			• Report annually on progress towards implementing Plan #1 (predator management) objectives.		
Cryptic skink *c*. 1.43 ha habitat	nil	nil	nil	nil	
McCann's skink <375 individuals	0.89 ha of high-quality lizard rock habitat (Habitat 7) to be avoided.	• Develop a lizard-habitat specific rehabilitation plan, in collaboration with an experienced herpetologist approved by DOC, for the WRS (Plan #5). • Extract weathered, lichen-encrusted rock slabs from the PIA, ahead of works, and stockpile nearby works area (on bare ground with no existing ecological value) to use for rehabilitation, post-works. • Install a lizard drift fence around the rock stock pile to ensure lizards do not colonise the pile ahead of its use in rehabilitation.	nil	nil	No *Note: predator control at Cranky Jim's Covenant will assist any McCann's skinks present while it lasts.*
McCann's skink *c*. 64.98 ha habitat				nil	

Values	Avoidance Actions	Remediation Actions	Mitigation Actions	Compensation Actions	Left-over Residual Effects?
		• 10 ha of the footprint of the WRS will be rehabilitated in a way that connects with existing habitat, and mimics present habitat. • Some planting will be carried out to replicate what is there now. • The 10-ha lizard habitat will be fenced to exclude stock. • Monitoring of passive migration into the area for 5 years- details to be included in the rehabilitation plan. Plan #5. • Woody weed control undertaken. • Report annually to DOC on progress made in implementing Plan #5 objectives.			