

SUMMARY STATEMENT – Brian Richardson

Introduction

1. My name is Brian Richardson and I'm employed as a Principal Scientist at the New Zealand Forest Research Institute.
2. I was asked by Canterbury Regional Council to quantify the risks of spray drift into streams from a variety of riverbed spraying scenarios using glyphosate or a mix of glyphosate and triclopyr as active ingredients.
3. I used the AGDISP spray simulation model to address this question. This model is commonly used:
 - to manage spray drift in forestry & wilding conifer control operations; and
 - to support regulatory processes by NZ's Environmental Protection Authority.
4. Using AGDISP, I quantified the amount of spray drift with distance downwind for a range of spraying scenarios relevant to operational riverbed spraying.
5. For each modelled scenario, a buffer distance was calculated to ensure that downwind spray deposition into a sensitive area (in this case the river) did not exceed a threshold value.
6. The threshold value separating acceptable from unacceptable spray drift was based on the lowest of the published values for:
 - MAV or maximum acceptable value for drinking water standards, or
 - EEL, the environmental exposure limit.
 - For the two chemicals evaluated, the EEL values were lowest and were therefore used in buffer distance calculations.
7. EEL values were calculated based on the predicted level of spray deposition converted into a concentration value based on assumptions about the volume of water into which the spray was deposited.

8. For the set of scenarios evaluated, the factors having the biggest influence on the buffer zone width needed to ensure herbicide concentrations do not exceed EELs are (as expected):
 - the choice of nozzle (droplet size),
 - wind speed and direction,
 - spray release height, and
 - the characteristics of the river next to the spray area.
9. Based on the modelling results, recommendations on buffer distances were made based for spraying scenarios with differing droplet sizes and spray release heights. The recommended buffer distances ranged from five to 20 m from the centre of the helicopter.
10. Some points of note regarding model assumptions and interpretation of recommendations are:
 - It is assumed that the aircraft is set up as described in the model and is spraying with the appropriate droplet size distribution.
 - AGDISP is an idealised model that includes simplifying assumptions such as steady state wind speed and direction. In reality, both of these factors fluctuate constantly so careful operational monitoring is needed to ensure spraying only occurs within modelled constraints.
 - Similarly, during spraying there can be errors in maintaining exact flight line positions and spray release heights that could be at variance to model predictions. Final operational recommendations should take into account these potential errors.
 - For the active ingredients being sprayed, it is assumed that water concentrations below the EEL values are acceptable.
 - The assumed characteristics of water bodies used to calculate concentrations may not always reflect the spraying situation. Risk increases with slow moving or static, shallow water bodies.