POSITION STATEMENT OF THE BRITISH COLUMBIA CHAPTER OF THE WILDLIFE SOCIETY ON ROUTINE USE OF GLYPHOSATE-BASED HERBICIDES IN FOREST MANAGEMENT

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Introduction

The British Columbia Chapter of The Wildlife Society (BCTWS) is a society of professional wildlife biologists practicing in British Columbia. Our members apply the principles and methods of ecology and wildlife management to achieve conservation outcomes for wildlife and habitats in British Columbia.

We speak with decision makers and user groups across the province building links and providing expert advice supporting science-based management directly from our membership. From time to time we will state our position on issues that affect the future of wildlife in BC.

This document communicates our position on the routine practice of spraying glyphosate-based herbicides to prevent regrowth of broadleaved plant species in regenerating cut blocks.

The Issue

Forest companies in British Columbia commonly use non-selective, systemic herbicides to kill a wide range of forest vegetation and maximize growth of commercially valuable conifer species. Glyphosate is the active ingredient in most such herbicides (Henderson et al. 2010). About 650,000 ha of forest lands have been treated across British Columbia, averaging about 17,000 ha per year since 2000 (Wood 2019).

Widespread use of forest herbicides has proceeded on the assumption that glyphosate does not pose significant risks to humans, animals, and forest ecosystems or persist in the environment (Rolando et al 2017, Clark 2009). Recent studies call those assumptions into question. For example, based on research completed by the International Agency for Research on Cancer (IARC 2015), the World Health Organization has classified glyphosate as "probably carcinogenic to humans." Wood (2019) studied glyphosate residues in forest plants harvested for food by First Nations and other users in BC forests, finding greater than expected residues in some species a year after spraying. Glyphosate that reaches wetland habitats due to drift or overspray is toxic to aquatic organisms. For example, Relyea's (2005a) simulated overspray of glyphosate in outdoor experiments on three species of North American tadpoles found 96–100% mortality after three weeks. Similar experiments on post-metamorphosis juveniles of these species resulted in 68–86% mortality one day later, and a related study (Relyea 2005b) found that adding a predatory threat doubled the toxic effect of the herbicide exposure.

Govindarajulu's (2008) review found many gaps in the knowledge base about the toxicity of glyphosate in ephemeral wetlands within BC forests. While operational guidelines exist to protect such sensitive habitats, application always involves drift and overspray that reaches untargeted vegetation (Thompson et al. 2012). Plants receiving sub-lethal doses have shown impacts such as poor health, reduced growth, and genetic mutations (Reddy et al 2008). Wood (2019) reported that plants receiving sub-lethal doses may store glyphosate indefinitely, translocate it into the environment, or slowly break it down.

According to Helander et al. (2012), assumptions about glyphosate's rapid breakdown and non-toxicity to animals may be more problematic in northern environments, such as boreal forests, that have long winters and short growing seasons. They cited recent studies indicating that glyphosate in northern forests may be retained and transported in soils, with cascading effects on nontarget organisms.

Govindarajulu (2008) reported that 90% of aerial applications and 57% of ground-based spraying occurred in BC's northern interior region. Today, herbicide spraying remains more common in northern interior forests than other regions of the province. Glyphosate spraying is implicated in two of the most important natural resource problems of this region: moose declines and increased wildfire threats.

Interior BC has seen sharp declines in moose during the past decade, with some populations falling by 50–70% (Kuzyk 2016). These declines occurred in association with widespread changes in the region's forested landscapes. Epidemic outbreaks of mountain pine beetle, followed by extensive salvage logging, dramatically reduced the amount and distribution of mature forest while creating networks of logging roads that provide motorized access to hunters and others. Mumma and Gillingham's (2019) study of cow moose survival in areas of moose decline found the most frequent causes of death to be wolf predation, apparent starvation (observed in 5 of the 6 study areas), and human harvest (unlicensed but for 1 exception). The incidence of starvation was greater than expected and increased as a result of roads and new cut blocks. Mortality from hunting likewise increased in association with roads and new cut blocks. The models used by Mumma and Gillingham (2019) did not suggest a strong influence from herbicide spraying. But clearly, moose are experiencing multiple stressors in these highly disturbed landscapes, including decreased condition and starvation indicative of problems in forage availability and quality. Spraying glyphosate to kill potential moose food poses one more adversity to severely stressed moose.

BC experienced its two most severe and costly wildfire years in 2017 and 2018, and worse is predicted in the face of climate change (Price et al 2013). Severe wildfire has many negative effects on forest wildlife species, vegetation, soils, and overall biodiversity. In 2017, 37 of BC's eminent forest ecologists and community leaders wrote to Premier Horgan and Minister Donaldson urging changes in policy and management to grow more resilient forests and mitigate threats from wildfire (Daniels et al. 2017). Key recommendations included the promotion of more land cover in deciduous species, such as aspen, that form natural firebreaks and retard the rate of wildfire spread. Provisions in BC's Forest Planning and Practices Regulation specify that within regenerating forest blocks, deciduous tree species may not comprise more than 5% of trees, or 2 ha, whichever is smaller. In spraying herbicides pursuant to this policy, forest companies eliminate a key defense against wildfire and further reduce the resilience of BC's forests.

BCTWS Position on Glyphosate Spraying in Forests

1. We believe in science-based management of BC's public forests for the full range of benefits including wildlife, ecological services, forest products, and social values. Routine use of herbicides to kill non-coniferous plant species is based on an outdated model that focuses exclusively on wood fiber production to the detriment of other forest values and the interests of all British Columbians.

2. We caution that the science on glyphosate use in forest ecosystems is evolving, with recent studies raising concerns about persistence, direct effects on amphibians and other non-target organisms, and indirect ecological impacts mediated through vegetation reduction.

3. We acknowledge that the precipitous moose declines in interior BC result from combined stressors including large-scale habitat loss (following beetle epidemics and salvage logging), greater vulnerability to motorized hunting, starvation, and predation. Glyphosate spraying of forage plants adds one more adversity to severely stressed populations.

4. We embrace research findings that demonstrate the importance of deciduous tree species, such as aspen, in mitigating the severity and effects of wildfire. Managing for mixed stands rather than conifer monocultures is an essential adaptation strategy to increase resilience of BC's forests in the face of climate change

5. Our position is that the routine use of glyphosate-based herbicides is contrary to the science-based, sustainable management of BC's forests. We urge the BC government to end this practice, as has happened in other provinces and nations, and to adopt policies more favourable to wildlife and forest ecosystem sustainability.

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