

# **Terrestrial invertebrate values present on land proposed for a solar farm by Lodestone Energy Ltd. at Haldon Station, Mackenzie Basin.**

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## **Introduction**

Lodestone Energy Limited are proposing to construct a 320-hectare, solar photo-voltaic array on Haldon Station, adjacent to Lake Benmore in the Mackenzie Basin (Figure 1). The installation is projected to generate 220 megawatts (MW) of electricity (Figure 2.). According to their website, Lodestone intends to restore the present land surface to an 'original' ecological state by;

“...establishing a rabbit-proof fenced zone around the solar farm, we anticipate that the site will begin the slow process of reverting to its original state. The modules will be elevated to enable foliage to grow and provide a sheltered environment for fauna to re-establish. International studies have shown that increased shading can improve outcomes for plants/soil quality.”<sup>1</sup>

While the website doesn't describe the original ecological state, the opportunities for restoration are numerous and should the application go ahead, careful ecological consideration and planning will be critical. This report summarises a brief site visit to identify invertebrate fauna values for which the Department of Conservation (DOC) has interests under the Conservation Act.

The land proposed for the array is an almost level (0.3° slope) outwash surface formed by gravels deposited by the Pukaki and Tekapo rivers, largely since the last glacial maxima (12,000 ybp). The area is exceedingly dry (mean rainfall is less than 800mm per annum<sup>2,3</sup>) with median annual sunshine hours above 2000<sup>3</sup>, ideal conditions for a solar farm and native invertebrates adapted to the semi-arid environment.

## **Methods and results**

The inspection was carried out on Thursday 20, November 2025 with a minimal three hours spent on the land proposed for the array. Invertebrates were noted during several walks through the top third of the area including the DC transmission line and surfaces either side of the line. A small number of specimens were collected for positive identification. Following the walked survey, a clockwise drive was carried out to inspect the far (western) side of the area. A similar suite of invertebrates was noted here as elsewhere.

## Summary of findings

The area proposed for the solar array was extremely dry and ecologically depleted. The vegetation was dominated by *Hieracium pilosella* and other low-stature exotic species (e.g. *Hypericum* sp. St John's Wort) and scattered Briar Rose (*Rosa rubiginosa*). Patches of *Muhlenbeckia astonii* were located on shallow terrace risers and supported a number of Copper butterflies (*Lycaenia salustius*). These gradual slopes comprised open areas with bare river gravels of considerable surface age as demonstrated by the lichen cover.

The walked survey produced eleven species of invertebrate. Of those, nine species were native with one threatened (Nationally Vulnerable) representative, the grasshopper *Sigaus minutus* (Figure 3.). The grasshoppers presented in considerable numbers with an encounter rate of at least three to five insects every five meters walked.

*Sigaus minutus* was common on bare soils between plant clusters although some were noted on stony surfaces. A ratio of plant cover to bare ground was approximately 70:30. Several day-active Wolf spiders (*Anoteropsis hilaris*) were noted traversing open patches. Appendix 1. Provides a list of taxa and coordinate locations.

## Discussion

The surface currently provides habitat for the Nationally Vulnerable grasshopper *Sigaus minutus* which has a restricted distribution and feeds largely on lichen and *Raoulia* mat plants. However, *S. minutus* also feeds on various species of exotic vegetation, including those found on the Haldon outwash plain. The ecological requirements for this insect are optimal in the area proposed for the PV array, particularly for oviposition (egg laying), crypsis (camouflage by lichen) and sun-basking. Meanwhile, the applicant's web site states;

