

Herbicide consent hearing summary of Duncan Gray

20.03.2024 whilst employed at PDP

My name is Duncan Peter Gray. I prepared this evidence during my employment at the Canterbury Regional Council. My qualifications and experience are set out in the main body of my evidence.

My evidence consists of two parts. Part 1 responds to an initial request from the Rivers group to provide advice upon the potential effects of herbicide usage by Rivers in their routine activities. Part two of my evidence is a response to the draft s.42A report and documents contained therein.

Part one

The focus of the first part of this evidence is on the use of generic products that have glyphosate, diquat and triclopyr as their active ingredients. Rivers are no longer wishing to include diquat in their consent application and so that chemical is not considered further here.

My evidence finds that while there is a large body of research on the fate and impacts of herbicides within the environment there remains considerable controversy around the appropriateness, or otherwise, of the use of this multitude of different chemicals.

A number of studies have found glyphosate and its derivatives to be widespread within the environment. However, glyphosate is considered to represent a low risk to human health at the concentrations found in the environment. Despite being highly soluble in water the chemical is not considered at risk of leaching or extensive movement from its location of application due to its high propensity to bind to particles.

Toxicological studies have found the specific chemical to be slightly to non-toxic however other chemicals mixed with glyphosate in the proprietary product have been found to be more toxic.

Although evidence is limited and piecemeal due to the complexity of ecological systems there exists a growing number of studies that have identified impacts of glyphosate-based herbicide use on ecosystems.

Glyphosate has been shown to be highly effective for the control of weed species.

Triclopyr comes in two available forms; an ester and an amine-based product. Material Safety Data Sheets (MSDS) report both formulations as having the same environmental toxicology classifications, and referring to the ecological information, both are reported as being highly toxic to aquatic organisms on an acute basis. However, toxic effects due to the amine-based formulations (garlon) would only occur at high concentrations extremely unlikely to occur in a real life scenario. The ester-based product (Grazon) is toxic to fish and aquatic invertebrates at lower concentrations more likely to be found during spraying. I recommended that ester-based formulations should only be used close to waterways or over shallow groundwater with considerable caution. This constraint is not considered to apply to the amine-based products.

Triclopyr based products are considered to have low toxicity to humans if swallowed, but may cause irritation to eyes and skin. The NZ Drinking Water Standards have set a provisional MAV of 0.1 mg/L triclopyr.

Triclopyr does not readily bind to soils so can be more mobile in the environment. Similar to the glyphosate suite of herbicides, results have been found whereby various formulations using triclopyr showed different degrees of toxicity.

Triclopyr has been found to be highly effective for the control of weeds.

Effects of herbicide use on water quality, fauna, flora and ecosystems will be variable between site types, receptor sensitivities, the chemical(s) used, and the application regime; discrete or periodic. However, the information to hand suggests that each chemical or formulation has the potential for a range of deleterious effects. Thus, while effects on water quality, fauna, flora and ecosystems are very difficult to quantify, describe or predict, there remains the potential for effects to occur.

Accordingly, a cautious approach should be taken to herbicide use alongside a strategy to reduce, minimise or avoid their use where possible.

The inappropriate use of herbicides could demonstrably result in a loss of ecological values and biodiversity. However, it is important to note that a lack of weed control can also result in a loss of ecological values, biodiversity or natural character of rivers. Weed infestations in rivers are such that doing nothing may also lead to a loss of values.

In terms of monitoring water quality during spray activities, it is my opinion that the currently consented values for glyphosate and amine based triclopyr are appropriately conservative compared to the existing water quality standards and should be retained. Currently for glyphosate, water downstream of the spraying operation shall not exceed 0.1 g/m³ and for triclopyr not more than 0.01 g/m³.

The exceptions to this are triclopyr ester-based herbicides that are not recommended to be used over or near water due to their toxicity to aquatic life. Accordingly, any detection of triclopyr ester-based formulations (above the detection limit) in water associated with this consent would indicate an inappropriate use of the chemical.

Part two

Part Two of my evidence was collated subsequent to a draft version of the s.42a report and addresses some specific topics.

Triclopyr over shallow groundwater

I remain of the opinion that the use of ester based triclopyr formulations over shallow groundwater and on river beds presents a high risk of leaching and subsequent entry of the chemical into surface water. There is a high risk of negative effects on stygofauna and surface water body ecosystems, including fish and macroinvertebrates. This activity should be undertaken with considerable caution.

Sites of ecological interest

The council hold various datasets of the species and communities present in and around waterways that should be referenced in this consent. However, the ramifications of herbicide use should be considered specifically for each species or community and reflected in consent conditions or the management strategy.

I think a register of sites is a useful component of this consent but that the stringency of conditions should reflect the degree of risk posed by herbicide applications. In the case of low risk species, such as salmonids, notification of the statutory managers and avoidance of bank denudation will be sufficient to ensure effects are managed.

Water quality and aquatic ecological monitoring

I have made some recommendations about the practicality and cost of water quality sampling however my main comments are around the use of macroinvertebrate sampling.

There is limited field-based research on the effects of glyphosate on macroinvertebrate communities. A recent review of the topic concluded that effects were generally short term or absent and when present involved subtle shifts in the relative abundance of different taxa.

In my opinion the assessment of such subtle shifts in community composition and the ability to attribute the differences between the applied herbicide and other factors would require a research calibre investigation that is beyond the scope of typical resource consent monitoring.

It is my opinion that should some ecological monitoring be required it would be more informative if it took the form of a discrete investigation akin to that suggested in the consent condition set of Ms Jolene Irvine. If after a predetermined number of attempts no effects were observed the consent holder could redirect that resource to other topics such as improved practises around sensitive habitats or dissolved oxygen sags.

