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ASSESSMENT OF FORESTRY RELATED USES OF HERBICIDES IN MINNESOTA, 1973-1975*

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ABSTRACT

During 1973-75, herbicides were applied annually to 22,300 acres in forest-related uses; this is 0.13% of Minnesota's total forest area. The primary herbicide was 2,4-D. The amount of 2,4-D was 1/40 of that used by agriculture in Minnesota. Application was mostly by helicopter with total costs of \$10-20 per acre. Users reported alternative methods of weed control were many times more expensive.

INTRODUCTION

Concern expressed over the use of 2,4-D in Minnesota forests prompted a survey to ascertain the nature and extent of current practices involving herbicides. In 1977, questionnaires were distributed to state and federal public agencies and forest industries known to be users of herbicides on forest lands.

Not included in the survey were utility companies, tree nurseries, small woodland owners and farmers. Except for utility companies, this useage is considered to be small. Members of the Minnesota Christmas Tree Growers Association were included in the sampling. Response from the public agencies and forest industries was 100 percent, and 16 of 110 Christmas tree growers responded.

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SURVEY RESULTS

A summary of the essential statistics obtained from this survey is given in Table 1. Data were solicited as averages for 1973, 1974, and 1975. Extreme fire incidence drastically curtailed normal forestry operations in 1976. Consequently, that year was excluded from the survey.

Chemicals and Rates of Application

The phenoxyacetic herbicides 2,4-D and 2,4,5-T were the only materials reported used for releasing plantations or natural regeneration from weeds. The 2,4-D was used alone or in some cases in a combination with 2,4,5-T. Only one user reported using 2,4,5-T alone. Rates of application varied from 2 to 3 pounds of acid equivalent per acre.

A number of other herbicides were reported as being used to control poison ivy, noxious weeds in or near agricultural areas, weeds in wildlife food patches and for other minor uses. These include: diuron, 2,4-DP; 2,4,5-TP simazine; and picloram. Because applications of these materials for killing poison ivy, Canada thistle, and other noxious weeds are usually in spots or small patches, it was not possible to get good estimates of the acreage involved. The extent of poison ivy control on farms, homes, and recreational residences was not determined in this survey.

Applications, Methods and Costs

The acreage reported as being treated by various methods is as follows:

helicopter: 12,540 acres
fixed wing aircraft: 65 acres
ground operated power sprayers
1,539 acres
hand sprayers: 1,937 acres
unspecified: 6,453 acres

Costs varied considerably depending on such variables as the size of area involved, nearness to loading bases and access. In general, most of the aerial spraying was done for \$10 to \$20 per acre including the herbicide costs.

The general range of total costs for using power sprayers was from \$15 to \$75 per acre. The greater range of costs for ground-based sprayers reflects cost sensitivity to conditions of the terrain and to other variables.

Because much of the use of hand operated applicators (e.g. back pumps and tree injectors) was in spot spraying rather than solid areas, costs per acre are hard to assess. Those cited range from \$15 to \$65 per acre.

Alternative Methods

Respondents were asked to estimate costs for using hand tools such as brush hooks and axes or such powered mechanical equipment as choppers, rollers or blades. Responses were based on actual experience or on best estimates.

The cost of using hand tools ranged from \$50 to \$160 per acre per treatment for plantation release. Since most woody plant species resprout or send up root suckers profusely after being cut, four or more repeated cuttings are considered necessary to assure reasonable plantation success, and these costs must be at least quadrupled. In most cases a single spraying is considered effective in releasing young plantations.

Mechanical powered equipment methods were estimated to cost from \$50 to \$370 per acre. These methods usually require some follow-up treatment and are not adapted to plantations with normal spacing. Mechanical site preparation to clear the area before planting and spraying the regrowth a year or two after planting is also commonly used. In such cases, the site preparation still must often be followed by spraying after planting to provide effective control of competition.

MAJOR FINDINGS AND CONCLUSIONS

A survey was conducted in 1977 to assess the extent and nature of current practices in the use of herbicides in forestry operations in recent years. The survey did not assess uses not directly related to the management of forest areas.

About 23,000 acres in Minnesota's forest land is treated with herbicides annually, largely by public agencies. This represents 0.13% of Minnesota's approximately 17,000,000 forested acres. About 70% of the area treated was to ensure establishment of pine or spruce plantations or the natural regeneration of these valuable species. Unless conifers are released from the competition of brush and fast growing hardwood sprouts and suckers, they seldom survive in adequate stocking, and their growth rate is seriously reduced.

Helicopter applications predominate using 2,4-D at 2-3 lbs. per acre. Total costs average \$10-\$20 per acre. Some 2,4,5-T is used in mixture with 2,4-D on difficult to control brushy species and on noxious weeds. The area treated to control noxious weeds including poison ivy, thistles, and others on the state noxious weed list is not great. However, state regulations for the control of such weeds and the obvious need to control poison ivy on public recreational areas makes this an important use of herbicides. The gallons of 2,4-D used, estimated at 14,000, were less than 2.5% of the amount used in agricultural production.*

Respondents to the survey considered it unfeasible to use such alternatives to herbicides as cutting or mowing by hand tools or mechanical power equipment unless combined with herbicides. A single spraying costing from \$10 to \$20 per acre usually is effective in releasing a plantation. By contrast, four or more mechanical treatments using hand tools or mechanical equipment costing from \$50 - \$370 per acre each are required. These many fold increases in costs would make such control totally uneconomic except in unusual situations.

*Minn. Dept. Agric. Div. Agronomy Serv. 1976. Amounts of herbicides sold in Minnesota in 1976 as reported by the County Agricultural Inspectors. Mimeo.

Table 1. Annual Acreage of Minnesota Forest Lands Treated with Herbicides, 1973-1975.

	Plantation ^{1/}	Understory ^{2/}	Site Preparation ^{3/}	Road & Trail ^{4/}	Noxious Weeds ^{5/}	Total
Superior National Forest	3,500	0	600	0	0	4,100
Chippewa National Forest	3,130	0	0	0	75	3,205
Bureau Indian Affairs	200	0	0	0	0	200
Eleven Minnesota Counties	550	20	220	1,060	15	1,865
Industry	1,610	0	100	260	15	1,985
Minnesota Division of Parks and Recreation	0	0	0	0	2,764	2,764
Minnesota Division of Forestry	4,000	500	200	100	25	4,825
Minnesota Division of Fish & Wildlife	0	0	0	0	1,200	1,200
Christmas Tree Growers Assoc. ^{6/}	1,870	0	300	0	20	2,190
TOTAL	14,860	520	1,426	1,420	4,114	22,334

^{1/} Pine or spruce plantings sprayed to release from competing brush or weed trees.

^{2/} Natural conifer regeneration sprayed to release from overhead competition.

^{3/} Areas treated prior to planting to reduce subsequent competition.

^{4/} Miles of roadside were converted to acres using a ratio of 1 mile (2 sides) to 4 acres. Excludes roadsides sprayed by counties or townships except for 11 northern counties when roadside control was primarily for woody plants. For a more complete estimate of roadside spraying see 1976 Chemical and Sprayer Data, Circ. 4, Minn. Dept. Agr., Div. of Agron. Services.

^{5/} Maintaining wildlife openings, controlling noxious weeds, controlling weeds in wildlife food patches, and other minor uses.

^{6/} Acreages estimated from 15 percent response to questionnaire. All other data in table based on 100 percent response.