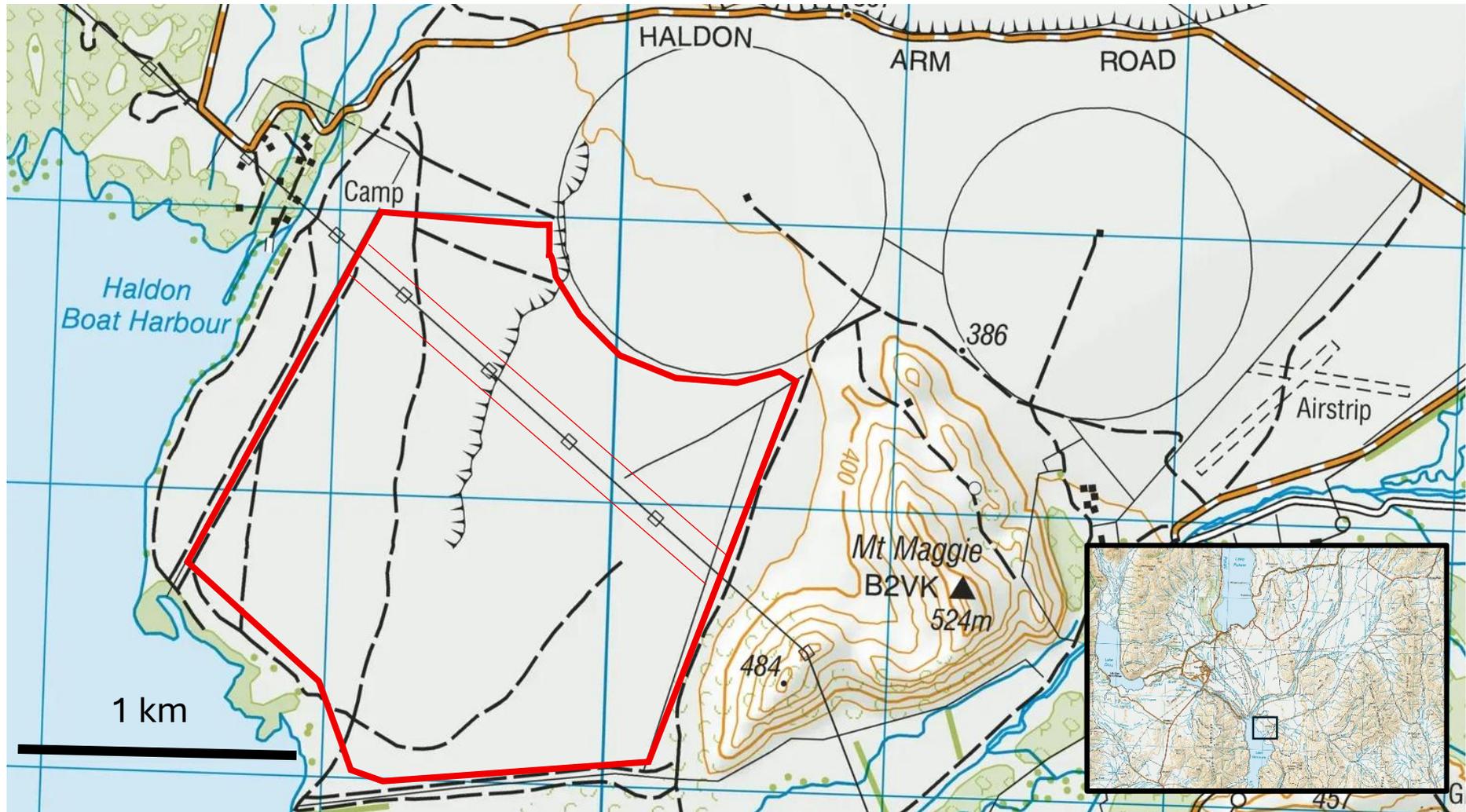
"International studies have shown that increased shading can improve outcomes for plants/soil quality"

On that basis, the applicant is keen to initiate an ecological restoration plan as part of the proposal at Haldon. However, increasing shading and vegetation cover is the opposite environment for *S. minutus* persistence in the Mackenzie basin. Ecological restoration will require careful design to include the optimal habitat requirements of *S. minutus* and my recommendation would be that the applicant (Lodestone) communicate with the nearby North Point solar proposal (at the delta between the Twizel and Tekapo rivers) where discussions and plans for a drylands invertebrate reserve are being prepared (by Wildlands invertebrate ecologist Vicki Smith).

