STATEMENT OF CONCERN FROM A GROUP OF SCIENTISTS

Vegetation degradation in intensive agronomic areas

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We are a group of concerned scientists who have personally observed significant vegetation stress and decline in areas where cropping and other agronomic enterprises are the dominant land use. We are convinced, both individually and as a group, that there is enough evidence to investigate the links between the status of vegetation health and the chemicals used to support these agronomic enterprises.

The maintenance of significant areas of native vegetation in agricultural landscapes has multiple benefits, both for the biodiversity that it supports and for the ecosystem services it provides. Widespread clearing has significantly reduced the cover and integrity of native vegetation, and climate change is considered a further threat to the remaining areas. Substantial financial and in-kind contributions from public and private sources have already been allocated to protecting and enhancing native vegetation across all land tenures, and we believe that, as a society, we have both the need and the responsibility to address this marked unintended decline.

The current run of wet seasons has resulted in vegetation recovery in many areas, but this is not evident in areas of intensive agronomic production where chemical use can be intense and application and use can change over time. For example, current best practice in cropping involves chemical weed control in fallowing, which is usually done using tractor-mounted spray rigs. In addition, some plants are chemically defoliated before harvest. With the widespread use of herbicide resistant varieties, there has been a change in the types and numbers of applications of selective herbicides needed for successful weed control. The timing of this application can be critical as farmers rush to harvest valuable crops before wet weather threatens to damage them. When the soil is too wet, spraying is often done from the air increasing the potential for chemical drift.

The increase in intensity, changing the suite of chemicals used and the application method in turn increases the risk of chemical drift onto non-target plant species across urban and rural landscapes and potentially impacting terrestrial and aquatic ecosystems. The Group has widely observed symptoms of chemical drift on non-target vegetation over the past few decades and the degradation of vegetation does not appear to be occurring from natural causes.

Our observations of indicators of Natural Capital decline in native vegetation health, vitality and condition show this decline is occurring at a rapid rate regardless of periods of severe drought (2018-19) or more recently periods of increased rainfall (2021-22). Our concern is that if nothing is done, we could see further widespread decline in biodiversity and the collapse of complex terrestrial and aquatic ecosystems. Also, there could be significant compromises to organic and regenerative agricultural enterprises and carbon sequestration initiatives.

The table below summarises the current impacts of chemical drift and the consequences if damage due to chemical drift continues:

Impacts and potential consequences of chemical drift

Impacts	Potential Consequences
Leaf necrosis and defoliation of native vegetation	• Reduced ability of plants to photosynthesize and transpire • Distal branch dieback • Progressive dieback • Increased insect-attack due to plant stress • Reduced ability of plant recovery due to leaf loss, dieback and poor growth of epicormic shoots • Loss of habitat for leaf-eating insects • Loss of faunal habitat • Changes to fauna and flora assemblages • Decreased plant resilience • Reduction in horticultural returns • Altered plant physiology and reproductive processes • Reduced carbon and nutrient cycle function
Herbicides entering waterways	• Disruption to the food web due to the loss or reduction of the critical primary trophic level • Contamination of tailwater, water in irrigation channels, and waterways incurring losses to aquatic micro and macro-invertebrates, and groundwater stygofauna • Promotion of toxic blue green algae blooms rendering water unsuitable for stock or municipal supply without treatment
Soil health damage	• Alteration of fungal hyphae connections and symbiotic fungi/root interactions in the soils
Non-target species impacts	• Decimation of local insect populations and threats to insectivorous bird species • Pest related diseases of vegetation due to the loss of beneficial birds and insects

Our discussions with land managers and their families have also raised concerns about public health effects of chemical drift. Where their health is not just the absence of disease or illness and includes social well-being, mental and physical state.

Signatories

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