Revised Response to Impact Assessment Review

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The review raised the following concern:

Appendix 3.13 (Doley 2020) provides interpreted scenarios based on a suite of assumptions and Audalia's proposed emissions strategy. It predicts a 5-32% reduction in net dry matter production for *Marianthus aquilonaris* but does not suggest how these predicted reductions will affect plant growth or reproduction success.

In light of additional information on the growth habits of *Marianthus aquilonaris* provided by the proponents, the following assumptions have been made concerning the form and growth of plants in the subject area:

1. The relative sizes of photosynthetic and non-photosynthetic organs (which determine the proportion of net dry matter production that is consumed in respiration) are assumed to be constant throughout the year.
2. The rate of net dry matter production throughout the year is constant with respect to plant characteristics (leaf age and the duration of leaf retention on the plant) but varies with meteorological conditions (especially solar radiation and water availability to the plant).
3. Shoot growth, flower bud formation and fruit set are resourced from current photosynthetic production and stored reserves in a manner that does not alter the response of current photosynthetic rates to impacts such as dust deposition.

It is assumed that the relative impact of dust deposition on plant growth and reproduction will be the same as that predicted for net dry matter production. In that case the following guidance can be offered:

1. During the growing period of *Marianthus aquilonaris* (August to November), limitation of dust deposition by the management of mining activities is likely to reduce plant growth and reproduction by seed by not more than about five per cent. This extent of growth reduction might be difficult to distinguish from normal inter-annual variations in shoot growth and seed production. It is considered to be unlikely that the extent of dust deposition on flowers would materially reduce pollination and seed set.
2. Dust deposition of 8 g/m^2/month during the summer and autumn (December to May) may reduce net dry matter production by up to 30 per cent. The actual rate of dry matter production during this time may be low due to reduced water availability to plants. If dust deposition increases the reflectance of solar radiation, shoot temperatures may be slightly lower than in unaffected plants, so that rates of respiration may also be reduced slightly. It is likely that the reduction in dry matter gain and its effect on plant functions that can be attributed to dust deposition during summer and autumn may be small, but in an extended drought it could be important for plant survival. It is recommended that dust and vegetation monitoring and management measures be applied, especially through the summer and autumn.
3. Because of the existence of a few scattered plants, it is suggested that they should be managed in accordance with a species recovery program. Installations could include fencing to exclude damaging agents and dust barriers (low windbreaks) around individual plants to intercept dust from adjacent roadways.
4. In the event of dust deposition occurring to the extent that it becomes visible on leaf surfaces, it may be possible to spray plants with water to remove excessive dust loads from the leaves.

5. Frequent and detailed monitoring of the condition of plants in areas most likely to be impacted is recommended highly, together with (if permitted) the collection of seeds.