On that basis, I'm concerned that competition between PV applicants in the Mackenzie Basin will result in an erosion of suitable invertebrate habitat as they vie for permission using independent ecological proposals. It would be preferable if applicants cooperated by adopting similar habitat restoration designs since the values are nearly equivalent across the eastern flank of the Mackenzie Basin.

## References

1. <https://lodestoneenergy.co.nz/haldon-station-solar-farm/>. Accessed 27.11.2025.
2. McIntosh, P.D. and Hunter, G.G. 1997. Soils and Land-Use Issues in the Mackenzie Hill Country. Landcare Research Science Series No. 109. P. 4.
3. NIWA. <https://niwa.co.nz/climate-and-weather/national-and-regional-climate-maps>. Accessed 26.11.2025.



**Figure 1.** Location map and approximate area of proposed Lodestone solar PV array on Haldon Station, Mackenzie Basin, Canterbury. Area of solar array is within the red polygon. A direct current transmission line runs between the narrow red lines and is proposed to be clear of PV panels, shown here by parallel narrow red lines.



**Figure 2.** Digital rendition of the proposed solar array overlain on a Google Earth oblique view looking toward the north west. Lake Benmore is visible at the top left, Mt Maggie lower right. Source; Lodestone Energy Ltd.



**Figure 3.** A Nationally Vulnerable *Sigaus minutus* grasshopper on the depleted surface of the proposed solar array area, Haldon Station. The adult grasshoppers are about 10-12 mm long.

## Appendix 1.

List of invertebrate taxa noted at Haldon Station on land proposed for a Lodestone energy Ltd. solar farm installation.

Class	Order	Family	Genus	Species	Coordinates	Notes
Arachnida	Opiliones	Phalangidae	<i>Phalangium</i>	<i>opilio</i>	1379035E, 5085465N	Introduced harvestman
	Araneae	Lycosidae	<i>Anoteropsis</i>	<i>hilaris</i>	1379715E, 5085410N	Native. Not threatened.
	Araneae	Gnaphosidae	<i>Matua</i> ?		1379665E, 5085445N	Endemic. Not threatened.
Insecta	Coleoptera	Carabidae	<i>Notogonum</i> ?	<i>Cf. feredayi</i> ?	1379645E, 5085705N	Endemic
	Coleoptera	Coccinellidae	<i>Coccinella</i>	<i>undceipunctata</i>	1379800E, 5085230N	Eleven spotted ladybird.
	Coleoptera	Chrysomelidae	<i>Chrysolina</i>	<i>hyperici</i>	1379700E, 5085525N	St John's Wort beetle. Introduced de-foliating bio-control agent for <i>Hypericum</i> spp.
	Hemiptera	Lygaeidae	<i>Rhypodes</i>	sp.	1379635E, 5085550N	Endemic
	Lepidoptera	Lycaenidae	<i>Lycaena</i>	<i>salustius</i>	1379578E, 5085708N	Common copper butterfly. Depends on <i>Muehlenbeckia</i> as a host plant.
	Lepidoptera	Lycaenidae	<i>Zizina</i>	<i>oxleyi</i>	1378530E, 5084770N	NZ Southern Blue butterfly. Endemic, not threatened.
	Orthoptera	Acrididae	<i>Sigaus</i>	<i>minutus</i>	1380240E, 5084925N 1380190E, 5084940N 1379705E, 5085640N 1379095E, 5085600N	Endemic to the Mackenzie Basin. <b>Nationally Vulnerable.</b>
	Orthoptera	Acrididae	<i>Phaulacridium</i>	<i>marginale</i>	1380115E, 5085055N	Native. Not threatened.