Appendix F

Herbicide Leaching Sensitivity Evaluation for Upland Sites

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Herbicide Leaching Sensitivity Evaluation for Upland Sites

This rating system is based on a system established for the Noxious Weed Management Projects FEIS on the Spotted Bear (MT) Ranger District in 1993. It has since been modified to reflect conditions found across the Flathead (MT) National Forest, and further modified to reflect characteristics of the Salmon-Challis National Forest.

Herbicide Sensitivity Evaluation for Upland Sites (Rating Ground Water Vulnerability to Contamination)

This evaluation is for use on **UPLAND SITES ONLY**. Riparian areas would receive special treatment as outlined in the Decision Tree of the EA for the Noxious and Invasive Weed Control project.

To use this evaluation system, evaluate the local site characteristics and sum the rating numbers, as follows:

High risk of leaching is associated with numbers that range from 40 to 30.

Moderate risk ranges from 29 to 20.

Low risk ranges from 19 to 5.

As the risk of leaching increases, the herbicide used on the site must have a lower leaching index.

Depth to Ground Water:

<15 FT = 10
15-50 FT = 5
> 50 FT = 0

Precipitation Zone:

30+ inches = 10
15-30 inches = 7
< 15 inches = 2

Soil Texture:

Gravelly = 10
Sandy = 8
Loamy = 5
Clayey = 2

Organic Matter:

Bare Ground = 10
Sagebrush/Grass = 8
Ponderosa pine = 7
Lodgepole pine/Douglas fir = 5
Meadow (sodgrass/sedge) = 3
Spruce/Alpine fir = 2
Grass = 2

The total score indicates the risk that pesticides would leach and reach ground water, given the site characteristics evaluated.

APPLICATION

Herbicides with the lower leaching indices, such as 2,4-D and Glyphosate, should be used on sites with characteristics leading to a high risk of leaching.

The risk of leaching is greatest for Picloram, followed in decreasing order by Clopyralid, Dicamba, 2,4-D, and Glyphosate.

The information used to develop the above criteria was drawn from the following sources:

- Bovey and others (1975), who attributed low concentrations of herbicide in the soil after spraying to the grass on the site;
- Wolt (1997) who modeled a pesticide leaching assessment for the Tansy Ragwort EIS on the Tally Lake Ranger District;
- The Montana Department of Agriculture (1997) cited in the EPA's comments on the Tansy EIS in reference to adequate soil depth to prevent leaching of Clopyralid into ground water;
- Herr and others (1966) and Moffat and others (1966), both cited in Baur and others (1972) in reference to the relative leaching rate in sandy vs clayey soils.

The actual risk that a pesticide would leach into ground water is also governed by the characteristics of the pesticide itself. For example, each herbicide has a different half life in the soil. Those with a longer half life have more time to leach to a greater depth. Most herbicides do not attach to soil particles, a few do and this characteristic influences the movement of herbicides through the soil.

Water solubility also affects the rate at which herbicides move through the soil. Those that are more soluble in water move to a greater extent.

RATIONALE

Depth to ground water is difficult to estimate in most places. However, there are sites where terraces lie a few feet above a river. Some of these terraces lack riparian characteristics; they are dry because of coarse, well-drained soils that make them highly susceptible to leaching. If the terrace surface is within 15 feet of the water table, there is a risk that herbicides could be leached into the water table. Only herbicides with a low risk of leaching should be used in these areas.

Precipitation leaches pesticides. The higher the precipitation zone, the greater the potential for leaching.

Soil texture influences the leaching of pesticides. Coarse soils are more susceptible to leaching than are fine textured soils. Fine textured soil particles are able to bond with some chemicals, which keeps the chemicals in the soil.

Organic matter holds onto pesticides and prevents them from leaching. The ability of organic matter to hold pesticides is greater than that of soil. The higher the organic content of the soil and the thicker the humus layer on the soil surface, the less risk there is of leaching. Soils with grass have high amounts of organic matter in the soil surface. Dry forest types have the least amount of organic matter in the soil.